

# Carbondale Downtown Traffic and Planning Study

Carbondale, Illinois

JUNE 30, 2016



PREPARED FOR:

SOUTHERN ILLINOIS METROPOLITAN PLANNING ORGANIZATION (SIMPO)  
3000 WEST DEYOUNG STREET  
SUITE 800 B-3  
MARION, IL 62959



PREPARED BY:

CRAWFORD, MURPHY & TILLY, INC.  
2750 WEST WASHINGTON STREET  
SPRINGFIELD, ILLINOIS 62702

## Contents

1.	Introduction .....	1
1.1.	Study Purpose .....	1
1.2.	Study Limits.....	1
1.3.	Study Process & Methodology.....	1
2.	Existing Conditions .....	3
2.1.	Traffic Counts .....	3
2.2.	Lane Configurations .....	3
2.3.	Bike Facility Inventory .....	4
2.4.	Sidewalk Facility Inventory .....	4
2.5.	Public Parking Inventory .....	5
2.6.	Capacity Levels of Service .....	5
3.	Range of Alternatives.....	6
3.1.	Alternative 1 – Base Condition .....	6
3.2.	Alternative 2 – Build One-Way Enhancement .....	6
3.3.	Alternative 3 – Build Two-Way—University Avenue as U.S. 51.....	6
3.4.	Alternative 4 – Build Two-Way—Illinois Avenue as U.S. 51.....	7
4.	Traffic Projections .....	7
4.1.	SIMPO Long Range Traffic Projections.....	7
4.2.	Recommended Traffic Projections.....	8
5.	Alternatives Analysis .....	8
5.1.	Traffic Capacity – Levels of Service .....	8
5.2.	Bicycle Impacts.....	9
5.3.	Pedestrian Impacts .....	10
5.4.	Parking Impacts.....	10
5.5.	Property Impacts.....	11
5.6.	Cost .....	11
6.	Conclusions .....	12
7.	Recommendations .....	13

## List of Exhibits

### *Existing Conditions*

- Exhibit 1**      Location Map
- Exhibit 2a**    Existing Conditions (2015)—Traffic Conditions
- Exhibit 2b**    Existing Conditions (2015)—Capacity Analysis

### *Alternative Plans & Typical Sections*

- Exhibit 3a**    Alternative 1—Base Condition—Plan
- Exhibit 3b**    Alternative 1—Base Condition—Typical Sections
- Exhibit 3c**    Alternative 2—Build One-Way Enhancement—Plan
- Exhibit 3d**    Alternative 2—Build One-Way Enhancement—Roundabout Option Detail
- Exhibit 3e**    Alternative 2—Build One-Way Enhancement—Typical Sections
- Exhibit 3f**    Alternative 3—Build Two-Way University Avenue—Plan
- Exhibit 3g**    Alternative 3—Build Two-Way University Avenue—Typical Sections
- Exhibit 3h**    Alternative 4—Build Two-Way Illinois Avenue—Plan
- Exhibit 3i**    Alternative 4—Build Two-Way Illinois Avenue—Typical Sections

### *Traffic Conditions*

- Exhibit 4a**    Alternatives 1 & 2—Base Condition/Build One-Way Enhancement
- Exhibit 4b**    Alternative 3—Build Two-Way University Avenue
- Exhibit 4c**    Alternative 4— Build Two-Way University Avenue with Roundabout at Mill Street
- Exhibit 4d**    Alternative 4—Build Two-Way Illinois Avenue

### *Capacity Analysis*

- Exhibit 5a**    Alternatives 1 & 2—Base Condition/Build One-Way Enhancement
- Exhibit 5b**    Alternative 3—Build Two-Way University Avenue
- Exhibit 5c**    Alternative 4—Build Two-Way Illinois Avenue

### *Opinion of Probable Costs*

- Exhibit 5d**    Alternative 2—Build One-Way Enhancement
- Exhibit 5e**    Alternative 3—Build Two-Way University Avenue
- Exhibit 5f**    Alternative 4—Build Two-Way Illinois Avenue

## List of Appendices

- Appendix A** Traffic Volume Projections Technical Report
- Appendix B** Traffic Analysis Report Text (see below)
- Appendix C** Synchro Analysis Outputs
- Appendix D** SIDRA Analysis Outputs (Roundabouts)
- Appendix E** Carbondale Bicycle Master Plan (May 2016)—Key Maps

Appendix B provides the Traffic Analysis Report text, but not its exhibits to avoid repetition with exhibits in this document. Most of the exhibits from the report are presented in this document, but are numbered differently. The following table correlates exhibit numbers between that report and this document:

Description	This Report	Traffic Analysis Report
Traffic Volume Projections		
Existing Conditions	Exhibit 2a	Exhibit 1A
Projected No-Build	Exhibit 4a	Exhibit 1B
Projected Build – University Ave (U.S. 51) – Two Way	Exhibit 4b	Exhibit 1D
Projected Build – University Ave (U.S. 51) – Roundabout	Exhibit 4c	Exhibit 1E
Projected Build – Illinois Ave	Exhibit 4d	Exhibit 1C
Capacity Analysis		
Existing Conditions	Exhibit 2b	Exhibit 2
Projected No-Build	Exhibit 5a	Exhibit 3
Projected Build – University Ave (U.S. 51) – Two Way	(see note)	Exhibit 5A
Projected Build – University Ave (U.S. 51) – Two Way Widening	Exhibit 5b	Exhibit 5B
Projected Build – Illinois Ave (U.S. 51) – Two Way	(see note)	Exhibit 4A
Projected Build – Illinois Ave (U.S. 51) – Two Way Widening	Exhibit 5c	Exhibit 4B

Note: These exhibits in the traffic analysis report also provided capacity analysis for two-way, non-widening options for University Avenue and Illinois Avenue. The same results may be found in Table 3 of the report.

## 1. Introduction

### 1.1. Study Purpose

The purpose of this Downtown Traffic and Planning Study is to better serve all modes of transportation and further enhance business in Carbondale. It does so by developing, evaluating and comparing transportation alternatives along the two roadways that carry U.S. 51 through downtown Carbondale: University Avenue (southbound U.S. 51) and Illinois Avenue (northbound U.S. 51). An initial technical analysis for vehicular traffic volume projections of Average Daily Traffic (ADT) has been completed and provides the foundation for the technical analysis (see **Appendix A**). This study focuses on the development of peak hour design traffic, performing traffic analysis and evaluating alternatives.

### 1.2. Study Limits

The limits of the study are situated in the heart of Carbondale. The study centers on a north-south one-way couple of United States Highway 51 (U.S. 51) along Illinois Avenue (northbound U.S. 51) and University Avenue (southbound U.S. 51). From south to north, the limits along Illinois Avenue run between just north of Grand Avenue at the southern terminus to just south of Willow Street at the northern terminus—a distance of approximately 1.2 miles. The University Avenue limits run north to south over its entire length. It diverges about one block south of Willow Street from Illinois Avenue, and converges back onto Illinois Avenue about one block north of Grand Avenue. Its total distance is about one mile. The two roadways share a combined signalized intersection with Mill Street, immediately north of the convergence.

Each roadway intersects an east-west one-way couple of Illinois Route 13 (IL 13). These intersections are located about midway through the study limits and include Walnut Street (eastbound IL 13) and Main Street (westbound IL 13).

The land use along the study limits varies to include commercial, residential, institutional and governmental uses. Southern Illinois University is located on the west side of Illinois Avenue, south of Mill Street. CN Railway operates a rail line that parallels Illinois Avenue, one-half block to the east. Please refer to **Exhibit 1** for a location map.

### 1.3. Study Process & Methodology

The study process ranged from reviewing existing conditions to recommending an action to improve those existing conditions. Review of existing conditions included gathering traffic counts and inventorying conditions such as traffic lanes, bicycle/pedestrian accommodations, and availability of parking. A traffic analysis of existing conditions revealed deficiencies to be improved by this project.

This report contains several exhibits to describe the existing and proposed alternative conditions. For tracking purposes, major intersections have been generally numbered to match the identifiers from provided data for signal timings and phasing—shown in **Table 1**. Roadway segments have been lettered sequentially, as shown **Table 2**. These numbers and letters are shown on some of the attached exhibits.

Table 1. Intersection Identification Numbers

ID	Existing North-South Route	North-South Roadway	East-West Roadway
9	U.S. 51 Southbound	University Avenue	Oak Street
10	U.S. 51 Southbound	University Avenue	Main Street (IL 13 WB)
11	U.S. 51 Southbound	University Avenue	Walnut Street (IL 13 EB)
12	U.S. 51 Southbound	University Avenue	College Street
13	U.S. 51 (Both Directions)	Illinois Avenue	Grand Avenue
17	U.S. 51 Northbound	Illinois Avenue	College Street
18	U.S. 51 Northbound	Illinois Avenue	Walnut Street (IL 13 EB)
19	U.S. 51 Northbound	Illinois Avenue	Main Street (IL 13 WB)
20	U.S. 51 Northbound	Illinois Avenue	Oak Street
21A	U.S. 51 Southbound	University Avenue	Mill Street
21B	U.S. 51 Northbound	Illinois Avenue	Mill Street

Table 2. Roadway Segment Identification Numbers

ID	Segment	From Roadway	To Roadway
A	Illinois Avenue (U.S. 51)	Chestnut Street	Willow Street
B	Illinois Avenue (U.S. 51 NB)	Oak Street	Chestnut Street
C	Illinois Avenue (U.S. 51 NB)	Walnut Street (IL 13 EB)	Main Street (IL 13 WB)
D	Illinois Avenue (U.S. 51 NB)	Mill Street	Walnut Street (IL 13 EB)
E	Illinois Avenue (U.S. 51)	Grand Avenue	Mill Street
F	University Ave (U.S. 51 SB)	Oak Street	Chestnut Street
G	University Ave (U.S. 51 SB)	Main Street (IL 13 WB)	Oak Street
H	University Ave (U.S. 51 SB)	Walnut Street (IL 13 EB)	Main Street (IL 13 WB)
I	University Ave (U.S. 51 SB)	Cherry Street	Walnut Street (IL 13 EB)
J	University Ave (U.S. 51 SB)	Normal Avenue	Cherry Street
K	University Ave (U.S. 51 SB)	Mill Street	Normal Avenue
L	Normal Avenue	Mill Street	University Ave (U.S. 51 SB)
M	Walnut Street (IL 13 EB)	Poplar Street	University Ave (U.S. 51 SB)
N	Walnut Street (IL 13 EB)	University Ave (U.S. 51 SB)	Illinois Avenue (U.S. 51 NB)
O	Walnut Street (IL 13 EB)	Illinois Avenue (U.S. 51 NB)	Washington Street
P	Walnut Street (IL 13 WB)	Poplar Street	University Ave (U.S. 51 SB)
Q	Walnut Street (IL 13 WB)	University Ave (U.S. 51 SB)	Illinois Avenue (U.S. 51 NB)
R	Walnut Street (IL 13 WB)	Illinois Avenue (U.S. 51 NB)	Washington Street

The project team developed alternative improvements to address the deficiencies. These alternatives included a “no-build” alternative that maintains the existing one-way couple on Illinois Avenue and University Avenue, an enhancement to the existing one-way couple with traffic calming and bicycle/pedestrian mobility improvements, converting Illinois Avenue to a two-way roadway that accommodates all U.S. 51 traffic—with University Avenue converted to local two-way traffic, and converting University Avenue similarly—with Illinois Avenue converted to local two-way traffic.

These alternatives were analyzed in order to make a recommendation. The analysis involved evaluating the effectiveness of the improvements, such as the resulting level of service and examining the bicycle, pedestrian and parking effects. The impact on neighboring properties, including displacements of buildings and off-street parking, were also studied and these costs were factored into the evaluation.

## 2. Existing Conditions

### 2.1. Traffic Counts

Existing traffic counts were collected within the study area in 2015, in three forms, as follows:

- Intersection turning movement counts with vehicular classification in 15 minute intervals over 24 hours
- Segment counts with vehicular classification in 15 minute intervals over a 24-hour period
- Segment counts with vehicular classification in one hour intervals over a 24-hour period

The counts showed that existing average daily traffic (ADT) decreases south to north along U.S. 51. At the south end of the study along Illinois Avenue, south of the convergence of University Avenue, the ADT is 17,500 vehicles per day (vpd). At the north end of the study, the ADT on Illinois Avenue north of the divergence of University Avenue is 12,000 vpd. Major changes in the ADT occur at the intersections with the IL 13 one-way couple of Walnut and Main Streets. Traffic generated by Memorial Hospital of Carbondale increases traffic on southbound U.S. 51 before reaching the IL 13 intersections. Southbound U.S. 51 traffic significantly decreases south of the IL 13 intersections, but accumulates traffic from the side streets of Cherry and College Streets. The divergence of Normal Avenue takes approximately 40% of the southbound U.S. 51 traffic immediately north of the Mill Street intersection.

IL 13 carries more traffic than U.S. 51 in Carbondale. Traffic along IL 13 ranges from 33,600 vpd (combined for both directions) just west of University Avenue to 41,700 vpd (combined for both directions) just east of Illinois Avenue. This reflects an increase of about 6,400 vpd west-to-east across the U.S. 51 one-way couple. The eastbound IL 13 ADT is about 12% lower than the westbound ADT, west of U.S. 51. The eastbound and westbound ADT on IL 13 is relatively the same between University and Illinois Avenues. East of U.S. 51, the eastbound IL 13 ADT is about 10% higher than the westbound ADT.

See **Exhibit 2a** for an exhibit showing existing traffic volumes and conditions. **Appendix A** contains the Traffic Volume Projections technical report, which contains further explanation and exhibits.

### 2.2. Lane Configurations

#### Illinois Avenue

Illinois Avenue facilitates northbound U.S. 51, and is predominately a two thru lane facility that also includes auxiliary turn lanes, a bicycle lane and on-street parking in select locations. The pavement width, measured from face-to-face of curb, is typically 38 feet with some variation approaching certain intersections. The travel lane width on Illinois Avenue varies between 11 and 12 feet. A dedicated bicycle lane was striped in 2015 on the east side of the roadway, measuring six feet wide from the edge of the adjacent travel lane to the face of curb. Currently, the bicycle lane is provided from Mill Street to Elm Street. On-street parking is provided intermittently on the west side of the roadway. A strip of parking is also provided on the east side of the roadway between Monroe Street and Main Street. It measures eight feet wide from the face of curb to the edge of the adjacent travel lane. **Exhibit 3b** provides a typical section for existing Illinois Avenue.

University Avenue

University Avenue provides two to three lanes for southbound U.S. 51, plus a bicycle lane and on-street parking in select locations. The pavement width is generally 38 feet measured face-to-face of curb. Two 12-foot wide travel lanes are provided between Illinois Avenue and Sycamore Street, and between Walnut Street and Mill Street. Three 11-foot wide travel lanes are provided between Sycamore Street and Walnut Street. A dedicated bicycle lane is provided from the divergence with Illinois Avenue to Mill Street. The bicycle lane, situated on the west side of the roadway, is five to six feet wide. It includes a segment adjacent to the on-street parking provided between Walnut Street and Mill Street. The on-street parking, also situated on the west side of the roadway, measures eight feet wide measured between the face of curb and the edge of the adjacent travel lane. **Exhibit 3b** provides a typical section for existing University Avenue.

2.3. Bicycle Facility Inventory

Within the study corridor, bicycle lanes are provided on a portion of Illinois Avenue and throughout University Avenue. Along Illinois Avenue, a six-foot wide bicycle lane is provided on the east side of the roadway, between Mill Street and Elm Street. The width is measured from the edge of the adjacent travel lane to the face of curb. There are currently no bicycle facilities provided north of Elm Street. Along University Avenue, a bicycle lane is provided from the divergence with Illinois Avenue southward to Mill Street. Situated on the west side of the roadway, the bicycle lane measures five feet wide between the Illinois Avenue and Sycamore Street, six feet wide between Sycamore Street and Walnut Street, and six feet wide adjacent to the on-street parking provided between Walnut Street and Mill Street.

Three east-west bicycle facilities cross the U.S. 51 one-way couple within the study corridor. Based on exhibits within the Carbondale Bicycle Master Plan (May 2016), Mill Street furnishes a signed bike route, but it is not striped. Main Street provides a striped westbound bike lane on the north side of the roadway. Oak Street includes a signed bike route, but is not striped. **Table 3** provides the existing bicycle facility status on University and Illinois Avenues:

Table 3. Existing Bicycle Facility Status

University Avenue	Illinois Avenue
Bicycle lane divergence w/ Illinois Ave to Mill St (west side of roadway)	Bicycle lane Mill St to Elm St only (east side of road)

2.4. Sidewalk Facility Inventory

Sidewalks are provided throughout the study corridor. On Illinois Avenue, sidewalks on the order of five to 10 feet wide line each side of the roadway from Mill Street to the divergence of University Avenue at the north end of the study. Depending on the location, a parkway or carriageway is situated between the sidewalk and roadway. The sidewalk is in various states of repair depending on location. On University Avenue, the existing sidewalk lines both sides of the roadway, except for the east side of the roadway between Illinois Avenue and Sycamore Street. The sidewalk width is on the order of five feet in most locations. **Table 4** summarizes the existing sidewalk status:

Table 4. Existing Sidewalk Status

	University Avenue	Illinois Avenue
West Side	Sidewalk provided continuously	Sidewalk provided continuously
East Side	Sidewalk Sycamore St to Mill St only	Sidewalk provided continuously

### 2.5. Parking Facility Inventory

According to the Downtown Carbondale Master Plan (April 2016), there are 4,300 public and private parking spaces in the greater downtown Carbondale area. Some of this parking is located within the U.S. 51 one-way couple study area, both on-street and off-street. On-Street metered parking along Illinois Avenue is predominately situated on the west side of the roadway from Mill Street to Monroe Street, and from Main Street to Oak Street; non-metered parking continues to University Avenue. Metered parking is provided on the east side of the roadway between Monroe Street and Main Street. These locations total 90 spaces, measuring eight feet wide between the face of curb and edge of the travel lane. Metered on-street parking is situated on the west side of University Avenue, from Walnut Street to a half-block south of College Street, and along Normal Avenue between University Avenue and Mill Street—encompassing 43 spaces. It measures eight feet wide from the face of curb to the edge of the travel lane. There are eight off-street public parking lots within the study corridor as well, providing 418 spaces total. All told, there are 551 public parking spaces within the study corridor as shown in **Table 5**:

Table 5. Existing Parking Inventory

Parking on Illinois Avenue	Parking on University Ave.	Off-Street Parking	Total Parking
90	43	418	551

### 2.6. Capacity Levels of Service

In May 2016, CMT completed a traffic analysis for the Carbondale Downtown Traffic and Planning Study, included as **Appendix B**. That study determined the existing level of service for intersections on the existing roadway network based on current traffic conditions. The six major intersections examined in the study included Mill Street, Walnut Street and Main Street each with Illinois Avenue and University Avenue. Each intersection performed at an overall level of service (LOS) C or better. No individual movements performed worse than LOS C, except three LOS D’s at the Illinois Avenue and Mill Street intersection: northbound left (AM and PM) and northbound through (AM). The overall level of service is presented in **Table 6** below, with details presented in **Exhibit 2b** and Synchro traffic analysis outputs provided in **Appendix C**:

Table 6. Existing Major Intersections LOS – AM(PM)

Illinois-Mill	Illinois-Walnut	Illinois-Main	University-Mill	University-Walnut	University-Main
C (C)	C (C)	C (C)	B (B)	A (B)	B (B)

AM Peak Hour LOS (PM Peak Hour LOS)

### 3. Range of Alternatives

In order to better serve all modes of transportation and enhance businesses, the study team identified alternative concepts. Those concepts formulated the alternatives described below. The alternatives include no-build, enhancing the existing one-way couple, and converting both Illinois Avenue and University Avenue to two-way traffic. In the latter, one alternative would assign U.S. 51 to University Avenue and the other alternative to Illinois Avenue.

#### 3.1. Alternative 1 – Base Condition

The “No-Build” alternative will maintain the existing condition, with only routine maintenance conducted on Illinois and University Avenues. It will not include extension of bicycle facilities, traffic calming, or reconfiguration of the Illinois Avenue-University Avenue-Mill Street complex intersection. **Exhibit 3a** shows a plan view of the base conditions and **Exhibit 3b** shows typical sections for Alternative 1.

#### 3.2. Alternative 2 – Build One-Way Enhancement

Alternative 2 will maintain the existing one-way couple of U.S. 51 on Illinois and University Avenues. However, unlike the “No-Build” base condition alternative, enhancements will be made, as follows: Traffic calming measures such as bump-outs at intersections intended to slow approaching traffic on each roadway. It will also shorten crosswalks to enhance pedestrian safety. A buffered bicycle lane will be completed on the east side of Illinois Avenue, north of Elm Street per the Carbondale Bicycle Master Plan (May 2016). Both University Avenue and Illinois Avenue pavement surface will be milled and overlaid. Even with these improvements, the footprint of Illinois Avenue and University Avenue will remain the same as today so as to not impact adjacent properties. Alternative 2 is depicted in **Exhibit 3c** (plan view) and **Exhibit 3e** (typical sections).

Alternative 2 will maintain the existing intersection between Illinois Avenue, University Avenue and Mill Street. As an additive option to this enhancement alternative, a roundabout could be provided similar to that proposed in Alternative 4. The roundabout would cost on the order of \$1.7M to implement, including reconstructing the pavement in the Mill Street intersection. This roundabout option is subject to further engineering study. Issues such as vertical grades, ADA compliance, the precise location of pedestrian accommodation, and accommodation of an existing 72” trunk sewer—along Mill Street from University Avenue to the railroad—would be examined in such a study. The roundabout could also be an excellent aesthetics opportunity for Carbondale, representing a gateway between downtown and Southern Illinois University. The infield of the roundabout can be utilized for this opportunity. See **Exhibit 3d** for a plan of this concept.

#### 3.3. Alternative 3 – Build Two-Way—University Avenue as U.S. 51

Alternative 3 will reconfigure traffic patterns in downtown Carbondale. Both University Avenue and Illinois Avenue will be converted to two-way traffic, with University Avenue marked as U.S. 51. Since the preliminary capacity analysis for just a two-lane two-way alternative provided very undesirable LOS results, University Avenue will typically have a five lane cross section with two lanes in each direction, a center turn lane or raised median, bike lanes and sidewalk. The traffic analysis (**Appendix B**) determined that two thru lanes in each direction are necessary to provide adequate LOS—providing only one lane in each direction would result in failing LOS. Illinois Avenue, the local facility, would have a narrower cross

section. It would consist of one lane in each direction, bike lanes, on street parking and sidewalks. The University Avenue cross section will expand beyond its existing footprint, while the Illinois Avenue cross section will generally remain within its existing footprint. At Mill Street, a roundabout could be constructed that serves University Avenue, Illinois Avenue and Mill Street. Traffic calming strategies—involving bump outs at intersections—could be used on both roadways. **Exhibit 3f** shows a plan view and **Exhibit 3g** shows typical sections for Alternative 3.

### 3.4. Alternative 4 – Build Two-Way—Illinois Avenue as U.S. 51

Alternative 4 will be similar to Alternative 3, except that Illinois Avenue will expand beyond its footprint to accommodate U.S. 51. The Illinois Avenue cross section will include two lanes in each direction, a center turn lane or raised median, bike lanes and a raised sidewalk. The traffic analysis (**Appendix B**) determined that two thru lanes in each direction are necessary to provide adequate LOS—providing only one lane in each direction would result in failing LOS. The University Avenue cross section will generally remain in its existing footprint. It will include one lane in each direction, bike lanes, on-street parking and sidewalks. Under this alternative, the sweeping University Avenue convergence with Illinois Avenue will be removed. Instead, University Avenue will follow a linear north-south alignment, aligning with Normal Avenue at the Mill Street intersection. Traffic calming strategies could be used on both roadways similar to Alternatives 2 and 3. Alternative 4 is depicted in **Exhibit 3h** (plan view) and **Exhibit 3i** (typical sections).

## 4. Traffic Projections

Traffic projections are based on existing traffic counts, historical traffic counts, Southern Illinois Metropolitan Planning Organization (SIMPO) long-range traffic projections and recommendations of this study. The existing traffic counts are briefly described in 2.1. This section outlines the traffic projections for each of the alternatives, and provides recommendations. **Exhibits 4a – 4d** provide traffic conditions for each of the four alternatives. For greater detail, refer to the Traffic Volume Projections report provided in **Appendix A**.

### 4.1. SIMPO Long Range Traffic Projections

The Lochmueller Group prepared a Long Range Traffic Projection Memorandum, dated June 30, 2014, for the SIMPO planning area. The projections were developed using a manual approach with considerations of the following:

- National and local lifestyle and behavioral trends
- Historic traffic and population trends
- Planning data (comprehensive plans, employment forecasts, freight projections, etc.)
- Economic development mechanisms
- Current and anticipated infrastructure improvements
- Development constraints (environmental obstacles, zoning, etc.)

Traffic projections were forecasted for 2040 traffic volumes using existing 2015 traffic volumes. This project was concerned with select segments in downtown Carbondale, including segments along University Avenue (U.S. 51 SB), Illinois Avenue (U.S. 51 NB), Walnut Street (IL 13 EB) and Main Street (IL 13 WB). The annual growth rate for these segments described in the report ranged from 0.53% to 1.77%.

## 4.2. Recommended Traffic Projections

For the Alternatives 1 and 2, the recommended traffic projections generally follow the same trends as the SIMPO traffic projections; however, modifications were made at the southern end of the study corridor. The projected growth rate was selected to be consistent along U.S. 51 from Mill Street to Walnut Street (IL 13 EB). This modification takes more of a regional approach to growth, as the segment traffic would not increase or decrease significantly between these two major cross streets.

Alternatives 3 and 4 required more consideration, as U.S. 51 carries both regional and local traffic. When identifying these two-way traffic scenarios with U.S. 51 on different roadway corridors, it became essential to determine a breakdown of regional versus local traffic. Based upon the average daily traffic (ADT) of the regional roadways outside of Carbondale, the regional traffic comprises 45% to 60% of the total U.S. 51 traffic within downtown Carbondale. The local split on University Avenue and Illinois Avenue requires some traffic engineering judgment as well. For this study, three-quarters of the total local traffic was assigned to the more-direct with greater destinations route, Illinois Avenue.

Using these assumptions for Alternative 3, University Avenue—marked as U.S. 51—will carry about 72% to 75% of the total northbound/southbound traffic. It will have a 2040 projected ADT of 9,800 to 16,700 vehicles per day. Illinois Avenue, as a local-only route, will carry approximately 25% to 28% of the total northbound/southbound traffic with an ADT ranging from 3,800 to 5,800 vehicles per day.

Alternative 4 reverses this scenario. With U.S. 51 marked on Illinois Avenue, it will carry approximately 80% to 85% of the total northbound/southbound traffic with an ADT between 11,100 and 18,700 vehicles per day. University Avenue will be a local route. It will carry about 15% to 20% of the total northbound/southbound traffic with an ADT of 2,500 to 4,500 vehicles per day. With the removal of the sweeping University Avenue convergence with Illinois Avenue at Mill Street, University Avenue traffic will be aligned with Normal Avenue. Traffic along Normal Avenue will be approximately 5,000 vehicles per day. This will be similar to Popular Avenue, a local north-south roadway ¼-mile to the west.

## 5. Alternatives Analysis

This study takes several measures of effectiveness into account when evaluating the alternatives. These measures include traffic capacity—in terms of level of service (LOS), bicycle and pedestrian impacts, parking impacts—on-street and off-street, and property impacts including building displacements. A preliminary opinion of probable construction costs for each alternative is also included for analysis.

### 5.1. Traffic Capacity – Levels of Service

Each alternative was evaluated in terms of LOS at major intersections. The six major intersections evaluated consisted of Illinois Avenue and University Avenue at Mill Street, Walnut Street, and Main Street. Both alternatives that will retain the one-way couple—Alternative 1 (no build) and Alternative 2 (enhancements)—outperformed Alternatives 3 and 4 in terms of overall and individual turning movement delay and LOS. Each of the latter will convert both corridors to two-way traffic, with Alternative 3 widening University Avenue to five lanes and Alternative 4 widening Illinois Avenue to five lanes. **Table 7** provides the level of service for each alternative, at each of the six intersections, for the AM and PM peak hour. The table shows how each alternative performed in terms of overall intersection LOS and individual movement LOS. For overall intersection LOS, Alternatives 1 and 2 meet IDOT criteria of LOS C, while

Alternatives 3 and 4 do not. For individual movements, no alternative is free of LOS D, E or F. However, only Alternative 3 and 4 have particularly heavy congestion at LOS E or F for a movement. In addition to the deficient LOS for the two-way alternatives, it was also identified through stakeholder coordination that several delivery trucks utilize the corridors for frequent drop-offs and the two-lane, two-way local facility would create additional congestion and preclude the normal circulation and delivery approach. Please refer to **Exhibits 5a – 5c** for further details.

Table 7. Projected LOS at Selected Intersections (at any point during day)

	Overall Intersection LOS				Individual Movement LOS				LOS E or F
	A-C	D	E	F	A-C	D	E	F	
Alternative 1	6	0	0	0	17	9	0	0	No
Alternative 2	6	0	0	0	17	9	0	0	No
Alternative 3	4	0	1	0	18	5	4	0	Yes
Alternative 4	5	0	1	0	25	9	1	2	Yes

The appendices provide further details and also illustrate the numerous deficiencies for the two-lane two-way scenarios. Although the five-lane typical section improves the LOS for the two-way alternatives, the anticipated impacts as a result of providing the wider roadway section are severe and discussed further herein. Synchro traffic analysis outputs are provided in **Appendix C**, and Sidra roundabout traffic analysis outputs are provided in **Appendix D**.

### 5.2. Bicycle Facility Impacts

Downtown Carbondale contains dedicated bicycle lanes in select areas, and has a vision for expanding bicycle accommodation. As stated in section 2.3, University Avenue provides a bicycle lane along nearly the entire length of the project corridor—from its divergence with Illinois Avenue to Mill Street. Illinois Avenue only has a bicycle lane from Mill Street to Elm Street. Mill Street, Main Street and Oak Street also have bicycle facilities.

Carbondale published a Bicycle Master Plan in May 2016. Additional bicycle facilities within the plan include a buffered bike lane on Illinois Avenue from Elm Street to University Avenue, and a buffered bike lane on Walnut Street. Cherry Street and College Street are slated to be marked bike routes. Each of these initiatives are noted as a high priority project. Another project noted in the plan is to convert the bike lane on University Avenue, from Walnut Street to Normal Avenue, to a buffered bike lane. Select maps from the Bicycle Master Plan are provided in **Appendix E**. Alternatives 2, 3 and 4 will all provide continuous bike lanes or shared lanes on University and Illinois Avenue, as shown in **Table 8**:

Table 8. Bicycle Facility Impacts

	Remark	Compatible w/Bike Plan?
Alternative 1	Does not implement the proposed bike lane on Illinois Avenue north of Elm Street	No
Alternative 2	Provides bike lanes continuously on University Avenue and Illinois Avenue	Yes
Alternative 3	Provides bike lanes on University Avenue, and shared lanes on Illinois Avenue	Yes
Alternative 4	Provides bike lanes on University Avenue, and shared lanes on Illinois Avenue	Yes

### 5.3. Pedestrian Facility Impacts

The sidewalk network in downtown Carbondale is extensive, however, there are two locations that can be improved within the study limits. The first area is a gap in sidewalk accommodations along University Avenue. No sidewalk is provided on the east side of the roadway between the divergence with Illinois Avenue and Sycamore Street, leaving a gap. Another area for potential improvement is along the south side of Mill Street, between Normal Avenue and University Avenue. Here, the existing 10-foot wide sidewalk is situated adjacent to the back of curb without any buffer. Alternatives 2, 3 and 4 will address both of these areas, as detailed in **Table 9**:

Table 9. Pedestrian Facility Impacts

	Remark	Gap Filled?	Mill Street Improvement?
Alternative 1	Maintains existing sidewalk network	No	No
Alternative 2	Improves existing sidewalk network	Yes	Yes
Alternative 3	Provides new sidewalk network	Yes	Yes
Alternative 4	Provides new sidewalk network	Yes	Yes

### 5.4. Parking Facility Impacts

Downtown Carbondale offers parking both on and off-street. Both Illinois and University Avenues provide on-street parking spaces, and parking lots are located adjacent to each roadway. Each alternative will impact parking differently. Alternative 1 will maintain the existing parking configuration. Alternative 2 will provide bump-outs on Illinois and University Avenues. Providing two lanes along all of University Avenue, as opposed to three lanes for certain blocks, will create an opportunity for additional on-street parking. Thus, Alternative 2 will provide an opportunity for 200 additional spaces overall compared to the existing conditions. Alternatives 3 and 4, which widen University Avenue and Illinois Avenue, respectively, result in substantial revisions to on-street parking and encroach onto adjacent off-street parking lots. These alternatives will reduce total parking by about 150 and 200 spaces, respectively. For Alternatives 2, 3 and 4, parking was estimated by taking the total length of parking bays and dividing by 22 feet—with appropriate deductions for locations adjacent to driveways. **Table 10** reflects the impact on parking per alternative:

Table 10. Parking Facility Impacts

	Parking on Illinois Avenue	Parking on University Avenue*	Off-Street Parking	Net Change
Alternative 1	90 ( $\Delta = 0$ )	43 ( $\Delta = 0$ )	418 ( $\Delta = 0$ )	551 ( $\Delta = 0$ )
Alternative 2	130 ( $\Delta = +40$ )	210 ( $\Delta = +167$ )	414 ( $\Delta = -4$ )	754 ( $\Delta = 203$ )
Alternative 3	100 ( $\Delta = +10$ )	12 ( $\Delta = -31$ )	289 ( $\Delta = -129$ )	401 ( $\Delta = -150$ )
Alternative 4	0 ( $\Delta = -90$ )	90 ( $\Delta = +47$ )	258 ( $\Delta = -160$ )	348 ( $\Delta = -203$ )

\* includes TBD spaces along Normal Avenue, between Mill Street and University Avenue

$\Delta$  = change over existing

### 5.5. Property Impacts

Communities must weigh the benefits of an alternative against its impacts, with none more prominent than property impacts. Property impacts range from acquiring a portion of a parcel up to impacting a building. The property impacts will vary across the alternatives. In Alternative 2, the roundabout will impact two parcels north of Mill Street, however minimally, compared to Alternatives 3 and 4. Alternative 3, which widens University Avenue, will impact 82 parcels and 32 buildings. Widening Illinois Avenue in Alternative 4 will impact 110 parcels and 57 buildings. **Table 11** shows the property impacts, including a breakdown by building type:

Table 11. Property Impacts

	Potential Parcel Impacts		Potential Building Impacts			
	Number	Proposed ROW	Commercial	Residential	Institutional	Governmental
Alternative 1	0	0.00 acres	0	0	0	0
Alternative 2	2	0.05 acres	0	0	0	0
Alternative 3	82	2.75 acres	17	9	4	2
Alternative 4	110	2.71 acres	54	1	2	0

### 5.6. Opinion of Probable Costs

Opinions of probable costs have been prepared for each alternative. The first component is construction costs, consisting of preliminary estimates of materials and labor, based on recent IDOT bid tab information, for major construction items—as well as costs for mobilization, traffic control, utilities, miscellaneous items, and contingency. Land acquisition costs are also included based on a preliminary right-of-way assessment.

The construction costs reflect the scope of work for each alternative. Alternative 1 will have no construction cost, as it maintains the existing roadways. The opinion for Alternative 2 reflects its streetscape scope and conversion of the Illinois Avenue/University Avenue/Mill Street intersection to a roundabout (approximately \$1.7M). The Alternatives 3 and 4 opinions coincide with widening of either Illinois Avenue or University Avenue, and the resurfacing of the other local roadway. **Exhibits 5d – 5f** provide summaries of the opinions. **Table 12** compares the opinions:

Table 12. Opinion of Probable Construction Costs

	Construction Cost	Land Acquisition	Building Impact	Total Cost Range
Alternative 1	-	-	-	-
Alternative 2	\$3.5M	\$0.1M to \$0.2M	-	\$3.6M to \$3.7M
Alternative 3	\$10.7M	\$0.2M to \$0.4M	\$4.2M to \$7.0M	\$15.1M to \$18.1M
Alternative 4	\$10.5M	\$0.3M to \$0.5M	\$4.4M to \$7.5M	\$15.3M to \$18.6M

## 6. Conclusions

The evaluation matrix in **Table 13** compares the differences between the alternatives. Green highlights indicate favorable outcomes, while red highlights indicate negative outcomes.

Alternative 1 will maintain the existing geometry and will meet level of service criteria. It will neither result in any net parking space change, impact any property parcels, nor incur any construction costs (outside of routine maintenance). Given there are no improvements to be made, Alternative 1 will not complete the vision of the bicycle plan, fill in the pedestrian gap on the east side of University Avenue (from Sycamore Street to Illinois Avenue), nor improve congestion or pedestrian accommodations along Mill Street.

Alternative 2 will improve the existing geometry with bump-out improvements at intersections and restriping of University Avenue and a possible roundabout additive alternate at Mill Street. The alternative performs well across all measures, including the addition of parking spaces and a relatively low cost compared to the other two-way alternatives.

Alternative 3 will convert both University Avenue and Illinois Avenue to two-way traffic, with University Avenue expanding to five lanes to carry U.S. 51. It also includes a roundabout at Mill Street. This alternative will meet bicycle and pedestrian goals, however, it does not meet other goals. Level of service will not be at LOS C or better at all intersections. In order to make way for an expanded University Avenue width, parking will be lost and adjacent properties will be affected, including buildings. This alternative will cost on the order of five times more to construct than Alternative 2.

Alternative 4 has similarities to Alternative 3. It will convert both University Avenue and Illinois Avenue to two-way traffic, with Illinois Avenue expanding to five lanes to carry U.S. 51. The University Avenue intersection with Mill Street will be removed, and University Avenue traffic will be routed onto Normal Avenue. This alternative will meet bicycle and pedestrian goals, but like Alternative 3, not meet the other goals. Level of service will not be at LOS C or better at all intersections. The expansion of the Illinois Avenue width will impact parking and adjacent properties, including buildings, and will cost on the order of five times more than Alternative 2. Preliminary studies determined that Alternative 4 impacts will be slightly greater than those of Alternative 3.

Table 13. Evaluation Matrix

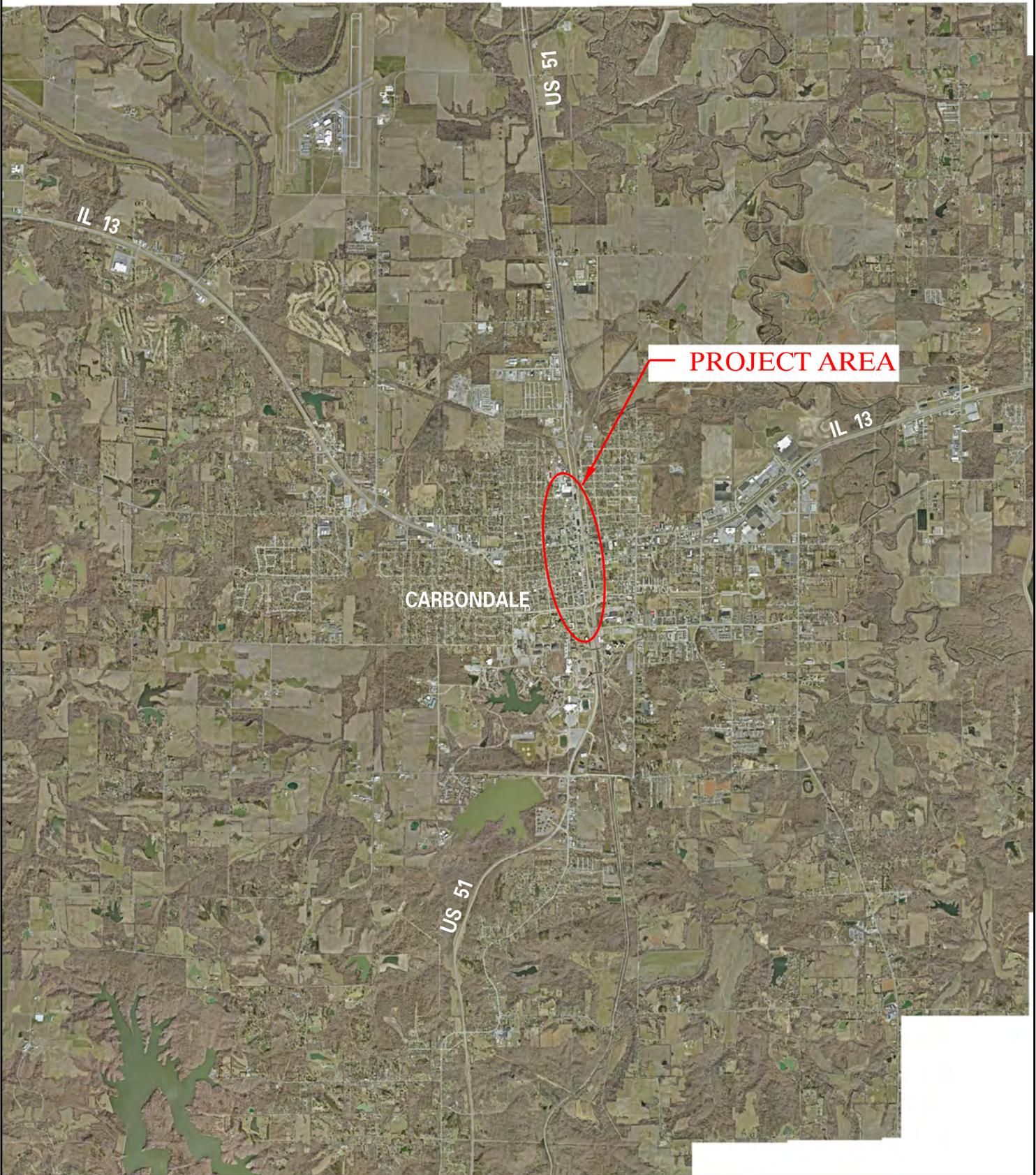
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Meets LOS Criteria	Yes	Yes	No	No
Bicycle Plan Compatibility	No	Yes	Yes	Yes
Ped Gap Filled on University	No	Yes	Yes	Yes
Mill Street Improvement	No	Yes	Yes	Yes
Parking Net Change	$\Delta = 0$	$\Delta = +203$	$\Delta = -150$	$\Delta = -203$
Potential Parcels Affected	0 parcels	2 parcels	82 parcels	110 parcels
Total Acreage	0.00 acre	0.05 acre	2.75 acres	2.71 acres
<b>Building Impacts</b>	0 buildings	0 buildings	32 buildings	57 buildings
Total Opinion of Costs	<b>\$0</b>	<b>\$3.6M-\$3.7M</b>	<b>\$15.1M-\$18.1M</b>	<b>\$15.3M-\$18.6M</b>

## 7. Recommendations

Based on the results of this study, Alternatives 1 and 2 warrant further consideration and additional studies if an improvement is still desired. Alternative 2 represents improvements over the no-build option of Alternative 1. A more detailed engineering evaluation of the proposed improvements could determine if the benefits of these improvements developed as Alternative 2 outweigh the costs to implement. Alternatives 3 and 4 both require a very high cost to implement, severely impact the adjacent properties and provide a level of service that is less than what the existing one-way configuration provides.

Based on this study, Alternative 2 will accomplish the goals of improving traffic flow, and increasing pedestrian and bicycle accommodations while having a minimal impact on surrounding properties. It could also result in a net increase in downtown parking all at a cost much less than Alternatives 3 or 4. Alternative 2 is recommended as the preferred alternative. If a Mill Street intersection improvement is desired, the additive alternate of constructing a roundabout at the University/Illinois Avenue and Mill street intersection could also be considered.





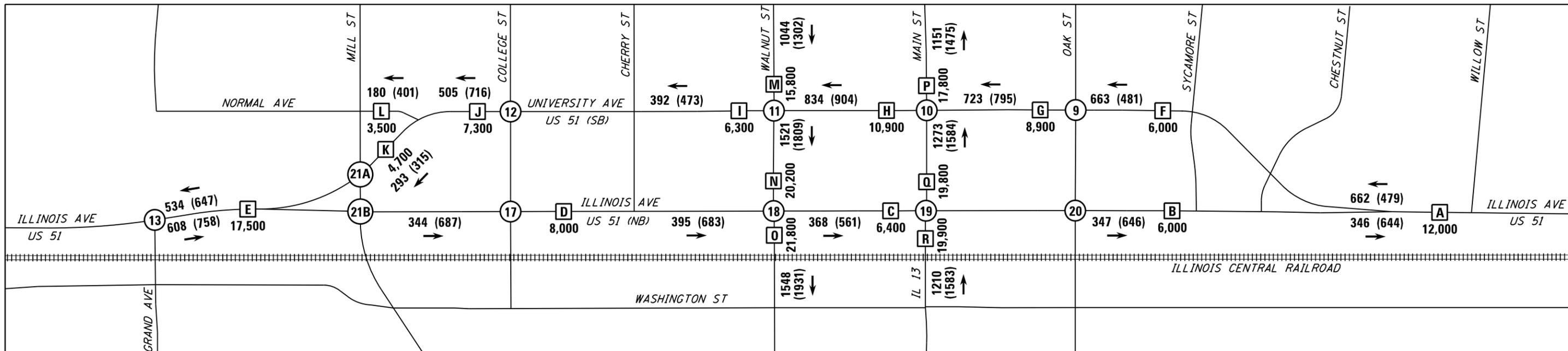
L:\Mar\16001-05\Draw\Exhibits\US51-Project Location Map.dgn



SCALE: 1" = 1 MILE

### LOCATION MAP

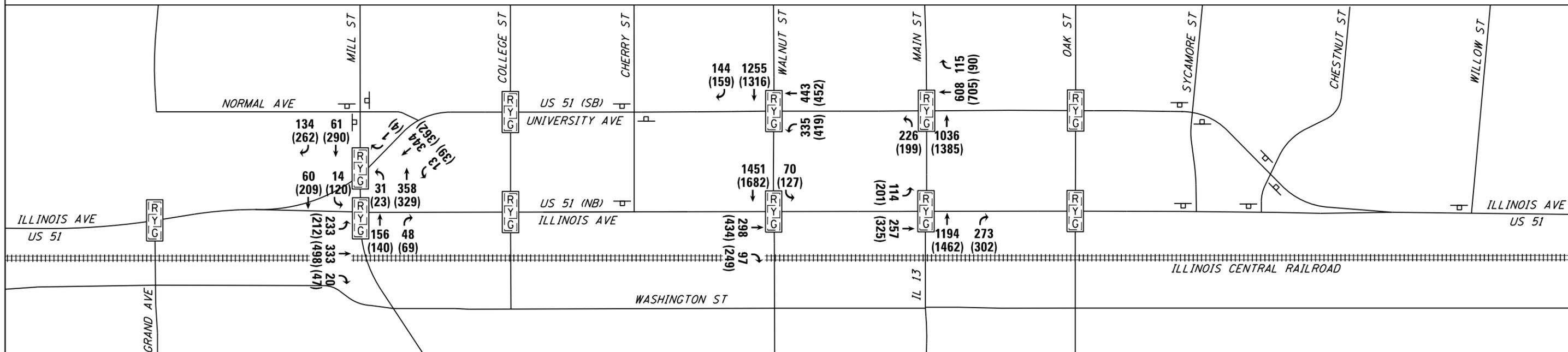
CARBONDALE, ILLINOIS  
JACKSON COUNTY



**LEGEND**

- X SEGMENT IDENTIFIER
- X,XXX AVERAGE DAILY TRAFFIC (ADT) - EXISTING
- ← TRAFFIC FLOW DIRECTION
- XXX (XXX) DIRECTIONAL DESIGN HOURLY VOLUME (DHV) IN AM (PM)
- (X) INTERSECTION IDENTIFIER

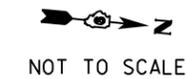
**AVERAGE DAILY TRAFFIC (ADT) & DESIGN HOURLY VOLUME (DHV)  
YEAR 2015**



**LEGEND**

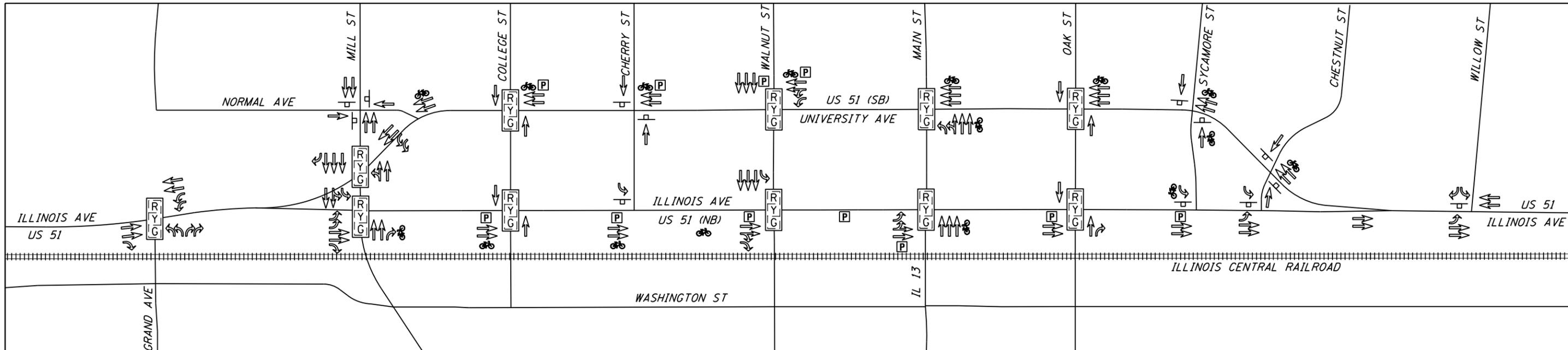
- ↶ TURN MOVEMENT
- XXX AM VOLUME
- (XXX) PM VOLUME
- R  
Y  
G TRAFFIC SIGNAL
- T STOP SIGN

**TURNING MOVEMENT VOLUMES AND INTERSECTION CONTROLS  
YEAR 2015**



**EXHIBIT 2a**

FILE NAME =	USER NAME = Peter Ross	DESIGNED - CMC	REVISED -	<b>CARBONDALE DOWNTOWN TRAFFIC AND PLANNING STUDY</b>	<b>TRAFFIC VOLUME PROJECTIONS EXISTING CONDITIONS</b>	F.A.P. RTE. 322	SECTION	COUNTY JACKSON	TOTAL SHEETS 5	SHEET NO. 1		
L:\Marion\1600105\Draw\CADD\Drawings\CM	Traffic Study (Renumbered for Report).dgn	DRAWN - AR	REVISED -			SCALE:	SHEET OF SHEETS	STA. TO STA.	ILLINOIS FED. AID PROJECT			
Default	PLOT SCALE = 473.1142' / in.	CHECKED - BSE	REVISED -									
	PLOT DATE = 6/17/2016 4:47:46 PM	DATE - 5/18/16	REVISED -									



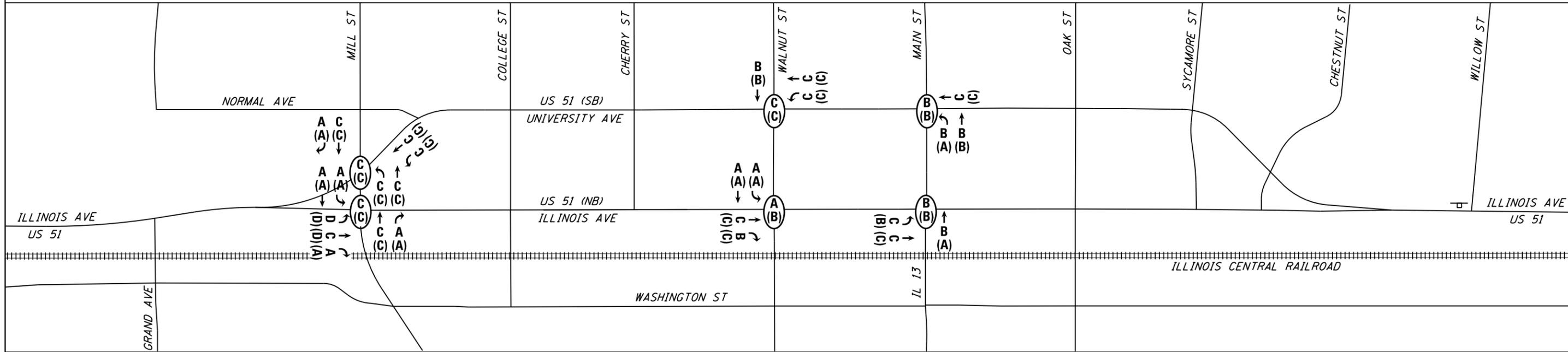
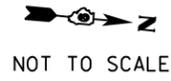
**LEGEND**

	LANE CONFIGURATION		TRAFFIC SIGNAL
	BIKE LANE		STOP SIGN
	PARKING		
	SHARED BIKE LANE/PARKING		

**LANE CONFIGURATIONS  
YEAR 2015**

US 51 SB UNIVERSITY: OWS - 2/3  
 US 51 NB ILLINOIS: OWS - 2

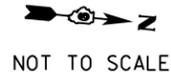
OWS = ONE WAY STREET - # LANES  
 TWS = TWO WAY STREET - # LANES



**LEGEND**

	TURN MOVEMENT
	AM LEVEL OF SERVICE
	PM LEVEL OF SERVICE
	INTERSECTION LEVEL OF SERVICE AM (PM)

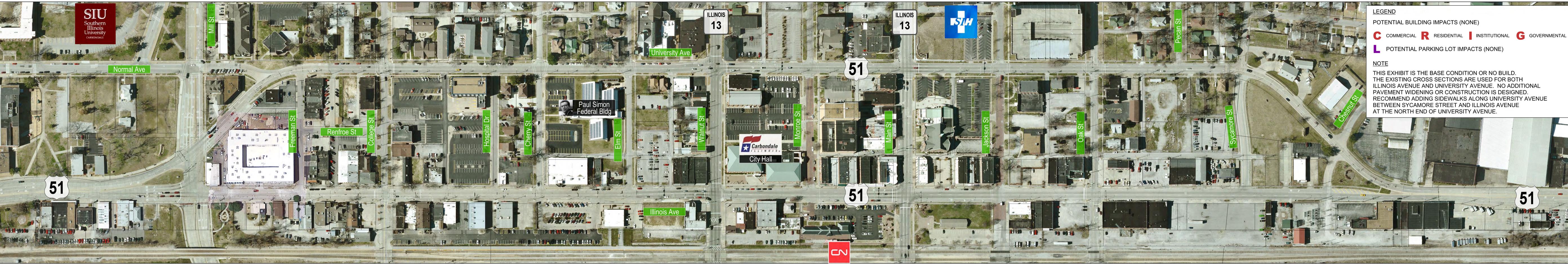
**LEVEL OF SERVICE  
YEAR 2015**



**EXHIBIT 2b**

FILE NAME =	USER NAME = Peter Ross	DESIGNED - CMC	REVISED -	<b>CARBONDALE DOWNTOWN TRAFFIC AND PLANNING STUDY</b>	<b>CAPACITY ANALYSIS EXISTING CONDITIONS</b>				F.A.P. RTE. 322	SECTION	COUNTY JACKSON	TOTAL SHEETS 6	SHEET NO. 1
L:\Marion\1600105\Draw\CADD\Drawings\CM	Traffic Study (Renumbered for Report).dgn	DRAWN - AR	REVISED -		SCALE:	SHEET	OF	SHEETS	STA.	TO	STA.	ILLINOIS FED. AID PROJECT	
Default	PLOT SCALE = 473.1142' / in.	CHECKED - BSE	REVISED -										
	PLOT DATE = 6/17/2016 4:50:17 PM	DATE - 5/18/16	REVISED -										

DIRECTORY: L:\Marion\GIS\BIB\Map-Exhibit\Impact Strip Map-Exhibit.dgn  
 FILE NAME: Impact Strip Map-Exhibit.dgn  
 USER NAME: jason  
 PLOT DATE: 6/29/2016 9:47:45 AM  
 PLOT SCALE: 1"=100'  
 PEN TABLE: Marion-Exhibit.tbl  
 PLOT DRIVER: PLOTDRIVER.P  
 PLOT SCALE: 1"=100'



**LEGEND**

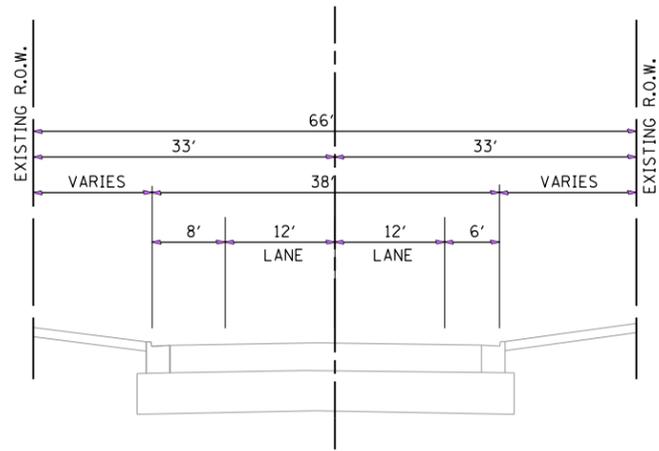
POTENTIAL BUILDING IMPACTS (NONE)

**C** COMMERCIAL   **R** RESIDENTIAL   **I** INSTITUTIONAL   **G** GOVERNMENTAL

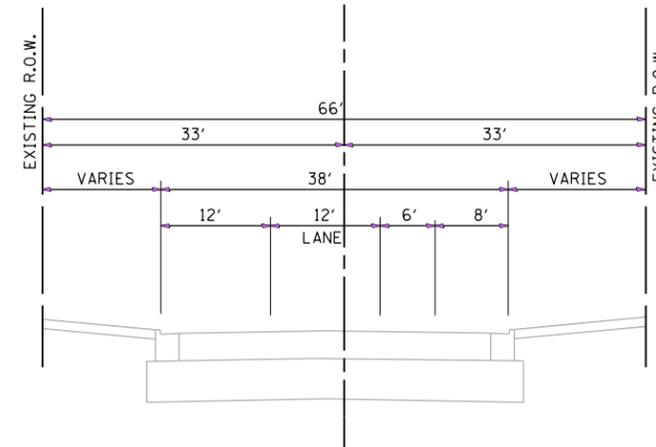
**L** POTENTIAL PARKING LOT IMPACTS (NONE)

**NOTE**

THIS EXHIBIT IS THE BASE CONDITION OR NO BUILD. THE EXISTING CROSS SECTIONS ARE USED FOR BOTH ILLINOIS AVENUE AND UNIVERSITY AVENUE. NO ADDITIONAL PAVEMENT WIDENING OR CONSTRUCTION IS DESIGNED. RECOMMEND ADDING SIDEWALKS ALONG UNIVERSITY AVENUE BETWEEN SYCAMORE STREET AND ILLINOIS AVENUE AT THE NORTH END OF UNIVERSITY AVENUE.



ILLINOIS AVENUE  
EXISTING



UNIVERSITY AVENUE  
EXISTING

**EXHIBIT 3b**

FILE NAME =  
L:\Marion\1600105\Draw\CADD\_Dr\Drawings\Typicals-20\EXIST.dgn  
Default



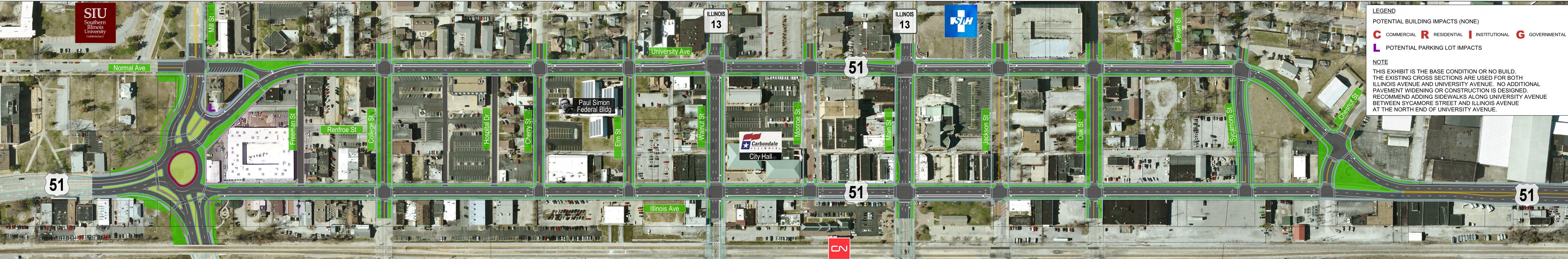
USER NAME = Peter Ross	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = 20.0000' / in.	CHECKED -	REVISED -
PLOT DATE = 6/29/2016 10:14:44 AM	DATE -	REVISED -

**STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION**

<b>ALTERNATIVE 1 – BASE CONDITION TYPICALS SECTIONS</b>				
SCALE:	SHEET	OF	SHEETS	STA. TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				

DIRECTORY: L:\MapInfo\1000000000\Map-Info\Streetscape\Map-Info\Streetscape.dgn  
 FILE NAME: Import - 51-FP-Map-51-Free-Scap.dgn  
 USER NAME: J. P. ...  
 USER DATE: 6/29/2016 2:45:18 PM  
 PEN TABLE: PenTable.tbl  
 PLOT DRIVER: PLOT\_DRIVER.tbl  
 PLOT SOURCE: L:\MapInfo\1000000000\Map-Info\Streetscape.dgn



**LEGEND**

POTENTIAL BUILDING IMPACTS (NONE)

**C** COMMERCIAL    **R** RESIDENTIAL    **I** INSTITUTIONAL    **G** GOVERNMENTAL

**L** POTENTIAL PARKING LOT IMPACTS

**NOTE**

THIS EXHIBIT IS THE BASE CONDITION OR NO BUILD. THE EXISTING CROSS SECTIONS ARE USED FOR BOTH ILLINOIS AVENUE AND UNIVERSITY AVENUE. NO ADDITIONAL PAVEMENT WIDENING OR CONSTRUCTION IS DESIGNED. RECOMMEND ADDING SIDEWALKS ALONG UNIVERSITY AVENUE BETWEEN SYCAMORE STREET AND ILLINOIS AVENUE AT THE NORTH END OF UNIVERSITY AVENUE.

**ALTERNATIVE 2 - BUILD ONE-WAY ENHANCEMENT - PLAN**  
**U.S. ROUTE 51 (NORTHBOUND ILLINOIS AVENUE - SOUTHBOUND UNIVERSITY AVENUE)**

PEN TABLE  
 PLOT DRIVER  
 PLOT SCALE

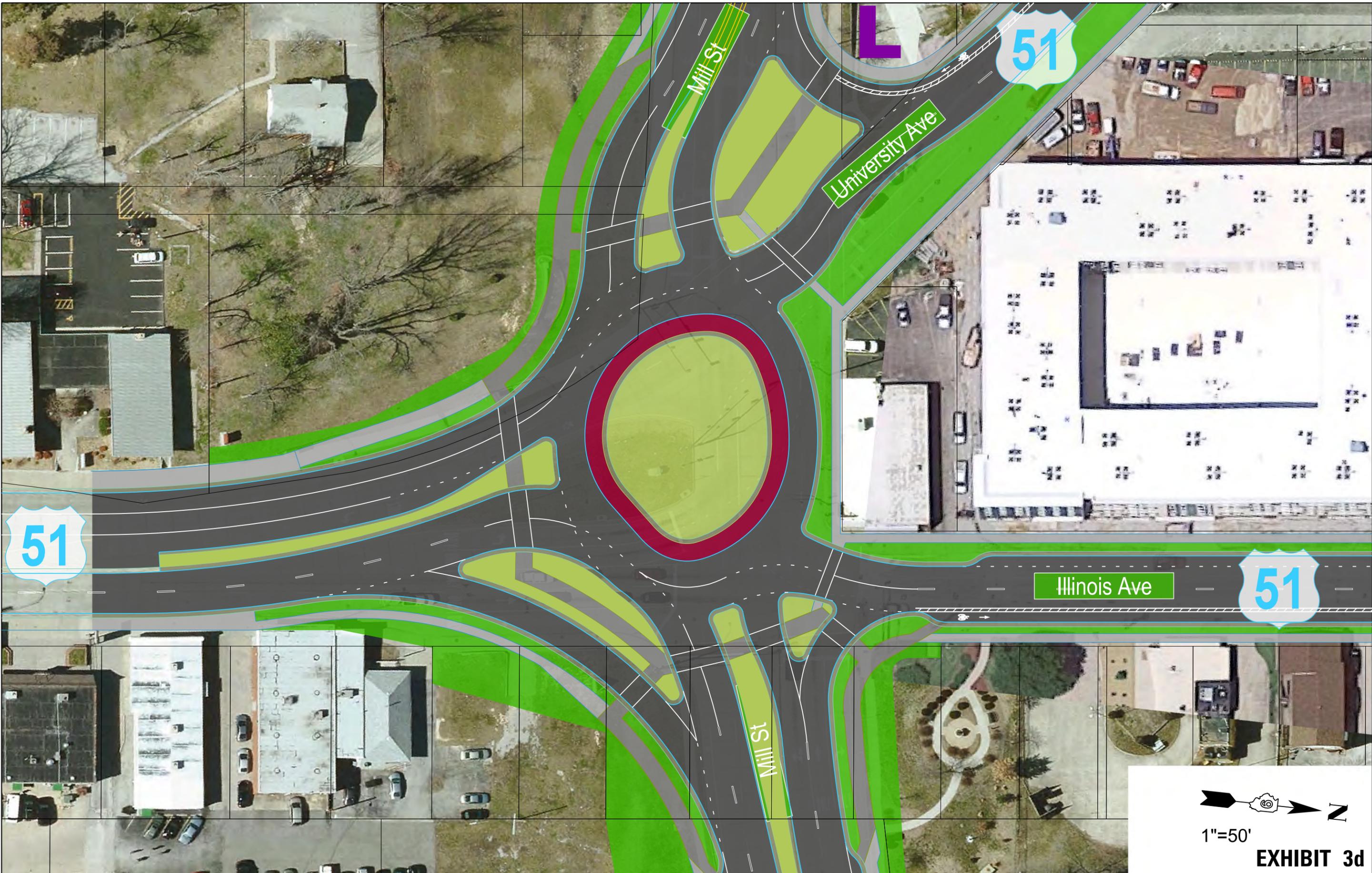
USER NAME  
 PLOT DATE

DIRECTORY  
 FILE NAME  
 MODEL NAME

L:\Marion\1600105\Draw\Exhibits\Streetscape - Roundabout.dgn  
 Streetscape - Roundabout.dgn  
 Default

Marion\_Exhibits.tbl  
 PDF\_Color.plt  
 50,0000' / in.

Peter Ross  
 6/29/2016 2:52:36 PM



1"=50'

**EXHIBIT 3d**



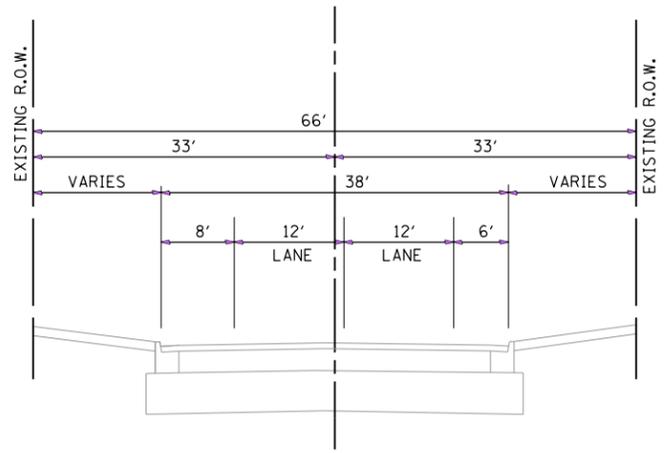
USER NAME = Peter Ross	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = 50.0000' / in.	CHECKED -	REVISED -
PLOT DATE = 6/29/2016 2:52:36 PM	DATE -	REVISED -

**STATE OF ILLINOIS  
 DEPARTMENT OF TRANSPORTATION**

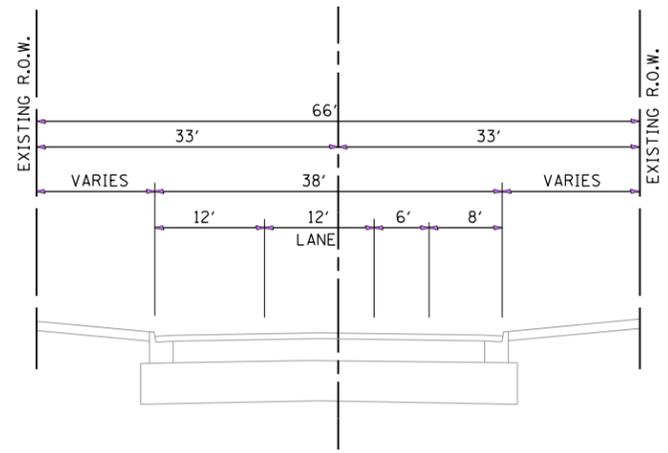
**ALTERNATIVE 2 - BUILD ONE-WAY ENHANCEMENT  
 ROUNDABOUT OPTION DETAIL**

SCALE: SHEET OF SHEETS STA. TO STA.

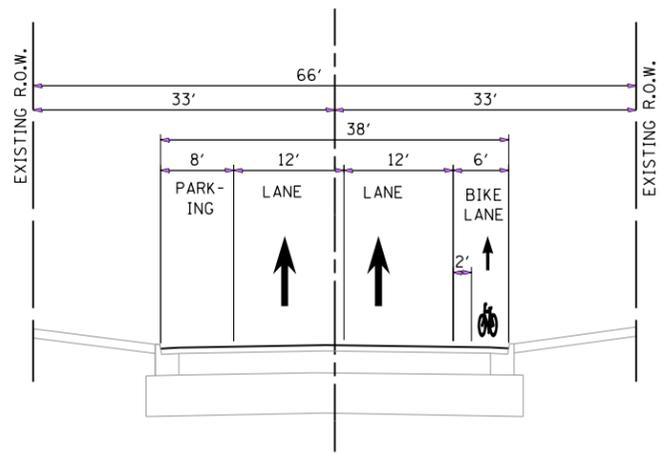
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				



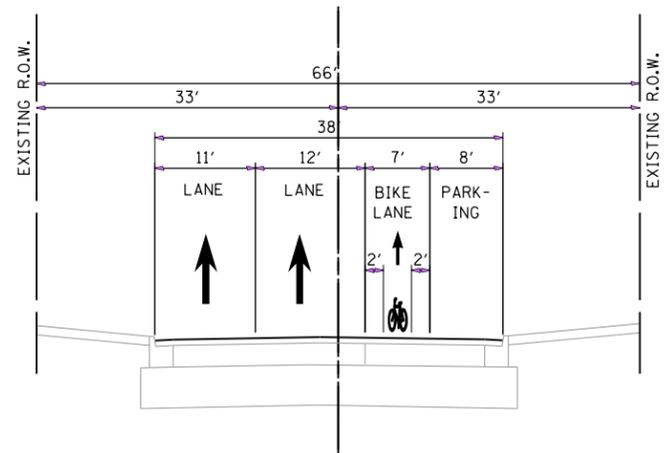
ILLINOIS AVENUE  
EXISTING



UNIVERSITY AVENUE  
EXISTING



ILLINOIS AVENUE  
PROPOSED



UNIVERSITY AVENUE  
PROPOSED

**EXHIBIT 3e**



USER NAME = Peter Ross	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = 20.0000' / in.	CHECKED -	REVISED -
PLOT DATE = 6/29/2016 10:16:25 AM	DATE -	REVISED -

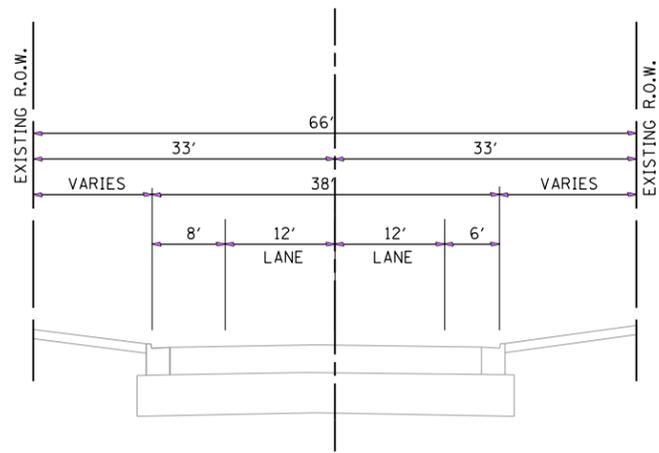
STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

ALTERNATIVE 2 - BUILD ONE-WAY ENHANCEMENT  
TYPICALS SECTIONS

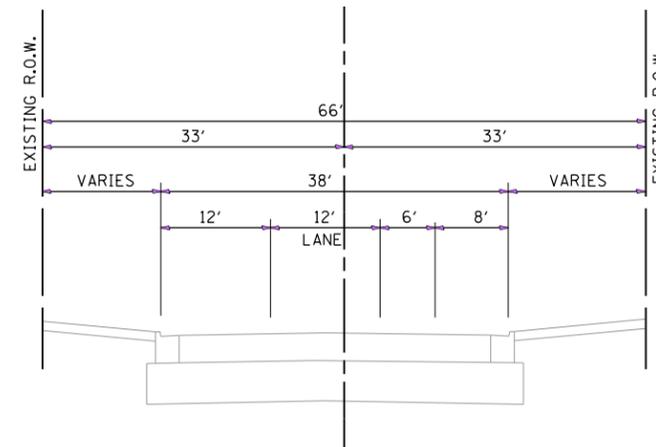
SCALE: SHEET OF SHEETS STA. TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				

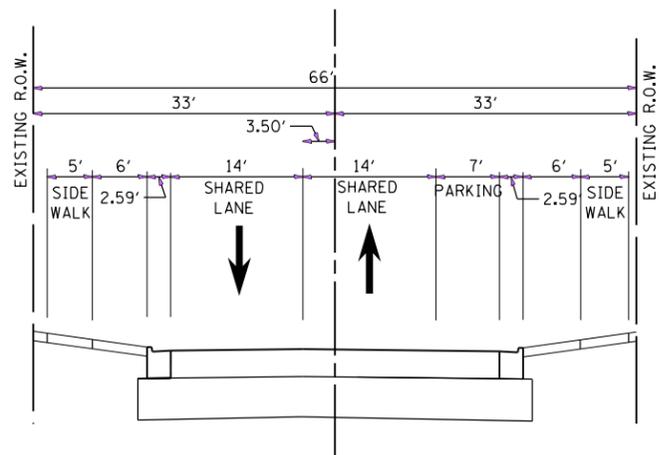




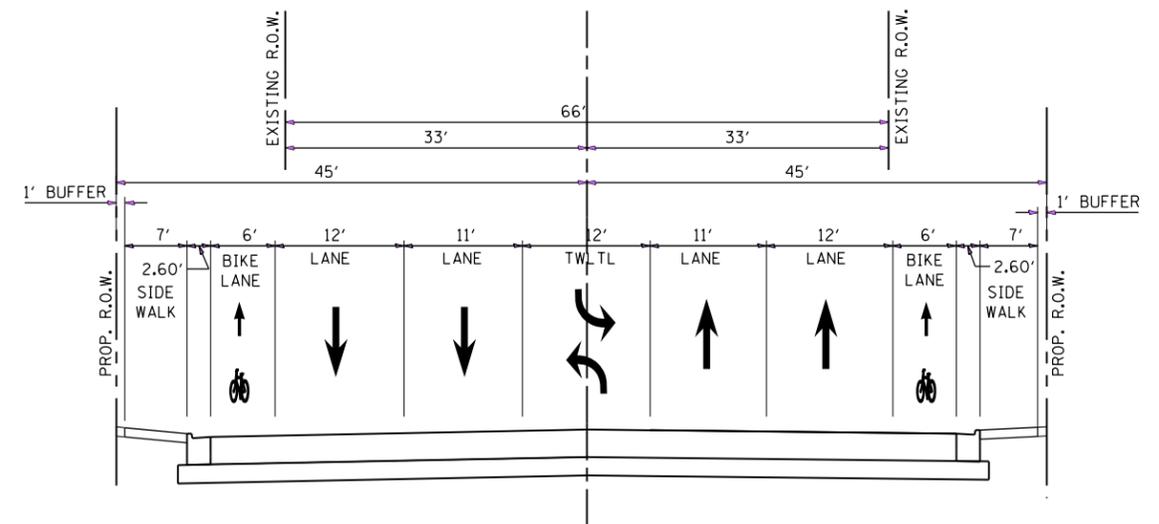
ILLINOIS AVENUE  
EXISTING



UNIVERSITY AVENUE  
EXISTING



ILLINOIS AVENUE  
(TWO-WAY SECTION)



UNIVERSITY AVENUE  
(U.S. ROUTE 51)  
(TWO-WAY - FIVE-LANE SECTION)

**EXHIBIT 3g**

FILE NAME =  
L:\Marion\16081025\Draw\CADD\_Dr\Drawings\Lightcals-20-ALT3.dgn  
Default



USER NAME = Peter Ross	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = 20.0000' / in.	CHECKED -	REVISED -
PLOT DATE = 6/29/2016 10:17:43 AM	DATE -	REVISED -

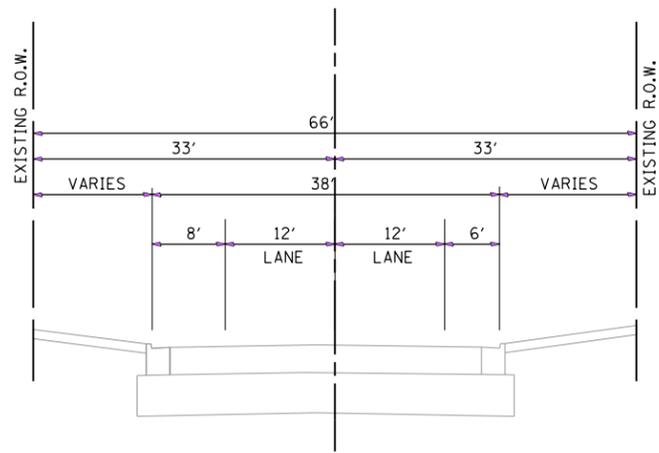
STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

ALTERNATIVE 3 - BUILD TWO-WAY UNIVERSITY AVENUE  
TYPICAL SECTIONS

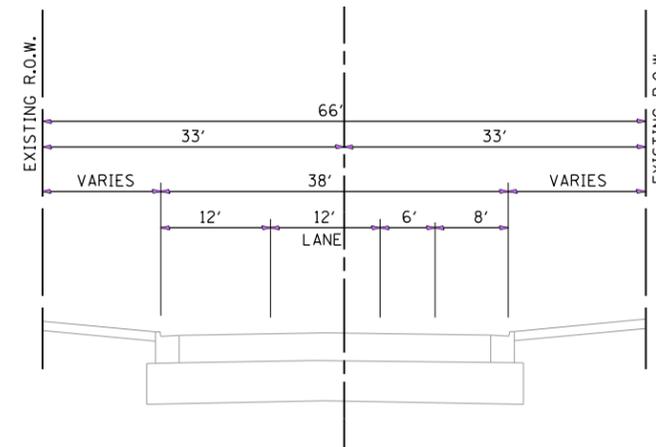
SCALE: SHEET OF SHEETS STA. TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				

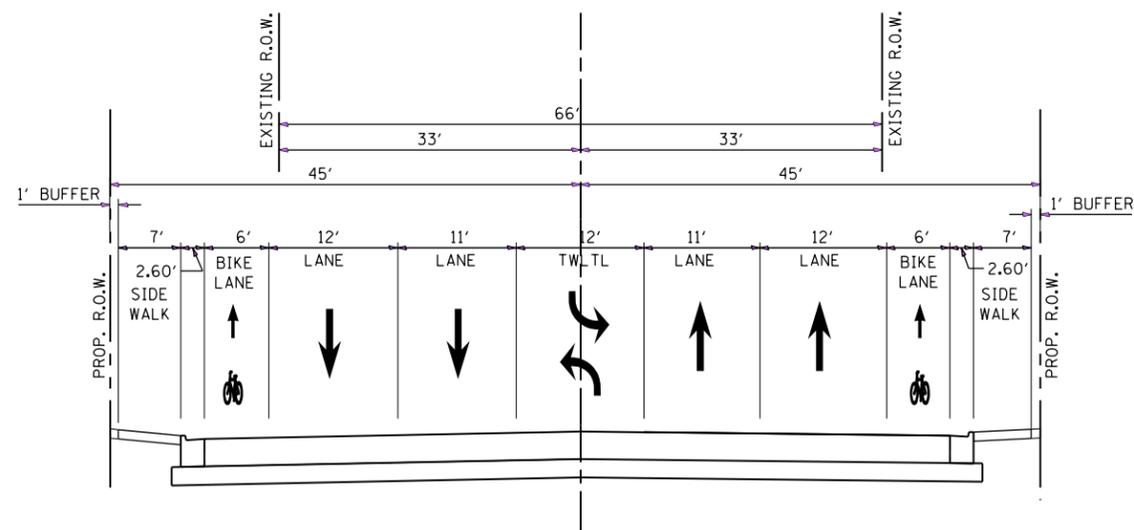




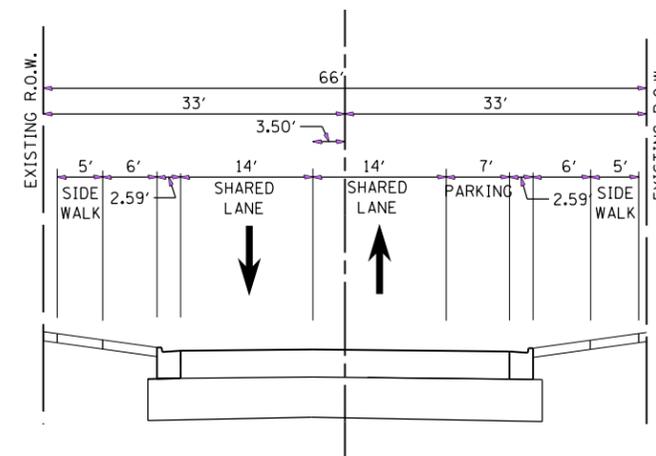
ILLINOIS AVENUE  
EXISTING



UNIVERSITY AVENUE  
EXISTING



ILLINOIS AVENUE  
(U.S. ROUTE 51)  
(TWO-WAY - FIVE-LANE SECTION)



UNIVERSITY AVENUE  
(TWO-WAY SECTION)

**EXHIBIT 3i**

FILE NAME =  
L:\Marion\1608105\Draw\CADD\_Dr\Drawings\Typicals-201-ALT4.dgn  
Default



USER NAME = Peter Ross	DESIGNED -	REVISED -
PLOT SCALE = 20.0000' / in.	DRAWN -	REVISED -
PLOT DATE = 6/29/2016 10:18:23 AM	CHECKED -	REVISED -
	DATE -	REVISED -

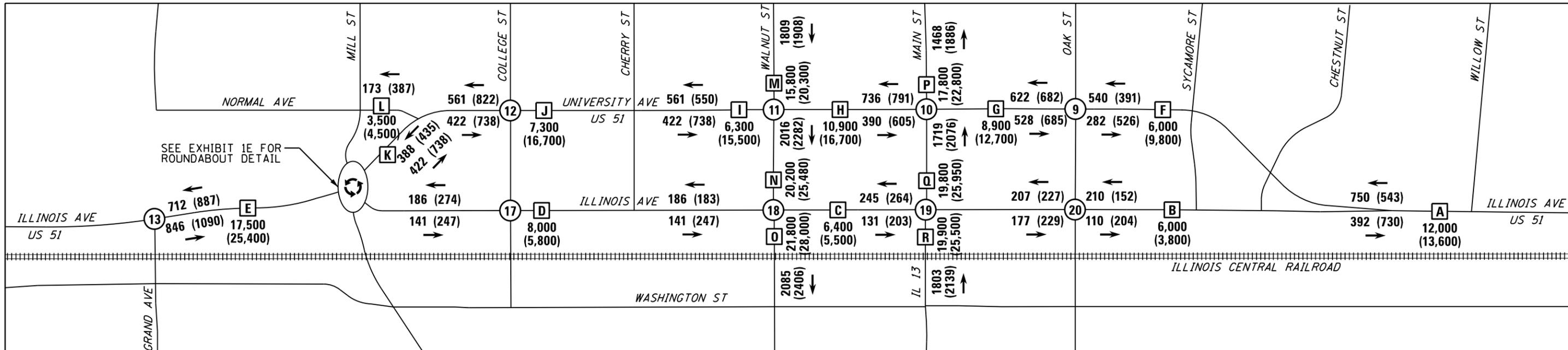
STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

ALTERNATIVE 4 - BUILD TWO-WAY ILLINOIS AVENUE  
TYPICAL SECTIONS

SCALE: SHEET OF SHEETS STA. TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				

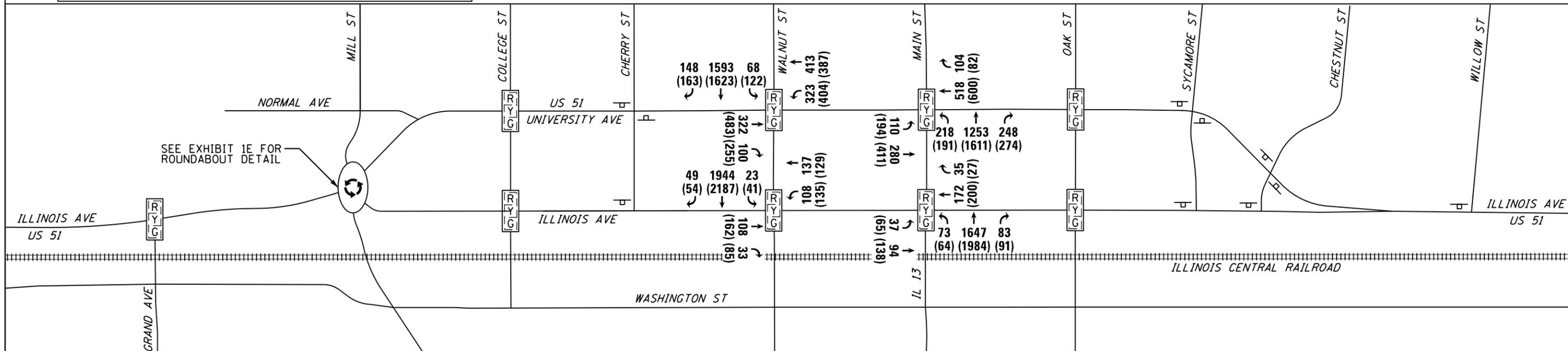




**LEGEND**

<b>X</b>	SEGMENT IDENTIFIER
<b>X,XXX</b>	AVERAGE DAILY TRAFFIC (ADT) - EXISTING
<b>(X,XXX)</b>	AVERAGE DAILY TRAFFIC (ADT) - PROJECTED
<b>←</b>	TRAFFIC FLOW DIRECTION
<b>XXX (XXX)</b>	DIRECTIONAL DESIGN HOURLY VOLUME (DHV) IN AM (PM)
<b>(X)</b>	INTERSECTION IDENTIFIER

**AVERAGE DAILY TRAFFIC (ADT) & DESIGN HOURLY VOLUME (DHV)  
YEAR 2040**



**LEGEND**

<b>↶</b>	TURN MOVEMENT	<b>RYR</b>	TRAFFIC SIGNAL
<b>XXX</b>	AM VOLUME	<b>P</b>	STOP SIGN
<b>(XXX)</b>	PM VOLUME		

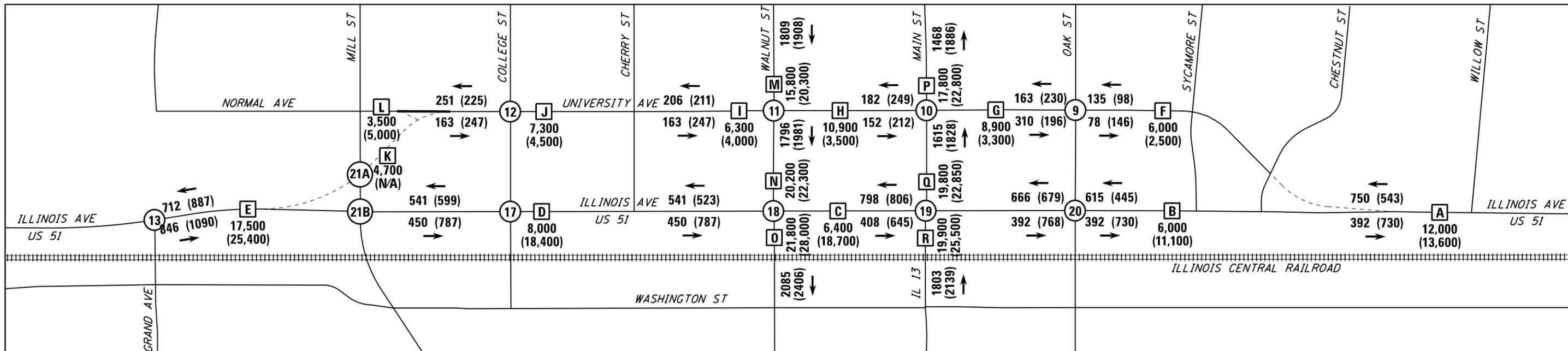
**TURNING MOVEMENT VOLUMES AND INTERSECTION CONTROLS  
YEAR 2040**



**EXHIBIT 4b**

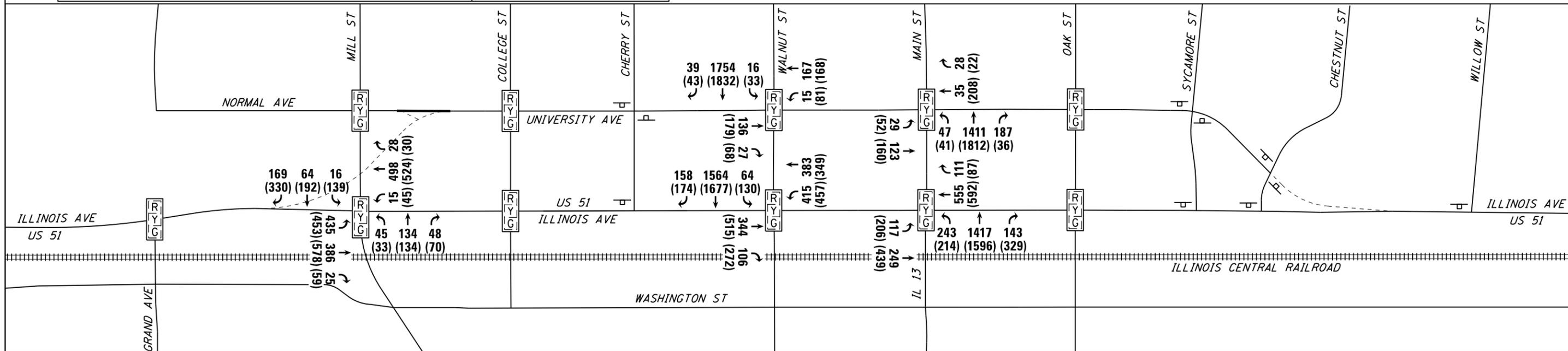
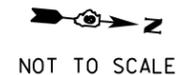
FILE NAME =	USER NAME = Peter Ross	DESIGNED - CMC	REVISED -	<b>CARBONDALE DOWNTOWN TRAFFIC AND PLANNING STUDY</b>	<b>TRAFFIC VOLUME PROJECTIONS PROJECTED BUILD - UNIVERSITY AVE. (US 51) - TWO WAY (ALTERNATIVE 3)</b>				F.A.P. RTE. 322	SECTION	COUNTY JACKSON	TOTAL SHEETS 5	SHEET NO. 4
L:\Marion\1600105\Draw\CADD\Drawings\CM	Traffic Study (Renumbered for Report).dgn	DRAWN - AR	REVISED -		SCALE:	SHEET	OF	SHEETS	STA.	TO	STA.	CONTRACT NO.	
	PLOT SCALE = 473.1142' / in.	CHECKED - BSE	REVISED -		ILLINOIS FED. AID PROJECT								
Default	PLOT DATE = 6/17/2016 4:48:50 PM	DATE - 5/18/16	REVISED -										





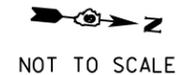
**LEGEND**

<b>X</b>	SEGMENT IDENTIFIER		
<b>X,XXX</b>	AVERAGE DAILY TRAFFIC (ADT) - EXISTING		
<b>(X,XXX)</b>	AVERAGE DAILY TRAFFIC (ADT) - PROJECTED		
←	TRAFFIC FLOW DIRECTION		
<b>XXX (XXX)</b>	DIRECTIONAL DESIGN HOURLY VOLUME (DHV) IN AM (PM)	—	NEW ROAD ALIGNMENT
<b>(X)</b>	INTERSECTION IDENTIFIER	- - -	REMOVE ROADWAY



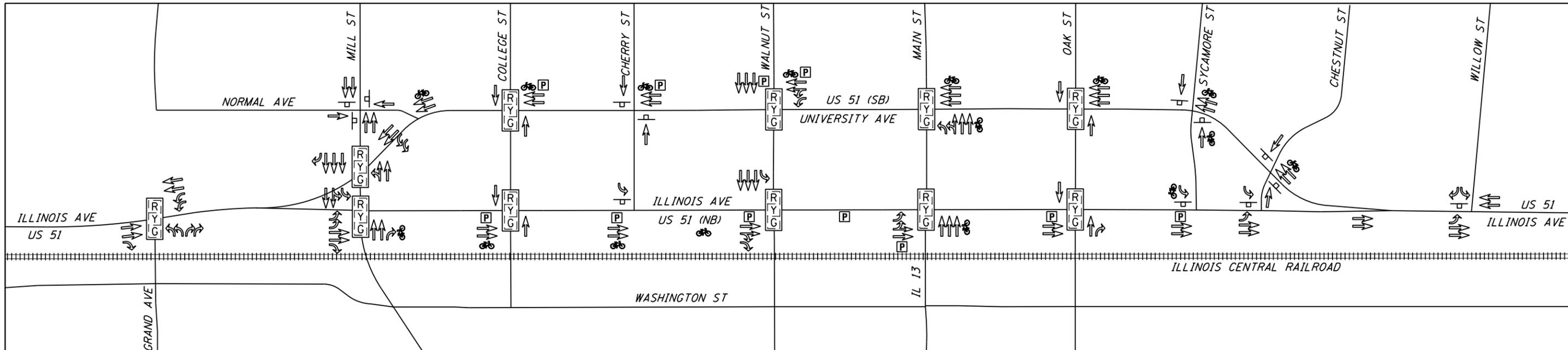
**LEGEND**

↶	TURN MOVEMENT	<b>R</b>	TRAFFIC SIGNAL
<b>XXX</b>	AM VOLUME	<b>Y</b>	
<b>(XXX)</b>	PM VOLUME	<b>R</b>	
		⊥	STOP SIGN
		—	NEW ROAD ALIGNMENT
		- - -	REMOVE ROADWAY



# EXHIBIT 4d

FILE NAME =	USER NAME = Peter Ross	DESIGNED - CMC	REVISED -	<b>CARBONDALE DOWNTOWN TRAFFIC AND PLANNING STUDY</b>	<b>TRAFFIC VOLUME PROJECTIONS PROJECTED BUILD - ILLINOIS AVE. (US 51) - TWO WAY (ALTERNATIVE 4)</b>				F.A.P. RTE. 322	SECTION	COUNTY JACKSON	TOTAL SHEETS 5	SHEET NO. 3
L:\Marion\1600105\Draw\CADD\Drawings\CM	Traffic Study (Renumbered for Report).dgn	DRAWN - AR	REVISED -		SCALE:	SHEET	OF	SHEETS	STA.	TO	STA.	CONTRACT NO.	
Default	PLOT SCALE = 473.1142' / in.	CHECKED - BSE	REVISED -										
	PLOT DATE = 6/17/2016 4:48:25 PM	DATE - 5/18/16	REVISED -		ILLINOIS FED. AID PROJECT								



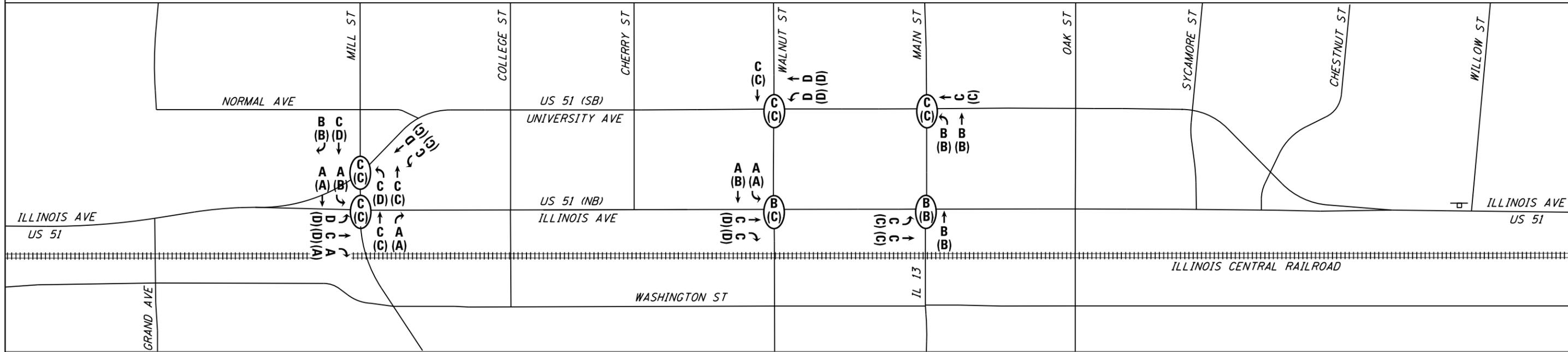
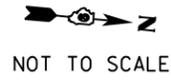
**LEGEND**

- LANE CONFIGURATION
- BIKE LANE
- PARKING
- SHARED BIKE LANE/PARKING
- TRAFFIC SIGNAL
- STOP SIGN

**LANE CONFIGURATIONS  
YEAR 2040**

US 51 SB UNIVERSITY: OWS - 2/3  
 US 51 NB ILLINOIS: OWS - 2

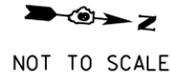
OWS = ONE WAY STREET - # LANES  
 TWS = TWO WAY STREET - # LANES



**LEGEND**

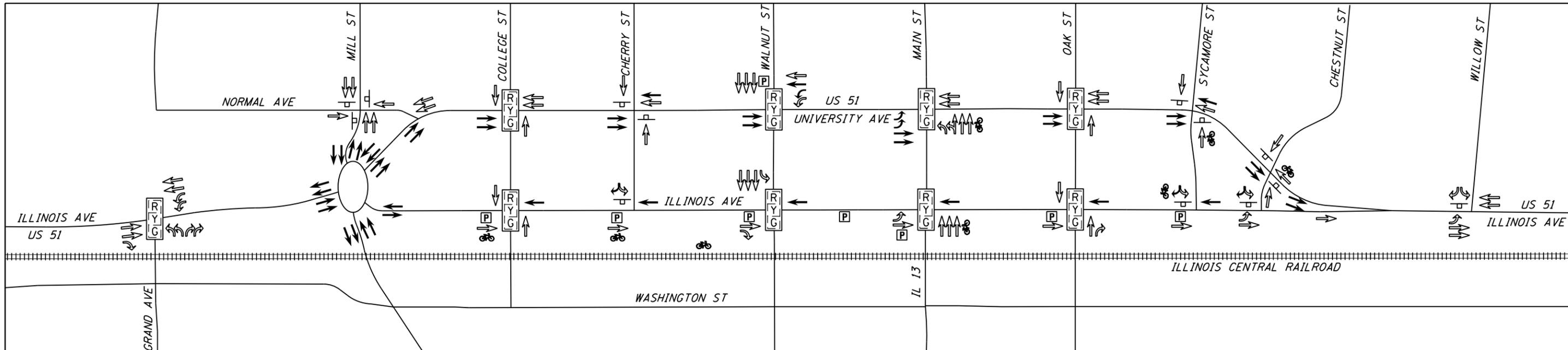
- TURN MOVEMENT
- AM LEVEL OF SERVICE
- PM LEVEL OF SERVICE
- INTERSECTION LEVEL OF SERVICE AM (PM)

**LEVEL OF SERVICE  
YEAR 2040**



**EXHIBIT 5a**

FILE NAME =	USER NAME = Peter Ross	DESIGNED - CMC	REVISED -	<b>CARBONDALE DOWNTOWN TRAFFIC AND PLANNING STUDY</b>	<b>CAPACITY ANALYSIS PROJECTED NO BUILD (ALTERNATIVES 1 &amp; 2)</b>				F.A.P. RTE. 322	SECTION	COUNTY JACKSON	TOTAL SHEETS 6	SHEET NO. 2
L:\Marion\1600105\Draw\CADD\Drawings\CM	Traffic Study (Renumbered for Report).dgn	DRAWN - AR	REVISED -		SCALE:	SHEET	OF	SHEETS	STA.	TO	STA.	CONTRACT NO.	
Default	PLOT SCALE = 473.1142' / in.	CHECKED - BSE	REVISED -										
	PLOT DATE = 6/17/2016 4:50:51 PM	DATE - 5/18/16	REVISED -										



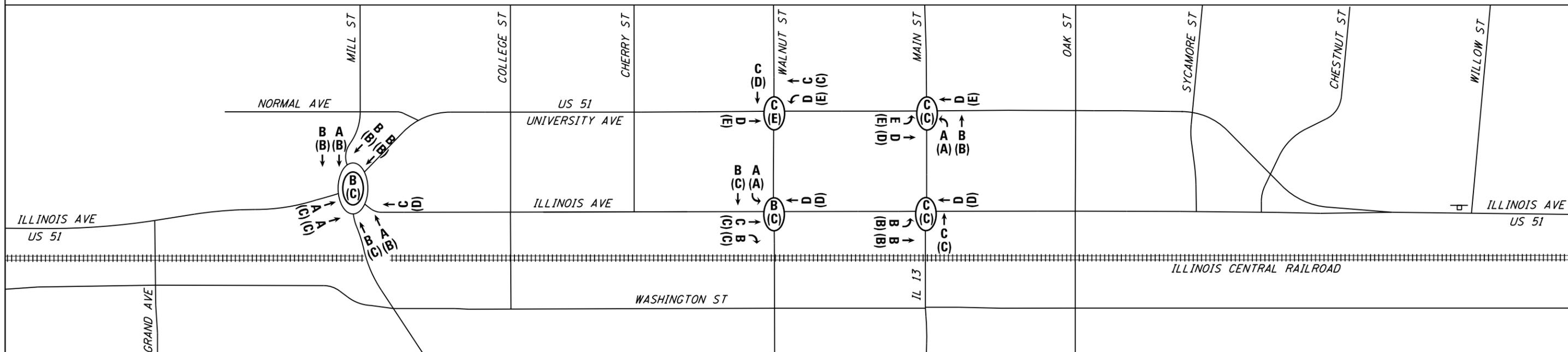
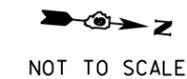
**LEGEND**

	LANE CONFIGURATION		TRAFFIC SIGNAL
	BIKE LANE		STOP SIGN
	PARKING		
	SHARED BIKE LANE/PARKING		

**LANE CONFIGURATIONS  
YEAR 2040**

US 51 UNIVERSITY: TWS - 4  
ILLINOIS: TWS - 2

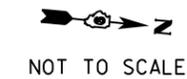
OWS = ONE WAY STREET - # LANES  
TWS = TWO WAY STREET - # LANES



**LEGEND**

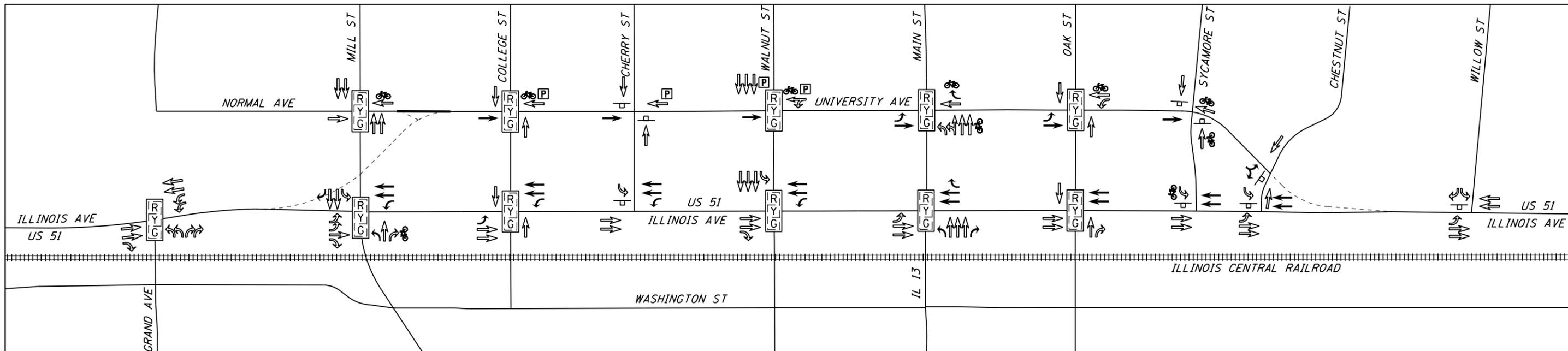
	TURN MOVEMENT
	AM LEVEL OF SERVICE
	PM LEVEL OF SERVICE
	INTERSECTION LEVEL OF SERVICE AM (PM)

**LEVEL OF SERVICE  
YEAR 2040**



**EXHIBIT 5b**

FILE NAME =	USER NAME = Peter Ross	DESIGNED - CMC	REVISED -	<b>CARBONDALE DOWNTOWN TRAFFIC AND PLANNING STUDY</b>	<b>CAPACITY ANALYSIS - PROJECTED BUILD UNIVERSITY AVE. (US 51) - TWO WAY - WIDENING (ALTERNATIVE 3)</b>				F.A.P. RTE. 322	SECTION	COUNTY JACKSON	TOTAL SHEETS 6	SHEET NO. 6
L:\Marion\1600105\Draw\CADD\Drawings\CM	Traffic Study (Renumbered for Report).dgn	DRAWN - AR	REVISED -		SCALE:	SHEET	OF	SHEETS	STA.	TO	STA.	CONTRACT NO.	
Default	PLOT SCALE = 473.1142' / in.	CHECKED - BSE	REVISED -										
	PLOT DATE = 6/17/2016 4:51:35 PM	DATE - 5/18/16	REVISED -		ILLINOIS FED. AID PROJECT								



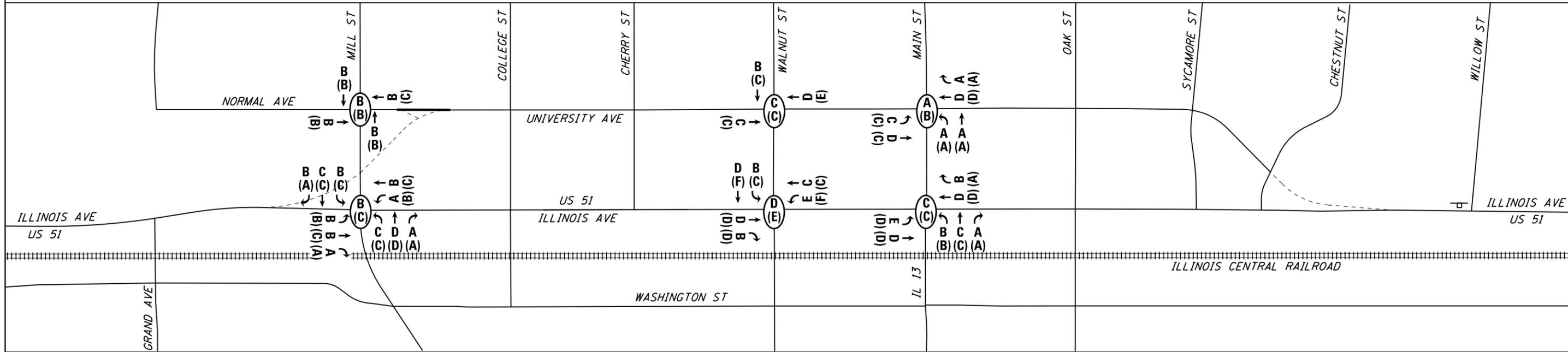
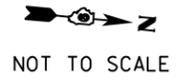
**LEGEND**

	LANE CONFIGURATION		TRAFFIC SIGNAL
	BIKE LANE		STOP SIGN
	PARKING		NEW ROAD ALIGNMENT
	SHARED BIKE LANE/PARKING		REMOVE ROADWAY

**LANE CONFIGURATIONS  
YEAR 2040**

UNIVERSITY: TWS - 2  
 US 51 ILLINOIS: TWS - 4

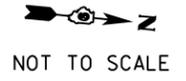
OWS = ONE WAY STREET - # LANES  
 TWS = TWO WAY STREET - # LANES



**LEGEND**

	TURN MOVEMENT		NEW ROAD ALIGNMENT
	AM LEVEL OF SERVICE		REMOVE ROADWAY
	PM LEVEL OF SERVICE		
	INTERSECTION LEVEL OF SERVICE AM (PM)		

**LEVEL OF SERVICE  
YEAR 2040**



**EXHIBIT 5c**

FILE NAME =	USER NAME = Peter Ross	DESIGNED - CMC	REVISED -	<b>CARBONDALE DOWNTOWN TRAFFIC AND PLANNING STUDY</b>	<b>CAPACITY ANALYSIS - PROJECTED BUILD ILLINOIS AVE. (US 51) - TWO WAY - WIDENING (ALTERNATIVE 4)</b>	F.A.P. RFE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.	
L:\Marion\1600105\Draw\CADD\Drawings\CM	Traffic Study (Renumbered for Report).dgn	DRAWN - AR	REVISED -			322		JACKSON	6	4	
Default	PLOT SCALE = 473.1142' / in.	CHECKED - BSE	REVISED -			CONTRACT NO.					
	PLOT DATE = 6/17/2016 4:51:19 PM	DATE - 5/18/16	REVISED -			ILLINOIS FED. AID PROJECT					

# Downtown Carbondale Traffic and Planning Study

## Feasibility Study

Conceptual Engineer's Opinion of Probable Construction Cost

Date: 6/17/2016  
 Route: FAP 322 - US51 SB University Ave  
 Section: Alt 2 - Streetscape

Designer: CMT  
 City/County: Carbondale/Jackson  
 Base Year: 2016

Work Classification		Estimated Costs	
1	Clearing, Minor Removal Items	\$	227,000
2	Earthwork	\$	119,000
3	Erosion Control and Landscaping	\$	62,000
4	Drainage	\$	193,000
5	Subbase, Base, Surface, Shoulders	\$	1,242,000
6	Marking and Signing	\$	171,000
7	Guardrail, Roadside Safety	\$	-
8	Traffic Signals and Roadway Lighting	\$	600,000
9	Detours, Temporary Traffic Control - Roadway	\$	161,000
10	Railroad Crossing Improvements	\$	-
11	Field Office and Laboratory	\$	15,000
12	Environmental Mitigation/Incidental Items	\$	-
13	Miscellaneous Items (5% Roadway Costs)	\$	140,000
14	Roadway Subtotal (Categories 1-13)	\$	2,930,000
15	Structure Removal	\$	-
16	Major Culverts	\$	-
17	Bridges	\$	-
18	Structures for Detours and Temporary Traffic Control	\$	-
19	Miscellaneous Items (10% Structure Costs)	\$	-
20	Structure Subtotal (Categories 15-19)	\$	-
21	Roadway and Structure Subtotal (Lines 14 and 20)	\$	2,930,000
22	Contingencies (10% of Line 21)	\$	293,000
23	Mobilization (5% of Lines 21-22)	\$	162,000
24	Utility Adjustments	\$	130,000
24	<b>Total Construction Cost (Lines 21-34)</b>	<b>\$</b>	<b>3,515,000</b>
25	Land Acquisition Cost Range		\$100,000 to \$150,000
26	Building Cost Range		\$0 to \$0
27	<b>Total Opinion of Costs Range</b>		<b>\$3,615,000 to \$3,665,000</b>

# Downtown Carbondale Traffic and Planning Study

## Feasibility Study

Conceptual Engineer's Opinion of Probable Construction Cost

Date: 6/17/2016  
 Route: FAP 322 - US51 SB University Ave  
 Section: Alt 3 - Build University as US 51

Designer: CMT  
 City/County: Carbondale/Jackson  
 Base Year: 2016

Work Classification		Estimated Costs	
1	Clearing, Minor Removal Items	\$	818,000
2	Earthwork	\$	448,000
3	Erosion Control and Landscaping	\$	105,000
4	Drainage	\$	1,796,000
5	Subbase, Base, Surface, Shoulders	\$	2,835,000
6	Marking and Signing	\$	119,000
7	Guardrail, Roadside Safety	\$	-
8	Traffic Signals and Roadway Lighting	\$	1,515,000
9	Detours, Temporary Traffic Control - Roadway	\$	502,000
10	Railroad Crossing Improvements	\$	-
11	Field Office and Laboratory	\$	15,000
12	Environmental Mitigation/Incidental Items	\$	-
13	Miscellaneous Items (5% Roadway Costs)	\$	408,000
14	Roadway Subtotal (Categories 1-13)	\$	8,561,000
15	Structure Removal	\$	-
16	Major Culverts	\$	-
17	Bridges	\$	-
18	Structures for Detours and Temporary Traffic Control	\$	-
19	Miscellaneous Items (10% Structure Costs)	\$	-
20	Structure Subtotal (Categories 15-19)	\$	-
21	Roadway and Structure Subtotal (Lines 14 and 20)	\$	8,561,000
22	Contingencies (10% of Line 21)	\$	857,000
22	Mobilization (5% of Lines 21-22)	\$	471,000
23	Utility Adjustments	\$	762,000
24	<b>Total Construction Cost (Lines 21-34)</b>	<b>\$</b>	<b>10,651,000</b>
25	Land Acquisition Cost Range		\$242,000 to \$407,000
26	Building Cost Range		\$4,181,000 to \$7,018,000
27	<b>Total Opinion of Costs Range</b>		<b>\$15,074,000 to \$18,076,000</b>

# Downtown Carbondale Traffic and Planning Study

## Feasibility Study

Conceptual Engineer's Opinion of Probable Construction Cost

Date: 6/17/2016  
 Route: FAP 322 - US51 NB Illinois Ave  
 Section: Alt 4 - Build Illinois as US 51

Designer: CMT  
 City/County: Carbondale/Jackson  
 Base Year: 2016

Work Classification		Estimated Costs	
1	Clearing, Minor Removal Items	\$	927,000
2	Earthwork	\$	408,000
3	Erosion Control and Landscaping	\$	105,000
4	Drainage	\$	1,696,000
5	Subbase, Base, Surface, Shoulders	\$	2,454,000
6	Marking and Signing	\$	119,000
7	Guardrail, Roadside Safety	\$	-
8	Traffic Signals and Roadway Lighting	\$	1,715,000
9	Detours, Temporary Traffic Control - Roadway	\$	524,000
10	Railroad Crossing Improvements	\$	-
11	Field Office and Laboratory	\$	15,000
12	Environmental Mitigation/Incidental Items	\$	-
13	Miscellaneous Items (5% Roadway Costs)	\$	399,000
14	Roadway Subtotal (Categories 1-13)	\$	8,362,000
15	Structure Removal	\$	-
16	Major Culverts	\$	-
17	Bridges	\$	-
18	Structures for Detours and Temporary Traffic Control	\$	-
19	Miscellaneous Items (10% Structure Costs)	\$	-
20	Structure Subtotal (Categories 15-19)	\$	-
21	Roadway and Structure Subtotal (Lines 14 and 20)	\$	8,362,000
22	Contingencies (10% of Line 21)	\$	837,000
22	Mobilization (5% of Lines 21-22)	\$	460,000
23	Utility Adjustments	\$	867,000
24	<b>Total Construction Cost (Lines 21-24)</b>	<b>\$</b>	<b>10,526,000</b>
25	Land Acquisition Cost Range		\$313,000 to \$531,000
26	Building Cost Range		\$4,428,000 to \$7,502,000
27	<b>Total Opinion of Costs Range</b>		<b>\$15,267,000 to \$18,559,000</b>

# Appendix A

Traffic Volume Projection Technical Memo

# Traffic Volume Projections

Carbondale Downtown Traffic and Planning Study

SOUTHERN ILLINOIS METROPOLITAN PLANNING ORGANIZATION  
(SIMPO)

APRIL 11, 2016



PREPARED FOR:

THE GREATER EGYPT REGIONAL PLANNING & DEVELOPMENT COMMISSION  
3000 WEST DEYOUNG STREET  
SUITE 800 B-3  
MARION, IL 62959



PREPARED BY:

CRAWFORD, MURPHY & TILLY, INC.  
2750 WEST WASHINGTON STREET  
SPRINGFIELD, ILLINOIS 62702



## TABLE OF CONTENTS

Table of Contents.....	1
Introduction .....	2
Existing Traffic Volumes.....	2
Historical Traffic Volumes .....	8
SIMPO Long Range Traffic Projections.....	14
Recommended Traffic Projections .....	15

## INTRODUCTION

The purpose of this overall study is to better serve all modes of transportation and further enhance business. This initial vehicular traffic volume projection portion of the study will focus on understanding the existing and historical vehicular traffic volumes of the downtown network as well as develop proposed vehicular traffic projections for different network scenarios. Traffic projections will be developed for three network scenarios including:

1. the no-build one-way couple scenario,
2. the build two-way with University Avenue as the state route scenario, and
3. the build two-way with Illinois Avenue as the state route scenario.

Traffic data was provided in three forms including:

1. Intersection Turning Movement Counts with Vehicular Classification in 15 minute intervals over 24 hours
2. Segment Counts with Vehicular Classification in 15 minute intervals over a 24 hour period
3. Segment Counts with Vehicular Classification in 1 hour intervals over a 24 hour period

All traffic counts provided for the study were taken in 2015. A network of AM and PM peak hour turning movements has been developed and calibrated based upon the provided data; however, this initial step of the study will focus on average daily traffic (ADT). Upon concurrence with the ADT projections for the 2040 design year for the above scenarios, the proposed growth rates will be applied to the no-build scenario peak hour movements. Traffic will be redistributed to the network for the two build scenarios in proportion to the shifted ADT.

## EXISTING TRAFFIC VOLUMES

For tracking purposes, segments of the network have been designated with a sequential lettering system. It is anticipated that a sequential numbering system will be assigned to intersections in the next steps of the study. The segment designations are shown in Table 1. A map of the segment designations is shown in Exhibit 1. The majority of these segments have counts. For those without segment counts, volumes were developed based upon turning movements from an adjacent intersection. Table 2 shows the corresponding existing ADT for each segment.

United States Highway 51 (US 51) ranges from an ADT of 12,000 at the north end of the study to an ADT of 17,500 at the south end of the study. See Chart 1 – US 51 Existing ADT. The ADT of northbound US 51 decreases from south to north with major changes occurring at the Illinois Route 13 (IL 13) couple intersections. The ADT of southbound US 51 increases from north to south, but it has a minor peak at the IL 13 couple intersections. The traffic generated by Memorial Hospital of Carbondale increases traffic on US 51 southbound before reaching the IL 13 couple intersections. Southbound US 51 traffic significantly decreases south of the IL 13 couple intersections but accumulates traffic from the side streets of Cherry Street and College Street. The divergence of Normal Avenue takes approximately 40% of the southbound US 51 traffic before getting to Mill Street.

IL 13 ranges from an ADT of 33,600 at the west end of the study to an ADT of 41,700 at the east end of the study. See Chart 2 – IL 13 Existing ADT. The ADT of IL 13 drops by approximately 6,400 west of the US 51 one-way couple. The ADT is fairly consistent between the one-way couple of US 51 and to the east, ranging from 40,000 to 41,700. The ADT of eastbound IL 13 is approximately 12% lower than westbound ADT on the section west of US 51. The opposite is true east of the couple where eastbound IL 13 is approximately 10% greater than westbound IL 13. The eastbound and westbound split is nearly the same between the US 51 couple.

**TABLE 1 – SEGMENT IDENTIFICATION**

	SEGMENT		FROM		TO	
	ROUTE	NAME	ROUTE	NAME	ROUTE	NAME
A	US 51	Illinois Avenue		Chestnut Street		Willow Street
B	US 51 NB	Illinois Avenue		Oak Street		Chestnut Street
C	US 51 NB	Illinois Avenue	IL 13 EB	Walnut Street	IL 13 WB	Main Street
D	US 51 NB	Illinois Avenue		Mill Street	IL 13 EB	Walnut Street
E	US 51	Illinois Avenue		Grand Ave		Mill Street
F	US 51 SB	University Avenue		Oak Street		Chestnut Street
G	US 51 SB	University Avenue	IL 13 WB	Main Street		Oak Street
H	US 51 SB	University Avenue	IL 13 EB	Walnut Street	IL 13 WB	Main Street
I	US 51 SB	University Avenue		Cherry Street	IL 13 EB	Walnut Street
J	US 51 SB	University Avenue		Normal Avenue		Cherry Street
K	US 51 SB	University Avenue		Mill Street		Normal Avenue
L		Normal Avenue		Mill Street	US 51 SB	University Avenue
M	IL 13 EB	Walnut Street		Poplar Street	US 51 SB	University Avenue
N	IL 13 EB	Walnut Street	US 51 SB	University Avenue	US 51 NB	Illinois Avenue
O	IL 13 EB	Walnut Street	US 51 NB	Illinois Avenue		Washington Street
P	IL 13 WB	Main Street		Poplar Street	US 51 SB	University Avenue
Q	IL 13 WB	Main Street	US 51 SB	University Avenue	US 51 NB	Illinois Avenue
R	IL 13 WB	Main Street	US 51 NB	Illinois Avenue		Washington Street

NB = Northbound  
 SB = Southbound  
 EB = Eastbound  
 WB = Westbound

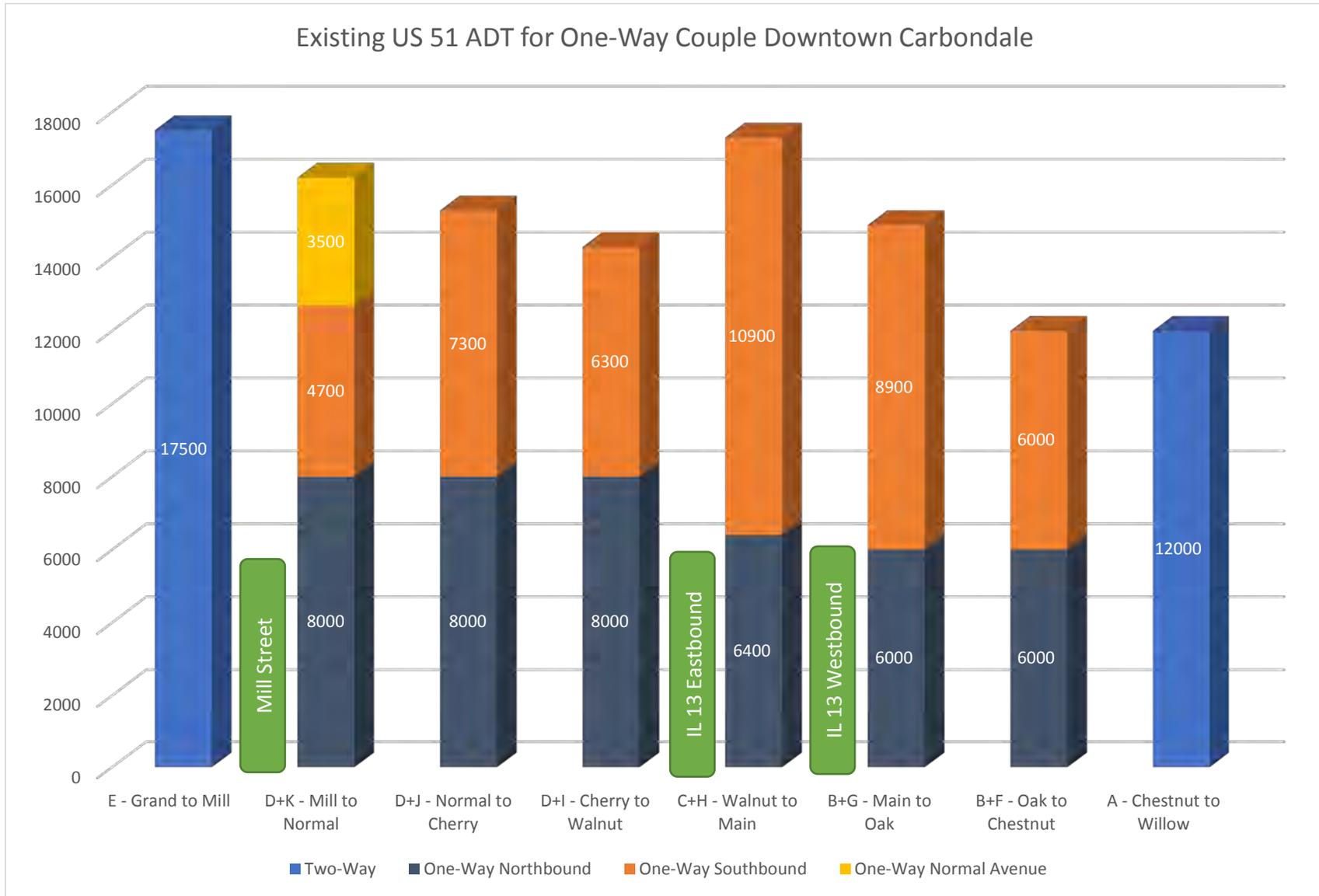


**TABLE 2 – EXISTING ADT**

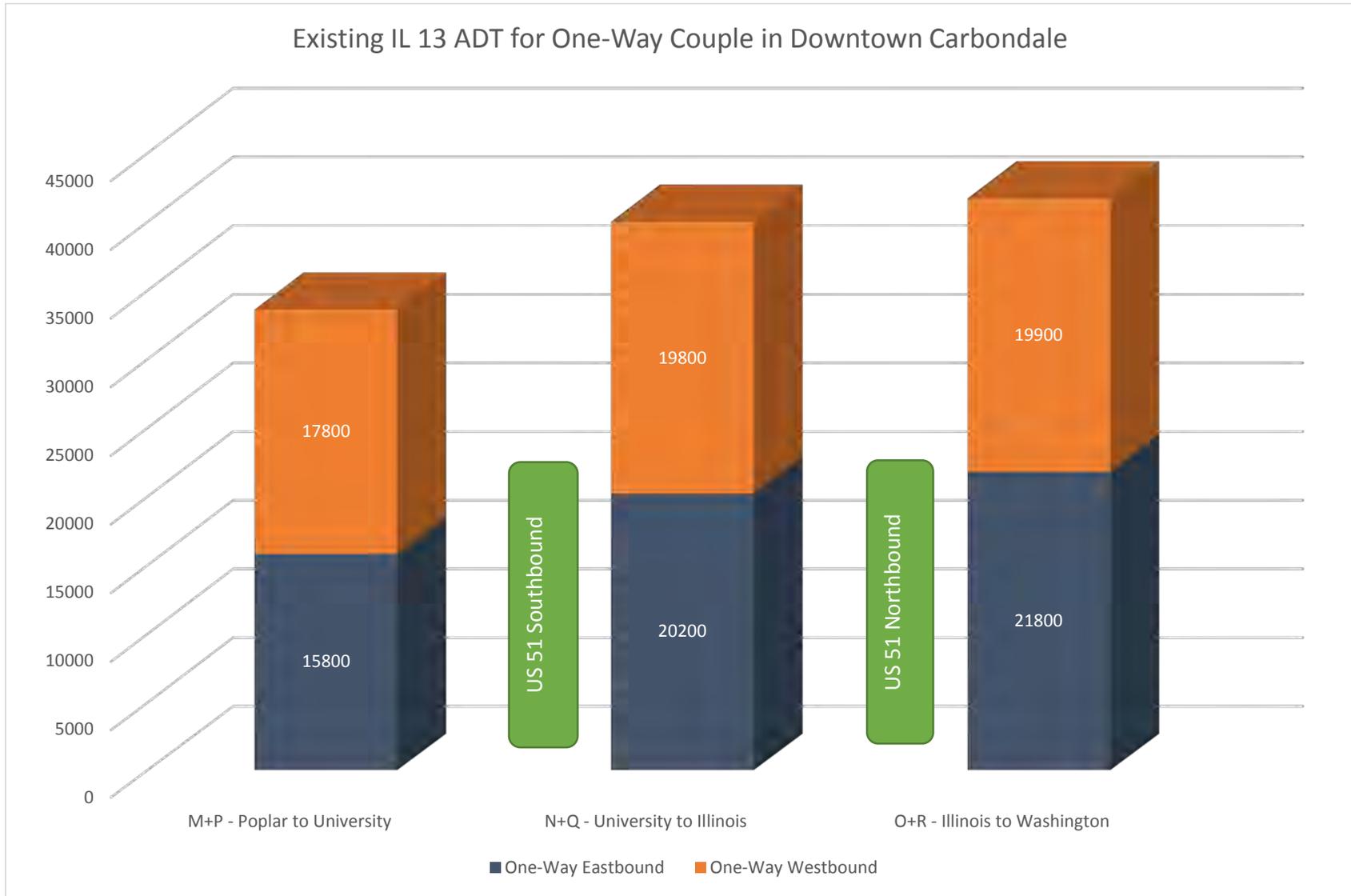
	SEGMENT		Existing ADT Rounded
	ROUTE	NAME	
A	US 51	Illinois Avenue	12,000
B	US 51 NB	Illinois Avenue	6,000
C	US 51 NB	Illinois Avenue	6,400
D	US 51 NB	Illinois Avenue	8,000
E	US 51	Illinois Avenue	17,500
F	US 51 SB	University Avenue	6,000
G	US 51 SB	University Avenue	8,900
H	US 51 SB	University Avenue	10,900
I	US 51 SB	University Avenue	6,300
J	US 51 SB	University Avenue	7,300
K	US 51 SB	University Avenue	4,700
L		Normal Avenue	3,500
M	IL 13 EB	Walnut Street	15,800
N	IL 13 EB	Walnut Street	20,200
O	IL 13 EB	Walnut Street	21,800
P	IL 13 WB	Main Street	17,800
Q	IL 13 WB	Main Street	19,800
R	IL 13 WB	Main Street	19,900

ADT = Average Daily Traffic

**CHART 1 – US 51 EXISTING ADT**



**CHART 2 – IL 13 EXISTING ADT**



## HISTORICAL TRAFFIC VOLUMES

The network has generally experienced a 2% annual decrease in traffic from 2007 to 2015 which equates to an approximate 15% reduction in volume. See Table 3 for the Historic Annualized Average Daily Traffic (AADT) Volumes. Source: IDOT Getting Around Illinois Mapping. Charts 3-5 show the history of US 51 north and south of IL 13 as well as IL 13. A general description of the history of each segment follows in the list below. The list follows the order of the segment designation.

- A. US 51 (Illinois Avenue) from Chestnut Street to Willow Street  
The traffic increased from 2005 to 2007. It decreased from 2007 to 2011 and has then effectively flat lined.
- B. US 51 Northbound (Illinois Avenue) from Oak Street to Chestnut Street  
The traffic was effectively the same from 2005 to 2009, decreased from 2009 to 2011, and then effectively flat lined.
- C. US 51 Northbound (Illinois Avenue) from IL 13 Eastbound (Walnut Street) to IL 13 Westbound (Main Street)  
The traffic was effectively the same from 2005 to 2009, decreased from 2009 to 2011, and then effectively flat lined.
- D. US 51 Northbound (Illinois Avenue) from Mill Street to IL 13 Eastbound (Walnut Street)  
The traffic dipped in 2007 from 2005 and 2009 volumes and then decreased again from 2009 to 2011. It then effectively flat lined.
- E. US 51 (Illinois Avenue) from Grand Avenue to Mill Street  
The traffic peaked in 2007, decreased from 2007 to 2011, surged in 2013, only to decrease to its lowest volume in 2015.
- F. US 51 Southbound (University Avenue) from Oak Street to Chestnut Street  
Traffic has steadily decreased from 2005 to 2013 and flat lined from 2013 to 2015.
- G. US 51 Southbound (University Avenue) from IL 13 Westbound (Main Street) to Oak Street  
Traffic steadily decreased from 2005 to 2011 and then increased from 2011 to 2013. It then effectively flat lined from 2013 to 2015.
- H. US 51 Southbound (University Avenue) from IL 13 Eastbound (Walnut Street) to IL 13 Westbound (Main Street)  
The traffic peaked in 2007 and then has steadily decreased from 2007 to 2015.
- I. US 51 Southbound (University Avenue) from Cherry Street to IL 13 Eastbound (Walnut Street)  
The traffic has steadily decreased from 2005 to 2015.
- J. US 51 Southbound (University Avenue) Normal Avenue to Cherry Street  
The traffic was effectively flat lined from 2005 to 2009, decreased from 2009 to 2011, flat lined from 2011 to 2013, and then decreased again from 2013 to 2015.
- K. US 51 Southbound (University Avenue) from Mill Street to Normal Avenue  
Traffic has steadily decreased from 2007 to 2015.
- L. Normal Avenue from Mill Street to US 51 Southbound (University Avenue)  
Traffic had a significant decrease from 2002 to 2007 and then has effectively flat lined. It has increased recently based upon the 2015 count.
- M. IL 13 Eastbound (Walnut Street) from Poplar Street to US 51 Southbound (University Avenue)

Traffic reached a peak in 2011 and then has subsequently decreased in 2015 to the minimum of recent records.

- N. IL 13 Eastbound (Walnut Street) from US 51 Southbound (University Avenue) to US 51 Northbound (Illinois Avenue)  
Traffic increased from 2005 to 2011, then decreased from 2011 to 2013, then flat lined from 2013 to 2015.
- O. IL 13 Eastbound (Walnut Street) from US 51 Northbound (Illinois Avenue) to Washington Street  
Traffic has steadily decreased from 2005 to 2015.
- P. IL 13 Westbound (Main Street) from Poplar Street to US 51 Southbound (University Avenue)  
Traffic peaked in 2007, decreased from 2007 to 2011, and then has effectively flat lined.
- Q. IL 13 Westbound (Main Street) from US 51 Southbound (University Avenue) to US 51 Northbound (Illinois Avenue)  
Traffic peaked in 2013 and then dropped in 2015.
- R. IL 13 Westbound (Main Street) from US 51 Northbound (Illinois Avenue) to Washington Street  
Traffic has decreased from 2007 to 2015.

**TABLE 3 – HISTORIC AADT VOLUMES**

	SEGMENT		Historical Annualized Average Daily Traffic (AADT) - reduced by factors from ADT							
	ROUTE	NAME	2002	2005	2007	2009	2011	2012	2013	2015
A	US 51	Illinois Avenue		10,400	12,300	12,000	10,300		10,600	10,600
B	US 51 NB	Illinois Avenue		6,800	6,500	6,500	5,500		5,300	5,300
C	US 51 NB	Illinois Avenue		6,900	6,300	6,600	5,700		5,800	5,700
D	US 51 NB	Illinois Avenue		9,800	8,300	8,800	7,600		7,300	7,100
E	US 51	Illinois Avenue		18,700	19,200	18,600	16,800		17,200	14,500
F	US 51 SB	University Avenue		8,000	6,800	6,400	5,600		5,300	5,300
G	US 51 SB	University Avenue		8,100	7,900	7,300	7,100		7,700	7,500
H	US 51 SB	University Avenue		11,100	11,800	10,900	10,000		9,800	9,100
I	US 51 SB	University Avenue		8,500	8,400	8,300	7,700		7,600	5,300
J	US 51 SB	University Avenue		8,600	8,600	8,300	7,700		7,600	6,900
K	US 51 SB	University Avenue			6,200	5,800	5,400		5,000	4,000
L		Normal Avenue	3,000		2,300			2,200		
M	IL 13 EB	Walnut Street		16,400	16,100	16,500	17,400		15,900	14,300
N	IL 13 EB	Walnut Street		18,600	18,800	19,100	19,100		17,900	17,800
O	IL 13 EB	Walnut Street		22,400	21,000	20,900	20,600		19,400	19,200
P	IL 13 WB	Main Street		16,300	16,600	16,400	15,100		15,200	14,800
Q	IL 13 WB	Main Street		16,200	16,900	16,400	17,800		17,800	16,500
R	IL 13 WB	Main Street			20,900	20,000	18,600		18,600	17,100

CHART 3 – US 51 HISTORIC AADT, AT AND NORTH OF IL 13

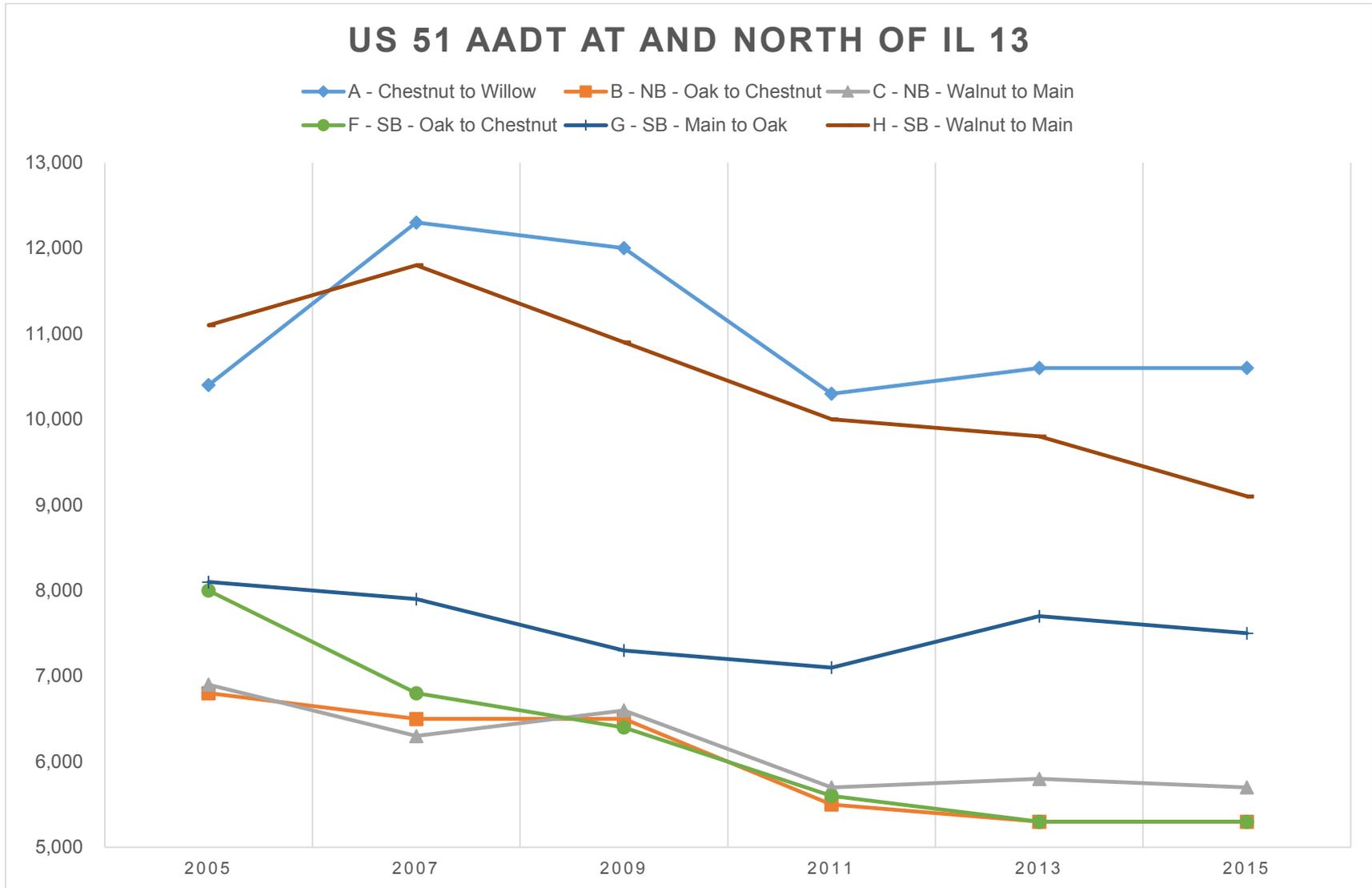


CHART 4 – US 51 HISTORIC AADT, SOUTH OF IL 13

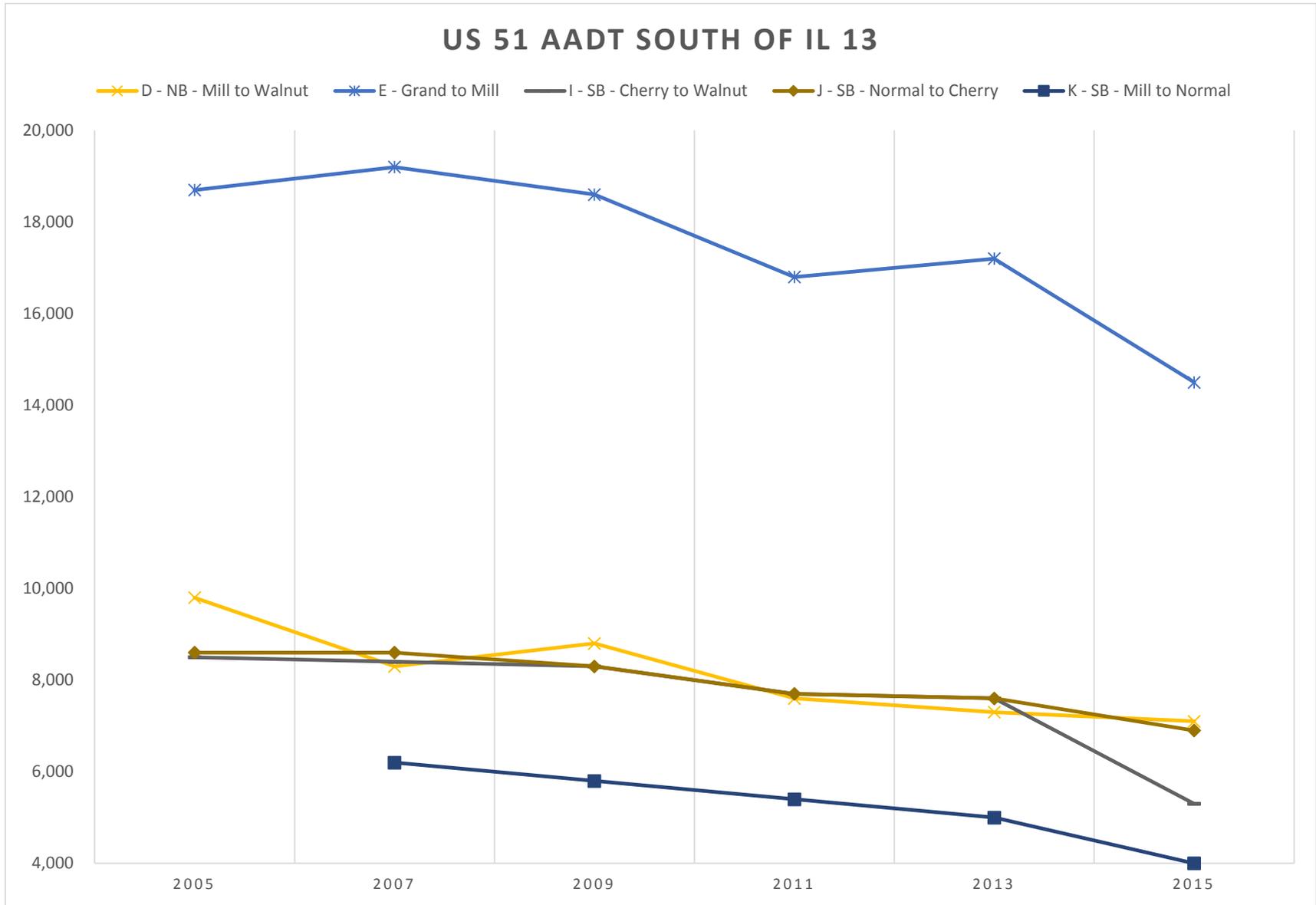
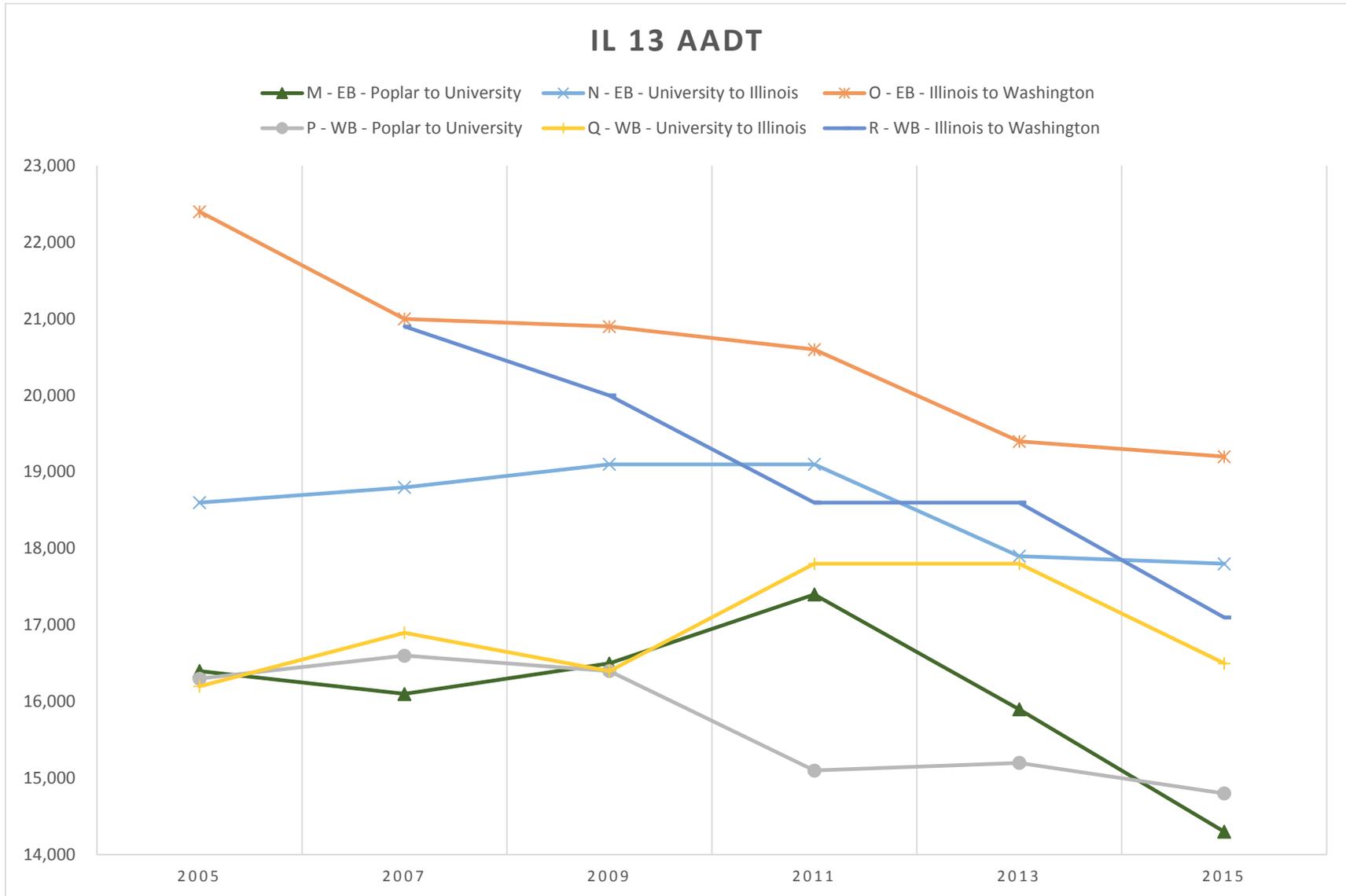


CHART 5 – IL 13 HISTORIC AADT



## SIMPO LONG RANGE TRAFFIC PROJECTIONS

The Lochmueller Group prepared a Long Range Traffic Projection Memorandum, dated June 30, 2014, for the Southern Illinois Metropolitan Planning Organization (SIMPO) planning area. The projections were developed using a manual approach with considerations of the following:

- National and local lifestyle and behavioral trends
- Historic traffic and population trends
- Planning data (comprehensive plans, employment forecasts, freight projections, etc.)
- Economic development mechanisms
- Current and anticipated infrastructure improvements
- Development constraints (environmental obstacles, zoning, etc.)

Traffic projections were identified in select segments in downtown Carbondale. Table 4 shows the existing and projected AADT as well as the calculated growth rate using said volumes. The growth rates vary between 0.5% and 1.0% in all areas, except for segments E and K which are at the very southern end of the study area. The northern end of the study area shows growth rates closer to 0.5% and the middle of the study area shows growth rates closer to 1.0%.

**TABLE 4 – SIMPO LONG RANGE TRAFFIC PROJECTIONS**

	ROUTE	NAME	2015 Existing AADT	2040 Projected AADT	Annual Growth Rate	Overall Growth
A	US 51	Illinois Avenue	10,600	12,100	0.53%	14%
B	US 51 NB	Illinois Avenue	5,300	6,100	0.56%	15%
C	US 51 NB	Illinois Avenue				
D	US 51 NB	Illinois Avenue	7,100	8,400	0.67%	18%
E	US 51	Illinois Avenue	14,500	22,500	1.77%	55%
F	US 51 SB	University Avenue				
G	US 51 SB	University Avenue	7,500	8,800	0.64%	17%
H	US 51 SB	University Avenue	9,100	11,200	0.83%	23%
I	US 51 SB	University Avenue				
J	US 51 SB	University Avenue	6,900	8,700	0.93%	26%
K	US 51 SB	University Avenue	4,000	5,700	1.43%	43%
L		Normal Avenue				
M	IL 13 EB	Walnut Street				
N	IL 13 EB	Walnut Street	17,800	22,200	0.89%	25%
O	IL 13 EB	Walnut Street				
P	IL 13 WB	Main Street	14,800	17,400	0.65%	18%
Q	IL 13 WB	Main Street				
R	IL 13 WB	Main Street	17,100	21,300	0.88%	25%

## RECOMMENDED TRAFFIC PROJECTIONS

For the no-build condition, the recommended traffic projections generally follow the same trends as the SIMPO traffic projections; however, the 1.5% at the southern end of the study is applied on US 51 from Mill Street to IL 13 Eastbound. This assumption treats the growth as more of a regional roadway approach where the segment traffic would not drop off or increase significantly until the next major cross street. See Table 5 for the No Build One-Way Traffic Projections.

US Route 51 carries regional and local traffic. When identifying two-way traffic scenarios with US Route 51 on different alignments of roadway, it becomes essential to determine which traffic is regional and will generally stay on the US Route in lieu of taking a local route. Based upon the ADT of the regional roadways outside of Carbondale, the regional traffic seems to range from 45-60% of the “in-town” ADT. Illinois Avenue was assumed to be a destination for  $\frac{3}{4}$  of the local traffic. See Table 6 – Build Two-Way Traffic Projections

Using these assumptions, the ADT of Illinois Avenue, with US 51 marked on Illinois Avenue, carries approximately 80-85% of the total north-south traffic with an ADT ranging from 11,100 to 18,700. The ADT of University Avenue, as a local-only route, was then 15-20% of the total north-south traffic with an ADT ranging from 2500 to 4500 from north to south. Normal Avenue was assumed to then carry two-way traffic and University Avenue between Normal Avenue and Mill Street would be removed. Normal Avenue would carry approximately 5000 ADT, which is commensurate to the existing ADT of Poplar Street, a similar north-south local street.

Using these assumptions, the ADT of University Avenue, with US 51 marked on University Avenue, carries approximately 72 to 75% of the total north-south traffic with an ADT ranging from 9,800 to 16,700. The ADT of Illinois Avenue, as a local-only route, was then 25-28% of the total north-south traffic with an ADT ranging from 3800 to 5800.

**TABLE 5 – NO BUILD ONE-WAY TRAFFIC PROJECTIONS**

	SEGMENT		EXISTING		PROJECTED NO-BUILD			
	ROUTE	NAME	Existing ADT Year	Existing ADT Rounded	Assumed Growth Rate Per Year	Projected ADT Year	Projected ADT Rounded	Overall Growth
A	US 51	Illinois Avenue	2015	12,000	0.5%	2040	13,600	13%
B	US 51 NB	Illinois Avenue	2015	6,000	0.5%	2040	6,800	13%
C	US 51 NB	Illinois Avenue	2015	6,400	1.0%	2040	8,200	28%
D	US 51 NB	Illinois Avenue	2015	8,000	1.5%	2040	11,600	45%
E	US 51	Illinois Avenue	2015	17,500	1.5%	2040	25,400	45%
F	US 51 SB	University Avenue	2015	6,000	0.5%	2040	6,800	13%
G	US 51 SB	University Avenue	2015	8,900	0.5%	2040	10,100	13%
H	US 51 SB	University Avenue	2015	10,900	1.0%	2040	14,000	28%
I	US 51 SB	University Avenue	2015	6,300	1.5%	2040	9,100	44%
J	US 51 SB	University Avenue	2015	7,300	1.5%	2040	10,600	45%
K	US 51 SB	University Avenue	2015	4,700	1.5%	2040	6,800	45%
L		Normal Avenue	2015	3,500	1.0%	2040	4,500	29%
M	IL 13 EB	Walnut Street	2015	15,800	1.0%	2040	20,300	28%
N	IL 13 EB	Walnut Street	2015	20,200	1.0%	2040	25,900	28%
O	IL 13 EB	Walnut Street	2015	21,800	1.0%	2040	28,000	28%
P	IL 13 WB	Main Street	2015	17,800	1.0%	2040	22,800	28%
Q	IL 13 WB	Main Street	2015	19,800	1.0%	2040	25,400	28%
R	IL 13 WB	Main Street	2015	19,900	1.0%	2040	25,500	28%

**TABLE 6 – BUILD TWO-WAY TRAFFIC PROJECTIONS**

	SEGMENT NAME	Projected ADT Rounded	Total North-South Travel In This Segment Couple	PROJECTED BUILD TWO-WAY			
				US 51 on University Avenue		US 51 on Illinois Avenue	
				Projected ADT Rounded	% of North- South Travel	Projected ADT Rounded	% of North- South Travel
A	Illinois Avenue	13,600	13,600	13,600	100%	13,600	100%
B	Illinois Avenue	6,800	13,600	3,800	28%	11,100	82%
C	Illinois Avenue	8,200	22,200	5,500	25%	18,700	84%
D	Illinois Avenue	11,600	22,900	5,800	25%	18,400	80%
E	Illinois Avenue	25,400	25,400	25,400	100%	25,400	100%
F	University Avenue	6,800	13,600	9,800	72%	2,500	18%
G	University Avenue	10,100	16,900	12,700	75%	3,300	20%
H	University Avenue	14,000	22,200	16,700	75%	3,500	16%
I	University Avenue	9,100	20,700	15,500	75%	4,000	19%
J	University Avenue	10,600	22,200	16,700	75%	4,500	20%
K	University Avenue	6,800	22,900	12,600	55%	<i>Removed</i>	-
L	Normal Avenue	4,500	22,900	4,500	20%	5,000	22%
M	Walnut Street	20,300	43,100	20,300	-	20,300	-
N	Walnut Street	25,900	51,300	TBD	-	TBD	-
O	Walnut Street	28,000	53,500	28,000	-	28,000	-
P	Main Street	22,800	43,100	22,800	-	22,800	-
Q	Main Street	25,400	51,300	TBD	-	TBD	-
R	Main Street	25,500	53,500	25,500	-	25,500	-

TBD = To Be Determined, By Calculating with Turn Movements in Next Phase of Study

Key	XXXXX	increase from no-build
	XXXXX	no change from no-build
	XXXXX	decrease from no-build

# Appendix B

Traffic Analysis Memo Text

# Traffic Analysis

## Carbondale Downtown Traffic and Planning Study

SOUTHERN ILLINOIS METROPOLITAN PLANNING ORGANIZATION  
(SIMPO)

MAY 18, 2016



PREPARED FOR:

THE GREATER EGYPT REGIONAL PLANNING & DEVELOPMENT COMMISSION  
3000 WEST DEYOUNG STREET  
SUITE 800 B-3  
MARION, IL 62959



PREPARED BY:

CRAWFORD, MURPHY & TILLY, INC.  
2750 WEST WASHINGTON STREET  
SPRINGFIELD, ILLINOIS 62702



## TABLE OF CONTENTS

Introduction .....	3
Turning Movement Projections and Intersection Controls .....	5
Performance of Existing System .....	6
Performance of No Build Alternative .....	6
Performance of Build Two-Way Alternative – Illinois Ave as US 51 .....	6
Performance of Build Two-Way Alternative – University Ave as US 51 .....	7
Capacity Summary .....	7
Preliminary Findings .....	9

## INTRODUCTION

The purpose of this Downtown Traffic and Planning Study is to evaluate and compare transportation alternatives that will better serve all modes of transportation and further enhance business. An initial technical analysis for vehicular traffic volume projections of Average Daily Traffic (ADT) has been completed and provides the foundation for this technical analysis. This next step of the study will focus on the development of AM and PM peak design hour turning movement volumes for different scenarios and then performing an intersection and corridor capacity analyses. The capacity analysis will provide the information used to determine if alternatives are feasible.

Projected design year (2040) traffic turning movements have been developed for three network scenarios including:

1. the no-build one-way couple scenario,
2. the build two-way with University Avenue as the state route (US 51) scenario, and
3. the build two-way with Illinois Avenue as the state route (US 51) scenario.

For tracking purposes, major intersections have been generally numbered to match the identifiers from provided data for signal timings and phasing. Intersection designations are shown in [Table 1](#). Segment designations are shown in [Table 2](#).

**TABLE 1 – INTERSECTION IDENTIFICATION**

#	North-South Street	North-South Route (Existing Condition)	East-West Street
9	University Avenue	US 51 Southbound	Oak Street
10	University Avenue	US 51 Southbound	Main Street (IL 13 Westbound)
11	University Avenue	US 51 Southbound	Walnut Street (IL 13 Eastbound)
12	University Avenue	US 51 Southbound	College Street
13	Illinois Avenue	US 51	Grand Avenue
17	Illinois Avenue	US 51 Northbound	College Street
18	Illinois Avenue	US 51 Northbound	Walnut Street (IL 13 Eastbound)
19	Illinois Avenue	US 51 Northbound	Main Street (IL 13 Westbound)
20	Illinois Avenue	US 51 Northbound	Oak Street
21A	University Avenue	US 51 Southbound	Mill Street
21B	Illinois Avenue	US 51 Northbound	Mill Street

**TABLE 2 – SEGMENT IDENTIFICATION**

	SEGMENT		FROM		TO	
	ROUTE	NAME	ROUTE	NAME	ROUTE	NAME
A	US 51	Illinois Avenue		Chestnut Street		Willow Street
B	US 51 NB	Illinois Avenue		Oak Street		Chestnut Street
C	US 51 NB	Illinois Avenue	IL 13 EB	Walnut Street	IL 13 WB	Main Street
D	US 51 NB	Illinois Avenue		Mill Street	IL 13 EB	Walnut Street
E	US 51	Illinois Avenue		Grand Ave		Mill Street
F	US 51 SB	University Avenue		Oak Street		Chestnut Street
G	US 51 SB	University Avenue	IL 13 WB	Main Street		Oak Street
H	US 51 SB	University Avenue	IL 13 EB	Walnut Street	IL 13 WB	Main Street
I	US 51 SB	University Avenue		Cherry Street	IL 13 EB	Walnut Street
J	US 51 SB	University Avenue		Normal Avenue		Cherry Street
K	US 51 SB	University Avenue		Mill Street		Normal Avenue
L		Normal Avenue		Mill Street	US 51 SB	University Avenue
M	IL 13 EB	Walnut Street		Poplar Street	US 51 SB	University Avenue
N	IL 13 EB	Walnut Street	US 51 SB	University Avenue	US 51 NB	Illinois Avenue
O	IL 13 EB	Walnut Street	US 51 NB	Illinois Avenue		Washington Street
P	IL 13 WB	Main Street		Poplar Street	US 51 SB	University Avenue
Q	IL 13 WB	Main Street	US 51 SB	University Avenue	US 51 NB	Illinois Avenue
R	IL 13 WB	Main Street	US 51 NB	Illinois Avenue		Washington Street

NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound

It should be noted that the preliminary capacity analysis focus was on the Walnut Main Street intersections (IL Route 13 one-way couple) since the majority of traffic exists at these two state route intersections. If one of the two-way build alternatives appears to be feasible, the intent is to further investigate the Oak Street and College Street intersections. These two intersections have traffic signal controls but have lower traffic volumes. The initial pass at this analysis of capacity does not address these intersections. In the event that the major intersections resulted in viable alternatives for build scenarios, then turning movement volumes will be confirmed and a capacity analysis performed at these locations. The analysis of Grand Avenue at US 51 was not deemed pertinent to the scope feasibility analysis. If further studies are performed in the future, then this intersection can be modeled as part of an interconnected the network.

It should also be noted that some research (Gayah & Daganzo, 2012<sup>1</sup>) indicates that two-way streets can perform better than one-way streets in some circumstances if left turns are prohibited on the two-way streets. This is predicated upon considering both flow and travel distance. This is referred to as “trip-serving capacity”. This initial pass of the traffic analysis focuses on the major intersections in the corridor. In a two-way traffic build alternative for US 51, it would not be practical to prohibit northbound US 51 left turn to westbound IL 13 or southbound US 51 left turn to eastbound IL 13 because these are major connections in the regional network. If operations of the major IL 13 intersections are found to be free of capacity issues with two-way traffic, then considerations of prohibited left turns from US 51 (Illinois Avenue or University Avenue) to minor side streets could be considered in later refined analyses to minimize the footprint of the improvements while maintaining sufficient operations. The preliminary capacity analysis assumed that left turns would be allowed.

## TURNING MOVEMENT PROJECTIONS AND INTERSECTION CONTROLS

**Exhibit 1** Traffic Volume Projections are illustrated on five exhibits included herein (numbered 1A-1E) that cover the following traffic volume scenarios respectively: Existing Conditions, Projected No-Build, Projected Build Illinois Ave U.S. 51 Two Way, Projected Build University Ave U.S. 51 Two Way, and a detail for the Mill Street intersections. The top panel of each exhibit contains the roadway network configuration, the segment and intersection identifiers, the existing and projected Average Daily Traffic (ADT), and the Design Hourly Volumes (DHV) for AM and PM peak hours. The bottom panel of each exhibit shows the roadway network configuration, intersection control types and configurations, and major intersection turning movement volumes for AM and PM peak hours.

The no-build condition turning movement volumes were calculated by using the growth rates shown in the previously submitted Traffic Volume Projections (April 11, 2016). The build condition turning movement volumes used the no-build traffic volumes but reassigned the volumes to the network based upon the percentages shown in the aforementioned submittal.

The network shown for the Build Two-Way Illinois Avenue as US 51 scenario reflects University Avenue reverting back to a rectangular grid local street and removing sweeping reverse curves from the current condition. At the north end of the study, the existing divergence/convergence of US 51 Southbound is removed. At the south end of the study, the existing divergence/convergence of US 51 Southbound is removed. This results in the removal of the existing curved intersection of Mill Street and a new intersection configuration at Normal/Mill.

The network shown for the Build Two-Way University Avenue as US 51 scenario has modifications to the existing configuration in order to accommodate the two-way traffic flow. At the north end of the study, the Illinois Avenue segment between Chestnut Street and Willow Street would only allow for northbound traffic flow which would converge with northbound University

---

<sup>1</sup> Gayah, V., & Daganzo, C. (2012). Analytical Capacity Comparison of One-Way and Two-Way Signalized Street Networks. Transportation Research Record.

Avenue traffic. South of Chestnut Street, Illinois Avenue would be two-way traffic. For southbound US 51 traffic to enter Illinois Avenue, they would need to make a southbound left at Chestnut Street and then a right turn on Illinois Avenue. At the south end of the study, a configuration with two closely spaced signalized intersections with revised lane configurations was initially conceptualized. Further investigation showed that five split phases would be needed to accommodate this arrangement. Due to the high level of delay expected with this phasing sequence, this concept was determined not to be feasible and is not shown. A multilane roundabout has been developed at the south end of the study to control the convergence of the five approaches. The assignment of traffic volumes at the roundabout is shown in [Exhibit 1E](#).

## PERFORMANCE OF EXISTING SYSTEM

[Exhibit 2](#) Capacity Analysis of Existing Conditions is one exhibit that shows lane configurations and capacity analysis. The top panel shows intersection controls and lane configurations. The existing network includes intermittent bicycle lanes and on-street parking throughout the corridor. The IL 13 intersections operate as two phase intersections with 80 second cycle lengths. The bottom panel shows the overall intersection level of service (LOS) as well as the LOS for individual turn movements at the major intersections. Signal phasing and timings were input from the provided data.

All of the major intersections operate at LOS C or better in the existing condition. The following turn movements at the intersection of Illinois Avenue and Mill Street operate at LOS D: northbound left (AM and PM), northbound thru (PM).

## PERFORMANCE OF NO BUILD ALTERNATIVE

[Exhibit 3](#) Capacity Analysis of the Projected No Build Condition is one exhibit that shows lane configurations and capacity analysis. The top panel shows intersection controls and lane configurations (it is the same as the existing condition exhibit). The bottom panel shows the overall intersection LOS as well as the LOS for individual turn movements at the major intersections for the design year (2040). The signal phasing was maintained from the existing condition and the signal timings were optimized.

All of the intersections continue to operate at LOS C or better with projected traffic. At Illinois Avenue and Mill Street, the same movements continue to operate at LOS D from the existing condition with the addition of the following: westbound left (PM). At University Avenue and Mill Street the southbound thru begins to operate at LOS D in the AM.

## PERFORMANCE OF BUILD TWO-WAY ALTERNATIVE – ILLINOIS AVE AS US 51

[Exhibit 4](#) Capacity Analysis of the Projected Build Condition with Illinois Avenue as US 51 with Two-Way Traffic shows lane configurations and capacity analysis. The exhibit has two sheets (lettered A and B) that reflect two lane configuration scenarios. Scenario A uses the existing pavement for vehicular lanes while maintaining parking and bike lanes. Scenario B includes pavement widening on Illinois Avenue for lane additions as well as the possible elimination of on-street parking and bike lanes.

In Scenario A, major Illinois Avenue intersections operate at LOS E and F in this condition. In this scenario, for the two IL 13 intersections, the existing two phase design is maintained due to a lack of channelization for left turn phasing. Split phasing was considered for the two-way traffic but it performed worse than the existing phasing; therefore, the existing phasing was maintained.

Scenario B includes two through lanes northbound and southbound on Illinois Avenue with a center turn lane at the major intersections. For the two IL 13 at Illinois Avenue intersections, protected left turn phasing was added to improve capacity. Even with the reasonable increase in capacity from additional channelization and phasing, the intersection of Illinois Avenue at IL 13 Eastbound (Walnut Street) continued to operate at LOS D and E in the AM and PM peaks respectively. Various movements operated at LOS F at this intersection as well.

## PERFORMANCE OF BUILD TWO-WAY ALTERNATIVE – UNIVERSITY AVE AS US 51

**Exhibit 5** Capacity Analysis of the Projected Build Condition with University Avenue as US 51 with Two-Way Traffic shows lane configurations and capacity analysis. The exhibit has two sheets (lettered A and B) that reflect two lane configuration scenarios. Scenario A uses the existing pavement for vehicular lanes while maintaining parking and bike lanes. Scenario B includes pavement widening on University Avenue for lane additions as well as the possible elimination of on-street parking and bike lanes.

In Scenario A, Major University Avenue intersections operate at LOS E and F in this condition. In this scenario, for the two IL 13 intersections, the existing two phase design is maintained due to a lack of channelization for left turn phasing. Split phasing was considered for the two-way traffic but it performed worse than the existing phasing; therefore, the existing phasing was maintained.

Scenario B includes two through lanes northbound and southbound on University Avenue with a southbound dual left turn lanes at IL 13 EB (Walnut Street) and northbound dual left turn lanes at IL 13 WB (Main Street). Protected left turn phasing was added to improve capacity. Even with the reasonable increase in capacity from additional channelization and phasing, the intersection of University Avenue at IL 13 Eastbound (Walnut Street) continued to operate at LOS E in the AM peak respectively. Also, University at IL 13 Westbound (Main Street) and Eastbound (Walnut Street) has various movements that operate at LOS D and E in the AM and PM peak hours. Illinois Avenue at IL 13 Westbound (Main Street) and Eastbound (Walnut Street) operates at LOS D for southbound movements.

## CAPACITY SUMMARY

A summary of all the capacities is shown in [Table 3](#).

**TABLE 3 – INTERSECTION CAPACITY SUMMARY**

Intersection LOS (AM (PM))							
Street	Cross Street	Existing Conditions One-Way	No Build One-Way	Build Illinois Two-Way Two Lane	Build Illinois Two-Way Four Lane	Build University Two-Way Two Lane	Build University Two-Way Four-Lane
Main St	University Ave	B (B)	C (C)	A (B)	A (B)	E (F)	C (C)
Walnut St	University Ave	C (C)	C (C)	B (C)	B (C)	F (F)	C (E)
Main St	Illinois Ave	B (B)	B (B)	F (F)	C (C)	C (D)	C (C)
Walnut St	Illinois Ave	A (B)	B (C)	F (F)	D (E)	C (D)	B (C)
Mill St	University Ave	C (C)	C (C)	-	-	-	-
Mill St	Illinois Ave	C (C)	C (C)	D (E)	B (C)	-	-
Mill St	Illinois and University Ave	-	-	-	-	B (C)	B (C)
Mill St	Normal Ave	-	-	B (B)	B (B)	-	-

Delay, seconds (AM (PM))							
Street	Cross Street	Existing Conditions One-Way	No Build One-Way	Build Illinois Two-Way Two Lane	Build Illinois Two-Way Four Lane	Build University Two-Way Two Lane	Build University Two-Way Four-Lane
Main St	University Ave	17.5 (16.4)	20.9 (21.5)	9.5 (11.6)	8.9 (12.1)	76.5 (119.6)	25.1 (30.0)
Walnut St	University Ave	23.9 (22.4)	31.4 (28.5)	17.2 (24.2)	21.3 (26.0)	89.9 (170.2)	33.3 (56.2)
Main St	Illinois Ave	13.6 (12.1)	17.7 (17.5)	123.1 (120.3)	27.1 (25.8)	25.9 (37.2)	23.0 (23.1)
Walnut St	Illinois Ave	9.7 (13.5)	12.6 (21.0)	253.4 (295.1)	42.9 (73.5)	21.3 (51.8)	16.3 (29.1)
Mill St	University Ave	20.9 (22.9)	28.3 (25.7)	-	-	-	-
Mill St	Illinois Ave	27.2 (26.9)	29.6 (33.7)	50.6 (55.2)	18.0 (20.1)	-	-
Mill St	Illinois and University Ave	-	-	-	-	11.6 (17.7)	11.6 (17.7)
Mill St	Normal Ave	-	-	16.2 (19.2)	13.3 (13.5)	-	-

## PRELIMINARY FINDINGS

Conclusions for the existing and no-build alternative are as follows:

1. The existing one-way configuration of US 51 at IL 13 intersections operates at an acceptable level of service (LOS C or better) with the existing traffic.
2. The existing one-way configuration of US 51 at IL 13 intersections generally meets capacity level of service requirements with projected traffic in the no-build condition. There are some turning movements that begin to operate at slightly less (LOS D) than IDOT design criteria (LOS C or better).
3. The US 51 intersection with Mill Street is an unconventional configuration with unique signal phasing. Overall, this clustered intersection operates at an acceptable level of service (LOS C or better); however, some movements operate at a less than an optimal level (LOS D) with existing and projected traffic.

Conclusions for the build two-way alternatives are as follows:

4. IL 13 carries a significant amount of traffic (more than double US 51) and therefore requires a significant amount of green time in the cycle. US 51 receives the balance of the available green time. Two-way traffic on US 51 puts a larger flow demand on the intersections over the one-way condition while not getting more green time. The signal timing with the two operations is less efficient than the one-way couple.
5. Maintaining the existing vehicular traveled way (reusing and reconfiguring the existing lanes) while maintaining parking, sidewalks, and bike lanes would result in vehicular capacity failure.
6. Lane additions to US 51 (Illinois or University Ave, depending on the alternative) would be necessary to reduce delay and avoid capacity failure but would still result in deficient performance (i.e. LOS E and F) for IL 13 intersections and turning movements.
7. The University Avenue as US 51 alternative performs slightly better than the Illinois Avenue as US 51 alternative at the IL 13 intersections.
8. The Illinois Avenue as US 51 alternative could result in removal of the unconventional clustered intersection at Mill Street. University Avenue could be converted back to a conventional low-volume grid street without a sweeping alignment towards Illinois Avenue at the north and south ends of the study.
9. The University Avenue as US 51 alternative could not maintain the existing unconventional clustered intersection at Mill Street. A five-leg multi-lane roundabout would be a feasible intersection control alternative to avoid capacity failure.

# Appendix C

Synchro Analysis Outputs

Lanes, Volumes, Timings  
2: Illinois Ave US51 NB & Mill St

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	60	0	0	156	48	233	333	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		85	135		135	0		0
Storage Lanes	1		0	0		1	2		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1478	2911	0	0	3124	1398	3152	3065	1454	0	0	0
Flt Permitted	0.950	0.999					0.950					
Satd. Flow (perm)	1478	2911	0	0	3124	1364	3152	3065	1430	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						284			185			
Link Speed (mph)		30			30			30				30
Link Distance (ft)		130			729			410				728
Travel Time (s)		3.0			16.6			9.3				16.5
Confl. Peds. (#/hr)						8			3			
Peak Hour Factor	0.88	0.88	0.88	0.74	0.74	0.74	0.96	0.96	0.96	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	2%	2%	4%	4%	0%	6%	0%	2%	2%	2%
Adj. Flow (vph)	16	68	0	0	211	65	243	347	21	0	0	0
Shared Lane Traffic (%)	10%											
Lane Group Flow (vph)	14	70	0	0	211	65	243	347	21	0	0	0
Turn Type	Split	NA			NA	Perm	Prot	NA	Perm			
Protected Phases	4 5!	4 5!			8		1!	6				
Permitted Phases						8			6			
Total Split (s)					18.7	18.7	12.3	23.0	23.0			
Total Lost Time (s)					4.7	4.7	5.3	6.6	6.6			
Act Effct Green (s)	26.1	26.1			15.4	15.4	9.7	21.9	21.9			
Actuated g/C Ratio	0.33	0.33			0.19	0.19	0.12	0.27	0.27			
v/c Ratio	0.03	0.07			0.35	0.13	0.64	0.41	0.04			
Control Delay	1.8	2.3			28.9	0.6	43.6	27.0	0.1			
Queue Delay	0.2	0.1			0.0	0.0	0.3	0.0	0.0			
Total Delay	1.9	2.4			28.9	0.6	44.0	27.0	0.1			
LOS	A	A			C	A	D	C	A			
Approach Delay		2.3			22.2			32.8				
Approach LOS		A			C			C				

Intersection Summary

Area Type: CBD  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 0 (0%), Referenced to phase 2:SET, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.64  
 Intersection Signal Delay: 27.2  
 Intersection Capacity Utilization 63.5%  
 Analysis Period (min) 15

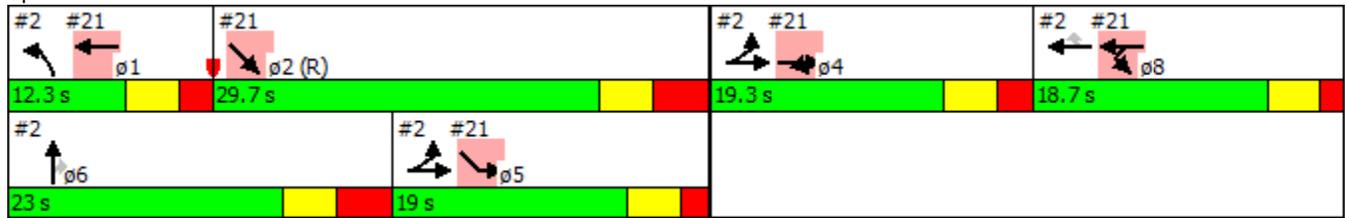
Intersection LOS: C  
 ICU Level of Service B

! Phase conflict between lane groups.

Lanes, Volumes, Timings  
 2: Illinois Ave US51 NB & Mill St

5/5/2016

Splits and Phases: 2: Illinois Ave US51 NB & Mill St



Lane Group	ø2	ø4	ø5
Lane Configurations			
Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	2	4	5
Permitted Phases			
Total Split (s)	29.7	19.3	19.0
Total Lost Time (s)			
Act Effect Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
<b>Intersection Summary</b>			

Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/5/2016

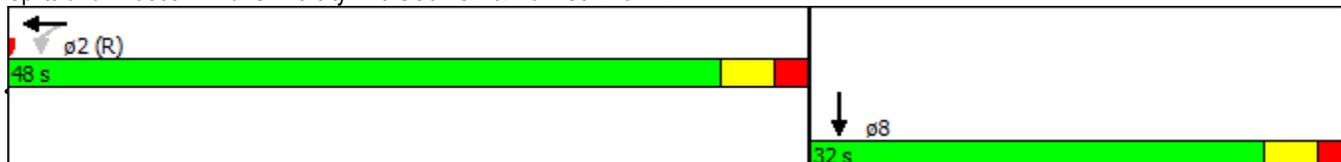


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↖↖↖						↗↗↗	
Volume (vph)	0	0	0	226	1036	0	0	0	0	0	608	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	215		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	1356	4199	0	0	0	0	0	4283	0
Flt Permitted				0.950	0.999							
Satd. Flow (perm)	0	0	0	1354	4199	0	0	0	0	0	4283	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)				63	26							34
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1022			441			684			730	
Travel Time (s)		23.2			10.0			15.5			16.6	
Confl. Peds. (#/hr)				1								1
Peak Hour Factor	0.92	0.92	0.92	0.76	0.76	0.76	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	2%	2%	2%	3%	5%	2%	2%	2%	2%	2%	6%	7%
Adj. Flow (vph)	0	0	0	297	1363	0	0	0	0	0	724	137
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	267	1393	0	0	0	0	0	861	0
Turn Type				Perm	NA						NA	
Protected Phases					2						8	
Permitted Phases				2								
Total Split (s)				48.0	48.0						32.0	
Total Lost Time (s)				5.4	5.4						4.9	
Act Effct Green (s)				42.6	42.6						27.1	
Actuated g/C Ratio				0.53	0.53						0.34	
v/c Ratio				0.36	0.62						0.58	
Control Delay				11.6	15.3						22.8	
Queue Delay				0.0	0.0						0.0	
Total Delay				11.6	15.3						22.8	
LOS				B	B						C	
Approach Delay					14.7						22.8	
Approach LOS					B						C	

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	25 (31%), Referenced to phase 2:WBTL, Start of Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	17.5
Intersection LOS:	B
Intersection Capacity Utilization:	54.4%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 10: University Ave US51 SB & Main St IL13 WB



# Lanes, Volumes, Timings

## 11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016

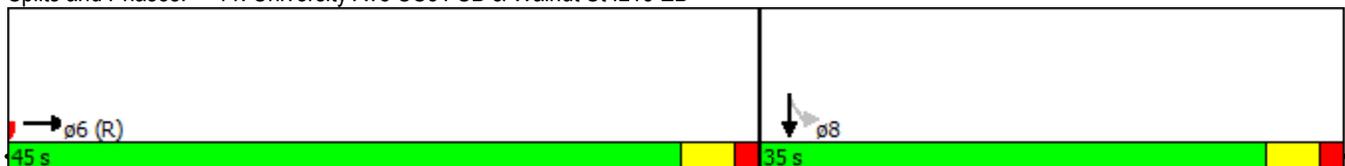


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑								↘	↙↑	
Volume (vph)	0	1255	144	0	0	0	0	0	0	335	443	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	4304	0	0	0	0	0	0	0	1421	2945	0
Flt Permitted										0.950	0.992	
Satd. Flow (perm)	0	4304	0	0	0	0	0	0	0	1421	2945	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		35								25	25	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		391			434			1268			684	
Travel Time (s)		8.9			9.9			28.8			15.5	
Confl. Peds. (#/hr)			3			1						
Peak Hour Factor	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.92	0.75	0.75	0.75
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	2%	2%	2%	4%	5%	2%
Parking (#/hr)		5										
Adj. Flow (vph)	0	1476	169	0	0	0	0	0	0	447	591	0
Shared Lane Traffic (%)										25%		
Lane Group Flow (vph)	0	1645	0	0	0	0	0	0	0	335	703	0
Turn Type		NA								Perm	NA	
Protected Phases		6									8	
Permitted Phases										8		
Total Split (s)		45.0								35.0	35.0	
Total Lost Time (s)		4.8								4.8	4.8	
Act Effct Green (s)		40.2								30.2	30.2	
Actuated g/C Ratio		0.50								0.38	0.38	
v/c Ratio		0.75								0.61	0.62	
Control Delay		18.4								33.5	32.2	
Queue Delay		0.0								0.0	0.0	
Total Delay		18.4								33.5	32.2	
LOS		B								C	C	
Approach Delay		18.4									32.6	
Approach LOS		B									C	

### Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 6:EBT, Start of Green, Master Intersection
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	23.9
Intersection LOS:	C
Intersection Capacity Utilization:	54.8%
ICU Level of Service:	A
Analysis Period (min):	15

### Splits and Phases: 11: University Ave US51 SB & Walnut St IL13 EB



Lanes, Volumes, Timings

14: Illinois Ave US51/Illinois Ave US51 NB & University Ave US51 SB

5/5/2016



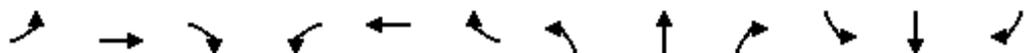
Lane Group	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations		↑↑			↙	↗↗
Volume (vph)	0	608	0	0	5	534
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0			0	150	0
Storage Lanes	0			0	1	2
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	3539	0	0	1770	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	0	0	1770	2787
Link Speed (mph)		30	30		30	
Link Distance (ft)		243	410		446	
Travel Time (s)		5.5	9.3		10.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	661	0	0	5	580
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	661	0	0	5	580
Sign Control		Free	Stop		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016

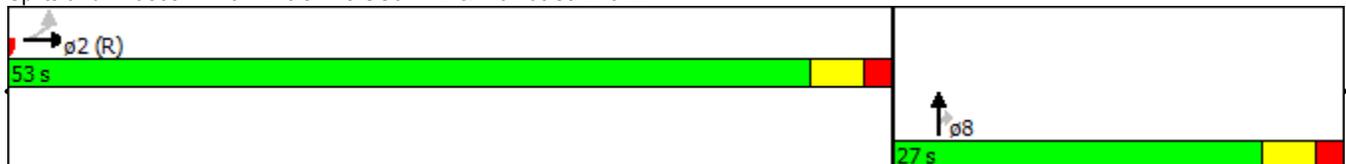


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑						↑↑	↗			
Volume (vph)	70	1451	0	0	0	0	0	298	97	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		85	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1562	4532	0	0	0	0	0	2787	1213	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	1562	4532	0	0	0	0	0	2787	1213	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	77							4	30			
Link Speed (mph)		30			30			30				30
Link Distance (ft)		434			457			1265				695
Travel Time (s)		9.9			10.4			28.8				15.8
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.84	0.84	0.84	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	2%	2%	2%	2%	2%	4%	9%	2%	2%	2%
Parking (#/hr)								5				
Adj. Flow (vph)	77	1595	0	0	0	0	0	355	115	0	0	0
Shared Lane Traffic (%)									10%			
Lane Group Flow (vph)	77	1595	0	0	0	0	0	367	103	0	0	0
Turn Type	Perm	NA						NA	Perm			
Protected Phases		2						8				
Permitted Phases	2								8			
Total Split (s)	53.0	53.0						27.0	27.0			
Total Lost Time (s)	5.0	5.0						5.0	5.0			
Act Effct Green (s)	48.0	48.0						22.0	22.0			
Actuated g/C Ratio	0.60	0.60						0.28	0.28			
v/c Ratio	0.08	0.59						0.48	0.29			
Control Delay	0.5	5.6						26.4	19.2			
Queue Delay	0.0	0.1						0.0	0.0			
Total Delay	0.5	5.7						26.4	19.2			
LOS	A	A						C	B			
Approach Delay		5.5						24.8				
Approach LOS		A						C				

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	9.7
Intersection LOS:	A
Intersection Capacity Utilization:	54.5%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 18: Illinois Ave US51 NB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/5/2016

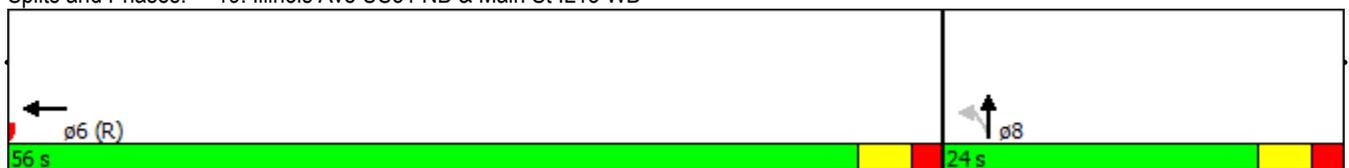


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑		↑	↑↑				
Volume (vph)	0	0	0	0	1194	273	114	257	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	260		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	4302	0	1395	2772	0	0	0	0
Flt Permitted							0.950	0.998				
Satd. Flow (perm)	0	0	0	0	4302	0	1393	2772	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)					127		43	30				
Link Speed (mph)		30			30			30				30
Link Distance (ft)		441			447			695				721
Travel Time (s)		10.0			10.2			15.8				16.4
Confl. Peds. (#/hr)			1			2	1		1			1
Peak Hour Factor	0.92	0.92	0.92	0.78	0.78	0.78	0.74	0.74	0.74	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	5%	6%	6%	5%	2%	2%	2%	2%
Parking (#/hr)								5	5			
Adj. Flow (vph)	0	0	0	0	1531	350	154	347	0	0	0	0
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	0	0	0	0	1881	0	139	362	0	0	0	0
Turn Type					NA		Perm	NA				
Protected Phases					6			8				
Permitted Phases							8					
Total Split (s)					56.0		24.0	24.0				
Total Lost Time (s)					5.2		5.2	5.2				
Act Effct Green (s)					50.8		18.8	18.8				
Actuated g/C Ratio					0.64		0.24	0.24				
v/c Ratio					0.68		0.39	0.54				
Control Delay					10.1		22.5	28.5				
Queue Delay					0.0		0.0	0.0				
Total Delay					10.1		22.5	28.5				
LOS					B		C	C				
Approach Delay					10.1			26.8				
Approach LOS					B			C				

Intersection Summary

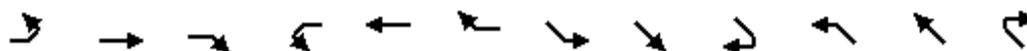
Area Type: CBD  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 41 (51%), Referenced to phase 6:WBT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.68  
 Intersection Signal Delay: 13.6  
 Intersection Capacity Utilization 54.4%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 19: Illinois Ave US51 NB & Main St IL13 WB



Lanes, Volumes, Timings  
21: University Ave US51 SB & Mill St

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↑↑↑	↑	↑	↑↑		↑↑	↑↑				
Volume (vph)	0	61	134	31	358	0	13	344	1	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		230	0		0	100		0	0		0
Storage Lanes	0		1	1		0	2		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4940	1553	1595	3390	0	2334	3438	0	0	0	0
Flt Permitted				0.950	0.955		0.950					
Satd. Flow (perm)	0	4940	1553	1595	3237	0	2334	3438	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			275									
Link Speed (mph)		30			30			30				30
Link Distance (ft)		331			130			211				446
Travel Time (s)		7.5			3.0			4.8				10.1
Confl. Peds. (#/hr)			3						1			
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.71	0.71	0.71	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	4%	3%	2%	2%	50%	5%	2%	2%	2%	2%
Adj. Flow (vph)	0	81	179	41	477	0	18	485	1	0	0	0
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	81	179	37	481	0	18	486	0	0	0	0
Turn Type		NA	Prot	Prot	NA		custom	NA				
Protected Phases		4	4	8	18!		5!	2				
Permitted Phases							5!					
Total Split (s)		19.3	19.3	18.7			19.0	29.7				
Total Lost Time (s)		5.3	5.3	4.7			5.0	6.6				
Act Effct Green (s)		7.1	7.1	15.4	24.6		14.0	25.8				
Actuated g/C Ratio		0.09	0.09	0.19	0.31		0.18	0.32				
v/c Ratio		0.18	0.46	0.12	0.60		0.04	0.44				
Control Delay		34.1	4.6	29.4	18.2		27.9	23.8				
Queue Delay		0.0	0.0	2.6	2.5		0.0	0.0				
Total Delay		34.1	4.6	32.0	20.7		27.9	23.8				
LOS		C	A	C	C		C	C				
Approach Delay		13.8			21.5			23.9				
Approach LOS		B			C			C				

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 0 (0%), Referenced to phase 2:SET, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.64  
 Intersection Signal Delay: 20.9  
 Intersection Capacity Utilization 63.5%  
 Analysis Period (min) 15

Intersection LOS: C

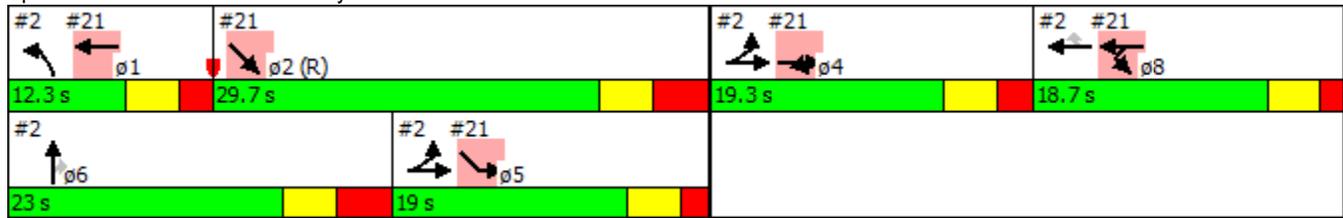
ICU Level of Service B

! Phase conflict between lane groups.

Lanes, Volumes, Timings  
 21: University Ave US51 SB & Mill St

5/5/2016

Splits and Phases: 21: University Ave US51 SB & Mill St



Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	1	6
Permitted Phases		
Total Split (s)	12.3	23.0
Total Lost Time (s)		
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
<b>Intersection Summary</b>		

Lanes, Volumes, Timings

29: University Ave US51 SB/Illinois Ave US51 & Illinois Ave US51 NB

5/5/2016



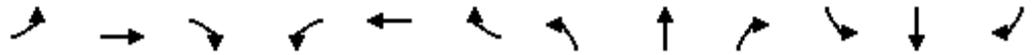
Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations				↑↑		↑↑
Volume (vph)	0	0	0	662	0	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	3539	0	2787
Flt Permitted						
Satd. Flow (perm)	0	0	0	3539	0	2787
Link Speed (mph)	30			30	30	
Link Distance (ft)	860			613	674	
Travel Time (s)	19.5			13.9	15.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	720	0	376
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	720	0	376
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.6%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
 2: Illinois Ave US51 NB & Mill St

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗			↗↗	↖	↖↗	↗↗	↖			
Volume (vph)	120	209	0	0	140	69	212	498	47	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		85	135		135	0		0
Storage Lanes	1		0	0		1	2		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1478	3074	0	0	3094	1454	3152	3124	1454	0	0	0
Flt Permitted	0.950	0.997					0.950					
Satd. Flow (perm)	1478	3074	0	0	3094	1417	3152	3124	1432	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						284			185			
Link Speed (mph)		30			30			30				30
Link Distance (ft)		130			729			410				728
Travel Time (s)		3.0			16.6			9.3				16.5
Confl. Peds. (#/hr)			1			9			2			
Peak Hour Factor	0.85	0.85	0.85	0.79	0.79	0.79	0.91	0.91	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	2%	2%	5%	0%	0%	4%	0%	2%	2%	2%
Shared Lane Traffic (%)	11%											
Lane Group Flow (vph)	125	262	0	0	177	87	233	547	52	0	0	0
Turn Type	Split	NA			NA	Perm	Prot	NA	Perm			
Protected Phases	4 5!	4 5!			8		1!	6				
Permitted Phases						8			6			
Detector Phase	4 5	4 5			8	8	1	6	6			
Switch Phase												
Minimum Initial (s)					5.0	5.0	5.0	20.0	20.0			
Minimum Split (s)					20.7	20.7	10.3	26.6	26.6			
Total Split (s)					18.7	18.7	12.0	23.0	23.0			
Total Split (%)					23.4%	23.4%	15.0%	28.8%	28.8%			
Yellow Time (s)					3.2	3.2	3.2	3.2	3.2			
All-Red Time (s)					1.5	1.5	2.1	3.4	3.4			
Lost Time Adjust (s)					0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)					4.7	4.7	5.3	6.6	6.6			
Lead/Lag					Lag	Lag	Lead	Lead	Lead			
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes			
Recall Mode					None	None	None	Max	Max			
Act Effct Green (s)	31.7	31.7			12.6	12.6	7.9	19.1	19.1			
Actuated g/C Ratio	0.40	0.40			0.16	0.16	0.10	0.24	0.24			
v/c Ratio	0.21	0.22			0.36	0.19	0.75	0.73	0.11			
Control Delay	3.1	2.6			31.9	0.9	53.7	36.6	0.4			
Queue Delay	1.1	0.6			0.0	0.0	1.1	0.0	0.0			
Total Delay	4.3	3.2			31.9	0.9	54.8	36.6	0.4			
LOS	A	A			C	A	D	D	A			
Approach Delay		3.5			21.7			39.4				
Approach LOS		A			C			D				

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80

Lanes, Volumes, Timings  
 2: Illinois Ave US51 NB & Mill St

5/5/2016

Lane Group	ø2	ø4	ø5
Lane Configurations			
Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	2	4	5
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	20.0	5.0	5.0
Minimum Split (s)	26.6	21.3	21.0
Total Split (s)	30.0	19.3	19.0
Total Split (%)	38%	24%	24%
Yellow Time (s)	3.2	3.2	3.2
All-Red Time (s)	3.4	2.1	1.8
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	C-Max	None	Max
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
<b>Intersection Summary</b>			

# Lanes, Volumes, Timings

## 2: Illinois Ave US51 NB & Mill St

5/5/2016

Offset: 0 (0%), Referenced to phase 2:SET, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 26.9

Intersection LOS: C

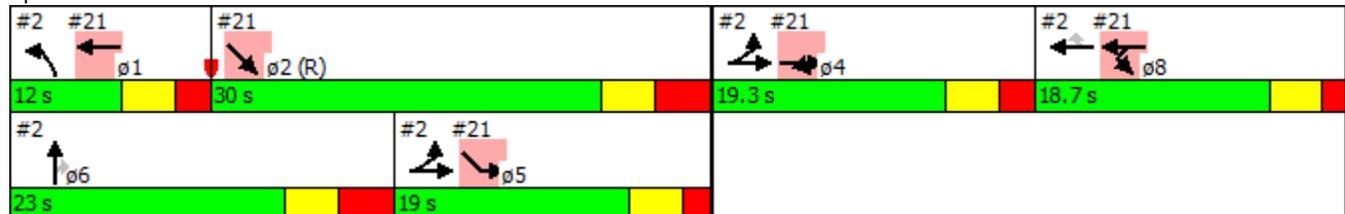
Intersection Capacity Utilization 71.9%

ICU Level of Service C

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 2: Illinois Ave US51 NB & Mill St



Lanes, Volumes, Timings  
 5: Normal Ave/University Ave US51 SB

5/5/2016



Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	0	0	358	180	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	3433	1863	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	3433	1863	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	354			363	271	
Travel Time (s)	8.0			8.3	6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	389	196	0	0
Sign Control	Stop			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.5%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↙	↕						↕	↘
Volume (vph)	0	0	0	199	1385	0	0	0	0	0	705	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	215		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	1383	4364	0	0	0	0	0	4487	0
Flt Permitted				0.950	0.999							
Satd. Flow (perm)	0	0	0	1381	4364	0	0	0	0	0	4487	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)				30	26							17
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1022			441			684			730	
Travel Time (s)		23.2			10.0			15.5			16.6	
Confl. Peds. (#/hr)				1								1
Peak Hour Factor	0.92	0.92	0.92	0.80	0.80	0.80	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	2%	1%	1%	2%	2%	2%	2%	2%	2%	3%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	224	1756	0	0	0	0	0	903	0
Turn Type				Perm	NA						NA	
Protected Phases					2						8	
Permitted Phases				2								
Detector Phase				2	2						8	
Switch Phase												
Minimum Initial (s)				10.0	10.0						8.0	
Minimum Split (s)				21.4	21.4						20.9	
Total Split (s)				51.0	51.0						29.0	
Total Split (%)				63.8%	63.8%						36.3%	
Yellow Time (s)				3.2	3.2						3.2	
All-Red Time (s)				2.2	2.2						1.7	
Lost Time Adjust (s)				0.0	0.0						0.0	
Total Lost Time (s)				5.4	5.4						4.9	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode				C-Max	C-Max						Max	
Act Effct Green (s)				45.6	45.6						24.1	
Actuated g/C Ratio				0.57	0.57						0.30	
v/c Ratio				0.28	0.70						0.66	
Control Delay				8.3	12.1						26.7	
Queue Delay				0.0	0.1						0.0	
Total Delay				8.3	12.2						26.7	
LOS				A	B						C	
Approach Delay					11.7						26.7	
Approach LOS					B						C	

Intersection Summary

Area Type: CBD  
 Cycle Length: 80  
 Actuated Cycle Length: 80

# Lanes, Volumes, Timings

## 10: University Ave US51 SB & Main St IL13 WB

5/5/2016

Offset: 25 (31%), Referenced to phase 2:WBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 16.4

Intersection LOS: B

Intersection Capacity Utilization 54.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 10: University Ave US51 SB & Main St IL13 WB



Lanes, Volumes, Timings

11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑								↖	↗↑	
Volume (vph)	0	1316	159	0	0	0	0	0	0	419	452	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	4313	0	0	0	0	0	0	0	1449	3041	0
Flt Permitted										0.950	0.989	
Satd. Flow (perm)	0	4313	0	0	0	0	0	0	0	1447	3040	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		39								25	25	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		391			434			1268			684	
Travel Time (s)		8.9			9.9			28.8			15.5	
Confl. Peds. (#/hr)			3			7			1	1		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Heavy Vehicles (%)	2%	2%	1%	2%	2%	2%	2%	2%	2%	2%	1%	2%
Parking (#/hr)		5										
Shared Lane Traffic (%)										32%		
Lane Group Flow (vph)	0	1603	0	0	0	0	0	0	0	320	659	0
Turn Type		NA								Perm	NA	
Protected Phases		6									8	
Permitted Phases										8		
Detector Phase		6								8	8	
Switch Phase												
Minimum Initial (s)		10.0								10.0	10.0	
Minimum Split (s)		20.8								20.8	20.8	
Total Split (s)		46.0								34.0	34.0	
Total Split (%)		57.5%								42.5%	42.5%	
Yellow Time (s)		3.2								3.2	3.2	
All-Red Time (s)		1.6								1.6	1.6	
Lost Time Adjust (s)		0.0								0.0	0.0	
Total Lost Time (s)		4.8								4.8	4.8	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max								Max	Max	
Act Effct Green (s)		41.2								29.2	29.2	
Actuated g/C Ratio		0.52								0.36	0.36	
v/c Ratio		0.72								0.59	0.59	
Control Delay		16.8								32.7	31.2	
Queue Delay		0.0								0.0	0.0	
Total Delay		16.8								32.7	31.2	
LOS		B								C	C	
Approach Delay		16.8									31.7	
Approach LOS		B									C	

Intersection Summary

Area Type: CBD  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 0 (0%), Referenced to phase 6:EBT, Start of Green, Master Intersection  
 Natural Cycle: 50

# Lanes, Volumes, Timings

## 11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 22.4

Intersection LOS: C

Intersection Capacity Utilization 58.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 11: University Ave US51 SB & Walnut St IL13 EB



Lanes, Volumes, Timings

14: Illinois Ave US51/Illinois Ave US51 NB & University Ave US51 SB

5/5/2016



Lane Group	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations		↑↑			↵	↵↵
Volume (vph)	0	608	0	0	5	534
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0			0	150	0
Storage Lanes	0			0	1	2
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	3539	0	0	1770	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	0	0	1770	2787
Link Speed (mph)		30	30		30	
Link Distance (ft)		243	410		446	
Travel Time (s)		5.5	9.3		10.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	661	0	0	5	580
Sign Control		Free	Stop		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.8%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings

18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑						↑↑	↗			
Volume (vph)	127	1682	0	0	0	0	0	434	249	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		85	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1593	4577	0	0	0	0	0	2820	1297	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	1590	4577	0	0	0	0	0	2820	1279	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	134							13	27			
Link Speed (mph)		30			30			30				30
Link Distance (ft)		434			457			1265				695
Travel Time (s)		9.9			10.4			28.8				15.8
Confl. Peds. (#/hr)	1								1			
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.84	0.84	0.84	0.92	0.92	0.92
Parking (#/hr)								5				
Shared Lane Traffic (%)									17%			
Lane Group Flow (vph)	134	1771	0	0	0	0	0	567	246	0	0	0
Turn Type	Perm	NA						NA	Perm			
Protected Phases		2						8				
Permitted Phases	2								8			
Detector Phase	2	2						8	8			
Switch Phase												
Minimum Initial (s)	18.0	18.0						18.0	18.0			
Minimum Split (s)	23.0	23.0						23.0	23.0			
Total Split (s)	49.0	49.0						31.0	31.0			
Total Split (%)	61.3%	61.3%						38.8%	38.8%			
Yellow Time (s)	3.2	3.2						3.2	3.2			
All-Red Time (s)	1.8	1.8						1.8	1.8			
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 Optimize?												
Recall Mode	C-Max	C-Max						Max	Max			
Act Effct Green (s)	44.0	44.0						26.0	26.0			
Actuated g/C Ratio	0.55	0.55						0.32	0.32			
v/c Ratio	0.14	0.70						0.61	0.57			
Control Delay	0.8	8.7						25.6	25.9			
Queue Delay	0.0	0.1						0.0	0.0			
Total Delay	0.8	8.8						25.6	25.9			
LOS	A	A						C	C			
Approach Delay		8.2						25.7				
Approach LOS		A						C				

Intersection Summary

Area Type: CBD  
 Cycle Length: 80  
 Actuated Cycle Length: 80

# Lanes, Volumes, Timings

## 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 13.5

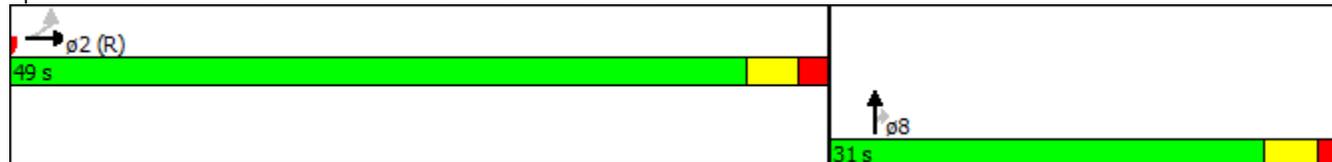
Intersection LOS: B

Intersection Capacity Utilization 60.7%

ICU Level of Service B

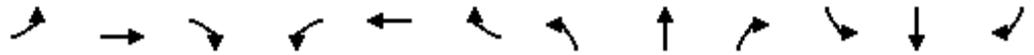
Analysis Period (min) 15

Splits and Phases: 18: Illinois Ave US51 NB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑		↑	↑↑				
Volume (vph)	0	0	0	0	1194	273	114	257	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	260		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	4481	0	1478	2830	0	0	0	0
Flt Permitted							0.950	0.998				
Satd. Flow (perm)	0	0	0	0	4481	0	1476	2830	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)					119		65	30				
Link Speed (mph)		30			30			30				30
Link Distance (ft)		441			447			695				721
Travel Time (s)		10.0			10.2			15.8				16.4
Confl. Peds. (#/hr)			1	1		1	1		1			1
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	0%	3%	2%	2%	2%	2%
Parking (#/hr)								5	5			
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	0	0	0	0	1578	0	111	288	0	0	0	0
Turn Type					NA		Perm	NA				
Protected Phases					6			8				
Permitted Phases							8					
Detector Phase					6		8	8				
Switch Phase												
Minimum Initial (s)					10.0		5.0	5.0				
Minimum Split (s)					21.2		21.2	21.2				
Total Split (s)					54.0		26.0	26.0				
Total Split (%)					67.5%		32.5%	32.5%				
Yellow Time (s)					3.2		3.2	3.2				
All-Red Time (s)					2.0		2.0	2.0				
Lost Time Adjust (s)					0.0		0.0	0.0				
Total Lost Time (s)					5.2		5.2	5.2				
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode					C-Max		Max	Max				
Act Effct Green (s)					48.8		20.8	20.8				
Actuated g/C Ratio					0.61		0.26	0.26				
v/c Ratio					0.57		0.26	0.38				
Control Delay					9.5		16.7	24.6				
Queue Delay					0.0		0.0	0.0				
Total Delay					9.5		16.7	24.6				
LOS					A		B	C				
Approach Delay					9.5			22.4				
Approach LOS					A			C				

Intersection Summary

Area Type: CBD  
 Cycle Length: 80

Lanes, Volumes, Timings  
19: Illinois Ave US51 NB & Main St IL13 WB

5/5/2016

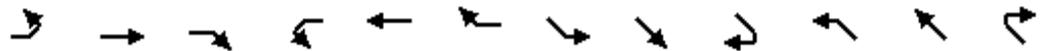
Actuated Cycle Length: 80	
Offset: 41 (51%), Referenced to phase 6:WBT, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 12.1	Intersection LOS: B
Intersection Capacity Utilization 54.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Illinois Ave US51 NB & Main St IL13 WB



Lanes, Volumes, Timings  
 21: University Ave US51 SB & Mill St

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↑↑↑	↑	↑	↑↑		↑↑	↑↑				
Volume (vph)	0	290	262	23	329	0	39	362	4	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		230	0		0	100		0	0		0
Storage Lanes	0		1	1		0	2		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	5187	1583	1643	3391	0	3400	3567	0	0	0	0
Flt Permitted				0.950	0.955		0.950					
Satd. Flow (perm)	0	5187	1583	1643	3238	0	3400	3567	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			308					1				
Link Speed (mph)		30			30			30				30
Link Distance (ft)		331			130			211				446
Travel Time (s)		7.5			3.0			4.8				10.1
Confl. Peds. (#/hr)			3						1			
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	2%	2%	3%	1%	0%	2%	2%	2%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	341	308	23	377	0	42	397	0	0	0	0
Turn Type		NA	Prot	Prot	NA		custom	NA				
Protected Phases		4	4	8	18!		5!	2				
Permitted Phases							5!					
Detector Phase		4	4	8	1 8		5	2				
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0			5.0	20.0				
Minimum Split (s)		21.3	21.3	20.7			21.0	26.6				
Total Split (s)		19.3	19.3	18.7			19.0	30.0				
Total Split (%)		24.1%	24.1%	23.4%			23.8%	37.5%				
Yellow Time (s)		3.2	3.2	3.2			3.2	3.2				
All-Red Time (s)		2.1	2.1	1.5			1.8	3.4				
Lost Time Adjust (s)		0.0	0.0	0.0			0.0	0.0				
Total Lost Time (s)		5.3	5.3	4.7			5.0	6.6				
Lead/Lag		Lead	Lead	Lag			Lag	Lag				
Lead-Lag Optimize?		Yes	Yes	Yes			Yes	Yes				
Recall Mode		None	None	None			Max	C-Max				
Act Effct Green (s)		12.7	12.7	12.6	19.9		14.0	24.9				
Actuated g/C Ratio		0.16	0.16	0.16	0.25		0.18	0.31				
v/c Ratio		0.41	0.60	0.09	0.58		0.07	0.36				
Control Delay		31.6	9.4	33.4	23.0		28.0	23.0				
Queue Delay		0.0	0.0	1.2	1.7		0.0	0.0				
Total Delay		31.6	9.4	34.6	24.7		28.0	23.0				
LOS		C	A	C	C		C	C				
Approach Delay		21.1			25.3			23.5				
Approach LOS		C			C			C				

Intersection Summary	
Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80

Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	1	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	20.0
Minimum Split (s)	10.3	26.6
Total Split (s)	12.0	23.0
Total Split (%)	15%	29%
Yellow Time (s)	3.2	3.2
All-Red Time (s)	2.1	3.4
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
<b>Intersection Summary</b>		

Lanes, Volumes, Timings  
 21: University Ave US51 SB & Mill St

5/5/2016

Offset: 0 (0%), Referenced to phase 2:SET, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 22.9

Intersection LOS: C

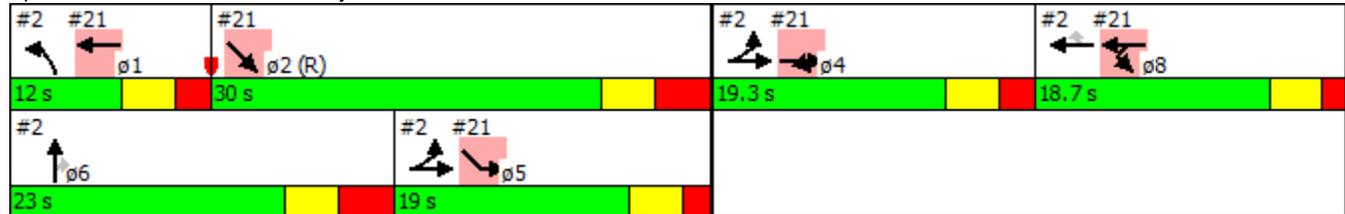
Intersection Capacity Utilization 71.9%

ICU Level of Service C

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 21: University Ave US51 SB & Mill St



Lanes, Volumes, Timings

29: University Ave US51 SB/Illinois Ave US51 & Illinois Ave US51 NB

5/5/2016



Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations				↑↑		↑↑
Volume (vph)	0	0	0	662	0	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	3539	0	2787
Flt Permitted						
Satd. Flow (perm)	0	0	0	3539	0	2787
Link Speed (mph)	30			30	30	
Link Distance (ft)	860			613	674	
Travel Time (s)	19.5			13.9	15.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	720	0	376
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.6%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
2: Illinois Ave US51 NB & Mill St

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖			↖↖	↖	↖↖	↖↖	↖			
Volume (vph)	20	64	0	0	167	60	338	483	25	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		85	135		135	0		0
Storage Lanes	1		0	0		1	2		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1478	2911	0	0	3124	1398	3152	3065	1454	0	0	0
Flt Permitted	0.950	0.999					0.950					
Satd. Flow (perm)	1478	2911	0	0	3124	1364	3152	3065	1430	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						194			185			
Link Speed (mph)		30			30			30				30
Link Distance (ft)		130			729			410				728
Travel Time (s)		3.0			16.6			9.3				16.5
Confl. Peds. (#/hr)						8			3			
Peak Hour Factor	0.88	0.88	0.88	0.74	0.74	0.74	0.96	0.96	0.96	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	2%	2%	4%	4%	0%	6%	0%	2%	2%	2%
Shared Lane Traffic (%)	10%											
Lane Group Flow (vph)	21	75	0	0	226	81	352	503	26	0	0	0
Turn Type	Split	NA			NA	Perm	Prot	NA	Perm			
Protected Phases	4 5!	4 5!			8		1!	6				
Permitted Phases						8			6			
Detector Phase	4 5	4 5			8	8	1	6	6			
Switch Phase												
Minimum Initial (s)					5.0	5.0	5.0	20.0	20.0			
Minimum Split (s)					20.7	20.7	10.3	26.6	26.6			
Total Split (s)					24.0	24.0	18.0	23.0	23.0			
Total Split (%)					30.0%	30.0%	22.5%	28.8%	28.8%			
Yellow Time (s)					3.2	3.2	3.2	3.2	3.2			
All-Red Time (s)					1.5	1.5	2.1	3.4	3.4			
Lost Time Adjust (s)					0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)					4.7	4.7	5.3	6.6	6.6			
Lead/Lag					Lag	Lag	Lead	Lead	Lead			
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes			
Recall Mode					None	None	None	Max	Max			
Act Effct Green (s)	26.6	26.6			17.6	17.6	12.9	19.3	19.3			
Actuated g/C Ratio	0.33	0.33			0.22	0.22	0.16	0.24	0.24			
v/c Ratio	0.04	0.08			0.33	0.18	0.69	0.68	0.05			
Control Delay	1.7	1.8			27.2	0.9	39.7	34.5	0.2			
Queue Delay	0.7	0.5			0.0	0.0	0.6	0.0	0.0			
Total Delay	2.3	2.3			27.2	0.9	40.3	34.5	0.2			
LOS	A	A			C	A	D	C	A			
Approach Delay		2.3			20.3			35.8				
Approach LOS		A			C			D				

Intersection Summary

Area Type: CBD

Cycle Length: 80

Actuated Cycle Length: 80

Lane Group	ø2	ø4	ø5
Lane Configurations			
Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	2	4	5
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	20.0	5.0	5.0
Minimum Split (s)	26.6	21.3	21.0
Total Split (s)	24.6	13.4	19.6
Total Split (%)	31%	17%	25%
Yellow Time (s)	3.2	3.2	3.2
All-Red Time (s)	3.4	2.1	1.8
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	C-Max	None	Max
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
<b>Intersection Summary</b>			

Lanes, Volumes, Timings  
 2: Illinois Ave US51 NB & Mill St

5/5/2016

Offset: 0 (0%), Referenced to phase 2:SET, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 29.6

Intersection LOS: C

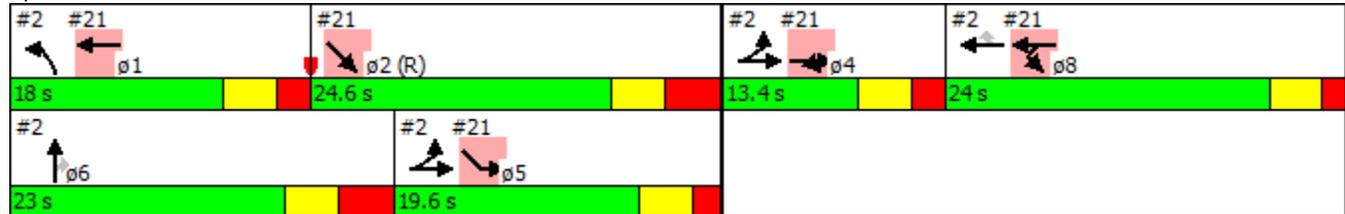
Intersection Capacity Utilization 65.7%

ICU Level of Service C

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 2: Illinois Ave US51 NB & Mill St



Lanes, Volumes, Timings  
 5: Normal Ave/University Ave US51 SB

5/5/2016



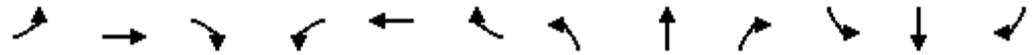
Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	0	0	358	180	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	3433	1863	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	3433	1863	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	354			363	271	
Travel Time (s)	8.0			8.3	6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	389	196	0	0
Sign Control	Stop			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.5%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↙	↔						↕	↘
Volume (vph)	0	0	0	290	1329	0	0	0	0	0	690	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	215		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	1356	4199	0	0	0	0	0	4278	0
Flt Permitted				0.950	0.999							
Satd. Flow (perm)	0	0	0	1354	4199	0	0	0	0	0	4278	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)				35	26							14
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1022			441			684				730
Travel Time (s)		23.2			10.0			15.5				16.6
Confl. Peds. (#/hr)				1								1
Peak Hour Factor	0.92	0.92	0.92	0.76	0.76	0.76	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	2%	2%	2%	3%	5%	2%	2%	2%	2%	2%	6%	7%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	344	1787	0	0	0	0	0	986	0
Turn Type				Perm	NA							NA
Protected Phases					2							8
Permitted Phases				2								
Detector Phase				2	2							8
Switch Phase												
Minimum Initial (s)				10.0	10.0							8.0
Minimum Split (s)				21.4	21.4							20.9
Total Split (s)				49.4	49.4							30.6
Total Split (%)				61.8%	61.8%							38.3%
Yellow Time (s)				3.2	3.2							3.2
All-Red Time (s)				2.2	2.2							1.7
Lost Time Adjust (s)				0.0	0.0							0.0
Total Lost Time (s)				5.4	5.4							4.9
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode				C-Max	C-Max							Max
Act Effct Green (s)				44.0	44.0							25.7
Actuated g/C Ratio				0.55	0.55							0.32
v/c Ratio				0.45	0.77							0.71
Control Delay				14.9	18.5							27.0
Queue Delay				0.0	0.3							0.0
Total Delay				14.9	18.7							27.0
LOS				B	B							C
Approach Delay					18.1							27.0
Approach LOS					B							C

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80

# Lanes, Volumes, Timings

## 10: University Ave US51 SB & Main St IL13 WB

5/5/2016

Offset: 25 (31%), Referenced to phase 2:WBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 20.9

Intersection LOS: C

Intersection Capacity Utilization 61.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: University Ave US51 SB & Main St IL13 WB



Lanes, Volumes, Timings

11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑								↘	↑↑↑	
Volume (vph)	0	1612	197	0	0	0	0	0	0	430	569	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	4299	0	0	0	0	0	0	0	1421	2945	0
Flt Permitted										0.950	0.992	
Satd. Flow (perm)	0	4299	0	0	0	0	0	0	0	1421	2945	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		41								25	25	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		391			434			1268			684	
Travel Time (s)		8.9			9.9			28.8			15.5	
Confl. Peds. (#/hr)			3			1						
Peak Hour Factor	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.92	0.75	0.75	0.75
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	2%	2%	2%	4%	5%	2%
Parking (#/hr)		5										
Shared Lane Traffic (%)										25%		
Lane Group Flow (vph)	0	2128	0	0	0	0	0	0	0	430	902	0
Turn Type		NA								Perm	NA	
Protected Phases		6									8	
Permitted Phases										8		
Detector Phase		6								8	8	
Switch Phase												
Minimum Initial (s)		10.0								10.0	10.0	
Minimum Split (s)		20.8								20.8	20.8	
Total Split (s)		48.0								32.0	32.0	
Total Split (%)		60.0%								40.0%	40.0%	
Yellow Time (s)		3.2								3.2	3.2	
All-Red Time (s)		1.6								1.6	1.6	
Lost Time Adjust (s)		0.0								0.0	0.0	
Total Lost Time (s)		4.8								4.8	4.8	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max								Max	Max	
Act Effct Green (s)		43.2								27.2	27.2	
Actuated g/C Ratio		0.54								0.34	0.34	
v/c Ratio		0.91								0.86	0.89	
Control Delay		23.7								47.0	42.2	
Queue Delay		0.0								0.0	0.0	
Total Delay		23.7								47.0	42.2	
LOS		C								D	D	
Approach Delay		23.7									43.8	
Approach LOS		C									D	

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 6:EBT, Start of Green, Master Intersection
Natural Cycle:	70

# Lanes, Volumes, Timings

## 11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 31.4

Intersection LOS: C

Intersection Capacity Utilization 68.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 11: University Ave US51 SB & Walnut St IL13 EB



Lanes, Volumes, Timings

14: Illinois Ave US51/Illinois Ave US51 NB & University Ave US51 SB

5/5/2016



Lane Group	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations		↑↑			↵	↵↵
Volume (vph)	0	608	0	0	5	534
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0			0	150	0
Storage Lanes	0			0	1	2
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	3539	0	0	1770	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	0	0	1770	2787
Link Speed (mph)		30	30		30	
Link Distance (ft)		243	410		446	
Travel Time (s)		5.5	9.3		10.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	661	0	0	5	580
Sign Control		Free	Stop		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.8%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings

18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑						↑↑	↘			
Volume (vph)	90	1952	0	0	0	0	0	432	133	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		85	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1562	4532	0	0	0	0	0	2787	1213	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	1562	4532	0	0	0	0	0	2787	1213	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	91							4	27			
Link Speed (mph)		30			30			30				30
Link Distance (ft)		434			457			1265				695
Travel Time (s)		9.9			10.4			28.8				15.8
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.84	0.84	0.84	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	2%	2%	2%	2%	2%	4%	9%	2%	2%	2%
Parking (#/hr)								5				
Shared Lane Traffic (%)									10%			
Lane Group Flow (vph)	99	2145	0	0	0	0	0	530	142	0	0	0
Turn Type	Perm	NA						NA	Perm			
Protected Phases		2						8				
Permitted Phases	2								8			
Detector Phase	2	2						8	8			
Switch Phase												
Minimum Initial (s)	18.0	18.0						18.0	18.0			
Minimum Split (s)	23.0	23.0						23.0	23.0			
Total Split (s)	53.0	53.0						27.0	27.0			
Total Split (%)	66.3%	66.3%						33.8%	33.8%			
Yellow Time (s)	3.2	3.2						3.2	3.2			
All-Red Time (s)	1.8	1.8						1.8	1.8			
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 Optimize?												
Recall Mode	C-Max	C-Max						Max	Max			
Act Effct Green (s)	48.0	48.0						22.0	22.0			
Actuated g/C Ratio	0.60	0.60						0.28	0.28			
v/c Ratio	0.10	0.79						0.69	0.40			
Control Delay	0.7	7.3						31.2	23.1			
Queue Delay	0.0	0.5						0.0	0.0			
Total Delay	0.7	7.9						31.2	23.1			
LOS	A	A						C	C			
Approach Delay		7.6						29.5				
Approach LOS		A						C				

Intersection Summary

Area Type: CBD  
 Cycle Length: 80  
 Actuated Cycle Length: 80

# Lanes, Volumes, Timings

## 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 12.6

Intersection LOS: B

Intersection Capacity Utilization 65.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 18: Illinois Ave US51 NB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑		↑	↑↑				
Volume (vph)	0	0	0	0	1473	330	146	329	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	260		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	4307	0	1395	2772	0	0	0	0
Flt Permitted							0.950	0.998				
Satd. Flow (perm)	0	0	0	0	4307	0	1393	2772	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)					87		30	30				
Link Speed (mph)		30			30			30				30
Link Distance (ft)		441			447			695				721
Travel Time (s)		10.0			10.2			15.8				16.4
Confl. Peds. (#/hr)			1			2	1		1			1
Peak Hour Factor	0.92	0.92	0.92	0.78	0.78	0.78	0.74	0.74	0.74	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	5%	6%	6%	5%	2%	2%	2%	2%
Parking (#/hr)								5	5			
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	0	0	0	0	2311	0	177	465	0	0	0	0
Turn Type					NA		Perm	NA				
Protected Phases					6			8				
Permitted Phases							8					
Detector Phase					6		8	8				
Switch Phase												
Minimum Initial (s)					10.0		5.0	5.0				
Minimum Split (s)					21.2		21.2	21.2				
Total Split (s)					56.0		24.0	24.0				
Total Split (%)					70.0%		30.0%	30.0%				
Yellow Time (s)					3.2		3.2	3.2				
All-Red Time (s)					2.0		2.0	2.0				
Lost Time Adjust (s)					0.0		0.0	0.0				
Total Lost Time (s)					5.2		5.2	5.2				
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode					C-Max		Max	Max				
Act Effct Green (s)					50.8		18.8	18.8				
Actuated g/C Ratio					0.64		0.24	0.24				
v/c Ratio					0.84		0.51	0.69				
Control Delay					14.4		26.1	30.7				
Queue Delay					0.0		0.0	0.0				
Total Delay					14.4		26.1	30.7				
LOS					B		C	C				
Approach Delay					14.4			29.4				
Approach LOS					B			C				

Intersection Summary

Area Type: CBD  
 Cycle Length: 80

Lanes, Volumes, Timings  
19: Illinois Ave US51 NB & Main St IL13 WB

5/5/2016

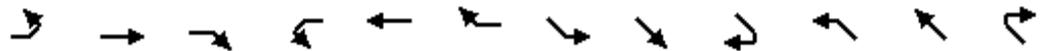
Actuated Cycle Length: 80	
Offset: 41 (51%), Referenced to phase 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 17.7	Intersection LOS: B
Intersection Capacity Utilization 61.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 19: Illinois Ave US51 NB & Main St IL13 WB



Lanes, Volumes, Timings  
 21: University Ave US51 SB & Mill St

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↑↑↑	↑	↑	↑↑		↑↑	↑↑				
Volume (vph)	0	65	169	45	460	0	19	498	1	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		230	0		0	100		0	0		0
Storage Lanes	0		1	1		0	2		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4940	1553	1595	3390	0	2334	3438	0	0	0	0
Flt Permitted				0.950	0.955		0.950					
Satd. Flow (perm)	0	4940	1553	1595	3237	0	2334	3438	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			225									
Link Speed (mph)		30			30			30				30
Link Distance (ft)		331			130			211				446
Travel Time (s)		7.5			3.0			4.8				10.1
Confl. Peds. (#/hr)			3						1			
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.71	0.71	0.71	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	4%	3%	2%	2%	50%	5%	2%	2%	2%	2%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	87	225	54	619	0	27	702	0	0	0	0
Turn Type		NA	Prot	Prot	NA		custom	NA				
Protected Phases		4	4	8	18!		5!	2				
Permitted Phases							5!					
Detector Phase		4	4	8	1 8		5	2				
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0			5.0	20.0				
Minimum Split (s)		21.3	21.3	20.7			21.0	26.6				
Total Split (s)		13.4	13.4	24.0			19.6	24.6				
Total Split (%)		16.8%	16.8%	30.0%			24.5%	30.8%				
Yellow Time (s)		3.2	3.2	3.2			3.2	3.2				
All-Red Time (s)		2.1	2.1	1.5			1.8	3.4				
Lost Time Adjust (s)		0.0	0.0	0.0			0.0	0.0				
Total Lost Time (s)		5.3	5.3	4.7			5.0	6.6				
Lead/Lag		Lead	Lead	Lag			Lag	Lag				
Lead-Lag Optimize?		Yes	Yes	Yes			Yes	Yes				
Recall Mode		None	None	None			Max	C-Max				
Act Effct Green (s)		7.0	7.0	17.6	29.9		14.6	20.7				
Actuated g/C Ratio		0.09	0.09	0.22	0.37		0.18	0.26				
v/c Ratio		0.20	0.66	0.15	0.65		0.06	0.79				
Control Delay		34.6	15.4	31.0	19.1		27.6	37.1				
Queue Delay		0.0	0.0	2.8	2.7		0.0	0.0				
Total Delay		34.6	15.4	33.9	21.8		27.6	37.1				
LOS		C	B	C	C		C	D				
Approach Delay		20.8			22.7			36.7				
Approach LOS		C			C			D				

Intersection Summary	
Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80

Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	1	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	20.0
Minimum Split (s)	10.3	26.6
Total Split (s)	18.0	23.0
Total Split (%)	23%	29%
Yellow Time (s)	3.2	3.2
All-Red Time (s)	2.1	3.4
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
<b>Intersection Summary</b>		

Lanes, Volumes, Timings  
 21: University Ave US51 SB & Mill St

5/5/2016

Offset: 0 (0%), Referenced to phase 2:SET, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 28.3

Intersection LOS: C

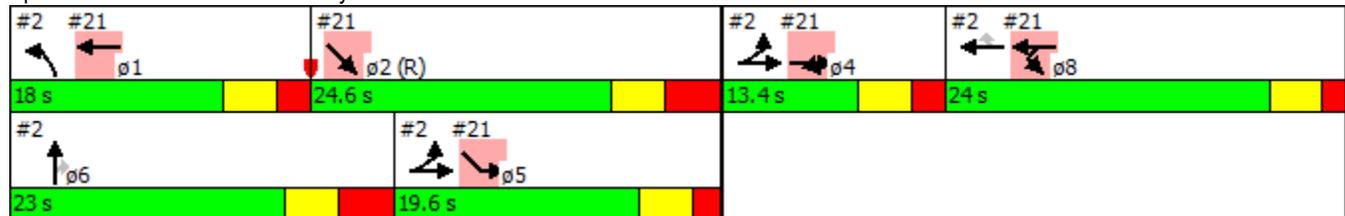
Intersection Capacity Utilization 65.7%

ICU Level of Service C

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 21: University Ave US51 SB & Mill St



Lanes, Volumes, Timings

29: University Ave US51 SB/Illinois Ave US51 & Illinois Ave US51 NB

5/5/2016



Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations				↑↑		↑↑
Volume (vph)	0	0	0	662	0	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	3539	0	2787
Flt Permitted						
Satd. Flow (perm)	0	0	0	3539	0	2787
Link Speed (mph)	30			30	30	
Link Distance (ft)	860			613	674	
Travel Time (s)	19.5			13.9	15.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	720	0	376
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.6%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
 2: Illinois Ave US51 NB & Mill St

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗			↗↗	↖	↖↗	↗↗	↖			
Volume (vph)	174	192	0	0	150	87	308	723	59	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		85	135		135	0		0
Storage Lanes	1		0	0		1	2		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1478	3054	0	0	3094	1454	3152	3124	1454	0	0	0
Flt Permitted	0.950	0.989					0.950					
Satd. Flow (perm)	1478	3054	0	0	3094	1417	3152	3124	1432	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						284			185			
Link Speed (mph)		30			30			30				30
Link Distance (ft)		130			729			410				728
Travel Time (s)		3.0			16.6			9.3				16.5
Confl. Peds. (#/hr)			1			9			2			
Peak Hour Factor	0.85	0.85	0.85	0.79	0.79	0.79	0.91	0.91	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	2%	2%	5%	0%	0%	4%	0%	2%	2%	2%
Shared Lane Traffic (%)	32%											
Lane Group Flow (vph)	139	292	0	0	190	110	338	795	65	0	0	0
Turn Type	Split	NA			NA	Perm	Prot	NA	Perm			
Protected Phases	4 5!	4 5!			8		1!	6				
Permitted Phases						8			6			
Detector Phase	4 5	4 5			8	8	1	6	6			
Switch Phase												
Minimum Initial (s)					5.0	5.0	5.0	20.0	20.0			
Minimum Split (s)					20.7	20.7	10.3	26.6	26.6			
Total Split (s)					17.5	17.5	17.0	28.0	28.0			
Total Split (%)					21.9%	21.9%	21.3%	35.0%	35.0%			
Yellow Time (s)					3.2	3.2	3.2	3.2	3.2			
All-Red Time (s)					1.5	1.5	2.1	3.4	3.4			
Lost Time Adjust (s)					0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)					4.7	4.7	5.3	6.6	6.6			
Lead/Lag					Lag	Lag	Lead	Lead	Lead			
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes			
Recall Mode					None	None	None	Max	Max			
Act Effct Green (s)	29.1	29.1			12.4	12.4	11.3	21.9	21.9			
Actuated g/C Ratio	0.36	0.36			0.16	0.16	0.14	0.27	0.27			
v/c Ratio	0.26	0.26			0.40	0.24	0.76	0.93	0.12			
Control Delay	10.7	7.7			33.0	1.2	45.4	48.3	0.5			
Queue Delay	2.4	1.3			0.1	0.0	0.8	0.0	0.0			
Total Delay	13.1	9.0			33.1	1.2	46.3	48.3	0.5			
LOS	B	A			C	A	D	D	A			
Approach Delay		10.3			21.4			45.1				
Approach LOS		B			C			D				

Intersection Summary	
Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80

Lanes, Volumes, Timings  
 2: Illinois Ave US51 NB & Mill St

5/5/2016

Lane Group	ø2	ø4	ø5
Lane Configurations			
Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	2	4	5
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	20.0	5.0	5.0
Minimum Split (s)	26.6	21.3	21.0
Total Split (s)	30.5	15.0	19.5
Total Split (%)	38%	19%	24%
Yellow Time (s)	3.2	3.2	3.2
All-Red Time (s)	3.4	2.1	1.8
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes
Recall Mode	C-Max	None	Max
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
<b>Intersection Summary</b>			

# Lanes, Volumes, Timings

## 2: Illinois Ave US51 NB & Mill St

5/5/2016

Offset: 0 (0%), Referenced to phase 2:SET, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 33.7

Intersection LOS: C

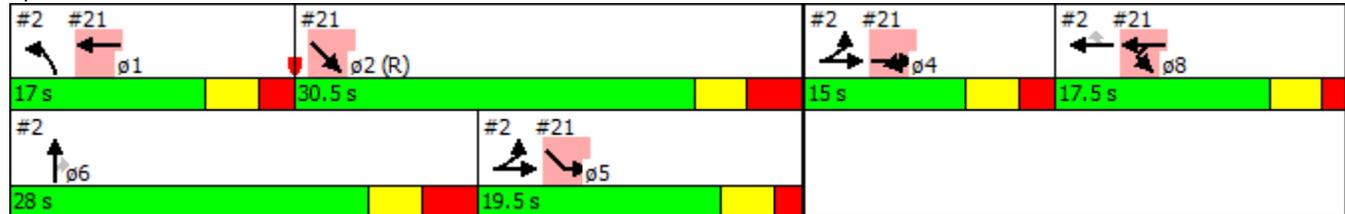
Intersection Capacity Utilization 82.6%

ICU Level of Service E

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 2: Illinois Ave US51 NB & Mill St



Lanes, Volumes, Timings  
 5: Normal Ave/University Ave US51 SB

5/5/2016



Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	0	0	358	180	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	3433	1863	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	3433	1863	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	354			363	271	
Travel Time (s)	8.0			8.3	6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	389	196	0	0
Sign Control	Stop			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.5%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↙	↔						↗	
Volume (vph)	0	0	0	255	1777	0	0	0	0	0	800	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	215		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	1383	4364	0	0	0	0	0	4482	0
Flt Permitted				0.950	0.999							
Satd. Flow (perm)	0	0	0	1381	4364	0	0	0	0	0	4482	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)				26	26						6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1022			441			684			730	
Travel Time (s)		23.2			10.0			15.5			16.6	
Confl. Peds. (#/hr)				1								1
Peak Hour Factor	0.92	0.92	0.92	0.80	0.80	0.80	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	2%	1%	1%	2%	2%	2%	2%	2%	2%	3%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	287	2253	0	0	0	0	0	1033	0
Turn Type				Perm	NA						NA	
Protected Phases					2						8	
Permitted Phases				2								
Detector Phase				2	2						8	
Switch Phase												
Minimum Initial (s)				10.0	10.0						8.0	
Minimum Split (s)				21.4	21.4						20.9	
Total Split (s)				53.0	53.0						27.0	
Total Split (%)				66.3%	66.3%						33.8%	
Yellow Time (s)				3.2	3.2						3.2	
All-Red Time (s)				2.2	2.2						1.7	
Lost Time Adjust (s)				0.0	0.0						0.0	
Total Lost Time (s)				5.4	5.4						4.9	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode				C-Max	C-Max						Max	
Act Effct Green (s)				47.6	47.6						22.1	
Actuated g/C Ratio				0.60	0.60						0.28	
v/c Ratio				0.34	0.86						0.83	
Control Delay				10.1	16.4						34.2	
Queue Delay				0.0	0.6						0.0	
Total Delay				10.1	17.1						34.2	
LOS				B	B						C	
Approach Delay					16.3						34.2	
Approach LOS					B						C	

Intersection Summary

Area Type: CBD

Cycle Length: 80

Actuated Cycle Length: 80

# Lanes, Volumes, Timings

## 10: University Ave US51 SB & Main St IL13 WB

5/5/2016

Offset: 25 (31%), Referenced to phase 2:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 21.5

Intersection LOS: C

Intersection Capacity Utilization 69.9%

ICU Level of Service C

Analysis Period (min) 15

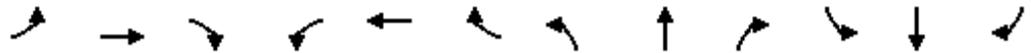
Splits and Phases: 10: University Ave US51 SB & Main St IL13 WB



Lanes, Volumes, Timings

11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑								↘	↙↑	
Volume (vph)	0	1691	217	0	0	0	0	0	0	538	581	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	4308	0	0	0	0	0	0	0	1449	3041	0
Flt Permitted										0.950	0.989	
Satd. Flow (perm)	0	4308	0	0	0	0	0	0	0	1447	3040	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)		43								25	25	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		391			434			1268			684	
Travel Time (s)		8.9			9.9			28.8			15.5	
Confl. Peds. (#/hr)			3			7			1	1		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Heavy Vehicles (%)	2%	2%	1%	2%	2%	2%	2%	2%	2%	2%	1%	2%
Parking (#/hr)		5										
Shared Lane Traffic (%)										32%		
Lane Group Flow (vph)	0	2074	0	0	0	0	0	0	0	411	846	0
Turn Type		NA								Perm	NA	
Protected Phases		6									8	
Permitted Phases										8		
Detector Phase		6								8	8	
Switch Phase												
Minimum Initial (s)		10.0								10.0	10.0	
Minimum Split (s)		20.8								20.8	20.8	
Total Split (s)		47.4								32.6	32.6	
Total Split (%)		59.3%								40.8%	40.8%	
Yellow Time (s)		3.2								3.2	3.2	
All-Red Time (s)		1.6								1.6	1.6	
Lost Time Adjust (s)		0.0								0.0	0.0	
Total Lost Time (s)		4.8								4.8	4.8	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max								Max	Max	
Act Effct Green (s)		42.6								27.8	27.8	
Actuated g/C Ratio		0.53								0.35	0.35	
v/c Ratio		0.90								0.79	0.79	
Control Delay		23.0								39.4	35.2	
Queue Delay		0.6								0.0	0.0	
Total Delay		23.6								39.4	35.2	
LOS		C								D	D	
Approach Delay		23.6									36.6	
Approach LOS		C									D	

Intersection Summary

Area Type: CBD  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 0 (0%), Referenced to phase 6:EBT, Start of Green, Master Intersection  
 Natural Cycle: 65

# Lanes, Volumes, Timings

## 11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 28.5

Intersection LOS: C

Intersection Capacity Utilization 73.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 11: University Ave US51 SB & Walnut St IL13 EB



Lanes, Volumes, Timings

14: Illinois Ave US51/Illinois Ave US51 NB & University Ave US51 SB

5/5/2016



Lane Group	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations		↑↑			↙	↘↘
Volume (vph)	0	608	0	0	5	534
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0			0	150	0
Storage Lanes	0			0	1	2
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	3539	0	0	1770	2787
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	0	0	1770	2787
Link Speed (mph)		30	30		30	
Link Distance (ft)		243	410		446	
Travel Time (s)		5.5	9.3		10.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	661	0	0	5	580
Sign Control		Free	Stop		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.8%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings

18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑						↑↑	↗			
Volume (vph)	163	2066	0	0	0	0	0	629	340	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		85	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1593	4577	0	0	0	0	0	2826	1297	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	1590	4577	0	0	0	0	0	2826	1279	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	49							4	27			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			457			1265			695	
Travel Time (s)		9.9			10.4			28.8			15.8	
Confl. Peds. (#/hr)	1								1			
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.84	0.84	0.84	0.92	0.92	0.92
Parking (#/hr)								5				
Shared Lane Traffic (%)									14%			
Lane Group Flow (vph)	172	2175	0	0	0	0	0	806	348	0	0	0
Turn Type	Perm	NA						NA	Perm			
Protected Phases		2						8				
Permitted Phases	2								8			
Detector Phase	2	2						8	8			
Switch Phase												
Minimum Initial (s)	18.0	18.0						18.0	18.0			
Minimum Split (s)	23.0	23.0						23.0	23.0			
Total Split (s)	49.0	49.0						31.0	31.0			
Total Split (%)	61.3%	61.3%						38.8%	38.8%			
Yellow Time (s)	3.2	3.2						3.2	3.2			
All-Red Time (s)	1.8	1.8						1.8	1.8			
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 Optimize?												
Recall Mode	C-Max	C-Max						Max	Max			
Act Effct Green (s)	44.0	44.0						26.0	26.0			
Actuated g/C Ratio	0.55	0.55						0.32	0.32			
v/c Ratio	0.19	0.86						0.88	0.80			
Control Delay	4.8	11.9						37.9	39.2			
Queue Delay	0.0	1.2						0.0	0.0			
Total Delay	4.8	13.1						37.9	39.2			
LOS	A	B						D	D			
Approach Delay		12.5						38.3				
Approach LOS		B						D				

Intersection Summary

Area Type: CBD  
 Cycle Length: 80  
 Actuated Cycle Length: 80

# Lanes, Volumes, Timings

## 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 21.0

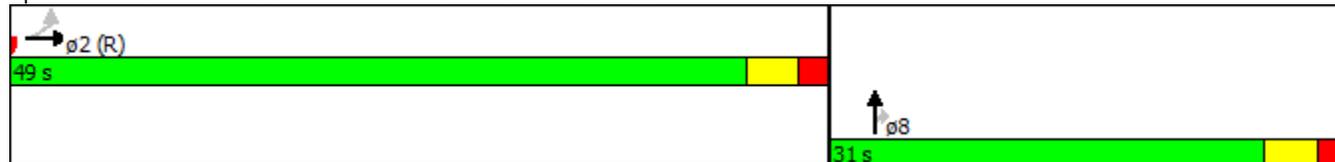
Intersection LOS: C

Intersection Capacity Utilization 76.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 18: Illinois Ave US51 NB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑		↑	↑↑				
Volume (vph)	0	0	0	0	1774	365	258	416	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	260		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	4492	0	1478	2828	0	0	0	0
Flt Permitted							0.950	0.996				
Satd. Flow (perm)	0	0	0	0	4492	0	1476	2828	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)					98		30	30				
Link Speed (mph)		30			30			30				30
Link Distance (ft)		441			447			695				721
Travel Time (s)		10.0			10.2			15.8				16.4
Confl. Peds. (#/hr)			1	1		1	1		1			1
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	0%	3%	2%	2%	2%	2%
Parking (#/hr)								5	5			
Shared Lane Traffic (%)							15%					
Lane Group Flow (vph)	0	0	0	0	2300	0	235	489	0	0	0	0
Turn Type					NA		Perm	NA				
Protected Phases					6			8				
Permitted Phases							8					
Detector Phase					6		8	8				
Switch Phase												
Minimum Initial (s)					10.0		5.0	5.0				
Minimum Split (s)					21.2		21.2	21.2				
Total Split (s)					55.0		25.0	25.0				
Total Split (%)					68.8%		31.3%	31.3%				
Yellow Time (s)					3.2		3.2	3.2				
All-Red Time (s)					2.0		2.0	2.0				
Lost Time Adjust (s)					0.0		0.0	0.0				
Total Lost Time (s)					5.2		5.2	5.2				
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode					C-Max		Max	Max				
Act Effct Green (s)					49.8		19.8	19.8				
Actuated g/C Ratio					0.62		0.25	0.25				
v/c Ratio					0.81		0.61	0.68				
Control Delay					14.0		27.6	28.6				
Queue Delay					0.1		0.0	0.0				
Total Delay					14.1		27.6	28.6				
LOS					B		C	C				
Approach Delay					14.1			28.3				
Approach LOS					B			C				

Intersection Summary

Area Type: CBD  
 Cycle Length: 80

# Lanes, Volumes, Timings

## 19: Illinois Ave US51 NB & Main St IL13 WB

5/5/2016

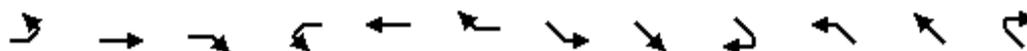
Actuated Cycle Length: 80	
Offset: 41 (51%), Referenced to phase 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 17.5	Intersection LOS: B
Intersection Capacity Utilization 69.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 19: Illinois Ave US51 NB & Main St IL13 WB



Lanes, Volumes, Timings  
21: University Ave US51 SB & Mill St

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↑↑↑	↑	↑	↑↑		↑↑	↑↑				
Volume (vph)	0	310	330	33	425	0	56	524	5	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		230	0		0	100		0	0		0
Storage Lanes	0		1	1		0	2		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	5187	1583	1643	3391	0	3400	3571	0	0	0	0
Flt Permitted				0.950	0.955		0.950					
Satd. Flow (perm)	0	5187	1583	1643	3238	0	3400	3571	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			388					1				
Link Speed (mph)		30			30			30				30
Link Distance (ft)		331			130			211				446
Travel Time (s)		7.5			3.0			4.8				10.1
Confl. Peds. (#/hr)			3						1			
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	2%	2%	3%	1%	0%	2%	2%	2%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	365	388	34	487	0	61	575	0	0	0	0
Turn Type		NA	Prot	Prot	NA		custom	NA				
Protected Phases		4	4	8	18!		5!	2				
Permitted Phases							5!					
Detector Phase		4	4	8	1 8		5	2				
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0			5.0	20.0				
Minimum Split (s)		21.3	21.3	20.7			21.0	26.6				
Total Split (s)		15.0	15.0	17.5			19.5	30.5				
Total Split (%)		18.8%	18.8%	21.9%			24.4%	38.1%				
Yellow Time (s)		3.2	3.2	3.2			3.2	3.2				
All-Red Time (s)		2.1	2.1	1.5			1.8	3.4				
Lost Time Adjust (s)		0.0	0.0	0.0			0.0	0.0				
Total Lost Time (s)		5.3	5.3	4.7			5.0	6.6				
Lead/Lag		Lead	Lead	Lag			Lag	Lag				
Lead-Lag Optimize?		Yes	Yes	Yes			Yes	Yes				
Recall Mode		None	None	None			Max	C-Max				
Act Effct Green (s)		9.6	9.6	12.4	23.1		14.5	24.8				
Actuated g/C Ratio		0.12	0.12	0.16	0.29		0.18	0.31				
v/c Ratio		0.58	0.73	0.13	0.69		0.10	0.52				
Control Delay		37.5	13.1	37.2	24.0		27.9	25.0				
Queue Delay		0.0	0.0	1.9	2.3		0.0	0.0				
Total Delay		37.5	13.1	39.1	26.4		27.9	25.0				
LOS		D	B	D	C		C	C				
Approach Delay		24.9			27.2			25.3				
Approach LOS		C			C			C				

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Lane Group	ø1	ø6
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	1	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	20.0
Minimum Split (s)	10.3	26.6
Total Split (s)	17.0	28.0
Total Split (%)	21%	35%
Yellow Time (s)	3.2	3.2
All-Red Time (s)	2.1	3.4
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
<b>Intersection Summary</b>		

Lanes, Volumes, Timings  
 21: University Ave US51 SB & Mill St

5/5/2016

Offset: 0 (0%), Referenced to phase 2:SET, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 25.7

Intersection LOS: C

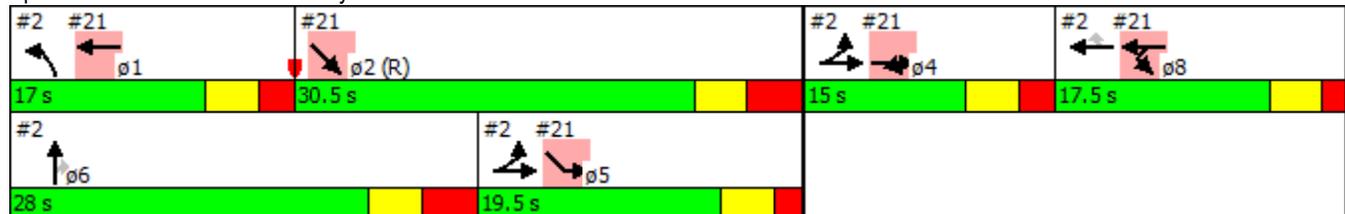
Intersection Capacity Utilization 82.6%

ICU Level of Service E

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 21: University Ave US51 SB & Mill St



Lanes, Volumes, Timings

29: University Ave US51 SB/Illinois Ave US51 & Illinois Ave US51 NB

5/5/2016



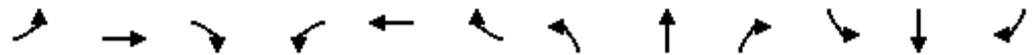
Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations				↑↑		↑↑
Volume (vph)	0	0	0	662	0	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	3539	0	2787
Flt Permitted						
Satd. Flow (perm)	0	0	0	3539	0	2787
Link Speed (mph)	30			30	30	
Link Distance (ft)	860			613	674	
Travel Time (s)	19.5			13.9	15.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	720	0	376
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.6%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↶	↶↶↶		↶	↶			↶	
Volume (vph)	0	0	0	218	1253	248	110	280	0	0	518	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	215		0	250		0	0		0
Storage Lanes	0		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	1356	4117	0	1593	1676	0	0	1570	0
Flt Permitted				0.950	0.999		0.078					
Satd. Flow (perm)	0	0	0	1351	4117	0	131	1676	0	0	1570	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					39						10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1022			461			681			730	
Travel Time (s)		23.2			10.5			15.5			16.6	
Confl. Peds. (#/hr)				1								1
Peak Hour Factor	0.92	0.92	0.92	0.76	0.76	0.76	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	2%	2%	2%	3%	5%	2%	2%	2%	2%	2%	6%	7%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	258	2004	0	120	304	0	0	741	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					2		7	4			8	
Permitted Phases				2			4					
Detector Phase				2	2		7	4			8	
Switch Phase												
Minimum Initial (s)				10.0	10.0		4.0	10.0			4.0	
Minimum Split (s)				21.4	21.4		8.0	21.4			20.0	
Total Split (s)				59.0	59.0		8.0	61.0			53.0	
Total Split (%)				49.2%	49.2%		6.7%	50.8%			44.2%	
Yellow Time (s)				3.2	3.2		3.5	3.2			3.5	
All-Red Time (s)				2.2	2.2		0.5	2.2			0.5	
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)				5.4	5.4		4.0	5.4			4.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Recall Mode				C-Max	C-Max		None	None			None	
Act Effct Green (s)				53.6	53.6		57.0	55.6			49.0	
Actuated g/C Ratio				0.45	0.45		0.48	0.46			0.41	
v/c Ratio				0.43	1.08		1.09	0.39			1.15	
Control Delay				20.5	64.9		101.5	30.9			116.1	
Queue Delay				0.0	9.6		0.0	0.0			0.0	
Total Delay				20.5	74.5		101.5	30.9			116.1	
LOS				C	E		F	C			F	
Approach Delay					68.3			50.9			116.1	
Approach LOS					E			D			F	

Intersection Summary

Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	120

# Lanes, Volumes, Timings

## 10: University Ave US51 SB & Main St IL13 WB

5/6/2016

Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.15

Intersection Signal Delay: 76.5

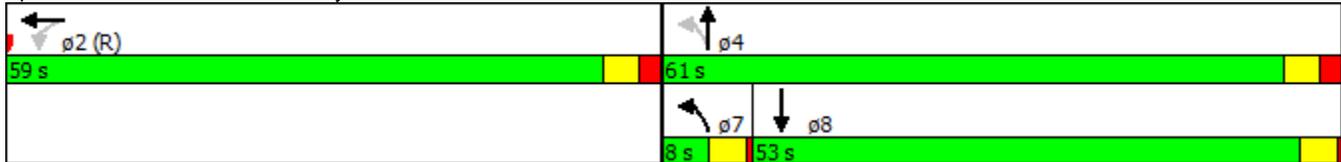
Intersection LOS: E

Intersection Capacity Utilization 95.6%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: University Ave US51 SB & Main St IL13 WB



Lanes, Volumes, Timings

11: University Ave US51 SB & Walnut St IL13 EB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕↕						↔		↕	↕	
Volume (vph)	68	1593	148	0	0	0	0	322	100	323	413	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	250		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4307	0	0	0	0	0	1623	0	1562	1629	0
Flt Permitted		0.998								0.117		
Satd. Flow (perm)	0	4307	0	0	0	0	0	1623	0	192	1629	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15						12				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		391			452			1274			681	
Travel Time (s)		8.9			10.3			29.0			15.5	
Confl. Peds. (#/hr)			3			1						
Peak Hour Factor	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.92	0.75	0.75	0.75
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	2%	2%	2%	4%	5%	2%
Parking (#/hr)		5										
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2128	0	0	0	0	0	459	0	431	551	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		2						8		7	4	
Permitted Phases	2									4		
Detector Phase	2	2						8		7	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0						10.0		4.0	10.0	
Minimum Split (s)	20.0	20.0						20.8		8.0	20.8	
Total Split (s)	57.0	57.0						35.0		28.0	63.0	
Total Split (%)	47.5%	47.5%						29.2%		23.3%	52.5%	
Yellow Time (s)	3.5	3.5						3.2		3.5	3.2	
All-Red Time (s)	0.5	0.5						1.6		0.5	1.6	
Lost Time Adjust (s)		0.0						0.0		0.0	0.0	
Total Lost Time (s)		4.0						4.8		4.0	4.8	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Recall Mode	C-Max	C-Max						Max		None	Max	
Act Effct Green (s)		53.0						30.2		59.0	58.2	
Actuated g/C Ratio		0.44						0.25		0.49	0.48	
v/c Ratio		1.11						1.10		1.17	0.70	
Control Delay		91.6						115.3		135.0	26.4	
Queue Delay		0.0						0.0		0.0	0.4	
Total Delay		91.6						115.3		135.0	26.8	
LOS		F						F		F	C	
Approach Delay		91.6						115.3			74.3	
Approach LOS		F						F			E	

Intersection Summary

Area Type: CBD

Cycle Length: 120

# Lanes, Volumes, Timings

## 11: University Ave US51 SB & Walnut St IL13 EB

5/6/2016

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:, Start of Green, Master Intersection

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.17

Intersection Signal Delay: 89.9

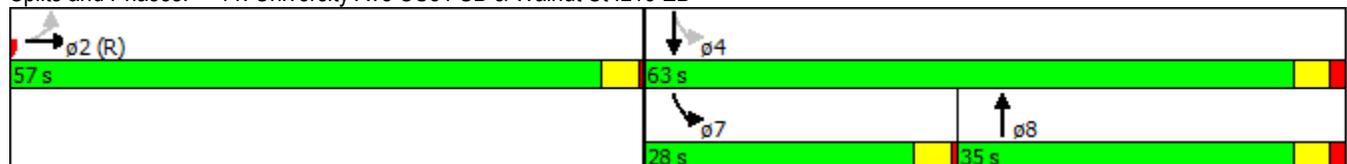
Intersection LOS: F

Intersection Capacity Utilization 95.6%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 11: University Ave US51 SB & Walnut St IL13 EB



Lanes, Volumes, Timings

14: Illinois Ave US51/Illinois Ave US51 NB & University Ave US51 SB

5/6/2016



Lane Group	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Volume (vph)	0	608	0	0	5	534
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0			0	150	0
Storage Lanes	2			0	0	2
Taper Length (ft)	25				25	
Satd. Flow (prot)	3614	3539	0	0	0	2787
Flt Permitted					0.950	
Satd. Flow (perm)	3614	3539	0	0	0	2787
Link Speed (mph)		30	30		30	
Link Distance (ft)		243	420		446	
Travel Time (s)		5.5	9.5		10.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	661	0	0	5	580
Sign Control		Free	Stop		Free	

Intersection Summary

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

Lanes, Volumes, Timings  
 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑						↑	↗		↖	
Volume (vph)	23	1944	49	0	0	0	0	108	33	108	137	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		85	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1562	4515	0	0	0	0	0	1439	1333	0	1640	0
Flt Permitted	0.950										0.800	
Satd. Flow (perm)	1562	4515	0	0	0	0	0	1439	1333	0	1341	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5							18			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		452			457			1265			695	
Travel Time (s)		10.3			10.4			28.8			15.8	
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.84	0.84	0.84	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	2%	2%	2%	2%	2%	4%	9%	2%	2%	2%
Parking (#/hr)								5				
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	2190	0	0	0	0	0	129	39	0	266	0
Turn Type	Perm	NA						NA	Perm	Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2								8	4		
Detector Phase	2	2						8	8	4	4	
Switch Phase												
Minimum Initial (s)	18.0	18.0						18.0	18.0	4.0	4.0	
Minimum Split (s)	23.0	23.0						23.0	23.0	20.0	20.0	
Total Split (s)	77.0	77.0						43.0	43.0	43.0	43.0	
Total Split (%)	64.2%	64.2%						35.8%	35.8%	35.8%	35.8%	
Yellow Time (s)	3.2	3.2						3.2	3.2	3.5	3.5	
All-Red Time (s)	1.8	1.8						1.8	1.8	0.5	0.5	
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		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max						Max	Max	None	None	
Act Effct Green (s)	72.0	72.0						38.0	38.0		39.0	
Actuated g/C Ratio	0.60	0.60						0.32	0.32		0.32	
v/c Ratio	0.03	0.81						0.28	0.09		0.61	
Control Delay	5.7	7.3						32.9	19.0		35.2	
Queue Delay	0.0	11.9						0.0	0.0		0.0	
Total Delay	5.7	19.2						32.9	19.0		35.2	
LOS	A	B						C	B		D	
Approach Delay		19.1						29.7			35.2	
Approach LOS		B						C			D	

Intersection Summary

Area Type: CBD  
 Cycle Length: 120  
 Actuated Cycle Length: 120

# Lanes, Volumes, Timings

## 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/6/2016

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 21.3

Intersection LOS: C

Intersection Capacity Utilization 84.3%

ICU Level of Service E

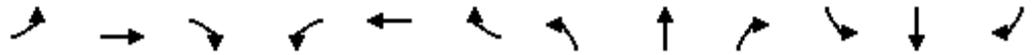
Analysis Period (min) 15

Splits and Phases: 18: Illinois Ave US51 NB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					←↑↑↑		↑	↑			↑	
Volume (vph)	0	0	0	73	1647	83	37	94	0	0	172	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	260		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	4404	0	1533	1425	0	0	1634	0
Flt Permitted					0.998		0.385					
Satd. Flow (perm)	0	0	0	0	4404	0	620	1425	0	0	1634	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					12						8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		461			447			695			721	
Travel Time (s)		10.5			10.2			15.8			16.4	
Confl. Peds. (#/hr)			1			2	1		1			1
Peak Hour Factor	0.92	0.92	0.92	0.78	0.78	0.78	0.74	0.74	0.74	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	5%	6%	6%	5%	2%	2%	2%	2%
Parking (#/hr)								5	5			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	2312	0	50	127	0	0	225	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					6		7	4			8	
Permitted Phases				6			4					
Detector Phase				6	6		7	4			8	
Switch Phase												
Minimum Initial (s)				10.0	10.0		4.0	5.0			5.0	
Minimum Split (s)				21.2	21.2		8.0	21.2			21.2	
Total Split (s)				80.6	80.6		8.0	39.4			31.4	
Total Split (%)				67.2%	67.2%		6.7%	32.8%			26.2%	
Yellow Time (s)				3.2	3.2		3.5	3.2			3.2	
All-Red Time (s)				2.0	2.0		0.5	2.0			2.0	
Lost Time Adjust (s)					0.0		0.0	0.0			0.0	
Total Lost Time (s)					5.2		4.0	5.2			5.2	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Recall Mode				C-Max	C-Max		None	Max			Max	
Act Effct Green (s)					75.4		35.4	34.2			27.8	
Actuated g/C Ratio					0.63		0.30	0.28			0.23	
v/c Ratio					0.83		0.23	0.31			0.58	
Control Delay					20.9		18.5	19.0			47.3	
Queue Delay					3.5		0.0	0.0			0.0	
Total Delay					24.4		18.5	19.0			47.3	
LOS					C		B	B			D	
Approach Delay					24.4			18.9			47.3	
Approach LOS					C			B			D	

Intersection Summary

Area Type: CBD  
 Cycle Length: 120

Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/6/2016

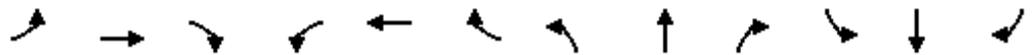
Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 6:WBTL, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.83  
 Intersection Signal Delay: 25.9 Intersection LOS: C  
 Intersection Capacity Utilization 69.9% ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 19: Illinois Ave US51 NB & Main St IL13 WB



Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↖↖↖		↖	↖			↖	
Volume (vph)	0	0	0	191	1611	274	194	411	0	0	600	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	215		0	250		0	0		0
Storage Lanes	0		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	1383	4262	0	1593	1676	0	0	1645	0
Flt Permitted				0.950	0.999		0.086					
Satd. Flow (perm)	0	0	0	1378	4262	0	144	1676	0	0	1645	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					32						6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1022			461			681			730	
Travel Time (s)		23.2			10.5			15.5			16.6	
Confl. Peds. (#/hr)				1								1
Peak Hour Factor	0.92	0.92	0.92	0.80	0.80	0.80	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	2%	1%	1%	2%	2%	2%	2%	2%	2%	3%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	215	2380	0	211	447	0	0	775	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					2		7	4			8	
Permitted Phases				2			4					
Detector Phase				2	2		7	4			8	
Switch Phase												
Minimum Initial (s)				10.0	10.0		4.0	10.0			4.0	
Minimum Split (s)				21.4	21.4		8.0	21.4			20.0	
Total Split (s)				60.0	60.0		12.0	60.0			48.0	
Total Split (%)				50.0%	50.0%		10.0%	50.0%			40.0%	
Yellow Time (s)				3.2	3.2		3.5	3.2			3.5	
All-Red Time (s)				2.2	2.2		0.5	2.2			0.5	
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)				5.4	5.4		4.0	5.4			4.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Recall Mode				C-Max	C-Max		None	None			None	
Act Effct Green (s)				54.6	54.6		56.0	54.6			44.0	
Actuated g/C Ratio				0.46	0.46		0.47	0.46			0.37	
v/c Ratio				0.34	1.22		1.29	0.59			1.28	
Control Delay				18.4	124.5		176.1	26.1			171.1	
Queue Delay				0.0	0.0		0.0	0.0			0.0	
Total Delay				18.4	124.5		176.1	26.1			171.1	
LOS				B	F		F	C			F	
Approach Delay					115.7			74.2			171.1	
Approach LOS					F			E			F	

Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

# Lanes, Volumes, Timings

## 10: University Ave US51 SB & Main St IL13 WB

5/6/2016

Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.29

Intersection Signal Delay: 119.6

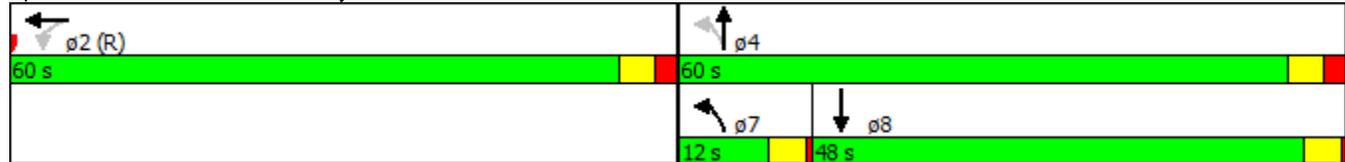
Intersection LOS: F

Intersection Capacity Utilization 122.7%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 10: University Ave US51 SB & Main St IL13 WB



Lanes, Volumes, Timings

11: University Ave US51 SB & Walnut St IL13 EB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕↕						↔		↕	↕	
Volume (vph)	122	1623	163	0	0	0	0	483	255	404	387	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	250		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4308	0	0	0	0	0	1598	0	1593	1693	0
Flt Permitted		0.997								0.085		
Satd. Flow (perm)	0	4308	0	0	0	0	0	1598	0	143	1693	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14						18				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		391			452			1274			681	
Travel Time (s)		8.9			10.3			29.0			15.5	
Confl. Peds. (#/hr)			3				1					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Heavy Vehicles (%)	2%	2%	1%	2%	2%	2%	2%	2%	2%	2%	1%	2%
Parking (#/hr)		5										
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2074	0	0	0	0	0	802	0	454	435	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		2						8		7	4	
Permitted Phases	2									4		
Detector Phase	2	2						8		7	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0						10.0		4.0	10.0	
Minimum Split (s)	20.0	20.0						20.8		8.0	20.8	
Total Split (s)	48.0	48.0						48.0		24.0	72.0	
Total Split (%)	40.0%	40.0%						40.0%		20.0%	60.0%	
Yellow Time (s)	3.5	3.5						3.2		3.5	3.2	
All-Red Time (s)	0.5	0.5						1.6		0.5	1.6	
Lost Time Adjust (s)		0.0						0.0		0.0	0.0	
Total Lost Time (s)		4.0						4.8		4.0	4.8	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Recall Mode	C-Max	C-Max						Max		None	Max	
Act Effct Green (s)		44.0						43.2		68.0	67.2	
Actuated g/C Ratio		0.37						0.36		0.57	0.56	
v/c Ratio		1.31						1.37		1.41	0.46	
Control Delay		175.2						208.2		223.2	19.6	
Queue Delay		0.2						0.0		0.0	0.0	
Total Delay		175.4						208.2		223.2	19.6	
LOS		F						F		F	B	
Approach Delay		175.4						208.2			123.6	
Approach LOS		F						F			F	

Intersection Summary

Area Type: CBD

Cycle Length: 120

# Lanes, Volumes, Timings

## 11: University Ave US51 SB & Walnut St IL13 EB

5/6/2016

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:, Start of Green, Master Intersection

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.41

Intersection Signal Delay: 170.2

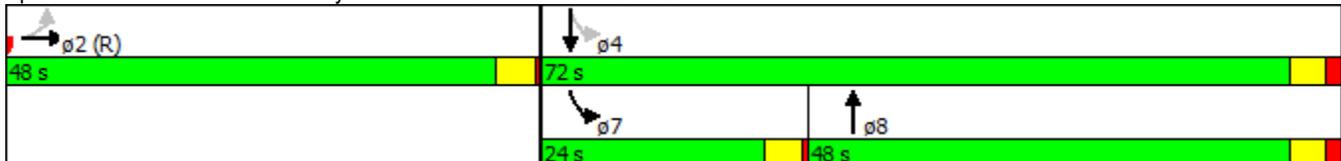
Intersection LOS: F

Intersection Capacity Utilization 122.7%

ICU Level of Service H

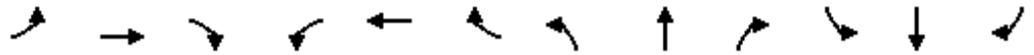
Analysis Period (min) 15

Splits and Phases: 11: University Ave US51 SB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑						↑	↗		↖	
Volume (vph)	41	2187	54	0	0	0	0	162	85	135	129	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		85	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1593	4558	0	0	0	0	0	1467	1425	0	1635	0
Flt Permitted	0.950										0.657	
Satd. Flow (perm)	1593	4558	0	0	0	0	0	1467	1425	0	1101	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5							18			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		452			457			1265			695	
Travel Time (s)		10.3			10.4			28.8			15.8	
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.84	0.84	0.84	0.92	0.92	0.92
Parking (#/hr)								5				
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	2359	0	0	0	0	0	193	101	0	287	0
Turn Type	Perm	NA						NA	Perm	Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2								8	4		
Detector Phase	2	2						8	8	4	4	
Switch Phase												
Minimum Initial (s)	18.0	18.0						18.0	18.0	4.0	4.0	
Minimum Split (s)	23.0	23.0						23.0	23.0	20.0	20.0	
Total Split (s)	75.0	75.0						45.0	45.0	45.0	45.0	
Total Split (%)	62.5%	62.5%						37.5%	37.5%	37.5%	37.5%	
Yellow Time (s)	3.2	3.2						3.2	3.2	3.5	3.5	
All-Red Time (s)	1.8	1.8						1.8	1.8	0.5	0.5	
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		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max						Max	Max	None	None	
Act Effct Green (s)	70.0	70.0						40.0	40.0		41.0	
Actuated g/C Ratio	0.58	0.58						0.33	0.33		0.34	
v/c Ratio	0.05	0.89						0.39	0.21		0.76	
Control Delay	5.4	9.4						33.7	24.8		49.0	
Queue Delay	0.0	46.2						0.0	0.0		0.0	
Total Delay	5.4	55.7						33.7	24.8		49.0	
LOS	A	E						C	C		D	
Approach Delay		54.8						30.6			49.0	
Approach LOS		D						C			D	

Intersection Summary

Area Type: CBD  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Lanes, Volumes, Timings  
 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/6/2016

Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.89  
 Intersection Signal Delay: 51.8 Intersection LOS: D  
 Intersection Capacity Utilization 90.8% ICU Level of Service E  
 Analysis Period (min) 15

Splits and Phases: 18: Illinois Ave US51 NB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					←↑↑↑		↑	↑			↑	
Volume (vph)	0	0	0	64	1984	91	65	138	0	0	200	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	260		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	4583	0	1624	1453	0	0	1647	0
Flt Permitted					0.999		0.368					
Satd. Flow (perm)	0	0	0	0	4583	0	629	1453	0	0	1647	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					10							5
Link Speed (mph)		30			30			30				30
Link Distance (ft)		461			447			695				721
Travel Time (s)		10.5			10.2			15.8				16.4
Confl. Peds. (#/hr)			1			2	1		1			1
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	0%	3%	2%	2%	2%	2%
Parking (#/hr)								5	5			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	2300	0	70	148	0	0	246	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					6		7	4				8
Permitted Phases				6			4					
Detector Phase				6	6		7	4				8
Switch Phase												
Minimum Initial (s)				10.0	10.0		4.0	5.0				5.0
Minimum Split (s)				21.2	21.2		8.0	21.2				21.2
Total Split (s)				79.0	79.0		8.0	41.0				33.0
Total Split (%)				65.8%	65.8%		6.7%	34.2%				27.5%
Yellow Time (s)				3.2	3.2		3.5	3.2				3.2
All-Red Time (s)				2.0	2.0		0.5	2.0				2.0
Lost Time Adjust (s)					0.0		0.0	0.0				0.0
Total Lost Time (s)					5.2		4.0	5.2				5.2
Lead/Lag							Lead					Lag
Lead-Lag Optimize?							Yes					Yes
Recall Mode				C-Max	C-Max		None	Max				Max
Act Effct Green (s)					73.8		37.0	35.8				29.4
Actuated g/C Ratio					0.62		0.31	0.30				0.24
v/c Ratio					0.82		0.31	0.34				0.60
Control Delay					20.8		17.6	17.2				47.3
Queue Delay					17.2		0.0	0.0				0.0
Total Delay					38.0		17.6	17.2				47.3
LOS					D		B	B				D
Approach Delay					38.0			17.3				47.3
Approach LOS					D			B				D

Intersection Summary

Area Type: CBD  
 Cycle Length: 120

Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/6/2016

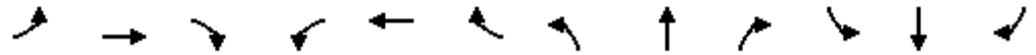
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 6:WBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 37.2	Intersection LOS: D
Intersection Capacity Utilization 78.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 19: Illinois Ave US51 NB & Main St IL13 WB



Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖ ↗	↖ ↗		↖ ↗	↖ ↗			↖ ↗	
Volume (vph)	0	0	0	218	1253	248	110	280	0	0	518	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	215		0	250		0	0		0
Storage Lanes	0		0	1		0	2		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	1356	4117	0	3090	3185	0	0	2977	0
Flt Permitted				0.950	0.999		0.122					
Satd. Flow (perm)	0	0	0	1353	4117	0	397	3185	0	0	2977	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					50						20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1022			461			681			730	
Travel Time (s)		23.2			10.5			15.5			16.6	
Confl. Peds. (#/hr)				1								1
Peak Hour Factor	0.92	0.92	0.92	0.76	0.76	0.76	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	2%	2%	2%	3%	5%	2%	2%	2%	2%	2%	6%	7%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	258	2004	0	120	304	0	0	741	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					2		7	4			8	
Permitted Phases				2			4					
Detector Phase				2	2		7	4			8	
Switch Phase												
Minimum Initial (s)				10.0	10.0		4.0	10.0			4.0	
Minimum Split (s)				21.4	21.4		8.0	21.4			20.0	
Total Split (s)				73.0	73.0		8.0	47.0			39.0	
Total Split (%)				60.8%	60.8%		6.7%	39.2%			32.5%	
Yellow Time (s)				3.2	3.2		3.5	3.2			3.5	
All-Red Time (s)				2.2	2.2		0.5	2.2			0.5	
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)				5.4	5.4		4.0	5.4			4.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Recall Mode				C-Max	C-Max		None	None			None	
Act Effct Green (s)				69.4	69.4		41.2	39.8			33.2	
Actuated g/C Ratio				0.58	0.58		0.34	0.33			0.28	
v/c Ratio				0.33	0.83		0.53	0.29			0.88	
Control Delay				8.8	10.8		57.6	47.1			53.5	
Queue Delay				0.0	0.5		0.0	0.0			0.0	
Total Delay				8.8	11.3		57.6	47.1			53.5	
LOS				A	B		E	D			D	
Approach Delay					11.0			50.1			53.5	
Approach LOS					B			D			D	

Intersection Summary

Area Type: CBD  
 Cycle Length: 120  
 Actuated Cycle Length: 120

# Lanes, Volumes, Timings

## 10: University Ave US51 SB & Main St IL13 WB

5/6/2016

Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 25.1

Intersection LOS: C

Intersection Capacity Utilization 73.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: University Ave US51 SB & Main St IL13 WB



Lanes, Volumes, Timings

11: University Ave US51 SB & Walnut St IL13 EB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔↔						↔↔		↔↔	↔↔	
Volume (vph)	68	1593	148	0	0	0	0	322	100	323	413	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	250		0
Storage Lanes	0		0	0		0	0		0	2		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4311	0	0	0	0	0	3071	0	3030	3094	0
Flt Permitted		0.998								0.239		
Satd. Flow (perm)	0	4311	0	0	0	0	0	3071	0	762	3094	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20						20				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		391			452			1274			681	
Travel Time (s)		8.9			10.3			29.0			15.5	
Confl. Peds. (#/hr)			3			1						
Peak Hour Factor	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.92	0.75	0.75	0.75
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	2%	2%	2%	4%	5%	2%
Parking (#/hr)		5										
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2128	0	0	0	0	0	459	0	431	551	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		2						8		7	4	
Permitted Phases	2									4		
Detector Phase	2	2						8		7	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0						10.0		4.0	10.0	
Minimum Split (s)	20.0	20.0						20.8		8.0	20.8	
Total Split (s)	72.0	72.0						28.0		20.0	48.0	
Total Split (%)	60.0%	60.0%						23.3%		16.7%	40.0%	
Yellow Time (s)	3.5	3.5						3.2		3.5	3.2	
All-Red Time (s)	0.5	0.5						1.6		0.5	1.6	
Lost Time Adjust (s)		0.0						0.0		0.0	0.0	
Total Lost Time (s)		4.0						4.8		4.0	4.8	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Recall Mode	C-Max	C-Max						Max		None	Max	
Act Effct Green (s)		68.0						23.7		44.0	43.2	
Actuated g/C Ratio		0.57						0.20		0.37	0.36	
v/c Ratio		0.87						0.74		0.75	0.50	
Control Delay		26.9						51.4		47.6	30.5	
Queue Delay		0.3						0.0		0.0	0.0	
Total Delay		27.2						51.4		47.6	30.5	
LOS		C						D		D	C	
Approach Delay		27.2						51.4			38.0	
Approach LOS		C						D			D	

Intersection Summary

Area Type: CBD

Cycle Length: 120

# Lanes, Volumes, Timings

## 11: University Ave US51 SB & Walnut St IL13 EB

5/6/2016

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:, Start of Green, Master Intersection

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 33.3

Intersection LOS: C

Intersection Capacity Utilization 73.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 11: University Ave US51 SB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑						↑	↗		↖	
Volume (vph)	23	1944	49	0	0	0	0	108	33	108	137	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		85	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1562	4515	0	0	0	0	0	1439	1333	0	1640	0
Flt Permitted	0.950										0.800	
Satd. Flow (perm)	1562	4515	0	0	0	0	0	1439	1333	0	1341	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5							18			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		452			457			1265			695	
Travel Time (s)		10.3			10.4			28.8			15.8	
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.84	0.84	0.84	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	2%	2%	2%	2%	2%	4%	9%	2%	2%	2%
Parking (#/hr)								5				
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	2190	0	0	0	0	0	129	39	0	266	0
Turn Type	Perm	NA						NA	Perm	Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2								8	4		
Detector Phase	2	2						8	8	4	4	
Switch Phase												
Minimum Initial (s)	18.0	18.0						18.0	18.0	4.0	4.0	
Minimum Split (s)	23.0	23.0						23.0	23.0	20.0	20.0	
Total Split (s)	77.0	77.0						43.0	43.0	43.0	43.0	
Total Split (%)	64.2%	64.2%						35.8%	35.8%	35.8%	35.8%	
Yellow Time (s)	3.2	3.2						3.2	3.2	3.5	3.5	
All-Red Time (s)	1.8	1.8						1.8	1.8	0.5	0.5	
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		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max						Max	Max	None	None	
Act Effct Green (s)	72.0	72.0						38.0	38.0		39.0	
Actuated g/C Ratio	0.60	0.60						0.32	0.32		0.32	
v/c Ratio	0.03	0.81						0.28	0.09		0.61	
Control Delay	7.3	11.3						32.9	19.0		35.2	
Queue Delay	0.0	1.8						0.0	0.0		0.0	
Total Delay	7.3	13.1						32.9	19.0		35.2	
LOS	A	B						C	B		D	
Approach Delay		13.0						29.7			35.2	
Approach LOS		B						C			D	

Intersection Summary	
Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	120

# Lanes, Volumes, Timings

## 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/6/2016

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 16.3

Intersection LOS: B

Intersection Capacity Utilization 84.3%

ICU Level of Service E

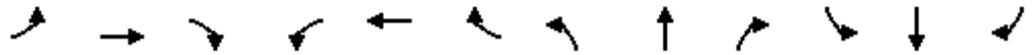
Analysis Period (min) 15

Splits and Phases: 18: Illinois Ave US51 NB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					←↑↑↑		↑	↑			↑	
Volume (vph)	0	0	0	73	1647	83	37	94	0	0	172	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	260		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	4404	0	1533	1425	0	0	1634	0
Flt Permitted					0.998		0.394					
Satd. Flow (perm)	0	0	0	0	4404	0	635	1425	0	0	1634	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					12							8
Link Speed (mph)		30			30			30				30
Link Distance (ft)		461			447			695				721
Travel Time (s)		10.5			10.2			15.8				16.4
Confl. Peds. (#/hr)			1			2	1		1			1
Peak Hour Factor	0.92	0.92	0.92	0.78	0.78	0.78	0.74	0.74	0.74	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	5%	6%	6%	5%	2%	2%	2%	2%
Parking (#/hr)								5	5			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	2312	0	50	127	0	0	225	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					6		7	4				8
Permitted Phases				6			4					
Detector Phase				6	6		7	4				8
Switch Phase												
Minimum Initial (s)				10.0	10.0		4.0	4.0				5.0
Minimum Split (s)				21.2	21.2		8.0	20.0				21.2
Total Split (s)				80.6	80.6		8.0	39.4				31.4
Total Split (%)				67.2%	67.2%		6.7%	32.8%				26.2%
Yellow Time (s)				3.2	3.2		3.5	3.5				3.2
All-Red Time (s)				2.0	2.0		0.5	0.5				2.0
Lost Time Adjust (s)					0.0		0.0	0.0				0.0
Total Lost Time (s)					5.2		4.0	4.0				5.2
Lead/Lag							Lead					Lag
Lead-Lag Optimize?							Yes					Yes
Recall Mode				C-Max	C-Max		None	None				Max
Act Effct Green (s)					75.4		35.4	35.4				27.8
Actuated g/C Ratio					0.63		0.30	0.30				0.23
v/c Ratio					0.83		0.23	0.30				0.58
Control Delay					20.9		18.7	18.4				47.3
Queue Delay					0.1		0.0	0.0				0.0
Total Delay					20.9		18.7	18.4				47.3
LOS					C		B	B				D
Approach Delay					20.9			18.5				47.3
Approach LOS					C			B				D

Intersection Summary

Area Type: CBD  
 Cycle Length: 120

Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/6/2016

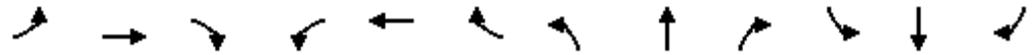
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 23.0	Intersection LOS: C
Intersection Capacity Utilization 69.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 19: Illinois Ave US51 NB & Main St IL13 WB



Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↖↖↖		↖↖	↖↖			↖↖	
Volume (vph)	0	0	0	191	1611	274	194	411	0	0	600	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	215		0	250		0	0		0
Storage Lanes	0		0	1		0	2		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	1383	4262	0	3090	3185	0	0	3119	0
Flt Permitted				0.950	0.999		0.123					
Satd. Flow (perm)	0	0	0	1380	4262	0	400	3185	0	0	3119	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					44						12	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1022			461			681			730	
Travel Time (s)		23.2			10.5			15.5			16.6	
Confl. Peds. (#/hr)				1								1
Peak Hour Factor	0.92	0.92	0.92	0.80	0.80	0.80	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	2%	1%	1%	2%	2%	2%	2%	2%	2%	3%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	215	2380	0	211	447	0	0	775	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					2		7	4			8	
Permitted Phases				2			4					
Detector Phase				2	2		7	4			8	
Switch Phase												
Minimum Initial (s)				10.0	10.0		4.0	10.0			4.0	
Minimum Split (s)				21.4	21.4		8.0	21.4			20.0	
Total Split (s)				77.0	77.0		9.0	43.0			34.0	
Total Split (%)				64.2%	64.2%		7.5%	35.8%			28.3%	
Yellow Time (s)				3.2	3.2		3.5	3.2			3.5	
All-Red Time (s)				2.2	2.2		0.5	2.2			0.5	
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)				5.4	5.4		4.0	5.4			4.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Recall Mode				C-Max	C-Max		None	None			None	
Act Effct Green (s)				71.6	71.6		39.0	37.6			30.0	
Actuated g/C Ratio				0.60	0.60		0.32	0.31			0.25	
v/c Ratio				0.26	0.93		0.87	0.45			0.98	
Control Delay				6.6	14.2		61.6	36.0			72.6	
Queue Delay				0.0	0.1		0.0	0.0			0.0	
Total Delay				6.6	14.3		61.6	36.0			72.6	
LOS				A	B		E	D			E	
Approach Delay					13.7			44.2			72.6	
Approach LOS					B			D			E	

Intersection Summary	
Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	120

# Lanes, Volumes, Timings

## 10: University Ave US51 SB & Main St IL13 WB

5/6/2016

Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 30.0

Intersection LOS: C

Intersection Capacity Utilization 89.0%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 10: University Ave US51 SB & Main St IL13 WB



Lanes, Volumes, Timings

11: University Ave US51 SB & Walnut St IL13 EB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↕↔						↕↔		↕↔	↕↔	
Volume (vph)	122	1623	163	0	0	0	0	483	255	404	387	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	250		0
Storage Lanes	0		0	0		0	0		0	2		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4313	0	0	0	0	0	3020	0	3090	3217	0
Flt Permitted		0.997								0.108		
Satd. Flow (perm)	0	4313	0	0	0	0	0	3020	0	351	3217	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18						10				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		391			452			1274			681	
Travel Time (s)		8.9			10.3			29.0			15.5	
Confl. Peds. (#/hr)			3			1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Heavy Vehicles (%)	2%	2%	1%	2%	2%	2%	2%	2%	2%	2%	1%	2%
Parking (#/hr)		5										
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2074	0	0	0	0	0	802	0	454	435	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		2						8		7	4	
Permitted Phases	2									4		
Detector Phase	2	2						8		7	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0						10.0		4.0	10.0	
Minimum Split (s)	20.0	20.0						20.8		8.0	20.8	
Total Split (s)	64.0	64.0						38.0		18.0	56.0	
Total Split (%)	53.3%	53.3%						31.7%		15.0%	46.7%	
Yellow Time (s)	3.5	3.5						3.2		3.5	3.2	
All-Red Time (s)	0.5	0.5						1.6		0.5	1.6	
Lost Time Adjust (s)		0.0						0.0		0.0	0.0	
Total Lost Time (s)		4.0						4.8		4.0	4.8	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Recall Mode	C-Max	C-Max						Max		None	Max	
Act Effct Green (s)		60.0						33.2		52.0	51.2	
Actuated g/C Ratio		0.50						0.28		0.43	0.43	
v/c Ratio		0.96						0.95		0.96	0.32	
Control Delay		40.6						63.9		78.3	31.4	
Queue Delay		13.0						0.0		0.0	0.0	
Total Delay		53.7						63.9		78.3	31.4	
LOS		D						E		E	C	
Approach Delay		53.7						63.9			55.3	
Approach LOS		D						E			E	

Intersection Summary

Area Type: CBD

Cycle Length: 120

# Lanes, Volumes, Timings

## 11: University Ave US51 SB & Walnut St IL13 EB

5/6/2016

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:, Start of Green, Master Intersection

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 56.2

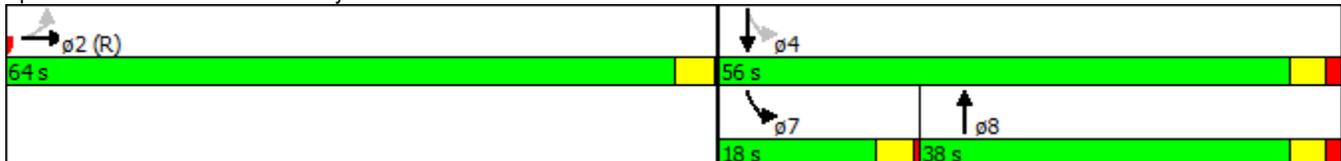
Intersection LOS: E

Intersection Capacity Utilization 89.0%

ICU Level of Service E

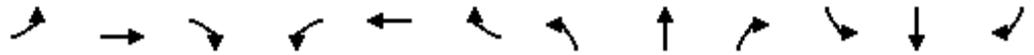
Analysis Period (min) 15

Splits and Phases: 11: University Ave US51 SB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	2187	54	0	0	0	0	162	85	135	129	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		85	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1593	4558	0	0	0	0	0	1467	1425	0	1635	0
Flt Permitted	0.950										0.657	
Satd. Flow (perm)	1593	4558	0	0	0	0	0	1467	1425	0	1101	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5							18			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		452			457			1265			695	
Travel Time (s)		10.3			10.4			28.8			15.8	
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.84	0.84	0.84	0.92	0.92	0.92
Parking (#/hr)								5				
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	2359	0	0	0	0	0	193	101	0	287	0
Turn Type	Perm	NA						NA	Perm	Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2								8	4		
Detector Phase	2	2						8	8	4	4	
Switch Phase												
Minimum Initial (s)	18.0	18.0						18.0	18.0	4.0	4.0	
Minimum Split (s)	23.0	23.0						23.0	23.0	20.0	20.0	
Total Split (s)	75.0	75.0						45.0	45.0	45.0	45.0	
Total Split (%)	62.5%	62.5%						37.5%	37.5%	37.5%	37.5%	
Yellow Time (s)	3.2	3.2						3.2	3.2	3.5	3.5	
All-Red Time (s)	1.8	1.8						1.8	1.8	0.5	0.5	
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		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max						Max	Max	None	None	
Act Effct Green (s)	70.0	70.0						40.0	40.0		41.0	
Actuated g/C Ratio	0.58	0.58						0.33	0.33		0.34	
v/c Ratio	0.05	0.89						0.39	0.21		0.76	
Control Delay	7.8	14.2						33.7	24.8		49.0	
Queue Delay	0.0	12.7						0.0	0.0		0.0	
Total Delay	7.8	26.9						33.7	24.8		49.0	
LOS	A	C						C	C		D	
Approach Delay		26.6						30.6			49.0	
Approach LOS		C						C			D	

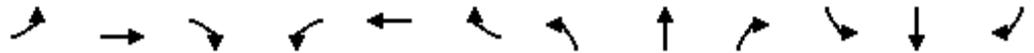
Intersection Summary

Area Type:	CBD
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green



Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					←↑↑↑		↑	↑			↑	
Volume (vph)	0	0	0	64	1984	91	65	138	0	0	200	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	260		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	4583	0	1624	1453	0	0	1647	0
Flt Permitted					0.999		0.368					
Satd. Flow (perm)	0	0	0	0	4583	0	629	1453	0	0	1647	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					10							5
Link Speed (mph)		30			30			30				30
Link Distance (ft)		461			447			695				721
Travel Time (s)		10.5			10.2			15.8				16.4
Confl. Peds. (#/hr)			1			2	1		1			1
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	0%	3%	2%	2%	2%	2%
Parking (#/hr)								5	5			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	2300	0	70	148	0	0	246	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					6		7	4				8
Permitted Phases				6			4					
Detector Phase				6	6		7	4				8
Switch Phase												
Minimum Initial (s)				10.0	10.0		4.0	5.0				5.0
Minimum Split (s)				21.2	21.2		8.0	21.2				21.2
Total Split (s)				79.0	79.0		8.0	41.0				33.0
Total Split (%)				65.8%	65.8%		6.7%	34.2%				27.5%
Yellow Time (s)				3.2	3.2		3.5	3.2				3.2
All-Red Time (s)				2.0	2.0		0.5	2.0				2.0
Lost Time Adjust (s)					0.0		0.0	0.0				0.0
Total Lost Time (s)					5.2		4.0	5.2				5.2
Lead/Lag							Lead					Lag
Lead-Lag Optimize?							Yes					Yes
Recall Mode				C-Max	C-Max		None	Max				Max
Act Effct Green (s)					73.8		37.0	35.8				29.4
Actuated g/C Ratio					0.62		0.31	0.30				0.24
v/c Ratio					0.82		0.31	0.34				0.60
Control Delay					20.8		17.7	17.3				47.3
Queue Delay					0.2		0.0	0.0				0.0
Total Delay					21.1		17.7	17.3				47.3
LOS					C		B	B				D
Approach Delay					21.1			17.4				47.3
Approach LOS					C			B				D

Intersection Summary

Area Type: CBD  
 Cycle Length: 120

Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/6/2016

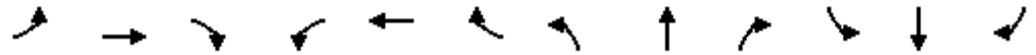
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 6:WBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 23.1	Intersection LOS: C
Intersection Capacity Utilization 78.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 19: Illinois Ave US51 NB & Main St IL13 WB



Lanes, Volumes, Timings  
2: Mill St & Illinois Ave US51 NB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	64	169	45	134	48	435	386	25	15	498	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		230	0		85	0		130	0		0
Storage Lanes	1		1	1		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1624	3036	1425	1593	1644	1398	1593	1676	1425	0	1663	0
Flt Permitted	0.557			0.707			0.397				0.986	
Satd. Flow (perm)	952	3036	1425	1185	1644	1342	666	1676	1425	0	1641	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			184			85			85			6
Link Speed (mph)		30			30			30				30
Link Distance (ft)		485			723			947				722
Travel Time (s)		11.0			16.4			21.5				16.4
Confl. Peds. (#/hr)							8					
Peak Hour Factor	0.88	0.88	0.92	0.92	0.74	0.74	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	2%	2%	4%	4%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	73	184	49	181	65	473	420	27	0	587	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	21.3	21.3	8.0	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2
Total Split (s)	8.7	22.0	22.0	8.0	21.3	21.3	50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	10.9%	27.5%	27.5%	10.0%	26.6%	26.6%	62.5%	62.5%	62.5%	62.5%	62.5%	62.5%
Yellow Time (s)	3.5	3.2	3.2	3.5	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
All-Red Time (s)	0.5	2.0	2.0	0.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	4.0	5.2	5.2	4.0	5.2	5.2	5.2	5.2	5.2		5.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	C-Max	C-Max	C-Max	None	None	None	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	24.0	20.0	20.0	21.3	16.1	16.1	44.8	44.8	44.8		44.8	
Actuated g/C Ratio	0.30	0.25	0.25	0.27	0.20	0.20	0.56	0.56	0.56		0.56	
v/c Ratio	0.06	0.10	0.37	0.15	0.55	0.19	1.27	0.45	0.03		0.64	
Control Delay	17.4	24.3	18.4	20.2	35.8	5.8	163.5	12.3	0.1		15.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	17.4	24.3	18.4	20.2	35.8	5.8	163.5	12.3	0.1		15.9	
LOS	B	C	B	C	D	A	F	B	A		B	
Approach Delay		19.9			26.6			89.6			15.9	
Approach LOS		B			C			F			B	

Intersection Summary

Area Type: CBD

Cycle Length: 80

Actuated Cycle Length: 80

Lanes, Volumes, Timings  
 2: Mill St & Illinois Ave US51 NB

5/5/2016

Offset: 0 (0%), Referenced to phase 4:EBTL and 7:EBL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.27

Intersection Signal Delay: 50.6

Intersection LOS: D

Intersection Capacity Utilization 86.5%

ICU Level of Service E

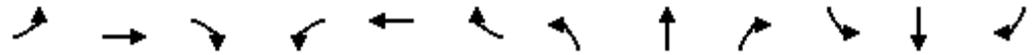
Analysis Period (min) 15

Splits and Phases: 2: Mill St & Illinois Ave US51 NB



Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↔		↖	↕			↕	↗
Volume (vph)	0	0	0	47	1411	187	29	123	0	0	135	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	215		0	0		0	0		400
Storage Lanes	0		0	1		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	1356	4144	0	1593	1676	0	0	1613	1358
Flt Permitted				0.950			0.598					
Satd. Flow (perm)	0	0	0	1353	4144	0	1003	1676	0	0	1613	1340
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					56							33
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1022			470			699			727	
Travel Time (s)		23.2			10.7			15.9			16.5	
Confl. Peds. (#/hr)				1								1
Peak Hour Factor	0.92	0.92	0.92	0.76	0.76	0.76	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	2%	2%	2%	3%	5%	2%	2%	2%	2%	2%	6%	7%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	56	2109	0	32	134	0	0	161	33
Turn Type				Perm	NA		Perm	NA			NA	custom
Protected Phases					8			2			6	
Permitted Phases				8			2					8
Detector Phase				8	8		2	2			6	8
Switch Phase												
Minimum Initial (s)				8.0	8.0		10.0	10.0			4.0	8.0
Minimum Split (s)				21.4	21.4		21.4	21.4			21.4	21.4
Total Split (s)				57.8	57.8		22.2	22.2			22.2	57.8
Total Split (%)				72.3%	72.3%		27.8%	27.8%			27.8%	72.3%
Yellow Time (s)				3.2	3.2		3.2	3.2			3.2	3.2
All-Red Time (s)				2.2	2.2		2.2	2.2			2.2	2.2
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)				5.4	5.4		5.4	5.4			5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode				C-Max	C-Max		None	None			None	C-Max
Act Effct Green (s)				55.9	55.9		13.3	13.3			13.3	55.9
Actuated g/C Ratio				0.70	0.70		0.17	0.17			0.17	0.70
v/c Ratio				0.06	0.72		0.19	0.48			0.60	0.03
Control Delay				1.3	3.3		55.4	59.9			40.3	1.9
Queue Delay				0.0	0.2		0.0	0.0			0.0	0.0
Total Delay				1.3	3.5		55.4	59.9			40.3	1.9
LOS				A	A		E	E			D	A
Approach Delay					3.5			59.0			33.8	
Approach LOS					A			E			C	

Intersection Summary	
Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80

# Lanes, Volumes, Timings

## 10: University Ave US51 SB & Main St IL13 WB

5/5/2016

Offset: 74.4 (93%), Referenced to phase 8:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 9.5

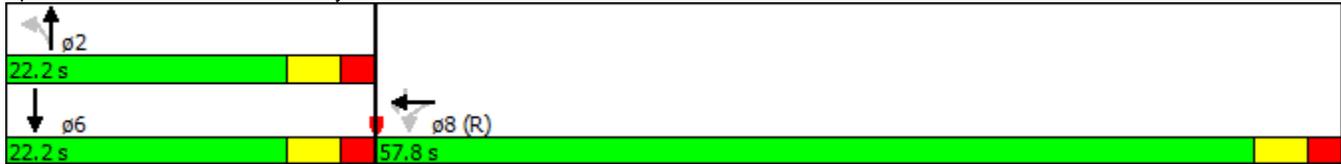
Intersection LOS: A

Intersection Capacity Utilization 60.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: University Ave US51 SB & Main St IL13 WB



Lanes, Volumes, Timings

11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑			↑	
Volume (vph)	16	1754	39	0	0	0	0	136	27	15	167	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	4368	0	0	0	0	0	1640	0	0	1623	0
Flt Permitted											0.965	
Satd. Flow (perm)	0	4368	0	0	0	0	0	1640	0	0	1573	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7						10				
Link Speed (mph)		30			30			30				30
Link Distance (ft)		391			468			1252				699
Travel Time (s)		8.9			10.6			28.5				15.9
Confl. Peds. (#/hr)			3				1					
Peak Hour Factor	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.92	0.75	0.75	0.75
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	2%	2%	2%	4%	5%	2%
Parking (#/hr)		5										
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2129	0	0	0	0	0	177	0	0	243	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Detector Phase	4	4						2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0						4.0		4.0	4.0	
Minimum Split (s)	21.7	21.7						21.7		21.7	21.7	
Total Split (s)	54.1	54.1						25.9		25.9	25.9	
Total Split (%)	67.6%	67.6%						32.4%		32.4%	32.4%	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	2.2	2.2						2.2		2.2	2.2	
Lost Time Adjust (s)		0.0						0.0			0.0	
Total Lost Time (s)		5.7						5.7			5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max						None		Max	Max	
Act Effct Green (s)		48.4						20.2			20.2	
Actuated g/C Ratio		0.60						0.25			0.25	
v/c Ratio		0.80						0.42			0.61	
Control Delay		15.2						27.2			27.2	
Queue Delay		0.0						0.0			0.0	
Total Delay		15.2						27.2			27.2	
LOS		B						C			C	
Approach Delay		15.2						27.2			27.2	
Approach LOS		B						C			C	

Intersection Summary

Area Type: CBD  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 0 (0%), Referenced to phase 4:EBTL, Start of Green, Master Intersection  
 Natural Cycle: 60

# Lanes, Volumes, Timings

## 11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 17.2

Intersection LOS: B

Intersection Capacity Utilization 74.3%

ICU Level of Service D

Analysis Period (min) 15

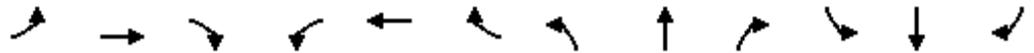
Splits and Phases: 11: University Ave US51 SB & Walnut St IL13 EB



Lanes, Volumes, Timings

18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑						↑	↗		↖	
Volume (vph)	64	1564	158	0	0	0	0	344	106	415	383	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		85	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1562	4473	0	0	0	0	0	1439	1333	0	1635	0
Flt Permitted	0.950										0.975	
Satd. Flow (perm)	1562	4473	0	0	0	0	0	1439	1333	0	1635	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21							100			
Link Speed (mph)		30			30			30				30
Link Distance (ft)		468			457			1265				695
Travel Time (s)		10.6			10.4			28.8				15.8
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.84	0.84	0.84	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	2%	2%	2%	2%	2%	4%	9%	2%	2%	2%
Parking (#/hr)								5				
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	1893	0	0	0	0	0	410	126	0	867	0
Turn Type	Perm	NA						NA	Perm	Split	NA	
Protected Phases		2						8		7	7	
Permitted Phases	2								8			
Detector Phase	2	2						8	8	7	7	
Switch Phase												
Minimum Initial (s)	18.0	18.0						18.0	18.0	4.0	4.0	
Minimum Split (s)	23.0	23.0						23.0	23.0	21.3	21.3	
Total Split (s)	28.0	28.0						23.0	23.0	29.0	29.0	
Total Split (%)	35.0%	35.0%						28.8%	28.8%	36.3%	36.3%	
Yellow Time (s)	3.2	3.2						3.2	3.2	3.5	3.5	
All-Red Time (s)	1.8	1.8						1.8	1.8	1.8	1.8	
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		5.3	
Lead/Lag								Lag	Lag	Lead	Lead	
Lead-Lag Optimize?								Yes	Yes	Yes	Yes	
Recall Mode	C-Max	C-Max						Max	Max	None	None	
Act Effct Green (s)	23.0	23.0						18.0	18.0		23.7	
Actuated g/C Ratio	0.29	0.29						0.22	0.22		0.30	
v/c Ratio	0.16	1.46						1.27	0.33		1.79	
Control Delay	30.6	236.5						173.4	11.3		381.1	
Queue Delay	0.0	0.0						0.0	0.0		0.0	
Total Delay	30.6	236.5						173.4	11.3		381.1	
LOS	C	F						F	B		F	
Approach Delay		229.2						135.3			381.1	
Approach LOS		F						F			F	

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80

# Lanes, Volumes, Timings

## 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.79

Intersection Signal Delay: 253.4

Intersection LOS: F

Intersection Capacity Utilization 118.3%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 18: Illinois Ave US51 NB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔↔↔		↗	↖			↖	
Volume (vph)	0	0	0	243	1417	143	117	249	0	0	555	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	260		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	4367	0	1533	1425	0	0	1634	0
Flt Permitted					0.993		0.130					
Satd. Flow (perm)	0	0	0	0	4367	0	210	1425	0	0	1634	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					22						14	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		470			447			695			721	
Travel Time (s)		10.7			10.2			15.8			16.4	
Confl. Peds. (#/hr)			1			2	1		1			1
Peak Hour Factor	0.92	0.92	0.92	0.78	0.78	0.78	0.74	0.74	0.74	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	5%	6%	6%	5%	2%	2%	2%	2%
Parking (#/hr)								5	5			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	2312	0	158	336	0	0	724	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					6		3	8			4	
Permitted Phases				6			8					
Detector Phase				6	6		3	8			4	
Switch Phase												
Minimum Initial (s)				10.0	10.0		4.0	5.0			4.0	
Minimum Split (s)				21.2	21.2		8.0	21.2			21.2	
Total Split (s)				40.0	40.0		8.0	40.0			32.0	
Total Split (%)				50.0%	50.0%		10.0%	50.0%			40.0%	
Yellow Time (s)				3.2	3.2		3.5	3.2			3.2	
All-Red Time (s)				2.0	2.0		0.5	2.0			2.0	
Lost Time Adjust (s)					0.0		0.0	0.0			0.0	
Total Lost Time (s)					5.2		4.0	5.2			5.2	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Recall Mode				C-Max	C-Max		None	Max			None	
Act Effct Green (s)					34.8		36.0	34.8			26.8	
Actuated g/C Ratio					0.44		0.45	0.44			0.34	
v/c Ratio					1.21		0.99	0.54			1.30	
Control Delay					123.2		62.0	39.5			175.0	
Queue Delay					0.0		0.0	0.0			0.0	
Total Delay					123.2		62.0	39.5			175.0	
LOS					F		E	D			F	
Approach Delay					123.2			46.7			175.0	
Approach LOS					F			D			F	

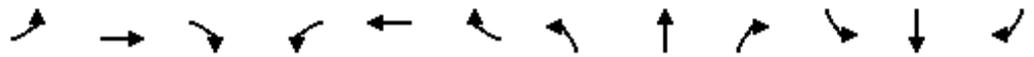
Intersection Summary

Area Type: CBD  
 Cycle Length: 80



Lanes, Volumes, Timings  
23: Normal Ave & Mill St

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Volume (vph)	4	204	0	100	388	109	10	50	25	20	100	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3536	0	0	3416	0	0	1778	0	0	1725	0
Flt Permitted		0.944			0.839			0.963			0.979	
Satd. Flow (perm)	0	3341	0	0	2889	0	0	1722	0	0	1696	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					44			27				83
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1024			485			175				354
Travel Time (s)		23.3			11.0			4.0				8.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	226	0	0	649	0	0	92	0	0	273	0
Turn Type	Perm	NA										
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.2	21.2		21.2	21.2		21.2	21.2		21.2	21.2	
Total Split (s)	42.0	42.0		42.0	42.0		38.0	38.0		38.0	38.0	
Total Split (%)	52.5%	52.5%		52.5%	52.5%		47.5%	47.5%		47.5%	47.5%	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.2	3.2		3.2	3.2	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.2			5.2			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		23.9			23.9			45.7			45.7	
Actuated g/C Ratio		0.30			0.30			0.57			0.57	
v/c Ratio		0.23			0.73			0.09			0.27	
Control Delay		20.4			19.6			7.4			7.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		20.4			19.6			7.4			7.8	
LOS		C			B			A			A	
Approach Delay		20.4			19.6			7.4			7.8	
Approach LOS		C			B			A			A	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	45
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	16.2
Intersection LOS:	B

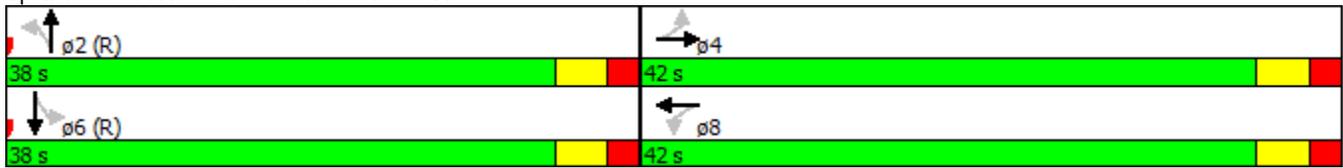
Lanes, Volumes, Timings  
 23: Normal Ave & Mill St

5/5/2016

Intersection Capacity Utilization 53.3%  
 Analysis Period (min) 15

ICU Level of Service A

Splits and Phases: 23: Normal Ave & Mill St



Lanes, Volumes, Timings  
2: Mill St & Illinois Ave US51 NB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	139	192	330	33	134	70	453	578	59	45	524	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		230	0		85	0		130	0		0
Storage Lanes	1		1	1		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1624	3217	1425	1593	1629	1454	1624	1644	1454	0	1658	0
Flt Permitted	0.579			0.611			0.370				0.900	
Satd. Flow (perm)	990	3217	1425	1024	1629	1396	633	1644	1454	0	1498	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			334			89			85			5
Link Speed (mph)		30			30			30				30
Link Distance (ft)		485			723			947				722
Travel Time (s)		11.0			16.4			21.5				16.4
Confl. Peds. (#/hr)							8					
Peak Hour Factor	0.85	0.85	0.85	0.79	0.79	0.79	0.91	0.91	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	2%	2%	5%	0%	0%	4%	0%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	226	388	42	170	89	498	635	65	0	652	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	21.3	21.3	8.0	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2
Total Split (s)	8.7	22.0	22.0	8.0	21.3	21.3	50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	10.9%	27.5%	27.5%	10.0%	26.6%	26.6%	62.5%	62.5%	62.5%	62.5%	62.5%	62.5%
Yellow Time (s)	3.5	3.2	3.2	3.5	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
All-Red Time (s)	0.5	2.0	2.0	0.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	4.0	5.2	5.2	4.0	5.2	5.2	5.2	5.2	5.2		5.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	C-Max	C-Max	C-Max	None	None	None	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	24.0	20.0	20.0	21.3	16.1	16.1	44.8	44.8	44.8			44.8
Actuated g/C Ratio	0.30	0.25	0.25	0.27	0.20	0.20	0.56	0.56	0.56			0.56
v/c Ratio	0.49	0.28	0.64	0.14	0.52	0.25	1.41	0.69	0.08			0.78
Control Delay	26.1	24.6	22.7	20.2	35.0	8.6	220.8	17.6	1.6			21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
Total Delay	26.1	24.6	22.7	20.2	35.0	8.6	220.8	17.6	1.6			21.7
LOS	C	C	C	C	D	A	F	B	A			C
Approach Delay		24.0			25.1			101.2				21.7
Approach LOS		C			C			F				C

Intersection Summary

Area Type: CBD

Cycle Length: 80

Actuated Cycle Length: 80

Lanes, Volumes, Timings  
 2: Mill St & Illinois Ave US51 NB

5/5/2016

Offset: 0 (0%), Referenced to phase 4:EBTL and 7:EBL, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.41

Intersection Signal Delay: 55.2

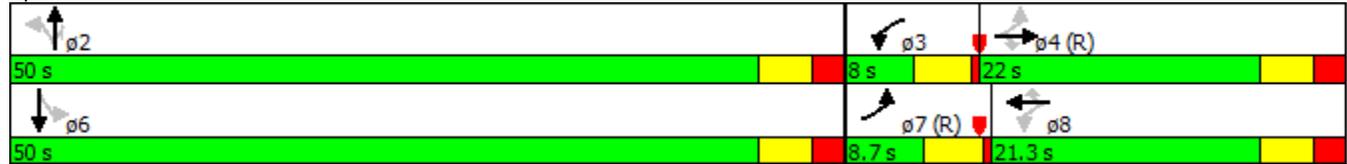
Intersection LOS: E

Intersection Capacity Utilization 103.2%

ICU Level of Service G

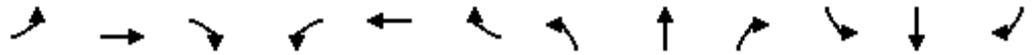
Analysis Period (min) 15

Splits and Phases: 2: Mill St & Illinois Ave US51 NB



Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↔		↗	↑			↘	↙
Volume (vph)	0	0	0	41	1812	36	52	160	0	0	208	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	215		0	0		0	0		400
Storage Lanes	0		0	1		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	1383	4354	0	1593	1676	0	0	1676	1411
Flt Permitted				0.950			0.434					
Satd. Flow (perm)	0	0	0	1380	4354	0	728	1676	0	0	1676	1392
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					7							33
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1022			470			699			727	
Travel Time (s)		23.2			10.7			15.9			16.5	
Confl. Peds. (#/hr)				1								1
Peak Hour Factor	0.92	0.92	0.92	0.80	0.80	0.80	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	2%	1%	1%	2%	2%	2%	2%	2%	2%	3%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	46	2315	0	57	174	0	0	236	25
Turn Type				Perm	NA		Perm	NA			NA	custom
Protected Phases					8			2			6	
Permitted Phases				8			2					8
Detector Phase				8	8		2	2			6	8
Switch Phase												
Minimum Initial (s)				8.0	8.0		10.0	10.0			4.0	8.0
Minimum Split (s)				21.4	21.4		21.4	21.4			21.4	21.4
Total Split (s)				57.0	57.0		23.0	23.0			23.0	57.0
Total Split (%)				71.3%	71.3%		28.8%	28.8%			28.8%	71.3%
Yellow Time (s)				3.2	3.2		3.2	3.2			3.2	3.2
All-Red Time (s)				2.2	2.2		2.2	2.2			2.2	2.2
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)				5.4	5.4		5.4	5.4			5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode				C-Max	C-Max		None	None			None	C-Max
Act Effct Green (s)				54.1	54.1		15.1	15.1			15.1	54.1
Actuated g/C Ratio				0.68	0.68		0.19	0.19			0.19	0.68
v/c Ratio				0.05	0.79		0.42	0.55			0.75	0.03
Control Delay				2.4	4.2		50.4	50.2			45.3	1.7
Queue Delay				0.0	0.4		0.0	0.0			0.0	0.0
Total Delay				2.4	4.6		50.4	50.2			45.3	1.7
LOS				A	A		D	D			D	A
Approach Delay					4.5			50.2			41.1	
Approach LOS					A			D			D	

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80

# Lanes, Volumes, Timings

## 10: University Ave US51 SB & Main St IL13 WB

5/5/2016

Offset: 74.4 (93%), Referenced to phase 8:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 11.6

Intersection LOS: B

Intersection Capacity Utilization 67.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 10: University Ave US51 SB & Main St IL13 WB



Lanes, Volumes, Timings

11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑			↑	
Volume (vph)	33	1832	43	0	0	0	0	179	68	81	168	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	4367	0	0	0	0	0	1614	0	0	1661	0
Flt Permitted		0.999									0.704	
Satd. Flow (perm)	0	4367	0	0	0	0	0	1614	0	0	1188	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6						7				
Link Speed (mph)		30			30			30				30
Link Distance (ft)		391			468			1252			699	
Travel Time (s)		8.9			10.6			28.5			15.9	
Confl. Peds. (#/hr)			3			1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Heavy Vehicles (%)	2%	2%	1%	2%	2%	2%	2%	2%	2%	2%	1%	2%
Parking (#/hr)		5										
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2074	0	0	0	0	0	269	0	0	280	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Detector Phase	4	4						2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0						4.0		4.0	4.0	
Minimum Split (s)	21.7	21.7						21.7		21.7	21.7	
Total Split (s)	49.0	49.0						31.0		31.0	31.0	
Total Split (%)	61.3%	61.3%						38.8%		38.8%	38.8%	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	2.2	2.2						2.2		2.2	2.2	
Lost Time Adjust (s)		0.0						0.0			0.0	
Total Lost Time (s)		5.7						5.7			5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max						None		Max	Max	
Act Effct Green (s)		43.3						25.3			25.3	
Actuated g/C Ratio		0.54						0.32			0.32	
v/c Ratio		0.88						0.52			0.75	
Control Delay		21.6						26.2			41.8	
Queue Delay		0.0						0.0			0.0	
Total Delay		21.6						26.2			41.8	
LOS		C						C			D	
Approach Delay		21.6						26.2			41.8	
Approach LOS		C						C			D	

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 4:EBTL, Start of Green, Master Intersection
Natural Cycle:	65

# Lanes, Volumes, Timings

## 11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 24.2

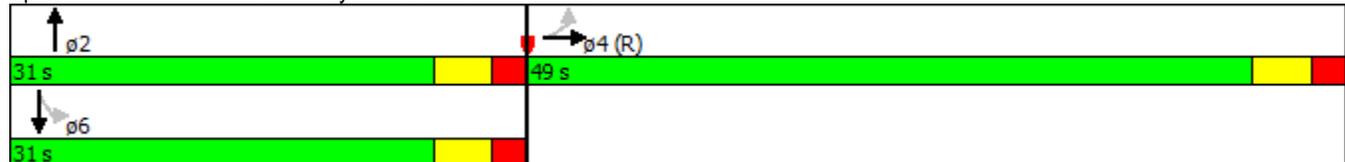
Intersection LOS: C

Intersection Capacity Utilization 87.5%

ICU Level of Service E

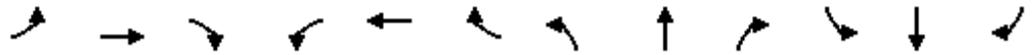
Analysis Period (min) 15

Splits and Phases: 11: University Ave US51 SB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	1677	174	0	0	0	0	515	272	457	349	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		85	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1593	4513	0	0	0	0	0	1467	1425	0	1630	0
Flt Permitted	0.950										0.972	
Satd. Flow (perm)	1593	4513	0	0	0	0	0	1467	1425	0	1630	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21							100			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		468			457			1265			695	
Travel Time (s)		10.6			10.4			28.8			15.8	
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.84	0.84	0.84	0.92	0.92	0.92
Parking (#/hr)								5				
Shared Lane Traffic (%)												
Lane Group Flow (vph)	137	1948	0	0	0	0	0	613	324	0	876	0
Turn Type	Perm	NA						NA	Perm	Split	NA	
Protected Phases		2						8		7	7	
Permitted Phases	2								8			
Detector Phase	2	2						8	8	7	7	
Switch Phase												
Minimum Initial (s)	18.0	18.0						18.0	18.0	4.0	4.0	
Minimum Split (s)	23.0	23.0						23.0	23.0	21.3	21.3	
Total Split (s)	27.0	27.0						26.0	26.0	27.0	27.0	
Total Split (%)	33.8%	33.8%						32.5%	32.5%	33.8%	33.8%	
Yellow Time (s)	3.2	3.2						3.2	3.2	3.5	3.5	
All-Red Time (s)	1.8	1.8						1.8	1.8	1.8	1.8	
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		5.3	
Lead/Lag								Lag	Lag	Lead	Lead	
Lead-Lag Optimize?								Yes	Yes	Yes	Yes	
Recall Mode	C-Max	C-Max						Max	Max	None	None	
Act Effct Green (s)	22.0	22.0						21.0	21.0		21.7	
Actuated g/C Ratio	0.28	0.28						0.26	0.26		0.27	
v/c Ratio	0.31	1.55						1.59	0.72		1.98	
Control Delay	32.6	278.0						304.2	29.3		465.9	
Queue Delay	0.0	0.0						0.0	0.0		0.0	
Total Delay	32.6	278.0						304.2	29.3		465.9	
LOS	C	F						F	C		F	
Approach Delay		261.9						209.1			465.9	
Approach LOS		F						F			F	

Intersection Summary

Area Type: CBD  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

# Lanes, Volumes, Timings

## 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.98

Intersection Signal Delay: 295.1

Intersection LOS: F

Intersection Capacity Utilization 131.7%

ICU Level of Service H

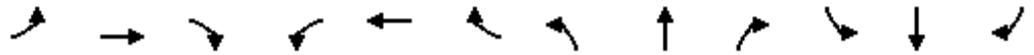
Analysis Period (min) 15

Splits and Phases: 18: Illinois Ave US51 NB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔↔↔		↗	↖			↖	
Volume (vph)	0	0	0	214	1596	329	206	439	0	0	592	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	260		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	4472	0	1624	1453	0	0	1645	0
Flt Permitted					0.995		0.126					
Satd. Flow (perm)	0	0	0	0	4472	0	215	1453	0	0	1645	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					57						10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		470			447			695			721	
Travel Time (s)		10.7			10.2			15.8			16.4	
Confl. Peds. (#/hr)			1			2	1		1			1
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%	0%	3%	2%	2%	2%	2%
Parking (#/hr)								5	5			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	2300	0	222	472	0	0	738	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					6		3	8			4	
Permitted Phases				6			8					
Detector Phase				6	6		3	8			4	
Switch Phase												
Minimum Initial (s)				10.0	10.0		4.0	5.0			4.0	
Minimum Split (s)				21.2	21.2		8.0	21.2			21.2	
Total Split (s)				39.0	39.0		8.0	41.0			33.0	
Total Split (%)				48.8%	48.8%		10.0%	51.3%			41.3%	
Yellow Time (s)				3.2	3.2		3.5	3.2			3.2	
All-Red Time (s)				2.0	2.0		0.5	2.0			2.0	
Lost Time Adjust (s)					0.0		0.0	0.0			0.0	
Total Lost Time (s)					5.2		4.0	5.2			5.2	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Recall Mode				C-Max	C-Max		None	Max			None	
Act Effct Green (s)					33.8		37.0	35.8			27.8	
Actuated g/C Ratio					0.42		0.46	0.45			0.35	
v/c Ratio					1.20		1.31	0.73			1.28	
Control Delay					117.8		178.7	37.0			163.8	
Queue Delay					0.0		0.0	0.0			0.0	
Total Delay					117.8		178.7	37.0			163.8	
LOS					F		F	D			F	
Approach Delay					117.8			82.3			163.8	
Approach LOS					F			F			F	

Intersection Summary

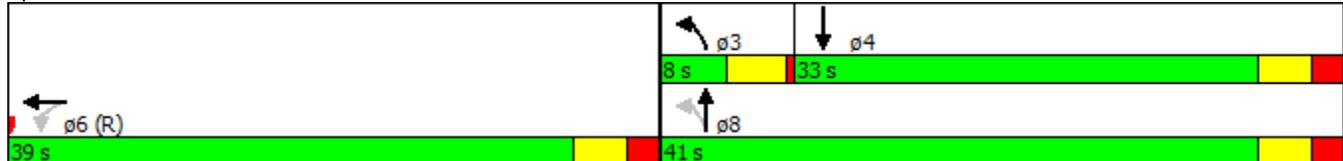
Area Type: CBD  
 Cycle Length: 80

Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/5/2016

Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 6:WBTL, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.31	
Intersection Signal Delay: 120.3	Intersection LOS: F
Intersection Capacity Utilization 114.7%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 19: Illinois Ave US51 NB & Main St IL13 WB



Lanes, Volumes, Timings  
23: Normal Ave & Mill St

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Volume (vph)	35	575	50	50	375	162	10	50	25	11	200	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3490	0	0	3381	0	0	1778	0	0	1827	0
Flt Permitted		0.875			0.744			0.963			0.990	
Satd. Flow (perm)	0	3063	0	0	2525	0	0	1722	0	0	1813	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			99			27			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1024			485			175			354	
Travel Time (s)		23.3			11.0			4.0			8.0	
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	776	0	0	667	0	0	92	0	0	262	0
Turn Type	Perm	NA										
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.2	21.2		21.2	21.2		21.2	21.2		21.2	21.2	
Total Split (s)	45.0	45.0		45.0	45.0		35.0	35.0		35.0	35.0	
Total Split (%)	56.3%	56.3%		56.3%	56.3%		43.8%	43.8%		43.8%	43.8%	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.2	3.2		3.2	3.2	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.2			5.2			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		27.7			27.7			41.9			41.9	
Actuated g/C Ratio		0.35			0.35			0.52			0.52	
v/c Ratio		0.72			0.71			0.10			0.27	
Control Delay		26.0			15.3			9.0			12.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		26.0			15.3			9.0			12.5	
LOS		C			B			A			B	
Approach Delay		26.0			15.3			9.0			12.5	
Approach LOS		C			B			A			B	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	45
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	19.2
Intersection LOS:	B

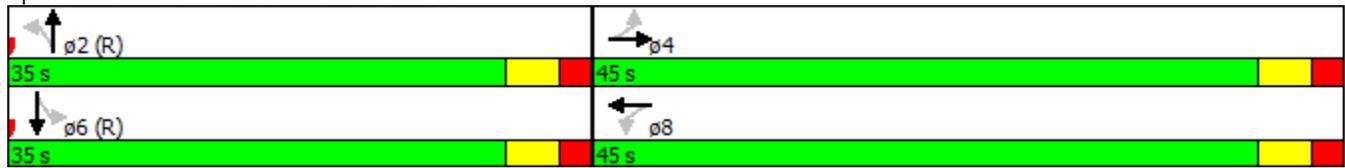
Lanes, Volumes, Timings  
23: Normal Ave & Mill St

5/5/2016

Intersection Capacity Utilization 62.9%  
Analysis Period (min) 15

ICU Level of Service B

Splits and Phases: 23: Normal Ave & Mill St



Lanes, Volumes, Timings  
2: Mill St & Illinois Ave US51 NB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗↗	↘	↘	↗	↘	↘↘	↗	↘	↘	↗↗	
Volume (vph)	16	64	169	45	134	48	435	386	25	15	498	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		230	0		85	300		130	150		0
Storage Lanes	1		1	1		1	2		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor						0.97						
Frt			0.850			0.850			0.850		0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	3036	1425	1593	1644	1398	3090	1676	1425	1593	3160	0
Flt Permitted	0.535			0.707			0.351			0.517		
Satd. Flow (perm)	915	3036	1425	1185	1644	1362	1142	1676	1425	867	3160	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			184			172			124			8
Link Speed (mph)		30			30			30				30
Link Distance (ft)		485			723			947				722
Travel Time (s)		11.0			16.4			21.5				16.4
Confl. Peds. (#/hr)							8					
Peak Hour Factor	0.88	0.88	0.92	0.92	0.74	0.74	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	2%	2%	4%	4%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	73	184	49	181	65	473	420	27	16	571	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	21.3	21.3	8.0	21.2	21.2	8.0	21.2	21.2	8.0	21.2	21.2
Total Split (s)	10.8	25.0	25.0	8.0	22.2	22.2	14.0	49.0	49.0	8.0	43.0	43.0
Total Split (%)	12.0%	27.8%	27.8%	8.9%	24.7%	24.7%	15.6%	54.4%	54.4%	8.9%	47.8%	47.8%
Yellow Time (s)	3.5	3.2	3.2	3.5	3.2	3.2	3.5	3.2	3.2	3.5	3.2	3.2
All-Red Time (s)	0.5	2.0	2.0	0.5	2.0	2.0	0.5	2.0	2.0	0.5	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.2	5.2	4.0	5.2	5.2	4.0	5.2	5.2	4.0	5.2	5.2
Lead/Lag	Lead	Lag	Lag									
Lead-Lag Optimize?	Yes											
Recall Mode	C-Max	C-Max	C-Max	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	28.3	23.0	23.0	22.2	17.0	17.0	53.0	48.6	48.6	43.1	37.9	37.9
Actuated g/C Ratio	0.31	0.26	0.26	0.25	0.19	0.19	0.59	0.54	0.54	0.48	0.42	0.42
v/c Ratio	0.05	0.09	0.37	0.16	0.58	0.16	0.53	0.46	0.03	0.04	0.43	0.43
Control Delay	20.0	26.3	17.3	23.2	41.9	0.9	11.4	15.7	0.1	8.5	19.4	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	26.3	17.3	23.2	41.9	0.9	11.4	15.7	0.1	8.5	19.4	19.4
LOS	B	C	B	C	D	A	B	B	A	A	B	B
Approach Delay		19.9			29.7			13.0			19.1	
Approach LOS		B			C			B			B	

# Lanes, Volumes, Timings

## 2: Mill St & Illinois Ave US51 NB

5/5/2016

### Intersection Summary

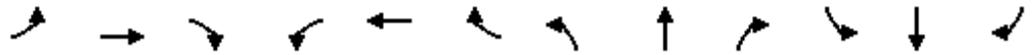
Area Type:	CBD		
Cycle Length:	90		
Actuated Cycle Length:	90		
Offset:	0 (0%), Referenced to phase 4:EBTL and 7:EBL, Start of Green		
Natural Cycle:	60		
Control Type:	Actuated-Coordinated		
Maximum v/c Ratio:	0.58		
Intersection Signal Delay:	18.0	Intersection LOS:	B
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

### Splits and Phases: 2: Mill St & Illinois Ave US51 NB



Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↶	↷	↷	↶	↷			↷	↶
Volume (vph)	0	0	0	47	1411	187	29	123	0	0	135	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	215		0	0		0	0		400
Storage Lanes	0		0	1		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.86	0.86	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				1.00	1.00							0.99
Frt					0.983							0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	1356	4144	0	1593	1676	0	0	1613	1358
Flt Permitted				0.950			0.561					
Satd. Flow (perm)	0	0	0	1353	4144	0	941	1676	0	0	1613	1340
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					53							33
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1022			470			699				727
Travel Time (s)		23.2			10.7			15.9				16.5
Confl. Peds. (#/hr)				1								1
Peak Hour Factor	0.92	0.92	0.92	0.76	0.76	0.76	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	2%	2%	2%	3%	5%	2%	2%	2%	2%	2%	6%	7%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	56	2109	0	32	134	0	0	161	33
Turn Type				Perm	NA		Perm	NA			NA	custom
Protected Phases					8			2				6
Permitted Phases				8			2					8
Detector Phase				8	8		2	2			6	8
Switch Phase												
Minimum Initial (s)				8.0	8.0		10.0	10.0			4.0	8.0
Minimum Split (s)				21.4	21.4		21.4	21.4			21.4	21.4
Total Split (s)				66.0	66.0		24.0	24.0			24.0	66.0
Total Split (%)				73.3%	73.3%		26.7%	26.7%			26.7%	73.3%
Yellow Time (s)				3.2	3.2		3.2	3.2			3.2	3.2
All-Red Time (s)				2.2	2.2		2.2	2.2			2.2	2.2
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)				5.4	5.4		5.4	5.4			5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode				C-Max	C-Max		None	None			None	C-Max
Act Effct Green (s)				65.0	65.0		14.2	14.2			14.2	65.0
Actuated g/C Ratio				0.72	0.72		0.16	0.16			0.16	0.72
v/c Ratio				0.06	0.70		0.22	0.51			0.63	0.03
Control Delay				2.0	3.8		34.1	40.8			46.3	1.8
Queue Delay				0.0	0.2		0.0	0.0			0.0	0.0
Total Delay				2.0	4.0		34.1	40.8			46.3	1.8
LOS				A	A		C	D			D	A
Approach Delay					3.9			39.5			38.8	
Approach LOS					A			D			D	

Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/5/2016

Intersection Summary

Area Type:	CBD		
Cycle Length:	90		
Actuated Cycle Length:	90		
Offset:	0 (0%), Referenced to phase 8:WBTL, Start of Green		
Natural Cycle:	60		
Control Type:	Actuated-Coordinated		
Maximum v/c Ratio:	0.70		
Intersection Signal Delay:	8.9	Intersection LOS:	A
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

Splits and Phases: 10: University Ave US51 SB & Main St IL13 WB



Lanes, Volumes, Timings

11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕↕						↔			↕	
Volume (vph)	16	1754	39	0	0	0	0	136	27	15	167	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00										
Fr't		0.997						0.978				
Flt Protected											0.996	
Satd. Flow (prot)	0	4368	0	0	0	0	0	1640	0	0	1623	0
Flt Permitted											0.966	
Satd. Flow (perm)	0	4368	0	0	0	0	0	1640	0	0	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6						9				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		391			468			1252			699	
Travel Time (s)		8.9			10.6			28.5			15.9	
Confl. Peds. (#/hr)			3				1					
Peak Hour Factor	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.92	0.75	0.75	0.75
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	2%	2%	2%	4%	5%	2%
Parking (#/hr)		5										
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2129	0	0	0	0	0	177	0	0	243	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Detector Phase	4	4						2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0						4.0		4.0	4.0	
Minimum Split (s)	21.7	21.7						21.7		21.7	21.7	
Total Split (s)	59.7	59.7						30.3		30.3	30.3	
Total Split (%)	66.3%	66.3%						33.7%		33.7%	33.7%	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	2.2	2.2						2.2		2.2	2.2	
Lost Time Adjust (s)		0.0						0.0			0.0	
Total Lost Time (s)		5.7						5.7			5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max						None		Max	Max	
Act Effct Green (s)		54.0						24.6			24.6	
Actuated g/C Ratio		0.60						0.27			0.27	
v/c Ratio		0.81						0.39			0.57	
Control Delay		17.2						28.3			47.1	
Queue Delay		0.6						0.0			0.0	
Total Delay		17.8						28.3			47.1	
LOS		B						C			D	
Approach Delay		17.8						28.3			47.1	
Approach LOS		B						C			D	

Intersection Summary

Area Type: CBD



Lanes, Volumes, Timings  
 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑						↑↑	↗	↘	↑↑	
Volume (vph)	64	1564	158	0	0	0	0	344	106	415	383	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		100	0		0	0		85	150		0
Storage Lanes	1		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.986							0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1562	4473	0	0	0	0	0	2929	1333	1593	3185	0
Flt Permitted	0.950									0.299		
Satd. Flow (perm)	1562	4473	0	0	0	0	0	2929	1333	501	3185	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23							88			
Link Speed (mph)		30			30			30				30
Link Distance (ft)		468			457			1265				695
Travel Time (s)		10.6			10.4			28.8				15.8
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.84	0.84	0.84	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	2%	2%	2%	2%	2%	4%	9%	2%	2%	2%
Parking (#/hr)								5				
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	1893	0	0	0	0	0	410	126	451	416	0
Turn Type	Perm	NA						NA	Perm	pm+pt	NA	
Protected Phases		2						8		7	4	
Permitted Phases	2								8	4		
Detector Phase	2	2						8	8	7	4	
Switch Phase												
Minimum Initial (s)	18.0	18.0						18.0	18.0	4.0	4.0	
Minimum Split (s)	23.0	23.0						23.0	23.0	21.3	20.0	
Total Split (s)	42.0	42.0						23.0	23.0	25.0	48.0	
Total Split (%)	46.7%	46.7%						25.6%	25.6%	27.8%	53.3%	
Yellow Time (s)	3.2	3.2						3.2	3.2	3.5	3.5	
All-Red Time (s)	1.8	1.8						1.8	1.8	1.8	0.5	
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	5.3	4.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Recall Mode	C-Max	C-Max						Max	Max	None	None	
Act Effct Green (s)	37.0	37.0						18.0	18.0	42.7	44.0	
Actuated g/C Ratio	0.41	0.41						0.20	0.20	0.47	0.49	
v/c Ratio	0.11	1.02						0.70	0.37	0.95	0.27	
Control Delay	18.7	44.0						40.8	15.2	67.0	21.5	
Queue Delay	0.0	1.1						0.0	0.0	0.0	0.0	
Total Delay	18.7	45.1						40.8	15.2	67.0	21.5	
LOS	B	D						D	B	E	C	
Approach Delay		44.1						34.8			45.2	
Approach LOS		D						C			D	

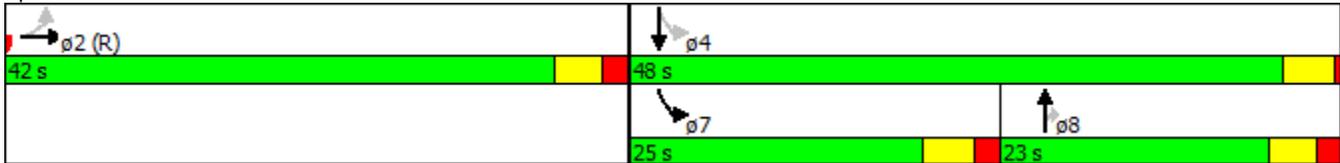
Intersection Summary

Lanes, Volumes, Timings  
 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016

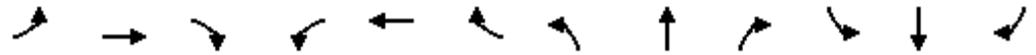
Area Type:	CBD		
Cycle Length:	90		
Actuated Cycle Length:	90		
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle:	90		
Control Type:	Actuated-Coordinated		
Maximum v/c Ratio:	1.02		
Intersection Signal Delay:	42.9	Intersection LOS:	D
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

Splits and Phases: 18: Illinois Ave US51 NB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↙	↑↑↑	↗	↙	↑↑			↑↑	↗
Volume (vph)	0	0	0	243	1417	143	117	249	0	0	555	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		100	260		0	0		150
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor						0.98	1.00					0.99
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	1593	4446	1371	1533	2901	0	0	3185	1425
Flt Permitted				0.950			0.216					
Satd. Flow (perm)	0	0	0	1593	4446	1350	348	2901	0	0	3185	1406
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						109						75
Link Speed (mph)		30			30			30				30
Link Distance (ft)		470			447			695				721
Travel Time (s)		10.7			10.2			15.8				16.4
Confl. Peds. (#/hr)			1			2	1		1			1
Peak Hour Factor	0.92	0.92	0.92	0.78	0.78	0.78	0.74	0.74	0.74	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	5%	6%	6%	5%	2%	2%	2%	2%
Parking (#/hr)								5	5			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	312	1817	183	158	336	0	0	603	121
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					6		3	8				4
Permitted Phases				6		6	8					4
Detector Phase				6	6	6	3	8				4
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	4.0	5.0			4.0	4.0
Minimum Split (s)				21.2	21.2	21.2	8.0	21.2			21.2	21.2
Total Split (s)				50.0	50.0	50.0	12.0	40.0			28.0	28.0
Total Split (%)				55.6%	55.6%	55.6%	13.3%	44.4%			31.1%	31.1%
Yellow Time (s)				3.2	3.2	3.2	3.5	3.2			3.2	3.2
All-Red Time (s)				2.0	2.0	2.0	0.5	2.0			2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				5.2	5.2	5.2	4.0	5.2			5.2	5.2
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Recall Mode				C-Max	C-Max	C-Max	None	Max			None	None
Act Effct Green (s)				44.8	44.8	44.8	36.0	34.8			22.9	22.9
Actuated g/C Ratio				0.50	0.50	0.50	0.40	0.39			0.25	0.25
v/c Ratio				0.39	0.82	0.25	0.65	0.30			0.75	0.29
Control Delay				16.0	23.1	6.5	57.1	42.3			37.6	14.0
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				16.0	23.1	6.5	57.1	42.3			37.6	14.0
LOS				B	C	A	E	D			D	B
Approach Delay					20.9			47.0			33.6	
Approach LOS					C			D			C	

Intersection Summary

Area Type:	CBD		
Cycle Length:	90		
Actuated Cycle Length:	90		
Offset:	0 (0%), Referenced to phase 6:WBTL, Start of Green		
Natural Cycle:	60		
Control Type:	Actuated-Coordinated		
Maximum v/c Ratio:	0.82		
Intersection Signal Delay:	27.1	Intersection LOS:	C
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

Splits and Phases: 19: Illinois Ave US51 NB & Main St IL13 WB



Lanes, Volumes, Timings  
23: Normal Ave & Mill St

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Volume (vph)	4	204	0	100	388	109	10	50	25	20	100	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.973			0.960			0.930	
Flt Protected		0.999			0.992			0.994			0.996	
Satd. Flow (prot)	0	3536	0	0	3416	0	0	1778	0	0	1725	0
Flt Permitted		0.947			0.840			0.958			0.976	
Satd. Flow (perm)	0	3352	0	0	2893	0	0	1713	0	0	1691	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					41			27			72	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1024			485			175			354	
Travel Time (s)		23.3			11.0			4.0			8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	226	0	0	649	0	0	92	0	0	273	0
Turn Type	Perm	NA										
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.2	21.2		21.2	21.2		21.2	21.2		21.2	21.2	
Total Split (s)	49.0	49.0		49.0	49.0		41.0	41.0		41.0	41.0	
Total Split (%)	54.4%	54.4%		54.4%	54.4%		45.6%	45.6%		45.6%	45.6%	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.2	3.2		3.2	3.2	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.2			5.2			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Act Effect Green (s)		43.8			43.8			35.8			35.8	
Actuated g/C Ratio		0.49			0.49			0.40			0.40	
v/c Ratio		0.14			0.45			0.13			0.38	
Control Delay		13.0			12.3			13.2			15.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.0			12.3			13.2			15.7	
LOS		B			B			B			B	
Approach Delay		13.0			12.3			13.2			15.7	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 41 (46%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green  
 Natural Cycle: 45

Lanes, Volumes, Timings  
23: Normal Ave & Mill St

5/5/2016

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 13.3

Intersection LOS: B

Intersection Capacity Utilization 53.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 23: Normal Ave & Mill St



Lanes, Volumes, Timings  
2: Mill St & Illinois Ave US51 NB

5/5/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	139	192	330	33	134	70	453	578	59	45	524	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		230	0		85	300		130	150		0
Storage Lanes	1		1	1		1	2		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor						0.97						
Frt			0.850			0.850			0.850		0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	3217	1425	1593	1629	1454	3090	1644	1454	1593	3160	0
Flt Permitted	0.476			0.611			0.319			0.313		
Satd. Flow (perm)	814	3217	1425	1024	1629	1417	1038	1644	1454	525	3160	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			371			221			172			8
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		485			723			947			722	
Travel Time (s)		11.0			16.4			21.5			16.4	
Confl. Peds. (#/hr)						8						
Peak Hour Factor	0.85	0.85	0.85	0.79	0.79	0.79	0.91	0.91	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	2%	2%	5%	0%	2%	4%	0%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	226	388	42	170	89	498	635	65	49	603	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.0	21.3	21.3	8.0	21.2	21.2	8.0	21.2	21.2	8.0	21.2	
Total Split (s)	12.8	26.0	26.0	8.0	21.2	21.2	16.0	48.0	48.0	8.0	40.0	
Total Split (%)	14.2%	28.9%	28.9%	8.9%	23.6%	23.6%	17.8%	53.3%	53.3%	8.9%	44.4%	
Yellow Time (s)	3.5	3.2	3.2	3.5	3.2	3.2	3.5	3.2	3.2	3.5	3.2	
All-Red Time (s)	0.5	2.0	2.0	0.5	2.0	2.0	0.5	2.0	2.0	0.5	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.2	5.2	4.0	5.2	5.2	4.0	5.2	5.2	4.0	5.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes											
Recall Mode	C-Max	C-Max	C-Max	None	None	None	None	Max	Max	None	Max	
Act Effct Green (s)	30.0	24.0	24.0	21.2	16.0	16.0	52.0	46.0	46.0	40.5	35.3	
Actuated g/C Ratio	0.33	0.27	0.27	0.24	0.18	0.18	0.58	0.51	0.51	0.45	0.39	
v/c Ratio	0.47	0.26	0.60	0.16	0.59	0.21	0.58	0.76	0.08	0.17	0.48	
Control Delay	27.3	28.2	8.3	22.6	43.3	1.1	12.5	26.0	0.2	10.7	22.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.3	28.2	8.3	22.6	43.3	1.1	12.5	26.0	0.2	10.7	22.0	
LOS	C	C	A	C	D	A	B	C	A	B	C	
Approach Delay		18.1			27.9			19.0			21.1	
Approach LOS		B			C			B			C	

# Lanes, Volumes, Timings

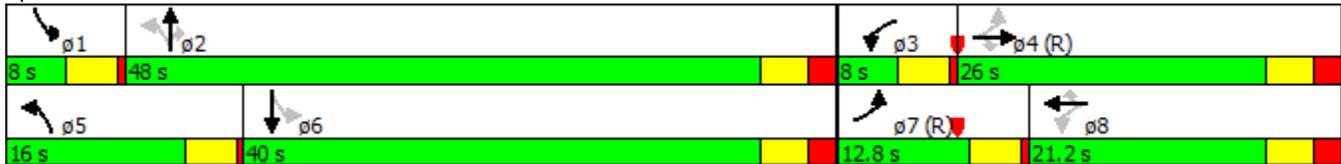
## 2: Mill St & Illinois Ave US51 NB

5/5/2016

### Intersection Summary

Area Type:	CBD		
Cycle Length:	90		
Actuated Cycle Length:	90		
Offset:	0 (0%), Referenced to phase 4:EBTL and 7:EBL, Start of Green		
Natural Cycle:	75		
Control Type:	Actuated-Coordinated		
Maximum v/c Ratio:	0.76		
Intersection Signal Delay:	20.1	Intersection LOS:	C
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

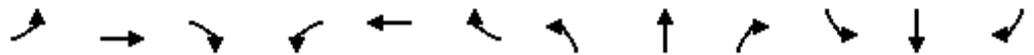
### Splits and Phases: 2: Mill St & Illinois Ave US51 NB



Lanes, Volumes, Timings

10: University Ave US51 SB & Main St IL13 WB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↔		↖	↕			↕	↗
Volume (vph)	0	0	0	41	1812	36	52	160	0	0	208	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	215		0	0		0	0		400
Storage Lanes	0		0	1		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.86	0.86	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				1.00	1.00							0.99
Frt					0.997							0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	1383	4355	0	1593	1676	0	0	1676	1411
Flt Permitted				0.950			0.434					
Satd. Flow (perm)	0	0	0	1380	4355	0	728	1676	0	0	1676	1392
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					7							33
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1022			470			699				727
Travel Time (s)		23.2			10.7			15.9				16.5
Confl. Peds. (#/hr)				1								1
Peak Hour Factor	0.92	0.92	0.92	0.80	0.80	0.80	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	3%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	0	0	46	2315	0	57	174	0	0	236	25
Turn Type				Perm	NA		Perm	NA			NA	custom
Protected Phases					8			2			6	
Permitted Phases				8			2					8
Detector Phase				8	8		2	2			6	8
Switch Phase												
Minimum Initial (s)				8.0	8.0		10.0	10.0			4.0	8.0
Minimum Split (s)				21.4	21.4		21.4	21.4			21.4	21.4
Total Split (s)				57.0	57.0		23.0	23.0			23.0	57.0
Total Split (%)				71.3%	71.3%		28.8%	28.8%			28.8%	71.3%
Yellow Time (s)				3.2	3.2		3.2	3.2			3.2	3.2
All-Red Time (s)				2.2	2.2		2.2	2.2			2.2	2.2
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)				5.4	5.4		5.4	5.4			5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode				C-Max	C-Max		None	None			None	C-Max
Act Effct Green (s)				54.1	54.1		15.1	15.1			15.1	54.1
Actuated g/C Ratio				0.68	0.68		0.19	0.19			0.19	0.68
v/c Ratio				0.05	0.79		0.42	0.55			0.75	0.03
Control Delay				3.0	6.5		33.6	32.2			45.3	1.7
Queue Delay				0.0	0.5		0.0	0.0			0.0	0.0
Total Delay				3.0	7.0		33.6	32.2			45.3	1.7
LOS				A	A		C	C			D	A
Approach Delay					6.9			32.5			41.1	
Approach LOS					A			C			D	

Lanes, Volumes, Timings  
 10: University Ave US51 SB & Main St IL13 WB

5/5/2016

Intersection Summary

Area Type:	CBD		
Cycle Length:	80		
Actuated Cycle Length:	80		
Offset:	0 (0%), Referenced to phase 8:WBTL, Start of Green		
Natural Cycle:	65		
Control Type:	Actuated-Coordinated		
Maximum v/c Ratio:	0.79		
Intersection Signal Delay:	12.1	Intersection LOS:	B
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

Splits and Phases: 10: University Ave US51 SB & Main St IL13 WB



Lanes, Volumes, Timings

11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑				↑
Volume (vph)	33	1832	43	0	0	0	0	179	68	81	168	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00										
Frt		0.997						0.963				
Flt Protected		0.999									0.984	
Satd. Flow (prot)	0	4367	0	0	0	0	0	1614	0	0	1661	0
Flt Permitted		0.999									0.704	
Satd. Flow (perm)	0	4367	0	0	0	0	0	1614	0	0	1188	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6						7				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		391			468			1252			699	
Travel Time (s)		8.9			10.6			28.5			15.9	
Confl. Peds. (#/hr)			3				1					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Heavy Vehicles (%)	2%	2%	1%	2%	2%	2%	2%	2%	2%	2%	1%	2%
Parking (#/hr)		5										
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2074	0	0	0	0	0	269	0	0	280	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Detector Phase	4	4						2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0						4.0		4.0	4.0	
Minimum Split (s)	21.7	21.7						21.7		21.7	21.7	
Total Split (s)	49.0	49.0						31.0		31.0	31.0	
Total Split (%)	61.3%	61.3%						38.8%		38.8%	38.8%	
Yellow Time (s)	3.5	3.5						3.5		3.5	3.5	
All-Red Time (s)	2.2	2.2						2.2		2.2	2.2	
Lost Time Adjust (s)		0.0						0.0			0.0	
Total Lost Time (s)		5.7						5.7			5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max						None		Max	Max	
Act Effct Green (s)		43.3						25.3			25.3	
Actuated g/C Ratio		0.54						0.32			0.32	
v/c Ratio		0.88						0.52			0.75	
Control Delay		21.6						26.2			58.8	
Queue Delay		0.0						0.0			0.0	
Total Delay		21.6						26.2			58.8	
LOS		C						C			E	
Approach Delay		21.6						26.2			58.8	
Approach LOS		C						C			E	

Intersection Summary

Area Type: CBD

# Lanes, Volumes, Timings

## 11: University Ave US51 SB & Walnut St IL13 EB

5/5/2016

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 4:EBTL, Start of Green, Master Intersection

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 26.0

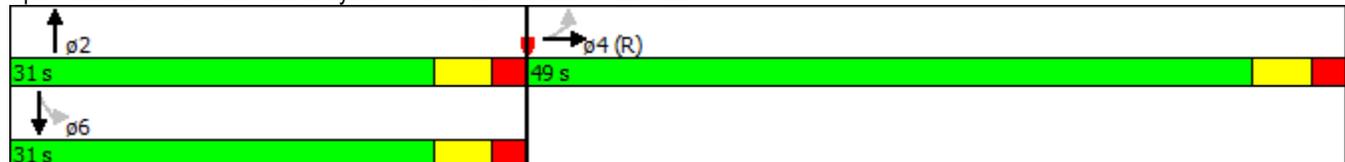
Intersection LOS: C

Intersection Capacity Utilization 87.5%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 11: University Ave US51 SB & Walnut St IL13 EB



Lanes, Volumes, Timings

18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	1677	174	0	0	0	0	515	272	457	349	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		100	0		0	0		85	150		0
Storage Lanes	1		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Fr <sub>t</sub>		0.986							0.850			
Fl <sub>t</sub> Protected	0.950									0.950		
Satd. Flow (prot)	1593	4513	0	0	0	0	0	2986	1425	1593	3185	0
Fl <sub>t</sub> Permitted	0.950									0.181		
Satd. Flow (perm)	1593	4513	0	0	0	0	0	2986	1425	303	3185	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25							100			
Link Speed (mph)		30			30			30				30
Link Distance (ft)		468			457			1265				695
Travel Time (s)		10.6			10.4			28.8				15.8
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.84	0.84	0.84	0.92	0.92	0.92
Parking (#/hr)								5				
Shared Lane Traffic (%)												
Lane Group Flow (vph)	137	1948	0	0	0	0	0	613	324	497	379	0
Turn Type	Perm	NA						NA	Perm	pm+pt	NA	
Protected Phases		2						8		7	4	
Permitted Phases	2								8	4		
Detector Phase	2	2						8	8	7	4	
Switch Phase												
Minimum Initial (s)	18.0	18.0						18.0	18.0	4.0	4.0	
Minimum Split (s)	23.0	23.0						23.0	23.0	21.3	20.0	
Total Split (s)	35.7	35.7						23.0	23.0	21.3	44.3	
Total Split (%)	44.6%	44.6%						28.8%	28.8%	26.6%	55.4%	
Yellow Time (s)	3.2	3.2						3.2	3.2	3.5	3.5	
All-Red Time (s)	1.8	1.8						1.8	1.8	1.8	0.5	
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	5.3	4.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Recall Mode	C-Max	C-Max						Max	Max	None	None	
Act Effct Green (s)	30.7	30.7						18.0	18.0	39.0	40.3	
Actuated g/C Ratio	0.38	0.38						0.22	0.22	0.49	0.50	
v/c Ratio	0.22	1.12						0.91	0.81	1.23	0.24	
Control Delay	20.1	80.1						50.9	38.5	152.9	21.0	
Queue Delay	0.0	0.0						0.0	0.0	0.0	0.0	
Total Delay	20.1	80.1						50.9	38.5	152.9	21.0	
LOS	C	F						D	D	F	C	
Approach Delay		76.1						46.6			95.8	
Approach LOS		E						D			F	

Intersection Summary

Area Type: CBD

# Lanes, Volumes, Timings

## 18: Illinois Ave US51 NB & Walnut St IL13 EB

5/5/2016

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.23

Intersection Signal Delay: 73.5

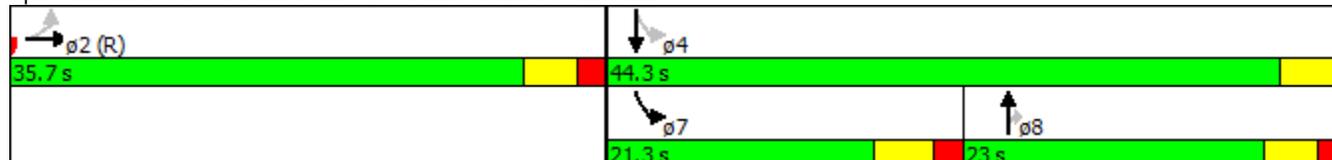
Intersection LOS: E

Intersection Capacity Utilization 99.9%

ICU Level of Service F

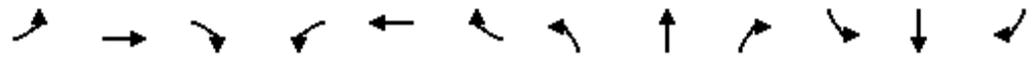
Analysis Period (min) 15

### Splits and Phases: 18: Illinois Ave US51 NB & Walnut St IL13 EB



Lanes, Volumes, Timings  
 19: Illinois Ave US51 NB & Main St IL13 WB

5/5/2016

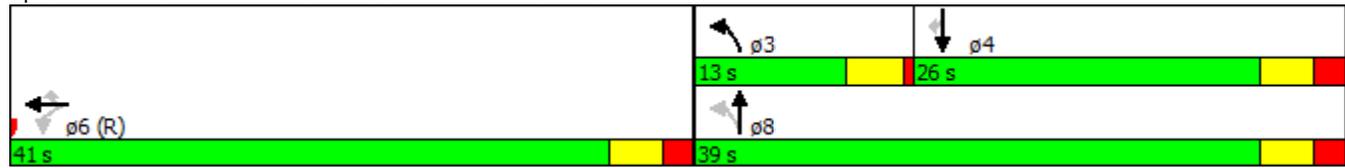


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↙	↑↑↑	↗	↙	↑↑			↑↑	↗
Volume (vph)	0	0	0	214	1516	329	206	439	0	0	592	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		100	260		0	0		150
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor						0.99	1.00					0.99
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	1608	4622	1439	1624	2957	0	0	3185	1425
Flt Permitted				0.950			0.202					
Satd. Flow (perm)	0	0	0	1608	4622	1418	345	2957	0	0	3185	1406
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						241						85
Link Speed (mph)		30			30			30				30
Link Distance (ft)		470			447			695				721
Travel Time (s)		10.7			10.2			15.8				16.4
Confl. Peds. (#/hr)			1			2	1		1			1
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	0%	3%	2%	2%	2%	2%
Parking (#/hr)								5	5			
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	230	1630	354	222	472	0	0	643	95
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					6		3	8				4
Permitted Phases				6		6	8					4
Detector Phase				6	6	6	3	8				4
Switch Phase												
Minimum Initial (s)				10.0	10.0	10.0	4.0	5.0			4.0	4.0
Minimum Split (s)				21.2	21.2	21.2	8.0	21.2			21.2	21.2
Total Split (s)				41.0	41.0	41.0	13.0	39.0			26.0	26.0
Total Split (%)				51.3%	51.3%	51.3%	16.3%	48.8%			32.5%	32.5%
Yellow Time (s)				3.2	3.2	3.2	3.5	3.2			3.2	3.2
All-Red Time (s)				2.0	2.0	2.0	0.5	2.0			2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				5.2	5.2	5.2	4.0	5.2			5.2	5.2
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Recall Mode				C-Max	C-Max	C-Max	None	Max			None	None
Act Effct Green (s)				35.8	35.8	35.8	35.0	33.8			20.8	20.8
Actuated g/C Ratio				0.45	0.45	0.45	0.44	0.42			0.26	0.26
v/c Ratio				0.32	0.79	0.46	0.76	0.38			0.78	0.22
Control Delay				15.8	22.3	7.1	50.1	36.5			35.1	8.4
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				15.8	22.3	7.1	50.1	36.5			35.1	8.4
LOS				B	C	A	D	D			D	A
Approach Delay					19.2			40.8			31.7	
Approach LOS					B			D			C	

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 6:WBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	25.8
Intersection LOS:	C
Intersection Capacity Utilization:	99.9%
ICU Level of Service:	F
Analysis Period (min):	15

Splits and Phases: 19: Illinois Ave US51 NB & Main St IL13 WB



Lanes, Volumes, Timings  
23: Normal Ave & Mill St

5/5/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Volume (vph)	35	575	50	50	375	162	10	50	25	11	200	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.959			0.960			0.983	
Flt Protected		0.997			0.996			0.994			0.998	
Satd. Flow (prot)	0	3550	0	0	3386	0	0	1778	0	0	1846	0
Flt Permitted		0.889			0.826			0.957			0.988	
Satd. Flow (perm)	0	3166	0	0	2808	0	0	1711	0	0	1828	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			104			27			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1024			485			175			354	
Travel Time (s)		23.3			11.0			4.0			8.0	
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	2%	0%	2%	2%	2%	2%	2%	3%	1%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	776	0	0	667	0	0	92	0	0	262	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.2	21.2		21.2	21.2		21.2	21.2		21.2	21.2	
Total Split (s)	47.0	47.0		47.0	47.0		33.0	33.0		33.0	33.0	
Total Split (%)	58.8%	58.8%		58.8%	58.8%		41.3%	41.3%		41.3%	41.3%	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.2	3.2		3.2	3.2	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.2			5.2			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Act Effect Green (s)		41.8			41.8			27.8			27.8	
Actuated g/C Ratio		0.52			0.52			0.35			0.35	
v/c Ratio		0.47			0.44			0.15			0.41	
Control Delay		12.9			10.9			14.0			21.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.9			10.9			14.0			21.4	
LOS		B			B			B			C	
Approach Delay		12.9			10.9			14.0			21.4	
Approach LOS		B			B			B			C	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	80											
Actuated Cycle Length:	80											
Offset:	0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green											

Lanes, Volumes, Timings  
23: Normal Ave & Mill St

5/5/2016

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 13.5

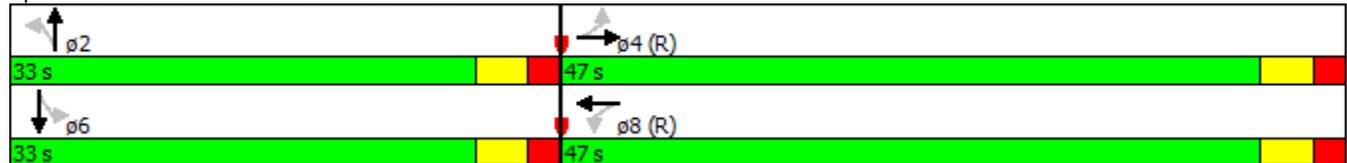
Intersection LOS: B

Intersection Capacity Utilization 62.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 23: Normal Ave & Mill St



# Appendix D

SIDRA Analysis Outputs (Roundabouts)

# MOVEMENT SUMMARY

 Site: 101 [EXIST\_AM-Mill Street / University Ave / Illinois Ave Roundabout]

No Build - Single Lane Roundabout  
AM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Illinois Ave.											
3	L2	352	0.0	0.886	28.9	LOS D	15.4	397.0	0.92	0.70	25.5
18a	R1	503	6.0	0.886	28.9	LOS D	15.4	397.0	0.92	0.70	25.2
18	R2	26	0.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.00	37.2
Approach		881	3.4	0.886	28.0	LOS D	15.4	397.0	0.89	0.68	25.5
East: Westbound Mill Street											
1	L2	61	3.0	0.516	19.3	LOS C	2.3	58.7	0.75	0.83	28.9
6	T1	165	4.0	0.516	19.3	LOS C	2.3	58.7	0.75	0.83	28.6
16b	R3	81	4.0	0.053	0.0	LOS A	0.0	0.0	0.00	0.00	37.2
Approach		307	3.8	0.516	14.2	LOS B	2.3	58.7	0.55	0.61	30.5
NorthWest: Southbound University Ave.											
7x	L2	1	0.0	1.237	143.6	LOS F	56.2	1479.8	1.00	3.28	11.3
7ax	L1	27	50.0	1.237	143.6	LOS F	56.2	1479.8	1.00	3.28	11.0
14ax	R1	701	5.0	1.237	143.6	LOS F	56.2	1479.8	1.00	3.28	11.2
14bx	R3	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	36.9
Approach		731	6.6	1.237	143.3	LOS F	56.2	1479.8	1.00	3.27	11.2
West: Eastbound Mill Street											
5a	L1	27	0.0	0.158	8.6	LOS A	0.5	13.5	0.57	0.57	33.0
2	T1	60	5.0	0.158	8.6	LOS A	0.5	13.5	0.57	0.57	33.0
12	R2	225	4.0	0.140	0.0	LOS A	0.0	0.0	0.00	0.00	37.9
Approach		312	3.9	0.158	2.4	LOS A	0.5	13.5	0.16	0.16	36.4
All Vehicles		2231	4.6	1.237	60.3	LOS F	56.2	1479.8	0.78	1.45	18.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# LANE LEVEL OF SERVICE

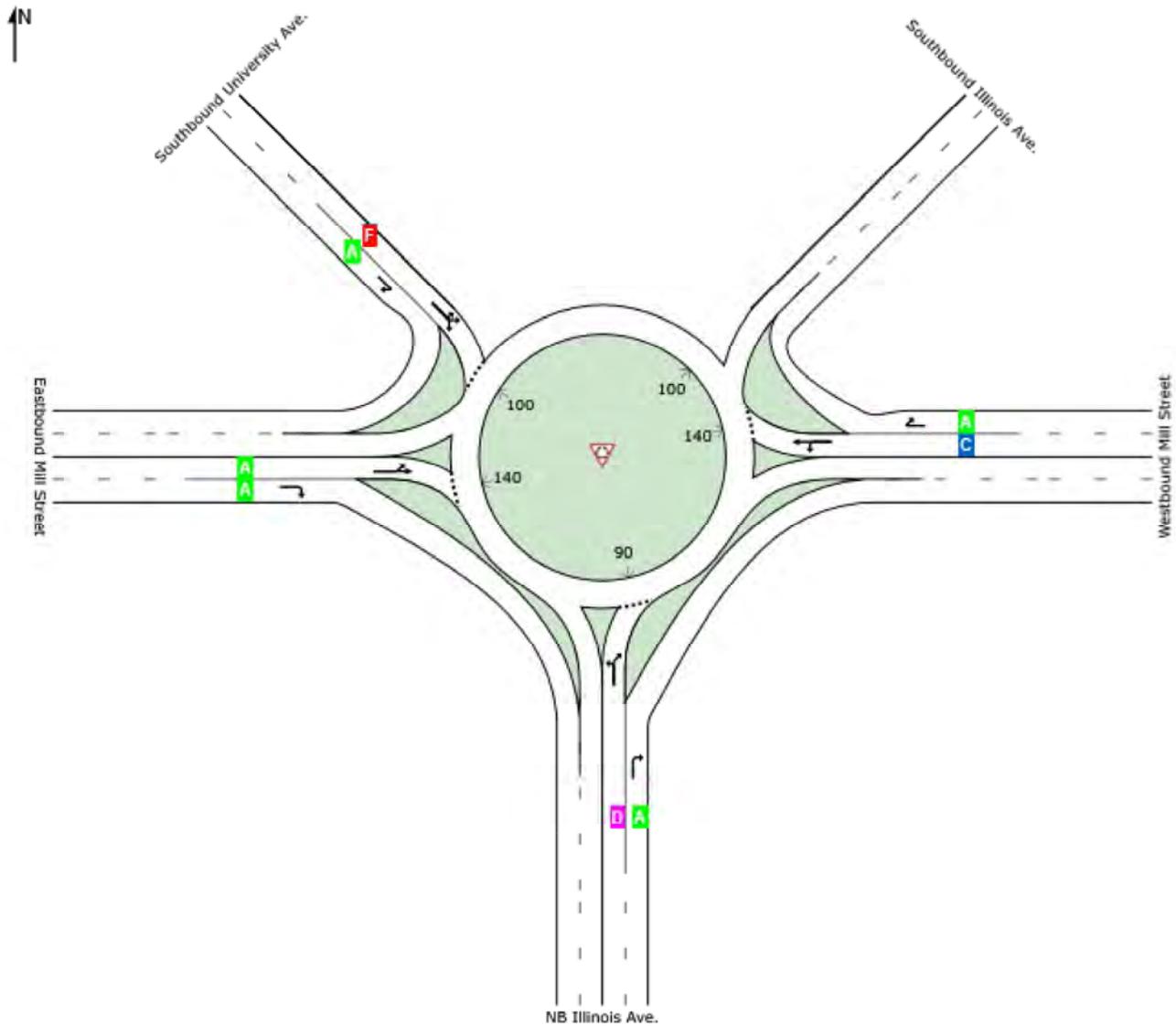
## Lane Level of Service

 Site: 101 [EXIST\_AM-Mill Street / University Ave / Illinois Ave Roundabout]

No Build - Single Lane Roundabout  
 AM Peak Hour  
 Roundabout

### All Movement Classes

	South	East	Northwest	West	Intersection
LOS	D	B	F	A	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).  
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

---

**SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com**  
Organisation: CRAWFORD, MURPHY & TILLY, INC. | Processed: Sunday, June 5, 2016 7:34:09 AM  
Project: L:\Marion\1600105\Planning\Traffic\SIDRA\Mill St Roundabout.sip7

# MOVEMENT SUMMARY

 Site: 101 [EXIST\_PM-Mill Street / University Ave / Illinois Ave Roundabout]

No Build - Single Lane Roundabout  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Illinois Ave.											
3	L2	321	0.0	1.669	324.9	LOS F	149.4	3861.6	1.00	5.44	6.0
18a	R1	753	6.0	1.669	324.9	LOS F	149.4	3861.6	1.00	5.44	5.9
18	R2	61	0.0	0.037	0.0	LOS A	0.0	0.0	0.00	0.00	37.2
Approach		1135	4.0	1.669	307.3	LOS F	149.4	3861.6	0.95	5.15	6.2
East: Westbound Mill Street											
1	L2	45	3.0	0.459	17.2	LOS C	1.9	49.2	0.73	0.79	29.7
6	T1	158	4.0	0.459	17.2	LOS C	1.9	49.2	0.73	0.79	29.5
16b	R3	118	4.0	0.077	0.0	LOS A	0.0	0.0	0.00	0.00	37.2
Approach		320	3.9	0.459	10.9	LOS B	1.9	49.2	0.46	0.50	31.9
NorthWest: Southbound University Ave.											
7x	L2	1	0.0	1.181	117.6	LOS F	55.3	1484.6	1.00	2.90	13.0
7ax	L1	77	50.0	1.181	117.6	LOS F	55.3	1484.6	1.00	2.90	12.6
14ax	R1	738	5.0	1.181	117.6	LOS F	55.3	1484.6	1.00	2.90	12.9
14bx	R3	7	0.0	0.004	0.0	LOS A	0.0	0.0	0.00	0.00	36.9
Approach		824	9.2	1.181	116.6	LOS F	55.3	1484.6	0.99	2.88	12.9
West: Eastbound Mill Street											
5a	L1	232	0.0	0.832	37.9	LOS E	6.7	171.0	0.88	1.14	23.0
2	T1	181	5.0	0.832	37.9	LOS E	6.7	171.0	0.88	1.14	23.0
12	R2	440	4.0	0.273	0.0	LOS A	0.0	0.0	0.00	0.00	37.9
Approach		853	3.1	0.832	18.4	LOS C	6.7	171.0	0.43	0.55	28.7
All Vehicles		3133	5.1	1.669	148.1	LOS F	149.4	3861.6	0.77	2.82	10.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# LANE LEVEL OF SERVICE

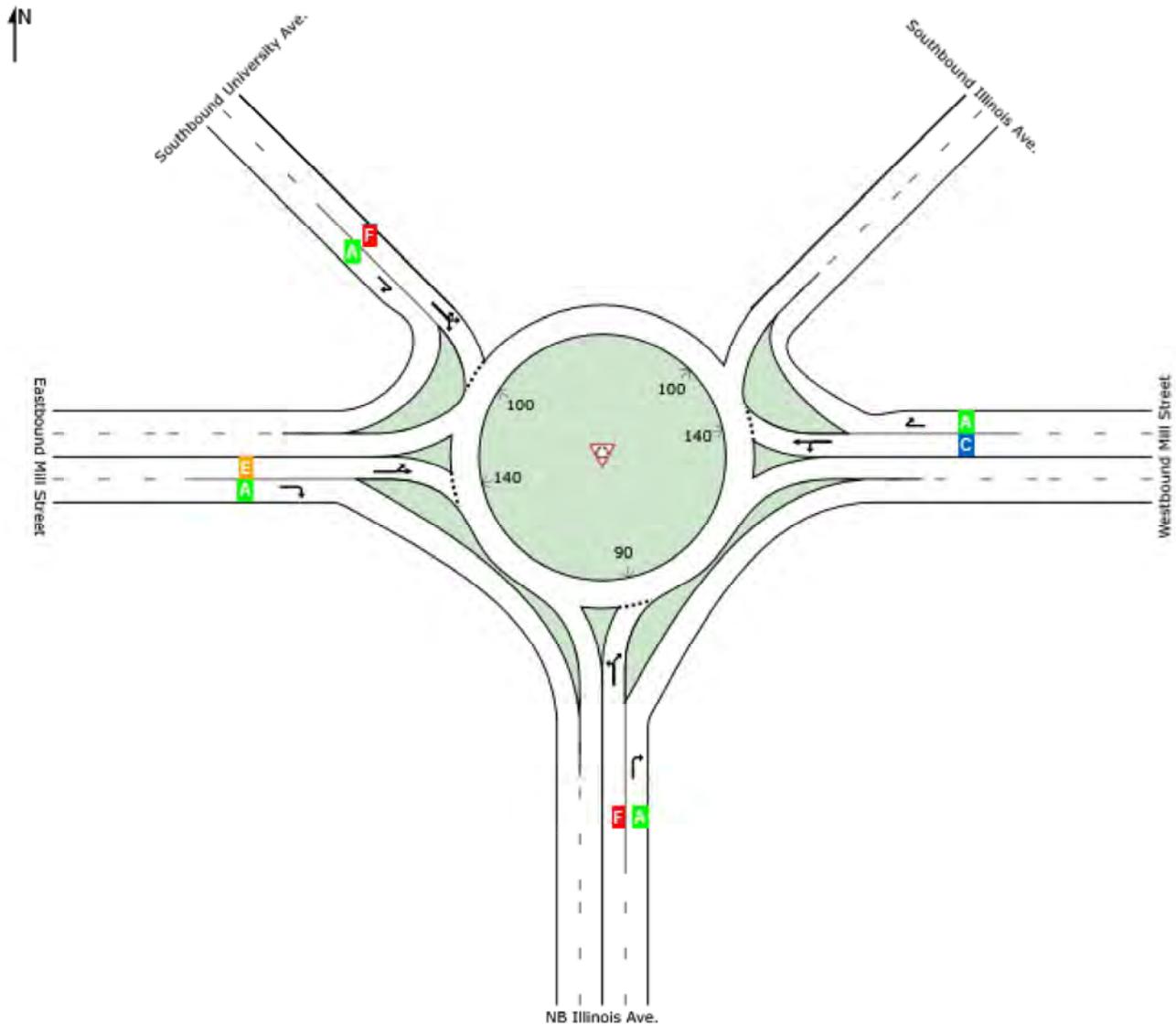
## Lane Level of Service

 Site: 101 [EXIST\_PM-Mill Street / University Ave / Illinois Ave Roundabout]

No Build - Single Lane Roundabout  
 PM Peak Hour  
 Roundabout

### All Movement Classes

	South	East	Northwest	West	Intersection
LOS	F	B	F	C	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).  
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

---

**SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com**  
Organisation: CRAWFORD, MURPHY & TILLY, INC. | Processed: Sunday, June 5, 2016 7:36:42 AM  
Project: L:\Marion\1600105\Planning\Traffic\SIDRA\Mill St Roundabout.sip7

# MOVEMENT SUMMARY

 Site: 101 [EXIST-2lane\_AM-Mill Street / University Ave / Illinois Ave Roundabout]

No Build - Single-Dual Lane Hybrid Roundabout  
AM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Illinois Ave.											
3	L2	352	0.0	0.447	8.8	LOS A	2.4	60.8	0.38	0.25	31.6
18a	R1	503	6.0	0.447	9.1	LOS A	2.4	60.8	0.37	0.24	32.9
18	R2	26	0.0	0.026	3.8	LOS A	0.1	2.2	0.21	0.09	34.5
Approach		881	3.4	0.447	8.8	LOS A	2.4	60.8	0.37	0.24	32.4
East: Westbound Mill Street											
1	L2	61	3.0	0.393	12.2	LOS B	1.3	32.4	0.59	0.62	31.7
6	T1	165	4.0	0.393	12.2	LOS B	1.3	32.4	0.59	0.62	31.3
16b	R3	81	4.0	0.111	6.1	LOS A	0.3	7.2	0.39	0.38	33.7
Approach		307	3.8	0.393	10.6	LOS B	1.3	32.4	0.54	0.56	32.0
NorthWest: Southbound University Ave.											
7x	L2	1	0.0	0.619	18.8	LOS C	3.4	91.1	0.72	0.81	29.6
7ax	L1	27	50.0	0.619	18.8	LOS C	3.4	91.1	0.72	0.81	28.0
14ax	R1	701	5.0	0.619	18.6	LOS C	3.6	93.0	0.73	0.82	29.3
14bx	R3	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	36.7
Approach		731	6.6	0.619	18.6	LOS C	3.6	93.0	0.73	0.82	29.2
West: Eastbound Mill Street											
5a	L1	27	0.0	0.264	9.7	LOS A	0.8	19.5	0.54	0.54	32.8
2	T1	60	5.0	0.264	9.7	LOS A	0.8	19.5	0.54	0.54	32.8
12	R2	225	4.0	0.264	9.5	LOS A	0.8	19.5	0.52	0.53	32.4
Approach		312	3.9	0.264	9.6	LOS A	0.8	19.5	0.53	0.53	32.5
All Vehicles		2231	4.6	0.619	12.4	LOS B	3.6	93.0	0.53	0.51	31.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# LANE LEVEL OF SERVICE

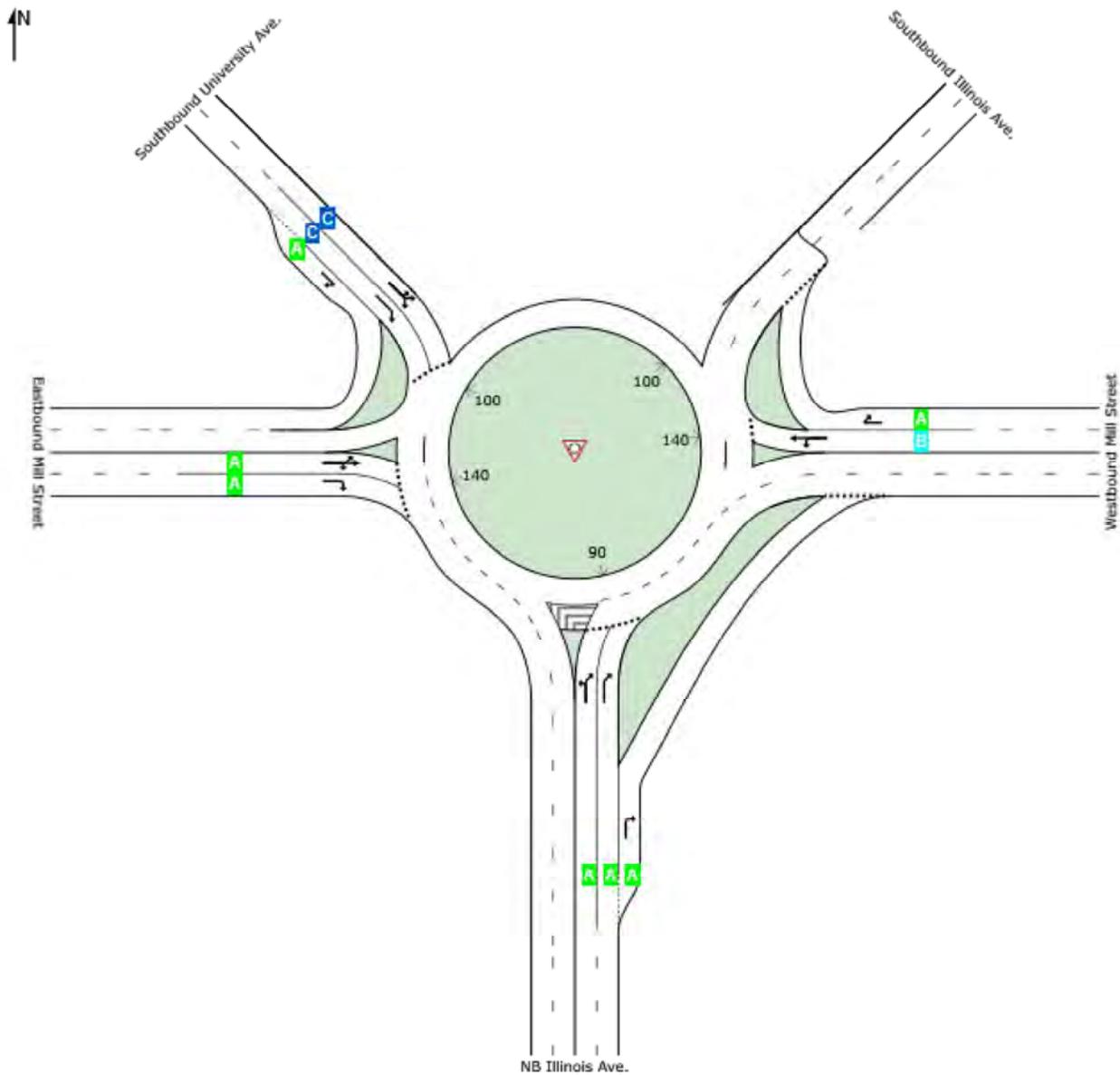
## Lane Level of Service

 **Site: 101 [EXIST-2lane\_AM-Mill Street / University Ave / Illinois Ave Roundabout]**

No Build - Single-Dual Lane Hybrid Roundabout  
 AM Peak Hour  
 Roundabout

### All Movement Classes

	South	East	Northwest	West	Intersection
LOS	A	B	C	A	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

---

**SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com**

Organisation: CRAWFORD, MURPHY & TILLY, INC. | Processed: Sunday, June 12, 2016 7:34:17 AM

Project: L:\Marion\1600105\Planning\Traffic\SIDRA\Mill St Roundabout.sip7

# MOVEMENT SUMMARY

 Site: 101 [EXIST-2lane\_PM-Mill Street / University Ave / Illinois Ave Roundabout]

No Build - Single-Dual Lane Hybrid Roundabout  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Illinois Ave.											
3	L2	321	0.0	0.850	33.4	LOS D	8.8	225.5	0.92	1.17	24.0
18a	R1	753	6.0	0.850	33.9	LOS D	8.8	225.5	0.90	1.15	24.2
18	R2	61	0.0	0.074	5.0	LOS A	0.3	6.4	0.39	0.29	33.8
Approach		1135	4.0	0.850	32.2	LOS D	8.8	225.5	0.88	1.11	24.5
East: Westbound Mill Street											
1	L2	45	3.0	0.480	18.5	LOS C	1.6	40.2	0.75	0.80	29.3
6	T1	158	4.0	0.480	18.5	LOS C	1.6	40.2	0.75	0.80	29.0
16b	R3	118	4.0	0.223	9.9	LOS A	0.6	15.1	0.57	0.57	31.8
Approach		320	3.9	0.480	15.4	LOS C	1.6	40.2	0.68	0.72	30.0
NorthWest: Southbound University Ave.											
7x	L2	1	0.0	0.672	21.2	LOS C	3.9	108.0	0.72	0.83	28.6
7ax	L1	77	50.0	0.672	21.2	LOS C	3.9	108.0	0.72	0.83	27.1
14ax	R1	738	5.0	0.672	20.5	LOS C	4.4	114.3	0.74	0.85	28.5
14bx	R3	7	0.0	0.004	0.0	LOS A	0.0	0.0	0.00	0.00	36.7
Approach		824	9.2	0.672	20.4	LOS C	4.4	114.3	0.74	0.84	28.4
West: Eastbound Mill Street											
5a	L1	232	0.0	0.769	29.0	LOS D	4.4	112.1	0.80	0.96	25.3
2	T1	181	5.0	0.769	29.0	LOS D	4.4	112.1	0.80	0.96	25.3
12	R2	440	4.0	0.769	28.3	LOS D	4.4	112.1	0.78	0.92	25.5
Approach		853	3.1	0.769	28.7	LOS D	4.4	112.1	0.79	0.94	25.4
All Vehicles		3133	5.1	0.850	26.4	LOS D	8.8	225.5	0.80	0.95	26.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com**

Organisation: CRAWFORD, MURPHY & TILLY, INC. | Processed: Sunday, June 12, 2016 7:35:45 AM

Project: L:\Marion\1600105\Planning\Traffic\SIDRA\Mill St Roundabout.sip7

# LANE LEVEL OF SERVICE

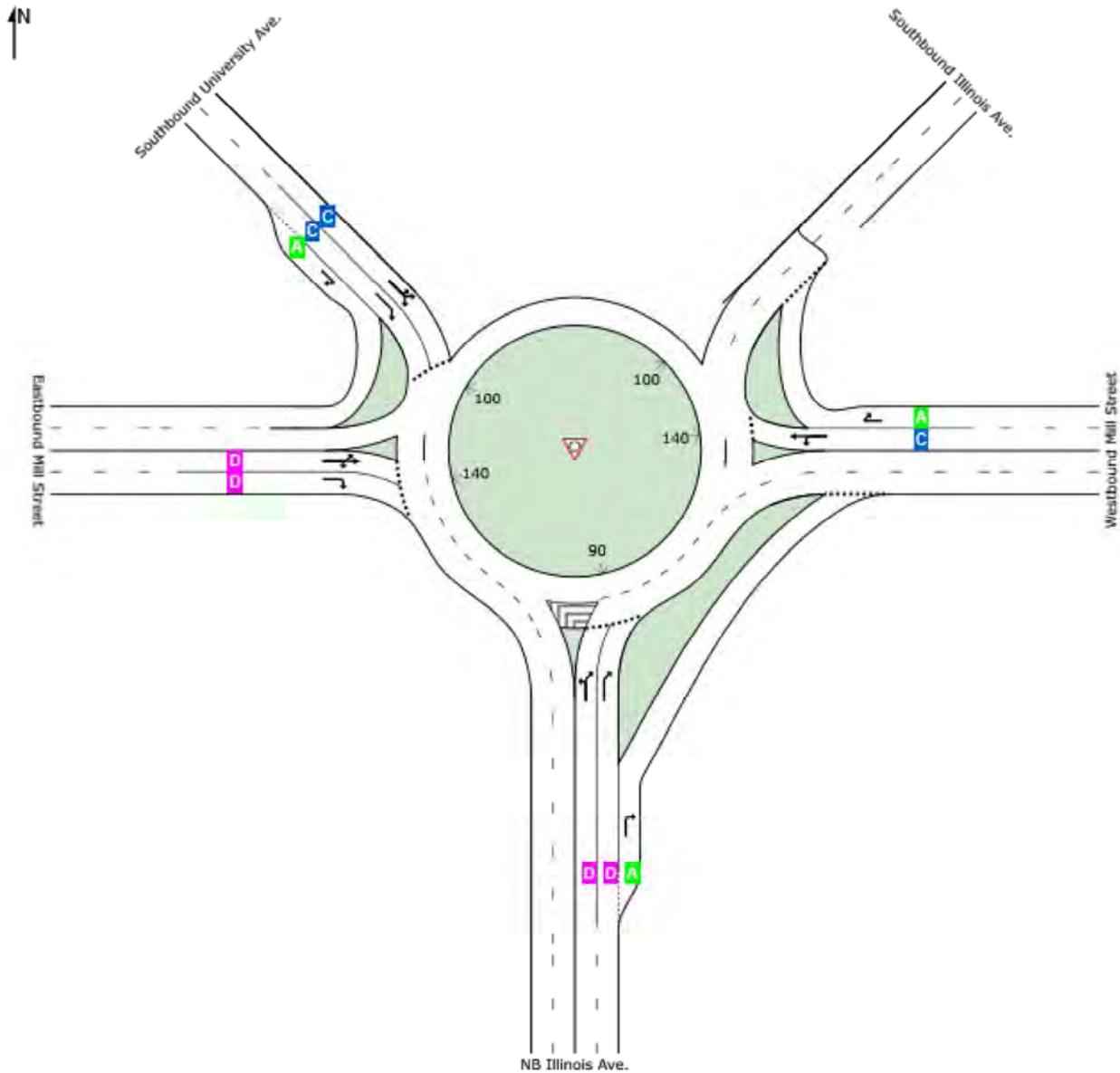
## Lane Level of Service

 Site: 101 [EXIST-2lane\_PM-Mill Street / University Ave / Illinois Ave Roundabout]

No Build - Single-Dual Lane Hybrid Roundabout  
 PM Peak Hour  
 Roundabout

### All Movement Classes

	South	East	Northwest	West	Intersection
LOS	D	C	C	D	D



Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

---

**SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com**

Organisation: CRAWFORD, MURPHY & TILLY, INC. | Processed: Sunday, June 12, 2016 7:35:45 AM

Project: L:\Marion\1600105\Planning\Traffic\SIDRA\Mill St Roundabout.sip7

# INTERSECTION SUMMARY

 Site: 101 [Mill Street / University Ave / Illinois Ave Roundabout]

Build University  
AM Peak Hour  
Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	31.1 mph	31.1 mph
Travel Distance (Total)	1478.5 veh-mi/h	1774.2 pers-mi/h
Travel Time (Total)	47.5 veh-h/h	57.0 pers-h/h
Demand Flows (Total)	2316 veh/h	2779 pers/h
Percent Heavy Vehicles (Demand)	4.4 %	
Degree of Saturation	0.521	
Practical Spare Capacity	63.2 %	
Effective Intersection Capacity	4445 veh/h	
Control Delay (Total)	7.45 veh-h/h	8.94 pers-h/h
Control Delay (Average)	11.6 sec	11.6 sec
Control Delay (Worst Lane)	17.1 sec	
Control Delay (Worst Movement)	17.1 sec	17.1 sec
Geometric Delay (Average)	0.0 sec	
Stop-Line Delay (Average)	11.6 sec	
Idling Time (Average)	8.6 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	1.9 veh	
95% Back of Queue - Distance (Worst Lane)	48.1 ft	
Queue Storage Ratio (Worst Lane)	0.04	
Total Effective Stops	1065 veh/h	1278 pers/h
Effective Stop Rate	0.46 per veh	0.46 per pers
Proportion Queued	0.47	0.47
Performance Index	67.3	67.3
Cost (Total)	718.92 \$/h	718.92 \$/h
Fuel Consumption (Total)	66.5 gal/h	
Carbon Dioxide (Total)	598.2 kg/h	
Hydrocarbons (Total)	0.052 kg/h	
Carbon Monoxide (Total)	0.703 kg/h	
NOx (Total)	1.187 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,111,440 veh/y	1,333,728 pers/y
Delay	3,577 veh-h/y	4,292 pers-h/y
Effective Stops	511,155 veh/y	613,386 pers/y
Travel Distance	709,671 veh-mi/y	851,606 pers-mi/y
Travel Time	22,804 veh-h/y	27,365 pers-h/y
Cost	345,084 \$/y	345,084 \$/y
Fuel Consumption	31,940 gal/y	
Carbon Dioxide	287,150 kg/y	
Hydrocarbons	25 kg/y	
Carbon Monoxide	337 kg/y	
NOx	570 kg/y	

# MOVEMENT SUMMARY

 Site: 101 [Mill Street / University Ave / Illinois Ave Roundabout]

Build University  
AM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
<b>South: NB Illinois Ave.</b>											
3	L2	352	0.0	0.443	8.5	LOS A	1.7	43.9	0.28	0.18	31.4
3a	L1	377	6.0	0.443	8.8	LOS A	1.7	43.9	0.28	0.19	31.6
18a	R1	126	6.0	0.443	8.9	LOS A	1.7	45.1	0.29	0.19	31.9
18	R2	26	0.0	0.443	8.9	LOS A	1.7	45.1	0.29	0.19	31.1
Approach		881	3.4	0.443	8.7	LOS A	1.7	45.1	0.28	0.18	31.5
<b>East: Westbound Mill Street</b>											
1	L2	61	3.0	0.393	12.2	LOS B	1.3	32.4	0.59	0.62	31.7
6	T1	165	4.0	0.393	12.2	LOS B	1.3	32.4	0.59	0.62	31.4
16a	R1	61	4.0	0.132	9.2	LOS A	0.4	9.0	0.35	0.32	34.2
16b	R3	20	4.0	0.132	1.9	LOS A	0.4	9.0	0.35	0.32	33.1
Approach		307	3.8	0.393	10.9	LOS B	1.3	32.4	0.53	0.54	32.1
<b>NorthEast: Southbound Illinois Ave.</b>											
1bx	L3	7	50.0	0.521	17.1	LOS C	1.9	48.1	0.69	0.75	28.1
1ax	L1	176	5.0	0.521	17.1	LOS C	1.9	48.1	0.69	0.75	28.6
16ax	R1	82	0.0	0.521	17.1	LOS C	1.9	48.1	0.69	0.75	28.5
16x	R2	1	0.0	0.521	17.1	LOS C	1.9	48.1	0.69	0.75	28.0
Approach		266	4.6	0.521	17.1	LOS C	1.9	48.1	0.69	0.75	28.6
<b>NorthWest: Southbound University Ave.</b>											
7x	L2	1	0.0	0.484	14.5	LOS B	1.7	44.1	0.60	0.65	31.4
7ax	L1	20	50.0	0.484	14.5	LOS B	1.7	44.1	0.60	0.65	29.6
14ax	R1	527	5.0	0.484	14.6	LOS B	1.8	46.5	0.61	0.66	30.9
14bx	R3	1	0.0	0.484	11.5	LOS B	1.8	46.5	0.63	0.68	29.9
Approach		549	6.6	0.484	14.6	LOS B	1.8	46.5	0.61	0.66	30.8
<b>West: Eastbound Mill Street</b>											
5b	L3	20	0.0	0.149	8.0	LOS A	0.4	10.3	0.51	0.51	33.9
5a	L1	7	0.0	0.149	8.0	LOS A	0.4	10.3	0.51	0.51	33.1
2	T1	60	5.0	0.149	8.0	LOS A	0.4	10.3	0.51	0.51	33.1
12	R2	225	4.0	0.374	11.4	LOS B	1.2	30.5	0.56	0.58	31.5
Approach		312	3.9	0.374	10.4	LOS B	1.2	30.5	0.54	0.56	32.0
<b>All Vehicles</b>		<b>2316</b>	<b>4.4</b>	<b>0.521</b>	<b>11.6</b>	<b>LOS B</b>	<b>1.9</b>	<b>48.1</b>	<b>0.47</b>	<b>0.46</b>	<b>31.1</b>

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# LANE LEVEL OF SERVICE

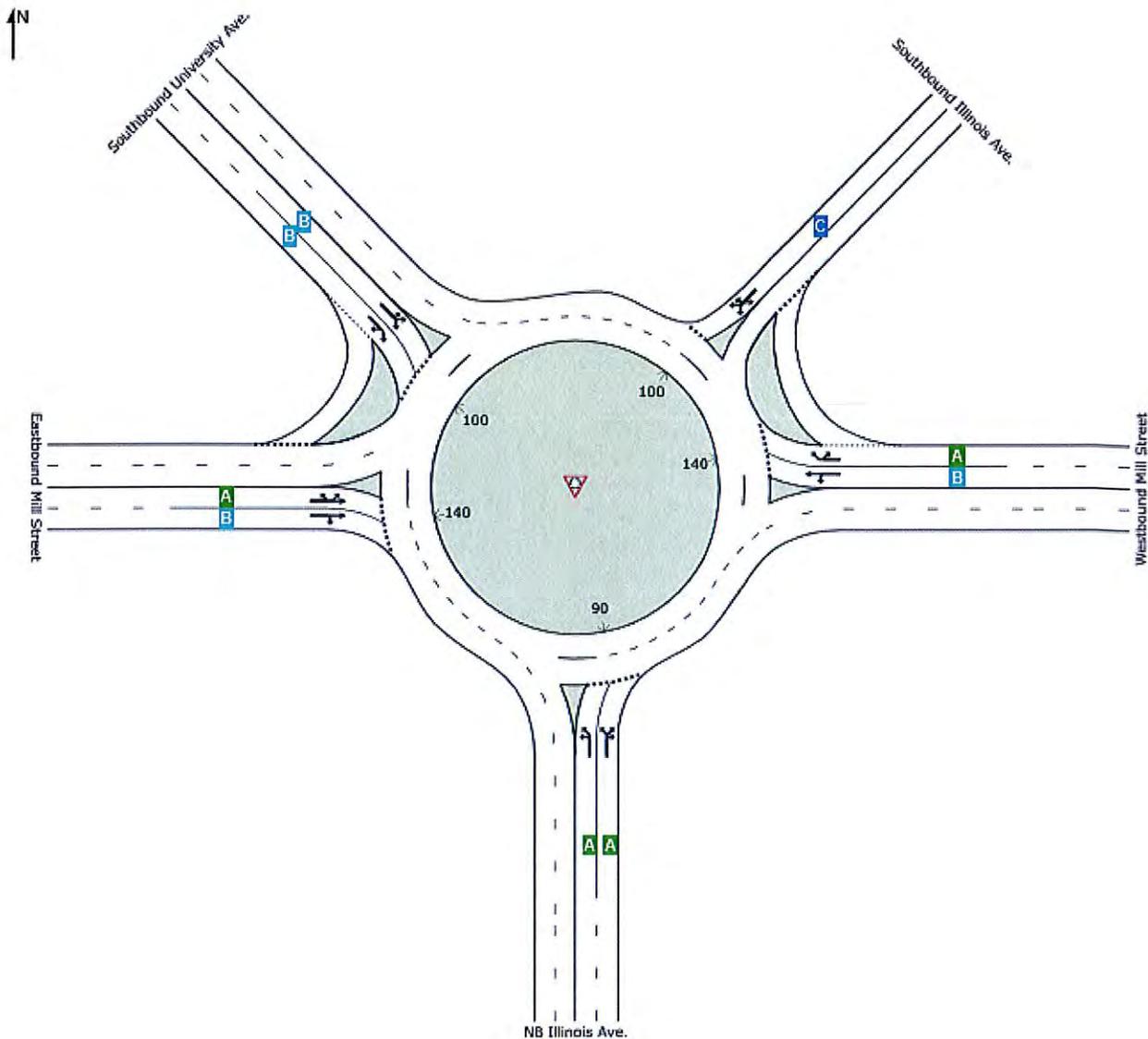
Lane Level of Service

 Site: 101 [Mill Street / University Ave / Illinois Ave Roundabout]

Build University  
AM Peak Hour  
Roundabout

## All Movement Classes

	South	East	Northeast	Northwest	West	Intersection
LOS	A	B	C	B	B	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# INTERSECTION SUMMARY

 Site: 101 [Mill Street / University Avenue / Illinois Avenue Roundabout]

PM Peak Hour  
Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	28.7 mph	28.7 mph
Travel Distance (Total)	1932.6 veh-mi/h	2319.2 pers-mi/h
Travel Time (Total)	67.3 veh-h/h	80.8 pers-h/h
Demand Flows (Total)	3025 veh/h	3630 pers/h
Percent Heavy Vehicles (Demand)	1.7 %	
Degree of Saturation	0.743	
Practical Spare Capacity	14.4 %	
Effective Intersection Capacity	4070 veh/h	
Control Delay (Total)	14.87 veh-h/h	17.84 pers-h/h
Control Delay (Average)	17.7 sec	17.7 sec
Control Delay (Worst Lane)	29.7 sec	
Control Delay (Worst Movement)	29.7 sec	29.7 sec
Geometric Delay (Average)	0.0 sec	
Stop-Line Delay (Average)	17.7 sec	
Idling Time (Average)	13.1 sec	
Intersection Level of Service (LOS)	LOS C	
95% Back of Queue - Vehicles (Worst Lane)	5.4 veh	
95% Back of Queue - Distance (Worst Lane)	135.7 ft	
Queue Storage Ratio (Worst Lane)	0.11	
Total Effective Stops	2224 veh/h	2669 pers/h
Effective Stop Rate	0.74 per veh	0.74 per pers
Proportion Queued	0.67	0.67
Performance Index	106.4	106.4
Cost (Total)	1008.98 \$/h	1008.98 \$/h
Fuel Consumption (Total)	82.2 gal/h	
Carbon Dioxide (Total)	734.0 kg/h	
Hydrocarbons (Total)	0.067 kg/h	
Carbon Monoxide (Total)	0.898 kg/h	
NOx (Total)	0.764 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,451,835 veh/y	1,742,202 pers/y
Delay	7,136 veh-h/y	8,563 pers-h/y
Effective Stops	1,067,747 veh/y	1,281,296 pers/y
Travel Distance	927,666 veh-mi/y	1,113,199 pers-mi/y
Travel Time	32,308 veh-h/y	38,769 pers-h/y
Cost	484,309 \$/y	484,309 \$/y
Fuel Consumption	39,437 gal/y	
Carbon Dioxide	352,325 kg/y	
Hydrocarbons	32 kg/y	
Carbon Monoxide	431 kg/y	
NOx	367 kg/y	

# MOVEMENT SUMMARY

 Site: 101 [Mill Street / University Avenue / Illinois Avenue Roundabout]

PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance ft		per veh	mph
<b>South: NB Illinois Ave.</b>											
3	L2	338	0.0	0.743	19.9	LOS C	5.4	135.7	0.72	0.81	27.3
3a	L1	596	4.0	0.743	19.9	LOS C	5.4	135.7	0.70	0.78	27.4
18a	R1	199	4.0	0.743	19.9	LOS C	4.9	127.1	0.68	0.76	27.8
18	R2	65	0.0	0.743	19.9	LOS C	4.9	127.1	0.68	0.76	27.2
Approach		1198	2.7	0.743	19.9	LOS C	5.4	135.7	0.70	0.78	27.4
<b>East: Westbound Mill Street</b>											
1	L2	42	0.0	0.446	17.3	LOS C	1.4	36.4	0.74	0.79	29.8
6	T1	148	2.0	0.446	17.3	LOS C	1.4	36.4	0.74	0.79	29.5
16a	R1	82	0.0	0.234	13.6	LOS B	0.7	16.4	0.53	0.50	32.5
16b	R3	28	0.0	0.234	3.8	LOS A	0.7	16.4	0.53	0.50	31.5
Approach		300	1.0	0.446	15.0	LOS C	1.4	36.4	0.66	0.69	30.4
<b>NorthEast: Southbound Illinois Ave.</b>											
1bx	L3	15	3.0	0.703	29.7	LOS D	3.0	76.1	0.84	0.97	25.3
1ax	L1	142	1.0	0.703	29.7	LOS D	3.0	76.1	0.84	0.97	24.9
16ax	R1	140	0.0	0.703	29.7	LOS D	3.0	76.1	0.84	0.97	24.8
16x	R2	1	0.0	0.703	29.7	LOS D	3.0	76.1	0.84	0.97	24.4
Approach		299	0.6	0.703	29.7	LOS D	3.0	76.1	0.84	0.97	24.9
<b>NorthWest: Southbound University Ave.</b>											
7x	L2	1	0.0	0.388	11.3	LOS B	1.3	32.6	0.56	0.59	32.5
7ax	L1	46	3.0	0.388	11.3	LOS B	1.3	32.6	0.56	0.59	31.9
14ax	R1	427	1.0	0.388	11.5	LOS B	1.4	34.1	0.57	0.60	32.1
14bx	R3	1	0.0	0.388	9.4	LOS A	1.4	34.1	0.58	0.61	31.1
Approach		475	1.2	0.388	11.5	LOS B	1.4	34.1	0.57	0.60	32.1
<b>West: Eastbound Mill Street</b>											
5b	L3	154	0.0	0.540	14.1	LOS B	2.4	60.4	0.63	0.68	30.5
5a	L1	52	0.0	0.540	14.1	LOS B	2.4	60.4	0.63	0.68	29.8
2	T1	159	1.0	0.540	14.1	LOS B	2.4	60.4	0.63	0.68	29.9
12	R2	388	2.0	0.564	14.6	LOS B	2.4	62.2	0.61	0.67	30.2
Approach		753	1.2	0.564	14.4	LOS B	2.4	62.2	0.62	0.67	30.1
<b>All Vehicles</b>		<b>3025</b>	<b>1.7</b>	<b>0.743</b>	<b>17.7</b>	<b>LOS C</b>	<b>5.4</b>	<b>135.7</b>	<b>0.67</b>	<b>0.74</b>	<b>28.7</b>

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# LANE LEVEL OF SERVICE

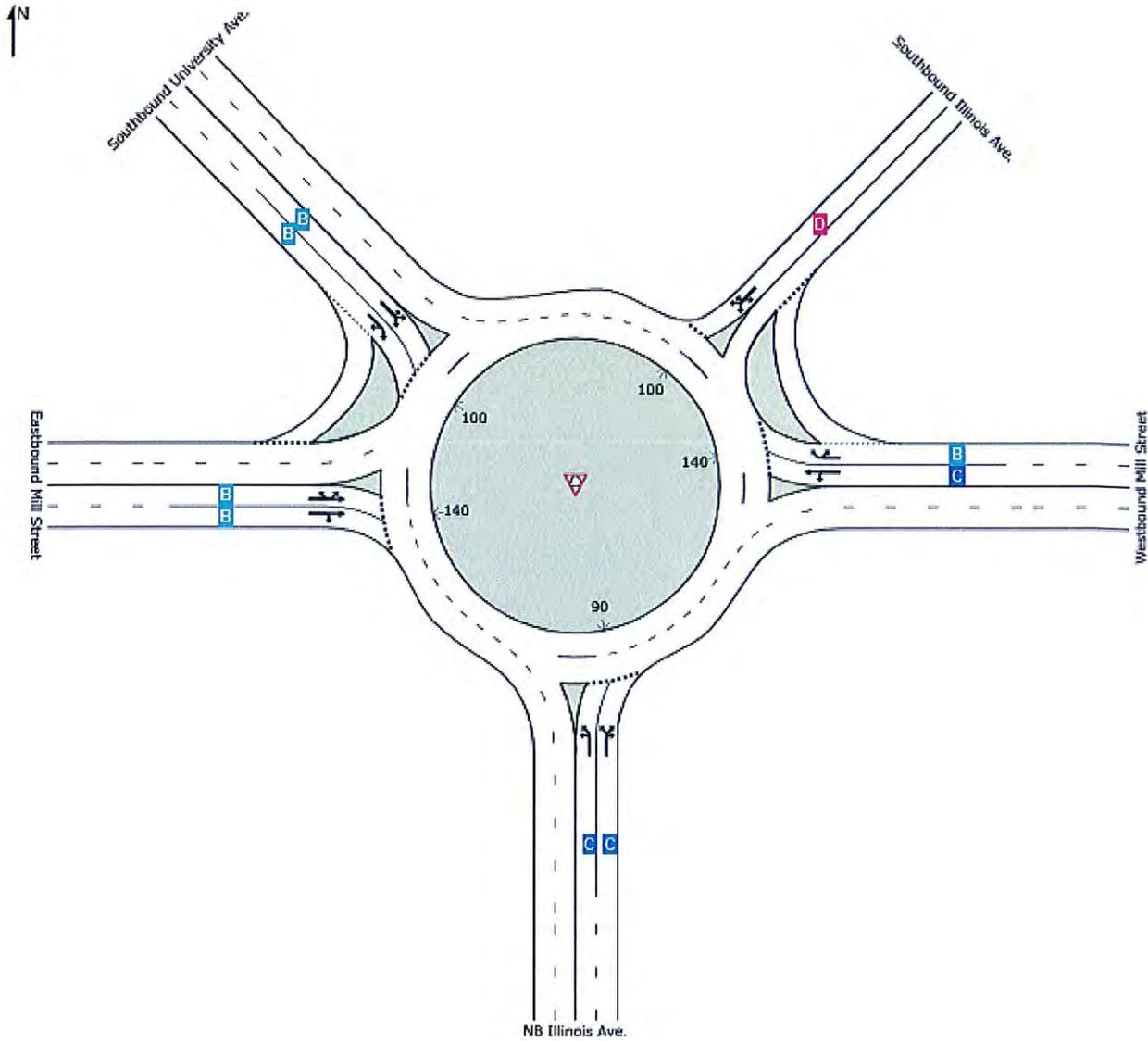
Lane Level of Service

 Site: 101 [Mill Street / University Avenue / Illinois Avenue Roundabout]

PM Peak Hour  
Roundabout

## All Movement Classes

	South	East	Northeast	Northwest	West	Intersection
LOS	C	C	D	B	B	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

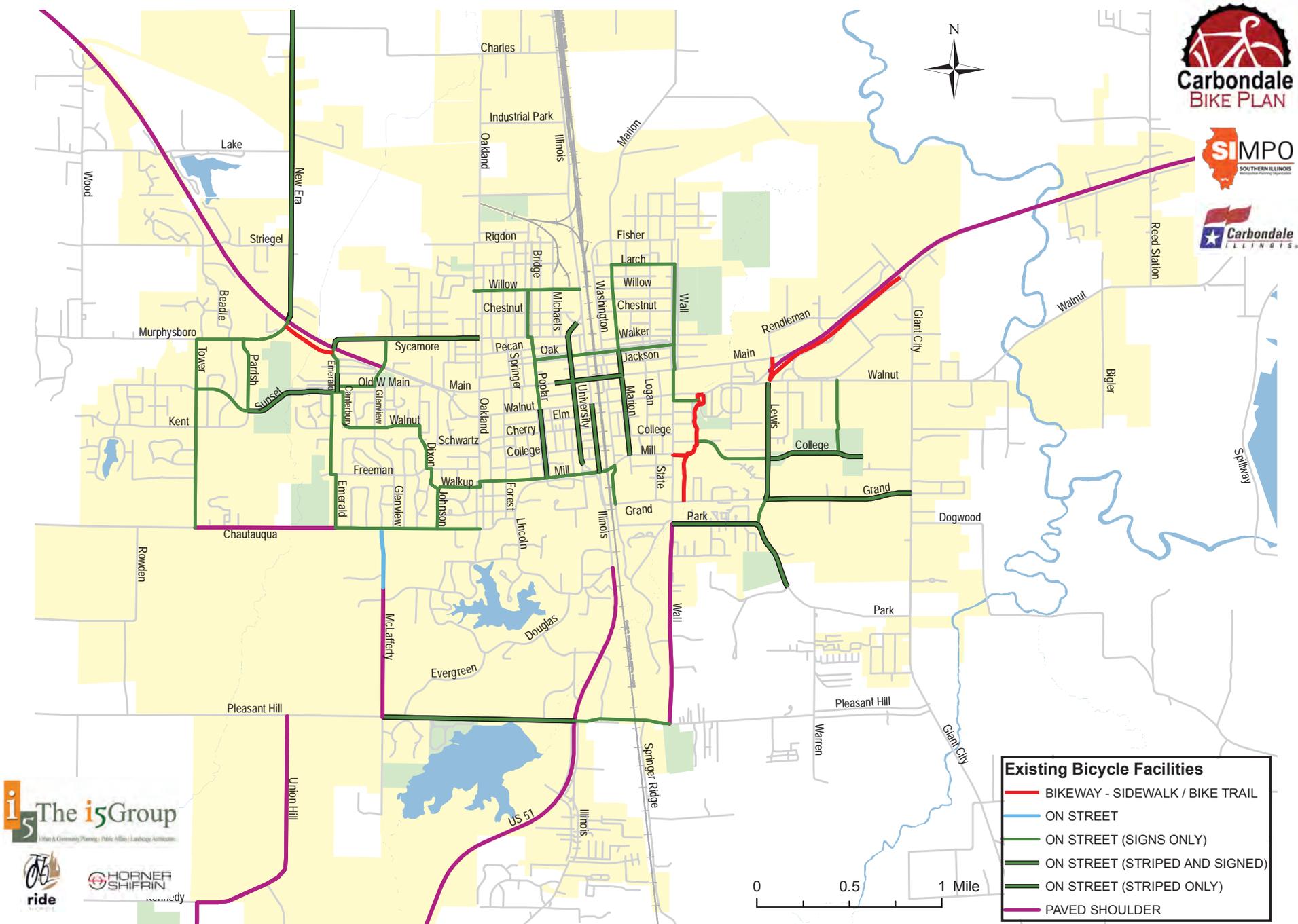
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# Appendix E

Carbondale Bicycle Master Plan (May 2016)—Key Maps



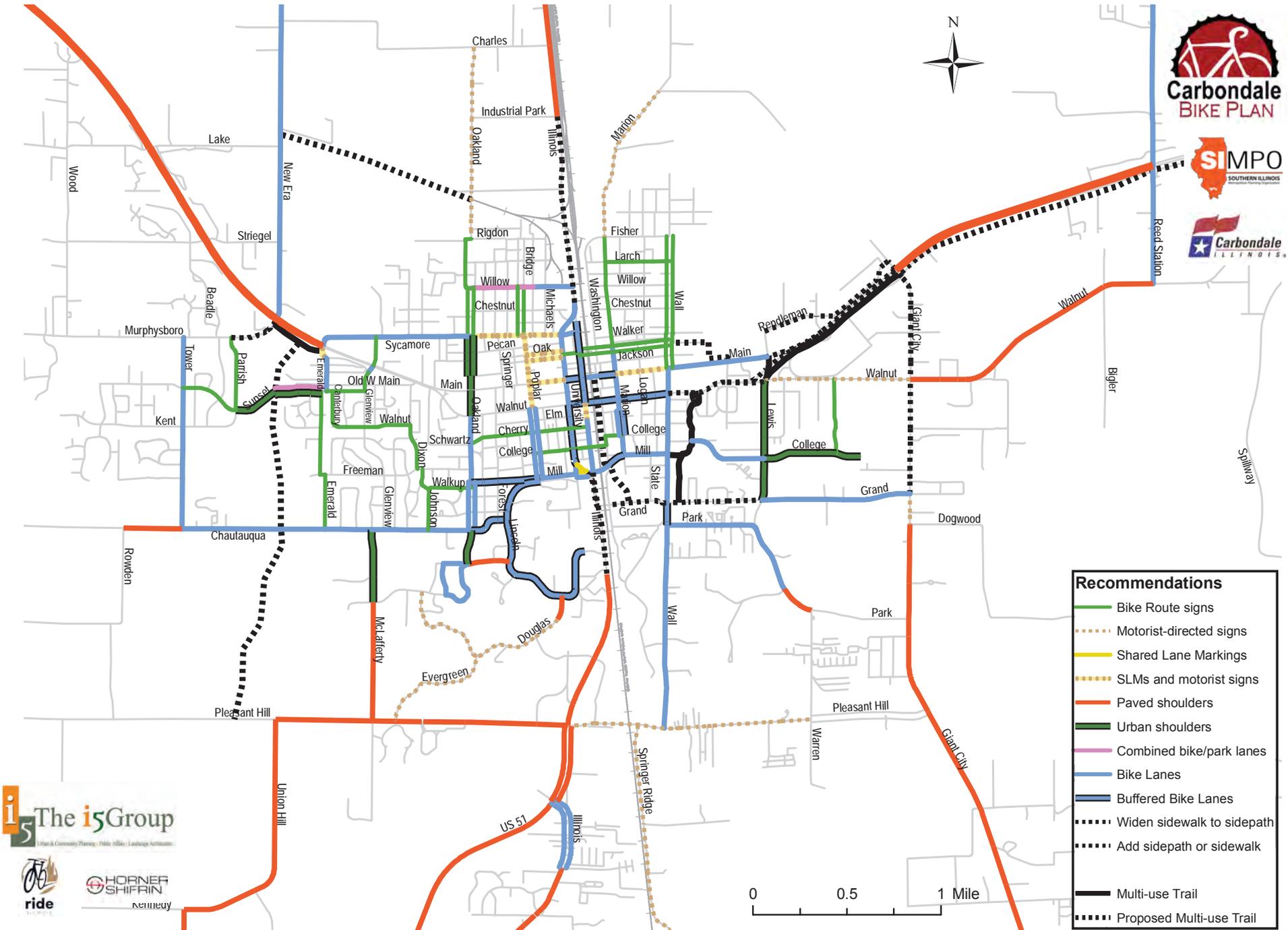
**FIGURE 2.1: Existing Bicycle Facilities**

**i5 The i5Group**  
 Urban & Community Planning | Public Affairs | Landscape Architecture



**HORNER SHIFRIN**  
 community





**FIGURE 4.1: Recommended Bicycle Network**

