Gannett Fleming

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October 13, 2006

Edwards & Kelcey
Attn: Mr. Stephen E. Cunningham, P.E.
Project Manager
3500 Horizon Boulevard
Suite 250
Trevose, PA 19053-4900

Dear Mr. Cunningham :

On behalf of HSP Gaming, LP, Gannett Fleming, Inc. is responding to a letter from Edwards and Kelsey, dated September 11, 2006, that details their review of the December 2005 Traffic Impact Study for the SugarHouse Casino.

The Traffic Impact Study is a preliminary document which has subsequently been revised and updated. We are enclosing two copies of the *Updated Traffic Impact Analysis* for your review. You will find many references in this letter to this updated report.

Below, we respond to the comments and findings of your letter.

Approach

1. Since December 2005 the phasing concept for Sugarhouse Casino has been revised and the revised phases are reflected in the updated traffic study. The traffic study now addresses three phases. They are:

   - Interim Casino – 1,500 slots, opening year 2008
   - Phase I Casino – 3,000 slots, opening year 2009
   - Phase II Casino – 5,000 slots, event center and hotel, potentially opening year 2012.

   The updated analysis includes the three intersections on Delaware Avenue and additional intersections on Girard and Frankford Avenues. Analysis was conducted for each of the three phases and for the build and no-build condition in 2022 (ten years following the projected completion of the Phase II facility). Analyses were performed for the Friday evening peak hour, which is the period with heaviest volumes of traffic on the overall network, both with and without added casino traffic.

2. A general description of existing and proposed land use is included in the Updated Traffic Impact Analysis.

3. The traffic study was prepared by a team of experienced traffic engineers, and the Updated Traffic Impact Analysis will be stamped and signed by a professional engineer. Brief biographies of the team are included in an appendix.

4. The updated traffic study includes analysis of additional intersections, including:

- Delaware Avenue/Shackamaxon Street (signalized)
- Delaware Avenue/Frankford Avenue (signalized)
- Delaware Avenue/Penn Street (signalized)
- Frankford Avenue/Laurel Street (unsignalized)
- Girard Avenue/Berks Street (signalized)
- Girard Avenue/Montgomery Avenue (signalized)
- Girard Avenue/Columbia Avenue (signalized)
- Girard Avenue/Marlborough Street (signalized)
- Girard Avenue/Shackamaxon Street (unsignalized)
- Girard Avenue/Frankford Avenue (signalized)

Data Collection

5. Additional traffic counts were taken in order to analyze the additional intersections.

6. The updated study includes diagrams showing site location, site peak hour trip generation and trip distribution.

7. A site plan is included in the updated report indicating proposed access points, including service delivery, bus, and valet / self-park traffic movements internal to the site.

8. The updated traffic study includes an appendix with the raw traffic data.

9. No Saturday analysis was conducted because, unlike sections of Delaware Avenue that are further south, there are no 'big box' retail facilities using this section of Delaware Avenue for access. The land use is predominantly industrial and generates very low volumes of background traffic. The analysis is based on the Friday peak evening hour which is the period when a combination of background and casino traffic create the higest roadway volumes.

10. Peak Hour Facts (PHFs) are calculated for each approach.

Trip Generation

11. The updated study includes a section on trip generation so that the assumptions can now be verified by a reviewer. A specialist in casino traffic, Urban Systems, Inc., was added to the team to assist in making the trip generation information as accurate as possible. In addition to utilizing their previous experience at locations in New Orleans and the Greater Chicago area, Urban Systems visited the Niagara Falls casino to observe traffic generation patterns for an urban casino of SugarHouse's size. The credentials of Denis J. Finigan, President of Urban Systems, Inc., are included in an appendix to the report.

12. Diagrams illustrating how casino traffic utilizes roadways is included in the updated study.

Analytical Approach/Tools Used

13. The study utilizes a 1% annual growth rate for background traffic, based on two separate sources. Traffic generated by five condominium towers adjacent to the site (Waterfront Square) is also included. The updated study now includes a general discussion of land use and future development in the study area. An appendix to the updated study lists many of the projects being proposed in the area; but as with all future development, it is difficult to estimate how many of these proposals will become a reality. A combination of market demand, availability of developable parcels, and community interest in a more measured development of the area is likely to result in modest and incremental change that can be accounted for in the annual one percent growth in traffic.

14. Class counts for heavy vehicles have been verified in the field and were found to be within the 5% range. Therefore, the assumption in the analysis of 5% is reasonable. Once the project is in detailed design, full classification counts will be conducted and used for the final, detailed analysis.

15. Peak hour trip generation was determined by taking the volumes for the peak three hours and assigning half of that traffic to the peak hour.

16. Trip distribution diagrams are included in the updated study.

17. In the updated study 5% of trips are assumed to be by public transit or pedestrian mode. Sidewalks are provided on Delaware Avenue and on all local streets in the vicinity of the project. There are no anticipated impacts to the public transit system from this number of trips.

18. These specific tables (Table 6 and Table 7) are no longer included in the study. More information is provided in the updated study.

19. The analysis in the preliminary study has been changed. A 2022 build and no-build analysis are included in the updated study.

Special Event and Open Day Plans

20. The updated study addresses plans for special events and opening day.

Mitigation Measures

21. Because the phases of development have changed for the overall project, the mitigation measures are different from those described in the initial study. Detailed mitigation measures for each of the phases are described in the updated study.

22. Our proposed mitigation measures are now more fully defined in the updated study.

23. Same as comment #22.

Other

24. The lane confiruration for Delaware Avenue and Shackamaxon Street are shown correctly in the updated study.

25. Shackamaxon Street is correctly described in the updated study.

26. Diagrams and text for the Frankford Avenue/Delaware Avenue intersection conform with one another in the updated study.

27. Intersections on Delaware Avenue operate on a 90-second cycle and intersections on local streets operate on a 60-second cycle. These cycle lengths are consistent with other intersections in the City of Philadelphia.

28. Control delay is correctly described in the original study document.

29. In the updated study the tables in the report correspond with the Synchro files. (The wrong version of the Synchro files may have been appended to the original study).

30. Same as above.

31. This is corrected in the updated study.

32. Tables and descriptions match one another in the updated study.

33. The wrong version of the Synchro files may have been appended to the original study.

We appreciate the effort and attention directed to the original study. We believe that the Updated Traffic Impact Analysis (attached) addresses these and other issues raised by community representatives. The SugarHouse team looks forward to a continuing dialogue with all interested parties regarding traffic and the SugarHouse Casino. We share a mutual goal: to minimize the impact of SugarHouse traffic on the surrounding area.

If you have any questions concerning this letter or the updated study, please contact me at 215-557-0106.

Sincerely,

GANNETT FLEMING, INC.

Susan P. Gibbons, R.A., AICP
Vice President

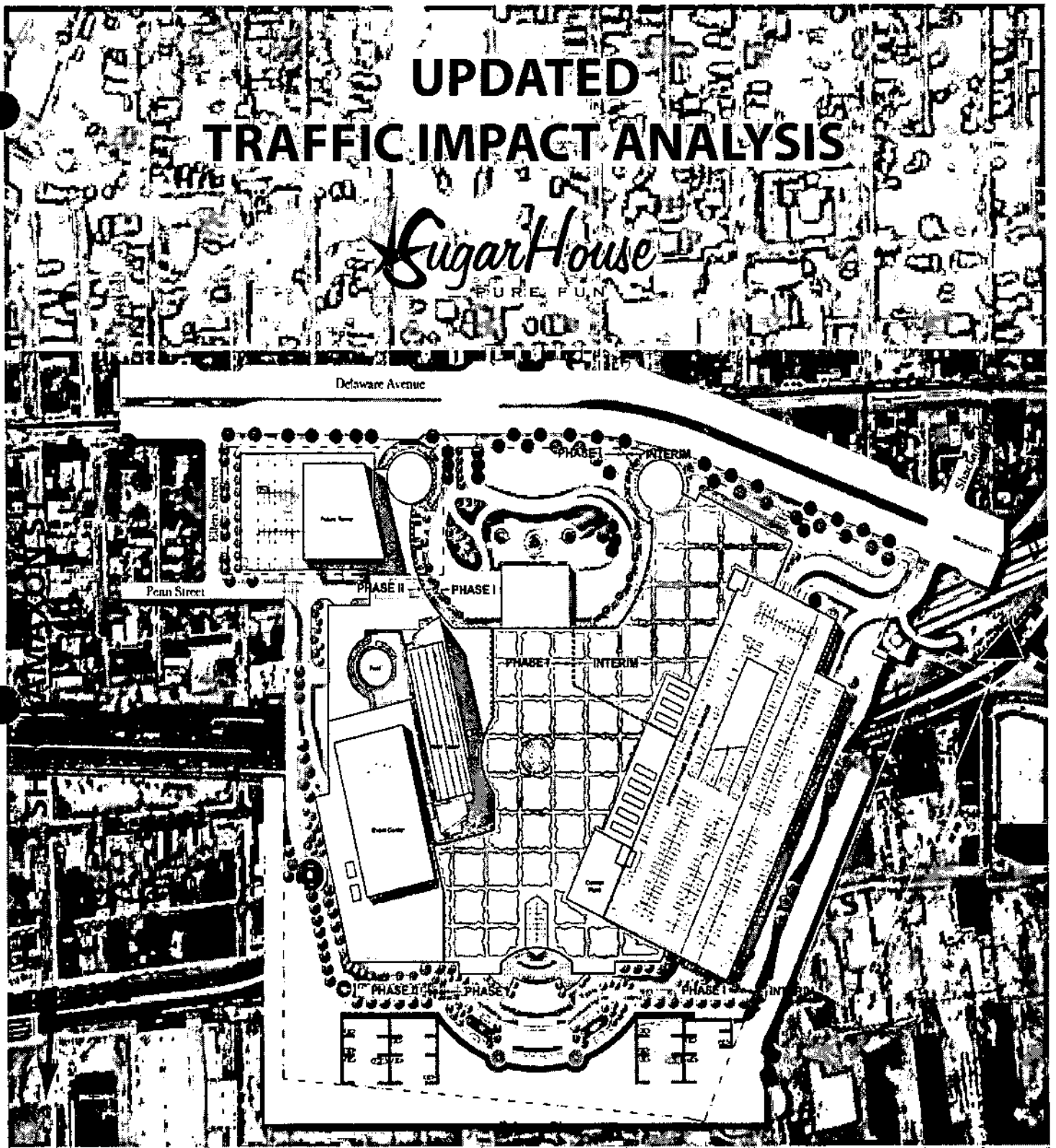
cc: Mr. Frank T. Donaghue, Esq.
Mr. Glenn Rowe, P.E., PennDOT
Mr. Stephen E. Cunningham, P.E., Edwards & Kelsey
Mr. Greg Carlin, HSP Gaming, LP
Mr. John M. Donnelly, Esq.

Attachment

UPDATED TRAFFIC IMPACT ANALYSIS

SugarHouse

PURE FUN



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1. EXECUTIVE SUMMARY

The goal of this traffic study is to evaluate the proposed SugarHouse Casino traffic impact on the surrounding local street network, determine measures to minimize impacts on neighborhood streets, and propose measures to optimize traffic operations during the most demanding traffic periods.

The SugarHouse Casino will be developed in three phases. The Interim Casino will consist of 1,500 slots; the Phase I Casino will consist of 3,000 slots; and the Phase II Casino will consist of 5,000 slots, a multi-purpose Event Center, and a 500-room luxury hi-rise hotel. The Interim Casino will include a 2,330-space self-park garage and valet parking; Phase I will include an additional 550-600 valet parking spaces; and Phase II will include an additional 900 standard parking spaces to the self-park garage and a second garage with approximately 540 additional spaces. The three phases are programmed to open in Years 2008, 2009, and 2012, respectively.

There are three main signalized access points to the SugarHouse Casino site along Delaware Avenue: Shackamaxon Street, Frankford Avenue, and Penn Street. These multiple site access and egress points are viewed as a critically important factor in on-site traffic management. Although the SugarHouse Casino site has three access points, most casino traffic will use two access and departure points: Shackamaxon Street and Frankford Avenue.

The major regional access point to the casino site is the I-95/Girard Avenue Interchange, which may carry up to eighty-five percent (northbound and southbound) of the traffic to the casino. The Interchange is programmed for major construction to improve I-95 access to and from Delaware Avenue and the casino site. The existing interchange is an inefficient access system which requires southbound traffic on I-95 to use Girard Avenue and other local streets to access the casino site.

The three proposed phases of casino development are closely aligned to the construction scheduling of the I-95/Girard Avenue Interchange improvements. The Interim Casino phase will open in 2008 and expand to Phase I around the anticipated commencement of Interchange construction. While dependent on market demand, Phase II is programmed to open at approximately the same time that the I-95/Girard Avenue Interchange is completed.

Although it is expected that casino-bound traffic will use Girard Avenue during the Interim Phase, this phase will generate the lowest volumes over a relatively short duration. During the I-95/Girard Avenue Interchange construction phase, PennDOT will implement a traffic management plan which may help to minimize the casino-bound traffic volumes on local roadways such as Berks Street and Frankford Avenue. After the I-95/Girard Avenue Interchange construction is completed and Phase II of casino development is completed, casino-bound traffic

from I-95 will have direct access to Delaware Avenue and the site, thereby minimizing impacts on local streets and neighborhoods.

In determining the most demanding traffic operational conditions, new traffic demand was added to the existing traffic volumes. Based on this analysis, a determination was made that the most operationally demanding period is the Friday PM peak period. Therefore, the analysis was focused on the Friday PM peak period. A detailed trip generation analysis was completed to establish casino-bound traffic demand. Results from the Philadelphia Gaming Advisory Task Force report were used extensively and field observations were conducted at other urban casino sites to estimate both the type and number of casino related trips. For other types of trips, information from the Institute of Transportation Engineers (ITE) Trip Generation Handbook was used. In addition, an annual traffic growth factor of one percent was applied to compensate for background traffic growth.

Transportation Demand Management measures were also applied to minimize traffic demand during peak traffic hours. These measures include scheduling employee working hours, event center activities, and line haul and group trips outside the peak traffic hours.

The traffic analysis for Interim Casino traffic conditions demonstrates that six (6) analyzed intersections along Girard Avenue will operate at overall Level of Service (LOS) C or better. In general, LOS D is acceptable in major urban areas. The overall LOS for the Interim Casino is at the same level as for existing conditions after traffic mitigation measures are applied. These mitigation measures include signal coordination and signal timing optimization. Similar to Girard Avenue, the analyzed intersections along Delaware Avenue are showing the same Levels of Service after implementation of the same traffic mitigation measures. Newly introduced left-turn movements from Delaware Avenue to the casino site have some impact on the approach delay but the impact on overall intersection delay is minimal.

In addition to operational mitigation measures, the Interim Casino plan suggests the introduction of measures that channel traffic from Girard Avenue to Berks Street and Frankford Avenue, thereby minimizing or eliminating casino-bound traffic on other residential streets. These measures which will require significant community input, could include prohibiting certain turns, implementing traffic calming techniques, and installing wayfinding and traffic restriction signage systems. The signage systems will guide vehicles to pre-designated streets and discourage vehicles from entering other local streets.

During Phases I and II of casino development, casino-bound traffic on Girard Avenue may level or taper off. While this may bring some decline in casino-bound traffic demand during Phases I and II, additional traffic may be added due to unrelated background traffic growth.

Unlike Girard Avenue, Delaware Avenue will experience an increase in traffic demand due to higher casino-bound traffic volumes during Phases I and II. The highest traffic demand is expected after Phase II is open due to more casino-bound traffic demand and the cumulative effects of unrelated background traffic growth. However, by utilizing mitigation measures such as coordinated traffic signals and optimized signal timing plans, and additional left-turn lane capacity at the intersections with both Frankford and Shackamaxon Avenues, overall intersection LOS will be C or better. Although overall intersection LOS is very good, several of the individual intersection approaches will operate at a lower LOS (but within acceptable levels). In general, lower Levels of Service are experienced at intersection approaches with high traffic volumes and higher Levels of Service are experienced at approaches with low traffic volumes.

In summary, although it is expected that casino-bound traffic will be using Girard Avenue during the Interim Casino phase, this phase will generate the lowest traffic volumes over a relatively short duration. The Interim Casino is scheduled to open in 2008, and expanding to Phase II by 2009. During Phases I and II, there is likely to be a gradual shift of casino-bound traffic from Girard Avenue and other local streets to Delaware Avenue. After the I-95/Girard Avenue Interchange construction is completed and Phase II of the casino development is completed, casino-bound traffic from I-95 will have direct access to Delaware Avenue and to the site, and negative impacts on local streets and neighborhoods will be minimal or negligible. With proposed mitigation measures in place, Delaware Avenue will operate at a satisfactory Level of Service.

2. PROJECT CHARACTERISTICS AND PHASING

The SugarHouse Casino will be developed over three phases: an Interim Phase, Phase I, and Phase II.

2.1. Interim Casino – 1,500 Slots

The Interim Casino represents the initial gaming component in a permanent casino facility consisting of 1,500 slot machines, food & beverage venues with approximately 390 seats, and gaming support, Pennsylvania Gaming Control Board, and other back-of-house components. This facility will be constructed and opened to the public in tandem with a +/- 2,330-space parking structure that during the interim operation will accommodate self-park and valet parking spaces and employee parking. Parking within the self-park garage will be free of charge to casino guests and employees. An interim ceremonial porte cochere and valet drop-off area and an enclosed loading dock will be provided during the Interim Casino phase while construction of Phase I proceeds.

The total gross building area of the Interim Casino phase, including the parking garage structure, will be approximately 1,269,500 square feet.

The opening year for the Interim Casino is scheduled for Year 2008.

2.2. Phase I Casino – 3,000 Slots

Phase I represents the contiguous expansion of the Interim Casino within a permanent facility to accommodate an additional 1,500 slot machines, for a total of 3,000 devices. Food & Beverage components will include a Buffet and Diner, Italian Restaurant, Steak House, Sports Bar and two lounges with a total seating capacity of +/- 1,340 seats. In addition, a +/- 6,500 square feet multi-purpose ballroom and entertainment performance space will compliment the program. The main porte cochere will be completed and significant site improvements and enhanced pedestrian promenades will also accompany the Phase I program. Additional back-of-house and warehousing spaces will extend below the casino level.

The Phase I Casino development will be supported by the +/- 2,330-space self-park garage developed for the Interim Phase, as well as approximately 550-600 additional valet parking spaces below the main casino floor level and extending out onto an on-grade valet lot to the south of the casino podium. The total parking inventory at the completion of Phase I will be approximately 2,880-2,930 spaces. As with the Interim Phase, parking within the self-park garage will be free of charge to casino guests and employees. Phase I will also include a large centralized and fully-enclosed loading dock facility that will be accessed through a dedicated service and bus route.

Once Phase I is completed the total gross building area of the SugarHouse facility, including the parking garage structure will be approximately 1,579,310 square feet.

The opening year for the Phase I casino is scheduled for Year 2009.

2.3. Phase II Casino – 5,000 Slots, Event Center and Hotel

The Phase II development program consists of the contiguous expansion of the Phase I Casino, with capacity for 2,000 additional slot machines or a total of 5,000 devices. A proposed 500-room luxury hi-rise hotel and a +/- 30,000 s.f. multi-purpose Event Center above the casino floor level will compliment the gaming component. In addition, two or three additional restaurants and one or two additional lounges and ancillary boutique retail shops are slated for this phase of development. The Phase II development program will be supported by additional parking, including an additional +/- 900-space expansion to the main self-park garage and a new +/- 540-space parking structure on the southeast parcel adjacent to the hotel (this garage is intended to support the hotel operation.) At the conclusion of the Phase II development program, the total parking inventory will exceed 4,500 spaces on site.

Parking within the self-park garage will remain free of charge to casino guests and employees.

Once Phase II is completed, the total gross building area of the SugarHouse facility, including the expanded Casino podium, Hotel, Event Center and expanded parking facilities will be approximately 2,937,300 square feet.

While this Phase II expansion is dependant on market demand, the Phase II casino opening is programmed for Year 2012.

3. THE STUDY AREA AND I-95 / GIRARD INTERCHANGE IMPROVEMENTS

3.1. General Description of Study Area

The area for which detailed traffic analysis was conducted comprises an area roughly bounded by the Delaware River, Girard Avenue, Frankford Avenue and the existing I-95/Girard Avenue Interchange. This area was chosen based on existing traffic patterns and the distribution of trips generated by the casino development.

3.2. Existing Land Use

The study area includes a variety of existing land uses. The land between I-95 and the Delaware River is an old industrial area. This area was once bustling with manufacturing and port-related activities, including a sugar refinery on the casino site itself. Today, many of the original buildings have been demolished and of those that remain, some stand empty waiting for redevelopment opportunities. Others continue to house small manufacturing and warehousing facilities. In anticipation of redevelopment, the City of Philadelphia invested in improvements to Delaware Avenue. Recently, this long anticipated redevelopment has begun to take place with the current construction of a high-rise condominium project, Waterfront Square, which is located immediately south of the SugarHouse casino site on the riverfront.

West of Delaware Avenue the character of the existing land use is entirely different. The community of Fishtown, centered around Girard Avenue, is an old neighborhood which originally housed the workers whose jobs were located on the nearby waterfront. Along Girard Avenue itself there are many small scale business and retail establishments mixed with neighborhood housing. The side streets that connect Girard Avenue and Delaware Avenue (Berks, Montgomery, Marlborough, Columbia Avenues and Shackamaxon Street) are predominantly residential, consisting of two- and three-story row houses, intermingled with some non-residential activities. Frankford Avenue is an arterial street with fewer residential and more business land uses.

In recent years this neighborhood has begun to change. With the rise of housing prices closer to Center City, the Fishtown neighborhood has also witnessed an increase in the cost of housing, with new residents moving in, and new infill development beginning to take place.

3.3. Future Land Use

Land use in the study area will change over time, both along the waterfront and, to a lesser extent, in the Fishtown neighborhood, with or without the development of a casino on the North Delaware Riverfront. In many older cities industrial waterfronts have been renewed as vibrant mixed-use amenities. For many years Philadelphia has hoped for a similar rebirth of its waterfront. The Penns Landing area, closer to Center City, has been the subject of numerous redevelopment proposals, and to the south new development has already been built on much of the old vacant industrial land.

Until recently, no such redevelopment has taken place on the North Delaware riverfront. Waterfront Square is the first new project to be approved and constructed. This will be a 780-unit condominium development in five towers, two of which are currently under construction. In addition there are other projects along the waterfront that are under discussion, including additional high-rise condominium units.

In the Fishtown neighborhood houses are being renovated and a number of small scale residential and commercial infill projects are currently proposed, either within or close to the study area. A list of projects under consideration is included in Appendix A. While some of this development is likely to occur in the coming years, a mixture of market demand, availability of developable parcels, and community interest in plans for measured growth will result in a modest, rather than fundamental, transformation of the area.

3.4. Vehicular Access and Circulation

Access to the study area is via I-95, Delaware Avenue and Girard Avenue. Regional access is provided by the Girard Avenue Interchange on I-95. Currently this interchange routes traffic from southbound I-95 directly onto Girard Avenue, while northbound traffic exits onto northbound Delaware Avenue. In order to access the riverfront from I-95 southbound traffic must travel several blocks along Girard Avenue and turn onto one of several local streets that connect Girard Avenue and Delaware Avenues.

Delaware Avenue, in addition to I-95, provides access to and from the center of the city. Girard Avenue is a local arterial street that provides connections to other mixed use neighborhoods to the north and south of Fishtown.

There are three main access points to the SugarHouse site along Delaware Avenue. These include two signalized intersections: Shackamaxon Street at the northern end of the site, and Frankford Avenue towards the southern end of the site. In addition, Penn Street also provides access to the site from the Delaware

Avenue – Penn Street intersection. These multiple site access and egress points are viewed as a critically important factor in on-site traffic management. While the site has three access points, for the purposes of this study, it is assumed that the primary points of entry and exit for both self-park and valet patrons will be the Shackamaxon Street and Frankford Avenue signalized intersections, respectively.

Three site access points and the surrounding street network will remain constant for all three phases of the project. However, the freeway access system will be reconfigured and this new configuration will impact travel routes of casino-bound traffic on the local street network.

The traffic circulation system that is internal to the site is described in Appendix B.

3.5. General Description of I-95 / Girard Avenue Interchange Improvements

The I-95/Girard Avenue Interchange is programmed by the Pennsylvania Department of Transportation (PennDOT) for major construction that will significantly improve I-95 access to Delaware Avenue and the casino site. The Interchange improvements are currently in the preliminary design phase and are scheduled to be under construction beginning in 2009. Based on the present construction schedule, the improvements are programmed to be completed and the Interchange open to traffic in 2012.

The I-95/Girard Avenue Interchange is currently a complicated ramping system that provides inefficient access between I-95 and Delaware Avenue. Traffic arriving via I-95 southbound must presently travel several blocks along Girard Avenue and turn onto local streets such as Berks Street or Frankford Avenue in order to access Delaware Avenue and the casino site.

The Interchange improvements proposed by PennDOT will reconfigure the existing ramping system and provide direct access to Delaware Avenue and the site for both northbound and southbound I-95 traffic. According to the PennDOT/DVRPC[1] Report, "I-95 Girard Avenue and I-676 Vine Expressway Interchanges, Section GIR Traffic Study"[2], upon completion, I-95 traffic will no longer need to use Girard Avenue to access Delaware Avenue.

The I-95/Girard Avenue Interchange construction will be accomplished in multiple stages. Although most of the stages have not yet been defined, the initial construction phase will provide alternate routing for traffic during construction.

[1] Delaware Valley Regional Planning Commission

[2] Published in June 2005

PennDOT will prepare a traffic management study which will determine how traffic is to be managed throughout the various construction stages. The SugarHouse Casino will work with PennDOT and the various groups representing the surrounding neighborhoods to develop a traffic management plan that minimizes community impacts during Interchange construction.

3.6. Casino Project Phasing and Coordination with I-95 / Girard Interchange Improvements

The three phases of casino development are closely aligned to the construction scheduling of the I-95/Girard Avenue Interchange improvements. The Interim Casino phase will open in 2008, expending to a Phase I, 3,000-slot facility in October 2009. The Phase I casino will open at approximately the same time that construction begins on the Interchange. The Phase II opening will hinge on the marketplace response to the casino, but could occur in the same timeframe as completion of the Interchange.

3.6.1. Interim Casino – 1,500-Slots

In the Interim Casino phase, the I-95/Girard Avenue Interchange will not be changed and casino-bound traffic will utilize the existing roadway network, following existing travel patterns. Presently, the main access route to the site for arriving I-95 southbound traffic is Girard Avenue. Along Girard Avenue, casino-bound traffic will most likely use local streets such as Berks Street and Frankford Avenue to access Delaware Avenue. For analysis purposes, it is assumed that approximately two-thirds of traffic will use Berks Street because of its proximity to the I-95 southbound off-ramp and the remaining one-third of traffic will use Frankford Avenue. While other local streets, such as Shackamaxon Street, E. Columbia Street, and Montgomery Avenue provide access to Delaware Avenue, casino-bound traffic is more likely to use Berks Street and Frankford Avenue given the proximity, character, and capacity of these roadways.

The main access route to the SugarHouse site for arriving I-95 northbound traffic is a circuitous route along Delaware Avenue (northbound), North Beach Street, to Delaware Avenue (westbound).

Departing traffic to I-95 northbound is provided a direct route; however, departing traffic traveling to I-95 southbound must travel a circuitous route along North Richmond Avenue, East Cumberland Street and Aramingo Avenue prior to accessing the I-95 southbound on-ramp. Table 3-1 below shows the trip distribution arrival and departure route percentages along the regional and local roadway network using the existing I-95/Girard Avenue Interchange.

Table 3-1: Interim Casino Phase Arrival & Departure Trip Distribution

Travel Route – ARRIVALS	**Arrival %**
I-95 SB → Girard Ave WB → Berks St SB → Delaware Ave WB	28%
I-95 SB → Girard Ave WB → Frankford Ave SB	10%
I-95 NB → Penns Landing → Delaware Ave EB	18%
I-95 NB → Delaware Ave EB → Beach St WB → Delaware Ave WB	29%
Spring Garden St SB → Delaware Ave EB	10%
Girard Ave EB → Frankford Ave SB	3%
Frankford Ave SB	2%
TOTAL ARRIVALS	**100%**
Travel Route – DEPARTURES	**Departure %**
Delaware Ave EB → I-95 NB	38%
Delaware Ave EB → Richmond St EB → Cumberland St NB → Aramingo Ave WB → I-95 SB	47%
Delaware Ave WB → Spring Garden St NB	10%
Frankford Ave NB → Girard Ave WB	3%
Frankford Ave NB	2%
TOTAL DEPARTURES	**100%**

Refer to Appendix C for maps showing Trip Distribution information.

3.6.2. Phase I Casino – 3,000-Slots

By the opening of Phase I the I-95/Girard Avenue Interchange is scheduled to be under construction. During construction stages PennDOT will provide alternate routing for traffic at minimum for the conditions where access to the Interchange is restricted or an access ramp is closed. Although PennDOT has not completed its study to define alternative routing during construction, it is highly likely that much of the traffic will be routed out of the construction zone. In addition, drivers will avoid the congestion resulting from construction by voluntarily seeking alternate routes. Even if there are periods of time when PennDOT does not entirely close the southbound Girard Avenue ramp, it is expected that fewer vehicles will use Girard Avenue during that period than during the period prior to construction.

Based on present conditions, traffic bound for the SugarHouse site on I-95 southbound will have several routing possibilities during the construction phase, including Aramingo Avenue and Richmond Street. There is also a possibility that a Delaware Avenue extension may be constructed as a means of managing traffic during the I-95 construction.

With these considerations in mind, this analysis assumes that I-95 southbound casino-bound traffic will use the I-95/Allegheny Avenue and I-95/Castor

Avenue Interchanges, and I-95 northbound casino-bound traffic will use the I-95/Penns Landing Interchange.

Departing traffic from the site to I-95 northbound during construction stages where interchange access is restricted will most likely use the I-95/Allegheny Avenue and I-95/Castor Avenue Interchanges. Departing traffic from the site to I-95 southbound during this phase will most likely use the I-95/Penns Landing Interchange.

PennDOT will be developing traffic plans to mitigate any operational deficiencies during each of its construction work phases. SugarHouse Casino will coordinate closely with PennDOT and local community representatives to minimize traffic disruptions created by interchange construction. Although I-95 construction at the Girard Avenue Interchange will introduce operational challenges which will be addressed in the PennDOT traffic management plans, local streets such as Berks Street and Frankford Avenue will benefit since casino-bound traffic will use alternative routes to access the site instead of the local street network due to construction related congestion. Table 3-2 below shows the projected trip distribution patterns for casino arrival and departures during this phase.

Table 3-2: Phase I Arrival & Departure Trip Distribution

Travel Route – ARRIVALS	**Arrival %**
I-95 SB → Allegheny Ave → Richmond Ave, Aramingo Ave, or Delaware Ave extended → Delaware Ave WB	40%
I-95 NB → Penns Landing → Delaware Ave EB	45%
Spring Garden St SB → Delaware Ave EB	10%
Girard Ave EB → Frankford Ave SB	3%
Frankford Ave SB	2%
TOTAL ARRIVALS	**100%**
Travel Route – DEPARTURES	**Departure %**
Delaware Ave EB → Richmond Ave → Allegheny Ave, Castor Ave → I-95 NB	40%
Delaware Ave WB → Penns Landing → I-95 SB	45%
Delaware Ave WB → Spring Garden St NB	10%
Frankford Ave NB → Girard Ave WB	3%
Frankford Ave NB	2%
TOTAL DEPARTURES	**100%**

For more detailed Trip Distribution information refer to Appendix C.

3.6.3. Phase II Casino – 5,000 Slots, Event Center, and Hotel

If the success of the casino warrants, a planned Phase II of SugarHouse may coincide with the scheduled completion of the Girard Avenue Interchange in 2012. I-95 southbound traffic will be provided direct access to Delaware Avenue via an exit ramp. Customers will no longer be required to travel from I-95

southbound along Girard Avenue to access the site. I-95 northbound traffic will also have direct access to Delaware Avenue via an exit ramp.

Departing traffic will have access to I-95 northbound via a new I-95 on-ramp, and access to I-95 southbound will also be provided via a new I-95 on-ramp. Customers will no longer be required to travel the circuitous route along Cumberland Street and Aramingo Avenue to access the I-95 southbound on-ramp. Table 3-3 below shows the trip distribution patterns for casino arrival and departures.

Table 3-3: Phase II Arrival & Departure Trip Distribution

Travel Route – ARRIVALS	**Arrival %**
I-95 SB → Delaware Ave WB	38%
I-95 NB → Delaware Ave WB	42%
I-95 NB → Penns Landing → Delaware Ave EB	5%
Spring Garden St SB → Delaware Ave EB	10%
Girard Ave EB → Frankford Ave SB	3%
Frankford Ave SB	2%
TOTAL ARRIVALS	**100%**
Travel Route – DEPARTURES	**Departure %**
Delaware Ave EB → I-95 NB	38%
Delaware Ave EB → I-95 SB	47%
Delaware Ave WB → Spring Garden St NB	10%
Frankford Ave NB → Girard Ave WB	3%
Frankford Ave NB	2%
TOTAL DEPARTURES	**100%**

For more detailed Trip Distribution information refer to Appendix C.

In summary, although casino-bound traffic will use Girard Avenue during the Interim Casino phase, this phase will generate lower traffic volumes because of the reduced casino size. The Interim Casino is slated for operation between April 2009 and October 2009.

During the I-95/Girard Avenue Interchange construction phase, SugarHouse Casino will work with PennDOT and local communities to develop a traffic management plan that may help remove casino-bound traffic from local streets such as Berks Street and Frankford Avenue. After the I-95/Girard Avenue Interchange construction is completed and Phase II of casino development is completed, casino-bound traffic from I-95 will have direct access to Delaware Avenue and to the site, and negative impacts on local streets and neighborhoods should be minimal.

4. STUDY AREA AND INTERSECTION DATA COLLECTION

4.1. Study Area Intersections

In the December 2005 Traffic Impact Analysis prepared by Gannett Fleming, three (3) signalized intersections and one (1) unsignalized intersection were studied to evaluate the traffic impact of the SugarHouse Casino development. These intersections include:

- Delaware Avenue and Shackamaxon Street (signalized)
- Delaware Avenue and Frankford Avenue (signalized)
- Delaware Avenue and Penn Street (signalized)
- Frankford Avenue and Laurel Street (unsignalized)

For this Update, the study area was expanded to include the following intersections:

- Girard Avenue and Berks Street (signalized)
- Girard Avenue and Montgomery Avenue (signalized)
- Girard Avenue and Columbia Avenue (signalized)
- Girard Avenue and Marlborough Street (signalized)
- Girard Avenue and Shackamaxon Street (unsignalized)
- Girard Avenue and Frankford Avenue (signalized)

A limited survey was conducted at each of the study intersections to collect pertinent traffic data such as roadway and intersection geometries, signage, one-way roadway designations, turning restrictions at intersections, and signal timing data. The study roadway and intersection characteristics are described below.

4.1.1. Delaware Avenue

Delaware Avenue is designated as a north-south arterial roadway; however, in the study area it has a northeast-southwest orientation and parallels Girard Avenue. For ease of reference Delaware Avenue will herein be referred to as an east-west roadway. Delaware Avenue provides three travel lanes for each direction of travel in the vicinity of the site and is generally separated by a concrete curb type median of approximately 14-feet in width. The posted speed limit along Delaware Avenue is 30 miles per hour and on-street parking is

permitted. A bicycle lane is provided between the parking aisle and the vehicle traveled right-of-way in both directions. Current land use on Delaware Avenue is industrial and vacant abandoned industrial land. Delaware Avenue was improved in anticipation of redevelopment taking place along the waterfront.

4.1.2. Girard Avenue

Girard Avenue has a mixture of residential, retail, and business land uses in the study area. It is identified as an east-west arterial roadway in the vicinity of the casino site. Generally two lanes of travel are provided in each direction, with two trolley tracks located in the center of the roadway. The trolley tracks are located within active vehicle travel lanes with stops at the Berks Street, Montgomery Avenue, Columbia Avenue, and Frankford Avenue intersections. When the trolley is stopped for passenger pick-up/drop-off, limited vehicle queuing was observed to occur behind the trolley. On-street parking is provided on both sides of the roadway. The posted speed limit on Girard Avenue is 30 miles per hour.

4.1.3. Berks Street

Berks Street is a residential-scale street, but only a few of the houses remain along a street with many vacant lots. It is a one-way local street with a north-south orientation, providing one lane of travel and on-street parking on both sides. North of the intersection with Girard Avenue, Berks Street is one-way northbound; south of the intersection with Girard Avenue, it is one-way southbound. Berks Street provides the most direct southbound travel route from Girard Avenue to Delaware Avenue.

4.1.4. Montgomery Avenue, Columbia Avenue, Shackamaxon Street

Montgomery Avenue, Columbia Avenue, and Shackamaxon Street are all one-way streets in the southbound direction of a single moving lane. These primarily residential streets are local roadways with on-street parking along both sides.

4.1.5. Marlborough Street

Marlborough Street is a one-way street in the northbound direction from Delaware Avenue to Girard Avenue. It provides one-lane of travel and offers on-street parking on both sides of the street. Land uses along this street are primarily residential.

4.1.6. Frankford Avenue

Frankford Avenue is a north-south arterial roadway and provides one lane for each direction of travel. Land use on this street is a mixture of residential and commercial. Frankford Avenue provides a direct travel route from Girard Avenue to the SugarHouse Casino drive leading to the porte cochere.

4.1.7. Girard Avenue – Berks Street Signalized Intersection

The Girard Avenue eastbound and westbound approaches to this intersection have three lanes providing an exclusive left-turn lane, through lane, and a shared through/right-turn lane. The exclusive through and shared through/right-turn lanes on the Girard Avenue approaches are separated by a low raised median

designated as trolley stop locations. The trolley tracks at this intersection run along Girard Avenue in the exclusive through travel lanes. South of Girard Avenue Berks Street is one-way in the southbound direction and north of Girard Avenue it is one-way in the northbound direction. Pedestrian crossing is provided on all intersection approaches. The intersection currently operates at a signal cycle length of 60 seconds without pedestrian actuation and 90 seconds with pedestrian actuation during the evening peak hour.

Prior to improvements at the I-95 Girard Avenue Interchange, patrons traveling to the SugarHouse Casino from I-95 north of the site are expected to use the existing I-95 southbound off-ramp to Girard Avenue. For purposes of this analysis, casino patrons would be directed by signage to drive west on Girard Avenue and make a left-turn onto southbound Berks Street for access to Delaware Avenue. Although most of the patrons may utilize this route to access the site, a limited number may continue through this intersection and use Frankford Avenue as a secondary access route to the casino. Use of the more residential intermediate streets could be discouraged through the use of wayfinding and traffic restriction signage and traffic calming measures. The most effective measures will be the product of future meetings with community representatives and PennDOT.

It is anticipated that during the I-95 Girard Interchange improvements many patrons will use alternative routes. Patrons will use the I-95 on- and off-ramps after improvements are completed. The new on- and off-ramps will offer a direct connection from I-95 to Delaware Avenue. Therefore, after completion of the interchange improvements, patrons arriving from I-95 are not anticipated to use this intersection or Berks Street for travel to and from the casino.

4.1.8. Girard Avenue – Montgomery Avenue signalized intersection

Girard Avenue and Montgomery Avenue intersect to form a four-leg signalized intersection. The eastbound Girard Avenue approach to this intersection provides an exclusive through lane and shared through/right-turn lane. The westbound Girard Avenue approach provides an exclusive left-turn lane and two through lanes. Trolley tracks are located in the inner most through lane on both Girard Avenue approaches. There is not a trolley stop at this intersection. Montgomery Avenue is one-way in the southbound direction. At the intersection with Girard Avenue, there is one single lane to accommodate through and turning movements. Crosswalks are provided on all intersection approaches. The intersection currently operates at a signal cycle length of 60 seconds during the evening peak hour.

Prior to the scheduled I-95/Girard Interchange improvements this intersection will be affected by patrons arriving from I-95 southbound and utilizing the Girard Avenue off-ramp to access the local roadway network. A mixture of traffic restrictive signage and traffic calming measures may be the most effective means of diverting casino-bound traffic from this primarily residential street.

During construction of the I-95/Girard Ave Interchange improvements, many casino patrons may use the Allegheny Avenue/Castor Avenue Interchanges as a result of PennDOT's anticipated traffic management plan and because of construction congestion. Fewer casino-bound trips are anticipated to use the Girard Avenue – Montgomery Avenue intersection during construction than in the pre-construction Interim Casino phase.

Following completion of the I-95/Girard Ave Interchange improvements, most patrons will utilize the new intersection that provides direct access to Delaware Avenue.

4.1.9. Girard Avenue – Columbia Avenue signalized intersection

Girard Avenue and Columbia Avenue intersect to form a four-approach signalized intersection. The Girard Avenue eastbound approach to this intersection has two lanes: an exclusive through and shared through/right-turn lane. A low raised concrete island separates the eastbound Girard Avenue approach travel lanes from the trolley tracks located in a yellow hatched island area centered on Girard Avenue. The westbound Girard Avenue approach provides one exclusive left-turn lane and two through movement lanes. The trolley stop located on the westbound Girard Avenue approach is a raised concrete island separating the exclusive left-turn lane and innermost through lane. The trolley tracks run in the exclusive left-turn lane of this approach. Columbia Avenue is a one-way street in the southbound direction. The southbound Columbia Avenue approach to this intersection has one travel lane for through and turning movements. Pedestrian crossing is provided on all intersection approaches. The intersection currently operates at a cycle length of 60 seconds during the evening peak hours.

Prior to, during, and following construction of the I-95/Girard Avenue Interchange improvements, traffic impacts are likely to be the same as those described for the Montgomery Avenue intersection

4.1.10. Girard Avenue – Marlborough Street signalized intersection

Girard Avenue and Marlborough Street intersect to form a four-leg signalized intersection. The eastbound Girard Avenue approach provides three travel lanes: an exclusive left-turn lane and two through lanes. The westbound Girard Avenue approach provides two lanes: an exclusive through and a shared through/right-turn movement lane. Yellow hatched striping separates the eastbound and westbound Girard Avenue approaches at this intersection. The trolley tracks are located in the eastbound Girard Avenue exclusive left-turn lane and in the yellow center striping. Marlborough Street is a one-way street in the northbound direction. The Marlborough Street approaches to this intersection have one travel lane to accommodate through and turning movements and on-street parking on each side of the roadway. Crosswalks are provided on all intersection approaches. The intersection currently operates at a cycle length of 60 seconds during evening peak hours.

Prior to the I-95/Girard Avenue Interchange improvements, this intersection will be affected by patrons coming from the existing I-95 southbound off-ramp onto westbound Girard Avenue. A mixture of traffic restrictive signage and traffic calming measures may be the most effective means of diverting casino-bound traffic from this primarily residential street. During and following construction of the Girard Avenue intersection improvements traffic impacts will be the same as those described for the Montgomery Avenue intersection

4.1.11. Girard Avenue – Shackamaxon Street unsignalized intersection
Shackamaxon Street intersects with Girard Avenue to form an unsignalized stop-sign controlled intersection. The eastbound Girard Avenue approach provides a through lane and shared through/right-turn lane. The westbound Girard Avenue approach provides two through lanes with an additional left-turn storage lane which extends from the Frankford Avenue intersection. It was observed that even though the left-turn bay is designed for the storage of left-turn vehicles at the upstream Frankford Avenue intersection, motorists utilize this bay for left-turns onto Shackamaxon Street. The eastbound trolley tracks run through the center yellow hatch area separating the eastbound and westbound travel lanes on Girard Avenue. The westbound trolley tracks run through the westbound Girard Avenue left-turn storage lane. East of the intersection Shackamaxon Street is one-way in the southbound direction and west of the intersection it is one-way in the northbound direction. Crosswalks are provided across the Shackamaxon intersection approaches only.

Prior to the I-95/Girard Avenue Interchange improvements this intersection is anticipated to be affected by patrons arriving from the existing I-95 southbound off-ramp onto westbound Girard Avenue. A mixture of traffic restrictive signage and traffic calming measures may be the most effective means of diverting casino-bound traffic from this primarily residential street. During and following construction of the Girard Avenue intersection improvements traffic impacts will be the same as those described for the Montgomery Avenue intersection.

4.1.12. Girard Avenue – Frankford Avenue signalized intersection
Girard Avenue and Frankford Avenue intersect to form a four-approach signalized intersection. The Girard Avenue eastbound and westbound approaches have three lanes: an exclusive left-turn lane, a through lane, and shared through/right-turn lane. The westbound Girard Avenue left-turn lane is separated from the through lane by a low raised concrete island and serves as the trolley stop. The trolley tracks run through the westbound Girard Avenue exclusive left-turn lanes. The second set of trolley tracks run in the yellow hatched island separating eastbound and westbound Girard Avenue travel lanes. Frankford Avenue northbound and southbound approaches have one shared left-turn/through movement/right-turn lane. The intersection currently operates at a cycle length of 60 seconds during evening peak hour.

This intersection is likely to be affected by patrons coming from I-95 southbound utilizing the existing Girard Avenue Interchange. These patrons are expected

to drive west on Girard Avenue and turn left onto Frankford Avenue.

During and following construction of the Girard Avenue intersection improvements, for the westbound Girard Avenue left-turn movement traffic impacts will be the same as those described for the Montgomery Avenue intersection. Additionally, patrons traveling to the site from areas within the City are anticipated to use the southbound Frankford Avenue through movement and eastbound Girard Avenue right-turn movement. Upon exiting the site, patrons returning to areas within the City are anticipated to use the Frankford Avenue northbound left-turn and through movements.

4.1.13. Delaware Avenue – Shackamaxon Street signalized intersection
Shackamaxon Street and Delaware Avenue intersect to form a four-leg signalized intersection. The eastbound and westbound Delaware Avenue approaches each accommodate an exclusive left-turn lane and three through lanes. Shackamaxon Street is a one-way roadway in the southbound direction and provides one lane for through and turning movements. A driveway forms the northbound approach to this intersection. Crosswalks are provided on the eastbound Delaware Avenue, northbound driveway, and southbound Shackamaxon Street approaches to the intersection. The intersection currently operates at a cycle length of 90 seconds during the evening peak hour.

The proposed SugarHouse Casino will be located on the vacant property located in the southwest quadrant of this intersection with the casino site driveway forming the northbound approach to this intersection. This intersection is anticipated to be significantly affected by casino patrons arriving from I-95 utilizing the Girard Avenue Interchange immediately north of the site on Delaware Avenue.

Prior to the I-95/Girard Avenue Interchange improvements, the majority of patrons traveling to the casino via I-95 to Delaware Avenue are expected to drive west on Delaware Avenue and make a left-turn into the proposed site driveway. Although many of the patrons of the casino are expected to utilize this route to access the site, a limited number of patrons are expected to continue through this intersection on Delaware Avenue and use the proposed driveway at Frankford Avenue. Upon exiting the site, patrons seeking access to I-95 are anticipated to make a right-turn onto Delaware Avenue and travel east towards the I-95 Interchange. During construction of the I-95/Girard Avenue Interchange, most casino patrons arriving from south of the site are anticipated to use the Penns Landing Interchange. Most patrons arriving from areas north of the site are anticipated to use the Allegheny Avenue/Castor Avenue Interchanges. The use of these interchanges results in casino-bound traffic coming from both east and west on Delaware Avenue.

Following the completion of the I-95/Girard Avenue Interchange, 85% of casino patrons are anticipated to access the site via the newly constructed I-95 on/off-ramps to Delaware Avenue. This results in a high percentage of patrons arriving

via Delaware Avenue westbound and turning left into the casino site driveways.

4.1.14. Delaware Avenue – Frankford Avenue signalized intersection
Frankford Avenue and Delaware Avenue currently intersect to form a three-approach signalized intersection. The eastbound and westbound Delaware Avenue approaches have an exclusive left-turn lane and three through lanes. Westbound Delaware Avenue right-turn movements are made prior to the signalized intersection via a channelized right-turn roadway. The southbound Frankford Avenue approach provides an exclusive left-turn and shared through/right-turn lane. Although inactive, a driveway forms the northbound approach to this intersection.

4.1.15. Delaware Avenue – Penn Street signalized intersection
Penn Street intersects Delaware Avenue to form a T-type signalized intersection. The eastbound Delaware Avenue approach provides three through lanes. Eastbound Delaware Avenue right-turn movements are made via a channelized right-turn lane prior to the signalized intersection. The westbound Delaware Avenue approach accommodates an exclusive left-turn lane and three through lanes. The Penn Street northbound approach has a single lane to accommodate through and turning movements. Approximately 60-feet from its intersection with Delaware Avenue, Penn Street curves sharply to the northeast. Crosswalks are provided on the eastbound Delaware Avenue and northbound Penn Street approaches. The intersection currently operates at a signal cycle length of 90 seconds during evening peak hours.

The majority of patrons visiting SugarHouse Casino are anticipated to travel east through this intersection en-route to the site driveways located at Frankford Avenue or Shackamaxon Street. Although Penn Street provides direct access to the site, no traffic was assigned to it in the traffic analysis.

Upon exiting the site, patrons are anticipated to pass through this intersection traveling westbound on Delaware Avenue towards Spring Garden or Penns Landing.

4.1.16. Frankford Avenue – Laurel Street unsignalized intersection
Laurel Street intersects with Frankford Avenue to form a stop-sign controlled intersection approximately 60 feet north of this intersection. Laurel Street is two-way with an east-west orientation.

Crosswalks are provided on the eastbound and southbound approaches to the intersection. The intersection currently operates at a cycle length of 90 seconds in the evening peak hour.

In the proposed condition, the SugarHouse Casino site will be located in the southeast quadrant of this intersection and the site driveway will form the northbound approach to this intersection. The travel patterns of casino-bound traffic through this intersection are anticipated to be similar to the Delaware

Avenue – Shackamaxon Street intersection.

4.2. Data Collection Activities and Existing Traffic Volumes

4.2.1. Data Collection Methodologies

The study team conducted a data collection program during several site visits as part of this study. This included turning movement counts (TMCs) collected during the weekday evening peak periods; traffic control device inventory; intersection surveys; observation of traffic operations; and signal timing. Manual traffic counts were conducted to quantify traffic activity, develop the peak hour traffic volume figures, and obtain traffic travel pattern characteristics. The manual traffic counts were initially conducted in December 2005 at four intersections: Delaware Avenue – Shackamaxon Street; Delaware Avenue – Frankford Avenue; Delaware Avenue – Penn Street; and Frankford Avenue – Laurel Avenue. Additional intersections along Girard Avenue were later added into the project study area and additional counts were collected in July and September of 2006. Table 4-1 below summarizes the count locations and dates. Traffic count data is contained in Appendix D.

Table 4-1: Traffic Counting Locations and Dates

DATA COLLECTION DATE	SELECTED INTERSECTIONS WITHIN THE PROJECT STUDY AREA
December 2005	Delaware Avenue and Shackamaxon Street (signalized)
December 2005	Delaware Avenue and Frankford Avenue (signalized)
December 2005	Delaware Avenue and Penn Street (signalized)
December 2005	Frankford Avenue and Laurel Street (unsignalized)
July 2006	Girard Avenue and Berks Street (signalized)
July 2006	Girard Avenue and Shackamaxon Street (unsignalized)
July 2006	Girard Avenue and Frankford Avenue (signalized)
July 2006	Delaware Avenue and Shackamaxon Street (signalized)
September 2006	Girard Avenue and Montgomery Avenue (signalized)
September 2006	Girard Avenue and Columbia Avenue (signalized)
September 2006	Girard Avenue and Marlborough Street (signalized)

Data was collected during the evening peak period between 4:00 PM and 6:00 PM. This time period was used because the weekday evening peak hour has the heaviest existing traffic volumes. Though casino traffic is expected to be greater on weekends, the combination of casino traffic and background traffic was determined to be greater during the weekday evening peak hour.

Generally volume count data collected during the summer months from the end of June to early September are found to be lower than those counted at other times during the year. This seasonal variation is the result of schools being out of session during summer months and regular commuters taking vacations,

Therefore, volume data collected in July 2006 was compared with volume data collected in December 2005 to determine an appropriate adjustment factor. It was found that December 2005 volumes were slightly higher than July 2006 (as anticipated) and an adjustment factor was applied to July 2006 volume data. This adjustment factor was developed by completing traffic counts at the intersection of Delaware Avenue and Shackamaxon Street in both December 2005 and July 2006.

The data collected in September 2006 was also compared with December 2005 data and it was found that additional adjustments were not needed for data collected in September 2006.

The volumes from these counts were compiled and the evening peak hour for the study intersections was determined to be from 4:15 PM to 5:15 PM. Note that traffic volumes across the network remain relatively consistent throughout the peak period studied. The existing evening peak hour volumes are presented in Appendix E.

5. EXISTING TRAFFIC CONDITIONS

5.1. Intersection Existing Conditions Evaluation

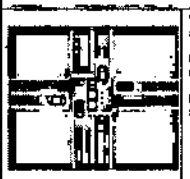
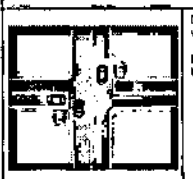
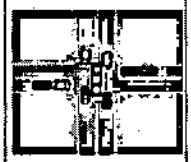
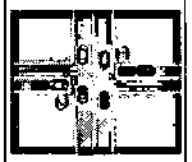
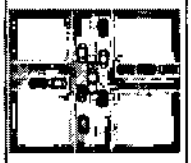
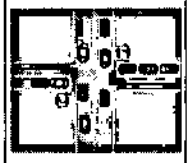
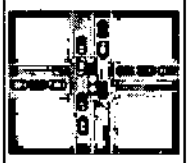
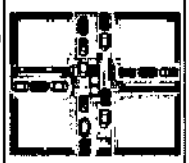
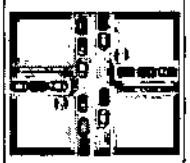
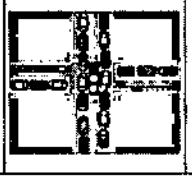
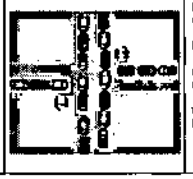
An existing operational analysis was performed to assess the operational state of traffic activity at individual intersections within the study area. Characteristics necessary to determine the existing levels of service included existing lane configuration, lane width, movement volumes, peak hour factor, heavy vehicle percentage, trolley stops and signal timing and phasing data as measured in the field. Analysis was conducted for the Friday evening peak hour. This was used because the weekday evening peak hour has the heaviest existing traffic volumes. Though casino traffic is expected to be greater on weekends, the combination of casino traffic and background traffic was determined to be greater during the Friday evening peak hour at this location. The Philadelphia Gaming Advisory Task Force findings indicated that weekday peak traffic volumes on North Delaware Avenue are approximately twice the weekend traffic volumes.

Based on area characteristics and industry standards the heavy vehicle percentage was estimated to be 5% of total traffic volumes. Brief classification counts were conducted during the Friday evening peak period at the following intersections: Delaware Avenue/Frankford Avenue, Delaware Avenue/Shakamaxon Street, Girard Avenue/Frankford Avenue, and Girard Avenue/Berks Street. These counts indicated that assumptions made in the model were within the range of field conditions.

If warranted, additional detailed analysis will be conducted during detailed design, which will be based on specific heavy vehicle percentages for each of the movements at specific intersections.

SYNCHRO, Version 6, was used to assess the roadway operational conditions discussed in this report. This computer software performs capacity analyses using both the 2000 Highway Capacity Manual (HCM) and Intersection Capacity Utilization (ICU) – 2003 methodologies. The operating condition of an intersection is measured in terms of Level of Service, and use of this software resulted in the calculation of Levels of Service for each studied intersection under existing conditions for the evening peak hour. LOS describes the operational condition of an intersection and falls into one of six categories: A through F. LOS A represents operating conditions with relatively little traffic and no congestion, while LOS F represents relatively high traffic and unpredictable operating conditions including high delay and driver discomfort. Generally, a facility intersection that operates at or better than LOS D where urban conditions exist is considered acceptable. Table 5-1 details and graphically provides examples and definitions of LOS A through F.

Table 5-1: Level of Service Definitions

Level of Service (LOS)						
LOS	**Roadway Sections**		**Signalized Intersection**		**Unsignalized Intersection**	
A		Free-flow conditions. Vehicles unaffected by other vehicles. Movement within the traffic stream is good. Minor disruptions to flow are absorbed without change to speed.		Very low delay: less than 10.0 sec. per vehicle. Most vehicles arrive during the green phase. Most vehicles do not need to stop.		Delays less than 10.0 sec. per vehicle. Little or no delay to minor street traffic.
B		Free-flow conditions. Other vehicles become more noticeable. Less freedom to maneuver. Minor disruptions to flow are absorbed although local deterioration in LOS is more obvious.		Delay in range of 10.1 to 20.0 sec. per vehicle. More vehicles stop than LOS A.		Delay in range of 10.1 to 15.0 sec. per vehicle. Short traffic delays to minor street traffic.
C		Traffic density on roadways becomes noticeable. Traffic becomes affected by other vehicles. Travel speeds may become reduced. Queuing occurs with serious traffic disruption.		Delay in range of 20.1 to 35.0 sec. per vehicle. Number of vehicles stopping is significant. Cycle failures may begin to appear.		Delay in range of 15.1 to 25.0 sec. per vehicle. Average traffic delays to minor street traffic.
D		Movement becomes restricted due to traffic congestion. Speed is reduced by increasing traffic. Minor disruptions can be absorbed without extensive queues forming and the service deteriorating.		Delay in range of 35.1 to 55.0 sec. per vehicle. Congestion more noticeable. Many vehicles stop. Cycle failures noticeable.		Delay in range of 25.1 to 35.0 sec. per vehicle. Long traffic delays to minor street traffic.
E		Operations at or near capacity. Minimum spacing for maintaining uniform flow. Speeds are highly variable and unpredictable.		Delay in range of 55.1 to 80.0 sec. per vehicle. Cycle failures frequent.		Delay in range of 35.1 to 50.0 sec. per vehicle. Very long delays to minor street traffic.
F		Forced or breakdown flow. Vehicle speeds are less than 30 mph. Complete congestion.		Delay in excess of 80.0 sec. per vehicle. Delay unacceptable to most drivers. Many cycle failures.		Delay in exceeds 50.0 sec. per vehicle. Extreme delays with queuing. Congestion affects other intersections. Warrants improvement to intersection.

For signalized intersections, Levels of Service are based on the average control delay per vehicle. The average control delay per vehicle is the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. This delay is dependent upon known factors of traffic volume, lane configuration and signalization characteristics of the intersection. A LOS is provided for each lane group and approach, and an overall LOS is assigned for the intersection.

Unsignalized intersection Levels of Service are defined based on the availability and acceptance of gaps in an intersection's traffic streams. These gaps are needed by traffic to successfully perform a turning or through movement maneuver from a stopped condition or when opposing an oncoming traffic stream. Levels of Service criteria are defined, as in signalized intersections, as

the average control delay per vehicle. These LOS delay threshold criteria differ slightly from signalized intersections to reflect different driver expectations. Levels of Service are assigned for minor turning movements occurring at an unsignalized intersection and those movements which conflict with the major street through movement.

The threshold limits for these LOS for signalized and unsignalized intersections are provided in Table 5-2 below:

Table 5-2: Level of Service Threshold Criteria

LOS	Signalized Intersections (seconds of control delay)	Unsignalized Intersections (seconds of control delay)
A	0 - 10	0 – 10
B	>10 – 20	>10 – 15
C	>20 – 35	>15 – 25
D	>35 – 55	>25 – 35
E	>55 – 80	>35 – 50
F	>80	>50

Note: Control delay includes initial deceleration delay, queue move-up time, stopped delay and final acceleration delay.

The calculations also determine the volume-to-capacity (V/C) ratio. The V/C ratio is a measure of how much available capacity of a lane group is being used by the vehicular volume. This ratio is used as a gauge for how much additional vehicular volume could be accommodated for a specific lane group.

The findings of the existing condition capacity analysis for each studied intersection are discussed in the following report section.

Appendix F offers a complete summary table of LOS, V/C, and delay calculated for each intersection and approach movement analyzed. Appendix G also contains the intersection analysis output printouts from SYNCHRO, Version 6, the software used for analyzing intersection operation, as well as level of service information, capacity information, and traffic signal timing information.

5.2. Intersection Capacity and Level of Service Analysis

The following summaries describe existing intersection capacity and LOS analysis for the signalized and unsignalized intersections within the study area. A more detailed table containing a summary of SYNCHRO outputs is contained in Appendix F. The complete SYNCHRO output files containing LOS, capacity, and traffic signal timing information are also contained in Appendix G.

5.2.1. Girard Avenue – Berks Street signalized intersection

The capacity analyses results indicate that during the evening peak hour this intersection operates well at overall LOS A. The eastbound and westbound Girard Avenue left-turn movements operate at LOS B and C. The Girard Avenue

through and right-turn lane groups operate at LOS A.

5.2.2. Girard Avenue – Montgomery Avenue signalized intersection
The capacity analyses results indicate that during the evening peak hour this intersection operates at overall LOS B. The eastbound and westbound Girard Avenue approaches operate at service levels C and B, respectively. The southbound Montgomery Avenue approach operates well at LOS B.

5.2.3. Girard Avenue – Columbia Avenue signalized intersection
During the evening peak hour, this intersection operates at overall LOS B. Girard Avenue eastbound and westbound approaches operate well at LOS A and B, respectively. The southbound Columbia Avenue approach also operates at LOS B.

5.2.4. Girard Avenue – Marlborough Street signalized intersection
Analysis of the evening conditions at this intersection show that the overall service level is B. The eastbound left-turn and through movements operate at LOS B and C, respectively. The Girard Avenue westbound lane group operates at LOS B. The northbound Marlborough Avenue approach also operates at LOS B.

5.2.5. Girard Avenue – Shackamaxon Street unsignalized intersection
The capacity analyses results indicate that the eastbound and westbound Girard Avenue left-turn movements operate very well at Level of Service A during the evening peak hour.

5.2.6. Girard Avenue – Frankford Avenue signalized intersection
During the evening peak hour this intersection operates at overall Level of Service C. The eastbound Girard Avenue approach operates at Level of Service D, however the eastbound left-turn movement operates at LOS F with a delay of 103.5 seconds and a V/C ratio of 1.03. The westbound Girard Avenue approach operates at Level of Service C. The northbound and southbound Frankford Avenue approaches operate at LOS B.

5.2.7. Delaware Avenue – Shackamaxon Street signalized intersection
The capacity analyses results indicate that during the evening peak the intersection operates at overall LOS A. The eastbound and westbound Delaware Avenue approaches operate very well at service level A. The southbound Shackamaxon Street approach operates at LOS C. The LOS C condition results from the limited green signal time given to this approach.

5.2.8. Delaware Avenue – Frankford Avenue signalized intersection
This intersection operates at overall LOS B. The Delaware Avenue eastbound and westbound approaches operate at LOS B or better. The southbound Frankford Avenue approach operates at LOS C for through and turning movements.

5.2.9. Delaware Avenue – Penn Street signalized intersection

This intersection operates well at overall LOS A during the evening peak hour. Delaware Avenue eastbound and westbound approaches operate very well at LOS A. The westbound Penn Street approach operates at LOS C. The LOS C condition occurs due to the limited green signal time provided to the Penn Street approach.

5.2.10. Frankford Avenue – Laurel Street unsignalized intersection

The stop-controlled Laurel Avenue approach operates at LOS B with a delay of 10.4 seconds during the evening peak hour studied.

Overall, nearly all of the intersections within the study area currently operate at LOS C or better. The exception is the intersection of Girard and Frankford Avenues. Although it currently operates at a LOS C overall, the eastbound approach operates at LOS D, mainly due to the left-turn movement, which operates at LOS F.

6. FUTURE NO-BUILD TRAFFIC CONDITIONS

The future No-Build conditions account for general background traffic growth throughout the study area, plus trip making expected to be generated by other major proposed projects that are also likely to be in place by the proposed project's build year.

6.1. Background Growth Rate

Background traffic growth accounts for the general increase in traffic generated by other area development and facilities affecting the study area. Factors such as new development, an increase in population, increase in number of vehicles owned, increase in vehicle miles of travel, etc. might trigger an increase in traffic volumes on roadways within the study area. These factors are accounted for by the background growth projections. Information from the 2003 Pennsylvania Traffic Data report published by PennDOT was used to identify the background traffic growth factor. The report shows traffic growth of 1% per year between the years 2002-2003 for principal and minor arterials and local roads in urban areas within Pennsylvania. The report also shows a growth factor of 19.9% for the ten year period from 1993 to 2003. The traffic growth volumes used by PennDOT are based on averages for urban areas across the Commonwealth. Meanwhile, Gannett Fleming, Inc., as a part of another study in Philadelphia, measured growth in general background traffic between 2003 and 2006. This study concluded no increase in traffic had taken place over this three year period in Philadelphia. Given this information, PennDOT's annual growth factor of 1% was used as a conservative assumption for analysis in this study

The annual background growth factor of 1% was applied to existing volumes to obtain the no-build volumes for the study years 2008, 2009, 2012 and 2022 (build year + 10 years). This percentage was added to all of the intersection movements throughout the study area. The analysis assumed that the 1% annual growth rate included similar growth in the current proportion of all the types of vehicles - cars, light trucks, heavy trucks and buses.

6.2. Other Development in Vicinity of Study Area

Other developments specifically included in the study include Waterfront Square, which will be located on the waterfront immediately south of the Sugarhouse Casino site. Waterfront Square is planned for a total of 780 residential condos in five towers. Two of these towers are already currently construction with the remaining three towers proposed for future development. The entire project was included in this analysis. Trip generation projections conducted for this study were based on methodologies as presented in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 7th Edition. The following Land Use

codes were used:

- Residential Component (ITE Land Use Code 232 – High Rise Residential Condominium)

Estimated traffic volumes generated by the 780-unit condominium development during the evening peak hour are: 196 entering vehicles and 92 exiting vehicles.

Traffic generated by the condominium development was distributed on roadways within the study areas based on the anticipated development entry/exit location and existing travel patterns along the roadway network. There are a number of other projects which have been proposed along the riverfront, north of center city and in the general vicinity of Fishtown, Northern Liberties and Lower Kensington. Some, but not all of these projects will probably be built between now and 2022. This new growth is accommodated for in the 1% annual growth factor.

6.3. No-Build Traffic Volumes

The future no-build volumes were estimated by applying background traffic growth to the existing traffic volumes and adding trips generated by the condominium development. No-build traffic volumes for intersections within the study area were projected for the future no-build years 2008, 2009, and 2012. In addition, no-build traffic volumes were proposed for 2022, i.e. ten years beyond completion of Phase II. The future no-build volumes for years 2008, 2009, 2012 and 2022 are exhibited in Appendix E.

6.4. Future No-Build Traffic Operations at Study Intersections

A Level of Service (LOS) analysis was conducted for the future no-build study years of 2008, 2009, 2012 and 2022 during the weekday evening peak hours for the study roadway network. The analysis was performed using the methodologies and computer software described under the existing conditions analysis.

A Level of Service Summary table is provided in Appendix F. The future no-build traffic volumes used in this analysis are those provided in Appendix G.

6.4.1. Future No-Build Year 2008 Conditions

The capacity analyses results indicate that during the future no-build year 2008, all studied intersections continue to operate at the same overall intersection Level of Service as calculated for existing traffic conditions. Although the overall intersection LOS will remain unchanged, some intersection movements and lane groups will experience a drop in LOS and are described below.

The Girard Avenue – Frankford Avenue intersection eastbound Girard Avenue left-turn movement will continue to operate at LOS F with a V/C increase from 1.03 in the existing condition to 1.06 in future no-build year 2008. The northbound Frankford Avenue approach will experience a delay increase of 1.2 seconds, resulting in LOS C conditions in the future no-build year 2008.

At the Delaware Avenue – Penn Street signalized intersection the eastbound Delaware Avenue approach will experience a drop from LOS A in the existing condition to LOS B in future no-build year 2008. In addition, the westbound left-turn movement - which will be affected by the proposed condominium development – is expected to operate at LOS D.

Eastbound left-turn movements at the Frankford Avenue – Laurel Avenue intersection will experience a 0.2 second delay increase and a Level of Service B.

6.4.2. Future No-Build Year 2009 Conditions

The capacity analyses results indicate that during the future no-build year 2009 evening peak hour, all studied intersections are anticipated to operate at the same overall intersection Levels of Service as calculated in future no-build year 2008 conditions. Furthermore, individual intersections lane groups and turning movements will also remain at year 2008 no-build service levels.

It should be noted that the Girard Avenue – Frankford Avenue intersection eastbound Girard Avenue left-turn movement will continue to operate poorly at LOS F with a V/C increase from 1.06 to 1.07 and delay increase from 113.6 to 115.4 seconds as compared to the 2009 future no-build condition.

6.4.3. Future No-Build Year 2012 Conditions

The capacity analyses results indicate that during the future no-build year 2012 evening peak hour, all studied intersections will continue to operate at the same overall Levels of Service as calculated in future no-build years 2008 and 2009.

It is noted that the Girard Avenue – Frankford Avenue intersection eastbound Girard Avenue left-turn movement will experience poor LOS F conditions with a V/C increase from 1.07 to 1.10 and a delay increase from 115.4 to 126.4 seconds as compared to the 2009 future no-build condition.

6.4.4. Future No-Build Year 2022 Conditions

During future no-build year 2022 all study intersections are anticipated to operate at overall LOS D or better. Although the overall intersection LOS will remain unchanged, some intersection movements and lane groups will experience a drop in LOS as compared to no-build year 2012 and are described below.

At the Girard Avenue – Montgomery Avenue intersection, the Girard Avenue westbound left-turn movement is anticipated to drop from LOS A and operate at LOS B in the 2022 no-build year 2022 condition. All other movements will

operate similarly to future no-build year 2012.

At the Girard Avenue – Columbia Avenue intersection, the Girard Avenue through movement is expected to drop from LOS B in future no-build year 2012 and operate at LOS C in no-build year 2022.

The signalized intersection of Girard Avenue – Frankford Avenue is anticipated to operate at overall LOS D conditions. The eastbound Girard Avenue left-turn will continue to operate at LOS F conditions and the through movements will operate at LOS D conditions. All other approaches will operate at LOS C conditions or better.

The overall service level of the Delaware Avenue – Frankford Avenue intersection will continue to operate at B. However, the eastbound Delaware Avenue left-turn movement will operate at LOS C.

Overall, the capacity analyses results indicate that during the future no-build years 2008 to 2012, all studied intersections continue to operate at the same overall intersection Level of Service as calculated for existing traffic conditions. However, there are a few approaches and movements at several intersections that experience minor drops in LOS. In Year 2022 overall intersection levels of service may decline slightly from no-build 2012 conditions, however overall LOS D or better are anticipated at all intersections.

7. TRIP GENERATION PROJECTIONS

7.1. Trip Generation Methodology

This section of the report, developed by Urban Systems, Inc., addresses projected vehicle trip generation characteristics of the SugarHouse Casino based upon three operating scenarios. These are the Interim Casino, 1,500 slots; the Phase I Casino, 3,000 slots; and Phase II - Full Development, a 5,000 slot casino, an Event Center, and a 500-room luxury hotel.

Vehicle trip generation estimates were developed for a design hour that coincides with a Friday PM peak period during a peak casino month.

Design hour vehicle trip generation estimates are based upon patron demand, employee demand, and non-casino related demand associated with the casino hotel and an Event Center.

7.2. Design Hour Demand Components

7.2.1. Casino Patron Demand

Patron demand estimates were prepared for each operating phase of the proposed SugarHouse development and are presented in Table 7-1.

Table 7-1: Annual Patron Demand Estimates by Operating Phase

Operating Scenario	Program	Annual Visitation
Interim Casino	1,500 Slots	3,000,000
Phase I Casino	3,000 Slots	5,200,000
Phase II Casino	5,000 Slots	7,000,000

As planned, the Interim Casino phase will feature 1,500 gaming devices, and limited food and beverage amenities.

The Phase I Casino will operate with 3,000 gaming devices and will provide a broad range of customer amenities such as restaurants, bars, lounges, and a multi-purpose ballroom and entertainment performance space.

The Phase II Casino will operate with 5,000 gaming devices, a 500-room luxury hotel, a multi-purpose Event Center, 2 or 3 additional restaurants, 1 or 2 additional lounges, and ancillary boutique retail shops.

Patron demand estimates for all development phases include person trip demand associated with casino entertainment and support amenities.

The Phase II casino development program, which will include the hotel and the

event center, will generate non-casino related person trip and vehicle trip demand. This demand is accounted for in design hour vehicle trip demand estimates.

7.2.2. Employee Demand

The estimation of design hour employee person and vehicle trip demand includes an assumption that Transportation Demand Management (TDM) measures will be implemented to limit the number of employees that enter or exit the site during weekday traffic peak periods. Casino land uses typically operate 24 hours a day, 7 days per week and gaming employees work varied shifts. In most casino operations these shifts are scheduled to manage parking and access impacts. Administrative and administrative support positions, conversely, typically follow a 9 to 5 work schedule and are assumed to contribute to weekday peak period casino trips.

For purposes of this analysis, it is assumed that 50 administrative position employee trips will occur during the design hour under the Interim Casino operating scenario; 100 employee trips will occur during the Phase I Casino operations; and 160 trips will be generated during full build-out of the SugarHouse Casino. All other employee shifts will be scheduled outside of the traffic peak periods.

For purposes of design hour vehicle trip demand, it is also assumed that TDM measures implemented at the site will include limiting service vehicle and delivery activity to periods that do not coincide with weekday peak traffic demand periods. Similarly, scheduled bus and group access will be limited to periods outside of weekday rush hour periods.

7.2.3. Hotel Demand

Hotel demand at casino land uses is primarily associated with gaming patron demand. This is particularly true of weekend periods. Non-casino related demand under the Phase II Casino operating scenario is estimated using an assumption that 20% of the rooms will be occupied by non-casino guests and 80% by casino guests. Design hour non-casino trips to the site are estimated using ITE trip generation rates for 100 occupied rooms.

7.2.4. Event Center Demand

Performance venues at casino land uses attract both casino patron and non-casino trips. Concerts, shows or other performances are typically scheduled during the evening hours outside of the traffic peak periods and primarily on weekends. For purposes of the estimation of design hour vehicle trip demand, it was assumed that 40% of the seats will be occupied by non-casino related trip makers and that 60% will be associated with casino customers. A 7 PM show time was assumed. For the purpose of vehicle trip estimation, it is assumed that 30% of the unlinked (non-casino) event center trips will access the site up to 2 hours prior to show time and during the Friday design hour period.

7.3. Design Hour Vehicle Trip Estimates

7.3.1. Methodology and Assumptions

The vehicle trip generation characteristics of casino land uses are not well documented in the transportation engineering and planning literature. Data published in the ITE Journal published by the Institute of Transportation Engineers is limited to data published for strip and off-strip or local casino hotel resorts that was collected in Las Vegas and data collected for a riverboat casino in St. Louis that was required by statute to cruise.

The estimation of design hour vehicle trip demand was prepared using the methodology employed by the Philadelphia Gaming Advisory Task Force for the estimation of patron or customer demand as well as other primary and secondary source data related to person and vehicle trip characteristics of casino land uses.

Primary source data used to estimate daily and design hour ingress and egress characteristics was collected at casino facilities located in urban areas and consists of observed patron entry and exit counts and parking garage entry and exit counts. Vehicle load factors used in the analysis represent data recorded at parking facility entry points and at casino porte-cocheres.

The Friday PM peak period was selected as the design hour for purposes of estimating the highest potential impact because this time period represents the peak weekday casino demand, as well as the peak traffic demand on the adjacent street network. Absolute peak hour casino demand that typically occurs in the evening on a Friday or Saturday night is greater than casino design hourly volumes used in this analysis, but it occurs when background traffic demand in the study area is lower.

7.3.2. Customer Person and Vehicle Trip Demand

Design Hour customer demand estimates were developed for each operating phase. This was done by estimating demand during a peak month; during an average week in a peak month; and on a Friday during a peak demand month. Daily trips were estimated using a factor of 18% of the weekly total. For the design hour it was assumed that 7.5% of the daily customer trips would enter and exit the site during the Friday evening peak hour. This peak hour factor, 7.5%, represents half of the occupancy estimated to be on site during the 4PM to 7PM period and accounts for hourly variations in entry and exit activity.

Table 7-2: Design-Hour Patron Demand Estimates by Operating Phase

Operating Scenario	Interim Casino	Phase I Casino	Phase II Casino
Peak Month	300,000	520,000	700,000
Peak Week	68,970	119,550	160,900
Friday	12,415	21,520	28,970
Design Hour	930	1,615	2,170

As would be expected, patron demand increases as the number of devices increase. Highest demand levels are reflected in the Phase II full development when 5,000 gaming devices, the hotel and event center come on line.

Patron estimates were converted to vehicle trip demand by the application of modal split and vehicle load factors. Modal split factors that were developed for the SugarHouse Casino site differ slightly from those published by the Philadelphia Gaming Advisory Task Force. It was assumed that 80% of the design hour trips to the site would be made by private auto, slightly higher than the Task Force estimate of 78% by auto.

Eight percent (8%) of the patron trips were assigned to the mode taxi and 7% to Casino Bus. The latter to include scheduled line haul and group trips.

The remaining 5% of the design hour trips were assumed to access the site by public transit and pedestrian traffic.

Table 7-3 summarizes design hour person trips by mode of access.

Table 7-3: Design Hour Person Trips by Mode of Access and Operating Phase

Mode of Access	Interim Casino	Phase I Casino	Phase II Casino
Auto	745	1290	1740
Taxi	75	130	175
Casino Bus	65	115	150
Other	47	81	110

Note: The sum of vehicle trip estimates may differ due to rounding.

Design hour person trips were converted to vehicle trip estimates using vehicle load factor for each vehicular mode of transportation. Vehicle load factors for the auto and taxi modes are slightly lower than those published by the Task Force. For the Auto mode, a vehicle load factor of 2.0 persons per vehicle is used rather than the published Task Force estimate of 2.2 persons per vehicle. Similarly, for the Taxi mode, a vehicle load factor of 1.5 persons per vehicle is used rather than the Task Force factor of 1.85 persons per vehicle. For the casino bus mode, a load factor of 35 persons per vehicle is used, slightly lower than the 38 persons per vehicle published by the Task Force.

Vehicle load factors used in this analysis are based on field data collected at urban dockside riverboat and land-based casinos in jurisdictions that include Niagara Falls, New Orleans, Shreveport-Bossier and the greater Chicago area.

Table 7-4 presents a summary of vehicle trip estimates by mode of access for each operating phase.

Table 7-4: Design Hour Vehicle Trips by Mode of Access and Operating Phase

Mode of Access	Interim Casino	Phase I Casino	Phase II Casino
Auto	372	646	869
Taxi	50	86	116
Casino Bus	2	3	4

It should be noted that while this analysis assumes that TDM measures will be in place to limit casino scheduled bus trips to the site to periods outside the PM peak hour, a small number of bus trips to the site can be expected to occur during peak traffic demand and will be accounted for in the estimation of design hour site generated traffic.

7.3.3. Employee Person and Vehicle Trip Demand

At full build out the SugarHouse Casino will employ an estimated 1,325 persons. The majority of these employment positions are directly related to gaming operations and, given the 7 day per week 24 hour per day operation of casinos, the majority of these employees will work shifts.

Employee access to the site can be more easily and effectively managed by scheduling work shifts as a traffic mitigation measure. For purposes of this analysis, it is assumed that as part of a TDM program, only administrative and administrative support personnel will access the site during normal weekday peak periods. For employee trips, a vehicle load factor of 1.0 person per vehicle is assumed. This equates to 50 design hour trips for the Interim Casino, 100 trips for the Phase 1 Casino and 160 trips for the Phase 2 Casino.

All administrative personnel trips are assumed to be exit trips during the Friday PM peak hour.

7.3.4. Phase II Non-Casino Person and Vehicle Trip Demand

Phase II Casino gaming demand estimates reflect full development of the site including a 500-room hotel and an event center with a seating capacity of 2,500 persons.

Experience at casino facilities indicates that the majority of the trips generated by amenities such as restaurants, hotels and performance venues is closely related to the primary attraction of the underlying land use activity, casino gaming. This is particularly the case on weekends when players are offered incentives such as free or reduced rate hotel rooms and are "comped" at casino restaurants and/or with show tickets.

For purposes of estimating design hour vehicle trip demand, it is assumed that 20% of the rooms in the hotel, 100 rooms, will be occupied by non-casino guests. Using data contained in the ITE publication, *Trip Generation* for "Land Use 310, Hotel" and the independent variable occupied rooms, a total of 70 PM peak

hour trips are estimated, 34 entering and 36 exiting.

Design hour vehicle trip demand associated with the 2,500 seat event center was estimated by assuming that 40% of the trips generated by the event center, representing 1000 seats during a sold out show, would be occupied by non-casino linked trip makers and that the remaining 60% would be occupied by casino guests to include hotel guests and other casino linked trips. The latter are assumed to be accounted for in the base patron demand estimates for the Phase 2 Casino development program.

For purposes of estimating design hour vehicle trip demand associated with the full development program, a 7 PM start is assumed for the event or performance. Thirty percent (30%) of these unlinked trips, 300 person trips, are assumed to arrive up to two hours before the show. A conservative auto load factor of 2.0 persons per vehicle yields an estimated 150 vehicle trips. Given the general characteristics of event or performance ingress and egress trips, it is assumed that all 150 trips are inbound trips.

7.3.5. Summary of Design Hour Vehicle Trip Demand

Table 7-5 presents a summary of vehicle trip demand estimates for each operating scenario by mode and /or trip category.

Table 7-5: Design Hour Vehicle Trip Demand by Operating Phase

Mode of Access/ Trip Category	Interim Casino		Phase I Casino		Phase II Casino	
	In	Out	In	Out	In	Out
Auto	194	179	336	311	452	417
Taxi	25	25	43	43	58	58
Casino Bus	2	2	3	3	4	4
Employee	0	50	0	100	0	160
Hotel	0	0	0	0	34	36
Event Center	0	0	0	0	150	0
Totals	221	256	382	456	698	675

Vehicle trip demand estimates presented take into account implementation of TDM measures to minimize the impact of employee ingress and egress, to limit service vehicle and delivery activity, and to manage scheduled casino bus traffic outside of weekday peak periods.

8. FUTURE BUILD TRAFFIC CONDITIONS

The objective of this traffic analysis is to determine projected traffic conditions and service levels within the study roadway network for future build years 2008, 2009, 2012, and 2022. These future conditions are then compared to future no-build conditions to determine the magnitude of projected traffic impacts on the study area roadway network. The analysis was performed using the same methodologies and computer software as described in the existing conditions and future no-build analyses. Appendix F provides a summary table of LOS, delay, and V/C, and Appendix G contains the SYNCHRO output files.

8.1. Build Traffic Volumes

The build volumes for future years 2008, 2009, and 2012 were obtained by adding the additional trips generated from the SugarHouse Casino during the future project phases to the future no-build volumes. Future build years correspond to Interim (1,500 slots), Phase I (3,000 slots), and Phase II (5,000 slots, event center and hotel). In addition, the study intersections were analyzed for year 2022 conditions (Phase II plus 10 years.)

The volumes for build conditions for the years 2008, 2009, 2012, and 2022 are exhibited in Appendix E.

8.2. Future Build Traffic Operations at Study Intersections

Traffic conditions for future build years 2008, 2009, 2012, and 2022 were analyzed in order to assess traffic impacts which the SugarHouse Casino may have on the study roadway network without any roadway improvements or mitigation measures in place. Intersections, lane groups, or individual movements which experienced a Level of Service drop from acceptable (LOS D or better) conditions to unacceptable (Level of Service E or F) conditions are considered impacted. Intersections, lane groups, or individual movements which operated at LOS E or F conditions in future no-build years and which experienced an increase in delay or V/C in future build years were also considered impacted, requiring improvements.

8.2.1. Future Build Year 2008 Conditions (Interim Casino Phase)

The capacity analyses results indicate that during the evening peak hour for future build year 2008 the following studied intersections are expected to operate at similar overall service levels as future no-build year 2008.

- Girard Avenue – Montgomery Avenue
- Girard Avenue – Columbia Avenue

- Girard Avenue – Marlborough Street
- Girard Avenue – Shackamaxon Street
- Girard Avenue – Frankford Avenue
- Delaware Avenue – Penn Street
- Frankford Avenue – Laurel Street

However, the following three intersections show a reduction in LOS for one or more approaches or movements:

The Girard Avenue – Berks Street intersection is expected to operate at a similar overall Level of Service A during the future build year 2008 condition. However, the eastbound and westbound Girard Avenue left-turn movement will operate at LOS B and D in build year 2008 as compared to LOS B and C, respectively, in the no-build year 2008 condition. The westbound left-turn lane queue is estimated to be 125 feet which can be stored within the existing left-turn storage bay. The drop in LOS and queuing conditions are related to casino patron arrivals utilizing the existing I-95/Girard Avenue Interchange, traveling west on Girard Avenue and turning left on Berks Street for access to Delaware Avenue.

The Delaware Avenue – Shackamaxon Street intersection is expected to continue to operate at a similar overall LOS A during future no-build year 2008. However, with the casino driveway forming the northbound approach to this intersection, one of the intersection movements used by casino patrons will in general experience a drop in service level. For example, the westbound Delaware Avenue left-turn movement used by patrons of the SugarHouse Casino will operate poorly at LOS F with a V/C 0.96 and a delay of 104.0 seconds, while the overall approach will operate at LOS B. The northbound driveway approach to this intersection will operate at LOS D.

The Delaware Avenue – Frankford Avenue intersection is expected to continue to operate at overall LOS B. Similar to the Shackamaxon Street intersection, those movements used by casino patrons arriving to or departing from the site are affected. The westbound Delaware Avenue left-turn movement into the casino site will operate poorly at LOS E with a V/C of 0.75 and delay of 61.2 seconds. The overall westbound Delaware Avenue approaches will operate at LOS B. The northbound driveway approach is anticipated to operate at overall LOS C.

8.2.2. Future Build Year 2009 Conditions (Phase I Casino)

The capacity analyses results indicate that during the evening peak hour for future build year 2009, all studied intersections continue to operate at similar overall service levels as for future no-build year 2009, except for the Delaware Avenue – Shackamaxon Street and Delaware Avenue – Frankford Avenue signalized intersection.

The intersection of Delaware Avenue – Shackamaxon Street is expected to

experience a decrease in overall LOS in future build year 2009 due to the increased casino-bound traffic using the northbound approach driveway. The westbound Delaware Avenue left-turn movement will operate poorly at LOS F with a V/C 1.31 and delay of 218.3 seconds, while overall approach will experience an LOS decrease from A to D. This is the result of the increase in casino-bound traffic volumes entering the site from Delaware Avenue and additional traffic volumes exiting the site. The northbound Casino driveway approach is anticipated to operate at LOS D.

The Delaware Avenue – Frankford Avenue signalized intersection was found to operate at LOS C conditions. However, the westbound Delaware Avenue left-turn movement into the site will operate poorly at LOS E with a V/C 0.81 and delay of 69.5 seconds. This is due to the increase in overall traffic volume entering the site in this project phase. The northbound site driveway approach is anticipated to operate at LOS C.

At the Girard Avenue – Frankford Avenue intersection the Girard Avenue eastbound left-turn movement will continue to operate poorly at LOS F with a V/C ratio of 1.07 and delay 115.4 seconds, similar to the no-build condition. Casino patrons are not anticipated to use this movement for access to and from the site.

8.2.3. Future Build Year 2012 Conditions (Phase II Casino)

The capacity analyses results indicate that during the evening peak hour for future build year 2012 all studied intersections will operate at the same overall service level as for future no-build year 2012, with the exception of the Delaware Avenue – Shackamaxon Street and Delaware Avenue – Frankford Avenue signalized intersections.

The Delaware Avenue – Shackamaxon Street intersection will operate at an unacceptable overall LOS F. The overall westbound Delaware Avenue approach will operate at an unacceptable LOS F. The westbound Delaware Avenue left-turn movement will also operate poorly at LOS F. These failed service levels are the result of limited lane geometry available at the intersection and the heavy casino patron volumes anticipated in the future build condition.

The Delaware Avenue – Frankford Avenue signalized intersection is anticipated to experience an overall Level of Service decrease from B in the future no-build year 2012 to LOS E in the future build year 2012. The westbound Delaware Avenue left-turn movement will operate poorly at LOS F, while the overall westbound approach will experience a service level drop from LOS A in the no-build year 2012 condition to LOS F in the build year 2012 condition.

At the Girard Avenue – Frankford Avenue intersection, the Girard Avenue eastbound left-turn movement continues to operate at LOS F with a V/C of 1.10 and a delay of 126.4 seconds, similar to the no-build year 2012 condition. It should be noted that although this movement operates at LOS F patrons of the

casino are not anticipated to affect this movement.

8.2.4. Future Build Year 2022 Conditions (Phase II + 10 years)

In future build year 2022, all studied intersections are anticipated to operate at or similar to future no-build year 2022 conditions, with the exception of the Delaware Avenue – Shackamaxon Street and Delaware Avenue – Frankford Avenue intersections.

The intersection of Delaware Avenue – Shackamaxon Street is anticipated to operate at overall LOS F. Delaware Avenue intersection through movements are expected to operate well at LOS A; however, movements affected by casino patrons will operate at much lower service levels. The westbound Delaware Avenue left-turns (site entry) and the northbound site driveway movement (site exit) will operate at LOS F.

The Delaware Avenue – Frankford Avenue intersection is anticipated to operate at overall LOS E. Similar to the Shackamaxon site driveway intersection, movements used by casino patrons are affected. The westbound Delaware Avenue left-turn movement will operate at LOS F. The northbound site driveway approach is anticipated to operate at LOS C.

9. FUTURE BUILD MITIGATION MEASURES

9.1. Study Intersections Mitigation Measures

After the determination of the future build year 2008, 2009, 2012, and 2022 operating conditions, opportunities to mitigate operational deficiencies at the study intersections, lane groups, and individual movements identified as impacted by SugarHouse Casino traffic were investigated. While mitigation measures such as those described below are under consideration, other measures may result in more appropriate solutions.

Traffic signal timing, phasing and coordination modifications:

- Girard Avenue corridor between Berks Street and Frankford Avenue.
- Delaware Avenue corridor between Shackamaxon Street and Penn Street.

Physical intersection improvements:

- Delaware Avenue – Shackamaxon Street signalized intersection.
- Delaware Avenue – Frankford Avenue signalized intersection.

Recommended mitigation measures would likely be implemented in coordination with the phased construction of the project.

9.1.1. Future Build Year 2008 Mitigation Measures and Conditions (Project Interim Casino Phase)

The following mitigation measures may be appropriate for the Girard Avenue corridor intersections, improving overall traffic flow and service level conditions between study intersections:

- Re-time and adjust phasing (where necessary) for each traffic signal along the Girard Avenue corridor. Each signal would have a 60-second background cycle length.
- Coordinate the traffic signals to maintain optimum offsets along the Girard Avenue corridor.

To mitigate the Delaware Avenue – Shackamaxon Street and Delaware Avenue – Frankford Avenue intersections the following improvements may be appropriate:

- Upgrade traffic signal equipment to allow for exclusive westbound Delaware Avenue left-turn movements into the site driveway and exclusive right-turn movements from the site driveways (i.e. the installation of left-turn and right-turn arrows).
- Adjust timing and phasing of these traffic signals to include a protected phase for westbound left-turns into the site driveways with a northbound site driveway exclusive right-turn overlap phase and a phase for exiting

movements from the site driveways.

- Coordinate the Delaware Avenue signalized intersections with Shackamaxon Street, Frankford Avenue, and Penn Street for improved traffic flow.
- Physical improvements to the study intersections will be considered for implementation during the Interim Casino phase of development.

Future build with mitigation year 2008 analyses indicate that all studied intersections along Girard Avenue would be improved, mitigating the impacts of the added SugarHouse Casino traffic. In fact, operational conditions were found to be similar and in some cases better than that of the future no-build year 2008 condition. At the Girard Avenue – Frankford Avenue intersection westbound Girard Avenue left-turn movement, although not impacted by casino patron travel, will also benefit from the mitigation measures and would improve from LOS F conditions in the no-build year 2008 to acceptable LOS D conditions.

The Delaware Avenue – Shackamaxon Street intersection is anticipated to operate at overall LOS A. The eastbound and westbound Delaware through and right-turn movements are expected to operate at excellent LOS A with minimal delay (less than 10 seconds per vehicle). The westbound Delaware Avenue left-turn movement will operate at acceptable LOS D with a V/C ratio of 0.31. Westbound Delaware Avenue left-turn queues (80 feet) would be stored in the existing left-turn storage bay (100 feet) provided. Southbound Shackamaxon through movements to the casino will be restricted, allowing for left-turning and right-turning movements only (see Appendix H). The southbound Shackamaxon Street approach is anticipated to operate at LOS C, similar to future no-build year 2008. The northbound SugarHouse Casino site driveway will operate at overall LOS C.

The Delaware Avenue – Frankford Avenue intersection would operate at overall LOS B conditions during the evening peak hour studied. The eastbound and westbound Delaware Avenue approaches would operate at LOS B and C, respectively. The westbound Delaware Avenue left-turn movement which is affected by casino patron travel will operate with a V/C of 0.39 and LOS D. Westbound Delaware Avenue left-turn vehicle queues would be stored within the existing left-turn lane provided.

Appendix H illustrates the 2008 mitigation measures for the Delaware Avenue – Shackamaxon Street and Delaware Avenue – Frankford Avenue signalized intersections.

9.1.2. Future Build Year 2009 Mitigation Measures and Conditions (Project Phase I)

In build year 2009, it is anticipated that the I-95/Girard Avenue Interchange would be under construction and that a traffic management plan will be implemented by

PennDOT to alleviate traffic congestion caused by the construction. This traffic mitigation plan has not yet been developed, so the details of detours and ramp closings are not known. As a generator of traffic in the vicinity of the I-95 construction, SugarHouse Casino will participate with PennDOT and other community interests in developing a management plan that minimizes the impacts of this reconstruction on neighborhood streets.

During the construction of the I-95/Girard Avenue Interchange it is expected that patrons of the casino may also utilize I-95 interchanges north of the SugarHouse site at Allegheny Avenue and Castor Avenue and south of the site at Penns Landing for access via Delaware Avenue either because of formal detours or simply to avoid congestion caused by the construction. Casino patron use of these alternative interchanges will minimize the amount of casino related traffic using the I-95/Girard Avenue Interchange, and thereby minimizing casino-bound traffic traveling along Girard Avenue, Berks Street, and Frankford Avenue. Therefore, no additional mitigation measures along Girard Avenue are proposed as traffic conditions will be no worse than the future build year 2008 condition.

Among the possible mitigation measures for the Delaware Avenue – Shackamaxon Street intersection are the following improvements beyond those identified in the year 2008. (Note: These improvements may also be considered for the Interim Casino phase.):

- Provide a second westbound Delaware Avenue left-turn lane for access to the site creating dual westbound Delaware Avenue left-turn lanes of approximately 200-feet in length. Although 200-feet of storage length is not necessary in the 2009 build year condition this length will accommodate 2022 year queues. The second left-turn lane can be accommodated through the removal of the designated on-street parking lane located along the south-side of Delaware Avenue in the vicinity of the site. Field observations of the on-street parking spaces bordering the SugarHouse site indicate that they are under currently under-utilized with only three occupied spaces at the time of observation.
- Relocate and upgrade signal equipment as necessary to provide for the second westbound Delaware Avenue left-turn lane.
- Adjust signal timing and phasing to accommodate a protected phase for dual left-turn movements into the site and right-turns exiting the site. The westbound Delaware Avenue left-turn and Shackamaxon/site driveway approach should operate under actuation.
- Coordinate signal with the Frankford Avenue and Penn Street intersections along Delaware Avenue.

Similar to the Delaware Avenue – Shackamaxon Street intersection recommended mitigation measures at the Delaware Avenue – Frankford Avenue intersection would include the following (also potentially completed during the

Interim Casino phase.):

- Construction of a second westbound Delaware Avenue left-turn lane for access to the site creating dual westbound Delaware Avenue left-turn lanes of approximately 175-feet in length. This storage bay length would accommodate the 2022 build year queues anticipated. Removal of the on-street parking spaces along the south-side of Delaware Avenue is recommended to accommodate the second left-turn lane.
- Signal improvements of timing, phasing, and coordination with the Shackamaxon Street and Penn Street intersections are recommended. Actuation of the eastbound and westbound Delaware Avenue left-turn movements and the northbound and southbound Frankford Avenue approaches is also recommended.

Additionally, it is recommended that the phasing of the Delaware Avenue – Penn Street intersection be adjusted. Although a minimum westbound Delaware Avenue left-turn volume is anticipated (approximately 50 vehicles), a high eastbound opposing volume of approximately 2,485 vehicles is projected in the build condition. Therefore, a protected/permitted westbound Delaware Avenue left-turn phase is recommended.

The build with mitigation year 2009 analysis indicates the intersections along Girard Avenue will operate at similar or better overall intersection LOS as compared to the no-build year 2008.

The intersection of Delaware Avenue – Shackamaxon Street will operate at overall LOS B with a delay of 11.5 seconds per vehicle. The westbound Delaware Avenue left-turn will operate at LOS D with a V/C ratio of 0.37. The southbound Shackamaxon Street approach will continue to operate at LOS C conditions similar to the no-build year 2009 condition. The site driveway approach to the intersection is anticipated to operate at LOS D conditions with an approach delay of 46.4 seconds.

The Delaware Avenue – Frankford Avenue intersection is anticipated to operate at overall intersection service level B. The eastbound and westbound Delaware Avenue left-turn movements operate at LOS D and queues are expected to be stored within existing eastbound left-turn lane and proposed dual westbound left-turn lanes. Southbound Frankford Avenue and the northbound site driveway will operate at LOS C and D, respectively.

The intersection of Delaware Avenue and Penn Street would continue to operate at overall LOS B similar to the no-build conditions; however, the westbound Delaware Avenue left-turn movement would improve from LOS D to LOS C.

Appendix H illustrates the potential 2009 mitigation measures for the Delaware Avenue – Shackamaxon Street and Delaware Avenue – Frankford Avenue

signalized intersections.

9.1.3. Future Build Year 2012 Mitigation Measures and Conditions (Project Phase II)

Analysis of the street network during the future build with mitigation year 2012 (assuming year 2009 mitigation measures have been implemented) reveals that minimal mitigation measures of signal timing optimization and coordination are necessary for those intersections along Delaware Avenue. Timing optimization and signal coordination at study intersections along Delaware Avenue is necessary due to the assumed shifts in travel patterns to and from the casino which would occur following the completion of the I-95/Girard Avenue Interchange.

The build with mitigation analysis for year 2012 indicates that the studied intersections will operate at or near future no-build year 2012 conditions with overall Level of Service C or better. Individual lane groups and turning movements will operate at LOS D or better.

The Delaware Avenue – Shackamaxon Street intersection is anticipated to operate at overall LOS B. The Delaware Avenue eastbound and westbound through movements will operate at excellent LOS A. Westbound Delaware Avenue left-turn movements will operate at LOS D with a V/C ratio of 0.70 and queues will be stored within the 200-foot left-turn lane provided. The southbound Shackamaxon Street approach is anticipated to operate at acceptable LOS D. The northbound site driveway will experience an overall delay of 43.8 seconds and LOS D conditions.

The Delaware Avenue – Frankford Avenue intersection will operate at overall LOS B. Through/right-turn movements along Delaware Avenue will operate at LOS B or better. LOS D operations are anticipated for the eastbound and westbound Delaware Avenue left-turns, with left-turn queues to be stored within the left-turn storage bays provided. The southbound Frankford Avenue and northbound site driveway approaches will operate at acceptable LOS D operations.

Appendix H illustrates the potential 2012 mitigation measures for the Delaware Avenue – Shackamaxon Street and Delaware Avenue – Frankford Avenue signalized intersections.

Analysis of the 2022 future build year conditions requires no additional mitigation. All study intersections, individual lane groups and turning movements are anticipated to operate within acceptable LOS D conditions.

Appendix F contains a detailed LOS Summary table and Appendix G contains the Synchro software printouts.

9.2. Local Street Network and Neighborhoods Mitigation Measures

Even though a limited amount of traffic will be generated for a relatively short period of time during the Interim Casino phase, a set of traffic mitigation measures may be implemented with community input and review to minimize impacts to the local street network and neighborhoods. These measures include wayfinding signage and traffic calming techniques which could be implemented along local streets prior to implementation of the Interim Casino phase. The detailed planning and design of such measures would be done with input from residents of the affected streets and surrounding neighborhoods. Once the I-95/Girard Avenue Interchange improvements are completed, it is not anticipated that these measures will need to remain in place. Other mitigation measures may be implemented based on neighborhood needs and particular traffic conditions created from subsequent casino development phases.

9.2.1. Wayfinding and Traffic Restriction Signage to/from SugarHouse Site

A system of wayfinding signage would be implemented prior to the Interim Casino phase to guide casino-bound traffic along designated routes and discourage use of neighborhood streets. During the Interim Casino phase, wayfinding signs would guide southbound traffic along Girard Avenue to Berks Street and Frankford Avenue to Delaware Avenue and to the casino site. Wayfinding signage would also guide northbound traffic along Delaware Avenue to the casino site.

In addition to the wayfinding signage, a signage system restricting traffic from entering local streets would be implemented prior to the Interim Casino phase. Signage prohibiting through traffic would be placed along northbound and southbound Girard Avenue at Montgomery Avenue, E. Columbia Street, and Shackamaxon Street.

Graphical representations of both the wayfinding and traffic restriction signage plans are contained in Appendix H.

9.2.2. Traffic Calming Measures

In addition to signage, a system of traffic calming measures could be implemented to deter casino-bound traffic from using neighborhood streets. On Montgomery Avenue, access to Delaware Avenue might, for example, no longer be possible. The Montgomery Avenue intersection with Delaware Avenue would be closed to through traffic. The block between Wildey Street and Delaware Avenue would be converted to two-way traffic movement, and Montgomery Avenue traffic would be diverted to Berks Street for access to Delaware Avenue.

Traffic impacts along Berks Street would be limited due to the small number of residences.

On East Columbia Avenue, several traffic calming measures could be implemented to discourage through traffic movements. These measures include a marked pedestrian crosswalk at the intersection of East Columbia Avenue and Girard Avenue. At the intersection East Columbia Avenue and Wildey Street, the sidewalk area and curb would be extended to narrow the street width with the intention of slowing traffic speeds and discouraging through traffic movements. On East Columbia Avenue, between Salmon Street and Delaware Avenue, a speed bump could be installed to slow traffic speeds and discourage through traffic movements. Through traffic movement on Shackamaxon Street to Delaware Avenue with direct entry to the casino driveway would no longer be allowed. Lane markings would permit left-only and right-only movements onto Delaware Avenue.

Graphical representations of the traffic calming measures are contained in Appendix H.

9.3. Events and Opening Day Mitigation Measures

The SugarHouse Casino site may include a 2,500 seat event center in Phase II or final phase of construction. It is anticipated a majority of event tickets will be complimentary to guests and patrons of the casino and would not generate new trips from areas outside the site. However, a percentage of the tickets will be offered to non-casino patrons and thereby are anticipated to generate new external (non-casino) trips to the site. Arrivals to events are typically spread out over a one to two hour period prior to the start time. These arrival trips are accounted for in the trip generation projections during the evening street peak hour of study.

At the conclusion of special events it is anticipated that although occurring significantly outside of the evening street peak hour, a traffic surge will occur as event attendees simultaneously exit from the event center. On-site policed traffic control will be implemented to assist patrons exiting the self-park garage and other parking areas and to evenly distribute exiting vehicles between the primary access driveways at Shackamaxon Street and Frankford Avenue. SugarHouse Casino will also implement manual/policed traffic control at the driveway intersections with Delaware Avenue to assist event center patrons in exiting the SugarHouse site safely and efficiently onto Delaware Avenue.

10. SUMMARY AND CONCLUSIONS

This traffic impact analysis analyzed existing and future traffic operations at ten intersections in the study area, determined SugarHouse Casino travel patterns along the roadway network, and projected trip generation data for the proposed development. In addition, intersections identified as impacted by the proposed development were analyzed and potential mitigation measures were identified for each of the three development phases. The following section summarizes the key information from this study:

- The SugarHouse Casino is to be constructed in three phases:
  - Interim Casino: 1,500 slots, food, beverage, and entertainment facility, and a 2,330-space parking structure; scheduled opening in 2008
  - Phase I Casino: 3,000 slots, additional food, beverage, and entertainment venues, and approximately 550-600 additional valet parking spaces; scheduled opening in 2009
  - Phase II Casino: 5,000 slots, additional food and beverage, Event Center, and 500-room hotel; potential opening based on market demand, in 2012

- It was determined that the most demanding traffic period for the street network and trips generated by the casino would occur during a typical Friday evening period.
  - Traffic count data indicates that the evening street peak hour occurs from 4:15 PM to 5:15 PM. All ten study intersections were analyzed for this peak hour.
  - Trip generation data indicates the casino will generate the following trips for each of the development phases (Table 10-1):

Table 10-1: Casino Trip Generation (Peak Hour Trips)

	Interim Casino		Phase I Casino		Phase II Casino	
	In	Out	In	Out	In	Out
Auto	194	179	336	311	452	417
Taxi	25	25	43	43	58	58
Casino Bus	2	2	3	3	4	4
Employee	0	50	0	100	0	160
Hotel	0	0	0	0	34	36
Event Center	0	0	0	0	150	0
TOTALS	**221**	**256**	**382**	**456**	**698**	**675**

- The I-95/Girard Avenue Interchange is the primary access route to the site from areas outside the City of Philadelphia. In fact, trip distribution analysis indicates that 85% of casino patrons will access the SugarHouse Casino via I-95.

- The I-95/Girard Avenue Interchange is scheduled for major improvements reconfiguring the existing ramping system and providing direct access to and from Delaware Avenue northeast of the SugarHouse Casino site. It is anticipated that construction of the intersection will begin in 2009 and end in 2012. Travel patterns for casino patrons will be dependant upon the I-95/Girard Avenue Interchange construction staging and traffic management strategies during construction.

- The two primary site access points are the signalized intersections of Delaware Avenue – Shackamaxon Street and Delaware Avenue – Frankford Avenue. A third access point is the signalized intersection of Delaware Avenue – Penn Street which will not serve as a main access point to the casino site.

- Existing roadway traffic volumes in the SugarHouse Casino site vicinity are expected to increase during the no-build study years as a result of population growth, employment growth, and other land use and redevelopment projects, prior to and without any improvements at the

subject SugarHouse Casino site.

- The existing and no-build traffic analysis for Years 2008, 2009, 2012, and 2022 shows that most of the study intersections operate at overall intersection LOS C or better during the peak hour studied. Only the Girard Avenue – Frankford Avenue intersection is expected to operate at LOS D with Girard Avenue eastbound left-turn operating at LOS F.

- Since the future build conditions analysis showed operational inefficiencies the following measures to mitigate the operational inefficiencies are among those to be considered for each of the three future conditions:

  - Future Build Conditions – Year 2008 (1,500 slots)

    Signal timing, phasing adjustments and coordination of the study intersections along Girard Avenue and Delaware Avenue

  - Future Build Conditions – Year 2009 (3,000 slots), Year 2012 (5,000 slots, event center, and hotel), and Year 2022 (Year 2012 + 10). (Note: these improvements will also be considered in the Interim Casino phase.)

    - At the intersections of Delaware Avenue – Shackamaxon Street and Delaware Avenue – Frankford Avenue, construct a second westbound Delaware Avenue left-turn lane for access to the site creating dual west-bound left-turns.
    - Signal timing, phasing adjustments and coordination of the study intersections along Delaware Avenue

- The local street network was also reviewed for the installation of traffic calming measures. During the Interim Casino phase casino patron arrivals traveling from I-95 southbound will exit onto Girard Avenue westbound and turn left at either Berks Street or Frankford Avenue to access the SugarHouse Casino site. Since Montgomery Avenue, Columbia Avenue, and Shackamaxon Street could also serve as travel routes from Girard Avenue to Delaware Avenue, the following traffic calming measures are among those that may deter casino-based traffic on these streets:

  - Discontinue access from Montgomery Avenue to Delaware Avenue by closing Montgomery Avenue at its intersection with Delaware Avenue. The section of Montgomery Avenue from Delaware Avenue to Wildey Street would be opened for two-way travel and traffic seeking access to Delaware Avenue would be diverted to Berks Street for a one-block segment until the intersection of Delaware Avenue.

  - On Columbia Avenue the sidewalk area and curb could be widened into the traveled way, narrowing the street width and slowing traffic

Between Salmon Street and Delaware Avenue a speed hump could be installed with the same intent of slowing and discouraging through traffic.

- At the intersection of Delaware Avenue and Shackamaxon Street, all southbound Shackamaxon Street through movements into the casino driveway would be prohibited.

- Other mitigation measures include a trailblazing signage system to guide casino patrons to and from the site and discourage patrons from utilizing neighborhood streets.

- After mitigation measures are implemented the overall intersection LOS are as follows:

  - Future Build Conditions – Year 2008 (1,500 slots)

    Most of the intersections will continue to operate at overall LOS C or better; however some intersection turning movements will experience LOS D. These intersections include:

    - Girard Avenue – Frankford Avenue
    - Delaware Avenue – Shackamaxon Street
    - Delaware Avenue – Frankford Avenue
    - Delaware Avenue – Penn Street

  - Future Build Conditions – Year 2009 (3,000 slots), Year 2012 (5,000 slots, event center, and hotel), and Year 2022 (Year 2012 + 10)

    Similar to future build Year 2008 most of the intersections will operate at LOS C or better, however the following intersections were shown to have individual lane groups or turning movements which operate at LOS D conditions:

    - Girard Avenue – Frankford Avenue
    - Delaware Avenue – Shackamaxon Street
    - Delaware Avenue – Frankford Avenue
    - Delaware Avenue – Penn Street

In summary, although it is expected that casino-bound traffic will use Girard Avenue during the Interim Casino phase, this phase will generate the lowest volumes and has a relatively short duration. During the I-95/Girard Interchange construction phase, PennDOT will be putting in place a traffic management plan which may help to minimize casino-bound traffic from local streets such as Berks Street and Frankford Avenue. After the I-95/Girard Avenue Interchange

construction is completed and Phase II of casino development is completed, casino-bound traffic from I-95 will have direct access to Delaware Avenue and to the site, and negative impacts on local streets and neighborhoods should be minimal.

The traffic analysis for Interim Casino phase traffic conditions demonstrates that six (6) analyzed intersections along Girard Avenue will operate at overall Level of Service (LOS) C or better. In general, LOS D is acceptable in major urban areas. The overall LOS for the Interim Casino phase is at the same level as for existing conditions after traffic mitigation measures are applied. Similar to Girard Avenue, the analyzed intersections along Delaware Avenue are showing the same Levels of Service after implementation of the same traffic mitigation measures. Newly introduced left-turn movements from Delaware Avenue to the casino site have some impact on the approach delay but the impact on overall intersection delay is minimal.

In addition to operational mitigation measures, the Interim Casino phase will introduce measures that channel traffic from Girard Avenue to Berks Street and Frankford Avenue and minimize or eliminate casino-bound traffic on other residential streets. These measures include prohibiting movements, implementing traffic calming techniques, and installing wayfinding signage systems. The signage systems will guide vehicles to pre-designated streets and discourage vehicles from entering other local streets.

During Phases I and II of casino development, casino-related traffic on Girard Avenue should level off and eventually taper off with completion of the Interchange reconstruction. Therefore, some decline in casino-bound traffic demand may be experienced during Phase I and II, although additional traffic may be added due to unrelated background traffic growth.

Unlike Girard Avenue, Delaware Avenue will experience an increase in traffic demand due to higher casino-bound traffic volumes for Phases I and II. The highest traffic demand is expected after the Phase II Casino is open due to more casino-bound traffic demand and the cumulative effects of unrelated background traffic growth. However, by utilizing mitigation measures to coordinate traffic signals and optimize signal timing plans, and by providing dual left-turn lanes at the intersections with both Frankford and Shackamaxon Avenues, overall intersection LOS will be C or better. Although overall intersection LOS is very good, several of the individual intersection approaches will operate at LOS D or better. In general, lower Levels of Service are experienced at intersection approaches with high traffic volumes and higher Levels of Service are experienced at approaches with low traffic volumes.

A

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POTENTIAL FUTURE DEVELOPMENT PROJECTS PROXIMATE TO SUGARHOUSE CASINO

Northern Liberties Neighborhood Association

The following potential projects were provided by the Northern Liberties Neighborhood Association:

1. Bridgeman's View Condo. N. Delaware Avenue and Poplar. 66 Stories. Number of units unknown.

2. Hoboken Brownstone. 700 N. Delaware Avenue. Four towers, 20 stories each. Four square blocks, Front to Delaware Avenue and Fairmont to Poplar.

3. Former Schmidts Brewery Redevelopment. Bart Blatstein. 14 acres. Girard Avenue and N. 2nd Street. Two phases. Phase I: 470 residential units, construction is about to commence. Phase II: three 22-story buildings, with 275 units, as well as 200 townhouse units surrounding the towers (estimated three years out for Phase II).

4. Trump Condo Tower. 45 stories, 250 units. N. Penn Street at N. Delaware Avenue.

5. Waterfront Square. Five towers, ranging from 21-35 stories. N. Penn Street. Phase I: two towers built. Phase II: construction to begin on two additional towers by 12/06. Total number of units 780. *

6. Horse Stables. 1100 block of N. American Street. 66 condo units.

7. Creative Real Estate Innovations (total of 4 projects)
   a. 11-story condo at Brown and N. American Streets. 40 units.
   b. 26 town homes on N. 2nd Street
   c. 13-story condo on N. 2nd Street. Number of units unknown.
   d. 7-story condo on 600 block of N. American St. Number of units unknown.

8. Fairmount Avenue Warehouse Conversion. 200 units.

9. Callowhill Warehouse Conversion, 4th Street, 200 units.

10. World Trade Center – Martin Shiftman. Two 60-story towers. Callowhill and Delaware Avenue.

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11. CNO Properties. 27-story tower, 275 units just south of Penn Treaty Park, between N. Delaware Avenue and the River.

12. HPH/Zev Shankman (total of 3 projects)
    a. 15 townhouses on N. 2nd Street
    b. 4-story condo on Brown Street (8-10 units)
    c. 5-story condo (6-8 units) on N. 2nd Street

New Kensington Community Development Corporation

The following were provided by NKCDC. Note that they appear to be more or less in-fill projects.

1. 1102-04 E. Columbia Avenue. Conversion of old industrial building to 6 condo units.

2. 2226-34 N. Front Street. Construction of five commercial units on individual lots.

3. 1325-29 Frankford Avenue. Construction of four row homes on industrial lot.

4. 1333-45 Susquehanna Avenue. Conversion of church building and parsonage to residences and photography studio.

5. 1202-22 Frankford Avenue. Conversion of light industrial lot to 32 condo units with 32 off-street parking spaces.

6. 300 E. Girard. Construction of commercial space and 2 rental units on property obtained from Philadelphia RDA for a community garden.

7. 2107 Susquehanna Avenue. Combining of 10 lots into one and building of 11 artist live/work rental units in seven buildings.

8. 1102-04 E. Columbia Avenue. Conversion of old industrial building to 6 condo units.

9. 2221-23 N. Front Street. Certificate to construct and operate a banquet hall.

10. 412-24 Moyer Street. ZBA hearing date: October 17
Matter at issue: Construction of 32 condo units with 32 off-street parking units

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Outcome: To be heard.

11. 1247-51 E. Columbia Avenue. Demolition of existing structures and construction of 6 town homes.

12. 2509 Frankford Avenue. Conversion of residential building to office of non-profit organization and residential unit.

13. 2657 Emerald Street. Legalization of conversion of single-family structure to two-family structure.

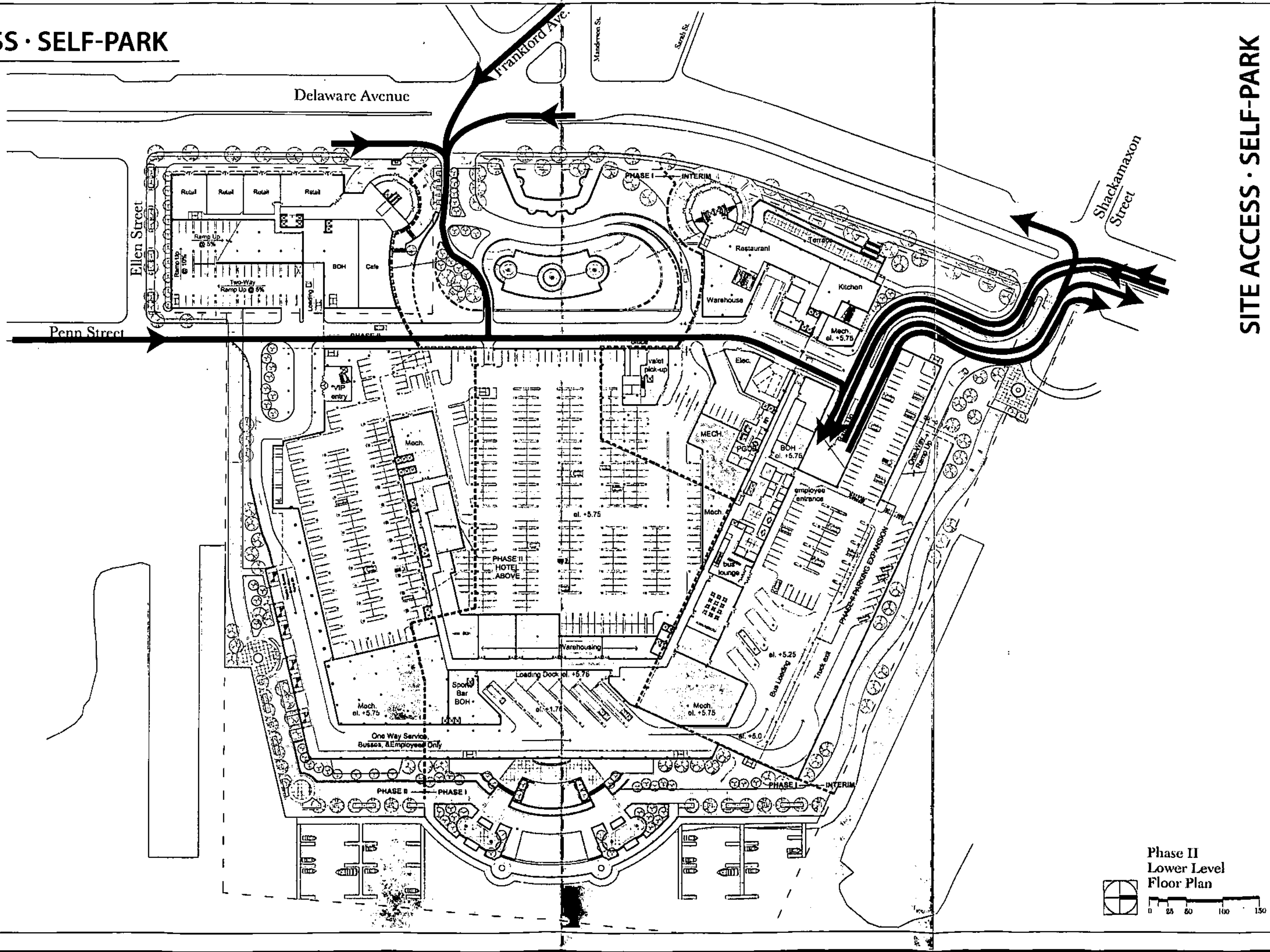
14. 2526 E. Hagert Street . Construction of single-family home; determination of ownership of backyard area behind lot in question.

* This project is approved and under construction. The entire project was specifically added to future traffic in addition to the 1% growth factor.

B

SITE ACCESS · SELF-PARK

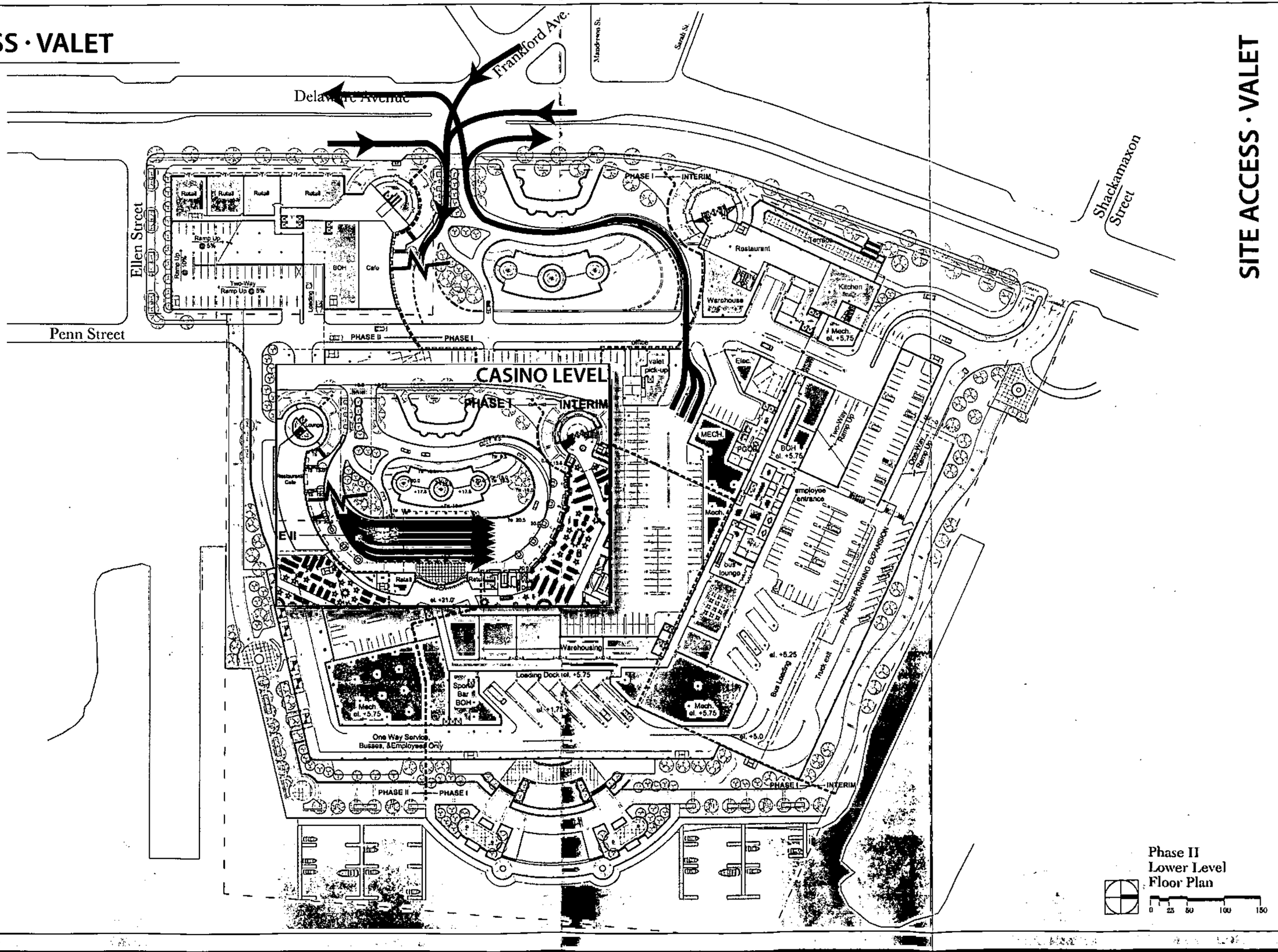
SITE ACCESS · SELF-PARK



Phase II
Lower Level
Floor Plan

0 25 50 100 150

SITE ACCESS · VALET

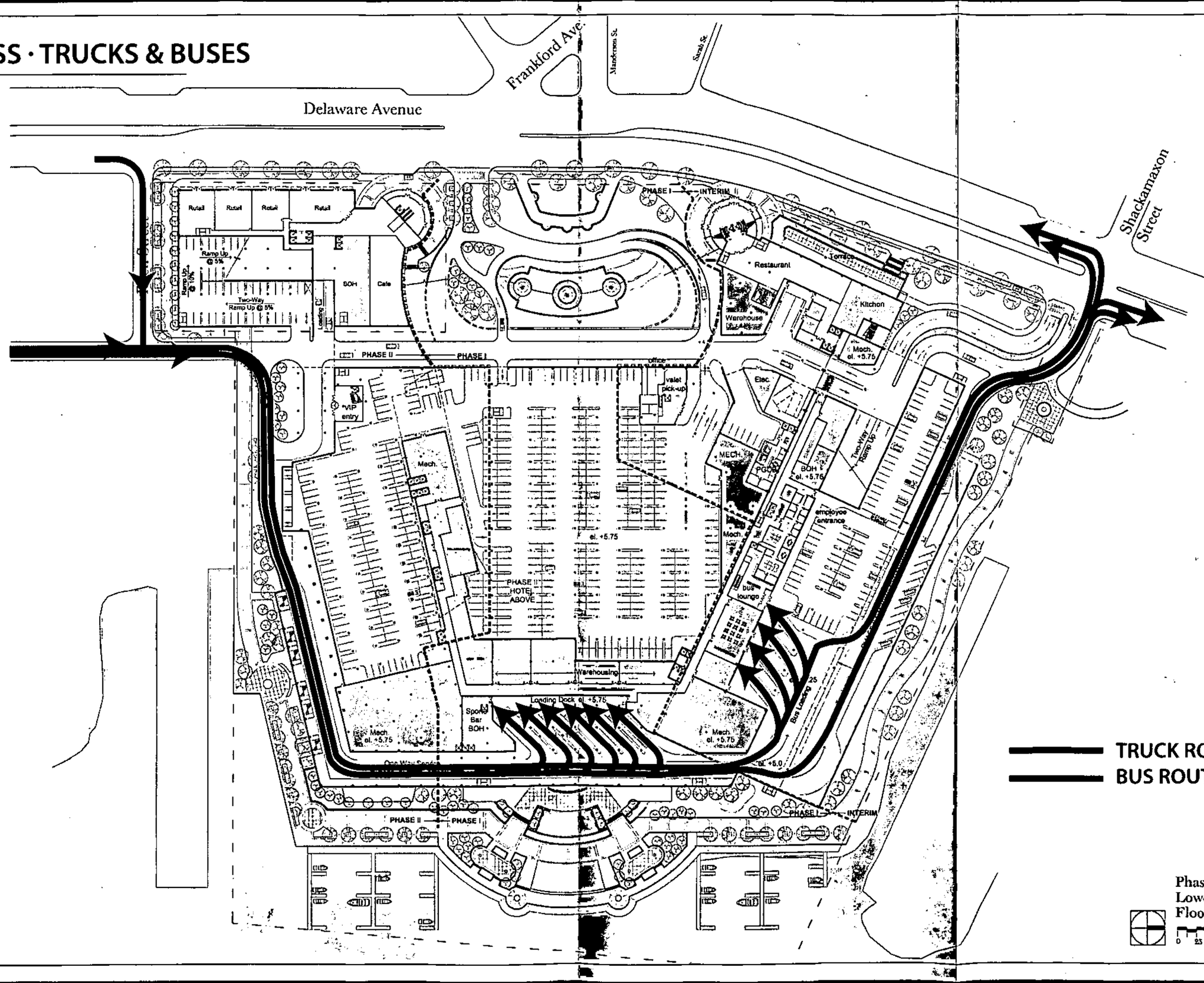


SITE ACCESS · VALET

Phase II
Lower Level
Floor Plan

0 25 50 100 150

SITE ACCESS · TRUCKS & BUSES

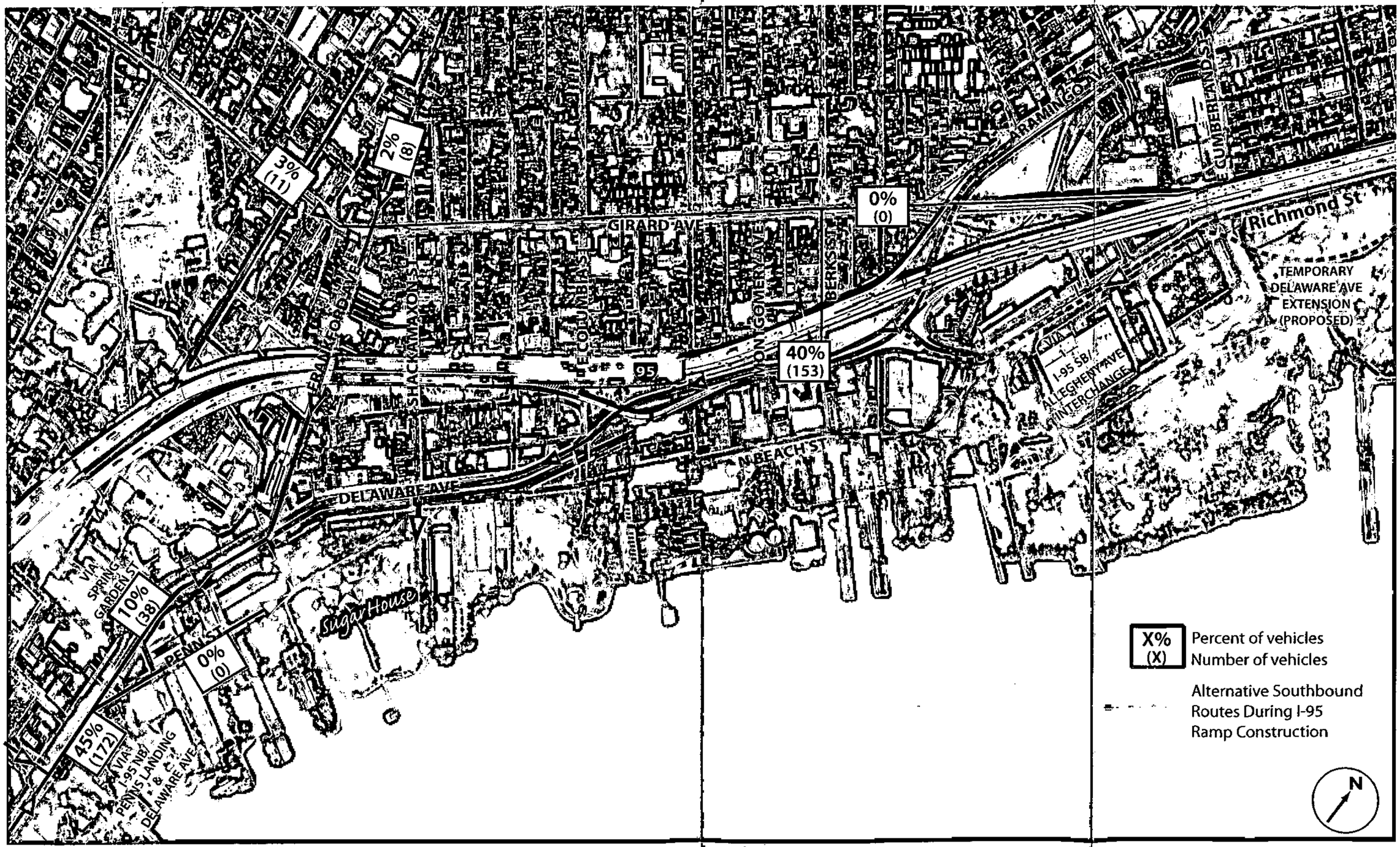


SITE ACCESS · TRUCKS & BUSES

C

TRIP DISTRIBUTION - ARRIVALS

PHASE I

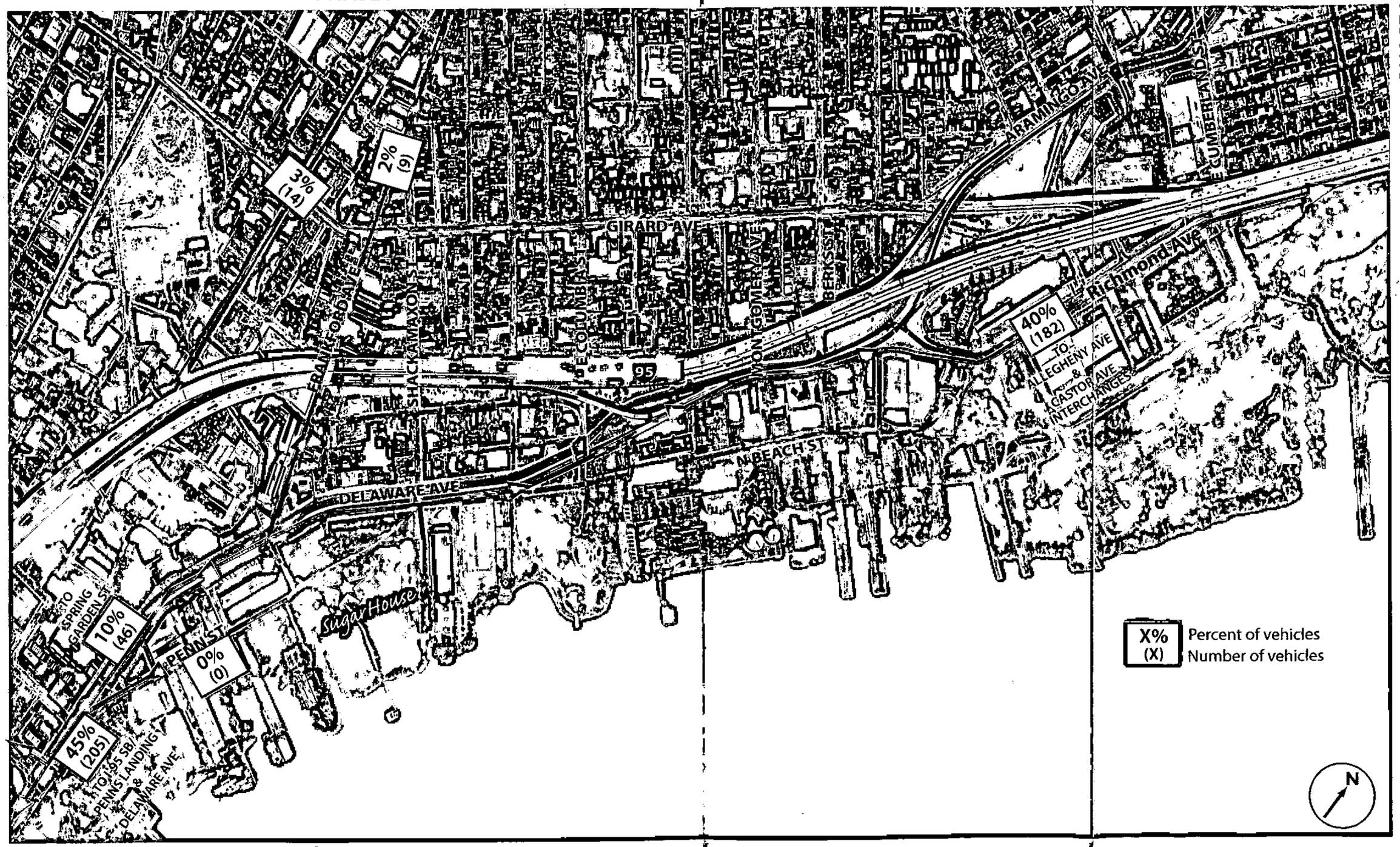


PHASE I

TRIP DISTRIBUTION - ARRIVALS

TRIP DISTRIBUTION - DEPARTURES

PHASE I

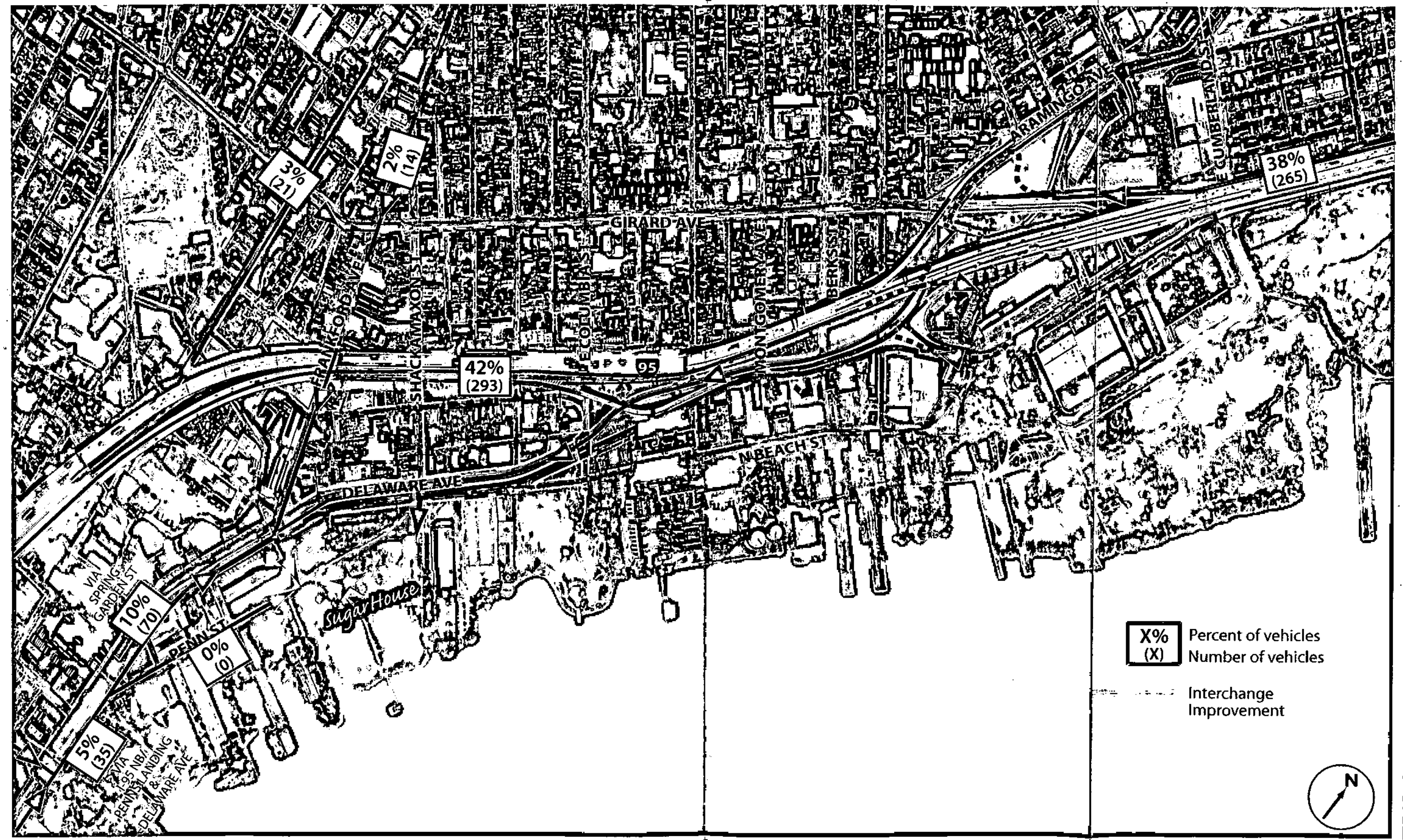


PHASE I

TRIP DISTRIBUTION - DEPARTURES

TRIP DISTRIBUTION - ARRIVALS

PHASE II

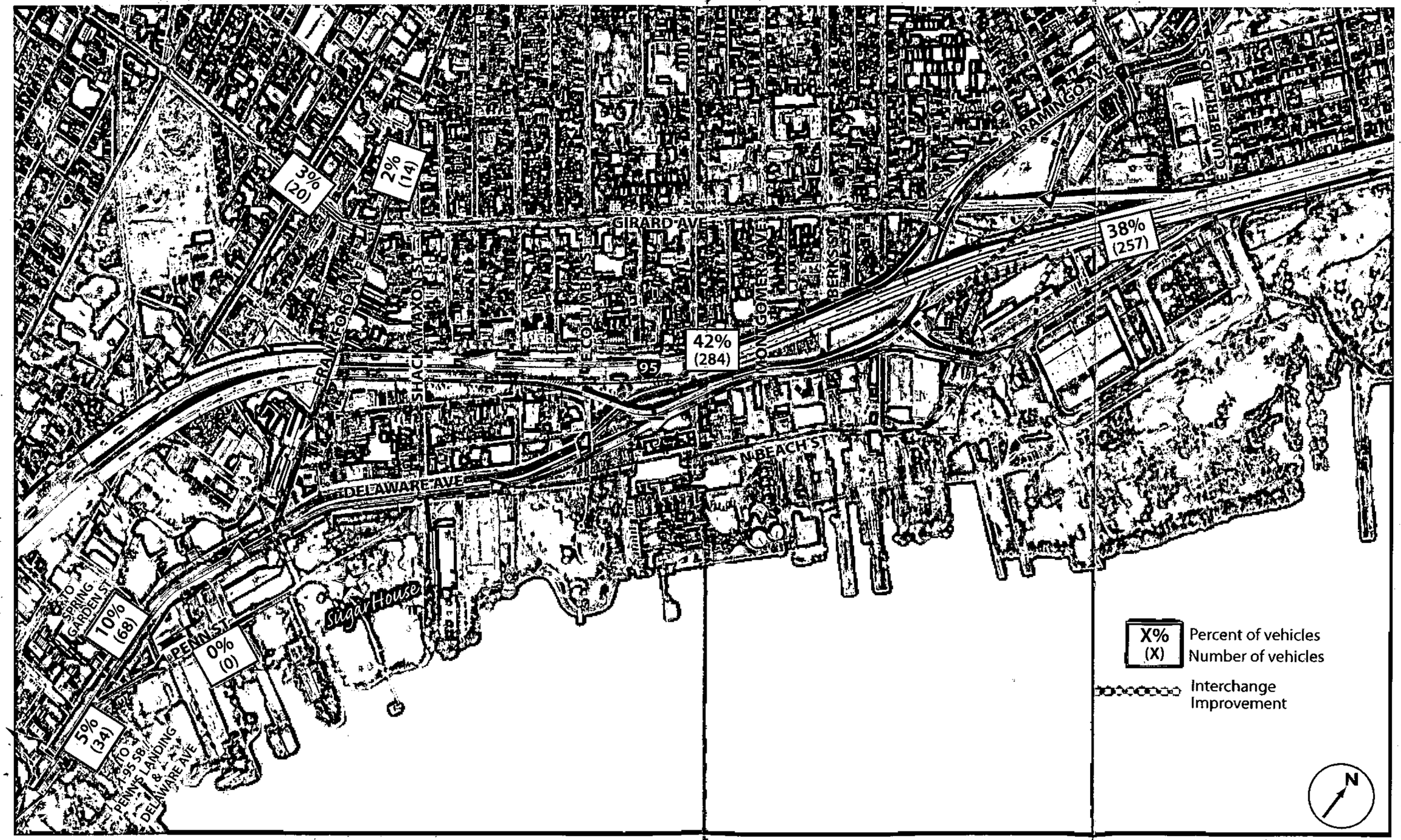


PHASE II

TRIP DISTRIBUTION - ARRIVALS

TRIP DISTRIBUTION - DEPARTURES

PHASE II

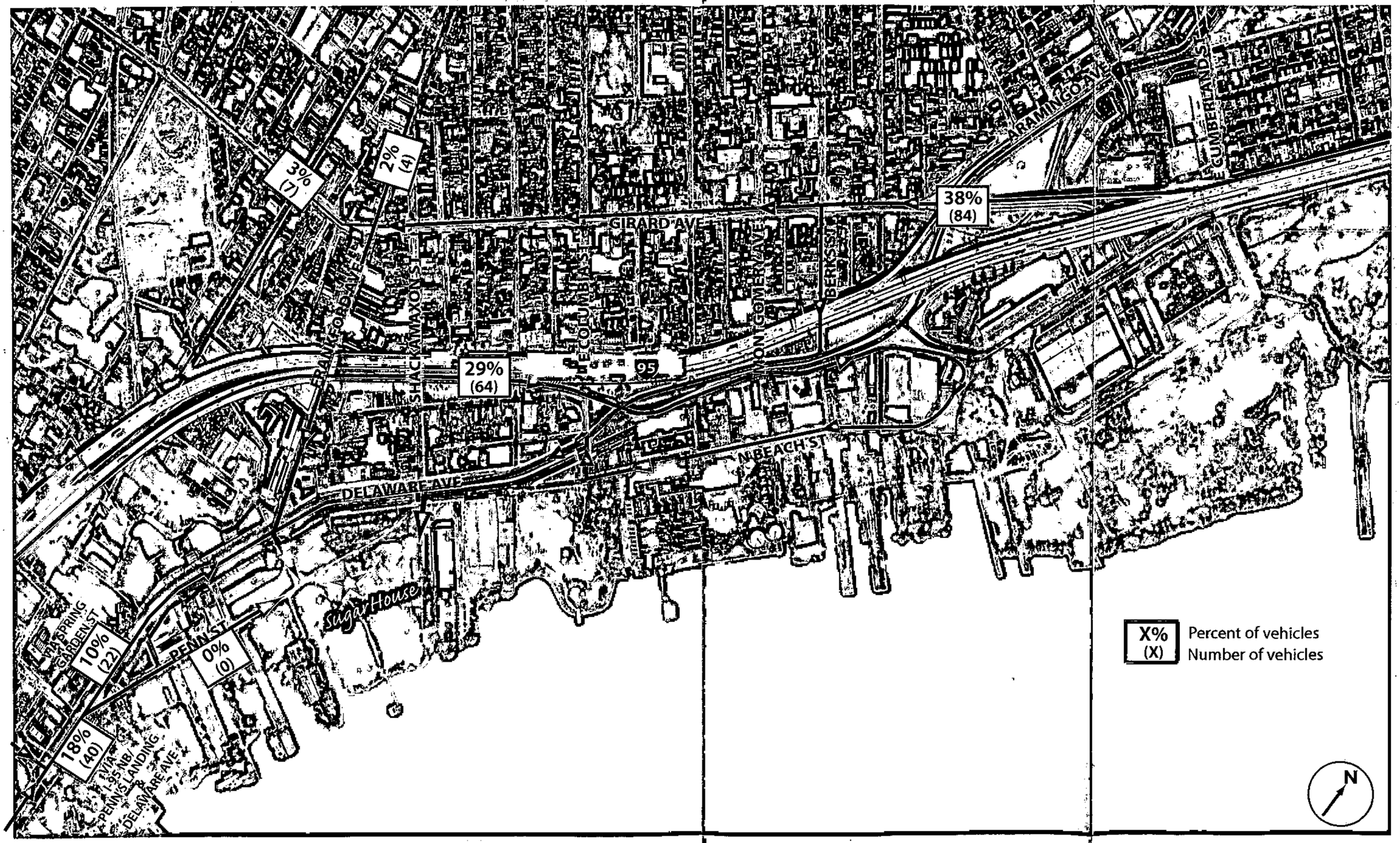


PHASE II

TRIP DISTRIBUTION - DEPARTURES

TRIP DISTRIBUTION - ARRIVALS

INTERIM PHASE

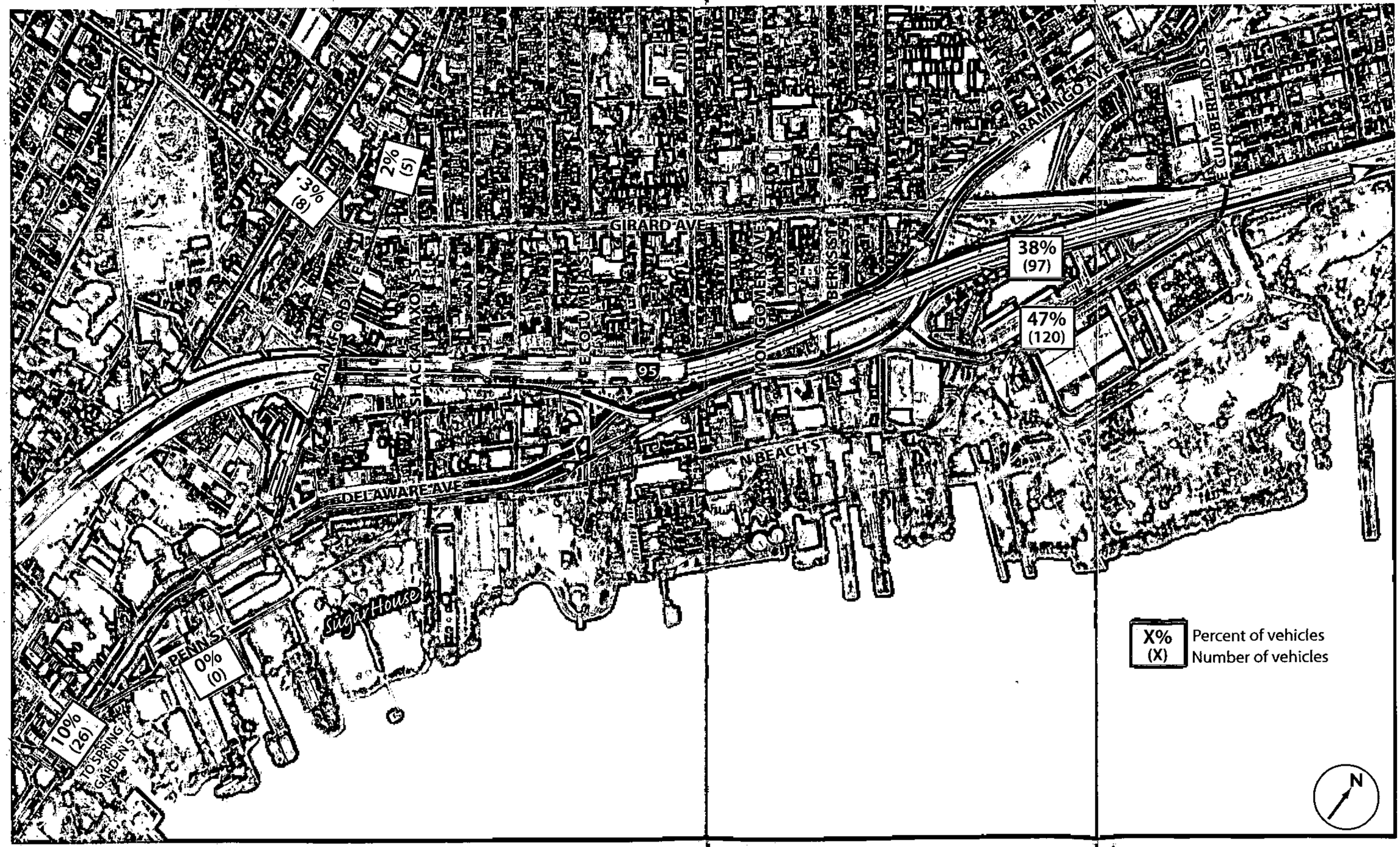


TRIP DISTRIBUTION - ARRIVALS

INTERIM PHASE

TRIP DISTRIBUTION - DEPARTURES

INTERIM PHASE

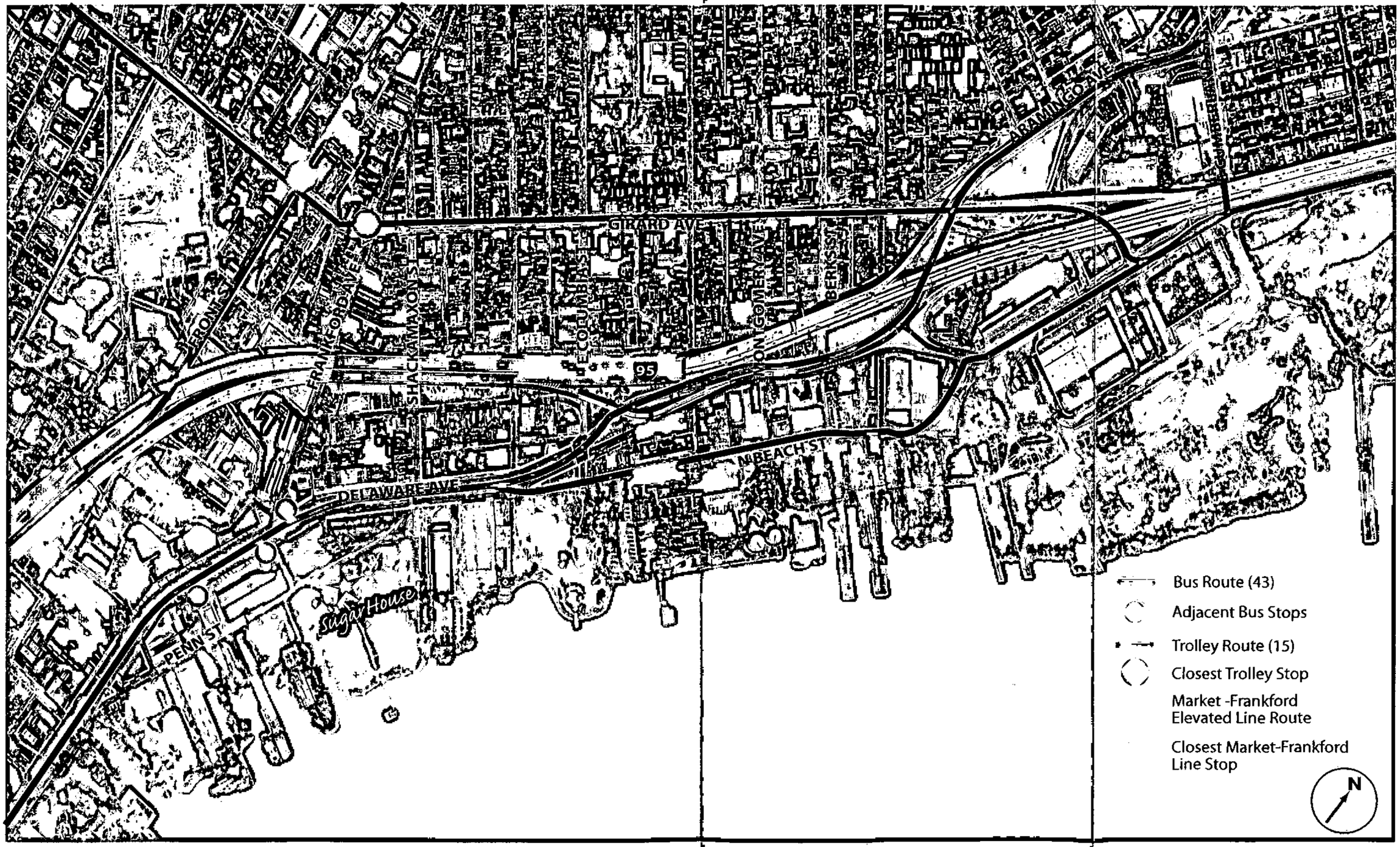


TRIP DISTRIBUTION - DEPARTURES

INTERIM PHASE

PUBLIC TRANSPORTATION

ACCESS POINTS



ACCESS POINTS

PUBLIC TRANSPORTATION

D

Intersection Turning Movement Count Summary

Intersection: Girard Avenue and Berks Street
Date: July 2006
Weather: Sunny

RAW DATA

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Berks Street			*Berks Street*			*Girard Avenue*			*Girard Avenue*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	15	170	0	27	162	65	439
4:15 PM	0	0	0	0	0	0	11	162	0	20	155	76	424
4:30 PM	0	0	0	0	0	0	19	163	1	15	148	61	407
4:45 PM	0	0	0	0	0	0	15	190	1	17	163	87	473
5:00 PM	0	0	0	0	0	0	18	165	3	24	164	66	440
5:15 PM	0	0	0	0	0	0	17	164	0	18	154	62	415
5:30 PM	0	0	0	0	0	0	20	166	2	18	140	53	399
5:45 PM	0	0	0	0	0	0	21	179	0	16	136	60	412
PM PEAK HOUR 4:45 PM - 5:45 PM	0	0	0	0	0	0	63	680	5	76	630	290	1744
PHF							0.83	0.89	0.42	0.79	0.96	0.83	

ADJUSTED 1.10806

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Berks Street			*Berks Street*			*Girard Avenue*			*Girard Avenue*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	17	188	0	30	180	72	486
4:15 PM	0	0	0	0	0	0	12	180	0	22	172	84	470
4:30 PM	0	0	0	0	0	0	21	181	1	17	164	68	451
4:45 PM	0	0	0	0	0	0	17	211	1	19	181	96	524
5:00 PM	0	0	0	0	0	0	20	183	3	27	182	73	488
5:15 PM	0	0	0	0	0	0	19	182	0	20	171	69	460
5:30 PM	0	0	0	0	0	0	22	184	2	20	155	59	442
5:45 PM	0	0	0	0	0	0	23	198	0	18	151	66	457
PM PEAK HOUR 4:15 PM to 5:15 PM	0	0	0	0	0	0	70	753	6	84	698	321	1932
PHF							0.83	0.89	0.42	0.79	0.96	0.83	

Intersection Turning Movement Count Summary

Intersection: Girard Avenue and Montgomery Avenue
Date: September 2006
Weather: Sunny

RAW DATA

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Montgomery Ave			*Montgomery Ave*			*Girard Avenue*			*Girard Avenue*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	12	1	14		233	2	2	165		429
4:15 PM	0	0	0	14	8	11		157	3	3	174		370
4:30 PM	0	0	0	19	5	12		173	6	6	143		364
4:45 PM	0	0	0	15	4	11		231	1	4	147		413
5:00 PM	0	0	0	15	7	13		214	7	4	138		398
5:15 PM	0	0	0	24	5	8		210	6	4	144		401
5:30 PM	0	0	0	15	5	14		183	2	3	169		391
5:45 PM	0	0	0	17	7	8		172	1	2	153		360
PM PEAK HOUR 4:45 PM - 5:45 PM	0	0	0	63	24	47	0	775	17	17	602	0	1545
PHF				0.83	0.75	0.90		0.84	0.61	0.71	0.86		

Intersection Turning Movement Count Summary

Intersection: Girard Avenue and Columbia Avenue
Date: September 2006
Weather: Sunny

RAW DATA

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Columbia Ave			*Columbia Ave*			*Girard Avenue*			*Girard Avenue*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	17	9	10		184	4	5	102		331
4:15 PM	0	0	0	11	5	17		221	8	6	148		416
4:30 PM	0	0	0	19	5	12		194	13	8	144		395
4:45 PM	0	0	0	19	11	7		223	3	6	127		396
5:00 PM	0	0	0	20	17	13		207	6	6	126		395
5:15 PM	0	0	0	17	6	8		283	11	13	143		481
5:30 PM	0	0	0	17	12	6		185	7	8	139		374
5:45 PM	0	0	0	19	13	12		175	5	4	130		358
PM PEAK HOUR 4:45 PM - 5:45 PM	0	0	0	69	38	49	0	845	30	26	545	0	1602
PHF				0.86	0.56	0.72		0.95	0.58	0.81	0.92		

Intersection Turning Movement Count Summary

Intersection: Girard Avenue and Marlborough St
Date: September 2006
Weather: Sunny

RAW DATA

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Marlborough St			*Marlborough St*			*Girard Avenue*			*Girard Avenue*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	9	5	6	0	0	0	8	211	0	0	168	10	417
4:15 PM	3	5	12	0	0	0	1	190	0	0	155	9	375
4:30 PM	1	5	13	0	0	0	7	189	0	0	136	7	358
4:45 PM	8	7	5	0	0	0	3	205	0	0	136	7	371
5:00 PM	3	4	5	0	0	0	2	194	0	0	134	12	354
5:15 PM	3	3	13	0	0	0	3	232	0	0	135	12	401
5:30 PM	5	6	2	0	0	0	1	163	0	0	152	11	340
5:45 PM	6	2	5	0	0	0	3	154	0	0	125	7	302
PM PEAK HOUR 4:45 PM - 5:45 PM	15	21	35	0	0	0	13	778	0	0	561	35	1458
PHF	0.47	0.75	0.67				0.46	0.95			0.90	0.73	

Intersection Turning Movement Count Summary

Intersection: Girard Avenue and Shackamaxon Street
Date: July 2006
Weather: Sunny

RAW DATA

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Shackamaxon Street			*Shackamaxon Street*			*Girard Avenue*			*Girard Avenue*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	1	136	7	7	97	7	255
4:15 PM	0	0	0	0	0	0	2	141	3	8	89	11	254
4:30 PM	0	0	0	0	0	0	4	141	7	5	98	5	260
4:45 PM	0	0	0	0	0	0	2	171	4	1	115	12	305
5:00 PM	0	0	0	0	0	0	2	134	5	6	122	11	280
5:15 PM	0	0	0	0	0	0	6	204	9	8	118	10	355
5:30 PM	0	0	0	0	0	0	0	140	7	8	130	9	294
5:45 PM	0	0	0	0	0	0	0	122	5	3	112	8	250
PM PEAK HOUR 4:45 PM - 5:45 PM	0	0	0	0	0	0	10	587	19	20	424	39	1099
PHF							0.63	0.86	0.68	0.63	0.87	0.81	

ADJUSTED 1.10806

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Shackamaxon Street			*Shackamaxon Street*			*Girard Avenue*			*Girard Avenue*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	1	151	8	8	107	8	283
4:15 PM	0	0	0	0	0	0	2	156	3	9	99	12	281
4:30 PM	0	0	0	0	0	0	4	156	8	6	109	6	288
4:45 PM	0	0	0	0	0	0	2	189	4	1	127	13	338
5:00 PM	0	0	0	0	0	0	2	148	6	7	135	12	310
5:15 PM	0	0	0	0	0	0	7	226	10	9	131	11	393
5:30 PM	0	0	0	0	0	0	0	155	8	9	144	10	326
5:45 PM	0	0	0	0	0	0	0	135	6	3	124	9	277
PM PEAK HOUR 4:15 PM to 5:15 PM	0	0	0	0	0	0	11	650	21	22	470	43	1218
PHF							0.63	0.86	0.68	0.63	0.87	0.81	

Intersection Turning Movement Count Summary

Intersection: Girard Avenue and Frankford Avenue
Date: July 2006
Weather: Sunny

RAW DATA

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Frankford Avenue			*Frankford Avenue*			*Girard Avenue*			*Girard Avenue*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	11	72	11	8	20	9	39	144	9	4	97	7	431
4:15 PM	18	67	6	12	20	19	32	129	11	5	116	8	443
4:30 PM	14	66	14	9	31	16	35	130	7	4	102	9	437
4:45 PM	12	65	16	10	16	20	36	123	7	7	106	6	424
5:00 PM	16	75	9	17	26	38	42	136	16	3	106	3	487
5:15 PM	16	75	5	16	27	15	35	126	7	5	109	3	439
5:30 PM	12	68	13	19	15	19	32	125	8	5	113	5	434
5:45 PM	10	38	7	11	15	24	23	99	8	3	83	3	324
PM PEAK HOUR 4:45 PM - 5:45 PM	60	273	45	48	93	93	145	518	41	19	430	26	1791
PHF	0.83	0.91	0.70	0.71	0.75	0.61	0.86	0.95	0.64	0.68	0.93	0.72	

ADJUSTED 1.10806

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Frankford Avenue			*Frankford Avenue*			*Girard Avenue*			*Girard Avenue*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	12	80	12	9	22	10	43	160	10	4	107	8	478
4:15 PM	20	74	7	13	22	21	35	143	12	6	129	9	491
4:30 PM	16	73	16	10	34	18	39	144	8	4	113	10	484
4:45 PM	13	72	18	11	18	22	40	136	8	8	117	7	470
5:00 PM	18	83	10	19	29	42	47	151	18	3	117	3	540
5:15 PM	18	83	6	18	30	17	39	140	8	6	121	3	486
5:30 PM	13	75	14	21	17	21	35	139	9	6	125	6	481
5:45 PM	11	42	8	12	17	27	25	110	9	3	92	3	359
PM PEAK HOUR 4:15 PM to 5:15 PM	66	303	50	53	103	103	161	574	45	21	476	29	1985
PHF	0.83	0.91	0.70	0.71	0.75	0.61	0.86	0.95	0.64	0.68	0.93	0.72	

Intersection Turning Movement Count Summary

Intersection: Delaware Avenue and Shackamaxon Street
Date:
Weather: Sunny

RAW DATA - December 2005

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Driveway			*Shackamaxon Street*			*Delaware Avenue*			*Delaware Avenue*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	2	0	2	6	0	6	0	403	2	2	85	0	508
4:15 PM	4	0	0	3	0	3	0	554	2	0	101	0	667
4:30 PM	3	0	0	7	0	10	0	444	2	0	96	0	562
4:45 PM	3	0	1	2	0	9	0	551		1	102	0	669
5:00 PM	6	0	1	5	0	4	0	468	2	0	118	0	604
5:15 PM	2	0	0	6	0	8	0	494	1	1	89	0	601
5:30 PM	4	0	0	6	0	8	0	501	3	0	80	0	602
5:45 PM	3	0	0	3	0	4	0	360	2	0	77	0	449
PM PEAK HOUR 4:45 PM - 5:45 PM	16	0	2	17	0	26	0	2017	6	1	417	0	2502
PHF	0.67		0.50	0.61		0.65		0.91	0.75	0.25	0.88		

RAW DATA - July 2006

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Driveway			*Shackamaxon Street*			*Delaware Avenue*			*Delaware Avenue*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	4	0	0	5	0	9	0	415	2	3	73	0	511
4:15 PM	0	0	0	4	0	3	0	448	1	2	80	0	538
4:30 PM	4	0	0	4	0	4	0	404	1	2	87	0	506
4:45 PM	1	0	3	3	0	4	0	433	0	1	104	0	549
5:00 PM	2	0	0	7	0	5	0	546	2	0	103	0	665
5:15 PM	6	0	0	9	0	10	0	472	3	1	109	0	610
5:30 PM	11	0	0	2	0	10	0	400	1	1	84	0	509
5:45 PM	1	0	1	4	0	4	0	306	1	1	110	0	428
PM PEAK HOUR 4:15 PM to 5:15 PM	7	0	3	18	0	16	0	1831	4	5	374	0	2258
PHF	0.44		0.25	0.64		0.80		0.84	0.50	0.63	0.90		

ADJUSTMENT FACTOR:	**2502**	**/**	**2258**	**=**
FOR JULY 2006 COUNT DATA				**1.10806023**

Intersection Turning Movement Count Summary

Intersection: Delaware Avenue - Frankford AVenue
Date: December 2005
Weather: Sunny

RAW DATA

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Closed Driveway			*Frankford Ave*			*Delaware Ave*			*Delaware Ave*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	35	0	42	74	437	0	0	108	17	713
4:15 PM	0	0	0	25	0	28	93	368	0	0	90	10	614
4:30 PM	0	0	0	21	0	30	74	403	0	0	107	9	644
4:45 PM	0	0	0	23	0	40	82	374	0	0	99	17	635
5:00 PM	0	0	0	25	0	21	84	387	0	0	104	8	629
5:15 PM	0	0	0	24	0	27	84	409	0	0	98	8	650
5:30 PM	0	0	0	9	0	16	79	325	0	0	94	6	529
5:45 PM	0	0	0	19	0	21	75	335	0	0	82	12	544
PM PEAK HOUR 4:45 PM - 5:45 PM	0	0	0	94	0	119	333	1532	0	0	400	44	2522
PHF				0.94		0.74	0.90	0.95			0.93	0.65	

Intersection Turning Movement Count Summary

Intersection: Delaware Avenue - Penn Street
Date: December 2005
Weather: Sunny

RAW DATA

BEGIN TIME	Northbound			Southbound			Northeastbound			Southwestbound			TOTAL
	Penn Street			-			*Delaware Ave*			*Delaware Ave*			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	1	0	0	0	0	0	0	433	0	1	133	0	568
4:15 PM	3	0	0	0	0	0	0	599	0		169	0	771
4:30 PM	8	0	0	0	0	0	0	531	0		145	0	684
4:45 PM	1	0	0	0	0	0	0	581	0		175	0	757
5:00 PM	2	0	0	0	0	0	0	503	0		146	0	651
5:15 PM	6	0	0	0	0	0	0	568	0	3	116	0	693
5:30 PM	4	0	0	0	0	0	0	524	0		169	0	697
5:45 PM	3	0	0	0	0	0	0	560	0		123	0	686
PM PEAK HOUR 4:45 PM - 5:45 PM	14	0	0	0	0	0	0	2214	0	0	635	0	2863
PHF	0.44							0.92			0.91		

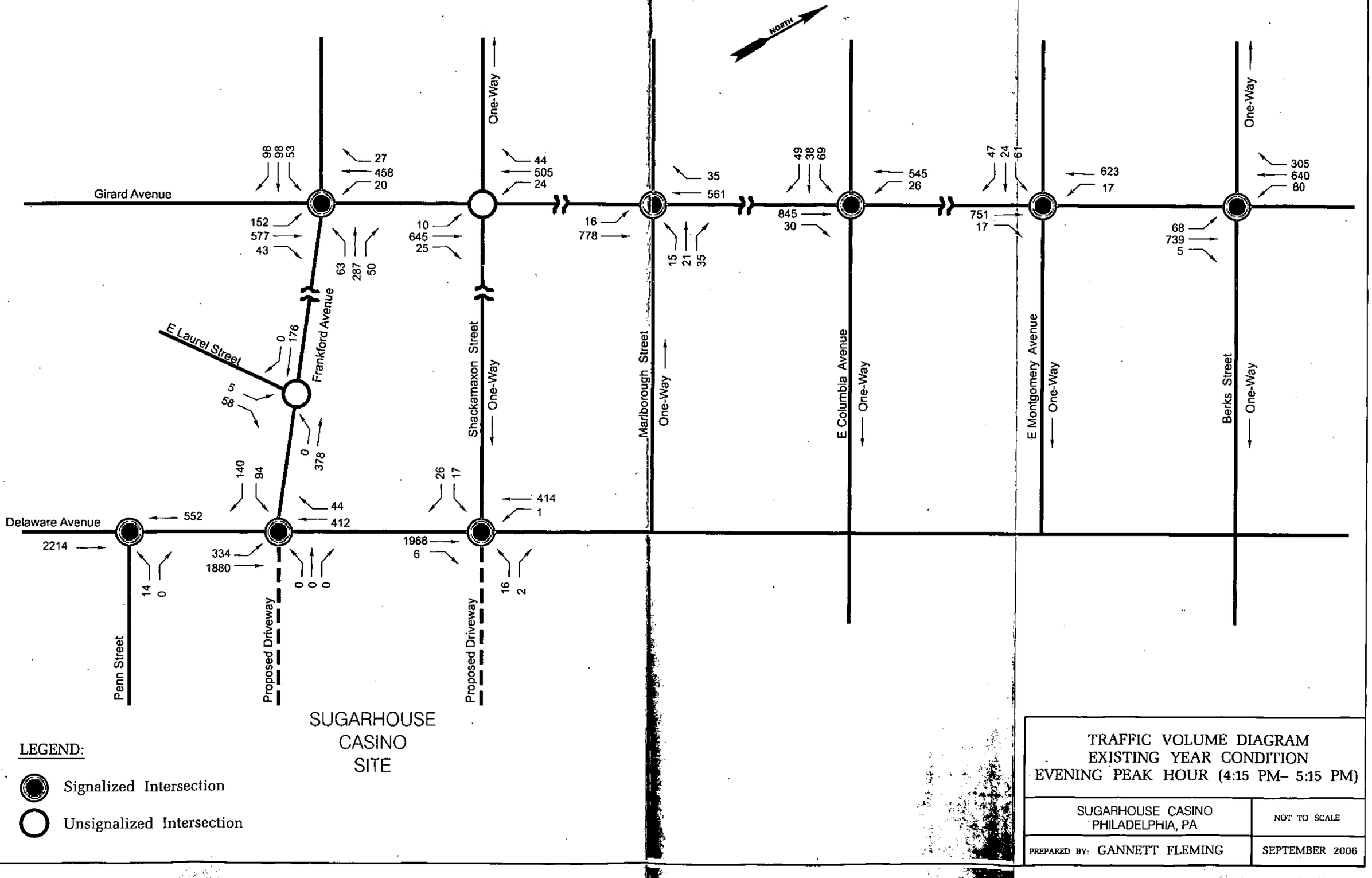
Intersection Turning Movement Count Summary

Intersection: Frankford Avenue - Laurel Street
Date: December 2005
Weather: Sunny

RAW DATA

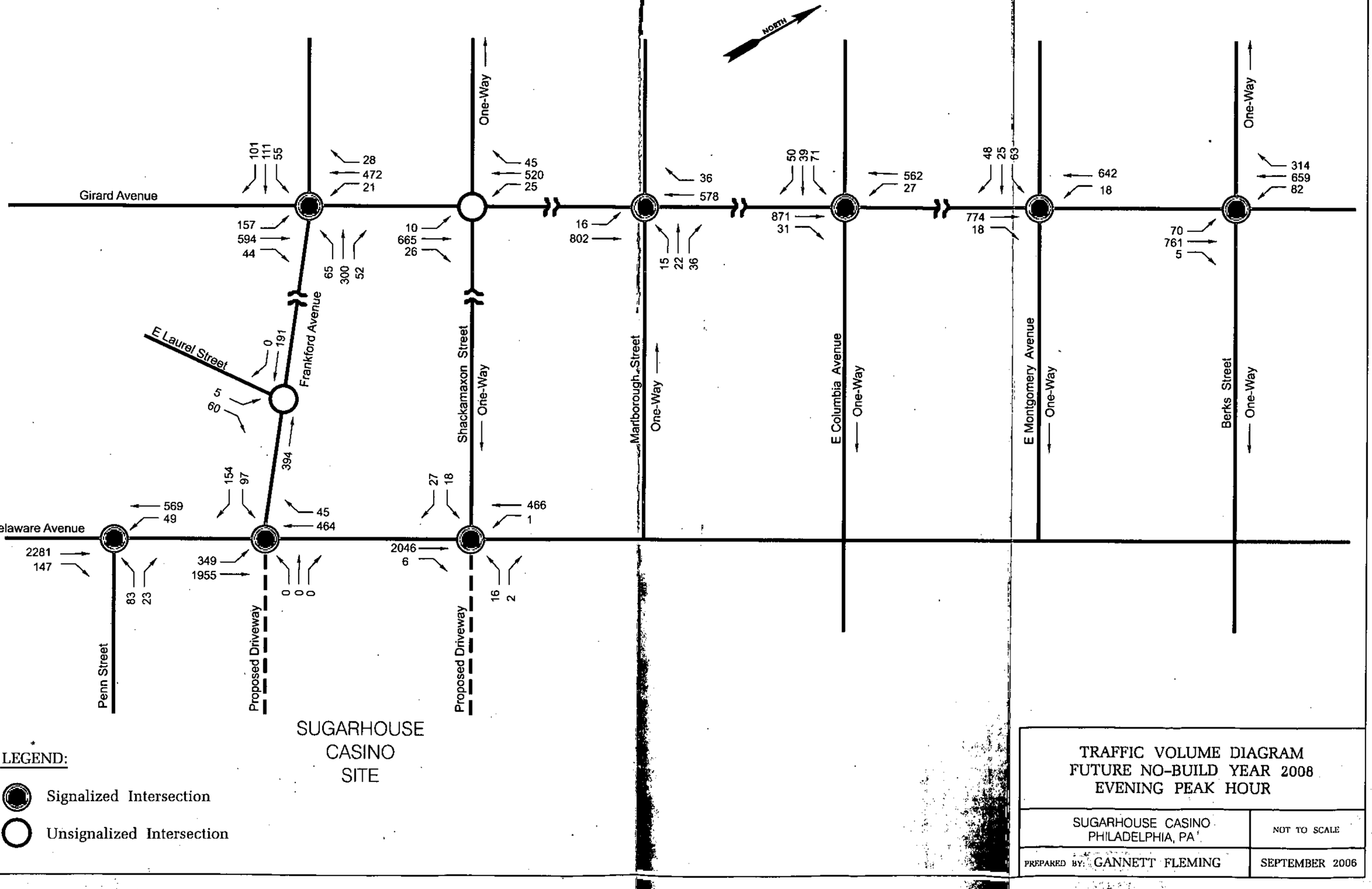
BEGIN TIME	Northbound			Southbound			Eastbound			Westbound			TOTAL
	-			-			*Laurel Avenue*			-			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	2	0	18	0	0	0	20
4:15 PM	0	0	0	0	0	0	1	0	16	0	0	0	17
4:30 PM	0	0	0	0	0	0	3	0	13	0	0	0	16
4:45 PM	0	0	0	0	0	0	0	0	17	0	0	0	17
5:00 PM	0	0	0	0	0	0	1	0	12	0	0	0	13
5:15 PM	0	0	0	0	0	0	1	0	12	0	0	0	13
5:30 PM	0	0	0	0	0	0	2	0	5	0	0	0	7
5:45 PM	0	0	0	0	0	0	1	0	14	0	0	0	15
PM PEAK HOUR 4:45 PM - 5:45 PM	0	0	0	0	0	0	5	0	58	0	0	0	63
PHF							0.42		0.85				

E



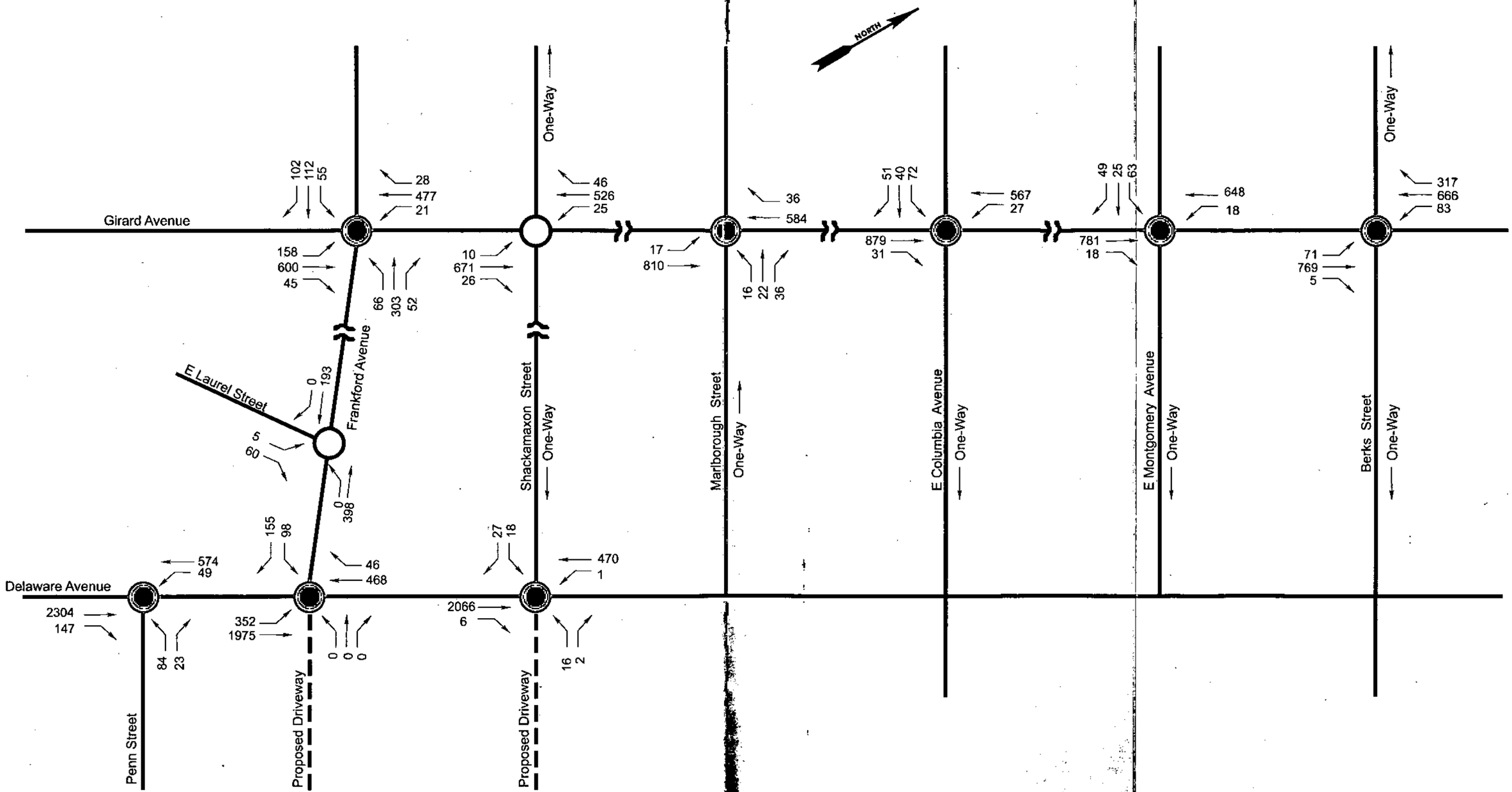
TRAFFIC VOLUME DIAGRAM
EXISTING YEAR CONDITION
EVENING PEAK HOUR (4:15 PM– 5:15 PM)

SUGARHOUSE CASINO PHILADELPHIA, PA	NOT TO SCALE
PREPARED BY: GANNETT FLEMING	SEPTEMBER 2006



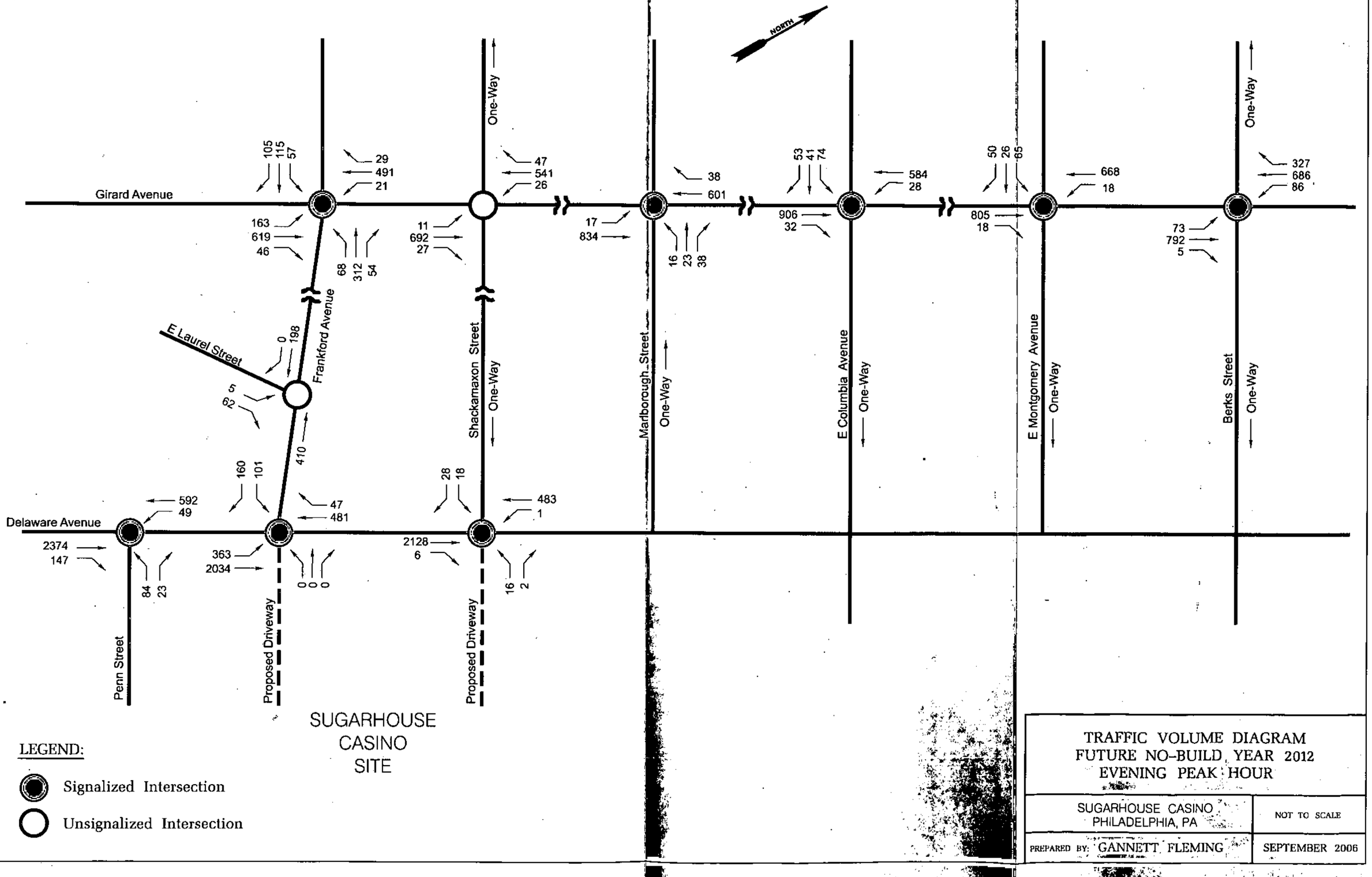
TRAFFIC VOLUME DIAGRAM
FUTURE NO-BUILD YEAR 2008
EVENING PEAK HOUR

SUGARHOUSE CASINO PHILADELPHIA, PA	NOT TO SCALE
PREPARED BY: GANNETT FLEMING	SEPTEMBER 2006



TRAFFIC VOLUME DIAGRAM
FUTURE NO-BUILD YEAR 2009
EVENING PEAK HOUR

SUGARHOUSE CASINO PHILADELPHIA, PA	NOT TO SCALE
PREPARED BY: GANNETT FLEMING	SEPTEMBER 2006

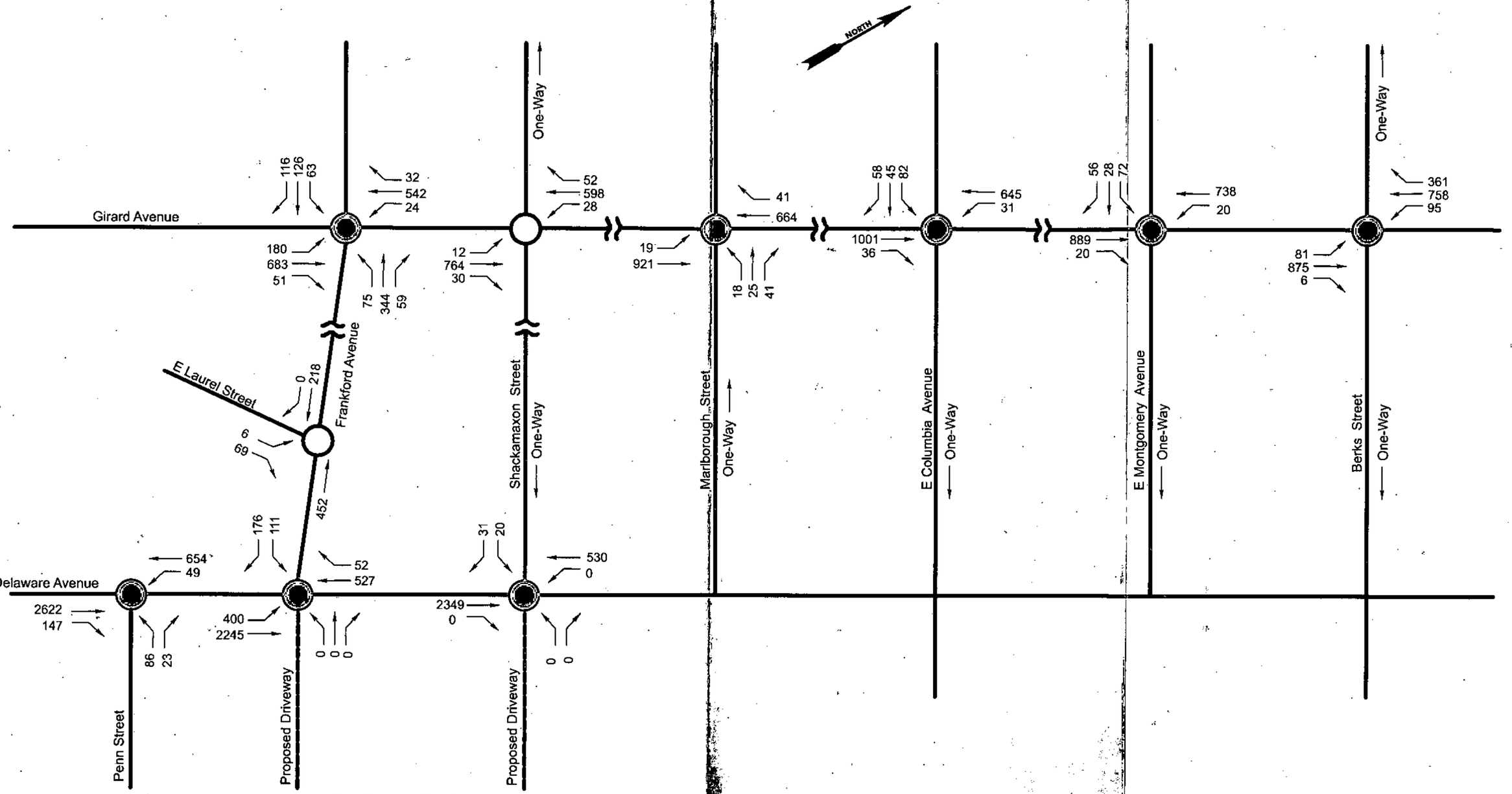


LEGEND:

- Signalized Intersection
- Unsignalized Intersection

TRAFFIC VOLUME DIAGRAM
FUTURE NO-BUILD, YEAR 2012
EVENING PEAK HOUR

SUGARHOUSE CASINO PHILADELPHIA, PA	NOT TO SCALE
PREPARED BY: GANNETT FLEMING	SEPTEMBER 2006



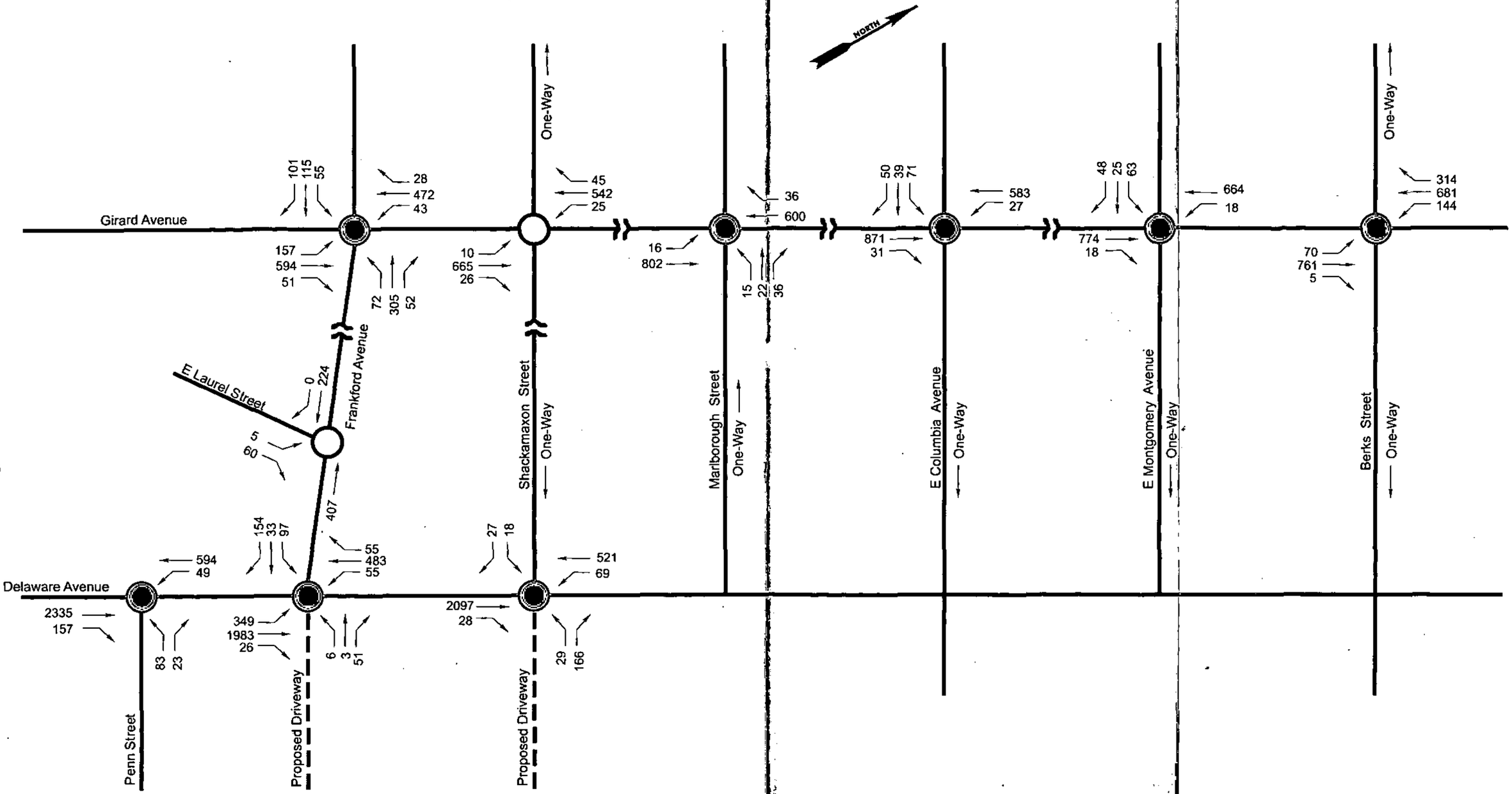
LEGEND:

Signalized Intersection

Unsignalized Intersection

TRAFFIC VOLUME DIAGRAM
FUTURE NO-BUILD YEAR 2022
EVENING PEAK HOUR

SUGARHOUSE CASINO PHILADELPHIA, PA	NOT TO SCALE
PREPARED BY: GANNETT FLEMING	OCTOBER 2006



SUGARHOUSE
CASINO
SITE

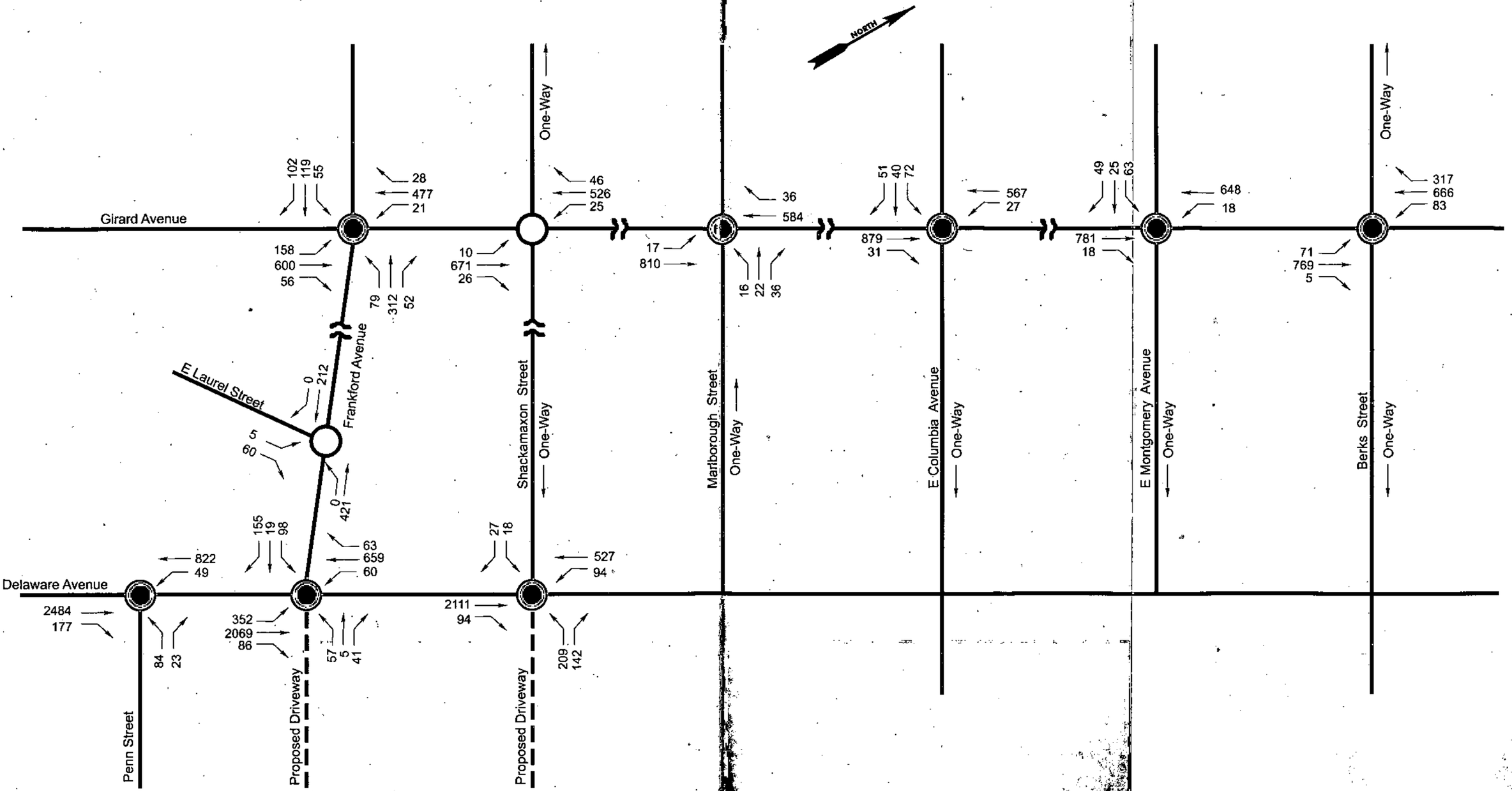
LEGEND:

Signalized Intersection

Unsignalized Intersection

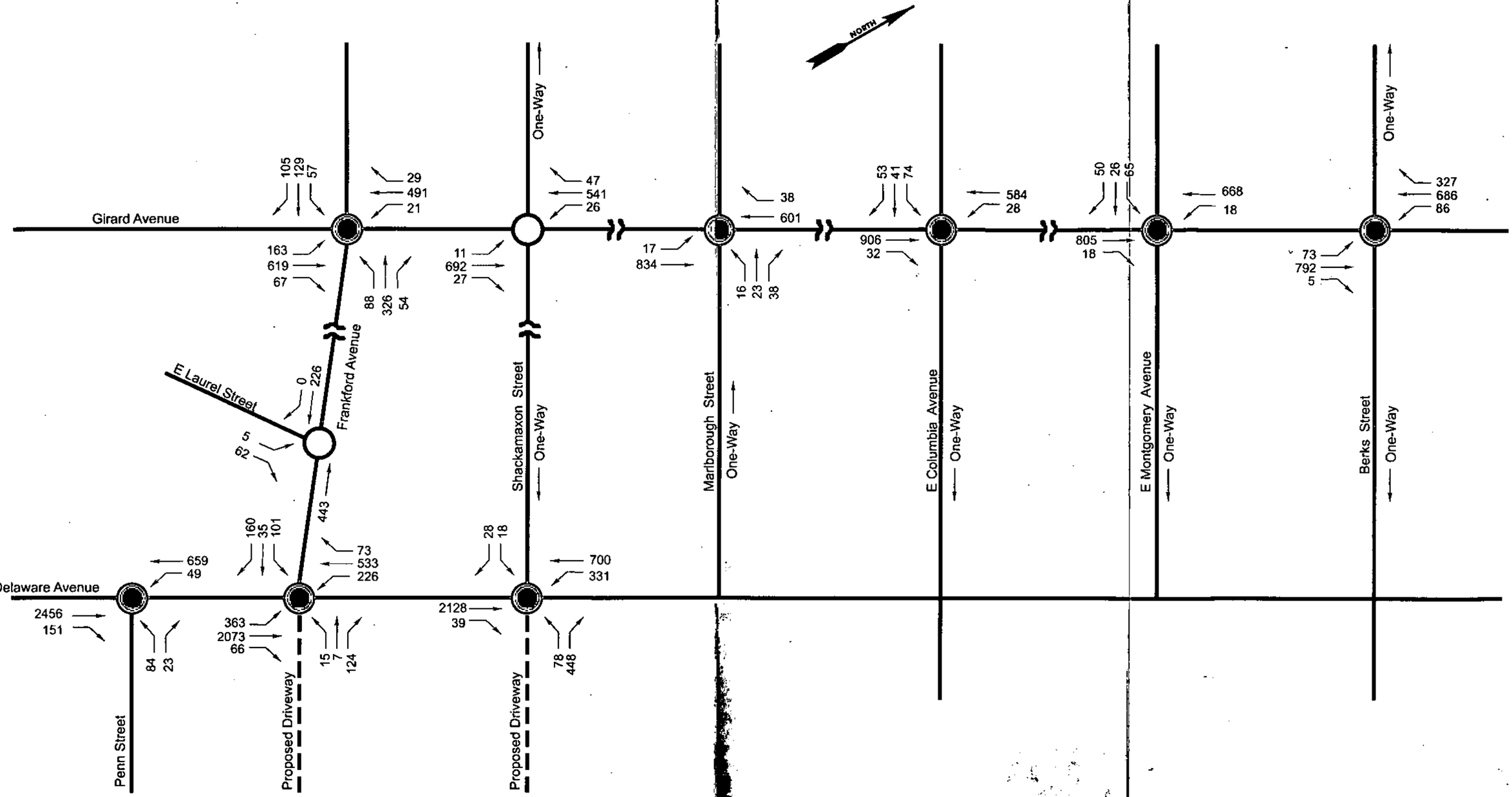
TRAFFIC VOLUME DIAGRAM
FUTURE BUILD YEAR 2008
INTERIM PHASE
EVENING PEAK HOUR

SUGARHOUSE CASINO PHILADELPHIA, PA	NOT TO SCALE
PREPARED BY: GANNETT FLEMING	SEPTEMBER 2006



TRAFFIC VOLUME DIAGRAM
FUTURE BUILD YEAR 2009
PHASE I
EVENING PEAK HOUR

SUGARHOUSE CASINO PHILADELPHIA, PA	NOT TO SCALE
PREPARED BY: GANNETT FLEMING	SEPTEMBER 2006



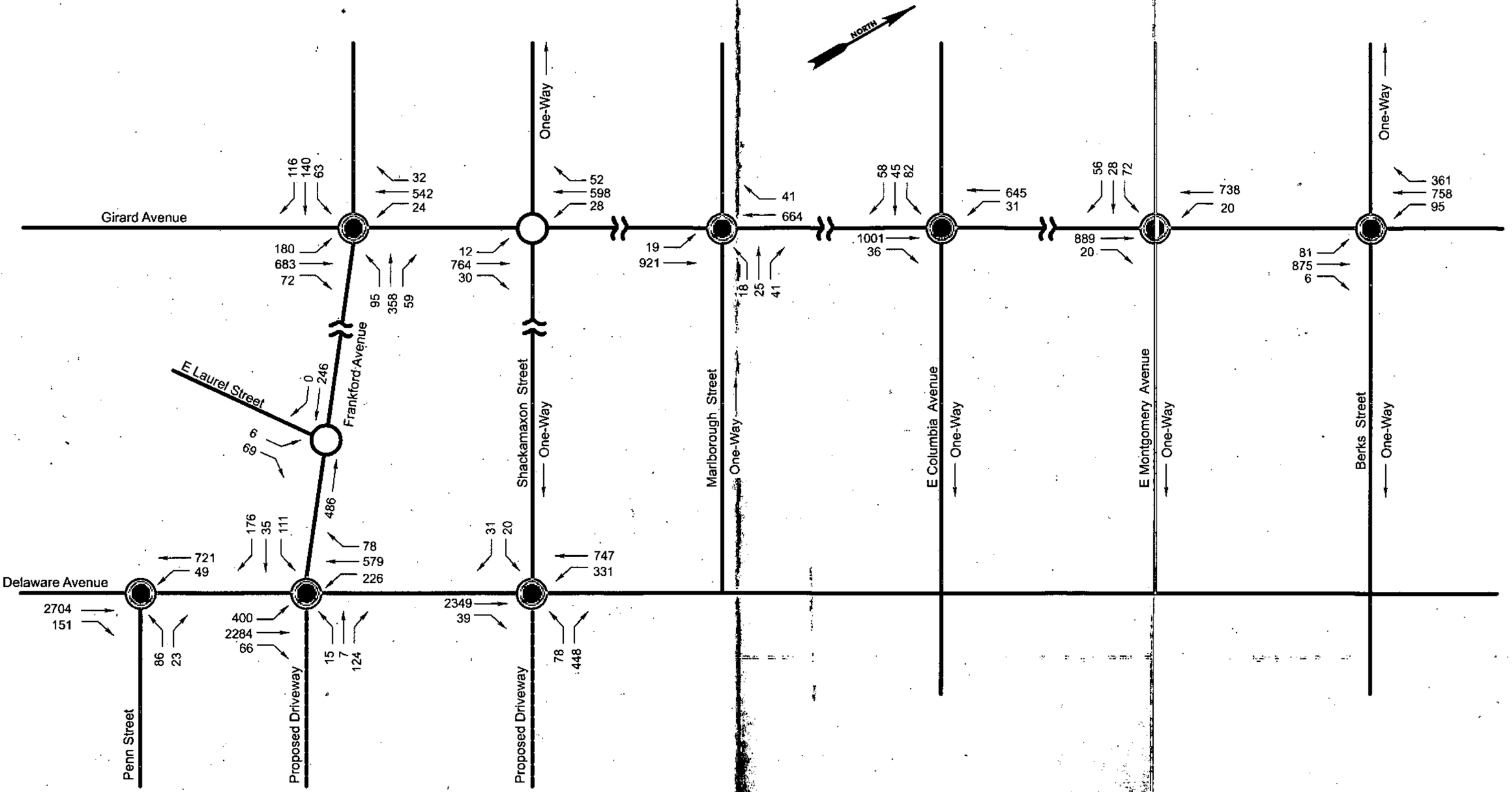
LEGEND:

Signalized Intersection

Unsignalized Intersection

TRAFFIC VOLUME DIAGRAM
FUTURE BUILD YEAR 2012
PHASE II
EVENING PEAK HOUR

SUGARHOUSE CASINO PHILADELPHIA, PA	NOT TO SCALE
PREPARED BY: GANNETT FLEMING	SEPTEMBER 2006



TRAFFIC VOLUME DIAGRAM
FUTURE BUILD YEAR 2022
(PHASE II + 10 YEARS)
EVENING PEAK HOUR

SUGARHOUSE CASINO PHILADELPHIA, PA	NOT TO SCALE
PREPARED BY: GANNETT FLEMING	OCTOBER 2006

F

LEVEL OF SERVICE (LOS) ANALYSIS SUMMARY

EVENING PEAK HOUR		2006 EXISTING			2008 NO-BUILD			2008 BUILD			2008 BUILD WITH MITIGATION			2009 NO-BUILD			2009 BUILD			2009 BUILD WITH MITIGATION			2012 NO-BUILD			2012 BUILD			2012 BUILD WITH MITIGATION			2022 NO-BUILD			2022 BUILD			2022 BUILD WITH MITIGATION		
Intersection Approach	Approach Movement	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
GIRARD AVENUE - BERKS STREET SIGNALIZED INTERSECTION																																							
Girard Avenue Northeastbound	L	B	19.6	0.33	B	19.6	0.34	B	19.6	0.34	B	14.7	0.14	B	19.7	0.35	B	19.7	0.35	B	14.8	0.15	B	19.7	0.35	B	19.7	0.35	B	14.6	0.15	B	19.7	0.39	B	19.7	0.39	B	16.1	0.19
	TR	A	1.9	0.36	A	1.9	0.37	A	1.9	0.37	A	3.0	0.51	A	1.9	0.37	A	1.9	0.37	A	3.1	0.52	A	1.9	0.38	A	1.9	0.38	A	3.3	0.53	A	2.2	0.42	A	2.2	0.42	A	3.1	0.55
	Overall Approach	A	3.5	-	A	3.5	-	A	3.5	-	A	4.0	-	A	3.5	-	A	3.5	-	A	4.1	-	A	3.5	-	A	3.5	-	A	4.3	-	A	3.7	-	A	3.7	-	A	4.2	-
Girard Avenue Southwestbound	L	C	28.4	0.42	C	28.7	0.43	D	44.0	0.76	B	15.8	0.32	C	28.8	0.44	C	28.8	0.44	B	14.3	0.19	C	29.3	0.45	C	29.3	0.45	B	14.4	0.19	C	30.6	0.50	C	30.6	0.50	B	16.2	0.24
	TR	A	4.1	0.43	A	4.2	0.44	A	4.3	0.45	B	12.3	0.62	A	4.2	0.45	A	4.2	0.45	B	12.1	0.61	A	4.3	0.46	A	4.3	0.46	B	12.4	0.63	A	4.7	0.51	A	4.7	0.51	B	11.7	0.67
	Overall Approach	A	6.3	-	A	6.4	-	A	10.0	-	B	12.8	-	A	6.4	-	A	6.4	-	B	12.3	-	A	6.6	-	A	6.6	-	B	12.6	-	A	7.0	-	A	7.0	-	B	12.1	-
Intersection	Overall	A	5.0	0.43	A	5.1	0.44	A	7.2	0.51	A	9.0	0.50	A	5.1	0.45	A	5.1	0.45	A	8.6	0.44	A	5.2	0.46	A	5.2	0.46	A	8.9	0.46	A	5.5	0.51	A	5.5	0.51	A	8.6	0.51
GIRARD AVENUE - MONTGOMERY AVENUE SIGNALIZED INTERSECTION																																							
Girard Avenue Northeastbound	TR	C	26.3	0.54	C	26.4	0.56	C	26.4	0.56	A	5.9	0.56	C	26.4	0.56	C	26.4	0.56	A	5.9	0.56	C	26.5	0.58	C	26.5	0.58	A	6.0	0.58	C	26.8	0.64	C	26.8	0.64	A	6.5	0.64
Girard Avenue Southwestbound	L	A	9.1	0.14	A	9.5	0.15	A	9.4	0.15	A	6.4	0.15	A	9.5	0.15	A	9.5	0.15	A	6.5	0.15	A	9.8	0.16	A	9.8	0.16	A	6.6	0.16	B	11.8	0.23	B	11.8	0.23	A	8.8	0.23
	TR	B	10.5	0.47	B	10.7	0.48	B	10.8	0.50	A	6.5	0.50	B	10.7	0.49	B	10.7	0.49	A	6.5	0.49	B	10.8	0.50	B	10.8	0.50	A	6.6	0.50	B	11.3	0.55	B	11.3	0.55	A	7.5	0.55
	Overall Approach	B	10.5	-	B	10.6	-	B	10.7	-	A	6.5	-	B	10.6	-	B	10.6	-	A	6.5	-	B	10.8	-	B	10.8	-	A	6.6	-	B	11.3	-	B	11.3	-	A	7.6	-
Montgomery Ave Southbound	LTR	B	11.6	0.18	B	11.7	0.19	B	11.7	0.19	B	11.7	0.19	B	11.7	0.19	B	11.7	0.19	B	11.7	0.19	B	11.8	0.20	B	11.8	0.20	B	11.8	0.20	B	12.0	0.22	B	12.0	0.22	B	12.0	0.22
Intersection	Overall	B	18.6	0.37	B	18.7	0.38	B	18.6	0.38	A	6.6	0.38	B	18.7	0.38	B	18.7	0.38	A	6.7	0.38	B	18.8	0.40	B	18.8	0.40	A	6.8	0.40	B	19.2	0.44	B	19.2	0.44	A	7.4	0.44
GIRARD AVENUE - COLUMBIA AVENUE SIGNALIZED INTERSECTION																																							
Girard Avenue Northeastbound	TR	A	5.3	0.71	A	5.6	0.73	A	5.6	0.73	A	7.0	0.73	A	5.7	0.74	A	5.7	0.74	A	7.1	0.74	A	6.4	0.76	A	6.4	0.76	A	7.7	0.76	A	9.2	0.84	A	9.2	0.84	B	10.6	0.84
Girard Avenue Southwestbound	L	C	21.5	0.26	C	22.7	0.28	C	23.1	0.28	B	12.0	0.28	C	23.0	0.29	C	23.0	0.29	B	12.4	0.29	C	23.8	0.31	C	23.8	0.31	B	12.9	0.31	C	25.0	0.33	C	25.0	0.33	B	13.5	0.33
	T	B	17.8	0.45	B	18.2	0.46	B	18.8	0.48	A	8.4	0.48	B	18.4	0.46	B	18.4	0.46	A	8.3	0.46	B	18.8	0.48	B	18.8	0.48	A	8.4	0.48	C	20.4	0.53	C	20.4	0.53	A	8.9	0.53
	Overall Approach	B	18.0	-	B	18.5	-	B	19.0	-	A	8.6	-	B	18.6	-	B	18.6	-	A	8.6	-	B	19.1	-	B	19.1	-	A	8.6	-	C	20.7	-	C	20.7	-	A	9.2	-
Columbia Ave Southbound	LTR	B	10.4	0.25	B	10.5	0.25	B	10.5	0.25	B	10.5	0.25	B	10.5	0.26	B	10.5	0.26	B	10.5	0.26	B	10.6	0.27	B	10.6	0.27	B	10.6	0.27	B	10.9	0.30	B	10.9	0.30	B	10.9	0.30
Intersection	Overall	B	10.4	0.46	B	10.7	0.47	B	11.0	0.47	A	8.0	0.47	B	10.8	0.48	B	10.8	0.48	A	8.0	0.48	B	11.4	0.49	B	11.4	0.49	A	8.4	0.49	B	13.4	0.55	B	13.4	0.55	B	10.1	0.55
GIRARD AVENUE - MARLBOROUGH STREET SIGNALIZED INTERSECTION																																							
Girard Avenue Northeastbound	L	B	18.1	0.11	B	18.2	0.12	B	18.1	0.12	A	4.6	0.12	B	18.2	0.12	B	18.1	0.12	A	7.6	0.12	B	18.2	0.13	B	17.9	0.13	A	7.5	0.13	B	18.5	0.16	B	18.3	0.16	B	13.4	0.16
	T	C	24.0	0.53	C	24.1	0.55	C	24.0	0.55	A	6.2	0.55	C	24.2	0.55	C	23.9	0.55	B	12.2	0.55	C	24.3	0.57	C	23.9	0.57	B	12.2	0.57	C	24.9	0.63	C	24.6	0.63	B	18.5	0.63
	Overall Approach	C	23.7	-	C	23.9	-	C	23.8	-	A	6.1	-	C	23.9	-	C	23.7	-	B	12.0	-	C	24.1	-	C	23.7	-	B	12.0	-	C	24.6	-	C	24.3	-	B	18.3	-
Girard Avenue Southwestbound	TR	B	12.1	0.40	B	11.9	0.41	B	11.7	0.43	A	2.4	0.43	B	11.8	0.42	B	11.8	0.42	A	2.4	0.42	B	11.7	0.43	B	11.7	0.43	A	2.5	0.43	B	10.9	0.48	B	10.9	0.48	A	2.9	0.48
Marlborough Ave Northbound	LTR	B	13.1	0.13	B	13.1	0.14	B	13.1	0.14	B	13.1	0.14	B	13.2	0.14	B	13.2	0.14	B	13.2	0.14	B	13.2	0.14	B	13.2	0.14	B	13.2	0.14	B	13.3	0.16	B	13.3	0.16	B	13.3	0.16
Intersection	Overall	B	18.2	0.36	B	18.2	0.37	B	18.0	0.37	A	5.0	0.37	B	18.2	0.38	B	18.1	0.38	A	8.2	0.38	B	18.2	0.39	B	18.0	0.39	A	8.2	0.39	B	18.2	0.43	B	18.1	0.43	B	11.6	0.43
GIRARD AVENUE - SHACKAMAXON STREET UNSIGNALIZED INTERSECTION																																							
Girard Avenue Northeastbound	L	A	0.5	0.02	A	0.5	0.02	A	0.6	0.02	A	0.6	0.02	A	0.5	0.02	A	0.5	0.02	A	0.5	0.02	A	0.6	0.02	A	0.6	0.02	A	0.6	0.02	A	0.7	0.02	A	0.7	0.02	A	0.7	0.02
Girard Avenue Southwestbound	L	A	9.5	0.05	A	9.6	0.05	A	9.6	0.05	A	9.7	0.05	A	9.7	0.05	A	9.7	0.05	A	9.7	0.05	A	9.8	0.05	A	9.8	0.05	A	9.8	0.05	B	10.3	0.06	B	10.3	0.06	B	10.4	0.06
GIRARD AVENUE - FRANKFORD AVENUE SIGNALIZED INTERSECTION																																							
Girard Avenue Northeastbound	L	F	103.5	1.03	F	113.6	1.06	F	113.6	1.06	D	49.8	0.80	F	115.4	1.07	F	115.4	1.07	D	50.3	0.80	F	126.4	1.10	F	126.4	1.10	D	53.4	0.83	F	165.2	1.22	F	165.2	1.22	D	48.0	0.81
	TR	C	26.3	0.76	C	27.2	0.78	C	27.7	0.79	C	21.1	0.67	C	27.6	0.79	C	28.5	0.81	C	25.4	0.76	C	28.8	0.81	C	30.9	0.85	C	27.0	0.80	D	35.3	0.90	D	39.6	0.93	B	13.6	0.55
	Overall Approach	D	42.3	-	D	45.2	-	D	45.4	-	C	27.0	-	D	45.8	-	D	46.2	-	C	30.5	-	D	49.1	-	D	50.1	-	C	32.3	-	E	62.2	[illegible]	E	64.9	[illegible]	C	20.5	-
Girard Avenue Southwestbound	L	D	36.6	0.18	D	36.4	0.19	D	40.9	0.39	B	15.9	0.29	D	36.3	0.19	D	36.3	0.19	D	36.8	0.14	D	36.2	0.19	D	36.4	0.19	D	36.7	0.14	D	35.8	0.22	D	35.8	0.22	A	8.8	0.26
	TR	C	25.5	0.59	C	26.2	0.61	C	26.4	0.61	B	17.0	0.52	C	26.3	0.62	C	26.3	0.62	A	5.9	0.58	C	26.8	0.64	C	26.9	0.64	A	6.0	0.60	C	29.3	0.70	C	29.3	0.70	B	14.2	0.81
	Overall Approach	C	26.1	-	C	26.8	-	C	27.9	-	B	16.9	-	C	26.8	-	C	26.8	-	A	7.6	-	C	27.3	-	C	27.4	-	A	7.6	-	C	29.6	-	C	29.6	-	B	13.9	-
Frankford Ave Northbound	T	B	19.1	0.68	C	20.3	0.71	C	21.7	0.74	D	50.2	0.96	C	20.7	0.72	C	23.7	0.78	D	38.0	0.90	C	21.8	0.75	C	28.5	0.85	D	53.7	0.99	C	27.4	0.84	D	42.1	0.95	D	53.9	1.00
Frankford Ave Southbound	T	B	16.2	0.55	B	17.3	0.59	B	17.6	0.60	C	31.3	0.80	B	17.4	0.60	B	18.0	0.62	C	24.5	0.72	B	18.2	0.62	B	19.5	0.67	C	27.7	0.78	C	21.9	0.72	C	24.0	0.76	C	27.5	0.80
Intersection	Overall	C	29.2	0.75	C	30.8	0.78	C	31.4	0.80	C	30.0	0.82	C	31.1	0.79	C	32.0	0.83	C	25.5	0.84	C	32.9	0.81	C	34.8	0.88	C	30.3	0.89	D	40.2	0.91	D	44.6	0.98	C	27.3	0.91

LEVEL OF SERVICE (LOS) ANALYSIS SUMMARY

EVENING PEAK HOUR		2006 EXISTING			2008 NO-BUILD			2008 BUILD			2008 BUILD WITH MITIGATION			2009 NO-BUILD			2009 BUILD			2009 BUILD WITH MITIGATION			2012 NO-BUILD			2012 BUILD			2012 BUILD WITH MITIGATION			2022 NO-BUILD			2022 BUILD			2022 BUILD WITH MITIGATION		
Intersection Approach	Approach Movement	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
DELAWARE AVENUE - SHACKAMAXON STREET SIGNALIZED INTERSECTION																																							
Delaware Ave Northeastbound	TR	A	7.8	0.63	A	7.5	0.65	A	3.4	0.68	A	7.5	0.85	A	7.5	0.66	A	3.0	0.70	A	5.6	0.86	A	7.4	0.68	A	4.0	0.69	A	4.7	0.80	A	7.2	0.75	A	4.4	0.76	A	5.4	0.86
Delaware Avenue Southwestbound	L	A	5.4	0.05	-	-	-	F	104.0	0.96	D	37.9	0.31	-	-	-	F	218.3	1.31	D	44.0	0.37	-	-	-	F	[illegible]	[illegible]	D	43.8	0.70	-	-	-	F	[illegible]	[illegible]	D	43.8	0.70
	T	A	4.6	0.14	A	4.6	0.15	A	4.7	0.17	A	3.4	0.16	-	-	-	A	4.7	0.17	A	5.3	0.17	-	-	-	A	5.0	0.23	A	2.5	0.20	-	-	-	A	5.1	0.25	A	2.2	0.21
	Overall Approach	A	4.6	-	A	4.6	-	B	15.9	-	A	7.3	-	A	4.6	0.15	D	35.8	-	B	10.9	-	A	4.7	0.16	F	[illegible]	[illegible]	B	15.3	-	A	4.7	0.17	F	[illegible]	[illegible]	B	14.6	-
Shackamaxon Ave/Proposed Driveway Northbound	L	-	-	-	-	-	-	C	29.5	0.11	C	33.1	0.13	-	-	-	D	54.6	0.80	D	49.3	0.78	-	-	-	C	32.6	0.30	D	46.5	0.57	-	-	-	-	-	-	D	52.6	0.64
	R	-	-	-	-	-	-	D	45.0	-	C	20.4	0.18	-	-	-	C	30.5	0.24	D	42.1	0.06	-	-	-	D	46.7	0.83	D	43.3	0.66	-	-	-	-	-	-	D	42.2	0.63
	Overall Approach	C	29.1	0.08				D	42.7	-	C	22.3	-	-	-	-	D	44.9	-	D	46.4	-	-	-	-	D	44.6	-	D	43.8	-	-	-	-	F	[illegible]	[illegible]	D	43.8	-
Shackamaxon Ave Southbound	LR	C	29.2	0.10	C	29.3	0.11	C	29.1	0.10	C	32.2	0.08	C	29.6	0.14	C	29.1	0.10	C	31.1	0.10	C	28.9	0.08	C	29.1	0.10	D	40.0	0.16	C	29.0	0.09	C	29.9	0.13	D	41.0	0.14
Intersection	Overall	A	8.0	0.51	A	7.5	0.52	A	9.0	0.77	A	8.8	0.64	A	8.0	0.54	B	14.4	1.19	B	11.5	0.79	A	7.3	0.54	F	153.6	[illegible]	B	13.6	0.75	A	7.2	0.59	F	[illegible]	[illegible]	B	13.4	0.81
DELAWARE AVENUE - FRANKFORD AVENUE SIGNALIZED INTERSECTION																																							
Delaware Avenue Northeastbound	L	B	13.8	0.61	B	16.7	0.69	C	20.7	0.71	C	23.4	0.66	B	17.0	0.70	C	29.7	0.85	D	37.4	0.79	B	18.1	0.73	C	24.8	0.79	D	38.1	0.78	C	24.3	0.85	D	35.1	0.92	D	36.1	0.80
	TR	B	12.0	0.60	B	12.6	0.62	B	18.8	0.64	B	11.3	0.76	B	12.9	0.63	B	19.7	0.69	A	6.9	0.78	B	13.5	0.65	B	19.7	0.69	A	6.3	0.75	B	15.2	0.72	C	20.6	0.75	A	4.8	0.80
	Overall Approach	B	12.3	-	B	13.3	-	B	19.1	-	B	13.1	-	B	13.5	-	C	21.1	-	B	11.2	-	B	14.2	-	C	20.4	-	B	10.9	-	B	16.6	-	C	22.8	-	A	9.6	-
Delaware Avenue Southwestbound	L	-	-	-	-	-	-	E	61.2	0.75	D	49.2	0.39	-	-	-	E	69.5	0.81	D	51.7	0.24	-	-	-	F	[illegible]	[illegible]	D	49.9	0.64	-	-	-	F	[illegible]	[illegible]	D	50.1	0.65
	TR				-	-	-	B	10.7	0.23	C	22.3	0.38	-	-	-	A	8.5	0.31	B	18.8	0.40	-	-	-	B	10.4	0.26	B	16.2	0.30	-	-	-	B	10.4	0.28	B	18.9	0.36
	Overall Approach	A	9.4	0.18	A	9.3	0.22	B	15.3	-	C	24.7	-	A	9.6	0.22	B	13.1	-	C	21.3	-	A	9.4	0.22	F	[illegible]	[illegible]	C	25.0	-	A	9.5	0.25	F	[illegible]	[illegible]	C	26.7	-
Frankford Ave/Proposed Driveway Northbound	LT	-	-	-	-	-	-	C	26.3	0.04	C	28.4	0.03	-	-	-	C	30.3	0.28	D	41.8	0.39	-	-	-	C	26.6	0.07	D	38.9	0.18	-	-	-	C	26.6	0.07	D	40.1	0.27
	R	-	-	-	-	-	-	C	27.2	0.12	C	28.4	0.04	-	-	-	C	26.8	0.10	C	33.3	0.04	-	-	-	C	30.4	0.33	D	38.9	0.21	-	-	-	C	30.5	0.34	D	37.7	0.09
	Overall Approach	-	-	-	-	-	-	C	27.1	-	C	28.4	-	-	-	-	C	28.9	-	D	37.7	-	-	-	-	C	29.8	-	D	38.9	-	-	-	-	C	29.9	-	D	38.1	-
Frankford Ave Southbound	L	C	29.3	0.27	C	29.4	0.28	C	32.0	0.37	C	32.7	0.32	C	29.5	0.28	C	29.5	0.28	D	36.2	0.38	C	29.6	0.29	C	29.6	0.29	D	43.3	0.55	C	30.1	0.32	C	30.1	0.32	D	43.6	0.56
	TR	C	27.2	0.12	C	27.3	0.14	C	28.6	0.23	C	31.2	0.24	C	27.3	0.14	C	28.0	0.19	C	34.2	0.18	C	27.4	0.14	C	28.7	0.24	D	39.6	0.28	C	27.6	0.15	C	28.9	0.25	D	39.7	0.33
	Overall Approach	C	27.9	-	C	28.0	-	C	29.6	-	C	31.7	-	C	28.0	-	C	28.5	-	C	34.9	-	C	28.1	-	C	29.0	-	D	40.8	-	C	28.4	-	C	29.3	-	D	40.9	-
Intersection	Overall	B	13.3	0.52	B	14.0	0.57	B	19.5	0.61	B	17.4	0.65	B	14.2	0.58	C	20.2	0.69	B	16.0	0.69	B	14.7	0.60	E	77.5	[illegible]	B	17.8	0.72	B	16.5	0.69	E	74.4	[illegible]	B	17.1	0.75
DELAWARE AVENUE - PENN STREET SIGNALIZED INTERSECTION																																							
Delaware Ave Northeastbound	Overall Approach	A	9.8	0.73	B	10.5	0.77	B	11.0	0.79	A	6.7	0.72	B	10.6	0.78	B	12.6	0.84	B	19.9	0.91	B	11.2	0.80	B	12.0	0.82	B	17.0	0.87	B	13.9	0.88	B	15.4	0.90	C	30.9	0.99
Delaware Avenue Southwestbound	L	-	-	-	D	42.5	0.65	D	39.0	0.65	D	40.5	0.65	D	42.6	0.65	D	39.3	0.65	C	32.7	0.27	D	42.4	0.65	D	38.9	0.65	B	12.4	0.29	D	42.2	0.65	D	38.2	0.65	D	46.1	0.25
	T	-	-	-	A	3.2	0.19	A	2.9	0.20	A	0.8	0.18	A	3.2	0.19	A	3.3	0.27	A	3.7	0.25	A	3.2	0.20	A	3.1	0.22	A	4.4	0.20	A	3.3	0.22	A	3.0	0.24	A	3.7	0.22
	Overall Approach	A	3.1	0.18	A	6.3	-	A	5.6	-	A	3.8	-	A	6.3	-	A	5.3	-	A	5.3	-	A	6.2	-	A	5.5	-	A	5.0	-	A	6.0	-	A	5.2	-	A	6.4	-
Penn Street Westbound	Overall Approach	C	28.8	0.08	D	35.9	0.51	D	35.9	0.51	D	53.7	0.75	D	36.0	0.52	D	36.1	0.52	D	51.2	0.68	D	36.0	0.52	D	36.1	0.52	D	48.5	0.72	D	36.4	0.53	D	36.5	0.53	D	52.1	0.70
Intersection	Overall	A	8.7	0.58	B	11.20	0.71	B	11.4	0.72	A	8.9	0.70	B	11.3	0.72	B	12.1	0.77	B	18.1	0.82	B	11.7	0.73	B	12.0	0.75	B	17.0	0.87	B	13.6	0.80	B	14.5	0.82	C	27.1	0.87
FRANKFORD AVENUE - LAUREL STREET UNSIGNALIZED INTERSECTION																																							
Laurel Avenue Eastbound	L	B	10.4	0.11	B	10.6	0.11	B	11.0	0.12	B	10.9	0.12	B	10.6	0.11	B	10.9	0.12	B	10.8	0.12	B	10.7	0.12	B	11.1	0.13	B	11.0	0.12	B	11.2	0.14	B	11.7	0.15	B	11.5	0.15
Frankford Avenue Northbound	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

G

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3002							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3002							
Volume (vph)	68	739	5	80	640	305	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	830	12	101	667	367	0	0	0	0	0	0
RTOR Reduction (vph)	0	2	0	0	104	0	0	0	0	0	0	0
Lane Group Flow (vph)	82	840	0	101	930	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			10			10						
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	8.0	42.0		8.0	42.0							
Effective Green, g (s)	9.0	43.0		9.0	43.0							
Actuated g/C Ratio	0.15	0.72		0.15	0.72							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	249	2349		241	2151							
v/s Ratio Prot	0.05	0.26		c0.06	c0.31							
v/s Ratio Perm												
v/c Ratio	0.33	0.36		0.42	0.43							
Uniform Delay, d1	22.8	3.2		23.1	3.5							
Progression Factor	0.73	0.47		1.00	1.00							
Incremental Delay, d2	3.0	0.4		5.3	0.6							
Delay (s)	19.6	1.9		28.4	4.1							
Level of Service	B	A		C	A							
Approach Delay (s)		3.5			6.3			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	5.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3765		1719	3438						1689	
Flt Permitted		1.00		0.22	1.00						0.98	
Satd. Flow (perm)		3765		391	3438						1689	
Volume (vph)	0	751	17	17	623	0	0	0	0	61	24	47
Peak hour factor, PHF	0.92	0.84	0.61	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	894	28	24	724	0	0	0	0	73	32	52
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	918	0	24	724	0	0	0	0	0	127	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		27.0		27.0	27.0						24.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						5.0	
Lane Grp Cap (vph)		1694		176	1547						704	
v/s Ratio Prot		c0.24			0.21							
v/s Ratio Perm				0.06							0.08	
v/c Ratio		0.54		0.14	0.47						0.18	
Uniform Delay, d1		12.0		9.7	11.5						11.0	
Progression Factor		2.12		0.79	0.83						1.00	
Incremental Delay, d2		0.9		1.5	0.9						0.6	
Delay (s)		26.3		9.1	10.5						11.6	
Level of Service		C		A	B						B	
Approach Delay (s)		26.3			10.5			0.0			11.6	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

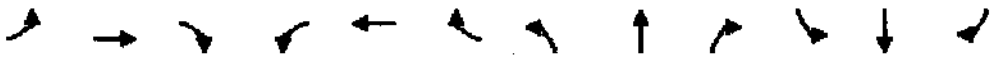
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↕		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1644	
Flt Permitted		1.00		0.18	1.00						0.98	
Satd. Flow (perm)		3296		310	3323						1644	
Volume (vph)	0	845	30	26	545	0	0	0	0	69	38	49
Peak hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	889	52	32	592	0	0	0	0	80	68	68
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	934	0	32	592	0	0	0	0	0	188	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		124	1329						767	
v/s Ratio Prot		c0.28			0.18							
v/s Ratio Perm				0.10							0.11	
v/c Ratio		0.71		0.26	0.45						0.25	
Uniform Delay, d1		15.1		12.0	13.1						9.6	
Progression Factor		0.16		1.41	1.28						1.00	
Incremental Delay, d2		2.9		4.5	1.0						0.8	
Delay (s)		5.3		21.5	17.8						10.4	
Level of Service		A		C	B						B	
Approach Delay (s)		5.3			18.0			0.0			10.4	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3288			1616				
Flt Permitted	0.35	1.00			1.00			0.99				
Satd. Flow (perm)	617	3074			3288			1616				
Volume (vph)	16	778	0	0	561	35	15	21	35	0	0	0
Peak-hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	35	819	0	0	623	48	32	28	52	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	33	0	0	0	0
Lane Group Flow (vph)	35	819	0	0	662	0	0	79	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	309	1537			1644			593				
v/s Ratio Prot		c0.27			0.20							
v/s Ratio Perm	0.06							0.05				
v/c Ratio	0.11	0.53			0.40			0.13				
Uniform Delay, d1	8.0	10.2			9.4			12.7				
Progression Factor	2.21	2.24			1.22			1.00				
Incremental Delay, d2	0.6	1.1			0.7			0.5				
Delay (s)	18.1	24.0			12.1			13.1				
Level of Service	B	C			B			B				
Approach Delay (s)		23.7			12.1			13.1			0.0	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↰	↑↑							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	645	25	24	505	44	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.81	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	750	37	38	580	54	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.95			0.83			0.86	0.86	0.83	0.86	0.86	0.95
vC, conflicting volume	635			787			1167	1511	393	1091	1502	317
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	556			537			837	1239	63	748	1229	221
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			95			100	100	100	100	100	100
cM capacity (veh/h)	936			835			208	137	812	241	139	732

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	391	412	38	387	248
Volume Left	16	0	38	0	0
Volume Right	0	37	0	0	54
cSH	936	1700	835	1700	1700
Volume to Capacity	0.02	0.24	0.05	0.23	0.15
Queue Length 95th (ft)	1	0	4	0	0
Control Delay (s)	0.5	0.0	9.5	0.0	0.0
Lane LOS	A		A		
Approach Delay (s)	0.3		0.5		
Approach LOS					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3274		1622	3288			1699			1573	
Flt Permitted	0.95	1.00		0.95	1.00			0.90			0.85	
Satd. Flow (perm)	1719	3274		1622	3288			1535			1355	
Volume (vph)	152	577	43	20	458	27	63	287	50	53	98	98
Peak hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	177	607	67	29	492	38	76	315	71	75	131	161
RTOR Reduction (vph)	0	14	0	0	10	0	0	11	0	0	47	0
Lane Group Flow (vph)	177	660	0	29	520	0	0	451	0	0	320	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7			3	8			2			6	
Permitted Phases		4					2			6		
Actuated Green, G (s)	6.0	15.0		6.0	15.0			25.0			25.0	
Effective Green, g (s)	6.0	16.0		6.0	16.0			26.0			26.0	
Actuated g/C Ratio	0.10	0.27		0.10	0.27			0.43			0.43	
Clearance Time (s)	4.0	5.0		4.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	172	873		162	877			665			587	
v/s Ratio Prot	c0.10			0.02	0.16							
v/s Ratio Perm		c0.20						c0.29			0.24	
v/c Ratio	1.03	0.76		0.18	0.59			0.68			0.55	
Uniform Delay, d1	27.0	20.2		24.7	19.2			13.6			12.6	
Progression Factor	1.00	1.00		1.39	1.19			1.00			1.00	
Incremental Delay, d2	76.5	6.1		2.3	2.8			5.5			3.6	
Delay (s)	103.5	26.3		36.6	25.5			19.1			16.2	
Level of Service	F	C		D	C			B			B	
Approach Delay (s)		42.3			26.1			19.1			16.2	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	29.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↰	↑↑↑			↑			↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		0.91		1.00	0.91			1.00			1.00	
Frt		1.00		1.00	1.00			0.98			0.92	
Flt Protected		1.00		0.95	1.00			0.96			0.98	
Satd. Flow (prot)		4937		1662	4940			1702			1850	
Flt Permitted		1.00		0.06	1.00			0.79			0.89	
Satd. Flow (perm)		4937		111	4940			1397			1678	
Volume (vph)	0	1968	6	1	414	0	16	0	2	17	0	26
Peak-hour factor, PHF	0.92	0.91	0.75	0.25	0.88	0.92	0.67	0.92	0.50	0.61	0.92	0.65
Adj. Flow (vph)	0	2163	8	4	470	0	24	0	4	28	0	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	3	0	0	32	0
Lane Group Flow (vph)	0	2171	0	4	470	0	0	25	0	0	36	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm			Perm			Perm		
Protected Phases					8			2			2	
Permitted Phases		4		8			2			2		
Actuated Green, G (s)		62.0		62.0	62.0			17.0			17.0	
Effective Green, g (s)		63.0		63.0	63.0			19.0			19.0	
Actuated g/C Ratio		0.70		0.70	0.70			0.21			0.21	
Clearance Time (s)		5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)		3456		78	3458			295			354	
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.44		0.04				0.02			c0.02	
v/c Ratio		0.63		0.05	0.14			0.08			0.10	
Uniform Delay, d1		7.2		4.2	4.5			28.5			28.6	
Progression Factor		0.98		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.7		1.2	0.1			0.6			0.6	
Delay (s)		7.8		5.4	4.6			29.1			29.2	
Level of Service		A		A	A			C			C	
Approach Delay (s)		7.8			4.6			29.1			29.2	
Approach LOS		A			A			C			C	

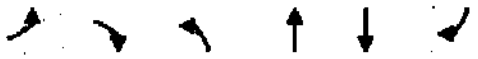
Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12
Total Lost time (s)		4.0					4.0	4.0			
Lane Util. Factor		1.00				1.00	0.91			0.91	
Frt		1.00	0.85			1.00	1.00			0.99	
Flt Protected		0.95	1.00			0.95	1.00			1.00	
Satd. Flow (prot)		1510	1538			1719	4940			4887	
Flt Permitted		0.95	1.00			0.43	1.00			1.00	
Satd. Flow (perm)		1510	1538			773	4940			4887	
Volume (vph)	94	0	140	0	0	334	1880	0	0	412	22
Peak hour factor, PHF	0.94	0.92	0.74	0.92	0.92	0.90	0.95	0.92	0.92	0.93	0.65
Adj. Flow (vph)	100	0	189	0	0	371	1979	0	0	443	34
RTOR Reduction (vph)	0	143	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	100	46	0	0	0	371	1979	0	0	467	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10					10			10
Turn Type	Perm					pm+pt			Perm		
Protected Phases		6				7	4			8	
Permitted Phases	6					4			8		
Actuated Green, G (s)	20.0	20.0				58.0	58.0			45.0	
Effective Green, g (s)	22.0	22.0				60.0	60.0			47.0	
Actuated g/C Ratio	0.24	0.24				0.67	0.67			0.52	
Clearance Time (s)	6.0	6.0				3.0	6.0			6.0	
Lane Grp Cap (vph)	369	376				610	3293			2552	
v/s Ratio Prot		0.03				0.06	c0.40			0.10	
v/s Ratio Perm	c0.07					c0.34					
v/c Ratio	0.27	0.12				0.61	0.60			0.18	
Uniform Delay, d1	27.5	26.5				6.6	8.3			11.4	
Progression Factor	1.00	1.00				1.64	1.37			0.82	
Incremental Delay, d2	1.8	0.7				3.0	0.5			0.2	
Delay (s)	29.3	27.2				13.8	12.0			9.4	
Level of Service	C	C				B	B			A	
Approach Delay (s)		27.9		0.0			12.3			9.4	
Approach LOS		C		A			B			A	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	1.00		0.91			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	1948		4693			4693
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	1948		4693			4693
Volume (vph)	14	0	2214	0	0	552
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	32	0	2407	0	0	607
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	32	0	2407	0	0	607
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10	10	10		10
Turn Type				Perm		
Protected Phases	8		2			6
Permitted Phases				6		
Actuated Green, G (s)	17.0		61.0			61.0
Effective Green, g (s)	19.0		63.0			63.0
Actuated g/C Ratio	0.21		0.70			0.70
Clearance Time (s)	6.0		6.0			6.0
Lane Grp Cap (vph)	411		3285			3285
v/s Ratio Prot	c0.02		c0.51			0.13
v/s Ratio Perm						
v/c Ratio	0.08		0.73			0.18
Uniform Delay, d1	28.5		8.3			4.7
Progression Factor	1.00		1.00			0.64
Incremental Delay, d2	0.4		1.5			0.1
Delay (s)	28.8		9.8			3.1
Level of Service	C		A			A
Approach Delay (s)	28.8		9.8			3.1
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	58	0	378	176	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	68	0	411	191	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked	0.92					
vC, conflicting volume	602	191	191			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	567	191	191			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	92	100			
cM capacity (veh/h)	441	843	1364			

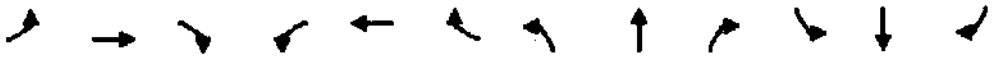
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	80	411	191
Volume Left	12	0	0
Volume Right	68	0	0
cSH	742	1364	1700
Volume to Capacity	0.11	0.00	0.11
Queue Length 95th (ft)	9	0	0
Control Delay (s)	10.4	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.4	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	30.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3001							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3001							
Volume (vph)	70	761	5	82	659	314	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	855	12	104	686	378	0	0	0	0	0	0
RTOR Reduction (vph)	0	2	0	0	107	0	0	0	0	0	0	0
Lane Group Flow (vph)	84	865	0	104	957	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	8.0	42.0		8.0	42.0							
Effective Green, g (s)	9.0	43.0		9.0	43.0							
Actuated g/C Ratio	0.15	0.72		0.15	0.72							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	249	2349		241	2151							
v/s Ratio Prot	0.05	0.26		c0.06	c0.32							
v/s Ratio Perm												
v/c Ratio	0.34	0.37		0.43	0.44							
Uniform Delay, d1	22.8	3.3		23.2	3.5							
Progression Factor	0.72	0.46		1.00	1.00							
Incremental Delay, d2	3.1	0.4		5.5	0.7							
Delay (s)	19.6	1.9		28.7	4.2							
Level of Service	B	A		C	A							
Approach Delay (s)		3.5			6.4			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	5.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3764		1719	3438						1690	
Flt Permitted		1.00		0.20	1.00						0.98	
Satd. Flow (perm)		3764		369	3438						1690	
Volume (vph)	0	774	18	18	642	0	0	0	0	63	25	48
Peak-hour factor, PHF	0.92	0.84	0.61	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	921	30	25	747	0	0	0	0	76	33	53
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	947	0	25	747	0	0	0	0	0	133	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type			Perm							Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		27.0		27.0	27.0						25.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1694		166	1547						704	
v/s Ratio Prot		c0.25			0.22							
v/s Ratio Perm				0.07							0.08	
v/c Ratio		0.56		0.15	0.48						0.19	
Uniform Delay, d1		12.1		9.7	11.6						11.1	
Progression Factor		2.10		0.79	0.83						1.00	
Incremental Delay, d2		0.9		1.8	1.0						0.6	
Delay (s)		26.4		9.5	10.7						11.7	
Level of Service		C		A	B						B	
Approach Delay (s)		26.4			10.6			0.0			11.7	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↳		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost Time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1645	
Flt Permitted		1.00		0.17	1.00						0.98	
Satd. Flow (perm)		3296		289	3323						1645	
Volume (vph)	0	871	31	27	562	0	0	0	0	71	39	50
Peak-hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	917	53	33	611	0	0	0	0	83	70	69
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	27	0
Lane Group Flow (vph)	0	963	0	33	611	0	0	0	0	0	195	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type			Perm							Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		116	1329						768	
v/s Ratio Prot		c0.29			0.18							
v/s Ratio Perm				0.11							0.12	
v/c Ratio		0.73		0.28	0.46						0.25	
Uniform Delay, d1		15.3		12.2	13.2						9.7	
Progression Factor		0.16		1.41	1.30						1.00	
Incremental Delay, d2		3.2		5.5	1.0						0.8	
Delay (s)		5.6		22.7	18.2						10.5	
Level of Service		A		C	B						B	
Approach Delay (s)		5.6			18.5			0.0			10.5	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3288			1616				
Flt Permitted	0.34	1.00			1.00			0.99				
Satd. Flow (perm)	599	3074			3288			1616				
Volume (vph)	16	802	0	0	578	36	15	22	36	0	0	0
Peak-hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	35	844	0	0	642	49	32	29	54	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	34	0	0	0	0
Lane Group Flow (vph)	35	844	0	0	682	0	0	81	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	300	1537			1644			593				
v/s Ratio Prot		c0.27			0.21							
v/s Ratio Perm	0.06							0.05				
v/c Ratio	0.12	0.55			0.41			0.14				
Uniform Delay, d1	8.0	10.3			9.5			12.7				
Progression Factor	2.20	2.23			1.18			1.00				
Incremental Delay, d2	0.6	1.1			0.7			0.5				
Delay (s)	18.2	24.1			11.9			13.1				
Level of Service	B	C			B			B				
Approach Delay (s)		23.9			11.9			13.1			0.0	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↰	↑↑							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	665	26	25	520	45	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.81	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	773	38	40	598	56	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.94			0.82			0.85	0.85	0.82	0.85	0.85	0.94
vC, conflicting volume	653			811			1202	1557	406	1123	1548	327
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	566			554			851	1267	61	758	1257	219
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			95			100	100	100	100	100	100
cM capacity (veh/h)	922			815			201	130	808	235	132	729

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	403	425	40	398	255
Volume Left	16	0	40	0	0
Volume Right	0	38	0	0	56
cSH	922	1700	815	1700	1700
Volume to Capacity	0.02	0.25	0.05	0.23	0.15
Queue Length 95th (ft)	1	0	4	0	0
Control Delay (s)	0.5	0.0	9.6	0.0	0.0
Lane LOS	A		A		
Approach Delay (s)	0.3		0.6		
Approach LOS					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3274		1622	3288			1699			1577	
Flt Permitted	0.95	1.00		0.95	1.00			0.89			0.85	
Satd. Flow (perm)	1719	3274		1622	3288			1530			1351	
Volume (vph)	157	594	44	21	472	28	65	300	52	55	111	101
Peak-hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	183	625	69	31	508	39	78	330	74	77	148	166
RTOR Reduction (vph)	0	14	0	0	10	0	0	11	0	0	44	0
Lane Group Flow (vph)	183	680	0	31	537	0	0	471	0	0	347	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10	10		10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7			3	8			2			6	
Permitted Phases		4					2			6		
Actuated Green, G (s)	6.0	15.0		6.0	15.0			25.0			25.0	
Effective Green, g (s)	6.0	16.0		6.0	16.0			26.0			26.0	
Actuated g/C Ratio	0.10	0.27		0.10	0.27			0.43			0.43	
Clearance Time (s)	4.0	5.0		4.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	172	873		162	877			663			585	
v/s Ratio Prot	c0.11			0.02	0.16							
v/s Ratio Perm		c0.21						c0.31			0.26	
v/c Ratio	1.06	0.78		0.19	0.61			0.71			0.59	
Uniform Delay, d1	27.0	20.4		24.8	19.3			13.9			13.0	
Progression Factor	1.00	1.00		1.37	1.20			1.00			1.00	
Incremental Delay, d2	86.6	6.8		2.4	3.0			6.4			4.4	
Delay (s)	113.6	27.2		36.4	26.2			20.3			17.3	
Level of Service	F	C		D	C			C			B	
Approach Delay (s)		45.2			26.8			20.3			17.3	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	30.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↰	↑↑↑			✣			✣	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		0.91			0.91						1.00	
Frt		1.00			1.00						0.92	
Flt Protected		1.00			1.00						0.98	
Satd. Flow (prot)		4940			4940						1851	
Flt Permitted		1.00			1.00						0.90	
Satd. Flow (perm)		4940			4940						1691	
Volume (vph)	0	2046	0	0	466	0	0	0	0	18	0	27
Peak-hour factor, PHF	0.92	0.91	0.92	0.92	0.88	0.92	0.92	0.92	0.92	0.61	0.92	0.65
Adj. Flow (vph)	0	2248	0	0	530	0	0	0	0	30	0	42
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	33	0
Lane Group Flow (vph)	0	2248	0	0	530	0	0	0	0	0	39	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type			Perm			Perm			Perm			
Protected Phases					8			2			2	
Permitted Phases		4		8			2			2		
Actuated Green, G (s)		62.0			62.0						17.0	
Effective Green, g (s)		63.0			63.0						19.0	
Actuated g/C Ratio		0.70			0.70						0.21	
Clearance Time (s)		5.0			5.0						6.0	
Lane Grp Cap (vph)		3458			3458						357	
v/s Ratio Prot					0.11							
v/s Ratio Perm		c0.46									c0.02	
v/c Ratio		0.65			0.15						0.11	
Uniform Delay, d1		7.4			4.5						28.7	
Progression Factor		0.91			1.00						1.00	
Incremental Delay, d2		0.8			0.1						0.6	
Delay (s)		7.5			4.6						29.3	
Level of Service		A			A						C	
Approach Delay (s)		7.5			4.6			0.0			29.3	
Approach LOS		A			A			A			C	

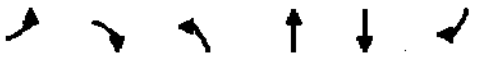
Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00				1.00	0.91			0.91	
Frt	1.00	0.85				1.00	1.00			0.98	
Flt Protected	0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1510	1538				1719	4940			4850	
Flt Permitted	0.95	1.00				0.38	1.00			1.00	
Satd. Flow (perm)	1510	1538				689	4940			4850	
Volume (vph)	97	0	154	0	0	349	1955	0	0	464	45
Peak-hour factor, PHF	0.94	0.92	0.74	0.92	0.92	0.90	0.95	0.92	0.92	0.93	0.65
Adj. Flow (vph)	103	0	208	0	0	388	2058	0	0	499	69
RTOR Reduction (vph)	0	157	0	0	0	0	0	0	0	20	0
Lane Group Flow (vph)	103	51	0	0	0	388	2058	0	0	548	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10					10			10
Turn Type	Perm					pm+pt			Perm		
Protected Phases		6				7	4			8	
Permitted Phases	6					4			8		
Actuated Green, G (s)	20.0	20.0				58.0	58.0			45.0	
Effective Green, g (s)	22.0	22.0				60.0	60.0			47.0	
Actuated g/C Ratio	0.24	0.24				0.67	0.67			0.52	
Clearance Time (s)	6.0	6.0				3.0	6.0			6.0	
Lane Grp Cap (vph)	369	376				562	3293			2533	
v/s Ratio Prot		0.03				c0.07	0.42			0.11	
v/s Ratio Perm	c0.07					c0.39					
v/c Ratio	0.28	0.14				0.69	0.62			0.22	
Uniform Delay, d1	27.6	26.6				6.8	8.6			11.6	
Progression Factor	1.00	1.00				1.82	1.41			0.79	
Incremental Delay, d2	1.9	0.7				4.3	0.6			0.2	
Delay (s)	29.4	27.3				16.7	12.6			9.3	
Level of Service	C	C				B	B			A	
Approach Delay (s)		28.0		0.0			13.3			9.3	
Approach LOS		C		A			B			A	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1933		4895		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1933		4895		115	4693
Volume (vph)	83	23	2281	147	49	569
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	189	25	2479	160	53	625
RTOR Reduction (vph)	6	0	8	0	0	0
Lane Group Flow (vph)	208	0	2631	0	53	625
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)				10		10
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	17.0		61.0		61.0	61.0
Effective Green, g (s)	19.0		63.0		63.0	63.0
Actuated g/C Ratio	0.21		0.70		0.70	0.70
Clearance Time (s)	6.0		6.0		6.0	6.0
Lane Grp Cap (vph)	408		3427		81	3285
v/s Ratio Prot	c0.11		c0.54			0.13
v/s Ratio Perm					0.46	
v/c Ratio	0.51		0.77		0.65	0.19
Uniform Delay, d1	31.4		8.8		7.5	4.7
Progression Factor	1.00		1.00		1.14	0.67
Incremental Delay, d2	4.5		1.7		33.9	0.1
Delay (s)	35.9		10.5		42.5	3.2
Level of Service	D		B		D	A
Approach Delay (s)	35.9		10.5			6.3
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	60	0	394	191	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	71	0	428	208	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked	0.92					
vC, conflicting volume	636	208	208			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	604	208	208			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	91	100			
cM capacity (veh/h)	420	825	1346			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	82	428	208
Volume Left	12	0	0
Volume Right	71	0	0
cSH	724	1346	1700
Volume to Capacity	0.11	0.00	0.12
Queue Length 95th (ft)	10	0	0
Control Delay (s)	10.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3002							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3002							
Volume (vph)	71	769	5	83	666	317	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	864	12	105	694	382	0	0	0	0	0	0
RTOR Reduction (vph)	0	2	0	0	108	0	0	0	0	0	0	0
Lane Group Flow (vph)	86	874	0	105	968	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	8.0	42.0		8.0	42.0							
Effective Green, g (s)	9.0	43.0		9.0	43.0							
Actuated g/C Ratio	0.15	0.72		0.15	0.72							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	249	2349		241	2151							
v/s Ratio Prot	0.05	0.27		c0.07	c0.32							
v/s Ratio Perm												
v/c Ratio	0.35	0.37		0.44	0.45							
Uniform Delay, d1	22.9	3.3		23.2	3.6							
Progression Factor	0.72	0.46		1.00	1.00							
Incremental Delay, d2	3.2	0.4		5.6	0.7							
Delay (s)	19.7	1.9		28.8	4.2							
Level of Service	B	A		C	A							
Approach Delay (s)		3.5			6.4			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	5.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↕		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3764		1719	3438						1689	
Flt Permitted		1.00		0.20	1.00						0.98	
Satd. Flow (perm)		3764		362	3438						1689	
Volume (vph)	0	781	18	18	648	0	0	0	0	63	25	49
Peak-hour factor, PHF	0.92	0.84	0.61	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	930	30	25	753	0	0	0	0	76	33	54
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	956	0	25	753	0	0	0	0	0	133	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		27.0		27.0	27.0						25.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1694		163	1547						704	
v/s Ratio Prot		c0.25			0.22							
v/s Ratio Perm				0.07							0.08	
v/c Ratio		0.56		0.15	0.49						0.19	
Uniform Delay, d1		12.2		9.7	11.6						11.1	
Progression Factor		2.09		0.79	0.83						1.00	
Incremental Delay, d2		1.0		1.8	1.0						0.6	
Delay (s)		26.4		9.5	10.7						11.7	
Level of Service		C		A	B						B	
Approach Delay (s)		26.4			10.6			0.0			11.7	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↰	↑↑						✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1644	
Flt Permitted		1.00		0.17	1.00						0.98	
Satd. Flow (perm)		3296		285	3323						1644	
Volume (vph)	0	879	31	27	567	0	0	0	0	72	40	51
Peak-hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	925	53	33	616	0	0	0	0	84	71	71
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	971	0	33	616	0	0	0	0	0	198	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		114	1329						767	
v/s Ratio Prot		c0.29			0.19							
v/s Ratio Perm				0.12							0.12	
v/c Ratio		0.74		0.29	0.46						0.26	
Uniform Delay, d1		15.3		12.2	13.3						9.7	
Progression Factor		0.16		1.42	1.31						1.00	
Incremental Delay, d2		3.3		5.7	1.0						0.8	
Delay (s)		5.7		23.0	18.4						10.5	
Level of Service		A		C	B						B	
Approach Delay (s)		5.7			18.6			0.0			10.5	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3288			1617				
Flt Permitted	0.34	1.00			1.00			0.99				
Satd. Flow (perm)	592	3074			3288			1617				
Volume (vph)	17	810	0	0	584	36	16	22	36	0	0	0
Peak-hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	37	853	0	0	649	49	34	29	54	0	0	0
RTOR Reduction (vph)	0	0	0	0	9	0	0	34	0	0	0	0
Lane Group Flow (vph)	37	853	0	0	689	0	0	83	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	296	1537			1644			593				
v/s Ratio Prot		c0.28			0.21							
v/s Ratio Perm	0.06							0.05				
v/c Ratio	0.12	0.55			0.42			0.14				
Uniform Delay, d1	8.0	10.4			9.5			12.7				
Progression Factor	2.19	2.22			1.17			1.00				
Incremental Delay, d2	0.7	1.1			0.7			0.5				
Delay (s)	18.2	24.2			11.8			13.2				
Level of Service	B	C			B			B				
Approach Delay (s)		23.9			11.8			13.2			0.0	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↰	↑↑							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	671	26	25	526	46	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.81	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	780	38	40	605	57	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.94			0.82			0.85	0.85	0.82	0.85	0.85	0.94
vC, conflicting volume	661			818			1213	1572	409	1134	1563	331
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	571			557			852	1274	58	759	1263	218
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			95			100	100	100	100	100	100
cM capacity (veh/h)	915			810			201	129	808	234	131	728

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	406	428	40	403	258
Volume Left	16	0	40	0	0
Volume Right	0	38	0	0	57
cSH	915	1700	810	1700	1700
Volume to Capacity	0.02	0.25	0.05	0.24	0.15
Queue Length 95th (ft)	1	0	4	0	0
Control Delay (s)	0.5	0.0	9.7	0.0	0.0
Lane LOS	A		A		
Approach Delay (s)	0.3		0.5		
Approach LOS					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3274		1622	3288			1699			1577	
Flt Permitted	0.95	1.00		0.95	1.00			0.89			0.85	
Satd. Flow (perm)	1719	3274		1622	3288			1525			1350	
Volume (vph)	158	600	45	21	477	28	66	303	52	55	112	102
Peak-hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	184	632	70	31	513	39	80	333	74	77	149	167
RTOR Reduction (vph)	0	14	0	0	10	0	0	11	0	0	44	0
Lane Group Flow (vph)	184	688	0	31	542	0	0	476	0	0	349	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7			3	8			2			6	
Permitted Phases		4					2			6		
Actuated Green, G (s)	6.0	15.0		6.0	15.0			25.0			25.0	
Effective Green, g (s)	6.0	16.0		6.0	16.0			26.0			26.0	
Actuated g/C Ratio	0.10	0.27		0.10	0.27			0.43			0.43	
Clearance Time (s)	4.0	5.0		4.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	172	873		162	877			661			585	
v/s Ratio Prot	c0.11			0.02	0.16							
v/s Ratio Perm		c0.21						c0.31			0.26	
v/c Ratio	1.07	0.79		0.19	0.62			0.72			0.60	
Uniform Delay, d1	27.0	20.4		24.8	19.3			14.0			13.0	
Progression Factor	1.00	1.00		1.37	1.20			1.00			1.00	
Incremental Delay, d2	88.4	7.1		2.4	3.1			6.7			4.4	
Delay (s)	115.4	27.6		36.3	26.3			20.7			17.4	
Level of Service	F	C		D	C			C			B	
Approach Delay (s)		45.8			26.8			20.7			17.4	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	31.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↰	↑↑↑			✣			✣	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		0.91			0.91						1.00	
Frt		1.00			1.00						0.89	
Flt Protected		1.00			1.00						0.99	
Satd. Flow (prot)		4940			4940						1811	
Flt Permitted		1.00			1.00						0.95	
Satd. Flow (perm)		4940			4940						1733	
Volume (vph)	0	2066	0	0	470	0	0	0	0	18	0	27
Peak-hour factor, PHF	0.92	0.91	0.92	0.92	0.88	0.92	0.92	0.92	0.92	0.67	0.50	0.25
Adj. Flow (vph)	0	2270	0	0	534	0	0	0	0	27	0	108
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	85	0
Lane Group Flow (vph)	0	2270	0	0	534	0	0	0	0	0	50	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm			Perm			Perm		
Protected Phases					8			2			2	
Permitted Phases		4		8			2			2		
Actuated Green, G (s)		62.0			62.0						17.0	
Effective Green, g (s)		63.0			63.0						19.0	
Actuated g/C Ratio		0.70			0.70						0.21	
Clearance Time (s)		5.0			5.0						6.0	
Lane Grp Cap (vph)		3458			3458						366	
v/s Ratio Prot					0.11							
v/s Ratio Perm		c0.46									c0.03	
v/c Ratio		0.66			0.15						0.14	
Uniform Delay, d1		7.5			4.5						28.8	
Progression Factor		0.89			1.00						1.00	
Incremental Delay, d2		0.8			0.1						0.8	
Delay (s)		7.5			4.6						29.6	
Level of Service		A			A						C	
Approach Delay (s)		7.5			4.6			0.0			29.6	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00				1.00	0.91			0.91	
Frt	1.00	0.85				1.00	1.00			0.98	
Flt Protected	0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1510	1538				1719	4940			4848	
Flt Permitted	0.95	1.00				0.38	1.00			1.00	
Satd. Flow (perm)	1510	1538				684	4940			4848	
Volume (vph)	98	0	155	0	0	352	1975	0	0	468	46
Peak-hour factor, PHF	0.94	0.92	0.74	0.92	0.92	0.90	0.95	0.92	0.92	0.93	0.65
Adj. Flow (vph)	104	0	209	0	0	391	2079	0	0	503	71
RTOR Reduction (vph)	0	158	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	104	51	0	0	0	391	2079	0	0	553	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10					10			10
Turn Type	Perm					pm+pt			Perm		
Protected Phases		6				7	4			8	
Permitted Phases	6					4			8		
Actuated Green, G (s)	20.0	20.0				58.0	58.0			45.0	
Effective Green, g (s)	22.0	22.0				60.0	60.0			47.0	
Actuated g/C Ratio	0.24	0.24				0.67	0.67			0.52	
Clearance Time (s)	6.0	6.0				3.0	6.0			6.0	
Lane Grp Cap (vph)	369	376				560	3293			2532	
v/s Ratio Prot		0.03				c0.07	0.42			0.11	
v/s Ratio Perm	c0.07					c0.40					
v/c Ratio	0.28	0.14				0.70	0.63			0.22	
Uniform Delay, d1	27.6	26.6				6.8	8.6			11.6	
Progression Factor	1.00	1.00				1.84	1.42			0.81	
Incremental Delay, d2	1.9	0.8				4.4	0.6			0.2	
Delay (s)	29.5	27.3				17.0	12.9			9.6	
Level of Service	C	C				B	B			A	
Approach Delay (s)		28.0		0.0			13.5			9.6	
Approach LOS		C		A			B			A	

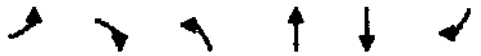
Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1933		4895		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1933		4895		115	4693
Volume (vph)	84	23	2304	147	49	574
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	191	25	2504	160	53	631
RTOR Reduction (vph)	6	0	8	0	0	0
Lane Group Flow (vph)	210	0	2656	0	53	631
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)				10		10
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	17.0		61.0		61.0	61.0
Effective Green, g (s)	19.0		63.0		63.0	63.0
Actuated g/C Ratio	0.21		0.70		0.70	0.70
Clearance Time (s)	6.0		6.0		6.0	6.0
Lane Grp Cap (vph)	408		3427		81	3285
v/s Ratio Prot	c0.11		c0.54			0.13
v/s Ratio Perm					0.46	
v/c Ratio	0.52		0.78		0.65	0.19
Uniform Delay, d1	31.4		8.9		7.5	4.7
Progression Factor	1.00		1.00		1.16	0.66
Incremental Delay, d2	4.6		1.8		33.9	0.1
Delay (s)	36.0		10.6		42.6	3.2
Level of Service	D		B		D	A
Approach Delay (s)	36.0		10.6			6.3
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	60	0	398	193	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	71	0	433	210	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked	0.92					
vC, conflicting volume	642	210	210			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	610	210	210			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	91	100			
cM capacity (veh/h)	415	823	1343			

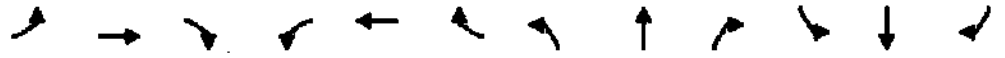
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	82	433	210
Volume Left	12	0	0
Volume Right	71	0	0
cSH	721	1343	1700
Volume to Capacity	0.11	0.00	0.12
Queue Length 95th (ft)	10	0	0
Control Delay (s)	10.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3001							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3001							
Volume (vph)	73	792	5	86	686	327	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	890	12	109	715	394	0	0	0	0	0	0
RTOR Reduction (vph)	0	1	0	0	112	0	0	0	0	0	0	0
Lane Group Flow (vph)	88	901	0	109	997	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			0			0				0		0
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	8.0	42.0		8.0	42.0							
Effective Green, g (s)	9.0	43.0		9.0	43.0							
Actuated g/C Ratio	0.15	0.72		0.15	0.72							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	249	2349		241	2151							
v/s Ratio Prot	0.05	0.27		c0.07	c0.33							
v/s Ratio Perm												
v/c Ratio	0.35	0.38		0.45	0.46							
Uniform Delay, d1	22.9	3.3		23.3	3.6							
Progression Factor	0.72	0.44		1.00	1.00							
Incremental Delay, d2	3.3	0.4		6.0	0.7							
Delay (s)	19.7	1.9		29.3	4.3							
Level of Service	B	A		C	A							
Approach Delay (s)		3.5			6.6			0.0			0.0	
Approach LOS		A			A			A			A	

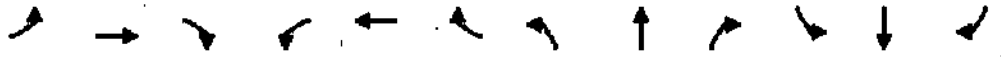
Intersection Summary			
HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3765		1719	3438						1690	
Flt Permitted		1.00		0.19	1.00						0.98	
Satd. Flow (perm)		3765		342	3438						1690	
Volume (vph)	0	805	18	18	668	0	0	0	0	65	26	50
Peak hour factor, PHF	0.92	0.84	0.61	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	958	30	25	777	0	0	0	0	78	35	56
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	984	0	25	777	0	0	0	0	0	139	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		27.0		27.0	27.0						25.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1694		154	1547						704	
v/s Ratio Prot		c0.26			0.23							
v/s Ratio Perm				0.07							0.08	
v/c Ratio		0.58		0.16	0.50						0.20	
Uniform Delay, d1		12.3		9.8	11.7						11.1	
Progression Factor		2.08		0.79	0.83						1.00	
Incremental Delay, d2		1.0		2.1	1.1						0.6	
Delay (s)		26.5		9.8	10.8						11.8	
Level of Service		C		A	B						B	
Approach Delay (s)		26.5			10.8			0.0			11.8	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1644	
Flt Permitted		1.00		0.17	1.00						0.98	
Satd. Flow (perm)		3296		285	3323						1644	
Volume (vph)	0	906	32	28	584	0	0	0	0	74	41	53
Peak-hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	954	55	35	635	0	0	0	0	86	73	74
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	1002	0	35	635	0	0	0	0	0	205	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type			Perm							Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		114	1329						767	
v/s Ratio Prot		c0.30			0.19							
v/s Ratio Perm				0.12							0.12	
v/c Ratio		0.76		0.31	0.48						0.27	
Uniform Delay, d1		15.5		12.3	13.4						9.8	
Progression Factor		0.18		1.44	1.33						1.00	
Incremental Delay, d2		3.7		6.1	1.1						0.9	
Delay (s)		6.4		23.8	18.8						10.6	
Level of Service		A		C	B						B	
Approach Delay (s)		6.4			19.1			0.0			10.6	
Approach LOS		A			B			A			B	

Intersection Summary					
HCM Average Control Delay	11.4	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.49				
Actuated Cycle Length (s)	60.0	Sum of lost time (s)		8.0	
Intersection Capacity Utilization	42.2%	ICU Level of Service		A	
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3287			1616				
Flt Permitted	0.33	1.00			1.00			0.99				
Satd. Flow (perm)	573	3074			3287			1616				
Volume (vph)	17	834	0	0	601	38	16	23	38	0	0	0
Peak-hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	37	878	0	0	668	52	34	31	57	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	36	0	0	0	0
Lane Group Flow (vph)	37	878	0	0	711	0	0	86	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	287	1537			1644			593				
v/s Ratio Prot		c0.29			0.22							
v/s Ratio Perm	0.06							0.05				
v/c Ratio	0.13	0.57			0.43			0.14				
Uniform Delay, d1	8.0	10.5			9.6			12.7				
Progression Factor	2.18	2.21			1.14			1.00				
Incremental Delay, d2	0.7	1.2			0.8			0.5				
Delay (s)	18.2	24.3			11.7			13.2				
Level of Service	B	C			B			B				
Approach Delay (s)		24.1			11.7			13.2			0.0	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↰	↑↑							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	692	27	26	541	47	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.81	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	805	40	41	622	58	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.93			0.81			0.85	0.85	0.81	0.85	0.85	0.93
vC, conflicting volume	680			844			1253	1622	422	1171	1613	340
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	581			575			869	1305	54	772	1294	215
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			95			100	100	100	100	100	100
cM capacity (veh/h)	901			790			193	122	804	227	124	726

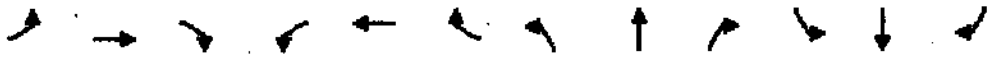
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	420	442	41	415	265
Volume Left	17	0	41	0	0
Volume Right	0	40	0	0	58
cSH	901	1700	790	1700	1700
Volume to Capacity	0.02	0.26	0.05	0.24	0.16
Queue Length 95th (ft)	1	0	4	0	0
Control Delay (s)	0.6	0.0	9.8	0.0	0.0
Lane LOS	A		A		
Approach Delay (s)	0.3		0.6		
Approach LOS					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3274		1622	3288			1699			1576	
Flt Permitted	0.95	1.00		0.95	1.00			0.89			0.84	
Satd. Flow (perm)	1719	3274		1622	3288			1519			1335	
Volume (vph)	163	619	46	21	491	29	68	312	54	57	115	105
Peak-hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	190	652	72	31	528	40	82	343	77	80	153	172
RTOR Reduction (vph)	0	14	0	0	10	0	0	11	0	0	44	0
Lane Group Flow (vph)	190	710	0	31	558	0	0	491	0	0	361	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7			3	8			2			6	
Permitted Phases		4					2			6		
Actuated Green, G (s)	6.0	15.0		6.0	15.0			25.0			25.0	
Effective Green, g (s)	6.0	16.0		6.0	16.0			26.0			26.0	
Actuated g/C Ratio	0.10	0.27		0.10	0.27			0.43			0.43	
Clearance Time (s)	4.0	5.0		4.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	172	873		162	877			658			579	
v/s Ratio Prot	c0.11			0.02	0.17							
v/s Ratio Perm		c0.22						c0.32			0.27	
v/c Ratio	1.10	0.81		0.19	0.64			0.75			0.62	
Uniform Delay, d1	27.0	20.6		24.8	19.4			14.2			13.2	
Progression Factor	1.00	1.00		1.36	1.21			1.00			1.00	
Incremental Delay, d2	99.4	8.2		2.4	3.3			7.6			5.0	
Delay (s)	126.4	28.8		36.2	26.8			21.8			18.2	
Level of Service	F	C		D	C			C			B	
Approach Delay (s)		49.1			27.3			21.8			18.2	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↰	↑↑↑			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		0.91			0.91						1.00	
Frt		1.00			1.00						0.91	
Flt Protected		1.00			1.00						0.98	
Satd. Flow (prot)		4940			4940						1833	
Flt Permitted		1.00			1.00						0.93	
Satd. Flow (perm)		4940			4940						1723	
Volume (vph)	0	2128	0	0	483	0	0	0	0	18	0	28
Peak-hour factor, PHF	0.92	0.91	0.92	0.92	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.65
Adj. Flow (vph)	0	2338	0	0	549	0	0	0	0	20	0	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	34	0
Lane Group Flow (vph)	0	2338	0	0	549	0	0	0	0	0	29	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)										10		10
Turn Type			Perm			Perm			Perm			
Protected Phases					8			2			2	
Permitted Phases		4		8		2			2			
Actuated Green, G (s)		62.0			62.0						17.0	
Effective Green, g (s)		63.0			63.0						19.0	
Actuated g/C Ratio		0.70			0.70						0.21	
Clearance Time (s)		5.0			5.0						6.0	
Lane Grp Cap (vph)		3458			3458						364	
v/s Ratio Prot					0.11							
v/s Ratio Perm		c0.47									c0.02	
v/c Ratio		0.68			0.16						0.08	
Uniform Delay, d1		7.7			4.6						28.5	
Progression Factor		0.85			1.00						1.00	
Incremental Delay, d2		0.9			0.1						0.4	
Delay (s)		7.4			4.7						28.9	
Level of Service		A			A						C	
Approach Delay (s)		7.4			4.7			0.0			28.9	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00				1.00	0.91			0.91	
Frt	1.00	0.85				1.00	1.00			0.98	
Flt Protected	0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1510	1538				1719	4940			4849	
Flt Permitted	0.95	1.00				0.37	1.00			1.00	
Satd. Flow (perm)	1510	1538				671	4940			4849	
Volume (vph)	101	0	160	0	0	363	2034	0	0	481	47
Peak hour factor, PHF	0.94	0.92	0.74	0.92	0.92	0.90	0.95	0.92	0.92	0.93	0.65
Adj. Flow (vph)	107	0	216	0	0	403	2141	0	0	517	72
RTOR Reduction (vph)	0	163	0	0	0	0	0	0	0	20	0
Lane Group Flow (vph)	107	53	0	0	0	403	2141	0	0	569	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10								
Turn Type	Perm					pm+pt			Perm		
Protected Phases		6				7	4			8	
Permitted Phases	6					4			8		
Actuated Green, G (s)	20.0	20.0				58.0	58.0			45.0	
Effective Green, g (s)	22.0	22.0				60.0	60.0			47.0	
Actuated g/C Ratio	0.24	0.24				0.67	0.67			0.52	
Clearance Time (s)	6.0	6.0				3.0	6.0			6.0	
Lane Grp Cap (vph)	369	376				552	3293			2532	
v/s Ratio Prot		0.03				c0.07	0.43			0.12	
v/s Ratio Perm	c0.07					c0.41					
v/c Ratio	0.29	0.14				0.73	0.65			0.22	
Uniform Delay, d1	27.6	26.6				7.0	8.8			11.6	
Progression Factor	1.00	1.00				1.88	1.46			0.79	
Incremental Delay, d2	2.0	0.8				4.9	0.6			0.2	
Delay (s)	29.6	27.4				18.1	13.5			9.4	
Level of Service	C	C				B	B			A	
Approach Delay (s)		28.1		0.0			14.2			9.4	
Approach LOS		C		A			B			A	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

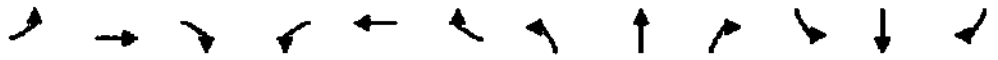
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost Time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1933		4897		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1933		4897		115	4693
Volume (vph)	84	23	2374	147	49	592
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	191	25	2580	160	53	651
RTOR Reduction (vph)	6	0	8	0	0	0
Lane Group Flow (vph)	210	0	2733	0	53	651
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)				10		10
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	17.0		61.0		61.0	61.0
Effective Green, g (s)	19.0		63.0		63.0	63.0
Actuated g/C Ratio	0.21		0.70		0.70	0.70
Clearance Time (s)	6.0		6.0		6.0	6.0
Lane Grp Cap (vph)	408		3428		81	3285
v/s Ratio Prot	c0.11		c0.56			0.14
v/s Ratio Perm					0.46	
v/c Ratio	0.52		0.80		0.65	0.20
Uniform Delay, d1	31.4		9.2		7.5	4.7
Progression Factor	1.00		1.00		1.14	0.66
Incremental Delay, d2	4.6		2.0		33.9	0.1
Delay (s)	36.0		11.2		42.4	3.2
Level of Service	D		B		D	A
Approach Delay (s)	36.0		11.2			6.2
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	62	0	410	198	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	73	0	446	215	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked	0.91					
vC, conflicting volume	661	215	215			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	629	215	215			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	91	100			
cM capacity (veh/h)	403	817	1337			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	85	446	215
Volume Left	12	0	0
Volume Right	73	0	0
cSH	714	1337	1700
Volume to Capacity	0.12	0.00	0.13
Queue Length 95th (ft)	10	0	0
Control Delay (s)	10.7	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.7	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		



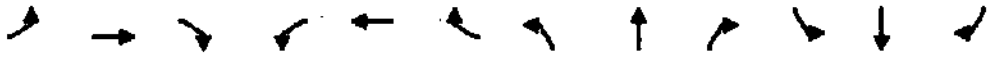
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3002							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3002							
Volume (vph)	81	875	6	95	758	361	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	983	14	120	790	435	0	0	0	0	0	0
RTOR Reduction (vph)	0	2	0	0	123	0	0	0	0	0	0	0
Lane Group Flow (vph)	98	995	0	120	1102	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			0			0				0		0
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	8.0	42.0		8.0	42.0							
Effective Green, g (s)	9.0	43.0		9.0	43.0							
Actuated g/C Ratio	0.15	0.72		0.15	0.72							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	249	2349		241	2151							
v/s Ratio Prot	0.06	0.30		c0.07	c0.37							
v/s Ratio Perm												
v/c Ratio	0.39	0.42		0.50	0.51							
Uniform Delay, d1	23.0	3.5		23.4	3.8							
Progression Factor	0.70	0.49		1.00	1.00							
Incremental Delay, d2	3.7	0.4		7.2	0.9							
Delay (s)	19.7	2.2		30.6	4.7							
Level of Service	B	A		C	A							
Approach Delay (s)		3.7			7.0			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱		↰	↑↑						⇳	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3765		1719	3438						1689	
Flt Permitted		1.00		0.15	1.00						0.98	
Satd. Flow (perm)		3765		273	3438						1689	
Volume (vph)	0	889	20	20	738	0	0	0	0	72	28	56
Peak hour factor, PHF	0.92	0.84	0.61	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	1058	33	28	858	0	0	0	0	87	37	62
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	1087	0	28	858	0	0	0	0	0	156	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		27.0		27.0	27.0						25.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1694		123	1547						704	
v/s Ratio Prot		c0.29			0.25							
v/s Ratio Perm				0.10							0.09	
v/c Ratio		0.64		0.23	0.55						0.22	
Uniform Delay, d1		12.8		10.1	12.1						11.2	
Progression Factor		2.01		0.79	0.83						1.00	
Incremental Delay, d2		1.1		3.8	1.3						0.7	
Delay (s)		26.8		11.8	11.3						12.0	
Level of Service		C		B	B						B	
Approach Delay (s)		26.8			11.3			0.0			12.0	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↳		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1644	
Flt Permitted		1.00		0.17	1.00						0.98	
Satd. Flow (perm)		3296		285	3323						1644	
Volume (vph)	0	1001	36	31	645	0	0	0	0	82	45	58
Peak-hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	1054	62	38	701	0	0	0	0	95	80	81
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	1109	0	38	701	0	0	0	0	0	228	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		114	1329						767	
v/s Ratio Prot		c0.34			0.21							
v/s Ratio Perm				0.13							0.14	
v/c Ratio		0.84		0.33	0.53						0.30	
Uniform Delay, d1		16.3		12.5	13.7						9.9	
Progression Factor		0.22		1.48	1.40						1.00	
Incremental Delay, d2		5.6		6.6	1.3						1.0	
Delay (s)		9.2		25.0	20.4						10.9	
Level of Service		A		C	C						B	
Approach Delay (s)		9.2			20.7			0.0			10.9	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3288			1617				
Flt Permitted	0.29	1.00			1.00			0.99				
Satd. Flow (perm)	511	3074			3288			1617				
Volume (vph)	19	921	0	0	664	41	18	25	41	0	0	0
Peak hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	41	969	0	0	738	56	38	33	61	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	39	0	0	0	0
Lane Group Flow (vph)	41	969	0	0	785	0	0	93	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	256	1537			1644			593				
v/s Ratio Prot		c0.32			0.24							
v/s Ratio Perm	0.08							0.06				
v/c Ratio	0.16	0.63			0.48			0.16				
Uniform Delay, d1	8.2	11.0			9.9			12.8				
Progression Factor	2.16	2.15			1.02			1.00				
Incremental Delay, d2	0.9	1.3			0.9			0.6				
Delay (s)	18.5	24.9			10.9			13.3				
Level of Service	B	C			B			B				
Approach Delay (s)		24.6			10.9			13.3			0.0	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↰	↑↑							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	12	764	30	28	598	52	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.81	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	19	888	44	44	687	64	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.90			0.78			0.83	0.83	0.78	0.83	0.83	0.90
vC, conflicting volume	752			932			1381	1789	466	1291	1779	376
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	620			634			910	1402	38	801	1390	205
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			94			100	100	100	100	100	100
cM capacity (veh/h)	847			723			175	103	794	210	105	717

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	463	488	44	458	293
Volume Left	19	0	44	0	0
Volume Right	0	44	0	0	64
cSH	847	1700	723	1700	1700
Volume to Capacity	0.02	0.29	0.06	0.27	0.17
Queue Length 95th (ft)	2	0	5	0	0
Control Delay (s)	0.7	0.0	10.3	0.0	0.0
Lane LOS	A		B		
Approach Delay (s)	0.3		0.6		
Approach LOS					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3274		1622	3289			1699			1576	
Flt Permitted	0.95	1.00		0.95	1.00			0.87			0.81	
Satd. Flow (perm)	1719	3274		1622	3289			1491			1288	
Volume (vph)	180	683	51	24	542	32	75	344	59	63	126	116
Peak-hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	209	719	80	35	583	44	90	378	84	89	168	190
RTOR Reduction (vph)	0	14	0	0	10	0	0	11	0	0	44	0
Lane Group Flow (vph)	209	785	0	35	617	0	0	541	0	0	403	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7			3	8			2			6	
Permitted Phases		4					2			6		
Actuated Green, G (s)	6.0	15.0		6.0	15.0			25.0			25.0	
Effective Green, g (s)	6.0	16.0		6.0	16.0			26.0			26.0	
Actuated g/C Ratio	0.10	0.27		0.10	0.27			0.43			0.43	
Clearance Time (s)	4.0	5.0		4.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	172	873		162	877			646			558	
v/s Ratio Prot	c0.12			0.02	0.19							
v/s Ratio Perm		c0.24						c0.36			0.31	
v/c Ratio	1.22	0.90		0.22	0.70			0.84			0.72	
Uniform Delay, d1	27.0	21.2		24.8	19.9			15.1			14.0	
Progression Factor	1.00	1.00		1.33	1.26			1.00			1.00	
Incremental Delay, d2	138.2	14.1		2.8	4.3			12.3			7.9	
Delay (s)	165.2	35.3		35.8	29.3			27.4			21.9	
Level of Service	F	D		D	C			C			C	
Approach Delay (s)		62.2			29.6			27.4			21.9	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM Average Control Delay	40.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		0.91			0.91						1.00	
Frt		1.00			1.00						0.91	
Flt Protected		1.00			1.00						0.98	
Satd. Flow (prot)		4940			4940						1832	
Flt Permitted		1.00			1.00						0.92	
Satd. Flow (perm)		4940			4940						1720	
Volume (vph)	0	2349	0	0	530	0	0	0	0	20	0	31
Peak-hour factor, PHF	0.92	0.91	0.92	0.92	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.65
Adj. Flow (vph)	0	2581	0	0	602	0	0	0	0	22	0	48
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	38	0
Lane Group Flow (vph)	0	2581	0	0	602	0	0	0	0	0	32	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)										10		10
Turn Type			Perm			Perm			Perm			
Protected Phases					8			2			2	
Permitted Phases		4		8			2			2		
Actuated Green, G (s)		62.0			62.0						17.0	
Effective Green, g (s)		63.0			63.0						19.0	
Actuated g/C Ratio		0.70			0.70						0.21	
Clearance Time (s)		5.0			5.0						6.0	
Lane Grp Cap (vph)		3458			3458						363	
v/s Ratio Prot					0.12							
v/s Ratio Perm		c0.52									c0.02	
v/c Ratio		0.75			0.17						0.09	
Uniform Delay, d1		8.5			4.6						28.5	
Progression Factor		0.72			1.00						1.00	
Incremental Delay, d2		1.1			0.1						0.5	
Delay (s)		7.2			4.7						29.0	
Level of Service		A			A						C	
Approach Delay (s)		7.2			4.7			0.0			29.0	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL2	SBL	SBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0				4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00				1.00	0.91			0.91	
Frt	1.00	0.85				1.00	1.00			0.98	
Flt Protected	0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1510	1538				1719	4940			4848	
Flt Permitted	0.95	1.00				0.34	1.00			1.00	
Satd. Flow (perm)	1510	1538				623	4940			4848	
Volume (vph)	111	0	176	0	0	400	2245	0	0	527	52
Peak-hour factor, PHF	0.94	0.92	0.74	0.92	0.92	0.90	0.95	0.92	0.92	0.93	0.65
Adj. Flow (vph)	118	0	238	0	0	444	2363	0	0	567	80
RTOR Reduction (vph)	0	180	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	118	58	0	0	0	444	2363	0	0	626	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10								
Turn Type	Perm					pm+pt			Perm		
Protected Phases		6				7	4			8	
Permitted Phases	6					4			8		
Actuated Green, G (s)	20.0	20.0				58.0	58.0			45.0	
Effective Green, g (s)	22.0	22.0				60.0	60.0			47.0	
Actuated g/C Ratio	0.24	0.24				0.67	0.67			0.52	
Clearance Time (s)	6.0	6.0				3.0	6.0			6.0	
Lane Grp Cap (vph)	369	376				525	3293			2532	
v/s Ratio Prot		0.04				c0.08	0.48			0.13	
v/s Ratio Perm	c0.08					c0.48					
v/c Ratio	0.32	0.15				0.85	0.72			0.25	
Uniform Delay, d1	27.9	26.7				8.3	9.6			11.8	
Progression Factor	1.00	1.00				2.00	1.52			0.78	
Incremental Delay, d2	2.3	0.9				7.8	0.6			0.2	
Delay (s)	30.1	27.6				24.3	15.2			9.5	
Level of Service	C	C				C	B			A	
Approach Delay (s)		28.4		0.0			16.6			9.5	
Approach LOS		C		A			B			A	

Intersection Summary			
HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

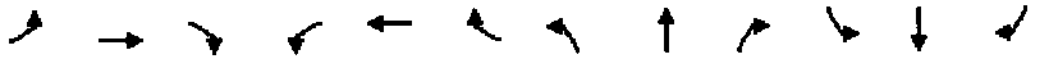
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1934		4901		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1934		4901		115	4693
Volume (vph)	86	23	2622	147	49	654
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	195	25	2850	160	53	719
RTOR Reduction (vph)	3	0	7	0	0	0
Lane Group Flow (vph)	217	0	3003	0	53	719
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)				10		10
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	17.0		61.0		61.0	61.0
Effective Green, g (s)	19.0		63.0		63.0	63.0
Actuated g/C Ratio	0.21		0.70		0.70	0.70
Clearance Time (s)	6.0		6.0		6.0	6.0
Lane Grp Cap (vph)	408		3431		81	3285
v/s Ratio Prot	c0.11		c0.61			0.15
v/s Ratio Perm					0.46	
v/c Ratio	0.53		0.88		0.65	0.22
Uniform Delay, d1	31.5		10.5		7.5	4.8
Progression Factor	1.00		1.00		1.14	0.65
Incremental Delay, d2	4.9		3.5		33.7	0.1
Delay (s)	36.4		13.9		42.2	3.3
Level of Service	D		B		D	A
Approach Delay (s)	36.4		13.9			6.0
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	6	69	0	452	218	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	81	0	491	237	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked	0.90					
vC, conflicting volume	726	237	237			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	697	237	237			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	90	100			
cM capacity (veh/h)	361	795	1313			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	95	491	237
Volume Left	14	0	0
Volume Right	81	0	0
cSH	674	1313	1700
Volume to Capacity	0.14	0.00	0.14
Queue Length 95th (ft)	12	0	0
Control Delay (s)	11.2	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.2	0.0	0.0
Approach LOS	B		

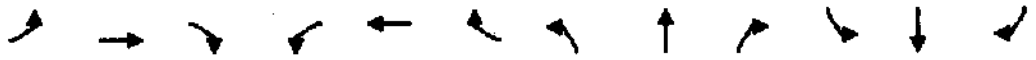
Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3005							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3005							
Volume (vph)	70	761	5	144	681	314	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	855	12	182	709	378	0	0	0	0	0	0
RTOR Reduction (vph)	0	2	0	0	107	0	0	0	0	0	0	0
Lane Group Flow (vph)	84	865	0	182	980	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	8.0	42.0		8.0	42.0							
Effective Green, g (s)	9.0	43.0		9.0	43.0							
Actuated g/C Ratio	0.15	0.72		0.15	0.72							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	249	2349		241	2154							
v/s Ratio Prot	0.05	0.26		c0.11	c0.33							
v/s Ratio Perm												
v/c Ratio	0.34	0.37		0.76	0.45							
Uniform Delay, d1	22.8	3.3		24.4	3.6							
Progression Factor	0.72	0.46		1.00	1.00							
Incremental Delay, d2	3.1	0.4		19.6	0.7							
Delay (s)	19.6	1.9		44.0	4.3							
Level of Service	B	A		D	A							
Approach Delay (s)		3.5			10.0			0.0			0.0	
Approach LOS		A			A			A			A	

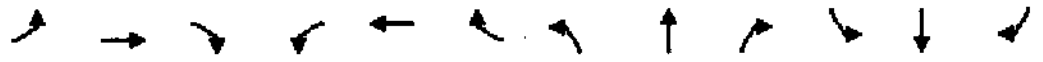
Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3764		1719	3438						1690	
Flt Permitted		1.00		0.20	1.00						0.98	
Satd. Flow (perm)		3764		369	3438						1690	
Volume (vph)	0	774	18	18	664	0	0	0	0	63	25	48
Peak-hour factor, PHF	0.92	0.84	0.61	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	921	30	25	772	0	0	0	0	76	33	53
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	947	0	25	772	0	0	0	0	0	133	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		27.0		27.0	27.0						25.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1694		166	1547						704	
v/s Ratio Prot		c0.25			0.22							
v/s Ratio Perm				0.07							0.08	
v/c Ratio		0.56		0.15	0.50						0.19	
Uniform Delay, d1		12.1		9.7	11.7						11.1	
Progression Factor		2.10		0.78	0.83						1.00	
Incremental Delay, d2		0.9		1.8	1.1						0.6	
Delay (s)		26.4		9.4	10.8						11.7	
Level of Service		C		A	B						B	
Approach Delay (s)		26.4			10.7			0.0			11.7	
Approach LOS		C			B			A			B	

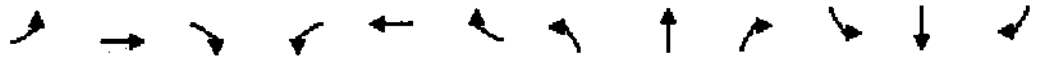
Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1645	
Flt Permitted		1.00		0.17	1.00						0.98	
Satd. Flow (perm)		3296		289	3323						1645	
Volume (vph)	0	871	31	27	583	0	0	0	0	71	39	50
Peak-hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	917	53	33	634	0	0	0	0	83	70	69
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	27	0
Lane Group Flow (vph)	0	963	0	33	634	0	0	0	0	0	195	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		116	1329						768	
v/s Ratio Prot		c0.29			0.19							
v/s Ratio Perm				0.11							0.12	
v/c Ratio		0.73		0.28	0.48						0.25	
Uniform Delay, d1		15.3		12.2	13.3						9.7	
Progression Factor		0.16		1.45	1.33						1.00	
Incremental Delay, d2		3.2		5.4	1.1						0.8	
Delay (s)		5.6		23.1	18.8						10.5	
Level of Service		A		C	B						B	
Approach Delay (s)		5.6			19.0			0.0			10.5	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



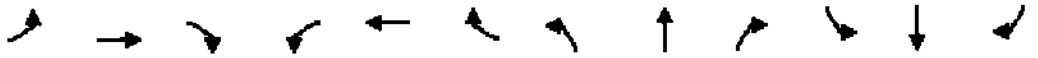
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3289			1616				
Flt Permitted	0.33	1.00			1.00			0.99				
Satd. Flow (perm)	576	3074			3289			1616				
Volume (vph)	16	802	0	0	600	36	15	22	36	0	0	0
Peak-hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	35	844	0	0	667	49	32	29	54	0	0	0
RTOR Reduction (vph)	0	0	0	0	9	0	0	34	0	0	0	0
Lane Group Flow (vph)	35	844	0	0	707	0	0	81	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	288	1537			1645			593				
v/s Ratio Prot		c0.27			0.21							
v/s Ratio Perm	0.06							0.05				
v/c Ratio	0.12	0.55			0.43			0.14				
Uniform Delay, d1	8.0	10.3			9.6			12.7				
Progression Factor	2.18	2.22			1.15			1.00				
Incremental Delay, d2	0.7	1.1			0.7			0.5				
Delay (s)	18.1	24.0			11.7			13.1				
Level of Service	B	C			B			B				
Approach Delay (s)		23.8			11.7			13.1			0.0	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↳		↰	↑↑↳							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	665	26	25	542	45	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.81	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	773	38	40	623	56	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.93			0.82			0.85	0.85	0.82	0.85	0.85	0.93
vC, conflicting volume	679			811			1215	1582	406	1149	1573	339
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	579			550			835	1265	54	757	1255	214
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			95			100	100	100	100	100	100
cM capacity (veh/h)	902			816			207	131	812	236	133	727

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	403	425	40	415	263
Volume Left	16	0	40	0	0
Volume Right	0	38	0	0	56
cSH	902	1700	816	1700	1700
Volume to Capacity	0.02	0.25	0.05	0.24	0.15
Queue Length 95th (ft)	1	0	4	0	0
Control Delay (s)	0.6	0.0	9.6	0.0	0.0
Lane LOS	A		A		
Approach Delay (s)	0.3		0.5		
Approach LOS					

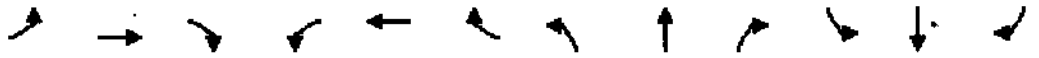
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3267		1622	3288			1699			1578	
Flt Permitted	0.95	1.00		0.95	1.00			0.88			0.85	
Satd. Flow (perm)	1719	3267		1622	3288			1507			1348	
Volume (vph)	157	594	51	43	472	28	72	305	52	55	115	101
Peak-hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	183	625	80	63	508	39	87	335	74	77	153	166
RTOR Reduction (vph)	0	16	0	0	10	0	0	11	0	0	43	0
Lane Group Flow (vph)	183	689	0	63	537	0	0	485	0	0	353	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10	10		10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7			3	8			2			6	
Permitted Phases		4					2			6		
Actuated Green, G (s)	6.0	15.0		6.0	15.0			25.0			25.0	
Effective Green, g (s)	6.0	16.0		6.0	16.0			26.0			26.0	
Actuated g/C Ratio	0.10	0.27		0.10	0.27			0.43			0.43	
Clearance Time (s)	4.0	5.0		4.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	172	871		162	877			653			584	
v/s Ratio Prot	c0.11			0.04	0.16							
v/s Ratio Perm		c0.21						c0.32			0.26	
v/c Ratio	1.06	0.79		0.39	0.61			0.74			0.60	
Uniform Delay, d1	27.0	20.4		25.3	19.3			14.2			13.1	
Progression Factor	1.00	1.00		1.36	1.21			1.00			1.00	
Incremental Delay, d2	86.6	7.3		6.4	3.0			7.5			4.6	
Delay (s)	113.6	27.7		40.9	26.4			21.7			17.6	
Level of Service	F	C		D	C			C			B	
Approach Delay (s)		45.4			27.9			21.7			17.6	
Approach LOS		D			C			C			B	

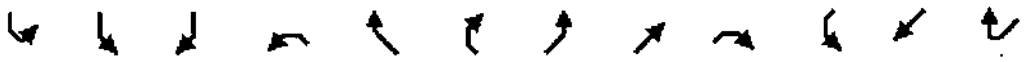
Intersection Summary			
HCM Average Control Delay	31.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↰	↑↑↑		↰		↱↱		↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor		0.91		1.00	0.91		1.00		0.88		1.00	
Frt		1.00		1.00	1.00		1.00		0.85		0.92	
Flt Protected		1.00		0.95	1.00		0.95		1.00		0.98	
Satd. Flow (prot)		4930		1662	4940		1719		2707		1851	
Flt Permitted		1.00		0.06	1.00		0.74		1.00		0.98	
Satd. Flow (perm)		4930		111	4940		1340		2707		1851	
Volume (vph)	0	2097	28	69	521	0	29	0	166	18	0	27
Peak-hour factor, PHF	0.92	0.91	0.92	0.92	0.88	0.92	0.92	0.92	0.92	0.61	0.92	0.65
Adj. Flow (vph)	0	2304	30	75	592	0	32	0	180	30	0	42
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	180	0	33	0
Lane Group Flow (vph)	0	2333	0	75	592	0	32	0	0	0	39	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm			D.Pm		NA	Perm		
Protected Phases					8						2	
Permitted Phases		4		8			2			2		
Actuated Green, G (s)		62.0		62.0	62.0		17.0		0.0		17.0	
Effective Green, g (s)		63.0		63.0	63.0		19.0		0.0		19.0	
Actuated g/C Ratio		0.70		0.70	0.70		0.21		0.00		0.21	
Clearance Time (s)		5.0		5.0	5.0		6.0				6.0	
Lane Grp Cap (vph)		3451		78	3458		283		0		391	
v/s Ratio Prot					0.12							
v/s Ratio Perm		0.47		c0.68			c0.02				0.02	
v/c Ratio		0.68		0.96	0.17		0.11		0.00		0.10	
Uniform Delay, d1		7.7		12.4	4.6		28.7		45.0		28.6	
Progression Factor		0.32		1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2		0.9		91.6	0.1		0.8		0.0		0.5	
Delay (s)		3.4		104.0	4.7		29.5		45.0		29.1	
Level of Service		A		F	A		C		D		C	
Approach Delay (s)		3.4			15.9			42.7			29.1	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

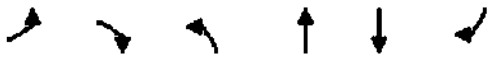


Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.87		1.00	0.85		1.00	1.00		1.00	0.98	
Flt Protected	0.95	0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1510	1567		1719	1538		1719	4930		1719	4836	
Flt Permitted	0.72	0.99		0.42	1.00		0.36	1.00		0.09	1.00	
Satd. Flow (perm)	1143	1567		766	1538		658	4930		154	4836	
Volume (vph)	97	33	154	6	3	51	349	1983	26	55	483	55
Peak-hour factor, PHF	0.94	0.92	0.74	0.92	0.92	0.92	0.90	0.95	0.92	0.92	0.93	0.65
Adj. Flow (vph)	103	36	208	7	3	55	388	2087	28	60	519	85
RTOR Reduction (vph)	0	157	0	0	11	0	0	1	0	0	25	0
Lane Group Flow (vph)	103	87	0	7	47	0	388	2114	0	60	579	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10						10			10
Turn Type	Perm			custom			pm+pt			Perm		
Protected Phases		6					7	4			8	
Permitted Phases	6			2	2		4			8		
Actuated Green, G (s)	20.0	20.0		21.0	21.0		58.0	58.0		45.0	45.0	
Effective Green, g (s)	22.0	22.0		22.0	22.0		60.0	60.0		47.0	47.0	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.67	0.67		0.52	0.52	
Clearance Time (s)	6.0	6.0		5.0	5.0		3.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	279	383		187	376		545	3287		80	2525	
v/s Ratio Prot		0.06					c0.07	0.43			0.12	
v/s Ratio Perm	c0.09			0.01	0.03		c0.40			0.39		
v/c Ratio	0.37	0.23		0.04	0.12		0.71	0.64		0.75	0.23	
Uniform Delay, d1	28.2	27.2		25.9	26.5		6.9	8.8		16.9	11.7	
Progression Factor	1.00	1.00		1.00	1.00		2.34	2.08		0.83	0.90	
Incremental Delay, d2	3.7	1.4		0.4	0.7		4.7	0.6		47.2	0.2	
Delay (s)	32.0	28.6		26.3	27.2		20.7	18.8		61.2	10.7	
Level of Service	C	C		C	C		C	B		E	B	
Approach Delay (s)		29.6			27.1			19.1			15.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1933		4893		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1933		4893		115	4693
Volume (vph)	83	23	2335	157	49	594
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	189	25	2538	171	53	653
RTOR Reduction (vph)	6	0	8	0	0	0
Lane Group Flow (vph)	208	0	2701	0	53	653
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)				10		10
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	17.0		61.0		61.0	61.0
Effective Green, g (s)	19.0		63.0		63.0	63.0
Actuated g/C Ratio	0.21		0.70		0.70	0.70
Clearance Time (s)	6.0		6.0		6.0	6.0
Lane Grp Cap (vph)	408		3425		81	3285
v/s Ratio Prot	c0.11		c0.55			0.14
v/s Ratio Perm					0.46	
v/c Ratio	0.51		0.79		0.65	0.20
Uniform Delay, d1	31.4		9.0		7.5	4.7
Progression Factor	1.00		1.00		0.72	0.58
Incremental Delay, d2	4.5		1.9		33.6	0.1
Delay (s)	35.9		11.0		39.0	2.9
Level of Service	D		B		D	A
Approach Delay (s)	35.9		11.0			5.6
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	60	0	407	224	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	71	0	442	243	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked	0.92					
vC, conflicting volume	686	243	243			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	659	243	243			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	91	100			
cM capacity (veh/h)	390	788	1305			

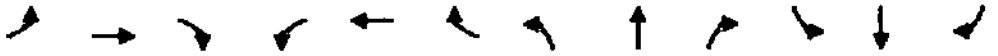
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	82	442	243
Volume Left	12	0	0
Volume Right	71	0	0
cSH	687	1305	1700
Volume to Capacity	0.12	0.00	0.14
Queue Length 95th (ft)	10	0	0
Control Delay (s)	11.0	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.0	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3005							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3005							
Volume (vph)	70	761	5	144	681	314	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	855	12	182	709	378	0	0	0	0	0	0
RTOR Reduction (vph)	0	1	0	0	117	0	0	0	0	0	0	0
Lane Group Flow (vph)	84	866	0	182	970	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	20.0	30.0		20.0	30.0							
Effective Green, g (s)	21.0	31.0		21.0	31.0							
Actuated g/C Ratio	0.35	0.52		0.35	0.52							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	582	1693		561	1553							
v/s Ratio Prot	0.05	0.26		c0.11	c0.32							
v/s Ratio Perm												
v/c Ratio	0.14	0.51		0.32	0.62							
Uniform Delay, d1	13.3	9.5		14.3	10.3							
Progression Factor	1.07	0.22		1.00	1.00							
Incremental Delay, d2	0.4	0.9		1.5	1.9							
Delay (s)	14.7	3.0		15.8	12.3							
Level of Service	B	A		B	B							
Approach Delay (s)		4.0			12.8			0.0			0.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↕		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3764		1719	3438						1690	
Flt Permitted		1.00		0.20	1.00						0.98	
Satd. Flow (perm)		3764		369	3438						1690	
Volume (vph)	0	774	18	18	664	0	0	0	0	63	25	48
Peak-hour factor, PHF	0.92	0.84	0.61	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	921	30	25	772	0	0	0	0	76	33	53
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	947	0	25	772	0	0	0	0	0	133	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		27.0		27.0	27.0						25.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1694		166	1547						704	
v/s Ratio Prot		c0.25			0.22							
v/s Ratio Perm				0.07							0.08	
v/c Ratio		0.56		0.15	0.50						0.19	
Uniform Delay, d1		12.1		9.7	11.7						11.1	
Progression Factor		0.41		0.49	0.48						1.00	
Incremental Delay, d2		0.9		1.6	0.9						0.6	
Delay (s)		5.9		6.4	6.5						11.7	
Level of Service		A		A	A						B	
Approach Delay (s)		5.9			6.5			0.0			11.7	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1645	
Flt Permitted		1.00		0.17	1.00						0.98	
Satd. Flow (perm)		3296		289	3323						1645	
Volume (vph)	0	871	31	27	583	0	0	0	0	71	39	50
Peak-hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	917	53	33	634	0	0	0	0	83	70	69
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	27	0
Lane Group Flow (vph)	0	963	0	33	634	0	0	0	0	0	195	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		116	1329						768	
v/s Ratio Prot		c0.29			0.19							
v/s Ratio Perm				0.11							0.12	
v/c Ratio		0.73		0.28	0.48						0.25	
Uniform Delay, d1		15.3		12.2	13.3						9.7	
Progression Factor		0.25		0.54	0.55						1.00	
Incremental Delay, d2		3.2		5.4	1.1						0.8	
Delay (s)		7.0		12.0	8.4						10.5	
Level of Service		A		B	A						B	
Approach Delay (s)		7.0			8.6			0.0			10.5	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3289			1616				
Flt Permitted	0.33	1.00			1.00			0.99				
Satd. Flow (perm)	576	3074			3289			1616				
Volume (vph)	16	802	0	0	600	36	15	22	36	0	0	0
Peak-hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	35	844	0	0	667	49	32	29	54	0	0	0
RTOR Reduction (vph)	0	0	0	0	9	0	0	34	0	0	0	0
Lane Group Flow (vph)	35	844	0	0	707	0	0	81	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	288	1537			1645			593				
v/s Ratio Prot		c0.27			0.21							
v/s Ratio Perm	0.06							0.05				
v/c Ratio	0.12	0.55			0.43			0.14				
Uniform Delay, d1	8.0	10.3			9.6			12.7				
Progression Factor	0.48	0.49			0.17			1.00				
Incremental Delay, d2	0.7	1.2			0.7			0.5				
Delay (s)	4.6	6.2			2.4			13.1				
Level of Service	A	A			A			B				
Approach Delay (s)		6.1			2.4			13.1			0.0	
Approach LOS		A			A			B			A	

Intersection Summary				
HCM Average Control Delay	5.0	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.37			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	33.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↳		↰	↑↑↳							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	665	26	25	542	45	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.81	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	773	38	40	623	56	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.93			0.83			0.87	0.87	0.83	0.87	0.87	0.93
vC, conflicting volume	679			811			1215	1582	406	1149	1573	339
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	579			574			854	1276	87	777	1266	214
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			95			100	100	100	100	100	100
cM capacity (veh/h)	902			812			204	131	788	232	133	727

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	403	425	40	415	263
Volume Left	16	0	40	0	0
Volume Right	0	38	0	0	56
cSH	902	1700	812	1700	1700
Volume to Capacity	0.02	0.25	0.05	0.24	0.15
Queue Length 95th (ft)	1	0	4	0	0
Control Delay (s)	0.6	0.0	9.7	0.0	0.0
Lane LOS	A		A		
Approach Delay (s)	0.3		0.5		
Approach LOS					

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	29.7%	ICU Level of Service	A	
Analysis Period (min)	15			

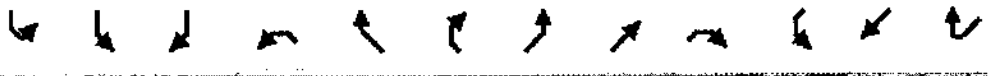
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3267		1622	3288			1699			1578	
Flt Permitted	0.95	1.00		0.95	1.00			0.84			0.79	
Satd. Flow (perm)	1719	3267		1622	3288			1447			1265	
Volume (vph)	157	594	51	43	472	28	72	305	52	55	115	101
Peak-hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	183	625	80	63	508	39	87	335	74	77	153	166
RTOR Reduction (vph)	0	16	0	0	10	0	0	10	0	0	44	0
Lane Group Flow (vph)	183	689	0	63	537	0	0	486	0	0	352	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7			3	8			2			6	
Permitted Phases		4					2			6		
Actuated Green, G (s)	8.0	18.0		8.0	18.0			20.0			20.0	
Effective Green, g (s)	8.0	19.0		8.0	19.0			21.0			21.0	
Actuated g/C Ratio	0.13	0.32		0.13	0.32			0.35			0.35	
Clearance Time (s)	4.0	5.0		4.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	229	1035		216	1041			506			443	
v/s Ratio Prot	c0.11			0.04	0.16							
v/s Ratio Perm		c0.21						c0.34			0.28	
v/c Ratio	0.80	0.67		0.29	0.52			0.96			0.80	
Uniform Delay, d1	25.2	17.7		23.4	16.7			19.1			17.6	
Progression Factor	1.00	1.00		0.54	0.92			1.00			1.00	
Incremental Delay, d2	24.6	3.4		3.2	1.7			31.2			13.8	
Delay (s)	49.8	21.1		15.9	17.0			50.2			31.3	
Level of Service	D	C		B	B			D			C	
Approach Delay (s)		27.0			16.9			50.2			31.3	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↰	↑↑↑		↰		↱↱		↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor		0.91		1.00	0.91		1.00		0.88		1.00	
Frt		1.00		1.00	1.00		1.00		0.85		0.92	
Flt Protected		1.00		0.95	1.00		0.95		1.00		0.98	
Satd. Flow (prot)		4930		1662	4940		1719		2707		1849	
Flt Permitted		1.00		0.95	1.00		0.80		1.00		0.98	
Satd. Flow (perm)		4930		1662	4940		1453		2707		1849	
Volume (vph)	0	2097	28	69	521	0	29	0	166	18	0	27
Peak-hour factor, PHF	0.92	0.91	0.92	0.92	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2304	30	75	592	0	32	0	180	20	0	29
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	4	0	24	0
Lane Group Flow (vph)	0	2333	0	75	592	0	32	0	176	0	25	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)										10		10
Turn Type				Prot			custom		custom	Perm		
Protected Phases				3	8				2 3		6	
Permitted Phases		4					2			6		
Actuated Green, G (s)		49.0		12.0	66.0		13.0		31.0		14.0	
Effective Green, g (s)		50.0		13.0	67.0		15.0		32.0		15.0	
Actuated g/C Ratio		0.56		0.14	0.74		0.17		0.36		0.17	
Clearance Time (s)		5.0		5.0	5.0		6.0				5.0	
Lane Grp Cap (vph)		2739		240	3678		242		962		308	
v/s Ratio Prot				c0.05	0.12				c0.07			
v/s Ratio Perm		c0.47					0.02				0.01	
v/c Ratio		0.85		0.31	0.16		0.13		0.18		0.08	
Uniform Delay, d1		16.9		34.5	3.3		32.0		20.0		31.7	
Progression Factor		0.29		1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2		2.6		3.4	0.1		1.1		0.4		0.5	
Delay (s)		7.5		37.9	3.4		33.1		20.4		32.2	
Level of Service		A		D	A		C		C		C	
Approach Delay (s)		7.5			7.3			22.3			32.2	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



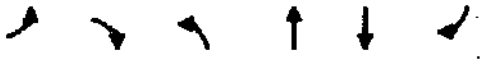
Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00		1.00	1.00	0.91		1.00	0.91	
Frt	1.00	0.87		0.96		0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	0.99		0.97		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1510	1567		1670		1538	1719	4930		1719	4836	
Flt Permitted	0.95	0.99		0.82		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1510	1567		1424		1538	1719	4930		1719	4836	
Volume (vph)	97	33	154	6	3	51	349	1983	26	55	483	55
Peak-hour factor, PHF	0.94	0.92	0.74	0.92	0.92	0.92	0.90	0.95	0.92	0.92	0.93	0.65
Adj. Flow (vph)	103	36	208	7	3	55	388	2087	28	60	519	85
RTOR Reduction (vph)	0	164	0	0	0	43	0	1	0	0	25	0
Lane Group Flow (vph)	103	80	0	10	0	12	388	2114	0	60	579	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10									
Turn Type	Perm			custom		custom	Prot			Prot		
Protected Phases		6					7	4		3	8	
Permitted Phases	6			2		2						
Actuated Green, G (s)	17.0	17.0		18.0		18.0	30.0	49.0		7.0	26.0	
Effective Green, g (s)	19.0	19.0		19.0		19.0	31.0	51.0		8.0	28.0	
Actuated g/C Ratio	0.21	0.21		0.21		0.21	0.34	0.57		0.09	0.31	
Clearance Time (s)	6.0	6.0		5.0		5.0	5.0	6.0		5.0	6.0	
Lane Grp Cap (vph)	319	331		301		325	592	2794		153	1505	
v/s Ratio Prot		0.05					c0.23	c0.43		0.03	0.12	
v/s Ratio Perm	c0.07			0.01		0.01						
v/c Ratio	0.32	0.24		0.03		0.04	0.66	0.76		0.39	0.38	
Uniform Delay, d1	30.1	29.5		28.2		28.2	25.0	14.8		38.7	24.3	
Progression Factor	1.00	1.00		1.00		1.00	0.78	0.67		1.08	0.89	
Incremental Delay, d2	2.7	1.7		0.2		0.2	3.8	1.3		7.4	0.7	
Delay (s)	32.7	31.2		28.4		28.4	23.4	11.3		49.2	22.3	
Level of Service	C	C		C		C	C	B		D	C	
Approach Delay (s)		31.7		28.4				13.1			24.7	
Approach LOS		C		C				B			C	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1933		4893		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1933		4893		105	4693
Volume (vph)	83	23	2335	157	49	594
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	189	25	2538	171	53	653
RTOR Reduction (vph)	5	0	8	0	0	0
Lane Group Flow (vph)	209	0	2701	0	53	653
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)				10		10
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	11.0		67.0		67.0	67.0
Effective Green, g (s)	13.0		69.0		69.0	69.0
Actuated g/C Ratio	0.14		0.77		0.77	0.77
Clearance Time (s)	6.0		6.0		6.0	6.0
Lane Grp Cap (vph)	279		3751		81	3598
v/s Ratio Prot	c0.11		c0.55			0.14
v/s Ratio Perm					0.51	
v/c Ratio	0.75		0.72		0.65	0.18
Uniform Delay, d1	36.9		5.5		4.9	2.8
Progression Factor	1.00		1.00		1.69	0.24
Incremental Delay, d2	16.7		1.2		32.2	0.1
Delay (s)	53.7		6.7		40.5	0.8
Level of Service	D		A		D	A
Approach Delay (s)	53.7		6.7			3.8
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	60	0	407	224	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	71	0	442	243	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked						
vC, conflicting volume	686	243	243			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	686	243	243			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	91	100			
cM capacity (veh/h)	409	788	1305			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	82	442	243
Volume Left	12	0	0
Volume Right	71	0	0
cSH	695	1305	1700
Volume to Capacity	0.12	0.00	0.14
Queue Length 95th (ft)	10	0	0
Control Delay (s)	10.9	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.9	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3002							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3002							
Volume (vph)	71	769	5	83	666	317	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	864	12	105	694	382	0	0	0	0	0	0
RTOR Reduction (vph)	0	2	0	0	108	0	0	0	0	0	0	0
Lane Group Flow (vph)	86	874	0	105	968	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	8.0	42.0		8.0	42.0							
Effective Green, g (s)	9.0	43.0		9.0	43.0							
Actuated g/C Ratio	0.15	0.72		0.15	0.72							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	249	2349		241	2151							
v/s Ratio Prot	0.05	0.27		c0.07	c0.32							
v/s Ratio Perm												
v/c Ratio	0.35	0.37		0.44	0.45							
Uniform Delay, d1	22.9	3.3		23.2	3.6							
Progression Factor	0.72	0.46		1.00	1.00							
Incremental Delay, d2	3.2	0.4		5.6	0.7							
Delay (s)	19.7	1.9		28.8	4.2							
Level of Service	B	A		C	A							
Approach Delay (s)		3.5			6.4			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	5.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3764		1719	3438						1689	
Flt Permitted		1.00		0.20	1.00						0.98	
Satd. Flow (perm)		3764		362	3438						1689	
Volume (vph)	0	781	18	18	648	0	0	0	0	63	25	49
Peak-hour factor, PHF	0.92	0.84	0.61	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	930	30	25	753	0	0	0	0	76	33	54
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	956	0	25	753	0	0	0	0	0	133	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		27.0		27.0	27.0						25.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1694		163	1547						704	
v/s Ratio Prot		c0.25			0.22							
v/s Ratio Perm				0.07							0.08	
v/c Ratio		0.56		0.15	0.49						0.19	
Uniform Delay, d1		12.2		9.7	11.6						11.1	
Progression Factor		2.09		0.79	0.83						1.00	
Incremental Delay, d2		1.0		1.8	1.0						0.6	
Delay (s)		26.4		9.5	10.7						11.7	
Level of Service		C		A	B						B	
Approach Delay (s)		26.4			10.6			0.0			11.7	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1644	
Flt Permitted		1.00		0.17	1.00						0.98	
Satd. Flow (perm)		3296		285	3323						1644	
Volume (vph)	0	879	31	27	567	0	0	0	0	72	40	51
Peak-hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	925	53	33	616	0	0	0	0	84	71	71
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	971	0	33	616	0	0	0	0	0	198	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		114	1329						767	
v/s Ratio Prot		c0.29			0.19							
v/s Ratio Perm				0.12							0.12	
v/c Ratio		0.74		0.29	0.46						0.26	
Uniform Delay, d1		15.3		12.2	13.3						9.7	
Progression Factor		0.16		1.42	1.31						1.00	
Incremental Delay, d2		3.3		5.7	1.0						0.8	
Delay (s)		5.7		23.0	18.4						10.5	
Level of Service		A		C	B						B	
Approach Delay (s)		5.7			18.6			0.0			10.5	
Approach LOS		A			B			A			B	

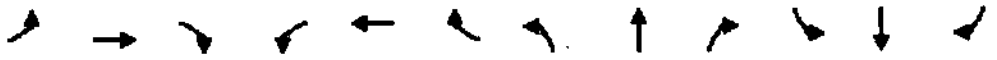
Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

c · Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3288			1617				
Flt Permitted	0.34	1.00			1.00			0.99				
Satd. Flow (perm)	592	3074			3288			1617				
Volume (vph)	17	810	0	0	584	36	16	22	36	0	0	0
Peak-hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	37	853	0	0	649	49	34	29	54	0	0	0
RTOR Reduction (vph)	0	0	0	0	9	0	0	34	0	0	0	0
Lane Group Flow (vph)	37	853	0	0	689	0	0	83	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	296	1537			1644			593				
v/s Ratio Prot		c0.28			0.21							
v/s Ratio Perm	0.06							0.05				
v/c Ratio	0.12	0.55			0.42			0.14				
Uniform Delay, d1	8.0	10.4			9.5			12.7				
Progression Factor	2.18	2.20			1.17			1.00				
Incremental Delay, d2	0.7	1.1			0.7			0.5				
Delay (s)	18.1	23.9			11.8			13.2				
Level of Service	B	C			B			B				
Approach Delay (s)		23.7			11.8			13.2			0.0	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↰	↑↑							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	671	26	25	526	46	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.81	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	780	38	40	605	57	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.94			0.81			0.85	0.85	0.81	0.85	0.85	0.94
vC, conflicting volume	661			818			1218	1572	409	1134	1563	331
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	571			550			846	1270	48	753	1259	218
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			95			100	100	100	100	100	100
cM capacity (veh/h)	915			811			202	129	816	236	131	728

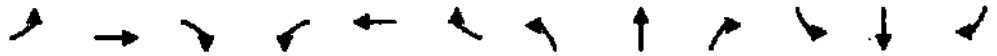
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	406	428	40	403	258
Volume Left	16	0	40	0	0
Volume Right	0	38	0	0	57
cSH	915	1700	811	1700	1700
Volume to Capacity	0.02	0.25	0.05	0.24	0.15
Queue Length 95th (ft)	1	0	4	0	0
Control Delay (s)	0.5	0.0	9.7	0.0	0.0
Lane LOS	A		A		
Approach Delay (s)	0.3		0.5		
Approach LOS					

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	29.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3263		1622	3288			1699			1579	
Flt Permitted	0.95	1.00		0.95	1.00			0.87			0.84	
Satd. Flow (perm)	1719	3263		1622	3288			1484			1345	
Volume (vph)	158	600	56	21	477	28	79	312	52	55	119	102
Peak-hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	184	632	88	31	513	39	95	343	74	77	159	167
RTOR Reduction (vph)	0	18	0	0	10	0	0	10	0	0	43	0
Lane Group Flow (vph)	184	702	0	31	542	0	0	502	0	0	361	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7			3	8			2			6	
Permitted Phases		4					2			6		
Actuated Green, G (s)	6.0	15.0		6.0	15.0			25.0			25.0	
Effective Green, g (s)	6.0	16.0		6.0	16.0			26.0			26.0	
Actuated g/C Ratio	0.10	0.27		0.10	0.27			0.43			0.43	
Clearance Time (s)	4.0	5.0		4.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	172	870		162	877			643			583	
v/s Ratio Prot	c0.11			0.02	0.16							
v/s Ratio Perm		c0.22						c0.34			0.27	
v/c Ratio	1.07	0.81		0.19	0.62			0.78			0.62	
Uniform Delay, d1	27.0	20.6		24.8	19.3			14.6			13.2	
Progression Factor	1.00	1.00		1.37	1.20			1.00			1.00	
Incremental Delay, d2	88.4	7.9		2.4	3.1			9.1			4.9	
Delay (s)	115.4	28.5		36.3	26.3			23.7			18.0	
Level of Service	F	C		D	C			C			B	
Approach Delay (s)		46.2			26.8			23.7			18.0	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↳		↰	↑↑↑		↰		↱↱		↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor		0.91		1.00	0.91		1.00		0.88		1.00	
Frt		0.99		1.00	1.00		1.00		0.85		0.92	
Flt Protected		1.00		0.95	1.00		0.95		1.00		0.98	
Satd. Flow (prot)		4909		1662	4940		1719		2707		1851	
Flt Permitted		1.00		0.06	1.00		0.74		1.00		0.98	
Satd. Flow (perm)		4909		111	4940		1340		2707		1851	
Volume (vph)	0	2111	94	94	527	0	209	0	142	18	0	27
Peak-hour factor, PHF	0.92	0.91	0.92	0.92	0.88	0.92	0.92	0.92	0.92	0.61	0.92	0.65
Adj. Flow (vph)	0	2320	102	102	599	0	227	0	154	30	0	42
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	16	0	33	0
Lane Group Flow (vph)	0	2417	0	102	599	0	227	0	138	0	39	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm			custom		custom	Perm		
Protected Phases					8						2	
Permitted Phases		4		8			6		6	2		
Actuated Green, G (s)		62.0		62.0	62.0		17.0		17.0		17.0	
Effective Green, g (s)		63.0		63.0	63.0		19.0		19.0		19.0	
Actuated g/C Ratio		0.70		0.70	0.70		0.21		0.21		0.21	
Clearance Time (s)		5.0		5.0	5.0		6.0		6.0		6.0	
Lane Grp Cap (vph)		3436		78	3458		283		571		391	
v/s Ratio Prot					0.12							
v/s Ratio Perm		0.49		c0.92			c0.17		0.05		0.02	
v/c Ratio		0.70		1.31	0.17		0.80		0.24		0.10	
Uniform Delay, d1		8.0		13.5	4.6		33.7		29.5		28.6	
Progression Factor		0.25		1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2		0.9		204.8	0.1		20.9		1.0		0.5	
Delay (s)		3.0		218.3	4.7		54.6		30.5		29.1	
Level of Service		A		F	A		D		C		C	
Approach Delay (s)		3.0			35.8			44.9			29.1	
Approach LOS		A			D			D			C	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00		1.00	1.00	0.91		1.00	0.91	
Frt	1.00	0.86		0.99		0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.96		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1510	1556		1710		1538	1719	4910		1719	4851	
Flt Permitted	0.95	1.00		0.56		1.00	0.28	1.00		0.09	1.00	
Satd. Flow (perm)	1510	1556		994		1538	506	4910		154	4851	
Volume (vph)	98	19	155	57	5	41	352	2069	86	60	659	63
Peak-hour factor, PHF	0.94	0.92	0.74	0.92	0.92	0.92	0.90	0.95	0.92	0.92	0.93	0.65
Adj. Flow (vph)	104	21	209	62	5	45	391	2178	93	65	709	97
RTOR Reduction (vph)	0	158	0	0	0	9	0	5	0	0	20	0
Lane Group Flow (vph)	104	72	0	67	0	36	391	2266	0	65	786	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10						10			10
Turn Type	Perm			custom		custom	pm+pt			Perm		
Protected Phases		6					7	4			8	
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	20.0	20.0		21.0		21.0	58.0	58.0		45.0	45.0	
Effective Green, g (s)	22.0	22.0		22.0		22.0	60.0	60.0		47.0	47.0	
Actuated g/C Ratio	0.24	0.24		0.24		0.24	0.67	0.67		0.52	0.52	
Clearance Time (s)	6.0	6.0		5.0		5.0	3.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	369	380		243		376	459	3273		80	2533	
v/s Ratio Prot		0.05					c0.09	0.46			0.16	
v/s Ratio Perm	c0.07			0.07		0.02	c0.48			0.42		
v/c Ratio	0.28	0.19		0.28		0.10	0.85	0.69		0.81	0.31	
Uniform Delay, d1	27.6	26.9		27.5		26.3	7.6	9.3		17.8	12.3	
Progression Factor	1.00	1.00		1.00		1.00	2.59	2.05		0.75	0.67	
Incremental Delay, d2	1.9	1.1		2.8		0.5	10.1	0.6		56.1	0.3	
Delay (s)	29.5	28.0		30.3		26.8	29.7	19.7		69.5	8.5	
Level of Service	C	C		C		C	C	B		E	A	
Approach Delay (s)		28.5		28.9				21.1			13.1	
Approach LOS		C		C				C			B	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

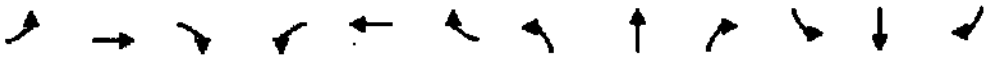
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Flt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1933		4891		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1933		4891		115	4693
Volume (vph)	84	23	2484	177	49	822
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	191	25	2700	192	53	903
RTOR Reduction (vph)	4	0	9	0	0	0
Lane Group Flow (vph)	212	0	2883	0	53	903
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)				10		10
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	17.0		61.0		61.0	61.0
Effective Green, g (s)	19.0		63.0		63.0	63.0
Actuated g/C Ratio	0.21		0.70		0.70	0.70
Clearance Time (s)	6.0		6.0		6.0	6.0
Lane Grp Cap (vph)	408		3424		81	3285
v/s Ratio Prot	c0.11		c0.59			0.19
v/s Ratio Perm					0.46	
v/c Ratio	0.52		0.84		0.65	0.27
Uniform Delay, d1	31.5		9.9		7.5	5.0
Progression Factor	1.00		1.00		0.81	0.61
Incremental Delay, d2	4.7		2.7		33.2	0.2
Delay (s)	36.1		12.6		39.3	3.3
Level of Service	D		B		D	A
Approach Delay (s)	36.1		12.6			5.3
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	60	0	421	212	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	71	0	458	230	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked	0.92					
vC, conflicting volume	688	230	230			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	661	230	230			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	91	100			
cM capacity (veh/h)	389	801	1320			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	82	458	230
Volume Left	12	0	0
Volume Right	71	0	0
cSH	695	1320	1700
Volume to Capacity	0.12	0.00	0.14
Queue Length 95th (ft)	10	0	0
Control Delay (s)	10.9	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.9	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3002							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3002							
Volume (vph)	71	769	5	83	666	317	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	864	12	105	694	382	0	0	0	0	0	0
RTOR Reduction (vph)	0	1	0	0	125	0	0	0	0	0	0	0
Lane Group Flow (vph)	86	875	0	105	951	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	20.0	30.0		20.0	30.0							
Effective Green, g (s)	21.0	31.0		21.0	31.0							
Actuated g/C Ratio	0.35	0.52		0.35	0.52							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	582	1693		561	1551							
v/s Ratio Prot	0.05	0.27		c0.07	c0.32							
v/s Ratio Perm												
v/c Ratio	0.15	0.52		0.19	0.61							
Uniform Delay, d1	13.4	9.6		13.6	10.3							
Progression Factor	1.07	0.22		1.00	1.00							
Incremental Delay, d2	0.5	1.0		0.7	1.8							
Delay (s)	14.8	3.1		14.3	12.1							
Level of Service	B	A		B	B							
Approach Delay (s)		4.1			12.3			0.0			0.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

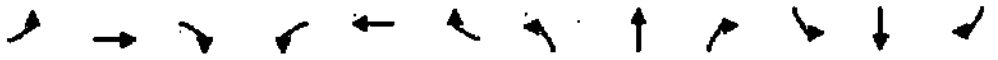
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3765		1719	3438						1689	
Flt Permitted		1.00		0.20	1.00						0.98	
Satd. Flow (perm)		3765		363	3438						1689	
Volume (vph)	0	781	18	18	648	0	0	0	0	63	25	49
Peak-hour factor, PHF	0.92	0.84	0.63	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	930	29	25	753	0	0	0	0	76	33	54
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	955	0	25	753	0	0	0	0	0	133	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		27.0		27.0	27.0						25.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1694		163	1547						704	
v/s Ratio Prot		c0.25			0.22							
v/s Ratio Perm				0.07							0.08	
v/c Ratio		0.56		0.15	0.49						0.19	
Uniform Delay, d1		12.2		9.7	11.6						11.1	
Progression Factor		0.41		0.50	0.49						1.00	
Incremental Delay, d2		1.0		1.6	0.9						0.6	
Delay (s)		5.9		6.5	6.5						11.7	
Level of Service		A		A	A						B	
Approach Delay (s)		5.9			6.5			0.0			11.7	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱		↰	↑↑						↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1644	
Flt Permitted		1.00		0.17	1.00						0.98	
Satd. Flow (perm)		3296		285	3323						1644	
Volume (vph)	0	879	31	27	567	0	0	0	0	72	40	51
Peak-hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	925	53	33	616	0	0	0	0	84	71	71
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	971	0	33	616	0	0	0	0	0	198	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		114	1329						767	
v/s Ratio Prot		c0.29			0.19							
v/s Ratio Perm				0.12							0.12	
v/c Ratio		0.74		0.29	0.46						0.26	
Uniform Delay, d1		15.3		12.2	13.3						9.7	
Progression Factor		0.25		0.55	0.55						1.00	
Incremental Delay, d2		3.3		5.7	1.0						0.8	
Delay (s)		7.1		12.4	8.3						10.5	
Level of Service		A		B	A						B	
Approach Delay (s)		7.1			8.6			0.0			10.5	
Approach LOS		A			A			A			B	

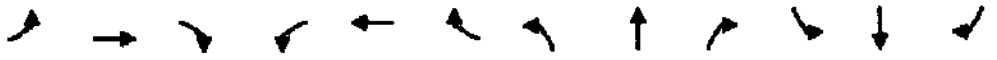
Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3288			1617				
Flt Permitted	0.34	1.00			1.00			0.99				
Satd. Flow (perm)	592	3074			3288			1617				
Volume (vph)	17	810	0	0	584	36	16	22	36	0	0	0
Peak-hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	37	853	0	0	649	49	34	29	54	0	0	0
RTOR Reduction (vph)	0	0	0	0	9	0	0	34	0	0	0	0
Lane Group Flow (vph)	37	853	0	0	689	0	0	83	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	296	1537			1644			593				
v/s Ratio Prot		c0.28			0.21							
v/s Ratio Perm	0.06							0.05				
v/c Ratio	0.12	0.55			0.42			0.14				
Uniform Delay, d1	8.0	10.4			9.5			12.7				
Progression Factor	0.87	1.06			0.18			1.00				
Incremental Delay, d2	0.7	1.1			0.7			0.5				
Delay (s)	7.6	12.2			2.4			13.2				
Level of Service	A	B			A			B				
Approach Delay (s)		12.0			2.4			13.2			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↰	↑↑							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	671	26	25	526	46	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.81	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	780	38	40	605	57	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.94			0.82			0.85	0.85	0.82	0.85	0.85	0.94
vC, conflicting volume	661			818			1213	1572	409	1134	1563	331
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	571			558			852	1274	59	760	1263	218
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			95			100	100	100	100	100	100
cM capacity (veh/h)	915			810			201	129	807	234	131	728

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	406	428	40	403	258
Volume Left	16	0	40	0	0
Volume Right	0	38	0	0	57
cSH	915	1700	810	1700	1700
Volume to Capacity	0.02	0.25	0.05	0.24	0.15
Queue Length 95th (ft)	1	0	4	0	0
Control Delay (s)	0.5	0.0	9.7	0.0	0.0
Lane LOS	A		A		
Approach Delay (s)	0.3		0.5		
Approach LOS					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3263		1622	3288			1699			1579	
Flt Permitted	0.95	1.00		0.95	1.00			0.85			0.82	
Satd. Flow (perm)	1719	3263		1622	3288			1450			1303	
Volume (vph)	158	600	56	21	477	28	79	312	52	55	119	102
Peak-hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	184	632	88	31	513	39	95	343	74	77	159	167
RTOR Reduction (vph)	0	18	0	0	9	0	0	10	0	0	43	0
Lane Group Flow (vph)	184	702	0	31	543	0	0	502	0	0	360	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7			3	8			2			6	
Permitted Phases		4					2			6		
Actuated Green, G (s)	8.0	16.0		8.0	16.0			22.0			22.0	
Effective Green, g (s)	8.0	17.0		8.0	17.0			23.0			23.0	
Actuated g/C Ratio	0.13	0.28		0.13	0.28			0.38			0.38	
Clearance Time (s)	4.0	5.0		4.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	229	925		216	932			556			499	
v/s Ratio Prot	c0.11			0.02	0.17							
v/s Ratio Perm		c0.22						c0.35			0.28	
v/c Ratio	0.80	0.76		0.14	0.58			0.90			0.72	
Uniform Delay, d1	25.2	19.6		23.0	18.5			17.4			15.8	
Progression Factor	1.00	1.00		1.54	0.19			1.00			1.00	
Incremental Delay, d2	25.0	5.8		1.3	2.5			20.5			8.8	
Delay (s)	50.3	25.4		36.8	5.9			38.0			24.5	
Level of Service	D	C		D	A			D			C	
Approach Delay (s)		30.5			7.6			38.0			24.5	
Approach LOS		C			A			D			C	

Intersection Summary			
HCM Average Control Delay	25.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↰↰	↑↑↑		↰		↱↱		↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor		0.91		0.97	0.91		1.00		0.88		1.00	
Frt		0.99		1.00	1.00		1.00		0.85		0.92	
Flt Protected		1.00		0.95	1.00		0.95		1.00		0.98	
Satd. Flow (prot)		4909		3224	4940		1719		2707		1851	
Flt Permitted		1.00		0.95	1.00		0.73		1.00		0.98	
Satd. Flow (perm)		4909		3224	4940		1316		2707		1851	
Volume (vph)	0	2111	94	94	527	0	209	0	142	18	0	27
Peak-hour factor, PHF	0.92	0.91	0.92	0.92	0.88	0.92	0.92	0.92	0.92	0.61	0.92	0.65
Adj. Flow (vph)	0	2320	102	102	599	0	227	0	154	30	0	42
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	141	0	33	0
Lane Group Flow (vph)	0	2418	0	102	599	0	227	0	13	0	39	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)										10		10
Turn Type				Prot			D.Pm		Over	Perm		
Protected Phases				3	8				3		2	
Permitted Phases		4					2			2		
Actuated Green, G (s)		56.3		7.6	68.9		20.1		7.6		20.1	
Effective Green, g (s)		57.3		8.6	69.9		22.1		8.6		22.1	
Actuated g/C Ratio		0.57		0.09	0.70		0.22		0.09		0.22	
Clearance Time (s)		5.0		5.0	5.0		6.0		5.0		6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)		2813		277	3453		291		233		409	
v/s Ratio Prot				c0.03	0.12				0.00			
v/s Ratio Perm		c0.49					c0.17				0.02	
v/c Ratio		0.86		0.37	0.17		0.78		0.06		0.10	
Uniform Delay, d1		18.0		43.1	5.2		36.7		42.0		31.0	
Progression Factor		0.18		1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2		2.4		0.8	0.1		12.7		0.1		0.1	
Delay (s)		5.6		44.0	5.3		49.3		42.1		31.1	
Level of Service		A		D	A		D		D		C	
Approach Delay (s)		5.6			10.9			46.4			31.1	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12	12
Total Lost time (s)		4.0		4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00		1.00	1.00	0.91		0.97	0.91	
Frt		1.00		0.99		0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.95		0.96		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1510		1710		1538	1719	4911		3335	4861	
Flt Permitted		0.95		0.51		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1510		913		1538	1719	4911		3335	4861	
Volume (vph)	98	19	155	57	5	41	352	2069	86	60	659	63
Peak-hour factor, PHF	0.90	0.95	0.92	0.92	0.93	0.65	0.92	0.92	0.92	0.94	0.92	0.74
Adj. Flow (vph)	109	20	168	62	5	63	383	2249	93	64	716	85
RTOR Reduction (vph)	0	136	0	0	0	51	0	4	0	0	13	0
Lane Group Flow (vph)	109	52	0	67	0	12	383	2338	0	64	788	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10									
Turn Type	Perm			custom		custom	Prot			Prot		
Protected Phases		6					7	4		3	8	
Permitted Phases	6			2		2						
Actuated Green, G (s)	17.0	17.0		18.0		18.0	29.3	58.9		7.1	38.7	
Effective Green, g (s)	19.0	19.0		19.0		19.0	28.3	60.9		8.1	40.7	
Actuated g/C Ratio	0.19	0.19		0.19		0.19	0.28	0.61		0.08	0.41	
Clearance Time (s)	6.0	6.0		5.0		5.0	3.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	287	296		173		292	486	2991		270	1978	
v/s Ratio Prot		0.03					c0.22	c0.48		0.02	0.16	
v/s Ratio Perm	0.07			c0.07		0.01						
v/c Ratio	0.38	0.18		0.39		0.04	0.79	0.78		0.24	0.40	
Uniform Delay, d1	35.4	33.9		35.4		33.1	33.1	14.6		43.1	21.0	
Progression Factor	1.00	1.00		1.00		1.00	1.02	0.41		1.19	0.87	
Incremental Delay, d2	0.8	0.3		6.4		0.3	3.5	0.9		0.4	0.6	
Delay (s)	36.2	34.2		41.8		33.3	37.4	6.9		51.7	18.8	
Level of Service	D	C		D		C	D	A		D	B	
Approach Delay (s)		34.9		37.7				11.2			21.3	
Approach LOS		C		D				B			C	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

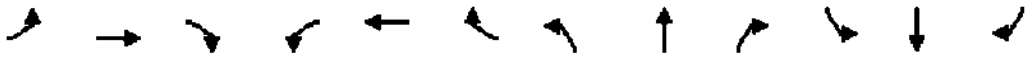
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1933		4891		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1933		4891		105	4693
Volume (vph)	84	23	2484	177	49	822
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	191	25	2700	192	53	903
RTOR Reduction (vph)	5	0	8	0	0	0
Lane Group Flow (vph)	211	0	2884	0	53	903
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)				10		10
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	14.0		63.0		74.0	74.0
Effective Green, g (s)	16.0		65.0		76.0	76.0
Actuated g/C Ratio	0.16		0.65		0.76	0.76
Clearance Time (s)	6.0		6.0		5.0	6.0
Lane Grp Cap (vph)	309		3179		193	3567
v/s Ratio Prot	c0.11		c0.59		0.02	c0.19
v/s Ratio Perm					0.19	
v/c Ratio	0.68		0.91		0.27	0.25
Uniform Delay, d1	39.6		14.9		17.5	3.6
Progression Factor	1.00		1.00		1.68	1.00
Incremental Delay, d2	11.6		4.9		3.3	0.2
Delay (s)	51.2		19.9		32.7	3.7
Level of Service	D		B		C	A
Approach Delay (s)	51.2		19.9		5.3	
Approach LOS	D		B		A	

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	60	0	421	212	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	71	0	458	230	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked						
vC, conflicting volume	688	230	230			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	688	230	230			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	91	100			
cM capacity (veh/h)	408	801	1320			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	82	458	230
Volume Left	12	0	0
Volume Right	71	0	0
cSH	703	1320	1700
Volume to Capacity	0.12	0.00	0.14
Queue Length 95th (ft)	10	0	0
Control Delay (s)	10.8	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.8	0.0	0.0
Approach LOS	B		

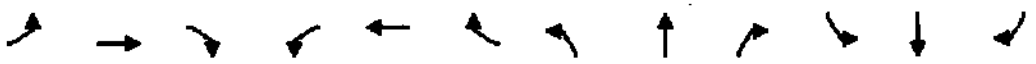
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3001							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3001							
Volume (vph)	73	792	5	86	686	327	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	890	12	109	715	394	0	0	0	0	0	0
RTOR Reduction (vph)	0	1	0	0	112	0	0	0	0	0	0	0
Lane Group Flow (vph)	88	901	0	109	997	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	8.0	42.0		8.0	42.0							
Effective Green, g (s)	9.0	43.0		9.0	43.0							
Actuated g/C Ratio	0.15	0.72		0.15	0.72							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	249	2349		241	2151							
v/s Ratio Prot	0.05	0.27		c0.07	c0.33							
v/s Ratio Perm												
v/c Ratio	0.35	0.38		0.45	0.46							
Uniform Delay, d1	22.9	3.3		23.3	3.6							
Progression Factor	0.72	0.45		1.00	1.00							
Incremental Delay, d2	3.3	0.4		6.0	0.7							
Delay (s)	19.7	1.9		29.3	4.3							
Level of Service	B	A		C	A							
Approach Delay (s)		3.5			6.6			0.0			0.0	
Approach LOS		A			A			A			A	

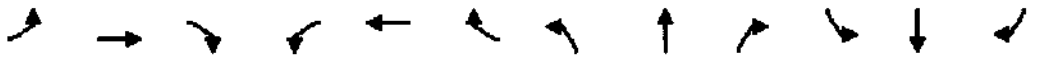
Intersection Summary			
HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3765		1719	3438						1690	
Flt Permitted		1.00		0.19	1.00						0.98	
Satd. Flow (perm)		3765		342	3438						1690	
Volume (vph)	0	805	18	18	668	0	0	0	0	65	26	50
Peak-hour factor, PHF	0.92	0.84	0.61	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	958	30	25	777	0	0	0	0	78	35	56
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	984	0	25	777	0	0	0	0	0	139	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		27.0		27.0	27.0						25.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1694		154	1547						704	
v/s Ratio Prot		c0.26			0.23							
v/s Ratio Perm				0.07							0.08	
v/c Ratio		0.58		0.16	0.50						0.20	
Uniform Delay, d1		12.3		9.8	11.7						11.1	
Progression Factor		2.08		0.79	0.83						1.00	
Incremental Delay, d2		1.0		2.1	1.1						0.6	
Delay (s)		26.5		9.8	10.8						11.8	
Level of Service		C		A	B						B	
Approach Delay (s)		26.5			10.8			0.0			11.8	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



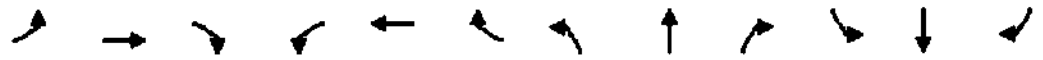
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1644	
Flt Permitted		1.00		0.17	1.00						0.98	
Satd. Flow (perm)		3296		285	3323						1644	
Volume (vph)	0	906	32	28	584	0	0	0	0	74	41	53
Peak-hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	954	55	35	635	0	0	0	0	86	73	74
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	1002	0	35	635	0	0	0	0	0	205	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		0
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		114	1329						767	
v/s Ratio Prot		c0.30			0.19							
v/s Ratio Perm				0.12							0.12	
v/c Ratio		0.76		0.31	0.48						0.27	
Uniform Delay, d1		15.5		12.3	13.4						9.8	
Progression Factor		0.18		1.44	1.33						1.00	
Incremental Delay, d2		3.7		6.1	1.1						0.9	
Delay (s)		6.4		23.8	18.8						10.6	
Level of Service		A		C	B						B	
Approach Delay (s)		6.4			19.1			0.0			10.6	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3287			1616				
Flt Permitted	0.33	1.00			1.00			0.99				
Satd. Flow (perm)	573	3074			3287			1616				
Volume (vph)	17	834	0	0	601	38	16	23	38	0	0	0
Peak-hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	37	878	0	0	668	52	34	31	57	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	36	0	0	0	0
Lane Group Flow (vph)	37	878	0	0	711	0	0	86	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	287	1537			1644			593				
v/s Ratio Prot		c0.29			0.22							
v/s Ratio Perm	0.06							0.05				
v/c Ratio	0.13	0.57			0.43			0.14				
Uniform Delay, d1	8.0	10.5			9.6			12.7				
Progression Factor	2.15	2.17			1.14			1.00				
Incremental Delay, d2	0.7	1.1			0.8			0.5				
Delay (s)	17.9	23.9			11.7			13.2				
Level of Service	B	C			B			B				
Approach Delay (s)		23.7			11.7			13.2			0.0	
Approach LOS		C			B			B			A	

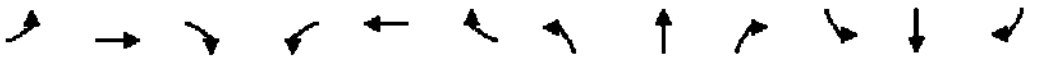
Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	692	27	26	541	47	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.87	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	805	40	41	622	54	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.93			0.80			0.84	0.84	0.80	0.84	0.84	0.93
vC, conflicting volume	676			844			1253	1618	422	1169	1611	338
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	577			560			858	1294	34	757	1285	213
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			95			100	100	100	100	100	100
cM capacity (veh/h)	905			792			195	123	820	231	124	728

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	420	442	41	415	261
Volume Left	17	0	41	0	0
Volume Right	0	40	0	0	54
cSH	905	1700	792	1700	1700
Volume to Capacity	0.02	0.26	0.05	0.24	0.15
Queue Length 95th (ft)	1	0	4	0	0
Control Delay (s)	0.6	0.0	9.8	0.0	0.0
Lane LOS	A		A		
Approach Delay (s)	0.3		0.6		
Approach LOS					

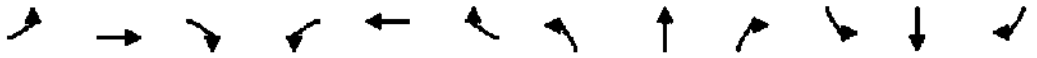
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.98			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3254		1622	3288			1699			1581	
Flt Permitted	0.95	1.00		0.95	1.00			0.84			0.83	
Satd. Flow (perm)	1719	3254		1622	3288			1447			1330	
Volume (vph)	163	619	67	21	491	29	88	326	54	57	129	105
Peak-hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	190	652	105	31	528	40	106	358	77	80	172	172
RTOR Reduction (vph)	0	21	0	0	10	0	0	10	0	0	41	0
Lane Group Flow (vph)	190	736	0	31	558	0	0	531	0	0	383	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10			10
Turn Type	Prot			Prot		Perm			Perm			
Protected Phases	7			3	8			2			6	
Permitted Phases		4					2			6		
Actuated Green, G (s)	6.0	15.0		6.0	15.0			25.0			25.0	
Effective Green, g (s)	6.0	16.0		6.0	16.0			26.0			26.0	
Actuated g/C Ratio	0.10	0.27		0.10	0.27			0.43			0.43	
Clearance Time (s)	4.0	5.0		4.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	172	868		162	877			627			576	
v/s Ratio Prot	c0.11			0.02	0.17							
v/s Ratio Perm		c0.23						c0.37			0.29	
v/c Ratio	1.10	0.85		0.19	0.64			0.85			0.67	
Uniform Delay, d1	27.0	20.8		24.8	19.4			15.2			13.5	
Progression Factor	1.00	1.00		1.37	1.21			1.00			1.00	
Incremental Delay, d2	99.4	10.1		2.4	3.3			13.3			6.0	
Delay (s)	126.4	30.9		36.4	26.9			28.5			19.5	
Level of Service	F	C		D	C			C			B	
Approach Delay (s)		50.1			27.4			28.5			19.5	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor		0.91		1.00	0.91		1.00		0.88		1.00	
Frt		1.00		1.00	1.00		1.00		0.85		0.92	
Flt Protected		1.00		0.95	1.00		0.95		1.00		0.98	
Satd. Flow (prot)		4927		1662	4940		1719		2707		1850	
Flt Permitted		1.00		0.06	1.00		0.74		1.00		0.98	
Satd. Flow (perm)		4927		111	4940		1336		2707		1850	
Volume (vph)	0	2128	39	331	700	0	78	0	448	18	0	28
Peak-hour factor, PHF	0.92	0.91	0.92	0.92	0.88	0.92	0.92	0.92	0.92	0.61	0.92	0.65
Adj. Flow (vph)	0	2338	42	360	795	0	85	0	487	30	0	43
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	16	0	34	0
Lane Group Flow (vph)	0	2378	0	360	795	0	85	0	471	0	39	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm			custom		custom	Perm		
Protected Phases					8						2	
Permitted Phases		4		8			6		6	2		
Actuated Green, G (s)		62.0		62.0	62.0		17.0		17.0		17.0	
Effective Green, g (s)		63.0		63.0	63.0		19.0		19.0		19.0	
Actuated g/C Ratio		0.70		0.70	0.70		0.21		0.21		0.21	
Clearance Time (s)		5.0		5.0	5.0		6.0		6.0		6.0	
Lane Grp Cap (vph)		3449		78	3458		282		571		391	
v/s Ratio Prot					0.16							
v/s Ratio Perm		0.48		c3.24			0.06		c0.17		0.02	
v/c Ratio		0.69		4.62	0.23		0.30		0.83		0.10	
Uniform Delay, d1		7.8		13.5	4.8		29.9		33.9		28.6	
Progression Factor		0.39		1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2		0.9		1655.9	0.2		2.7		12.8		0.5	
Delay (s)		4.0		1669.4	5.0		32.6		46.7		29.1	
Level of Service		A		F	A		C		D		C	
Approach Delay (s)		4.0			523.8			44.6			29.1	
Approach LOS		A			F			D			C	

Intersection Summary			
HCM Average Control Delay	153.6	HCM Level of Service	F
HCM Volume to Capacity ratio	3.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00		1.00	1.00	0.91		1.00	0.91	
Frt	1.00	0.87		0.95		0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	0.99		0.97		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1510	1567		1664		1538	1719	4916		1719	4819	
Flt Permitted	0.95	0.99		0.79		1.00	0.33	1.00		0.09	1.00	
Satd. Flow (perm)	1510	1567		1366		1538	593	4916		154	4819	
Volume (vph)	101	35	160	15	7	124	363	2073	66	226	533	73
Peak-hour factor, PHF	0.94	0.92	0.74	0.92	0.92	0.92	0.90	0.95	0.92	0.92	0.93	0.65
Adj. Flow (vph)	107	38	216	16	8	135	403	2182	72	246	573	112
RTOR Reduction (vph)	0	163	0	0	0	9	0	4	0	0	32	0
Lane Group Flow (vph)	107	91	0	24	0	126	403	2250	0	246	653	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10						10			10
Turn Type	Perm			custom		custom	pm+pt			Perm		
Protected Phases		6					7	4			8	
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	20.0	20.0		21.0		21.0	58.0	58.0		45.0	45.0	
Effective Green, g (s)	22.0	22.0		22.0		22.0	60.0	60.0		47.0	47.0	
Actuated g/C Ratio	0.24	0.24		0.24		0.24	0.67	0.67		0.52	0.52	
Clearance Time (s)	6.0	6.0		5.0		5.0	3.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	369	383		334		376	508	3277		80	2517	
v/s Ratio Prot		0.06					c0.08	0.46			0.14	
v/s Ratio Perm	0.07			0.02		c0.08	0.45			c1.60		
v/c Ratio	0.29	0.24		0.07		0.33	0.79	0.69		3.08	0.26	
Uniform Delay, d1	27.6	27.3		26.1		28.0	7.3	9.2		21.5	11.9	
Progression Factor	1.00	1.00		1.00		1.00	2.45	2.06		0.80	0.85	
Incremental Delay, d2	2.0	1.5		0.4		2.4	6.8	0.6		965.5	0.2	
Delay (s)	29.6	28.7		26.6		30.4	24.8	19.7		982.8	10.4	
Level of Service	C	C		C		C	C	B		F	B	
Approach Delay (s)		29.0		29.8				20.4			267.3	
Approach LOS		C		C				C			F	

Intersection Summary			
HCM Average Control Delay	77.5	HCM Level of Service	E
HCM Volume to Capacity ratio	2.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1933		4897		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1933		4897		115	4693
Volume (vph)	84	23	2456	151	49	659
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	191	25	2670	164	53	724
RTOR Reduction (vph)	5	0	8	0	0	0
Lane Group Flow (vph)	211	0	2827	0	53	724
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)				10		10
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	17.0		61.0		61.0	61.0
Effective Green, g (s)	19.0		63.0		63.0	63.0
Actuated g/C Ratio	0.21		0.70		0.70	0.70
Clearance Time (s)	6.0		6.0		6.0	6.0
Lane Grp Cap (vph)	408		3428		81	3285
v/s Ratio Prot	c0.11		c0.58			0.15
v/s Ratio Perm					0.46	
v/c Ratio	0.52		0.82		0.65	0.22
Uniform Delay, d1	31.4		9.6		7.5	4.8
Progression Factor	1.00		1.00		0.73	0.61
Incremental Delay, d2	4.6		2.4		33.4	0.1
Delay (s)	36.1		12.0		38.9	3.1
Level of Service	D		B		D	A
Approach Delay (s)	36.1		12.0			5.5
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	62	0	443	226	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	73	0	482	246	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked	0.92					
vC, conflicting volume	727	246	246			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	702	246	246			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	91	100			
cM capacity (veh/h)	366	786	1303			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	85	482	246
Volume Left	12	0	0
Volume Right	73	0	0
cSH	677	1303	1700
Volume to Capacity	0.13	0.00	0.14
Queue Length 95th (ft)	11	0	0
Control Delay (s)	11.1	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.1	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3001							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3001							
Volume (vph)	73	792	5	86	686	327	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	890	12	109	715	394	0	0	0	0	0	0
RTOR Reduction (vph)	0	1	0	0	124	0	0	0	0	0	0	0
Lane Group Flow (vph)	88	901	0	109	985	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	20.0	30.0		20.0	30.0							
Effective Green, g (s)	21.0	31.0		21.0	31.0							
Actuated g/C Ratio	0.35	0.52		0.35	0.52							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	582	1693		561	1551							
v/s Ratio Prot	0.05	0.27		c0.07	c0.33							
v/s Ratio Perm												
v/c Ratio	0.15	0.53		0.19	0.63							
Uniform Delay, d1	13.4	9.7		13.6	10.4							
Progression Factor	1.06	0.24		1.00	1.00							
Incremental Delay, d2	0.5	1.0		0.8	2.0							
Delay (s)	14.6	3.3		14.4	12.4							
Level of Service	B	A		B	B							
Approach Delay (s)		4.3			12.6			0.0			0.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↳		↰	↑↑						↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3765		1719	3438						1690	
Flt Permitted		1.00		0.19	1.00						0.98	
Satd. Flow (perm)		3765		342	3438						1690	
Volume (vph)	0	805	18	18	668	0	0	0	0	65	26	50
Peak-hour factor, PHF	0.92	0.84	0.61	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	958	30	25	777	0	0	0	0	78	35	56
RTOR Reduction (vph)	0	-4	0	0	0	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	984	0	25	777	0	0	0	0	0	139	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		27.0		27.0	27.0						25.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1694		154	1547						704	
v/s Ratio Prot		c0.26			0.23							
v/s Ratio Perm				0.07							0.08	
v/c Ratio		0.58		0.16	0.50						0.20	
Uniform Delay, d1		12.3		9.8	11.7						11.1	
Progression Factor		0.41		0.49	0.48						1.00	
Incremental Delay, d2		1.0		1.8	0.9						0.6	
Delay (s)		6.0		6.6	6.6						11.8	
Level of Service		A		A	A						B	
Approach Delay (s)		6.0			6.6			0.0			11.8	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1644	
Flt Permitted		1.00		0.17	1.00						0.98	
Satd. Flow (perm)		3296		285	3323						1644	
Volume (vph)	0	906	32	28	584	0	0	0	0	74	41	53
Peak-hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	954	55	35	635	0	0	0	0	86	73	74
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	1002	0	35	635	0	0	0	0	0	205	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		114	1329						767	
v/s Ratio Prot		c0.30			0.19							
v/s Ratio Perm				0.12							0.12	
v/c Ratio		0.76		0.31	0.48						0.27	
Uniform Delay, d1		15.5		12.3	13.4						9.8	
Progression Factor		0.26		0.55	0.55						1.00	
Incremental Delay, d2		3.7		6.1	1.1						0.9	
Delay (s)		7.7		12.9	8.4						10.6	
Level of Service		A		B	A						B	
Approach Delay (s)		7.7			8.6			0.0			10.6	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3287			1616				
Flt Permitted	0.33	1.00			1.00			0.99				
Satd. Flow (perm)	573	3074			3287			1616				
Volume (vph)	17	834	0	0	601	38	16	23	38	0	0	0
Peak-hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	37	878	0	0	668	52	34	31	57	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	36	0	0	0	0
Lane Group Flow (vph)	37	878	0	0	711	0	0	86	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	287	1537			1644			593				
v/s Ratio Prot		c0.29			0.22							
v/s Ratio Perm	0.06							0.05				
v/c Ratio	0.13	0.57			0.43			0.14				
Uniform Delay, d1	8.0	10.5			9.6			12.7				
Progression Factor	0.86	1.05			0.18			1.00				
Incremental Delay, d2	0.7	1.1			0.8			0.5				
Delay (s)	7.5	12.2			2.5			13.2				
Level of Service	A	B			A			B				
Approach Delay (s)		12.0			2.5			13.2			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↰	↑↑							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	692	27	26	541	47	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.81	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	805	40	41	622	58	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.93			0.81			0.84	0.84	0.81	0.84	0.84	0.93
vC, conflicting volume	680			844			1253	1622	422	1171	1613	340
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	581			569			865	1303	46	767	1292	215
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			95			100	100	100	100	100	100
cM capacity (veh/h)	901			791			194	122	811	226	124	726

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	420	442	41	415	265
Volume Left	17	0	41	0	0
Volume Right	0	40	0	0	58
cSH	901	1700	791	1700	1700
Volume to Capacity	0.02	0.26	0.05	0.24	0.16
Queue Length 95th (ft)	1	0	4	0	0
Control Delay (s)	0.6	0.0	9.8	0.0	0.0
Lane LOS	A		A		
Approach Delay (s)	0.3		0.6		
Approach LOS					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.98			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3254		1622	3288			1699			1581	
Flt Permitted	0.95	1.00		0.95	1.00			0.82			0.81	
Satd. Flow (perm)	1719	3254		1622	3288			1405			1285	
Volume (vph)	163	619	67	21	491	29	88	326	54	57	129	105
Peak-hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	190	652	105	31	528	40	106	358	77	80	172	172
RTOR Reduction (vph)	0	22	0	0	9	0	0	10	0	0	41	0
Lane Group Flow (vph)	190	736	0	31	559	0	0	531	0	0	383	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7			3	8			2			6	
Permitted Phases		4					2			6		
Actuated Green, G (s)	8.0	16.0		8.0	16.0			22.0			22.0	
Effective Green, g (s)	8.0	17.0		8.0	17.0			23.0			23.0	
Actuated g/C Ratio	0.13	0.28		0.13	0.28			0.38			0.38	
Clearance Time (s)	4.0	5.0		4.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	229	922		216	932			539			493	
v/s Ratio Prot	c0.11			0.02	0.17							
v/s Ratio Perm		c0.23						c0.38			0.30	
v/c Ratio	0.83	0.80		0.14	0.60			0.99			0.78	
Uniform Delay, d1	25.3	19.9		23.0	18.6			18.3			16.3	
Progression Factor	1.00	1.00		1.54	0.18			1.00			1.00	
Incremental Delay, d2	28.0	7.1		1.3	2.6			35.3			11.4	
Delay (s)	53.4	27.0		36.7	6.0			53.7			27.7	
Level of Service	D	C		D	A			D			C	
Approach Delay (s)		32.3			7.6			53.7			27.7	
Approach LOS		C			A			D			C	

Intersection Summary			
HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↱		↰↰	↑↑↑		↰		↱↱		↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor		0.91		0.97	0.91		1.00		0.88		1.00	
Frt		1.00		1.00	1.00		1.00		0.85		0.92	
Flt Protected		1.00		0.95	1.00		0.95		1.00		0.98	
Satd. Flow (prot)		4927		3224	4940		1719		2707		1850	
Flt Permitted		1.00		0.95	1.00		0.70		1.00		0.98	
Satd. Flow (perm)		4927		3224	4940		1274		2707		1850	
Volume (vph)	0	2128	39	331	700	0	78	0	448	18	0	28
Peak-hour factor, PHF	0.92	0.91	0.92	0.92	0.88	0.92	0.92	0.92	0.92	0.61	0.92	0.65
Adj. Flow (vph)	0	2338	42	360	795	0	85	0	487	30	0	43
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	199	0	38	0
Lane Group Flow (vph)	0	2378	0	360	795	0	85	0	288	0	35	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)										10		10
Turn Type				Prot			D.Pm		Over	Perm		
Protected Phases				3	8				3		2	
Permitted Phases		4					2			2		
Actuated Green, G (s)		59.2		15.0	79.2		9.8		15.0		9.8	
Effective Green, g (s)		60.2		16.0	80.2		11.8		16.0		11.8	
Actuated g/C Ratio		0.60		0.16	0.80		0.12		0.16		0.12	
Clearance Time (s)		5.0		5.0	5.0		6.0		5.0		6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)		2966		516	3962		150		433		218	
v/s Ratio Prot				c0.11	0.16				0.11			
v/s Ratio Perm		c0.48					c0.07				0.02	
v/c Ratio		0.80		0.70	0.20		0.57		0.66		0.16	
Uniform Delay, d1		15.3		39.7	2.3		41.7		39.5		39.6	
Progression Factor		0.20		1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2		1.6		4.1	0.1		4.8		3.8		0.3	
Delay (s)		4.7		43.8	2.5		46.5		43.3		40.0	
Level of Service		A		D	A		D		D		D	
Approach Delay (s)		4.7			15.3			43.8			40.0	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00		1.00	1.00	0.91		0.97	0.91	
Frt	1.00	0.88		0.95		0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	0.99		0.97		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1510	1572		1664		1538	1719	4917		3335	4832	
Flt Permitted	0.95	0.99		0.56		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1510	1572		969		1538	1719	4917		3335	4832	
Volume (vph)	101	35	160	15	7	124	363	2073	66	226	533	73
Peak-hour factor, PHF	0.90	0.95	0.92	0.92	0.93	0.65	0.92	0.92	0.92	0.94	0.92	0.74
Adj. Flow (vph)	112	37	174	16	8	191	395	2253	72	240	579	99
RTOR Reduction (vph)	0	150	0	0	0	148	0	3	0	0	20	0
Lane Group Flow (vph)	112	61	0	24	0	43	395	2322	0	240	658	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10									
Turn Type	Perm			custom		custom	Prot			Prot		
Protected Phases		6					7	4		3	8	
Permitted Phases	6			2		2						
Actuated Green, G (s)	11.6	11.6		12.6		12.6	30.3	61.1		10.3	43.1	
Effective Green, g (s)	13.6	13.6		13.6		13.6	29.3	63.1		11.3	45.1	
Actuated g/C Ratio	0.14	0.14		0.14		0.14	0.29	0.63		0.11	0.45	
Clearance Time (s)	6.0	6.0		5.0		5.0	3.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	205	214		132		209	504	3103		377	2179	
v/s Ratio Prot		0.04					c0.23	c0.47		0.07	0.14	
v/s Ratio Perm	c0.07			0.02		0.03						
v/c Ratio	0.55	0.28		0.18		0.21	0.78	0.75		0.64	0.30	
Uniform Delay, d1	40.3	38.8		38.3		38.4	32.4	12.9		42.4	17.4	
Progression Factor	1.00	1.00		1.00		1.00	1.05	0.42		1.10	0.91	
Incremental Delay, d2	3.0	0.7		0.7		0.5	4.0	0.9		3.4	0.4	
Delay (s)	43.3	39.6		38.9		38.9	38.1	6.3		49.9	16.2	
Level of Service	D	D		D		D	D	A		D	B	
Approach Delay (s)		40.8		38.9				10.9			25.0	
Approach LOS		D		D				B			C	

Intersection Summary			
HCM Average Control Delay	17.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1933		4897		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1933		4897		103	4693
Volume (vph)	84	23	2456	151	49	659
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	191	25	2670	164	53	724
RTOR Reduction (vph)	5	0	6	0	0	0
Lane Group Flow (vph)	211	0	2828	0	53	724
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)				10		10
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	13.2		64.3		74.8	74.8
Effective Green, g (s)	15.2		66.3		76.8	76.8
Actuated g/C Ratio	0.15		0.66		0.77	0.77
Clearance Time (s)	6.0		6.0		5.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	294		3247		184	3604
v/s Ratio Prot	c0.11		c0.58		c0.02	0.15
v/s Ratio Perm					0.20	
v/c Ratio	0.72		0.87		0.29	0.20
Uniform Delay, d1	40.4		13.4		15.6	3.2
Progression Factor	1.00		1.00		0.74	1.35
Incremental Delay, d2	8.1		3.5		0.8	0.1
Delay (s)	48.5		17.0		12.4	4.4
Level of Service	D		B		B	A
Approach Delay (s)	48.5		17.0			5.0
Approach LOS	D		B			A

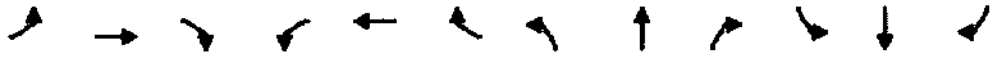
Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	62	0	443	226	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	73	0	482	246	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked						
vC, conflicting volume	727	246	246			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	727	246	246			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	91	100			
cM capacity (veh/h)	386	786	1303			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	85	482	246
Volume Left	12	0	0
Volume Right	73	0	0
cSH	686	1303	1700
Volume to Capacity	0.12	0.00	0.14
Queue Length 95th (ft)	11	0	0
Control Delay (s)	11.0	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.0	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

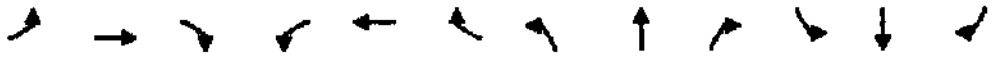


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3002							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3002							
Volume (vph)	81	875	6	95	758	361	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	983	14	120	790	435	0	0	0	0	0	0
RTOR Reduction (vph)	0	2	0	0	123	0	0	0	0	0	0	0
Lane Group Flow (vph)	98	995	0	120	1102	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			0			0				0		0
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	8.0	42.0		8.0	42.0							
Effective Green, g (s)	9.0	43.0		9.0	43.0							
Actuated g/C Ratio	0.15	0.72		0.15	0.72							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	249	2349		241	2151							
v/s Ratio Prot	0.06	0.30		c0.07	c0.37							
v/s Ratio Perm												
v/c Ratio	0.39	0.42		0.50	0.51							
Uniform Delay, d1	23.0	3.5		23.4	3.8							
Progression Factor	0.70	0.49		1.00	1.00							
Incremental Delay, d2	3.7	0.4		7.2	0.9							
Delay (s)	19.7	2.2		30.6	4.7							
Level of Service	B	A		C	A							
Approach Delay (s)		3.7			7.0			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3765		1719	3438						1689	
Flt Permitted		1.00		0.15	1.00						0.98	
Satd. Flow (perm)		3765		273	3438						1689	
Volume (vph)	0	889	20	20	738	0	0	0	0	72	28	56
Peak-hour factor, PHF	0.92	0.84	0.61	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	1058	33	28	858	0	0	0	0	87	37	62
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	1087	0	28	858	0	0	0	0	0	156	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		27.0		27.0	27.0						25.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1694		123	1547						704	
v/s Ratio Prot		c0.29			0.25							
v/s Ratio Perm				0.10							0.09	
v/c Ratio		0.64		0.23	0.55						0.22	
Uniform Delay, d1		12.8		10.1	12.1						11.2	
Progression Factor		2.01		0.79	0.83						1.00	
Incremental Delay, d2		1.1		3.8	1.3						0.7	
Delay (s)		26.8		11.8	11.3						12.0	
Level of Service		C		B	B						B	
Approach Delay (s)		26.8			11.3			0.0			12.0	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

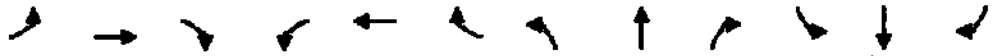
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1644	
Flt Permitted		1.00		0.17	1.00						0.98	
Satd. Flow (perm)		3296		285	3323						1644	
Volume (vph)	0	1001	36	31	645	0	0	0	0	82	45	58
Peak-hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	1054	62	38	701	0	0	0	0	95	80	81
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	1109	0	38	701	0	0	0	0	0	228	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		114	1329						767	
v/s Ratio Prot		c0.34			0.21							
v/s Ratio Perm				0.13							0.14	
v/c Ratio		0.84		0.33	0.53						0.30	
Uniform Delay, d1		16.3		12.5	13.7						9.9	
Progression Factor		0.22		1.48	1.40						1.00	
Incremental Delay, d2		5.6		6.6	1.3						1.0	
Delay (s)		9.2		25.0	20.4						10.9	
Level of Service		A		C	C						B	
Approach Delay (s)		9.2			20.7			0.0			10.9	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3288			1617				
Flt Permitted	0.29	1.00			1.00			0.99				
Satd. Flow (perm)	511	3074			3288			1617				
Volume (vph)	19	921	0	0	664	41	18	25	41	0	0	0
Peak-hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	41	969	0	0	738	56	38	33	61	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	39	0	0	0	0
Lane Group Flow (vph)	41	969	0	0	785	0	0	93	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	256	1537			1644			593				
v/s Ratio Prot		c0.32			0.24							
v/s Ratio Perm	0.08							0.06				
v/c Ratio	0.16	0.63			0.48			0.16				
Uniform Delay, d1	8.2	11.0			9.9			12.8				
Progression Factor	2.14	2.13			1.02			1.00				
Incremental Delay, d2	0.8	1.2			0.9			0.6				
Delay (s)	18.3	24.6			10.9			13.3				
Level of Service	B	C			B			B				
Approach Delay (s)		24.3			10.9			13.3			0.0	
Approach LOS		C			B			B			A	

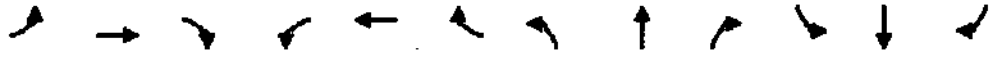
Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	12	764	30	28	598	52	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.81	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	19	888	44	44	687	64	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.90			0.77			0.82	0.82	0.77	0.82	0.82	0.90
vC, conflicting volume	752			932			1381	1789	466	1291	1779	376
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	620			618			897	1395	14	787	1383	205
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			94			100	100	100	100	100	100
cM capacity (veh/h)	847			725			177	103	813	213	105	717

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	463	488	44	458	293
Volume Left	19	0	44	0	0
Volume Right	0	44	0	0	64
cSH	847	1700	725	1700	1700
Volume to Capacity	0.02	0.29	0.06	0.27	0.17
Queue Length 95th (ft)	2	0	5	0	0
Control Delay (s)	0.7	0.0	10.3	0.0	0.0
Lane LOS	A		B		
Approach Delay (s)	0.3		0.6		
Approach LOS					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3256		1622	3289			1699			1581	
Flt Permitted	0.95	1.00		0.95	1.00			0.82			0.80	
Satd. Flow (perm)	1719	3256		1622	3289			1413			1284	
Volume (vph)	180	683	72	24	542	32	95	358	59	63	140	116
Peak-hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	209	719	112	35	583	44	114	393	84	89	187	190
RTOR Reduction (vph)	0	21	0	0	10	0	0	10	0	0	41	0
Lane Group Flow (vph)	209	810	0	35	617	0	0	581	0	0	425	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10			10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7			3	8			2			6	
Permitted Phases		4					2			6		
Actuated Green, G (s)	6.0	15.0		6.0	15.0			25.0			25.0	
Effective Green, g (s)	6.0	16.0		6.0	16.0			26.0			26.0	
Actuated g/C Ratio	0.10	0.27		0.10	0.27			0.43			0.43	
Clearance Time (s)	4.0	5.0		4.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	172	868		162	877			612			556	
v/s Ratio Prot	c0.12			0.02	0.19							
v/s Ratio Perm		c0.25						c0.41			0.33	
v/c Ratio	1.22	0.93		0.22	0.70			0.95			0.76	
Uniform Delay, d1	27.0	21.5		24.8	19.9			16.4			14.4	
Progression Factor	1.00	1.00		1.33	1.26			1.00			1.00	
Incremental Delay, d2	138.2	18.2		2.8	4.3			25.8			9.6	
Delay (s)	165.2	39.6		35.8	29.3			42.1			24.0	
Level of Service	F	D		D	C			D			C	
Approach Delay (s)		64.9			29.6			42.1			24.0	
Approach LOS		E			C			D			C	

Intersection Summary			
HCM Average Control Delay	44.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↰	↑↑↑			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		0.91		1.00	0.91			1.00			1.00	
Frt		1.00		1.00	1.00			0.89			0.91	
Flt Protected		1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)		4928		1662	4940			1590			1832	
Flt Permitted		1.00		0.06	1.00			0.94			0.63	
Satd. Flow (perm)		4928		111	4940			1509			1167	
Volume (vph)	0	2349	39	331	747	0	78	0	448	20	0	31
Peak-hour factor, PHF	0.92	0.91	0.92	0.92	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.65
Adj. Flow (vph)	0	2581	42	360	849	0	85	0	487	22	0	48
RTOR Reduction (vph)	0	2	0	0	0	0	0	6	0	0	38	0
Lane Group Flow (vph)	0	2621	0	360	849	0	0	566	0	0	32	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)										10		10
Turn Type				Perm			Perm			Perm		
Protected Phases					8			2			2	
Permitted Phases		4		8			2			2		
Actuated Green, G (s)		62.0		62.0	62.0			17.0			17.0	
Effective Green, g (s)		63.0		63.0	63.0			19.0			19.0	
Actuated g/C Ratio		0.70		0.70	0.70			0.21			0.21	
Clearance Time (s)		5.0		5.0	5.0			6.0			6.0	
Lane Grp Cap (vph)		3450		78	3458			319			246	
v/s Ratio Prot					0.17							
v/s Ratio Perm		0.53		c3.24				c0.38			0.03	
v/c Ratio		0.76		4.62	0.25			1.78			0.13	
Uniform Delay, d1		8.7		13.5	4.9			35.5			28.8	
Progression Factor		0.38		1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.1		1655.9	0.2			361.6			1.1	
Delay (s)		4.4		1669.4	5.1			397.1			29.9	
Level of Service		A		F	A			F			C	
Approach Delay (s)		4.4			500.6			397.1			29.9	
Approach LOS		A			F			F			C	

Intersection Summary			
HCM Average Control Delay	189.1	HCM Level of Service	F
HCM Volume to Capacity ratio	3.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	108.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00		1.00	1.00	0.91		1.00	0.91	
Frt	1.00	0.87		0.95		0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	0.99		0.97		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1510	1565		1664		1538	1719	4918		1719	4820	
Flt Permitted	0.95	0.99		0.79		1.00	0.30	1.00		0.09	1.00	
Satd. Flow (perm)	1510	1565		1354		1538	550	4918		154	4820	
Volume (vph)	111	35	176	15	7	124	400	2284	66	226	579	78
Peak-hour factor, PHF	0.94	0.92	0.74	0.92	0.92	0.92	0.90	0.95	0.92	0.92	0.93	0.65
Adj. Flow (vph)	118	38	238	16	8	135	444	2404	72	246	623	120
RTOR Reduction (vph)	0	180	0	0	0	6	0	3	0	0	32	0
Lane Group Flow (vph)	118	96	0	24	0	129	444	2473	0	246	711	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10									
Turn Type	Perm			custom		custom	pm+pt			Perm		
Protected Phases		6					7	4			8	
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	20.0	20.0		21.0		21.0	58.0	58.0		45.0	45.0	
Effective Green, g (s)	22.0	22.0		22.0		22.0	60.0	60.0		47.0	47.0	
Actuated g/C Ratio	0.24	0.24		0.24		0.24	0.67	0.67		0.52	0.52	
Clearance Time (s)	6.0	6.0		5.0		5.0	3.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	369	383		331		376	484	3279		80	2517	
v/s Ratio Prot		0.06					c0.09	0.50			0.15	
v/s Ratio Perm	0.08			0.02		c0.08	0.52			c1.60		
v/c Ratio	0.32	0.25		0.07		0.34	0.92	0.75		3.08	0.28	
Uniform Delay, d1	27.9	27.4		26.2		28.0	9.1	10.1		21.5	12.1	
Progression Factor	1.00	1.00		1.00		1.00	2.46	1.98		0.77	0.84	
Incremental Delay, d2	2.3	1.6		0.4		2.5	12.8	0.7		964.2	0.3	
Delay (s)	30.1	28.9		26.6		30.5	35.1	20.6		980.9	10.4	
Level of Service	C	C		C		C	D	C		F	B	
Approach Delay (s)		29.3		29.9				22.8			251.8	
Approach LOS		C		C				C			F	

Intersection Summary			
HCM Average Control Delay	74.4	HCM Level of Service	E
HCM Volume to Capacity ratio	2.05		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1934		4901		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1934		4901		115	4693
Volume (vph)	86	23	2704	151	49	721
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	195	25	2939	164	53	792
RTOR Reduction (vph)	2	0	7	0	0	0
Lane Group Flow (vph)	218	0	3096	0	53	792
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)				10		10
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	17.0		61.0		61.0	61.0
Effective Green, g (s)	19.0		63.0		63.0	63.0
Actuated g/C Ratio	0.21		0.70		0.70	0.70
Clearance Time (s)	6.0		6.0		6.0	6.0
Lane Grp Cap (vph)	408		3431		81	3285
v/s Ratio Prot	c0.11		c0.63			0.17
v/s Ratio Perm					0.46	
v/c Ratio	0.53		0.90		0.65	0.24
Uniform Delay, d1	31.6		11.0		7.5	4.9
Progression Factor	1.00		1.00		0.68	0.58
Incremental Delay, d2	4.9		4.4		33.2	0.2
Delay (s)	36.5		15.4		38.2	3.0
Level of Service	D		B		D	A
Approach Delay (s)	36.5		15.4			5.2
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	6	69	0	486	246	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	81	0	528	267	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked	0.90					
vC, conflicting volume	796	267	267			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	773	267	267			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	89	100			
cM capacity (veh/h)	327	764	1279			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	95	528	267
Volume Left	14	0	0
Volume Right	81	0	0
cSH	636	1279	1700
Volume to Capacity	0.15	0.00	0.16
Queue Length 95th (ft)	13	0	0
Control Delay (s)	11.7	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.7	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	13	10	10	13	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frt	1.00	1.00		1.00	0.95							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1662	3277		1604	3002							
Flt Permitted	0.95	1.00		0.95	1.00							
Satd. Flow (perm)	1662	3277		1604	3002							
Volume (vph)	81	875	6	95	758	361	0	0	0	0	0	0
Peak-hour factor, PHF	0.83	0.89	0.42	0.79	0.96	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	983	14	120	790	435	0	0	0	0	0	0
RTOR Reduction (vph)	0	2	0	0	124	0	0	0	0	0	0	0
Lane Group Flow (vph)	98	995	0	120	1101	0	0	0	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Parking (#/hr)			0			0				0		0
Turn Type	Prot			Prot								
Protected Phases	7	4		3	8							
Permitted Phases												
Actuated Green, G (s)	18.0	32.0		18.0	32.0							
Effective Green, g (s)	19.0	33.0		19.0	33.0							
Actuated g/C Ratio	0.32	0.55		0.32	0.55							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Lane Grp Cap (vph)	526	1802		508	1651							
v/s Ratio Prot	0.06	0.30		c0.07	c0.37							
v/s Ratio Perm												
v/c Ratio	0.19	0.55		0.24	0.67							
Uniform Delay, d1	14.9	8.7		15.1	9.6							
Progression Factor	1.04	0.24		1.00	1.00							
Incremental Delay, d2	0.6	1.0		1.1	2.2							
Delay (s)	16.1	3.1		16.2	11.7							
Level of Service	B	A		B	B							
Approach Delay (s)		4.2			12.1			0.0			0.0	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	8.6	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	45.8%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↕		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	15	15	12	12	12	11	11	11	12	12	12
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		1.00		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3765		1719	3438						1689	
Flt Permitted		1.00		0.15	1.00						0.98	
Satd. Flow (perm)		3765		273	3438						1689	
Volume (vph)	0	889	20	20	738	0	0	0	0	72	28	56
Peak-hour factor, PHF	0.92	0.84	0.61	0.71	0.86	0.92	0.92	0.92	0.92	0.83	0.75	0.90
Adj. Flow (vph)	0	1058	33	28	858	0	0	0	0	87	37	62
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	30	0
Lane Group Flow (vph)	0	1087	0	28	858	0	0	0	0	0	156	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						2	
Permitted Phases				8						2		
Actuated Green, G (s)		27.0		27.0	27.0						25.0	
Effective Green, g (s)		27.0		27.0	27.0						25.0	
Actuated g/C Ratio		0.45		0.45	0.45						0.42	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1694		123	1547						704	
v/s Ratio Prot		c0.29			0.25							
v/s Ratio Perm				0.10							0.09	
v/c Ratio		0.64		0.23	0.55						0.22	
Uniform Delay, d1		12.8		10.1	12.1						11.2	
Progression Factor		0.43		0.54	0.53						1.00	
Incremental Delay, d2		1.1		3.4	1.1						0.7	
Delay (s)		6.5		8.8	7.5						12.0	
Level of Service		A		A	A						B	
Approach Delay (s)		6.5			7.6			0.0			12.0	
Approach LOS		A			A			A			B	

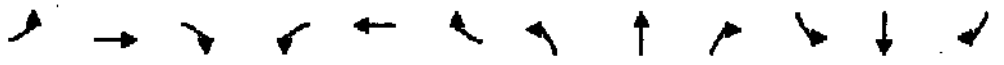
Intersection Summary				
HCM Average Control Delay	7.4	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.44			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	52.7%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱		↰	↑↑						↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	11	12	12	12	12	11	11	11
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		3296		1622	3323						1644	
Flt Permitted		1.00		0.17	1.00						0.98	
Satd. Flow (perm)		3296		285	3323						1644	
Volume (vph)	0	1001	36	31	645	0	0	0	0	82	45	58
Peak-hour factor, PHF	0.92	0.95	0.58	0.81	0.92	0.92	0.92	0.92	0.92	0.86	0.56	0.72
Adj. Flow (vph)	0	1054	62	38	701	0	0	0	0	95	80	81
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	1109	0	38	701	0	0	0	0	0	228	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10				10		10
Turn Type				Perm						Perm		
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		24.0		24.0	24.0						28.0	
Effective Green, g (s)		24.0		24.0	24.0						28.0	
Actuated g/C Ratio		0.40		0.40	0.40						0.47	
Clearance Time (s)		4.0		4.0	4.0						4.0	
Lane Grp Cap (vph)		1318		114	1329						767	
v/s Ratio Prot		c0.34			0.21							
v/s Ratio Perm				0.13							0.14	
v/c Ratio		0.84		0.33	0.53						0.30	
Uniform Delay, d1		16.3		12.5	13.7						9.9	
Progression Factor		0.30		0.56	0.56						1.00	
Incremental Delay, d2		5.6		6.6	1.3						1.0	
Delay (s)		10.6		13.5	8.9						10.9	
Level of Service		B		B	A						B	
Approach Delay (s)		10.6			9.2			0.0			10.9	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			0.99			0.94				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1662	3074			3288			1617				
Flt Permitted	0.29	1.00			1.00			0.99				
Satd. Flow (perm)	511	3074			3288			1617				
Volume (vph)	19	921	0	0	664	41	18	25	41	0	0	0
Peak-hour factor, PHF	0.46	0.95	0.92	0.92	0.90	0.73	0.47	0.75	0.67	0.92	0.92	0.92
Adj. Flow (vph)	41	969	0	0	738	56	38	33	61	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	39	0	0	0	0
Lane Group Flow (vph)	41	969	0	0	785	0	0	93	0	0	0	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)		10				10	10		10			
Turn Type	Perm						Perm					
Protected Phases		4			8			2				
Permitted Phases	4						2					
Actuated Green, G (s)	30.0	30.0			30.0			22.0				
Effective Green, g (s)	30.0	30.0			30.0			22.0				
Actuated g/C Ratio	0.50	0.50			0.50			0.37				
Clearance Time (s)	4.0	4.0			4.0			4.0				
Lane Grp Cap (vph)	256	1537			1644			593				
v/s Ratio Prot		c0.32			0.24							
v/s Ratio Perm	0.08							0.06				
v/c Ratio	0.16	0.63			0.48			0.16				
Uniform Delay, d1	8.2	11.0			9.9			12.8				
Progression Factor	1.50	1.53			0.20			1.00				
Incremental Delay, d2	1.2	1.7			0.9			0.6				
Delay (s)	13.4	18.5			2.9			13.3				
Level of Service	B	B			A			B				
Approach Delay (s)		18.3			2.9			13.3			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↳		↰	↑↑↳							
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	12	764	30	28	598	52	0	0	0	0	0	0
Peak Hour Factor	0.63	0.86	0.68	0.63	0.87	0.81	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	19	888	44	44	687	64	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		191			542							
pX, platoon unblocked	0.90			0.84			0.88	0.88	0.84	0.88	0.88	0.90
vC, conflicting volume	752			932			1381	1789	466	1291	1779	376
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	620			722			976	1438	163	873	1427	205
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.6	4.0	3.4
p0 queue free %	98			94			100	100	100	100	100	100
cM capacity (veh/h)	847			715			166	104	704	198	106	717

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3
Volume Total	463	488	44	458	293
Volume Left	19	0	44	0	0
Volume Right	0	44	0	0	64
cSH	847	1700	715	1700	1700
Volume to Capacity	0.02	0.29	0.06	0.27	0.17
Queue Length 95th (ft)	2	0	5	0	0
Control Delay (s)	0.7	0.0	10.4	0.0	0.0
Lane LOS	A		B		
Approach Delay (s)	0.3		0.6		
Approach LOS					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.98			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1719	3256		1622	3289			1699			1581	
Flt Permitted	0.95	1.00		0.34	1.00			0.82			0.80	
Satd. Flow (perm)	1719	3256		578	3289			1399			1269	
Volume (vph)	180	683	72	24	542	32	95	358	59	63	140	116
Peak-hour factor, PHF	0.86	0.95	0.64	0.68	0.93	0.72	0.83	0.91	0.70	0.71	0.75	0.61
Adj. Flow (vph)	209	719	112	35	583	44	114	393	84	89	187	190
RTOR Reduction (vph)	0	21	0	0	9	0	0	10	0	0	41	0
Lane Group Flow (vph)	209	810	0	35	618	0	0	581	0	0	425	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	6	0	0	0	0	0	0	0	0
Parking (#/hr)			10			10			10			10
Turn Type	Prot			Perm			Perm			Perm		
Protected Phases	7				8			2			6	
Permitted Phases		4		8			2			6		
Actuated Green, G (s)	9.0	26.0		13.0	13.0			24.0			24.0	
Effective Green, g (s)	9.0	27.0		14.0	14.0			25.0			25.0	
Actuated g/C Ratio	0.15	0.45		0.23	0.23			0.42			0.42	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	258	1465		135	767			583			529	
v/s Ratio Prot	c0.12				c0.19							
v/s Ratio Perm		0.25		0.06				c0.42			0.33	
v/c Ratio	0.81	0.55		0.26	0.81			1.00			0.80	
Uniform Delay, d1	24.7	12.1		18.8	21.7			17.5			15.3	
Progression Factor	1.00	1.00		0.25	0.28			1.00			1.00	
Incremental Delay, d2	23.4	1.5		4.2	8.1			36.5			12.2	
Delay (s)	48.0	13.6		8.8	14.2			53.9			27.5	
Level of Service	D	B		A	B			D			C	
Approach Delay (s)		20.5			13.9			53.9			27.5	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM Average Control Delay	27.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↳		↰↰	↑↑↑		↰		↱↱		↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	13	11	12	12	12	12	12	16	16	16
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor		0.91		0.97	0.91		1.00		0.88		1.00	
Frt		1.00		1.00	1.00		1.00		0.85		0.91	
Flt Protected		1.00		0.95	1.00		0.95		1.00		0.98	
Satd. Flow (prot)		4928		3224	4940		1719		2707		1832	
Flt Permitted		1.00		0.95	1.00		0.70		1.00		0.98	
Satd. Flow (perm)		4928		3224	4940		1269		2707		1832	
Volume (vph)	0	2349	39	331	747	0	78	0	448	20	0	31
Peak-hour factor, PHF	0.92	0.91	0.92	0.92	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.65
Adj. Flow (vph)	0	2581	42	360	849	0	85	0	487	22	0	48
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	213	0	43	0
Lane Group Flow (vph)	0	2621	0	360	849	0	85	0	274	0	27	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)										10		10
Turn Type				Prot			D.Pm		Over	Perm		
Protected Phases				3	8				3		2	
Permitted Phases		4					2			2		
Actuated Green, G (s)		60.5		15.0	80.5		8.5		15.0		8.5	
Effective Green, g (s)		61.5		16.0	81.5		10.5		16.0		10.5	
Actuated g/C Ratio		0.62		0.16	0.82		0.10		0.16		0.10	
Clearance Time (s)		5.0		5.0	5.0		6.0		5.0		6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)		3031		516	4026		133		433		192	
v/s Ratio Prot				c0.11	0.17				0.10			
v/s Ratio Perm		c0.53					c0.07				0.01	
v/c Ratio		0.86		0.70	0.21		0.64		0.63		0.14	
Uniform Delay, d1		15.8		39.7	2.1		42.9		39.2		40.7	
Progression Factor		0.20		1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2		2.3		4.1	0.1		9.7		3.0		0.3	
Delay (s)		5.4		43.8	2.2		52.6		42.2		41.0	
Level of Service		A		D	A		D		D		D	
Approach Delay (s)		5.4			14.6			43.8			41.0	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	13	12	15	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00		1.00	1.00	0.91		0.97	0.91	
Frt	1.00	0.87		0.95		0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	0.99		0.97		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1510	1565		1664		1538	1719	4918		3335	4820	
Flt Permitted	0.95	0.99		0.37		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1510	1565		640		1538	1719	4918		3335	4820	
Volume (vph)	111	35	176	15	7	124	400	2284	66	226	579	78
Peak-hour factor, PHF	0.94	0.92	0.74	0.92	0.92	0.92	0.90	0.95	0.92	0.92	0.93	0.65
Adj. Flow (vph)	118	38	238	16	8	135	444	2404	72	246	623	120
RTOR Reduction (vph)	0	205	0	0	0	116	0	3	0	0	25	0
Lane Group Flow (vph)	118	71	0	24	0	19	444	2473	0	246	718	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Parking (#/hr)	10		10									
Turn Type	Perm			custom		custom	Prot			Prot		
Protected Phases		6					7	4		3	8	
Permitted Phases	6			2		2						
Actuated Green, G (s)	11.9	11.9		12.9		12.9	33.2	60.8		10.3	39.9	
Effective Green, g (s)	13.9	13.9		13.9		13.9	32.2	62.8		11.3	41.9	
Actuated g/C Ratio	0.14	0.14		0.14		0.14	0.32	0.63		0.11	0.42	
Clearance Time (s)	6.0	6.0		5.0		5.0	3.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	210	218		89		214	554	3089		377	2020	
v/s Ratio Prot		0.05					c0.26	c0.50		0.07	0.15	
v/s Ratio Perm	c0.08			0.04		0.01						
v/c Ratio	0.56	0.33		0.27		0.09	0.80	0.80		0.65	0.36	
Uniform Delay, d1	40.2	38.8		38.5		37.5	31.0	13.9		42.5	19.8	
Progression Factor	1.00	1.00		1.00		1.00	1.09	0.30		1.09	0.93	
Incremental Delay, d2	3.4	0.9		1.6		0.2	2.2	0.6		4.0	0.5	
Delay (s)	43.6	39.7		40.1		37.7	36.1	4.8		50.1	18.9	
Level of Service	D	D		D		D	D	A		D	B	
Approach Delay (s)		40.9		38.1				9.6			26.7	
Approach LOS		D		D				A			C	

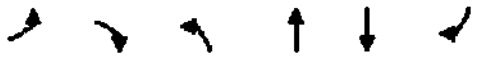
Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.91		1.00	0.91
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1934		4901		1719	4693
Flt Permitted	0.96		1.00		0.06	1.00
Satd. Flow (perm)	1934		4901		106	4693
Volume (vph)	86	23	2704	151	49	721
Peak-hour factor, PHF	0.44	0.92	0.92	0.92	0.92	0.91
Adj. Flow (vph)	195	25	2939	164	53	792
RTOR Reduction (vph)	4	0	6	0	0	0
Lane Group Flow (vph)	216	0	3097	0	53	792
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Parking (#/hr)				10		10
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	14.0		62.0		74.0	74.0
Effective Green, g (s)	16.0		64.0		76.0	76.0
Actuated g/C Ratio	0.16		0.64		0.76	0.76
Clearance Time (s)	6.0		6.0		5.0	6.0
Lane Grp Cap (vph)	309		3137		210	3567
v/s Ratio Prot	c0.11		c0.63		0.02	c0.17
v/s Ratio Perm					0.17	
v/c Ratio	0.70		0.99		0.25	0.22
Uniform Delay, d1	39.7		17.6		22.9	3.5
Progression Factor	1.00		1.00		1.90	1.04
Incremental Delay, d2	12.4		13.3		2.6	0.1
Delay (s)	52.1		30.9		46.1	3.7
Level of Service	D		C		D	A
Approach Delay (s)	52.1		30.9			6.4
Approach LOS	D		C			A

Intersection Summary			
HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	6	69	0	486	246	0
Peak Hour Factor	0.42	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	81	0	528	267	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				318	1152	
pX, platoon unblocked						
vC, conflicting volume	796	267	267			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	796	267	267			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	89	100			
cM capacity (veh/h)	352	764	1279			

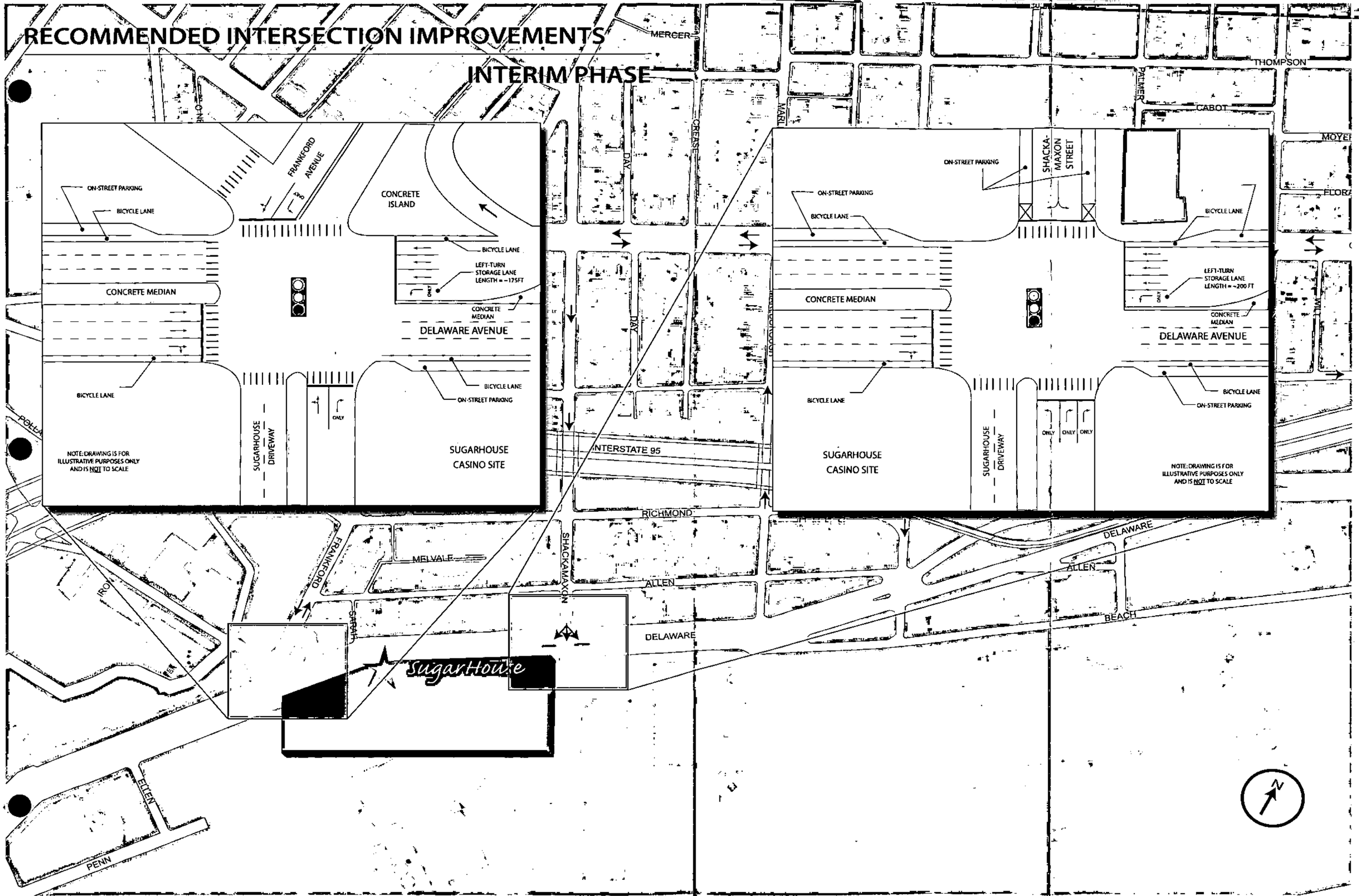
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	95	528	267
Volume Left	14	0	0
Volume Right	81	0	0
cSH	650	1279	1700
Volume to Capacity	0.15	0.00	0.16
Queue Length 95th (ft)	13	0	0
Control Delay (s)	11.5	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.5	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

H

RECOMMENDED INTERSECTION IMPROVEMENTS

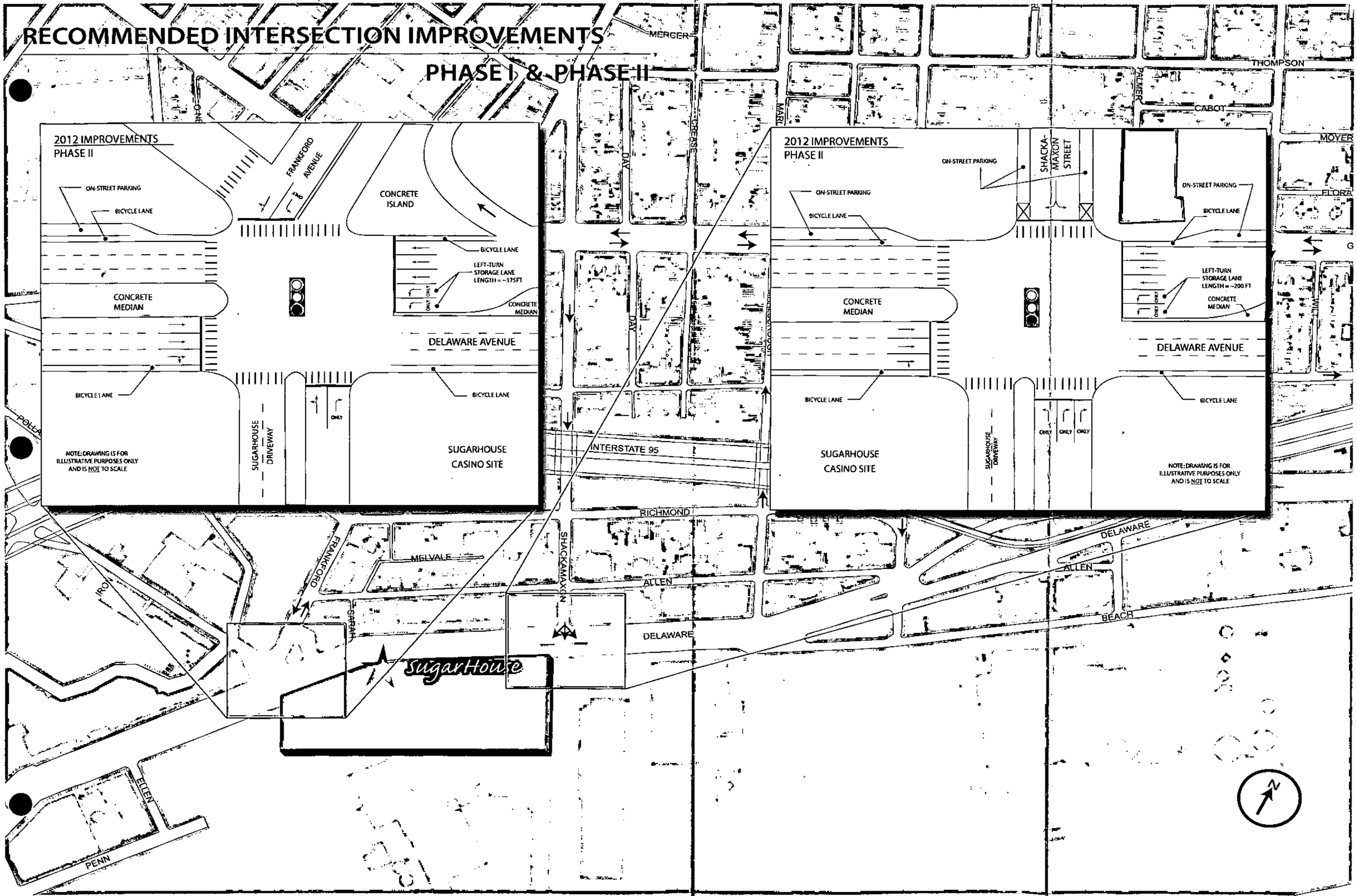
INTERIM PHASE



RECOMMENDED INTERSECTION IMPROVEMENTS
INTERIM PHASE

RECOMMENDED INTERSECTION IMPROVEMENTS

PHASE I & PHASE II



RECOMMENDED TRAFFIC IMPROVEMENTS
PROPOSED SUGARHOUSE CASINO SITE

GOAL: Mitigate traffic on residential streets

RECOMMENDATION:
No Direct Entry to Casino from Shackamaxon Street

No Through Movements

RECOMMENDATION:
Traffic Calming Measures on Columbia Avenue

Ped-friendly crosswalks

Curb bump-outs

Speed Bumps

RECOMMENDATION:
Close Access to Delaware Avenue from Montgomery Avenue

Convert to two-way traffic

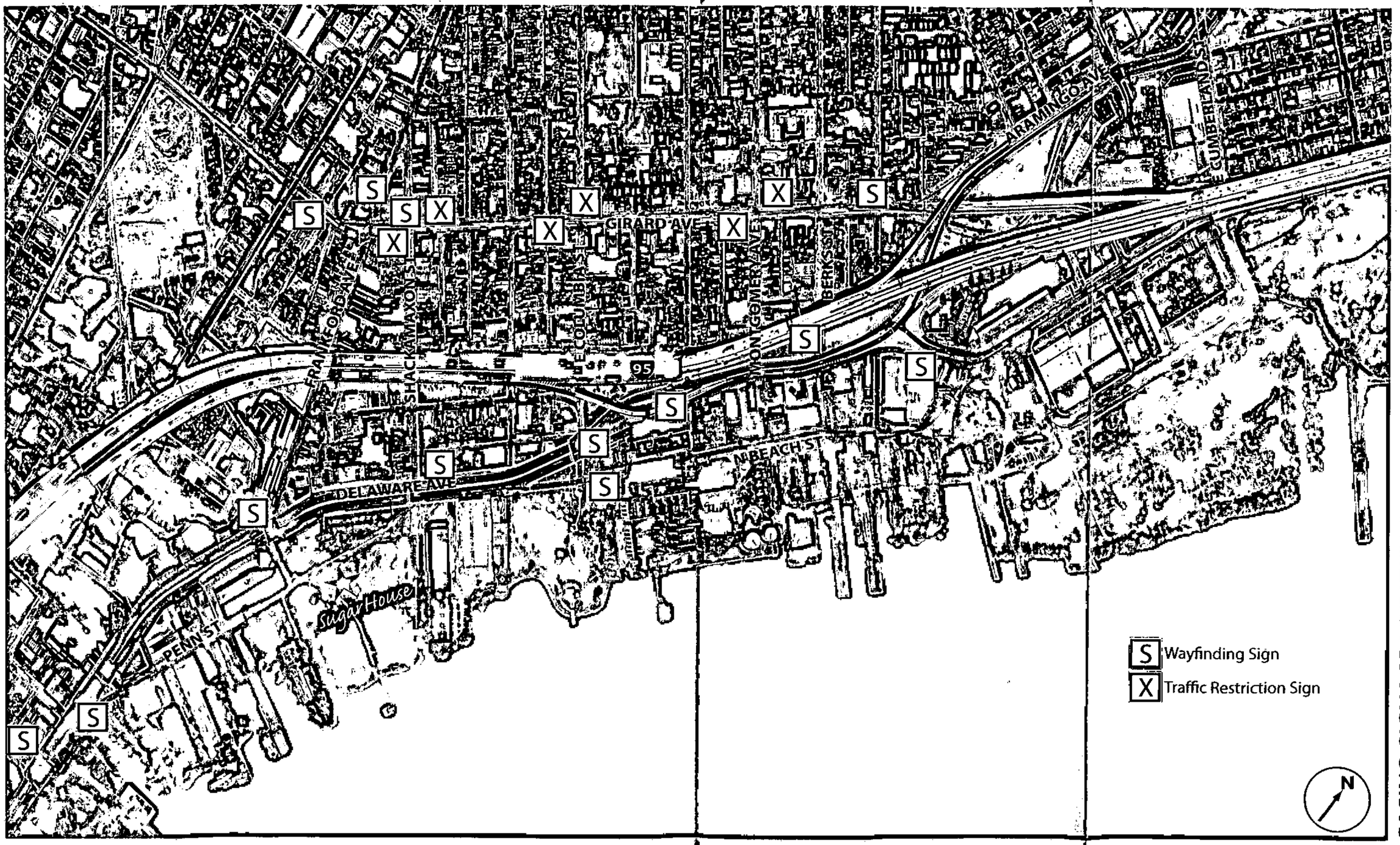
Non-Residential Traffic Routed to Berks Street

Close access to Delaware Avenue

PALETHORP
HANCOCK
MASCHER
HOWARD
HOPE
O'NEIL
GIRARD
LEE
WILDEY
DUNTON
MASTER
MERGER
DAY
COLUMBIA
MARLBOROUGH
HYDE
EARL
PALMER
EYRE
WILL
BERKS
MONTGOMERY
MILLER
BELGRADE
THOMPSON
MOYER
FLORA
WILDE
SALMON
INTERSTATE 95
RICHMOND
DELAWARE
BEACH
ALLEN
MELVALE
SARAH
FRANKFORD
SHACKAMAXON
SugarHouse

RECOMMENDED TRAFFIC IMPROVEMENTS

CASINO SIGNAGE LOCATIONS



CASINO SIGNAGE LOCATIONS