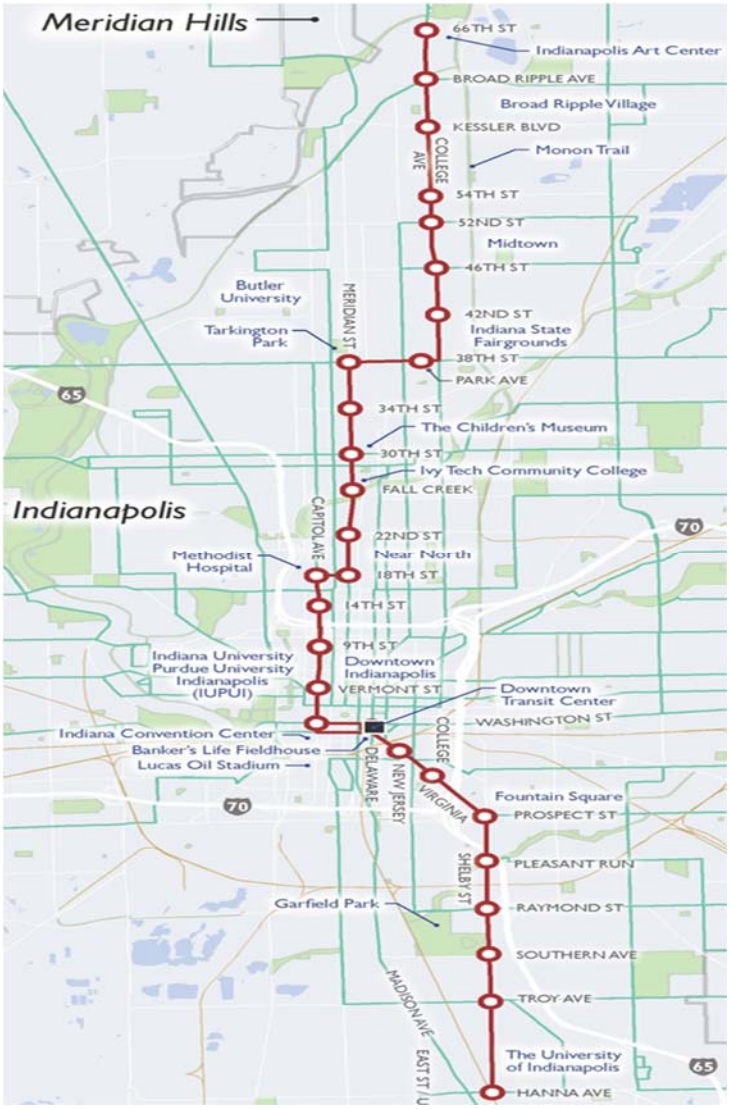
FINAL DESIGN TRAFFIC OPERATIONS REPORT

IndyGo Red Line Rapid Transit Project – Phase 1



IndyGo

April, 2016

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Executive Summary

Introduction

The Indianapolis Public Transportation Corporations (IndyGo) ***Red Line Rapid Transit Project – Phase 1*** would be constructed in an existing urban corridor and introduce a new high capacity transit service, Bus Rapid Transit (BRT) to relieve congestion, thereby enhancing transportation options and increasing overall mobility. **Figure ES-1** presents the project alignment and extents. In order to achieve higher operating speeds and increase reliability, the Red Line Rapid Transit Project would include the installation of dedicated transit lanes along 58% of the corridor; either center- or curb-running exclusive transit lanes or dedicated business access transit (BAT) lanes. The project lane configurations were determined based on the existing street configuration and traffic volumes.

This report uses the 60% plans (developed during the Final Design phase) as a base with additional changes made as of December, 2016. It also includes some alternative design ideas identified during the traffic workshop held on November, 2016. It updates some of the technical analysis work and results presented in the Preliminary Design Traffic Operations Report (April, 2016). The report presents updates to the VISSIM microsimulation modeling reflecting the design updates and introduces the Synchro signalized intersection analysis for the proposed bicycle lane along Illinois Street.

Conclusion

Based on the results of the signalized intersection analysis conducted with VISSIM and Synchro (Progress design set after 60% dated December, 2016), the project would not result in any traffic impacts outside the allowable levels.

Project Description

Exclusive transit lanes would be installed on the northern portion of the corridor, including the College Avenue and Meridian Street corridor segments; the College Avenue exclusive transit lane would be bidirectional. East 38th Street and East 18th Street would include mixed flow traffic lanes and Capitol Avenue would include dedicated lanes (exclusive transit lane on northbound; BAT lane southbound). Maryland Street and Washington Street would also include dedicated lanes, each a mix of exclusive transit and BAT lanes. The southern end of the corridor, including Delaware Street, Virginia Avenue, and Shelby Street would not include any dedicated transit lanes and BRT service would operate in mixed flow traffic lanes.

In areas with center-running dedicated lanes, a concrete median will be installed that would limit left turns at some intersections. The project would require minor curb realignments near stations and at intersections, though appropriate lane widths would be maintained to accommodate traffic flow. The project would remove or limit some existing left turns but would include new U-turn locations to ensure drivers could still access all businesses and other destinations. The project would also include transit signal priority (TSP) at all 52 signalized intersections along the corridor and real time passenger information at stations.

Figure ES-1: Indy Go Red Line Rapid Transit (Phase 1)

The introduction of a concrete median and updated signal timing plans would introduce access management principles to the corridor. These geometric and signal timing changes would be required to provide the BRT service with dedicated travel lanes, which would result in decreased travel times, improved reliability, and increased ridership. Access management is a set of techniques that organize roadway access points and include several techniques designed to increase roadway capacity, manage congestion, and reduce crashes.

Recent Federal Highway Administration studies have shown that access management techniques can provide net benefits to businesses affected by their implementation and do not decrease profitability or property values. Managing access can result in better traffic flow, fewer crashes, and a better shopping experience for customers. The implementation of a median would provide for safer approaches to many businesses.

Traffic Analysis Methodology

The traffic analysis focused on the evaluation of the traffic operations of the progress set after the 60% design plans dated December 2016. This report presents the results of the Vissim traffic analysis updates to the Preliminary design and the Synchro signalized intersection analysis for the proposed bicycle lane along Illinois Street. The intent of the intersection traffic analysis was to verify that general traffic conditions would be acceptable based on changes in geometric and traffic signal timing conditions.

The operational analysis is based on an update to the previous Vissim models and the changes recommended at the traffic workshop held on November, 2016. This analysis includes the extension of the College Avenue model to 66th Street, and the intersection of Morris Street/Shelby Street and Woodlawn Avenue/Virginia Avenue to the Virginia Avenue/Shelby Street/Prospect Street Vissim model. All other models begin and end at the same points defined in the Preliminary Design Traffic Operations Report.

The microsimulation analysis allowed for the detailed use of TSP to provide a more comprehensive traffic and BRT operations-level analysis. TSP would be utilized to ensure BRT vehicles have priority at traffic signals; different TSP plans were developed in the VISSIM models to ensure satisfactory bus and general traffic operations.

Peak-hour level of service (LOS) thresholds at signalized intersections were designated based on established Indianapolis Department of Public Works (DPW) standards. LOS A, B, C, or D was considered acceptable, while heavily used or physically constrained intersections operating at LOS E or F could also have been considered acceptable, as identified by DPW on a case-by-case basis. Intersections that currently and would continue to operate at LOS E or F was considered acceptable. The traffic impact threshold approach, previously described, was consistently applied to identify changes in traffic levels at all intersections.

Signalized Intersection Analysis along Illinois Street

As part of the project, Illinois Street, which operates as a four-lane one-way northbound arterial paralleling Capitol Avenue, is proposed to have the westernmost existing travel lane converted into a protected bicycle lane facility. The corridor studied was from the Illinois Street & Market Street intersection, to the south near downtown Indianapolis, to the Illinois Street & 16th Street intersection to the north, beyond the junction with I-65. Synchro analysis was conducted under existing AM and PM peak hour conditions to understand the impact of the lane reduction on traffic operations.

Analysis shows that under existing conditions, all 12 intersections along the Illinois Street corridor in the AM peak hour and 11 of the 12 intersections in the PM peak hour operate at LOS D or better. The Illinois Street & 10th Street intersection during the PM peak hour was determined to operate at LOS E. With the project and subsequent changes to traffic volumes and signal optimization, all 12 intersections along the Illinois Street corridor in both the AM and PM peak hours would operate at LOS D or better.

Microsimulation Analysis

The VISSIM traffic analysis based on the 60% plan with additional changes made as of December, 2016 identified one signalized intersection with existing deficiencies, 49 intersections that would operate at LOS D or better with the project, and three intersections would operate at LOS E with the project.

Virginia Avenue & South Street & East Street, has existing deficiencies and operates at LOS E under Existing Conditions in both AM and PM peak hours. In the Final Design, the transit queue jump lane at the Virginia Avenue southeast approach was removed and reverted to the existing configuration (mixed flow). This change increased the bus travel times and speed compared to results presented in the Preliminary Traffic Operations Report (April, 2016).

In order to improve bus operations, different traffic signal timing plans were investigated including swapping phases to prioritize the Virginia Avenue traffic. This treatment in combination with TSP would improve the transit operations while the overall intersection LOS would remain at E. This signalized intersection is a location with known traffic issues, acknowledged by DPW, and would continue to operate at the same LOS under the Build Conditions.

At Meridian Street & 38th Street, the Build Conditions would result in LOS E traffic operations during the AM peak hour, due to the reduction in capacity of the southbound direction. Different geometric (limited to increasing storage lengths) and traffic signal timing plan designs were tested to attempt to achieve an LOS of D or better with the project. However, no acceptable configuration was found that did not involve adding southbound through capacity or prohibiting the northbound left turning movements at this intersection. Both of these intersection modifications were impractical given the limited right of way, and the presence of commercial buildings at this intersection.

At Meridian Street & 32nd Street, the LOS E traffic operations result from spillback queuing at the downstream intersection of Meridian Street & 30th Street. A combination of heavy southbound through traffic and significant amount of right turning traffic, heading west towards the I-65 interchange, would cause queuing during the AM peak hour. The downstream queues would clear during the mainline green phase and would not degrade the LOS at Meridian Street & 30th Street.

Adding a southbound right turn lane at Meridian Street & 30th Street was infeasible due to the limited right of way and proximity of the Children's Museum and Library. Similarly, adding a southbound right turn lane at Meridian Street & 32nd Street was infeasible due to the limited right of way and the presence of a historic property along 32nd Street .

In lieu of capacity improvements to decrease queuing at Meridian Street & 30th Street or Meridian Street & 32nd Street, modifications to the signal timings were analyzed in order to create a metering effect between 30th Street and 32nd Street. The modifications included: (1) running the signal as pretimed and (2) utilizing alternative split percentages. However, the

results showed similar or worse LOS for the modified scenarios. In order to alleviate congestion in the southbound direction, the project will include signage for vehicles heading to I-65 to redirect traffic and lighten the southbound right turning volumes at the downstream intersections.

CDM Smith recommends DPW acknowledge the limitations of the project to provide LOS D under the Build Conditions at these locations and elect to make an exception at these locations and consider LOS E acceptable.

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Section 1
Introduction

This report provides an overview of the traffic analyses and results completed for the progress set after the 60% Design dated December, 2016 for Indianapolis Public Transportation Corporations (IndyGo) Red Line Rapid Transit Project – Phase 1. The following sections include a project description, analysis methodology, and analysis results.

This report use the 60% plans (developed during the Final Design phase) as a base with additional changes made as of December, 2016. It also includes some alternative design ideas identified during the traffic workshop held on November, 2016. It updates some of the technical analysis work and results presented in the Preliminary Design Traffic Operations Report (April, 2016). The report updates the VISSIM microsimulation modeling, including the extension of the College Avenue corridor model to 66th Street, expansion of the Virginia Avenue & Shelby Street & Prospect Street intersection model to include Morris Street/Shelby Street and Woodlawn Avenue/Virginia Avenue, and introduces Synchro signalized intersection analysis for the proposed bicycle lane along Illinois Street.

The Synchro operational analysis results of the intersections along the corridor that are not included in the Vissim models can be found in the Preliminary Design Traffic Operations Report (April, 2016); none of these intersections have changed since the preliminary design.

1.1 Project Description

IndyGo proposes to implement the Red Line Rapid Transit project on behalf of the City of Indianapolis. The Red Line will be the first all-electric BRT in the nation and the first rapid transit service in Indiana. As shown in **Figure 1-1**, the complete line is envisioned as a 35-mile Bus Rapid Transit (BRT) corridor, to be completed in three phases, focused on the Indianapolis Regional Center (downtown and vicinity) and extending north through Marion County to the Cities of Carmel and Westfield in Hamilton County and south through Marion County to the City of Greenwood in Johnson County. The Red Line will serve as the backbone to the planned regional transit network proposed in the Indy Connect study.

As shown in **Figure 1-2**, Phase 1 is a 13.1-mile long initial operating segment with 28 stations that will operate from the Broad Ripple Village in the north through the central business district of Indianapolis to the University of Indianapolis in the south. In the future, Phase 2 will extend the service from Broad Ripple to Westfield to the north and Phase 3 from University of Indianapolis to Greenwood to the south. This report documents the traffic operations analysis for Phase 1 of the Red Line.

In order to improve travel speeds and provide frequent, reliable service, 58 percent of the project will operate in dedicated transit lanes, either center- or curb-running exclusive transit lanes or business access transit (BAT) lanes, depending on the existing street configuration and traffic volumes. The project will also include transit signal priority (TSP) at signalized intersections throughout the corridor. The project will require minor curb realignments near stations and at intersections, though it will maintain lane widths to accommodate traffic flow. The project will remove or limit some existing left turns but will include new U-turn locations to ensure drivers can still access all businesses and other destinations.

Stations located throughout the corridor will provide a canopy, real-time transit arrival and departure information, self-service ticketing equipment and security cameras. Bike racks will be located along sidewalks near station locations. The stations will provide level boarding on buses to and from the platform, allowing all passengers to quickly board and alight without waiting in-line or navigating steps. Other station amenities may include benches, information kiosks, security cameras, a public announcement system, and opportunities for public art.

The project will provide Red Line BRT service 20 hours per day, seven days per week, and 365 days per year. Fourteen of the 20 daily hours will include 10-minute headway service; six hours will include 30-minute headway service with a fleet of 13 all-electric BRT vehicles.

Figure 1-1: IndyGo Red Line Rapid Transit (All Phases)

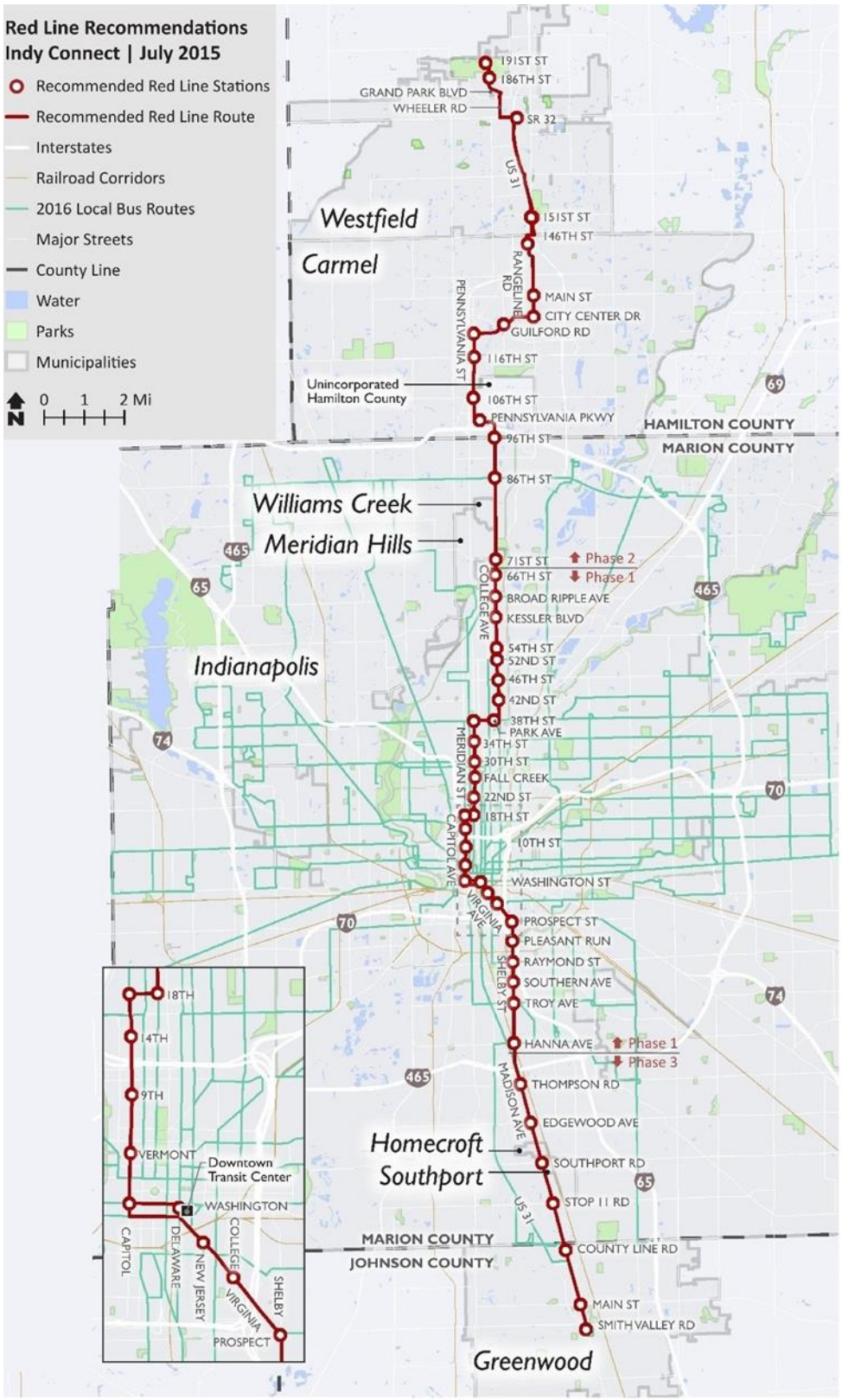

Figure 1-2: Indy Go Red Line Rapid Transit (Phase 1)

1.2 Existing Conditions

1.2.1 Overview

The project corridor is among the most dense and diverse areas of Indianapolis; it serves as the economic spine of the region. The corridor includes a growing amount of residential, commercial and hospitality/tourism venues and attractions. The route also serves major universities, hospitals and federal, state and local government centers. Currently, all stations of the Phase 1 project corridor account for a combined 54,758 residents, 144,885 employees, and 52,517 households.

Existing transit ridership on the five IndyGo primary routes (Routes 4, 16, 17, 18, 28) that operate for a significant length along the corridor is currently about 7,792 riders per weekday, with a significant portion of this ridership on the project corridor. The headway on each of these existing services is 13 to 20 minutes in the peak and 20 to 30 minutes off peak though some at an hour or greater, depending on time of day and day of week. These routes connect with other IndyGo routes in the network.

1.2.2 Roadway Conditions

The existing roadway conditions vary along the project corridor and can be broken into 21 segments, including Illinois Street. The different Existing Conditions cross-sections are generally as follows:

- *Existing Segment 1: College Avenue between 66th Street and 38th Street*
  - Two (2) northbound travel lanes.
  - One (1) southbound travel lane.
  - Parking lanes on both sides of the street.
- *Existing Segment 2: 38th Street between Meridian Street and College Avenue*
  - Three (3) eastbound travel lanes.
  - Three (3) westbound travel lanes.
  - Raised median.
- *Existing Segment 3: Meridian Street between 38th Street and 18th Street*
  - Two (2) northbound travel lanes.
  - Two (2) southbound travel lanes.
  - Parking lanes on both sides of the street (Exception: “No Parking” Between Fall Creek & 30th Street on either sides of the street).
- *Existing Segment 4: 18th Street between Meridian Street and Illinois Street*
  - One (1) eastbound travel lane.
  - One (1) westbound travel lane.

- *Existing Segment 5: 18th Street between Illinois Street and Capitol Avenue*
  - One (1) eastbound travel lane.
- *Existing Segment 6: Capitol Avenue between 18th Street and Washington Street*
  - Three (3) to five (5) southbound travel lanes.
  - Parking lanes on both sides of the street.
  - One (1) southbound bicycle lane on the west side of the street (portion of the segment).
- *Existing Segment 7: Capitol Avenue between Washington Street and Maryland Street*
  - Four (4) southbound travel lanes.
- *Existing Segment 8: Maryland Street between Capitol Avenue and Delaware Street/Virginia Street*
  - Four (4) eastbound travel lanes.
  - Parking lanes on both sides of the street.
- *Existing Segment 9: Delaware Street between Maryland Street/Virginia Street and Washington Street*
  - Five (5) northbound travel lanes.
  - Parking lane on the west side of the street.
- *Existing Segment 10: Washington Street between Delaware Street and Capitol Avenue*
  - Three (3) eastbound travel lanes.
  - Parking lanes on both sides of the street.
- *Existing Segment 11: Alabama Street between Washington Street and Maryland Street*
  - Three (3) southbound travel lanes.
  - Parking lanes on both sides of the street.
- *Existing Segment 12: Alabama Street between Maryland Street and Virginia*
  - One (1) southbound travel lane.
- *Existing Segment 13: Virginia Avenue between Delaware Street/Maryland Street and Prospect Street/Virginia Avenue*
  - One (1) northbound travel lanes.
  - One (1) southbound travel lanes.
  - Parking lanes on both sides of the street.

- *Existing Segment 14: Shelby Street between Prospect Street/Virginia Avenue and Pleasant Run Parkway Drive*
  - One (1) northbound travel lane.
  - One (1) southbound travel lane.
  - One (1) northbound protected bicycle lane on the west side of the street.
  - One (1) southbound protected bicycle lane on the west side of the street.
  - Parking lane on the east side of the street (major portion of the segment).
- *Existing Segment 15: Shelby Street between Pleasant Run Parkway Drive and Beecher Street*
  - One (1) northbound travel lane.
  - One (1) southbound travel lane.
  - One (1) northbound protected bicycle lane.
  - One (1) southbound protected bicycle lane.
- *Existing Segment 16: Shelby Street between Beecher Street and Troy Avenue*
  - One (1) northbound travel lane.
  - One (1) southbound travel lane.
  - One (1) part-time parking, part-time northbound travel lane.
  - One (1) part-time parking, part-time southbound travel lane.
- *Existing Segment 17: Shelby Street between Troy Avenue and Hanna Avenue*
  - One (1) northbound travel lane.
  - One (1) southbound travel lane.
  - One (1) two-way left turn lane.
  - One (1) northbound protected bicycle lane.
  - One (1) southbound protected bicycle lane.
- Existing Segment 18: Illinois Street between Market Street and St. Clair Street
  - Four (4) northbound travel lanes.
  - One (1) northbound bicycle lane.
  - Parking lanes on both sides of the street.
- Existing Segment 19: Illinois Street between St. Clair Street and 10th Street

- Three (3) northbound travel lanes.
- One (1) northbound bicycle lane.
- Parking lanes on both sides of the street.

- Existing Segment 20: Illinois Street between 10th Street and 12th Street
  - Four (4) northbound travel lanes.
  - One (1) northbound bicycle lane.
  - Parking lanes on both sides of the street.
- Existing Segment 21: Illinois Street between 12th Street and 16th Street
  - Three (3) northbound travel lanes.
  - One (1) northbound bicycle lane.
  - Parking lanes on both sides of the street.

1.3 Build Conditions

1.3.1 Overview

The project is a 13.1-mile long initial operating segment with 28 stations that will operate from the Broad Ripple Village in the north through the central business district of Indianapolis to the University of Indianapolis in the south.

In order to improve travel speeds and provide frequent, reliable service, 58 percent of the project will operate in dedicated transit lanes, either center- or curb-running business access transit lanes allowing buses and right turning vehicles only, depending on the existing street configuration and traffic volumes. The project will also include transit signal priority (TSP) at signalized intersections throughout the corridor. The project will require minor curb realignments near stations and at intersections, though it will maintain lane widths to accommodate traffic flow. The project will remove or limit some existing left turns but will include new U-turn locations to ensure drivers can still access all businesses and other destinations.

Stations located throughout the corridor will provide a canopy, real-time transit arrival and departure information, self-service ticketing equipment and security cameras. Bike racks will be located along sidewalks near station locations. The stations will provide level boarding on buses to and from the platform, allowing all passengers to quickly board and alight without waiting in-line or navigating steps. Other station amenities may include benches, information kiosks, a public announcement system, and opportunities for public art.

The project will provide Red Line BRT service 20 hours per day, seven days per week, and 365 days per year. Fourteen of the 20 daily hours will include 10-minute headway service; six hours will include 30-minute headway service with a fleet of 13 all-electric BRT vehicles.

1.3.2 Roadway Conditions

Below are the major design changes that have been made between the preliminary design and the 60% plans (developed during the Final Design phase):

- At College Avenue and Westfield Boulevard/Broad Ripple Avenue, the northbound right turn movement was reintroduced and now represents the existing configuration.
- Dedicated transit and BAT lanes have been removed on 38th Street, resulting in three mixed-flow travel lanes in both directions.
- A portion of Alabama Street has been revised to two-way traffic. This was done as part of the Downtown Transit Center implementation, not this project.
- The dedicated transit and BAT lanes on Capitol Avenue have shifted from the west side of the street to the east side. BAT lanes now consist of left turning traffic instead of right turning traffic.
- At Capitol Avenue & Washington Street, the southbound approach was re-configured to provide two dedicated through lanes and one dedicated right turn lane.
- The dedicated transit queue jump lane at the Virginia Avenue southeast approach has been removed and now represents the existing configuration (mixed flow).
- Illinois Street currently has four travel lanes, it is proposed to have the westernmost existing travel lane converted into a protected bicycle facility. The Synchro traffic analysis at the signalized intersections along Illinois is presented in this report in Section 3.

The build roadway conditions vary along the project corridor and can be broken into 20 segments including Illinois Street. The different Build Conditions cross-sections are as follows:

- *Build Segment 1: College Avenue between 66th Street and 38th Street*
  - One (1) northbound travel lane.
  - One (1) bi-directional, dedicated transit lane.
  - One (1) southbound travel lane.
  - Parking lanes on both sides of the street.
  - Mountable median.
- *Build Segment 2: 38th Street between Meridian Street and College Avenue*
  - Three (3) eastbound travel lanes.
  - Three (3) westbound travel lanes.
  - Select left turn bays.
  - Raised median (portion of the segment).
- *Build Segment 3a: Meridian Street between 38th Street and Fall Creek Parkway Drive*
  - One (1) northbound travel lane.

- One (1) northbound center dedicated transit lane.
- One (1) southbound travel lane.
- One (1) southbound center dedicated transit lane.
- Parking lane on the east side of the street.
- Mountable median.

- *Build Segment 3b: Meridian Street between Fall Creek Parkway Drive and 18th Street*
  - One (1) northbound travel lane.
  - One (1) northbound center dedicated transit lane.
  - One (1) southbound travel lane.
  - One (1) southbound center dedicated transit lane.
  - Parking lane on the east side of the street (between 18th and 22nd Streets).
  - Parking lane on the west side of the street (between 22nd Street and Fall Creek Parkway Drive).
  - Mountable median.
- *Build Segment 4: 18th Street between Capitol Avenue and Meridian Street*
  - One (1) eastbound travel lane.
  - One (1) westbound travel lane.
- *Build Segment 5: Capitol Avenue between 18th Street and 10th Street*
  - Two (2) southbound travel lanes.
  - One (1) southbound business access and transit lane.
  - One (1) northbound curb running dedicated transit lane.
  - Parking lane on the west side of the street.
- *Build Segment 6: Capitol Avenue between 10th Street and Washington Street*
  - Two (2) southbound travel lanes.
  - One (1) southbound business access and transit lane.
  - One (1) northbound curb running dedicated transit lane.
  - Angled parking on the west side of the street.
- *Build Segment 7: Capitol Avenue between Washington Street and Maryland Street*
  - Four (4) southbound travel lanes.

- *Build Segment 8: Maryland Street between Capitol Avenue and Delaware Street/Virginia Street*
  - Three (3) eastbound travel lanes.
  - One (1) eastbound business access and transit lane.
  - Parking lanes on both sides of the street.
- *Build Segment 9: Delaware Street between Maryland Street/Virginia Street and Washington Street*
  - Five (5) northbound travel lanes.
  - Parking lane on the west side of the street.
- *Build Segment 10: Washington Street between Delaware Street and Capitol Avenue*
  - Two (2) eastbound travel lanes.
  - One (1) eastbound business access and transit lane or additional travel lane (switches by block).
  - Parking lanes on both sides of the street.
- *Build Segment 11: Alabama Street between Washington Street and Maryland Street*
  - Two (2) southbound travel lanes.
  - One (1) northbound travel lanes.
  - Parking lane on west side of the street.
- *Build Segment 12: Alabama Street between Maryland Street and Virginia Avenue*
  - One (1) southbound travel lane.
- *Build Segment 13: Virginia Avenue between Delaware Street/Maryland Street and Prospect Street/Virginia Avenue*
  - One (1) northbound travel lanes.
  - One (1) southbound travel lanes.
  - Parking lanes on both sides of the street.
  - Center turn lanes as needed.
- *Build Segment 14: Shelby Street between Prospect Street/Virginia Avenue and Pleasant Run Parkway Drive*
  - One (1) northbound travel lane.
  - One (1) southbound travel lane.

- One (1) northbound protected bicycle lane on the west side of the street.
- One (1) southbound protected bicycle lane on the west side of the street.
- Parking lane on the east side of the street (portion of the segment).

- *Build Segment 15: Shelby Street between Pleasant Run Parkway Drive and Beecher Street*
  - One (1) northbound travel lane.
  - One (1) southbound travel lane.
  - One (1) northbound protected bicycle lane.
  - One (1) southbound protected bicycle lane.
- *Build Segment 16: Shelby Street between Beecher Street and Troy Avenue*
  - One (1) northbound travel lane.
  - One (1) southbound travel lane.
  - Parking lanes on both sides of the street.
- *Build Segment 17: Shelby Street between Troy Avenue and Hanna Avenue*
  - One (1) northbound travel lane.
  - One (1) southbound travel lane.
  - One (1) two-way left turn lane.
  - One (1) northbound protected bicycle lane.
  - One (1) southbound protected bicycle lane.
- *Build Segment 18: Illinois Street between Market Street and 11th Street*
  - Two-way protected bicycle lane.
  - Three (3) northbound travel lanes.
  - One (1) floating parking lane on between the protected bicycle lane and travel lanes.
  - One (1) parking lane on the east side of the street.
- *Build Segment 19: Illinois Street between 11th Street and 12th Street*
  - Two-way protected bicycle lane.
  - Four (4) northbound travel lanes.
- *Build Segment 20: Illinois Street between 12th Street and 16th Street*
  - Two-way protected bicycle lane.

- Three (3) northbound travel lanes.
- One (1) floating parking lane on between the protected bicycle lane and travel lanes.
- One (1) parking lane on the east side of the street.

The introduction of a concrete median and updated signal timing plans would introduce access management principles to the corridor. These geometric and signal timing changes would be required to provide the BRT service with dedicated travel lanes, which would result in decreased travel times, improved reliability, and increased ridership. Access management is a set of techniques that organize roadway access points and include several techniques designed to increase roadway capacity, manage congestion, and reduce crashes.

Recent Federal Highway Administration studies have shown that access management techniques can provide net benefits to businesses affected by their implementation and do not decrease profitability or property values. Managing access can result in better traffic flow, fewer crashes, and a better shopping experience for customers. The implementation of a median would provide for safer approaches to many businesses.

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Section 2
Traffic Analysis Methodology

In order to fully understand the potential traffic impacts of the Build Conditions along the Red Line BRT corridor, it was necessary to perform a microsimulation traffic analysis which allowed for the detailed use of TSP to provide a more comprehensive traffic and BRT operations-level analysis.

Microsimulation analysis was performed along dedicated transit lane segments on College Avenue, 38th Street, Meridian Street and Capitol Avenue, and at select intersections (Washington Street & Illinois Street intersection, Virginia Avenue & South Street & East Street, Virginia Avenue & Shelby Street & Prospect Street, Morris Street/Shelby Street and Woodlawn Avenue/Virginia Avenue) using the microscopic simulation tool VISSIM.

The VISSIM analysis is an update to the previous Vissim models presented in the Preliminary Design Traffic Operations Report (April, 2016). This report use the 60% plans (developed during the Final Design phase) as a base with additional changes made as of December, 2016.

The Level of Service (LOS) thresholds developed for evaluating traffic impacts along the corridor were based on standardized, state of the practice traffic impact analysis methods and consultation with the City of Indianapolis Department of Public Works (DPW). The study area, traffic impact thresholds, and details of the diversion and corridor traffic analysis methodology are described below and detailed in the subsequent sections of this report.

2.1 Traffic Impact Thresholds

For the purposes of this report, traffic impact thresholds were established to evaluate changes in traffic levels along the corridor. The standard practice for identifying specific corridor-level traffic impacts is to measure peak-hour (morning and evening rush hour) level of service (LOS) at signalized intersections within the study area.

LOS for signalized intersections is a measure of signal control delay (seconds/vehicle) ranging from A to F, as follows[1]:

- LOS A = Free flow (intersection control delay: <10 seconds/vehicle).
- LOS B = Reasonably free flow (intersection control delay: 10-20 seconds/vehicle).
- LOS C = Stable flow (intersection control delay: 20-35 seconds/vehicle).
- LOS D = Approaching unstable flow (intersection control delay: 35-55 seconds/vehicle).
- LOS E = Unstable flow (intersection control delay: 55-80 seconds/vehicle).
- LOS F = Forced or breakdown flow (intersection control delay: > 80 seconds/vehicle).

[1] Transportation Research Board, Highway Capacity Manual 2010, 2010.

DPW establishes LOS standards within the City of Indianapolis, which were used for this analysis. LOS A, B, C, or D is considered acceptable, while heavily used or physically constrained intersections operating at LOS E or F may also be considered acceptable, as identified by DPW on a case-by-case basis. In order to identify traffic impacts, the following assumptions were made:

No Impact

- Intersections that operate at LOS A, B, C, or D under existing conditions and would operate at:
  - LOS A, B, C, or D under build conditions.
  - LOS E or F under build conditions and specific location deemed acceptable by DPW.
- Intersections that operate at LOS E under existing conditions and would operate at:
  - LOS A, B, C, D or E under build conditions.
  - LOS F under build conditions and specific location deemed acceptable by DPW.
- Intersections that operate at LOS F under existing conditions and would operate at:
  - LOS A, B, C, D, E, or F under build conditions.

Impact

- Intersections that operate at LOS A, B, C, or D under existing conditions and would operate at:
  - LOS E or F under build conditions and specific location deemed not acceptable by DPW.
- Intersections that operate at LOS E under existing conditions and would operate at:
  - LOS F under build conditions and specific location deemed not acceptable by DPW.

Due to the fundamental differences in the analysis techniques, the LOS for some of the study intersection results slightly varied between the Synchro and VISSIM analysis. Regardless of the analysis technique, the traffic impact threshold approach, previously described, was consistently applied to compare Existing and Build Conditions to identify mitigations for impacted intersection.

2.2 Traffic Volumes

The traffic analysis was an update of the analysis performed for the Preliminary phase. Most traffic volumes came from this previous analysis. New counts were collected in September, 2016 at the intersections along College Avenue, north of Broad Ripple Avenue to 66th Street, and the intersection of Morris Street/Shelby Street and Woodlawn Avenue/Virginia Avenue for the extension and analysis of the Vissim models.

The Illinois Street bicycle analysis traffic counts were collected for six intersections in November, 2016, the other six intersections in the study area came either from the IndyGo Red Line BRT Alternatives Analysis (AA) Study or the DPW/INDOT Synchro files.

With the removal of travel lanes under the build conditions, some vehicles currently using the project corridor are expected to divert or re-route to use other parallel roadways for their trips. The details of the traffic diversion analysis are presented in the Preliminary Design Traffic Operations Report (April, 2016).

2.4 Signalized Intersection Analysis along Illinois Street

Signalized intersection analysis was conducted along the Illinois Street corridor in order to provide a planning-level analysis and identify volume and capacity changes along the corridor for the Build Conditions. Synchro was used to assess the intersection operations with and without the project changes. Existing traffic counts and timings along Illinois Street were collected for six intersections. The other six intersections in the project area came from previous studies and the City of Indianapolis. As a result of the Build Conditions, which reduces the number of travel lanes and adds a bidirectional protected bicycle lane, Synchro was also used to modify existing signal timing phasing along the corridor to accommodate the addition of the protected bicycle lane and associated left turn pockets that would be a part of the Build Conditions.

The changes in LOS between Existing and Build Conditions were used to measure traffic impacts and identify potential locations that required adjustments to the Build Conditions designs to meet the required traffic impact thresholds. Additionally, potential queuing concerns resulting from the Build Conditions, specifically for the I-65 off-ramp intersection with Illinois Street, was noted; a queuing report from Synchro was generated to assess the impacts of the project on queue spillback onto the I-65 ramps.

The Synchro analysis was based on Build Conditions designs from the 60% Design plans. The intent of this analysis is to verify that general traffic conditions would be acceptable based on changes in geometric and traffic signal timing conditions. The following section describes the Synchro analysis.

The traffic analysis included all signalized intersections along the corridor:

1. Illinois Street & Market Street
2. Illinois Street & Ohio Street.
3. Illinois Street & New York Street.
4. Illinois Street & Vermont Street.
5. Illinois Street & Michigan Street.
6. Illinois Street & North Street.
7. Illinois Street & Walnut Street.
8. Illinois Street & St. Clair Street.
9. Illinois Street & 10th Street.
10. Illinois Street & 11th Street/I-65 Off-Ramp.
11. Illinois Street & 12th Street/I-65 On-Ramp.

12. Illinois Street & 16th Street.

2.4.1 Analysis Steps

The analysis steps used for the development of the signalized intersection capacity analysis included:

1. Develop existing traffic count data by collecting traffic count data from the AA study and other studies, supplemented by manual traffic counts.
2. Analyze Existing AM and PM peak hour traffic conditions using Synchro modeling software.
3. Develop traffic volume forecasts for the Build Conditions; volumes were assumed to reduce by 10 percent along the corridor as a reduction in travel lanes.
4. Compare Existing and Build Conditions LOS and queuing reports to identify traffic impacts (or not) based on DPW traffic impact thresholds.
5. Develop and evaluate mitigations, if needed, at Build Conditions intersections that would cause traffic impacts.

2.5 Microsimulation Analysis

The microsimulation analysis used the VISSIM software package to provide a more comprehensive traffic and BRT operations-level analysis along select sections of the corridor. This analysis considered specific roadway segments and evaluated both signalized and un-signalized intersections. VISSIM allows for the inclusion of TSP, which was utilized to ensure BRT vehicles have priority at traffic signals and can make movements between unique geometric configurations.

The value of this stochastic microsimulation software is its ability to account for system variability through repeated model runs and account for individual driver behavior such as lane change decision points and spillback effects. By comparison, Synchro is a static deterministic model that assumes no variability in driver behavior. As such, Synchro predicts operations based on mathematical formulae and cannot accurately predict operations in oversaturated conditions or account for queue overflow into through lanes.

The VISSIM analysis was based on Build Conditions from the 60% plans with additional changes made as of December, 2016. The intent of this analysis was to verify that bus operations and the accompanying TSP plans would explicitly work based on changes in geometric and traffic signal timing conditions.

This analysis was particularly important for College Avenue, where the build conditions includes a bi-directional BRT lane that would require TSP to prevent two buses from operating in different directions in the same lane at the same time. Similar to the signalized intersection analysis, results of the microsimulation analysis were used to modify build geometry and signal timings to ensure it met the required traffic impact thresholds. The microsimulation analysis locations included:

1. College Avenue between 66th Street and 38th Street: AM and PM peak hours. This model was extended to include intersections north of Westfield Boulevard/Broad Ripple Avenue.

2. 38th Street between Meridian Street and College Avenue: AM and PM peak hours.
3. Meridian Street between 38th Street and 18th Street: AM and PM peak hours. This model was extended to include the intersection at 16th Street.
4. Capitol Avenue between 18th Street and Washington Street: AM peak hour (Capitol Avenue is southbound only and the AM peak hour represented the heaviest traffic volumes). This model was extended to include the intersection at Maryland Street.
5. Washington Street & Illinois Street intersection: AM and PM peak hours.
6. Virginia Avenue & South Street & East Street intersection: AM and PM peak hours.
7. Virginia Avenue & Shelby Street & Prospect Street intersection: AM and PM peak hours. This model was extended to include Morris Street/Shelby Street and Woodlawn Avenue/Virginia Avenue intersections.

2.5.1 Data and Assumptions

The traffic analysis presented in this report is an updated of the analysis performed for the Preliminary phase. Most of theraffic volumes, traffic signal operation, travel times, congestion observations came from this previous analysis. New data collection was conducted for the extension of College Avenue and Virginia Avenue/Shelby Street/Prospect Street. Data collection included count data, a field evaluation to observe traffic signal operations, congestion, and queuing patterns. All of these observations were conducted during both the AM and PM peak periods and were used to calibrate the Existing Conditions VISSIM models. Specific data and assumptions developed for the VISSIM modeling are described in the following sections.

Traffic counts for the Illinois Street bicycle analysis were collected at six intersections, the other six intersections in the study area came either form the IndyGo Red Line BRT Alternatives Analysis (AA) Study or DPW/INDOT Synchro files.

2.5.1.1 Traffic Volumes

Traffic volumes and heavy vehicles at signalized intersections used for both the Existing and Build Conditions VISSIM analysis were taken from the preliminary traffic analysis. Traffic volumes at un-signalized intersections were estimated based on field observation and evaluation of surrounding land uses. Additional traffic counts were collected for the intersections north of Broad Ripple Boulevard and supplemented with traffic volumes from the Traffic Impact Study for the new development north of Westfield Boulevard/Broad Ripple Avenue. Traffic counts for the intersections of Morris Street & Shelby Street and Woodlawn Avenue & Virginia Avenue were established by balancing the entering/exiting volumes with the Virginia Avenue/Shelby Street/Prospect Street intersection. Side-street volumes on Morris Street and Woodlawn Avenue were estimated based on direction provided by DPW.

The Origin and Destination (O-D) tables developed for the preliminary phase were modified to extend the intersections north of Broad Ripple Boulevard.

For the Illinois Street bicycle analysis traffic counts were collected for six intersections, the other six intersections in the study area came either form the IndyGo Red Line BRT Alternatives Analysis (AA) Study or DPW/INDOT Synchro files.

2.5.1.2 Intersection Geometry

Intersection geometry for the Existing Conditions VISSIM models reflects the current lane configuration. The Build Conditions VISSIM analysis was updated based on 60% plans as a base with additional changes made as of December, 2016, which had some changes from the December, 2015 designs used for the Preliminary Design. This analysis also included input received in the traffic workshop held on November, 2016. These improvements are being considered for incorporation in the Final Design plans, currently under development.

2.5.1.3 Signal Timing

Current signal timing plans were provided by DPW for all Existing Conditions models. Signal timing plans for the Build Conditions models used data from Synchro as a starting point. These timing plans were modified to include TSP phases and further adjusted and optimized during the VISSIM analysis to mitigate potential traffic or transit service impacts.

The Build Conditions models also required developing signal timing plans for new signalized intersections, pedestrian crossing signals at stations, and transit vehicle hold points along College Avenue. The hold points are required to prevent two buses from operating in different directions in the same lane at the same time.

The TSP operations were analyzed using the built-in TSP VISSIM algorithm which simulates industry standard TSP operations, and assumed the following, based on conversations with IndyGo and DPW:

- TSP mode Early/Extend.
- TSP maximum green extension of 10 to 15 seconds.
- TSP calls do not omit other phases, including pedestrian phases (Exception at Meridian Street where N-S left turns can be omitted. This treatment was also tested at select intersections along College Avenue and found to have a negligible impact on transit but a negative impact on the overall automobile performance , which was deemed not appropriate for the corridor operations. However, this signal phasing treatment could be beneficial during off-peak hours.,).
- TSP calls may swap phases at Virginia Avenue/Shelby Street/Prospect Street.
- Pedestrian walk times were reduced to allow for better BRT and vehicular operations where necessary, while retaining sufficient pedestrian crossing time. Thus, in some cases the walk time was reduced to no less than 5 seconds, while flashing “Don’t Walk” time was not adjusted. An exception was made on College Avenue at the pedestrian crossing near schools, where walking speed was reduced from 3.5 to 2.4-2.0 ft. /sec. In these cases, the flashing “Don’t Walk” time provided was enough to cross to the center median pedestrian refugee; the decreased walking speed is not harmful to the intersections’ operation. At all the intersections, the pedestrian phases were set to pre-timed operations. With exception of 38th Street, signal timings have been revised to incorporate phase recalls as existing (most operate with minimum recall) with exception of Meridian Street/ 38th Street, Park Avenue/38th Street and College Avenue & 38th Street that have max recall. The pedestrian phase at 38th Street/Park Avenue is fully actuated.

- Intersection operations prioritize serving corridor coordination over BRT phase.

2.5.1.4 Public Transit

Public transit service was modeled for all Existing and Build Conditions models, including route alignment, transit stop locations, boarding/alighting times, bus headways, and TSP. The current bus system information was used for the Existing Conditions models. The Build Conditions assumed the proposed BRT service along with programmed changes to existing service that IndyGo would implement to complement the BRT service.

2.5.1.5 Microsimulation Outputs

For all Existing Conditions and Build Conditions models, five unique runs were conducted for each model and the results were averaged to obtain representative measures of effectiveness, which included intersection LOS, automobile and bus speed, vehicle delay, and queue lengths. All models were run for a total of 90 minutes with one half-hour for network seeding. Data collected during the last hour of the run was used in processing results.

2.5.2 Methodology

Based on the data gathered and the assumptions described above, the methodology used to perform the microsimulation analysis and arrive at the recommendations to mitigate operational issues at the spot locations was as follows:

1. Modeling and calibration of Existing Conditions: After inputting the lane geometry, traffic volumes, signal timings and transit information in VISSIM, the Existing Conditions models were calibrated to match the observed travel times or corridor flow rates within the three calibration targets as defined in the *FHWA Traffic Analysis Toolbox, Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software*[2], which is widely used for freeways, but can also be applied to arterials:

    a. Travel Time: Existing Conditions models were calibrated so that the model travel times would be within +/- 15 percent or 1 minute if higher than the measured travel times.

    b. Flow Rates: Existing Conditions models were calibrated so that the GEH statistic would be less than 5 for individual link flows in 85 percent of modeled cases. The GEH volume tolerance formula was developed to overcome the wide range in volume data, and is computed as follows:

[2] Dowling, R., A. Skabardonis, and V. Alexiadis. *Traffic Analysis Toolbox Volume III: Guidelines for Applying Microsimulation Software*. FHWA-HRT-04-040, 2004. Page 64.

$$GEH = \sqrt{\frac{(E-V)^2}{(E+V)/2}}$$

where:

E = model estimated volume
V = field count

c. Visual Audits: visually acceptable queuing using professional engineering judgment.

All the criteria for travel times, flow rate, and visual inspection were satisfied in all Existing Conditions models.

2. Modeling of the Build Conditions: The Existing Conditions calibrated models were updated to incorporate geometry, volumes, and preliminary signal timings representative of the Build Conditions and incorporated the assumptions described above. The LOS target for the Build models is described above in Section 2.1.

Section 3

Signalized Intersection Analysis along Illinois Street

During the preliminary phase, the signalized intersection analysis was conducted with Synchro along the entire Red Line Rapid Transit Project, with exception of the Illinois Street Corridor. This report presents the results of the analysis along Illinois Street for Existing and Build Conditions based on the 60% Design plans, signal timing and phasing data and traffic volume collected on November, 2016.

Illinois Street operates as a four-lane one-way northbound arterial paralleling Capitol Avenue and is proposed to have the westernmost existing travel lane converted into a protected bicycle lane facility. Synchro analysis conducted under existing AM and PM peak hour conditions as well as under Build Conditions show that under Existing Conditions.

3.1 Results

Results of the Existing and Build Conditions signalized intersection along Illinois Street are shown in **Table 3-1**.

Table 3-1: Existing and Build Conditions Signalized Intersections LOS

Intersection	2015 Existing Conditions		2015 Build Conditions	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Illinois St & Market St	C	C	B	B
Illinois St & Ohio St	C	C	B	B
Illinois St & New York St	C	C	C	D
Illinois St & Vermont St	C	C	C	C
Illinois St & Michigan St	C	C	C	C
Illinois St & North St	C	C	C	C
Illinois St & Walnut St	B	C	A	A
Illinois St & St. Clair St	A	B	A	A
Illinois St & 10th St	A	**E**	B	D
Illinois St & 11th St/I-65 Off-Ramp	B	A	B	A
Illinois St & 12th St/I-65 On-Ramp	B	D	D	D
Illinois St & 16th St	C	C	C	D

Note: Unacceptable LOS shown in **BOLD**.

3.2 Evaluation

As shown in **Table 3-1** analysis shows that under Existing Conditions, all 12 intersections along the Illinois Street corridor in the AM peak hour and 11 of the 12 intersections in the PM peak hour operate at LOS D or better. Illinois Street & 10th Street intersection during the PM peak hour was determined to operate at LOS E. With the project and subsequent changes to traffic volumes and signal optimization, all 12 intersections along the Illinois Street corridor in both the AM and PM peak hours operate at LOS D or better.

Additional queuing analysis was conducted for the Illinois St & 11th St/I-65 Off-Ramp intersection, as there were concerns of queue spillback occurring to the southbound I-65 mainline roadway because of the Build Conditions. **Table 3-2** shows the average and 95th percentile queue lengths for the intersection. As shown, there are expected to be minimal changes to the queue lengths under Build Conditions and would not impact the I-65 Off-Ramp operations. Detailed signalized intersection analysis results for the signalized intersection along Illinois Street are included in **Appendix A**.

Table 3-2: Queuing Results at I-65 Off-Ramp

Illinois St & 11th St/I-65 Off-Ramp (EBT lane group)	2015 Existing Conditions Queue Length (ft)		2015 Build Conditions Queue Length (ft)		Queue Length Change (ft)	
	Average	95th	Average	95th	Average	95th
AM Peak Hour	188	234	188	237	0	+3
PM Peak Hour	47	76	47	76	0	0

Note: Length of I-65 off-ramp is approximately 1,000 ft (Google Earth).

Section 4
Microsimulation Analysis

The VISSIM analysis is an update to the previous Vissim models presented in the Preliminary Design Traffic Operations Report (April, 2016). The updates were based on the a progress set after 60% Design plans, dated December, 2016, which had some changes from the December, 2015 preliminary designs and input received at the traffic workshop held on November, 2016.

Based on preliminary planning-level analysis performed in Synchro and in coordination with DPW, four segments and three signalized intersections were identified for microsimulation analysis due to unique geometry or potential BRT operational issues:

1. College Avenue between 66 th Street and 38th Street: AM and PM peak hours. This model was extended to include intersections north of Westfield Boulevard/Broad Ripple Avenue to 66th Street.
2. 38th Street between Meridian Street and College Avenue: AM and PM peak hours.
3. Meridian Street between 38th Street and 18th Street: AM and PM peak hours. This model was extended to include the intersection at 16th Street.
4. Capitol Avenue between 18th Street and Washington Street: AM peak hour (Capitol Avenue is southbound only and the AM peak hour represented the heaviest traffic volumes). This model was extended to include the intersection at Maryland Street.
5. Washington Street & Illinois Street intersection: AM and PM peak hours.
6. Virginia Avenue & South Street & East Street intersection: AM and PM peak hours.
7. Virginia Avenue & Shelby Street & Prospect Street intersection: AM and PM peak hours. This model was extended to include the intersections at Morris Street/Shelby Street and Woodlawn Avenue/Virginia Avenue.

Below are the major differences/updates from the preliminary Vissim models:

- College Avenue and Westfield Boulevard/Broad Ripple Avenue was reverted back to allow the northbound right turn movement. A number of signal timings plans were tested to achieve an LOS D, including a pedestrian scramble and throttling upstream and downstream incoming traffic. Throttling was successful for providing LOS D in the PM peak hour.
- Tested phase skipping and/or swapping at the low left turn volumes along College Avenue in order to prioritize transit. This treatment was tested at a couple of signalized intersections (61st Street and 57th Street) during AM and PM peak hour and found to have a negligible impact on transit but a negative impact on the overall automobile performance (LOS E), which was deemed not appropriate for the corridor operations. However, this signal phasing treatment could be beneficial during off-peak hours.
- Tested throttling phases for intersections upstream and downstream of College Avenue/Kessler Boulevard and College Avenue & Westfield Boulevard/Broad Ripple Avenue. This treatment spread the delay concentrated at these two constrained

intersections to the adjacent intersections that had better performance. With this improvement both intersections performed at LOS D in the PM peak hour.

- Dedicated transit and BAT lanes were removed on 38th street, resulting in three mixed-flow travel lanes in both directions.
- Along 38th Street, signal timings were revised to incorporate phase recalls as exist today (most operate with minimum recall) with the exception of Meridian Street/ 38th Street, Park Avenue/38th Street and College Avenue & 38th Street that have max recall.
- At Meridian Street & 38th Street a northbound left turn storage lane was added. This was proposed to be removed in the Preliminary phase.
- BRT stations on the entire Red Line project have shifted from right-side door to left-side door.
- The dedicated transit and BAT lanes on Capitol have shifted from the west side of the street to the east side. BAT lanes now consist of left turning traffic instead of right turning traffic.
- At Capitol Avenue & Washington Street, the southbound approach was re-configured to provide two dedicated through lanes and one dedicated right-turn lane.
- At Capitol Avenue & 9th Street, the traffic signal was modified to represent a signalized pedestrian crossing.
- Tested phase skipping and/or swapping at the low left turn volumes along Meridian Street in order to prioritize transit. The treatment was found to be beneficial to transit operations, while minimally impacting overall LOS. The one exception occurred at Meridian Street & 22nd Street, where left turn volumes are high enough such that phase skipping and/or swapping should not be allowed.
- Dedicated transit queue jump lane at the Virginia Avenue southeast approach were removed to the existing configuration (mixed flow). Tested phase swapping at Virginia Avenue/South Street/East Street to prioritize transit along Virginia Avenue. This treatment in combination with TSP would improve the transit operations.

4.1 Results

Results of the Existing and Build Conditions microsimulation LOS analysis for study segments and intersections are shown in **Table 4-1**. Results of the Existing and Build Conditions microsimulation bus speed analysis for study segments are shown in **Table 4-2**. Detailed microsimulation analysis results are included in **Appendix B**.

Table 4-1: Existing and Build Conditions Microsimulation LOS

Model	Intersection	2015 Existing Conditions LOS		2015 Build Conditions LOS	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1: College Avenue	College Ave & 66th St	B	C	B	B
	College Ave & 64th St	B	A	B	C
	College Ave & Canal Point Development (New signal))	n/a	n/a	C	C
	College Ave & Westfield Blvd/Broad Ripple Ave	B	C	C	D
	College Avenue & Parking Garage (South of Broad Ripple) (New signal)	n/a	n/a	B	D
	College Ave & 61st St (#)	n/a	n/a	C	D
	College Ave & Kessler Blvd	C	D	C	D
	College Ave & AT&T Development (New signal)	n/a	n/a	B	D
	College Ave & 57th St	A	A	B	D
	College Ave & 54th St	B	C	C	D
	College Ave & 52nd St	B	D	C	D
	College Ave & 49th St	A	B	C	C
	College Ave & 46th St	B	C	B	D
	College Ave & 42nd St	A	A	B	C
	College Ave & 38th St	C	C	D	D
2: 38th Street	Meridian St & 38th St	C	C	**E**	D
	Pennsylvania Ave & 38th St	A	B	A	B
	Washington Ave & 38th St	A	A	A	A
	Central Avenue & 38th St	A	B	B	B
	Park Avenue (BRT Station) & 38th St (#)	n/a	n/a	A	A
	College Ave & 38th St	C	C	D	C
3: Meridian Street	Meridian St & 38th St	C	C	**E**	D
	Meridian St & 34th St	B	B	C	C
	Meridian St & 32nd St	B	A	**E**	C
	Meridian St & 30th St	B	B	D	C
	Meridian St & 29th St	B	B	B	C
	Meridian St & 28th St	A	B	B	B
	Meridian St & Fall Creek Pkwy	D	C	D	C
	Meridian St & 25th St (#)	n/a	n/a	B	B
	Meridian St & 22nd St	B	B	C	D
	Meridian St & 21st St	C	B	C	D
	Meridian St & 18th St	B	B	B	D
	Meridian St & 16th St	B	C	B	D
4: Capitol Avenue (+)	Capitol Ave & 18th St	B	n/a	B	n/a
	Capitol Ave & 16th St	B	n/a	B	n/a
	Capitol Ave & 12th St	B	n/a	A	n/a
	Capitol Ave & 11th St	A	n/a	A	n/a
	Capitol Ave & 10th St	A	n/a	A	n/a
	Capitol Ave & 9th St (#)	n/a	n/a	A	n/a
	Capitol Ave & St. Clair St	B	n/a	A	n/a
	Capitol Ave & Walnut St	A	n/a	A	n/a
	Capitol Ave & North St	A	n/a	A	n/a
	Capitol Ave & Michigan St	B	n/a	B	n/a
	Capitol Ave & Vermont St	B	n/a	A	n/a
	Capitol Ave & New York St/Indiana Ave	C	n/a	B	n/a
	Capitol Ave & Ohio St	B	n/a	B	n/a
	Capitol Ave & Market St	B	n/a	A	n/a

Model	Intersection	2015 Existing Conditions LOS		2015 Build Conditions LOS	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
	Capitol Ave & Washington St	B	n/a	B	n/a
	Capitol Ave & Maryland St	C	n/a	B	n/a
5: Washington Street & Illinois Street	Washington St & Illinois St	C	D	C	C
6: Virginia Avenue & South Street & East Street	Virginia Ave & South St & East St	**E**	**E**	**E**	**E**
7: Virginia Avenue & Shelby Street & Prospect Street	Virginia Ave & Shelby St & Prospect St	C	D	D	D
	Virginia Ave & Woodlawn Ave (*)	A	B	A	B
	Shelby St & Morris St (*)	B	A	B	A

Notes: Unacceptable LOS shown in **BOLD; #** = Unsignalized under existing conditions, signalized intersection in the build scenario; + = Only AM conditions were modeled; * = Traffic volume and signal timing inputs were estimated.

Table 4-2: Existing and Build Conditions Microsimulation Bus Speed

Model	Segment Direction	2015 Existing Conditions Bus Speed		2015 Build Conditions BRT Speed		Speed Change (mph)	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1: College Ave	NB: 38th St to 66th St	8.5	7.4	14.3	13.8	+ 5.8	+ 6.4
	SB: 66th St to 38th St	5.4	5.8	12.9	11.4	+ 7.5	+ 5.6
2: 38th St	EB: Meridian Ave to College Ave	11.7	11.7	12.8	12.2	+ 1.2	+ 0.5
	WB: College Ave to Meridian Ave	11.4	11.1	13.1	12.2	+ 1.8	+ 1.1
3: Meridian St	NB: 18th St to 38th St	10.2	9.7	16.5	16.5	+ 6.3	+ 6.8
	SB: 38th St to 18th St	13.1	13.0	18.8	19.0	+ 5.7	+ 6.0
4: Capitol Ave (*,+)	NB: Washington St to 18th St	n/a	n/a	14.3	n/a	n/a	n/a
	SB: 18th St to Washington St	5.1	n/a	15.3	n/a	+ 10.2	n/a

Notes: * = No existing NB buses; + = Only AM conditions were modeled.

4.2 Evaluation

Forty-nine of the signalized intersections evaluated with microsimulation operate at an acceptable LOS (LOS D or better) under Existing Conditions in both AM and PM peak hours.

One intersection, Virginia Avenue & South Street & East Street, has existing deficiencies and operates at LOS E under Existing Conditions in both AM and PM peak hours. In the Final Design, the transit queue jump lane at the Virginia Avenue southeast approach was removed and reverted to the existing configuration (mixed flow). This change increased the bus travel times and speed compared to results presented in the Preliminary Traffic Operations Report (April, 2016).

In order to improve bus operations, different traffic signal timing plans were investigated including swapping phases to prioritize the Virginia Avenue traffic. This treatment in combination with TSP would improve the transit operations while the overall intersection LOS would remain at E. This signalized intersection is a location with known traffic issues, acknowledged by DPW, and would continue to operate at the same LOS under the Build Conditions. Based on DPW traffic

impact thresholds, the Build Conditions would not result in a traffic impact. However, delay would change at this location under Build Conditions, as shown in **Table 4-3.**

Table 4-3: Existing Conditions Deficient Signalized Intersections LOS and Delay

Intersection	2015 Existing Conditions LOS/Delay (seconds per vehicle)		2015 Build Conditions LOS/Delay (seconds per vehicle)		Delay Change (seconds per vehicle)	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Virginia Ave & South St & East St	**E/62**	**E/69**	**E/73**	**E/68**	**+ 11**	**- 1**

Note: Unacceptable LOS shown in **BOLD**.

Two signalized intersection operate at an acceptable LOS C or better under Existing Conditions in both AM and PM peak hours but would operate at an LOS E under Build Conditions in the AM peak hour, as shown in **Table 4-4**.

At Meridian Street & 38th Street, different geometric (limited to increasing storage lengths) and traffic signal timing plan designs were tested to attempt to achieve an LOS of D or better under the Build Conditions. However, no acceptable configuration was found that did not involve adding southbound through capacity or prohibiting the northbound left turning movements at this intersection. Both of these intersection modifications are impractical given the, limited right of way, and the presence of commercial buildings at this intersection.

At Meridian Street & 32nd Street, the LOS E traffic operations result from spillback queuing at the downstream intersection of Meridian Street & 30th Street. A combination of heavy southbound through traffic and significant amount of right turning traffic, heading west towards the I-65 interchange, would cause queuing during the AM peak hour. The downstream queues would clear during the mainline green phase and would not degrade the LOS at Meridian Street & 30th Street.

Adding a southbound right turn lane at Meridian Street & 30th Street is infeasible due to the limited right of way and proximity of the Children's Museum and Library. Similarly, adding a southbound right turn lane at Meridian Street & 32nd Street is infeasible due to the limited right of way and the presence of a historic property along 32nd Street.

In lieu of capacity improvements to decrease queuing at Meridian Street & 30th Street or Meridian Street & 32nd Street, modifications to the signal timings were analyzed in order to create a metering effect between 30th Street and 32nd Street. The modifications included: (1) running the signal as pretimed and (2) utilizing alternative split percentages. However, the results showed similar or worse LOS for the modified scenarios. In order to alleviate congestion in the southbound direction, the project will include signage for vehicles heading to I-65 to redirect traffic and lighten the southbound right turning volumes at the downstream intersections.

CDM Smith recommends DPW acknowledge the limitations of the project to provide LOS D under the Build Conditions at these locations and elect to make an exception at these locations and consider LOS E acceptable.

Table 4-4: Future Conditions Deficient Signalized Intersections LOS and Delay

Intersection	2015 Existing Conditions LOS/Delay (seconds per vehicle)		2015 Build Conditions LOS/Delay (seconds per vehicle)		Delay Change (seconds per vehicle)	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Meridian St & 38th St	C/25	C/29	**E/67**	D/43	+ 42	+ 14
Meridian St & 32nd St	B/13	A/9	**E/62**	C/24	+ 49	+ 15

Note: Unacceptable LOS shown in **BOLD**

Most beneficial to the BRT operation, all of the Build Conditions concept designs analyzed in VISSIM will improve the bus travel speeds compared to existing bus speeds. As shown in **Table 4-5**, bus speed will increase between 9 and 200 percent. These speed increases will be critical to the success of the BRT system in providing fast, efficient and reliable service. The bus speed increases along College Avenue, between 68 and 140 percent, are notable because the BRT will operate in a bi-directional, dedicated transit lane that will require a complex TSP plan to safely move both NB and SB buses along this section of the corridor.

Table 4-5: Build Conditions Microsimulation Bus Speed Increases

Model	Segment Direction	Build Conditions Percent Speed Increase Compared to Existing Conditions (mph)	
		AM Peak Hour	PM Peak Hour
1: College Ave	NB: 38th St to 66th Street	68%	88%
	SB: 66th Street to 38th St	140%	98%
2: 38th St	EB: Meridian Ave to College Ave	10%	4%
	WB: College Ave to Meridian Ave	15%	10%
3: Meridian St	NB: 18th St to 38th St	62%	70%
	SB: 38th St to 18th St	44%	46%
4: Capitol Ave (*,+)	NB: Washington St to 18th St	n/a	n/a
	SB: 18th St to Washington St	200%	n/a

Notes: * = No existing NB buses; + = Only AM conditions were modeled.

An important note is the decrease in passenger car speeds along most of the corridors. This is a result of decreasing capacity for the passenger cars, maintaining turning volumes and maintaining priority of the pedestrian movements. Along College Avenue, Meridian Street, and 38th Street, the passenger cars speed were reduced up to 10.0 mph, 7.4 mph, and 3.8 mph, respectively, under the Build Conditions.

On College Avenue, TSP was only used at the "holding points" to manage the conflicts between buses in the single exclusive BRT lane during the peak hours. If capacity is increased at intersections performing near or at capacity, like Kessler Avenue, adding the TSP functionality to all signalized intersection could further improve the transit operations and through traffic

operations during peak hours. TSP along College Avenue is recommended for off-peak operations. Similar to College Avenue, adding capacity on Meridian Street and 38th Street could potentially improve operations for passenger cars.

An increase in passenger car speeds was observed along the Capitol Avenue corridor. The existing corridor has more than sufficient capacity; therefore, the reduction in capacity in the Build Conditions is negligible. The TSP operations in the Build Conditions favor the progression of the southbound through movement, which is the predominant movement throughout the corridor. Along the length of the Capitol Avenue corridor, the passenger cars speed was increased by up to 5.7 mph under the Build Conditions. Detailed speeds data is included in **Appendix B**.

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Section 5
Conclusion

Based on the results of the signalized intersection analysis conducted with VISSIM and Synchro (based on the progress set after 60% Design plans, dated December, 2016), the Build Conditions would not result in any traffic impacts outside the allowable levels.

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Appendix A
Signalized Intersection Analysis Results along Illinois Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	33	0	0	55	126	113	1702	80	0	0	0
Future Volume (veh/h)	108	33	0	0	55	126	113	1702	80	0	0	0
Number	1	6	16	5	2	12	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1937	0	0	1937	1900	1900	1863	1900			
Adj Flow Rate, veh/h	117	36	0	0	60	137	123	1850	87			
Adj No. of Lanes	0	1	0	0	1	0	0	4	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	93	18	0	0	258	589	139	2245	108			
Arrive On Green	0.49	0.49	0.00	0.00	0.49	0.49	0.36	0.36	0.36			
Sat Flow, veh/h	4	36	0	0	526	1200	383	6178	297			
Grp Volume(v), veh/h	153	0	0	0	0	197	593	937	530			
Grp Sat Flow(s),veh/h/ln	40	0	0	0	0	1725	1844	1602	1810			
Q Serve(g_s), s	3.7	0.0	0.0	0.0	0.0	4.6	21.1	18.4	18.4			
Cycle Q Clear(g_c), s	3.7	0.0	0.0	0.0	0.0	4.6	21.1	18.4	18.4			
Prop In Lane	0.76		0.00	0.00		0.70	0.21		0.16			
Lane Grp Cap(c), veh/h	0	0	0	0	0	847	670	1164	658			
V/C Ratio(X)	0.00	0.00	0.00	0.00	0.00	0.23	0.88	0.81	0.81			
Avail Cap(c_a), veh/h	0	0	0	0	0	847	803	1396	789			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	10.2	20.9	20.1	20.1			
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.6	9.1	2.5	4.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.0	2.3	12.4	8.5	9.9			
LnGrp Delay(d),s/veh	0.0	0.0	0.0	0.0	0.0	10.9	30.0	22.5	24.3			
LnGrp LOS						B	C	C	C			
Approach Vol, veh/h		153			197			2060				
Approach Delay, s/veh		0.0			10.9			25.1				
Approach LOS		A			B			C				

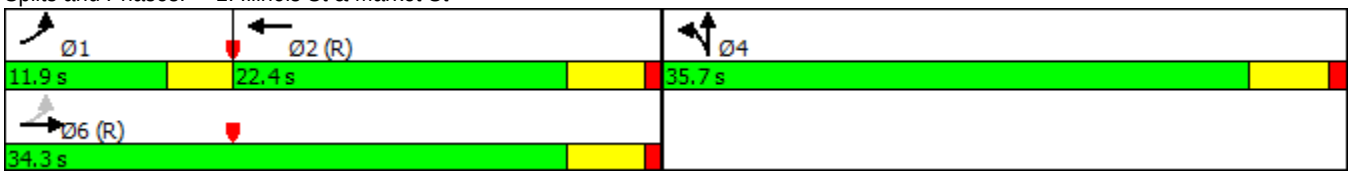
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		39.4		30.6		39.4		
Change Period (Y+Rc), s		5.0		5.2		5.0		
Max Green Setting (Gmax), s		17.4		30.5		29.3		
Max Q Clear Time (g_c+I1), s		6.6		23.1		5.7		
Green Ext Time (p_c), s		0.4		2.3		0.5		

Intersection Summary	
HCM 2010 Ctrl Delay	22.4
HCM 2010 LOS	C

Phase Number	1	2	4	6
Movement	EBL	WBT	NBTL	EBTL
Lead/Lag	Lead	Lag		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	None	C-Min	None	C-Min
Maximum Split (s)	11.9	22.4	35.7	34.3
Maximum Split (%)	17.0%	32.0%	51.0%	49.0%
Minimum Split (s)	7.5	22	35.2	23
Yellow Time (s)	3.5	4	4.2	4
All-Red Time (s)	0	1	1	1
Minimum Initial (s)	4	10	10	10
Vehicle Extension (s)	2	0.2	0.2	0.2
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		6	14	7
Flash Dont Walk (s)		11	16	11
Dual Entry	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	1.4	13.3	35.7	1.4
End Time (s)	13.3	35.7	1.4	35.7
Yield/Force Off (s)	9.8	30.7	66.2	30.7
Yield/Force Off 170(s)	9.8	19.7	50.2	19.7
Local Start Time (s)	58.1	0	22.4	58.1
Local Yield (s)	66.5	17.4	52.9	17.4
Local Yield 170(s)	66.5	6.4	36.9	6.4

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 13.3 (19%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	

Splits and Phases: 1: Illinois St & Market St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	174	0	0	528	197	183	1399	173	0	0	0
Future Volume (veh/h)	58	174	0	0	528	197	183	1399	173	0	0	0
Number	1	6	16	5	2	12	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1863	0	0	1863	1863	1900	1863	1900			
Adj Flow Rate, veh/h	63	189	0	0	574	214	199	1521	188			
Adj No. of Lanes	0	2	0	0	2	1	0	4	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	97	838	0	0	1819	814	223	1833	231			
Arrive On Green	0.51	0.51	0.00	0.00	0.51	0.51	0.34	0.34	0.34			
Sat Flow, veh/h	4	1716	0	0	3632	1583	660	5430	685			
Grp Volume(v), veh/h	75	177	0	0	574	214	551	879	478			
Grp Sat Flow(s),veh/h/ln	25	1611	0	0	1770	1583	1830	1602	1742			
Q Serve(g_s), s	3.3	4.2	0.0	0.0	6.6	5.3	20.0	17.5	17.5			
Cycle Q Clear(g_c), s	3.3	4.2	0.0	0.0	6.6	5.3	20.0	17.5	17.5			
Prop In Lane	0.84		0.00	0.00		1.00	0.36		0.39			
Lane Grp Cap(c), veh/h	0	828	0	0	1819	814	618	1081	588			
V/C Ratio(X)	0.00	0.21	0.00	0.00	0.32	0.26	0.89	0.81	0.81			
Avail Cap(c_a), veh/h	0	828	0	0	1819	814	687	1204	654			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	0.0	9.3	0.0	0.0	9.9	9.6	22.0	21.2	21.2			
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.5	0.8	12.3	3.5	6.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	2.0	0.0	0.0	3.3	2.5	12.1	8.2	9.4			
LnGrp Delay(d),s/veh	0.0	9.9	0.0	0.0	10.3	10.3	34.3	24.7	27.4			
LnGrp LOS		A			B	B	C	C	C			
Approach Vol, veh/h		252			788			1908				
Approach Delay, s/veh		6.9			10.3			28.1				
Approach LOS		A			B			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		41.2		28.8		41.2		
Change Period (Y+Rc), s		5.2		5.2		5.2		
Max Green Setting (Gmax), s		19.3		26.3		33.3		
Max Q Clear Time (g_c+I1), s		8.6		22.0		6.2		
Green Ext Time (p_c), s		1.1		1.6		1.2		

Intersection Summary	
HCM 2010 Ctrl Delay	21.6
HCM 2010 LOS	C

Phase Number	1	2	4	6
Movement	EBL	WBT	NBTL	EBTL
Lead/Lag	Lead	Lag		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	None	C-Min	None	C-Min
Maximum Split (s)	14	24.5	31.5	38.5
Maximum Split (%)	20.0%	35.0%	45.0%	55.0%
Minimum Split (s)	9.5	24.2	31.2	25.2
Yellow Time (s)	3.5	4.2	4.2	4.2
All-Red Time (s)	0	1	1	1
Minimum Initial (s)	4	10	10	10
Vehicle Extension (s)	1	0.2	0.2	0.2
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		6	9	7
Flash Dont Walk (s)		13	17	13
Dual Entry	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	11.2	25.2	49.7	11.2
End Time (s)	25.2	49.7	11.2	49.7
Yield/Force Off (s)	21.7	44.5	6	44.5
Yield/Force Off 170(s)	21.7	31.5	59	31.5
Local Start Time (s)	56	0	24.5	56
Local Yield (s)	66.5	19.3	50.8	19.3
Local Yield 170(s)	66.5	6.3	33.8	6.3

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 25.2 (36%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	

Splits and Phases: 2: Illinois St & Ohio St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	235	562	0	0	0	0	0	1371	101	0	0	0
Future Volume (veh/h)	235	562	0	0	0	0	0	1371	101	0	0	0
Number	5	2	12				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1863	0				0	1863	1863			
Adj Flow Rate, veh/h	255	611	0				0	1490	110			
Adj No. of Lanes	0	3	0				0	4	1			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	466	1222	0				0	3369	832			
Arrive On Green	0.33	0.33	0.00				0.00	0.17	0.17			
Sat Flow, veh/h	1430	3919	0				0	6669	1583			
Grp Volume(v), veh/h	319	547	0				0	1490	110			
Grp Sat Flow(s),veh/h/ln	1791	1695	0				0	1602	1583			
Q Serve(g_s), s	10.2	9.1	0.0				0.0	14.6	4.1			
Cycle Q Clear(g_c), s	10.2	9.1	0.0				0.0	14.6	4.1			
Prop In Lane	0.80		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	583	1104	0				0	3369	832			
V/C Ratio(X)	0.55	0.50	0.00				0.00	0.44	0.13			
Avail Cap(c_a), veh/h	583	1104	0				0	3369	832			
HCM Platoon Ratio	1.00	1.00	1.00				1.00	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	19.4	19.0	0.0				0.0	19.7	15.4			
Incr Delay (d2), s/veh	3.7	1.6	0.0				0.0	0.4	0.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.7	4.5	0.0				0.0	6.6	1.9			
LnGrp Delay(d),s/veh	23.0	20.6	0.0				0.0	20.2	15.7			
LnGrp LOS	C	C						C	B			
Approach Vol, veh/h		866						1600				
Approach Delay, s/veh		21.5						19.9				
Approach LOS		C						B				

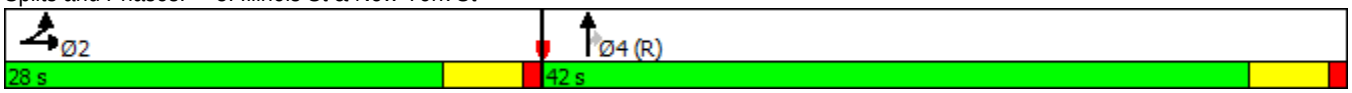
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		28.0		42.0				
Change Period (Y+Rc), s		5.2		5.2				
Max Green Setting (Gmax), s		22.8		36.8				
Max Q Clear Time (g_c+I1), s		12.2		16.6				
Green Ext Time (p_c), s		1.0		2.6				

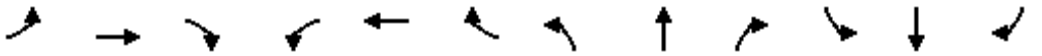
Intersection Summary	
HCM 2010 Ctrl Delay	20.4
HCM 2010 LOS	C

Phase Number	2	4
Movement	EBTL	NBT
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	Max	Max
Maximum Split (s)	28	42
Maximum Split (%)	40.0%	60.0%
Minimum Split (s)	27.2	41.2
Yellow Time (s)	4.2	4.2
All-Red Time (s)	1	1
Minimum Initial (s)	10	10
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	7	16
Flash Dont Walk (s)	15	20
Dual Entry	Yes	Yes
Inhibit Max	Yes	Yes
Start Time (s)	26.6	54.6
End Time (s)	54.6	26.6
Yield/Force Off (s)	49.4	21.4
Yield/Force Off 170(s)	34.4	1.4
Local Start Time (s)	42	0
Local Yield (s)	64.8	36.8
Local Yield 170(s)	49.8	16.8

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	70
Offset: 54.6 (78%), Referenced to phase 4:NBT, Start of Green	

Splits and Phases: 3: Illinois St & New York St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	63	0	0	127	28	86	1121	35	0	0	0
Future Volume (vph)	27	63	0	0	127	28	86	1121	35	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)		5.0			5.0			5.2				
Lane Util. Factor		1.00			1.00			0.86				
Frt		1.00			0.98			1.00				
Flt Protected		0.99			1.00			1.00				
Satd. Flow (prot)		1835			1818			5935				
Flt Permitted		0.89			1.00			1.00				
Satd. Flow (perm)		1650			1818			5935				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	68	0	0	138	30	93	1218	38	0	0	0
RTOR Reduction (vph)	0	0	0	0	11	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	97	0	0	157	0	0	1343	0	0	0	0
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			4		2	2				
Permitted Phases	4											
Actuated Green, G (s)		19.5			19.5			40.3				
Effective Green, g (s)		19.5			19.5			40.3				
Actuated g/C Ratio		0.28			0.28			0.58				
Clearance Time (s)		5.0			5.0			5.2				
Lane Grp Cap (vph)		459			506			3416				
v/s Ratio Prot					c0.09			c0.23				
v/s Ratio Perm		0.06										
v/c Ratio		0.21			0.31			0.39				
Uniform Delay, d1		19.4			19.9			8.1				
Progression Factor		1.00			1.00			2.45				
Incremental Delay, d2		1.0			1.6			0.3				
Delay (s)		20.4			21.5			20.3				
Level of Service		C			C			C				
Approach Delay (s)		20.4			21.5			20.3			0.0	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4
Movement	NBTL	EBWB
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	Max	Max
Maximum Split (s)	45.5	24.5
Maximum Split (%)	65.0%	35.0%
Minimum Split (s)	24.2	24
Yellow Time (s)	4.2	4
All-Red Time (s)	1	1
Minimum Initial (s)	10	10
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	7	7
Flash Dont Walk (s)	12	12
Dual Entry	No	Yes
Inhibit Max	Yes	Yes
Start Time (s)	24.5	0
End Time (s)	0	24.5
Yield/Force Off (s)	64.8	19.5
Yield/Force Off 170(s)	52.8	7.5
Local Start Time (s)	0	45.5
Local Yield (s)	40.3	65
Local Yield 170(s)	28.3	53

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	50
Offset: 24.5 (35%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 4: Illinois St & Vermont St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	1310	80	196	945	0	0	0	0
Future Volume (veh/h)	0	0	0	0	1310	80	196	945	0	0	0	0
Number				5	2	12	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00			
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln				0	1863	1900	1900	1863	0			
Adj Flow Rate, veh/h				0	1424	87	213	1027	0			
Adj No. of Lanes				0	3	0	0	4	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	2	2	2	2	0			
Cap, veh/h				0	2086	127	451	2365	0			
Arrive On Green				0.00	0.43	0.43	0.14	0.14	0.00			
Sat Flow, veh/h				0	5068	299	1059	5817	0			
Grp Volume(v), veh/h				0	985	526	364	876	0			
Grp Sat Flow(s),veh/h/ln				0	1695	1810	1810	1602	0			
Q Serve(g_s), s				0.0	16.5	16.5	13.0	11.7	0.0			
Cycle Q Clear(g_c), s				0.0	16.5	16.5	13.0	11.7	0.0			
Prop In Lane				0.00		0.17	0.59		0.00			
Lane Grp Cap(c), veh/h				0	1443	771	770	2046	0			
V/C Ratio(X)				0.00	0.68	0.68	0.47	0.43	0.00			
Avail Cap(c_a), veh/h				0	1443	771	770	2046	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	16.3	16.3	22.8	22.3	0.0			
Incr Delay (d2), s/veh				0.0	2.6	4.9	2.1	0.7	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	8.2	9.2	7.0	5.3	0.0			
LnGrp Delay(d),s/veh				0.0	18.9	21.1	24.9	22.9	0.0			
LnGrp LOS					B	C	C	C				
Approach Vol, veh/h					1511			1240				
Approach Delay, s/veh					19.7			23.5				
Approach LOS					B			C				

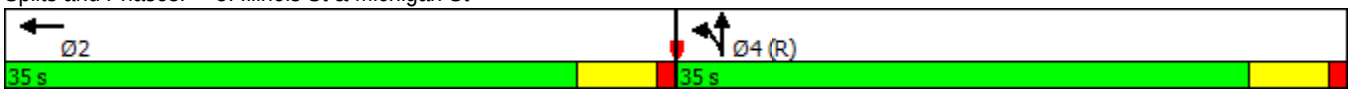
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		35.0		35.0				
Change Period (Y+Rc), s		5.2		5.2				
Max Green Setting (Gmax), s		29.8		29.8				
Max Q Clear Time (g_c+I1), s		18.5		15.0				
Green Ext Time (p_c), s		2.0		1.8				

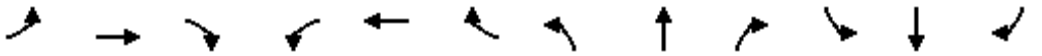
Intersection Summary	
HCM 2010 Ctrl Delay	21.4
HCM 2010 LOS	C

Phase Number	2	4
Movement	WBT	NBTL
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	Max	Max
Maximum Split (s)	35	35
Maximum Split (%)	50.0%	50.0%
Minimum Split (s)	27.2	34.2
Yellow Time (s)	4.2	4.2
All-Red Time (s)	1	1
Minimum Initial (s)	10	10
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	6	12
Flash Dont Walk (s)	16	17
Dual Entry	No	Yes
Inhibit Max	Yes	Yes
Start Time (s)	40.6	5.6
End Time (s)	5.6	40.6
Yield/Force Off (s)	0.4	35.4
Yield/Force Off 170(s)	54.4	18.4
Local Start Time (s)	35	0
Local Yield (s)	64.8	29.8
Local Yield 170(s)	48.8	12.8

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	65
Offset: 5.6 (8%), Referenced to phase 4:NBTL, Start of Green	

Splits and Phases: 5: Illinois St & Michigan St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	53	0	0	206	33	30	917	39	0	0	0
Future Volume (vph)	11	53	0	0	206	33	30	917	39	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)		5.0			5.0			5.2				
Lane Util. Factor		0.95			0.95			0.86				
Frt		1.00			0.98			0.99				
Flt Protected		0.99			1.00			1.00				
Satd. Flow (prot)		3509			3466			5936				
Flt Permitted		0.90			1.00			1.00				
Satd. Flow (perm)		3198			3466			5936				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	58	0	0	224	36	33	997	42	0	0	0
RTOR Reduction (vph)	0	0	0	0	18	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	70	0	0	242	0	0	1064	0	0	0	0
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			4		2	2				
Permitted Phases	4											
Actuated Green, G (s)		26.5			26.5			33.3				
Effective Green, g (s)		26.5			26.5			33.3				
Actuated g/C Ratio		0.38			0.38			0.48				
Clearance Time (s)		5.0			5.0			5.2				
Lane Grp Cap (vph)		1210			1312			2823				
v/s Ratio Prot					c0.07			c0.18				
v/s Ratio Perm		0.02										
v/c Ratio		0.06			0.18			0.38				
Uniform Delay, d1		13.8			14.5			11.7				
Progression Factor		1.00			1.00			2.50				
Incremental Delay, d2		0.1			0.3			0.3				
Delay (s)		13.9			14.8			29.6				
Level of Service		B			B			C				
Approach Delay (s)		13.9			14.8			29.6			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4
Movement	NBTL	EBWB
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	Max	Max
Maximum Split (s)	38.5	31.5
Maximum Split (%)	55.0%	45.0%
Minimum Split (s)	25.2	28
Yellow Time (s)	4.2	4
All-Red Time (s)	1	1
Minimum Initial (s)	10	10
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	7	7
Flash Dont Walk (s)	13	16
Dual Entry	No	No
Inhibit Max	Yes	Yes
Start Time (s)	51.1	19.6
End Time (s)	19.6	51.1
Yield/Force Off (s)	14.4	46.1
Yield/Force Off 170(s)	1.4	30.1
Local Start Time (s)	0	38.5
Local Yield (s)	33.3	65
Local Yield 170(s)	20.3	49

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	55
Offset: 51.1 (73%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 6: Illinois St & North St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	5	0	0	6	6	17	938	2	0	0	0
Future Volume (veh/h)	6	5	0	0	6	6	17	938	2	0	0	0
Number	3	8	18	7	4	14	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1863	0	0	1863	1900	1900	1863	1900			
Adj Flow Rate, veh/h	7	5	0	0	7	7	18	1020	2			
Adj No. of Lanes	0	1	0	0	1	0	0	4	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	361	238	0	0	281	281	59	3592	7			
Arrive On Green	0.33	0.33	0.00	0.00	0.33	0.33	0.17	0.17	0.17			
Sat Flow, veh/h	852	724	0	0	856	856	112	6796	14			
Grp Volume(v), veh/h	12	0	0	0	0	14	299	469	272			
Grp Sat Flow(s),veh/h/ln	1576	0	0	0	0	1712	1857	1602	1860			
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.4	9.8	8.9	8.9			
Cycle Q Clear(g_c), s	0.3	0.0	0.0	0.0	0.0	0.4	9.8	8.9	8.9			
Prop In Lane	0.58		0.00	0.00		0.50	0.06		0.01			
Lane Grp Cap(c), veh/h	599	0	0	0	0	562	982	1694	983			
V/C Ratio(X)	0.02	0.00	0.00	0.00	0.00	0.02	0.30	0.28	0.28			
Avail Cap(c_a), veh/h	599	0	0	0	0	562	982	1694	983			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	15.9	0.0	0.0	0.0	0.0	15.9	17.7	17.3	17.3			
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.1	0.8	0.4	0.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.0	0.0	0.2	5.3	4.0	4.8			
LnGrp Delay(d),s/veh	15.9	0.0	0.0	0.0	0.0	16.0	18.5	17.7	18.0			
LnGrp LOS	B					B	B	B	B			
Approach Vol, veh/h		12			14			1040				
Approach Delay, s/veh		15.9			16.0			18.0				
Approach LOS		B			B			B				

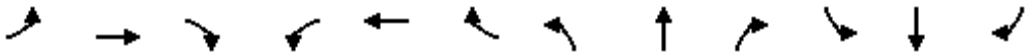
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		42.0		28.0				28.0
Change Period (Y+Rc), s		5.0		5.0				5.0
Max Green Setting (Gmax), s		37.0		23.0				23.0
Max Q Clear Time (g_c+I1), s		11.8		2.4				2.3
Green Ext Time (p_c), s		1.3		0.0				0.0

Intersection Summary	
HCM 2010 Ctrl Delay	17.9
HCM 2010 LOS	B

Phase Number	2	4	8
Movement	NBTL	WBT	EBTL
Lead/Lag			
Lead-Lag Optimize			
Recall Mode	Max	Max	Max
Maximum Split (s)	42	28	28
Maximum Split (%)	60.0%	40.0%	40.0%
Minimum Split (s)	27	27	23
Yellow Time (s)	4	4	4
All-Red Time (s)	1	1	1
Minimum Initial (s)	15	10	10
Vehicle Extension (s)	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0
Time To Reduce (s)	0	0	0
Walk Time (s)	7	9	0
Flash Dont Walk (s)	15	13	7
Dual Entry	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes
Start Time (s)	61.6	33.6	33.6
End Time (s)	33.6	61.6	61.6
Yield/Force Off (s)	28.6	56.6	56.6
Yield/Force Off 170(s)	13.6	43.6	49.6
Local Start Time (s)	0	42	42
Local Yield (s)	37	65	65
Local Yield 170(s)	22	52	58

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	55
Offset: 61.6 (88%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 7: Illinois St & Walnut St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	54	0	0	171	64	31	837	38	0	0	0
Future Volume (vph)	23	54	0	0	171	64	31	837	38	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)		5.0			5.0			5.2	5.2			
Lane Util. Factor		1.00			1.00			0.91	1.00			
Frt		1.00			0.96			1.00	0.85			
Flt Protected		0.99			1.00			1.00	1.00			
Satd. Flow (prot)		1835			1794			4738	1583			
Flt Permitted		0.88			1.00			1.00	1.00			
Satd. Flow (perm)		1634			1794			4738	1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	59	0	0	186	70	34	910	41	0	0	0
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	19	0	0	0
Lane Group Flow (vph)	0	84	0	0	237	0	0	944	22	0	0	0
Turn Type	Perm	NA			NA		Split	NA	Perm			
Protected Phases		4			4		2	2				
Permitted Phases	4								2			
Actuated Green, G (s)		23.0			23.0			36.8	36.8			
Effective Green, g (s)		23.0			23.0			36.8	36.8			
Actuated g/C Ratio		0.33			0.33			0.53	0.53			
Clearance Time (s)		5.0			5.0			5.2	5.2			
Lane Grp Cap (vph)		536			589			2490	832			
v/s Ratio Prot					c0.13			c0.20				
v/s Ratio Perm		0.05							0.01			
v/c Ratio		0.16			0.40			0.38	0.03			
Uniform Delay, d1		16.6			18.2			9.8	8.0			
Progression Factor		1.00			1.00			0.13	0.00			
Incremental Delay, d2		0.6			2.0			0.4	0.1			
Delay (s)		17.3			20.2			1.7	0.1			
Level of Service		B			C			A	A			
Approach Delay (s)		17.3			20.2			1.6			0.0	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4
Movement	NBTL	EBWB
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	Max	Max
Maximum Split (s)	42	28
Maximum Split (%)	60.0%	40.0%
Minimum Split (s)	24.2	28
Yellow Time (s)	4.2	4
All-Red Time (s)	1	1
Minimum Initial (s)	10	10
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	7	7
Flash Dont Walk (s)	12	16
Dual Entry	No	No
Inhibit Max	Yes	Yes
Start Time (s)	2.1	44.1
End Time (s)	44.1	2.1
Yield/Force Off (s)	38.9	67.1
Yield/Force Off 170(s)	26.9	51.1
Local Start Time (s)	0	42
Local Yield (s)	36.8	65
Local Yield 170(s)	24.8	49

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	55
Offset: 2.1 (3%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 8: Illinois St & St. Clair St

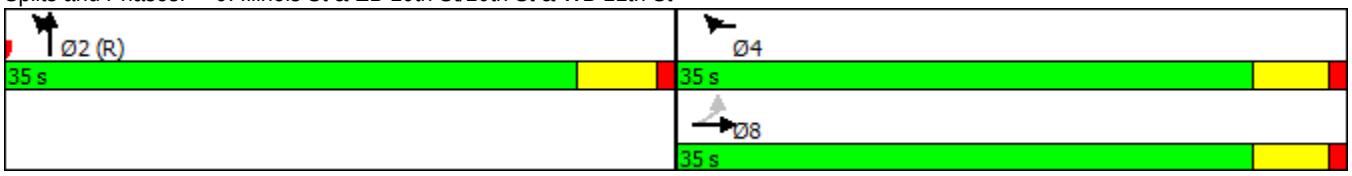
Movement	EBL	EBT	WBR	WBR2	NBL	NBT	NBR
Lane Configurations							
Traffic Volume (vph)	101	227	299	58	101	751	25
Future Volume (vph)	101	227	299	58	101	751	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0			5.2	
Lane Util. Factor		0.95	0.88			0.91	
Frt		1.00	0.85			1.00	
Flt Protected		0.98	1.00			0.99	
Satd. Flow (prot)		3486	2787			5035	
Flt Permitted		0.98	1.00			0.99	
Satd. Flow (perm)		3486	2787			5035	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	247	325	63	110	816	27
RTOR Reduction (vph)	0	0	21	0	0	5	0
Lane Group Flow (vph)	0	357	367	0	0	948	0
Turn Type	Perm	NA	Prot		Split	NA	
Protected Phases		8	4		2	2	
Permitted Phases	8		4				
Actuated Green, G (s)		30.0	30.0			29.8	
Effective Green, g (s)		30.0	30.0			29.8	
Actuated g/C Ratio		0.43	0.43			0.43	
Clearance Time (s)		5.0	5.0			5.2	
Lane Grp Cap (vph)		1494	1194			2143	
v/s Ratio Prot			c0.13			c0.19	
v/s Ratio Perm		0.10					
v/c Ratio		0.24	0.31			0.44	
Uniform Delay, d1		12.7	13.2			14.2	
Progression Factor		1.00	1.00			0.14	
Incremental Delay, d2		0.4	0.7			0.6	
Delay (s)		13.1	13.8			2.6	
Level of Service		B	B			A	
Approach Delay (s)		13.1				2.6	
Approach LOS		B				A	

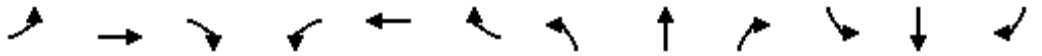
Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	8
Movement	NBTL	WBR	EBTL
Lead/Lag			
Lead-Lag Optimize			
Recall Mode	Max	Max	Max
Maximum Split (s)	35	35	35
Maximum Split (%)	50.0%	50.0%	50.0%
Minimum Split (s)	32.2	33	33
Yellow Time (s)	4.2	4	4
All-Red Time (s)	1	1	1
Minimum Initial (s)	10	10	10
Vehicle Extension (s)	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0
Time To Reduce (s)	0	0	0
Walk Time (s)	7	8	8
Flash Dont Walk (s)	20	20	20
Dual Entry	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes
Start Time (s)	25.2	60.2	60.2
End Time (s)	60.2	25.2	25.2
Yield/Force Off (s)	55	20.2	20.2
Yield/Force Off 170(s)	35	0.2	0.2
Local Start Time (s)	0	35	35
Local Yield (s)	29.8	65	65
Local Yield 170(s)	9.8	45	45

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	70
Offset: 25.2 (36%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 9: Illinois St & EB 10th St/10th St & WB 11th St





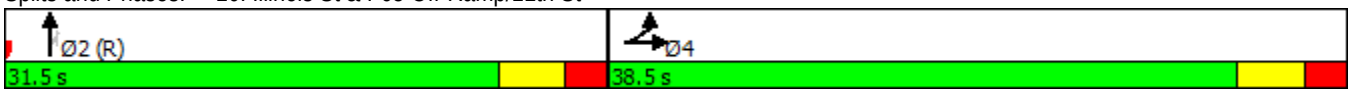
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	895	0	0	0	0	0	786	77	0	0	0
Future Volume (vph)	191	895	0	0	0	0	0	786	77	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)	5.8	5.8						5.8	5.8			
Lane Util. Factor	0.91	0.91						0.86	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	1.00						1.00	1.00			
Satd. Flow (prot)	1610	3387						5981	1583			
Flt Permitted	0.95	1.00						1.00	1.00			
Satd. Flow (perm)	1610	3387						5981	1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	973	0	0	0	0	0	854	84	0	0	0
RTOR Reduction (vph)	29	27	0	0	0	0	0	0	38	0	0	0
Lane Group Flow (vph)	158	967	0	0	0	0	0	854	46	0	0	0
Turn Type	Split	NA						NA	Perm			
Protected Phases	4	4						2				
Permitted Phases									2			
Actuated Green, G (s)	27.8	27.8						30.6	30.6			
Effective Green, g (s)	27.8	27.8						30.6	30.6			
Actuated g/C Ratio	0.40	0.40						0.44	0.44			
Clearance Time (s)	5.8	5.8						5.8	5.8			
Vehicle Extension (s)	0.2	0.2						0.2	0.2			
Lane Grp Cap (vph)	639	1345						2614	691			
v/s Ratio Prot	0.10	c0.29						c0.14				
v/s Ratio Perm									0.03			
v/c Ratio	0.25	0.72						0.33	0.07			
Uniform Delay, d1	14.1	17.8						12.9	11.4			
Progression Factor	1.00	1.00						0.47	0.15			
Incremental Delay, d2	0.1	1.6						0.3	0.2			
Delay (s)	14.2	19.4						6.4	1.9			
Level of Service	B	B						A	A			
Approach Delay (s)		18.5			0.0			6.0			0.0	
Approach LOS		B			A			A			A	

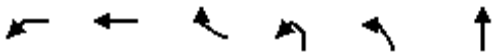
Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4
Movement	NBT	EBTL
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	C-Max	Ped
Maximum Split (s)	31.5	38.5
Maximum Split (%)	45.0%	55.0%
Minimum Split (s)	29.8	32.8
Yellow Time (s)	3.5	3.5
All-Red Time (s)	2.3	2.3
Minimum Initial (s)	15	15
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	5	6
Flash Dont Walk (s)	19	21
Dual Entry	Yes	Yes
Inhibit Max	Yes	Yes
Start Time (s)	33.6	65.1
End Time (s)	65.1	33.6
Yield/Force Off (s)	59.3	27.8
Yield/Force Off 170(s)	40.3	6.8
Local Start Time (s)	0	31.5
Local Yield (s)	25.7	64.2
Local Yield 170(s)	6.7	43.2

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 33.6 (48%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 10: Illinois St & I-65 Off-Ramp/11th St





Movement	WBL	WBT	WBR	NBL2	NBL	NBT
Lane Configurations						
Traffic Volume (vph)	89	465	198	131	156	690
Future Volume (vph)	89	465	198	131	156	690
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10
Total Lost time (s)	5.3	5.3			5.8	5.8
Lane Util. Factor	0.97	0.95			1.00	0.91
Frt	1.00	0.96			1.00	1.00
Flt Protected	0.95	1.00			0.95	1.00
Satd. Flow (prot)	3433	3381			1652	4746
Flt Permitted	0.95	1.00			0.95	1.00
Satd. Flow (perm)	3433	3381			1652	4746
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	505	215	142	170	750
RTOR Reduction (vph)	0	69	0	0	42	0
Lane Group Flow (vph)	97	651	0	0	270	750
Turn Type	Split	NA		Split	Split	NA
Protected Phases	4	4		2	2	2
Permitted Phases						
Actuated Green, G (s)	25.0	25.0			33.9	33.9
Effective Green, g (s)	25.0	25.0			33.9	33.9
Actuated g/C Ratio	0.36	0.36			0.48	0.48
Clearance Time (s)	5.3	5.3			5.8	5.8
Vehicle Extension (s)	0.2	0.2			0.2	0.2
Lane Grp Cap (vph)	1226	1207			800	2298
v/s Ratio Prot	0.03	c0.19			c0.16	0.16
v/s Ratio Perm						
v/c Ratio	0.08	0.54			0.34	0.33
Uniform Delay, d1	14.9	17.9			11.1	11.1
Progression Factor	1.00	1.00			0.34	0.47
Incremental Delay, d2	0.0	0.2			1.1	0.4
Delay (s)	14.9	18.1			4.9	5.5
Level of Service	B	B			A	A
Approach Delay (s)		17.8				5.3
Approach LOS		B				A

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4
Movement	NBTL	WBTL
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	C-Max	Ped
Maximum Split (s)	38.5	31.5
Maximum Split (%)	55.0%	45.0%
Minimum Split (s)	37.8	30.3
Yellow Time (s)	3.5	3.5
All-Red Time (s)	2.3	1.8
Minimum Initial (s)	15	15
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	5	4
Flash Dont Walk (s)	27	21
Dual Entry	Yes	Yes
Inhibit Max	Yes	Yes
Start Time (s)	40.6	9.1
End Time (s)	9.1	40.6
Yield/Force Off (s)	3.3	35.3
Yield/Force Off 170(s)	46.3	14.3
Local Start Time (s)	0	38.5
Local Yield (s)	32.7	64.7
Local Yield 170(s)	5.7	43.7

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 40.6 (58%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 11: I-65 On-Ramp & Illinois St & 12th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	404	0	0	693	24	141	665	54	0	0	0
Future Volume (veh/h)	111	404	0	0	693	24	141	665	54	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863			
Adj Flow Rate, veh/h	121	439	0	0	753	26	153	723	59			
Adj No. of Lanes	1	2	0	0	2	0	1	3	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	267	1344	0	0	871	30	837	2398	747			
Arrive On Green	0.08	0.38	0.00	0.00	0.25	0.25	0.16	0.16	0.16			
Sat Flow, veh/h	1774	3632	0	0	3584	120	1774	5085	1583			
Grp Volume(v), veh/h	121	439	0	0	382	397	153	723	59			
Grp Sat Flow(s),veh/h/ln	1774	1770	0	0	1770	1841	1774	1695	1583			
Q Serve(g_s), s	3.3	6.1	0.0	0.0	14.4	14.5	5.2	8.8	2.2			
Cycle Q Clear(g_c), s	3.3	6.1	0.0	0.0	14.4	14.5	5.2	8.8	2.2			
Prop In Lane	1.00		0.00	0.00		0.07	1.00		1.00			
Lane Grp Cap(c), veh/h	267	1344	0	0	442	460	837	2398	747			
V/C Ratio(X)	0.45	0.33	0.00	0.00	0.86	0.86	0.18	0.30	0.08			
Avail Cap(c_a), veh/h	320	1648	0	0	541	563	837	2398	747			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.95	0.95	0.95			
Uniform Delay (d), s/veh	18.0	15.4	0.0	0.0	25.1	25.1	17.8	19.3	16.6			
Incr Delay (d2), s/veh	0.4	0.1	0.0	0.0	10.2	9.9	0.5	0.3	0.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.6	3.0	0.0	0.0	8.2	8.5	2.7	4.2	1.0			
LnGrp Delay(d),s/veh	18.5	15.4	0.0	0.0	35.3	35.0	18.3	19.6	16.8			
LnGrp LOS	B	B			D	D	B	B	B			
Approach Vol, veh/h		560			779			935				
Approach Delay, s/veh		16.1			35.2			19.2				
Approach LOS		B			D			B				

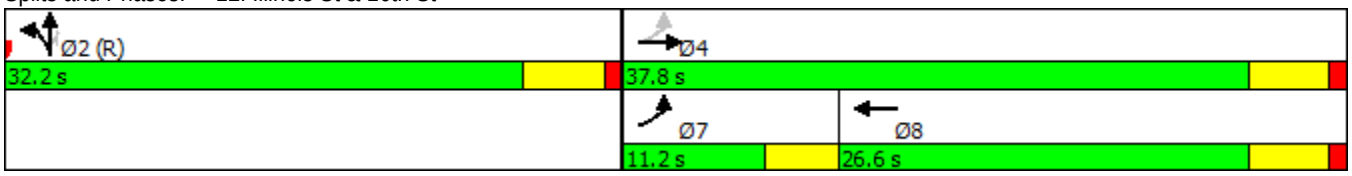
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		38.2		31.8			9.1	22.7
Change Period (Y+Rc), s		5.2		5.2			3.8	5.2
Max Green Setting (Gmax), s		27.0		32.6			7.4	21.4
Max Q Clear Time (g_c+I1), s		10.8		8.1			5.3	16.5
Green Ext Time (p_c), s		1.0		1.5			0.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	23.9
HCM 2010 LOS	C

Phase Number	2	4	7	8
Movement	NBTL	EBTL	EBL	WBT
Lead/Lag			Lead	Lag
Lead-Lag Optimize			Yes	Yes
Recall Mode	C-Min	None	None	None
Maximum Split (s)	32.2	37.8	11.2	26.6
Maximum Split (%)	46.0%	54.0%	16.0%	38.0%
Minimum Split (s)	27.2	26.2	9.5	26.2
Yellow Time (s)	4.2	4.2	3.8	4.2
All-Red Time (s)	1	1	0	1
Minimum Initial (s)	20	20	4	15
Vehicle Extension (s)	0.2	0.2	1	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	6		6
Flash Dont Walk (s)	15	15		15
Dual Entry	No	Yes	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	6.3	38.5	38.5	49.7
End Time (s)	38.5	6.3	49.7	6.3
Yield/Force Off (s)	33.3	1.1	45.9	1.1
Yield/Force Off 170(s)	18.3	56.1	45.9	56.1
Local Start Time (s)	0	32.2	32.2	43.4
Local Yield (s)	27	64.8	39.6	64.8
Local Yield 170(s)	12	49.8	39.6	49.8

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 6.3 (9%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 12: Illinois St & 16th St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	157	93	0	0	71	72	60	1447	125	0	0	0
Future Volume (veh/h)	157	93	0	0	71	72	60	1447	125	0	0	0
Number	1	6	16	5	2	12	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1937	0	0	1937	1900	1900	1863	1900			
Adj Flow Rate, veh/h	171	101	0	0	77	78	65	1573	136			
Adj No. of Lanes	0	1	0	0	1	0	0	4	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	85	34	0	0	471	477	75	1946	173			
Arrive On Green	0.53	0.53	0.00	0.00	0.53	0.53	0.32	0.32	0.32			
Sat Flow, veh/h	3	63	0	0	884	895	234	6052	537			
Grp Volume(v), veh/h	272	0	0	0	0	155	515	811	448			
Grp Sat Flow(s),veh/h/ln	66	0	0	0	0	1779	1851	1602	1768			
Q Serve(g_s), s	6.6	0.0	0.0	0.0	0.0	3.1	18.3	16.1	16.1			
Cycle Q Clear(g_c), s	6.6	0.0	0.0	0.0	0.0	3.1	18.3	16.1	16.1			
Prop In Lane	0.63		0.00	0.00		0.50	0.13		0.30			
Lane Grp Cap(c), veh/h	0	0	0	0	0	948	595	1030	568			
V/C Ratio(X)	0.00	0.00	0.00	0.00	0.00	0.16	0.87	0.79	0.79			
Avail Cap(c_a), veh/h	0	0	0	0	0	948	807	1396	770			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	8.4	22.3	21.6	21.6			
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.4	5.9	1.5	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.0	1.6	10.3	7.3	8.3			
LnGrp Delay(d),s/veh	0.0	0.0	0.0	0.0	0.0	8.7	28.3	23.0	24.2			
LnGrp LOS						A	C	C	C			
Approach Vol, veh/h		272			155			1774				
Approach Delay, s/veh		0.0			8.7			24.8				
Approach LOS		A			A			C				

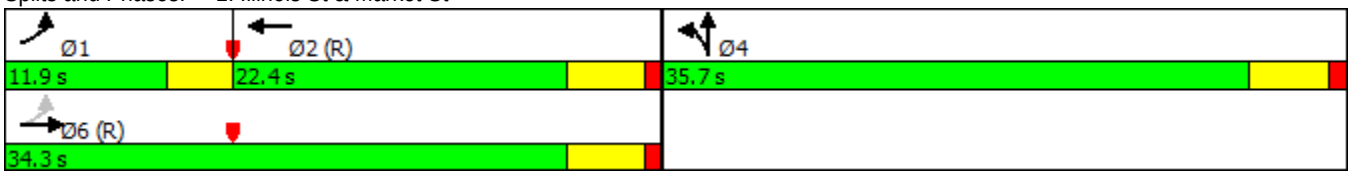
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		42.3		27.7		42.3		
Change Period (Y+Rc), s		5.0		5.2		5.0		
Max Green Setting (Gmax), s		17.4		30.5		29.3		
Max Q Clear Time (g_c+I1), s		5.1		20.3		8.6		
Green Ext Time (p_c), s		0.5		2.2		0.5		

Intersection Summary	
HCM 2010 Ctrl Delay	20.6
HCM 2010 LOS	C

Phase Number	1	2	4	6
Movement	EBL	WBT	NBTL	EBTL
Lead/Lag	Lead	Lag		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	None	C-Min	None	C-Min
Maximum Split (s)	11.9	22.4	35.7	34.3
Maximum Split (%)	17.0%	32.0%	51.0%	49.0%
Minimum Split (s)	7.5	22	35.2	23
Yellow Time (s)	3.5	4	4.2	4
All-Red Time (s)	0	1	1	1
Minimum Initial (s)	4	10	10	10
Vehicle Extension (s)	2	0.2	0.2	0.2
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		6	14	7
Flash Dont Walk (s)		11	16	11
Dual Entry	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	1.4	13.3	35.7	1.4
End Time (s)	13.3	35.7	1.4	35.7
Yield/Force Off (s)	9.8	30.7	66.2	30.7
Yield/Force Off 170(s)	9.8	19.7	50.2	19.7
Local Start Time (s)	58.1	0	22.4	58.1
Local Yield (s)	66.5	17.4	52.9	17.4
Local Yield 170(s)	66.5	6.4	36.9	6.4

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 13.3 (19%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	

Splits and Phases: 1: Illinois St & Market St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	178	379	0	0	294	143	74	1710	221	0	0	0
Future Volume (veh/h)	178	379	0	0	294	143	74	1710	221	0	0	0
Number	1	6	16	5	2	12	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1863	0	0	1863	1863	1900	1863	1900			
Adj Flow Rate, veh/h	193	412	0	0	320	155	80	1859	240			
Adj No. of Lanes	0	2	0	0	2	1	0	4	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	94	793	0	0	1709	765	86	2131	283			
Arrive On Green	0.48	0.48	0.00	0.00	0.48	0.48	0.37	0.37	0.37			
Sat Flow, veh/h	4	1727	0	0	3632	1583	233	5783	767			
Grp Volume(v), veh/h	247	358	0	0	320	155	636	1002	541			
Grp Sat Flow(s),veh/h/ln	36	1611	0	0	1770	1583	1851	1602	1727			
Q Serve(g_s), s	8.4	10.4	0.0	0.0	3.6	3.9	23.1	20.1	20.1			
Cycle Q Clear(g_c), s	8.4	10.4	0.0	0.0	3.6	3.9	23.1	20.1	20.1			
Prop In Lane	0.78		0.00	0.00		1.00	0.13		0.44			
Lane Grp Cap(c), veh/h	0	778	0	0	1709	765	682	1181	637			
V/C Ratio(X)	0.00	0.46	0.00	0.00	0.19	0.20	0.93	0.85	0.85			
Avail Cap(c_a), veh/h	0	778	0	0	1709	765	695	1204	649			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	0.0	12.0	0.0	0.0	10.3	10.4	21.3	20.3	20.3			
Incr Delay (d2), s/veh	0.0	2.0	0.0	0.0	0.2	0.6	18.9	5.5	9.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	5.0	0.0	0.0	1.8	1.8	15.3	9.8	11.3			
LnGrp Delay(d),s/veh	0.0	14.0	0.0	0.0	10.5	11.0	40.2	25.8	30.0			
LnGrp LOS		B			B	B	D	C	C			
Approach Vol, veh/h		605			475			2179				
Approach Delay, s/veh		8.3			10.7			31.0				
Approach LOS		A			B			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		39.0		31.0		39.0		
Change Period (Y+Rc), s		5.2		5.2		5.2		
Max Green Setting (Gmax), s		19.3		26.3		33.3		
Max Q Clear Time (g_c+I1), s		5.9		25.1		12.4		
Green Ext Time (p_c), s		1.3		0.7		1.3		

Intersection Summary	
HCM 2010 Ctrl Delay	23.8
HCM 2010 LOS	C

Phase Number	1	2	4	6
Movement	EBL	WBT	NBTL	EBTL
Lead/Lag	Lead	Lag		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	None	C-Min	None	C-Min
Maximum Split (s)	14	24.5	31.5	38.5
Maximum Split (%)	20.0%	35.0%	45.0%	55.0%
Minimum Split (s)	9.5	24.2	31.2	25.2
Yellow Time (s)	3.5	4.2	4.2	4.2
All-Red Time (s)	0	1	1	1
Minimum Initial (s)	4	10	10	10
Vehicle Extension (s)	1	0.2	0.2	0.2
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		6	9	7
Flash Dont Walk (s)		13	17	13
Dual Entry	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	11.2	25.2	49.7	11.2
End Time (s)	25.2	49.7	11.2	49.7
Yield/Force Off (s)	21.7	44.5	6	44.5
Yield/Force Off 170(s)	21.7	31.5	59	31.5
Local Start Time (s)	56	0	24.5	56
Local Yield (s)	66.5	19.3	50.8	19.3
Local Yield 170(s)	66.5	6.3	33.8	6.3

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 25.2 (36%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	

Splits and Phases: 2: Illinois St & Ohio St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	278	1136	0	0	0	0	0	1889	223	0	0	0
Future Volume (veh/h)	278	1136	0	0	0	0	0	1889	223	0	0	0
Number	5	2	12				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1863	0				0	1863	1863			
Adj Flow Rate, veh/h	302	1235	0				0	2053	242			
Adj No. of Lanes	0	3	0				0	4	1			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	314	1382	0				0	3369	832			
Arrive On Green	0.33	0.33	0.00				0.00	0.17	0.17			
Sat Flow, veh/h	963	4410	0				0	6669	1583			
Grp Volume(v), veh/h	569	968	0				0	2053	242			
Grp Sat Flow(s),veh/h/ln	1815	1695	0				0	1602	1583			
Q Serve(g_s), s	21.6	18.9	0.0				0.0	20.7	9.3			
Cycle Q Clear(g_c), s	21.6	18.9	0.0				0.0	20.7	9.3			
Prop In Lane	0.53		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	591	1104	0				0	3369	832			
V/C Ratio(X)	0.96	0.88	0.00				0.00	0.61	0.29			
Avail Cap(c_a), veh/h	591	1104	0				0	3369	832			
HCM Platoon Ratio	1.00	1.00	1.00				1.00	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	23.2	22.3	0.0				0.0	22.3	17.6			
Incr Delay (d2), s/veh	29.0	9.8	0.0				0.0	0.8	0.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	15.5	10.2	0.0				0.0	9.4	4.3			
LnGrp Delay(d),s/veh	52.2	32.1	0.0				0.0	23.1	18.5			
LnGrp LOS	D	C						C	B			
Approach Vol, veh/h		1537						2295				
Approach Delay, s/veh		39.5						22.6				
Approach LOS		D						C				

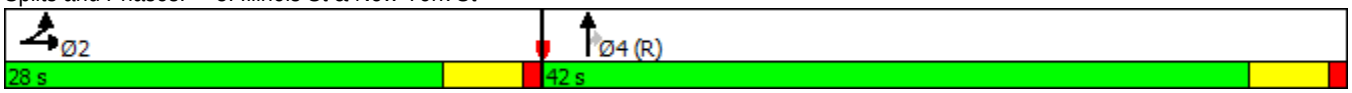
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		28.0		42.0				
Change Period (Y+Rc), s		5.2		5.2				
Max Green Setting (Gmax), s		22.8		36.8				
Max Q Clear Time (g_c+I1), s		23.6		22.7				
Green Ext Time (p_c), s		0.0		3.8				

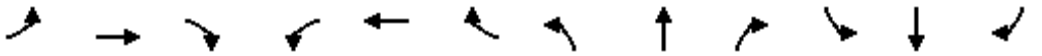
Intersection Summary	
HCM 2010 Ctrl Delay	29.4
HCM 2010 LOS	C

Phase Number	2	4
Movement	EBTL	NBT
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	Max	Max
Maximum Split (s)	28	42
Maximum Split (%)	40.0%	60.0%
Minimum Split (s)	27.2	41.2
Yellow Time (s)	4.2	4.2
All-Red Time (s)	1	1
Minimum Initial (s)	10	10
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	7	16
Flash Dont Walk (s)	15	20
Dual Entry	Yes	Yes
Inhibit Max	Yes	Yes
Start Time (s)	26.6	54.6
End Time (s)	54.6	26.6
Yield/Force Off (s)	49.4	21.4
Yield/Force Off 170(s)	34.4	1.4
Local Start Time (s)	42	0
Local Yield (s)	64.8	36.8
Local Yield 170(s)	49.8	16.8

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	70
Offset: 54.6 (78%), Referenced to phase 4:NBT, Start of Green	

Splits and Phases: 3: Illinois St & New York St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	209	0	0	77	28	67	2145	280	0	0	0
Future Volume (vph)	156	209	0	0	77	28	67	2145	280	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)		5.0			5.0			5.2				
Lane Util. Factor		1.00			1.00			0.86				
Frt		1.00			0.96			0.98				
Flt Protected		0.98			1.00			1.00				
Satd. Flow (prot)		1824			1797			5872				
Flt Permitted		0.81			1.00			1.00				
Satd. Flow (perm)		1506			1797			5872				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	170	227	0	0	84	30	73	2332	304	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	32	0	0	0	0
Lane Group Flow (vph)	0	397	0	0	111	0	0	2677	0	0	0	0
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			4		2	2				
Permitted Phases	4											
Actuated Green, G (s)		19.5			19.5			40.3				
Effective Green, g (s)		19.5			19.5			40.3				
Actuated g/C Ratio		0.28			0.28			0.58				
Clearance Time (s)		5.0			5.0			5.2				
Lane Grp Cap (vph)		419			500			3380				
v/s Ratio Prot					0.06			c0.46				
v/s Ratio Perm		c0.26										
v/c Ratio		0.95			0.22			0.79				
Uniform Delay, d1		24.7			19.4			11.6				
Progression Factor		1.00			1.00			2.08				
Incremental Delay, d2		32.6			1.0			1.6				
Delay (s)		57.3			20.4			25.7				
Level of Service		E			C			C				
Approach Delay (s)		57.3			20.4			25.7			0.0	
Approach LOS		E			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	29.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4
Movement	NBTL	EBWB
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	Max	Max
Maximum Split (s)	45.5	24.5
Maximum Split (%)	65.0%	35.0%
Minimum Split (s)	24.2	24
Yellow Time (s)	4.2	4
All-Red Time (s)	1	1
Minimum Initial (s)	10	10
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	7	7
Flash Dont Walk (s)	12	12
Dual Entry	No	Yes
Inhibit Max	Yes	Yes
Start Time (s)	24.5	0
End Time (s)	0	24.5
Yield/Force Off (s)	64.8	19.5
Yield/Force Off 170(s)	52.8	7.5
Local Start Time (s)	0	45.5
Local Yield (s)	40.3	65
Local Yield 170(s)	28.3	53

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	60
Offset: 24.5 (35%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 4: Illinois St & Vermont St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	793	170	234	2193	0	0	0	0
Future Volume (veh/h)	0	0	0	0	793	170	234	2193	0	0	0	0
Number				5	2	12	7	4	14			
Initial Q (Qb), veh				0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00			
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln				0	1863	1900	1900	1863	0			
Adj Flow Rate, veh/h				0	862	185	254	2384	0			
Adj No. of Lanes				0	3	0	0	4	0			
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %				0	2	2	2	2	0			
Cap, veh/h				0	1368	292	314	3176	0			
Arrive On Green				0.00	0.33	0.33	0.17	0.17	0.00			
Sat Flow, veh/h				0	4366	896	597	6303	0			
Grp Volume(v), veh/h				0	695	352	780	1858	0			
Grp Sat Flow(s),veh/h/ln				0	1695	1705	1833	1602	0			
Q Serve(g_s), s				0.0	12.2	12.3	28.7	25.6	0.0			
Cycle Q Clear(g_c), s				0.0	12.2	12.3	28.7	25.6	0.0			
Prop In Lane				0.00		0.53	0.33		0.00			
Lane Grp Cap(c), veh/h				0	1104	555	964	2527	0			
V/C Ratio(X)				0.00	0.63	0.63	0.81	0.74	0.00			
Avail Cap(c_a), veh/h				0	1104	555	964	2527	0			
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00			
Upstream Filter(I)				0.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh				0.0	20.0	20.1	25.6	24.3	0.0			
Incr Delay (d2), s/veh				0.0	2.7	5.4	7.3	1.9	0.0			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.0	6.1	6.6	16.5	11.8	0.0			
LnGrp Delay(d),s/veh				0.0	22.7	25.5	32.9	26.3	0.0			
LnGrp LOS					C	C	C	C				
Approach Vol, veh/h					1047			2638				
Approach Delay, s/veh					23.7			28.2				
Approach LOS					C			C				

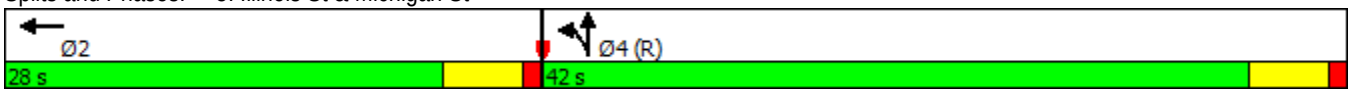
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		28.0		42.0				
Change Period (Y+Rc), s		5.2		5.2				
Max Green Setting (Gmax), s		22.8		36.8				
Max Q Clear Time (g_c+I1), s		14.3		30.7				
Green Ext Time (p_c), s		1.3		3.1				

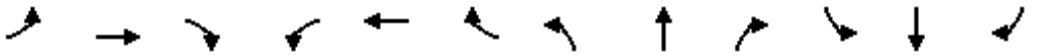
Intersection Summary	
HCM 2010 Ctrl Delay	26.9
HCM 2010 LOS	C

Phase Number	2	4
Movement	WBT	NBTL
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	Max	Max
Maximum Split (s)	28	42
Maximum Split (%)	40.0%	60.0%
Minimum Split (s)	27.2	34.2
Yellow Time (s)	4.2	4.2
All-Red Time (s)	1	1
Minimum Initial (s)	10	10
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	6	12
Flash Dont Walk (s)	16	17
Dual Entry	No	Yes
Inhibit Max	Yes	Yes
Start Time (s)	47.6	5.6
End Time (s)	5.6	47.6
Yield/Force Off (s)	0.4	42.4
Yield/Force Off 170(s)	54.4	25.4
Local Start Time (s)	42	0
Local Yield (s)	64.8	36.8
Local Yield 170(s)	48.8	19.8

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	65
Offset: 5.6 (8%), Referenced to phase 4:NBTL, Start of Green	

Splits and Phases: 5: Illinois St & Michigan St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	232	0	0	34	34	24	2182	196	0	0	0
Future Volume (vph)	120	232	0	0	34	34	24	2182	196	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)		5.0			5.0			5.2				
Lane Util. Factor		0.95			0.95			0.86				
Frt		1.00			0.93			0.99				
Flt Protected		0.98			1.00			1.00				
Satd. Flow (prot)		3480			3274			5905				
Flt Permitted		0.82			1.00			1.00				
Satd. Flow (perm)		2906			3274			5905				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	252	0	0	37	37	26	2372	213	0	0	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	382	0	0	73	0	0	2591	0	0	0	0
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			4		2	2				
Permitted Phases	4											
Actuated Green, G (s)		23.0			23.0			36.8				
Effective Green, g (s)		23.0			23.0			36.8				
Actuated g/C Ratio		0.33			0.33			0.53				
Clearance Time (s)		5.0			5.0			5.2				
Lane Grp Cap (vph)		954			1075			3104				
v/s Ratio Prot					0.02			c0.44				
v/s Ratio Perm		c0.13										
v/c Ratio		0.40			0.07			0.83				
Uniform Delay, d1		18.2			16.1			14.0				
Progression Factor		1.00			1.00			2.04				
Incremental Delay, d2		1.3			0.1			1.6				
Delay (s)		19.4			16.3			30.2				
Level of Service		B			B			C				
Approach Delay (s)		19.4			16.3			30.2			0.0	
Approach LOS		B			B			C			A	

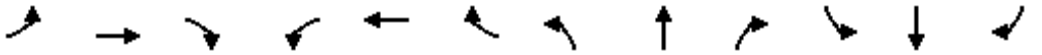
Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4
Movement	NBTL	EBWB
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	Max	Max
Maximum Split (s)	42	28
Maximum Split (%)	60.0%	40.0%
Minimum Split (s)	25.2	28
Yellow Time (s)	4.2	4
All-Red Time (s)	1	1
Minimum Initial (s)	10	10
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	7	7
Flash Dont Walk (s)	13	16
Dual Entry	No	No
Inhibit Max	Yes	Yes
Start Time (s)	51.1	23.1
End Time (s)	23.1	51.1
Yield/Force Off (s)	17.9	46.1
Yield/Force Off 170(s)	4.9	30.1
Local Start Time (s)	0	42
Local Yield (s)	36.8	65
Local Yield 170(s)	23.8	49

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	65
Offset: 51.1 (73%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 6: Illinois St & North St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	18	0	0	66	13	19	2320	6	0	0	0
Future Volume (veh/h)	21	18	0	0	66	13	19	2320	6	0	0	0
Number	3	8	18	7	4	14	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1863	0	0	1863	1900	1900	1863	1900			
Adj Flow Rate, veh/h	23	20	0	0	72	14	21	2522	7			
Adj No. of Lanes	0	1	0	0	1	0	0	4	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	0	2	0			
Cap, veh/h	318	254	0	0	498	97	28	3621	10			
Arrive On Green	0.33	0.33	0.00	0.00	0.33	0.33	0.17	0.17	0.17			
Sat Flow, veh/h	729	774	0	0	1516	295	53	6851	20			
Grp Volume(v), veh/h	43	0	0	0	0	86	733	1149	667			
Grp Sat Flow(s),veh/h/ln	1503	0	0	0	0	1811	1860	1602	1859			
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	2.3	26.2	23.5	23.5			
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.0	0.0	2.3	26.2	23.5	23.5			
Prop In Lane	0.53		0.00	0.00		0.16	0.03		0.01			
Lane Grp Cap(c), veh/h	573	0	0	0	0	595	983	1694	983			
V/C Ratio(X)	0.08	0.00	0.00	0.00	0.00	0.14	0.75	0.68	0.68			
Avail Cap(c_a), veh/h	573	0	0	0	0	595	983	1694	983			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	16.2	0.0	0.0	0.0	0.0	16.6	24.4	23.3	23.3			
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.0	0.0	0.5	5.1	2.2	3.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.0	0.0	1.3	14.9	11.0	13.1			
LnGrp Delay(d),s/veh	16.4	0.0	0.0	0.0	0.0	17.1	29.6	25.5	27.1			
LnGrp LOS	B					B	C	C	C			
Approach Vol, veh/h		43			86			2550				
Approach Delay, s/veh		16.4			17.1			27.1				
Approach LOS		B			B			C				

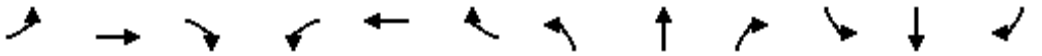
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		42.0		28.0				28.0
Change Period (Y+Rc), s		5.0		5.0				5.0
Max Green Setting (Gmax), s		37.0		23.0				23.0
Max Q Clear Time (g_c+I1), s		28.2		4.3				4.4
Green Ext Time (p_c), s		3.2		0.1				0.1

Intersection Summary	
HCM 2010 Ctrl Delay	26.6
HCM 2010 LOS	C

Phase Number	2	4	8
Movement	NBTL	WBT	EBTL
Lead/Lag			
Lead-Lag Optimize			
Recall Mode	Max	Max	Max
Maximum Split (s)	42	28	28
Maximum Split (%)	60.0%	40.0%	40.0%
Minimum Split (s)	27	27	23
Yellow Time (s)	4	4	4
All-Red Time (s)	1	1	1
Minimum Initial (s)	15	10	10
Vehicle Extension (s)	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0
Time To Reduce (s)	0	0	0
Walk Time (s)	7	9	0
Flash Dont Walk (s)	15	13	7
Dual Entry	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes
Start Time (s)	61.6	33.6	33.6
End Time (s)	33.6	61.6	61.6
Yield/Force Off (s)	28.6	56.6	56.6
Yield/Force Off 170(s)	13.6	43.6	49.6
Local Start Time (s)	0	42	42
Local Yield (s)	37	65	65
Local Yield 170(s)	22	52	58

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	60
Offset: 61.6 (88%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 7: Illinois St & Walnut St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	195	0	0	106	67	26	2205	123	0	0	0
Future Volume (vph)	54	195	0	0	106	67	26	2205	123	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)		5.0			5.0			5.2	5.2			
Lane Util. Factor		1.00			1.00			0.91	1.00			
Frt		1.00			0.95			1.00	0.85			
Flt Protected		0.99			1.00			1.00	1.00			
Satd. Flow (prot)		1843			1765			4744	1583			
Flt Permitted		0.89			1.00			1.00	1.00			
Satd. Flow (perm)		1665			1765			4744	1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	212	0	0	115	73	28	2397	134	0	0	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	64	0	0	0
Lane Group Flow (vph)	0	271	0	0	187	0	0	2425	70	0	0	0
Turn Type	Perm	NA			NA		Split	NA	Perm			
Protected Phases		4			4		2	2				
Permitted Phases	4								2			
Actuated Green, G (s)		23.0			23.0			36.8	36.8			
Effective Green, g (s)		23.0			23.0			36.8	36.8			
Actuated g/C Ratio		0.33			0.33			0.53	0.53			
Clearance Time (s)		5.0			5.0			5.2	5.2			
Lane Grp Cap (vph)		547			579			2493	832			
v/s Ratio Prot					0.11			c0.51				
v/s Ratio Perm		c0.16							0.04			
v/c Ratio		0.50			0.32			0.97	0.08			
Uniform Delay, d1		18.8			17.6			16.1	8.2			
Progression Factor		1.00			1.00			0.17	0.00			
Incremental Delay, d2		3.2			1.5			8.7	0.1			
Delay (s)		22.0			19.1			11.4	0.1			
Level of Service		C			B			B	A			
Approach Delay (s)		22.0			19.1			10.8			0.0	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4
Movement	NBTL	EBWB
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	Max	Max
Maximum Split (s)	42	28
Maximum Split (%)	60.0%	40.0%
Minimum Split (s)	24.2	28
Yellow Time (s)	4.2	4
All-Red Time (s)	1	1
Minimum Initial (s)	10	10
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	7	7
Flash Dont Walk (s)	12	16
Dual Entry	No	No
Inhibit Max	Yes	Yes
Start Time (s)	2.1	44.1
End Time (s)	44.1	2.1
Yield/Force Off (s)	38.9	67.1
Yield/Force Off 170(s)	26.9	51.1
Local Start Time (s)	0	42
Local Yield (s)	36.8	65
Local Yield 170(s)	24.8	49

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	75
Offset: 2.1 (3%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 8: Illinois St & St. Clair St

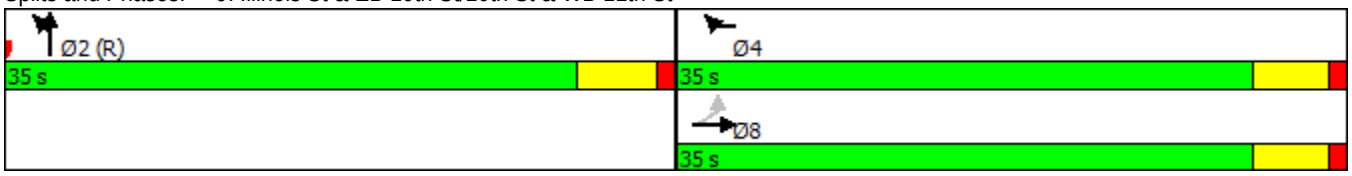
Movement	EBL	EBT	WBR	WBR2	NBL	NBT	NBR
Lane Configurations							
Traffic Volume (vph)	251	760	119	146	46	2227	57
Future Volume (vph)	251	760	119	146	46	2227	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0			5.2	
Lane Util. Factor		0.95	0.88			0.91	
Frt		1.00	0.85			1.00	
Flt Protected		0.99	1.00			1.00	
Satd. Flow (prot)		3496	2787			5062	
Flt Permitted		0.99	1.00			1.00	
Satd. Flow (perm)		3496	2787			5062	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	273	826	129	159	50	2421	62
RTOR Reduction (vph)	0	0	19	0	0	3	0
Lane Group Flow (vph)	0	1099	269	0	0	2530	0
Turn Type	Perm	NA	Prot		Split	NA	
Protected Phases		8	4		2	2	
Permitted Phases	8		4				
Actuated Green, G (s)		30.0	30.0			29.8	
Effective Green, g (s)		30.0	30.0			29.8	
Actuated g/C Ratio		0.43	0.43			0.43	
Clearance Time (s)		5.0	5.0			5.2	
Lane Grp Cap (vph)		1498	1194			2154	
v/s Ratio Prot			0.10			c0.50	
v/s Ratio Perm		0.31					
v/c Ratio		0.73	0.22			1.17	
Uniform Delay, d1		16.7	12.6			20.1	
Progression Factor		1.00	1.00			0.51	
Incremental Delay, d2		3.2	0.4			80.3	
Delay (s)		19.9	13.1			90.6	
Level of Service		B	B			F	
Approach Delay (s)		19.9				90.6	
Approach LOS		B				F	

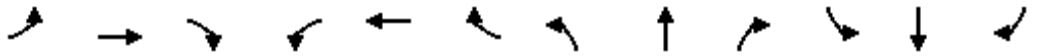
Intersection Summary			
HCM 2000 Control Delay	65.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	8
Movement	NBTL	WBR	EBTL
Lead/Lag			
Lead-Lag Optimize			
Recall Mode	Max	Max	Max
Maximum Split (s)	35	35	35
Maximum Split (%)	50.0%	50.0%	50.0%
Minimum Split (s)	32.2	33	33
Yellow Time (s)	4.2	4	4
All-Red Time (s)	1	1	1
Minimum Initial (s)	10	10	10
Vehicle Extension (s)	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0
Time To Reduce (s)	0	0	0
Walk Time (s)	7	8	8
Flash Dont Walk (s)	20	20	20
Dual Entry	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes
Start Time (s)	25.2	60.2	60.2
End Time (s)	60.2	25.2	25.2
Yield/Force Off (s)	55	20.2	20.2
Yield/Force Off 170(s)	35	0.2	0.2
Local Start Time (s)	0	35	35
Local Yield (s)	29.8	65	65
Local Yield 170(s)	9.8	45	45

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	90
Offset: 25.2 (36%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 9: Illinois St & EB 10th St/10th St & WB 11th St





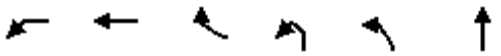
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	318	0	0	0	0	0	2152	482	0	0	0
Future Volume (vph)	21	318	0	0	0	0	0	2152	482	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)	5.8	5.8						5.8	5.8			
Lane Util. Factor	0.91	0.91						0.86	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	1.00						1.00	1.00			
Satd. Flow (prot)	1610	3389						5981	1583			
Flt Permitted	0.95	1.00						1.00	1.00			
Satd. Flow (perm)	1610	3389						5981	1583			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	346	0	0	0	0	0	2339	524	0	0	0
RTOR Reduction (vph)	13	27	0	0	0	0	0	0	188	0	0	0
Lane Group Flow (vph)	8	321	0	0	0	0	0	2339	336	0	0	0
Turn Type	Split	NA						NA	Perm			
Protected Phases	4	4						2				
Permitted Phases									2			
Actuated Green, G (s)	27.0	27.0						31.4	31.4			
Effective Green, g (s)	27.0	27.0						31.4	31.4			
Actuated g/C Ratio	0.39	0.39						0.45	0.45			
Clearance Time (s)	5.8	5.8						5.8	5.8			
Vehicle Extension (s)	0.2	0.2						0.2	0.2			
Lane Grp Cap (vph)	621	1307						2682	710			
v/s Ratio Prot	0.01	c0.09						c0.39				
v/s Ratio Perm									0.21			
v/c Ratio	0.01	0.25						0.87	0.47			
Uniform Delay, d1	13.3	14.6						17.5	13.5			
Progression Factor	1.00	1.00						0.27	0.01			
Incremental Delay, d2	0.0	0.4						0.4	0.2			
Delay (s)	13.3	15.0						5.1	0.3			
Level of Service	B	B						A	A			
Approach Delay (s)		14.9			0.0			4.2			0.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4
Movement	NBT	EBTL
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	C-Max	Max
Maximum Split (s)	37.2	32.8
Maximum Split (%)	53.1%	46.9%
Minimum Split (s)	29.8	32.8
Yellow Time (s)	3.5	3.5
All-Red Time (s)	2.3	2.3
Minimum Initial (s)	15	15
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	5	6
Flash Dont Walk (s)	19	21
Dual Entry	Yes	Yes
Inhibit Max	Yes	Yes
Start Time (s)	33.6	0.8
End Time (s)	0.8	33.6
Yield/Force Off (s)	65	27.8
Yield/Force Off 170(s)	46	6.8
Local Start Time (s)	0	37.2
Local Yield (s)	31.4	64.2
Local Yield 170(s)	12.4	43.2

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 33.6 (48%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 10: Illinois St & I-65 Off-Ramp/11th St



Movement	WBL	WBT	WBR	NBL2	NBL	NBT
Lane Configurations						
Traffic Volume (vph)	347	99	71	958	18	1197
Future Volume (vph)	347	99	71	958	18	1197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10
Total Lost time (s)	5.3	5.3			5.8	5.8
Lane Util. Factor	0.97	0.95			1.00	0.91
Frt	1.00	0.94			1.00	1.00
Flt Protected	0.95	1.00			0.95	1.00
Satd. Flow (prot)	3433	3318			1652	4746
Flt Permitted	0.95	1.00			0.95	1.00
Satd. Flow (perm)	3433	3318			1652	4746
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	377	108	77	1041	20	1301
RTOR Reduction (vph)	0	17	0	0	148	0
Lane Group Flow (vph)	377	168	0	0	913	1301
Turn Type	Split	NA		Split	Split	NA
Protected Phases	4	4		2	2	2
Permitted Phases						
Actuated Green, G (s)	25.5	25.5			33.4	33.4
Effective Green, g (s)	25.5	25.5			33.4	33.4
Actuated g/C Ratio	0.36	0.36			0.48	0.48
Clearance Time (s)	5.3	5.3			5.8	5.8
Vehicle Extension (s)	0.2	0.2			0.2	0.2
Lane Grp Cap (vph)	1250	1208			788	2264
v/s Ratio Prot	c0.11	0.05			c0.55	0.27
v/s Ratio Perm						
v/c Ratio	0.30	0.14			1.16	0.57
Uniform Delay, d1	15.9	14.9			18.3	13.2
Progression Factor	1.00	1.00			0.61	0.01
Incremental Delay, d2	0.6	0.2			78.3	0.5
Delay (s)	16.5	15.1			89.6	0.6
Level of Service	B	B			F	A
Approach Delay (s)		16.1				40.6
Approach LOS		B				D

Intersection Summary			
HCM 2000 Control Delay	35.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4
Movement	NBTL	WBTL
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	C-Max	Max
Maximum Split (s)	39.2	30.8
Maximum Split (%)	56.0%	44.0%
Minimum Split (s)	37.8	30.3
Yellow Time (s)	3.5	3.5
All-Red Time (s)	2.3	1.8
Minimum Initial (s)	15	15
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	5	4
Flash Dont Walk (s)	27	21
Dual Entry	Yes	Yes
Inhibit Max	Yes	Yes
Start Time (s)	40.6	9.8
End Time (s)	9.8	40.6
Yield/Force Off (s)	4	35.3
Yield/Force Off 170(s)	47	14.3
Local Start Time (s)	0	39.2
Local Yield (s)	33.4	64.7
Local Yield 170(s)	6.4	43.7

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 40.6 (58%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 11: I-65 On-Ramp & Illinois St & 12th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	703	0	0	570	10	161	1234	132	0	0	0
Future Volume (veh/h)	170	703	0	0	570	10	161	1234	132	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863			
Adj Flow Rate, veh/h	185	764	0	0	620	11	175	1341	143			
Adj No. of Lanes	1	2	0	0	2	0	1	3	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	323	1317	0	0	768	14	850	2438	759			
Arrive On Green	0.10	0.37	0.00	0.00	0.22	0.22	0.16	0.16	0.16			
Sat Flow, veh/h	1774	3632	0	0	3651	63	1774	5085	1583			
Grp Volume(v), veh/h	185	764	0	0	308	323	175	1341	143			
Grp Sat Flow(s),veh/h/ln	1774	1770	0	0	1770	1852	1774	1695	1583			
Q Serve(g_s), s	5.3	12.1	0.0	0.0	11.6	11.6	6.0	17.0	5.5			
Cycle Q Clear(g_c), s	5.3	12.1	0.0	0.0	11.6	11.6	6.0	17.0	5.5			
Prop In Lane	1.00		0.00	0.00		0.03	1.00		1.00			
Lane Grp Cap(c), veh/h	323	1317	0	0	382	400	850	2438	759			
V/C Ratio(X)	0.57	0.58	0.00	0.00	0.81	0.81	0.21	0.55	0.19			
Avail Cap(c_a), veh/h	330	1648	0	0	541	566	850	2438	759			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.79	0.79	0.79			
Uniform Delay (d), s/veh	18.4	17.6	0.0	0.0	26.1	26.1	17.9	22.5	17.6			
Incr Delay (d2), s/veh	1.4	0.2	0.0	0.0	3.9	3.8	0.4	0.7	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.7	5.9	0.0	0.0	6.1	6.3	3.1	8.2	2.5			
LnGrp Delay(d),s/veh	19.8	17.8	0.0	0.0	30.0	29.8	18.3	23.2	18.1			
LnGrp LOS	B	B			C	C	B	C	B			
Approach Vol, veh/h		949			631			1659				
Approach Delay, s/veh		18.2			29.9			22.3				
Approach LOS		B			C			C				

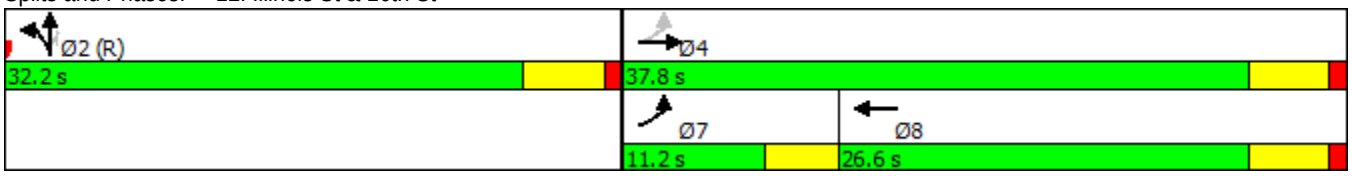
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		38.8		31.2			10.9	20.3
Change Period (Y+Rc), s		5.2		5.2			3.8	5.2
Max Green Setting (Gmax), s		27.0		32.6			7.4	21.4
Max Q Clear Time (g_c+I1), s		19.0		14.1			7.3	13.6
Green Ext Time (p_c), s		1.8		1.8			0.0	1.5

Intersection Summary	
HCM 2010 Ctrl Delay	22.5
HCM 2010 LOS	C

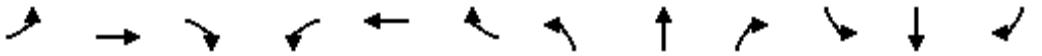
Phase Number	2	4	7	8
Movement	NBTL	EBTL	EBL	WBT
Lead/Lag			Lead	Lag
Lead-Lag Optimize			Yes	Yes
Recall Mode	C-Min	None	None	None
Maximum Split (s)	32.2	37.8	11.2	26.6
Maximum Split (%)	46.0%	54.0%	16.0%	38.0%
Minimum Split (s)	27.2	26.2	9.5	26.2
Yellow Time (s)	4.2	4.2	3.8	4.2
All-Red Time (s)	1	1	0	1
Minimum Initial (s)	20	20	4	15
Vehicle Extension (s)	0.2	0.2	1	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	6		6
Flash Dont Walk (s)	15	15		15
Dual Entry	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	6.3	38.5	38.5	49.7
End Time (s)	38.5	6.3	49.7	6.3
Yield/Force Off (s)	33.3	1.1	45.9	1.1
Yield/Force Off 170(s)	18.3	56.1	45.9	56.1
Local Start Time (s)	0	32.2	32.2	43.4
Local Yield (s)	27	64.8	39.6	64.8
Local Yield 170(s)	12	49.8	39.6	49.8

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 6.3 (9%), Referenced to phase 2:NBTL, Start of Green	

Splits and Phases: 12: Illinois St & 16th St



HCM Signalized Intersection Capacity Analysis
1: Illinois St & Market St



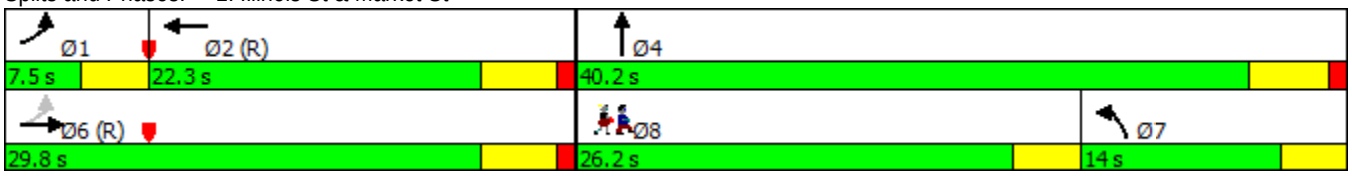
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	33	0	0	55	126	113	1532	80	0	0	0
Future Volume (vph)	108	33	0	0	55	126	113	1532	80	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	12	10	10	12	12	12	12
Total Lost time (s)		5.0			5.0		3.5	5.2				
Lane Util. Factor		1.00			1.00		1.00	0.91				
Frt		1.00			0.91		1.00	0.99				
Flt Protected		0.96			1.00		0.95	1.00				
Satd. Flow (prot)		2033			1913		1652	4711				
Flt Permitted		0.67			1.00		0.95	1.00				
Satd. Flow (perm)		1408			1913		1652	4711				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	117	36	0	0	60	137	123	1665	87	0	0	0
RTOR Reduction (vph)	0	0	0	0	50	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	153	0	0	147	0	123	1744	0	0	0	0
Turn Type	pm+pt	NA			NA		Prot	NA				
Protected Phases	1	6			2		7	4				
Permitted Phases	6											
Actuated Green, G (s)		25.2			25.2		27.4	34.6				
Effective Green, g (s)		25.2			25.2		27.4	34.6				
Actuated g/C Ratio		0.36			0.36		0.39	0.49				
Clearance Time (s)		5.0			5.0		3.5	5.2				
Vehicle Extension (s)		0.2			0.2		0.2	0.2				
Lane Grp Cap (vph)		506			688		646	2328				
v/s Ratio Prot					0.08		0.07	c0.37				
v/s Ratio Perm		c0.11										
v/c Ratio		0.30			0.21		0.19	0.75				
Uniform Delay, d1		16.1			15.5		14.0	14.2				
Progression Factor		1.00			1.00		1.00	1.00				
Incremental Delay, d2		0.1			0.7		0.1	1.2				
Delay (s)		16.2			16.2		14.1	15.4				
Level of Service		B			B		B	B				
Approach Delay (s)		16.2			16.2			15.3			0.0	
Approach LOS		B			B			B			A	

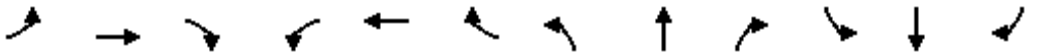
Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	1	2	4	6	7	8
Movement	EBL	WBT	NBT	EBTL	NBL	Ped
Lead/Lag	Lead	Lag			Lag	Lead
Lead-Lag Optimize	Yes	Yes			Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None
Maximum Split (s)	7.5	22.3	40.2	29.8	14	26.2
Maximum Split (%)	10.7%	31.9%	57.4%	42.6%	20.0%	37.4%
Minimum Split (s)	7.5	22	35.2	23	7.5	26.2
Yellow Time (s)	3.5	4	4.2	4	3.5	3.5
All-Red Time (s)	0	1	1	1	0	0
Minimum Initial (s)	4	10	10	10	4	4
Vehicle Extension (s)	2	0.2	0.2	0.2	0.2	0.2
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		6	14	7		6.7
Flash Dont Walk (s)		11	16	11		16
Dual Entry	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	7.5	29.8	0	56	29.8
End Time (s)	7.5	29.8	0	29.8	0	56
Yield/Force Off (s)	4	24.8	64.8	24.8	66.5	52.5
Yield/Force Off 170(s)	4	13.8	48.8	13.8	66.5	36.5
Local Start Time (s)	62.5	0	22.3	62.5	48.5	22.3
Local Yield (s)	66.5	17.3	57.3	17.3	59	45
Local Yield 170(s)	66.5	6.3	41.3	6.3	59	29

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 7.5 (11%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	

Splits and Phases: 1: Illinois St & Market St





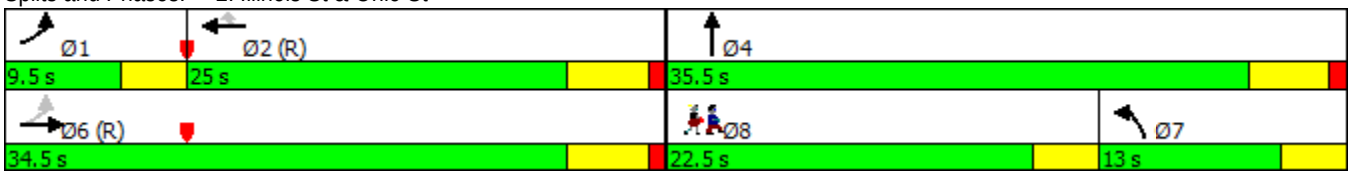
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	174	0	0	528	197	183	1259	173	0	0	0
Future Volume (vph)	58	174	0	0	528	197	183	1259	173	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	10	12	12	12	12
Total Lost time (s)		5.2			5.2	5.2	3.5	5.2				
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91				
Frt		1.00			1.00	0.85	1.00	0.98				
Flt Protected		0.99			1.00	1.00	0.95	1.00				
Satd. Flow (prot)		3496			3539	1583	1770	4660				
Flt Permitted		0.76			1.00	1.00	0.95	1.00				
Satd. Flow (perm)		2675			3539	1583	1770	4660				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	189	0	0	574	214	199	1368	188	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	92	0	27	0	0	0	0
Lane Group Flow (vph)	0	252	0	0	574	122	199	1529	0	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Prot	NA				
Protected Phases	1	6			2		7	4				
Permitted Phases	6					2						
Actuated Green, G (s)		32.0			32.0	32.0	29.3	27.6				
Effective Green, g (s)		32.0			32.0	32.0	29.3	27.6				
Actuated g/C Ratio		0.46			0.46	0.46	0.42	0.39				
Clearance Time (s)		5.2			5.2	5.2	3.5	5.2				
Vehicle Extension (s)		0.2			0.2	0.2	0.2	0.2				
Lane Grp Cap (vph)		1222			1617	723	740	1837				
v/s Ratio Prot					c0.16		0.11	c0.33				
v/s Ratio Perm		0.09				0.08						
v/c Ratio		0.21			0.35	0.17	0.27	0.83				
Uniform Delay, d1		11.4			12.3	11.2	13.3	19.1				
Progression Factor		1.00			1.00	1.00	1.00	1.00				
Incremental Delay, d2		0.0			0.6	0.5	0.1	3.2				
Delay (s)		11.4			12.9	11.7	13.4	22.3				
Level of Service		B			B	B	B	C				
Approach Delay (s)		11.4			12.6			21.3			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	1	2	4	6	7	8
Movement	EBL	WBT	NBT	EBTL	NBL	Ped
Lead/Lag	Lead	Lag			Lag	Lead
Lead-Lag Optimize	Yes	Yes			Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None
Maximum Split (s)	9.5	25	35.5	34.5	13	22.5
Maximum Split (%)	13.6%	35.7%	50.7%	49.3%	18.6%	32.1%
Minimum Split (s)	9.5	24.2	31.2	25.2	7.5	22.5
Yellow Time (s)	3.5	4.2	4.2	4.2	3.5	3.5
All-Red Time (s)	0	1	1	1	0	0
Minimum Initial (s)	4	10	10	10	4	4
Vehicle Extension (s)	1	0.2	0.2	0.2	0.2	0.2
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		6	9	7		2
Flash Dont Walk (s)		13	17	13		17
Dual Entry	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	36.3	45.8	0.8	36.3	23.3	0.8
End Time (s)	45.8	0.8	36.3	0.8	36.3	23.3
Yield/Force Off (s)	42.3	65.6	31.1	65.6	32.8	19.8
Yield/Force Off 170(s)	42.3	52.6	14.1	52.6	32.8	2.8
Local Start Time (s)	60.5	0	25	60.5	47.5	25
Local Yield (s)	66.5	19.8	55.3	19.8	57	44
Local Yield 170(s)	66.5	6.8	38.3	6.8	57	27

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 45.8 (65%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	

Splits and Phases: 2: Illinois St & Ohio St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	235	562	0	0	0	0	0	1234	101	0	0	0
Future Volume (veh/h)	235	562	0	0	0	0	0	1234	101	0	0	0
Number	5	2	12				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1863	0				0	1863	1863			
Adj Flow Rate, veh/h	255	611	0				0	1341	110			
Adj No. of Lanes	0	3	0				0	3	1			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	483	1097	0				0	2673	832			
Arrive On Green	0.33	0.33	0.00				0.00	0.17	0.17			
Sat Flow, veh/h	1198	3519	0				0	5253	1583			
Grp Volume(v), veh/h	315	551	0				0	1341	110			
Grp Sat Flow(s),veh/h/ln	1480	1543	0				0	1695	1583			
Q Serve(g_s), s	12.8	10.3	0.0				0.0	16.7	4.1			
Cycle Q Clear(g_c), s	12.8	10.3	0.0				0.0	16.7	4.1			
Prop In Lane	0.81		0.00				0.00		1.00			
Lane Grp Cap(c), veh/h	575	1005	0				0	2673	832			
V/C Ratio(X)	0.55	0.55	0.00				0.00	0.50	0.13			
Avail Cap(c_a), veh/h	575	1005	0				0	2673	832			
HCM Platoon Ratio	1.00	1.00	1.00				1.00	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	20.2	19.4	0.0				0.0	20.6	15.4			
Incr Delay (d2), s/veh	3.7	2.2	0.0				0.0	0.7	0.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.8	4.7	0.0				0.0	8.0	1.9			
LnGrp Delay(d),s/veh	23.9	21.5	0.0				0.0	21.3	15.7			
LnGrp LOS	C	C						C	B			
Approach Vol, veh/h		866						1451				
Approach Delay, s/veh		22.4						20.9				
Approach LOS		C						C				

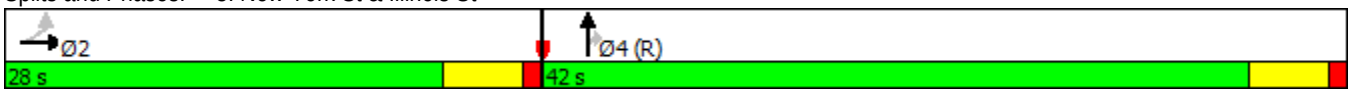
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		28.0		42.0				
Change Period (Y+Rc), s		5.2		5.2				
Max Green Setting (Gmax), s		22.8		36.8				
Max Q Clear Time (g_c+I1), s		14.8		18.7				
Green Ext Time (p_c), s		0.9		2.3				

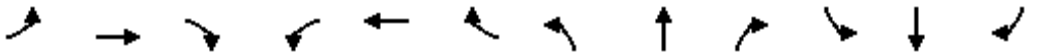
Intersection Summary	
HCM 2010 Ctrl Delay	21.4
HCM 2010 LOS	C

Phase Number	2	4
Movement	EBTL	NBT
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	Max	Max
Maximum Split (s)	28	42
Maximum Split (%)	40.0%	60.0%
Minimum Split (s)	27.2	41.2
Yellow Time (s)	4.2	4.2
All-Red Time (s)	1	1
Minimum Initial (s)	10	10
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	7	16
Flash Dont Walk (s)	15	20
Dual Entry	Yes	Yes
Inhibit Max	Yes	Yes
Start Time (s)	26.6	54.6
End Time (s)	54.6	26.6
Yield/Force Off (s)	49.4	21.4
Yield/Force Off 170(s)	34.4	1.4
Local Start Time (s)	42	0
Local Yield (s)	64.8	36.8
Local Yield 170(s)	49.8	16.8

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	70
Offset: 54.6 (78%), Referenced to phase 4:NBT, Start of Green	

Splits and Phases: 3: New York St & Illinois St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	63	0	0	127	28	86	1009	35	0	0	0
Future Volume (vph)	27	63	0	0	127	28	86	1009	35	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	12	12	12	12
Total Lost time (s)		5.0			5.0		3.5	5.2				
Lane Util. Factor		1.00			1.00		1.00	0.91				
Frt		1.00			0.98		1.00	0.99				
Flt Protected		0.99			1.00		0.95	1.00				
Satd. Flow (prot)		1835			1818		1652	4722				
Flt Permitted		0.89			1.00		0.95	1.00				
Satd. Flow (perm)		1650			1818		1652	4722				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	68	0	0	138	30	93	1097	38	0	0	0
RTOR Reduction (vph)	0	0	0	0	11	0	0	5	0	0	0	0
Lane Group Flow (vph)	0	97	0	0	157	0	93	1130	0	0	0	0
Turn Type	Perm	NA			NA		Prot	NA				
Protected Phases		4			4		5	2				
Permitted Phases	4											
Actuated Green, G (s)		19.5			19.5		19.5	40.3				
Effective Green, g (s)		19.5			19.5		19.5	40.3				
Actuated g/C Ratio		0.28			0.28		0.28	0.58				
Clearance Time (s)		5.0			5.0		3.5	5.2				
Lane Grp Cap (vph)		459			506		460	2718				
v/s Ratio Prot					c0.09		0.06	c0.24				
v/s Ratio Perm		0.06										
v/c Ratio		0.21			0.31		0.20	0.42				
Uniform Delay, d1		19.4			19.9		19.3	8.3				
Progression Factor		1.00			1.00		1.70	2.35				
Incremental Delay, d2		1.0			1.6		0.8	0.4				
Delay (s)		20.4			21.5		33.6	19.9				
Level of Service		C			C		C	B				
Approach Delay (s)		20.4			21.5			20.9			0.0	
Approach LOS		C			C			C			A	

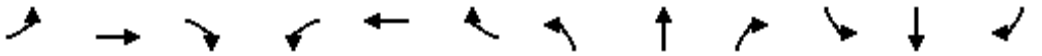
Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	5	6
Movement	NBT	EBWB	NBL	Ped
Lead/Lag			Lag	Lead
Lead-Lag Optimize			Yes	Yes
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	45.5	24.5	23	22.5
Maximum Split (%)	65.0%	35.0%	32.9%	32.1%
Minimum Split (s)	24.2	24	7.5	22.5
Yellow Time (s)	4.2	4	3.5	3.5
All-Red Time (s)	1	1	0	0
Minimum Initial (s)	10	10	3	4
Vehicle Extension (s)	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	7		7
Flash Dont Walk (s)	12	12		12
Dual Entry	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	24.5	0	47	24.5
End Time (s)	0	24.5	0	47
Yield/Force Off (s)	64.8	19.5	66.5	43.5
Yield/Force Off 170(s)	52.8	7.5	66.5	31.5
Local Start Time (s)	0	45.5	22.5	0
Local Yield (s)	40.3	65	42	19
Local Yield 170(s)	28.3	53	42	7

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	55
Offset: 24.5 (35%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 4: Illinois St & Vermont St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1310	80	196	851	0	0	0	0
Future Volume (vph)	0	0	0	0	1310	80	196	851	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	12	12	12	12
Total Lost time (s)					5.2		3.5	5.2				
Lane Util. Factor					0.91		1.00	0.91				
Frt					0.99		1.00	1.00				
Flt Protected					1.00		0.95	1.00				
Satd. Flow (prot)					5041		1652	4746				
Flt Permitted					1.00		0.95	1.00				
Satd. Flow (perm)					5041		1652	4746				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1424	87	213	925	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	110	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1501	0	103	925	0	0	0	0
Turn Type					NA		Prot	NA				
Protected Phases					2		7	4				
Permitted Phases												
Actuated Green, G (s)					29.8		9.0	29.8				
Effective Green, g (s)					29.8		9.0	29.8				
Actuated g/C Ratio					0.43		0.13	0.43				
Clearance Time (s)					5.2		3.5	5.2				
Lane Grp Cap (vph)					2146		212	2020				
v/s Ratio Prot					c0.30		0.06	c0.19				
v/s Ratio Perm												
v/c Ratio					0.70		0.49	0.46				
Uniform Delay, d1					16.4		28.4	14.3				
Progression Factor					1.00		2.42	2.45				
Incremental Delay, d2					1.9		7.3	0.7				
Delay (s)					18.4		76.0	35.8				
Level of Service					B		E	D				
Approach Delay (s)		0.0			18.4			43.4			0.0	
Approach LOS		A			B			D			A	

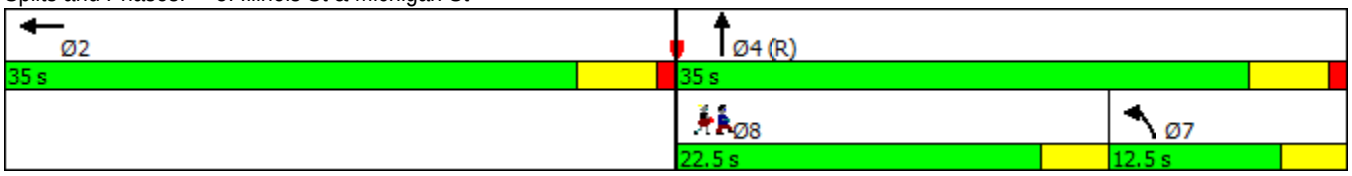
Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

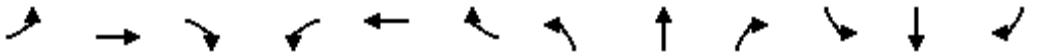
c Critical Lane Group

Phase Number	2	4	7	8
Movement	WBT	NBT	NBL	Ped
Lead/Lag			Lag	Lead
Lead-Lag Optimize			Yes	Yes
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	35	35	12.5	22.5
Maximum Split (%)	50.0%	50.0%	17.9%	32.1%
Minimum Split (s)	27.2	34.2	7.5	22.5
Yellow Time (s)	4.2	4.2	3.5	3.5
All-Red Time (s)	1	1	0	0
Minimum Initial (s)	10	10	4	4
Vehicle Extension (s)	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	6	12		2
Flash Dont Walk (s)	16	17		17
Dual Entry	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	40.6	5.6	28.1	5.6
End Time (s)	5.6	40.6	40.6	28.1
Yield/Force Off (s)	0.4	35.4	37.1	24.6
Yield/Force Off 170(s)	54.4	18.4	37.1	7.6
Local Start Time (s)	35	0	22.5	0
Local Yield (s)	64.8	29.8	31.5	19
Local Yield 170(s)	48.8	12.8	31.5	2

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	65
Offset: 5.6 (8%), Referenced to phase 4:NBT, Start of Green	

Splits and Phases: 5: Illinois St & Michigan St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	53	0	0	206	33	30	825	39	0	0	0
Future Volume (vph)	11	53	0	0	206	33	30	825	39	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	12	12	12	12
Total Lost time (s)		5.0			5.0		3.5	5.2				
Lane Util. Factor		0.95			0.95		1.00	0.91				
Frt		1.00			0.98		1.00	0.99				
Flt Protected		0.99			1.00		0.95	1.00				
Satd. Flow (prot)		3509			3466		1652	4714				
Flt Permitted		0.90			1.00		0.95	1.00				
Satd. Flow (perm)		3198			3466		1652	4714				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	58	0	0	224	36	33	897	42	0	0	0
RTOR Reduction (vph)	0	0	0	0	18	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	70	0	0	242	0	33	932	0	0	0	0
Turn Type	Perm	NA			NA		Prot	NA				
Protected Phases		4			4		5	2				
Permitted Phases	4											
Actuated Green, G (s)		26.5			26.5		11.5	33.3				
Effective Green, g (s)		26.5			26.5		11.5	33.3				
Actuated g/C Ratio		0.38			0.38		0.16	0.48				
Clearance Time (s)		5.0			5.0		3.5	5.2				
Lane Grp Cap (vph)		1210			1312		271	2242				
v/s Ratio Prot					c0.07		0.02	c0.20				
v/s Ratio Perm		0.02										
v/c Ratio		0.06			0.18		0.12	0.42				
Uniform Delay, d1		13.8			14.5		24.9	12.0				
Progression Factor		1.00			1.00		1.86	2.53				
Incremental Delay, d2		0.1			0.3		0.8	0.5				
Delay (s)		13.9			14.8		47.3	30.9				
Level of Service		B			B		D	C				
Approach Delay (s)		13.9			14.8			31.4			0.0	
Approach LOS		B			B			C			A	

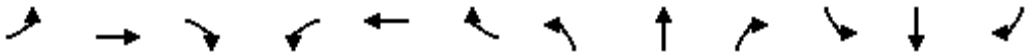
Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	5	6
Movement	NBT	EBWB	NBL	Ped
Lead/Lag			Lag	Lead
Lead-Lag Optimize			Yes	Yes
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	38.5	31.5	15	23.5
Maximum Split (%)	55.0%	45.0%	21.4%	33.6%
Minimum Split (s)	25.2	28	7.5	23.5
Yellow Time (s)	4.2	4	3.5	3.5
All-Red Time (s)	1	1	0	0
Minimum Initial (s)	10	10	4	4
Vehicle Extension (s)	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	7		7
Flash Dont Walk (s)	13	16		13
Dual Entry	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	51.1	19.6	4.6	51.1
End Time (s)	19.6	51.1	19.6	4.6
Yield/Force Off (s)	14.4	46.1	16.1	1.1
Yield/Force Off 170(s)	1.4	30.1	16.1	58.1
Local Start Time (s)	0	38.5	23.5	0
Local Yield (s)	33.3	65	35	20
Local Yield 170(s)	20.3	49	35	7

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	60
Offset: 51.1 (73%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 6: Illinois St & North St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	5	0	0	6	6	17	844	2	0	0	0
Future Volume (vph)	6	5	0	0	6	6	17	844	2	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	12	12	12	12
Total Lost time (s)		5.0			5.0		3.5	5.0				
Lane Util. Factor		1.00			1.00		1.00	0.91				
Frt		1.00			0.93		1.00	1.00				
Flt Protected		0.97			1.00		0.95	1.00				
Satd. Flow (prot)		1810			1737		1652	4745				
Flt Permitted		0.92			1.00		0.95	1.00				
Satd. Flow (perm)		1711			1737		1652	4745				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	5	0	0	7	7	18	917	2	0	0	0
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	12	0	0	9	0	18	919	0	0	0	0
Turn Type	Perm	NA			NA		Prot	NA				
Protected Phases		8			4		5	2				
Permitted Phases	8											
Actuated Green, G (s)		23.0			23.0		13.0	37.0				
Effective Green, g (s)		23.0			23.0		13.0	37.0				
Actuated g/C Ratio		0.33			0.33		0.19	0.53				
Clearance Time (s)		5.0			5.0		3.5	5.0				
Lane Grp Cap (vph)		562			570		306	2508				
v/s Ratio Prot					0.01		0.01	c0.19				
v/s Ratio Perm		c0.01										
v/c Ratio		0.02			0.02		0.06	0.37				
Uniform Delay, d1		15.9			15.9		23.5	9.6				
Progression Factor		1.00			1.00		0.84	0.15				
Incremental Delay, d2		0.1			0.1		0.3	0.4				
Delay (s)		16.0			15.9		20.0	1.9				
Level of Service		B			B		C	A				
Approach Delay (s)		16.0			15.9			2.2			0.0	
Approach LOS		B			B			A			A	

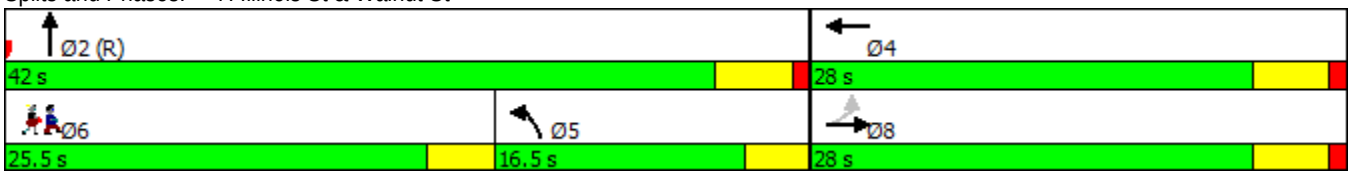
Intersection Summary			
HCM 2000 Control Delay	2.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		

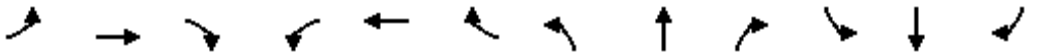
c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NBT	WBT	NBL	Ped	EBTL
Lead/Lag			Lag	Lead	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max
Maximum Split (s)	42	28	16.5	25.5	28
Maximum Split (%)	60.0%	40.0%	23.6%	36.4%	40.0%
Minimum Split (s)	27	27	7.5	25.5	23
Yellow Time (s)	4	4	3.5	3.5	4
All-Red Time (s)	1	1	0	0	1
Minimum Initial (s)	15	10	4	4	10
Vehicle Extension (s)	0.2	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	7	9		7	0
Flash Dont Walk (s)	15	13		15	7
Dual Entry	No	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	61.6	33.6	17.1	61.6	33.6
End Time (s)	33.6	61.6	33.6	17.1	61.6
Yield/Force Off (s)	28.6	56.6	30.1	13.6	56.6
Yield/Force Off 170(s)	13.6	43.6	30.1	68.6	49.6
Local Start Time (s)	0	42	25.5	0	42
Local Yield (s)	37	65	38.5	22	65
Local Yield 170(s)	22	52	38.5	7	58

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	60
Offset: 61.6 (88%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 7: Illinois St & Walnut St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	54	0	0	171	64	31	753	38	0	0	0
Future Volume (vph)	23	54	0	0	171	64	31	753	38	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	12	12	12	12
Total Lost time (s)		5.0			5.0		3.5	5.2				
Lane Util. Factor		1.00			1.00		1.00	0.91				
Frt		1.00			0.96		1.00	0.99				
Flt Protected		0.99			1.00		0.95	1.00				
Satd. Flow (prot)		1835			1794		1652	4712				
Flt Permitted		0.88			1.00		0.95	1.00				
Satd. Flow (perm)		1634			1794		1652	4712				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	59	0	0	186	70	34	818	41	0	0	0
RTOR Reduction (vph)	0	0	0	0	19	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	84	0	0	237	0	34	851	0	0	0	0
Turn Type	Perm	NA			NA		Prot	NA				
Protected Phases		4			4		5	2				
Permitted Phases	4											
Actuated Green, G (s)		23.0			23.0		16.0	36.8				
Effective Green, g (s)		23.0			23.0		16.0	36.8				
Actuated g/C Ratio		0.33			0.33		0.23	0.53				
Clearance Time (s)		5.0			5.0		3.5	5.2				
Lane Grp Cap (vph)		536			589		377	2477				
v/s Ratio Prot					c0.13		0.02	c0.18				
v/s Ratio Perm		0.05										
v/c Ratio		0.16			0.40		0.09	0.34				
Uniform Delay, d1		16.6			18.2		21.3	9.6				
Progression Factor		1.00			1.00		0.75	0.01				
Incremental Delay, d2		0.6			2.0		0.4	0.4				
Delay (s)		17.3			20.2		16.5	0.4				
Level of Service		B			C		B	A				
Approach Delay (s)		17.3			20.2			1.1			0.0	
Approach LOS		B			C			A			A	

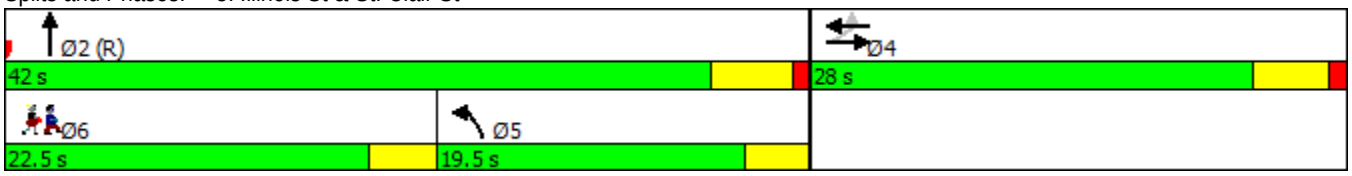
Intersection Summary			
HCM 2000 Control Delay	6.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	5	6
Movement	NBT	EBWB	NBL	Ped
Lead/Lag			Lag	Lead
Lead-Lag Optimize			Yes	Yes
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	42	28	19.5	22.5
Maximum Split (%)	60.0%	40.0%	27.9%	32.1%
Minimum Split (s)	24.2	28	7.5	22.5
Yellow Time (s)	4.2	4	3.5	3.5
All-Red Time (s)	1	1	0	0
Minimum Initial (s)	10	10	4	4
Vehicle Extension (s)	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	7		7
Flash Dont Walk (s)	12	16		12
Dual Entry	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	2.1	44.1	24.6	2.1
End Time (s)	44.1	2.1	44.1	24.6
Yield/Force Off (s)	38.9	67.1	40.6	21.1
Yield/Force Off 170(s)	26.9	51.1	40.6	9.1
Local Start Time (s)	0	42	22.5	0
Local Yield (s)	36.8	65	38.5	19
Local Yield 170(s)	24.8	49	38.5	7

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	60
Offset: 2.1 (3%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 8: Illinois St & St. Clair St



Movement	EBL	EBT	WBR	WBR2	NBL	NBT	NBR
Lane Configurations							
Traffic Volume (vph)	101	227	299	58	101	676	25
Future Volume (vph)	101	227	299	58	101	676	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10	12
Total Lost time (s)		5.0	5.0		3.5	5.2	
Lane Util. Factor		0.95	0.88		1.00	0.91	
Frt		1.00	0.85		1.00	0.99	
Flt Protected		0.98	1.00		0.95	1.00	
Satd. Flow (prot)		3486	2787		1652	4721	
Flt Permitted		0.98	1.00		0.95	1.00	
Satd. Flow (perm)		3486	2787		1652	4721	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	247	325	63	110	735	27
RTOR Reduction (vph)	0	0	51	0	0	6	0
Lane Group Flow (vph)	0	357	337	0	110	756	0
Turn Type	Perm	NA	Prot		Prot	NA	
Protected Phases		8	4		5	2	
Permitted Phases	8		4				
Actuated Green, G (s)		30.0	30.0		6.0	29.8	
Effective Green, g (s)		30.0	30.0		6.0	29.8	
Actuated g/C Ratio		0.43	0.43		0.09	0.43	
Clearance Time (s)		5.0	5.0		3.5	5.2	
Lane Grp Cap (vph)		1494	1194		141	2009	
v/s Ratio Prot			c0.12		c0.07	c0.16	
v/s Ratio Perm		0.10					
v/c Ratio		0.24	0.28		0.78	0.38	
Uniform Delay, d1		12.7	13.0		31.4	13.7	
Progression Factor		1.00	1.00		0.68	0.16	
Incremental Delay, d2		0.4	0.6		32.5	0.5	
Delay (s)		13.1	13.6		54.0	2.7	
Level of Service		B	B		D	A	
Approach Delay (s)		13.1				9.2	
Approach LOS		B				A	

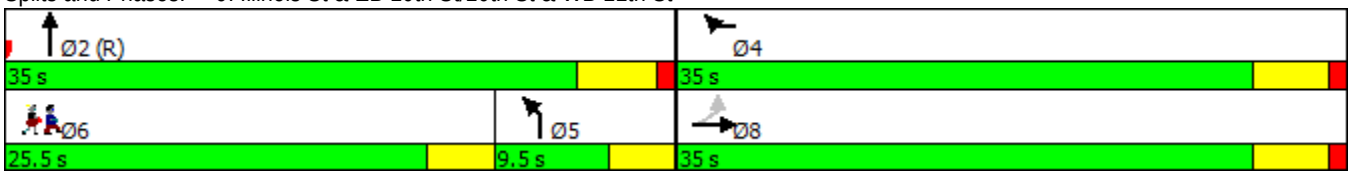
Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

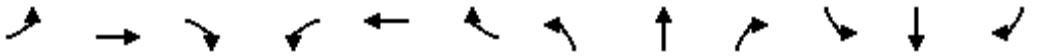
c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NBT	WBR	NBL	Ped	EBTL
Lead/Lag			Lag	Lead	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max
Maximum Split (s)	35	35	9.5	25.5	35
Maximum Split (%)	50.0%	50.0%	13.6%	36.4%	50.0%
Minimum Split (s)	32.2	33	7.5	25.5	33
Yellow Time (s)	4.2	4	3.5	3.5	4
All-Red Time (s)	1	1	0	0	1
Minimum Initial (s)	10	10	4	4	10
Vehicle Extension (s)	0.2	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	7	8		2	8
Flash Dont Walk (s)	20	20		20	20
Dual Entry	No	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	25.2	60.2	50.7	25.2	60.2
End Time (s)	60.2	25.2	60.2	50.7	25.2
Yield/Force Off (s)	55	20.2	56.7	47.2	20.2
Yield/Force Off 170(s)	35	0.2	56.7	27.2	0.2
Local Start Time (s)	0	35	25.5	0	35
Local Yield (s)	29.8	65	31.5	22	65
Local Yield 170(s)	9.8	45	31.5	2	45

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	70
Offset: 25.2 (36%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 9: Illinois St & EB 10th St/10th St & WB 11th St





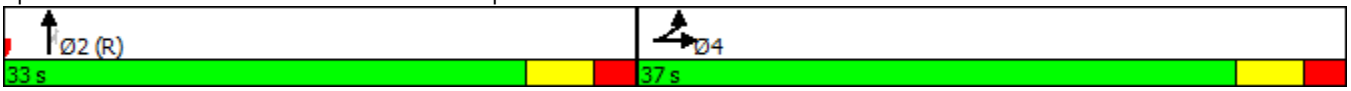
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	895	0	0	0	0	0	707	77	0	0	0
Future Volume (vph)	191	895	0	0	0	0	0	707	77	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	10	10	12	12	12
Total Lost time (s)	5.8	5.8						5.8	5.8			
Lane Util. Factor	0.91	0.91						0.91	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	1.00						1.00	1.00			
Satd. Flow (prot)	1610	3387						4746	1478			
Flt Permitted	0.95	1.00						1.00	1.00			
Satd. Flow (perm)	1610	3387						4746	1478			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	973	0	0	0	0	0	768	84	0	0	0
RTOR Reduction (vph)	47	27	0	0	0	0	0	0	33	0	0	0
Lane Group Flow (vph)	140	967	0	0	0	0	0	768	51	0	0	0
Turn Type	Split	NA						NA	Perm			
Protected Phases	4	4						2				
Permitted Phases									2			
Actuated Green, G (s)	27.7	27.7						30.7	30.7			
Effective Green, g (s)	27.7	27.7						30.7	30.7			
Actuated g/C Ratio	0.40	0.40						0.44	0.44			
Clearance Time (s)	5.8	5.8						5.8	5.8			
Vehicle Extension (s)	0.2	0.2						0.2	0.2			
Lane Grp Cap (vph)	637	1340						2081	648			
v/s Ratio Prot	0.09	c0.29						c0.16				
v/s Ratio Perm									0.03			
v/c Ratio	0.22	0.72						0.37	0.08			
Uniform Delay, d1	14.0	17.9						13.2	11.4			
Progression Factor	1.00	1.00						0.43	0.19			
Incremental Delay, d2	0.1	1.7						0.5	0.2			
Delay (s)	14.1	19.5						6.1	2.4			
Level of Service	B	B						A	A			
Approach Delay (s)		18.7			0.0			5.8			0.0	
Approach LOS		B			A			A			A	

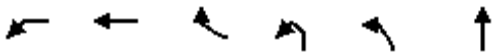
Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4
Movement	NBT	EBTL
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	C-Max	Ped
Maximum Split (s)	33	37
Maximum Split (%)	47.1%	52.9%
Minimum Split (s)	29.8	32.8
Yellow Time (s)	3.5	3.5
All-Red Time (s)	2.3	2.3
Minimum Initial (s)	15	15
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	5	6
Flash Dont Walk (s)	19	21
Dual Entry	Yes	Yes
Inhibit Max	Yes	Yes
Start Time (s)	36	69
End Time (s)	69	36
Yield/Force Off (s)	63.2	30.2
Yield/Force Off 170(s)	44.2	9.2
Local Start Time (s)	0	33
Local Yield (s)	27.2	64.2
Local Yield 170(s)	8.2	43.2

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 36 (51%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 10: Illinois St & I-65 Off-Ramp/11th St





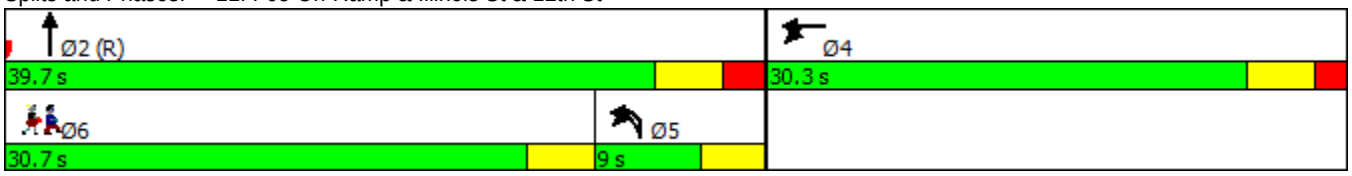
Movement	WBL	WBT	WBR	NBL2	NBL	NBT
Lane Configurations						
Traffic Volume (vph)	89	465	198	131	156	621
Future Volume (vph)	89	465	198	131	156	621
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10
Total Lost time (s)	5.3	5.3			3.5	5.8
Lane Util. Factor	0.97	0.95			1.00	0.91
Frt	1.00	0.96			1.00	1.00
Flt Protected	0.95	1.00			0.95	1.00
Satd. Flow (prot)	3433	3381			1652	4746
Flt Permitted	0.95	1.00			0.95	1.00
Satd. Flow (perm)	3433	3381			1652	4746
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	505	215	142	170	675
RTOR Reduction (vph)	0	88	0	0	57	0
Lane Group Flow (vph)	97	632	0	0	255	675
Turn Type	Split	NA		Prot	Prot	NA
Protected Phases	4	4		5	5	2
Permitted Phases						
Actuated Green, G (s)	11.4	11.4			26.0	47.5
Effective Green, g (s)	11.4	11.4			26.0	47.5
Actuated g/C Ratio	0.16	0.16			0.37	0.68
Clearance Time (s)	5.3	5.3			3.5	5.8
Vehicle Extension (s)	0.2	0.2			0.2	0.2
Lane Grp Cap (vph)	559	550			613	3220
v/s Ratio Prot	0.03	c0.19			c0.15	c0.14
v/s Ratio Perm						
v/c Ratio	0.17	1.15			0.42	0.21
Uniform Delay, d1	25.2	29.3			16.4	4.2
Progression Factor	1.00	1.00			0.78	0.50
Incremental Delay, d2	0.1	86.7			0.2	0.1
Delay (s)	25.3	116.0			12.9	2.3
Level of Service	C	F			B	A
Approach Delay (s)		105.2				5.6
Approach LOS		F				A

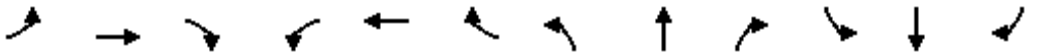
Intersection Summary			
HCM 2000 Control Delay	50.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	5	6
Movement	NBT	WBTL	NBL	Ped
Lead/Lag			Lag	Lead
Lead-Lag Optimize				
Recall Mode	C-Max	Ped	None	None
Maximum Split (s)	39.7	30.3	9	30.7
Maximum Split (%)	56.7%	43.3%	12.9%	43.9%
Minimum Split (s)	37.8	30.3	7.5	30.5
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	2.3	1.8	0	0
Minimum Initial (s)	15	15	4	5
Vehicle Extension (s)	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	4		2
Flash Dont Walk (s)	27	21		25
Dual Entry	Yes	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	25	64.7	55.7	25
End Time (s)	64.7	25	64.7	55.7
Yield/Force Off (s)	58.9	19.7	61.2	52.2
Yield/Force Off 170(s)	31.9	68.7	61.2	27.2
Local Start Time (s)	0	39.7	30.7	0
Local Yield (s)	33.9	64.7	36.2	27.2
Local Yield 170(s)	6.9	43.7	36.2	2.2

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 25 (36%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 11: I-65 On-Ramp & Illinois St & 12th St





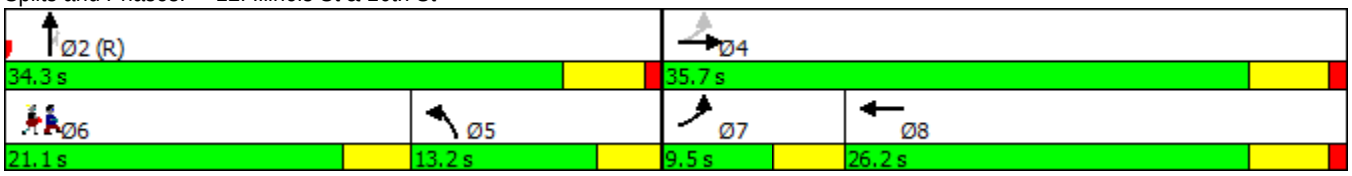
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	404	0	0	693	24	141	599	54	0	0	0
Future Volume (vph)	111	404	0	0	693	24	141	599	54	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	12	12	12
Total Lost time (s)	3.8	5.2			5.2		3.5	5.2	5.2			
Lane Util. Factor	1.00	0.95			0.95		1.00	0.91	1.00			
Frt	1.00	1.00			0.99		1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00			
Satd. Flow (prot)	1770	3539			3521		1652	4746	1478			
Flt Permitted	0.21	1.00			1.00		0.95	1.00	1.00			
Satd. Flow (perm)	382	3539			3521		1652	4746	1478			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	121	439	0	0	753	26	153	651	59	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	29	0	0	0
Lane Group Flow (vph)	121	439	0	0	775	0	153	651	30	0	0	0
Turn Type	pm+pt	NA			NA		Prot	NA	Perm			
Protected Phases	7	4			8		5	2				
Permitted Phases	4								2			
Actuated Green, G (s)	24.4	24.4			15.7		27.3	35.2	35.2			
Effective Green, g (s)	24.4	24.4			15.7		27.3	35.2	35.2			
Actuated g/C Ratio	0.35	0.35			0.22		0.39	0.50	0.50			
Clearance Time (s)	3.8	5.2			5.2		3.5	5.2	5.2			
Vehicle Extension (s)	1.0	0.2			0.2		0.2	0.2	0.2			
Lane Grp Cap (vph)	230	1233			789		644	2386	743			
v/s Ratio Prot	c0.04	0.12			c0.22		0.09	c0.14				
v/s Ratio Perm	0.15								0.02			
v/c Ratio	0.53	0.36			0.98		0.24	0.27	0.04			
Uniform Delay, d1	17.6	17.0			27.0		14.4	10.0	8.8			
Progression Factor	1.00	1.00			1.00		0.73	0.59	0.32			
Incremental Delay, d2	1.0	0.1			27.5		0.1	0.3	0.1			
Delay (s)	18.6	17.0			54.5		10.5	6.2	2.9			
Level of Service	B	B			D		B	A	A			
Approach Delay (s)		17.4			54.5			6.7			0.0	
Approach LOS		B			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

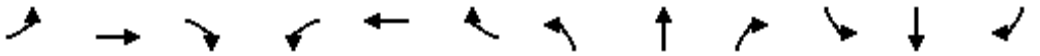
Phase Number	2	4	5	6	7	8
Movement	NBT	EBTL	NBL	Ped	EBL	WBT
Lead/Lag			Lag	Lead	Lead	Lag
Lead-Lag Optimize					Yes	Yes
Recall Mode	C-Min	None	None	None	None	None
Maximum Split (s)	34.3	35.7	13.2	21.1	9.5	26.2
Maximum Split (%)	49.0%	51.0%	18.9%	30.1%	13.6%	37.4%
Minimum Split (s)	27.2	26.2	7.5	20.5	9.5	26.2
Yellow Time (s)	4.2	4.2	3.5	3.5	3.8	4.2
All-Red Time (s)	1	1	0	0	0	1
Minimum Initial (s)	20	20	4	4	4	15
Vehicle Extension (s)	0.2	0.2	0.2	0.2	1	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	7	6		2		6
Flash Dont Walk (s)	15	15		15		15
Dual Entry	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	68	32.3	19.1	68	32.3	41.8
End Time (s)	32.3	68	32.3	19.1	41.8	68
Yield/Force Off (s)	27.1	62.8	28.8	15.6	38	62.8
Yield/Force Off 170(s)	12.1	47.8	28.8	0.6	38	47.8
Local Start Time (s)	0	34.3	21.1	0	34.3	43.8
Local Yield (s)	29.1	64.8	30.8	17.6	40	64.8
Local Yield 170(s)	14.1	49.8	30.8	2.6	40	49.8

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 68 (97%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 12: Illinois St & 16th St



HCM Signalized Intersection Capacity Analysis
1: Illinois St & Market St



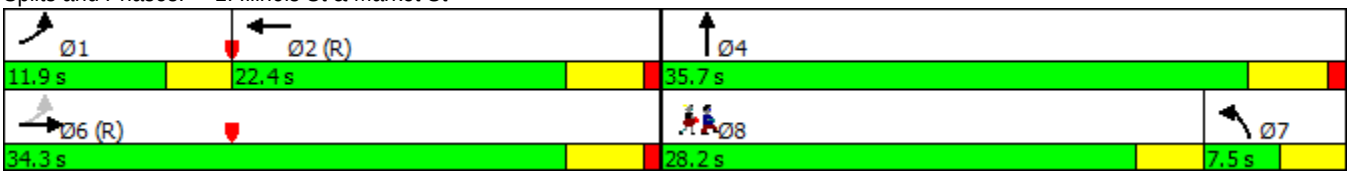
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	93	0	0	71	72	60	1302	125	0	0	0
Future Volume (vph)	157	93	0	0	71	72	60	1302	125	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	12	10	10	12	12	12	12
Total Lost time (s)		5.0			5.0		3.5	5.2				
Lane Util. Factor		1.00			1.00		1.00	0.91				
Frt		1.00			0.93		1.00	0.99				
Flt Protected		0.97			1.00		0.95	1.00				
Satd. Flow (prot)		2047			1968		1652	4684				
Flt Permitted		0.72			1.00		0.95	1.00				
Satd. Flow (perm)		1519			1968		1652	4684				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	171	101	0	0	77	78	65	1415	136	0	0	0
RTOR Reduction (vph)	0	0	0	0	50	0	0	12	0	0	0	0
Lane Group Flow (vph)	0	272	0	0	105	0	65	1539	0	0	0	0
Turn Type	pm+pt	NA			NA		Prot	NA				
Protected Phases	1	6			2		7	4				
Permitted Phases	6											
Actuated Green, G (s)		19.4			19.4		22.8	40.4				
Effective Green, g (s)		19.4			19.4		22.8	40.4				
Actuated g/C Ratio		0.28			0.28		0.33	0.58				
Clearance Time (s)		5.0			5.0		3.5	5.2				
Vehicle Extension (s)		0.2			0.2		2.0	0.2				
Lane Grp Cap (vph)		420			545		538	2703				
v/s Ratio Prot					0.05		0.04	c0.33				
v/s Ratio Perm		c0.18										
v/c Ratio		0.65			0.19		0.12	0.57				
Uniform Delay, d1		22.3			19.3		16.6	9.3				
Progression Factor		1.00			1.00		1.00	1.00				
Incremental Delay, d2		2.6			0.8		0.0	0.9				
Delay (s)		24.9			20.1		16.6	10.2				
Level of Service		C			C		B	B				
Approach Delay (s)		24.9			20.1			10.5			0.0	
Approach LOS		C			C			B			A	

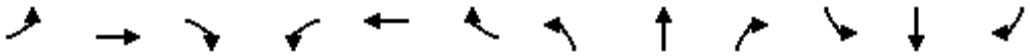
Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	1	2	4	6	7	8
Movement	EBL	WBT	NBT	EBTL	NBL	Ped
Lead/Lag	Lead	Lag			Lag	Lead
Lead-Lag Optimize	Yes	Yes			Yes	Yes
Recall Mode	None	C-Min	Max	C-Min	None	None
Maximum Split (s)	11.9	22.4	35.7	34.3	7.5	28.2
Maximum Split (%)	17.0%	32.0%	51.0%	49.0%	10.7%	40.3%
Minimum Split (s)	7.5	22	35.2	23	7.5	26.2
Yellow Time (s)	3.5	4	4.2	4	3.5	3.5
All-Red Time (s)	0	1	1	1	0	0
Minimum Initial (s)	4	10	10	10	4	4
Vehicle Extension (s)	2	0.2	0.2	0.2	2	0.2
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		6	14	7		6.7
Flash Dont Walk (s)		11	16	11		16
Dual Entry	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	1.4	13.3	35.7	1.4	63.9	35.7
End Time (s)	13.3	35.7	1.4	35.7	1.4	63.9
Yield/Force Off (s)	9.8	30.7	66.2	30.7	67.9	60.4
Yield/Force Off 170(s)	9.8	19.7	50.2	19.7	67.9	44.4
Local Start Time (s)	58.1	0	22.4	58.1	50.6	22.4
Local Yield (s)	66.5	17.4	52.9	17.4	54.6	47.1
Local Yield 170(s)	66.5	6.4	36.9	6.4	54.6	31.1

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 13.3 (19%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	

Splits and Phases: 1: Illinois St & Market St





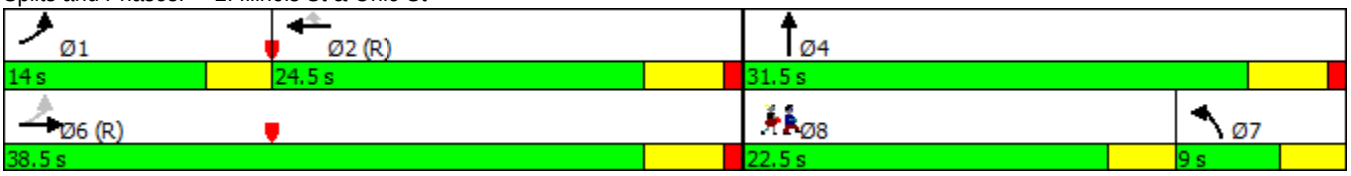
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	178	379	0	0	294	143	74	1539	221	0	0	0
Future Volume (vph)	178	379	0	0	294	143	74	1539	221	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	12	12	12	12
Total Lost time (s)		5.2			5.2	5.2	3.5	5.2				
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91				
Frt		1.00			1.00	0.85	1.00	0.98				
Flt Protected		0.98			1.00	1.00	0.95	1.00				
Satd. Flow (prot)		3484			3539	1583	1652	4657				
Flt Permitted		0.74			1.00	1.00	0.95	1.00				
Satd. Flow (perm)		2633			3539	1583	1652	4657				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	193	412	0	0	320	155	80	1673	240	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	108	0	19	0	0	0	0
Lane Group Flow (vph)	0	605	0	0	320	47	80	1894	0	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Prot	NA				
Protected Phases	1	6			2		7	4				
Permitted Phases	6					2						
Actuated Green, G (s)		21.1			21.1	21.1	21.8	38.5				
Effective Green, g (s)		21.1			21.1	21.1	21.8	38.5				
Actuated g/C Ratio		0.30			0.30	0.30	0.31	0.55				
Clearance Time (s)		5.2			5.2	5.2	3.5	5.2				
Vehicle Extension (s)		0.2			0.2	0.2	0.2	0.2				
Lane Grp Cap (vph)		793			1066	477	514	2561				
v/s Ratio Prot					0.09		0.05	c0.41				
v/s Ratio Perm		c0.23				0.03						
v/c Ratio		0.76			0.30	0.10	0.16	0.74				
Uniform Delay, d1		22.2			18.8	17.6	17.4	11.9				
Progression Factor		1.00			1.00	1.00	1.00	1.00				
Incremental Delay, d2		3.9			0.7	0.4	0.1	2.0				
Delay (s)		26.1			19.5	18.0	17.5	13.9				
Level of Service		C			B	B	B	B				
Approach Delay (s)		26.1			19.0			14.1			0.0	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	1	2	4	6	7	8
Movement	EBL	WBT	NBT	EBTL	NBL	Ped
Lead/Lag	Lead	Lag			Lag	Lead
Lead-Lag Optimize	Yes	Yes			Yes	Yes
Recall Mode	None	C-Min	Max	C-Min	None	None
Maximum Split (s)	14	24.5	31.5	38.5	9	22.5
Maximum Split (%)	20.0%	35.0%	45.0%	55.0%	12.9%	32.1%
Minimum Split (s)	9.5	24.2	31.2	25.2	7.5	22.5
Yellow Time (s)	3.5	4.2	4.2	4.2	3.5	3.5
All-Red Time (s)	0	1	1	1	0	0
Minimum Initial (s)	4	10	10	10	4	4
Vehicle Extension (s)	1	0.2	0.2	0.2	0.2	0.2
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		6	9	7		2
Flash Dont Walk (s)		13	17	13		17
Dual Entry	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	11.2	25.2	49.7	11.2	2.2	49.7
End Time (s)	25.2	49.7	11.2	49.7	11.2	2.2
Yield/Force Off (s)	21.7	44.5	6	44.5	7.7	68.7
Yield/Force Off 170(s)	21.7	31.5	59	31.5	7.7	51.7
Local Start Time (s)	56	0	24.5	56	47	24.5
Local Yield (s)	66.5	19.3	50.8	19.3	52.5	43.5
Local Yield 170(s)	66.5	6.3	33.8	6.3	52.5	26.5

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 25.2 (36%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	

Splits and Phases: 2: Illinois St & Ohio St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	278	1136	0	0	0	0	0	1700	223	0	0	0
Future Volume (veh/h)	278	1136	0	0	0	0	0	1700	223	0	0	0
Number	5	2	12				7	4	14			
Initial Q (Qb), veh	0	0	0				0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1863	0				0	1863	1900			
Adj Flow Rate, veh/h	302	1235	0				0	1848	242			
Adj No. of Lanes	0	3	0				0	3	0			
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0				0	2	2			
Cap, veh/h	363	1238	0				0	2395	311			
Arrive On Green	0.33	0.33	0.00				0.00	0.17	0.17			
Sat Flow, veh/h	870	3952	0				0	4724	592			
Grp Volume(v), veh/h	550	987	0				0	1371	719			
Grp Sat Flow(s),veh/h/ln	1585	1543	0				0	1695	1758			
Q Serve(g_s), s	22.8	22.2	0.0				0.0	27.0	27.3			
Cycle Q Clear(g_c), s	22.8	22.2	0.0				0.0	27.0	27.3			
Prop In Lane	0.55		0.00				0.00		0.34			
Lane Grp Cap(c), veh/h	596	1005	0				0	1782	924			
V/C Ratio(X)	0.92	0.98	0.00				0.00	0.77	0.78			
Avail Cap(c_a), veh/h	596	1005	0				0	1782	924			
HCM Platoon Ratio	1.00	1.00	1.00				1.00	0.33	0.33			
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00			
Uniform Delay (d), s/veh	24.3	23.4	0.0				0.0	24.9	25.0			
Incr Delay (d2), s/veh	22.1	24.4	0.0				0.0	3.3	6.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	14.2	12.7	0.0				0.0	13.5	15.0			
LnGrp Delay(d),s/veh	46.4	47.8	0.0				0.0	28.1	31.4			
LnGrp LOS	D	D						C	C			
Approach Vol, veh/h		1537						2090				
Approach Delay, s/veh		47.3						29.3				
Approach LOS		D						C				

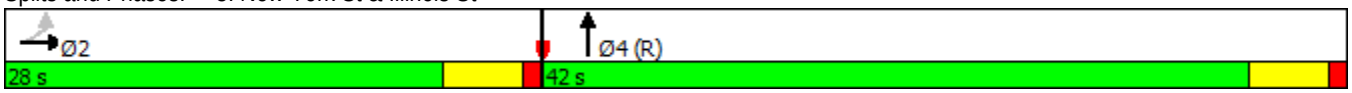
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				
Phs Duration (G+Y+Rc), s		28.0		42.0				
Change Period (Y+Rc), s		5.2		5.2				
Max Green Setting (Gmax), s		22.8		36.8				
Max Q Clear Time (g_c+I1), s		24.8		29.3				
Green Ext Time (p_c), s		0.0		2.7				

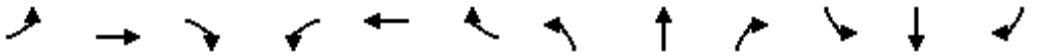
Intersection Summary	
HCM 2010 Ctrl Delay	36.9
HCM 2010 LOS	D

Phase Number	2	4
Movement	EBTL	NBT
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	Max	C-Max
Maximum Split (s)	28	42
Maximum Split (%)	40.0%	60.0%
Minimum Split (s)	27.2	41.2
Yellow Time (s)	4.2	4.2
All-Red Time (s)	1	1
Minimum Initial (s)	10	10
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	7	16
Flash Dont Walk (s)	15	20
Dual Entry	Yes	Yes
Inhibit Max	Yes	Yes
Start Time (s)	26.6	54.6
End Time (s)	54.6	26.6
Yield/Force Off (s)	49.4	21.4
Yield/Force Off 170(s)	34.4	1.4
Local Start Time (s)	42	0
Local Yield (s)	64.8	36.8
Local Yield 170(s)	49.8	16.8

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 54.6 (78%), Referenced to phase 4:NBT, Start of Green	

Splits and Phases: 3: New York St & Illinois St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	209	0	0	77	28	67	1931	280	0	0	0
Future Volume (vph)	156	209	0	0	77	28	67	1931	280	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	12	12	12	12
Total Lost time (s)		5.0			5.0		3.5	5.2				
Lane Util. Factor		1.00			1.00		1.00	0.91				
Frt		1.00			0.96		1.00	0.98				
Flt Protected		0.98			1.00		0.95	1.00				
Satd. Flow (prot)		1824			1797		1652	4656				
Flt Permitted		0.81			1.00		0.95	1.00				
Satd. Flow (perm)		1506			1797		1652	4656				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	170	227	0	0	84	30	73	2099	304	0	0	0
RTOR Reduction (vph)	0	0	0	0	5	0	0	27	0	0	0	0
Lane Group Flow (vph)	0	397	0	0	109	0	73	2376	0	0	0	0
Turn Type	Perm	NA			NA		Prot	NA				
Protected Phases		4			4		5	2				
Permitted Phases	4											
Actuated Green, G (s)		19.5			19.5		19.5	40.3				
Effective Green, g (s)		19.5			19.5		19.5	40.3				
Actuated g/C Ratio		0.28			0.28		0.28	0.58				
Clearance Time (s)		5.0			5.0		3.5	5.2				
Lane Grp Cap (vph)		419			500		460	2680				
v/s Ratio Prot					0.06		0.04	c0.51				
v/s Ratio Perm		c0.26										
v/c Ratio		0.95			0.22		0.16	0.89				
Uniform Delay, d1		24.7			19.4		19.1	12.9				
Progression Factor		1.00			1.00		0.87	1.84				
Incremental Delay, d2		32.6			1.0		0.5	3.2				
Delay (s)		57.3			20.4		17.0	26.9				
Level of Service		E			C		B	C				
Approach Delay (s)		57.3			20.4			26.6			0.0	
Approach LOS		E			C			C			A	

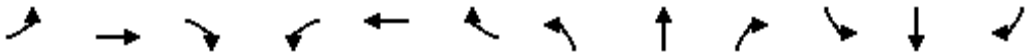
Intersection Summary			
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	5	6
Movement	NBT	EBWB	NBL	Ped
Lead/Lag			Lead	Lag
Lead-Lag Optimize			Yes	Yes
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	45.5	24.5	23	22.5
Maximum Split (%)	65.0%	35.0%	32.9%	32.1%
Minimum Split (s)	24.2	24	7.5	22.5
Yellow Time (s)	4.2	4	3.5	3.5
All-Red Time (s)	1	1	0	0
Minimum Initial (s)	10	10	3	4
Vehicle Extension (s)	0.2	0.2	0.2	3
Minimum Gap (s)	0.2	0.2	0.2	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	7		7
Flash Dont Walk (s)	12	12		12
Dual Entry	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	24.5	0	24.5	47.5
End Time (s)	0	24.5	47.5	0
Yield/Force Off (s)	64.8	19.5	44	66.5
Yield/Force Off 170(s)	52.8	7.5	44	54.5
Local Start Time (s)	0	45.5	0	23
Local Yield (s)	40.3	65	19.5	42
Local Yield 170(s)	28.3	53	19.5	30

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	75
Offset: 24.5 (35%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 4: Illinois St & Vermont St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	793	170	234	1974	0	0	0	0
Future Volume (vph)	0	0	0	0	793	170	234	1974	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	12	12	12	12
Total Lost time (s)					5.2		3.5	5.2				
Lane Util. Factor					0.91		1.00	0.91				
Frt					0.97		1.00	1.00				
Flt Protected					1.00		0.95	1.00				
Satd. Flow (prot)					4951		1652	4746				
Flt Permitted					1.00		0.95	1.00				
Satd. Flow (perm)					4951		1652	4746				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	862	185	254	2146	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	75	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1044	0	179	2146	0	0	0	0
Turn Type					NA		Prot	NA				
Protected Phases					2		7	4				
Permitted Phases												
Actuated Green, G (s)					22.8		11.0	36.8				
Effective Green, g (s)					22.8		11.0	36.8				
Actuated g/C Ratio					0.33		0.16	0.53				
Clearance Time (s)					5.2		3.5	5.2				
Lane Grp Cap (vph)					1612		259	2495				
v/s Ratio Prot					c0.21		0.11	c0.45				
v/s Ratio Perm												
v/c Ratio					0.65		0.69	0.86				
Uniform Delay, d1					20.2		27.9	14.4				
Progression Factor					1.00		1.38	1.57				
Incremental Delay, d2					2.0		7.4	2.2				
Delay (s)					22.2		46.0	24.7				
Level of Service					C		D	C				
Approach Delay (s)		0.0			22.2			26.9			0.0	
Approach LOS		A			C			C			A	

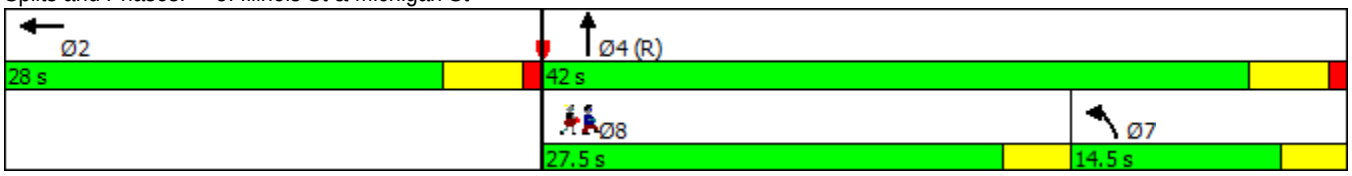
Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

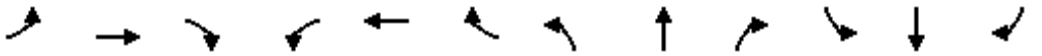
c Critical Lane Group

Phase Number	2	4	7	8
Movement	WBT	NBT	NBL	Ped
Lead/Lag			Lag	Lead
Lead-Lag Optimize			Yes	Yes
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	28	42	14.5	27.5
Maximum Split (%)	40.0%	60.0%	20.7%	39.3%
Minimum Split (s)	27.2	34.2	7.5	27.5
Yellow Time (s)	4.2	4.2	3.5	3.5
All-Red Time (s)	1	1	0	0
Minimum Initial (s)	10	10	4	4
Vehicle Extension (s)	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	6	12		7
Flash Dont Walk (s)	16	17		17
Dual Entry	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	47.6	5.6	33.1	5.6
End Time (s)	5.6	47.6	47.6	33.1
Yield/Force Off (s)	0.4	42.4	44.1	29.6
Yield/Force Off 170(s)	54.4	25.4	44.1	12.6
Local Start Time (s)	42	0	27.5	0
Local Yield (s)	64.8	36.8	38.5	24
Local Yield 170(s)	48.8	19.8	38.5	7

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	70
Offset: 5.6 (8%), Referenced to phase 4:NBT, Start of Green	

Splits and Phases: 5: Illinois St & Michigan St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	232	0	0	34	34	24	1964	196	0	0	0
Future Volume (vph)	120	232	0	0	34	34	24	1964	196	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	12	12	12	12
Total Lost time (s)		5.0			5.0		3.5	5.2				
Lane Util. Factor		0.95			0.95		1.00	0.91				
Frt		1.00			0.93		1.00	0.99				
Flt Protected		0.98			1.00		0.95	1.00				
Satd. Flow (prot)		3480			3274		1652	4682				
Flt Permitted		0.82			1.00		0.95	1.00				
Satd. Flow (perm)		2906			3274		1652	4682				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	252	0	0	37	37	26	2135	213	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	17	0	0	0	0
Lane Group Flow (vph)	0	382	0	0	71	0	26	2331	0	0	0	0
Turn Type	Perm	NA			NA		Prot	NA				
Protected Phases		4			4		5	2				
Permitted Phases	4											
Actuated Green, G (s)		23.0			23.0		15.0	36.8				
Effective Green, g (s)		23.0			23.0		15.0	36.8				
Actuated g/C Ratio		0.33			0.33		0.21	0.53				
Clearance Time (s)		5.0			5.0		3.5	5.2				
Lane Grp Cap (vph)		954			1075		354	2461				
v/s Ratio Prot					0.02		0.02	c0.50				
v/s Ratio Perm		c0.13										
v/c Ratio		0.40			0.07		0.07	0.95				
Uniform Delay, d1		18.2			16.1		22.0	15.7				
Progression Factor		1.00			1.00		1.57	1.98				
Incremental Delay, d2		1.3			0.1		0.2	5.6				
Delay (s)		19.4			16.2		34.7	36.7				
Level of Service		B			B		C	D				
Approach Delay (s)		19.4			16.2			36.6			0.0	
Approach LOS		B			B			D			A	

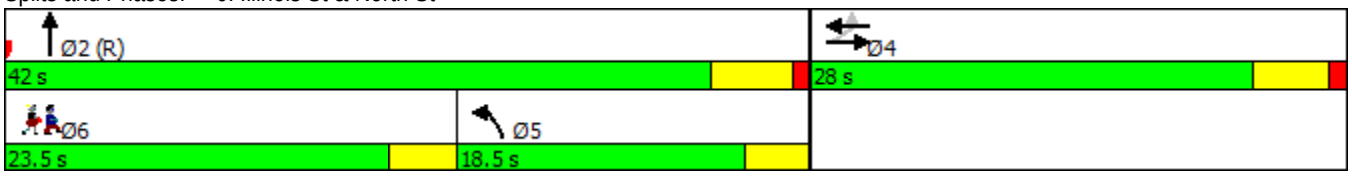
Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

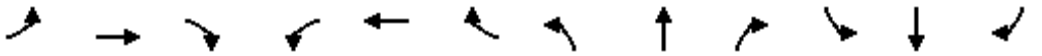
c Critical Lane Group

Phase Number	2	4	5	6
Movement	NBT	EBWB	NBL	Ped
Lead/Lag			Lag	Lead
Lead-Lag Optimize			Yes	Yes
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	42	28	18.5	23.5
Maximum Split (%)	60.0%	40.0%	26.4%	33.6%
Minimum Split (s)	25.2	28	7.5	23.5
Yellow Time (s)	4.2	4	3.5	3.5
All-Red Time (s)	1	1	0	0
Minimum Initial (s)	10	10	4	4
Vehicle Extension (s)	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	7		7
Flash Dont Walk (s)	13	16		13
Dual Entry	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	51.1	23.1	4.6	51.1
End Time (s)	23.1	51.1	23.1	4.6
Yield/Force Off (s)	17.9	46.1	19.6	1.1
Yield/Force Off 170(s)	4.9	30.1	19.6	58.1
Local Start Time (s)	0	42	23.5	0
Local Yield (s)	36.8	65	38.5	20
Local Yield 170(s)	23.8	49	38.5	7

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	70
Offset: 51.1 (73%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 6: Illinois St & North St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	18	0	0	66	13	19	2088	6	0	0	0
Future Volume (vph)	21	18	0	0	66	13	19	2088	6	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	12	12	12	12
Total Lost time (s)		5.0			5.0		3.5	5.0				
Lane Util. Factor		1.00			1.00		1.00	0.91				
Frt		1.00			0.98		1.00	1.00				
Flt Protected		0.97			1.00		0.95	1.00				
Satd. Flow (prot)		1814			1822		1652	4744				
Flt Permitted		0.87			1.00		0.95	1.00				
Satd. Flow (perm)		1615			1822		1652	4744				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	20	0	0	72	14	21	2270	7	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	43	0	0	84	0	21	2277	0	0	0	0
Turn Type	Perm	NA			NA		Prot	NA				
Protected Phases		8			4		5	2				
Permitted Phases	8											
Actuated Green, G (s)		23.0			23.0		13.0	37.0				
Effective Green, g (s)		23.0			23.0		13.0	37.0				
Actuated g/C Ratio		0.33			0.33		0.19	0.53				
Clearance Time (s)		5.0			5.0		3.5	5.0				
Lane Grp Cap (vph)		530			598		306	2507				
v/s Ratio Prot					c0.05		0.01	c0.48				
v/s Ratio Perm		0.03										
v/c Ratio		0.08			0.14		0.07	0.91				
Uniform Delay, d1		16.2			16.5		23.5	15.0				
Progression Factor		1.00			1.00		0.53	0.18				
Incremental Delay, d2		0.3			0.5		0.2	2.7				
Delay (s)		16.5			17.0		12.7	5.4				
Level of Service		B			B		B	A				
Approach Delay (s)		16.5			17.0			5.4			0.0	
Approach LOS		B			B			A			A	

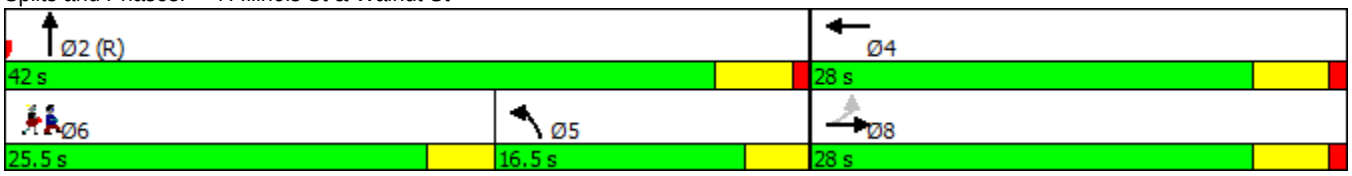
Intersection Summary			
HCM 2000 Control Delay	6.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

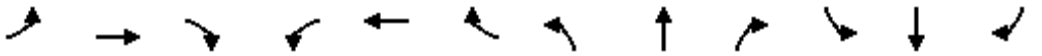
c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NBT	WBT	NBL	Ped	EBTL
Lead/Lag			Lag	Lead	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max
Maximum Split (s)	42	28	16.5	25.5	28
Maximum Split (%)	60.0%	40.0%	23.6%	36.4%	40.0%
Minimum Split (s)	27	27	7.5	25.5	23
Yellow Time (s)	4	4	3.5	3.5	4
All-Red Time (s)	1	1	0	0	1
Minimum Initial (s)	15	10	4	4	10
Vehicle Extension (s)	0.2	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	7	9		7	0
Flash Dont Walk (s)	15	13		15	7
Dual Entry	No	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	61.6	33.6	17.1	61.6	33.6
End Time (s)	33.6	61.6	33.6	17.1	61.6
Yield/Force Off (s)	28.6	56.6	30.1	13.6	56.6
Yield/Force Off 170(s)	13.6	43.6	30.1	68.6	49.6
Local Start Time (s)	0	42	25.5	0	42
Local Yield (s)	37	65	38.5	22	65
Local Yield 170(s)	22	52	38.5	7	58

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	65
Offset: 61.6 (88%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 7: Illinois St & Walnut St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	195	0	0	106	67	26	1985	123	0	0	0
Future Volume (vph)	54	195	0	0	106	67	26	1985	123	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	12	12	12	12
Total Lost time (s)		5.0			5.0		3.5	5.2				
Lane Util. Factor		1.00			1.00		1.00	0.91				
Frt		1.00			0.95		1.00	0.99				
Flt Protected		0.99			1.00		0.95	1.00				
Satd. Flow (prot)		1843			1765		1652	4705				
Flt Permitted		0.89			1.00		0.95	1.00				
Satd. Flow (perm)		1665			1765		1652	4705				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	212	0	0	115	73	28	2158	134	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	271	0	0	185	0	28	2282	0	0	0	0
Turn Type	Perm	NA			NA		Prot	NA				
Protected Phases		4			4		5	2				
Permitted Phases	4											
Actuated Green, G (s)		23.0			23.0		16.0	36.8				
Effective Green, g (s)		23.0			23.0		16.0	36.8				
Actuated g/C Ratio		0.33			0.33		0.23	0.53				
Clearance Time (s)		5.0			5.0		3.5	5.2				
Lane Grp Cap (vph)		547			579		377	2473				
v/s Ratio Prot					0.10		0.02	c0.49				
v/s Ratio Perm		c0.16										
v/c Ratio		0.50			0.32		0.07	0.92				
Uniform Delay, d1		18.8			17.6		21.2	15.3				
Progression Factor		1.00			1.00		0.38	0.04				
Incremental Delay, d2		3.2			1.5		0.2	3.4				
Delay (s)		22.0			19.1		8.3	4.0				
Level of Service		C			B		A	A				
Approach Delay (s)		22.0			19.1			4.1			0.0	
Approach LOS		C			B			A			A	

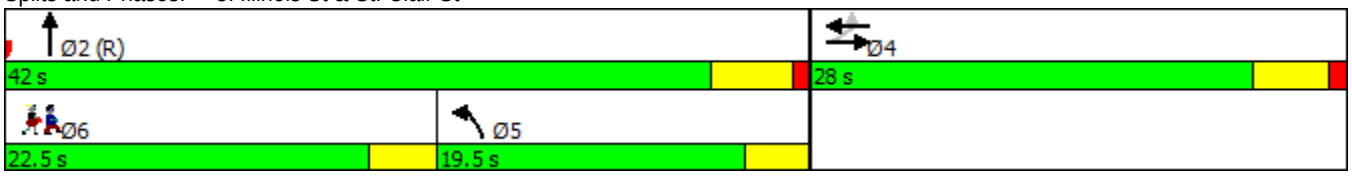
Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	5	6
Movement	NBT	EBWB	NBL	Ped
Lead/Lag			Lag	Lead
Lead-Lag Optimize			Yes	Yes
Recall Mode	Max	Max	Max	Max
Maximum Split (s)	42	28	19.5	22.5
Maximum Split (%)	60.0%	40.0%	27.9%	32.1%
Minimum Split (s)	24.2	28	7.5	22.5
Yellow Time (s)	4.2	4	3.5	3.5
All-Red Time (s)	1	1	0	0
Minimum Initial (s)	10	10	4	4
Vehicle Extension (s)	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7	7		7
Flash Dont Walk (s)	12	16		12
Dual Entry	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	2.1	44.1	24.6	2.1
End Time (s)	44.1	2.1	44.1	24.6
Yield/Force Off (s)	38.9	67.1	40.6	21.1
Yield/Force Off 170(s)	26.9	51.1	40.6	9.1
Local Start Time (s)	0	42	22.5	0
Local Yield (s)	36.8	65	38.5	19
Local Yield 170(s)	24.8	49	38.5	7

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	70
Offset: 2.1 (3%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 8: Illinois St & St. Clair St



Movement	EBL	EBT	WBR	WBR2	NBL	NBT	NBR
Lane Configurations							
Traffic Volume (vph)	251	760	119	146	46	2004	57
Future Volume (vph)	251	760	119	146	46	2004	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10	12
Total Lost time (s)		5.0	5.0		3.5	5.2	
Lane Util. Factor		0.95	0.88		1.00	0.91	
Frt		1.00	0.85		1.00	1.00	
Flt Protected		0.99	1.00		0.95	1.00	
Satd. Flow (prot)		3496	2787		1652	4727	
Flt Permitted		0.99	1.00		0.95	1.00	
Satd. Flow (perm)		3496	2787		1652	4727	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	273	826	129	159	50	2178	62
RTOR Reduction (vph)	0	0	51	0	0	4	0
Lane Group Flow (vph)	0	1099	237	0	50	2236	0
Turn Type	Perm	NA	Prot		Prot	NA	
Protected Phases		8	4		5	2	
Permitted Phases	8		4				
Actuated Green, G (s)		30.0	30.0		8.0	29.8	
Effective Green, g (s)		30.0	30.0		8.0	29.8	
Actuated g/C Ratio		0.43	0.43		0.11	0.43	
Clearance Time (s)		5.0	5.0		3.5	5.2	
Lane Grp Cap (vph)		1498	1194		188	2012	
v/s Ratio Prot			0.09		0.03	c0.47	
v/s Ratio Perm		0.31					
v/c Ratio		0.73	0.20		0.27	1.11	
Uniform Delay, d1		16.7	12.5		28.3	20.1	
Progression Factor		1.00	1.00		0.69	0.47	
Incremental Delay, d2		3.2	0.4		1.5	53.7	
Delay (s)		19.9	12.9		21.0	63.2	
Level of Service		B	B		C	E	
Approach Delay (s)		19.9				62.3	
Approach LOS		B				E	

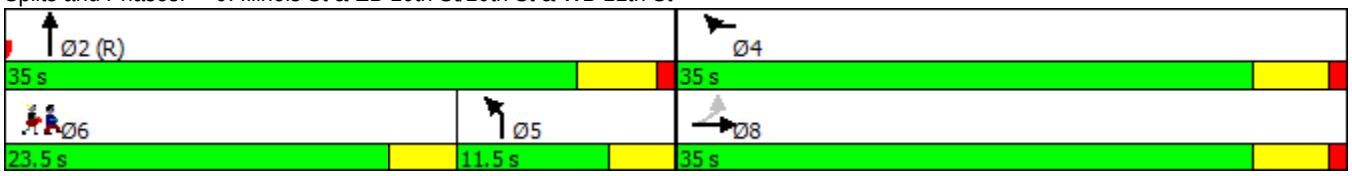
Intersection Summary			
HCM 2000 Control Delay	45.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

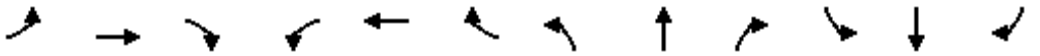
c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NBT	WBR	NBL	Ped	EBTL
Lead/Lag			Lag	Lead	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max
Maximum Split (s)	35	35	11.5	23.5	35
Maximum Split (%)	50.0%	50.0%	16.4%	33.6%	50.0%
Minimum Split (s)	32.2	33	7.5	23.5	33
Yellow Time (s)	4.2	4	3.5	3.5	4
All-Red Time (s)	1	1	0	0	1
Minimum Initial (s)	10	10	4	4	10
Vehicle Extension (s)	0.2	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	7	8		5	8
Flash Dont Walk (s)	20	20		15	20
Dual Entry	No	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	25.2	60.2	48.7	25.2	60.2
End Time (s)	60.2	25.2	60.2	48.7	25.2
Yield/Force Off (s)	55	20.2	56.7	45.2	20.2
Yield/Force Off 170(s)	35	0.2	56.7	30.2	0.2
Local Start Time (s)	0	35	23.5	0	35
Local Yield (s)	29.8	65	31.5	20	65
Local Yield 170(s)	9.8	45	31.5	5	45

Intersection Summary	
Cycle Length	70
Control Type	Pretimed
Natural Cycle	80
Offset: 25.2 (36%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 9: Illinois St & EB 10th St/10th St & WB 11th St





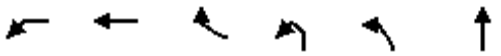
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	318	0	0	0	0	0	1937	482	0	0	0
Future Volume (vph)	21	318	0	0	0	0	0	1937	482	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	10	10	12	12	12
Total Lost time (s)	5.8	5.8						5.8	5.8			
Lane Util. Factor	0.91	0.91						0.91	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	1.00						1.00	1.00			
Satd. Flow (prot)	1610	3389						4746	1478			
Flt Permitted	0.95	1.00						1.00	1.00			
Satd. Flow (perm)	1610	3389						4746	1478			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	346	0	0	0	0	0	2105	524	0	0	0
RTOR Reduction (vph)	13	27	0	0	0	0	0	0	188	0	0	0
Lane Group Flow (vph)	8	321	0	0	0	0	0	2105	336	0	0	0
Turn Type	Split	NA						NA	Perm			
Protected Phases	4	4						2				
Permitted Phases									2			
Actuated Green, G (s)	27.0	27.0						31.4	31.4			
Effective Green, g (s)	27.0	27.0						31.4	31.4			
Actuated g/C Ratio	0.39	0.39						0.45	0.45			
Clearance Time (s)	5.8	5.8						5.8	5.8			
Vehicle Extension (s)	0.2	0.2						0.2	0.2			
Lane Grp Cap (vph)	621	1307						2128	662			
v/s Ratio Prot	0.01	c0.09						c0.44				
v/s Ratio Perm									0.23			
v/c Ratio	0.01	0.25						0.99	0.51			
Uniform Delay, d1	13.3	14.6						19.1	13.8			
Progression Factor	1.00	1.00						0.27	0.01			
Incremental Delay, d2	0.0	0.0						3.9	0.3			
Delay (s)	13.3	14.6						9.1	0.4			
Level of Service	B	B						A	A			
Approach Delay (s)		14.5			0.0			7.4			0.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4
Movement	NBT	EBTL
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	C-Max	Ped
Maximum Split (s)	37.2	32.8
Maximum Split (%)	53.1%	46.9%
Minimum Split (s)	29.8	32.8
Yellow Time (s)	3.5	3.5
All-Red Time (s)	2.3	2.3
Minimum Initial (s)	15	15
Vehicle Extension (s)	0.2	0.2
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)	5	6
Flash Dont Walk (s)	19	21
Dual Entry	Yes	Yes
Inhibit Max	Yes	Yes
Start Time (s)	34	1.2
End Time (s)	1.2	34
Yield/Force Off (s)	65.4	28.2
Yield/Force Off 170(s)	46.4	7.2
Local Start Time (s)	0	37.2
Local Yield (s)	31.4	64.2
Local Yield 170(s)	12.4	43.2

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	75
Offset: 34 (49%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 10: Illinois St & I-65 Off-Ramp/11th St



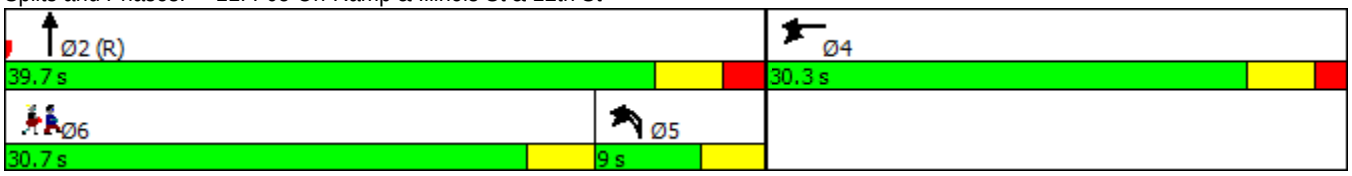
Movement	WBL	WBT	WBR	NBL2	NBL	NBT
Lane Configurations						
Traffic Volume (vph)	347	99	71	958	18	1077
Future Volume (vph)	347	99	71	958	18	1077
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10
Total Lost time (s)	5.3	5.3			3.5	5.8
Lane Util. Factor	0.97	0.95			1.00	0.91
Frt	1.00	0.94			1.00	1.00
Flt Protected	0.95	1.00			0.95	1.00
Satd. Flow (prot)	3433	3318			1652	4746
Flt Permitted	0.95	1.00			0.95	1.00
Satd. Flow (perm)	3433	3318			1652	4746
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	377	108	77	1041	20	1171
RTOR Reduction (vph)	0	27	0	0	278	0
Lane Group Flow (vph)	377	158	0	0	783	1171
Turn Type	Split	NA		Prot	Prot	NA
Protected Phases	4	4		5	5	2
Permitted Phases						
Actuated Green, G (s)	25.0	25.0			42.2	33.9
Effective Green, g (s)	25.0	25.0			42.2	33.9
Actuated g/C Ratio	0.36	0.36			0.60	0.48
Clearance Time (s)	5.3	5.3			3.5	5.8
Vehicle Extension (s)	0.2	0.2			0.2	0.2
Lane Grp Cap (vph)	1226	1185			995	2298
v/s Ratio Prot	c0.11	0.05			c0.47	0.25
v/s Ratio Perm						
v/c Ratio	0.31	0.13			0.79	0.51
Uniform Delay, d1	16.2	15.2			10.5	12.4
Progression Factor	1.00	1.00			8.19	0.06
Incremental Delay, d2	0.1	0.0			2.3	0.3
Delay (s)	16.3	15.2			88.3	1.1
Level of Service	B	B			F	A
Approach Delay (s)		15.9				42.5
Approach LOS		B				D

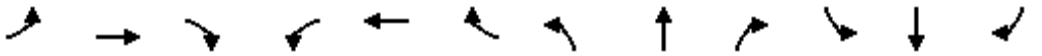
Intersection Summary			
HCM 2000 Control Delay	37.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	5	6
Movement	NBT	WBTL	NBL	Ped
Lead/Lag			Lag	Lead
Lead-Lag Optimize				
Recall Mode	C-Max	Ped	Max	None
Maximum Split (s)	39.7	30.3	9	30.7
Maximum Split (%)	56.7%	43.3%	12.9%	43.9%
Minimum Split (s)	10.8	30.3	7.5	30.5
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	2.3	1.8	0	0
Minimum Initial (s)	5	5	4	5
Vehicle Extension (s)	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		4		2
Flash Dont Walk (s)		21		25
Dual Entry	Yes	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	45	14.7	5.7	45
End Time (s)	14.7	45	14.7	5.7
Yield/Force Off (s)	8.9	39.7	11.2	2.2
Yield/Force Off 170(s)	8.9	18.7	11.2	47.2
Local Start Time (s)	0	39.7	30.7	0
Local Yield (s)	33.9	64.7	36.2	27.2
Local Yield 170(s)	33.9	43.7	36.2	2.2

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	110
Offset: 45 (64%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 11: I-65 On-Ramp & Illinois St & 12th St





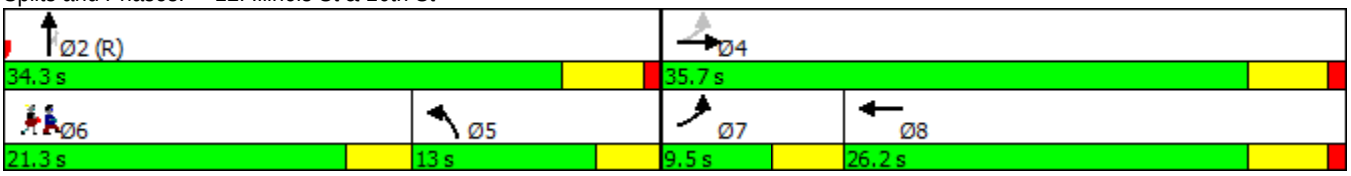
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	703	0	0	570	10	161	1111	132	0	0	0
Future Volume (vph)	170	703	0	0	570	10	161	1111	132	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	12	12	12
Total Lost time (s)	3.8	5.2			5.2		3.5	5.2	5.2			
Lane Util. Factor	1.00	0.95			0.95		1.00	0.91	1.00			
Frt	1.00	1.00			1.00		1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00			
Satd. Flow (prot)	1770	3539			3530		1652	4746	1478			
Flt Permitted	0.29	1.00			1.00		0.95	1.00	1.00			
Satd. Flow (perm)	540	3539			3530		1652	4746	1478			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	764	0	0	620	11	175	1208	143	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	46	0	0	0
Lane Group Flow (vph)	185	764	0	0	628	0	175	1208	97	0	0	0
Turn Type	pm+pt	NA			NA		Prot	NA	Perm			
Protected Phases	7	4			8		5	2				
Permitted Phases	4								2			
Actuated Green, G (s)	19.5	19.5			10.0		9.8	40.1	40.1			
Effective Green, g (s)	19.5	19.5			10.0		9.8	40.1	40.1			
Actuated g/C Ratio	0.28	0.28			0.14		0.14	0.57	0.57			
Clearance Time (s)	3.8	5.2			5.2		3.5	5.2	5.2			
Vehicle Extension (s)	0.2	0.2			0.2		0.2	0.2	0.2			
Lane Grp Cap (vph)	250	985			504		231	2718	846			
v/s Ratio Prot	0.06	c0.22			c0.18		c0.11	c0.25				
v/s Ratio Perm	0.15								0.07			
v/c Ratio	0.74	0.78			1.25		0.76	0.44	0.12			
Uniform Delay, d1	21.4	23.2			30.0		29.0	8.6	6.8			
Progression Factor	1.00	1.00			1.00		0.80	0.24	0.01			
Incremental Delay, d2	9.5	3.5			126.9		11.1	0.5	0.3			
Delay (s)	30.8	26.8			156.9		34.4	2.5	0.3			
Level of Service	C	C			F		C	A	A			
Approach Delay (s)		27.6			156.9			6.0			0.0	
Approach LOS		C			F			A			A	

Intersection Summary			
HCM 2000 Control Delay	43.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Phase Number	2	4	5	6	7	8
Movement	NBT	EBTL	NBL	Ped	EBL	WBT
Lead/Lag			Lag	Lead	Lead	Lag
Lead-Lag Optimize					Yes	Yes
Recall Mode	C-Min	None	None	None	None	None
Maximum Split (s)	34.3	35.7	13	21.3	9.5	26.2
Maximum Split (%)	49.0%	51.0%	18.6%	30.4%	13.6%	37.4%
Minimum Split (s)	27.2	26.2	7.5	20.5	9.5	26.2
Yellow Time (s)	4.2	4.2	3.5	3.5	3.8	4.2
All-Red Time (s)	1	1	0	0	0	1
Minimum Initial (s)	20	20	4	4	4	15
Vehicle Extension (s)	0.2	0.2	0.2	0.2	0.2	0.2
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	7	6		2		6
Flash Dont Walk (s)	15	15		15		15
Dual Entry	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	16	50.3	37.3	16	50.3	59.8
End Time (s)	50.3	16	50.3	37.3	59.8	16
Yield/Force Off (s)	45.1	10.8	46.8	33.8	56	10.8
Yield/Force Off 170(s)	30.1	65.8	46.8	18.8	56	65.8
Local Start Time (s)	0	34.3	21.3	0	34.3	43.8
Local Yield (s)	29.1	64.8	30.8	17.8	40	64.8
Local Yield 170(s)	14.1	49.8	30.8	2.8	40	49.8

Intersection Summary	
Cycle Length	70
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 16 (23%), Referenced to phase 2:NBT, Start of Green	

Splits and Phases: 12: Illinois St & 16th St



Appendix B
Microsimulation Analysis Results

Table B-1: College Avenue AM Peak Hour - Existing and Build Conditions MOEs by Approach

			AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
ID	Intersection	Approach	No Build	Build	No Build	Build	No Build	Build
1	College Ave & 66th St	NB	1,006	810	0.6	14.9	A	B
		SB	1,005	816	0.2	9.2	A	A
		WB	17	22	9.5	22.5	A	C
		EB	21	25	11.4	24.7	B	C
2	College Ave & 64th St	NB	931	833	12.9	11.7	B	B
		SB	945	782	8.4	12.5	A	B
		WB	146	169	8.3	8.9	A	A
		EB	119	125	8.4	9.1	A	A
3	College Ave & Canal Point Development (New signal)	NB	n/a	888	n/a	5.8	n/a	A
		SB	n/a	823	n/a	37.3	n/a	D
		WB	n/a	114	n/a	31.5	n/a	C
4	College Ave & Westfield Blvd /Broad Ripple Ave	NB	723	632	16.2	20.5	B	C
		SB	899	859	14.7	44.1	B	D
		WB	580	609	25.1	26.3	C	C
		EB	353	362	27.8	29.8	C	C
5	College Ave & Parking Garage (New signal)	NB	n/a	641	n/a	34.3	n/a	C
		SB	n/a	538	n/a	1.4	n/a	A
		EB	n/a	33	n/a	29.1	n/a	C
6	College Ave & 61st St (#)	NB	n/a	568	n/a	30.5	n/a	C
		SB	n/a	558	n/a	39.7	n/a	D
		EB	n/a	65	n/a	21.2	n/a	C
		WB	n/a	98	n/a	21.9	n/a	C
7	College Ave & Kessler Blvd	NB	726	670	18.8	28.8	B	C
		SB	655	566	27.9	24.8	C	C
		WB	831	852	23.2	36.3	C	D
		EB	590	583	22.1	28.1	C	C
8	College Ave & AT&T Development (New signal)	NB	n/a	676	n/a	25.6	n/a	C
		SB	n/a	623	n/a	11.7	n/a	B
		EB	n/a	49	n/a	26.0	n/a	C
9	College Ave & 57th St	NB	694	655	1.9	27.3	A	C
		SB	709	626	6.9	7.7	A	A
		WB	42	75	32.3	21.9	C	C
		EB	35	59	27.6	19.0	C	B
10	College Ave & 54th St	NB	623	571	10.0	16.2	A	B
		SB	750	652	18.8	24.6	B	C
		WB	297	325	34.1	27.1	C	C
		EB	148	158	30.4	27.0	C	C
11	College Ave & 52nd St	NB	583	542	17.1	20.7	B	C
		SB	772	679	10.5	26.1	B	C
		WB	381	428	21.3	28.6	C	C
		EB	158	178	27.3	24.2	C	C
12	College Ave & 49th St	NB	542	509	7.3	15.3	A	B
		SB	843	748	6.6	31.8	A	C
		WB	78	100	25.4	18.1	C	B
		EB	51	73	28.5	20.8	C	C
13	College Ave & 46th St	NB	535	485	8.9	20.2	A	C
		SB	824	710	13.3	17.2	B	B
		WB	382	385	29.5	21.0	C	C
		EB	190	208	26.6	19.0	C	B

ID	Intersection	Approach	AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
14	College Ave & 42nd St	NB	525	453	5.4	18.9	A	B
		SB	871	739	9.2	17.7	A	B
		WB	80	95	22.3	15.8	C	B
		EB	88	130	26.9	17.3	C	B
15	College Ave & 38th Ave	NB	429	367	33.1	54.8	C	D
		SB	907	814	41.9	45.7	D	D
		WB	1,167	1,158	19.9	35.7	B	D
		EB	1,148	1,132	19.1	30.1	B	C

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-2: College Avenue AM Peak Hour - Existing and Build Conditions MOEs by Intersection

ID	Intersection	Type of operations	AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	College Ave & 66th St (#)	Unsignalized/ Signalized	2,049	1,673	11.4	12.3	B	B
2	College Ave & 64th St	Signalized	2,141	1,909	10.3	11.6	B	B
3	College Ave & Canal Point Development	Signalized (New)	n/a	1,825	n/a	21.6	n/a	C
4	College Ave & Westfield Blvd /Broad Ripple Ave	Signalized	2,555	2,462	19.3	31.6	B	C
5	College Avenue & Parking Garage	Signalized (New)	n/a	1,212	n/a	19.5	n/a	B
6	College Ave & 61st St (#)	Signalized	n/a	1,289	n/a	33.4	n/a	C
7	College Ave & Kessler Blvd	Signalized	2,802	2,671	22.9	30.2	C	C
8	College Ave & AT&T Development	Signalized (New)	n/a	1,348	n/a	19.2	n/a	B
9	College Ave & 57th St	Signalized	1,480	1,415	5.8	18.0	A	B
10	College Ave & 54th St	Signalized	1,818	1,706	19.2	22.5	B	C
11	College Ave & 52nd St	Signalized	1,894	1,827	16.1	24.9	B	C
12	College Ave & 49th St	Signalized	1,514	1,430	8.6	24.4	A	C
13	College Ave & 46th St	Signalized	1,931	1,788	16.6	19.0	B	B
14	College Ave & 42nd St	Signalized	1,564	1,417	9.6	17.9	A	B
15	College Ave & 38th Ave	Signalized	3,651	3,471	26.7	38.3	C	D

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-3: College Avenue AM Peak Hour – Average Travel Times (Seconds)

ID	Segment	AM No Build			AM Build			
		All Vehicles	Car	Bus	All Vehicles	Car	Bus	BRT
1	NB: 38th St to 66th St	476	461	1,453	636	637	n/a	866
2	SB: 66th St to 38th St	544	536	2,321	672	671	n/a	966

Table B-4: College Avenue AM Peak Hour – Average Speeds (MPH)

			AM No Build			AM Build			
ID	Segment	Distance (feet)	All Vehicles	Car	Bus	All Vehicles	Car	Bus	BRT
1	NB: 38th St to Broad Ripple Ave	18,214	26.1	26.9	8.5	19.5	19.5	n/a	14.3
2	SB: Broad Ripple Ave to 38th St	18,214	22.8	23.2	5.4	18.5	18.5	n/a	12.9

s

Table B-5: College Avenue PM Peak Hour - Existing and Build Conditions MOEs by Approach

			PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
ID	Intersection	Approach	No Build	Build	No Build	Build	No Build	Build
1	College Ave & 66th St	NB	1,007	791	0.8	21.5	A	C
		SB	1,210	1,052	0.4	11.1	A	B
		WB	20	22	13.3	27.8	B	C
		EB	23	25	15.2	30.6	B	C
2	College Ave & 64th St	NB	948	752	6.4	10.2	A	B
		SB	1,070	974	5.9	25.3	A	C
		WB	206	250	23.8	91.8	C	**F**
		EB	214	227	32.4	42.9	C	D
3	College Ave & Canal Point Development (New signal)	NB	n/a	1,592	n/a	3.0	n/a	A
		SB	n/a	983	n/a	60.5	n/a	**E**
		WB	n/a	134	n/a	43.9	n/a	D
4	College Ave & Westfield Blvd /Broad Ripple Ave	NB	876	660	26.1	25.5	C	C
		SB	998	1,112	26.8	33.8	C	C
		WB	619	642	31.7	55.1	C	**E**
		EB	552	546	45.7	110.2	D	**F**
5	College Ave & Parking Garage (New signal)	NB	n/a	655	n/a	87.5	n/a	A
		SB	n/a	737	n/a	4.9	n/a	**E**
		EB	n/a	33	n/a	58.5	n/a	D
6	College Ave & 61st St (#)	NB	n/a	645	n/a	23.5	n/a	C
		SB	n/a	766	n/a	83.1	n/a	**F**
		EB	n/a	55	n/a	26.5	n/a	C
		WB	n/a	96	n/a	28.1	n/a	C
7	College Ave & Kessler Blvd	NB	998	759	33.4	37.0	C	D
		SB	656	716	99.7	53.6	**F**	D
		WB	871	843	28.9	64.9	C	**E**
		EB	687	709	26.2	52.3	C	D
8	College Ave & AT&T Development (New signal)	NB	n/a	772	n/a	78.6	n/a	**E**
		SB	n/a	738	n/a	18.0	n/a	B
		EB	n/a	91	n/a	24.4	n/a	C
9	College Ave & 57th St	NB	1,003	788	2.7	83.1	A	**F**
		SB	658	682	5.8	28.1	A	C
		WB	42	75	30.4	27.2	C	C
		EB	100	117	33.0	26.8	C	C
10	College Ave & 54th St	NB	1,061	866	28.6	44.4	C	D
		SB	606	652	37.0	44.5	D	D
		WB	351	364	42.4	57.8	D	**E**
		EB	279	309	40.8	39.0	D	D
11	College Ave & 52nd St	NB	1,094	897	36.7	56.6	D	**E**
		SB	551	617	35.0	42.9	D	D
		WB	388	423	19.7	55.5	B	**E**
		EB	394	407	48.0	57.0	D	**E**
12	College Ave & 49th St	NB	1,105	932	15.8	30.7	B	C
		SB	584	621	7.4	26.3	A	C
		WB	75	111	28.2	24.7	C	C
		EB	183	199	30.9	25.5	C	C
13	College Ave & 46th St	NB	1,127	917	13.4	78.2	B	**E**
		SB	562	583	13.0	40.8	B	D

			PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
ID	Intersection	Approach	No Build	Build	No Build	Build	No Build	Build
		WB	423	450	36.8	34.6	D	C
		EB	333	336	34.2	28.2	C	C
14	College Ave & 42nd St	NB	1,076	867	7.6	24.2	A	C
		SB	590	602	5.5	13.0	A	B
		WB	95	106	31.4	22.0	C	C
		EB	116	154	31.6	22.7	C	C
15	College Ave & 38th Ave	NB	917	721	40.6	37.8	D	D
		SB	618	659	34.7	54.6	C	D
		WB	1,298	1,295	24.3	37.2	C	D
		EB	1,546	1,546	32.6	28.9	C	C

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-6: College Avenue PM Peak Hour - Existing and Build Conditions MOEs by Intersection

ID	Intersection	Type of operations	PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	College Ave & 66th St (#)	Unsignalized/ Signalized	2,260	1,890	15.2	15.9	C	B
2	College Ave & 64th St	Signalized	2,438	2,203	9.9	29.5	A	C
3	College Ave & Canal Point Development	Signalized (New)	n/a	2,709	n/a	25.9	n/a	C
4	College Ave & Westfield Blvd /Broad Ripple Ave	Signalized	3,045	2,960	31.0	50.7	C	D
5	College Avenue & Parking Garage	Signalized (New)	n/a	1,425	n/a	44.1	n/a	D
6	College Ave & 61st St (#)	Signalized	n/a	1,562	n/a	53.1	n/a	D
7	College Ave & Kessler Blvd	Signalized	3,212	3,027	44.2	52.3	D	D
8	College Ave & AT&T Development	Signalized (New)	n/a	1,601	n/a	47.6	n/a	D
9	College Ave & 57th St	Signalized	1,803	1,662	6.2	54.1	A	D
10	College Ave & 54th St	Signalized	2,297	2,191	34.4	45.9	C	D
11	College Ave & 52nd St	Signalized	2,427	2,344	35.4	52.9	D	D
12	College Ave & 49th St	Signalized	1,947	1,863	15.2	28.4	B	C
13	College Ave & 46th St	Signalized	2,445	2,286	20.2	52.7	C	D
14	College Ave & 42nd St	Signalized	1,877	1,729	9.6	20.0	A	C
15	College Ave & 38th Ave	Signalized	4,379	4,221	32.1	37.0	C	D

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-7: College Avenue PM Peak Hour – Average Travel Times (Seconds)

ID	Segment	PM No Build			PM Build			
		All Vehicles	Car	Bus	All Vehicles	Car	Bus	BRT
1	NB: 38th St to 66th St	546	536	1,677	992	992	n/a	897
2	SB: 66th St to 38th St	660	647	2,146	879	878	n/a	1,088

Table B-8: College Avenue PM Peak Hour – Average Speeds (MPH)

ID	Segment	Distance (feet)	PM No Build			PM Build			
			All Vehicles	Car	Bus	All Vehicles	Car	Bus	BRT
1	NB: 38th St to Broad Ripple Ave	18,214	22.7	23.1	7.4	14.4	14.4	n/a	13.8
2	SB: Broad Ripple Ave to 38th St	18,214	18.8	19.1	5.8	18.8	18.9	n/a	11.4

Table B-9: 38th Street AM Peak Hour - Existing and Build Conditions MOEs by Approach

			AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
ID	Intersection	Approach	No Build	Build	No Build	Build	No Build	Build
1	38th St & Meridian St	NB	474	354	31.4	41.8	C	D
		SB	1,569	796	32.3	241.6	C	**F**
		WB	1,565	1,588	14.8	19.4	B	B
		EB	1,470	1,473	24.1	29.4	C	C
2	38th St & Pennsylvania Ave	NB	54	54	42.5	48.5	D	D
		SB	202	200	54.3	61.6	D	**E**
		WB	1,567	1,588	4.7	4.9	A	A
		EB	1,340	1,314	1.8	2.6	A	A
3	38th St &Washington Ave	NB	94	94	35.7	37.0	D	D
		SB	134	134	43.8	41.6	D	D
		WB	1,556	1,572	4.7	6.7	A	A
		EB	1,296	1,272	2.6	1.8	A	A
4	38th St & Central Ave	NB	84	84	39.8	41.3	D	D
		SB	355	351	44.0	48.8	D	D
		WB	1,509	1,519	3.0	3.6	A	A
		EB	1,309	1,296	3.4	8.1	A	A
5	38th St/BRT Station & Park Ave (#)	WB	n/a	1,438	n/a	3.9	n/a	A
		EB	n/a	1,188	n/a	4.1	n/a	A
6	38th St & College Ave	NB	431	352	37.0	37.2	D	D
		SB	932	802	40.6	72.0	D	**E**
		WB	1,175	1,199	16.5	26.0	B	C
		EB	1,155	1,146	9.8	20.2	A	C

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-10: 38th Street AM Peak Hour - Existing and Build Conditions MOEs by Intersection

			AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
ID	Intersection	Type of operations	No Build	Build	No Build	Build	No Build	Build
1	38th St & Meridian St	Signalized	5,078	4,211	24.5	66.8	C	**E**
2	38th St & Pennsylvania Ave	Signalized	3,163	3,156	7.2	8.3	A	A
3	38th St &Washington Ave	Signalized	3,080	3,072	6.5	7.1	A	A
4	38th St & Central Ave	Signalized	3,257	3,250	8.6	11.2	A	B
5	38th St/BRT Station & Park Ave (#)	Unsignalized/Signalized	n/a	2,626	n/a	4.0	n/a	A
6	38th St & College Ave	Signalized	3,693	3,499	22.9	35.8	C	D

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-11: 38th Street AM Peak Hour - Average Travel Times (Seconds)

		AM No Build			AM Build		
ID	Segment	All Vehicles	Car	Bus	All Vehicles	Car	BRT
1	EB: Meridian St to College Ave	80	80	193	90	90	176
2	WB: College Ave to Meridian St	81	81	198	88	88	174

Table B-12: 38th Street AM Peak Hour - Average Speeds (MPH)

			AM No Build			AM Build		
ID	Segment	Distance (feet)	All Vehicles	Car	Bus	All Vehicles	Car	BRT
1	EB: Meridian St to College Ave	3,315	28.1	28.2	11.7	25.0	25.1	12.8
2	WB: College Ave to Meridian St	3,355	27.7	27.9	11.4	26.1	26.1	13.1

Table B-13: 38th Street PM Peak Hour - Existing and Build Conditions MOEs by Approach

			PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
ID	Intersection	Approach	No Build	Build	No Build	Build	No Build	Build
1	38th St & Meridian St	NB	1,256	1,046	56.0	68.0	**E**	**E**
		SB	831	669	28.6	42.8	C	D
		WB	1,463	1,454	11.9	21.8	B	C
		EB	1,644	1,639	23.9	45.5	C	D
2	38th St & Pennsylvania Ave	NB	345	351	44.3	65.1	D	**E**
		SB	164	163	57.1	54.7	**E**	D
		WB	1,434	1,435	5.6	8.0	A	A
		EB	1,606	1,622	4.3	3.9	A	A
3	38th St &Washington Ave	NB	366	364	47.2	49.5	D	D
		SB	56	56	39.5	32.9	D	C
		WB	1,399	1,408	5.3	7.2	A	A
		EB	1,702	1,722	2.3	3.1	A	A
4	38th St & Central Ave	NB	258	258	51.4	49.3	D	D
		SB	247	243	43.4	40.4	D	D
		WB	1,355	1,361	2.6	11.1	A	B
		EB	1,739	1,752	5.0	9.1	A	A
5	38th St/BRT Station & Park Ave (#)	WB	n/a	1,447	n/a	6.6	n/a	A
		EB	n/a	1,634	n/a	9.0	n/a	A
6	38th St & College Ave	NB	914	725	42.8	40.7	D	D
		SB	650	555	35.3	43.4	D	D
		WB	1,300	1,301	20.6	32.7	C	C
		EB	1,571	1,598	17.8	23.2	B	C

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-14: 38th Street PM Peak Hour - Existing and Build Conditions MOEs by Intersection

			PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
ID	Intersection	Type of operations	No Build	Build	No Build	Build	No Build	Build
1	38th St & Meridian St	Signalized	5,194	4,808	29.0	42.9	C	D
2	38th St & Pennsylvania Ave	Signalized	3,549	3,571	11.2	13.9	B	B
3	38th St &Washington Ave	Signalized	3,523	3,550	8.7	9.9	A	A
4	38th St & Central Ave	Signalized	3,599	3,614	10.0	14.8	B	B
5	38th St/BRT Station & Park Ave (#)	Unsignalized /Signalized	n/a	3,081	n/a	7.9	n/a	A
6	38th St & College Ave	Signalized	4,435	4,179	26.4	31.9	C	C

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-15: 38th Street PM Peak Hour - Average Travel Times (Seconds)

		PM No Build			PM Build		
ID	Segment	All Vehicles	Car	Bus	All Vehicles	Car	BRT
1	EB: Meridian St to College Ave	81	81	192	94	94	185
2	WB: College Ave to Meridian St	92	92	203	109	109	188

Table B-16: 38th Street PM Peak Hour - Average Speeds (MPH)

			PM No Build			PM Build		
ID	Segment	Distance (feet)	All Vehicles	Car	Bus	All Vehicles	Car	BRT
1	EB: Meridian St to College Ave	3,315	27.7	27.8	11.7	23.9	24.0	12.2
2	WB: College Ave to Meridian St	3,355	24.5	24.6	11.1	20.9	20.9	12.2

Table B-17: Meridian Street AM Peak Hour - Existing and Build Conditions MOEs by Approach

			AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
ID	Intersection	Approach	No Build	Build	No Build	Build	No Build	Build
1	Meridian St & 38th St	NB	474	354	31.4	41.8	C	D
		SB	1,569	796	32.3	241.6	C	**F**
		EB	1,470	1,473	24.1	29.4	C	C
		WB	1,565	1,588	14.8	19.4	B	B
2	Meridian St & 34th St	NB	720	559	14.9	36.6	B	D
		SB	1,270	870	15.0	22.8	B	C
		EB	108	137	16.0	34.3	B	C
		WB	205	245	20.2	71.1	C	**E**
3	Meridian St & 32nd St	NB	753	563	4.9	15.1	A	B
		SB	1,682	1,097	16.1	87.0	B	**F**
		EB	46	56	22.1	62.3	C	**E**
		WB	45	48	31.6	57.7	C	**E**
4	Meridian St & 30th St	NB	659	500	7.0	12.8	A	B
		SB	1,674	1,154	20.4	55.0	C	D
		WB	572	599	20.3	31.3	C	C
5	Meridian St & 29th St	NB	629	474	9.9	14.4	A	B
		SB	1,242	819	6.5	7.0	A	A
		EB	483	494	20.2	31.6	C	C
6	Meridian St & 28th St	NB	631	494	9.0	13.0	A	B
		SB	1,055	686	9.0	10.0	A	B
		EB	13	25	18.1	28.6	B	C
		WB	78	98	21.0	28.5	C	C
7	Meridian St & Fall Creek Pkwy	NB	492	390	26.3	13.7	C	B
		SB	1,225	735	32.3	43.0	C	D
		EB	263	271	47.4	32.9	D	C
		WB	1,770	1,727	41.9	43.8	D	D
8	Meridian St & 25th St (#)	NB	n/a	526	n/a	16.8	n/a	B
		SB	n/a	1,119	n/a	13.4	n/a	B
		WB	n/a	257	n/a	29.4	n/a	C
9	Meridian St & 22nd St	NB	706	533	9.2	18.6	A	B
		SB	1,548	1,163	23.5	30.1	C	C
		EB	131	169	24.1	32.4	C	C
		WB	183	201	25.8	38.7	C	D
10	Meridian St & 21st St	NB	695	582	44.8	34.6	D	C
		SB	1,281	999	13.9	18.5	B	B
		EB	395	371	30.6	65.8	C	**E**
		WB	82	95	25.7	40.2	C	D
11	Meridian St & 18th St	NB	737	551	8.1	9.0	A	A
		SB	1,285	914	11.3	12.9	B	B
		EB	77	94	21.3	26.1	C	C
		WB	59	66	19.8	25.0	B	C
12	Meridian St & 16th St	NB	710	554	20.0	16.1	C	B
		SB	1,290	986	13.0	8.8	B	A
		EB	526	529	17.7	24.3	B	C
		WB	838	832	18.6	28.4	B	C

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-18: Meridian Street AM Peak Hour - Existing and Build Conditions MOEs by Intersection

			AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
ID	Intersection	Type of operations	No Build	Build	No Build	Build	No Build	Build
1	Meridian St & 38th St	Signalized	5,078	4,211	24.5	66.8	C	**E**
2	Meridian St & 34th St	Signalized	2,303	1,811	15.5	34.5	B	C
3	Meridian St & 32nd St	Signalized	2,526	1,764	13.1	62.4	B	**E**
4	Meridian St & 30th St	Signalized	2,905	2,253	17.3	39.3	B	D
5	Meridian St & 29th St	Signalized	2,354	1,787	10.2	15.7	B	B
6	Meridian St & 28th St	Signalized	1,777	1,303	9.6	12.9	A	B
7	Meridian St & Fall Creek Pkwy	Signalized	3,750	3,123	37.1	38.9	D	D
8	Meridian St & 25th St (#)	Signalized	n/a	1,902	n/a	16.5	n/a	B
9	Meridian St & 22nd St	Signalized	2,568	2,066	19.8	28.2	B	C
10	Meridian St & 21st St	Signalized	2,453	2,047	25.8	32.7	C	C
11	Meridian St & 18th St	Signalized	2,158	1,625	10.8	12.8	B	B
12	Meridian St & 16th St	Signalized	3,364	2,901	16.6	18.7	B	B

Notes: Unacceptable LOS shown in **BOLD**; **#** = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-19: Meridian Street AM Peak Hour – Average Travel Times (Seconds)

		AM No Build			AM Build		
ID	Segment	All Vehicles	Car	Bus	All Vehicles	Car	BRT
1	NB: 18th St to 38th St	392.9	384.4	702.0	425.5	425.4	513.8
2	SB: 38th St to 18th St	415.5	412.9	546.2	520.2	520.1	452.4

Table B-20: Meridian Street AM Peak Hour – Average Speeds (MPH)

			AM No Build			AM Build		
ID	Segment	Distance (feet)	All Vehicles	Car	Bus	All Vehicles	Car	BRT
1	NB: 18th St to 38th St	12,439	23.1	23.6	12.9	21.3	21.3	16.5
2	SB: 38th St to 18th St	12,451	21.8	22.0	16.6	17.4	17.4	18.8

Table B-21: Meridian Street PM Peak Hour - Existing and Build Conditions MOEs by Approach

			PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
ID	Intersection	Approach	No Build	Build	No Build	Build	No Build	Build
1	Meridian St & 38th St	NB	1,256	1,046	56.0	68.0	**E**	**E**
		SB	831	669	28.6	42.8	C	D
		EB	1,644	1,639	23.9	45.5	C	D
		WB	1,463	1,454	11.9	21.8	B	C
2	Meridian St & 34th St	NB	1,251	961	11.4	24.0	B	C
		SB	754	560	13.2	15.8	B	B
		EB	219	254	18.9	42.0	B	D
		WB	210	246	23.6	104.7	C	**F**
3	Meridian St & 32nd St	NB	1,469	1,101	10.7	27.8	B	C
		SB	859	687	6.5	17.8	A	B
		EB	57	70	20.0	31.0	C	C
		WB	26	35	22.4	34.2	C	C
4	Meridian St & 30th St	NB	1,650	1,239	10.4	19.0	B	B
		SB	1,023	799	15.7	19.1	B	B
		WB	625	653	20.9	34.8	C	C
5	Meridian St & 29th St	NB	1,231	928	18.9	13.9	B	B
		SB	626	473	10.2	17.8	B	B
		EB	757	743	17.1	38.0	B	D
6	Meridian St & 28th St	NB	1,250	962	15.9	16.7	B	B
		SB	676	499	8.4	6.2	A	A
		EB	70	72	23.2	29.3	C	C
		WB	48	69	21.2	24.8	C	C
7	Meridian St & Fall Creek Pkwy	NB	1,288	1,042	32.3	15.3	C	B
		SB	808	532	24.9	19.0	C	B
		EB	849	847	33.4	29.5	C	C
		WB	599	591	25.2	23.1	C	C
8	Meridian St & 25th St (#)	NB	n/a	1,019	n/a	14.4	n/a	B
		SB	n/a	644	n/a	6.6	n/a	A
		WB	n/a	167	n/a	25.0	n/a	C
9	Meridian St & 22nd St	NB	1,356	1,022	7.2	39.7	A	D
		SB	829	676	33.9	51.2	C	D
		EB	200	240	30.0	43.3	C	D
		WB	238	252	33.4	72.6	C	**E**
10	Meridian St & 21st St	NB	1,479	1,132	19.5	58.6	B	**E**
		SB	763	620	9.3	8.1	A	A
		EB	247	234	23.7	38.1	C	D
		WB	52	67	21.9	32.5	C	C
11	Meridian St & 18th St	NB	1,320	967	4.7	66.5	A	**E**
		SB	864	645	8.4	11.5	A	B
		EB	343	383	42.3	54.8	D	D
		WB	44	52	32.3	106.4	C	**F**
12	Meridian St & 16th St	NB	1,211	950	17.2	38.2	B	D
		SB	861	677	32.5	33.4	C	C
		EB	958	870	21.9	64.3	C	**E**
		WB	689	655	21.1	62.3	C	**E**

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-22: Meridian Street PM Peak Hour - Existing and Build Conditions MOEs by Intersection

			PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
ID	Intersection	Type of operations	No Build	Build	No Build	Build	No Build	Build
1	Meridian St & 38th St	Signalized	5,194	4,808	29.0	42.9	C	D
2	Meridian St & 34th St	Signalized	2,434	2,021	13.7	33.8	B	C
3	Meridian St & 32nd St	Signalized	2,411	1,893	9.5	24.4	A	C
4	Meridian St & 30th St	Signalized	3,298	2,691	14.0	22.9	B	C
5	Meridian St & 29th St	Signalized	2,614	2,144	16.3	23.1	B	C
6	Meridian St & 28th St	Signalized	2,044	1,602	13.8	14.3	B	B
7	Meridian St & Fall Creek Pkwy	Signalized	3,544	3,012	29.7	21.5	C	C
8	Meridian St & 25th St (#)	Signalized	n/a	1,830	n/a	12.6	n/a	B
9	Meridian St & 22nd St	Signalized	2,623	2,190	19.7	47.4	B	D
10	Meridian St & 21st St	Signalized	2,541	2,053	16.9	40.2	B	D
11	Meridian St & 18th St	Signalized	2,571	2,047	11.5	48.0	B	D
12	Meridian St & 16th St	Signalized	3,719	3,152	22.7	49.4	C	D

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-23: Meridian Street PM Peak Hour – Average Travel Times (Seconds)

		PM No Build			PM Build		
ID	Segment	All Vehicles	Car	Bus	All Vehicles	Car	BRT
1	NB: 18th St to 38th St	433.7	429.8	733.1	664.0	663.9	515.2
2	SB: 38th St to 18th St	400.1	395.7	554.9	380.3	380.2	446.6

Table B-24: Meridian Street PM Peak Hour – Average Speeds (MPH)

			PM No Build			PM Build		
ID	Segment	Distance (feet)	All Vehicles	Car	Bus	All Vehicles	Car	BRT
1	NB: 18th St to 38th St	12,439	20.9	21.1	12.4	13.7	13.7	16.5
2	SB: 38th St to 18th St	12,451	22.7	22.9	16.3	23.9	23.9	19.0

Table B-25: Capitol Avenue AM Peak Hour - Existing and Build Conditions MOEs by Approach

			AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
ID	Intersection	Approach	No Build	Build	No Build	Build	No Build	Build
1	Capitol Ave & 18th St	SB	2,037	1,380	10.9	10.8	B	B
		EB	53	53	15.4	15.3	B	B
2	Capitol Ave & 16th St	SB	2,029	1,445	8.9	18.8	A	B
		EB	598	570	19.8	20.3	B	C
		WB	858	807	16.2	17.7	B	B
3	Capitol Ave & 12th St	SB	1,972	1,339	7.7	5.1	A	A
		EB	10	10	9.8	9.2	A	A
		WB	600	558	44.7	20.9	D	C
4	Capitol Ave & 11th St	SB	2,348	1,711	5.5	6.3	A	A
		WB	297	296	16.4	20.7	B	C
5	Capitol Ave & 10th St	SB	1,904	1,336	5.5	2.1	A	A
		EB	374	354	17.0	19.4	B	B
6	Capitol Ave & 9th St (#)	SB	n/a	1,301	n/a	3.6	n/a	A
		EB	n/a	69	n/a	13.6	n/a	B
		WB	n/a	58	n/a	19.3	n/a	B
7	Capitol Ave & St. Clair St	SB	1,677	1,169	11.7	1.5	B	A
		EB	111	109	14.1	14.4	B	B
		WB	184	158	20.1	22.6	C	C
8	Capitol Ave & Walnut St	SB	1,713	1,190	2.8	2.3	A	A
		WB	0	0	0.0	0.0	A	A
9	Capitol Ave & North St	SB	1,947	1,385	6.2	4.1	A	A
		EB	46	48	13.0	15.3	B	B
		WB	153	145	14.9	20.5	B	C
10	Capitol Ave & Michigan St	SB	1,783	1,359	11.9	8.1	B	A
		WB	1,060	1,061	13.9	19.1	B	B
11	Capitol Ave & Vermont St	SB	1,633	1,166	16.3	5.4	B	A
		EB	131	119	9.4	14.6	A	B
		WB	175	167	16.4	23.5	B	C
12	Capitol Ave & New York St/ Indiana Ave	SB	1,424	1,079	22.7	10.5	C	B
		SEB	415	378	39.4	38.2	D	D
		EB	658	630	18.4	21.1	B	C
13	Capitol Ave & Ohio St	SB	1,459	1,067	22.1	6.9	C	A
		EB	224	207	17.2	18.1	B	B
		WB	483	423	13.1	15.1	B	B
14	Capitol Ave & Market St	SB	1,571	1,114	14.2	4.4	B	A
		WB	69	67	32.5	18.3	C	B
15	Capitol Ave & Washington St	SB	1,228	925	17.0	6.6	B	A
		WB	985	976	12.8	17.9	B	B
16	Capitol Ave & Maryland St	SB	1,063	791	28.7	20.4	C	C
		EB	703	700	11.9	9.1	B	A

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-26: Capitol Avenue AM Peak Hour - Existing and Build Conditions MOEs by Intersection

ID	Intersection	Type of operations	AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	Capitol Ave & 18th St	Signalized	2,090	1,495	11.0	11.4	B	B
2	Capitol Ave & 16th St	Signalized	3,485	2,828	12.6	18.8	B	**B**
3	Capitol Ave & 12th St	Signalized	2,582	1,913	16.3	9.7	B	A
4	Capitol Ave & 11th St	Signalized	2,645	2,013	6.7	8.4	A	A
5	Capitol Ave & 10th St	Signalized	2,278	1,696	7.4	5.7	A	A
6	Capitol Ave & 9th St (#)	Signalized	n/a	1,434	n/a	4.8	n/a	A
7	Capitol Ave & St. Clair St	Signalized	1,972	1,442	12.6	4.8	B	A
8	Capitol Ave & Walnut St	Signalized	1,713	1,196	2.8	2.3	A	A
9	Capitol Ave & North St	Signalized	2,146	1,584	7.0	5.9	A	A
10	Capitol Ave & Michigan St	Signalized	2,843	2,426	12.7	13.0	B	B
11	Capitol Ave & Vermont St	Signalized	1,939	1,458	15.8	8.3	B	A
12	Capitol Ave & New York St/Indiana Ave	Signalized	2,497	2,093	24.3	18.7	C	B
13	Capitol Ave & Ohio St	Signalized	2,166	1,703	19.6	10.3	B	B
14	Capitol Ave & Market St	Signalized	1,640	1,187	15.0	5.3	B	A
15	Capitol Ave & Washington St	Signalized	2,213	1,901	15.1	12.4	B	B
16	Capitol Ave & Maryland St	Signalized	1,766	1,491	22.0	15.1	C	B

Notes: Unacceptable LOS shown in **BOLD**; # = Un-signalized under existing conditions, signalized intersection in the build scenario

Table B-27: Capitol Avenue AM Peak Hour – Average Travel Times (Seconds)

ID	Segment	AM No Build			AM Build			
		All Vehicles	Car	Bus	All Vehicles	Car	Bus	BRT
1	NB: Washington St to 18th St	n/a	n/a	n/a	n/a	n/a	n/a	396.9
2	SB: 18th St to Washington St	324.6	321.9	1028.8	219.4	219.2	n/a	375.0

Table B-28: Capitol Avenue AM Peak Hour – Average Speeds (MPH)

ID	Segment	Distance (feet)	AM No Build			AM Build			
			All Vehicles	Car	Bus	All Vehicles	Car	Bus	BRT
1	NB: Washington St to 18th St	8,371	n/a	n/a	n/a	n/a	n/a	n/a	14.3
2	SB: 18th St to Washington St	8,400	17.6	17.8	5.6	23.5	23.5	n/a	15.3

Table B-29: Washington Street & Illinois Street AM Peak Hour - Existing and Build Conditions MOEs by Approach

ID	Intersection	Approach	AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	Washington St & Illinois St	NB	1,733	1,732	25.3	29.2	C	C
		WB	1,234	1,247	21.0	20.7	C	C

Table B-30: Washington Street & Illinois Street AM Peak Hour - Existing and Build Conditions MOEs by Intersection

ID	Intersection	Type of operation	AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	Washington St & Illinois St	Signalized	2,967	2,979	23.5	25.6	C	C

Table B-31: Washington Street & Illinois Street PM Peak Hour - Existing and Build Conditions MOEs by Approach

ID	Intersection	Approach	PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	Washington St & Illinois St	NB	1,640	1,649	46.6	28.7	D	C
		WB	1,001	1,015	19.8	20.1	B	C

Table B-32: Washington Street & Illinois Street PM Peak Hour - Existing and Build Conditions MOEs by Intersection

ID	Intersection	Type of operation	PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	Washington St & Illinois St	Signalized	2,641	2,664	36.4	25.4	D	C

Table B-33: Virginia Avenue & South Street & East Street AM Peak Hour - Existing and Build Conditions MOEs by Approach

ID	Intersection	Approach	AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	Virginia Avenue & South Street & East Street	NB	372	384	60.1	67.1	**E**	**E**
		SB	499	487	58.9	90.7	**E**	**F**
		WB	742	743	47.9	84.8	D	**F**
		EB	215	220	95.4	66.5	**F**	**E**
		NWB	348	349	81.8	70.5	**F**	**E**
		SEB	73	78	55.7	56.1	**E**	**E**

Notes: Unacceptable LOS shown in **BOLD**

Table B-34: Virginia Avenue & South Street & East Street AM Peak Hour - Existing and Build Conditions MOEs by Intersection

ID	Intersection	Type of operations	AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	Virginia Avenue & South Street & East Street	Signalized	372	2,261	62.4	78.1	**E**	**E**

Notes: Unacceptable LOS shown in **BOLD**

Table B-35: Virginia Avenue & South Street & East Street PM Peak Hour - Existing and Build Conditions MOEs by Approach

ID	Intersection	Approach	PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	Virginia Avenue & South Street & East Street	NB	328	329	74.5	87.7	**E**	**F**
		SB	1,005	970	58.4	76.9	**E**	**E**
		WB	128	131	40.6	54.3	D	D
		EB	842	869	64.0	70.8	**E**	**E**
		NWB	191	192	69.2	71.9	**E**	**E**
		SEB	431	101	107.8	117.2	**F**	**F**

Notes: Unacceptable LOS shown in **BOLD**

Table B-36: Virginia Avenue & South Street & East Street PM Peak Hour - Existing and Build Conditions MOEs by Intersection

ID	Intersection	Approach	PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	Virginia Avenue & South Street & East Street	Signalized	2,925	2,592	69.0	76.3	**E**	**E**

Notes: Unacceptable LOS shown in **BOLD**

Table B-37: Virginia Avenue & Shelby Street & Prospect Street AM Peak Hour - Existing and Build Conditions MOEs by Approach

ID	Intersection	Approach	AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	Virginia Avenue & Shelby Street & Prospect Street	NB	443	447	16.3	16.7	B	B
		SEB	156	158	39.0	40.1	D	D
		WB	174	172	40.9	41.7	D	D
2	Virginia Avenue & Woodlawn Avenue (*)	NWB	468	470	5.5	5.9	A	A
		SEB	160	162	7.7	8.5	A	A
		EB	28	28	36.9	36.1	D	D
3	Shelby Street & Morris Street (*)	SWB	28	28	29.3	29.4	C	C
		NB	440	444	11.4	12.4	B	B
		SB	151	153	5.5	5.0	A	A

Notes: Unacceptable LOS shown in **BOLD;** * = Traffic volume and signal timing inputs were estimated.

Table B-38: Virginia Avenue & Shelby Street & Prospect Street AM Peak Hour - Existing and Build Conditions MOEs by Intersection

ID	Intersection	Type of operations	AM Volumes (vph)		AM Delay (sec/veh)		AM HCM LOS	
			No Build	Build	No Build	Build	No Build	Build
1	Virginia Avenue & Shelby Street & Prospect Street	Signalized	773	777	26.4	27.0	C	C
2	Virginia Avenue & Woodlawn Avenue (*)	Signalized	684	688	8.3	8.7	A	A
3	Shelby Street & Morris Street (*)	Signalized	643	649	12.9	13.4	B	B

Notes: Unacceptable LOS shown in **BOLD;** * = Traffic volume and signal timing inputs were estimated.

Table B-39: Virginia Avenue & Shelby Street & Prospect Street PM Peak Hour - Existing and Build Conditions MOEs by Approach

			PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
ID	Intersection	Approach	No Build	Build	No Build	Build	No Build	Build
1	Virginia Avenue & Shelby Street & Prospect Street	NB	319	323	27.7	29.4	C	C
		SEB	484	486	25.6	27.9	C	C
		WB	209	207	39.8	40.6	D	D
2	Virginia Avenue & Woodlawn Avenue (*)	NWB	280	282	14.0	12.8	B	B
		SEB	483	485	13.3	14.0	B	B
		EB	28	28	41.6	41.9	D	D
3	Shelby Street & Morris Street (*)	SWB	28	28	26.9	27.7	C	C
		NB	321	325	9.1	13.0	A	B
		SB	362	364	3.0	3.1	A	A

Notes: Unacceptable LOS shown in **BOLD**; * = Traffic volume and signal timing inputs were estimated.

Table B-40: Virginia Avenue & Shelby Street & Prospect Street PM Peak Hour - Existing and Build Conditions MOEs by Intersection

			PM Volumes (vph)		PM Delay (sec/veh)		PM HCM LOS	
ID	Intersection	Approach	No Build	Build	No Build	Build	No Build	Build
1	Virginia Avenue & Shelby Street & Prospect Street	Signalized	1,012	1,016	29.2	30.9	C	C
2	Virginia Avenue & Woodlawn Avenue (*)	Signalized	819	823	15.0	15.0	B	B
3	Shelby Street & Morris Street (*)	Signalized	736	742	8.1	9.9	A	A

Notes: Unacceptable LOS shown in **BOLD**; * = Traffic volume and signal timing inputs were estimated.

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