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APPENDIX B: MEMORANDUM

To: Terri Slimmer

From: Jeff Tumlin, Jeremy Nelson, and Francesca Napolitan

Date: March 26, 2010

Subject: West Hollywood General Plan Update Trip Reduction Impacts Analysis

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Executive Summary

Background

In California, every city and county is required to develop a General Plan. General Plans are often described as the "constitution" or "blueprint" for a community, articulating a community's vision for the future and policies to guide its growth and development. The City of West Hollywood is currently in the planning process of their general plan update which will establish policies to govern development through the year 2035.

One of the central aims of the general plan update process is to evaluate what changes the City of West Hollywood could implement that would allow the City to sustain its success as a vibrant, dynamic place that provides a high quality of life and economic opportunity, while minimizing traffic congestion.

A transportation planning consultant team was tasked with assisting City staff to accomplish the objective to continue sustainable growth while reducing the rate of increase in traffic and congestion. Specifically, the transportation consultant team will assist City staff in developing and analyzing strategies that can reasonably be expected to help reduce per capita vehicle traffic and promote increased use of carpooling, transit, bicycling, and walking.

Purpose of this Memo

This technical memorandum was developed by Nelson\Nygaard to assist the City and the consultant team in evaluating the trip reduction impacts of various transportation and parking policies and programs under consideration as part of the general plan update. It should be noted that the purpose of this memo is to provide planning-level, order-of-magnitude, comparative estimates of the quantitative impacts of proposed/planned system changes on auto trips and mode split. Portions of this introductory text will be integrated into Fehr & Peers' report summarizing the traffic modeling analysis of each of the West Hollywood General Plan policy alternatives, and the entire memo will be attached as an Appendix to that report.

What this Memo Contains

- This Executive Summary.
- **Appendix A:** A draft map showing the 3 different area types used during the analysis and referenced throughout this memo. These area types are: Commercial Corridors, Transit-Oriented Development (TOD) Zones, and Residential Areas.
- **Appendix B:** Summary table of the proposed policies and programs under consideration for the three different General Plan alternatives. This policies and programs contained in this table (and the underlying assumptions) were developed by Nelson\Nygaard based on our previous issues and opportunities analysis with feedback from the entire project team.
- **Appendix C:** Summary of the estimates of the likely anticipated reduction in peak-hour vehicle trips that could be achieved with the implementation of the 13 policies under consideration in each of the three different West Hollywood alternatives. Because of the long planning horizon and inherent uncertainty in long-term planning analysis, these are planning-level, order-of-magnitude, comparative estimates.
- **Appendix D:** Detailed description of each of the 13 policies and the research used to develop the trip reduction estimates in the summary table.
- **Appendix E:** A select list of works cited in the development of our estimates of trip reduction impacts.

Proposed Trip Reduction Policies & Programs

This memorandum presents a comparison of tiered implementation scenarios for 3 different General Plan alternatives: the Preferred General Plan Alternative, a TOD Focus Alternative, and an Enhanced TDM Alternative. The trip reduction policies and programs evaluated in each alternative are:

- Parking Policies
  - Reduced/eliminated minimum parking requirements
  - Unbundled parking
  - Public parking pricing
- Transportation System Improvements
  - Bike system improvements
  - Pedestrian system improvements
  - Transit system improvements
- Transportation Demand Management (TDM) Policies
  - Subsidized transit
  - Fare-free transit zone or service
  - Parking cash-out
  - Car sharing
  - Bike sharing
- Mode Shift Policies
  - Carpooling
  - Telecommuting/alternative work schedules

Analytical Methodology

Stand-Alone Methodology

In addition to a land use plan, the West Hollywood General Plan will contain a number of the above listed transportation policies and programs initiatives intended to help reduce per capita vehicle trips, strengthen West Hollywood's alternative transportation network, and encourage travelers to shift to sustainable travel modes. The following provides an overview of the analytical methodology used in this memorandum to evaluate the *stand-alone* trip reduction impacts of the General Plan transportation policies and programs under consideration.

- **Development of policy options.** The potential range of transportation policies and programs under three different General Plan policy alternatives was outlined by Nelson\Nygaard in discussion with City staff and the full project team.
- **Development of comparative implementation scenarios.** Nelson\Nygaard then worked with City staff and consultant team to refine and operationalize these policy alternatives based on past and current experience in West Hollywood. For example:
  - Some existing policies and programs were evaluated based on either status quo implementation or expanded implementation.
  - For new policies or programs, either a moderate or robust implementation framework was considered.
- **Trip Reduction Impact Analysis (TRIA).** Based on the best available research tailored to local conditions in West Hollywood, Nelson\Nygaard derived planning-level, order-of-magnitude, comparative estimates of the reductions in peak-hour vehicle trips that could be anticipated with implementation of a suite of policies and programs. These estimates were based on the reasonable implementation assumptions described above that included:
  - Continuation and/or expansion of existing policies and programs; and
  - Implementation of new policies and programs that research has shown to have a proven effect on mode choice and travel behavior.
- **Disaggregation of impacts.** Nelson\Nygaard disaggregated the trip reduction estimates for individual strategies wherever it was logical to do so and the available research and case studies allowed us to derive a reasonable estimate. In some instances, trip reduction estimates for individual policies and programs were disaggregated as follows:
  - **New trips versus existing trips.** For several polices, reductions in new versus existing trips were evaluated due to differing policies for new development/employers versus existing development/employers. For example, in determining the effects of unbundled parking on auto ownership, new households were separated from existing households for the purposes of this analysis due to the fact that the unbundled parking policy in each of the three alternatives only applies to new residential developments. Thus, no reductions in existing household vehicle ownership are expected as these households will not be required to unbundle parking in any of the three alternatives. Similarly, in determining the effects of subsidized transit passes, new peak-hour commuter trips were separated from existing peak-hour commuter trips. For each of the three alternatives, the provision of partially or fully subsidized transit passes will only be required in new commercial and residential developments, thus no reductions in peak-hour trips from existing commercial and residential developments would be expected.

- **Vehicle trip generation versus vehicle ownership.** Household vehicle ownership is called out separately from vehicle trip reductions in the analysis because different policies impact each metric differently. While there is undoubtedly a correlation between vehicle ownership and peak-hour vehicle trips (e.g., lower auto ownership rates correlate with lower trip generation rates), there is currently insufficient research available to offer an estimate of the exact nature of that relationship. For this reason we have taken a conservative approach and assumed that each proposed policy either affects vehicle trip generation rates or vehicle ownership rates, but not both. In addition, for those strategies where we were only able to quantify vehicle ownership reductions, we have been conservative and assumed that those impacts are already accounted for by trip reduction strategies that we were able to quantify.

- **Impacts of some strategies were not quantifiable with available information.** The estimated reduction in peak-hour vehicle trips can be quantified with greater certainty for some policies and programs due to available data, while others do not lend themselves to easy quantification due to lack of data or other unknown variables. Where there was not enough available data to quantify the likely impact, we indicated in our analysis that the impact was "not known" or "not applicable." It must be stated emphatically that such a designation does not necessarily mean that a strategy has no impact on reducing vehicle trips in reality. Instead, these designations mean that:
  - The impact on peak-hour trips is not significant enough to model (e.g., the impact could fall within the margin of error);
  - In our professional opinion there is no solid basis (e.g., empirical research or published case studies) for documenting the precise trip reduction impacts; or
  - We believe the 4D (density, design, diversity, destinations) traffic model adjustments conducted by Fehr & Peers will adequately account for the impacts of this strategy.

  We have therefore excluded the impacts of certain strategies from this analysis in order to avoid the risk of misstating the likely benefits or to avoid "double counting" the benefits (e.g., pedestrian improvements adequately accounted for under "street network connectivity" factor of the 4D traffic model adjustments).

Cumulative Methodology

Because the transportation policies and programs under consideration in the three General Plan alternatives would ideally be implemented concurrently as a package, Nelson\Nygaard also developed a *cumulative* estimate of the likely trip reduction impacts of implementing several strategies concurrently.[1] The following provides an overview of the analytical methodology used to evaluate the cumulative trip reduction impacts of the General Plan transportation policies and programs under consideration.

- **Impacts of reforming parking requirements are highly localized.** At the request of the City of West Hollywood, Nelson\Nygaard developed an estimate of the likely estimate of the stand-alone impacts of reforming off-street parking requirements for new development. However, these impacts were excluded (netted out) of the cumulative impacts analysis for two reasons:
  - Changes to parking requirements would affect only the supply of off-street parking provided at new development while leaving the existing parking supply development unaffected. After examining the growth projections being considered in each of the General Plan alternatives, Nelson\Nygaard realized that new development projected

[1] As described in the previous section, Nelson\Nygaard developed a tailored package of trip reduction strategies for each General Plan alternative in coordination with the City of West Hollywood. It was this package that was evaluated in the cumulative analysis.

by 2035 in all alternatives is a very small percentage of total development in 2035.[2] For this reason, the absolute, citywide impacts of reducing off-street parking requirements will be much smaller than the site-level impacts that can be achieved when comparing a single development project's trip generation with conventional parking requirements versus reduced parking requirements.[3]

- While the methodology Nelson\Nygaard developed for calculating the stand-alone trip reduction impacts of reforming parking requirements is based on the best available data, it also includes a number of assumptions that were necessary to incorporate into the model where local data, case studies, or transportation research was not available. For this reason, we felt that it was prudent to exclude these stand-alone impacts from the cumulative analysis in order to maintain a highly conservative methodology.

- **Variable impacts depending on trip origins and destinations.** As discussed in the overview of the stand-alone methodology, the effectiveness of many TDM strategies implemented by West Hollywood can vary depending on trip type. One dimension of trip type is where a trip begins and ends. TDM strategies can have different effectiveness on trips with different origins and destinations. For example:
  - *Internal/Internal Trips.* Some policies and programs implemented by West Hollywood may be most effective in reducing vehicle trips that begin and end in West Hollywood (e.g., reforming residential parking requirements, reforming commercial parking requirements, demand-responsive pricing for all public parking).
  - *Internal/External Trips.* Some policies and programs implemented by West Hollywood may be most effective in reducing vehicle trips that begin in West Hollywood but end outside of West Hollywood (e.g., reforming residential parking requirements, regional transit system improvements).
  - *External/Internal Trips.* Some policies and programs implemented by West Hollywood may be most effective in reducing vehicle trips that begin outside of West Hollywood but have their final destination in West Hollywood (e.g., employee parking cash-out, regional transit system improvements).
  - *External/External Trips.* Most of the policies and programs under consideration in the West Hollywood General Plan will have effectively no impact on regional "pass through" trips that both begin and end outside of West Hollywood.[4] For this reason, Nelson\Nygaard did not estimate the trip reduction impacts on these trip types.[5]

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[2] For example, according to City of West Hollywood estimates, the total increase in off-street parking associated with new development by 2035 under the Preferred General Plan alternative will be 6,767 spaces (relative to 2035 No Project). This represents only 6.5% of the total estimated parking supply in 2035 under the Preferred General Plan alternative. For more information see Appendices C and D.

[3] While the trip reduction *percentages* may be similar in the citywide analysis we developed compared to a site-level analysis done using a modeling program such as Urbemis, the *absolute* reduction in vehicle trips will be smaller because the trip reductions percentages are being applied to a small number of parcels relative to the amount of existing development.

[4] The sole exception is the Subway to the Sea rail extension that is assumed in all General Plan alternatives. While Nelson\Nygaard did estimate the potential transit mode shifts and peak-hour trip reductions from this project, it was not possible to disaggregate how many of those former vehicle trips were pass through trips (relative to other trip types). For this reason, it was assumed that *all* the peak-hour trip reductions from the Subway to the Sea project applied only to those vehicle trips that under No Project alternative would have originated in West Hollywood, ended in West Hollywood, or both originated and ended in West Hollywood.

[5] There are other TDM strategies that would have a significant impact on regional "pass through" vehicle trips that both begin and end outside of West Hollywood but pass through the City boundaries for some portion of their trip. These strategies include a) coordinated capacity reductions or signal retiming on some West Hollywood arterials that could result in diversion of trips to non-West Hollywood streets or b) local or regional congestion pricing (to be effective at reducing pass-through peak-hour vehicle trips in West Hollywood, congestion pricing cannot just be applied to regional freeways but would also need to be applied to local West Hollywood streets). Aside from these strategies, the only

For the purposes of Nelson\Nygaard's analysis, it was assumed that the variable effectiveness of *individual* TDM strategies as a function of trip origins and destinations are averaged out in the *cumulative* trip reduction estimates. (Note that only the cumulative estimates are incorporated into Fehr and Peers 4D traffic modeling.) This was done because it was not possible at this time to further disaggregate the trip reduction impacts by trip origins and destinations as doing so would require a better understanding of the proportion of trips of internal/internal, internal/external, and external/internal trips and—for trips that end outside of West Hollywood—a speculative analysis of the policies and programs likely to be implemented in neighboring jurisdictions by 2035. Fehr and Peers may tailor Nelson\Nygaard's vehicle trip reduction estimates based on the relative proportion of trips with different origins and destinations being assumed in the traffic modeling of each General Plan alternative.

- **Development of reductions in non-commuter trips**. For Nelson\Nygaard's analysis of stand-alone impacts of each of the individual trip reduction strategies, we focused on peak-hour *commuter* vehicle trips. This is because the transportation literature contains a significant amount of information on commuter travel generally, and more specifically, the effects of TDM policies on reducing peak-hour commuter vehicle trips are relatively well understood. At the request of the City, Nelson\Nygaard has also analyzed the cumulative trip reduction impacts on *non-commuter* trips. However, the literature on non-commuter travel is less robust, and the research on the precise effects of TDM policies on peak-hour non-commuter trips is extremely limited. What is known is summarized below:
  - Traditionally, non-commuter trips have comprised a small percentage of peak-hour travel in U.S. communities. For this reason, much of the funding for programs and policies to reduce traffic congestion has focused on commuter travel and much of the research analyzing the effectiveness of reducing peak-hour traffic congestion has focused on commuter trips.
  - Due to demographic shifts (especially the aging of Baby Boomers) and growth in the incidence of flexible work schedules, telecommuting, and self-employment, non-commuter trips comprise an increasingly large proportion of all peak-hour trips.[6] However, the funding criteria for TDM programs and the amount of research analyzing the effectiveness of such programs has not kept pace with these changes in peak-hour travel behavior.
  - Further complicating this issue, the distinction between a commuter trip and a non-commuter trip has become blurred in recent decades as more commuters engage in "trip chaining." Trip chaining occurs when a trip for shopping, socializing, or other non-work purpose is combined (or chained) before, after, or during the commute trip.
  - In addition, non-commuter travel must be broken down into two distinct categories: discretionary and non-discretionary. Some discretionary trips are unconstrained both spatially and temporally, so that the traveler has a great degree of flexibility in determining trip time and route (e.g. Saturday afternoon walking trip to the Starbucks in my neighborhood versus a Saturday morning vehicle trip to the Starbucks across town). However, some non-commuter trips can be as highly constrained as a commuter trip (e.g. a trip to the doctor has a relatively fixed origin-destination pair and

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effective way for West Hollywood to reduce pass through vehicle trips on its local streets is to continue to collaborate with neighboring jurisdictions (including communities that are trip "donors" and trip "attractors") for the timely implementation of more robust regional trip reduction policies and programs.

[6] According to the 2009 National Household Transportation Survey, non-commuter trips comprise approximately 50% of all trips in the U.S. (by all modes at all times). According to Fehr and Peers, non-commuter peak-hour vehicle trips in West Hollywood comprise approximately 73% of all PM peak-hour vehicle trips.

limited flexibility of trip route and trip time). The effects of TDM programs on these two different categories of non-commuter travel are not well understood.

- Many of the TDM strategies that are most effective at reducing peak-hour vehicle trips (such as parking cash-out, subsidized transit passes) are commonly deployed as part of an employer-based TDM program. The effects of these strategies on non-commuter peak-hour trips are therefore not typically analyzed.
- Other TDM strategies (such as telecommuting and alternative work schedules) are *only* implemented as part of an employer-based TDM program, but potential decreases in peak-hour commuter trips made possible by these strategies may be offset by potential increases in peak-hour non-commuter trips.
- The effects of other TDM strategies (such as improvements to the transit, bicycle, and pedestrian networks) on non-commuter travel are highly context sensitive. For example, comparing the peak-hour mode splits for commuter and non-commuter trips in several different communities with subway systems would be technically possible (using the National Household Transportation Survey). But this approach is not advisable due to the likely variability of a number of other factors in these communities that affect mode choice and travel behavior, including regional employment distribution patterns, relative travel times on key local and regional corridors, and per-mile costs of travel by auto versus transit (largely a function of differences in parking pricing and relative levels of transit subsidy).
- Finally, some TDM strategies (such as Safe Routes to School) are specifically targeted at non-commuter peak-hour trips, and as a result, the effects of these programs on reducing such trips are well understood. However, Safe Routes to School was determined not to be a relevant policy for the City of West Hollywood to consider, given the presence of few schools and a relatively low percentage of households with school age children.

To undertake our analysis of the cumulative trip reduction effects of TDM policies on peak-hour non-commuter vehicle trips, Nelson\Nygaard conducted a second literature review. As we had anticipated, the available research on this topic is limited. However practical experience and common sense suggests that TDM policies certainly have *some* impact on peak-hour non-commuter vehicle trips, so we have derived a planning-level, order-of-magnitude, comparative estimate of the potential cumulative non-commuter effects. This estimate was derived by applying a highly conservative discount factor to the cumulative commuter trip reduction percentages, effectively “scaling them down” based on what is known about TDM strategies’ relatively weaker efficacy in reducing non-commuter trips. This discount factor was tailored to the specific trip types (new versus existing trips) and area types (commercial corridors, TOD zones, and residential zones) for each of the three General Plan alternatives. We believe that this method, while speculative, represents a highly conservative approach that provides the City with a reasonable estimate of the likely trip reduction effects of TDM strategies on non-commuter trips (while simultaneously avoiding the risk of overstating potential reductions).

- **Non-additive impacts.** The cumulative estimates of trip reductions for each of the three General Plan alternatives were developed using a non-additive methodology. This was done for several reasons, including:
  - Evaluative research of vehicle trip reduction strategies often attempts to isolate the stand-alone effects of implementing these strategies in order to understand the actual relationship of the independent and dependent variables. Often it is difficult to isolate these effects because in reality, multiple changes to the transportation system occur concurrently.

- Because trip reduction strategies often support one another in creating high-quality alternatives to auto commuting, multiple strategies implemented jointly can leverage greater impacts when compared to stand-alone implementation. For example, constructing the Subway to the Sea and offering subsidized transit fares will increase transit ridership (and reduce vehicle trips) to a greater degree than one or other in isolation.
- Conversely, some trip reduction strategies are mutually exclusive. For example, Nelson\Nygaard considered telecommuting to be a mutually-exclusive strategy from other TDM strategies (since telecommuters cannot by definition commute by transit, carpooling, bicycling, etc.). These impacts were therefore "netted out" of the cumulative estimates for certain policy alternatives.
- The stand-alone estimates of the effectiveness of strategies such as pricing of public parking were reduced in the cumulative estimates, given that the City of West Hollywood can only directly influence the pricing structure of the on-street parking and off-street lots and garages which are under its jurisdiction. Since the City has jurisdiction over an estimated 30% percent of the publically-available parking within West Hollywood's boundaries, the impact of parking pricing in the cumulative trip reduction estimates were reduced to account for this.
- When estimating the cumulative impacts of multiple transit-related strategies (e.g., subsidized transit fares, fare-free transit zones, transit system improvements), the stand-alone impacts for each individual strategy were adjusted by varying degrees depending on the area type and General Plan alternative. This was done based on professional judgment and common sense to reflect the fact that, while these are complementary transit measures that have increased efficacy when implemented together, there is a practical limit to how many vehicle trips can reasonably be expected to be converted to transit trips in West Hollywood even under the most aggressive policy scenario.[7]

Summary of Methodology

The stand-alone and cumulative estimates of peak-hour vehicle trip reductions that could likely be achieved with implementation of the proposed transportation policies and programs were drawn from Nelson\Nygaard's library of best practice case studies as well as a literature review. Wherever possible, the estimates were based on quantitative data (empirically derived or modeled). When appropriate, professional judgment was used to refine the estimates for the proposed policy alternatives, based on our experience in developing, analyzing, and implementing vehicle trip reduction strategies. At every step, assumptions and analysis were conservative, in order to avoid overstating potential benefits. At the same time, the inverse error of being overly conservative—and thereby understating potential benefits—was also avoided.

Findings

Nelson\Nygaard's findings suggest that West Hollywood can certainly reduce per capita peak-hour vehicle trips with the implementation of a broad-based suite of trip reduction strategies. While the precise impacts of specific trip reduction policies can vary, several factors—including peer-reviewed empirical evidence, real-world experience of peer communities, basic economic

[7] While there is no theoretical limit to the maximum cumulative reduction in vehicle trips that could be achieved with trip reduction strategies, in practice the application of such policies and programs can obviously be constrained by external factors. These constraints include financial, technical, or political limitations on the ability to implement more aggressive TDM strategies. Nelson\Nygaard therefore believes that it is prudent to acknowledge these real-world implementation constraints when developing the cumulative trip reduction estimates by recognizing that there is likely a practical limit to the total trip reductions that can be achieved even in the most aggressive implementation scenario.

theory, and common sense—provide overwhelming support for the findings in this memorandum that a concerted and comprehensive effort to promote mode shift and reduce vehicle trips can be effective in West Hollywood. The planning-level, order-of-magnitude, comparative estimates of likely trip reduction impacts are summarized below and discussed in detail in Appendices B, C, and D.

Stand-Alone Impacts

In general, the most effective individual trip reduction strategies—when evaluated in isolation—will likely be a continuation and/or enhancement of the following policies and programs:

- Public parking management/pricing to discourage commuter parking
- Parking cash-out programs, including a local ordinance and/or local enforcement of existing State law
- Subsidized transit
- Transit system improvements
- Carpooling incentives
- Telecommuting and alternative work schedules

As discussed above, some strategies will certainly have an impact on reducing peak-hour commuter vehicle trips (e.g., enhancements to pedestrian and bicycle facilities), but those impacts could not be quantified at this time.[8]

Cumulative Impacts

Preferred General Plan

In the Preferred General Plan scenario, there will likely be moderate reductions in peak-hour vehicle trips (relative to existing) as follows:

Commuter Trips

- Commercial Corridors: 31% (new), 19% (existing)
- TOD Zones: 26% (new), 22% (existing)
- Residential Zones: 12%

Non-Commuter Trips

- Commercial Corridors: 5% (new), 3% (existing)
- TOD Zones: 7% (new), 6% (existing)
- Residential Zones: 2%

TOD Focus Alternative

In the TOD Focus Alternative, there will likely be moderate reductions in peak-hour vehicle trips (relative to existing) as follows:

Commuter Trips

- Commercial Corridors: 20%
- TOD Zones: 39% (new), 30% (existing)

[8] For more information see the section titled "Impacts of some strategies not quantifiable with available information."

- Residential Zones: 10%

Non-Commuter Trips

- Commercial Corridor Non-Commuter Trips: 5%
- TOD Zones Non-Commuter Trips: 13% (new), 10% (existing)
- Residential Zone Non-Commuter Trips: 3%

Extensive TDM Alternative

In the Extensive TDM Alternative, there will likely be high reductions in peak-hour vehicle trips (relative to existing) as follows:

Commuter Trips

- Commercial Corridor and TOD Zones Commuter Trips: 44% (new), 35% (existing)
- Residential Zone Commuter Trips: 20%

Non-Commuter Trips

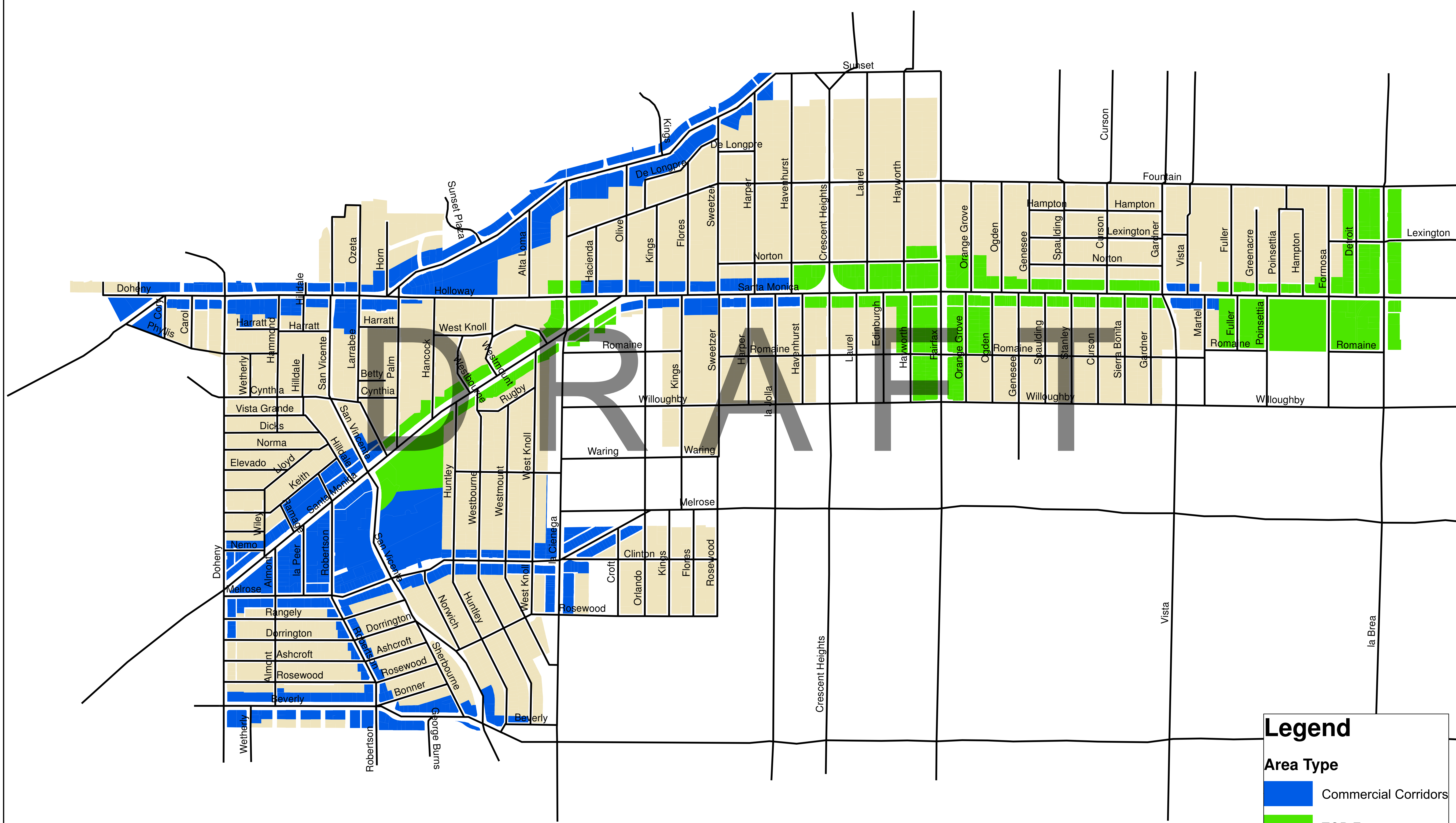
- Commercial Corridors and TOD Zones: 15% (new), 12% (existing)
- Residential Zones: 7%

Summary of Findings

The findings of the trip reduction impact analysis represent what we believe to be best practice in transportation planning. We have undertaken this analysis according to the highest professional standards. Nelson\Nygaard is confident in the validity and accuracy of these findings for the purposes of deriving planning-level, order-of-magnitude, comparative estimates of the likely peak-hour vehicle trip reduction benefits of the transportation policies and programs under consideration in the City of West Hollywood's General Plan Update.

Appendix A:

Area Types Map



Source: City of West Hollywood (provided by Fehr and Peers 3/23/10)

Appendix B:
Proposed Policies & Programs

Proposed Policy or Program	Preferred General Plan		TOD Focus Alternative		Enhanced TDM Alternative	
	Residential Areas	*Commercial Corridors/ TOD Zones*	*Residential Areas*	*Commercial Corridors/ TOD Zones*	*Residential Areas*	*Commercial Corridors/ TOD Zones*
Reduced or Eliminated Auto Parking Requirements	No change from existing policy.	Phase in tailored reductions in minimum parking requirements.	No change from existing policy.	- Eliminate minimum parking requirements for TOD projects. - Phase in tailored maximum parking requirements for TOD projects (higher maximum for shared parking).	- Eliminate minimum parking requirements. - Set low maximum for parking requirements (higher maximum for shared parking).	
Unbundled Auto Parking	No change from existing policy.	All new multifamily residential and commercial development will be required to unbundle parking.	- All new multifamily residential and commercial development will be required to unbundle parking.		No change from existing policy.	All new multifamily residential and commercial development in TOD projects will be required to unbundle parking. Explore creating a Zoning Parking Credit program in commercial corridors.
Pricing of Public Auto Parking	No change from existing policy.	Demand responsive pricing of all public on- and off-street parking in commercial corridors.	- Demand responsive pricing of all public on- and off-street parking in all areas. - Phased increases to price of on-street residential parking permits.		No change from existing policy.	-Demand responsive pricing of all public on- and off-street parking for TOD projects.
Bike System Improvements	Implement improvements identified in the adopted Bicycle and Pedestrian Mobility Plan as funding becomes available.		Expedite funding of improvements identified in the adopted Bicycle and Pedestrian Mobility Plan as funding becomes available, with target improvements to enhance regional/through connectivity to jobs, educational institutions, and services.		Implement improvements identified in the adopted Bicycle and Pedestrian Mobility Plan as funding becomes available, with targeted improvements to enhance access to TOD projects.	
Pedestrian System Improvements	- Implement improvements identified in the adopted Bicycle and Pedestrian Mobility Plan/ADA Transition Plan as funding becomes available. - Continue to pursue Safe Routes to School funding for public schools and work to improve cooperation with the LAUSD to be eligible for additional funding opportunities.		- Expedite funding of improvements identified in the adopted Bicycle and Pedestrian Mobility Plan/ADA Transition Plan as funding becomes available, with targeted improvements to enhance local connectivity to jobs, educational institutions, and services. - Continue to pursue Safe Routes to School funding for public schools and work to improve cooperation with the LAUSD to be eligible for additional funding opportunities. - Coordinate with private schools located within the City and adjacent cities to develop Safe Routes to School programs/projects and apply for funding.		- Implement improvements identified in the adopted Bicycle and Pedestrian Mobility Plan/ADA Transition Plan as funding becomes available, with targeted improvements to enhance access to TOD projects. - Continue to pursue Safe Routes to School funding for public schools within the City and in adjacent cities and work to improve cooperation with the LAUSD to be eligible for additional funding opportunities.	
Transit System Improvements	- Implement improvements identified in the adopted regional Short-Range Transit Plan as funding becomes available. - Assume subway-to-the-sea alignment through West Hollywood.		- Advocate for expedited funding of improvements identified in the adopted regional Short-Range Transit Plan as funding becomes available, with targeted improvements to enhance regional/through connectivity to jobs, educational institutions, and services. - Assume subway-to-the-sea alignment through West Hollywood.		- Advocate for expedited funding of improvements identified in the adopted regional Short-Range Transit Plan as funding becomes available, with targeted improvements to enhance access to TOD projects. - Assume subway-to-the-sea alignment through West Hollywood.	

Trip Reduction Strategy	Preferred General Plan		TOD Focus Alternative		Enhanced TDM Alternative	
	Residential Areas	*Commercial Corridors/ TOD Zones*	*Residential Areas*		*Residential Areas*	*Commercial Corridors/ TOD Zones*
Fare Free Transit Zone	No change from existing policy.		No change from existing policy.		- Create a fare-free transit zone within the City of West Hollywood so that all transit trips originating within City boundaries are fare-free.	
Auto Parking Cash-Out	N/A to residential development (see unbundled parking).	No change from existing policy.	N/A to residential development (see unbundled parking).	- Expand existing parking cash-out requirement to all businesses (i.e. regardless of number of employees or SF of business) if the employer subsidizes or provides free parking for employees.	N/A to residential development (see Unbundled Parking).	- Expand existing parking cash-out requirement to all businesses in TOD projects (i.e. regardless of number of employees or SF of business) if the employer subsidizes or provides free parking for employees.
Car Sharing	- Implement a small-scale car sharing program for City employees. - Pursue multi-jurisdictional car sharing program with regional partners including City of LA, Westside Cities, and SCAG.		Require development projects to implement o-site car sharing program or pay into a fund to incentivize a car sharing operator to implement a citywide program in the near-term. - Pursue multi-jurisdictional car sharing program with regional partners including City of LA, Westside Cities, and SCAG.		Require TOD development projects to implement on-site car sharing program or pay into a fund to incentivize a car sharing operator to implement a citywide program in the near-term. - Pursue multi-jurisdictional car sharing program with regional partners including City of LA, Westside Cities, and SCAG.	
Bike Sharing	- Implement a small-scale bike sharing program for City employees. - Pursue multi-jurisdictional bike sharing program with regional partners including City of LA, Westside Cities, and SCAG.		- Require development projects to implement on-site bike sharing program or pay into a fund to incentivize a bike sharing operator to implement a citywide program in the near-term. - Pursue multi-jurisdictional bike sharing program with regional partners including City of LA, Westside Cities, and SCAG.		- Require TOD development projects to implement on-site bike sharing program or pay into a fund to incentivize a bike sharing operator to implement a citywide program in the near-term. - Pursue multi-jurisdictional bike sharing program with regional partners including City of LA, Westside Cities, and SCAG.	
Carpooling/Vanpooling	Target small to moderate increase in employee participation rates in carpools and vanpools due to additional promotional efforts by the City.		Target moderate to high increase in employee participation rates in carpools and vanpools due to additional promotional efforts by the City, mode split performance targets for new development, and public or private subsidies.		Target moderate to high increase in employee participation rates in carpools and vanpools at TOD projects due to additional promotional efforts by the City, mode split performance targets for new development, and public or private subsidies.	
Telecommuting/Alternative Work Schedules	Target small to moderate increase in employee participation rates in telecommuting and alternative work schedules due to additional promotional efforts by the City.		Target moderate to high increase in employee participation rates in telecommuting and alternative work schedules for employees due to additional promotional efforts by the City, mode split performance targets for new development, and public or private subsidies.		Target moderate to high increase in employee participation rates in telecommuting and alternative work schedules for employees at TOD projects due to additional promotional efforts by the City, mode split performance targets for new development, and public or private subsidies.	

Appendix C:

Summary of Vehicle Trip Reduction Estimates

Summary of Estimated Reductions in Peak-Hour Vehicle Trips

	Proposed Policy or Program	Trip Type Affected[1]	Reduction in Peak-Hour Vehicle Trips[2]: Preferred General Plan	TOD Focus	Enhanced TDM	No Project	Impact on Household Auto Ownership[3]: Preferred General Plan	TOD Focus	Enhanced TDM	No Project
Stand-Alone Estimates	Reduced / Eliminated Minimum Parking Requirements[4]	Commuter	17% (All Areas)	22% (All Areas)	28% (All Areas)	0%	N/A[5]	N/A[5]	N/A[5]	N/A[5]
	Unbundled Parking[6]	Commuter	N/A[5]	N/A[5]	N/A[5]	N/A[5]	Commercial New: 15% Commercial Existing: 0%	Commercial: 0%	All Areas New: 15% All Areas Existing: 0%	All Areas New: 0% All Areas Existing: 0%
							TOD: 0%	TOD New: 15% TOD Existing: 0%		
							Residential: 0%	Residential: 0%		
	Public Parking Pricing	Commuter	Commercial: 17%	Commercial: 0%	Commercial: 17%	0%	N/A[5]	N/A[5]	N/A[5]	N/A[5]
			TOD: 0%	TOD: 17%	TOD: 17%					
			Residential: 0%	Residential: 0%	Residential: 0%					
	Bike System Improvements[7]	Commuter	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]
	Pedestrian System Improvements	Commuter	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]
	Transit System Improvements[8]	Commuter	Commercial: 20.1%	Commercial: 20.1%	Commercial: 20.1%	0%	N/A[4]	N/A[4]	N/A[4]	N/A[4]
			TOD: 20.1%	TOD: 20.1%	TOD: 20.1%					
			Residential: 10%	Residential: 10%	Residential: 10%					
	Subsidized Transit Fares[9]	Commuter	Commercial New: 8.5% Commercial Existing: 0%	Commercial New: 0% Commercial Existing: 0%	Commercial New: 29% Commercial Existing: 0%	0%	N/A[5]	N/A[5]	N/A[5]	N/A[5]
			TOD New: 8.5% TOD Existing: 0%	TOD New: 29% TOD Existing: 0%	TOD New: 29% TOD Existing: 0%					
			Residential: 0%	Residential: 0%	Residential: 0%					
	Transit Fare Free Zone[10]	Commuter	0%	0%	Commercial: 9.2%	0%	N/A[5]	N/A[5]	N/A[5]	N/A[5]
					TOD: 9.2%					
					Residential: 4.6%					
	Parking Cash-Out	Commuter	0%	Commercial: 0%	Commercial: 5%	0%	N/A[5]	N/A[5]	N/A[5]	N/A[5]
				TOD: 5%	TOD: 5%					
				Residential: 0%	Residential: 0%					
	Car Sharing	Commuter	N/A[5]	N/A[5]	N/A[5]	N/A[5]	0%	Commercial: 0%	Commercial: 10%	0%
								TOD: 10%	TOD: 10%	
								Residential: 0%	Residential: 0%	
	Bike Sharing[11]	Commuter	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]	N/A[5]
	Carpooling[12]	Commuter	Commercial: 2%	Commercial: 0%	Commercial: 5%	0%	N/A[5]	N/A[5]	N/A[5]	N/A[5]
			TOD: 2%	TOD: 5%	TOD: 5%					
			Residential: 2%	Residential: 0%	Residential: 5%					
	Telecommuting / Alternative Work Schedules[13]	Commuter	Commercial: 2%	Commercial: 0%	Commercial: 5%	0%	N/A[5]	N/A[5]	N/A[5]	N/A[5]
			TOD: 2%	TOD: 5%	TOD: 5%					
			Residential: 2%	Residential: 0%	Residential: 5%					
Cumulative Estimates	Commercial Corridors[14]	New Commuter	31%	20%	44%	0%	Commercial: 15%	Commercial: 0%	Commercial: 15%	0%
	TOD Zones[14]		26%	39%	44%		TOD: 0%	TOD: 15%	TOD: 15%	
	Residential Zones[14]		12%	10%	20%		Residential: 0%	Residential: 0%	Residential: 15%	
	Commercial Corridors[14]	Existing Commuter	19%	20%	35%	0%	0%	0%	0%	0%
	TOD Zones[14]		22%	30%	35%					
	Residential Zones[14]		12%	10%	20%					
	Commercial Corridors[15]	New Non-Commuter	5%	5%	15%	0%	N/A[5]	N/A[5]	N/A[5]	N/A[5]
	TOD Zones[15]		7%	13%	15%					
	Residential Zones[15]		2%	3%	7%					
	Commercial Corridors[15]	Existing Non-Commuter	3%	5%	12%	0%	N/A[5]	N/A[5]	N/A[5]	N/A[5]
	TOD Zones[15]		6%	10%	12%					
	Residential Zones[15]		2%	3%	7%					

Notes and Sources

[1] "Commuter Trips" are Home-Based Work (HBW) trips, including school trips. All other trip types are "Non Commuter."

[2] For estimates of both peak-hour vehicle trip reductions and household vehicle ownership reductions, area types are defined as follows: Commercial Corridors, TOD Zones, Residential Zones. For more information, see Appendix A.

[3] Household vehicle ownership is called out separately from vehicle trip reductions because different policies impact each metric differently and although there is undoubtedly a correlation between vehicle ownership and peak-hour vehicle trips (e.g. lower auto ownership rates certainly correlate with lower trip generation rates), there is currently insufficient research available to offer an estimate of the exact nature of that relationship. For this reason we have taken a conservative approach and assumed that each proposed policy either affects vehicle trip generation rates or vehicle ownership rates, but not both.

[4] The stand-alone impacts of this strategy were excluded (netted out) of the cumulative impacts estimates because the methodology Nelson\Nygaard developed at the City's request for estimating the stand-alon impacts includes a number of assumptions that were necessary to incorporate into the model where local data, case studies, or transportation research was not available. For this reason, we felt that it was prudent to exclude these stand-alone impacts from the cumulative analysis in order to maintain a highly conservative methodology.

[5] N/A doesn't necessarily mean that a strategy has no impact on reducing vehicle trips in reality. Instead it means that a) the impact on peak-hour trips is not significant enough to model (e.g. the impact could fall within the margin of error) or b) in our professional opinion there is not a solid enough basis (e.g. empirical research or published case studies) to allow us to document the precise trip reduction impacts for the purposes of traffic model, c) we believe the 4D model adjustments (density, design, diversity, destinations) will adequately account for the impacts and we have therefore excluded these impacts to avoid "double counting" (e.g. pedestrian improvements are adequately accounted for under "street connectivity" factor of the 4D model adjustments), or d) the policy alternatives considered in West Hollywood and their impacts are not well understood (e.g. reducing and/or eliminating minimum parking requirements will certainly have some impact on vehicle ownership through Tiebout Sorting, (e.g. self-selection) effects; however the order of magnitude impacts depend on a number of factors that are not known at this time such as: phased implementation of recommendations, how developers respond to reduced/eliminated parking minimums and/or parking maximums, and West Hollywood's households' sensitivity to changes in the costs of auto ownership, know as price elasticity of demand). Where 0% reduction is noted, this indicates that we estimate the strategy to have no measurable impact at all in reducing peak-hour vehicle trips (or no additional impact beyond impacts of current programs).

[6] New commuter trips are separated from existing commuter trips both for unbundled parking and subsidized transit fares. This is because the trip reduction impacts are different for each group due to the fact that these programs will only be applied to new developments (unbundled parking) or new employers (subsidized transit fares).

[7] The available research on the impact of this strategy suggests a 0.46% to 0.96% increase in bike commuting trips, but does not document the reduction in peak-hour vehicle trips.

[8] Transit system improvements assume a Subway to the Sea alignment through West Hollywood in all General Plan alternatives. The effectiveness of this policy in Residential Zones is reduced given the lower percentage of existing residents in this area who currently commute via transit.

[9] New commuter trips are separated from existing commuter trips both for unbundled parking and subsidized transit fares. This is because the trip reduction impacts are different for each group due to the fact that these programs will only be applied to new developments (unbundled parking) or new employers (subsidized transit fares).

[10] Fare free zones assume that all transit rides originating within West Hollywood are free. The effectiveness of this policy in Residential Zones is reduced given the lower percentage of residents who in this area who commute via transit. Also, it is important to note that the effects of fare free zones and subsidized transit fares are not additive.

[11] The available research on the impact of this strategy suggests a 5% to 8% shift from auto commuters (both those in single occupant vehicles and those in carpools) to bike commuters. It should be noted that when summing the impacts of multiple strategies, telecommuting is a mutually-exclusive strategy (e.g. telecommuters cannot by definition commute by transit, carpooling, bicycling, etc.).

[12] The available research on the impact of this strategy suggests a 5% to 15% increase in ridesharing, but does not document the reduction in peak-hour vehicle trips.

[13] The available research on the impact of this strategy suggests a 20% to 50% decrease in peak-hour vehicle trips, but does not specify participation rates. For this reason we have conservatively estimated the reduction in peak-hour vehicle trips as 50% of the total documented decrease, assuming that participation rates will only be half of the participation rates in the case studies researched.

[14] Estimates of cumulative trip reduction impacts for commuter trips are not a summation of the stand-alone trip reductions impacts for the individual strategies. Instead they are based on highly-conservative calculation based on available literature, professional judgment, and practical experience of the likely maximum trip reduction effects of all policies and programs under consideration in each General Plan alternative. For more information, see the section entitled "Cumulative Methodology" included in the Introduction to this technical memorandum.

[15] Estimates of trip reduction impacts for non-commuter trips are based on available literature, professional judgment, and practical experience of the likely maximum trip reduction effects of all policies and programs under consideration in each General Plan alternative. A highly conservative discounting of the commuter trip reduction impacts was derived for each trip type and area type based on the likely effectiveness of the TDM policies and programs on non-commuter trips. For more information, see the section entitled "Cumulative Methodology" included in the Introduction to this technical memorandum.

Appendix D:

Detailed Discussion of Vehicle Trip Reduction Estimates

Category 1: Parking Policies

1.1 Reduced / Eliminated Minimum Parking Requirements

Overview

Most cities' minimum parking requirements for new development typically take into account only two variables: land use type and the size (or intensity) of the development. However, they fail to take into account a number of other factors which affect parking demand including geographic factors (e.g. pedestrian environment, proximity to transit, and availability of services), demographic factors (e.g. income, household size, and vehicle ownership rates), and other relevant factors that affect parking demand (e.g. the presence of transportation demand management programs like car-sharing).

Minimum parking requirements are intended to achieve specific goals (most commonly identified by cities as avoiding spillover parking problems and reducing congestion of on-street parking). However, these goals can also be achieved through other policies, such as pricing curb parking at market rates, residential parking permit programs, and other parking management techniques.

Reduced parking requirements could be established in locations where parking demand will be lower due to the geographic and demographic factors described above. Eliminating parking requirements would not mean that no new parking would be constructed. Rather, it would mean that market forces would determine the appropriate level of supply, based on market demands. Minimum parking requirements could be waived entirely anywhere in the City of West Hollywood where there are measures in place to combat parking spillover but especially in mixed-used areas and in proximity to major transit corridors.

Current Policies & Programs

For commercial and retail uses, the West Hollywood municipal code generally requires 3.5 parking spaces per 1,000 sq. ft. Restaurant uses require 9 parking spaces per 1,000 sq. ft. and bars and clubs require 15 parking spaces per 1,000 sq. ft.

For residential uses, parking requirements vary based on number of bedrooms and location.

- Single family detached: 2 spaces per unit
- Condominiums, multifamily, duplexes, townhouses:
  - Studio up to 500 sq. ft.: 1 space per unit
  - 1 bedroom and studios over 500 sq. ft.: 1.5 spaces per unit
  - 2 to 3 bedrooms: 2 spaces per unit
  - 4 or more bedrooms: 3 spaces per unit
  - Guests: 1 covered space per 4 units, for developments with more than 5 units

Proposed Trip Reduction Policies & Programs

Preferred General Plan

In Commercial Corridors, phase in tailored reductions in minimum commercial parking requirements.

In residential areas, maintain existing policies.

TOD Focus Alternative

In TOD Zones, eliminate minimum parking requirements for Transit Oriented Development (TOD) projects and phase in tailored reductions in maximum parking requirements for TOD projects (higher maximum for shared parking).

Outside of the TOD Zones, maintain existing policies.

Enhanced TDM Alternative

Throughout West Hollywood eliminate minimum parking requirements and set low maximum parking requirements for both commercial and residential development projects (higher maximum for shared parking).

Summary of Literature and Study Impacts

Research shows that there is an indirect link between reduced minimum parking requirements and a decline in vehicle trips. Setting minimum parking requirements often results in lower parking prices, as the supply of parking exceeds demand, which in turn increases vehicle ownership. Studies reveal that the elasticity of vehicle ownership with respect to vehicle operating costs is typically -0.4 to -1.0, hence a 10% increase in total vehicle operating costs reduces vehicle ownership 4-10%.[1]

Average income households in the US spend an average of $3,800 annually per vehicle.[2] Therefore, if one assumes that a hypothetical residential parking space has an annualized cost of $800 per year, parking costs would add 21% to vehicle costs for an average income household. If we assume a vehicle price elasticity of –0.7 (Figure 1), residential minimum parking requirements that exceed the actual demand for parking increase vehicle ownership about 15%. The resulting increase in vehicle ownership produces more residential-based vehicle trips. Conversely, decreasing or eliminating residential parking requirements would result in a proportionate reduction in residential-based vehicle trips.

Figure 1 Vehicle Ownership Reductions from Residential Parking Pricing

Annual (Monthly) Fee	-0.4 Elasticity	-0.7 Elasticity	-1.0 Elasticity
$300 ($25)	4%	6%	8%
$600 ($50)	8%	11%	15%
$900 ($75)	11%	17%	23%
$1,200 ($100)	15%	23%	30%
$1,500 ($125)	19%	28%	38%

In order to determine the impacts of restructuring parking requirements a number of assumptions were made in order to determine how many daily trips are associated with a single residential or commercial parking space and how many of these trips occur during the peak-hour. Described below are the assumptions and methodology employed for this analysis:

1. The trip generation factor associated with a parking space is the parking turnover factor of the number of vehicles/space/day multiplied by 2 to derive number of trips/space/day. This is a daily average from multiple parking facilities drawn from both primary sources (parking surveys in West Hollywood and other Southern California peer cities) and

[1] Victoria Transport Policy Institute (2009), *Transportation Elasticities,* www.vtpi.org/tdm/tdm11.htm.
[2] Bureau of Labor Statistics (2003), Consumer Expenditure Survey, 2002, www.bls.gov.

secondary sources (transportation literature). The average may include weekdays and weekends depending on data available. This was calculated as follows[3]:

a. Residential off-street: This average was derived based on the assumption that every residential unit in West Hollywood has an off-street parking space. The average drive alone mode split in West Hollywood is 75% (US Census), therefore it is assumed that 75% of all off-street residential parking spaces generate 2 trips per day for commuting and that the remaining 25% of all off-street residential parking spaces generate 2 trips per day for non-commuting (shopping, errands etc.). In reality, some off-street residential parking spaces generate zero non-commuting trips, while others generate both commuter and non-commuter trips, so 2 trips/space/day was used as a reasonable estimate for purposes of this analysis.

b. Commercial/Visitor/Employee Off-street: Limited local data is available for this parking type. City-provided data for a single hardware store suggested 16 vehicles/space/day for a trip generation factor of 32 trips/day/space.[4] Because a hardware store is likely a high-turnover land use, other types of off-street parking (especially employee) have a longer average parking durations and therefore lower turnover rates, and to maintain a conservative methodology, the average trip generation rate for all commercial/visitor/employee off-street parking is assumed to 50% of the rate of the surveyed hardware store.

c. Public off-street: No available local data exists for this parking type. Average parking turnover and trip generation factor is assumed to be the same as public on-street parking as explained below.

d. Public on-street: Average weekday and weekend on-street parking turnover for Sunset and Melrose Commercial Corridors is 6.3 vehicles/space/day.[5] This equates with 12.6 trips/space/day. Because not all on-street parking in West Hollywood is along commercial and/or metered streets (which have higher turnover factor than on-street parking in unmetered residential areas), and in order to maintain a highly conservative analysis, the combined turnover factor for commercial and visitor on-street parking is was discounted by 66%, resulting in a citywide on-street parking turnover factor of 3.1 vehicles/space/day and 4.2 trips/space/day.

2. To estimate the number of future parking spaces that would be available for each of the three alternatives, the current number of parking spaces[6] was increased based on an estimate of the number of spaces projected to be provided under current parking standards:

    a. No Project Build Out: Residential assumes an average of 1.5 spaces per unit.[7] Growth in on-street parking is excluded because City assumes that there will be no increase in on-street parking.[8]

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[3] For the Aggressive TDM alternative only, a 10% reduction was applied to account for the reduced trip generation assumed with the robust TDM scenario proposed in this alternative.
[4] City of West Hollywood communication, 3/4/10.
[5] "West Hollywood Parking Turnover," West Hollywood On-Street Parking Study. Prepared by Civic Enterprises Associates, 2009.
[6] The current number of parking spaces is based on actual survey counts or informed order-of-magnitude estimates Source: City of West Hollywood communication, 3/4/10.

[7] City of West Hollywood growth projections under consideration in the Draft General Plan and current parking requirements in the City's existing zoning code.

b. Preferred General Plan Build Out Residential: No changes proposed to residential parking requirements in this alternative, so residential number assumes an average of 1.5 spaces per unit for residential development (current requirement for 1 BR and large studios).

c. Preferred General Plan Build Out Commercial: Proposed policy is a phased reduction in commercial parking requirements tailored to location, so commercial number assumes 2.625 spaces per KSF for new commercial development, a 25% reduction of existing requirement for typical commercial use of 3.5 spaces per KSF.[9] Public off- and on-street parking based on informed order-of-magnitude estimates. Growth in on-street parking is excluded because City assumes that there will be no increase in on-street parking.[10]

d. TOD Focus Alternative Build Out Residential: For new residential development in TOD Zones/Commercial Corridors, the proposed policy is to eliminate minimum parking requirements and implement parking maximums; the residential number therefore assumes an average of 1 space per unit for new residential development in TOD Zones/Commercial Corridors (in other words, assumption is that a) the parking maximums implemented average to 1 space/unit and b) all development provides parking at the maximum ratio).

e. TOD Focus Alternative Build Out Commercial: For new commercial development in TOD Zones/Commercial Corridors, the proposed policy is to eliminate minimum parking requirements and implement parking maximums (with a higher maximum for shared parking); the commercial number therefore assumes an average of 2 spaces per KSF per unit for new commercial development in TOD Zones/Commercial Corridors, a 42.9% reduction of existing requirement for typical commercial use of 3.5 spaces per KSF.[11] This hypothetical commercial parking maximum aligns with Nelson\Nygaard research that blended commercial parking demand in "Main St." retail context is less than 2 spaces/KSF as well as recent research that TOD projects parked according to standard parking requirements are over parked by as much as 50%.[12] Growth in on-street parking is excluded because City assumes that there will be no increase in on-street parking.[13]

f. Enhanced TDM Alternative Build Out Residential: For all new residential development, the proposed policy is to eliminate minimum parking requirements and implement parking maximums; the residential number therefore assumes an average of 1 space per unit for all new residential development in (in other words, assumption is that a) the parking maximums implemented average to 1 space/unit and b) all development provides parking at the maximum ratio).

g. Enhanced TDM Alternative Build Out Commercial: For new commercial development, the proposed policy is to eliminate minimum parking requirements and implement parking maximums (with a higher maximum for shared parking);

[8] City of West Hollywood communication, 3/4/10.
[9] City of West Hollywood growth projections under consideration in the Draft General Plan and current parking requirements in the City's existing zoning code.
[10] City of West Hollywood communication, 3/4/10.
[11] City of West Hollywood growth projections under consideration in the Draft General Plan and current parking requirements in the City's existing zoning code.
[12] "Technical Memorandum: Main St. Parking Demand," Nelson\Nygaard, 2006 and "TCRP Report 128: Effects of TOD on Housing, Parking, and Travel." G.B. Arrington and Robert Cervero, Washington, D.C.: National Academies of Sciences' Transportation Research Board Transit Cooperative Research Program, 2008.
[13] City of West Hollywood communication, 3/4/10.

the commercial number therefore assumes an average of 2 spaces per KSF per unit for all new commercial development in TOD Zones/Commercial Corridors, a 42.9% reduction of existing requirement for typical commercial use of 3.5 spaces per KSF.[14] This hypothetical commercial parking maximum aligns with Nelson\Nygaard research that blended commercial parking demand in "Main St." retail context is less than 2 spaces/KSF as well as recent research that TOD projects parked according to standard parking requirements are overparked by as much as 50%.[15] Growth in on-street parking is excluded because City assumes that there will be no increase in on-street parking.[16]

3. To determine the total daily trips for each of the three alternatives, the trip generation factor calculated in Step 1 was multiplied by the total number of parking spaces calculated in Step 2. The resulting total daily trips was then multiplied by a parking space occupancy factor of peak-hour of 90%.[17]

4. To determine how many of the total daily trips generated would likely occur during the peak-hour, total daily trips were multiplied by 0.1. Industry standard "rule of thumb" is that 15% (0.15) of total daily trips occur in peak-hours. However, West Hollywood does not have typical employment travel demand patterns, but instead has more trips occurring outside of commute hours than is common in a typical urban Central Business District (CBD) or suburban office park. Therefore a slightly lower discount factor of 10% (0.1) was used for this analysis. The resulting number of total AM and PM peak-hour trips is in the same range as Fehr and Peers' 2035 No Project model output for total AM and PM peak-hour trips of 48,998.[18]

5. To determine the total daily PM commuter peak-hour trips, total daily peak-hour trips (Step 4) were reduced by 50% and multiplied by 0.27. A factor of 0.27 was used based on the assumption that the 2035 split between PM peak-hour commuter and PM non-commuter vehicle trips is the same as current 27% commuter and 73% non-commuter.[19]

6. To determine the total daily PM non-commuter peak-hour trips, total daily peak-hour trips (Step 4) were reduced by 50% and multiplied by 0.73. A factor of 0.73 was used based on the assumption that total 2035 No Project Commute PM peak-hour trips is 7,342 and total 2035 No Project Non-Commute PM peak-hour trips is 19,785. Total 2035 No Project PM peak-hour trips is 27,127.[20]

Summary of Estimated Impacts in West Hollywood

Preferred General Plan

Based on the assumptions and methodology described above, the Preferred General Plan would result in a 17% in peak-hour vehicle trips. Because the available data did not allow for fine-

[14] City of West Hollywood growth projections under consideration in the Draft General Plan and current parking requirements in the City's existing zoning code.
[15] "Technical Memorandum: Main St. Parking Demand," Nelson\Nygaard, 2006 and "TCRP Report 128: Effects of TOD on Housing, Parking, and Travel." G.B. Arrington and Robert Cervero, Washington, D.C.: National Academies of Sciences' Transportation Research Board Transit Cooperative Research Program, 2008.
[16] City of West Hollywood communication, 3/4/10.
[17] Best practice peak-hour parking occupancy thresholds are 85% for on-street parking and 95% for off-street. This average of 90% assumes that all parking will be managed using best practice principles at least at peak demand periods. This parking occupancy rate is highly conservative in that it does not account for commercial or residential vacancy rates which drive down blended average parking occupancy rates.
[18] Fehr and Peers communication, dated 3/3/10.
[19] Fehr and Peers communication, dated 3/3/10.
[20] Fehr and Peers communication, dated 3/3/10.

grained analysis of this strategy, this trip reduction estimate was not disaggregated by area type or trip type.

TOD Focus Alternative

Based on the assumptions and methodology described above, the TOD Focus alternative would result in a 22% in peak-hour vehicle trips. Because the available data did not allow for fine-grained analysis of this strategy, this trip reduction estimate was not disaggregated by area type or trip type.

Enhanced TDM Alternative

Based on the assumptions and methodology described above, the Enhanced TDM alternative would result in a 28% in peak-hour vehicle trips. Because the available data did not allow for fine-grained analysis of this strategy, this trip reduction estimate was not disaggregated by area type or trip type.

1.2 Unbundled Parking

Overview

Parking costs are generally subsumed into the sale or rental price of housing and commercial space. Although the cost of parking is often hidden in this way, parking is never free; instead the cost to construct and maintain the "free" parking is hidden in the cost of all other goods and services. For all commercial and residential development in West Hollywood, the cost to lease or purchase parking could be unbundled from the cost to lease or purchase the usable space.

Such a policy would provide a financial incentive to residents and employers to lease only the amount of parking they need. For residential development, unbundled parking may prompt some residents to dispense with one of their cars and to make more of their trips by other modes. Among households with below-average vehicle ownership rates (e.g., low-income people, singles and single parents, seniors on fixed incomes, and college students), unbundled parking can also provide a substantial financial benefit that increases housing affordability. Unbundled parking can allow employers to provide employees with an equitable transportation benefit that can reduce vehicle commuting.

Current Policies & Programs

The City of West Hollywood does not require the unbundling of parking in residential or commercial developments.

Proposed Trip Reduction Policies & Programs

Preferred General Plan

All new multi-family residential and commercial developments, located within the Commercial Corridors will be required to unbundle parking.

In the remaining areas of West Hollywood, unbundled parking in residential or commercial developments will not be required.

TOD Focus Alternative

All new multi-family residential and commercial developments, located within the TOD Zones will be required to unbundle parking.

In the remaining areas of West Hollywood, unbundled parking in residential or commercial developments will not be required.

Enhanced TDM Alternative

All new multi-family residential and commercial developments, in the City of West Hollywood will be required to unbundle parking. The City of West Hollywood will also explore creating a Zoning Parking Credit program in Commercial Corridors.

Summary of Literature and Study Impacts

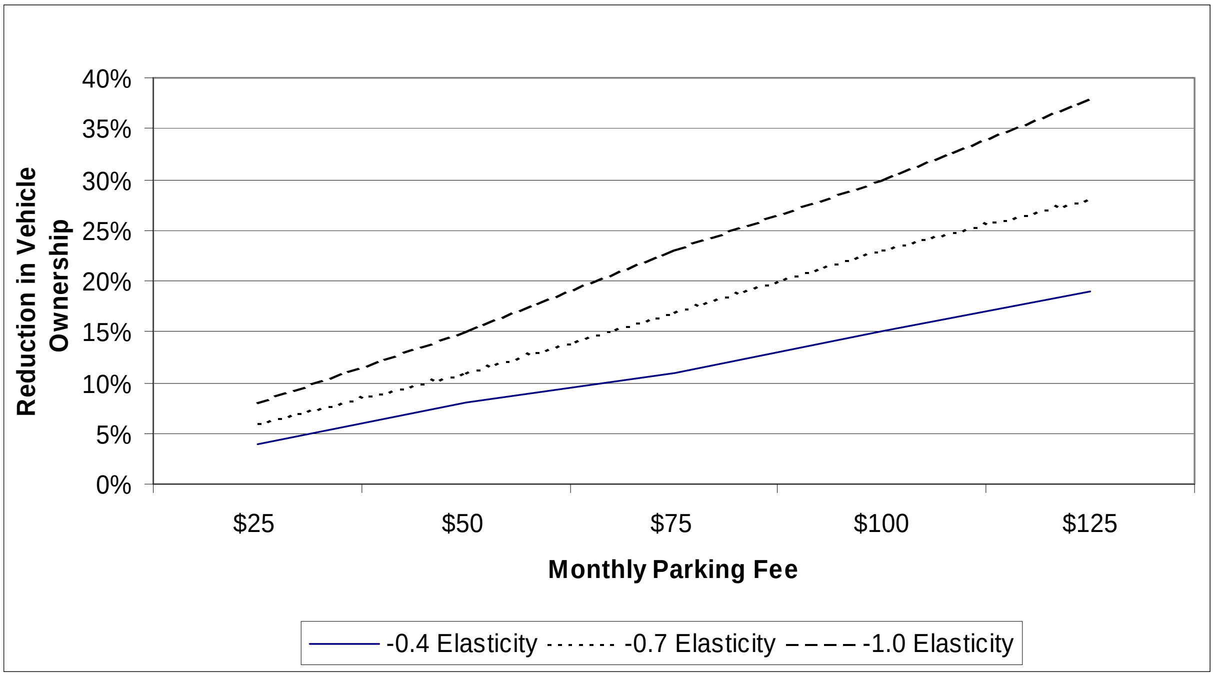
Charging separately for parking is the single most effective strategy to encourage households to own fewer cars, and subsequently reduce vehicle trips. According to a study by Todd Litman, unbundling residential parking can significantly reduce household vehicle ownership.[21] Studies

[21] Victoria Transport Policy Institute (2009), *Parking Requirement Impacts on Housing Affordability,* www.vtpi.org/park-hou.pdf.

reveal that the elasticity of vehicle ownership with respect to price is typically -0.4 to -1.0, so a 10% increase in total vehicle costs reduces vehicle ownership 4-10%.[22]

Average income households spend an average of $3,800 annually per vehicle.[23] Assuming that residential parking spaces have a monthly cost of $100 and a very conservative vehicle price elasticity of demand factor of –0.4 the unbundling of residential parking costs would decrease vehicle ownership by 15% (Figure 2). This decrease would likely result in a proportionate reduction in residential-based vehicle trips.

Figure 2 Reduction in Vehicle Ownership from Unbundling Parking Costs



Summary of Estimated Impacts in West Hollywood

Preferred General Plan

If we assume a monthly cost of $100 per space for unbundled parking in all new multi-family residential developments and unit types within Commercial Corridors, residential vehicle ownership at new multi-family residential developments will likely fall by 15% by 2035.

TOD Focus Alternative

If we assume a monthly cost of $100 per space for unbundled parking in all new multi-family residential developments and unit types within TOD Zones, residential vehicle ownership at new multi-family residential developments will likely fall by 15% by 2035.

[22] Victoria Transport Policy Institute (2009), *Transportation Elasticities,* www.vtpi.org/tdm/tdm11.htm.
[23] Bureau of Labor Statistics (2003), *Consumer Expenditure Survey, 2002*, www.bls.gov.

Enhanced TDM Alternative

If we assume a monthly cost of $100 per space for unbundled parking in all new multi-family residential developments and unit types in all area types, residential vehicle ownership at new multi-family residential developments will likely fall by 15% by 2035.

1.3 Public Parking Pricing

Overview

One of the most significant factors affecting motorists' choice of whether to drive or travel by another mode is the price of parking at the destination. In addition, studies have shown that an average of 28% of traffic congestion in urban mixed-use districts is attributable to cruising for parking: motorists who have already arrived at their destination but are searching and circling to find a free or below market-rate curb parking space.[24]

In these circumstances, managing on- and off-street parking prices as part of an integrated district-wide parking system is an important strategy for reducing peak-hour trip generation and localized traffic congestion, especially for trips to areas with high employment densities. Demand-responsive, market-based prices for parking pricing also have secondary benefits including:

- Distributing highly variable parking demand to match available supply to ensure that there are available curb parking spaces at all times of day.
- Promoting parking turnover to prevent commuters parking all-day in on-street parking spaces intended for short-term parking.

Current Policies and Programs

Off-Street Parking Pricing

Off-street parking pricing varies in West Hollywood by garage and time of day. Figure 3 below provides details on the hourly and daily maximum cost for parking at public parking garages in West Hollywood.

Figure 3 Off-Street Public Parking

Parking Lot/Structure	Current Rate Per 20 minutes or per hour	Current Peak Maximum Rate
Kings Road	$1.00 / 20 minutes – 8am to 6 pm $7.50 max.	$4.00
La Jolla/Havenhurst Lot	$.75 / hour	
Orange Grove Lot	$.75 / hour – 8am to 6 pm	$4.00
Spaulding Lot	$.75 / hour	$7.00
Sunset Lot	$1.00 / hour	$8.00
Melrose Lot	$1.00/ hour	
La Peer Lot	$1.00 / hour	$8.00
West Hollywood Park	$1.00 / hour	$10.00

The monthly cost of off-street parking varies from $60 to $100 for a monthly daytime pass at West Hollywood municipal garages. The majority of West Hollywood municipal garages charge $90 for a monthly daytime parking permit.

On-Street Parking Pricing

On-street parking meters are located on major thoroughfares and Commercial Corridors throughout the City, and the cost per hour and hours of enforcement vary by location. Currently the majority of meters operate from 8 AM to 6 PM, Monday through Saturday except for those on

[24] Shoup, Donald. *The High Cost of Free Parking.* APA Planner's Press. 2005.

Sunset Boulevard, which operate from 8 AM to 2 AM, Monday through Saturday. Most meters throughout West Hollywood have a 2-hour time limit. The time limits on Sunset Boulevard change from 2 to 4 hours after 10 PM. In addition, there are some short-stay meters (10 to 30 minutes) to accommodate businesses that have requested short-term parking. Parking charges vary from $1.00 per hour on Sunset Boulevard and the area around Pacific Design Center to $0.75 throughout the rest of the City.

Proposed Trip Reduction Policies & Programs

For the purposes of this analysis it is assumed, based on consultant judgment, that there is a 50 percent increase in the average monthly parking rate in municipal parking lots and garages from the current $90 per month to $135 per month by the 2035 endpoint planning horizon of the General Plan.

Preferred General Plan

Within Commercial Corridors implement demand-responsive pricing of all public on-street and off-street parking.

Outside of the Commercial Corridors, parking management policies will remain as they currently are.

TOD Focus Alternative

Within TOD Zones implement demand responsive pricing of all public on-street and off-street parking for commercial projects.

Outside of the TOD Zones, parking management policies will remain as they currently are.

Enhanced TDM Alternative

Implement demand responsive pricing of all public on-street and off-street parking, including phased increases to price of on-street residential parking permits.

Summary of Literature and Study Impacts

The reduction in employee vehicle trips from public parking pricing varies both in the amount charged for parking and in the type of location the pricing is implemented. Parking pricing has a much more profound effect in denser areas where more alternative mode choices are present and as a result, vehicle trips face greater reductions in those districts. Data regarding vehicle trip reductions are drawn from a study conducted by Comsis Corporation and the Institute of Transportation Engineers (ITE), and translated into informative tables by Todd Litman of the Victoria Transport Policy Institute (VTPI; see Figure 3).[25] According to the information developed by Litman regarding "place types," every community fits into one of three categories: Low Density Suburb, Activity Center, or Regional CBD/Corridor. With a commute citywide drive alone rate of 75%, the travel characteristics of West Hollywood indicate that the city is similar to what Litman terms an Activity Center.[26]

Figure 3 Typical Mode Split by Location

	Low Density Suburb	Activity Center	Regional CBD/Corridor

[25] Comsis Corporation (1993), *Implementing Effective Travel Demand Management Measures: Inventory of Measures and Synthesis of Experience*, USDOT and Institute of Transportation Engineers; www.bts.gov/ntl/DOCS/474.html. Victoria Transport Policy Institute (2009), *Trip Reduction Tables*, www.vtpi.org/tdm/tdm41.htm

[26] In this case, the term transit encompasses all non-drive alone and carpool modes (i.e. buses, shuttles, walking, biking, etc.). The citywide drive alone rate was calculated using 2000 U.S. Census data.

Single Occupant Vehicle	85%	66%	41%
Transit	7%	16%	30%
Rideshare	8%	18%	29%
Average Vehicle Occupancy	*1.05*	*1.20*	*1.35*
Average Vehicle Ridership	*1.13*	*1.35*	*1.90*

Source: Victoria Transport Policy Institute, TDM Encyclopedia, Trip Reduction Tables, www.vtpi.org/tdm/tdm41.htm.

If we assume that a public parking space in West Hollywood increases from $90 to $135 per month by 2035, this would represent an average increase in daily parking charges from $4.15 to $6.22 by 2035 (a net $2.07 increase per day by 2035). As shown in Figure 4, research from VTPI suggests that the decrease in commuter vehicle trips would be between 12.3% and 25.1% given that West Hollywood is an "Activity Center." Additional reductions in commuter vehicle trips could likely be achieved with higher parking charges (see Figure 4).

Figure 4 Vehicle Trips Reduced by Increased Daily Parking Fees[27]

Worksite Setting	$1.49	$2.98	$4.47	$5.96
Low Density Suburb	6.5%	15.1%	25.3%	36.1%
Activity Center	12.3%	25.1%	37.0%	46.8%
Regional CBD/Corridor	17.5%	31.8%	42.6%	50.0%

Research regarding the pricing effects on short-term visitor vehicle trips is insufficient to make an estimate of impacts. No documented drop in visitor vehicle trips has been found from cities that have implemented public parking pricing. Instead, common responses by short-term parkers to changes in public parking prices are to slightly reduce the amount of time they park for or to seek out lower-priced parking in facilities that may be further away from high demand areas (and are therefore underutilized) and then walk or take a transit to their final destination.

Summary of Estimated Impacts in West Hollywood

Preferred General Plan

If we assume that the daily parking fee increases by $2.07 for employee parking, it is conservatively estimated that the decrease in employee vehicle trips would be 17% in Commercial Corridors, given that West Hollywood is an "Activity Center."[28]

TOD Focus Alternative

If we assume that the daily parking fee increases by $2.07 for employee parking, it is conservatively estimated that the decrease in employee vehicle trips would be 17% in TOD Zones, given that West Hollywood is an "Activity Center."[29]

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[27] Victoria Transport Policy Institute (2008), *Land Use Impacts on Transport*, www.vtpi.org/landtravel.pdf.
[28] The percentage decrease in vehicle trips is calculated using the formula derived from the relationship between Activity Center vehicle trip reductions and daily parking fees in Figure 4 ($y = 0.0774x + 0.0145$).
[29] The percentage decrease in vehicle trips is calculated using the formula derived from the relationship between Activity Center vehicle trip reductions and daily parking fees in Figure 4 ($y = 0.0774x + 0.0145$).

Enhanced TDM Alternative

If we assume that the daily parking fee increases by $2.07 for employee parking, it is conservatively estimated that the decrease in employee vehicle trips would be 17% in Commercial Corridors and TOD Zones given that West Hollywood is an “Activity Center.”[30]

[30] The percentage decrease in vehicle trips is calculated using the formula derived from the relationship between Activity Center vehicle trip reductions and daily parking fees in Figure 4 ($y = 0.0774x + 0.0145$).

Category 2: Transportation System Improvements

2.1 Bike System Improvements

Overview

Bicycle system improvements can help reduce peak-hour vehicle trips by making commuting by bike easier and more convenient for more people. Bike facilities can serve direct door-to-door trips, especially those trips that are "too far too walk but too close to drive" (e.g. trips of between one and two miles are too long to walk for most people, but are a short bicycle ride). In addition, improved bicycle facilities can increase access to and from transit hubs, thereby expanding the "catchment area"[31] of the transit stop or station and increasing ridership. Bicycle access can also reduce parking pressure on heavily-used and/or heavily-subsidized feeder bus lines and auto-oriented park-and-ride facilities.

Current Policies and Programs

Currently, West Hollywood has a limited number of excellent bike facilities, such as the dedicated bike lanes on Santa Monica Boulevard between Almont and Kings Roads. In addition, San Vicente Boulevard, Beverly Boulevard, Melrose Avenue, Fairfax Avenue, and Fountain Avenue between Fairfax Avenue and La Brea Avenue are signed bike routes. In total, the bicycle network consists of approximately 5.5 miles of bike lanes and routes.

All new non-residential buildings or structures are required to provide off-street bicycle parking. A minimum of one employee bicycle parking space for each 7,500 square feet of gross floor area, and a minimum of one visitor or short term bicycle parking space for each 10,000 square feet of gross floor area is required. In addition, non-residential buildings over 10,000 square feet must provide shower and locker facilities.

Proposed Trip Reduction Policies & Programs

Preferred General Plan

The Preferred General Plan alternative assumes that the City of West Hollywood will implement bike system improvements identified in the West Hollywood Bicycle and Pedestrian Mobility Plan, adopted in April 2003, as necessary funding becomes available.

TOD Focus Alternative

Assumes the bike system improvements detailed in the Preferred General Plan scenario above, with targeted projects to enhance access to TOD Zones.

Enhanced TDM Alternative

Assumes the bike system improvements detailed in the Preferred General Plan scenario above, with targeted projects to enhance regional/through connectivity to jobs, educational institutions, and services.

Summary of Literature and Study Impacts

One important advantage of bicycling compared to walking is that bicycling can substitute directly for automobile trips with longer distances. A before-after study of bicycle facility implementation

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[31] A transit catchment area is the geographic area from which a transit station draws riders.

found that each mile of bikeway improvement per 100,000 residents increases bicycle commuting 0.075%, all else being equal.[32]

Summary of Estimated Impacts in West Hollywood

The estimated impacts of bicycle system improvements are relatively small, and we believe that the 4-D model adjustments (density, design, diversity, destinations) will adequately account for these impacts for purposes of the modeling effort. This does not imply that bicycle system improvements will have no impact on vehicle ownership and trips in West Hollywood, but they have been excluded from the impacts analysis in order to maintain a conservative methodology as the available data does not document the impacts of bicycle system improvements on peak-hour vehicle trips.

[32] Arthur Nelson and David Allen (1997), *If You Build Them, Commuters Will Use Them; Cross-Sectional Analysis of Commuters and Bicycle Facilities,* Transportation Research Record 1578, www.enhancements.org/download/trb/1578-10.PDF.

2.2 Pedestrian System Improvements

Overview

A walkable environment gives people more transportation choices and improves quality of life. A well-designed network of streets and pedestrian ways is key to improving pedestrian accessibility, and includes streets, alleys, trails, midblock crossings and pedestrian paseos. Walking is also a free transportation option for accessing public transit, and is available to most people within a quarter to half mile of transit stations and stops. Creating a safe, comfortable, and convenient walking environment is key part of supporting alternative modes of transportation as all types of trips begin and end with a walk trip.

Current Policies and Programs

The city of West Hollywood's pedestrian facilities are relatively well developed. The design of the pedestrian realm (which includes the ground-floor street wall, public sidewalk/crosswalk right-of-way, and private/public open spaces) on a number of streets within West Hollywood is excellent, particularly considering the amount of auto traffic that the major streets are carrying. There has been significant public sector investment to improve streetscapes, such as Santa Monica Boulevard (to make it more pleasant to walk), and the private sector has also invested in pedestrian realm amenities. West Hollywood has a high rate of walking, with 2000 U.S. Census data showing that 5.5% of residents walk to work, more than twice the national rate of 2.7%. The high rates of walking in West Hollywood suggest that conditions are favorable for walking.

Proposed Trip Reduction Policies & Programs

Preferred General Plan

The Preferred General Plan alternative assumes that the City of West Hollywood will implement pedestrian system improvements identified in the West Hollywood Bicycle and Pedestrian Mobility Plan/ ADA Transition Plan, adopted April 2003, as necessary funding becomes available.

The City of West Hollywood will continue to pursue pedestrian grant funding and will work to improve cooperation with the LAUSD to be eligible for additional Safe Routes to School funding opportunities.

TOD Focus Alternative

Assumes the pedestrian system improvements detailed in the Preferred General Plan scenario above, with targeted projects to enhance access to TOD Zones.

The City of West Hollywood will continue to pursue pedestrian grant funding and will work to improve cooperation with the LAUSD to be eligible for additional Safe Routes to School funding opportunities.

Enhanced TDM Alternative

Assumes the pedestrian system improvements detailed in the Preferred General Plan scenario above, with targeted projects to enhance local connectivity to jobs, educational institutions, and services.

The City of West Hollywood will continue to pursue pedestrian grant funding and will work to improve cooperation with the LAUSD to be eligible for additional Safe Routes to School funding opportunities. In addition, the City of West Hollywood will coordinate with private schools located within the City to apply for funding.

Summary of Literature and Study Impacts

It can be difficult to estimate precisely how much walkability investments affect travel, since it is often accompanied by investments in other alternative transportation means and changes in land use. However, studies have found that there is a direct connection between a high quality pedestrian environment and usage of travel modes other than driving:

- Walking is three times more common in a community with pedestrian friendly streets than in otherwise comparable communities that are less conducive to walking.[33]
- Residents in a pedestrian friendly community walk, bicycle, or ride transit for 49% of work trips (18 percentage points higher than in a comparable automobile community) and 15% of their non-work trips (11 percentage points higher than in a comparable automobile-oriented community).[34]
- Investments in the pedestrian environment have positive impacts on all road users. Benefits include: reduces auto-dependency and air pollution, improves livability, increases mobility for low-income households, and even increases retail sales and property values.[35]

In addition to the studies discussed above, a significant amount of research had been conducted on how urban form affects travel behavior. Urban design elements that impact pedestrian access such as street patterns (grid versus cul-de-sacs), topography, ease of street crossings, sidewalk continuity have been shown to reduce VMT and daily vehicle trips.[36] In another study, which examined how urban form variables affected the number of pedestrian trips for recreation and shopping, it was shown that perceived safety, shade, and the frequency and desirability of seeing people while walking had a significant impact (for shopping trips, distance, the ease of walking and comfort were significant variables).[37]

Summary of Estimated Impacts in West Hollywood

Nelson\Nygaard believes that the 4-D model adjustments (density, design, diversity, destinations) will adequately account for the impacts, specifically in terms of the street connectivity criteria in the model. We have therefore excluded these impacts to avoid “double counting” as part of the modeling effort. This does not imply that pedestrian system improvements will have no impact on vehicle ownership and trips in West Hollywood, but they have been excluded from the impacts analysis in order to maintain a conservative methodology as the available data does not document the impacts of pedestrian system improvements on peak-hour vehicle trips.

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[33] Anne Vernez Moudon, Paul Hess, Mary Catherine Snyder and Kiril Stanilov (2003), *Effects of Site Design on Pedestrian Travel in Mixed Use, Medium-Density Environments*, www.wsdot.wa.gov/research/reports/fullreports/432.1.pdf

[34] Robert Cervero and Carolyn Radisch (1995), *Travel Choices in Pedestrian Versus Automobile Oriented Neighborhoods*, www.uctc.net/papers/281.pdf.

[35] Local Government Commission (2001) *The Economic Benefits of Walkable Communities*. www.lgc.org/freepub/docs/community_design/focus/walk_to_money.pdf

[36] 1000 Friends of Portland (1993) *The Pedestrian Environment: LUTRAQ Report Volume 4A*, http://ntl.bts.gov/DOCS/tped.html.

[37] Susan Handy, Kelly Clifton, and Janice Fisher (1998) The Effectiveness of Land Use Policies as a Strategy for Reducing Auto Dependence : A Study of Austin Neighborhoods, www.des.ucdavis.edu/faculty/handy/Austin_Report.pdf.

2.3 Transit System Improvements

Overview

In most cities that have succeeded in growing while limiting the growth of vehicle trips, a fundamental component of their success has been improved transit services. Existing transit services can be improved in several ways, including:

- Increasing frequency (e.g. reduced headways).
- Increasing reliability and on-time performance.
- Reducing travel time and travel time variability.
- Increasing service span (e.g. hours of operation).
- Enhancing passenger amenities (both in-vehicle and at stations and stops).

The connectivity and convenience of the transit system can also be enhanced through the addition of new bus routes running in mixed-flow travel lanes or by adding new service running in dedicated transit rights-of-way, such as Bus Rapid Transit (BRT), light rail, or heavy/commuter rail service.

Current Policies and Programs

A variety of public and private transportation services are available within the city of West Hollywood, and connect to other communities in the greater Los Angeles area. A summary of existing services is below.

Los Angeles Metro

The Los Angeles County Metropolitan Transportation Authority (Metro) provides fixed route bus service in Los Angeles County with a total service area of 1,433 square miles. Within West Hollywood Metro operates 16 local bus routes and four rapid bus lines. Metro is in the planning phase of identifying a Westside rail extension that may run along Santa Monica Boulevard.

Los Angeles Department of Transportation (LADOT) Community DASH

LADOT Community DASH service supplements Metro service by connecting local communities with local service connections through three community shuttle services in the area: the Hollywood/West Hollywood DASH that operates on Sunset Blvd. connecting the Hollywood/Highland Red Line subway station to Cedars Sinai Medical Center; the Fairfax DASH operates a circular route running north-south on Fairfax Avenue, each-west on Melrose, north-south on La Cienega Blvd. to Cedars Sinai Medical Center, and east-west on 3rd Ave. to the Farmer's Market; and the Hollywood DASH operates a circular route that primarily runs east-west on Hollywood Blvd. and Fountain Avenues between Highland Ave. and Vermont Ave.

CityLine

West Hollywood's CityLine is a local fixed-route transit service provided by the City of West Hollywood primarily running east-west along Santa Monica Blvd. and Fountain Ave. between La Brea Ave. and Cedar Sinai Medical Center.

Proposed Trip Reduction Policies & Programs

All scenarios assume a Subway-to-the-Sea alignment through West Hollywood.

Preferred General Plan

The Preferred General Plan alternative assumes that the City of West Hollywood will implement transit improvements identified in LA Metro's Short Range Transit Plan as necessary funding becomes available.

TOD Focus Alternative

Advocate for expedited funding of improvements identified in the adopted Regional Short-Range Transit Plan, with targeted improvements to enhance access to TOD Zones.

Enhanced TDM Alternative

Advocate for expedited funding of improvements identified in the adopted Regional Short-Range Transit Plan as funding becomes available, with targeted projects to enhance regional/through connectivity to jobs, educational institutions, and services.

Summary of Literature and Study Impacts

The elasticity of transit use with respect to transit service frequency is about 0.5, which means that a 1.0% increase in service (measured by transit vehicle mileage or operating hours) increases average ridership by 0.5%.[38] The elasticity of transit use to service expansion (e.g. routes into new parts of a community already served by transit) is in the range of 0.6 to 1.0, which means that 1.0% of additional service increases ridership by 0.6-1.0%.

Comprehensive improvements, such as Light Rail or Bus Rapid Transit systems, can provide large increases in transit use and attract large numbers of discretionary riders who would otherwise travel by automobile. Various cities have seen increases in bus ridership with the introduction of BRT service – Pittsburgh (38%), Los Angeles (40%), Brisbane (42%), Adelaide (76%), Leeds (50%). Impacts of other expansions in transit vary depending on the conditions in which it is implemented.[39]

At this time, the only major transit capacity upgrade planned by local or regional transit operators in to or through West Hollywood is LA Metro's "Subway to the Sea" project. Metro projects a 500% increase in transit capacity for all of the Subway to the Sea alternatives that include Heavy Rail Transit (HRT) compared to the "No Build" (existing conditions) scenario.[40] Given the 0.5 elasticity listed above from increases in service, we can anticipate a 250% increase in ridership from both residents and employees of West Hollywood.[41] This results in 5,885 new resident transit trips and 3,960 new employee transit trips (excluding resident employees) for a total of 9,845 new transit trips compared to existing transit ridership in the 2000 Census.[42]

However, not all of these new transit riders will be shifting to transit from single-occupant vehicles (SOV); some will be shifting to transit from other non-SOV modes (e.g. biking and telecommuting are two common "donor modes" when a community upgrades its transit facilities). In order to calculate the net decrease in vehicles trips, we have factored out 100% of the bike trips and "other" trips (888 total rips) reported in the 2000 Census from the total new transit trips (9,845 trips). The resulting estimate of 8,957 new weekday transit commuter trips coming from single-

[38] Richard Pratt (2000) *Traveler Response to Transportation System Changes*, Interim Handbook, TCRP Web Document 12. http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_webdoc_12.pdf.
[39] Victoria Transport Policy Institute (2008). *Traffic Calming*, www.vtpi.org/tdm/tdm4.htm.
[40] Westside Extension Transit Corridor Study, pp 7-9.
[41] It should be noted that a 0.5 elasticity is a conservative estimate as it reflects increases in bus capacity, and not rail capacity, which typically experiences greater gains in ridership.
[42] Census 2000 data showing 1,177 resident and 1,969 employee transit riders. Two trips are assumed per rider.

occupant commuter vehicles represents a 20.1% decrease in the West Hollywood's current number of single-occupant commuter vehicle trips.[43]

Summary of Estimated Impacts in West Hollywood

Preferred General Plan

Based on our analysis, Nelson\Nygaard estimates a 20.1% decrease in new commuter vehicle trips in the Preferred General Plan alternative for Commercial Corridors and TOD Zones, and a 10% reduction in new commuter vehicle trips in Residential Zones given the lower percentage of residents in this area who commute to work via transit in comparison to Commercial Corridors and TOD Zones.

TOD Focus Alternative

Based on our analysis, Nelson\Nygaard assumes a 20.1% decrease in new commuter vehicle trips in the TOD Focus alternative for Commercial Corridors and TOD Zones, and a 10% reduction in new commuter vehicle trips in Residential Zones given the lower percentage of residents in this area who commute to work via transit in comparison to Commercial Corridors and TOD Zones.

Enhanced TDM Alternative

Based on our analysis Nelson\Nygaard assumes a 20.1% decrease in new commuter vehicle trips in the Enhanced TDM alternative for Commercial Corridors and TOD Zones, and a 10% reduction in new commuter vehicle trips in Residential Zones given the lower percentage of residents in this area who commute to work via transit in comparison to Commercial Corridors and TOD Zones.

[43] The 2000 US Census reports a total of 44,476 single-occupant commuter vehicle trips in West Hollywood.

Category 3: Transportation Demand Management (TDM) Policies

3.1 Subsidized Transit Fares

Overview

In recent years, growing numbers of transit agencies have teamed with universities, employers, building developers, or entire districts or neighborhoods to provide universal or subsidized transit fares to certain riders (students, employees, etc). This subsidy typically provides unlimited transit rides on local or regional transit providers for a low monthly fee, often absorbed entirely by the employer, school, or developers.[44]

Current Policies & Programs

The City's current TDM Ordinance applies to businesses over 10,000 sq. ft. and with more than 5 employees. The TDM Ordinance includes a number of programs that subject employers may choose to implement in order to meet their Average Vehicle Ridership (AVR) target. Subsidized transit fares are one of the eligible programs. A number of private employers provide transit subsidies to their employees. The type and amount of subsidy varies by employer. Some employers cover a percentage of the cost that an employee spends on transit, others give a set dollar amount, and others provide employees with 100% free transit passes. Currently, there is not a formally established enforcement mechanism for compliance with the TDM Ordinance.

In addition, some development projects are often required by the City to develop a TDM Plan which may include providing subsidized transit fares to the development's employees and/or residents. In the last five years, a number of major developments have submitted or inquired about the TDM Ordinance requirement. There are approximately 8 TDM Plans which have been approved since the adoption of the Ordinance. The Sunset Millennium and Gateway Plaza, have both committed in their TDM Plan to a monthly parking charge ranging from $20 to $150, with the revenues to be used to subsidize employee transit commute benefits. The TDM Plans are required to be reviewed annually by the City and a penalty fee assessed in the development is in violation of any provision of the Plan, but the monitoring and enforcement process has been not been as robust as originally envisioned.

Proposed Trip Reduction Policies & Programs

Preferred General Plan

Assumes expansion of subsidized transit programs throughout the City of West Hollywood as follows:

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[44] It should be noted that subsidized transit fares don't mean that *nobody* pays for the costs of providing the service. Instead the foregone farebox revenue that would have been received from current or new transit riders is backfilled by a public agency and/or a private entity (such as an employer or developer). Typically, program costs are negotiated by the transit operator and the payee based on the "net average operating cost per subsidized rider." This is the average operating cost per rider (net of those riders' foregone farebox revenue) multiplied by the total number of subsidized riders (including both current riders and any projected increase in riders). When transit operators have surplus capacity available on existing transit service in the fare-free route or zone so that all subsidized riders can be accommodated on existing service, they can typically lower the discounted pass cost to the payee (since empty seats generate no revenue, any revenue is a net financial benefit to the operator). However, transit operators will naturally need to negotiate a higher per-pass cost whenever the projected growth in subsidized riders requires new transit capacity to be added (in order to cover the additional costs for more drivers and/or vehicles, reduced headways, and/or longer service span). In either case, transit operators typically offer a "volume discount" to the payee to reflect their reduced operating costs (through shortened dwell times) and transaction costs (through less processing of low-value payments) that often accrue with subsidized transit fare programs where a larger share of system riders are using pre-paid fare media.

- In all new commercial developments, the developer and/or property management will be required to provide a 50% transit fare subsidy for all employees for the lifetime of the building.
- In all new residential developments, the developer and/or property management will be required to provide a 50% transit fare subsidy for all residents for the lifetime of the building.

TOD Focus Alternative

Assumes expansion of subsidized transit fare programs in TOD Zones as follows:

- In all new commercial developments, the developer and/or property management will be required to provide a 100% transit fare subsidy for all employees for the lifetime of the building.
- In all new residential developments, the developer and/or property management will be required to provide a 100% transit fare subsidy for all residents for the lifetime of the building.
- With facilitation by the City, BIDs and/or TMAs will be encouraged to provide a similar transit fare subsidy to groups that are not covered by the requirements for new construction.
- Require development to provide financial contributions to the transit capital and/or operational funds to expand existing City transportation services.

In the rest of West Hollywood, no changes to existing polices would be made.

Enhanced TDM Alternative

Assumes expansion of subsidized transit fare program throughout the City of West Hollywood is proposed:

- In all new commercial developments, the developer and/or property management will be required to provide a 100% transit fare subsidy for all employees for the lifetime of the building.
- In all new residential developments, the developer and/or property management will be required to provide a 100% transit fare subsidy for residents for the lifetime of the building.
- With facilitation by the City, BIDs and/or TMAs will be encouraged to provide a similar transit fare subsidy to groups that are not covered by the requirements for new construction.
- Require development to provide financial contributions to the transit capital and/or operational funds to expand existing City transportation services.

Summary of Literature and Study Impacts

Current research regarding the impacts of subsidized transit fare programs can be generally broken into two categories.

- The first set of research focuses on demonstrating the effects transit passes have on mode splits by surveying users before and after implementation.
- The second method bases the results of a transit pass implementation on the actual percent of vehicle trips reduced.

Both of these types of research can be useful for different purposes, as discussed below.

The first set of data is useful in illustrating the impacts of transit passes in various settings. Figure 5 shows the drive-alone and transit mode splits before and after subsidized transit pass implementation in different locations. These studies show reductions in drive-alone mode share of 4% to 42%, with an average reduction of 19%. In addition, these case studies show a wide range of increased transit mode share of between 25% and 145% with an average rise of 95%.

Figure 5 Employee Mode Splits Before & After Implementation of Subsidized Transit Pass Programs

Location	Drive Alone to work			Transit to work		
Municipalities	*Before*	*After*	*% Change*	*Before*	*After*	*% Change*
Santa Clara (County)[45]	76%	60%	27%	11%	27%	145%
Bellevue, Washington (Downtown)[46]	81%	57%	42%	13%	18%	38%
Ann Arbor, Michigan (Downtown)[47]	N/A	N/A	4%	20%	25%	25%
Universities						
UCLA (faculty and staff)[48]	46%	42%	9%	9%	20%	122%
Univ. of Washington, Seattle (faculty)[49]	60%	47%	22%	11%	27%	145%
Univ. of Washington, Seattle (staff)	44%	39%	11%	25%	36%	44%
Average Percent Change	**-**	**-**	**19%**	**-**	**-**	**87%**

Source: Table created by Nelson\Nygaard from studies cited in table footnotes.

Data regarding vehicle trip reductions are drawn from a study conducted by Comsis Corporation and the Institute of Transportation Engineers (ITE), and translated into informative tables by Todd Litman of the Victoria Transport Policy Institute (VTPI).[50] According to the information developed by Litman regarding “place types” and summarized in Figure 6, every community fits into one of three categories: Low Density Suburb, Activity Center, or Regional CBD/Corridor. With a commute citywide drive alone rate of 75%, the travel characteristics of West Hollywood indicate that the city is similar to what Litman terms an Activity Center.[51]

Figure 6 Typical Mode Split by Location

	Low Density Suburb	Activity Center	Regional CBD/Corridor
Single Occupant Vehicle	85%	66%	41%
Transit	7%	16%	30%
Rideshare	8%	18%	29%

[45] Santa Clara Valley Transportation Authority (1997). *Eco Pass Pilot Program Survey Summary of Findings*.
[46] King County Metro (2000) *FlexPass: Excellence in Commute Reduction, Eight Years and Counting*. www.commuterchallenge.org/cc/newsmar01_flexpass.html.
[47] Christopher White, Jonathan Levine, and Moira Zellner (2002). *Impacts of an Employer-Based Transit Pass Program: The Go Pass in Ann Arbor, Michigan*. www.apta.com/research/info/briefings/documents/white.pdf.
[48] Jeffrey Brown, Daniel Baldwin Hess, and Donald Shoup (2003). *Fare-Free Public Transit at Universities*. http://shoup.bol.ucla.edu/FareFreePublicTransitAtUniversities.pdf.
[49] University of Washington Facilities Services, *The U-PASS Online and Telephone Survey Report (2006)*, www.washington.edu/commuterservices/programs/upass/reports.php.
[50] Comsis Corporation (1993), *Implementing Effective Travel Demand Management Measures: Inventory of Measures and Synthesis of Experience*, USDOT and Institute of Transportation Engineers, www.bts.gov/ntl/DOCS/474.html. Victoria Transport Policy Institute (2009), *Trip Reduction Tables*, www.vtpi.org/tdm/tdm41.htm.
[51] In this case, the term transit encompasses all non-drive alone and carpool modes (i.e. buses, shuttles, walking, biking, etc.). The citywide drive alone rate was calculated using 2000 U.S. Census data.

Average Vehicle Occupancy	*1.05*	*1.20*	*1.35*
Average Vehicle Ridership	*1.13*	*1.35*	*1.90*

Source: Victoria Transport Policy Institute, TDM Encyclopedia, Trip Reduction Tables, www.vtpi.org/tdm/tdm41.htm.

Furthermore, Figure 7 breaks each category into three subcategories of rideshare oriented, mode neutral, and transit oriented. Essentially, if transit or ridesharing comprises more than 50% of the alternate mode share, the site is transit oriented or rideshare oriented, respectively. If neither transit nor ridesharing dominates, then the area is considered mode neutral. In the case of West Hollywood, neither carpooling nor transit usage comprise more than 50% of the alternative mode share making the city mode neutral.

Figure 7 Vehicle Trip Reduction by Workplace Setting and Daily Transit Subsidy[52]

	Daily Transit Subsidy			
Worksite Setting	**$0.75**	**$1.49**	**$2.98**	**$5.96**
Low density suburb, rideshare oriented	0.1%	0.2%	0.6%	1.9%
Low density suburb, mode neutral	1.5%	3.3%	7.9%	21.7%
Low density suburb, transit oriented	2.0%	4.2%	9.9%	23.2%
Activity center, rideshare oriented	1.1%	2.4%	5.8%	16.5%
Activity center, mode neutral	3.4%	7.3%	16.4%	38.7%
Activity center, transit oriented	5.2%	10.9%	23.5%	49.7%
Regional CBD/Corridor, rideshare oriented	2.2%	4.7%	10.9%	28.3%
Regional CBD/Corridor, mode neutral	6.2%	12.9%	26.9%	54.3%
Regional CBD/Corridor, transit oriented	9.1%	18.1%	35.5%	64.0%

We have updated the daily transit subsidy information in Figure 7 to account for inflation since the Litman data was compiled; the source for this inflationary escalation was the U.S. Bureau of Labor Statistics Consumer Price Index (CPI).[53] This analysis utilizes the current cost of an LA Metro “EZ Transit Pass” as this is the most comprehensive monthly pass type currently offered by a transit operator serving West Hollywood. Given the $70 monthly cost of an EZ Transit Pass, it can be estimated that the daily amount needed to fully subsidize the transit cost for an employee would be $3.27.[54]

However, the Preferred General Plan assumes only a 50% subsidy or a $1.64 daily subsidy. As shown in Figure 7, this sum falls between the $1.49 and $2.98 subsidies. By calculating the statistical relationship between the proposed level of transit subsidy and likely associated percent decrease in vehicle trips, we find that the likely percent reduction in vehicle trips from a transit subsidy covering all employees in West Hollywood would be 8.5%.[55]

The TOD Focus alternative and the Enhanced TDM alternative both assume a 100% subsidy or a $3.27 daily subsidy. As shown in Figure 7, this sum falls between the $2.98 and $5.96 subsidies. By calculating the statistical relationship between the proposed level of transit subsidy and likely associated percent decrease in vehicle trips, we find that a likely percent reduction in vehicle trips from a transit fare subsidy covering all employees in West Hollywood would be 29%.

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[52] Victoria Transport Policy Institute (2008), *Transportation Elasticities*, www.vtpi.org/elasticities.pdf.
[53] Bureau of Labor Statistics, *Consumer Price Index*, http://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt.
[54] Based on an average 260.7 weekdays per year and 21.7 weekdays per month.
[55] The percentage decrease in vehicle trips is calculated using the formula derived from the relationship between Activity Center vehicle trip reductions and daily parking fees in Figure 7 (y = 0.0684x - 0.0267).

Summary of Estimated Impacts in West Hollywood

Preferred General Plan

The Preferred General Plan assumes an expansion of the program to provide a 50% subsidized EZ Transit Pass to 100% of employees and residents in new commercial or residential developments in Commercial Corridors and TOD Zones, resulting in an 8.5% reduction in new trips.

TOD Focus Alternative

The TOD Focus alternative assumes an expansion of the program to provide a 100% subsidized EZ Transit Pass to 100% of employees and residents in new commercial or residential developments in TOD Zones, resulting in a 29% reduction in new trips.

Enhanced TDM Alternative

The Enhanced TDM alternative assumes an expansion of the program to provide a 100% subsidized EZ Transit Pass to 100% of employees and residents in new commercial or residential developments in Commercial Corridors and TOD Zones, resulting in a 29% reduction in new trips.

3.2 Fare-Free Transit Service or Zone

Overview

Fare-free transit refers to programs in which transit riders do not pay out of pocket any of the cost of their transit trips. The implementation of fare-free transit services or zones in North American dates back to the 1970's when a number of free transit services were tested in federally-funded case studies. Given the significant funding constraints facing public transit operators since that time period, offering fare-free transit has not been sustainable on a widespread basis. Today, fare-free free transit service is offered by over 50 transit operators in North America, typically on select transit routes (e.g. tourist-focused circulators) and or in specific geographic areas (e.g. downtowns or university campuses).

Current Policies & Programs

Neither the City of West Hollywood nor other regional transit operators currently offer any transit fare-free services or zones within the City of West Hollywood boundaries.

Proposed Trip Reduction Policies & Programs

Preferred General Plan

The Preferred General Plan assumes that the City of West Hollywood will maintain existing policies.

TOD Focus Alternative

The TOD Focus alternative assumes that the City of West Hollywood will maintain existing policies.

Enhanced TDM Alternative

The Enhanced TDM alternative assumes the creation of a fare-free transit zone within the City of West Hollywood so that all transit trips originating within City boundaries are fare-free.

Summary of Literature and Study Impacts

The best known cases in the United States of fare-free zones are Portland, OR and Seattle, WA which have both been in place for approximately 25 years. Both cities instituted a fare-free policy for trips taken entirely within the CBD on regular bus service. Prior to the implementation of a fare free zone the average fare was 22.5 cents in Portland. After elimination of the fare, a nine-fold ridership increase was estimated for intra-CBD trips. In Seattle, surveys showed that the fare-free service had resulted in a three-fold increase after eight months over the intra-CBD ridership previously carried on all buses.[56]

It is important to note that fare-free transit zones and peak-hour commuter vehicle trips are not equivalent mode choices (what economists call "substitute goods"). Instead, transit ridership gained through fare-free zones is to some extent due to travelers shifting some of their shorter trips within the fare-free zone from other modes such as walking and bicycling. In other words, while fare-free transit zones do increase the share of intra-zonal transit trips taken throughout the day, this strategy doesn't necessarily reduce peak-hour vehicle commuter trips (which tend to be longer and therefore are more likely to have origins or destinations outside the fare-free zone). In addition, fare-free transit zones also tend to induce more people to travel more often within the fare-free zone, meaning that an increase in transit trips created by establishing a fare-free transit

[56] Richard Pratt (2000) *Traveler Response to Transportation System Changes*, Interim Handbook, TCRP Web Document 12. http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_webdoc_12.pdf.

zone does not necessarily equate to a proportional reduction in vehicle trips and we can not therefore assume a 1:1 "displacement effect."

Fare-free transit zones will affect intra-city and inter-city transit trips differently. Research shows that intra-city transit trips that are completely within the fare-free zone (and therefore 100% free) can experience a 200% increase.[57] Given the difference in current[58] and projected[59] transit trips in West Hollywood with the planned increase in transit capacity from the Subway-to-the-Sea project, Nelson\Nygaard estimates the potential for 4,708 new *intra*-city transit trips in West Hollywood by 2035.

The same research also shows that inter-city transit trips that are only reduced cost (but not free) do not experience the same level of transit ridership increases. These transit trips experience a -0.36 elasticity, which means that if one leg of a two-way inter-city trip is free, there will be an 18% increase in transit ridership. Employee data from the 2000 US Census suggests that an 18% increase in transit ridership would result in 285 new *inter*-city transit trips with origins or destinations in West Hollywood by 2035.

Combining new inter-city and intra-city trips results in an estimate of 4,993 new transit trips in West Hollywood by 2035. Once we net out 100% of commuter trips by those individuals who are shifting from substitute modes (bicycling and "other"), we estimate 4,105 fewer peak-hour vehicle trips, or a decrease of 9.2% compared to the total peak-hour commuter vehicle trips in West Hollywood 2000.[60]

Summary of Estimated Impacts in West Hollywood

Preferred General Plan

This alternative assumes no implementation of a fare free zone; therefore no reductions in vehicle trips can be estimated.

TOD Focus Alternative

This alternative assumes no implementation of a fare free zone; therefore no reductions in vehicle trips can be estimated.

Enhanced TDM Alternative

Based on our analysis, Nelson\Nygaard assumes a 9.2% decrease in new peak-hour commuter vehicle trips in the Enhanced TDM alternative for Commercial Corridors and TOD Zones, and a 4.1% reduction in new peak-hour vehicle trips in Residential Zones given the lower percentage of residents in this area who commute to work via transit in comparison to Commercial Corridors and TOD Zones.

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[57] Richard Pratt (2000) *Traveler Response to Transportation System Changes*, Interim Handbook, TCRP Web Document 12. http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_webdoc_12.pdf.
[58] According to the 2000 U.S. Census, 1,177 West Hollywood residents currently commute to work by transit.
[59] Projected transit trips are based on research from Richard Pratt (2000) *Traveler Response to Transportation System Changes*, Interim Handbook, TCRP Web Document 12. http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_webdoc_12.pdf.
[60] According to the 2000 U.S. Census, there are currently a total of 44,476 peak-hour commuter vehicle trips in West Hollywood.

3.3 Parking Cash-Out

Overview

The majority of North American employers provide free or reduced price parking for their employees as a fringe benefit. Under a parking cash-out requirement, employers are allowed to continue this practice on the condition that they offer the cash value of the parking subsidy to any employee who does not drive to work. Offering employees the option of "cashing out" their subsidized parking space can incentivize employees to ride transit, bike, walk, or carpool to work, thereby reducing vehicle commute trips and emissions.

The cash value of the parking subsidy can be offered in one of three forms:

- A transit/vanpool subsidy equal to the value of the parking subsidy (of which up to $120 is tax-free for both employer and employee).
- A taxable carpool/walk/bike subsidy equal to the value of the parking subsidy.
- Alternately, employees can be given a general "transportation fringe benefit" equal to the market value of an employee parking space, and all employee parking can simply be priced with a daily fee.

Parking cash-out is already state law in California, but the current state law only applies to employers with 50 employees or more who lease their parking and who's parking costs can be separated out as a line item on their lease. In addition, the California Air Resources Board (CARB) is nominally tasked with monitoring compliance, but CARB currently has no dedicated enforcement resources. For this reason, California jurisdictions such as West Hollywood and Los Angeles have implemented local parking cash-out requirements and enforcement mechanisms. In the Fall of 2009, SB 375 (Lowenthal) was signed into law giving local California agencies (including cities, counties, and air districts) the explicit authority to enforce the state's existing parking cash-out law beginning January 1, 2010.

Current Policies and Programs

The City of West Hollywood has adopted a TDM Ordinance which requires all businesses with five or more employees at a worksite located in the city and in a development of 10,000 or more square feet of enclosed space to offer parking cash out to employees if the employer subsidizes or provides free parking for employees.

Proposed Trip Reduction Policies & Programs

Preferred General Plan

The City of West Hollywood will maintain its existing parking cash out policy.

TOD Focus Alternative

Assumes the expansion of the existing parking cash-out requirement to all businesses in TOD zones (i.e. regardless of number of employees or SF of business) if the employer subsidizes or provides free parking for employees.

In the rest of West Hollywood, no changes to existing polices would be made.

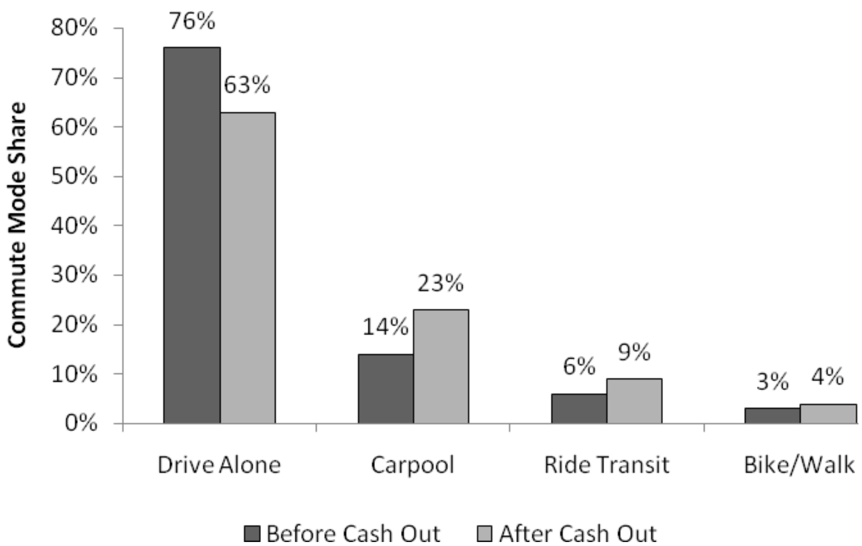
Enhanced TDM Alternative

Assumes the expansion of the existing parking cash-out requirement to all businesses throughout the City of West Hollywood (i.e. regardless of number of employees or the square footage of the business) if the employer subsidizes or provides free parking for employees.

Summary of Literature and Study Impacts

Research performed by Donald Shoup at the University of California-Los Angeles found that single-occupancy vehicle trips declined by 17% and other modes increased significantly (carpooling by 64%, transit by 50%, and walking/biking by 33%) after a parking cash-out program was introduced at various urban and suburban worksites with varying levels of transit service. These findings are illustrated in Figure 10. These mode shifts resulted in an average 12% fewer vehicle miles traveled (VMT) per year per employee. This reduction is equivalent to removing one of every eight cars driven to work.[61] The analysis found that reductions in auto trips tend to increase over time, as more employees find opportunities to reduce their driving and take advantage of the parking cash-out "fringe benefit."

Figure 8 Parking Cash-Out Impacts on Commute Mode



Another parking cash-out case study is that of suburban Pleasanton. The City initiated a daily form of parking cash-out in January 1994. The City offers $2 per day to employees who use a commute alternative instead of driving to work alone. All City employees are eligible to participate with no minimum days required. In 1993, the year before the program was implemented, only 28 employees were commuting to work using alternative modes. Average participation in 2004 doubled to 57 employees per month, which has resulted in an annualized reduction of 20,625 commuter vehicle trips.[62]

[61] Donald C. Shoup, *Evaluating the Effects of Cashing Out Employer-Paid Parking: Eight Case Studies*, www.arb.ca.gov/research/apr/past/93-308a.pdf.
[62] U.S. Environmental Protection Agency (2005), *Parking Cash Out: Implementing Commuter Benefits as One of the Nation's Best Workplaces for Commuters,* www.bestworkplaces.org/pdf/ParkingCashout_07.pdf.

Summary of Estimated Impacts in West Hollywood

Preferred General Plan

This alternative assumes no expansion of existing parking cash-out programs, therefore no reductions in vehicle trips can be estimated.

TOD Focus Alternative

By expanding the current parking cash-out ordinance to apply to all employers in TOD Zones, Nelson\Nygaard conservatively estimates a 5% reduction in peak-hour vehicle trips in this area.

Enhanced TDM Alternative

By expanding the current parking cash-out ordinance to apply to all employers in Commercial Corridors and TOD Zones, Nelson\Nygaard conservatively estimates a 5% reduction in peak-hour vehicle trips in these areas.

3.4 Car Sharing

Overview

Car sharing programs allow people to have on-demand access to a shared fleet of vehicles on an as-needed basis. Usage charges are assessed at an hourly and/or mileage rate, in addition to a refundable deposit and/or a low annual membership fee. Car sharing is similar to conventional car rental programs with a few key differences:

- System users must be members of a car sharing organization.
- Fee structures typically emphasize short-term rentals rather than daily or weekly rentals.
- Vehicle reservations and access is "self-service."
- Vehicle locations are widely distributed rather than concentrated.
- Vehicles must be picked up and dropped off at the same location.

Car sharing programs reduce the need for businesses or households to own vehicles, and reduce personal transportation costs and vehicle miles traveled (VMT). Through car sharing, individuals gain access to vehicles by joining an organization that maintains a fleet of cars and light trucks in a network of locations.

Car sharing has sometimes been referred to as the "missing link" in the package of alternatives to the private automobile. For example, vehicles available near a person's workplace or school can enable them to commute to work via transit or other means, knowing that they'll have a car share vehicle available to them throughout the day for unanticipated work or personal trips but will pay for the service only if it is needed and on a "a la carte" per-trip basis.

Current Policies and Programs

There are currently no car share programs in West Hollywood.

Proposed Trip Reduction Policies & Programs

Preferred General Plan

The Preferred General Plan alternative assumes that the City of West Hollywood will:

- Implement a small-scale car sharing program for City employees.
- Pursue multi-jurisdictional car sharing program with regional partners including the Westside Cities, and SCAG.

TOD Focus Alternative

The TOD Focus alternative assumes that the City of West Hollywood will:

- Require development projects in the TOD zone to implement on-site car sharing program or pay into a fund to incentivize a car sharing operator to implement a citywide program in the near-term.
- Pursue multi-jurisdictional car sharing program with regional partners including the Westside Cities, and SCAG.

Enhanced TDM Alternative

The Enhanced TDM alternative assumes that the City of West Hollywood will:

- Require development projects throughout the City to implement on-site car sharing program or pay into a fund to incentivize a car sharing operator to implement a citywide program in the near-term.
- Pursue multi-jurisdictional car sharing program with regional partners including the Westside Cities, and SCAG.

Summary of Literature and Study Impacts

According to the Transportation Research Board, each car-sharing vehicle takes nearly 15 private cars off the road – a net reduction of almost 14 vehicles.[63] Additionally, according to the Transportation Research Board, the average reduction in vehicle ownership in North American cities with carsharing programs was 20%. This study also citied research which found that the impacts of carsharing can increase over time as the program expands and/or gains wider visibility and familiarity among target markets (for example: in Seattle, WA the 2001 impact of car sharing was a 6% reduction in vehicle ownership but by 2004 the program had resulted in a 15% reduction in vehicle ownership).

A UC Berkeley study of San Francisco's City CarShare found that members drive nearly 50% less after joining. The study also found that when people joined the car-sharing organization, nearly 30% reduced their household vehicle ownership and two-thirds avoided purchasing another car.

For the purposes of this analysis, carsharing may not have a large impact on peak-hour commuter vehicle trips. This is because some studies, including the UC Berkeley study cited above, found that nearly three-quarters of the vehicle trips made by carsharing members were for discretionary (non-commute) travel, such as running errands, visiting friends and other social activities; conversely, about one-quarter of trips were for commuting to work or for recreation. This research also indicates that most carsharing trips were made outside of peak periods, thereby generating a limited impact on reducing peak period vehicle traffic.[64]

Summary of Estimated Impacts in West Hollywood

Preferred General Plan

Given the small scale carsharing program proposed in the Preferred General Plan alternative it is difficult to determine the impact of car sharing. Therefore, no reductions in vehicle trips or auto ownership can be estimated.

TOD Focus Alternative

It is estimated that the introduction of a car sharing program in TOD Zones would result in a 10% reduction in household vehicle ownership in this area.

Enhanced TDM Alternative

It is estimated that the introduction of a car sharing program in Commercial Corridors and TOD Zones would result in a 10% reduction in household vehicle ownership in these areas.

[63] Transportation Research Board (2005), *Car-Sharing: Where and How it Succeeds*, Transit Cooperative Research Program Report 108. http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_rpt_108.pdf.
[64] Robert Cervero and Yu-Hsin Tsai (2003), *San Francisco City CarShare: Travel-Demand Trends and Second-Year Impacts, Institute of Urban and Regional Development*, http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1026&context=iurd.

3.5 Bike Sharing

Overview

Bike sharing is a form of bike rental where people can have access to a shared fleet of bicycles on an as-needed basis. Bike share programs provide safe and convenient access to bicycles for short trips, such as running errands during lunch or for accessing the transit system by helping to bridge "first mile/last mile" barriers.

Bike sharing programs have been implemented in various forms for the past 40 years. Until recently, bike share programs worldwide have experienced low to moderate success. However, in the last 5 years innovations in technology have given rise to a new (third) generation of technology-driven bike share programs. These new bike share programs can dramatically lower the barrier to use by allowing reservations and/or payment via smart card, credit card, or even cell phone. In addition, damage or theft of bicycles is minimized by linking accounts to a user's credit card.

The most common operational models for current bike sharing programs are:

- The first and most common model is a privately–operated program, where contracts for exclusive rights to outdoor advertising space (bus stops, billboards, etc.) include a provision that requires the advertising company to install, operate, and maintain a bike sharing system. The Vélib system in Paris is an example of this first model.

- The second model is a publicly-operated program run by a government agency as part of a larger transit access or TDM/parking management strategy. Montreal's Bixi and Long Beach's employee-based program are examples of this second model. Some cities sell advertising rights at the bike stations and on the bikes themselves to help defray program costs, but the program is not operated by an advertising company.

Pricing of bike sharing programs is structured to encourage short trips in order to prevent users from tying up a single bicycle for long periods of time and to optimize utilization of the fleet.

The Vélib program in Paris, France is one of the most successful examples of the third generation bicycle sharing programs. Vélib provides rental bikes that are available day or night throughout the city and stations are densely distributed. The system has 1,450 stations located about 900 – 1500 feet apart. Stations consist of terminals and stands for securing the bikes. Bicycles are accessed through Smart Cards that can be swiped at any station. Bicycles can also be returned at any station. Annual membership is not required, but accounts are linked to a credit card which is charged in the event of loss or damage to a bicycle. The first 30 minutes of each use are free, $1.30 for the second half hour, $2.60 for the third half hour and $5.20 for the fourth half hour and each additional half hour. The maximum ride time is three hours. Credit cards may also be used to purchase a short-term pass of one-day or seven-day subscriptions.

Current Policies and Programs

There are currently no bike share programs in West Hollywood.

Proposed Trip Reduction Policies & Programs

Preferred General Plan

The Preferred General Plan alternative assumes that the City of West Hollywood will:

– Implement a small-scale bike sharing program for City employees.

- Pursue multi-jurisdictional bike sharing program with regional partners including the Westside Cities, and SCAG.

TOD Focus Alternative

The TOD Focus alternative assumes that the City of West Hollywood will:

- Require development projects located in the TOD zone to implement on-site bike sharing program or pay into a fund to incentivize a bike sharing operator to implement a citywide program in the near-term.
- Pursue multi-jurisdictional bike sharing program with regional partners including the Westside Cities, and SCAG.

Enhanced TDM Alternative

The Enhanced TDM alternative assumes that the City of West Hollywood will:

- Require all development projects throughout the City to implement on-site bike sharing program or pay into a fund to incentivize a bike sharing operator to implement a citywide program in the near-term.

- Pursue multi-jurisdictional bike sharing program with regional partners including the Westside Cities, and SCAG.

Summary of Literature and Study Impacts

Successful bike sharing programs have resulted in automobile to bike mode shifts as large as 5% to 8% in all trip types in the areas they serve.[65] Impacts may be lower if conditions are not conducive to bicycling (few available bicycles in the system, insufficient network of dedicated bike routes, and/or climate conditions not conducive to bicycling).

In general, bike share programs are not utilized for regular commuter trips: since there is a per-use fee, regular bicycle commuters will ultimately purchase their own bicycle. Instead, bike-share programs are a "supportive" mode in that that they provide on-demand and close to door-to-door travel for short, unscheduled trips that are too far to walk and not well-served by transit. Similar to car-sharing programs, bike sharing programs – while not used primarily for commuting – play an important role in the transportation system by allowing commuters to travel by transit knowing that they will have multiple travel options available to them during the workday.

Summary of Estimated Impacts in West Hollywood

The available research does not allow Nelson\Nygaard to develop a meaningful estimate of the impacts of bike sharing programs on peak-hour vehicle trips. In addition, it is our professional opinion that implementation of a bike sharing program would likely result in a relatively small reduction in peak-hour vehicle trips. This does not imply that a bike sharing program would have no impact on vehicle ownership and trips in West Hollywood, or offer secondary benefits to the residents, employees, and visitors (such as expanded mobility options, better public health outcomes through encouragement of active transportation, etc.). However, any benefits realized from a bike sharing program have been excluded from the impacts analysis in order to maintain a conservative methodology.

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[65] Victoria Transport Policy Institute (2008), *Public Bike Systems: Automated Bike Rentals for Short Utilitarian Trips*, www.vtpi.org/tdm/tdm126.htm. Note: this research does not state if the shift from automobile trips to bicycle trips is for commute or non-commute trips, nor does the research state at what time of day these trips occur, i.e. peak or non peak trips.

Category 4: Mode Shift Policies

4.1 Carpooling

Overview

Carpooling is the shared use of a car by the driver—usually the owner of the vehicle—and one or more passengers. When carpooling, people either get a ride or offer a ride to others instead of each driving separately. Carpooling arrangements and schemes involve varying degrees of formality and regularity. Carpools may be formal (a regular arrangement facilitated by an employer, ridesharing website, or other means) or casual (where the driver and passenger make an ad hoc, one-time arrangement).

Current Policies and Programs

Under the City of West Hollywood's TDM Ordinance employers with 5 or more employees in a building of 10,000 square feet or greater are required to provide each of their employees with information about ridesharing and provide preferential parking for carpools. According to 2000 US Census data 6.1% of West Hollywood residents carpooled to work and according to 2000 CTTP data 11.5% of employees who work in West Hollywood carpool to work.

Proposed Trip Reduction Policies & Programs

Preferred General Plan

This alternative assumes a small to moderate increase in employee participation rates in carpools and vanpools due to additional promotional efforts in by the City.

TOD Focus Alternative

This alternative assumes a moderate to high increase in employee participation rates in carpools and vanpools for employees located in the TOD Zones due to additional promotional efforts by the City, mode split performance targets for new development, and public or private subsidies.

Enhanced TDM Alternative

This alternative assumes a moderate to high increase in employee participation rates in carpools and vanpools for employees located throughout the City due to additional promotional efforts by the City, mode split performance targets for new development, and public or private subsidies.

Summary of Literature and Study Impacts

Experience indicates that ridesharing programs typically attract 5-15% of commute trips if they offer only information and encouragement, and 10-30% if they also offer financial incentives such as parking cash out or vanpool subsidies.[66]

Rideshare programs that include incentives such as HOV priority and parking cash-out often reduce affected commute trips by 10-30%.[67] If implemented without such incentives travel impacts are usually smaller. A study conducted by Reid Ewing concluded that ridesharing programs can reduce daily vehicle commute trips to specific worksites by 5-15%, and up to 20% or more if implemented with parking pricing.[68]

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[66] Bryon York and David Fabricatore (2001), *Puget Sound Vanpool Market Assessment*, www.wsdot.wa.gov.
[67] Philip Winters and Daniel Rudge (1995), *Commute Alternatives Educational Outreach*, www.cutr.eng.usf.edu.
[68] Reid Ewing (1993), *TDM, Growth Management, and the Other Four Out of Five Trips.*

Analysis by other researchers indicate that the elasticity of vanpool ridership with respect to fees is -2.6% using a 1997 data set and -14.8% using a less statistically robust 1999 data set, that is, a one dollar decrease in vanpool fares is associated with a 2.6% to 14.8% increase in the predicted odds of choosing vanpool with respect to drive alone. The same study found that the elasticity of vanpooling with respect to price to be -0.61 (1997) and 13.4% (1999), meaning that for each 10% increase in vanpool price, there is a 6% to 13% decrease in vanpool mode choice with respect to vehicle mode choice. Conversely, a 10% decrease in vanpool price will increase the odds of choosing vanpool (with respect to vehicle mode choice) by 6% to 13%. Using a nested logit model, the study found the elasticity of vanpooling with respect to fares to be -1.14.[69]

One study estimates the price elasticity of vanpooling at about 1.5, meaning that a 10% reduction in vanpool fares increases ridership by about 15%.[70] For example, if vanpool fares that are currently $50 per month are reduced to $40 (a 20% reduction), ridership is likely to increase by about 30% (20% x 1.5). Of course, the precise trip reduction impacts will vary depending on the specific market and whether other ridesharing incentives are also provided.

Because rideshare passengers tend to have relatively long commutes, mileage reductions can be relatively large. For example, if ridesharing reduces 5% of commute trips it may reduce 10% of vehicle miles because the trips that are reduced are twice as long as average. Rideshare programs can typically reduce up to 8.3% of commute VMT, up to 3.6% of total regional VMT, and up to 1.8% of regional vehicle trips.[71]

Summary of Estimated Impacts in West Hollywood

Preferred General Plan

Based on the available research and our professional judgment, a moderate expansion of carpool and vanpool programs will result in an employee rideshare increase of 2% in all area types.

TOD Focus Alternative

Based on the available research and our professional judgment, a moderate expansion of carpool and vanpool programs will result in an employee rideshare increase of 5% in TOD Zones.

Enhanced TDM Alternative

Based on the available research and our professional judgment, a moderate expansion of carpool and vanpool programs will result in an employee rideshare increase of 5% in all area types.

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[69] Francis Wambalaba, Sisinnio Concas and Marlo Chavarria (2004), *Price Elasticity of Rideshare: Commuter Fringe Benefits for Vanpools*, www.nctr.usf.edu/pdf/527-14.pdf.
Sisinnio Concas, Philip L. Winters and Francis W. Wambalaba (2005), *Fare Pricing Elasticity, Subsidies And The Demand For Vanpool Services.*
[70] Bryon York and David Fabricatore (2001), *Puget Sound Vanpool Market Assessment*, www.wsdot.wa.gov.
[71] Apogee (1994), *Costs and Cost Effectiveness of Transportation Control Measures; A Review and Analysis of the Literature*, National Association of Regional Councils, www.narc.org.
TDM Resource Center (1996), *Transportation Demand Management; A Guide to Including TDM Strategies in Major Investment Studies and in Planning for Other Transportation Projects*, Office of Urban Mobility, WSDOT, www.wsdot.wa.gov.

4.2 Telecommuting / Alternative Work Schedules

Overview

Telecommuting and alternative work schedules typically allow or require employees to start and/or leave work outside of peak-hours. These strategies are often a part of a company's Trip Reduction or TDM program and include:

- *Flextime.* Employees are allowed some flexibility in their daily work schedules, e.g. starting at 7:30AM or after 9AM and leaving at 4 PM or after 6 PM.
- *Compressed Workweek (CWW).* Employees work fewer but longer days, such as four 10-hour days each week (4/40), or 9-hour days with one day off every two weeks (9/80).
- *Staggered Shifts.* Shifts are staggered to reduce the number of employees arriving and leaving a worksite at one time, e.g. one shift works between 8:00 and 4:30, another shift 8:30 and 5:00, and a third 9:00 and 5:30.

Current Policies and Programs

A number of West Hollywood employers offer their employees the option of alternative work schedules including compressed work weeks such as four 10-hour days each week (4/40), or 9-hour days with one day off every two weeks (9/80). According to the 2000 US Census 6.9% of West Hollywood residents work from home.

Proposed Trip Reduction Policies & Programs

Preferred General Plan

Assumes a small to moderate increase in employee participation rates in telecommuting and alternative work schedules for employees located throughout the City due to additional promotional efforts by the City.

TOD Focus Alternative

Assumes a moderate to high increase in employee participation rates in telecommuting and alternative work schedules for employees located in the TOD Zones and transit corridors due to additional promotional efforts by the City, mode split performance targets for new development, and public or private subsidies.

Enhanced TDM Alternative

Assumes a moderate to high increase in employee participation rates in telecommuting and alternative work schedules for employees located throughout the City due to additional promotional efforts by the City, mode split performance targets for new development, and public or private subsidies.

Summary of Literature and Study Impacts

Flextime reduces peak period congestion directly, and can make ridesharing and transit use more feasible.[72] Staggered shifts can reduce peak-period trips, particularly around large employment centers. Reid Ewing estimates that flextime and telecommuting together can reduce peak-hour vehicle commute trips by 20-50%.[73]

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[72] Alyssa Freas and Stuart Anderson (1991), *Effects of Variable Work Hour Programs on Ridesharing and Organizational Effectiveness, Transportation Research Record 1321*.
[73] Reid Ewing (1993), *TDM, Growth Management, and the Other Four Out of Five Trips.*

Flexible work schedules can also reduce total vehicle travel. One survey of commuters found that it could reduce vehicle trips by up to 8% if 50% of employees are participating in the program, making it among the most effective commute trip reduction strategies considered in that study.[74]

Another analysis estimates that compressed work weeks can reduce up to 0.6% of VMT and up to 0.5% of vehicle trips in a region.[75] However, other research indicates that compressed work weeks may provide modest reductions in total vehicle travel, in part because participants make additional vehicle trips during their non-work days.[76] Compressed work weeks may also encourage some employees to move further from worksites or to drive rather than rideshare.

Summary of Estimated Impacts in West Hollywood

Preferred General Plan

Based on the available research and our professional judgment, we conservatively estimate that a small to moderate increase in telecommuting/alternative work schedule programs could reduce peak-hour vehicle commuting trips by 2% in all area types.

TOD Focus Alternative

Based on the available research and our professional judgment, we conservatively estimate that a moderate to high increase in telecommuting/alternative work schedule programs could reduce peak-hour vehicle commuting trips by 5% in Residential Zones.

Enhanced TDM Alternative

Based on the available research and our professional judgment, we conservatively estimate that a moderate to high increase in telecommuting/alternative work schedule programs could reduce peak-hour vehicle commuting trips by 5% in all area types.

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[74] Center for Urban Transportation Research (1998), *A Market-Based Approach to Cost-Effective Trip Reduction Program Design*, http://ntl.bts.gov/lib/3000/3600/3633/cashdoc.pdf.
[75] Apogee (1994), *Costs and Cost Effectiveness of Transportation Control Measures; A Review and Analysis of the Literature*, National Association of Regional Councils, www.narc.org.
[76] Amy Ho and Jakki Stewart (1992), "Case Study on Impact of 4/40 Compressed Workweek Program on Trip Reduction," *Transportation Research Record 1346*, TRB, www.trb.org, pp. 25-32 and Genevieve Giuliano (1995), "The Weakening Transportation-Land Use Connection, *ACCESS*, Vol. 6, University of California Transportation Center, www.uctc.net, Spring 1995, pp. 3-11.

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WEST HOLLYWOOD TRAVEL DEMAND MODEL DEVELOPMENT REPORT

LOC, LC-ppmsca-09756

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April 2010

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TABLE OF CONTENTS

INTRODUCTION 1
General Discussion of the TDF Model 1
Study Area and Street Network 2

SUMMARY OF THE INPUT DATA 4
Data Collection 4
Land Use Data 4
Traffic Analysis Zone System 4
Street Network 8

DESCRIPTION OF THE MODEL CALIBRATION PROCESS 10
Trip Generation Rates 10
Production/Attraction Balancing 11
Trip Distribution (Gravity Model) 15
Trip Assignment 16

MODEL VALIDATION 20
Static Validation 20
Dynamic Validation 23

APPENDICES

Appendix A: Traffic Analysis Zones Key Map

Appendix B: West Hollywood Model Friction Factor Curves

LIST OF FIGURES

Figure 1 West Hollywood Study Area and Street Network 3

Figure 2 West Hollywood External Station Locations 7

Figure 3 External Weight Stations 19

Figure 4 TAZs Used For Dynamic Model Validation 25

LIST OF TABLES

Table 1 – Model Land Use Categories 5

Table 2 – External Gateways 6

Table 3 – Typical Roadway Speeds and Capacities 9

Table 4 – Trip Production to Attraction Ratios by Purpose 13

Table 5 – Daily Vehicle Trip Generation Rate Comparison 14

Table 6 – Work Locations for West Hollywood Residents 17

Table 7 – Residential Locations for West Hollywood Employees 17

Table 8 – Percent of Trips by Purpose that are Internal/External 17

Table 9 – Matrix of Daily Through (EE) Trips 18

Table 10 – Results of Daily Model Validation 22

Table 11 – Results of Peak Hour Model Validation 22

Table 12 – Results of Dynamic Validation Tests 26

INTRODUCTION

The purpose of this report is to introduce the Travel Demand Forecast (TDF) model built for West Hollywood's General Plan update. This report describes the model development process in general, and how this process was applied to develop the West Hollywood model, including the sources of data used to develop key model inputs.

GENERAL DISCUSSION OF THE TDF MODEL

This section summarizes the answers to commonly asked questions related to TDF models and how the City can use a TDF model.

What is a TDF model?

A TDF model is a computer program that simulates traffic levels and travel patterns for a specific geographic area. The program consists of input files that summarize the area's land uses, street network, travel characteristics, and other key factors. Using this data, the model performs a series of calculations to determine the amount of trips generated, the beginning and ending location of each trip, and the route taken by the trip. The model's output includes projections of traffic volumes on major roads, and peak hour turning movements at certain key intersections.

How is a TDF model useful?

The City TDF model will be a valuable tool for preparing long-range transportation planning studies, such as West Hollywood's General Plan Update. The travel model will be used to estimate the average daily and peak hour traffic volumes on the major roads in response to future land use, transportation infrastructure, and policy assumptions, and form a consistent basis by which to analyze the different potential land use scenarios. Additionally, using these traffic projections, transportation improvements will be identified to accommodate the changing traffic patterns associated with the General Plan's preferred land use alternative.

How do we know if the TDF model is accurate?

To be deemed accurate for projecting traffic volumes in the future, a model must first be calibrated to a year in which actual land use data and traffic volumes are available and well documented. A model is accurately calibrated when it replicates the actual traffic counts on the major roads within certain ranges of error established in *Travel Forecasting Guidelines* (Caltrans, 1992) and it demonstrates stable responses to varying levels of inputs. The West Hollywood model has been calibrated to 2008 base year conditions using actual traffic counts, census data, and land use data surveyed and compiled by City staff.

Is the City of West Hollywood TDF model consistent with standard practices?

The City of West Hollywood model is consistent in form and function with standard travel forecasting models used in transportation planning. The model includes a land use/trip generation module, a gravity-based trip distribution model, and a capacity-restrained equilibrium traffic assignment process. The travel model utilizes Version 5.0 of the TransCAD Transportation GIS software, which is consistent with many of the models used by local jurisdictions in California and throughout the nation. The Southern California Association of Governments (SCAG), the metropolitan planning organization (MPO) for Southern California, maintains their current regional travel demand model in TransCAD.

How can the TDF model be used?

The TDF model can be used for many purposes related to the planning and design of the City's transportation system. The following is a partial listing of the potential uses of the TDF model:

- To update the land use and circulation elements of the General Plan
- To conduct a city-wide traffic impact fee program
- To evaluate the traffic impacts of area-wide land use plan alternatives
- To evaluate the shift in traffic resulting from a roadway improvement
- To evaluate the traffic impacts of land development proposals
- To determine trip distribution patterns of larger land development proposals
- To support the development of transportation sections of Environmental Impact Reports (EIRs)
- To support the preparation of project development reports for Caltrans

STUDY AREA AND STREET NETWORK

Figure 1 shows the study area for the model. The model area encompasses the City of West Hollywood and neighboring areas in the City of Los Angeles and portions of the City of Beverly Hills. The study area contains all areas that may experience land use changes as part of the General Plan update process.

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CITY OF WEST HOLLYWOOD GENERAL PLAN UPDATE
STUDY AREA AND STREET NETWORK

FIGURE 1

SUMMARY OF THE INPUT DATA

DATA COLLECTION

A data collection effort was undertaken at the outset of the West Hollywood general plan update process. Data sources include SCAG for street network and regional travel data, Los Angles Department of Transportation (LADOT) and the City of West Hollywood for traffic count data, and the City of West Hollywood for land use, and street network data.

LAND USE DATA

Land use data is one of the primary inputs to the West Hollywood model, and this data is instrumental in estimating trip generation. The model's primary source of land use data is the City's parcel-level land use database (maintained in a GIS format). This database provides information on how much development currently exists within each traffic analysis zone (TAZ) (discussed below). The City's land use data is supplemented by SCAG TAZ-based data for areas in the City of Los Angeles bordering the City of West Hollywood.

Land use in the model is divided into a variety of residential and non-residential categories. The City of West Hollywood model employs 27 land use data categories to describe land use in the City, as shown in Table 1.

TRAFFIC ANALYSIS ZONE SYSTEM

Travel demand models use traffic analysis zones (TAZs) to subdivide the study area for the purpose of connecting land uses to the street network. TAZs represent physical areas containing land uses that produce or attract vehicle-trip ends. Since SCAG is the MPO for the area, the TAZ system for the West Hollywood model was developed to nest within SCAG's TAZ system. After reviewing the TAZ layer used in the SCAG regional model, along with the street network and recent aerial photographs, a set of TAZ boundaries was created for the West Hollywood model to achieve the following local area enhancements:

- Large TAZs were subdivided, allowing for a more detailed assignment of local traffic to the highway network. This level of detail was necessary to forecast traffic volumes at the turning movement level.
- Considerable detail was added to the TAZ system along the primary east-west corridors to allow for a detailed traffic assignment and a more accurate calculation of the 4D variables (density, diversity of land uses, design of the streetscape, and access to regional destinations).
- TAZs were created to be consistent with large developments such as the Pacific Design Center, the Beverly Center, and Cedars-Sinai Hospital.

The resulting 2008 model TAZ system includes 258 zones in the model area, of which 191 zones cover the City of West Hollywood and the remaining 67 cover the surrounding areas of the City of Los Angeles and the City of Beverly Hills. Detailed maps showing the TAZ numbers in all portions of the model area are included in Appendix A.

Also included in the TAZ structure are the external stations or gateways at points where major roadways provide access into the model area. The external gateways represent all major routes by which traffic can enter or exit the study area and capture the traffic entering, exiting, or passing through the model area. Table 2 contains a list of the 22 external gateways numbered from 1001 to 1022 that were established for this model. Figure 2 illustrates the locations of the external stations.

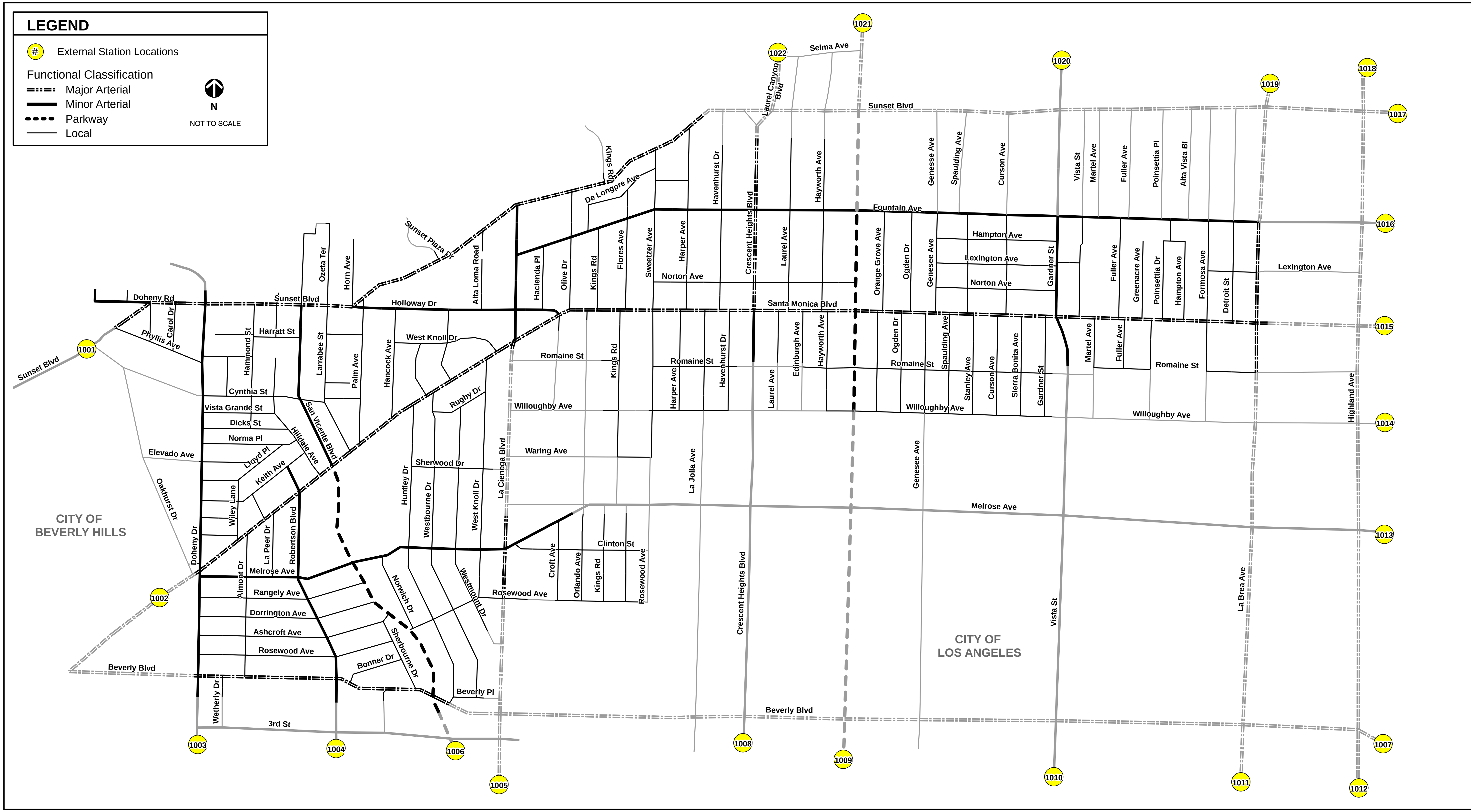
TABLE 1 MODEL LAND USE CATEGORIES	
Residential	
Land Use Type	**Units**
Single-Family (SF)	Dwelling Units
Multi-Family (MF)	Dwelling Units
Non-Residential	
Land Use Type	**Units**
Hotel	Thousand Square-feet
Restaurant	Thousand Square-feet
Bar/Nightclub	Thousand Square-feet
Recreational/Entertainment Facilities	Thousand Square-feet
Personal Services	Thousand Square-feet
Retail	Thousand Square-feet
Automotive Related	Thousand Square-feet
Office	Thousand Square-feet
Library/Museum	Thousand Square-feet
Senior Center	Thousand Square-feet
Police and Fire Services	Thousand Square-feet
Bus Yard	Thousand Square-feet
Elementary and Middle School	Students
High Schools	Students
Religious Facilities	Thousand Square-feet
Industrial	Thousand Square-feet
Galleries	Thousand Square-feet
PDC Showroom	Thousand Square-feet
Regional Retail	Employees
Regional Hospital	Employees
SCAG Retail[1]	Employees
SCAG Service[1]	Employees
SCAG Other[1]	Employees

[1] Data adapted from SCAG TAZs uses SCAG units of employment

Source: Fehr & Peers, 2009.

TABLE 2 EXTERNAL GATEWAYS	
Gateway Number	**Gateway Description**
1001	Sunset Boulevard West
1002	Santa Monica Boulevard West
1003	Doheny Drive South
1004	Robertson Boulevard South
1005	La Cienega Boulevard South
1006	San Vicente Boulevard South
1007	Beverly Boulevard East
1008	Crescent Heights Boulevard South
1009	Fairfax Avenue South
1010	Vista Street South
1011	La Brea Avenue South
1012	Highland Avenue South
1013	Melrose Avenue East
1014	Willoughby Avenue East
1015	Santa Monica Boulevard East
1016	Fountain Avenue East
1017	Sunset Boulevard East
1018	Highland Avenue North
1019	La Brea Avenue North
1020	Gardner Street North
1021	Fairfax Avenue North
1022	Laurel Canyon Boulevard North

Source: Fehr & Peers, 2009.



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CITY OF WEST HOLLYWOOD GENERAL PLAN UPDATE
EXTERNAL STATION LOCATIONS

FIGURE 2

STREET NETWORK

The street network for the base year conditions is derived from the City's GIS roadway centerline file. The model street network includes all arterials, parkways, collectors, and local roads within the study area (see Figure 1). These classifications are based on the City's previous General Plan circulation element and reflect existing conditions.

The streets shown in Figure 1 are classified in three major categories and form the primary street network that is represented in the model structure. As is typical for urban-area models, the model network focuses on the most used facility types. Residential streets are included as well, not to precisely replicate individual travel patterns but to distribute traffic volumes more realistically. The three major street categories are described below.

Arterials

Roadway segments classified as arterials are major roads that provide connections within the City, between the City and neighboring areas, and through the City (cut-through traffic). Arterials in West Hollywood typically have two lanes in each direction, with travel speeds of 30-35 miles per hour (mph).

Parkways

Roadway segments classified as Parkways are major roads that provide connections within the City, between the City and neighboring areas, and through the City (cut-through traffic). From a vehicular circulation standpoint, Parkways function in the same way as Arterials. Parkways in West Hollywood typically have two lanes in each direction, with travel speeds of 30-35 miles per hour (mph).

Collectors

Collectors are facilities that connect local streets to the arterial and highway system, and may also provide direct access to local land uses. Collectors typically have one lane in each direction, with speeds of 25-30 mph.

For each of its records, the street network database includes a street name, distance, functional class, speed, capacity, and number of lanes. These attributes were checked using maps, aerial photographs, and other data provided by the City. Table 3 shows the initial roadway speeds, lanes and capacities used for each roadway class in the model. Where necessary, these values were then modified to reflect current conditions at specific locations.

For a representative sample of network links, traffic counts for daily, AM peak hour, Mid-day (MD) peak hour, and PM peak hour have been coded for validating the model. These traffic counts were collected as part of the City's ongoing count program.

TABLE 3 TYPICAL ROADWAY SPEEDS AND CAPACITIES				
Roadway Classification [1]	**Speed (MPH)**	**Total Through Lanes**	**Lane Capacity (Vehicles per hour per lane)**	**Total Facility Capacity (Vehicles per hour)**
Arterial/Parkway	30-35	4-6	900	3,600-4,800
Collector	25-30	2	750	1,500
Local	25	2	600	1,200
Centroid Connector[2]	25	2	10,000	20,000

[1] City of West Hollywood Circulation Element, 1984.

[2] Centroid connectors are abstract representations of the starting and ending point of each trip, and thus should have no

Source: Fehr & Peers, 2009.

DESCRIPTION OF THE MODEL CALIBRATION PROCESS

Model calibration is the process by which parameters for the model are determined. These parameters are based on comparing travel estimates computed by the model with actual data from the area being modeled. This section provides a general description of the calibration steps and the adjustments made during the process to achieve accuracy levels that are within Caltrans guidelines.

TRIP GENERATION RATES

Trip generation rates relate the number of vehicle trips going to and from a site to some measure of the intensity of use at the site. Each trip has two ends, a "production" and an "attraction". By convention, trips with one end at a residence are defined as being "produced" by the residence and "attracted" to the other use (workplace, school, retail store, etc.), and are called "Home-Based" trips. Trips that do not have one end at a residence are called "Non-Home-Based" trips.

There are seven trip purposes used in the West Hollywood model:

1. Home-Based Work (HBW): trips between a residence and a workplace.
2. Home-Based Other (HBO): trips between a residence and any other destination.
3. Non-Home-Based (NHB): trips that do not begin or end at a residence, such as traveling from a workplace to a restaurant, or from a retail store to a bank.
4. Regional Retail (RRET): trips generated by Beverly Center
5. Regional Hospital (RHOS): trips generated by Cedars-Sinai Medical Center
6. Internal to External Commute Trips (IXHBW): Work trips of model area residents who work outside the model area
7. External to Internal Commute Trips (XIHBW): Work trips of model area employees who live outside the model area.

Trip generation rates are initially defined for total trips and later split by trip purpose, for both productions and attractions.

The most widely used source for individual project vehicle trip generation rates in the transportation planning field is *Trip Generation, 8th Edition* (Institute of transportation Engineers [ITE], 2008). This book contains national averages of trip generation rates for a variety of land uses in what are generally suburban locations. The ITE land use categories tend to be very specific, while model land use categories (accounting for all land use in the City) tend to be more general. ITE rates are appropriate for smaller site specific uses, such as traffic studies for development review, and they can provide a starting point for travel models by capturing the interaction between all land uses in the City. However, the unique local characteristics of West Hollywood require the development of specific trip generation rates for the model.

A traffic impact study uses ITE trip generation rates because, in most cases, the project being examined shares characteristics with the information contained in *Trip Generation, 8th Edition.* In other words, both the traffic impact study and the ITE rates rely on single-use, isolated projects that have plenty of free parking and little or no interaction with other nearby uses. When assessing the impact of an individual project, the ITE rates are typically appropriate since they can correctly mimic the site being analyzed in the traffic impact study.

The West Hollywood model, on the other hand, generates trips by purpose, and balances productions to attractions. The model also has trip rates calibrated to local conditions and other advanced trip generation features such as the cross classification of dwelling units by vehicle availability. Traffic impact studies rely on ITE trip rates that only vary based on land use type or size. While these trip rates are a valid starting point for model calibration and validation, they have a different purpose and are not necessarily suitable for demand forecasting without customization.

Certain ITE rates are more applicable to West Hollywood model rates because of their comparable level of detail. For example, both ITE and the West Hollywood model have a generic office category. Some ITE rates, however, cannot be used directly because the land use category is not the same as the City's land use classifications. For example, ITE's restaurant categories include high turnover restaurant, fast food restaurant, fast food restaurant with drive-through with seating, fast food restaurant with drive-through and no seating, etc. By necessity, West Hollywood restaurant rates represent a compilation and average of those rates customized to the City. It is important to recognize that ITE rates are also averages, based on driveway counts at multiple locations, so the utilization of average rates within the West Hollywood model is entirely appropriate.

The 2008 trip generation rates were initially based on residential trip generation surveys, the SCAG regional model, the San Diego Association of Governments' (SANDAG) trip generation survey, and *Trip Generation, 8th Edition*. The rates were then modified to account for local conditions based on counts, production-to-attraction balancing (discussed below), and the difference between ITE and model land use definitions. The final West Hollywood trip generation rates are unique to the West Hollywood model, and they are ultimately based upon the results of successful model calibration and validation.

PRODUCTION/ATTRACTION BALANCING

Local trips (internal-to-internal, or I-I) are trips that both start and end in the study area. One of the basic assumptions of any travel model is that the total number of local trips produced is equal to the total number of local trips attracted. It is logically assumed that if a journey is started somewhere, it must have an ending somewhere else. If the total productions and attractions are not equal, the model will typically adjust the attractions to match the productions, thus ensuring that each departing traveler finds a destination. While it is never possible to achieve a perfect match between productions and attractions prior to the automatic balancing procedure, the existence of a substantial mismatch in one or more trip purposes indicates that either land use inputs or trip generation factors may be in error.

Table 4 summarizes the local trip productions and attractions from the West Hollywood travel model for each trip purpose, prior to the application of the automatic balancing procedure. Guidelines published by Federal Highway Administration's Transportation Model Improvement Program (TMIP) and National Highway Cooperative Research Program (NCHRP) suggest that, prior to balancing, the number of productions and attractions should match to within plus or minus 10% (i.e., the production-to-attraction ratio should be within the range of 0.90 to 1.10). The results shown in Table 4 indicate that the 2008 model meets the published guidelines for all trip purposes.

In addition to production and attraction balancing, the percent of total trips for each purpose were checked for reasonableness. Typical values are provided below:

- HBW[1] trips 18% to 27% of all trips
- HBO trips: 47% to 54% of all trips
- NHB trips: 22% to 31% of all trips

It is important to note that West Hollywood as a city is somewhat unique, in that it is an activity center carved out of a large metropolitan area. Therefore, West Hollywood has a greater than average concentration of retail, restaurant, bar and nightclub uses, as well as a higher concentration of regional draws. This combination of uses attracting people from all from many areas leads to a higher level of non-home based trip making than other areas. Thus, the fact that West Hollywood trip rates fall slightly outside the normal distribution of HBO and NHB trip is to be expected given the nature of the City. This information, in conjunction with trip generation rate comparisons and trip purpose distributions discussed later in this report, indicates that the trip generation component of the West Hollywood model is performing reasonably.

[1] The trip purposes listed are the broad categories applied in most every travel model. The more specific West Hollywood trip purposes are subsets of these broader trip purposes, and have been aggregated here for ease of comparison. IXHBW and XIHBW are subsets of the HBW trip purpose. School, College, and REC are subsets of the HBO trip purpose.

TABLE 4 TRIP PRODUCTION TO ATTRACTION RATIOS BY PURPOSE			
		Percent of Total Daily Vehicle Trips	
Trip Purpose	**Production/ Attraction Ratio**	**2008 West Hollywood Model[1]**	**California[2]**
Home-Based Work (HBW)	0.98	22%	21%
Home-Based Other (HBO)	1.00	46%	48%
Non-Home-Based (NHB)	1.02	32%	31%
Total		100%	100%

[1] The trip purposes listed are the broad categories applied in most every travel model. The more specific West Hollywood trip purposes are subsets of these broader trip purposes, and have been aggregated here for ease of comparison. IXHBW and XIHBW are subsets of the HBW trip purpose. Regional Retail and Regional Hospital are subsets of the HBO trip purpose.

[2] 2000-2001 California Statewide Household Travel Survey Final Report, June 2002.

Note: May not total 100% due to rounding

Source: Fehr & Peers, 2009.

TABLE 5 DAILY VEHICLE TRIP GENERATION RATE COMPARISON		
Residential[1]		
Land Use Type	**Units**	**Daily Vehicle Trip Rate**
Single-Family (SF)	Dwelling Units	9.65
Multi-Family (MF)	Dwelling Units	5.30
Non-Residential[2]		
Land Use Type	**Units**	**Daily Vehicle Trip Rate**
Hotel	Thousand Square-feet	2.89
Restaurant	Thousand Square-feet	112.50
Bar/Nightclub	Thousand Square-feet	112.50
Recreational/Entertainment Facilities	Thousand Square-feet	45.00
Personal Services	Thousand Square-feet	41.36
Retail	Thousand Square-feet	43.54
Automotive Related	Thousand Square-feet	27.75
Office	Thousand Square-feet	11.44
Library/Museum	Thousand Square-feet	75.00
Senior Center	Thousand Square-feet	10.46
Police and Fire Services	Thousand Square-feet	9.47
Bus Yard	Thousand Square-feet	15.00
Elementary and Middle School	Students	1.94
High Schools	Students	1.31
Religious Facilities	Thousand Square-feet	13.67
Industrial	Thousand Square-feet	3.46
Galleries	Thousand Square-feet	4.34
PDC Showroom	Thousand Square-feet	1.52
Regional Retail	Employees	20.82
Regional Hospital	Employees	6.51
SCAG Retail1	Employees	18.50
SCAG Service1	Employees	4.34
SCAG Other1	Employees	2.73

Source: Fehr & Peers, 2009.

TRIP DISTRIBUTION (GRAVITY MODEL)

Once the trip generation step has determined the number of trips that begin and end in each zone, the trip distribution process determines the specific destination of each originating trip. The destination may be within the zone itself, resulting in an intra-zonal trip. If the destination is outside of the zone of origin, it is an inter-zonal trip. Internal-internal (I-I) trips originate and terminate within the model area. Trips that originate within but terminate outside of the model area are internal-external (I-X), and trips that originate outside and terminate inside of the model area are external-internal (X-I). Trips passing completely through the model area are external-external (E-E).

The trip distribution model uses a gravity model equation to distribute trips to all zones. This equation estimates an accessibility index for each zone based on the number of attractions in each zone and a friction factor, which is a function of travel time between zones. Each attraction zone is given its share of productions based on its share of the accessibility index. This process applies to the I-I, I-X, and X-I trips. The E-E trips are added to the trip table prior to final assignment.

Friction Factors

Friction factors, also known as travel time factors, determine the relative attractiveness of each destination zone based on the travel time between TAZs and the number of potential origins and destinations in each TAZ. These factors are used in the trip distribution stage of the model. The 2008 West Hollywood model friction factors are based on data reported in national modeling reference documents such as National Cooperative Highway Research Program (NCHRP) 365, and modified based on local conditions and comparison with the SCAG model. See Appendix B for friction factor curves.

Trips between the Model Area and External Areas

One of the important inputs to a travel model is an estimate of the amount of travel between the study area and neighboring areas outside the model. These are typically called internal-external, or I-X/X-I, trips.

The United States Census Bureau surveys residential and work locations at the place level. Table 6 illustrates the distribution of work locations for West Hollywood residents, while Table 7 illustrates the distribution of residential locations for West Hollywood employees. The census data is specific to West Hollywood, while the model area also encompasses parts of neighboring Los Angeles and Beverly Hills. It is assumed that a certain percentage of West Hollywood employees who live outside the City of West Hollywood live in the neighboring areas of Los Angeles and Beverly Hills included in the model area.

Based on this data, the proportion of HBW trips entering and leaving the study area was estimated. For non-work trip purposes, information from the SCAG Regional Model was used to develop an initial estimate of the percent of HBO and NHB trips that travel between West Hollywood and other areas. These estimates were then refined using the City's land use database. Table 8 summarizes the proportion of trips by purpose and area type that are assumed to have one end outside the model area.

After the number of I-X/X-I trips was estimated, these trips were distributed to the stations around the perimeter of the model area using external station weights. External station weights were based on counts collected at each external station. The number of through trips at each station was subtracted from the count and the remainder was made up of I-X/X-I trips. The resulting external station weights are presented in Figure 4.

Through Trips

Through trips (also called external-external, or EE trips) are those that pass through the study area without stopping inside the study area. The major flows of through traffic in the West Hollywood area use

Santa Monica Boulevard, with lower volumes of through traffic using various north-south streets. The size of these flows was estimated based on Caltrans traffic counts and the SCAG Regional Model. The through trips were modified in conjunction with the external station weights so that results at the model gateways accurately represented observed data. The resulting through trip matrix is summarized in Table 9.

TRIP ASSIGNMENT

The trip assignment process determines the route that each vehicle trip takes from origin to destination. The model selects these routes in a manner that is sensitive to congestion and the desire of drivers to minimize overall travel time. It uses an iterative, capacity-restrained assignment, and volume adjustments are made that progress towards equilibrium. This technique finds a travel path for each trip that minimizes travel time, while taking into account congestion delays caused by other trips in the model.

The general assignment process includes the following steps.

- Assign all trips to the links along their selected paths.
- After all assignments, examine the volume on each link and adjust its impedance based on the volume-to-capacity ratio.
- Repeat the assignment process for a set number of iterations or until specified criteria related to minimizing travel delays are satisfied.

Calibration of the street network included modification of the centroid connectors to more accurately represent the location at which traffic accesses local roads; adjustment of speeds from posted speed limits to reflect the attractiveness of the route and the prevailing speed of traffic; and refinement of turn penalties.

Turn Penalties

Turn penalties are used to prohibit or add delay to certain turning movements. The West Hollywood model prohibits traffic from making turns across impassable medians. In addition, the model does not allow U-turns in order to avoid counter-intuitive traffic routing. Information on prohibited turns was provided by the City and supplemented with field surveys and aerials.

TABLE 6 WORK LOCATIONS FOR WEST HOLLYWOOD RESIDENTS		
Year	**Percent Working Inside West Hollywood**	**Percent Working Outside West Hollywood**
2000	19%	81%
Source: U.S. Census Bureau.		

TABLE 7 RESIDENTIAL LOCATIONS FOR WEST HOLLYWOOD EMPLOYEES		
Year	**Percent Living Inside West Hollywood**	**Percent Living Outside West Hollywood**
2000	15%	85%
Source: U.S. Census Bureau.		

TABLE 8 PERCENT OF TRIPS BY PURPOSE THAT ARE INTERNAL/EXTERNAL		
Purpose	**Production**	**Attraction**
Home-Based Work (HBW)[1]	80%	84%
Home-Based Other (HBO)	40%	65%
Non-Home-Based (NHB)	41%	40%
Regional Retail (RRET)	N/A	96%
Regional Hospital (RHOS)	N/A	96%
[1] Percentages for HBW reported in this table also account for the IXHBW and XIHBW trip purposes. Source: Fehr & Peers, 2009.		

TABLE 9
MATRIX OF DAILY THROUGH (EE) TRIPS

Origin \ Destination	Sunset Boulevard West	Santa Monica Boulevard West	Doheny Drive South	Robertson Boulevard South	La Cienega Boulevard South	San Vicente Boulevard South	Beverly Boulevard East	Crescent Heights Boulevard South	Fairfax Avenue South	Vista Street South	La Brea Avenue South	Highland Avenue South	Melrose Avenue East	Willoughby Avenue East	Santa Monica Boulevard East	Fountain Avenue East	Sunset Boulevard East	Highland Avenue North	La Brea Avenue North	Gardner Street North	Fairfax Avenue North	Laurel Canyon Boulevard North	Total
Sunset Boulevard West		0	0	25	105	460	375	0	35	0	0	0	150	0	995	225	1,155	140	535	345	1,230	875	**6,650**
Santa Monica Boulevard West	0		0	0	0	0	1,925	0	0	0	0	0	545	0	470	210	495	240	0	745	890	860	**6,380**
Doheny Drive South	0	0		0	0	0	25	0	0	0	0	0	0	0	50	20	65	90	0	175	160	535	**1,120**
Robertson Boulevard South	25	0	0		0	0	0	0	0	0	0	0	25	0	55	0	0	50	20	30	85	740	**1,030**
La Cienega Boulevard South	105	0	0	0		0	355	150	0	0	0	0	0	0	0	0	0	0	0	35	160	585	**1,390**
San Vicente Boulevard South	460	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**460**
Beverly Boulevard East	375	1,925	25	0	355	0		0	0	0	0	0	450	0	0	0	0	0	0	125	295	325	**3,875**
Crescent Heights Boulevard South	0	0	0	0	150	0	0		0	0	0	0	55	0	0	55	20	335	20	335	475	2,190	**3,635**
Fairfax Avenue South	35	0	0	0	0	0	0	0		0	0	0	0	0	0	25	655	15	20	685	4,075	685	**6,195**
Vista Street South	0	0	0	0	0	0	0	0	0		0	0	40	0	0	0	25	70	340	215	0	0	**690**
La Brea Avenue South	0	0	0	0	0	0	0	0	0	0		0	2,720	0	35	610	895	4,110	4,535	90	60	0	**13,055**
Highland Avenue South	0	0	0	0	0	0	0	0	0	0	0		150	0	265	0	60	14,350	130	25	60	0	**15,040**
Melrose Avenue East	150	545	0	25	0	0	450	55	0	40	2,720	150		0	570	245	0	0	0	0	0	0	**4,950**
Willoughby Avenue East	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	**0**
Santa Monica Boulevard East	995	470	50	55	0	0	0	0	0	0	35	265	570	0		0	0	0	730	0	25	0	**3,195**
Fountain Avenue East	225	210	20	0	0	0	0	55	25	0	610	0	245	0	0		0	0	25	0	0	0	**1,415**
Sunset Boulevard East	1,155	495	65	0	0	0	0	20	655	25	895	60	0	0	0	0		0	0	45	20	0	**3,435**
Highland Avenue North	140	240	90	50	0	0	0	335	15	70	4,110	14,350	0	0	0	0	0		0	0	0	0	**19,400**
La Brea Avenue North	535	0	0	20	0	0	0	20	20	340	4,535	130	0	0	730	25	0	0		0	0	0	**6,355**
Gardner Street North	345	745	175	30	35	0	125	335	685	215	90	25	0	0	0	0	45	0	0		25	0	**2,875**
Fairfax Avenue North	1,230	890	160	85	160	0	295	475	4,075	0	60	60	0	0	25	0	20	0	0	25		0	**7,560**
Laurel Canyon Boulevard North	875	860	535	740	585	0	325	2,190	685	0	0	0	0	0	0	0	0	0	0	0	0		**6,795**
Total	**6,650**	**6,380**	**1,120**	**1,030**	**1,390**	**460**	**3,875**	**3,635**	**6,195**	**690**	**13,055**	**15,040**	**4,950**	**0**	**3,195**	**1,415**	**3,435**	**19,400**	**6,355**	**2,875**	**7,560**	**6,795**	**23,380**

Note: All trips are rounded to the nearest 5.
Source: SCAG

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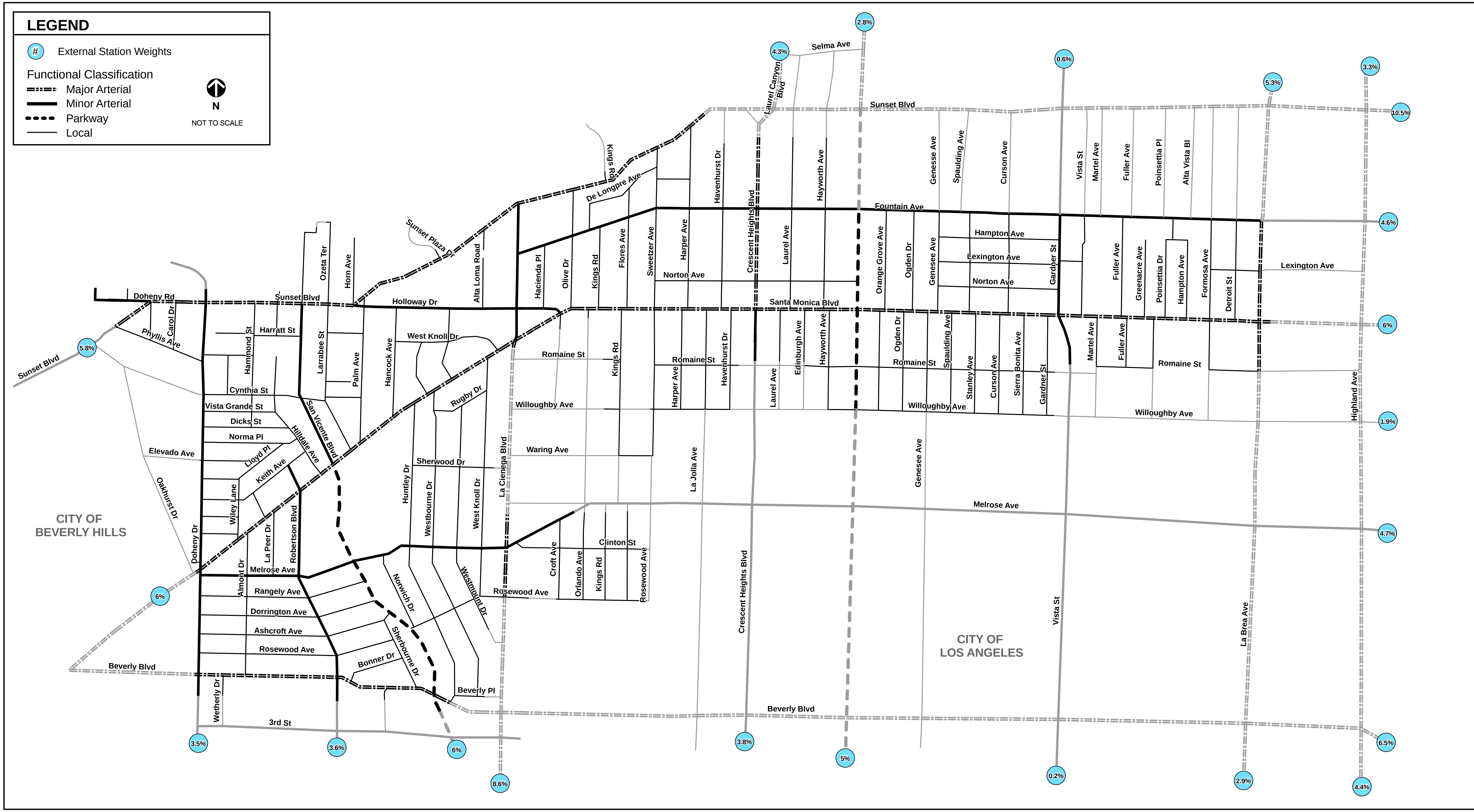

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CITY OF WEST HOLLYWOOD GENERAL PLAN UPDATE
EXTERNAL STATION WEIGHTS

FIGURE 3

MODEL VALIDATION

Model validation is the term used to describe model performance in terms of how closely the model's output matches existing travel data in the base year. During the model development process, these outputs are used to further calibrate model inputs. The extent to which model outputs match existing travel data validates the assumptions of the inputs.

Traditionally, most model validation guidelines have focused on the performance of the trip assignment function in accurately assigning trips to the street network. This metric is called static validation, and it remains the most common means of measuring model accuracy.

Models are seldom used for static applications, however; by far the most common use of models is to forecast how a change in inputs would result in a change in traffic conditions. Therefore, another test of a model's accuracy focuses on the model's ability to predict realistic differences in outputs as inputs are changed. This method is referred to as dynamic validation. This section describes the highest-level validation checks that have been performed for the West Hollywood model.

STATIC VALIDATION

The most critical static measurement of the accuracy of any travel model is the degree to which it can approximate actual traffic counts in the base year. Caltrans has established certain trip assignment guidelines for models forecasting future year traffic in *Travel Forecasting Guidelines* (California Department of Transportation, November 1992). The validity of the West Hollywood model was tested under daily, AM peak hour, Mid-Day (MD) peak hour, and PM peak hour conditions. Model volumes were compared to existing traffic counts at 107 individual count sites for daily validation, 214 count sites for AM peak hour validation, 217 count sites for PM peak hour validation, and 233 counts sites for MD peak hour validation[2]. The results are shown in Tables 10 and 11.

Link volume results from model runs were examined and checked for reasonableness. Links where model results varied substantially from the observed counts were identified, and the characteristics of these links were reviewed to ensure that the link attributes reflected local operating conditions. In some cases, link characteristics such as speeds were modified to better reflect conditions on the ground.

Comparison Techniques

Travel model accuracy is usually tested using four comparison techniques:

- The volume-to-count ratio is computed by dividing the model volume by the actual traffic count for individual roadways (or intersections) area-wide.
- The maximum deviation is the difference between the model volume and the actual count divided by the actual count.
- The correlation coefficient estimates the relationship between actual traffic counts and the estimated traffic volumes from the model.

[2] The difference in the number of count locations between the different analysis periods is attributable to the availability of counts and the counts meeting a minimum threshold of 100 trips. Streets with volumes lower than 100 trips tend to see fluctuations greater than can be accounted for with a travel model.

- The percent root mean square error (RMSE) is the square root of the model volume minus the actual count squared, divided by the number of counts. It is a measure similar to standard deviation in that it assesses the accuracy of the entire model.

TABLE 10 RESULTS OF DAILY MODEL VALIDATION		
Validation Item	**Criterion for Acceptance**	**Model Results**
Count Locations	N/A	107
% of Links Within Caltrans Standard Deviations	At Least 75%	77%
% of Screenlines Within Caltrans Standard Deviations	100%	100%
2-way Sum of All Links Counted	Within ± 10%	-5%
Correlation Coefficient	Greater than 88%	91%
RMSE	40% or less	23%
Source: Fehr & Peers, 2009.		

TABLE 11 RESULTS OF PEAK HOUR MODEL VALIDATION				
Validation Item	**Criterion for Acceptance**	**AM Peak Hour Model Results**	**PM Peak Hour Model Results**	**MD Peak Hour Model Results**
Count Locations	N/A	214	217	233
% of Links Within Caltrans Standard Deviations	At Least 75%	78%	76%	78%
% of Screenlines Within Caltrans Standard Deviations	100%	100%	100%	100%
2-way Sum of All Links Counted	Within ± 10%	0%	2%	-3%
Correlation Coefficient	Greater than 88%	93%	94%	95%
RMSE	40% or less	24%	23%	21%
Source: Fehr & Peers, 2009.				

Validation Guidelines

For a model to be considered accurate and appropriate for use in travel forecasting, it must replicate actual conditions within a certain level of accuracy. Since it would be impossible for any model to replicate all counts precisely, validation guidelines have been established by Caltrans and other agencies. Key validation standards for daily travel models based on the Caltrans guidelines are summarized below:

- At least 75 percent of the roadway links for which counts are available should be within the maximum desirable deviation, which ranges from approximately 15 to 60 percent depending on total volume (the larger the volume, the less deviation is permitted).
- All of the roadway screenlines should be within the maximum desirable deviation, which ranges from approximately 15 to 64 percent depending on total volume.
- The two-way sum of the volumes on all roadway links for which counts are available should be within 10 percent of the counts.
- The correlation coefficient between the actual ground counts and the estimated traffic volumes should be greater than 88 percent.

Although not stated in the Caltrans standards, an additional Fehr & Peers validation guideline was applied to the West Hollywood model:

- The RMSE should not exceed 40 percent.

DYNAMIC VALIDATION

The traditional approach to the validation of travel demand models is to compare the link volumes for the model's base year to actual traffic counts. This approach provides information on a model's ability to reproduce a static condition. While reproducing these conditions is very important, it is also important to know that the model will produce stable and reasonable results when various inputs such as land use are changed. The following section presents a selection of the dynamic validation results.

Land Use Changes

A basic form of dynamic validation is to vary the amounts of a particular land use type and compare the magnitude and direction of change from the original forecast. Of particular interest are changes in:

- Vehicle Trips (VT)
- Change in VT per land use unit change (VT/DU or KSF)
- Vehicle Miles Traveled (VMT)
- Change in VMT per land use unit change (VMT/DU or KSF)
- Vehicle Hours Traveled (VHT)
- Change in VHT per land use unit change (VHT/DU or KSF)
- Vehicle miles traveled per vehicle trip (VMT/VT)

This form of dynamic validation was performed on the West Hollywood model by adjusting the number of multi-family dwelling units and the retail development in TAZs 92 and 17. These zones were selected due to the differences in their geographic location. To isolate each of these changes, tests were done sequentially, changing one item at a time.

Figure 4 shows the location of the zones that were used for dynamic validation. Zone 92 is located on Santa Monica Boulevard near the intersection of La Jolla and contains a broad mix of residential and non-residential land uses. Zone 17 is located on Sunset Boulevard towards the western end of the Sunset Strip (around Palm Avenue) and also contains a broad mix of residential and non-residential land uses. The results are shown in Table 12.

- Adding a single DU to the model is a test of how much noise (random error) is in the model. Total VMT changed by between 9 and 12 vehicle miles per day per dwelling unit added, depending on the zone it was added to. Both zones showed a little noise when a single dwelling unit was added. However, both zones perform very well when a realistic quantity of development is added.

- The change in VT per added DU ranges from 3 – 5, but when more than one dwelling unit is added, the model produces stable and reasonable results.

- The VHT per DU change is fairly stable around 0 to 1. There is some noise when adding a single dwelling unit to either zone. Again, the noise at this extremely small level of change is no longer present for typical increases in the level of development.

- Adding retail land uses to either zone shows a high level of stability and logical results in all metrics. VMT/KSF and VHT/KSF is lower for the Santa Monica Boulevard zone than the Sunset Boulevard zone. These results should be expected given more central location of the Santa Monica Boulevard zone.

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CITY OF WEST HOLLYWOOD GENERAL PLAN UPDATE
TAZs USED FOR DYNAMIC MODEL VALIDATION

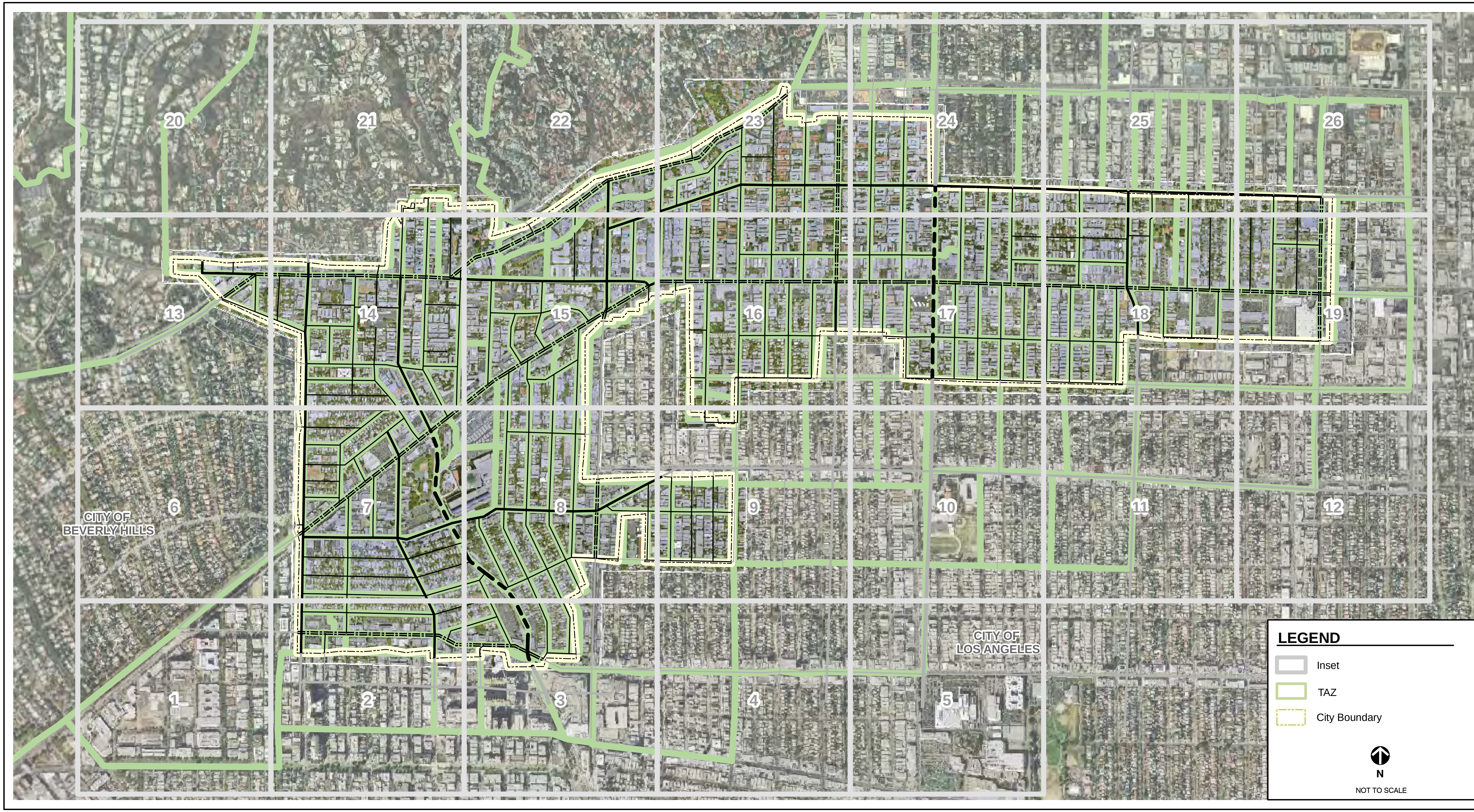
FIGURE 4

TABLE 12 RESULTS OF DYNAMIC VALIDATION TESTS								
TAZ	Scenario	Vehicle Trips (VT)1	Change in VT/DU or KSF Change	Vehicle Miles Traveled (VMT)1	Change in VMT/DU or KSF Change	Vehicle Hours Traveled (VHT)1	Change in VHT/DU or KSF Change	VMT/VT
Residential Land Use Results - Multifamily Unit with 1 Car								
Base Case		750,413	N/A	1,061,032	N/A	38,216	N/A	1.41
92 - Santa Monica	Added 1 DU	750,416	3.0	1,061,044	12.0	38,217	1.0	1.41
	Added 50 DUs	750,623	4.2	1,061,347	6.3	38,235	0.4	1.41
	Added 100 DUs	750,835	4.2	1,061,662	6.3	38,254	0.4	1.41
17 - Sunset	Added 1 DU	750,418	5.0	1,061,041	9.0	38,216	0.0	1.41
	Added 50 DUs	750,625	4.2	1,061,387	7.1	38,238	0.4	1.41
	Added 100 DUs	750,834	4.2	1,061,737	7.1	38,259	0.4	1.41
Retail Land Use Results								
Base Case		750,413	N/A	1,061,032	N/A	38,216	N/A	1.41
92 - Santa Monica	Added 1 KSF	750,445	32.0	1,061,072	40.0	38,219	3.0	1.41
	Added 10 KSF	750,734	32.1	1,061,499	46.7	38,244	2.8	1.41
	Added 50 KSF	753,633	32.2	1,065,663	46.3	38,493	2.8	1.41
17 - Sunset	Added 1 KSF	750,445	32.0	1,061,086	54.0	38,220	4.0	1.41
	Added 10 KSF	750,735	32.2	1,061,607	57.5	38,251	3.5	1.41
	Added 50 KSF	753,616	32.0	1,066,779	57.5	38,576	3.6	1.42

[1] VT, VMT, and VHT, as reported here, represent all model area trips on the model network, including through trips. This approach is taken to measure the effect of these changes on the model area as a whole. Performance measures reported in other documents using model data may differ in methodological approach.

Source: Fehr & Peers, 2009.

APPENDIX A:
TRAFFIC ANALYSIS ZONES KEY MAP



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CITY OF WEST HOLLYWOOD
TRAFFIC ANALYSIS ZONES

KEY MAP

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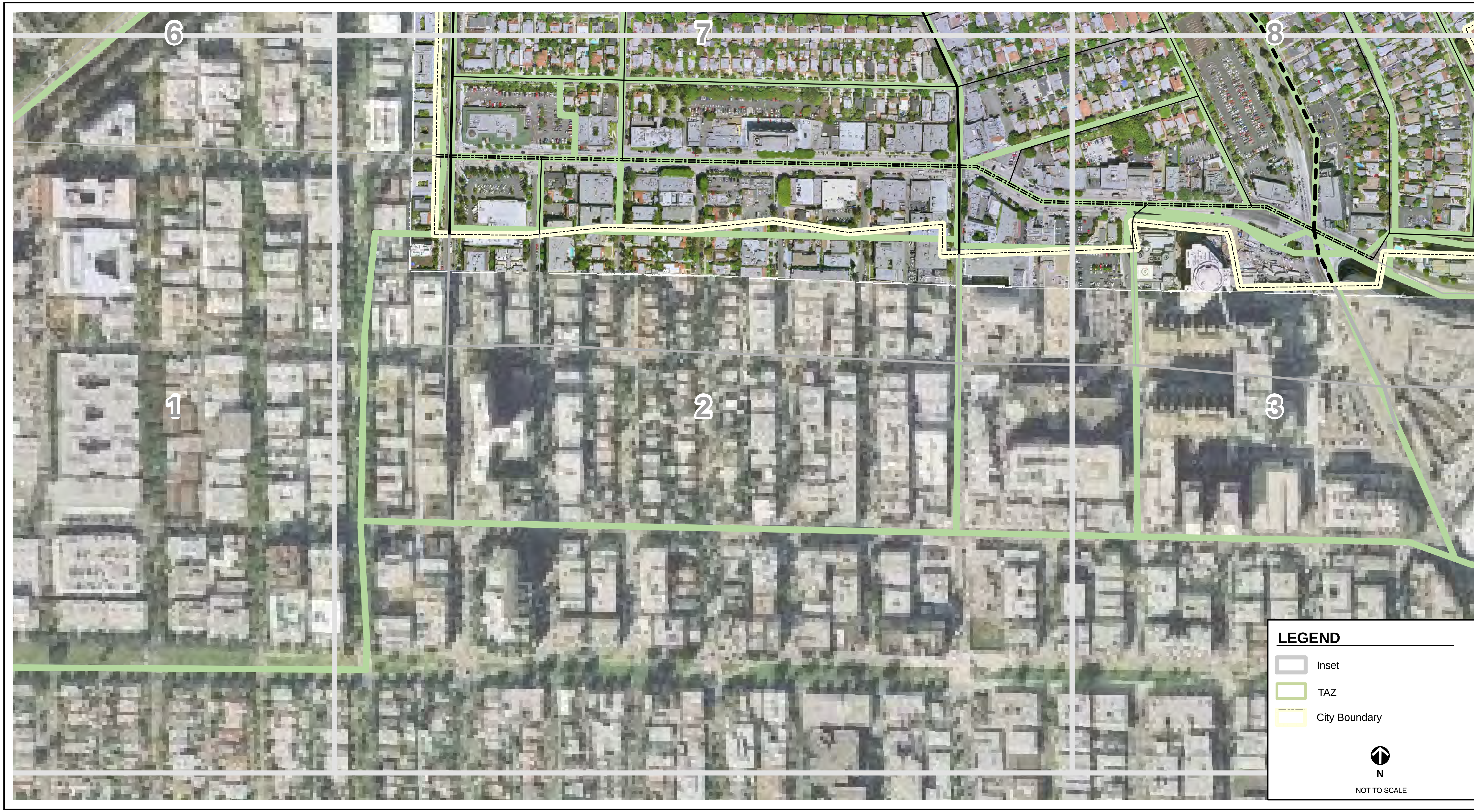
CITY OF WEST HOLLYWOOD
TRAFFIC ANALYSIS ZONES

INSET 1



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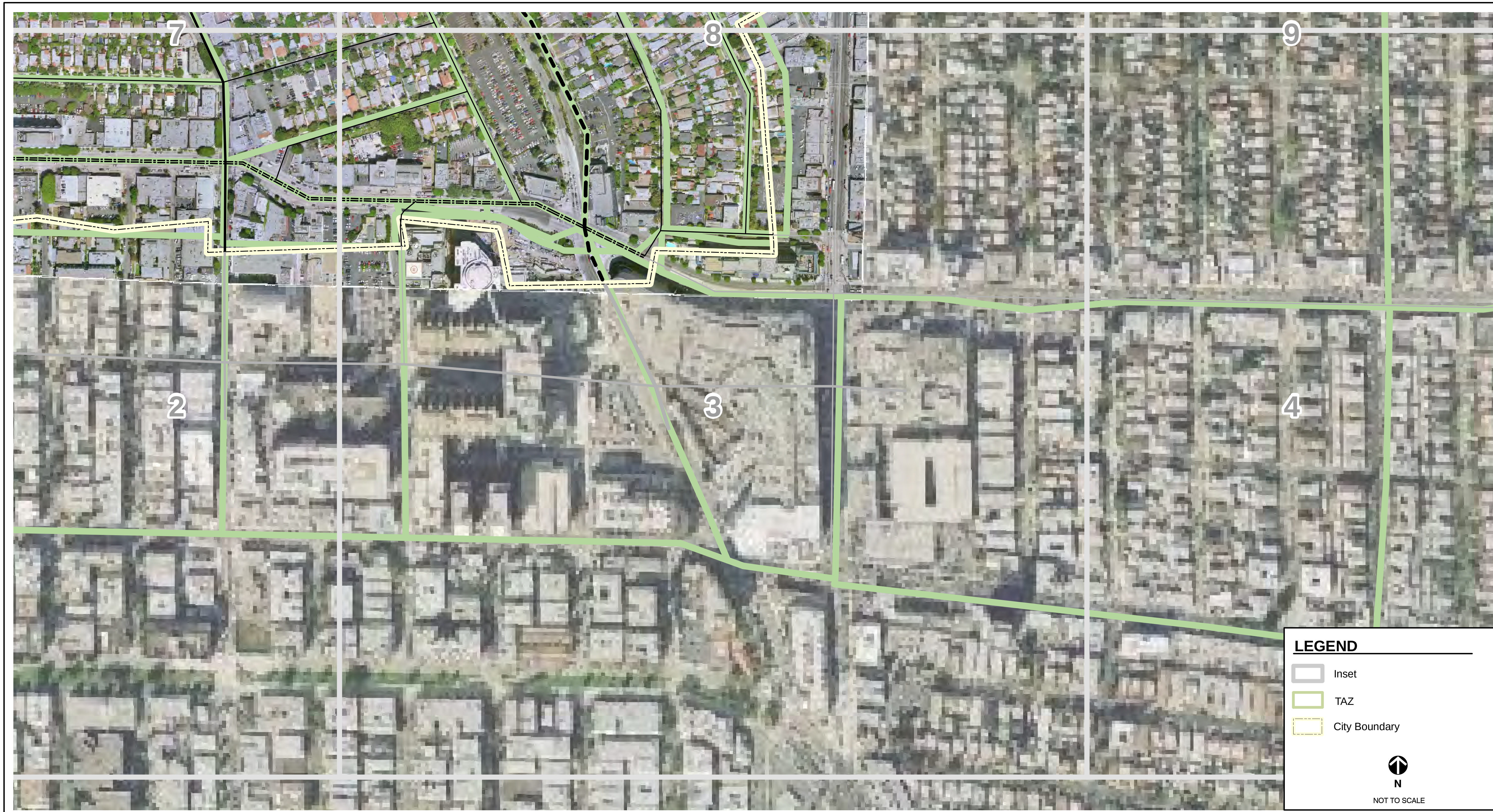
TRAFFIC ANALYSIS ZONES
INSET 2



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TRAFFIC ANALYSIS ZONES
INSET 3

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TRAFFIC ANALYSIS ZONES
INSET 4

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TRAFFIC ANALYSIS ZONES

INSET 5

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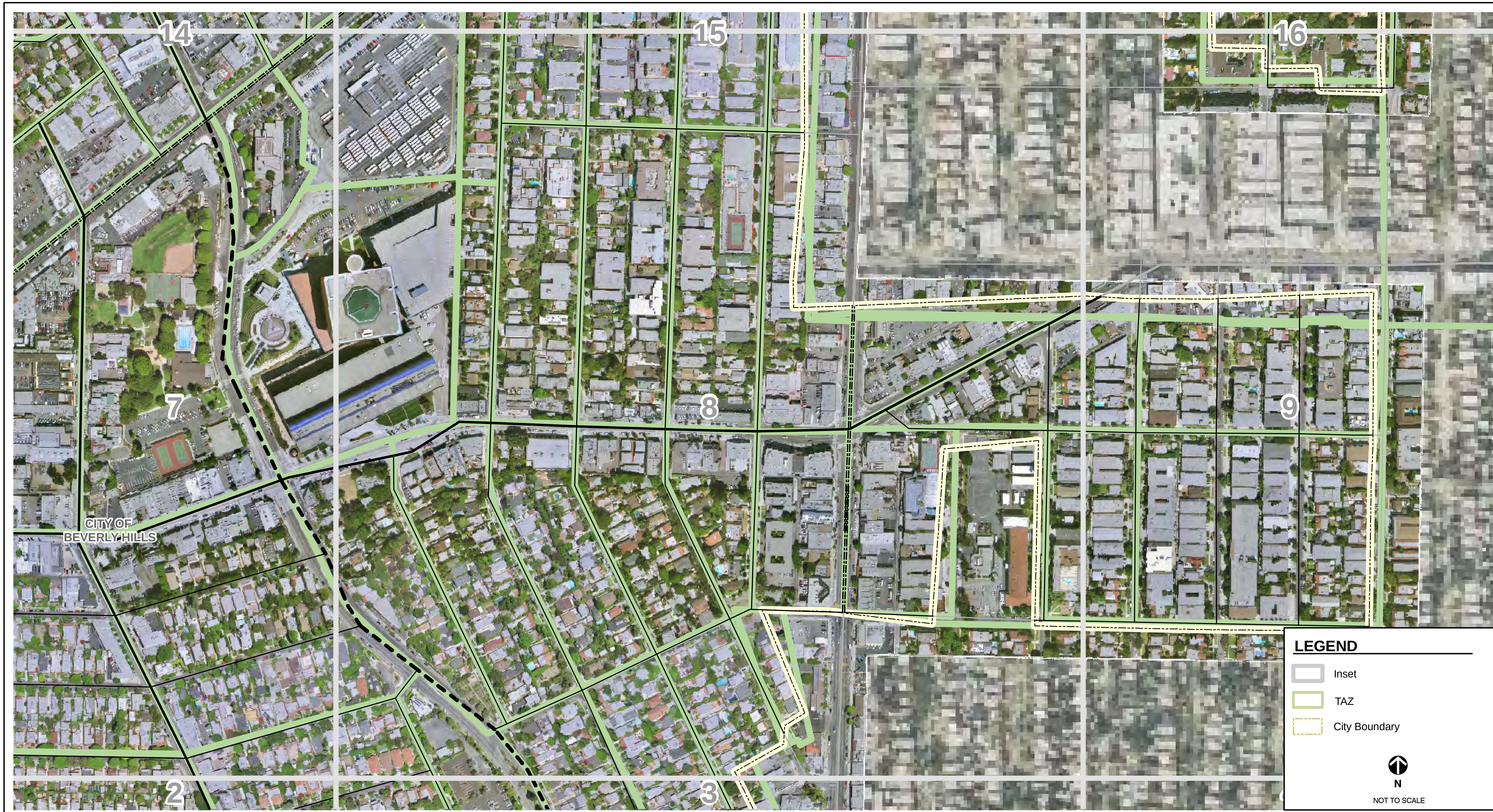
TRAFFIC ANALYSIS ZONES
INSET 7



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CITY OF WEST HOLLYWOOD
TRAFFIC ANALYSIS ZONES
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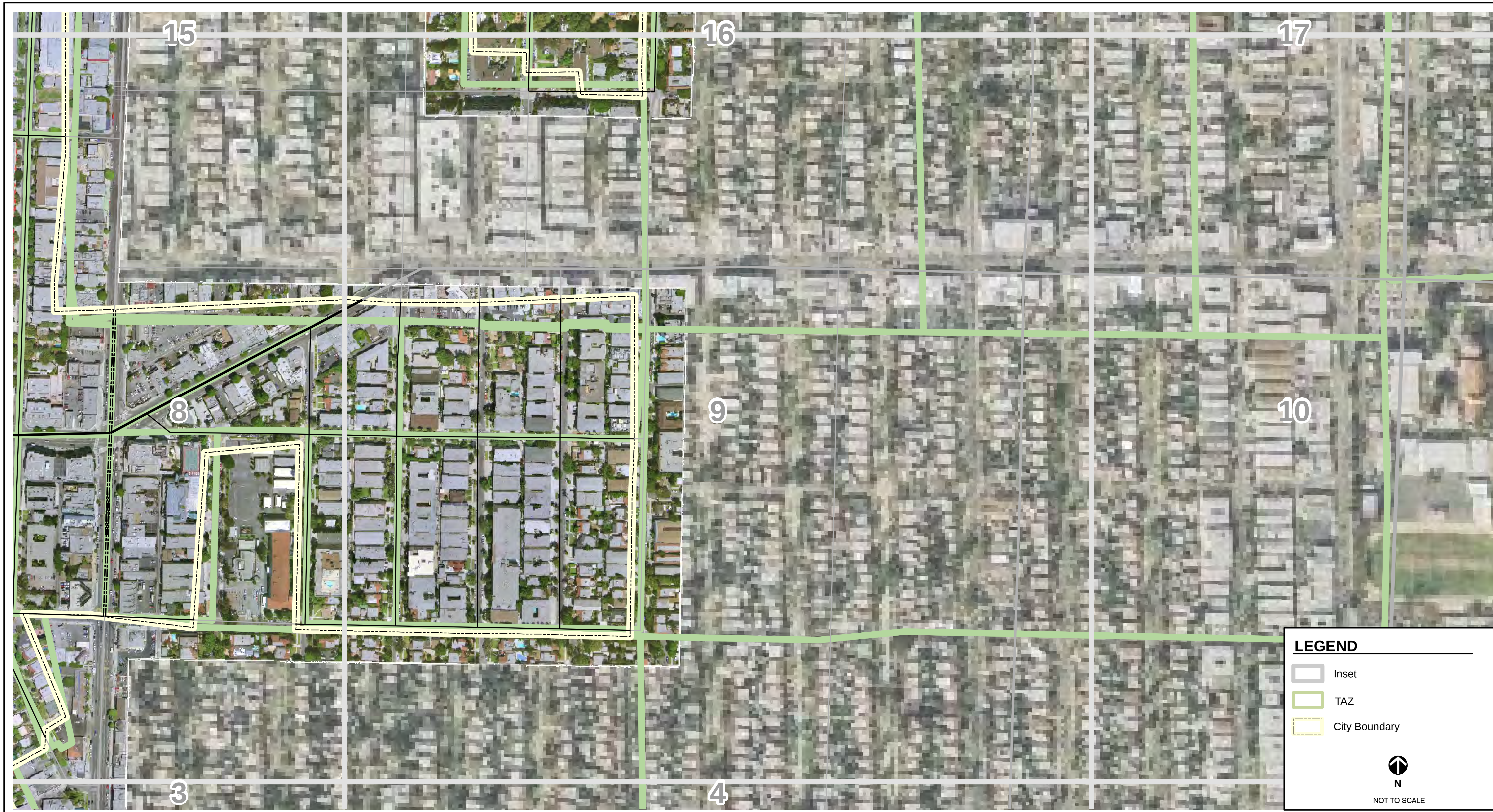

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TRAFFIC ANALYSIS ZONES
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TRAFFIC ANALYSIS ZONES
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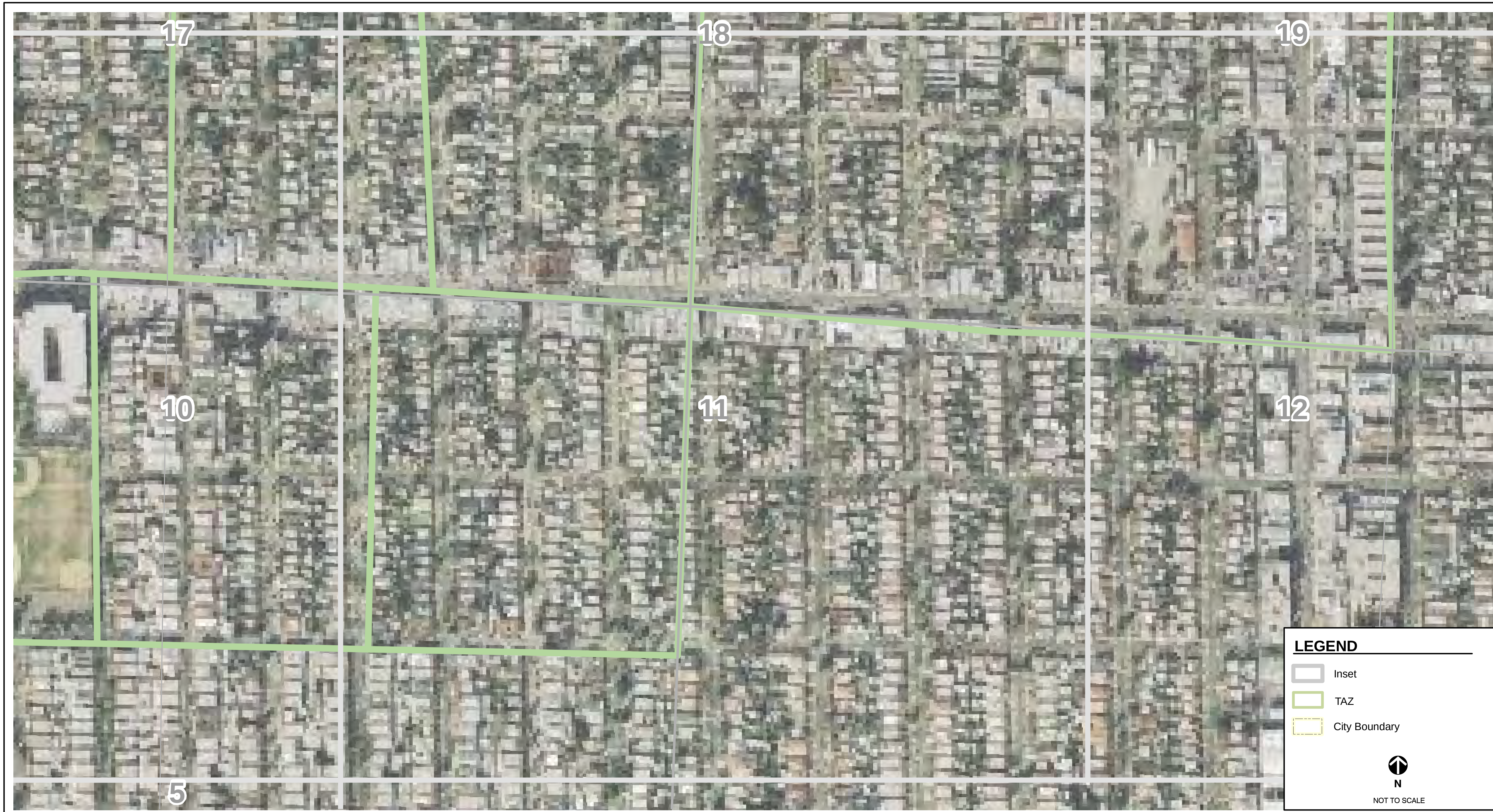

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TRAFFIC ANALYSIS ZONES

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TRAFFIC ANALYSIS ZONES

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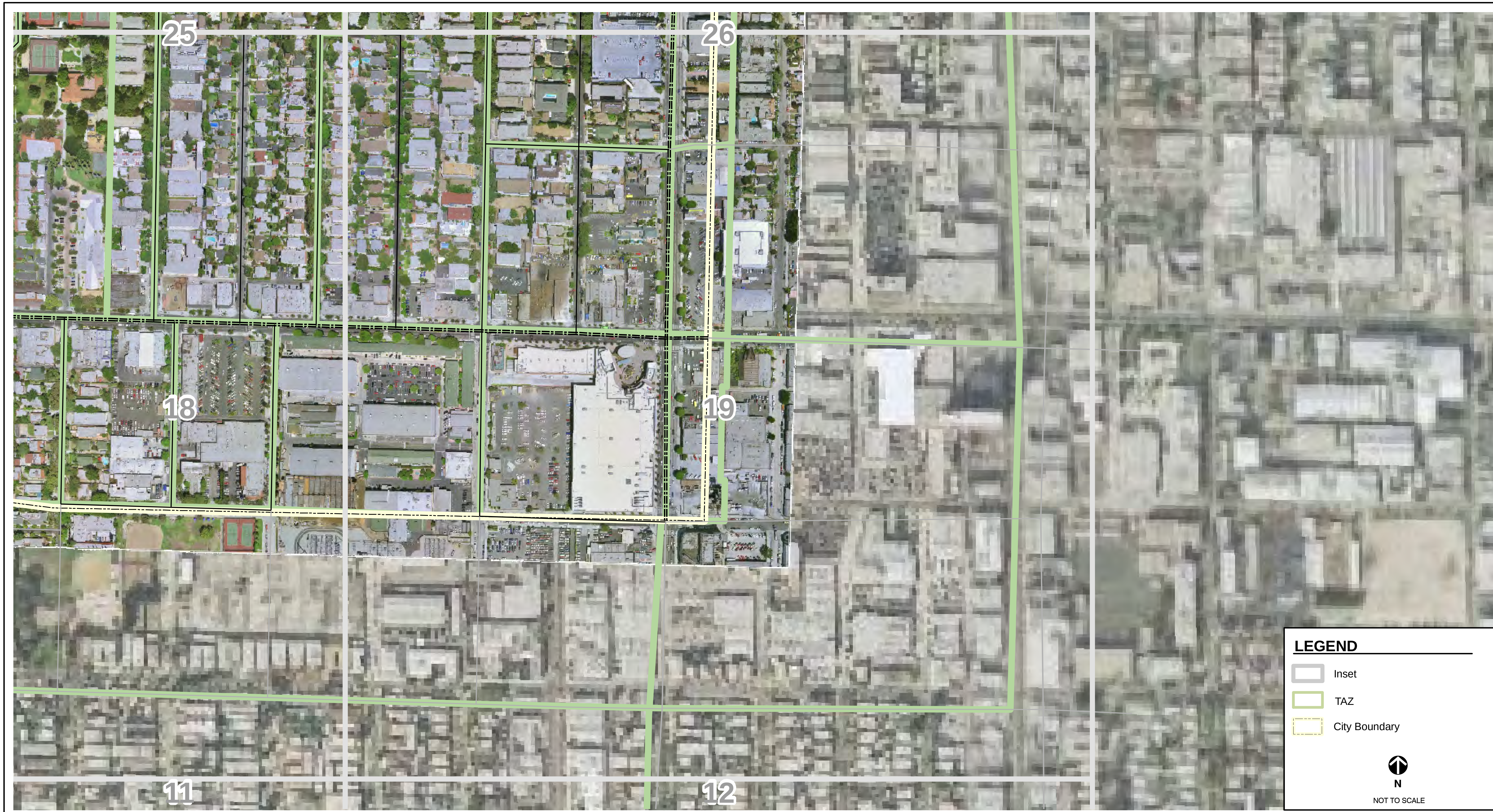

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TRAFFIC ANALYSIS ZONES
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TRANSPORTATION CONSULTANTS

CITY OF WEST HOLLYWOOD
TRAFFIC ANALYSIS ZONES
INSET 24

FEHR & PEERS
TRANSPORTATION CONSULTANTS

CITY OF WEST HOLLYWOOD
TRAFFIC ANALYSIS ZONES

INSET 25

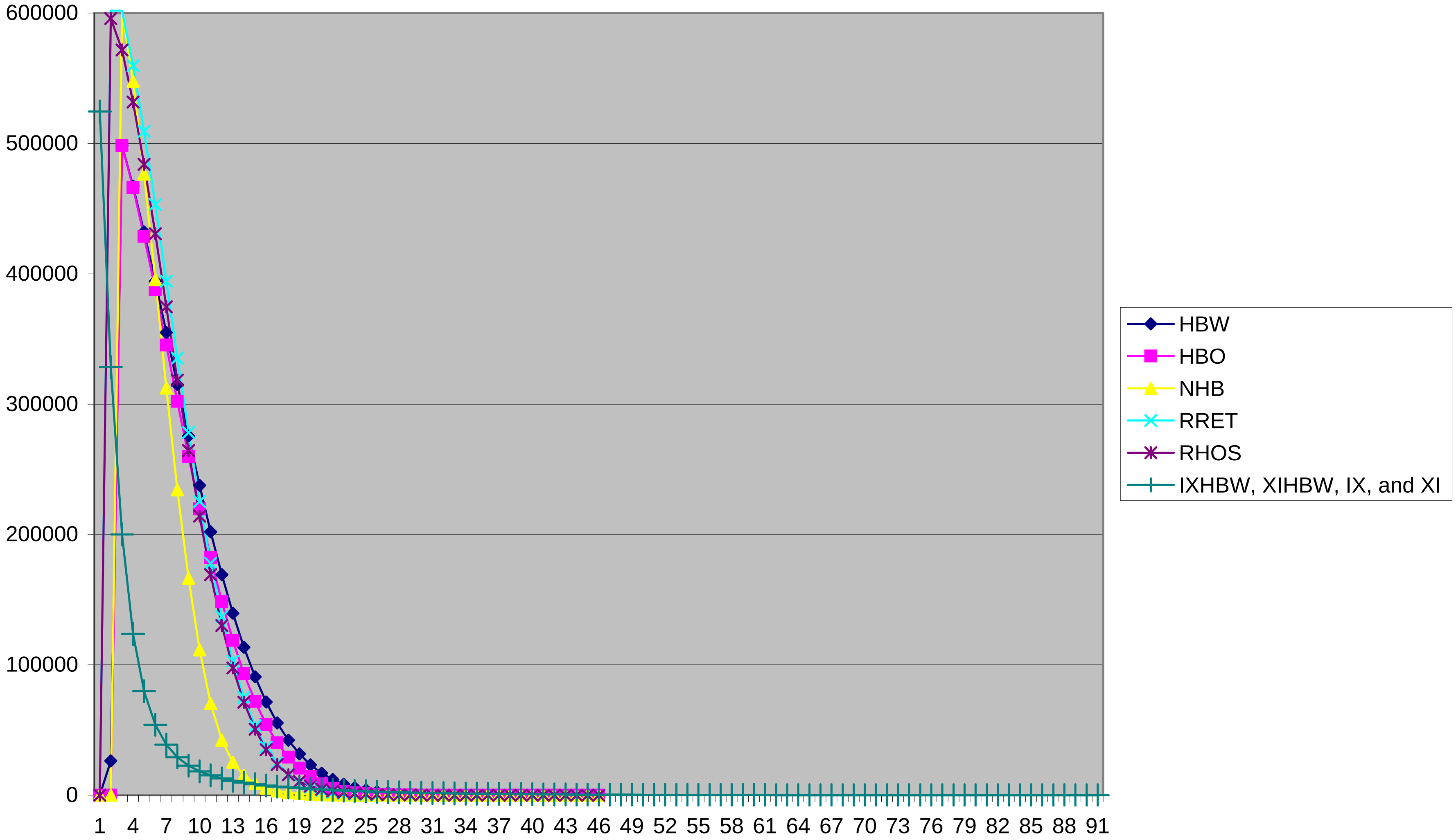
FEHR & PEERS
TRANSPORTATION CONSULTANTS

CITY OF WEST HOLLYWOOD
TRAFFIC ANALYSIS ZONES

INSET 26

APPENDIX B:
WEST HOLLYWOOD MODEL FRICTION FACTOR CURVES

APPENDIX B
Friction Factors



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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	1.00		0.95	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (prot)	1509	2970		1509	3018	1350	1509	1566		1433	1451	
Flt Permitted	0.06	1.00		0.25	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (perm)	101	2970		394	3018	1350	1509	1566		1433	1451	
Volume (vph)	20	887	104	44	1648	264	73	54	6	168	58	15
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	934	109	46	1735	278	77	57	6	177	61	16
RTOR Reduction (vph)	0	6	0	0	0	71	0	4	0	0	4	0
Lane Group Flow (vph)	21	1037	0	46	1735	207	77	59	0	125	125	0
Turn Type	pm+pt			Perm		Perm	Split			Split		
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6			2		2						
Actuated Green, G (s)	82.6	82.6		77.6	77.6	77.6	10.5	10.5		14.9	14.9	
Effective Green, g (s)	82.6	82.6		77.6	77.6	77.6	10.5	10.5		14.9	14.9	
Actuated g/C Ratio	0.69	0.69		0.65	0.65	0.65	0.09	0.09		0.12	0.12	
Clearance Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	1.0	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	81	2044		255	1952	873	132	137		178	180	
v/s Ratio Prot	0.00	c0.35			c0.57		c0.05	0.04		c0.09	0.09	
v/s Ratio Perm	0.18			0.12		0.15						
v/c Ratio	0.26	0.51		0.18	0.89	0.24	0.58	0.43		0.70	0.69	
Uniform Delay, d1	14.7	9.0		8.5	17.6	8.8	52.6	51.9		50.4	50.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.9		1.5	6.5	0.6	6.4	2.2		11.8	10.9	
Delay (s)	15.3	9.9		10.0	24.1	9.5	59.1	54.1		62.3	61.3	
Level of Service	B	A		B	C	A	E	D		E	E	
Approach Delay (s)		10.0			21.8			56.8			61.8	
Approach LOS		A			C			E			E	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.91	0.95		1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)	1509	3018	1350	1509	3000		1433	1405	1282		1529	
Flt Permitted	0.06	1.00	1.00	0.20	1.00		0.45	0.59	1.00		0.77	
Satd. Flow (perm)	100	3018	1350	311	3000		685	856	1282		1208	
Volume (vph)	16	923	78	173	1689	68	173	65	106	85	82	22
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	972	82	182	1778	72	182	68	112	89	86	23
RTOR Reduction (vph)	0	0	26	0	3	0	0	0	103	0	4	0
Lane Group Flow (vph)	17	972	56	182	1847	0	91	159	9	0	194	0
Turn Type	Perm		Perm	pm+pt			Perm		Over	Perm		
Protected Phases		6		5	2			4	5		8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	63.3	63.3	63.3	76.5	76.5		16.0	16.0	10.2		16.5	
Effective Green, g (s)	63.3	63.3	63.3	76.5	76.5		15.5	15.5	9.2		16.0	
Actuated g/C Ratio	0.53	0.53	0.53	0.64	0.64		0.13	0.13	0.08		0.13	
Clearance Time (s)	4.0	4.0	4.0	3.0	4.0		3.5	3.5	3.0		3.5	
Vehicle Extension (s)	4.5	4.5	4.5	1.0	4.5		2.0	2.0	1.0		4.0	
Lane Grp Cap (vph)	53	1592	712	290	1913		88	111	98		161	
v/s Ratio Prot		0.32		0.05	c0.62				0.01			
v/s Ratio Perm	0.17		0.04	0.35			0.13	c0.19			c0.16	
v/c Ratio	0.32	0.61	0.08	0.63	0.97		1.03	1.43	0.09		1.20	
Uniform Delay, d1	16.1	19.8	14.0	12.4	20.5		52.2	52.2	51.5		52.0	
Progression Factor	1.00	1.00	1.00	1.33	1.17		1.00	1.00	1.00		1.00	
Incremental Delay, d2	15.3	1.8	0.2	1.5	8.3		105.5	238.4	0.1		135.9	
Delay (s)	31.4	21.5	14.2	18.0	32.3		157.8	290.7	51.6		187.9	
Level of Service	C	C	B	B	C		F	F	D		F	
Approach Delay (s)		21.1			31.0			183.3			187.9	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	51.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.95	0.91	0.95	1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2948		1509	3013		1433	1385	1282	1509	1514	
Flt Permitted	0.08	1.00		0.20	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	131	2948		310	3013		1433	1385	1282	1509	1514	
Volume (vph)	4	938	171	110	1828	18	205	14	171	27	42	19
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	4	987	180	116	1924	19	216	15	180	28	44	20
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	163	0	15	0
Lane Group Flow (vph)	4	1158	0	116	1943	0	116	115	17	28	49	0
Turn Type	Perm			pm+pt			Split		pm+ov	Split		
Protected Phases		6		5	2		4	4	5	3	3	
Permitted Phases	6			2					4			
Actuated Green, G (s)	86.1	86.1		94.2	94.2		7.0	7.0	12.1	7.8	7.8	
Effective Green, g (s)	86.1	86.1		94.2	94.2		7.0	7.0	11.1	6.8	6.8	
Actuated g/C Ratio	0.72	0.72		0.79	0.79		0.06	0.06	0.09	0.06	0.06	
Clearance Time (s)	4.0	4.0		3.0	4.0		4.0	4.0	3.0	3.0	3.0	
Vehicle Extension (s)	4.5	4.5		1.0	4.5		2.0	2.0	1.0	2.0	2.0	
Lane Grp Cap (vph)	94	2115		284	2365		84	81	161	86	86	
v/s Ratio Prot		0.39		0.01	c0.64		0.08	c0.08	0.00	0.02	c0.03	
v/s Ratio Perm	0.03			0.31					0.01			
v/c Ratio	0.04	0.55		0.41	0.82		1.38	1.42	0.10	0.33	0.57	
Uniform Delay, d1	4.9	7.9		4.8	7.8		56.5	56.5	49.9	54.4	55.2	
Progression Factor	0.85	1.85		1.33	1.25		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.9		0.2	2.3		229.5	246.5	0.1	0.8	5.1	
Delay (s)	4.9	15.5		6.7	12.1		286.0	303.0	50.0	55.2	60.2	
Level of Service	A	B		A	B		F	F	D	E	E	
Approach Delay (s)		15.5			11.8			187.4			58.7	
Approach LOS		B			B			F			E	

Intersection Summary			
HCM Average Control Delay	33.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.89			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1509	3010		1509	3015			1412			1474	
Flt Permitted	0.09	1.00		0.21	1.00			0.96			0.73	
Satd. Flow (perm)	136	3010		341	3015			1365			1098	
Volume (vph)	12	1145	21	21	1860	11	9	8	58	32	17	32
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	1205	22	22	1958	12	9	8	61	34	18	34
RTOR Reduction (vph)	0	1	0	0	0	0	0	56	0	0	21	0
Lane Group Flow (vph)	13	1226	0	22	1970	0	0	22	0	0	65	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	102.1	102.1		102.1	102.1			9.9			9.9	
Effective Green, g (s)	102.1	102.1		102.1	102.1			9.9			9.9	
Actuated g/C Ratio	0.85	0.85		0.85	0.85			0.08			0.08	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	4.5	4.5		4.5	4.5			3.0			3.0	
Lane Grp Cap (vph)	116	2561		290	2565			113			91	
v/s Ratio Prot		0.41			c0.65							
v/s Ratio Perm	0.10			0.06				0.02			c0.06	
v/c Ratio	0.11	0.48		0.08	0.77			0.19			0.71	
Uniform Delay, d1	1.5	2.3		1.4	3.9			51.3			53.7	
Progression Factor	2.21	1.88		1.00	0.84			1.00			1.00	
Incremental Delay, d2	1.7	0.6		0.2	1.1			0.8			23.1	
Delay (s)	5.0	4.8		1.7	4.3			52.2			76.8	
Level of Service	A	A		A	A			D			E	
Approach Delay (s)		4.8			4.3			52.2			76.8	
Approach LOS		A			A			D			E	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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	1.00
Frt	1.00	1.00		1.00	0.99			0.91			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.95	1.00
Satd. Flow (prot)	1509	3014		1509	2990			1422			1513	1350
Flt Permitted	0.17	1.00		0.35	1.00			0.95			0.73	1.00
Satd. Flow (perm)	264	3014		554	2990			1367			1154	1350
Volume (vph)	59	728	6	20	1255	81	1	0	2	97	1	75
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	766	6	21	1321	85	1	0	2	102	1	79
RTOR Reduction (vph)	0	0	0	0	3	0	0	2	0	0	0	79
Lane Group Flow (vph)	62	772	0	21	1403	0	0	1	0	0	103	0
Turn Type	Perm			Perm			Perm			Perm		NA
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	96.7	96.7		96.7	96.7			15.3			15.3	0.0
Effective Green, g (s)	96.7	96.7		96.7	96.7			15.3			15.3	0.0
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.13			0.13	0.00
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	213	2429		446	2409			174			147	0
v/s Ratio Prot		0.26			c0.47							
v/s Ratio Perm	0.23			0.04				0.00			c0.09	
v/c Ratio	0.29	0.32		0.05	0.58			0.01			0.70	0.00
Uniform Delay, d1	3.0	3.0		2.4	4.3			45.7			50.2	60.0
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	3.4	0.3		0.2	1.0			0.0			14.0	0.0
Delay (s)	6.4	3.4		2.6	5.3			45.7			64.2	60.0
Level of Service	A	A		A	A			D			E	E
Approach Delay (s)		3.6			5.3			45.7			62.4	
Approach LOS		A			A			D			E	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)	1509	2975		1509	3016			1515	1350		1519	
Flt Permitted	0.16	1.00		0.19	1.00			0.95	1.00		0.98	
Satd. Flow (perm)	247	2975		296	3016			1515	1350		1519	
Volume (vph)	2	936	97	195	1409	5	150	6	116	12	13	6
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2	985	102	205	1483	5	158	6	122	13	14	6
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	94	0	6	0
Lane Group Flow (vph)	2	1084	0	205	1488	0	0	164	28	0	27	0
Turn Type	Perm			pm+pt			Split		pm+ov	Split		
Protected Phases		6		5	2		4	4	5	8	8	
Permitted Phases	6			2					4			
Actuated Green, G (s)	78.6	78.6		93.7	93.7			18.8	30.9		5.5	
Effective Green, g (s)	78.6	78.6		93.7	93.7			18.8	29.9		5.5	
Actuated g/C Ratio	0.60	0.60		0.72	0.72			0.14	0.23		0.04	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0	3.0		4.0	
Vehicle Extension (s)	3.0	3.0		1.0	3.0			4.0	1.0		3.0	
Lane Grp Cap (vph)	149	1799		317	2174			219	311		64	
v/s Ratio Prot		0.36		0.06	c0.49			c0.11	0.01		c0.02	
v/s Ratio Perm	0.01			0.41					0.01			
v/c Ratio	0.01	0.60		0.65	0.68			0.75	0.09		0.43	
Uniform Delay, d1	10.2	16.0		10.2	10.0			53.3	39.4		60.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	1.5		3.4	1.8			13.9	0.0		4.5	
Delay (s)	10.4	17.5		13.6	11.8			67.2	39.4		65.2	
Level of Service	B	B		B	B			E	D		E	
Approach Delay (s)		17.5			12.0			55.4			65.2	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	4336	1350	1509	4314		1509	3018	1350	1509	2961	
Flt Permitted	0.10	1.00	1.00	0.25	1.00		0.16	1.00	1.00	0.17	1.00	
Satd. Flow (perm)	153	4336	1350	393	4314		258	3018	1350	276	2961	
Volume (vph)	178	871	43	250	1653	57	50	639	109	55	1047	151
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	187	917	45	263	1740	60	53	673	115	58	1102	159
RTOR Reduction (vph)	0	0	19	0	4	0	0	0	84	0	12	0
Lane Group Flow (vph)	187	917	26	263	1796	0	53	673	31	58	1249	0
Turn Type	pm+pt		Perm	pm+pt			Perm		Perm	pm+pt		
Protected Phases	1	6		5	2			4		3	8	
Permitted Phases	6		6	2			4		4	8		
Actuated Green, G (s)	45.4	40.4	40.4	45.4	40.4		23.6	23.6	23.6	30.6	30.6	
Effective Green, g (s)	46.4	41.4	41.4	46.4	41.4		24.6	24.6	24.6	31.6	31.6	
Actuated g/C Ratio	0.52	0.46	0.46	0.52	0.46		0.27	0.27	0.27	0.35	0.35	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	5.0	3.0	5.0	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0		3.0	3.0	3.0	2.0	3.0	
Lane Grp Cap (vph)	154	1995	621	265	1984		71	825	369	138	1040	
v/s Ratio Prot	c0.07	0.21		0.06	0.42			0.22		0.01	c0.42	
v/s Ratio Perm	c0.56		0.02	0.46			0.21		0.02	0.13		
v/c Ratio	1.21	0.46	0.04	0.99	0.91		0.75	0.82	0.09	0.42	1.20	
Uniform Delay, d1	17.4	16.6	13.4	19.2	22.5		29.9	30.6	24.3	21.3	29.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	141.5	0.8	0.1	52.9	7.4		34.2	6.3	0.1	0.8	99.7	
Delay (s)	158.9	17.4	13.5	72.1	29.9		64.1	36.8	24.4	22.0	128.9	
Level of Service	F	B	B	E	C		E	D	C	C	F	
Approach Delay (s)		40.3			35.3			36.9			124.2	
Approach LOS		D			D			D			F	

Intersection Summary			
HCM Average Control Delay	58.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.97		0.95	1.00		0.95
Frt	0.99		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	2912		3018	1350		3018
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	2912		3018	1350		3018
Volume (vph)	1565	126	386	431	0	401
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1647	133	406	454	0	422
RTOR Reduction (vph)	6	0	0	291	0	0
Lane Group Flow (vph)	1774	0	406	163	0	422
Turn Type				Perm		
Protected Phases	4		2			2
Permitted Phases				2		
Actuated Green, G (s)	56.0		35.0	35.0		35.0
Effective Green, g (s)	56.0		36.0	36.0		36.0
Actuated g/C Ratio	0.56		0.36	0.36		0.36
Clearance Time (s)	4.0		5.0	5.0		5.0
Vehicle Extension (s)	7.0		3.0	3.0		3.0
Lane Grp Cap (vph)	1631		1086	486		1086
v/s Ratio Prot	c0.61		0.13			c0.14
v/s Ratio Perm				0.12		
v/c Ratio	1.09		0.37	0.34		0.39
Uniform Delay, d1	22.0		23.7	23.3		23.8
Progression Factor	1.00		0.85	1.72		1.00
Incremental Delay, d2	50.2		0.9	1.8		1.0
Delay (s)	72.2		21.0	41.8		24.9
Level of Service	E		C	D		C
Approach Delay (s)	72.2		32.0			24.9
Approach LOS	E		C			C

Intersection Summary			
HCM Average Control Delay	54.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		1.00			1.00			0.87			0.90	
Flt Protected		1.00			1.00			1.00			0.99	
Satd. Flow (prot)		3009			3014			1381			1423	
Flt Permitted		0.95			0.94			0.99			0.94	
Satd. Flow (perm)		2861			2828			1366			1352	
Volume (vph)	2	433	8	32	1562	3	1	0	19	13	8	51
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2	456	8	34	1644	3	1	0	20	14	8	54
RTOR Reduction (vph)	0	1	0	0	0	0	0	18	0	0	31	0
Lane Group Flow (vph)	0	465	0	0	1681	0	0	3	0	0	45	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4	4		4		
Actuated Green, G (s)		73.1			73.1			8.4			8.4	
Effective Green, g (s)		73.6			73.6			8.4			8.4	
Actuated g/C Ratio		0.82			0.82			0.09			0.09	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		0.2			0.2			3.0			3.0	
Lane Grp Cap (vph)		2340			2313			127			126	
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.59			0.00			c0.03	
v/c Ratio		0.20			0.73			0.02			0.36	
Uniform Delay, d1		1.8			3.7			37.1			38.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			2.0			0.1			1.7	
Delay (s)		2.0			5.7			37.1			40.0	
Level of Service		A			A			D			D	
Approach Delay (s)		2.0			5.7			37.1			40.0	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		1.00			1.00			0.94			0.95	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3009			3004			1489			1495	
Flt Permitted		0.89			0.93			0.97			0.96	
Satd. Flow (perm)		2684			2797			1449			1440	
Volume (vph)	16	545	6	33	1415	35	9	36	33	20	66	53
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	574	6	35	1489	37	9	38	35	21	69	56
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	597	0	0	1560	0	0	82	0	0	117	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			6			6	
Permitted Phases	2			2			6			6		
Actuated Green, G (s)		69.4			69.4			12.1			12.1	
Effective Green, g (s)		69.9			69.9			12.1			12.1	
Actuated g/C Ratio		0.78			0.78			0.13			0.13	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		2085			2172			195			194	
v/s Ratio Prot												
v/s Ratio Perm		0.22			c0.56			0.06			c0.08	
v/c Ratio		0.29			0.72			0.42			0.61	
Uniform Delay, d1		2.9			5.1			35.7			36.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			2.1			1.5			5.3	
Delay (s)		3.2			7.2			37.2			42.0	
Level of Service		A			A			D			D	
Approach Delay (s)		3.2			7.2			37.2			42.0	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	1.00		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2990		1509	3004		1509	2965		1509	2921	
Flt Permitted	0.12	1.00		0.29	1.00		0.10	1.00		0.27	1.00	
Satd. Flow (perm)	187	2990		459	3004		151	2965		428	2921	
Volume (vph)	182	502	33	228	1359	42	34	613	81	48	1121	303
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	192	528	35	240	1431	44	36	645	85	51	1180	319
RTOR Reduction (vph)	0	5	0	0	2	0	0	10	0	0	24	0
Lane Group Flow (vph)	192	558	0	240	1473	0	36	720	0	51	1475	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	36.9	33.9		50.0	44.0		42.0	42.0		42.0	42.0	
Effective Green, g (s)	35.9	33.9		50.0	44.0		42.0	42.0		42.0	42.0	
Actuated g/C Ratio	0.36	0.34		0.50	0.44		0.42	0.42		0.42	0.42	
Clearance Time (s)	3.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	1.0	4.9		1.0	5.0		4.3	4.3		4.7	4.7	
Lane Grp Cap (vph)	94	1014		357	1322		63	1245		180	1227	
v/s Ratio Prot	c0.04	0.19		0.08	c0.49			0.24			c0.50	
v/s Ratio Perm	c0.69			0.25			0.24			0.12		
v/c Ratio	2.04	0.55		0.67	1.11		0.57	0.58		0.28	1.20	
Uniform Delay, d1	36.9	26.9		16.2	28.0		22.1	22.2		19.1	29.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	504.1	2.2		3.9	62.3		15.4	0.9		1.6	98.8	
Delay (s)	541.0	29.0		20.0	90.3		37.6	23.1		20.7	127.8	
Level of Service	F	C		C	F		D	C		C	F	
Approach Delay (s)		159.2			80.4			23.8			124.3	
Approach LOS		F			F			C			F	

Intersection Summary			
HCM Average Control Delay	98.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	115.1%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	1.00		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2967		1509	3004		1509	2953		1509	2905	
Flt Permitted	0.08	1.00		0.17	1.00		0.11	1.00		0.22	1.00	
Satd. Flow (perm)	134	2967		272	3004		176	2953		356	2905	
Volume (vph)	106	957	120	229	1360	43	53	611	103	65	867	288
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	112	1007	126	241	1432	45	56	643	108	68	913	303
RTOR Reduction (vph)	0	10	0	0	2	0	0	13	0	0	22	0
Lane Group Flow (vph)	112	1123	0	241	1475	0	56	738	0	68	1194	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	55.0	55.0		55.0	55.0		35.0	35.0		35.0	35.0	
Effective Green, g (s)	56.0	56.0		56.0	56.0		36.0	36.0		36.0	36.0	
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.36	0.36		0.36	0.36	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	4.9	4.9		4.9	4.9		4.9	4.9		4.9	4.9	
Lane Grp Cap (vph)	75	1662		152	1682		63	1063		128	1046	
v/s Ratio Prot		0.38			0.49			0.25			c0.41	
v/s Ratio Perm	0.84			c0.89			0.32			0.19		
v/c Ratio	1.49	0.68		1.59	0.88		0.89	0.69		0.53	1.14	
Uniform Delay, d1	22.0	15.6		22.0	19.0		30.1	27.3		25.3	32.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.03		1.00	1.00	
Incremental Delay, d2	279.7	2.2		292.4	6.8		83.9	3.7		14.9	75.2	
Delay (s)	301.7	17.8		314.4	25.8		113.9	31.8		40.2	107.2	
Level of Service	F	B		F	C		F	C		D	F	
Approach Delay (s)		43.3			66.3			37.5			103.7	
Approach LOS		D			E			D			F	

Intersection Summary			
HCM Average Control Delay	65.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	114.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	0.95			0.95	1.00	
Frt	1.00			1.00	0.95	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	3005			3014	1459	
Flt Permitted	1.00			0.92	0.97	
Satd. Flow (perm)	3005			2776	1459	
Volume (vph)	786	22	29	1305	47	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	827	23	31	1374	49	32
RTOR Reduction (vph)	1	0	0	0	29	0
Lane Group Flow (vph)	849	0	0	1405	52	0
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	70.2			70.2	9.2	
Effective Green, g (s)	72.8			72.8	9.2	
Actuated g/C Ratio	0.81			0.81	0.10	
Clearance Time (s)	6.6			6.6	4.0	
Vehicle Extension (s)	5.0			5.0	3.0	
Lane Grp Cap (vph)	2431			2245	149	
v/s Ratio Prot	0.28				c0.04	
v/s Ratio Perm				c0.51		
v/c Ratio	0.35			0.63	0.35	
Uniform Delay, d1	2.3			3.3	37.6	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.4			1.3	1.4	
Delay (s)	2.7			4.7	39.0	
Level of Service	A			A	D	
Approach Delay (s)	2.7			4.7	39.0	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	5.1	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	81.6%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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		1.00	
Frt	1.00	1.00		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	1509	3011		1509	2994			1571	1350		1555	
Flt Permitted	0.24	1.00		0.17	1.00			0.56	1.00		0.87	
Satd. Flow (perm)	386	3011		270	2994			883	1350		1363	
Volume (vph)	96	1183	18	48	910	49	54	192	74	35	367	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	101	1245	19	51	958	52	57	202	78	37	386	63
RTOR Reduction (vph)	0	1	0	0	4	0	0	0	59	0	6	0
Lane Group Flow (vph)	101	1263	0	51	1006	0	0	259	19	0	480	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	59.5	59.5		59.5	59.5			21.5	21.5		21.5	
Effective Green, g (s)	60.0	60.0		60.0	60.0			22.0	22.0		22.0	
Actuated g/C Ratio	0.67	0.67		0.67	0.67			0.24	0.24		0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	4.3	4.3		5.0	5.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	257	2007		180	1996			216	330		333	
v/s Ratio Prot		c0.42			0.34							
v/s Ratio Perm	0.26			0.19				0.29	0.01		c0.35	
v/c Ratio	0.39	0.63		0.28	0.50			1.20	0.06		1.44	
Uniform Delay, d1	6.8	8.6		6.2	7.5			34.0	26.1		34.0	
Progression Factor	1.00	1.00		0.34	0.25			1.00	1.00		1.00	
Incremental Delay, d2	4.5	1.5		2.7	0.6			125.4	0.1		214.9	
Delay (s)	11.2	10.1		4.8	2.5			159.4	26.1		248.9	
Level of Service	B	B		A	A			F	C		F	
Approach Delay (s)		10.2			2.6			128.6			248.9	
Approach LOS		B			A			F			F	

Intersection Summary			
HCM Average Control Delay	55.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	105.2%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.97		1.00	1.00		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2919		1509	1582		1509	4301		1509	4215	
Flt Permitted	0.21	1.00		0.23	1.00		0.22	1.00		0.27	1.00	
Satd. Flow (perm)	334	2919		373	1582		353	4301		427	4215	
Volume (vph)	142	658	183	225	844	21	96	811	46	42	1168	266
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	149	693	193	237	888	22	101	854	48	44	1229	280
RTOR Reduction (vph)	0	9	0	0	2	0	0	14	0	0	40	0
Lane Group Flow (vph)	149	877	0	237	908	0	101	888	0	44	1469	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	19.0	19.0		19.0	19.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	4.9	4.9		4.9	4.9		0.2	0.2		0.2	0.2	
Lane Grp Cap (vph)	141	1232		157	668		141	1720		171	1686	
v/s Ratio Prot		0.30			0.57			0.21			c0.35	
v/s Ratio Perm	0.45			c0.64			0.29			0.10		
v/c Ratio	1.06	0.71		1.51	1.36		0.72	0.52		0.26	0.87	
Uniform Delay, d1	13.0	10.7		13.0	13.0		11.4	10.2		9.0	12.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	91.7	2.4		259.3	171.5		26.7	1.1		3.6	6.5	
Delay (s)	104.7	13.1		272.3	184.5		38.0	11.3		12.6	18.9	
Level of Service	F	B		F	F		D	B		B	B	
Approach Delay (s)		26.3			202.6			14.0			18.8	
Approach LOS		C			F			B			B	

Intersection Summary			
HCM Average Control Delay	63.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	117.9%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95	1.00		0.95		0.95	0.95	1.00		1.00	
Frt	1.00	1.00	0.85		1.00		1.00	1.00	0.85		0.94	
Flt Protected	0.95	1.00	1.00		1.00		0.95	0.95	1.00		0.99	
Satd. Flow (prot)	1509	3018	1350		3014		1433	1439	1350		1464	
Flt Permitted	0.10	1.00	1.00		1.00		0.95	0.95	1.00		0.99	
Satd. Flow (perm)	163	3018	1350		3014		1433	1439	1350		1464	
Volume (vph)	15	872	239	0	1332	11	602	8	15	30	24	49
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	918	252	0	1402	12	634	8	16	32	25	52
RTOR Reduction (vph)	0	0	61	0	0	0	0	0	13	0	28	0
Lane Group Flow (vph)	16	918	191	0	1414	0	317	325	3	0	81	0
Turn Type	pm+pt		Perm				Split		Perm	Split		
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6		6						4			
Actuated Green, G (s)	76.0	76.0	76.0		71.2		26.0	26.0	26.0		6.0	
Effective Green, g (s)	76.0	76.0	76.0		71.2		26.0	26.0	26.0		6.0	
Actuated g/C Ratio	0.63	0.63	0.63		0.59		0.22	0.22	0.22		0.05	
Clearance Time (s)	3.0	4.0	4.0		4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	1.0	6.0	6.0		6.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	112	1911	855		1788		310	312	293		73	
v/s Ratio Prot	0.00	c0.30			c0.47		0.22	c0.23			c0.06	
v/s Ratio Perm	0.09		0.14						0.00			
v/c Ratio	0.14	0.48	0.22		0.79		1.02	1.04	0.01		1.12	
Uniform Delay, d1	13.4	11.6	9.4		18.7		47.0	47.0	36.9		57.0	
Progression Factor	0.90	0.90	1.34		1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8	0.5		3.7		57.0	62.2	0.0		140.3	
Delay (s)	12.2	11.2	13.1		22.3		104.0	109.2	36.9		197.3	
Level of Service	B	B	B		C		F	F	D		F	
Approach Delay (s)		11.7			22.3			105.0			197.3	
Approach LOS		B			C			F			F	

Intersection Summary			
HCM Average Control Delay	40.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	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		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1509	1588	1350	1509	1539		1509	2984		1509	3018	1350
Flt Permitted	0.25	1.00	1.00	0.55	1.00		0.08	1.00		0.43	1.00	1.00
Satd. Flow (perm)	391	1588	1350	873	1539		125	2984		689	3018	1350
Volume (vph)	161	189	123	93	241	63	94	469	38	39	1350	686
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	169	199	129	98	254	66	99	494	40	41	1421	722
RTOR Reduction (vph)	0	0	96	0	11	0	0	5	0	0	0	122
Lane Group Flow (vph)	169	199	33	98	309	0	99	529	0	41	1421	600
Turn Type	pm+pt		Perm	pm+pt			pm+pt			pm+pt		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2			4			8		8
Actuated Green, G (s)	33.8	25.3	25.3	30.1	23.7		56.3	50.5		50.8	48.0	48.0
Effective Green, g (s)	33.3	25.8	25.8	29.1	23.7		55.8	51.0		49.8	48.0	48.0
Actuated g/C Ratio	0.33	0.26	0.26	0.29	0.24		0.56	0.51		0.50	0.48	0.48
Clearance Time (s)	3.0	4.5	4.5	3.0	4.0		3.0	4.5		3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	1.0	2.5		1.0	5.0		1.0	5.0	5.0
Lane Grp Cap (vph)	214	410	348	288	365		136	1522		358	1449	648
v/s Ratio Prot	c0.06	0.13		0.02	0.20		c0.03	0.18		0.00	c0.47	
v/s Ratio Perm	c0.20		0.02	0.08			0.37			0.05		0.44
v/c Ratio	0.79	0.49	0.10	0.34	0.85		0.73	0.35		0.11	0.98	0.93
Uniform Delay, d1	27.7	31.5	28.2	26.9	36.4		18.9	14.6		13.0	25.5	24.3
Progression Factor	0.99	0.99	1.71	0.96	0.98		1.88	0.88		0.75	0.69	0.55
Incremental Delay, d2	16.5	0.9	0.1	0.3	16.1		13.5	0.6		0.0	11.5	11.1
Delay (s)	43.9	31.9	48.3	26.0	51.8		49.0	13.3		9.8	29.2	24.5
Level of Service	D	C	D	C	D		D	B		A	C	C
Approach Delay (s)		40.2			45.7			18.9			27.3	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	93.0%	ICU Level of Service	F
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		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	4	1	11	0	64	94	16	397	19	28	381	13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	1	12	0	67	99	17	418	20	29	401	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											460	
pX, platoon unblocked												
vC, conflicting volume	1051	938	408	934	935	428	415			438		
vC1, stage 1 conf vol							0			0		
vC2, stage 2 conf vol							0			0		
vCu, unblocked vol	1051	938	408	934	935	428	415			438		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)							3.1			3.1		
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	98	100	73	84	98			97		
cM capacity (veh/h)	132	251	643	232	252	627	941			933		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	17	166	17	438	29	415
Volume Left	4	0	17	0	29	0
Volume Right	12	99	0	20	0	14
cSH	311	392	941	1700	933	1700
Volume to Capacity	0.05	0.42	0.02	0.26	0.03	0.24
Queue Length 95th (ft)	4	52	1	0	2	0
Control Delay (s)	17.2	20.8	8.9	0.0	9.0	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	17.2	20.8	0.3		0.6	
Approach LOS	C	C				

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	44.7%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.94			0.99		1.00	0.98		1.00	0.99	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1471			1547		1509	2962		1509	2986	
Flt Permitted		0.89			0.82		0.47	1.00		0.45	1.00	
Satd. Flow (perm)		1328			1296		754	2962		722	2986	
Volume (vph)	31	37	59	141	172	12	160	360	50	7	363	28
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	33	39	62	148	181	13	168	379	53	7	382	29
RTOR Reduction (vph)	0	27	0	0	2	0	0	28	0	0	14	0
Lane Group Flow (vph)	0	107	0	0	340	0	168	404	0	7	397	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		28.1			28.1		15.3	15.3		15.3	15.3	
Effective Green, g (s)		28.7			28.7		14.3	14.3		14.3	14.3	
Actuated g/C Ratio		0.56			0.56		0.28	0.28		0.28	0.28	
Clearance Time (s)		4.6			4.6		3.0	3.0		3.0	3.0	
Vehicle Extension (s)		4.5			4.5		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		747			729		211	831		202	837	
v/s Ratio Prot								0.14			0.13	
v/s Ratio Perm		0.08			c0.26		c0.22			0.01		
v/c Ratio		0.14			0.47		0.80	0.49		0.03	0.47	
Uniform Delay, d1		5.3			6.6		17.0	15.3		13.3	15.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			2.1		18.5	0.4		0.1	0.4	
Delay (s)		5.7			8.7		35.5	15.7		13.4	15.7	
Level of Service		A			A		D	B		B	B	
Approach Delay (s)		5.7			8.7			21.3			15.6	
Approach LOS		A			A			C			B	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	51.0	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	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)				4.0	4.0			4.0			4.0	4.0
Lane Util. Factor				1.00	0.95			0.95			0.95	1.00
Frt				1.00	1.00			1.00			1.00	0.85
Flt Protected				0.95	1.00			1.00			1.00	1.00
Satd. Flow (prot)				1509	3008			3009			3018	1350
Flt Permitted				0.95	1.00			0.92			1.00	1.00
Satd. Flow (perm)				1509	3008			2771			3018	1350
Volume (vph)	0	0	0	229	1498	31	28	451	0	0	325	71
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	241	1577	33	29	475	0	0	342	75
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	241	1609	0	0	504	0	0	342	75
Turn Type				custom			custom					Free
Protected Phases				2	2		3	3			1	
Permitted Phases				4	4		6	6				Free
Actuated Green, G (s)				68.4	68.4			43.0			31.0	160.0
Effective Green, g (s)				67.0	67.0			42.0			31.0	160.0
Actuated g/C Ratio				0.42	0.42			0.26			0.19	1.00
Clearance Time (s)				3.0	3.0			3.0			4.0	
Vehicle Extension (s)				1.0	1.0			1.0			4.0	
Lane Grp Cap (vph)				670	1335			744			585	1350
v/s Ratio Prot				0.02	c0.08			c0.05			c0.11	
v/s Ratio Perm				0.13	0.45			c0.13				0.06
v/c Ratio				0.36	1.21			0.68			0.58	0.06
Uniform Delay, d1				32.2	46.5			52.9			58.6	0.0
Progression Factor				1.00	1.00			0.21			1.00	1.00
Incremental Delay, d2				1.5	99.6			1.4			4.2	0.1
Delay (s)				33.7	146.1			12.3			62.9	0.1
Level of Service				C	F			B			E	A
Approach Delay (s)		0.0			131.5			12.3			51.6	
Approach LOS		A			F			B			D	

Intersection Summary			
HCM Average Control Delay	97.8	HCM Level of Service	F
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)	1509	2996		1509	3009			1549	1350		1553	1350
Flt Permitted	0.08	1.00		0.34	1.00			0.64	1.00		0.71	1.00
Satd. Flow (perm)	123	2996		534	3009			1024	1350		1127	1350
Volume (vph)	67	561	28	191	1670	34	65	63	109	68	81	14
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	591	29	201	1758	36	68	66	115	72	85	15
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	94	0	0	15
Lane Group Flow (vph)	71	617	0	201	1793	0	0	134	21	0	157	0
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		NA
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	64.0	51.5		74.0	58.0			17.5	17.5		17.5	0.0
Effective Green, g (s)	63.5	51.5		74.0	58.0			18.0	18.0		18.0	0.0
Actuated g/C Ratio	0.64	0.52		0.74	0.58			0.18	0.18		0.18	0.00
Clearance Time (s)	3.5	4.0		3.5	4.0			4.5	4.5		4.5	
Vehicle Extension (s)	1.0	5.0		1.0	5.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	244	1543		576	1745			184	243		203	0
v/s Ratio Prot	0.03	0.21		c0.06	c0.60							
v/s Ratio Perm	0.15			0.19				0.13	0.02		c0.14	
v/c Ratio	0.29	0.40		0.35	1.03			0.73	0.09		0.77	0.00
Uniform Delay, d1	14.8	14.8		4.7	21.0			38.7	34.1		39.1	50.0
Progression Factor	1.97	0.83		1.71	1.30			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.9	0.8		0.2	15.1			13.4	0.2		16.6	0.0
Delay (s)	32.0	13.0		8.2	42.4			52.1	34.3		55.7	50.0
Level of Service	C	B		A	D			D	C		E	D
Approach Delay (s)		15.0			39.0			43.9			55.2	
Approach LOS		B			D			D			E	

Intersection Summary			
HCM Average Control Delay	34.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2987		1509	3008		1509	3018	1350	1509	2888	
Flt Permitted	0.07	1.00		0.33	1.00		0.37	1.00	1.00	0.28	1.00	
Satd. Flow (perm)	112	2987		522	3008		586	3018	1350	451	2888	
Volume (vph)	67	593	43	201	1814	40	81	472	158	77	276	111
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	624	45	212	1909	42	85	497	166	81	291	117
RTOR Reduction (vph)	0	5	0	0	2	0	0	0	128	0	43	0
Lane Group Flow (vph)	71	664	0	212	1949	0	85	497	38	81	365	0
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	60.7	56.9		69.0	61.2		23.0	23.0	23.0	23.0	23.0	
Effective Green, g (s)	60.7	56.9		69.0	61.2		23.0	23.0	23.0	23.0	23.0	
Actuated g/C Ratio	0.61	0.57		0.69	0.61		0.23	0.23	0.23	0.23	0.23	
Clearance Time (s)	4.0	4.0		3.5	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	1.0	5.0		1.0	5.0		4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	121	1700		440	1841		135	694	311	104	664	
v/s Ratio Prot	0.02	0.22		c0.04	c0.65			0.16			0.13	
v/s Ratio Perm	0.33			0.29			0.14		0.03	c0.18		
v/c Ratio	0.59	0.39		0.48	1.06		0.63	0.72	0.12	0.78	0.55	
Uniform Delay, d1	19.1	11.9		6.4	19.4		34.7	35.5	30.5	36.1	33.9	
Progression Factor	1.90	0.65		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.3	0.6		0.3	38.6		20.2	6.2	0.8	42.7	3.3	
Delay (s)	40.7	8.5		6.7	58.0		54.9	41.7	31.3	78.8	37.2	
Level of Service	D	A		A	E		D	D	C	E	D	
Approach Delay (s)		11.5			53.0			40.9			44.1	
Approach LOS		B			D			D			D	

Intersection Summary			
HCM Average Control Delay	42.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.91				0.86
Flt Protected	0.95	1.00		0.95	1.00			0.98				1.00
Satd. Flow (prot)	1509	3008		1509	3013			1426				1374
Flt Permitted	0.95	1.00		0.95	1.00			0.98				1.00
Satd. Flow (perm)	1509	3008		1509	3013			1426				1374
Volume (vph)	42	1369	30	52	1472	14	24	0	41	0	0	42
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	1441	32	55	1549	15	25	0	43	0	0	44
RTOR Reduction (vph)	0	1	0	0	0	0	0	40	0	0	0	0
Lane Group Flow (vph)	44	1472	0	55	1564	0	0	28	0	0	0	44
Turn Type	Prot			Prot			Perm					Over
Protected Phases	8	2		1 8	6			4				8
Permitted Phases							4					
Actuated Green, G (s)	7.5	60.9		20.5	73.9			6.6				7.5
Effective Green, g (s)	7.5	60.9		20.5	73.9			6.6				7.5
Actuated g/C Ratio	0.08	0.61		0.20	0.74			0.07				0.08
Clearance Time (s)	4.0	4.0			4.0			4.0				4.0
Vehicle Extension (s)	1.0	5.0			5.0			3.0				1.0
Lane Grp Cap (vph)	113	1832		309	2227			94				103
v/s Ratio Prot	0.03	c0.49		0.04	c0.52							c0.03
v/s Ratio Perm								0.02				
v/c Ratio	0.39	0.80		0.18	0.70			0.30				0.43
Uniform Delay, d1	44.1	15.0		32.8	7.1			44.5				44.2
Progression Factor	1.00	1.00		1.00	1.00			1.00				1.00
Incremental Delay, d2	0.8	3.8		0.1	1.9			1.8				1.0
Delay (s)	44.9	18.8		32.9	9.0			46.3				45.2
Level of Service	D	B		C	A			D				D
Approach Delay (s)		19.6			9.8			46.3			45.2	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.1%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95		0.97	0.95			0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	2927	2984		2927	3013		2927	2920			3018	1350
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (perm)	2927	2984		2927	3013		2927	2920			3018	1350
Volume (vph)	167	557	45	176	1218	13	188	434	119	0	932	592
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	176	586	47	185	1282	14	198	457	125	0	981	623
RTOR Reduction (vph)	0	6	0	0	1	0	0	25	0	0	0	145
Lane Group Flow (vph)	176	627	0	185	1295	0	198	557	0	0	981	478
Turn Type	Prot			Prot			Prot					Perm
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases												4
Actuated Green, G (s)	8.2	30.4		8.4	30.6		8.7	47.7			34.0	34.0
Effective Green, g (s)	8.2	30.9		8.4	31.1		9.7	48.7			35.0	35.0
Actuated g/C Ratio	0.08	0.31		0.08	0.31		0.10	0.49			0.35	0.35
Clearance Time (s)	4.0	4.5		4.0	4.5		5.0	5.0			5.0	5.0
Vehicle Extension (s)	1.0	5.0		1.0	5.0		2.0	4.0			4.0	4.0
Lane Grp Cap (vph)	240	922		246	937		284	1422			1056	473
v/s Ratio Prot	0.06	0.21		c0.06	c0.43		c0.07	0.19			0.33	
v/s Ratio Perm												c0.35
v/c Ratio	0.73	0.68		0.75	1.38		0.70	0.39			0.93	1.01
Uniform Delay, d1	44.8	30.2		44.8	34.5		43.7	16.3			31.3	32.5
Progression Factor	1.00	1.00		1.11	1.07		1.00	1.00			0.42	0.43
Incremental Delay, d2	9.6	4.0		8.6	177.3		5.9	0.2			7.6	31.3
Delay (s)	54.4	34.3		58.3	214.2		49.6	16.5			20.6	45.1
Level of Service	D	C		E	F		D	B			C	D
Approach Delay (s)		38.7			194.7			24.9			30.2	
Approach LOS		D			F			C			C	

Intersection Summary			
HCM Average Control Delay	82.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95	1.00		1.00		0.95	0.95	
Frt		1.00			1.00	0.85		0.96		1.00	0.98	
Flt Protected		1.00			1.00	1.00		0.98		0.95	0.97	
Satd. Flow (prot)		3011			3018	1350		1498		1433	1429	
Flt Permitted		1.00			1.00	1.00		0.98		0.95	0.97	
Satd. Flow (perm)		3011			3018	1350		1498		1433	1429	
Volume (vph)	0	682	10	0	1286	266	23	24	20	232	24	18
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	718	11	0	1354	280	24	25	21	244	25	19
RTOR Reduction (vph)	0	1	0	0	0	51	0	16	0	0	6	0
Lane Group Flow (vph)	0	728	0	0	1354	229	0	54	0	144	138	0
Turn Type						pm+ov	Split			Split		
Protected Phases		2			6	4	3	3		4	4	
Permitted Phases						6						
Actuated Green, G (s)		65.7			65.7	81.8		6.2		16.1	16.1	
Effective Green, g (s)		65.7			65.7	81.8		6.2		16.1	16.1	
Actuated g/C Ratio		0.66			0.66	0.82		0.06		0.16	0.16	
Clearance Time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Vehicle Extension (s)		4.5			4.5	4.0		3.0		4.0	4.0	
Lane Grp Cap (vph)		1978			1983	1158		93		231	230	
v/s Ratio Prot		0.24			c0.45	0.03		c0.04		c0.10	0.10	
v/s Ratio Perm						0.14						
v/c Ratio		0.37			0.68	0.20		0.58		0.62	0.60	
Uniform Delay, d1		7.8			10.7	2.0		45.6		39.1	39.0	
Progression Factor		0.28			1.00	1.00		1.00		1.47	1.50	
Incremental Delay, d2		0.4			1.9	0.1		8.9		5.6	4.8	
Delay (s)		2.6			12.6	2.1		54.6		63.1	63.3	
Level of Service		A			B	A		D		E	E	
Approach Delay (s)		2.6			10.8			54.6			63.2	
Approach LOS		A			B			D			E	

Intersection Summary			
HCM Average Control Delay	15.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.9%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.97			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1509	3005		1509	3011			1511			1509	
Flt Permitted	0.13	1.00		0.27	1.00			0.78			0.94	
Satd. Flow (perm)	212	3005		436	3011			1194			1433	
Volume (vph)	20	873	25	38	1389	20	38	51	29	34	107	65
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	919	26	40	1462	21	40	54	31	36	113	68
RTOR Reduction (vph)	0	2	0	0	1	0	0	12	0	0	17	0
Lane Group Flow (vph)	21	943	0	40	1482	0	0	113	0	0	200	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	72.0	72.0		72.0	72.0			20.0			20.0	
Effective Green, g (s)	72.0	72.0		72.0	72.0			20.0			20.0	
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.20			0.20	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			3.0			3.0	
Lane Grp Cap (vph)	153	2164		314	2168			239			287	
v/s Ratio Prot		0.31			c0.49							
v/s Ratio Perm	0.10			0.09				0.09			c0.14	
v/c Ratio	0.14	0.44		0.13	0.68			0.47			0.70	
Uniform Delay, d1	4.3	5.7		4.3	7.7			35.3			37.2	
Progression Factor	0.98	1.10		1.43	1.36			1.00			1.00	
Incremental Delay, d2	1.8	0.6		0.7	1.5			6.6			13.2	
Delay (s)	6.0	6.9		6.9	12.0			41.9			50.4	
Level of Service	A	A		A	B			D			D	
Approach Delay (s)		6.9			11.9			41.9			50.4	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM Average Control Delay	14.4	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	67.5%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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		0.95		1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1509	2991		1509	3018	1350		2960		1509	3018	1350
Flt Permitted	0.09	1.00		0.32	1.00	1.00		0.69		0.27	1.00	1.00
Satd. Flow (perm)	146	2991		512	3018	1350		2044		422	3018	1350
Volume (vph)	120	625	39	119	1213	114	21	528	72	73	1142	106
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	658	41	125	1277	120	22	556	76	77	1202	112
RTOR Reduction (vph)	0	4	0	0	0	63	0	10	0	0	0	70
Lane Group Flow (vph)	126	695	0	125	1277	57	0	644	0	77	1202	42
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	56.2	49.0		53.8	47.8	47.8		34.0		34.0	34.0	34.0
Effective Green, g (s)	55.2	49.0		52.8	47.8	47.8		34.0		34.0	34.0	34.0
Actuated g/C Ratio	0.55	0.49		0.53	0.48	0.48		0.34		0.34	0.34	0.34
Clearance Time (s)	3.0	4.0		3.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	1.0	3.0		1.0	3.0	3.0		3.5		3.5	3.5	3.5
Lane Grp Cap (vph)	165	1466		320	1443	645		695		143	1026	459
v/s Ratio Prot	c0.05	0.23		0.02	c0.42						c0.40	
v/s Ratio Perm	0.37			0.19		0.04		0.32		0.18		0.03
v/c Ratio	0.76	0.47		0.39	0.88	0.09		0.93		0.54	1.17	0.09
Uniform Delay, d1	17.3	16.9		12.5	23.6	14.2		31.8		26.7	33.0	22.5
Progression Factor	1.00	1.00		0.81	0.79	0.48		1.00		1.00	1.00	1.00
Incremental Delay, d2	17.0	1.1		0.2	6.9	0.2		20.3		13.8	87.7	0.4
Delay (s)	34.3	18.0		10.4	25.5	7.1		52.1		40.4	120.7	22.9
Level of Service	C	B		B	C	A		D		D	F	C
Approach Delay (s)		20.5			22.8			52.1			108.4	
Approach LOS		C			C			D			F	

Intersection Summary			
HCM Average Control Delay	53.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	118.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620
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	1.00		0.90	
Flt Protected	0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1509	3018	3012		1408	
Flt Permitted	0.17	1.00	1.00		0.99	
Satd. Flow (perm)	276	3018	3012		1408	
Volume (vph)	59	803	1219	14	54	176
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	845	1283	15	57	185
RTOR Reduction (vph)	0	0	1	0	81	0
Lane Group Flow (vph)	62	845	1297	0	161	0
Turn Type	Perm					
Protected Phases		2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	72.4	72.4	72.4		20.1	
Effective Green, g (s)	71.9	71.9	71.9		20.1	
Actuated g/C Ratio	0.72	0.72	0.72		0.20	
Clearance Time (s)	3.5	3.5	3.5		4.0	
Vehicle Extension (s)	5.0	5.0	5.0		3.0	
Lane Grp Cap (vph)	198	2170	2166		283	
v/s Ratio Prot		0.28	c0.43		c0.11	
v/s Ratio Perm	0.22					
v/c Ratio	0.31	0.39	0.60		0.57	
Uniform Delay, d1	5.1	5.5	6.9		36.1	
Progression Factor	0.57	0.57	1.00		1.00	
Incremental Delay, d2	3.7	0.5	1.2		2.6	
Delay (s)	6.6	3.6	8.2		38.7	
Level of Service	A	A	A		D	
Approach Delay (s)		3.8	8.2		38.7	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2965		1509	2998		1509	3018	1350	1509	2963	
Flt Permitted	0.10	1.00		0.28	1.00		0.14	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	152	2965		447	2998		229	3018	1350	436	2963	
Volume (vph)	130	624	83	211	1131	51	109	567	71	65	813	111
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	657	87	222	1191	54	115	597	75	68	856	117
RTOR Reduction (vph)	0	10	0	0	3	0	0	0	43	0	10	0
Lane Group Flow (vph)	137	734	0	222	1242	0	115	597	32	68	963	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	53.2	46.3		53.4	46.4		34.7	27.7	27.7	30.0	25.6	
Effective Green, g (s)	52.2	46.3		52.4	46.4		33.8	27.8	27.8	29.6	25.7	
Actuated g/C Ratio	0.52	0.46		0.52	0.46		0.34	0.28	0.28	0.30	0.26	
Clearance Time (s)	3.0	4.0		3.0	4.0		3.0	4.1	4.1	3.5	4.1	
Vehicle Extension (s)	1.0	0.2		1.0	0.2		1.0	5.0	5.0	1.0	5.0	
Lane Grp Cap (vph)	159	1373		298	1391		154	839	375	171	761	
v/s Ratio Prot	c0.05	0.25		0.04	c0.41		c0.04	0.20		0.02	c0.32	
v/s Ratio Perm	0.40			0.35			0.21		0.02	0.10		
v/c Ratio	0.86	0.53		0.74	0.89		0.75	0.71	0.08	0.40	1.26	
Uniform Delay, d1	18.3	19.2		16.9	24.5		27.6	32.5	26.7	26.4	37.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.52	0.59	
Incremental Delay, d2	34.1	1.5		8.5	9.1		27.7	5.1	0.4	0.5	128.6	
Delay (s)	52.4	20.7		25.4	33.6		55.3	37.6	27.1	14.1	150.6	
Level of Service	D	C		C	C		E	D	C	B	F	
Approach Delay (s)		25.6			32.4			39.2			141.7	
Approach LOS		C			C			D			F	

Intersection Summary			
HCM Average Control Delay	59.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2977		1509	2996		1509	1529		1509	1534	
Flt Permitted	0.13	1.00		0.25	1.00		0.23	1.00		0.56	1.00	
Satd. Flow (perm)	210	2977		389	2996		359	1529		896	1534	
Volume (vph)	30	852	85	60	1267	63	26	121	40	85	279	83
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	897	89	63	1334	66	27	127	42	89	294	87
RTOR Reduction (vph)	0	7	0	0	3	0	0	12	0	0	11	0
Lane Group Flow (vph)	32	979	0	63	1397	0	27	157	0	89	370	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	65.0	65.0		65.0	65.0		27.0	27.0		27.0	27.0	
Effective Green, g (s)	65.0	65.0		65.0	65.0		27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.65	0.65		0.65	0.65		0.27	0.27		0.27	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	137	1935		253	1947		97	413		242	414	
v/s Ratio Prot		0.33			c0.47			0.10			c0.24	
v/s Ratio Perm	0.15			0.16			0.08			0.10		
v/c Ratio	0.23	0.51		0.25	0.72		0.28	0.38		0.37	0.89	
Uniform Delay, d1	7.2	9.1		7.3	11.5		28.8	29.7		29.6	35.1	
Progression Factor	0.89	0.87		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	0.9		2.3	2.3		1.6	0.6		0.9	21.0	
Delay (s)	10.3	8.9		9.7	13.8		30.4	30.3		30.5	56.1	
Level of Service	B	A		A	B		C	C		C	E	
Approach Delay (s)		8.9			13.6			30.3			51.2	
Approach LOS		A			B			C			D	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.93			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1509	3008		1509	3013			1456			1509	
Flt Permitted	0.16	1.00		0.29	1.00			0.88			0.96	
Satd. Flow (perm)	256	3008		465	3013			1303			1464	
Volume (vph)	24	882	20	46	1381	13	26	10	35	2	5	3
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	928	21	48	1454	14	27	11	37	2	5	3
RTOR Reduction (vph)	0	1	0	0	0	0	0	34	0	0	3	0
Lane Group Flow (vph)	25	948	0	48	1468	0	0	41	0	0	7	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	83.5	83.5		83.5	83.5			8.5			8.5	
Effective Green, g (s)	83.5	83.5		83.5	83.5			8.5			8.5	
Actuated g/C Ratio	0.84	0.84		0.84	0.84			0.08			0.08	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			3.0			3.0	
Lane Grp Cap (vph)	214	2512		388	2516			111			124	
v/s Ratio Prot		0.32			c0.49							
v/s Ratio Perm	0.10			0.10				c0.03			0.00	
v/c Ratio	0.12	0.38		0.12	0.58			0.37			0.06	
Uniform Delay, d1	1.5	2.0		1.5	2.7			43.2			42.1	
Progression Factor	1.00	1.00		1.99	3.31			1.00			1.00	
Incremental Delay, d2	1.1	0.4		0.5	0.7			2.1			0.2	
Delay (s)	2.6	2.4		3.5	9.5			45.3			42.3	
Level of Service	A	A		A	A			D			D	
Approach Delay (s)		2.4			9.4			45.3			42.3	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.4%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)	1509	2993		1509	3013			1518	1350		1484	
Flt Permitted	0.20	1.00		0.21	1.00			0.44	1.00		0.98	
Satd. Flow (perm)	322	2993		337	3013			703	1350		1456	
Volume (vph)	18	987	56	91	1237	13	50	4	50	11	67	67
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	19	1039	59	96	1302	14	53	4	53	12	71	71
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	46	0	39	0
Lane Group Flow (vph)	19	1096	0	96	1316	0	0	57	7	0	115	0
Turn Type	Perm			pm+pt			Perm		Perm	Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	70.9	70.9		78.3	78.3			13.7	13.7		13.7	
Effective Green, g (s)	70.9	70.9		78.3	78.3			13.7	13.7		13.7	
Actuated g/C Ratio	0.71	0.71		0.78	0.78			0.14	0.14		0.14	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	0.2	0.2		1.0	0.2			4.0	4.0		3.0	
Lane Grp Cap (vph)	228	2122		304	2359			96	185		199	
v/s Ratio Prot		0.37		0.01	c0.44							
v/s Ratio Perm	0.06			0.24				c0.08	0.01		0.08	
v/c Ratio	0.08	0.52		0.32	0.56			0.59	0.04		0.58	
Uniform Delay, d1	4.5	6.7		3.7	4.2			40.5	37.4		40.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.7	0.9		0.2	1.0			11.0	0.1		4.0	
Delay (s)	5.2	7.6		4.0	5.1			51.5	37.6		44.5	
Level of Service	A	A		A	A			D	D		D	
Approach Delay (s)		7.5			5.1			44.8			44.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	0.98		1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2953		1509	2992		1509	4247		1509	4254	
Flt Permitted	0.14	1.00		0.16	1.00		0.14	1.00		0.18	1.00	
Satd. Flow (perm)	221	2953		248	2992		221	4247		283	4254	
Volume (vph)	138	764	128	250	1032	61	97	751	120	70	1138	163
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	145	804	135	263	1086	64	102	791	126	74	1198	172
RTOR Reduction (vph)	0	13	0	0	4	0	0	21	0	0	19	0
Lane Group Flow (vph)	145	926	0	263	1146	0	102	896	0	74	1351	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	47.5	41.5		55.5	46.5		34.7	28.8		32.3	27.6	
Effective Green, g (s)	46.5	41.5		55.5	46.5		33.7	28.8		31.3	27.6	
Actuated g/C Ratio	0.46	0.42		0.56	0.46		0.34	0.29		0.31	0.28	
Clearance Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)	1.0	0.2		1.0	0.2		1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	167	1225		264	1391		138	1223		134	1174	
v/s Ratio Prot	0.04	0.31		c0.10	0.38		c0.04	0.21		0.02	c0.32	
v/s Ratio Perm	0.36			c0.45			0.21			0.15		
v/c Ratio	0.87	0.76		1.00	0.82		0.74	0.73		0.55	1.15	
Uniform Delay, d1	20.4	24.9		18.7	23.2		26.9	32.1		25.5	36.2	
Progression Factor	1.00	1.00		1.00	1.00		1.42	1.27		1.00	1.00	
Incremental Delay, d2	33.8	4.4		53.9	5.6		15.7	2.7		2.8	78.1	
Delay (s)	54.2	29.3		72.6	28.8		53.8	43.6		28.3	114.3	
Level of Service	D	C		E	C		D	D		C	F	
Approach Delay (s)		32.6			37.0			44.6			109.9	
Approach LOS		C			D			D			F	

Intersection Summary			
HCM Average Control Delay	58.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0		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	1.00	1.00	1.00	1.00	
Frt		0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1531		1509	1588	1350	1509	1588	1350	1509	1575	
Flt Permitted		0.99		0.59	1.00	1.00	0.35	1.00	1.00	0.61	1.00	
Satd. Flow (perm)		1515		940	1588	1350	559	1588	1350	974	1575	
Volume (vph)	10	211	75	396	301	54	42	190	125	31	331	19
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	222	79	417	317	57	44	200	132	33	348	20
RTOR Reduction (vph)	0	23	0	0	0	26	0	0	94	0	4	0
Lane Group Flow (vph)	0	289	0	417	317	31	44	200	38	33	364	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2		2	4		4	8		
Actuated Green, G (s)		27.0		27.0	27.0	27.0	14.1	14.1	14.1	14.1	14.1	
Effective Green, g (s)		27.5		27.5	27.5	27.5	14.6	14.6	14.6	14.6	14.6	
Actuated g/C Ratio		0.55		0.55	0.55	0.55	0.29	0.29	0.29	0.29	0.29	
Clearance Time (s)		4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)		4.0		4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		832		516	872	741	163	463	393	284	459	
v/s Ratio Prot					0.20			0.13			c0.23	
v/s Ratio Perm		0.19		c0.44		0.02	0.08		0.03	0.03		
v/c Ratio		0.35		0.81	0.36	0.04	0.27	0.43	0.10	0.12	0.79	
Uniform Delay, d1		6.3		9.2	6.4	5.2	13.7	14.4	12.9	13.0	16.4	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.3		9.5	0.4	0.0	0.9	0.6	0.1	0.2	9.2	
Delay (s)		6.6		18.7	6.7	5.3	14.5	15.0	13.1	13.2	25.5	
Level of Service		A		B	A	A	B	B	B	B	C	
Approach Delay (s)		6.6			12.9			14.3			24.5	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	50.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1509	2990		1509	1588	1350	1509	2996		1509	3018	1350
Flt Permitted	0.13	1.00		0.52	1.00	1.00	0.41	1.00		0.36	1.00	1.00
Satd. Flow (perm)	205	2990		819	1588	1350	655	2996		579	3018	1350
Volume (vph)	33	322	21	150	683	122	37	560	28	57	508	21
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	35	339	22	158	719	128	39	589	29	60	535	22
RTOR Reduction (vph)	0	6	0	0	0	41	0	5	0	0	0	10
Lane Group Flow (vph)	35	355	0	158	719	87	39	613	0	60	535	12
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		4
Actuated Green, G (s)	31.0	31.0		31.0	31.0	31.0	36.0	36.0		36.0	36.0	36.0
Effective Green, g (s)	31.0	31.0		31.0	31.0	31.0	36.0	36.0		36.0	36.0	36.0
Actuated g/C Ratio	0.41	0.41		0.41	0.41	0.41	0.48	0.48		0.48	0.48	0.48
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lane Grp Cap (vph)	85	1236		339	656	558	314	1438		278	1449	648
v/s Ratio Prot		0.12			c0.45			c0.20			0.18	
v/s Ratio Perm	0.17			0.19		0.06	0.06			0.10		0.01
v/c Ratio	0.41	0.29		0.47	1.10	0.16	0.12	0.43		0.22	0.37	0.02
Uniform Delay, d1	15.6	14.6		16.0	22.0	13.8	10.8	12.8		11.3	12.3	10.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.1	0.6		4.5	64.3	0.6	0.8	0.9		1.8	0.7	0.1
Delay (s)	29.6	15.2		20.5	86.3	14.4	11.6	13.7		13.1	13.0	10.3
Level of Service	C	B		C	F	B	B	B		B	B	B
Approach Delay (s)		16.5			66.8			13.6			13.0	
Approach LOS		B			E			B			B	

Intersection Summary			
HCM Average Control Delay	33.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	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			1.00	
Frt	1.00	1.00		1.00	1.00			0.96			0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.98			1.00	
Satd. Flow (prot)	1509	1586		1509	1586			1491			1391	
Flt Permitted	0.12	1.00		0.39	1.00			0.87			0.98	
Satd. Flow (perm)	193	1586		622	1586			1324			1373	
Volume (vph)	6	515	4	7	952	8	14	10	11	19	10	267
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	542	4	7	1002	8	15	11	12	20	11	281
RTOR Reduction (vph)	0	0	0	0	0	0	0	9	0	0	70	0
Lane Group Flow (vph)	6	546	0	7	1010	0	0	29	0	0	242	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	50.5	50.5		50.5	50.5			18.8			18.8	
Effective Green, g (s)	50.0	50.0		50.0	50.0			18.3			18.3	
Actuated g/C Ratio	0.66	0.66		0.66	0.66			0.24			0.24	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.5			3.5	
Vehicle Extension (s)	0.2	0.2		0.2	0.2			4.0			4.0	
Lane Grp Cap (vph)	126	1039		408	1039			318			329	
v/s Ratio Prot		0.34			c0.64							
v/s Ratio Perm	0.03			0.01				0.02			c0.18	
v/c Ratio	0.05	0.53		0.02	0.97			0.09			0.74	
Uniform Delay, d1	4.7	6.9		4.6	12.5			22.5			26.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.2		0.0	21.2			0.2			8.8	
Delay (s)	4.7	7.1		4.6	33.6			22.7			35.6	
Level of Service	A	A		A	C			C			D	
Approach Delay (s)		7.1			33.4			22.7			35.6	
Approach LOS		A			C			C			D	

Intersection Summary			
HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	76.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0	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	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2985		1509	3018	1350	1509	3018	1350	1509	2953	
Flt Permitted	0.30	1.00		0.95	1.00	1.00	0.10	1.00	1.00	0.36	1.00	
Satd. Flow (perm)	473	2985		1509	3018	1350	159	3018	1350	578	2953	
Volume (vph)	38	460	36	325	914	28	69	555	72	64	1012	167
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	40	484	38	342	962	29	73	584	76	67	1065	176
RTOR Reduction (vph)	0	6	0	0	0	15	0	0	42	0	15	0
Lane Group Flow (vph)	40	516	0	342	962	14	73	584	34	67	1226	0
Turn Type	Perm			Prot		Perm	Perm		Perm	Perm		
Protected Phases		8		7	4			6			2	
Permitted Phases	8					4	6		6	2		
Actuated Green, G (s)	25.0	25.0		13.0	41.0	41.0	39.0	39.0	39.0	39.0	39.0	
Effective Green, g (s)	26.0	26.0		12.0	42.0	42.0	40.0	40.0	40.0	40.0	40.0	
Actuated g/C Ratio	0.29	0.29		0.13	0.47	0.47	0.44	0.44	0.44	0.44	0.44	
Clearance Time (s)	5.0	5.0		3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	137	862		201	1408	630	71	1341	600	257	1312	
v/s Ratio Prot		0.17		c0.23	c0.32			0.19			0.42	
v/s Ratio Perm	0.08					0.01	c0.46		0.03	0.12		
v/c Ratio	0.29	0.60		1.70	0.68	0.02	1.03	0.44	0.06	0.26	0.93	
Uniform Delay, d1	24.9	27.5		39.0	18.8	12.9	25.0	17.2	14.2	15.7	23.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.3	3.1		336.1	2.7	0.1	114.8	1.0	0.2	2.5	13.4	
Delay (s)	30.2	30.6		375.1	21.5	13.0	139.8	18.3	14.4	18.2	37.2	
Level of Service	C	C		F	C	B	F	B	B	B	D	
Approach Delay (s)		30.5			112.0			30.0			36.2	
Approach LOS		C			F			C			D	

Intersection Summary			
HCM Average Control Delay	59.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	98.7%	ICU Level of Service	F
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)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
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	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3132		1583	3143		1583	1630		1583	1607	
Flt Permitted	0.95	1.00		0.95	1.00		0.18	1.00		0.24	1.00	
Satd. Flow (perm)	1583	3132		1583	3143		303	1630		394	1607	
Volume (vph)	28	790	62	205	1173	62	93	358	61	67	398	125
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	29	832	65	216	1235	65	98	377	64	71	419	132
RTOR Reduction (vph)	0	8	0	0	5	0	0	9	0	0	16	0
Lane Group Flow (vph)	29	889	0	216	1295	0	98	432	0	71	535	0
Turn Type	Prot			custom			Perm			Perm		
Protected Phases	5	2		1	2			4			4	
Permitted Phases				1	6		4			4		
Actuated Green, G (s)	9.5	28.0		9.0	28.0		22.0	22.0		22.0	22.0	
Effective Green, g (s)	8.5	28.0		8.5	28.0		22.0	22.0		22.0	22.0	
Actuated g/C Ratio	0.12	0.40		0.12	0.40		0.31	0.31		0.31	0.31	
Clearance Time (s)	3.0	4.0		3.5	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	5.0		2.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	191	1244		191	1248		95	509		123	501	
v/s Ratio Prot	0.02	0.28		c0.14	c0.41			0.27			c0.33	
v/s Ratio Perm							0.32			0.18		
v/c Ratio	0.15	0.71		1.13	1.04		1.03	0.85		0.58	1.07	
Uniform Delay, d1	27.8	17.9		31.0	21.2		24.2	22.7		20.3	24.2	
Progression Factor	1.00	1.00		1.32	0.52		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	3.5		65.5	19.8		101.2	16.1		18.2	59.7	
Delay (s)	27.9	21.4		106.5	30.9		125.4	38.8		38.6	83.9	
Level of Service	C	C		F	C		F	D		D	F	
Approach Delay (s)		21.6			41.6			54.5			78.7	
Approach LOS		C			D			D			E	

Intersection Summary			
HCM Average Control Delay	44.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	70.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.0%	ICU Level of Service	G
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)	1700	1700	1700	1700	1700	1700	1700	2500	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0		4.0	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	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3112		1583	3148		1583	2451	1417	1583	1577	
Flt Permitted	0.20	1.00		0.20	1.00		0.17	1.00	1.00	0.52	1.00	
Satd. Flow (perm)	327	3112		327	3148		286	2451	1417	874	1577	
Volume (vph)	46	765	99	91	1203	49	45	308	94	44	467	262
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	48	805	104	96	1266	52	47	324	99	46	492	276
RTOR Reduction (vph)	0	17	0	0	5	0	0	0	21	0	3	0
Lane Group Flow (vph)	48	893	0	96	1313	0	47	324	78	46	765	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	20.1	20.1		20.1	20.1		31.0	31.0	31.0	31.0	31.0	
Effective Green, g (s)	20.4	20.4		20.4	20.4		31.6	31.6	31.6	31.6	31.6	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.53	0.53	0.53	0.53	0.53	
Clearance Time (s)	4.3	4.3		4.3	4.3		4.6	4.6	4.6	4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	111	1058		111	1070		151	1291	746	460	831	
v/s Ratio Prot		0.29			c0.42			0.13			c0.49	
v/s Ratio Perm	0.15			0.29			0.16		0.05	0.05		
v/c Ratio	0.43	0.84		0.86	1.23		0.31	0.25	0.10	0.10	0.92	
Uniform Delay, d1	15.3	18.3		18.5	19.8		8.0	7.7	7.1	7.1	13.0	
Progression Factor	1.00	1.00		0.70	0.80		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.8	8.2		43.6	108.5		5.3	0.5	0.3	0.4	17.0	
Delay (s)	27.1	26.5		56.6	124.5		13.3	8.2	7.4	7.5	30.1	
Level of Service	C	C		E	F		B	A	A	A	C	
Approach Delay (s)		26.6			119.9			8.6			28.8	
Approach LOS		C			F			A			C	

Intersection Summary			
HCM Average Control Delay	60.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
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)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	3167	1417	1583	3167	1417	1583	3167	1417	1583	3167	1417
Flt Permitted	0.09	1.00	1.00	0.34	1.00	1.00	0.37	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	157	3167	1417	565	3167	1417	615	3167	1417	342	3167	1417
Volume (vph)	132	596	66	104	1188	86	25	862	79	62	540	169
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	139	627	69	109	1251	91	26	907	83	65	568	178
RTOR Reduction (vph)	0	0	37	0	0	42	0	0	45	0	0	16
Lane Group Flow (vph)	139	627	32	109	1251	49	26	907	38	65	568	162
Turn Type	Perm		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases		6			2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	54.6	54.6	54.6	54.6	54.6	54.6	54.0	54.0	54.0	54.0	54.0	54.0
Effective Green, g (s)	56.5	56.5	56.5	56.5	56.5	56.5	55.5	55.5	55.5	55.5	55.5	55.5
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	5.9	5.9	5.9	5.9	5.9	5.9	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	74	1491	667	266	1491	667	284	1465	655	158	1465	655
v/s Ratio Prot		0.20			0.40			c0.29			0.18	
v/s Ratio Perm	c0.89		0.02	0.19		0.03	0.04		0.03	0.19		0.11
v/c Ratio	1.88	0.42	0.05	0.41	0.84	0.07	0.09	0.62	0.06	0.41	0.39	0.25
Uniform Delay, d1	31.8	20.9	17.2	20.8	27.8	17.4	18.1	24.3	17.8	21.4	21.1	19.6
Progression Factor	0.87	0.86	1.22	1.13	1.01	1.76	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	438.1	0.8	0.1	1.1	1.4	0.0	0.6	2.0	0.2	7.7	0.8	0.9
Delay (s)	465.5	18.9	21.1	24.5	29.4	30.6	18.7	26.3	18.0	29.1	21.9	20.5
Level of Service	F	B	C	C	C	C	B	C	B	C	C	C
Approach Delay (s)		93.4			29.1			25.4			22.2	
Approach LOS		F			C			C			C	

Intersection Summary			
HCM Average Control Delay	39.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
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)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3072	3167	1417	3072	3156		1583	3167	1417	1583	4402	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.10	1.00	1.00	0.16	1.00	
Satd. Flow (perm)	3072	3167	1417	3072	3156		162	3167	1417	259	4402	
Volume (vph)	94	651	57	235	1211	27	72	805	166	72	1249	347
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	99	685	60	247	1275	28	76	847	175	76	1315	365
RTOR Reduction (vph)	0	0	3	0	1	0	0	0	70	0	41	0
Lane Group Flow (vph)	99	685	57	247	1302	0	76	847	105	76	1639	0
Turn Type	Prot		pm+ov	Prot			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2	3	1	6		3	8	1	7	4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	8.0	48.0	53.6	8.0	48.0		45.3	39.7	47.7	45.3	39.7	
Effective Green, g (s)	8.0	49.3	54.9	8.0	49.3		46.7	41.1	49.1	46.7	41.1	
Actuated g/C Ratio	0.07	0.41	0.46	0.07	0.41		0.39	0.34	0.41	0.39	0.34	
Clearance Time (s)	4.0	5.3	4.0	4.0	5.3		4.0	5.4	4.0	4.0	5.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	205	1301	696	205	1297		129	1085	627	163	1508	
v/s Ratio Prot	0.03	c0.22	0.00	c0.08	c0.41		c0.03	0.27	0.01	0.02	c0.37	
v/s Ratio Perm			0.04				0.20		0.06	0.16		
v/c Ratio	0.48	0.53	0.08	1.20	1.00		0.59	0.78	0.17	0.47	1.09	
Uniform Delay, d1	54.0	26.6	18.3	56.0	35.4		29.5	35.4	22.5	25.8	39.5	
Progression Factor	0.73	0.49	0.33	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	1.5	0.0	129.1	25.9		6.7	5.6	0.1	2.1	50.7	
Delay (s)	41.1	14.4	6.1	185.1	61.2		36.2	41.0	22.6	27.9	90.1	
Level of Service	D	B	A	F	E		D	D	C	C	F	
Approach Delay (s)		16.9			81.0			37.7			87.4	
Approach LOS		B			F			D			F	

Intersection Summary			
HCM Average Control Delay	63.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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		1.00	0.91	
Frt	1.00	0.89			0.96		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	1420			1500		1509	4290		1509	4295	
Flt Permitted	0.55	1.00			0.86		0.10	1.00		0.26	1.00	
Satd. Flow (perm)	866	1420			1306		162	4290		415	4295	
Volume (vph)	36	25	60	52	50	41	111	924	70	23	1465	99
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	38	26	63	55	53	43	117	973	74	24	1542	104
RTOR Reduction (vph)	0	53	0	0	18	0	0	5	0	0	6	0
Lane Group Flow (vph)	38	36	0	0	133	0	117	1042	0	24	1640	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	16.3	16.3			16.3		75.7	70.3		66.5	64.1	
Effective Green, g (s)	16.3	16.3			16.3		75.7	70.3		65.5	64.1	
Actuated g/C Ratio	0.16	0.16			0.16		0.76	0.70		0.66	0.64	
Clearance Time (s)	4.0	4.0			4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)	5.0	5.0			5.0		1.0	0.2		1.0	0.2	
Lane Grp Cap (vph)	141	231			213		225	3016		287	2753	
v/s Ratio Prot		0.03					c0.04	0.24		0.00	c0.38	
v/s Ratio Perm	0.04				c0.10		0.35			0.05		
v/c Ratio	0.27	0.16			0.63		0.52	0.35		0.08	0.60	
Uniform Delay, d1	36.6	35.9			39.0		6.7	5.8		6.0	10.4	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.67	0.90	
Incremental Delay, d2	2.2	0.7			7.9		1.0	0.3		0.0	0.1	
Delay (s)	38.8	36.6			46.9		7.7	6.1		4.0	9.5	
Level of Service	D	D			D		A	A		A	A	
Approach Delay (s)		37.3			46.9			6.3			9.4	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	EBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NWR2
Lane Configurations											
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00	0.95					0.95	
Frt	1.00	1.00	0.85	0.85	0.97					1.00	
Flt Protected	0.95	1.00	1.00	1.00	1.00					0.99	
Satd. Flow (prot)	1509	3018	1350	1350	2914					2985	
Flt Permitted	0.95	1.00	1.00	1.00	1.00					0.62	
Satd. Flow (perm)	1509	3018	1350	1350	2914					1862	
Volume (vph)	89	523	55	290	362	63	45	103	51	554	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	94	551	58	305	381	66	47	108	54	583	0
RTOR Reduction (vph)	0	0	0	284	5	0	0	0	0	0	0
Lane Group Flow (vph)	94	551	58	21	489	0	0	0	0	745	0
Turn Type	custom		Perm	Perm				custom	Prot		Free
Protected Phases	3	3			6				2	1	
Permitted Phases	4	4	3	3				2		2	Free
Actuated Green, G (s)	68.4	68.4	12.0	12.0	31.0					43.0	
Effective Green, g (s)	67.0	67.0	11.0	11.0	31.0					42.0	
Actuated g/C Ratio	0.42	0.42	0.07	0.07	0.19					0.26	
Clearance Time (s)	3.0	3.0	3.0	3.0	4.0					4.0	
Vehicle Extension (s)	1.0	1.0	1.0	1.0	3.0					4.0	
Lane Grp Cap (vph)	670	1339	93	93	565					706	
v/s Ratio Prot	0.01	c0.03			c0.17					c0.20	
v/s Ratio Perm	0.05	0.15	c0.04	0.02						c0.07	
v/c Ratio	0.14	0.41	0.62	0.23	0.87					1.06	
Uniform Delay, d1	28.8	32.7	72.5	70.5	62.5					59.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00					0.55	
Incremental Delay, d2	0.0	0.1	9.0	0.5	16.2					48.4	
Delay (s)	28.9	32.7	81.5	70.9	78.7					81.0	
Level of Service	C	C	F	E	E					F	
Approach Delay (s)		46.7			78.7					81.0	
Approach LOS		D			E					F	

Intersection Summary			
HCM Average Control Delay	65.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.9%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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	1.00		0.95	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1509	2987		1509	3018	1350	1509	1498		1433	1463	
Flt Permitted	0.16	1.00		0.20	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	258	2987		315	3018	1350	1509	1498		1433	1463	
Volume (vph)	14	1032	75	33	1116	237	74	51	31	250	137	28
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	15	1086	79	35	1175	249	78	54	33	263	144	29
RTOR Reduction (vph)	0	3	0	0	0	96	0	21	0	0	4	0
Lane Group Flow (vph)	15	1162	0	35	1175	153	78	66	0	213	219	0
Turn Type	pm+pt			Perm		Perm	Split			Split		
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6			2		2						
Actuated Green, G (s)	77.2	77.2		72.4	72.4	72.4	11.8	11.8		19.0	19.0	
Effective Green, g (s)	77.2	77.2		72.4	72.4	72.4	11.8	11.8		19.0	19.0	
Actuated g/C Ratio	0.64	0.64		0.60	0.60	0.60	0.10	0.10		0.16	0.16	
Clearance Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	1.0	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	174	1922		190	1821	815	148	147		227	232	
v/s Ratio Prot	0.00	c0.39			c0.39		c0.05	0.04		0.15	c0.15	
v/s Ratio Perm	0.05			0.11		0.11						
v/c Ratio	0.09	0.60		0.18	0.65	0.19	0.53	0.45		0.94	0.94	
Uniform Delay, d1	10.4	12.5		10.6	15.5	10.6	51.4	51.0		49.9	50.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.4		2.1	1.8	0.5	3.4	2.2		42.4	43.2	
Delay (s)	10.5	13.9		12.7	17.2	11.2	54.8	53.2		92.3	93.2	
Level of Service	B	B		B	B	B	D	D		F	F	
Approach Delay (s)		13.9			16.1			54.0			92.8	
Approach LOS		B			B			D			F	

Intersection Summary			
HCM Average Control Delay	27.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.0%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.91	0.95		1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)	1509	3018	1350	1509	2990		1433	1407	1282		1529	
Flt Permitted	0.16	1.00	1.00	0.10	1.00		0.48	0.63	1.00		0.76	
Satd. Flow (perm)	258	3018	1350	159	2990		717	905	1282		1184	
Volume (vph)	12	1254	58	147	1127	73	180	76	223	104	92	24
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	1320	61	155	1186	77	189	80	235	109	97	25
RTOR Reduction (vph)	0	0	16	0	4	0	0	0	228	0	3	0
Lane Group Flow (vph)	13	1320	45	155	1259	0	95	174	7	0	228	0
Turn Type	Perm		Perm	pm+pt			Perm		Over	Perm		
Protected Phases		6		5	2			4	5		8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	64.0	64.0	64.0	71.5	71.5		16.0	16.0	4.5		21.5	
Effective Green, g (s)	64.0	64.0	64.0	71.5	71.5		15.5	15.5	3.5		21.0	
Actuated g/C Ratio	0.53	0.53	0.53	0.60	0.60		0.13	0.13	0.03		0.18	
Clearance Time (s)	4.0	4.0	4.0	3.0	4.0		3.5	3.5	3.0		3.5	
Vehicle Extension (s)	4.5	4.5	4.5	1.0	4.5		2.0	2.0	1.0		4.0	
Lane Grp Cap (vph)	138	1610	720	134	1782		93	117	37		207	
v/s Ratio Prot		0.44		c0.03	0.42				0.01			
v/s Ratio Perm	0.05		0.03	c0.65			0.13	c0.19			c0.19	
v/c Ratio	0.09	0.82	0.06	1.16	0.71		1.02	1.49	0.19		1.10	
Uniform Delay, d1	13.8	23.2	13.5	26.0	16.9		52.2	52.2	56.9		49.5	
Progression Factor	1.00	1.00	1.00	1.96	1.41		1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.4	4.8	0.2	117.1	1.9		99.3	259.0	0.9		91.9	
Delay (s)	15.1	28.0	13.7	168.3	25.8		151.5	311.2	57.7		141.4	
Level of Service	B	C	B	F	C		F	F	E		F	
Approach Delay (s)		27.3			41.4			162.9			141.4	
Approach LOS		C			D			F			F	

Intersection Summary			
HCM Average Control Delay	59.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.95	0.91	0.95	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2979		1509	3001		1433	1388	1282	1509	1502	
Flt Permitted	0.18	1.00		0.08	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	290	2979		120	3001		1433	1388	1282	1509	1502	
Volume (vph)	9	1501	139	140	1223	47	256	25	323	31	15	9
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	1580	146	147	1287	49	269	26	340	33	16	9
RTOR Reduction (vph)	0	4	0	0	2	0	0	0	163	0	9	0
Lane Group Flow (vph)	9	1722	0	147	1334	0	147	148	177	33	16	0
Turn Type	Perm			pm+pt			Split		pm+ov	Split		
Protected Phases		6		5	2		4	4	5	3	3	
Permitted Phases	6			2					4			
Actuated Green, G (s)	82.0	82.0		89.0	89.0		13.0	13.0	17.0	7.0	7.0	
Effective Green, g (s)	82.0	82.0		89.0	89.0		13.0	13.0	16.0	6.0	6.0	
Actuated g/C Ratio	0.68	0.68		0.74	0.74		0.11	0.11	0.13	0.05	0.05	
Clearance Time (s)	4.0	4.0		3.0	4.0		4.0	4.0	3.0	3.0	3.0	
Vehicle Extension (s)	4.5	4.5		1.0	4.5		2.0	2.0	1.0	2.0	2.0	
Lane Grp Cap (vph)	198	2036		124	2226		155	150	214	75	75	
v/s Ratio Prot		0.58		0.03	0.44		0.10	c0.11	c0.02	c0.02	0.01	
v/s Ratio Perm	0.03			c0.85					0.12			
v/c Ratio	0.05	0.85		1.19	0.60		0.95	0.99	0.83	0.44	0.22	
Uniform Delay, d1	6.2	14.3		19.5	7.2		53.2	53.4	50.7	55.4	54.8	
Progression Factor	1.34	1.33		1.52	1.72		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	3.2		130.6	1.0		55.9	68.7	21.4	1.5	0.5	
Delay (s)	8.6	22.3		160.2	13.3		109.0	122.1	72.0	56.9	55.3	
Level of Service	A	C		F	B		F	F	E	E	E	
Approach Delay (s)		22.2			27.9			92.3			56.2	
Approach LOS		C			C			F			E	

Intersection Summary			
HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.91			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1509	3013		1509	3008			1432			1518	
Flt Permitted	0.15	1.00		0.09	1.00			0.93			0.57	
Satd. Flow (perm)	238	3013		150	3008			1351			882	
Volume (vph)	26	1739	20	61	1401	29	29	18	91	33	18	8
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	27	1831	21	64	1475	31	31	19	96	35	19	8
RTOR Reduction (vph)	0	1	0	0	1	0	0	42	0	0	4	0
Lane Group Flow (vph)	27	1851	0	64	1505	0	0	104	0	0	58	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	98.5	98.5		98.5	98.5			13.5			13.5	
Effective Green, g (s)	98.5	98.5		98.5	98.5			13.5			13.5	
Actuated g/C Ratio	0.82	0.82		0.82	0.82			0.11			0.11	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	4.5	4.5		4.5	4.5			3.0			3.0	
Lane Grp Cap (vph)	195	2473		123	2469			152			99	
v/s Ratio Prot		c0.61			0.50							
v/s Ratio Perm	0.11			0.43				c0.08			0.07	
v/c Ratio	0.14	0.75		0.52	0.61			0.69			0.58	
Uniform Delay, d1	2.2	5.0		3.4	3.9			51.2			50.6	
Progression Factor	1.52	1.67		1.02	1.03			1.00			1.00	
Incremental Delay, d2	0.7	1.1		6.0	0.4			12.1			8.4	
Delay (s)	4.1	9.4		9.5	4.4			63.3			59.0	
Level of Service	A	A		A	A			E			E	
Approach Delay (s)		9.3			4.6			63.3			59.0	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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	1.00
Frt	1.00	1.00		1.00	0.98			0.91			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.95	1.00
Satd. Flow (prot)	1509	3012		1509	2965			1430			1515	1350
Flt Permitted	0.22	1.00		0.14	1.00			0.91			0.73	1.00
Satd. Flow (perm)	343	3012		223	2965			1318			1162	1350
Volume (vph)	130	1402	16	41	977	127	12	4	29	165	5	84
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	1476	17	43	1028	134	13	4	31	174	5	88
RTOR Reduction (vph)	0	1	0	0	8	0	0	26	0	0	0	88
Lane Group Flow (vph)	137	1492	0	43	1154	0	0	22	0	0	179	0
Turn Type	Perm			Perm			Perm			Perm		NA
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	91.8	91.8		91.8	91.8			20.2			20.2	0.0
Effective Green, g (s)	91.8	91.8		91.8	91.8			20.2			20.2	0.0
Actuated g/C Ratio	0.76	0.76		0.76	0.76			0.17			0.17	0.00
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	262	2304		171	2268			222			196	0
v/s Ratio Prot		c0.50			0.39							
v/s Ratio Perm	0.40			0.19				0.02			c0.15	
v/c Ratio	0.52	0.65		0.25	0.51			0.10			0.91	0.00
Uniform Delay, d1	5.5	6.6		4.1	5.4			42.2			49.0	60.0
Progression Factor	1.00	1.00		0.91	0.90			1.00			1.00	1.00
Incremental Delay, d2	7.3	1.4		3.1	0.7			0.2			40.6	0.0
Delay (s)	12.8	8.0		6.8	5.6			42.4			89.6	60.0
Level of Service	B	A		A	A			D			F	E
Approach Delay (s)		8.4			5.7			42.4			79.9	
Approach LOS		A			A			D			E	

Intersection Summary			
HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.97	
Satd. Flow (prot)	1509	2974		1509	3015			1515	1350		1535	
Flt Permitted	0.29	1.00		0.05	1.00			0.95	1.00		0.97	
Satd. Flow (perm)	457	2974		86	3015			1515	1350		1535	
Volume (vph)	5	1484	159	230	941	5	139	4	241	21	15	2
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	1562	167	242	991	5	146	4	254	22	16	2
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	190	0	2	0
Lane Group Flow (vph)	5	1725	0	242	996	0	0	150	64	0	38	0
Turn Type	Perm			pm+pt			Split		pm+ov	Split		
Protected Phases		6		5	2		4	4	5	8	8	
Permitted Phases	6			2					4			
Actuated Green, G (s)	69.6	69.6		88.5	88.5			17.7	33.6		11.8	
Effective Green, g (s)	69.6	69.6		88.5	88.5			17.7	32.6		11.8	
Actuated g/C Ratio	0.54	0.54		0.68	0.68			0.14	0.25		0.09	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0	3.0		4.0	
Vehicle Extension (s)	3.0	3.0		1.0	3.0			4.0	1.0		3.0	
Lane Grp Cap (vph)	245	1592		222	2053			206	339		139	
v/s Ratio Prot		0.58		c0.13	0.33			c0.10	0.02		c0.02	
v/s Ratio Perm	0.01			c0.62					0.03			
v/c Ratio	0.02	1.08		1.09	0.49			0.73	0.19		0.27	
Uniform Delay, d1	14.2	30.2		45.5	9.9			53.8	38.3		55.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	48.9		86.5	0.8			12.9	0.1		4.8	
Delay (s)	14.3	79.1		132.0	10.7			66.7	38.4		59.9	
Level of Service	B	E		F	B			E	D		E	
Approach Delay (s)		79.0			34.4			48.9			59.9	
Approach LOS		E			C			D			E	

Intersection Summary			
HCM Average Control Delay	59.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	4336	1350	1509	4296		1509	3018	1350	1509	2943	
Flt Permitted	0.12	1.00	1.00	0.12	1.00		0.17	1.00	1.00	0.15	1.00	
Satd. Flow (perm)	197	4336	1350	190	4296		276	3018	1350	235	2943	
Volume (vph)	250	1381	93	184	1052	68	75	790	116	139	944	186
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	1454	98	194	1107	72	79	832	122	146	994	196
RTOR Reduction (vph)	0	0	59	0	8	0	0	0	91	0	18	0
Lane Group Flow (vph)	263	1454	39	194	1171	0	79	832	31	146	1172	0
Turn Type	pm+pt		Perm	pm+pt			Perm		Perm	pm+pt		
Protected Phases	1	6		5	2			4		3	8	
Permitted Phases	6		6	2			4		4	8		
Actuated Green, G (s)	48.5	34.9	34.9	43.5	32.4		22.0	22.0	22.0	31.0	31.0	
Effective Green, g (s)	49.5	35.9	35.9	44.5	33.4		23.0	23.0	23.0	31.0	31.0	
Actuated g/C Ratio	0.55	0.40	0.40	0.49	0.37		0.26	0.26	0.26	0.34	0.34	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	5.0	3.0	4.0	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0		3.0	3.0	3.0	2.0	3.0	
Lane Grp Cap (vph)	307	1730	539	257	1594		71	771	345	138	1014	
v/s Ratio Prot	c0.13	0.34		0.09	0.27			0.28		0.05	c0.40	
v/s Ratio Perm	c0.34		0.03	0.28			0.29		0.02	0.32		
v/c Ratio	0.86	0.84	0.07	0.75	0.73		1.11	1.08	0.09	1.06	1.16	
Uniform Delay, d1	20.3	24.5	16.7	16.7	24.5		33.5	33.5	25.5	29.5	29.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.6	5.1	0.3	10.6	3.1		140.8	55.9	0.1	92.9	81.3	
Delay (s)	39.9	29.6	17.0	27.3	27.5		174.3	89.4	25.6	122.4	110.8	
Level of Service	D	C	B	C	C		F	F	C	F	F	
Approach Delay (s)		30.4			27.5			88.4			112.1	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	60.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.97		0.95	1.00		0.95
Frt	0.99		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	2906		3018	1350		3018
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	2906		3018	1350		3018
Volume (vph)	899	93	491	1488	0	385
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	946	98	517	1566	0	405
RTOR Reduction (vph)	9	0	0	630	0	0
Lane Group Flow (vph)	1035	0	517	936	0	405
Turn Type				Perm		
Protected Phases	4		2			2
Permitted Phases				2		
Actuated Green, G (s)	49.7		41.3	41.3		41.3
Effective Green, g (s)	49.7		42.3	42.3		42.3
Actuated g/C Ratio	0.50		0.42	0.42		0.42
Clearance Time (s)	4.0		5.0	5.0		5.0
Vehicle Extension (s)	7.0		3.0	3.0		3.0
Lane Grp Cap (vph)	1444		1277	571		1277
v/s Ratio Prot	c0.36		0.17			0.13
v/s Ratio Perm				c0.69		
v/c Ratio	0.72		0.40	1.64		0.32
Uniform Delay, d1	19.6		20.1	28.9		19.2
Progression Factor	1.00		0.79	4.05		1.00
Incremental Delay, d2	2.8		0.3	290.8		0.7
Delay (s)	22.5		16.2	407.5		19.9
Level of Service	C		B	F		B
Approach Delay (s)	22.5		310.4			19.9
Approach LOS	C		F			B

Intersection Summary			
HCM Average Control Delay	192.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	111.4%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		1.00			1.00			0.89			0.99	
Flt Protected		1.00			1.00			0.99			0.96	
Satd. Flow (prot)		3014			3013			1410			1518	
Flt Permitted		0.95			0.92			0.96			0.77	
Satd. Flow (perm)		2874			2777			1361			1216	
Volume (vph)	4	1301	10	13	703	3	2	1	10	33	9	3
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	4	1369	11	14	740	3	2	1	11	35	9	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	10	0	0	3	0
Lane Group Flow (vph)	0	1384	0	0	757	0	0	4	0	0	44	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4	4		4		
Actuated Green, G (s)		74.4			74.4			7.1			7.1	
Effective Green, g (s)		74.9			74.9			7.1			7.1	
Actuated g/C Ratio		0.83			0.83			0.08			0.08	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		0.2			0.2			3.0			3.0	
Lane Grp Cap (vph)		2392			2311			107			96	
v/s Ratio Prot												
v/s Ratio Perm		c0.48			0.27			0.00			c0.04	
v/c Ratio		0.58			0.33			0.04			0.46	
Uniform Delay, d1		2.4			1.7			38.3			39.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			0.4			0.1			3.5	
Delay (s)		3.5			2.1			38.4			43.1	
Level of Service		A			A			D			D	
Approach Delay (s)		3.5			2.1			38.4			43.1	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	4.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.1%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		1.00			0.99			0.97			0.98	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3006			2989			1524			1534	
Flt Permitted		0.93			0.85			0.96			0.82	
Satd. Flow (perm)		2810			2553			1473			1276	
Volume (vph)	18	1044	21	39	765	40	24	135	55	32	74	21
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	19	1099	22	41	805	42	25	142	58	34	78	22
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	1139	0	0	885	0	0	225	0	0	126	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			6			6	
Permitted Phases	2			2			6			6		
Actuated Green, G (s)		63.7			63.7			17.8			17.8	
Effective Green, g (s)		64.2			64.2			17.8			17.8	
Actuated g/C Ratio		0.71			0.71			0.20			0.20	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		2004			1821			291			252	
v/s Ratio Prot												
v/s Ratio Perm		c0.41			0.35			c0.15			0.10	
v/c Ratio		0.57			0.49			0.77			0.50	
Uniform Delay, d1		6.2			5.7			34.2			32.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.2			0.9			12.0			1.6	
Delay (s)		7.4			6.6			46.2			33.7	
Level of Service		A			A			D			C	
Approach Delay (s)		7.4			6.6			46.2			33.7	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM Average Control Delay	12.2	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	82.4%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	3004		1509	2982		1509	2983		1509	2968	
Flt Permitted	0.19	1.00		0.15	1.00		0.19	1.00		0.10	1.00	
Satd. Flow (perm)	309	3004		240	2982		304	2983		151	2968	
Volume (vph)	187	980	30	156	660	56	66	1171	97	68	759	94
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	197	1032	32	164	695	59	69	1233	102	72	799	99
RTOR Reduction (vph)	0	2	0	0	6	0	0	6	0	0	9	0
Lane Group Flow (vph)	197	1062	0	164	748	0	69	1329	0	72	889	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	50.0	42.0		40.2	35.2		42.0	42.0		42.0	42.0	
Effective Green, g (s)	50.0	42.0		39.2	35.2		42.0	42.0		42.0	42.0	
Actuated g/C Ratio	0.50	0.42		0.39	0.35		0.42	0.42		0.42	0.42	
Clearance Time (s)	3.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	1.0	4.9		1.0	5.0		4.3	4.3		4.7	4.7	
Lane Grp Cap (vph)	284	1262		145	1050		128	1253		63	1247	
v/s Ratio Prot	c0.07	0.35		c0.05	0.25			0.45			0.30	
v/s Ratio Perm	0.27			c0.40			0.23			c0.48		
v/c Ratio	0.69	0.84		1.13	0.71		0.54	1.06		1.14	0.71	
Uniform Delay, d1	16.9	26.0		28.7	28.0		21.7	29.0		29.0	24.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	6.9		114.3	4.1		6.2	43.1		157.6	2.3	
Delay (s)	22.7	32.9		143.0	32.1		27.9	72.1		186.6	26.3	
Level of Service	C	C		F	C		C	E		F	C	
Approach Delay (s)		31.3			51.9			69.9			38.2	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM Average Control Delay	48.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2996		1509	2961		1509	2944		1509	2941	
Flt Permitted	0.22	1.00		0.11	1.00		0.13	1.00		0.11	1.00	
Satd. Flow (perm)	348	2996		182	2961		212	2944		176	2941	
Volume (vph)	231	1213	62	93	818	118	96	962	187	67	742	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	243	1277	65	98	861	124	101	1013	197	71	781	158
RTOR Reduction (vph)	0	4	0	0	11	0	0	16	0	0	17	0
Lane Group Flow (vph)	243	1338	0	98	974	0	101	1194	0	71	922	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	55.0	55.0		55.0	55.0		35.0	35.0		35.0	35.0	
Effective Green, g (s)	56.0	56.0		56.0	56.0		36.0	36.0		36.0	36.0	
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.36	0.36		0.36	0.36	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	4.9	4.9		4.9	4.9		4.9	4.9		4.9	4.9	
Lane Grp Cap (vph)	195	1678		102	1658		76	1060		63	1059	
v/s Ratio Prot		0.45			0.33			0.41			0.31	
v/s Ratio Perm	c0.70			0.54			c0.48			0.40		
v/c Ratio	1.25	0.80		0.96	0.59		1.33	1.13		1.13	0.87	
Uniform Delay, d1	22.0	17.5		21.0	14.4		32.0	32.0		32.0	29.8	
Progression Factor	1.00	1.00		1.00	1.00		0.98	0.91		1.00	1.00	
Incremental Delay, d2	146.2	4.0		79.0	1.5		209.6	68.4		152.3	9.8	
Delay (s)	168.2	21.5		99.9	16.0		241.2	97.3		184.3	39.6	
Level of Service	F	C		F	B		F	F		F	D	
Approach Delay (s)		44.0			23.6			108.4			49.8	
Approach LOS		D			C			F			D	

Intersection Summary			
HCM Average Control Delay	57.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	109.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	0.95			0.95	1.00	
Frt	1.00			1.00	0.96	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	3008			3014	1475	
Flt Permitted	1.00			0.88	0.97	
Satd. Flow (perm)	3008			2660	1475	
Volume (vph)	1429	32	25	1020	55	22
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1504	34	26	1074	58	23
RTOR Reduction (vph)	1	0	0	0	18	0
Lane Group Flow (vph)	1537	0	0	1100	63	0
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	70.1			70.1	9.3	
Effective Green, g (s)	72.7			72.7	9.3	
Actuated g/C Ratio	0.81			0.81	0.10	
Clearance Time (s)	6.6			6.6	4.0	
Vehicle Extension (s)	5.0			5.0	3.0	
Lane Grp Cap (vph)	2430			2149	152	
v/s Ratio Prot	c0.51				c0.04	
v/s Ratio Perm				0.41		
v/c Ratio	0.63			0.51	0.41	
Uniform Delay, d1	3.4			2.8	37.8	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.3			0.9	1.8	
Delay (s)	4.7			3.7	39.6	
Level of Service	A			A	D	
Approach Delay (s)	4.7			3.7	39.6	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	5.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: Fountain Ave & Gardner St

8/18/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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		1.00	
Frt	1.00	0.99		1.00	0.99			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1509	3001		1509	2998			1578	1350		1563	
Flt Permitted	0.22	1.00		0.13	1.00			0.67	1.00		0.41	
Satd. Flow (perm)	354	3001		201	2998			1059	1350		647	
Volume (vph)	96	1330	51	119	976	45	51	336	68	51	402	38
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	101	1400	54	125	1027	47	54	354	72	54	423	40
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	50	0	3	0
Lane Group Flow (vph)	101	1451	0	125	1070	0	0	408	22	0	514	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	59.5	59.5		59.5	59.5			21.5	21.5		21.5	
Effective Green, g (s)	60.0	60.0		60.0	60.0			22.0	22.0		22.0	
Actuated g/C Ratio	0.67	0.67		0.67	0.67			0.24	0.24		0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	4.3	4.3		5.0	5.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	236	2001		134	1999			259	330		158	
v/s Ratio Prot		0.48			0.36							
v/s Ratio Perm	0.29			c0.62				0.39	0.02		c0.79	
v/c Ratio	0.43	0.73		0.93	0.54			1.58	0.07		3.25	
Uniform Delay, d1	7.0	9.7		13.2	7.8			34.0	26.1		34.0	
Progression Factor	1.00	1.00		0.68	0.48			1.00	1.00		1.00	
Incremental Delay, d2	5.6	2.3		58.4	0.9			276.7	0.1		1030.1	
Delay (s)	12.6	12.0		67.4	4.7			310.7	26.2		1064.1	
Level of Service	B	B		E	A			F	C		F	
Approach Delay (s)		12.0			11.2			268.0			1064.1	
Approach LOS		B			B			F			F	

Intersection Summary			
HCM Average Control Delay	189.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	121.6%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.98		1.00	0.99		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2950		1509	1571		1509	4260		1509	4214	
Flt Permitted	0.21	1.00		0.21	1.00		0.22	1.00		0.22	1.00	
Satd. Flow (perm)	334	2950		334	1571		353	4260		353	4214	
Volume (vph)	204	913	161	161	683	52	165	1060	140	78	1048	242
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	215	961	169	169	719	55	174	1116	147	82	1103	255
RTOR Reduction (vph)	0	15	0	0	6	0	0	31	0	0	69	0
Lane Group Flow (vph)	215	1115	0	169	768	0	174	1232	0	82	1289	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	19.0	19.0		19.0	19.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	141	1246		141	663		141	1704		141	1686	
v/s Ratio Prot		0.38			0.49			0.29			0.31	
v/s Ratio Perm	c0.64			0.51			c0.49			0.23		
v/c Ratio	1.52	0.89		1.20	1.16		1.23	0.72		0.58	0.76	
Uniform Delay, d1	13.0	12.1		13.0	13.0		13.5	11.4		10.6	11.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	268.8	8.6		138.9	87.2		152.0	2.7		16.3	3.4	
Delay (s)	281.8	20.6		151.9	100.2		165.5	14.1		26.9	15.0	
Level of Service	F	C		F	F		F	B		C	B	
Approach Delay (s)		62.4			109.5			32.4			15.7	
Approach LOS		E			F			C			B	

Intersection Summary			
HCM Average Control Delay	49.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.38		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	113.2%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95	1.00		0.95		0.95	0.95	1.00		1.00	
Frt	1.00	1.00	0.85		1.00		1.00	1.00	0.85		0.94	
Flt Protected	0.95	1.00	1.00		1.00		0.95	0.95	1.00		0.99	
Satd. Flow (prot)	1509	3018	1350		3014		1433	1439	1350		1464	
Flt Permitted	0.11	1.00	1.00		1.00		0.95	0.95	1.00		0.99	
Satd. Flow (perm)	169	3018	1350		3014		1433	1439	1350		1464	
Volume (vph)	15	872	239	0	1332	11	602	8	15	30	24	49
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	918	252	0	1402	12	634	8	16	32	25	52
RTOR Reduction (vph)	0	0	59	0	0	0	0	0	13	0	28	0
Lane Group Flow (vph)	16	918	193	0	1414	0	317	325	3	0	81	0
Turn Type	pm+pt		Perm				Split		Perm	Split		
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6		6						4			
Actuated Green, G (s)	77.2	77.2	77.2		72.4		21.0	21.0	21.0		9.8	
Effective Green, g (s)	77.2	77.2	77.2		72.4		21.0	21.0	21.0		9.8	
Actuated g/C Ratio	0.64	0.64	0.64		0.60		0.18	0.18	0.18		0.08	
Clearance Time (s)	3.0	4.0	4.0		4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	1.0	6.0	6.0		6.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	118	1942	869		1818		251	252	236		120	
v/s Ratio Prot	0.00	c0.30			c0.47		0.22	c0.23			c0.06	
v/s Ratio Perm	0.09		0.14						0.00			
v/c Ratio	0.14	0.47	0.22		0.78		1.26	1.29	0.01		0.68	
Uniform Delay, d1	12.7	11.0	8.9		17.8		49.5	49.5	40.9		53.6	
Progression Factor	0.84	1.11	1.39		1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.5	0.4		3.3		146.2	156.8	0.0		14.2	
Delay (s)	10.7	12.7	12.8		21.1		195.7	206.3	40.9		67.8	
Level of Service	B	B	B		C		F	F	D		E	
Approach Delay (s)		12.7			21.1			197.2			67.8	
Approach LOS		B			C			F			E	

Intersection Summary			
HCM Average Control Delay	54.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	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		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1509	1588	1350	1509	1509		1509	2995		1509	3018	1350
Flt Permitted	0.30	1.00	1.00	0.56	1.00		0.20	1.00		0.09	1.00	1.00
Satd. Flow (perm)	475	1588	1350	891	1509		318	2995		147	3018	1350
Volume (vph)	517	314	147	39	148	74	107	1174	61	58	835	248
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	544	331	155	41	156	78	113	1236	64	61	879	261
RTOR Reduction (vph)	0	0	82	0	20	0	0	3	0	0	0	72
Lane Group Flow (vph)	544	331	73	41	214	0	113	1297	0	61	879	189
Turn Type	pm+pt		Perm	pm+pt			pm+pt			pm+pt		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2			4			8		8
Actuated Green, G (s)	39.5	33.1	33.1	22.9	19.5		49.7	43.9		47.8	43.2	43.2
Effective Green, g (s)	40.0	33.6	33.6	21.9	19.5		49.2	44.4		46.8	43.2	43.2
Actuated g/C Ratio	0.40	0.34	0.34	0.22	0.20		0.49	0.44		0.47	0.43	0.43
Clearance Time (s)	3.0	4.5	4.5	3.0	4.0		3.0	4.5		3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	1.0	2.5		1.0	5.0		1.0	5.0	5.0
Lane Grp Cap (vph)	361	534	454	210	294		214	1330		118	1304	583
v/s Ratio Prot	c0.25	0.21		0.00	0.14		c0.03	c0.43		0.02	0.29	
v/s Ratio Perm	c0.35		0.05	0.04			0.23			0.22		0.14
v/c Ratio	1.51	0.62	0.16	0.20	0.73		0.53	0.97		0.52	0.67	0.32
Uniform Delay, d1	26.3	27.8	23.3	31.3	37.8		15.8	27.3		19.6	22.8	18.8
Progression Factor	1.16	1.16	1.57	0.93	0.90		0.96	0.44		0.90	0.86	0.90
Incremental Delay, d2	234.3	0.9	0.1	0.2	7.9		0.4	10.3		1.4	2.4	1.3
Delay (s)	264.8	33.2	36.6	29.2	41.7		15.5	22.2		19.0	21.9	18.1
Level of Service	F	C	D	C	D		B	C		B	C	B
Approach Delay (s)		156.0			39.9			21.7			21.0	
Approach LOS		F			D			C			C	

Intersection Summary			
HCM Average Control Delay	58.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	105.5%	ICU Level of Service	G
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		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	12	32	34	0	8	49	19	470	117	145	467	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	13	34	36	0	8	52	20	495	123	153	492	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											460	
pX, platoon unblocked												
vC, conflicting volume	1390	1457	494	1446	1398	556	497			618		
vC1, stage 1 conf vol							0			0		
vC2, stage 2 conf vol							0			0		
vCu, unblocked vol	1390	1457	494	1446	1398	556	497			618		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)							3.1			3.1		
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	68	94	100	93	90	98			83		
cM capacity (veh/h)	87	105	575	66	114	530	915			879		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	82	60	20	618	153	497
Volume Left	13	0	20	0	153	0
Volume Right	36	52	0	123	0	5
cSH	155	350	915	1700	879	1700
Volume to Capacity	0.53	0.17	0.02	0.36	0.17	0.29
Queue Length 95th (ft)	65	15	2	0	16	0
Control Delay (s)	51.7	17.4	9.0	0.0	10.0	0.0
Lane LOS	F	C	A		A	
Approach Delay (s)	51.7	17.4	0.3		2.3	
Approach LOS	F	C				

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.98			0.98		1.00	0.97		1.00	0.99	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1539			1522		1509	2915		1509	2998	
Flt Permitted		0.91			0.72		0.57	1.00		0.24	1.00	
Satd. Flow (perm)		1417			1126		900	2915		374	2998	
Volume (vph)	120	413	104	59	54	20	116	587	172	18	276	12
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	435	109	62	57	21	122	618	181	19	291	13
RTOR Reduction (vph)	0	11	0	0	10	0	0	65	0	0	7	0
Lane Group Flow (vph)	0	659	0	0	130	0	122	734	0	19	297	0
Turn Type	D.Pm			D.Pm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		25.4			25.4		18.0	18.0		18.0	18.0	
Effective Green, g (s)		26.0			26.0		17.0	17.0		17.0	17.0	
Actuated g/C Ratio		0.51			0.51		0.33	0.33		0.33	0.33	
Clearance Time (s)		4.6			4.6		3.0	3.0		3.0	3.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		722			574		300	972		125	999	
v/s Ratio Prot								c0.25			0.10	
v/s Ratio Perm		c0.46			0.12		0.14			0.05		
v/c Ratio		0.91			0.23		0.41	0.76		0.15	0.30	
Uniform Delay, d1		11.5			6.9		13.1	15.1		11.9	12.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		17.9			0.9		0.9	3.4		0.6	0.2	
Delay (s)		29.3			7.8		14.0	18.5		12.5	12.7	
Level of Service		C			A		B	B		B	B	
Approach Delay (s)		29.3			7.8			17.9			12.7	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	51.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)				4.0	4.0			4.0			4.0	4.0
Lane Util. Factor				1.00	0.95			0.95			0.95	1.00
Frt				1.00	0.99			1.00			1.00	0.85
Flt Protected				0.95	1.00			1.00			1.00	1.00
Satd. Flow (prot)				1509	2999			3008			3018	1350
Flt Permitted				0.95	1.00			0.91			1.00	1.00
Satd. Flow (perm)				1509	2999			2752			3018	1350
Volume (vph)	0	0	0	94	978	43	27	400	0	0	376	99
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	99	1029	45	28	421	0	0	396	104
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	99	1072	0	0	449	0	0	396	104
Turn Type				custom			custom					Free
Protected Phases				2	2		3	3			1	
Permitted Phases				4	4		6	6				Free
Actuated Green, G (s)				68.4	68.4			43.0			31.0	160.0
Effective Green, g (s)				67.0	67.0			42.0			31.0	160.0
Actuated g/C Ratio				0.42	0.42			0.26			0.19	1.00
Clearance Time (s)				3.0	3.0			3.0			4.0	
Vehicle Extension (s)				1.0	1.0			1.0			4.0	
Lane Grp Cap (vph)				670	1331			740			585	1350
v/s Ratio Prot				0.01	c0.06			c0.04			c0.13	
v/s Ratio Perm				0.06	0.30			c0.12				0.08
v/c Ratio				0.15	0.81			0.61			0.68	0.08
Uniform Delay, d1				28.9	40.8			51.8			59.9	0.0
Progression Factor				1.00	1.00			0.17			1.00	1.00
Incremental Delay, d2				0.5	5.3			0.6			6.2	0.1
Delay (s)				29.4	46.0			9.5			66.0	0.1
Level of Service				C	D			A			E	A
Approach Delay (s)		0.0			44.6			9.5			52.3	
Approach LOS		A			D			A			D	

Intersection Summary			
HCM Average Control Delay	39.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.4%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)	1509	3004		1509	3005			1555	1350		1549	1350
Flt Permitted	0.14	1.00		0.13	1.00			0.63	1.00		0.54	1.00
Satd. Flow (perm)	221	3004		213	3005			997	1350		865	1350
Volume (vph)	81	1259	40	232	1055	31	90	122	299	98	94	14
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	85	1325	42	244	1111	33	95	128	315	103	99	15
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	87	0	0	11
Lane Group Flow (vph)	85	1365	0	244	1142	0	0	223	228	0	202	4
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	67.8	58.5		57.3	51.5			23.7	23.7		23.7	23.7
Effective Green, g (s)	67.8	58.5		56.8	51.5			24.2	24.2		24.2	24.2
Actuated g/C Ratio	0.68	0.58		0.57	0.52			0.24	0.24		0.24	0.24
Clearance Time (s)	3.5	4.0		3.5	4.0			4.5	4.5		4.5	4.5
Vehicle Extension (s)	1.0	5.0		1.0	5.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	308	1757		190	1548			241	327		209	327
v/s Ratio Prot	0.03	c0.45		c0.07	0.38							
v/s Ratio Perm	0.15			c0.66				0.22	0.17		c0.23	0.00
v/c Ratio	0.28	0.78		1.28	0.74			0.93	0.70		0.97	0.01
Uniform Delay, d1	9.3	15.8		17.1	19.0			37.0	34.6		37.5	28.8
Progression Factor	1.25	0.73		1.62	0.33			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.7	2.6		138.6	0.9			37.9	6.3		52.2	0.0
Delay (s)	13.3	14.2		166.3	7.1			74.9	40.9		89.7	28.8
Level of Service	B	B		F	A			E	D		F	C
Approach Delay (s)		14.2			35.1			55.0			85.4	
Approach LOS		B			D			D			F	

Intersection Summary			
HCM Average Control Delay	32.6	HCM Level of Service	C
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2994		1509	2993		1509	3018	1350	1509	2971	
Flt Permitted	0.07	1.00		0.07	1.00		0.20	1.00	1.00	0.17	1.00	
Satd. Flow (perm)	107	2994		108	2993		316	3018	1350	276	2971	
Volume (vph)	127	1724	97	175	1518	88	97	614	208	89	508	59
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	134	1815	102	184	1598	93	102	646	219	94	535	62
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	89	0	9	0
Lane Group Flow (vph)	134	1913	0	184	1687	0	102	646	130	94	588	0
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	65.5	59.5		65.0	59.0		23.0	23.0	23.0	23.0	23.0	
Effective Green, g (s)	65.5	59.5		64.5	59.0		23.0	23.0	23.0	23.0	23.0	
Actuated g/C Ratio	0.66	0.60		0.64	0.59		0.23	0.23	0.23	0.23	0.23	
Clearance Time (s)	4.0	4.0		3.5	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	1.0	5.0		1.0	5.0		4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	154	1781		147	1766		73	694	311	63	683	
v/s Ratio Prot	0.05	0.64		c0.07	0.56			0.21			0.20	
v/s Ratio Perm	0.52			c0.74			0.32		0.10	c0.34		
v/c Ratio	0.87	1.07		1.25	0.96		1.40	0.93	0.42	1.49	0.86	
Uniform Delay, d1	23.5	20.2		28.2	19.3		38.5	37.7	32.8	38.5	37.0	
Progression Factor	1.10	0.74		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	29.9	42.1		157.2	13.2		242.7	20.9	4.1	288.0	13.4	
Delay (s)	55.6	57.1		185.3	32.4		281.2	58.6	36.9	326.5	50.4	
Level of Service	E	E		F	C		F	E	D	F	D	
Approach Delay (s)		57.0			47.4			77.2			87.9	
Approach LOS		E			D			E			F	

Intersection Summary			
HCM Average Control Delay	61.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.9%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	0.99			0.92				0.86
Flt Protected	0.95	1.00		0.95	1.00			0.98				1.00
Satd. Flow (prot)	1509	3007		1509	3000			1436				1374
Flt Permitted	0.95	1.00		0.95	1.00			0.98				1.00
Satd. Flow (perm)	1509	3007		1509	3000			1436				1374
Volume (vph)	34	1619	38	72	1232	49	45	0	57	0	0	47
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	36	1704	40	76	1297	52	47	0	60	0	0	49
RTOR Reduction (vph)	0	1	0	0	2	0	0	48	0	0	0	0
Lane Group Flow (vph)	36	1743	0	76	1347	0	0	59	0	0	0	49
Turn Type	Prot			Prot			Perm					Over
Protected Phases	8	2		1 8	6			4				8
Permitted Phases							4					
Actuated Green, G (s)	7.7	64.7		15.7	72.7			7.6				7.7
Effective Green, g (s)	7.7	64.7		15.7	72.7			7.6				7.7
Actuated g/C Ratio	0.08	0.65		0.16	0.73			0.08				0.08
Clearance Time (s)	4.0	4.0			4.0			4.0				4.0
Vehicle Extension (s)	1.0	5.0			5.0			3.0				1.0
Lane Grp Cap (vph)	116	1946		237	2181			109				106
v/s Ratio Prot	0.02	c0.58		0.05	c0.45							c0.04
v/s Ratio Perm								0.04				
v/c Ratio	0.31	0.90		0.32	0.62			0.54				0.46
Uniform Delay, d1	43.6	14.8		37.4	6.8			44.5				44.2
Progression Factor	1.00	1.00		1.00	1.00			1.00				1.00
Incremental Delay, d2	0.6	6.9		0.3	1.3			5.4				1.2
Delay (s)	44.2	21.7		37.7	8.1			49.9				45.3
Level of Service	D	C		D	A			D				D
Approach Delay (s)		22.2			9.7			49.9			45.3	
Approach LOS		C			A			D			D	

Intersection Summary			
HCM Average Control Delay	18.1	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	75.6%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95		0.97	0.95			0.95	1.00
Frt	1.00	0.98		1.00	0.99		1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	2927	2972		2927	3002		2927	2941			3018	1350
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (perm)	2927	2972		2927	3002		2927	2941			3018	1350
Volume (vph)	451	1088	123	185	756	27	186	908	186	0	685	309
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	475	1145	129	195	796	28	196	956	196	0	721	325
RTOR Reduction (vph)	0	9	0	0	2	0	0	17	0	0	0	228
Lane Group Flow (vph)	475	1265	0	195	822	0	196	1135	0	0	721	98
Turn Type	Prot			Prot			Prot					Perm
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases												4
Actuated Green, G (s)	18.4	44.5		4.0	30.1		4.0	38.0			29.0	29.0
Effective Green, g (s)	18.4	45.0		4.0	30.6		5.0	39.0			30.0	30.0
Actuated g/C Ratio	0.18	0.45		0.04	0.31		0.05	0.39			0.30	0.30
Clearance Time (s)	4.0	4.5		4.0	4.5		5.0	5.0			5.0	5.0
Vehicle Extension (s)	1.0	5.0		1.0	5.0		2.0	4.0			4.0	4.0
Lane Grp Cap (vph)	539	1337		117	919		146	1147			905	405
v/s Ratio Prot	c0.16	c0.43		c0.07	0.27		c0.07	c0.39			0.24	
v/s Ratio Perm												0.07
v/c Ratio	0.88	0.95		1.67	0.89		1.34	0.99			0.80	0.24
Uniform Delay, d1	39.7	26.3		48.0	33.2		47.5	30.3			32.2	26.4
Progression Factor	1.00	1.00		0.74	1.66		1.00	1.00			1.39	5.58
Incremental Delay, d2	15.1	14.7		329.2	11.2		192.7	23.8			4.3	0.3
Delay (s)	54.9	41.1		364.8	66.4		240.2	54.1			49.1	147.6
Level of Service	D	D		F	E		F	D			D	F
Approach Delay (s)		44.8			123.5			81.2			79.7	
Approach LOS		D			F			F			E	

Intersection Summary			
HCM Average Control Delay	76.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95	1.00		1.00		0.95	0.95	
Frt		1.00			1.00	0.85		0.93		1.00	1.00	
Flt Protected		1.00			1.00	1.00		0.99		0.95	0.96	
Satd. Flow (prot)		3010			3018	1350		1466		1433	1446	
Flt Permitted		1.00			1.00	1.00		0.30		0.71	0.73	
Satd. Flow (perm)		3010			3018	1350		444		1073	1091	
Volume (vph)	0	1326	23	0	947	220	13	20	33	363	44	7
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1396	24	0	997	232	14	21	35	382	46	7
RTOR Reduction (vph)	0	1	0	0	0	59	0	32	0	0	1	0
Lane Group Flow (vph)	0	1419	0	0	997	173	0	38	0	191	243	0
Turn Type						Perm	Perm			Perm		
Protected Phases		2			6			3			4	
Permitted Phases						6	3			4		
Actuated Green, G (s)		59.3			59.3	59.3		8.0		20.7	20.7	
Effective Green, g (s)		59.3			59.3	59.3		8.0		20.7	20.7	
Actuated g/C Ratio		0.59			0.59	0.59		0.08		0.21	0.21	
Clearance Time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Vehicle Extension (s)		4.5			4.5	4.5		3.0		4.0	4.0	
Lane Grp Cap (vph)		1785			1790	801		36		222	226	
v/s Ratio Prot		c0.47			0.33							
v/s Ratio Perm						0.13		c0.09		0.18	c0.22	
v/c Ratio		0.79			0.56	0.22		1.05		0.86	1.08	
Uniform Delay, d1		15.7			12.4	9.5		46.0		38.3	39.6	
Progression Factor		0.99			1.00	1.00		1.00		1.36	1.37	
Incremental Delay, d2		1.6			1.3	0.6		165.4		23.1	74.9	
Delay (s)		17.1			13.6	10.1		211.4		75.2	129.0	
Level of Service		B			B	B		F		E	F	
Approach Delay (s)		17.1			13.0			211.4			105.4	
Approach LOS		B			B			F			F	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.6%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.97			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1509	3009		1509	3008			1522			1516	
Flt Permitted	0.24	1.00		0.11	1.00			0.85			0.89	
Satd. Flow (perm)	374	3009		182	3008			1306			1368	
Volume (vph)	70	1474	30	54	992	22	61	104	42	26	67	33
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	1552	32	57	1044	23	64	109	44	27	71	35
RTOR Reduction (vph)	0	1	0	0	1	0	0	9	0	0	13	0
Lane Group Flow (vph)	74	1583	0	57	1066	0	0	208	0	0	120	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	72.0	72.0		72.0	72.0			20.0			20.0	
Effective Green, g (s)	72.0	72.0		72.0	72.0			20.0			20.0	
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.20			0.20	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			3.0			3.0	
Lane Grp Cap (vph)	269	2166		131	2166			261			274	
v/s Ratio Prot		c0.53			0.35							
v/s Ratio Perm	0.20			0.31				c0.16			0.09	
v/c Ratio	0.28	0.73		0.44	0.49			0.80			0.44	
Uniform Delay, d1	4.9	8.3		5.7	6.1			38.1			35.1	
Progression Factor	1.90	2.32		0.59	0.61			1.00			1.00	
Incremental Delay, d2	1.7	1.5		9.2	0.7			21.9			5.0	
Delay (s)	11.0	20.7		12.5	4.4			60.0			40.1	
Level of Service	B	C		B	A			E			D	
Approach Delay (s)		20.3			4.8			60.0			40.1	
Approach LOS		C			A			E			D	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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		0.95		1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1509	2989		1509	3018	1350		2962		1509	3018	1350
Flt Permitted	0.17	1.00		0.09	1.00	1.00		1.00		0.13	1.00	1.00
Satd. Flow (perm)	264	2989		142	3018	1350		2962		205	3018	1350
Volume (vph)	256	1320	88	92	913	146	0	1149	160	148	749	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	269	1389	93	97	961	154	0	1209	168	156	788	84
RTOR Reduction (vph)	0	5	0	0	0	39	0	11	0	0	0	58
Lane Group Flow (vph)	269	1477	0	97	961	115	0	1366	0	156	788	26
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	61.0	52.3		50.5	44.8	44.8		31.0		31.0	31.0	31.0
Effective Green, g (s)	61.0	52.3		49.5	44.8	44.8		31.0		31.0	31.0	31.0
Actuated g/C Ratio	0.61	0.52		0.50	0.45	0.45		0.31		0.31	0.31	0.31
Clearance Time (s)	3.0	4.0		3.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	1.0	3.0		1.0	3.0	3.0		3.5		3.5	3.5	3.5
Lane Grp Cap (vph)	313	1563		135	1352	605		918		64	936	419
v/s Ratio Prot	c0.10	c0.49		0.03	0.32			0.46			0.26	
v/s Ratio Perm	0.42			0.32		0.09				c0.76		0.02
v/c Ratio	0.86	0.95		0.72	0.71	0.19		1.49		2.44	0.84	0.06
Uniform Delay, d1	15.1	22.5		18.1	22.4	16.7		34.5		34.5	32.2	24.3
Progression Factor	1.00	1.00		1.18	0.89	0.74		1.00		1.00	1.00	1.00
Incremental Delay, d2	19.6	13.0		12.2	2.7	0.6		225.4		691.5	9.1	0.3
Delay (s)	34.7	35.5		33.5	22.7	13.0		259.9		726.0	41.3	24.6
Level of Service	C	D		C	C	B		F		F	D	C
Approach Delay (s)		35.4			22.3			259.9			143.8	
Approach LOS		D			C			F			F	

Intersection Summary			
HCM Average Control Delay	110.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.43		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	132.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620
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		0.93	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1509	3018	2996		1447	
Flt Permitted	0.21	1.00	1.00		0.97	
Satd. Flow (perm)	337	3018	2996		1447	
Volume (vph)	181	1453	1036	53	109	104
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	191	1529	1091	56	115	109
RTOR Reduction (vph)	0	0	4	0	34	0
Lane Group Flow (vph)	191	1529	1143	0	190	0
Turn Type	Perm					
Protected Phases		2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	72.3	72.3	72.3		20.2	
Effective Green, g (s)	71.8	71.8	71.8		20.2	
Actuated g/C Ratio	0.72	0.72	0.72		0.20	
Clearance Time (s)	3.5	3.5	3.5		4.0	
Vehicle Extension (s)	5.0	5.0	5.0		3.0	
Lane Grp Cap (vph)	242	2167	2151		292	
v/s Ratio Prot		0.51	0.38		c0.13	
v/s Ratio Perm	c0.57					
v/c Ratio	0.79	0.71	0.53		0.65	
Uniform Delay, d1	9.2	8.1	6.4		36.6	
Progression Factor	1.06	1.06	1.00		1.00	
Incremental Delay, d2	2.4	0.2	0.9		4.9	
Delay (s)	12.2	8.7	7.4		41.6	
Level of Service	B	A	A		D	
Approach Delay (s)		9.1	7.4		41.6	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2989		1509	2973		1509	3018	1350	1509	2962	
Flt Permitted	0.11	1.00		0.09	1.00		0.15	1.00	1.00	0.16	1.00	
Satd. Flow (perm)	174	2989		151	2973		231	3018	1350	257	2962	
Volume (vph)	232	1242	85	168	932	102	136	1012	195	79	632	88
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	244	1307	89	177	981	107	143	1065	205	83	665	93
RTOR Reduction (vph)	0	5	0	0	8	0	0	0	67	0	11	0
Lane Group Flow (vph)	244	1391	0	177	1080	0	143	1065	138	83	747	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	57.8	50.3		46.7	42.2		34.0	27.5	27.5	27.9	24.7	
Effective Green, g (s)	57.8	50.3		45.7	42.2		33.0	27.5	27.5	27.4	24.7	
Actuated g/C Ratio	0.58	0.50		0.46	0.42		0.33	0.28	0.28	0.27	0.25	
Clearance Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.5	4.0	
Vehicle Extension (s)	1.0	0.2		1.0	0.2		1.0	5.0	5.0	1.0	5.0	
Lane Grp Cap (vph)	255	1503		117	1255		147	830	371	104	732	
v/s Ratio Prot	c0.11	0.47		c0.05	0.36		c0.05	c0.35		0.02	0.25	
v/s Ratio Perm	0.44			c0.64			0.27		0.10	0.20		
v/c Ratio	0.96	0.93		1.51	0.86		0.97	1.28	0.37	0.80	1.02	
Uniform Delay, d1	25.0	23.1		24.7	26.2		30.8	36.2	29.3	37.2	37.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.05	1.10	
Incremental Delay, d2	43.8	11.2		269.6	7.9		65.3	136.6	2.8	30.1	37.8	
Delay (s)	68.8	34.3		294.3	34.1		96.2	172.8	32.1	69.3	79.4	
Level of Service	E	C		F	C		F	F	C	E	E	
Approach Delay (s)		39.4			70.5			144.7			78.4	
Approach LOS		D			E			F			E	

Intersection Summary			
HCM Average Control Delay	82.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.38		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	105.6%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	3007		1509	2966		1509	1555		1509	1515	
Flt Permitted	0.15	1.00		0.10	1.00		0.35	1.00		0.28	1.00	
Satd. Flow (perm)	233	3007		163	2966		562	1555		439	1515	
Volume (vph)	162	1485	36	60	1161	150	94	255	42	90	177	79
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	171	1563	38	63	1222	158	99	268	44	95	186	83
RTOR Reduction (vph)	0	1	0	0	8	0	0	6	0	0	18	0
Lane Group Flow (vph)	171	1600	0	63	1372	0	99	306	0	95	251	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	68.6	68.6		68.6	68.6		23.4	23.4		23.4	23.4	
Effective Green, g (s)	68.6	68.6		68.6	68.6		23.4	23.4		23.4	23.4	
Actuated g/C Ratio	0.69	0.69		0.69	0.69		0.23	0.23		0.23	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	160	2063		112	2035		132	364		103	355	
v/s Ratio Prot		0.53			0.46			0.20			0.17	
v/s Ratio Perm	c0.73			0.39			0.18			c0.22		
v/c Ratio	1.07	0.78		0.56	0.67		0.75	0.84		0.92	0.71	
Uniform Delay, d1	15.7	10.5		8.0	9.2		35.6	36.5		37.4	35.2	
Progression Factor	1.08	1.15		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	88.0	2.7		18.9	1.8		21.0	15.9		64.0	6.3	
Delay (s)	105.0	14.9		26.9	11.0		56.6	52.4		101.4	41.5	
Level of Service	F	B		C	B		E	D		F	D	
Approach Delay (s)		23.6			11.7			53.4			57.1	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM Average Control Delay	25.4	HCM Level of Service	C
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	104.1%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.95			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.98	
Satd. Flow (prot)	1509	3011		1509	3015			1464			1500	
Flt Permitted	0.16	1.00		0.13	1.00			0.82			0.86	
Satd. Flow (perm)	249	3011		214	3015			1237			1308	
Volume (vph)	19	1419	21	32	1330	7	94	14	73	22	21	17
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	20	1494	22	34	1400	7	99	15	77	23	22	18
RTOR Reduction (vph)	0	1	0	0	0	0	0	25	0	0	15	0
Lane Group Flow (vph)	20	1515	0	34	1407	0	0	166	0	0	48	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	75.2	75.2		75.2	75.2			16.8			16.8	
Effective Green, g (s)	75.2	75.2		75.2	75.2			16.8			16.8	
Actuated g/C Ratio	0.75	0.75		0.75	0.75			0.17			0.17	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			3.0			3.0	
Lane Grp Cap (vph)	187	2264		161	2267			208			220	
v/s Ratio Prot		c0.50			0.47							
v/s Ratio Perm	0.08			0.16				c0.13			0.04	
v/c Ratio	0.11	0.67		0.21	0.62			0.80			0.22	
Uniform Delay, d1	3.3	6.2		3.7	5.8			40.0			35.9	
Progression Factor	1.00	1.00		2.11	2.75			1.00			1.00	
Incremental Delay, d2	1.1	1.6		2.1	0.9			18.9			0.5	
Delay (s)	4.5	7.8		9.8	16.8			58.9			36.4	
Level of Service	A	A		A	B			E			D	
Approach Delay (s)		7.7			16.6			58.9			36.4	
Approach LOS		A			B			E			D	

Intersection Summary			
HCM Average Control Delay	15.3	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	72.0%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)	1509	2995		1509	3009			1531	1350		1503	
Flt Permitted	0.21	1.00		0.06	1.00			0.68	1.00		0.98	
Satd. Flow (perm)	341	2995		102	3009			1080	1350		1483	
Volume (vph)	57	1616	86	86	1094	21	178	59	110	6	60	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	60	1701	91	91	1152	22	187	62	116	6	63	42
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	55	0	24	0
Lane Group Flow (vph)	60	1789	0	91	1173	0	0	249	61	0	87	0
Turn Type	Perm			pm+pt			Perm		Perm	Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	58.1	58.1		65.7	65.7			26.3	26.3		26.3	
Effective Green, g (s)	58.1	58.1		65.7	65.7			26.3	26.3		26.3	
Actuated g/C Ratio	0.58	0.58		0.66	0.66			0.26	0.26		0.26	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	0.2	0.2		1.0	0.2			4.0	4.0		3.0	
Lane Grp Cap (vph)	198	1740		118	1977			284	355		390	
v/s Ratio Prot		c0.60		0.03	c0.39							
v/s Ratio Perm	0.18			0.48				c0.23	0.05		0.06	
v/c Ratio	0.30	1.03		0.77	0.59			0.88	0.17		0.22	
Uniform Delay, d1	10.7	20.9		20.1	9.6			35.3	28.5		28.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	3.9	29.1		24.2	1.3			25.3	0.3		0.3	
Delay (s)	14.6	50.0		44.2	11.0			60.6	28.8		29.2	
Level of Service	B	D		D	B			E	C		C	
Approach Delay (s)		48.9			13.4			50.5			29.2	
Approach LOS		D			B			D			C	

Intersection Summary			
HCM Average Control Delay	35.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	0.99		1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2979		1509	2976		1509	4270		1509	4244	
Flt Permitted	0.17	1.00		0.09	1.00		0.14	1.00		0.14	1.00	
Satd. Flow (perm)	268	2979		138	2976		227	4270		227	4244	
Volume (vph)	249	1311	122	189	871	89	127	959	108	103	1006	165
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	262	1380	128	199	917	94	134	1009	114	108	1059	174
RTOR Reduction (vph)	0	7	0	0	8	0	0	14	0	0	22	0
Lane Group Flow (vph)	262	1501	0	199	1003	0	134	1109	0	108	1211	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	52.0	46.0		52.0	46.0		34.0	28.0		34.0	28.0	
Effective Green, g (s)	51.0	46.0		51.0	46.0		33.0	28.0		33.0	28.0	
Actuated g/C Ratio	0.51	0.46		0.51	0.46		0.33	0.28		0.33	0.28	
Clearance Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)	1.0	0.2		1.0	0.2		1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	199	1370		139	1369		139	1196		139	1188	
v/s Ratio Prot	0.07	0.50		c0.07	0.34		c0.05	0.26		0.04	c0.29	
v/s Ratio Perm	0.61			c0.66			0.27			0.22		
v/c Ratio	1.32	1.10		1.43	0.73		0.96	0.93		0.78	1.02	
Uniform Delay, d1	23.2	27.0		22.3	22.0		31.0	35.0		26.5	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.06	0.80		1.00	1.00	
Incremental Delay, d2	173.4	54.8		230.4	3.5		60.8	11.7		21.5	31.0	
Delay (s)	196.5	81.8		252.7	25.5		93.6	39.8		48.0	67.0	
Level of Service	F	F		F	C		F	D		D	E	
Approach Delay (s)		98.8			62.9			45.5			65.5	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM Average Control Delay	71.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	108.0%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0		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	1.00	1.00	1.00	1.00	
Frt		0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1550		1509	1588	1350	1509	1588	1350	1509	1566	
Flt Permitted		0.99		0.44	1.00	1.00	0.61	1.00	1.00	0.37	1.00	
Satd. Flow (perm)		1537		702	1588	1350	963	1588	1350	590	1566	
Volume (vph)	14	396	83	244	240	83	74	363	309	86	189	19
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	15	417	87	257	253	87	78	382	325	91	199	20
RTOR Reduction (vph)	0	15	0	0	0	43	0	0	193	0	6	0
Lane Group Flow (vph)	0	504	0	257	253	44	78	382	132	91	213	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2		2	4		4	8		
Actuated Green, G (s)		22.9		22.9	22.9	22.9	14.1	14.1	14.1	14.1	14.1	
Effective Green, g (s)		23.4		23.4	23.4	23.4	14.6	14.6	14.6	14.6	14.6	
Actuated g/C Ratio		0.51		0.51	0.51	0.51	0.32	0.32	0.32	0.32	0.32	
Clearance Time (s)		4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)		4.0		4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		782		357	808	687	306	504	428	187	497	
v/s Ratio Prot					0.16			c0.24			0.14	
v/s Ratio Perm		0.33		c0.37		0.03	0.08		0.10	0.15		
v/c Ratio		0.64		0.72	0.31	0.06	0.25	0.76	0.31	0.49	0.43	
Uniform Delay, d1		8.3		8.8	6.6	5.7	11.7	14.1	11.9	12.7	12.4	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.0		7.3	0.3	0.1	0.4	6.4	0.4	2.0	0.6	
Delay (s)		10.3		16.0	6.9	5.8	12.1	20.6	12.3	14.7	13.0	
Level of Service		B		B	A	A	B	C	B	B	B	
Approach Delay (s)		10.3			10.7			16.3			13.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	46.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1509	2961		1509	1588	1350	1509	2949		1509	3018	1350
Flt Permitted	0.27	1.00		0.24	1.00	1.00	0.36	1.00		0.18	1.00	1.00
Satd. Flow (perm)	428	2961		384	1588	1350	575	2949		290	3018	1350
Volume (vph)	66	666	96	137	485	155	65	823	147	122	591	106
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	69	701	101	144	511	163	68	866	155	128	622	112
RTOR Reduction (vph)	0	15	0	0	0	59	0	19	0	0	0	46
Lane Group Flow (vph)	69	787	0	144	511	104	68	1002	0	128	622	66
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		4
Actuated Green, G (s)	31.0	31.0		31.0	31.0	31.0	36.0	36.0		36.0	36.0	36.0
Effective Green, g (s)	31.0	31.0		31.0	31.0	31.0	36.0	36.0		36.0	36.0	36.0
Actuated g/C Ratio	0.41	0.41		0.41	0.41	0.41	0.48	0.48		0.48	0.48	0.48
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lane Grp Cap (vph)	177	1224		159	656	558	276	1416		139	1449	648
v/s Ratio Prot		0.27			0.32			0.34			0.21	
v/s Ratio Perm	0.16			c0.37		0.08	0.12			c0.44		0.05
v/c Ratio	0.39	0.64		0.91	0.78	0.19	0.25	0.71		0.92	0.43	0.10
Uniform Delay, d1	15.4	17.6		20.6	19.0	14.0	11.5	15.4		18.2	12.8	10.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.4	2.6		49.9	8.9	0.7	2.1	3.0		57.6	0.9	0.3
Delay (s)	21.7	20.2		70.6	27.9	14.7	13.6	18.4		75.8	13.7	11.0
Level of Service	C	C		E	C	B	B	B		E	B	B
Approach Delay (s)		20.3			32.8			18.1			22.6	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	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			1.00	
Frt	1.00	1.00		1.00	1.00			0.95			0.90	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1509	1585		1509	1582			1505			1418	
Flt Permitted	0.38	1.00		0.26	1.00			0.99			0.94	
Satd. Flow (perm)	606	1585		420	1582			1492			1349	
Volume (vph)	115	791	12	14	583	15	3	50	32	10	8	52
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	121	833	13	15	614	16	3	53	34	11	8	55
RTOR Reduction (vph)	0	0	0	0	1	0	0	30	0	0	48	0
Lane Group Flow (vph)	121	846	0	15	629	0	0	60	0	0	26	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	37.6	37.6		37.6	37.6			7.1			7.1	
Effective Green, g (s)	37.1	37.1		37.1	37.1			6.6			6.6	
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.13			0.13	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.5			3.5	
Vehicle Extension (s)	0.2	0.2		0.2	0.2			4.0			4.0	
Lane Grp Cap (vph)	435	1137		301	1135			190			172	
v/s Ratio Prot		c0.53			0.40							
v/s Ratio Perm	0.20			0.04				c0.04			0.02	
v/c Ratio	0.28	0.74		0.05	0.55			0.32			0.15	
Uniform Delay, d1	2.6	4.4		2.1	3.4			20.5			20.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	2.3		0.0	0.3			1.3			0.6	
Delay (s)	2.7	6.8		2.2	3.8			21.8			20.6	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		6.3			3.7			21.8			20.6	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	51.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0	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	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2996		1509	3018	1350	1509	3018	1350	1509	2973	
Flt Permitted	0.48	1.00		0.95	1.00	1.00	0.20	1.00	1.00	0.16	1.00	
Satd. Flow (perm)	758	2996		1509	3018	1350	311	3018	1350	257	2973	
Volume (vph)	105	831	43	170	457	54	106	994	130	67	818	89
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	111	875	45	179	481	57	112	1046	137	71	861	94
RTOR Reduction (vph)	0	4	0	0	0	30	0	0	73	0	9	0
Lane Group Flow (vph)	111	916	0	179	481	27	112	1046	64	71	946	0
Turn Type	Perm			Prot		Perm	Perm		Perm	Perm		
Protected Phases		8		7	4			6			2	
Permitted Phases	8					4	6		6	2		
Actuated Green, G (s)	25.0	25.0		11.0	39.0	39.0	41.0	41.0	41.0	41.0	41.0	
Effective Green, g (s)	26.0	26.0		10.0	40.0	40.0	42.0	42.0	42.0	42.0	42.0	
Actuated g/C Ratio	0.29	0.29		0.11	0.44	0.44	0.47	0.47	0.47	0.47	0.47	
Clearance Time (s)	5.0	5.0		3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	219	866		168	1341	600	145	1408	630	120	1387	
v/s Ratio Prot		c0.31		c0.12	0.16			0.35			0.32	
v/s Ratio Perm	0.15					0.02	c0.36		0.05	0.28		
v/c Ratio	0.51	1.06		1.07	0.36	0.04	0.77	0.74	0.10	0.59	0.68	
Uniform Delay, d1	26.7	32.0		40.0	16.5	14.2	20.0	19.6	13.4	17.7	18.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.1	46.9		87.9	0.7	0.1	32.1	3.6	0.3	19.6	2.7	
Delay (s)	34.8	78.9		127.9	17.3	14.3	52.1	23.2	13.8	37.3	21.5	
Level of Service	C	E		F	B	B	D	C	B	D	C	
Approach Delay (s)		74.2			44.7			24.7			22.6	
Approach LOS		E			D			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)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2983		1509	2976		1509	1526		1509	1553	
Flt Permitted	0.95	1.00		0.95	1.00		0.22	1.00		0.18	1.00	
Satd. Flow (perm)	1509	2983		1509	2976		345	1526		289	1553	
Volume (vph)	98	927	77	155	778	80	114	394	139	85	370	64
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	103	976	81	163	819	84	120	415	146	89	389	67
RTOR Reduction (vph)	0	8	0	0	11	0	0	18	0	0	9	0
Lane Group Flow (vph)	103	1049	0	163	892	0	120	543	0	89	447	0
Turn Type	Prot			custom			Perm			Perm		
Protected Phases	5	2		1	2			4			4	
Permitted Phases				1	6		4			4		
Actuated Green, G (s)	9.5	28.0		9.0	28.0		22.0	22.0		22.0	22.0	
Effective Green, g (s)	8.5	28.0		8.5	28.0		22.0	22.0		22.0	22.0	
Actuated g/C Ratio	0.12	0.40		0.12	0.40		0.31	0.31		0.31	0.31	
Clearance Time (s)	3.0	4.0		3.5	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	5.0		2.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	182	1185		182	1182		108	476		90	485	
v/s Ratio Prot	0.07	c0.35		c0.11	0.30			c0.36			0.29	
v/s Ratio Perm							0.35			0.31		
v/c Ratio	0.57	0.88		0.90	0.75		1.11	1.14		0.99	0.92	
Uniform Delay, d1	29.3	19.8		30.6	18.3		24.2	24.2		24.1	23.4	
Progression Factor	1.00	1.00		1.33	0.46		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	9.8		23.5	1.3		119.6	86.0		91.9	25.4	
Delay (s)	31.7	29.6		64.0	9.8		143.9	110.3		116.0	48.8	
Level of Service	C	C		E	A		F	F		F	D	
Approach Delay (s)		29.8			18.1			116.2			59.8	
Approach LOS		C			B			F			E	

Intersection Summary			
HCM Average Control Delay	47.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	70.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.6%	ICU Level of Service	G
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)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0		4.0	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	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3133		1583	3130		1583	1667	1417	1583	1606	
Flt Permitted	0.20	1.00		0.20	1.00		0.39	1.00	1.00	0.34	1.00	
Satd. Flow (perm)	327	3133		327	3130		653	1667	1417	568	1606	
Volume (vph)	76	1002	77	90	884	75	66	516	162	51	345	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	80	1055	81	95	931	79	69	543	171	54	363	116
RTOR Reduction (vph)	0	9	0	0	11	0	0	0	8	0	13	0
Lane Group Flow (vph)	80	1127	0	95	999	0	69	543	163	54	466	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	20.1	20.1		20.1	20.1		31.0	31.0	31.0	31.0	31.0	
Effective Green, g (s)	20.4	20.4		20.4	20.4		31.6	31.6	31.6	31.6	31.6	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.53	0.53	0.53	0.53	0.53	
Clearance Time (s)	4.3	4.3		4.3	4.3		4.6	4.6	4.6	4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	111	1065		111	1064		344	878	746	299	846	
v/s Ratio Prot		c0.36			0.32			c0.33			0.29	
v/s Ratio Perm	0.24			0.29			0.11		0.12	0.10		
v/c Ratio	0.72	1.06		0.86	0.94		0.20	0.62	0.22	0.18	0.55	
Uniform Delay, d1	17.3	19.8		18.4	19.2		7.5	10.0	7.6	7.4	9.5	
Progression Factor	1.00	1.00		0.72	0.72		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.1	44.3		36.6	11.1		1.3	3.3	0.7	1.3	2.6	
Delay (s)	50.4	64.1		49.9	24.9		8.8	13.2	8.3	8.7	12.0	
Level of Service	D	E		D	C		A	B	A	A	B	
Approach Delay (s)		63.2			27.0			11.8			11.7	
Approach LOS		E			C			B			B	

Intersection Summary			
HCM Average Control Delay	33.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
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)	1700	1700	1700	1700	1700	2500	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	3167	1417	1583	3100		1583	3167	1417	1583	3167	1417
Flt Permitted	0.16	1.00	1.00	0.12	1.00		0.25	1.00	1.00	0.17	1.00	1.00
Satd. Flow (perm)	268	3167	1417	193	3100		423	3167	1417	286	3167	1417
Volume (vph)	110	1117	102	63	847	138	234	944	140	166	753	119
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	1176	107	66	892	145	246	994	147	175	793	125
RTOR Reduction (vph)	0	0	57	0	11	0	0	0	20	0	0	47
Lane Group Flow (vph)	116	1176	50	66	1026	0	246	994	127	175	793	78
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		Perm
Protected Phases		6			2			8			4	
Permitted Phases	6		6	2			8		8	4		4
Actuated Green, G (s)	54.6	54.6	54.6	54.6	54.6		54.0	54.0	54.0	54.0	54.0	54.0
Effective Green, g (s)	56.5	56.5	56.5	56.5	56.5		55.5	55.5	55.5	55.5	55.5	55.5
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47		0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	5.9	5.9	5.9	5.9	5.9		5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	126	1491	667	91	1460		196	1465	655	132	1465	655
v/s Ratio Prot		0.37			0.33			0.31			0.25	
v/s Ratio Perm	c0.43		0.04	0.34			0.58		0.09	c0.61		0.05
v/c Ratio	0.92	0.79	0.08	0.73	0.70		1.26	0.68	0.19	1.33	0.54	0.12
Uniform Delay, d1	29.7	26.7	17.4	25.5	25.1		32.2	25.3	19.0	32.2	23.1	18.3
Progression Factor	0.97	0.96	1.17	0.49	0.49		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.3	1.6	0.1	27.3	1.8		149.5	2.5	0.7	189.5	1.4	0.4
Delay (s)	61.1	27.2	20.4	39.8	14.1		181.7	27.8	19.7	221.8	24.6	18.7
Level of Service	E	C	C	D	B		F	C	B	F	C	B
Approach Delay (s)		29.5			15.6			54.3			55.5	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM Average Control Delay	39.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
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)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3072	3167	1417	3072	3113		1583	3167	1417	1583	4437	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.15	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	3072	3167	1417	3072	3113		250	3167	1417	168	4437	
Volume (vph)	271	1203	105	308	846	107	104	1177	396	104	817	162
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	285	1266	111	324	891	113	109	1239	417	109	860	171
RTOR Reduction (vph)	0	0	14	0	8	0	0	0	29	0	25	0
Lane Group Flow (vph)	285	1266	97	324	996	0	109	1239	388	109	1006	0
Turn Type	Prot		pm+ov	Prot			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2	3	1	6		3	8	1	7	4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	8.0	48.0	55.0	8.0	48.0		45.3	38.3	46.3	45.3	38.3	
Effective Green, g (s)	8.0	49.3	56.3	8.0	49.3		46.7	39.7	47.7	46.7	39.7	
Actuated g/C Ratio	0.07	0.41	0.47	0.07	0.41		0.39	0.33	0.40	0.39	0.33	
Clearance Time (s)	4.0	5.3	4.0	4.0	5.3		4.0	5.4	4.0	4.0	5.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	205	1301	712	205	1279		175	1048	610	148	1468	
v/s Ratio Prot	c0.09	c0.40	0.01	c0.11	0.32		0.04	c0.39	0.04	c0.04	0.23	
v/s Ratio Perm			0.06				0.21		0.23	0.24		
v/c Ratio	1.39	0.97	0.14	1.58	0.78		0.62	1.18	0.64	0.74	0.69	
Uniform Delay, d1	56.0	34.7	18.1	56.0	30.6		25.7	40.1	29.2	57.1	34.7	
Progression Factor	0.84	0.74	0.54	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	194.9	15.2	0.1	283.3	4.7		6.7	92.0	2.2	17.3	2.6	
Delay (s)	241.9	40.7	9.9	339.3	35.3		32.4	132.1	31.3	74.4	37.4	
Level of Service	F	D	A	F	D		C	F	C	E	D	
Approach Delay (s)		73.2			109.5			102.1			40.9	
Approach LOS		E			F			F			D	

Intersection Summary			
HCM Average Control Delay	83.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	103.1%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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		1.00	0.91	
Frt	1.00	0.91			0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	1444			1509		1509	4278		1509	4195	
Flt Permitted	0.55	1.00			0.64		0.14	1.00		0.18	1.00	
Satd. Flow (perm)	870	1444			980		221	4278		288	4195	
Volume (vph)	119	83	126	77	73	45	293	1121	110	20	1022	282
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	125	87	133	81	77	47	308	1180	116	21	1076	297
RTOR Reduction (vph)	0	61	0	0	12	0	0	9	0	0	43	0
Lane Group Flow (vph)	125	159	0	0	193	0	308	1287	0	21	1330	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	24.1	24.1			24.1		67.9	62.5		61.3	58.9	
Effective Green, g (s)	24.1	24.1			24.1		67.5	62.5		60.3	58.9	
Actuated g/C Ratio	0.24	0.24			0.24		0.68	0.62		0.60	0.59	
Clearance Time (s)	4.0	4.0			4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)	5.0	5.0			5.0		1.0	0.2		1.0	0.2	
Lane Grp Cap (vph)	210	348			236		214	2674		191	2471	
v/s Ratio Prot		0.11					c0.07	0.30		0.00	0.32	
v/s Ratio Perm	0.14				c0.20		c0.90			0.06		
v/c Ratio	0.60	0.46			0.82		1.44	0.48		0.11	0.54	
Uniform Delay, d1	33.6	32.4			35.9		11.9	10.1		8.2	12.4	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.56	1.21	
Incremental Delay, d2	6.7	2.0			21.4		222.2	0.6		0.0	0.1	
Delay (s)	40.3	34.4			57.3		234.1	10.7		12.8	15.0	
Level of Service	D	C			E		F	B		B	B	
Approach Delay (s)		36.5			57.3			53.6			15.0	
Approach LOS		D			E			D			B	

Intersection Summary			
HCM Average Control Delay	37.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	EBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NWR2
Lane Configurations											
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0					4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95					0.95	1.00
Frt	1.00	1.00	0.85	0.85	0.95					1.00	0.86
Flt Protected	0.95	1.00	1.00	1.00	1.00					0.98	1.00
Satd. Flow (prot)	1509	3018	1350	1350	2861					2969	1374
Flt Permitted	0.95	1.00	1.00	1.00	1.00					0.65	1.00
Satd. Flow (perm)	1509	3018	1350	1350	2861					1970	1374
Volume (vph)	66	1218	310	53	334	135	42	121	108	470	58
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	69	1282	326	56	352	142	44	127	114	495	61
RTOR Reduction (vph)	0	0	0	43	4	0	0	0	0	0	0
Lane Group Flow (vph)	69	1282	326	13	534	0	0	0	0	736	61
Turn Type	custom		Perm	Perm				Prot	Prot		Free
Protected Phases	3	3			6			2	2	1	
Permitted Phases	4	4	3	3						2	Free
Actuated Green, G (s)	68.4	68.4	12.0	12.0	31.0					43.0	160.0
Effective Green, g (s)	67.0	67.0	11.0	11.0	31.0					42.0	160.0
Actuated g/C Ratio	0.42	0.42	0.07	0.07	0.19					0.26	1.00
Clearance Time (s)	3.0	3.0	3.0	3.0	4.0					4.0	
Vehicle Extension (s)	1.0	1.0	1.0	1.0	3.0					4.0	
Lane Grp Cap (vph)	670	1339	93	93	554					711	1374
v/s Ratio Prot	0.01	c0.07			c0.19					c0.20	
v/s Ratio Perm	0.04	0.36	c0.24	0.01						c0.07	0.04
v/c Ratio	0.10	0.96	3.51	0.14	0.96					1.04	0.04
Uniform Delay, d1	28.3	45.1	74.5	70.1	63.9					59.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00					0.46	1.00
Incremental Delay, d2	0.0	15.3	1153.9	0.3	30.3					42.1	0.1
Delay (s)	28.3	60.4	1228.4	70.3	94.2					69.4	0.1
Level of Service	C	E	F	E	F					E	A
Approach Delay (s)		279.2			94.2					69.4	
Approach LOS		F			F					E	

Intersection Summary			
HCM Average Control Delay	190.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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	1.00		0.95	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (prot)	1509	2969		1509	3018	1350	1509	1553		1433	1446	
Flt Permitted	0.05	1.00		0.24	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (perm)	82	2969		377	3018	1350	1509	1553		1433	1446	
Volume (vph)	30	910	110	50	1670	300	80	60	10	170	60	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	958	116	53	1758	316	84	63	11	179	63	21
RTOR Reduction (vph)	0	6	0	0	0	85	0	5	0	0	6	0
Lane Group Flow (vph)	32	1068	0	53	1758	231	84	69	0	129	128	0
Turn Type	pm+pt			Perm		Perm	Split			Split		
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6			2		2						
Actuated Green, G (s)	80.6	80.6		74.6	74.6	74.6	12.3	12.3		15.1	15.1	
Effective Green, g (s)	80.6	80.6		74.6	74.6	74.6	12.3	12.3		15.1	15.1	
Actuated g/C Ratio	0.67	0.67		0.62	0.62	0.62	0.10	0.10		0.13	0.13	
Clearance Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	1.0	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	79	1994		234	1876	839	155	159		180	182	
v/s Ratio Prot	0.01	c0.36			c0.58		c0.06	0.04		c0.09	0.09	
v/s Ratio Perm	0.26			0.14		0.17						
v/c Ratio	0.41	0.54		0.23	0.94	0.28	0.54	0.43		0.72	0.70	
Uniform Delay, d1	17.9	10.1		10.0	20.6	10.4	51.2	50.6		50.4	50.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	1.0		2.2	10.4	0.8	3.8	1.9		12.7	11.6	
Delay (s)	19.2	11.1		12.2	31.0	11.2	55.0	52.4		63.1	61.9	
Level of Service	B	B		B	C	B	E	D		E	E	
Approach Delay (s)		11.4			27.6			53.8			62.5	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.91	0.95		1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00		0.98	
Satd. Flow (prot)	1509	3018	1350	1509	2991		1433	1410	1282		1526	
Flt Permitted	0.06	1.00	1.00	0.18	1.00		0.46	0.63	1.00		0.75	
Satd. Flow (perm)	102	3018	1350	293	2991		698	916	1282		1177	
Volume (vph)	20	950	80	190	1730	110	180	90	110	110	100	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1000	84	200	1821	116	189	95	116	116	105	32
RTOR Reduction (vph)	0	0	26	0	4	0	0	0	106	0	4	0
Lane Group Flow (vph)	21	1000	58	200	1933	0	95	189	10	0	249	0
Turn Type	Perm		Perm	pm+pt			Perm		Over	Perm		
Protected Phases		6		5	2			4	5		8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	62.5	62.5	62.5	76.5	76.5		16.0	16.0	11.0		16.5	
Effective Green, g (s)	62.5	62.5	62.5	76.5	76.5		15.5	15.5	10.0		16.0	
Actuated g/C Ratio	0.52	0.52	0.52	0.64	0.64		0.13	0.13	0.08		0.13	
Clearance Time (s)	4.0	4.0	4.0	3.0	4.0		3.5	3.5	3.0		3.5	
Vehicle Extension (s)	4.5	4.5	4.5	1.0	4.5		2.0	2.0	1.0		4.0	
Lane Grp Cap (vph)	53	1572	703	288	1907		90	118	107		157	
v/s Ratio Prot		0.33		0.06	c0.65				0.01			
v/s Ratio Perm	0.21		0.04	0.39			0.14	c0.21			c0.21	
v/c Ratio	0.40	0.64	0.08	0.69	1.01		1.06	1.60	0.09		1.58	
Uniform Delay, d1	17.4	20.6	14.4	13.3	21.8		52.2	52.2	50.8		52.0	
Progression Factor	1.00	1.00	1.00	1.32	1.15		1.00	1.00	1.00		1.00	
Incremental Delay, d2	20.7	2.0	0.2	2.8	17.8		110.8	306.6	0.1		290.8	
Delay (s)	38.1	22.6	14.6	20.4	42.7		163.0	358.9	50.9		342.8	
Level of Service	D	C	B	C	D		F	F	D		F	
Approach Delay (s)		22.3			40.6			223.1			342.8	
Approach LOS		C			D			F			F	

Intersection Summary			
HCM Average Control Delay	73.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	107.2%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.95	0.91	0.95	1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2944		1509	3013		1433	1387	1282	1509	1521	
Flt Permitted	0.08	1.00		0.18	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	120	2944		280	3013		1433	1387	1282	1509	1521	
Volume (vph)	10	980	190	210	1870	20	230	20	200	30	50	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	1032	200	221	1968	21	242	21	211	32	53	21
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	189	0	13	0
Lane Group Flow (vph)	11	1222	0	221	1989	0	132	131	22	32	61	0
Turn Type	Perm			pm+pt			Split		pm+ov	Split		
Protected Phases		6		5	2		4	4	5	3	3	
Permitted Phases	6			2					4			
Actuated Green, G (s)	84.7	84.7		93.7	93.7		7.0	7.0	13.0	8.3	8.3	
Effective Green, g (s)	84.7	84.7		93.7	93.7		7.0	7.0	12.0	7.3	7.3	
Actuated g/C Ratio	0.71	0.71		0.78	0.78		0.06	0.06	0.10	0.06	0.06	
Clearance Time (s)	4.0	4.0		3.0	4.0		4.0	4.0	3.0	3.0	3.0	
Vehicle Extension (s)	4.5	4.5		1.0	4.5		2.0	2.0	1.0	2.0	2.0	
Lane Grp Cap (vph)	85	2078		270	2353		84	81	171	92	93	
v/s Ratio Prot		0.42		0.03	c0.66		0.09	c0.09	0.01	0.02	c0.04	
v/s Ratio Perm	0.09			0.61					0.01			
v/c Ratio	0.13	0.59		0.82	0.85		1.57	1.62	0.13	0.35	0.65	
Uniform Delay, d1	5.7	8.9		7.6	8.5		56.5	56.5	49.2	54.1	55.1	
Progression Factor	1.05	1.91		2.73	1.40		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.7	1.1		9.4	2.1		306.6	327.2	0.1	0.8	11.9	
Delay (s)	8.7	18.1		30.2	14.0		363.1	383.7	49.4	54.9	67.0	
Level of Service	A	B		C	B		F	F	D	D	E	
Approach Delay (s)		18.0			15.6			229.1			63.4	
Approach LOS		B			B			F			E	

Intersection Summary			
HCM Average Control Delay	42.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.90			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1509	3007		1509	3013			1420			1473	
Flt Permitted	0.06	1.00		0.19	1.00			0.96			0.75	
Satd. Flow (perm)	100	3007		302	3013			1368			1131	
Volume (vph)	20	1220	30	30	2010	20	10	10	60	40	20	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1284	32	32	2116	21	11	11	63	42	21	42
RTOR Reduction (vph)	0	1	0	0	1	0	0	56	0	0	22	0
Lane Group Flow (vph)	21	1315	0	32	2136	0	0	29	0	0	84	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	99.5	99.5		99.5	99.5			12.5			12.5	
Effective Green, g (s)	99.5	99.5		99.5	99.5			12.5			12.5	
Actuated g/C Ratio	0.83	0.83		0.83	0.83			0.10			0.10	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	4.5	4.5		4.5	4.5			3.0			3.0	
Lane Grp Cap (vph)	83	2493		250	2498			143			118	
v/s Ratio Prot		0.44			c0.71							
v/s Ratio Perm	0.21			0.11				0.02			c0.07	
v/c Ratio	0.25	0.53		0.13	0.86			0.20			0.71	
Uniform Delay, d1	2.2	3.1		2.0	6.0			49.2			52.0	
Progression Factor	2.14	1.77		1.11	0.92			1.00			1.00	
Incremental Delay, d2	6.1	0.7		0.3	1.3			0.7			17.6	
Delay (s)	10.8	6.2		2.5	6.9			49.9			69.6	
Level of Service	B	A		A	A			D			E	
Approach Delay (s)		6.3			6.8			49.9			69.6	
Approach LOS		A			A			D			E	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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	1.00
Frt	1.00	1.00		1.00	0.99			0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.96	1.00
Satd. Flow (prot)	1509	3012		1509	2985			1445			1519	1350
Flt Permitted	0.13	1.00		0.33	1.00			0.87			0.73	1.00
Satd. Flow (perm)	199	3012		527	2985			1282			1157	1350
Volume (vph)	60	760	10	30	1420	110	10	0	10	110	10	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	800	11	32	1495	116	11	0	11	116	11	84
RTOR Reduction (vph)	0	1	0	0	4	0	0	9	0	0	0	84
Lane Group Flow (vph)	63	810	0	32	1607	0	0	13	0	0	127	0
Turn Type	Perm			Perm			Perm			Perm		NA
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	95.0	95.0		95.0	95.0			17.0			17.0	0.0
Effective Green, g (s)	95.0	95.0		95.0	95.0			17.0			17.0	0.0
Actuated g/C Ratio	0.79	0.79		0.79	0.79			0.14			0.14	0.00
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	158	2385		417	2363			182			164	0
v/s Ratio Prot		0.27			c0.54							
v/s Ratio Perm	0.32			0.06				0.01			c0.11	
v/c Ratio	0.40	0.34		0.08	0.68			0.07			0.77	0.00
Uniform Delay, d1	3.8	3.6		2.8	5.6			44.6			49.7	60.0
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	7.4	0.4		0.4	1.6			0.2			20.1	0.0
Delay (s)	11.2	4.0		3.1	7.2			44.8			69.7	60.0
Level of Service	B	A		A	A			D			E	E
Approach Delay (s)		4.5			7.2			44.8			65.9	
Approach LOS		A			A			D			E	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1509	2976		1509	3015			1517	1350		1526	
Flt Permitted	0.11	1.00		0.15	1.00			0.96	1.00		0.98	
Satd. Flow (perm)	176	2976		235	3015			1517	1350		1526	
Volume (vph)	10	990	100	200	1540	10	160	10	120	20	30	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	1042	105	211	1621	11	168	11	126	21	32	11
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	95	0	6	0
Lane Group Flow (vph)	11	1143	0	211	1632	0	0	179	31	0	58	0
Turn Type	Perm			pm+pt			Split		pm+ov	Split		
Protected Phases		6		5	2		4	4	5	8	8	
Permitted Phases	6			2					4			
Actuated Green, G (s)	70.6	70.6		87.0	87.0			20.0	33.4		11.0	
Effective Green, g (s)	70.6	70.6		87.0	87.0			20.0	32.4		11.0	
Actuated g/C Ratio	0.54	0.54		0.67	0.67			0.15	0.25		0.08	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0	3.0		4.0	
Vehicle Extension (s)	3.0	3.0		1.0	3.0			4.0	1.0		3.0	
Lane Grp Cap (vph)	96	1616		279	2018			233	336		129	
v/s Ratio Prot		0.38		0.07	c0.54			c0.12	0.01		c0.04	
v/s Ratio Perm	0.06			0.43					0.01			
v/c Ratio	0.11	0.71		0.76	0.81			0.77	0.09		0.45	
Uniform Delay, d1	14.5	22.0		15.7	15.5			52.8	37.5		56.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	2.4	2.6		9.9	3.6			14.9	0.0		10.8	
Delay (s)	16.9	24.7		25.6	19.1			67.7	37.6		67.4	
Level of Service	B	C		C	B			E	D		E	
Approach Delay (s)		24.6			19.9			55.2			67.4	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	4336	1350	1509	4305		1509	3018	1350	1509	2959	
Flt Permitted	0.10	1.00	1.00	0.23	1.00		0.16	1.00	1.00	0.17	1.00	
Satd. Flow (perm)	153	4336	1350	364	4305		258	3018	1350	276	2959	
Volume (vph)	190	920	50	260	1780	90	60	640	120	70	1080	160
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	200	968	53	274	1874	95	63	674	126	74	1137	168
RTOR Reduction (vph)	0	0	16	0	6	0	0	0	92	0	13	0
Lane Group Flow (vph)	200	968	37	274	1963	0	63	674	34	74	1292	0
Turn Type	pm+pt		Perm	pm+pt			Perm		Perm	pm+pt		
Protected Phases	1	6		5	2			4		3	8	
Permitted Phases	6		6	2			4		4	8		
Actuated Green, G (s)	45.4	40.4	40.4	45.4	40.4		23.6	23.6	23.6	30.6	30.6	
Effective Green, g (s)	46.4	41.4	41.4	46.4	41.4		24.6	24.6	24.6	31.6	31.6	
Actuated g/C Ratio	0.52	0.46	0.46	0.52	0.46		0.27	0.27	0.27	0.35	0.35	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	5.0	3.0	5.0	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0		3.0	3.0	3.0	2.0	3.0	
Lane Grp Cap (vph)	154	1995	621	251	1980		71	825	369	138	1039	
v/s Ratio Prot	c0.07	0.22		0.06	0.46			0.22		0.02	c0.44	
v/s Ratio Perm	c0.59		0.03	0.50			0.24		0.03	0.17		
v/c Ratio	1.30	0.49	0.06	1.09	0.99		0.89	0.82	0.09	0.54	1.24	
Uniform Delay, d1	18.4	16.9	13.5	19.2	24.1		31.4	30.6	24.4	21.6	29.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	173.7	0.8	0.2	83.4	18.3		68.6	6.3	0.1	2.0	117.8	
Delay (s)	192.1	17.7	13.7	102.6	42.4		99.9	36.9	24.5	23.6	147.0	
Level of Service	F	B	B	F	D		F	D	C	C	F	
Approach Delay (s)		46.1			49.8			39.7			140.4	
Approach LOS		D			D			D			F	

Intersection Summary			
HCM Average Control Delay	69.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	117.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.97		0.95	1.00		0.95
Frt	0.99		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	2911		3018	1350		3018
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	2911		3018	1350		3018
Volume (vph)	1630	140	410	480	0	410
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1716	147	432	505	0	432
RTOR Reduction (vph)	7	0	0	323	0	0
Lane Group Flow (vph)	1856	0	432	182	0	432
Turn Type				Perm		
Protected Phases	4		2			2
Permitted Phases				2		
Actuated Green, G (s)	56.0		35.0	35.0		35.0
Effective Green, g (s)	56.0		36.0	36.0		36.0
Actuated g/C Ratio	0.56		0.36	0.36		0.36
Clearance Time (s)	4.0		5.0	5.0		5.0
Vehicle Extension (s)	7.0		3.0	3.0		3.0
Lane Grp Cap (vph)	1630		1086	486		1086
v/s Ratio Prot	c0.64		c0.14			0.14
v/s Ratio Perm				0.13		
v/c Ratio	1.14		0.40	0.37		0.40
Uniform Delay, d1	22.0		23.9	23.7		23.9
Progression Factor	1.00		0.84	1.77		1.00
Incremental Delay, d2	70.5		1.0	2.0		1.1
Delay (s)	92.5		21.0	43.9		25.0
Level of Service	F		C	D		C
Approach Delay (s)	92.5		33.4			25.0
Approach LOS	F		C			C

Intersection Summary			
HCM Average Control Delay	66.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		1.00			1.00			0.91			0.92	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		3002			3009			1423			1445	
Flt Permitted		0.84			0.93			0.91			0.93	
Satd. Flow (perm)		2534			2805			1314			1363	
Volume (vph)	20	460	10	40	1700	20	10	0	20	20	20	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	484	11	42	1789	21	11	0	21	21	21	63
RTOR Reduction (vph)	0	1	0	0	0	0	0	19	0	0	21	0
Lane Group Flow (vph)	0	515	0	0	1852	0	0	13	0	0	84	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4	4		4		
Actuated Green, G (s)		71.8			71.8			9.7			9.7	
Effective Green, g (s)		72.3			72.3			9.7			9.7	
Actuated g/C Ratio		0.80			0.80			0.11			0.11	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		0.2			0.2			3.0			3.0	
Lane Grp Cap (vph)		2036			2253			142			147	
v/s Ratio Prot												
v/s Ratio Perm		0.20			c0.66			0.01			c0.06	
v/c Ratio		0.25			0.82			0.09			0.57	
Uniform Delay, d1		2.2			5.1			36.2			38.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			3.5			0.3			5.0	
Delay (s)		2.5			8.7			36.5			43.1	
Level of Service		A			A			D			D	
Approach Delay (s)		2.5			8.7			36.5			43.1	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.0%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		1.00			1.00			0.94			0.94	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3005			3003			1485			1487	
Flt Permitted		0.87			0.92			0.96			0.94	
Satd. Flow (perm)		2605			2771			1434			1417	
Volume (vph)	20	600	10	40	1560	40	10	40	40	30	70	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	632	11	42	1642	42	11	42	42	32	74	74
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	0	0	31	0
Lane Group Flow (vph)	0	663	0	0	1725	0	0	95	0	0	149	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			6			6	
Permitted Phases	2			2			6			6		
Actuated Green, G (s)		67.3			67.3			14.2			14.2	
Effective Green, g (s)		67.8			67.8			14.2			14.2	
Actuated g/C Ratio		0.75			0.75			0.16			0.16	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		1962			2087			226			224	
v/s Ratio Prot												
v/s Ratio Perm		0.25			c0.62			0.07			c0.11	
v/c Ratio		0.34			0.83			0.42			0.66	
Uniform Delay, d1		3.7			7.3			34.2			35.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			3.9			1.3			7.2	
Delay (s)		4.1			11.2			35.5			42.9	
Level of Service		A			B			D			D	
Approach Delay (s)		4.1			11.2			35.5			42.9	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM Average Control Delay	12.4	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	101.6%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	1.00		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2986		1509	3003		1509	2958		1509	2920	
Flt Permitted	0.13	1.00		0.23	1.00		0.10	1.00		0.24	1.00	
Satd. Flow (perm)	210	2986		372	3003		151	2958		374	2920	
Volume (vph)	190	540	40	300	1480	50	40	660	100	70	1130	310
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	200	568	42	316	1558	53	42	695	105	74	1189	326
RTOR Reduction (vph)	0	6	0	0	2	0	0	12	0	0	25	0
Lane Group Flow (vph)	200	604	0	316	1609	0	42	788	0	74	1490	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	33.2	30.2		50.0	44.0		42.0	42.0		42.0	42.0	
Effective Green, g (s)	32.2	30.2		50.0	44.0		42.0	42.0		42.0	42.0	
Actuated g/C Ratio	0.32	0.30		0.50	0.44		0.42	0.42		0.42	0.42	
Clearance Time (s)	3.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	1.0	4.9		1.0	5.0		4.3	4.3		4.7	4.7	
Lane Grp Cap (vph)	94	902		366	1321		63	1242		157	1226	
v/s Ratio Prot	c0.04	0.20		0.14	c0.54			0.27			c0.51	
v/s Ratio Perm	c0.64			0.30			0.28			0.20		
v/c Ratio	2.13	0.67		0.86	1.22		0.67	0.63		0.47	1.22	
Uniform Delay, d1	40.0	30.5		18.0	28.0		23.4	22.9		21.0	29.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	541.3	3.9		18.0	105.1		26.8	1.3		4.1	104.6	
Delay (s)	581.3	34.5		36.0	133.1		50.2	24.2		25.1	133.6	
Level of Service	F	C		D	F		D	C		C	F	
Approach Delay (s)		169.5			117.2			25.5			128.5	
Approach LOS		F			F			C			F	

Intersection Summary			
HCM Average Control Delay	113.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	132.1%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	1.00		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2963		1509	3003		1509	2958		1509	2882	
Flt Permitted	0.07	1.00		0.15	1.00		0.11	1.00		0.16	1.00	
Satd. Flow (perm)	113	2963		232	3003		176	2958		251	2882	
Volume (vph)	110	1020	140	230	1470	50	60	730	110	70	940	400
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	1074	147	242	1547	53	63	768	116	74	989	421
RTOR Reduction (vph)	0	11	0	0	2	0	0	12	0	0	17	0
Lane Group Flow (vph)	116	1210	0	242	1598	0	63	872	0	74	1393	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	55.0	55.0		55.0	55.0		35.0	35.0		35.0	35.0	
Effective Green, g (s)	56.0	56.0		56.0	56.0		36.0	36.0		36.0	36.0	
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.36	0.36		0.36	0.36	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	4.9	4.9		4.9	4.9		4.9	4.9		4.9	4.9	
Lane Grp Cap (vph)	63	1659		130	1682		63	1065		90	1038	
v/s Ratio Prot		0.41			0.53			0.29			c0.48	
v/s Ratio Perm	1.02			c1.04			0.36			0.29		
v/c Ratio	1.84	0.73		1.86	0.95		1.00	0.82		0.82	1.34	
Uniform Delay, d1	22.0	16.4		22.0	20.7		32.0	29.0		29.1	32.0	
Progression Factor	1.00	1.00		1.00	1.00		0.98	1.01		1.00	1.00	
Incremental Delay, d2	433.2	2.9		415.6	12.9		112.8	7.0		54.9	160.6	
Delay (s)	455.2	19.2		437.6	33.6		144.3	36.4		84.0	192.6	
Level of Service	F	B		F	C		F	D		F	F	
Approach Delay (s)		57.1			86.7			43.6			187.2	
Approach LOS		E			F			D			F	

Intersection Summary			
HCM Average Control Delay	98.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	125.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	0.95			0.95	1.00	
Frt	0.99			1.00	0.94	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	3002			3015	1453	
Flt Permitted	1.00			0.92	0.97	
Satd. Flow (perm)	3002			2768	1453	
Volume (vph)	860	30	30	1450	50	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	905	32	32	1526	53	42
RTOR Reduction (vph)	2	0	0	0	36	0
Lane Group Flow (vph)	935	0	0	1558	59	0
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	70.1			70.1	9.3	
Effective Green, g (s)	72.7			72.7	9.3	
Actuated g/C Ratio	0.81			0.81	0.10	
Clearance Time (s)	6.6			6.6	4.0	
Vehicle Extension (s)	5.0			5.0	3.0	
Lane Grp Cap (vph)	2425			2236	150	
v/s Ratio Prot	0.31				c0.04	
v/s Ratio Perm				c0.56		
v/c Ratio	0.39			0.70	0.39	
Uniform Delay, d1	2.4			3.8	37.7	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.5			1.8	1.7	
Delay (s)	2.9			5.6	39.4	
Level of Service	A			A	D	
Approach Delay (s)	2.9			5.6	39.4	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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		1.00	
Frt	1.00	1.00		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1509	3011		1509	2993			1570	1350		1550	
Flt Permitted	0.20	1.00		0.15	1.00			0.52	1.00		0.75	
Satd. Flow (perm)	315	3011		238	2993			826	1350		1163	
Volume (vph)	100	1260	20	50	1040	60	60	200	80	50	380	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1326	21	53	1095	63	63	211	84	53	400	74
RTOR Reduction (vph)	0	1	0	0	5	0	0	0	58	0	7	0
Lane Group Flow (vph)	105	1346	0	53	1153	0	0	274	26	0	520	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	59.5	59.5		59.5	59.5			21.5	21.5		21.5	
Effective Green, g (s)	60.0	60.0		60.0	60.0			22.0	22.0		22.0	
Actuated g/C Ratio	0.67	0.67		0.67	0.67			0.24	0.24		0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	4.3	4.3		5.0	5.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	210	2007		159	1995			202	330		284	
v/s Ratio Prot		c0.45			0.39							
v/s Ratio Perm	0.33			0.22				0.33	0.02		c0.45	
v/c Ratio	0.50	0.67		0.33	0.58			1.36	0.08		1.83	
Uniform Delay, d1	7.5	9.0		6.4	8.1			34.0	26.2		34.0	
Progression Factor	1.00	1.00		0.44	0.36			1.00	1.00		1.00	
Incremental Delay, d2	8.3	1.8		3.8	0.8			189.2	0.1		387.7	
Delay (s)	15.8	10.8		6.6	3.7			223.2	26.3		421.7	
Level of Service	B	B		A	A			F	C		F	
Approach Delay (s)		11.2			3.9			177.0			421.7	
Approach LOS		B			A			F			F	

Intersection Summary			
HCM Average Control Delay	86.4	HCM Level of Service	F
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	111.2%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.97		1.00	1.00		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2920		1509	1581		1509	4301		1509	4218	
Flt Permitted	0.21	1.00		0.21	1.00		0.22	1.00		0.23	1.00	
Satd. Flow (perm)	334	2920		334	1581		353	4301		366	4218	
Volume (vph)	150	730	200	230	920	30	110	900	50	50	1260	280
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	768	211	242	968	32	116	947	53	53	1326	295
RTOR Reduction (vph)	0	7	0	0	3	0	0	14	0	0	30	0
Lane Group Flow (vph)	158	972	0	242	997	0	116	986	0	53	1591	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	19.0	19.0		19.0	19.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	4.9	4.9		4.9	4.9		0.2	0.2		0.2	0.2	
Lane Grp Cap (vph)	141	1233		141	668		141	1720		146	1687	
v/s Ratio Prot		0.33			0.63			0.23			c0.38	
v/s Ratio Perm	0.47			c0.72			0.33			0.14		
v/c Ratio	1.12	0.79		1.72	1.49		0.82	0.57		0.36	0.94	
Uniform Delay, d1	13.0	11.3		13.0	13.0		12.1	10.5		9.5	13.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	111.8	3.9		350.5	229.6		39.6	1.4		6.9	12.0	
Delay (s)	124.8	15.2		363.5	242.6		51.7	11.9		16.3	25.0	
Level of Service	F	B		F	F		D	B		B	C	
Approach Delay (s)		30.4			266.1			16.0			24.8	
Approach LOS		C			F			B			C	

Intersection Summary			
HCM Average Control Delay	82.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	126.2%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95	1.00		0.95		0.95	0.95	1.00		1.00	
Frt	1.00	1.00	0.85		1.00		1.00	1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00		1.00		0.95	0.96	1.00		0.99	
Satd. Flow (prot)	1509	3018	1350		3005		1433	1441	1350		1455	
Flt Permitted	0.07	1.00	1.00		1.00		0.95	0.96	1.00		0.99	
Satd. Flow (perm)	118	3018	1350		3005		1433	1441	1350		1455	
Volume (vph)	30	900	240	0	1420	40	630	20	20	40	30	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	947	253	0	1495	42	663	21	21	42	32	84
RTOR Reduction (vph)	0	0	59	0	2	0	0	0	16	0	34	0
Lane Group Flow (vph)	32	947	194	0	1535	0	333	351	5	0	124	0
Turn Type	pm+pt		Perm				Split		Perm	Split		
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6		6						4			
Actuated Green, G (s)	76.0	76.0	76.0		69.9		26.0	26.0	26.0		6.0	
Effective Green, g (s)	76.0	76.0	76.0		69.9		26.0	26.0	26.0		6.0	
Actuated g/C Ratio	0.63	0.63	0.63		0.58		0.22	0.22	0.22		0.05	
Clearance Time (s)	3.0	4.0	4.0		4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	1.0	6.0	6.0		6.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	99	1911	855		1750		310	312	293		73	
v/s Ratio Prot	0.01	c0.31			c0.51		0.23	c0.24			c0.09	
v/s Ratio Perm	0.20		0.14						0.00			
v/c Ratio	0.32	0.50	0.23		0.88		1.07	1.12	0.02		1.70	
Uniform Delay, d1	16.2	11.8	9.4		21.4		47.0	47.0	36.9		57.0	
Progression Factor	0.88	0.93	1.28		1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.6	0.8	0.5		6.6		72.2	89.0	0.0		364.7	
Delay (s)	14.8	11.8	12.5		28.0		119.2	136.0	37.0		421.7	
Level of Service	B	B	B		C		F	F	D		F	
Approach Delay (s)		12.0			28.0			125.2			421.7	
Approach LOS		B			C			F			F	

Intersection Summary			
HCM Average Control Delay	58.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	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		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1509	1588	1350	1509	1538		1509	2985		1509	3018	1350
Flt Permitted	0.23	1.00	1.00	0.55	1.00		0.08	1.00		0.41	1.00	1.00
Satd. Flow (perm)	361	1588	1350	880	1538		128	2985		653	3018	1350
Volume (vph)	170	190	130	100	260	70	100	510	40	40	1400	690
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	200	137	105	274	74	105	537	42	42	1474	726
RTOR Reduction (vph)	0	0	100	0	10	0	0	5	0	0	0	123
Lane Group Flow (vph)	179	200	37	105	338	0	105	574	0	42	1474	603
Turn Type	pm+pt		Perm	pm+pt			pm+pt			pm+pt		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2			4			8		8
Actuated Green, G (s)	35.1	26.6	26.6	31.6	25.1		54.9	49.0		48.5	45.6	45.6
Effective Green, g (s)	34.6	27.1	27.1	30.6	25.1		55.3	49.5		47.5	45.6	45.6
Actuated g/C Ratio	0.35	0.27	0.27	0.31	0.25		0.55	0.50		0.48	0.46	0.46
Clearance Time (s)	3.0	4.5	4.5	3.0	4.0		3.0	4.5		3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	1.0	2.5		1.0	5.0		1.0	5.0	5.0
Lane Grp Cap (vph)	211	430	366	304	386		151	1478		326	1376	616
v/s Ratio Prot	c0.06	0.13		0.02	0.22		c0.04	0.19		0.00	c0.49	
v/s Ratio Perm	c0.23		0.03	0.09			0.34			0.06		0.45
v/c Ratio	0.85	0.47	0.10	0.35	0.87		0.70	0.39		0.13	1.07	0.98
Uniform Delay, d1	27.9	30.4	27.3	25.9	35.9		20.5	15.8		14.2	27.2	26.7
Progression Factor	1.02	1.01	1.77	0.94	0.98		1.80	0.85		0.75	0.68	0.55
Incremental Delay, d2	24.6	0.8	0.1	0.2	18.9		9.1	0.6		0.0	37.5	16.3
Delay (s)	53.0	31.5	48.4	24.8	54.0		45.9	14.1		10.6	56.1	30.9
Level of Service	D	C	D	C	D		D	B		B	E	C
Approach Delay (s)		43.4			47.2			19.0			47.1	
Approach LOS		D			D			B			D	

Intersection Summary			
HCM Average Control Delay	41.7	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
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		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	20	30	0	90	120	20	400	20	80	390	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	21	32	0	95	126	21	421	21	84	411	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											460	
pX, platoon unblocked												
vC, conflicting volume	1226	1074	421	1095	1074	432	432			442		
vC1, stage 1 conf vol							0			0		
vC2, stage 2 conf vol							0			0		
vCu, unblocked vol	1226	1074	421	1095	1074	432	432			442		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)							3.1			3.1		
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	89	95	100	52	80	98			91		
cM capacity (veh/h)	71	196	632	153	196	624	935			932		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	63	221	21	442	84	432
Volume Left	11	0	21	0	84	0
Volume Right	32	126	0	21	0	21
cSH	206	322	935	1700	932	1700
Volume to Capacity	0.31	0.69	0.02	0.26	0.09	0.25
Queue Length 95th (ft)	31	119	2	0	7	0
Control Delay (s)	30.0	37.5	8.9	0.0	9.2	0.0
Lane LOS	D	E	A		A	
Approach Delay (s)	30.0	37.5	0.4		1.5	
Approach LOS	D	E				

Intersection Summary			
Average Delay	8.8		
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.93			0.99		1.00	0.98		1.00	0.99	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1463			1543		1509	2959		1509	2988	
Flt Permitted		0.87			0.80		0.42	1.00		0.43	1.00	
Satd. Flow (perm)		1292			1262		672	2959		686	2988	
Volume (vph)	40	40	80	150	180	20	190	400	60	10	440	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	42	84	158	189	21	200	421	63	11	463	32
RTOR Reduction (vph)	0	41	0	0	3	0	0	28	0	0	12	0
Lane Group Flow (vph)	0	127	0	0	365	0	200	456	0	11	483	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		25.3			25.3		18.1	18.1		18.1	18.1	
Effective Green, g (s)		25.9			25.9		17.1	17.1		17.1	17.1	
Actuated g/C Ratio		0.51			0.51		0.34	0.34		0.34	0.34	
Clearance Time (s)		4.6			4.6		3.0	3.0		3.0	3.0	
Vehicle Extension (s)		4.5			4.5		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		656			641		225	992		230	1002	
v/s Ratio Prot								0.15			0.16	
v/s Ratio Perm		0.10			c0.29		c0.30			0.02		
v/c Ratio		0.19			0.57		0.89	0.46		0.05	0.48	
Uniform Delay, d1		6.8			8.7		16.1	13.3		11.5	13.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.7			3.6		31.7	0.3		0.1	0.4	
Delay (s)		7.5			12.3		47.7	13.7		11.5	13.8	
Level of Service		A			B		D	B		B	B	
Approach Delay (s)		7.5			12.3			23.6			13.8	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	16.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	51.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.7%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)				4.0	4.0			4.0			4.0	4.0
Lane Util. Factor				1.00	0.95			0.95			0.95	1.00
Frt				1.00	1.00			1.00			1.00	0.85
Flt Protected				0.95	1.00			1.00			1.00	1.00
Satd. Flow (prot)				1509	3006			3008			3018	1350
Flt Permitted				0.95	1.00			0.91			1.00	1.00
Satd. Flow (perm)				1509	3006			2754			3018	1350
Volume (vph)	0	0	0	240	1570	40	30	460	0	0	330	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	253	1653	42	32	484	0	0	347	84
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	253	1694	0	0	516	0	0	347	84
Turn Type				custom			custom					Free
Protected Phases				2	2		3	3			1	
Permitted Phases				4	4		6	6				Free
Actuated Green, G (s)				68.4	68.4			43.0			31.0	160.0
Effective Green, g (s)				67.0	67.0			42.0			31.0	160.0
Actuated g/C Ratio				0.42	0.42			0.26			0.19	1.00
Clearance Time (s)				3.0	3.0			3.0			4.0	
Vehicle Extension (s)				1.0	1.0			1.0			4.0	
Lane Grp Cap (vph)				670	1334			740			585	1350
v/s Ratio Prot				0.03	c0.09			c0.05			c0.11	
v/s Ratio Perm				0.14	0.48			c0.14				0.06
v/c Ratio				0.38	1.27			0.70			0.59	0.06
Uniform Delay, d1				32.5	46.5			53.3			58.8	0.0
Progression Factor				1.00	1.00			0.18			1.00	1.00
Incremental Delay, d2				1.6	127.4			1.2			4.4	0.1
Delay (s)				34.1	173.9			10.8			63.1	0.1
Level of Service				C	F			B			E	A
Approach Delay (s)		0.0			155.8			10.8			50.8	
Approach LOS		A			F			B			D	

Intersection Summary			
HCM Average Control Delay	114.3	HCM Level of Service	F
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)	1509	2997		1509	3008			1549	1350		1560	1350
Flt Permitted	0.08	1.00		0.30	1.00			0.55	1.00		0.75	1.00
Satd. Flow (perm)	123	2997		478	3008			866	1350		1188	1350
Volume (vph)	70	630	30	200	1790	40	70	70	130	80	140	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	663	32	211	1884	42	74	74	137	84	147	32
RTOR Reduction (vph)	0	3	0	0	2	0	0	0	137	0	0	32
Lane Group Flow (vph)	74	692	0	211	1924	0	0	148	0	0	231	0
Turn Type	pm+pt			pm+pt			Perm		NA	Perm		NA
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	60.2	51.5		70.2	58.0			21.3	0.0		21.3	0.0
Effective Green, g (s)	59.7	51.5		70.2	58.0			21.8	0.0		21.8	0.0
Actuated g/C Ratio	0.60	0.52		0.70	0.58			0.22	0.00		0.22	0.00
Clearance Time (s)	3.5	4.0		3.5	4.0			4.5			4.5	
Vehicle Extension (s)	1.0	5.0		1.0	5.0			3.0			3.0	
Lane Grp Cap (vph)	187	1543		487	1745			189	0		259	0
v/s Ratio Prot	0.03	0.23		c0.06	c0.64							
v/s Ratio Perm	0.20			0.24				0.17			c0.19	
v/c Ratio	0.40	0.45		0.43	1.10			0.78	0.00		0.89	0.00
Uniform Delay, d1	19.0	15.3		6.3	21.0			36.9	50.0		38.0	50.0
Progression Factor	1.92	0.85		1.71	1.28			1.00	1.00		1.00	1.00
Incremental Delay, d2	6.0	0.9		0.3	47.2			18.8	0.0		29.4	0.0
Delay (s)	42.6	13.9		11.1	74.1			55.7	50.0		67.4	50.0
Level of Service	D	B		B	E			E	D		E	D
Approach Delay (s)		16.7			67.8			52.9			65.3	
Approach LOS		B			E			D			E	

Intersection Summary			
HCM Average Control Delay	55.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.1%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2986		1509	3006		1509	3018	1350	1509	2855	
Flt Permitted	0.07	1.00		0.29	1.00		0.26	1.00	1.00	0.23	1.00	
Satd. Flow (perm)	113	2986		459	3006		410	3018	1350	367	2855	
Volume (vph)	80	670	50	220	1920	50	90	530	160	90	320	180
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	705	53	232	2021	53	95	558	168	95	337	189
RTOR Reduction (vph)	0	5	0	0	2	0	0	0	129	0	77	0
Lane Group Flow (vph)	84	753	0	232	2072	0	95	558	39	95	449	0
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	60.3	56.3		69.0	61.0		23.0	23.0	23.0	23.0	23.0	
Effective Green, g (s)	60.3	56.3		69.0	61.0		23.0	23.0	23.0	23.0	23.0	
Actuated g/C Ratio	0.60	0.56		0.69	0.61		0.23	0.23	0.23	0.23	0.23	
Clearance Time (s)	4.0	4.0		3.5	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	1.0	5.0		1.0	5.0		4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	124	1681		408	1834		94	694	311	84	657	
v/s Ratio Prot	0.03	0.25		c0.05	c0.69			0.18			0.16	
v/s Ratio Perm	0.38			0.34			0.23		0.03	c0.26		
v/c Ratio	0.68	0.45		0.57	1.13		1.01	0.80	0.12	1.13	0.68	
Uniform Delay, d1	22.5	12.8		7.0	19.5		38.5	36.4	30.5	38.5	35.2	
Progression Factor	1.83	0.77		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.3	0.7		1.1	66.1		95.7	9.6	0.8	138.0	5.7	
Delay (s)	50.5	10.5		8.1	85.6		134.2	46.0	31.3	176.5	40.9	
Level of Service	D	B		A	F		F	D	C	F	D	
Approach Delay (s)		14.5			77.8			53.2			61.6	
Approach LOS		B			E			D			E	

Intersection Summary			
HCM Average Control Delay	59.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.7%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.92				0.86
Flt Protected	0.95	1.00		0.95	1.00			0.98				1.00
Satd. Flow (prot)	1509	3006		1509	3012			1428				1374
Flt Permitted	0.95	1.00		0.95	1.00			0.98				1.00
Satd. Flow (perm)	1509	3006		1509	3012			1428				1374
Volume (vph)	50	1490	40	110	1560	20	30	0	50	0	0	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	1568	42	116	1642	21	32	0	53	0	0	53
RTOR Reduction (vph)	0	1	0	0	1	0	0	49	0	0	0	0
Lane Group Flow (vph)	53	1609	0	116	1662	0	0	36	0	0	0	53
Turn Type	Prot			Prot			Perm					Over
Protected Phases	8	2		1 8	6			4				8
Permitted Phases							4					
Actuated Green, G (s)	8.6	59.3		21.6	72.3			7.1				8.6
Effective Green, g (s)	8.6	59.3		21.6	72.3			7.1				8.6
Actuated g/C Ratio	0.09	0.59		0.22	0.72			0.07				0.09
Clearance Time (s)	4.0	4.0			4.0			4.0				4.0
Vehicle Extension (s)	1.0	5.0			5.0			3.0				1.0
Lane Grp Cap (vph)	130	1783		326	2178			101				118
v/s Ratio Prot	0.04	c0.54		c0.08	c0.55							0.04
v/s Ratio Perm								0.03				
v/c Ratio	0.41	0.90		0.36	0.76			0.35				0.45
Uniform Delay, d1	43.3	17.8		33.3	8.6			44.3				43.4
Progression Factor	1.00	1.00		1.00	1.00			1.00				1.00
Incremental Delay, d2	0.8	7.9		0.2	2.6			2.1				1.0
Delay (s)	44.0	25.7		33.5	11.2			46.4				44.4
Level of Service	D	C		C	B			D				D
Approach Delay (s)		26.3			12.6			46.4			44.4	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.5%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95		0.97	0.95			0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	2927	2985		2927	3011		2927	2908			3018	1350
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (perm)	2927	2985		2927	3011		2927	2908			3018	1350
Volume (vph)	180	640	50	190	1340	20	220	470	150	0	940	640
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	674	53	200	1411	21	232	495	158	0	989	674
RTOR Reduction (vph)	0	6	0	0	1	0	0	31	0	0	0	141
Lane Group Flow (vph)	189	721	0	200	1431	0	232	622	0	0	989	533
Turn Type	Prot			Prot			Prot					Perm
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases												4
Actuated Green, G (s)	8.4	29.9		8.6	30.1		9.0	48.0			34.0	34.0
Effective Green, g (s)	8.4	30.4		8.6	30.6		10.0	49.0			35.0	35.0
Actuated g/C Ratio	0.08	0.30		0.09	0.31		0.10	0.49			0.35	0.35
Clearance Time (s)	4.0	4.5		4.0	4.5		5.0	5.0			5.0	5.0
Vehicle Extension (s)	1.0	5.0		1.0	5.0		2.0	4.0			4.0	4.0
Lane Grp Cap (vph)	246	907		252	921		293	1425			1056	473
v/s Ratio Prot	0.06	0.24		c0.07	c0.48		c0.08	0.21			0.33	
v/s Ratio Perm												c0.39
v/c Ratio	0.77	0.80		0.79	1.55		0.79	0.44			0.94	1.13
Uniform Delay, d1	44.8	31.9		44.8	34.7		44.0	16.5			31.4	32.5
Progression Factor	1.00	1.00		1.07	1.12		1.00	1.00			0.39	0.40
Incremental Delay, d2	12.2	7.2		10.0	252.9		12.8	0.3			6.1	66.6
Delay (s)	57.0	39.1		57.9	291.6		56.7	16.8			18.3	79.7
Level of Service	E	D		E	F		E	B			B	E
Approach Delay (s)		42.8			263.0			27.3			43.2	
Approach LOS		D			F			C			D	

Intersection Summary			
HCM Average Control Delay	110.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.0%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95	1.00		1.00		0.95	0.95	
Frt		1.00			1.00	0.85		0.95		1.00	0.95	
Flt Protected		1.00			1.00	1.00		0.98		0.95	0.98	
Satd. Flow (prot)		3007			3018	1350		1492		1433	1403	
Flt Permitted		1.00			1.00	1.00		0.98		0.95	0.98	
Satd. Flow (perm)		3007			3018	1350		1492		1433	1403	
Volume (vph)	0	800	20	0	1410	280	30	30	30	240	30	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	842	21	0	1484	295	32	32	32	253	32	53
RTOR Reduction (vph)	0	1	0	0	0	58	0	18	0	0	17	0
Lane Group Flow (vph)	0	862	0	0	1484	237	0	78	0	168	153	0
Turn Type						pm+ov	Split			Split		
Protected Phases		2			6	4	3	3		4	4	
Permitted Phases						6						
Actuated Green, G (s)		63.0			63.0	80.4		7.6		17.4	17.4	
Effective Green, g (s)		63.0			63.0	80.4		7.6		17.4	17.4	
Actuated g/C Ratio		0.63			0.63	0.80		0.08		0.17	0.17	
Clearance Time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Vehicle Extension (s)		4.5			4.5	4.0		3.0		4.0	4.0	
Lane Grp Cap (vph)		1894			1901	1139		113		249	244	
v/s Ratio Prot		0.29			c0.49	0.04		c0.05		c0.12	0.11	
v/s Ratio Perm						0.14						
v/c Ratio		0.45			0.78	0.21		0.69		0.67	0.63	
Uniform Delay, d1		9.6			13.5	2.3		45.0		38.7	38.3	
Progression Factor		0.30			1.00	1.00		1.00		1.44	1.51	
Incremental Delay, d2		0.6			3.3	0.1		15.9		7.4	5.4	
Delay (s)		3.4			16.7	2.4		60.9		63.1	63.1	
Level of Service		A			B	A		E		E	E	
Approach Delay (s)		3.4			14.4			60.9			63.1	
Approach LOS		A			B			E			E	

Intersection Summary			
HCM Average Control Delay	18.1	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	69.6%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.97			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1509	3004		1509	3008			1515			1491	
Flt Permitted	0.12	1.00		0.25	1.00			0.71			0.93	
Satd. Flow (perm)	186	3004		391	3008			1099			1404	
Volume (vph)	30	950	30	60	1460	30	40	60	30	40	110	100
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	1000	32	63	1537	32	42	63	32	42	116	105
RTOR Reduction (vph)	0	2	0	0	1	0	0	11	0	0	24	0
Lane Group Flow (vph)	32	1030	0	63	1568	0	0	126	0	0	239	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	72.0	72.0		72.0	72.0			20.0			20.0	
Effective Green, g (s)	72.0	72.0		72.0	72.0			20.0			20.0	
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.20			0.20	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			3.0			3.0	
Lane Grp Cap (vph)	134	2163		282	2166			220			281	
v/s Ratio Prot		0.34			c0.52							
v/s Ratio Perm	0.17			0.16				0.11			c0.17	
v/c Ratio	0.24	0.48		0.22	0.72			0.57			0.85	
Uniform Delay, d1	4.7	6.0		4.7	8.2			36.1			38.6	
Progression Factor	1.33	1.30		1.44	1.32			1.00			1.00	
Incremental Delay, d2	4.0	0.7		1.6	1.9			10.4			26.2	
Delay (s)	10.3	8.5		8.3	12.7			46.5			64.8	
Level of Service	B	A		A	B			D			E	
Approach Delay (s)		8.5			12.5			46.5			64.8	
Approach LOS		A			B			D			E	

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	83.8%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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		0.95		1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1509	2993		1509	3018	1350		2959		1509	3018	1350
Flt Permitted	0.09	1.00		0.27	1.00	1.00		0.62		0.22	1.00	1.00
Satd. Flow (perm)	137	2993		434	3018	1350		1844		354	3018	1350
Volume (vph)	150	680	40	190	1360	120	30	580	80	110	1180	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	716	42	200	1432	126	32	611	84	116	1242	116
RTOR Reduction (vph)	0	4	0	0	0	60	0	10	0	0	0	70
Lane Group Flow (vph)	158	754	0	200	1432	66	0	717	0	116	1242	46
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	54.5	46.5		55.5	47.0	47.0		34.0		34.0	34.0	34.0
Effective Green, g (s)	53.5	46.5		54.5	47.0	47.0		34.0		34.0	34.0	34.0
Actuated g/C Ratio	0.54	0.46		0.54	0.47	0.47		0.34		0.34	0.34	0.34
Clearance Time (s)	3.0	4.0		3.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	1.0	3.0		1.0	3.0	3.0		3.5		3.5	3.5	3.5
Lane Grp Cap (vph)	169	1392		317	1418	635		627		120	1026	459
v/s Ratio Prot	c0.07	0.25		0.05	c0.47						c0.41	
v/s Ratio Perm	0.44			0.30		0.05		0.39		0.33		0.03
v/c Ratio	0.93	0.54		0.63	1.01	0.10		1.14		0.97	1.21	0.10
Uniform Delay, d1	23.6	19.1		13.0	26.5	14.8		33.0		32.4	33.0	22.5
Progression Factor	1.00	1.00		1.12	0.80	0.77		1.00		1.00	1.00	1.00
Incremental Delay, d2	49.6	1.5		2.3	23.4	0.3		82.6		73.6	103.9	0.4
Delay (s)	73.2	20.6		16.9	44.7	11.6		115.6		106.1	136.9	23.0
Level of Service	E	C		B	D	B		F		F	F	C
Approach Delay (s)		29.7			39.1			115.6			125.5	
Approach LOS		C			D			F			F	

Intersection Summary			
HCM Average Control Delay	74.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	128.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620
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	1.00		0.90	
Flt Protected	0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1509	3018	3008		1410	
Flt Permitted	0.13	1.00	1.00		0.99	
Satd. Flow (perm)	214	3018	3008		1410	
Volume (vph)	60	870	1370	30	60	180
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	916	1442	32	63	189
RTOR Reduction (vph)	0	0	1	0	59	0
Lane Group Flow (vph)	63	916	1473	0	193	0
Turn Type	Perm					
Protected Phases		2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	72.3	72.3	72.3		20.2	
Effective Green, g (s)	71.8	71.8	71.8		20.2	
Actuated g/C Ratio	0.72	0.72	0.72		0.20	
Clearance Time (s)	3.5	3.5	3.5		4.0	
Vehicle Extension (s)	5.0	5.0	5.0		3.0	
Lane Grp Cap (vph)	154	2167	2160		285	
v/s Ratio Prot		0.30	c0.49		c0.14	
v/s Ratio Perm	0.29					
v/c Ratio	0.41	0.42	0.68		0.68	
Uniform Delay, d1	5.6	5.7	7.8		36.9	
Progression Factor	0.65	0.56	1.00		1.00	
Incremental Delay, d2	6.3	0.5	1.8		6.2	
Delay (s)	10.0	3.7	9.6		43.1	
Level of Service	A	A	A		D	
Approach Delay (s)		4.1	9.6		43.1	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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	0.95	1.00	1.00	0.95	
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2935		1509	2990		1509	3018	1350	1509	2965	
Flt Permitted	0.09	1.00		0.25	1.00		0.14	1.00	1.00	0.19	1.00	
Satd. Flow (perm)	137	2935		399	2990		229	3018	1350	306	2965	
Volume (vph)	140	630	140	220	1210	80	130	670	140	70	910	120
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	663	147	232	1274	84	137	705	147	74	958	126
RTOR Reduction (vph)	0	19	0	0	5	0	0	0	72	0	10	0
Lane Group Flow (vph)	147	791	0	232	1353	0	137	705	75	74	1074	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	53.3	46.3		53.3	46.3		34.6	27.6	27.6	30.1	25.6	
Effective Green, g (s)	52.3	46.3		52.3	46.3		33.7	27.7	27.7	29.7	25.7	
Actuated g/C Ratio	0.52	0.46		0.52	0.46		0.34	0.28	0.28	0.30	0.26	
Clearance Time (s)	3.0	4.0		3.0	4.0		3.0	4.1	4.1	3.5	4.1	
Vehicle Extension (s)	1.0	0.2		1.0	0.2		1.0	5.0	5.0	1.0	5.0	
Lane Grp Cap (vph)	154	1359		275	1384		154	836	374	139	762	
v/s Ratio Prot	c0.06	0.27		0.05	c0.45		c0.05	0.23		0.02	c0.36	
v/s Ratio Perm	0.44			0.39			0.25		0.06	0.14		
v/c Ratio	0.95	0.58		0.84	0.98		0.89	0.84	0.20	0.53	1.41	
Uniform Delay, d1	21.7	19.7		18.6	26.3		29.7	34.1	27.7	26.9	37.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.63	0.57	
Incremental Delay, d2	58.1	1.8		19.7	19.4		47.9	10.1	1.2	1.8	191.1	
Delay (s)	79.9	21.6		38.3	45.8		77.6	44.2	28.9	18.7	212.4	
Level of Service	E	C		D	D		E	D	C	B	F	
Approach Delay (s)		30.5			44.7			46.6			200.0	
Approach LOS		C			D			D			F	

Intersection Summary			
HCM Average Control Delay	80.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	107.1%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2976		1509	2996		1509	1522		1509	1532	
Flt Permitted	0.10	1.00		0.23	1.00		0.21	1.00		0.53	1.00	
Satd. Flow (perm)	156	2976		363	2996		331	1522		846	1532	
Volume (vph)	40	890	90	70	1410	70	30	130	50	90	290	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	937	95	74	1484	74	32	137	53	95	305	95
RTOR Reduction (vph)	0	7	0	0	3	0	0	14	0	0	12	0
Lane Group Flow (vph)	42	1025	0	74	1555	0	32	176	0	95	388	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	64.4	64.4		64.4	64.4		27.6	27.6		27.6	27.6	
Effective Green, g (s)	64.4	64.4		64.4	64.4		27.6	27.6		27.6	27.6	
Actuated g/C Ratio	0.64	0.64		0.64	0.64		0.28	0.28		0.28	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	100	1917		234	1929		91	420		233	423	
v/s Ratio Prot		0.34			c0.52			0.12			c0.25	
v/s Ratio Perm	0.27			0.20			0.10			0.11		
v/c Ratio	0.42	0.53		0.32	0.81		0.35	0.42		0.41	0.92	
Uniform Delay, d1	8.7	9.7		8.0	13.2		29.0	29.6		29.5	35.1	
Progression Factor	0.80	0.86		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.2	1.1		3.5	3.7		2.3	0.7		1.2	24.5	
Delay (s)	19.2	9.4		11.5	16.9		31.4	30.3		30.7	59.6	
Level of Service	B	A		B	B		C	C		C	E	
Approach Delay (s)		9.8			16.6			30.5			54.1	
Approach LOS		A			B			C			D	

Intersection Summary			
HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	105.9%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.94			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1509	3003		1509	3012			1469			1492	
Flt Permitted	0.13	1.00		0.27	1.00			0.88			0.90	
Satd. Flow (perm)	206	3003		432	3012			1311			1362	
Volume (vph)	30	930	30	50	1530	20	30	20	40	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	979	32	53	1611	21	32	21	42	11	11	11
RTOR Reduction (vph)	0	1	0	0	1	0	0	33	0	0	10	0
Lane Group Flow (vph)	32	1010	0	53	1631	0	0	62	0	0	23	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	82.6	82.6		82.6	82.6			9.4			9.4	
Effective Green, g (s)	82.6	82.6		82.6	82.6			9.4			9.4	
Actuated g/C Ratio	0.83	0.83		0.83	0.83			0.09			0.09	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			3.0			3.0	
Lane Grp Cap (vph)	170	2480		357	2488			123			128	
v/s Ratio Prot		0.34			c0.54							
v/s Ratio Perm	0.16			0.12				c0.05			0.02	
v/c Ratio	0.19	0.41		0.15	0.66			0.51			0.18	
Uniform Delay, d1	1.8	2.3		1.7	3.3			43.1			41.7	
Progression Factor	1.00	1.00		2.01	2.96			1.00			1.00	
Incremental Delay, d2	2.4	0.5		0.7	1.1			3.3			0.7	
Delay (s)	4.2	2.8		4.2	10.9			46.4			42.4	
Level of Service	A	A		A	B			D			D	
Approach Delay (s)		2.8			10.6			46.4			42.4	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.0%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1509	2989		1509	3011			1521	1350		1485	
Flt Permitted	0.18	1.00		0.18	1.00			0.41	1.00		0.96	
Satd. Flow (perm)	279	2989		292	3011			659	1350		1428	
Volume (vph)	20	1060	70	100	1330	20	80	10	60	20	70	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1116	74	105	1400	21	84	11	63	21	74	74
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	54	0	35	0
Lane Group Flow (vph)	21	1187	0	105	1420	0	0	95	9	0	134	0
Turn Type	Perm			pm+pt			Perm		Perm	Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	69.3	69.3		77.1	77.1			14.9	14.9		14.9	
Effective Green, g (s)	69.3	69.3		77.1	77.1			14.9	14.9		14.9	
Actuated g/C Ratio	0.69	0.69		0.77	0.77			0.15	0.15		0.15	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	0.2	0.2		1.0	0.2			4.0	4.0		3.0	
Lane Grp Cap (vph)	193	2071		271	2321			98	201		213	
v/s Ratio Prot		0.40		0.01	c0.47							
v/s Ratio Perm	0.08			0.28				c0.14	0.01		0.09	
v/c Ratio	0.11	0.57		0.39	0.61			0.97	0.05		0.63	
Uniform Delay, d1	5.1	7.8		4.7	5.0			42.3	36.5		40.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	1.1	1.2		0.3	1.2			80.4	0.1		5.7	
Delay (s)	6.2	9.0		5.0	6.2			122.7	36.6		45.7	
Level of Service	A	A		A	A			F	D		D	
Approach Delay (s)		8.9			6.1			88.4			45.7	
Approach LOS		A			A			F			D	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	0.98		1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2950		1509	2990		1509	4229		1509	4245	
Flt Permitted	0.12	1.00		0.14	1.00		0.14	1.00		0.14	1.00	
Satd. Flow (perm)	183	2950		219	2990		221	4229		230	4245	
Volume (vph)	150	800	140	290	1090	70	100	810	160	80	1230	200
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	842	147	305	1147	74	105	853	168	84	1295	211
RTOR Reduction (vph)	0	14	0	0	5	0	0	29	0	0	22	0
Lane Group Flow (vph)	158	975	0	305	1216	0	105	992	0	84	1484	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	47.5	41.5		55.5	46.5		34.6	28.7		32.4	27.6	
Effective Green, g (s)	46.5	41.5		55.5	46.5		33.6	28.7		31.4	27.6	
Actuated g/C Ratio	0.46	0.42		0.56	0.46		0.34	0.29		0.31	0.28	
Clearance Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)	1.0	0.2		1.0	0.2		1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	151	1224		251	1390		137	1214		121	1172	
v/s Ratio Prot	0.05	0.33		c0.12	0.41		c0.04	0.23		0.03	c0.35	
v/s Ratio Perm	0.43			c0.55			0.22			0.19		
v/c Ratio	1.05	0.80		1.22	0.87		0.77	0.82		0.69	1.27	
Uniform Delay, d1	22.8	25.6		21.0	24.1		28.1	33.2		26.8	36.2	
Progression Factor	1.00	1.00		1.00	1.00		1.35	1.25		1.00	1.00	
Incremental Delay, d2	86.1	5.4		127.6	7.9		19.3	4.7		13.0	126.5	
Delay (s)	108.9	31.0		148.5	32.1		57.1	46.1		39.8	162.7	
Level of Service	F	C		F	C		E	D		D	F	
Approach Delay (s)		41.7			55.3			47.1			156.2	
Approach LOS		D			E			D			F	

Intersection Summary			
HCM Average Control Delay	80.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.9%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0		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	1.00	1.00	1.00	1.00	
Frt		0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1535		1509	1588	1350	1509	1588	1350	1509	1576	
Flt Permitted		0.97		0.55	1.00	1.00	0.31	1.00	1.00	0.58	1.00	
Satd. Flow (perm)		1496		867	1588	1350	493	1588	1350	918	1576	
Volume (vph)	20	250	80	400	380	70	50	210	150	40	360	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	263	84	421	400	74	53	221	158	42	379	21
RTOR Reduction (vph)	0	20	0	0	0	34	0	0	111	0	4	0
Lane Group Flow (vph)	0	348	0	421	400	40	53	221	47	42	396	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2		2	4		4	8		
Actuated Green, G (s)		27.6		27.6	27.6	27.6	14.9	14.9	14.9	14.9	14.9	
Effective Green, g (s)		28.1		28.1	28.1	28.1	15.4	15.4	15.4	15.4	15.4	
Actuated g/C Ratio		0.55		0.55	0.55	0.55	0.30	0.30	0.30	0.30	0.30	
Clearance Time (s)		4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)		4.0		4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		816		473	866	737	147	475	404	275	471	
v/s Ratio Prot					0.25			0.14			c0.25	
v/s Ratio Perm		0.23		c0.49		0.03	0.11		0.03	0.05		
v/c Ratio		0.43		0.89	0.46	0.05	0.36	0.47	0.12	0.15	0.84	
Uniform Delay, d1		6.9		10.3	7.1	5.5	14.2	14.7	13.1	13.3	16.9	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.5		18.9	0.5	0.0	1.5	0.7	0.1	0.3	12.8	
Delay (s)		7.4		29.2	7.6	5.5	15.7	15.4	13.2	13.5	29.7	
Level of Service		A		C	A	A	B	B	B	B	C	
Approach Delay (s)		7.4			17.6			14.7			28.2	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	51.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1509	2984		1509	1588	1350	1509	2998		1509	3018	1350
Flt Permitted	0.13	1.00		0.46	1.00	1.00	0.35	1.00		0.30	1.00	1.00
Satd. Flow (perm)	205	2984		735	1588	1350	558	2998		480	3018	1350
Volume (vph)	50	380	30	160	730	130	80	670	30	60	610	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	400	32	168	768	137	84	705	32	63	642	32
RTOR Reduction (vph)	0	8	0	0	0	42	0	4	0	0	0	12
Lane Group Flow (vph)	53	424	0	168	768	95	84	733	0	63	642	20
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		4
Actuated Green, G (s)	31.0	31.0		31.0	31.0	31.0	36.0	36.0		36.0	36.0	36.0
Effective Green, g (s)	31.0	31.0		31.0	31.0	31.0	36.0	36.0		36.0	36.0	36.0
Actuated g/C Ratio	0.41	0.41		0.41	0.41	0.41	0.48	0.48		0.48	0.48	0.48
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lane Grp Cap (vph)	85	1233		304	656	558	268	1439		230	1449	648
v/s Ratio Prot		0.14			c0.48			c0.24			0.21	
v/s Ratio Perm	0.26			0.23		0.07	0.15			0.13		0.01
v/c Ratio	0.62	0.34		0.55	1.17	0.17	0.31	0.51		0.27	0.44	0.03
Uniform Delay, d1	17.4	15.0		16.7	22.0	13.9	11.9	13.4		11.7	12.9	10.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	29.8	0.8		7.1	92.5	0.7	3.0	1.3		2.9	1.0	0.1
Delay (s)	47.2	15.8		23.8	114.5	14.6	15.0	14.7		14.6	13.9	10.4
Level of Service	D	B		C	F	B	B	B		B	B	B
Approach Delay (s)		19.2			87.5			14.7			13.8	
Approach LOS		B			F			B			B	

Intersection Summary			
HCM Average Control Delay	40.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.95			0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			1.00	
Satd. Flow (prot)	1509	1584		1509	1588	1350		1492			1392	
Flt Permitted	0.11	1.00		0.38	1.00	1.00		0.73			0.99	
Satd. Flow (perm)	173	1584		598	1588	1350		1108			1376	
Volume (vph)	10	530	10	10	990	10	20	20	20	20	20	360
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	558	11	11	1042	11	21	21	21	21	21	379
RTOR Reduction (vph)	0	1	0	0	0	4	0	16	0	0	107	0
Lane Group Flow (vph)	11	568	0	11	1042	7	0	47	0	0	314	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		
Actuated Green, G (s)	58.8	58.8		58.8	58.8	58.8		21.9			21.9	
Effective Green, g (s)	58.3	58.3		58.3	58.3	58.3		21.4			21.4	
Actuated g/C Ratio	0.66	0.66		0.66	0.66	0.66		0.24			0.24	
Clearance Time (s)	3.5	3.5		3.5	3.5	3.5		3.5			3.5	
Vehicle Extension (s)	0.2	0.2		0.2	0.2	0.2		4.0			4.0	
Lane Grp Cap (vph)	115	1053		398	1056	897		270			336	
v/s Ratio Prot		0.36			c0.66							
v/s Ratio Perm	0.06			0.02		0.01		0.04			c0.23	
v/c Ratio	0.10	0.54		0.03	0.99	0.01		0.17			0.94	
Uniform Delay, d1	5.3	7.7		5.0	14.3	5.0		26.2			32.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	0.3		0.0	24.2	0.0		0.4			32.9	
Delay (s)	5.4	8.0		5.0	38.5	5.0		26.6			65.4	
Level of Service	A	A		A	D	A		C			E	
Approach Delay (s)		7.9			37.8			26.6			65.4	
Approach LOS		A			D			C			E	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	87.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0	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	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2984		1509	3018	1350	1509	3018	1350	1509	2959	
Flt Permitted	0.26	1.00		0.95	1.00	1.00	0.10	1.00	1.00	0.31	1.00	
Satd. Flow (perm)	419	2984		1509	3018	1350	159	3018	1350	498	2959	
Volume (vph)	50	490	40	350	990	30	70	640	80	70	1140	170
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	516	42	368	1042	32	74	674	84	74	1200	179
RTOR Reduction (vph)	0	6	0	0	0	17	0	0	47	0	13	0
Lane Group Flow (vph)	53	552	0	368	1042	15	74	674	37	74	1366	0
Turn Type	Perm			Prot		Perm	Perm		Perm	Perm		
Protected Phases		8		7	4			6			2	
Permitted Phases	8					4	6		6	2		
Actuated Green, G (s)	25.0	25.0		13.0	41.0	41.0	39.0	39.0	39.0	39.0	39.0	
Effective Green, g (s)	26.0	26.0		12.0	42.0	42.0	40.0	40.0	40.0	40.0	40.0	
Actuated g/C Ratio	0.29	0.29		0.13	0.47	0.47	0.44	0.44	0.44	0.44	0.44	
Clearance Time (s)	5.0	5.0		3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	121	862		201	1408	630	71	1341	600	221	1315	
v/s Ratio Prot		0.18		c0.24	c0.35			0.22			0.46	
v/s Ratio Perm	0.13					0.01	c0.47		0.03	0.15		
v/c Ratio	0.44	0.64		1.83	0.74	0.02	1.04	0.50	0.06	0.33	1.04	
Uniform Delay, d1	26.1	27.9		39.0	19.6	12.9	25.0	17.9	14.3	16.3	25.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.1	3.6		392.7	3.5	0.1	119.0	1.3	0.2	4.0	35.4	
Delay (s)	37.2	31.5		431.7	23.1	13.0	144.0	19.2	14.5	20.4	60.4	
Level of Service	D	C		F	C	B	F	B	B	C	E	
Approach Delay (s)		32.0			127.1			29.8			58.4	
Approach LOS		C			F			C			E	

Intersection Summary			
HCM Average Control Delay	72.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
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)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
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	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3125		1583	3141		1583	1631		1583	1608	
Flt Permitted	0.95	1.00		0.95	1.00		0.18	1.00		0.18	1.00	
Satd. Flow (perm)	1583	3125		1583	3141		303	1631		303	1608	
Volume (vph)	30	820	80	250	1240	70	100	420	70	90	420	130
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	863	84	263	1305	74	105	442	74	95	442	137
RTOR Reduction (vph)	0	10	0	0	6	0	0	8	0	0	16	0
Lane Group Flow (vph)	32	937	0	263	1373	0	105	508	0	95	563	0
Turn Type	Prot			custom			Perm			Perm		
Protected Phases	5	2		1	2			4			4	
Permitted Phases				1	6		4			4		
Actuated Green, G (s)	9.5	28.0		9.0	28.0		22.0	22.0		22.0	22.0	
Effective Green, g (s)	8.5	28.0		8.5	28.0		22.0	22.0		22.0	22.0	
Actuated g/C Ratio	0.12	0.40		0.12	0.40		0.31	0.31		0.31	0.31	
Clearance Time (s)	3.0	4.0		3.5	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	5.0		2.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	191	1241		191	1247		95	509		95	502	
v/s Ratio Prot	0.02	0.30		c0.17	c0.44			0.31			c0.35	
v/s Ratio Perm							0.35			0.31		
v/c Ratio	0.17	0.75		1.38	1.10		1.11	1.00		1.00	1.12	
Uniform Delay, d1	27.8	18.3		31.0	21.2		24.2	24.2		24.2	24.2	
Progression Factor	1.00	1.00		1.30	0.54		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	4.3		172.7	46.8		123.6	39.3		92.3	78.0	
Delay (s)	28.0	22.6		213.0	58.4		147.9	63.5		116.6	102.3	
Level of Service	C	C		F	E		F	E		F	F	
Approach Delay (s)		22.8			83.1			77.8			104.3	
Approach LOS		C			F			E			F	

Intersection Summary			
HCM Average Control Delay	70.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	70.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.0%	ICU Level of Service	G
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)	1700	1700	1700	1700	1700	1700	1700	2500	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0		4.0	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	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3110		1583	3149		1583	2451	1417	1583	1582	
Flt Permitted	0.20	1.00		0.20	1.00		0.13	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	327	3110		327	3149		211	2451	1417	779	1582	
Volume (vph)	50	820	110	100	1270	50	50	370	100	50	530	270
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	863	116	105	1337	53	53	389	105	53	558	284
RTOR Reduction (vph)	0	17	0	0	5	0	0	0	17	0	2	0
Lane Group Flow (vph)	53	962	0	105	1385	0	53	389	88	53	840	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	20.1	20.1		20.1	20.1		31.0	31.0	31.0	31.0	31.0	
Effective Green, g (s)	20.4	20.4		20.4	20.4		31.6	31.6	31.6	31.6	31.6	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.53	0.53	0.53	0.53	0.53	
Clearance Time (s)	4.3	4.3		4.3	4.3		4.6	4.6	4.6	4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	111	1057		111	1071		111	1291	746	410	833	
v/s Ratio Prot		0.31			c0.44			0.16			c0.53	
v/s Ratio Perm	0.16			0.32			0.25		0.06	0.07		
v/c Ratio	0.48	0.91		0.95	1.29		0.48	0.30	0.12	0.13	1.01	
Uniform Delay, d1	15.6	18.9		19.3	19.8		9.0	8.0	7.2	7.2	14.2	
Progression Factor	1.00	1.00		0.69	0.79		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	14.0	13.0		59.5	137.2		14.0	0.6	0.3	0.7	33.2	
Delay (s)	29.6	31.9		72.8	152.9		23.0	8.6	7.5	7.9	47.4	
Level of Service	C	C		E	F		C	A	A	A	D	
Approach Delay (s)		31.8			147.3			9.8			45.0	
Approach LOS		C			F			A			D	

Intersection Summary			
HCM Average Control Delay	75.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	108.9%	ICU Level of Service	G
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)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	3167	1417	1583	3167	1417	1583	3167	1417	1583	3167	1417
Flt Permitted	0.09	1.00	1.00	0.32	1.00	1.00	0.32	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	152	3167	1417	533	3167	1417	537	3167	1417	258	3167	1417
Volume (vph)	140	630	90	110	1200	100	30	990	80	70	620	240
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	663	95	116	1263	105	32	1042	84	74	653	253
RTOR Reduction (vph)	0	0	50	0	0	28	0	0	45	0	0	16
Lane Group Flow (vph)	147	663	45	116	1263	77	32	1042	39	74	653	237
Turn Type	Perm		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases		6			2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	54.6	54.6	54.6	54.6	54.6	54.6	54.0	54.0	54.0	54.0	54.0	54.0
Effective Green, g (s)	56.5	56.5	56.5	56.5	56.5	56.5	55.5	55.5	55.5	55.5	55.5	55.5
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	5.9	5.9	5.9	5.9	5.9	5.9	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	72	1491	667	251	1491	667	248	1465	655	119	1465	655
v/s Ratio Prot		0.21			0.40			c0.33			0.21	
v/s Ratio Perm	c0.97		0.03	0.22		0.05	0.06		0.03	0.29		0.17
v/c Ratio	2.04	0.44	0.07	0.46	0.85	0.12	0.13	0.71	0.06	0.62	0.45	0.36
Uniform Delay, d1	31.8	21.3	17.3	21.5	27.9	17.8	18.4	25.8	17.8	24.3	21.8	20.8
Progression Factor	0.87	0.85	1.41	1.13	1.03	1.44	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	509.8	0.9	0.2	0.6	0.6	0.0	1.1	3.0	0.2	22.0	1.0	1.6
Delay (s)	537.5	19.0	24.7	24.8	29.3	25.7	19.5	28.8	18.0	46.4	22.8	22.4
Level of Service	F	B	C	C	C	C	B	C	B	D	C	C
Approach Delay (s)		103.8			28.7			27.8			24.5	
Approach LOS		F			C			C			C	

Intersection Summary			
HCM Average Control Delay	42.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
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)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3072	3167	1417	3072	3156		1583	3167	1417	1583	4408	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.10	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	3072	3167	1417	3072	3156		168	3167	1417	168	4408	
Volume (vph)	110	740	60	260	1330	30	80	910	200	100	1330	350
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	779	63	274	1400	32	84	958	211	105	1400	368
RTOR Reduction (vph)	0	0	2	0	1	0	0	0	67	0	39	0
Lane Group Flow (vph)	116	779	61	274	1431	0	84	958	144	105	1729	0
Turn Type	Prot		pm+ov	Prot			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2	3	1	6		3	8	1	7	4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	8.0	48.0	54.9	8.0	48.0		45.2	38.3	46.3	45.4	38.4	
Effective Green, g (s)	8.0	49.3	56.2	8.0	49.3		46.6	39.7	47.7	46.8	39.8	
Actuated g/C Ratio	0.07	0.41	0.47	0.07	0.41		0.39	0.33	0.40	0.39	0.33	
Clearance Time (s)	4.0	5.3	4.0	4.0	5.3		4.0	5.4	4.0	4.0	5.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	205	1301	711	205	1297		147	1048	610	148	1462	
v/s Ratio Prot	0.04	c0.25	0.00	c0.09	c0.45		0.03	0.30	0.02	c0.04	c0.39	
v/s Ratio Perm			0.04				0.19		0.09	0.24		
v/c Ratio	0.57	0.60	0.09	1.34	1.10		0.57	0.91	0.24	0.71	1.18	
Uniform Delay, d1	54.3	27.6	17.7	56.0	35.4		30.3	38.5	24.0	27.8	40.1	
Progression Factor	0.74	0.52	0.39	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.4	1.9	0.0	180.7	58.3		5.3	13.5	0.2	14.4	89.4	
Delay (s)	43.7	16.3	6.9	236.7	93.6		35.5	52.1	24.2	42.2	129.5	
Level of Service	D	B	A	F	F		D	D	C	D	F	
Approach Delay (s)		19.0			116.6			46.3			124.6	
Approach LOS		B			F			D			F	

Intersection Summary			
HCM Average Control Delay	87.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.1%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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		1.00	0.91	
Frt	1.00	0.90			0.96		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	1422			1498		1509	4287		1509	4290	
Flt Permitted	0.52	1.00			0.85		0.08	1.00		0.24	1.00	
Satd. Flow (perm)	825	1422			1300		124	4287		386	4290	
Volume (vph)	50	30	70	60	60	50	120	980	80	30	1580	120
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	32	74	63	63	53	126	1032	84	32	1663	126
RTOR Reduction (vph)	0	60	0	0	18	0	0	6	0	0	7	0
Lane Group Flow (vph)	53	46	0	0	161	0	126	1110	0	32	1782	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	18.4	18.4			18.4		73.6	67.0		64.7	61.1	
Effective Green, g (s)	18.4	18.4			18.4		73.6	67.0		63.7	61.1	
Actuated g/C Ratio	0.18	0.18			0.18		0.74	0.67		0.64	0.61	
Clearance Time (s)	4.0	4.0			4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)	5.0	5.0			5.0		1.0	0.2		1.0	0.2	
Lane Grp Cap (vph)	152	262			239		209	2872		275	2621	
v/s Ratio Prot		0.03					c0.05	0.26		0.00	c0.42	
v/s Ratio Perm	0.06				c0.12		0.39			0.07		
v/c Ratio	0.35	0.17			0.67		0.60	0.39		0.12	0.68	
Uniform Delay, d1	35.6	34.4			38.0		11.5	7.3		6.7	12.9	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.67	0.98	
Incremental Delay, d2	2.9	0.7			9.4		3.3	0.4		0.0	0.1	
Delay (s)	38.5	35.1			47.4		14.8	7.7		4.5	12.9	
Level of Service	D	D			D		B	A		A	B	
Approach Delay (s)		36.2			47.4			8.5			12.7	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	EBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NWR2
Lane Configurations											
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0					4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95					0.95	1.00
Frt	1.00	1.00	0.85	0.85	0.96					1.00	0.86
Flt Protected	0.95	1.00	1.00	1.00	1.00					0.99	1.00
Satd. Flow (prot)	1509	3018	1350	1350	2886					2986	1374
Flt Permitted	0.95	1.00	1.00	1.00	1.00					0.62	1.00
Satd. Flow (perm)	1509	3018	1350	1350	2886					1860	1374
Volume (vph)	90	530	340	60	390	80	80	110	60	620	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	558	358	63	411	84	84	116	63	653	32
RTOR Reduction (vph)	0	0	0	44	9	0	0	0	0	0	0
Lane Group Flow (vph)	95	558	358	19	570	0	0	0	0	832	32
Turn Type	custom		Perm	Perm				custom	Prot		Free
Protected Phases	3	3			6				2	1	
Permitted Phases	4	4	3	3				2		2	Free
Actuated Green, G (s)	68.4	68.4	12.0	12.0	31.0					43.0	160.0
Effective Green, g (s)	67.0	67.0	11.0	11.0	31.0					42.0	160.0
Actuated g/C Ratio	0.42	0.42	0.07	0.07	0.19					0.26	1.00
Clearance Time (s)	3.0	3.0	3.0	3.0	4.0					4.0	
Vehicle Extension (s)	1.0	1.0	1.0	1.0	3.0					4.0	
Lane Grp Cap (vph)	670	1339	93	93	559					706	1374
v/s Ratio Prot	0.01	c0.03			c0.20					c0.23	
v/s Ratio Perm	0.05	0.16	c0.27	0.01						c0.08	0.02
v/c Ratio	0.14	0.42	3.85	0.21	1.02					1.18	0.02
Uniform Delay, d1	28.8	32.7	74.5	70.4	64.5					59.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00					0.60	1.00
Incremental Delay, d2	0.0	0.1	1307.9	0.4	43.2					94.0	0.0
Delay (s)	28.9	32.8	1382.4	70.8	107.7					129.1	0.0
Level of Service	C	C	F	E	F					F	A
Approach Delay (s)		484.6			107.7					129.1	
Approach LOS		F			F					F	

Intersection Summary			
HCM Average Control Delay	274.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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	1.00		0.95	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1509	2986		1509	3018	1350	1509	1493		1433	1453	
Flt Permitted	0.16	1.00		0.19	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	254	2986		294	3018	1350	1509	1493		1433	1453	
Volume (vph)	20	1070	80	40	1120	270	80	60	40	290	140	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1126	84	42	1179	284	84	63	42	305	147	42
RTOR Reduction (vph)	0	4	0	0	0	110	0	23	0	0	6	0
Lane Group Flow (vph)	21	1206	0	42	1179	174	84	82	0	242	246	0
Turn Type	pm+pt			Perm		Perm	Split			Split		
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6			2		2						
Actuated Green, G (s)	76.9	76.9		71.9	71.9	71.9	12.1	12.1		19.0	19.0	
Effective Green, g (s)	76.9	76.9		71.9	71.9	71.9	12.1	12.1		19.0	19.0	
Actuated g/C Ratio	0.64	0.64		0.60	0.60	0.60	0.10	0.10		0.16	0.16	
Clearance Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	1.0	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	173	1914		176	1808	809	152	151		227	230	
v/s Ratio Prot	0.00	c0.40			0.39		c0.06	0.05		0.17	c0.17	
v/s Ratio Perm	0.08			0.14		0.13						
v/c Ratio	0.12	0.63		0.24	0.65	0.22	0.55	0.54		1.07	1.07	
Uniform Delay, d1	10.7	13.0		11.2	15.8	11.1	51.4	51.3		50.5	50.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.6		3.2	1.8	0.6	4.3	3.9		78.3	79.1	
Delay (s)	10.8	14.6		14.4	17.7	11.7	55.7	55.2		128.8	129.6	
Level of Service	B	B		B	B	B	E	E		F	F	
Approach Delay (s)		14.5			16.4			55.4			129.2	
Approach LOS		B			B			E			F	

Intersection Summary			
HCM Average Control Delay	34.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.7%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.91	0.95		1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00		0.98	
Satd. Flow (prot)	1509	3018	1350	1509	2978		1433	1411	1282		1531	
Flt Permitted	0.14	1.00	1.00	0.09	1.00		0.43	0.61	1.00		0.76	
Satd. Flow (perm)	225	3018	1350	138	2978		648	877	1282		1189	
Volume (vph)	20	1310	60	150	1160	110	190	100	230	110	120	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1379	63	158	1221	116	200	105	242	116	126	32
RTOR Reduction (vph)	0	0	15	0	6	0	0	0	235	0	4	0
Lane Group Flow (vph)	21	1379	48	158	1331	0	100	205	7	0	270	0
Turn Type	Perm		Perm	pm+pt			Perm		Over	Perm		
Protected Phases		6		5	2			4	5		8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	64.0	64.0	64.0	71.5	71.5		16.0	16.0	4.5		21.5	
Effective Green, g (s)	64.0	64.0	64.0	71.5	71.5		15.5	15.5	3.5		21.0	
Actuated g/C Ratio	0.53	0.53	0.53	0.60	0.60		0.13	0.13	0.03		0.18	
Clearance Time (s)	4.0	4.0	4.0	3.0	4.0		3.5	3.5	3.0		3.5	
Vehicle Extension (s)	4.5	4.5	4.5	1.0	4.5		2.0	2.0	1.0		4.0	
Lane Grp Cap (vph)	120	1610	720	122	1774		84	113	37		208	
v/s Ratio Prot		0.46		c0.04	0.45				0.01			
v/s Ratio Perm	0.09		0.04	c0.73			0.15	c0.23			c0.23	
v/c Ratio	0.17	0.86	0.07	1.30	0.75		1.19	1.81	0.19		1.30	
Uniform Delay, d1	14.4	24.1	13.5	25.2	17.7		52.2	52.2	56.9		49.5	
Progression Factor	1.00	1.00	1.00	2.11	1.45		1.00	1.00	1.00		1.00	
Incremental Delay, d2	3.2	6.1	0.2	171.8	2.3		158.3	399.0	0.9		164.6	
Delay (s)	17.6	30.2	13.7	225.0	28.0		210.5	451.2	57.8		214.1	
Level of Service	B	C	B	F	C		F	F	E		F	
Approach Delay (s)		29.3			48.8			233.2			214.1	
Approach LOS		C			D			F			F	

Intersection Summary			
HCM Average Control Delay	79.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.95	0.91	0.95	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.95	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2977		1509	3001		1433	1341	1282	1509	1506	
Flt Permitted	0.16	1.00		0.07	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	256	2977		110	3001		1433	1341	1282	1509	1506	
Volume (vph)	10	1520	150	170	1300	50	260	30	460	40	20	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	1600	158	179	1368	53	274	32	484	42	21	11
RTOR Reduction (vph)	0	5	0	0	2	0	0	14	151	0	10	0
Lane Group Flow (vph)	11	1753	0	179	1419	0	175	180	270	42	22	0
Turn Type	Perm			pm+pt			Split		pm+ov	Split		
Protected Phases		6		5	2		4	4	5	3	3	
Permitted Phases	6			2					4			
Actuated Green, G (s)	81.3	81.3		88.3	88.3		13.0	13.0	17.0	7.7	7.7	
Effective Green, g (s)	81.3	81.3		88.3	88.3		13.0	13.0	16.0	6.7	6.7	
Actuated g/C Ratio	0.68	0.68		0.74	0.74		0.11	0.11	0.13	0.06	0.06	
Clearance Time (s)	4.0	4.0		3.0	4.0		4.0	4.0	3.0	3.0	3.0	
Vehicle Extension (s)	4.5	4.5		1.0	4.5		2.0	2.0	1.0	2.0	2.0	
Lane Grp Cap (vph)	173	2017		116	2208		155	145	214	84	84	
v/s Ratio Prot		0.59		0.04	0.47		0.12	0.13	c0.03	c0.03	0.01	
v/s Ratio Perm	0.04			c1.10					0.18			
v/c Ratio	0.06	0.87		1.54	0.64		1.13	1.24	1.26	0.50	0.26	
Uniform Delay, d1	6.5	15.2		21.2	7.9		53.5	53.5	52.0	55.0	54.3	
Progression Factor	1.29	1.25		1.57	1.80		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	4.0		273.5	1.1		111.1	153.0	150.0	1.7	0.6	
Delay (s)	8.9	23.0		306.6	15.4		164.6	206.5	202.0	56.7	54.9	
Level of Service	A	C		F	B		F	F	F	E	D	
Approach Delay (s)		22.9			47.9			194.9			55.9	
Approach LOS		C			D			F			E	

Intersection Summary			
HCM Average Control Delay	65.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.91			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1509	3011		1509	3009			1431			1513	
Flt Permitted	0.13	1.00		0.07	1.00			0.93			0.49	
Satd. Flow (perm)	201	3011		111	3009			1342			765	
Volume (vph)	30	1900	30	70	1510	30	30	20	100	50	20	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	2000	32	74	1589	32	32	21	105	53	21	11
RTOR Reduction (vph)	0	1	0	0	1	0	0	31	0	0	4	0
Lane Group Flow (vph)	32	2031	0	74	1620	0	0	127	0	0	81	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	97.0	97.0		97.0	97.0			15.0			15.0	
Effective Green, g (s)	97.0	97.0		97.0	97.0			15.0			15.0	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.12			0.12	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	4.5	4.5		4.5	4.5			3.0			3.0	
Lane Grp Cap (vph)	162	2434		90	2432			168			96	
v/s Ratio Prot		c0.67			0.54							
v/s Ratio Perm	0.16			0.67				0.09			c0.11	
v/c Ratio	0.20	0.83		0.82	0.67			0.76			0.84	
Uniform Delay, d1	2.6	6.8		6.6	4.8			50.7			51.3	
Progression Factor	1.47	1.23		0.92	1.04			1.00			1.00	
Incremental Delay, d2	1.0	1.3		18.6	0.4			17.6			44.3	
Delay (s)	4.9	9.7		24.6	5.3			68.4			95.6	
Level of Service	A	A		C	A			E			F	
Approach Delay (s)		9.6			6.2			68.4			95.6	
Approach LOS		A			A			E			F	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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	1.00
Frt	1.00	1.00		1.00	0.98			0.92			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.95	1.00
Satd. Flow (prot)	1509	3012		1509	2965			1446			1516	1350
Flt Permitted	0.19	1.00		0.11	1.00			0.75			0.67	1.00
Satd. Flow (perm)	300	3012		173	2965			1098			1057	1350
Volume (vph)	140	1560	20	50	1060	140	20	10	40	200	10	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	1642	21	53	1116	147	21	11	42	211	11	95
RTOR Reduction (vph)	0	1	0	0	8	0	0	35	0	0	0	95
Lane Group Flow (vph)	147	1662	0	53	1255	0	0	39	0	0	222	0
Turn Type	Perm			Perm			Perm			Perm		NA
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	91.0	91.0		91.0	91.0			21.0			21.0	0.0
Effective Green, g (s)	91.0	91.0		91.0	91.0			21.0			21.0	0.0
Actuated g/C Ratio	0.76	0.76		0.76	0.76			0.18			0.18	0.00
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	228	2284		131	2248			192			185	0
v/s Ratio Prot		c0.55			0.42							
v/s Ratio Perm	0.49			0.31				0.04			c0.21	
v/c Ratio	0.64	0.73		0.40	0.56			0.20			1.20	0.00
Uniform Delay, d1	6.9	7.8		5.1	6.1			42.4			49.5	60.0
Progression Factor	1.00	1.00		0.90	0.91			1.00			1.00	1.00
Incremental Delay, d2	13.2	2.1		8.2	0.9			0.5			130.3	0.0
Delay (s)	20.1	9.9		12.7	6.4			42.9			179.8	60.0
Level of Service	C	A		B	A			D			F	E
Approach Delay (s)		10.7			6.7			42.9			143.9	
Approach LOS		B			A			D			F	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1509	2977		1509	3013			1517	1350		1495	
Flt Permitted	0.27	1.00		0.06	1.00			0.96	1.00		0.98	
Satd. Flow (perm)	427	2977		90	3013			1517	1350		1495	
Volume (vph)	10	1640	160	240	1000	10	150	10	250	30	20	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	1726	168	253	1053	11	158	11	263	32	21	21
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	191	0	12	0
Lane Group Flow (vph)	11	1891	0	253	1064	0	0	169	72	0	62	0
Turn Type	Perm			pm+pt			Split		pm+ov	Split		
Protected Phases		6		5	2		4	4	5	8	8	
Permitted Phases	6			2					4			
Actuated Green, G (s)	66.8	66.8		87.0	87.0			19.2	36.4		11.8	
Effective Green, g (s)	66.8	66.8		87.0	87.0			19.2	35.4		11.8	
Actuated g/C Ratio	0.51	0.51		0.67	0.67			0.15	0.27		0.09	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0	3.0		4.0	
Vehicle Extension (s)	3.0	3.0		1.0	3.0			4.0	1.0		3.0	
Lane Grp Cap (vph)	219	1530		237	2016			224	368		136	
v/s Ratio Prot		c0.63		c0.13	0.35			c0.11	0.02		c0.04	
v/s Ratio Perm	0.03			0.58					0.03			
v/c Ratio	0.05	1.24		1.07	0.53			0.75	0.19		0.46	
Uniform Delay, d1	15.8	31.6		46.4	11.0			53.1	36.3		56.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.4	111.9		77.5	1.0			14.2	0.1		10.7	
Delay (s)	16.2	143.5		123.8	12.0			67.4	36.4		66.7	
Level of Service	B	F		F	B			E	D		E	
Approach Delay (s)		142.8			33.5			48.5			66.7	
Approach LOS		F			C			D			E	

Intersection Summary			
HCM Average Control Delay	91.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.8%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	4336	1350	1509	4288		1509	3018	1350	1509	2938	
Flt Permitted	0.11	1.00	1.00	0.12	1.00		0.17	1.00	1.00	0.15	1.00	
Satd. Flow (perm)	178	4336	1350	197	4288		276	3018	1350	235	2938	
Volume (vph)	290	1470	120	190	1140	90	80	840	130	160	990	210
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	305	1547	126	200	1200	95	84	884	137	168	1042	221
RTOR Reduction (vph)	0	0	76	0	10	0	0	0	102	0	20	0
Lane Group Flow (vph)	305	1547	50	200	1285	0	84	884	35	168	1243	0
Turn Type	pm+pt		Perm	pm+pt			Perm		Perm	pm+pt		
Protected Phases	1	6		5	2			4		3	8	
Permitted Phases	6		6	2			4		4	8		
Actuated Green, G (s)	49.5	34.7	34.7	42.5	31.2		22.0	22.0	22.0	31.0	31.0	
Effective Green, g (s)	50.5	35.7	35.7	43.5	32.2		23.0	23.0	23.0	31.0	31.0	
Actuated g/C Ratio	0.56	0.40	0.40	0.48	0.36		0.26	0.26	0.26	0.34	0.34	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	5.0	3.0	4.0	
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0		3.0	3.0	3.0	2.0	3.0	
Lane Grp Cap (vph)	319	1720	536	260	1534		71	771	345	138	1012	
v/s Ratio Prot	c0.16	0.36		0.10	0.30			0.29		0.05	c0.42	
v/s Ratio Perm	c0.38		0.04	0.27			0.30		0.03	0.37		
v/c Ratio	0.96	0.90	0.09	0.77	0.84		1.18	1.15	0.10	1.22	1.23	
Uniform Delay, d1	24.6	25.5	17.0	17.3	26.5		33.5	33.5	25.6	30.0	29.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	38.2	8.0	0.3	11.6	5.6		164.5	80.9	0.1	146.6	111.7	
Delay (s)	62.8	33.4	17.4	28.9	32.1		198.0	114.4	25.7	176.6	141.2	
Level of Service	E	C	B	C	C		F	F	C	F	F	
Approach Delay (s)		36.9			31.7			109.7			145.3	
Approach LOS		D			C			F			F	

Intersection Summary			
HCM Average Control Delay	74.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.97		0.95	1.00		0.95
Frt	0.98		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	2902		3018	1350		3018
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	2902		3018	1350		3018
Volume (vph)	930	110	500	1600	0	400
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	979	116	526	1684	0	421
RTOR Reduction (vph)	10	0	0	645	0	0
Lane Group Flow (vph)	1085	0	526	1039	0	421
Turn Type				Perm		
Protected Phases	4		2			2
Permitted Phases				2		
Actuated Green, G (s)	51.1		39.9	39.9		39.9
Effective Green, g (s)	51.1		40.9	40.9		40.9
Actuated g/C Ratio	0.51		0.41	0.41		0.41
Clearance Time (s)	4.0		5.0	5.0		5.0
Vehicle Extension (s)	7.0		3.0	3.0		3.0
Lane Grp Cap (vph)	1483		1234	552		1234
v/s Ratio Prot	c0.37		0.17			0.14
v/s Ratio Perm				c0.77		
v/c Ratio	0.73		0.43	1.88		0.34
Uniform Delay, d1	19.1		21.2	29.6		20.3
Progression Factor	1.00		0.76	4.25		1.00
Incremental Delay, d2	2.9		0.3	398.8		0.8
Delay (s)	22.0		16.3	524.5		21.0
Level of Service	C		B	F		C
Approach Delay (s)	22.0		403.5			21.0
Approach LOS	C		F			C

Intersection Summary			
HCM Average Control Delay	248.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	119.5%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		1.00			1.00			0.93			0.98	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		3010			3008			1465			1502	
Flt Permitted		0.95			0.89			0.93			0.85	
Satd. Flow (perm)		2857			2680			1379			1314	
Volume (vph)	10	1440	20	20	770	10	10	10	20	40	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	1516	21	21	811	11	11	11	21	42	11	11
RTOR Reduction (vph)	0	1	0	0	1	0	0	19	0	0	10	0
Lane Group Flow (vph)	0	1547	0	0	842	0	0	24	0	0	54	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4	4		4		
Actuated Green, G (s)		72.7			72.7			8.8			8.8	
Effective Green, g (s)		73.2			73.2			8.8			8.8	
Actuated g/C Ratio		0.81			0.81			0.10			0.10	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		0.2			0.2			3.0			3.0	
Lane Grp Cap (vph)		2324			2180			135			128	
v/s Ratio Prot												
v/s Ratio Perm		c0.54			0.31			0.02			c0.04	
v/c Ratio		0.67			0.39			0.18			0.42	
Uniform Delay, d1		3.4			2.3			37.3			38.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.5			0.5			0.6			2.2	
Delay (s)		4.9			2.8			37.9			40.5	
Level of Service		A			A			D			D	
Approach Delay (s)		4.9			2.8			37.9			40.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.3%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		1.00			0.99			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3003			2987			1522			1516	
Flt Permitted		0.93			0.85			0.95			0.80	
Satd. Flow (perm)		2790			2542			1453			1221	
Volume (vph)	20	1100	30	40	850	50	30	140	60	40	80	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1158	32	42	895	53	32	147	63	42	84	42
RTOR Reduction (vph)	0	2	0	0	4	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	1209	0	0	986	0	0	242	0	0	154	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			6			6	
Permitted Phases	2			2			6			6		
Actuated Green, G (s)		62.8			62.8			18.7			18.7	
Effective Green, g (s)		63.3			63.3			18.7			18.7	
Actuated g/C Ratio		0.70			0.70			0.21			0.21	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		1962			1788			302			254	
v/s Ratio Prot												
v/s Ratio Perm		c0.43			0.39			c0.17			0.13	
v/c Ratio		0.62			0.55			0.80			0.61	
Uniform Delay, d1		7.0			6.5			33.9			32.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.5			1.2			14.1			4.0	
Delay (s)		8.5			7.7			48.0			36.3	
Level of Service		A			A			D			D	
Approach Delay (s)		8.5			7.7			48.0			36.3	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	3001		1509	2985		1509	2977		1509	2962	
Flt Permitted	0.13	1.00		0.12	1.00		0.18	1.00		0.10	1.00	
Satd. Flow (perm)	207	3001		191	2985		278	2977		151	2962	
Volume (vph)	200	1050	40	210	780	60	70	1210	120	80	780	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	1105	42	221	821	63	74	1274	126	84	821	116
RTOR Reduction (vph)	0	3	0	0	5	0	0	8	0	0	11	0
Lane Group Flow (vph)	211	1144	0	221	879	0	74	1392	0	84	926	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	50.0	42.0		39.4	34.4		42.0	42.0		42.0	42.0	
Effective Green, g (s)	50.0	42.0		38.4	34.4		42.0	42.0		42.0	42.0	
Actuated g/C Ratio	0.50	0.42		0.38	0.34		0.42	0.42		0.42	0.42	
Clearance Time (s)	3.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	1.0	4.9		1.0	5.0		4.3	4.3		4.7	4.7	
Lane Grp Cap (vph)	255	1260		126	1027		117	1250		63	1244	
v/s Ratio Prot	c0.10	0.38		c0.07	0.29			0.47			0.31	
v/s Ratio Perm	0.32			c0.60			0.27			c0.56		
v/c Ratio	0.83	0.91		1.75	0.86		0.63	1.11		1.33	0.74	
Uniform Delay, d1	19.5	27.2		28.2	30.5		22.9	29.0		29.0	24.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.5	11.1		369.8	9.1		12.7	62.8		225.9	2.9	
Delay (s)	37.9	38.3		398.0	39.6		35.6	91.8		254.9	27.3	
Level of Service	D	D		F	D		D	F		F	C	
Approach Delay (s)		38.2			111.3			89.0			46.0	
Approach LOS		D			F			F			D	

Intersection Summary			
HCM Average Control Delay	71.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	114.6%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2995		1509	2966		1509	2943		1509	2948	
Flt Permitted	0.18	1.00		0.08	1.00		0.11	1.00		0.11	1.00	
Satd. Flow (perm)	291	2995		135	2966		176	2943		176	2948	
Volume (vph)	280	1330	70	120	920	120	120	1070	210	80	880	160
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	1400	74	126	968	126	126	1126	221	84	926	168
RTOR Reduction (vph)	0	4	0	0	7	0	0	16	0	0	15	0
Lane Group Flow (vph)	295	1470	0	126	1087	0	126	1331	0	84	1079	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	55.0	55.0		55.0	55.0		35.0	35.0		35.0	35.0	
Effective Green, g (s)	56.0	56.0		56.0	56.0		36.0	36.0		36.0	36.0	
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.36	0.36		0.36	0.36	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	4.9	4.9		4.9	4.9		4.9	4.9		4.9	4.9	
Lane Grp Cap (vph)	163	1677		76	1661		63	1059		63	1061	
v/s Ratio Prot		0.49			0.37			0.45			0.37	
v/s Ratio Perm	c1.01			0.94			c0.71			0.48		
v/c Ratio	1.81	0.88		1.66	0.65		2.00	1.26		1.33	1.02	
Uniform Delay, d1	22.0	19.0		22.0	15.3		32.0	32.0		32.0	32.0	
Progression Factor	1.00	1.00		1.00	1.00		1.01	0.98		1.00	1.00	
Incremental Delay, d2	387.6	6.8		347.0	2.0		498.3	122.9		225.9	32.0	
Delay (s)	409.6	25.8		369.0	17.3		530.5	154.2		257.9	64.0	
Level of Service	F	C		F	B		F	F		F	E	
Approach Delay (s)		89.8			53.6			186.4			77.8	
Approach LOS		F			D			F			E	

Intersection Summary			
HCM Average Control Delay	104.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.88		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	118.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	0.95			0.95	1.00	
Frt	1.00			1.00	0.95	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	3007			3014	1467	
Flt Permitted	1.00			0.85	0.97	
Satd. Flow (perm)	3007			2574	1467	
Volume (vph)	1590	40	30	1160	60	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1674	42	32	1221	63	32
RTOR Reduction (vph)	1	0	0	0	23	0
Lane Group Flow (vph)	1715	0	0	1253	72	0
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	69.9			69.9	9.5	
Effective Green, g (s)	72.5			72.5	9.5	
Actuated g/C Ratio	0.81			0.81	0.11	
Clearance Time (s)	6.6			6.6	4.0	
Vehicle Extension (s)	5.0			5.0	3.0	
Lane Grp Cap (vph)	2422			2074	155	
v/s Ratio Prot	c0.57				c0.05	
v/s Ratio Perm				0.49		
v/c Ratio	0.71			0.60	0.46	
Uniform Delay, d1	4.0			3.3	37.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.8			1.3	2.2	
Delay (s)	5.7			4.6	40.0	
Level of Service	A			A	D	
Approach Delay (s)	5.7			4.6	40.0	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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			1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.97			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1509	3000		1509	2993		1509	1548			1559	
Flt Permitted	0.20	1.00		0.10	1.00		0.18	1.00			0.28	
Satd. Flow (perm)	315	3000		153	2993		289	1548			446	
Volume (vph)	110	1470	60	120	1040	60	130	350	70	60	410	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	1547	63	126	1095	63	137	368	74	63	432	53
RTOR Reduction (vph)	0	3	0	0	5	0	0	8	0	0	5	0
Lane Group Flow (vph)	116	1607	0	126	1153	0	137	434	0	0	543	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	59.5	59.5		59.5	59.5		21.5	21.5			21.5	
Effective Green, g (s)	60.0	60.0		60.0	60.0		22.0	22.0			22.0	
Actuated g/C Ratio	0.67	0.67		0.67	0.67		0.24	0.24			0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	4.3	4.3		5.0	5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	210	2000		102	1995		71	378			109	
v/s Ratio Prot		0.54			0.39			0.28				
v/s Ratio Perm	0.37			c0.82			0.47				c1.22	
v/c Ratio	0.55	0.80		1.24	0.58		1.93	1.15			4.99	
Uniform Delay, d1	7.9	10.8		15.0	8.1		34.0	34.0			34.0	
Progression Factor	1.00	1.00		0.79	0.62		1.00	1.00			1.00	
Incremental Delay, d2	10.1	3.5		162.4	1.2		465.6	92.8			1814.1	
Delay (s)	18.0	14.3		174.3	6.2		499.6	126.8			1848.1	
Level of Service	B	B		F	A		F	F			F	
Approach Delay (s)		14.5			22.7			215.0			1848.1	
Approach LOS		B			C			F			F	

Intersection Summary			
HCM Average Control Delay	288.0	HCM Level of Service	F
HCM Volume to Capacity ratio	2.24		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	130.9%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.98		1.00	0.99		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2944		1509	1571		1509	4262		1509	4212	
Flt Permitted	0.21	1.00		0.21	1.00		0.22	1.00		0.22	1.00	
Satd. Flow (perm)	334	2944		334	1571		353	4262		353	4212	
Volume (vph)	220	980	190	170	750	60	170	1170	150	90	1150	270
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	1032	200	179	789	63	179	1232	158	95	1211	284
RTOR Reduction (vph)	0	10	0	0	6	0	0	25	0	0	55	0
Lane Group Flow (vph)	232	1222	0	179	846	0	179	1365	0	95	1440	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	19.0	19.0		19.0	19.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	141	1243		141	663		141	1705		141	1685	
v/s Ratio Prot		0.41			0.54			0.32			0.34	
v/s Ratio Perm	c0.69			0.54			c0.51			0.27		
v/c Ratio	1.65	0.98		1.27	1.28		1.27	0.80		0.67	0.85	
Uniform Delay, d1	13.0	12.8		13.0	13.0		13.5	11.9		11.1	12.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	320.0	21.3		165.4	135.5		165.4	4.1		22.8	5.8	
Delay (s)	333.0	34.2		178.4	148.5		178.9	16.0		33.9	18.1	
Level of Service	F	C		F	F		F	B		C	B	
Approach Delay (s)		81.5			153.7			34.6			19.0	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM Average Control Delay	64.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	122.4%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95	1.00		0.95		0.95	0.95	1.00		1.00	
Frt	1.00	1.00	0.85		1.00		1.00	1.00	0.85		0.94	
Flt Protected	0.95	1.00	1.00		1.00		0.95	0.95	1.00		0.98	
Satd. Flow (prot)	1509	3018	1350		3008		1433	1439	1350		1475	
Flt Permitted	0.09	1.00	1.00		1.00		0.95	0.95	1.00		0.98	
Satd. Flow (perm)	140	3018	1350		3008		1433	1439	1350		1475	
Volume (vph)	20	970	240	0	1380	30	630	10	20	60	50	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1021	253	0	1453	32	663	11	21	63	53	84
RTOR Reduction (vph)	0	0	55	0	1	0	0	0	17	0	22	0
Lane Group Flow (vph)	21	1021	198	0	1484	0	332	342	4	0	178	0
Turn Type	pm+pt		Perm				Split		Perm	Split		
Protected Phases	1	6			2		4	4		3	3	
Permitted Phases	6		6						4			
Actuated Green, G (s)	76.0	76.0	76.0		71.1		21.0	21.0	21.0		11.0	
Effective Green, g (s)	76.0	76.0	76.0		71.1		21.0	21.0	21.0		11.0	
Actuated g/C Ratio	0.63	0.63	0.63		0.59		0.18	0.18	0.18		0.09	
Clearance Time (s)	3.0	4.0	4.0		4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	1.0	6.0	6.0		6.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	99	1911	855		1782		251	252	236		135	
v/s Ratio Prot	0.00	c0.34			c0.49		0.23	c0.24			c0.12	
v/s Ratio Perm	0.13		0.15						0.00			
v/c Ratio	0.21	0.53	0.23		0.83		1.32	1.36	0.02		1.32	
Uniform Delay, d1	14.5	12.2	9.5		19.7		49.5	49.5	40.9		54.5	
Progression Factor	0.75	0.93	0.94		1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.6	0.3		4.7		170.3	184.4	0.0		186.5	
Delay (s)	11.2	11.9	9.3		24.4		219.8	233.9	41.0		241.0	
Level of Service	B	B	A		C		F	F	D		F	
Approach Delay (s)		11.4			24.4			221.3			241.0	
Approach LOS		B			C			F			F	

Intersection Summary			
HCM Average Control Delay	68.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	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		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1509	1588	1350	1509	1509		1509	2994		1509	3018	1350
Flt Permitted	0.28	1.00	1.00	0.55	1.00		0.17	1.00		0.10	1.00	1.00
Satd. Flow (perm)	452	1588	1350	869	1509		267	2994		152	3018	1350
Volume (vph)	520	340	150	40	160	80	110	1260	70	60	890	250
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	547	358	158	42	168	84	116	1326	74	63	937	263
RTOR Reduction (vph)	0	0	77	0	20	0	0	3	0	0	0	69
Lane Group Flow (vph)	547	358	81	42	232	0	116	1397	0	63	937	194
Turn Type	pm+pt		Perm	pm+pt			pm+pt			pm+pt		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2			4			8		8
Actuated Green, G (s)	40.5	34.0	34.0	24.0	20.5		49.0	42.8		46.5	41.8	41.8
Effective Green, g (s)	41.0	34.5	34.5	23.0	20.5		48.5	43.3		45.5	41.8	41.8
Actuated g/C Ratio	0.41	0.34	0.34	0.23	0.20		0.48	0.43		0.46	0.42	0.42
Clearance Time (s)	3.0	4.5	4.5	3.0	4.0		3.0	4.5		3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	1.0	2.5		1.0	5.0		1.0	5.0	5.0
Lane Grp Cap (vph)	360	548	466	216	309		194	1296		119	1262	564
v/s Ratio Prot	c0.25	0.23		0.00	0.15		c0.03	c0.47		0.02	0.31	
v/s Ratio Perm	c0.37		0.06	0.04			0.26			0.22		0.14
v/c Ratio	1.52	0.65	0.17	0.19	0.75		0.60	1.08		0.53	0.74	0.34
Uniform Delay, d1	25.6	27.7	22.8	30.5	37.4		16.9	28.4		21.7	24.6	19.8
Progression Factor	1.18	1.18	1.53	0.89	0.88		0.99	0.47		0.94	0.91	0.92
Incremental Delay, d2	239.9	1.2	0.1	0.1	8.4		1.0	39.8		1.6	3.3	1.4
Delay (s)	269.9	33.8	35.0	27.2	41.4		17.7	53.2		22.0	25.6	19.7
Level of Service	F	C	C	C	D		B	D		C	C	B
Approach Delay (s)		155.5			39.4			50.5			24.1	
Approach LOS		F			D			D			C	

Intersection Summary			
HCM Average Control Delay	68.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	110.1%	ICU Level of Service	H
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		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	40	40	0	20	50	30	550	120	190	470	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	42	42	0	21	53	32	579	126	200	495	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											460	
pX, platoon unblocked												
vC, conflicting volume	1605	1668	500	1663	1611	642	505			705		
vC1, stage 1 conf vol							0			0		
vC2, stage 2 conf vol							0			0		
vCu, unblocked vol	1605	1668	500	1663	1611	642	505			705		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)							3.1			3.1		
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	41	93	100	73	89	97			77		
cM capacity (veh/h)	48	71	571	31	77	474	912			855		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	95	74	32	705	200	505
Volume Left	11	0	32	0	200	0
Volume Right	42	53	0	126	0	11
cSH	107	192	912	1700	855	1700
Volume to Capacity	0.88	0.38	0.03	0.41	0.23	0.30
Queue Length 95th (ft)	131	42	3	0	23	0
Control Delay (s)	131.1	34.9	9.1	0.0	10.5	0.0
Lane LOS	F	D	A		B	
Approach Delay (s)	131.1	34.9	0.4		3.0	
Approach LOS	F	D				

Intersection Summary			
Average Delay	10.8		
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.98			0.97		1.00	0.97		1.00	0.99	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1537			1519		1509	2925		1509	2993	
Flt Permitted		0.90			0.74		0.53	1.00		0.21	1.00	
Satd. Flow (perm)		1394			1138		837	2925		329	2993	
Volume (vph)	130	420	110	60	70	30	130	700	180	20	340	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	442	116	63	74	32	137	737	189	21	358	21
RTOR Reduction (vph)	0	12	0	0	14	0	0	51	0	0	9	0
Lane Group Flow (vph)	0	683	0	0	155	0	137	875	0	21	370	0
Turn Type	D.Pm			D.Pm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		23.1			23.1		20.3	20.3		20.3	20.3	
Effective Green, g (s)		23.7			23.7		19.3	19.3		19.3	19.3	
Actuated g/C Ratio		0.46			0.46		0.38	0.38		0.38	0.38	
Clearance Time (s)		4.6			4.6		3.0	3.0		3.0	3.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		648			529		317	1107		125	1133	
v/s Ratio Prot								c0.30			0.12	
v/s Ratio Perm		c0.49			0.14		0.16			0.06		
v/c Ratio		1.05			0.29		0.43	0.79		0.17	0.33	
Uniform Delay, d1		13.7			8.5		11.8	14.1		10.5	11.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		50.3			1.4		0.9	3.9		0.6	0.2	
Delay (s)		63.9			9.9		12.7	18.0		11.2	11.4	
Level of Service		E			A		B	B		B	B	
Approach Delay (s)		63.9			9.9			17.3			11.4	
Approach LOS		E			A			B			B	

Intersection Summary			
HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	51.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)				4.0	4.0			4.0			4.0	4.0
Lane Util. Factor				1.00	0.95			0.95			0.95	1.00
Frt				1.00	0.99			1.00			1.00	0.85
Flt Protected				0.95	1.00			1.00			1.00	1.00
Satd. Flow (prot)				1509	2997			3007			3018	1350
Flt Permitted				0.95	1.00			0.90			1.00	1.00
Satd. Flow (perm)				1509	2997			2723			3018	1350
Volume (vph)	0	0	0	100	1040	50	30	410	0	0	390	100
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	105	1095	53	32	432	0	0	411	105
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	105	1146	0	0	464	0	0	411	105
Turn Type				custom			custom					Free
Protected Phases				2	2		3	3			1	
Permitted Phases				4	4		6	6				Free
Actuated Green, G (s)				68.4	68.4			43.0			31.0	160.0
Effective Green, g (s)				67.0	67.0			42.0			31.0	160.0
Actuated g/C Ratio				0.42	0.42			0.26			0.19	1.00
Clearance Time (s)				3.0	3.0			3.0			4.0	
Vehicle Extension (s)				1.0	1.0			1.0			4.0	
Lane Grp Cap (vph)				670	1330			734			585	1350
v/s Ratio Prot				0.01	c0.06			c0.04			c0.14	
v/s Ratio Perm				0.06	0.32			c0.12				0.08
v/c Ratio				0.16	0.86			0.63			0.70	0.08
Uniform Delay, d1				29.0	42.3			52.2			60.2	0.0
Progression Factor				1.00	1.00			0.13			1.00	1.00
Incremental Delay, d2				0.5	7.5			0.5			6.9	0.1
Delay (s)				29.5	49.8			7.3			67.1	0.1
Level of Service				C	D			A			E	A
Approach Delay (s)		0.0			48.1			7.3			53.5	
Approach LOS		A			D			A			D	

Intersection Summary			
HCM Average Control Delay	40.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.5%	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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)	1509	3002		1509	3003			1555	1350		1551	1350
Flt Permitted	0.10	1.00		0.09	1.00			0.60	1.00		0.55	1.00
Satd. Flow (perm)	163	3002		144	3003			957	1350		874	1350
Volume (vph)	90	1420	50	240	1180	40	100	130	320	100	110	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	1495	53	253	1242	42	105	137	337	105	116	21
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	72	0	0	16
Lane Group Flow (vph)	95	1546	0	253	1282	0	0	242	265	0	221	5
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	65.9	58.5		55.4	51.5			25.6	25.6		25.6	25.6
Effective Green, g (s)	65.9	58.5		54.9	51.5			26.1	26.1		26.1	26.1
Actuated g/C Ratio	0.66	0.58		0.55	0.52			0.26	0.26		0.26	0.26
Clearance Time (s)	3.5	4.0		3.5	4.0			4.5	4.5		4.5	4.5
Vehicle Extension (s)	1.0	5.0		1.0	5.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	247	1756		125	1547			250	352		228	352
v/s Ratio Prot	0.04	c0.51		c0.07	0.43							
v/s Ratio Perm	0.21			c1.04				c0.25	0.20		0.25	0.00
v/c Ratio	0.38	0.88		2.02	0.83			0.97	0.75		0.97	0.02
Uniform Delay, d1	12.1	17.8		19.8	20.5			36.5	34.0		36.6	27.4
Progression Factor	1.91	0.76		2.07	0.43			1.00	1.00		1.00	1.00
Incremental Delay, d2	3.5	5.3		463.3	0.5			47.5	8.8		50.3	0.0
Delay (s)	26.6	18.9		504.4	9.4			84.0	42.7		86.8	27.4
Level of Service	C	B		F	A			F	D		F	C
Approach Delay (s)		19.3			90.9			60.0			81.7	
Approach LOS		B			F			E			F	

Intersection Summary			
HCM Average Control Delay	56.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	104.6%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2994		1509	2994		1509	3018	1350	1509	2968	
Flt Permitted	0.07	1.00		0.07	1.00		0.17	1.00	1.00	0.17	1.00	
Satd. Flow (perm)	107	2994		108	2994		276	3018	1350	276	2968	
Volume (vph)	180	1780	100	190	1620	90	180	630	230	120	570	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	1874	105	200	1705	95	189	663	242	126	600	74
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	88	0	9	0
Lane Group Flow (vph)	189	1975	0	200	1796	0	189	663	154	126	665	0
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	65.5	59.5		65.0	59.0		23.0	23.0	23.0	23.0	23.0	
Effective Green, g (s)	65.5	59.5		64.5	59.0		23.0	23.0	23.0	23.0	23.0	
Actuated g/C Ratio	0.66	0.60		0.64	0.59		0.23	0.23	0.23	0.23	0.23	
Clearance Time (s)	4.0	4.0		3.5	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	1.0	5.0		1.0	5.0		4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	154	1781		147	1766		63	694	311	63	683	
v/s Ratio Prot	0.07	0.66		c0.07	0.60			0.22			0.22	
v/s Ratio Perm	0.73			c0.81			c0.68		0.11	0.46		
v/c Ratio	1.23	1.11		1.36	1.02		3.00	0.96	0.50	2.00	0.97	
Uniform Delay, d1	27.9	20.2		29.0	20.5		38.5	38.0	33.5	38.5	38.2	
Progression Factor	1.04	0.83		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	132.0	54.6		199.8	25.7		941.0	24.8	5.6	501.3	28.5	
Delay (s)	161.1	71.5		228.8	46.2		979.5	62.8	39.0	539.8	66.7	
Level of Service	F	E		F	D		F	E	D	F	E	
Approach Delay (s)		79.3			64.5			215.9			141.2	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM Average Control Delay	107.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	119.9%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	0.99			0.94				0.86
Flt Protected	0.95	1.00		0.95	1.00			0.97				1.00
Satd. Flow (prot)	1509	3008		1509	2998			1450				1374
Flt Permitted	0.95	1.00		0.95	1.00			0.97				1.00
Satd. Flow (perm)	1509	3008		1509	2998			1450				1374
Volume (vph)	40	1790	40	90	1350	60	70	0	60	0	0	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	1884	42	95	1421	63	74	0	63	0	0	53
RTOR Reduction (vph)	0	1	0	0	2	0	0	31	0	0	0	0
Lane Group Flow (vph)	42	1925	0	95	1482	0	0	106	0	0	0	53
Turn Type	Prot			Prot			Perm					Over
Protected Phases	8	2		1 8	6			4				8
Permitted Phases							4					
Actuated Green, G (s)	7.8	62.1		15.8	70.1			10.1				7.8
Effective Green, g (s)	7.8	62.1		15.8	70.1			10.1				7.8
Actuated g/C Ratio	0.08	0.62		0.16	0.70			0.10				0.08
Clearance Time (s)	4.0	4.0			4.0			4.0				4.0
Vehicle Extension (s)	1.0	5.0			5.0			3.0				1.0
Lane Grp Cap (vph)	118	1868		238	2102			146				107
v/s Ratio Prot	0.03	c0.64		c0.06	c0.49							0.04
v/s Ratio Perm								0.07				
v/c Ratio	0.36	1.03		0.40	0.70			0.73				0.50
Uniform Delay, d1	43.7	18.9		37.8	8.8			43.6				44.2
Progression Factor	1.00	1.00		1.00	1.00			1.00				1.00
Incremental Delay, d2	0.7	29.1		0.4	2.0			16.6				1.3
Delay (s)	44.4	48.0		38.2	10.9			60.2				45.5
Level of Service	D	D		D	B			E				D
Approach Delay (s)		47.9			12.5			60.2			45.5	
Approach LOS		D			B			E			D	

Intersection Summary			
HCM Average Control Delay	33.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95		0.97	0.95			0.95	1.00
Frt	1.00	0.99		1.00	0.99		1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	2927	2974		2927	3002		2927	2934			3018	1350
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (perm)	2927	2974		2927	3002		2927	2934			3018	1350
Volume (vph)	480	1210	130	220	850	30	240	930	210	0	760	310
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	505	1274	137	232	895	32	253	979	221	0	800	326
RTOR Reduction (vph)	0	8	0	0	3	0	0	20	0	0	0	228
Lane Group Flow (vph)	505	1403	0	232	924	0	253	1180	0	0	800	98
Turn Type	Prot			Prot			Prot					Perm
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases												4
Actuated Green, G (s)	19.0	44.5		4.0	29.5		4.0	38.0			29.0	29.0
Effective Green, g (s)	19.0	45.0		4.0	30.0		5.0	39.0			30.0	30.0
Actuated g/C Ratio	0.19	0.45		0.04	0.30		0.05	0.39			0.30	0.30
Clearance Time (s)	4.0	4.5		4.0	4.5		5.0	5.0			5.0	5.0
Vehicle Extension (s)	1.0	5.0		1.0	5.0		2.0	4.0			4.0	4.0
Lane Grp Cap (vph)	556	1338		117	901		146	1144			905	405
v/s Ratio Prot	0.17	c0.47		c0.08	0.31		c0.09	c0.40			0.27	
v/s Ratio Perm												0.07
v/c Ratio	0.91	1.05		1.98	1.03		1.73	1.03			0.88	0.24
Uniform Delay, d1	39.6	27.5		48.0	35.0		47.5	30.5			33.3	26.4
Progression Factor	1.00	1.00		0.73	1.62		1.00	1.00			1.45	6.11
Incremental Delay, d2	18.2	38.3		464.8	32.9		356.7	35.1			8.3	0.3
Delay (s)	57.9	65.8		500.1	89.6		404.2	65.6			56.5	161.6
Level of Service	E	E		F	F		F	E			E	F
Approach Delay (s)		63.7			171.7			124.6			87.0	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM Average Control Delay	106.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.5%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95	1.00		1.00		0.95	0.95	
Frt		1.00			1.00	0.85		0.95		1.00	0.99	
Flt Protected		1.00			1.00	1.00		0.99		0.95	0.97	
Satd. Flow (prot)		3008			3018	1350		1488		1433	1447	
Flt Permitted		1.00			1.00	1.00		0.30		0.69	0.72	
Satd. Flow (perm)		3008			3018	1350		451		1040	1079	
Volume (vph)	0	1470	30	0	1060	230	20	40	40	370	60	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1547	32	0	1116	242	21	42	42	389	63	11
RTOR Reduction (vph)	0	1	0	0	0	55	0	24	0	0	2	0
Lane Group Flow (vph)	0	1578	0	0	1116	187	0	81	0	195	266	0
Turn Type						Perm	Perm			Perm		
Protected Phases		2			6			3			4	
Permitted Phases						6	3			4		
Actuated Green, G (s)		58.9			58.9	58.9		8.0		21.1	21.1	
Effective Green, g (s)		58.9			58.9	58.9		8.0		21.1	21.1	
Actuated g/C Ratio		0.59			0.59	0.59		0.08		0.21	0.21	
Clearance Time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Vehicle Extension (s)		4.5			4.5	4.5		3.0		4.0	4.0	
Lane Grp Cap (vph)		1772			1778	795		36		219	228	
v/s Ratio Prot		c0.52			0.37							
v/s Ratio Perm						0.14		c0.18		0.19	c0.25	
v/c Ratio		0.89			0.63	0.24		2.25		0.89	1.17	
Uniform Delay, d1		17.8			13.4	9.8		46.0		38.3	39.5	
Progression Factor		0.99			1.00	1.00		1.00		1.34	1.35	
Incremental Delay, d2		1.9			1.7	0.7		642.4		27.0	105.1	
Delay (s)		19.5			15.1	10.5		688.4		78.4	158.3	
Level of Service		B			B	B		F		E	F	
Approach Delay (s)		19.5			14.3			688.4			124.6	
Approach LOS		B			B			F			F	

Intersection Summary			
HCM Average Control Delay	51.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.97			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1509	3007		1509	3005			1521			1511	
Flt Permitted	0.22	1.00		0.09	1.00			0.81			0.84	
Satd. Flow (perm)	342	3007		144	3005			1251			1290	
Volume (vph)	100	1600	40	60	1050	30	70	120	50	30	70	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1684	42	63	1105	32	74	126	53	32	74	42
RTOR Reduction (vph)	0	2	0	0	2	0	0	10	0	0	14	0
Lane Group Flow (vph)	105	1724	0	63	1135	0	0	243	0	0	134	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	72.0	72.0		72.0	72.0			20.0			20.0	
Effective Green, g (s)	72.0	72.0		72.0	72.0			20.0			20.0	
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.20			0.20	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			3.0			3.0	
Lane Grp Cap (vph)	246	2165		104	2164			250			258	
v/s Ratio Prot		c0.57			0.38							
v/s Ratio Perm	0.31			0.44				c0.19			0.10	
v/c Ratio	0.43	0.80		0.61	0.52			0.97			0.52	
Uniform Delay, d1	5.7	9.2		7.0	6.3			39.7			35.7	
Progression Factor	2.09	2.13		0.68	0.59			1.00			1.00	
Incremental Delay, d2	3.7	2.2		21.3	0.8			50.5			7.3	
Delay (s)	15.5	21.7		26.0	4.5			90.3			42.9	
Level of Service	B	C		C	A			F			D	
Approach Delay (s)		21.4			5.7			90.3			42.9	
Approach LOS		C			A			F			D	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.2%	ICU Level of Service	G
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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		0.95		1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1509	2989		1509	3018	1350		2955		1509	3018	1350
Flt Permitted	0.14	1.00		0.09	1.00	1.00		1.00		0.13	1.00	1.00
Satd. Flow (perm)	227	2989		148	3018	1350		2955		205	3018	1350
Volume (vph)	280	1340	90	130	950	150	0	1180	190	180	760	100
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	1411	95	137	1000	158	0	1242	200	189	800	105
RTOR Reduction (vph)	0	5	0	0	0	32	0	13	0	0	0	72
Lane Group Flow (vph)	295	1501	0	137	1000	126	0	1429	0	189	800	33
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	61.0	52.0		49.0	43.0	43.0		31.0		31.0	31.0	31.0
Effective Green, g (s)	61.0	52.0		48.0	43.0	43.0		31.0		31.0	31.0	31.0
Actuated g/C Ratio	0.61	0.52		0.48	0.43	0.43		0.31		0.31	0.31	0.31
Clearance Time (s)	3.0	4.0		3.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	1.0	3.0		1.0	3.0	3.0		3.5		3.5	3.5	3.5
Lane Grp Cap (vph)	318	1554		139	1298	581		916		64	936	419
v/s Ratio Prot	c0.13	c0.50		0.05	0.33			0.48			0.27	
v/s Ratio Perm	0.44			0.42		0.09				c0.92		0.02
v/c Ratio	0.93	0.97		0.99	0.77	0.22		1.56		2.95	0.85	0.08
Uniform Delay, d1	21.6	23.1		20.7	24.3	17.9		34.5		34.5	32.4	24.4
Progression Factor	1.00	1.00		1.22	0.84	0.68		1.00		1.00	1.00	1.00
Incremental Delay, d2	31.6	16.1		63.8	3.6	0.7		257.3		919.6	9.8	0.4
Delay (s)	53.2	39.2		89.1	24.1	12.9		291.8		954.1	42.2	24.8
Level of Service	D	D		F	C	B		F		F	D	C
Approach Delay (s)		41.5			29.6			291.8			198.1	
Approach LOS		D			C			F			F	

Intersection Summary			
HCM Average Control Delay	133.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	138.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620
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		0.97	
Satd. Flow (prot)	1509	3018	2995		1448	
Flt Permitted	0.19	1.00	1.00		0.97	
Satd. Flow (perm)	297	3018	2995		1448	
Volume (vph)	190	1550	1120	60	120	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	200	1632	1179	63	126	116
RTOR Reduction (vph)	0	0	4	0	34	0
Lane Group Flow (vph)	200	1632	1238	0	208	0
Turn Type	Perm					
Protected Phases		2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	72.3	72.3	72.3		20.2	
Effective Green, g (s)	71.8	71.8	71.8		20.2	
Actuated g/C Ratio	0.72	0.72	0.72		0.20	
Clearance Time (s)	3.5	3.5	3.5		4.0	
Vehicle Extension (s)	5.0	5.0	5.0		3.0	
Lane Grp Cap (vph)	213	2167	2150		292	
v/s Ratio Prot		0.54	0.41		c0.14	
v/s Ratio Perm	c0.67					
v/c Ratio	0.94	0.75	0.58		0.71	
Uniform Delay, d1	12.2	8.7	6.8		37.2	
Progression Factor	0.92	0.87	1.00		1.00	
Incremental Delay, d2	8.8	0.2	1.1		8.0	
Delay (s)	20.0	7.7	7.9		45.2	
Level of Service	C	A	A		D	
Approach Delay (s)		9.1	7.9		45.2	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	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	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2988		1509	2971		1509	3018	1350	1509	2971	
Flt Permitted	0.10	1.00		0.09	1.00		0.15	1.00	1.00	0.17	1.00	
Satd. Flow (perm)	163	2988		149	2971		244	3018	1350	265	2971	
Volume (vph)	240	1310	90	240	950	110	160	1220	230	80	790	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	253	1379	95	253	1000	116	168	1284	242	84	832	95
RTOR Reduction (vph)	0	5	0	0	9	0	0	0	67	0	8	0
Lane Group Flow (vph)	253	1469	0	253	1107	0	168	1284	175	84	919	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	58.5	51.0		47.0	42.5		32.5	26.0	26.0	28.0	24.0	
Effective Green, g (s)	58.5	51.0		46.0	42.5		31.5	26.0	26.0	27.5	24.0	
Actuated g/C Ratio	0.58	0.51		0.46	0.42		0.32	0.26	0.26	0.28	0.24	
Clearance Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.5	4.0	
Vehicle Extension (s)	1.0	0.2		1.0	0.2		1.0	5.0	5.0	1.0	5.0	
Lane Grp Cap (vph)	257	1524		116	1263		146	785	351	116	713	
v/s Ratio Prot	c0.12	0.49		c0.08	0.37		c0.06	c0.43		0.03	0.31	
v/s Ratio Perm	0.46			c0.92			0.30		0.13	0.17		
v/c Ratio	0.98	0.96		2.18	0.88		1.15	1.64	0.50	0.72	1.29	
Uniform Delay, d1	26.9	23.6		25.0	26.4		49.4	37.0	31.4	49.3	38.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.02	1.08	
Incremental Delay, d2	51.3	15.9		558.7	8.8		120.7	291.8	5.0	16.4	139.8	
Delay (s)	78.2	39.6		583.7	35.1		170.1	328.8	36.4	66.9	180.7	
Level of Service	E	D		F	D		F	F	D	E	F	
Approach Delay (s)		45.2			136.5			271.3			171.2	
Approach LOS		D			F			F			F	

Intersection Summary			
HCM Average Control Delay	154.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.5%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	3004		1509	2953		1509	1553		1509	1512	
Flt Permitted	0.12	1.00		0.07	1.00		0.35	1.00		0.24	1.00	
Satd. Flow (perm)	186	3004		114	2953		549	1553		389	1512	
Volume (vph)	170	1600	50	70	1210	200	110	290	50	100	190	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1684	53	74	1274	211	116	305	53	105	200	95
RTOR Reduction (vph)	0	2	0	0	12	0	0	7	0	0	18	0
Lane Group Flow (vph)	179	1735	0	74	1473	0	116	351	0	105	277	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	66.0	66.0		66.0	66.0		26.0	26.0		26.0	26.0	
Effective Green, g (s)	66.0	66.0		66.0	66.0		26.0	26.0		26.0	26.0	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.26	0.26		0.26	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	123	1983		75	1949		143	404		101	393	
v/s Ratio Prot		0.58			0.50			0.23			0.18	
v/s Ratio Perm	c0.96			0.65			0.21			c0.27		
v/c Ratio	1.46	0.87		0.99	0.76		0.81	0.87		1.04	0.71	
Uniform Delay, d1	17.0	13.7		16.6	11.5		34.7	35.4		37.0	33.5	
Progression Factor	1.03	1.05		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	242.2	5.5		100.3	2.8		28.2	17.7		100.7	5.7	
Delay (s)	259.7	19.9		116.8	14.3		62.9	53.1		137.7	39.2	
Level of Service	F	B		F	B		E	D		F	D	
Approach Delay (s)		42.3			19.2			55.5			65.1	
Approach LOS		D			B			E			E	

Intersection Summary			
HCM Average Control Delay	37.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	111.7%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	1.00		1.00	1.00			0.95			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1509	3009		1509	3014			1466			1507	
Flt Permitted	0.14	1.00		0.11	1.00			0.80			0.82	
Satd. Flow (perm)	226	3009		180	3014			1195			1267	
Volume (vph)	20	1510	30	40	1380	10	100	20	80	30	30	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1589	32	42	1453	11	105	21	84	32	32	21
RTOR Reduction (vph)	0	1	0	0	1	0	0	25	0	0	12	0
Lane Group Flow (vph)	21	1620	0	42	1463	0	0	185	0	0	73	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	74.0	74.0		74.0	74.0			18.0			18.0	
Effective Green, g (s)	74.0	74.0		74.0	74.0			18.0			18.0	
Actuated g/C Ratio	0.74	0.74		0.74	0.74			0.18			0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0			3.0			3.0	
Lane Grp Cap (vph)	167	2227		133	2230			215			228	
v/s Ratio Prot		c0.54			0.49							
v/s Ratio Perm	0.09			0.23				c0.16			0.06	
v/c Ratio	0.13	0.73		0.32	0.66			0.86			0.32	
Uniform Delay, d1	3.7	7.3		4.4	6.6			39.8			35.7	
Progression Factor	1.00	1.00		2.10	2.49			1.00			1.00	
Incremental Delay, d2	1.5	2.1		4.5	1.1			28.0			0.8	
Delay (s)	5.3	9.4		13.8	17.5			67.8			36.5	
Level of Service	A	A		B	B			E			D	
Approach Delay (s)		9.4			17.4			67.8			36.5	
Approach LOS		A			B			E			D	

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	76.5%	ICU Level of Service	D
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	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		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		1.00	
Satd. Flow (prot)	1509	2995		1509	3007			1533	1350		1500	
Flt Permitted	0.17	1.00		0.07	1.00			0.65	1.00		0.97	
Satd. Flow (perm)	272	2995		107	3007			1035	1350		1462	
Volume (vph)	60	1730	90	90	1220	30	180	70	120	10	70	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	1821	95	95	1284	32	189	74	126	11	74	53
RTOR Reduction (vph)	0	4	0	0	1	0	0	0	55	0	24	0
Lane Group Flow (vph)	63	1912	0	95	1315	0	0	263	71	0	114	0
Turn Type	Perm			pm+pt			Perm		Perm	Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	55.4	55.4		64.0	64.0			28.0	28.0		28.0	
Effective Green, g (s)	55.4	55.4		64.0	64.0			28.0	28.0		28.0	
Actuated g/C Ratio	0.55	0.55		0.64	0.64			0.28	0.28		0.28	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	0.2	0.2		1.0	0.2			4.0	4.0		3.0	
Lane Grp Cap (vph)	151	1659		133	1924			290	378		409	
v/s Ratio Prot		c0.64		0.03	c0.44							
v/s Ratio Perm	0.23			0.42				c0.25	0.05		0.08	
v/c Ratio	0.42	1.15		0.71	0.68			0.91	0.19		0.28	
Uniform Delay, d1	12.9	22.3		23.7	11.5			34.7	27.4		28.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	8.3	76.1		14.0	2.0			30.2	0.3		0.4	
Delay (s)	21.2	98.4		37.7	13.5			65.0	27.7		28.5	
Level of Service	C	F		D	B			E	C		C	
Approach Delay (s)		96.0			15.1			52.9			28.5	
Approach LOS		F			B			D			C	

Intersection Summary			
HCM Average Control Delay	60.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	0.99		1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2978		1509	2975		1509	4262		1509	4230	
Flt Permitted	0.14	1.00		0.09	1.00		0.14	1.00		0.14	1.00	
Satd. Flow (perm)	216	2978		138	2975		227	4262		227	4230	
Volume (vph)	310	1350	130	210	950	100	130	1020	130	110	1080	210
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	326	1421	137	221	1000	105	137	1074	137	116	1137	221
RTOR Reduction (vph)	0	7	0	0	8	0	0	16	0	0	29	0
Lane Group Flow (vph)	326	1551	0	221	1097	0	137	1195	0	116	1329	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	52.0	46.0		52.0	46.0		34.0	28.0		34.0	28.0	
Effective Green, g (s)	51.0	46.0		51.0	46.0		33.0	28.0		33.0	28.0	
Actuated g/C Ratio	0.51	0.46		0.51	0.46		0.33	0.28		0.33	0.28	
Clearance Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)	1.0	0.2		1.0	0.2		1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	175	1370		139	1369		139	1193		139	1184	
v/s Ratio Prot	c0.09	0.52		0.08	0.37		c0.05	0.28		0.04	c0.31	
v/s Ratio Perm	c0.86			0.73			0.28			0.23		
v/c Ratio	1.86	1.13		1.59	0.80		0.99	1.00		0.83	1.12	
Uniform Delay, d1	22.2	27.0		22.9	23.1		32.2	36.0		28.2	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.09	0.77		1.00	1.00	
Incremental Delay, d2	409.3	69.1		296.7	5.0		65.8	24.6		31.8	66.7	
Delay (s)	431.6	96.1		319.6	28.1		100.8	52.3		60.0	102.7	
Level of Service	F	F		F	C		F	D		E	F	
Approach Delay (s)		154.2			76.7			57.3			99.3	
Approach LOS		F			E			E			F	

Intersection Summary			
HCM Average Control Delay	102.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	114.0%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)		4.0		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	1.00	1.00	1.00	1.00	
Frt		0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1552		1509	1588	1350	1509	1588	1350	1509	1557	
Flt Permitted		0.99		0.40	1.00	1.00	0.56	1.00	1.00	0.33	1.00	
Satd. Flow (perm)		1531		633	1588	1350	884	1588	1350	525	1557	
Volume (vph)	20	460	90	260	290	100	80	380	320	90	200	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	484	95	274	305	105	84	400	337	95	211	32
RTOR Reduction (vph)	0	13	0	0	0	50	0	0	193	0	10	0
Lane Group Flow (vph)	0	587	0	274	305	55	84	400	144	95	233	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2		2	4		4	8		
Actuated Green, G (s)		25.4		25.4	25.4	25.4	14.8	14.8	14.8	14.8	14.8	
Effective Green, g (s)		25.9		25.9	25.9	25.9	15.3	15.3	15.3	15.3	15.3	
Actuated g/C Ratio		0.53		0.53	0.53	0.53	0.31	0.31	0.31	0.31	0.31	
Clearance Time (s)		4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)		4.0		4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		806		333	836	711	275	494	420	163	484	
v/s Ratio Prot					0.19			c0.25			0.15	
v/s Ratio Perm		0.38		c0.43		0.04	0.10		0.11	0.18		
v/c Ratio		0.73		0.82	0.36	0.08	0.31	0.81	0.34	0.58	0.48	
Uniform Delay, d1		8.9		9.7	6.8	5.8	12.9	15.6	13.1	14.3	13.7	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		3.5		15.7	0.4	0.1	0.6	9.5	0.5	5.2	0.8	
Delay (s)		12.5		25.4	7.2	5.8	13.5	25.1	13.6	19.5	14.5	
Level of Service		B		C	A	A	B	C	B	B	B	
Approach Delay (s)		12.5			14.3			19.2			15.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1509	2963		1509	1588	1350	1509	2955		1509	3018	1350
Flt Permitted	0.22	1.00		0.21	1.00	1.00	0.29	1.00		0.14	1.00	1.00
Satd. Flow (perm)	355	2963		339	1588	1350	464	2955		222	3018	1350
Volume (vph)	80	720	100	140	530	160	100	940	150	130	720	120
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	758	105	147	558	168	105	989	158	137	758	126
RTOR Reduction (vph)	0	15	0	0	0	41	0	17	0	0	0	43
Lane Group Flow (vph)	84	848	0	147	558	127	105	1130	0	137	758	83
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		4
Actuated Green, G (s)	31.0	31.0		31.0	31.0	31.0	36.0	36.0		36.0	36.0	36.0
Effective Green, g (s)	31.0	31.0		31.0	31.0	31.0	36.0	36.0		36.0	36.0	36.0
Actuated g/C Ratio	0.41	0.41		0.41	0.41	0.41	0.48	0.48		0.48	0.48	0.48
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lane Grp Cap (vph)	147	1225		140	656	558	223	1418		107	1449	648
v/s Ratio Prot		0.29			0.35			0.38			0.25	
v/s Ratio Perm	0.24			c0.43		0.09	0.23			c0.62		0.06
v/c Ratio	0.57	0.69		1.05	0.85	0.23	0.47	0.80		1.28	0.52	0.13
Uniform Delay, d1	16.9	18.1		22.0	19.9	14.2	13.1	16.4		19.5	13.5	10.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	15.1	3.2		90.0	13.1	0.9	7.0	4.7		180.0	1.4	0.4
Delay (s)	32.0	21.3		112.0	33.0	15.2	20.1	21.2		199.5	14.9	11.2
Level of Service	C	C		F	C	B	C	C		F	B	B
Approach Delay (s)		22.3			42.9			21.1			39.2	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	30.5	HCM Level of Service	C
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	98.9%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	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			1.00	
Frt	1.00	1.00		1.00	1.00			0.95			0.91	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1509	1583		1509	1581			1503			1430	
Flt Permitted	0.36	1.00		0.25	1.00			0.97			0.93	
Satd. Flow (perm)	575	1583		393	1581			1465			1350	
Volume (vph)	150	840	20	20	620	20	10	60	40	20	10	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	884	21	21	653	21	11	63	42	21	11	63
RTOR Reduction (vph)	0	0	0	0	1	0	0	32	0	0	55	0
Lane Group Flow (vph)	158	905	0	21	673	0	0	84	0	0	40	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	49.7	49.7		49.7	49.7			8.6			8.6	
Effective Green, g (s)	49.2	49.2		49.2	49.2			8.1			8.1	
Actuated g/C Ratio	0.75	0.75		0.75	0.75			0.12			0.12	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.5			3.5	
Vehicle Extension (s)	0.2	0.2		0.2	0.2			4.0			4.0	
Lane Grp Cap (vph)	433	1193		296	1191			182			167	
v/s Ratio Prot		c0.57			0.43							
v/s Ratio Perm	0.27			0.05				c0.06			0.03	
v/c Ratio	0.36	0.76		0.07	0.57			0.46			0.24	
Uniform Delay, d1	2.7	4.6		2.1	3.5			26.6			25.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	2.5		0.0	0.4			2.5			1.0	
Delay (s)	2.9	7.1		2.1	3.8			29.1			26.8	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		6.5			3.8			29.1			26.8	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	65.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0		4.0	4.0	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	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	2993		1509	3018	1350	1509	3018	1350	1509	2971	
Flt Permitted	0.46	1.00		0.95	1.00	1.00	0.14	1.00	1.00	0.14	1.00	
Satd. Flow (perm)	733	2993		1509	3018	1350	220	3018	1350	220	2971	
Volume (vph)	130	880	50	200	490	90	110	1060	150	70	950	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	926	53	211	516	95	116	1116	158	74	1000	116
RTOR Reduction (vph)	0	4	0	0	0	24	0	0	84	0	10	0
Lane Group Flow (vph)	137	975	0	211	516	71	116	1116	74	74	1106	0
Turn Type	Perm			Prot		Perm	Perm		Perm	Perm		
Protected Phases		8		7	4			6			2	
Permitted Phases	8					4	6		6	2		
Actuated Green, G (s)	25.0	25.0		11.0	39.0	39.0	41.0	41.0	41.0	41.0	41.0	
Effective Green, g (s)	26.0	26.0		10.0	40.0	40.0	42.0	42.0	42.0	42.0	42.0	
Actuated g/C Ratio	0.29	0.29		0.11	0.44	0.44	0.47	0.47	0.47	0.47	0.47	
Clearance Time (s)	5.0	5.0		3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	212	865		168	1341	600	103	1408	630	103	1386	
v/s Ratio Prot		c0.33		c0.14	0.17			0.37			0.37	
v/s Ratio Perm	0.19					0.05	c0.53		0.05	0.34		
v/c Ratio	0.65	1.13		1.26	0.38	0.12	1.13	0.79	0.12	0.72	0.80	
Uniform Delay, d1	28.0	32.0		40.0	16.8	14.7	24.0	20.3	13.5	19.3	20.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	14.2	71.8		154.4	0.8	0.4	126.7	4.7	0.4	35.0	4.9	
Delay (s)	42.2	103.8		194.4	17.6	15.1	150.7	25.0	13.9	54.2	25.3	
Level of Service	D	F		F	B	B	F	C	B	D	C	
Approach Delay (s)		96.2			62.7			34.2			27.1	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM Average Control Delay	52.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	2979		1509	2973		1509	1529		1509	1553	
Flt Permitted	0.95	1.00		0.95	1.00		0.18	1.00		0.18	1.00	
Satd. Flow (perm)	1509	2979		1509	2973		289	1529		289	1553	
Volume (vph)	100	970	90	190	830	90	150	450	150	110	410	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1021	95	200	874	95	158	474	158	116	432	74
RTOR Reduction (vph)	0	10	0	0	11	0	0	17	0	0	9	0
Lane Group Flow (vph)	105	1106	0	200	958	0	158	615	0	116	497	0
Turn Type	Prot			custom			Perm			Perm		
Protected Phases	5	2		1	2			4			4	
Permitted Phases				1	6		4			4		
Actuated Green, G (s)	9.5	28.0		9.0	28.0		22.0	22.0		22.0	22.0	
Effective Green, g (s)	8.5	28.0		8.5	28.0		22.0	22.0		22.0	22.0	
Actuated g/C Ratio	0.12	0.40		0.12	0.40		0.31	0.31		0.31	0.31	
Clearance Time (s)	3.0	4.0		3.5	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	5.0		2.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	182	1183		182	1181		90	477		90	485	
v/s Ratio Prot	0.07	c0.37		c0.13	0.32			0.40			0.32	
v/s Ratio Perm							c0.55			0.40		
v/c Ratio	0.58	0.94		1.10	0.81		1.76	1.29		1.29	1.02	
Uniform Delay, d1	29.3	20.4		31.0	18.9		24.2	24.2		24.2	24.2	
Progression Factor	1.00	1.00		1.32	0.47		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	14.6		79.0	2.3		381.4	145.1		190.8	47.3	
Delay (s)	32.0	35.0		119.9	11.2		405.7	169.3		215.0	71.6	
Level of Service	C	D		F	B		F	F		F	E	
Approach Delay (s)		34.8			29.8			216.6			98.3	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	81.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	70.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	114.0%	ICU Level of Service	H
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)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0		4.0	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	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3134		1583	3129		1583	1667	1417	1583	1604	
Flt Permitted	0.20	1.00		0.20	1.00		0.37	1.00	1.00	0.28	1.00	
Satd. Flow (perm)	327	3134		327	3129		618	1667	1417	467	1604	
Volume (vph)	90	1070	80	140	940	80	70	590	170	70	360	120
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	1126	84	147	989	84	74	621	179	74	379	126
RTOR Reduction (vph)	0	9	0	0	11	0	0	0	6	0	10	0
Lane Group Flow (vph)	95	1201	0	147	1062	0	74	621	173	74	495	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8		8	4		
Actuated Green, G (s)	20.1	20.1		20.1	20.1		31.0	31.0	31.0	31.0	31.0	
Effective Green, g (s)	20.4	20.4		20.4	20.4		31.6	31.6	31.6	31.6	31.6	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.53	0.53	0.53	0.53	0.53	
Clearance Time (s)	4.3	4.3		4.3	4.3		4.6	4.6	4.6	4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	111	1066		111	1064		325	878	746	246	845	
v/s Ratio Prot		0.38			0.34			c0.37			0.31	
v/s Ratio Perm	0.29			c0.45			0.12		0.12	0.16		
v/c Ratio	0.86	1.13		1.32	1.00		0.23	0.71	0.23	0.30	0.59	
Uniform Delay, d1	18.4	19.8		19.8	19.8		7.6	10.7	7.7	8.0	9.7	
Progression Factor	1.00	1.00		0.75	0.73		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	53.0	69.2		178.2	20.9		1.6	4.8	0.7	3.1	3.0	
Delay (s)	71.4	89.0		193.1	35.3		9.3	15.5	8.4	11.1	12.7	
Level of Service	E	F		F	D		A	B	A	B	B	
Approach Delay (s)		87.8			54.3			13.5			12.5	
Approach LOS		F			D			B			B	

Intersection Summary			
HCM Average Control Delay	50.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.9%	ICU Level of Service	G
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)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	3167	1417	1583	3167	1417	1583	3167	1417	1583	3167	1417
Flt Permitted	0.17	1.00	1.00	0.09	1.00	1.00	0.21	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)	283	3167	1417	142	3167	1417	350	3167	1417	211	3167	1417
Volume (vph)	120	1220	140	70	960	150	270	1070	150	180	850	120
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	1284	147	74	1011	158	284	1126	158	189	895	126
RTOR Reduction (vph)	0	0	44	0	0	22	0	0	15	0	0	33
Lane Group Flow (vph)	126	1284	103	74	1011	136	284	1126	143	189	895	93
Turn Type	Perm		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases		6			2			8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	54.6	54.6	54.6	54.6	54.6	54.6	54.0	54.0	54.0	54.0	54.0	54.0
Effective Green, g (s)	56.5	56.5	56.5	56.5	56.5	56.5	55.5	55.5	55.5	55.5	55.5	55.5
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	5.9	5.9	5.9	5.9	5.9	5.9	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	133	1491	667	67	1491	667	162	1465	655	98	1465	655
v/s Ratio Prot		0.41			0.32			0.36			0.28	
v/s Ratio Perm	0.45		0.07	c0.52		0.10	0.81		0.10	c0.89		0.07
v/c Ratio	0.95	0.86	0.15	1.10	0.68	0.20	1.75	0.77	0.22	1.93	0.61	0.14
Uniform Delay, d1	30.3	28.3	18.1	31.8	24.7	18.6	32.2	26.9	19.3	32.2	24.2	18.5
Progression Factor	0.97	0.95	1.02	0.57	0.59	0.65	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	35.9	2.7	0.2	105.8	1.2	0.3	363.0	3.9	0.8	453.0	1.9	0.5
Delay (s)	65.3	29.4	18.7	123.8	15.8	12.4	395.3	30.8	20.1	485.3	26.1	19.0
Level of Service	E	C	B	F	B	B	F	C	C	F	C	B
Approach Delay (s)		31.3			21.8			95.8			97.1	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	61.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
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)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3072	3167	1417	3072	3119		1583	3167	1417	1583	4445	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.11	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	3072	3167	1417	3072	3119		185	3167	1417	168	4445	
Volume (vph)	280	1320	110	360	990	110	110	1280	420	110	930	170
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	1389	116	379	1042	116	116	1347	442	116	979	179
RTOR Reduction (vph)	0	0	8	0	7	0	0	0	23	0	22	0
Lane Group Flow (vph)	295	1389	108	379	1151	0	116	1347	419	116	1136	0
Turn Type	Prot		pm+ov	Prot			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2	3	1	6		3	8	1	7	4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	8.0	48.0	55.0	8.0	48.0		45.3	38.3	46.3	45.3	38.3	
Effective Green, g (s)	8.0	49.3	56.3	8.0	49.3		46.7	39.7	47.7	46.7	39.7	
Actuated g/C Ratio	0.07	0.41	0.47	0.07	0.41		0.39	0.33	0.40	0.39	0.33	
Clearance Time (s)	4.0	5.3	4.0	4.0	5.3		4.0	5.4	4.0	4.0	5.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	205	1301	712	205	1281		154	1048	610	148	1471	
v/s Ratio Prot	c0.10	c0.44	0.01	c0.12	0.37		0.04	c0.43	0.05	c0.05	0.26	
v/s Ratio Perm			0.07				0.25		0.25	0.26		
v/c Ratio	1.44	1.07	0.15	1.85	0.90		0.75	1.29	0.69	0.78	0.77	
Uniform Delay, d1	56.0	35.4	18.2	56.0	33.0		26.7	40.1	29.9	57.4	36.1	
Progression Factor	0.85	0.76	0.60	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	211.5	39.2	0.1	400.2	10.2		18.6	135.7	3.2	23.2	4.0	
Delay (s)	259.2	66.2	11.0	456.2	43.2		45.4	175.9	33.2	80.6	40.1	
Level of Service	F	E	B	F	D		D	F	C	F	D	
Approach Delay (s)		94.3			145.0			134.8			43.8	
Approach LOS		F			F			F			D	

Intersection Summary			
HCM Average Control Delay	108.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	111.9%	ICU Level of Service	H
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)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
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		1.00	0.91	
Frt	1.00	0.91			0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1509	1448			1508		1509	4276		1509	4187	
Flt Permitted	0.53	1.00			0.63		0.12	1.00		0.16	1.00	
Satd. Flow (perm)	847	1448			964		193	4276		247	4187	
Volume (vph)	150	90	130	80	80	50	300	1190	120	30	1080	320
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	95	137	84	84	53	316	1253	126	32	1137	337
RTOR Reduction (vph)	0	56	0	0	12	0	0	10	0	0	47	0
Lane Group Flow (vph)	158	176	0	0	209	0	316	1369	0	32	1427	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	25.0	25.0			25.0		66.4	60.4		61.6	58.0	
Effective Green, g (s)	25.0	25.0			25.0		65.4	60.4		60.6	58.0	
Actuated g/C Ratio	0.25	0.25			0.25		0.65	0.60		0.61	0.58	
Clearance Time (s)	4.0	4.0			4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)	5.0	5.0			5.0		1.0	0.2		1.0	0.2	
Lane Grp Cap (vph)	212	362			241		192	2583		182	2428	
v/s Ratio Prot		0.12					c0.08	0.32		0.00	0.34	
v/s Ratio Perm	0.19				c0.22		c0.99			0.10		
v/c Ratio	0.75	0.49			0.87		1.65	0.53		0.18	0.59	
Uniform Delay, d1	34.6	32.0			35.9		11.9	11.5		8.4	13.4	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.55	1.26	
Incremental Delay, d2	15.7	2.1			28.2		312.8	0.8		0.0	0.1	
Delay (s)	50.3	34.1			64.1		324.8	12.3		13.0	16.9	
Level of Service	D	C			E		F	B		B	B	
Approach Delay (s)		40.7			64.1			70.6			16.8	
Approach LOS		D			E			E			B	

Intersection Summary			
HCM Average Control Delay	45.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	EBR2	NBT	NBR	NBR2	SBL2	SBL	SBT	NWR2
Lane Configurations											
Ideal Flow (vphpl)	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0					4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95					0.95	1.00
Frt	1.00	1.00	0.85	0.85	0.95					1.00	0.86
Flt Protected	0.95	1.00	1.00	1.00	1.00					0.98	1.00
Satd. Flow (prot)	1509	3018	1350	1350	2859					2971	1374
Flt Permitted	0.95	1.00	1.00	1.00	1.00					0.65	1.00
Satd. Flow (perm)	1509	3018	1350	1350	2859					1955	1374
Volume (vph)	70	1220	320	60	370	140	60	130	110	530	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	1284	337	63	389	147	63	137	116	558	63
RTOR Reduction (vph)	0	0	0	47	6	0	0	0	0	0	0
Lane Group Flow (vph)	74	1284	337	16	593	0	0	0	0	811	63
Turn Type	custom		Perm	Perm				Prot	Prot		Free
Protected Phases	3	3			6			2	2	1	
Permitted Phases	4	4	3	3						2	Free
Actuated Green, G (s)	68.4	68.4	12.0	12.0	31.0					43.0	160.0
Effective Green, g (s)	67.0	67.0	11.0	11.0	31.0					42.0	160.0
Actuated g/C Ratio	0.42	0.42	0.07	0.07	0.19					0.26	1.00
Clearance Time (s)	3.0	3.0	3.0	3.0	4.0					4.0	
Vehicle Extension (s)	1.0	1.0	1.0	1.0	3.0					4.0	
Lane Grp Cap (vph)	670	1339	93	93	554					710	1374
v/s Ratio Prot	0.01	c0.07			c0.21					c0.22	
v/s Ratio Perm	0.04	0.36	c0.25	0.01						c0.08	0.05
v/c Ratio	0.11	0.96	3.62	0.18	1.07					1.14	0.05
Uniform Delay, d1	28.4	45.2	74.5	70.2	64.5					59.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00					0.50	1.00
Incremental Delay, d2	0.0	15.5	1206.8	0.3	58.7					79.5	0.1
Delay (s)	28.4	60.7	1281.3	70.6	123.2					108.9	0.1
Level of Service	C	E	F	E	F					F	A
Approach Delay (s)		293.7			123.2					108.9	
Approach LOS		F			F					F	

Intersection Summary			
HCM Average Control Delay	210.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

APPROVED BY COUNCIL 10/19/09

CITY COUNCIL
NEW BUSINESS

October 19, 2009

SUBJECT: Traffic Study Thresholds

INITIATED BY: Community Development Department
(Terri Slimmer, Transportation Manager)
(Anne McIntosh, Director)

STATEMENT OF THE SUBJECT:

The City Council will consider the Transportation Commission recommendation to adopt new traffic study thresholds used for purposes of determining the traffic impacts of development.

RECOMMENDATION:

Staff recommends that the City Council adopt the new traffic study thresholds for development.

BACKGROUND

The California Environmental Quality Act (CEQA) was adopted in 1970 and incorporated in the Public Resources Code §§21000-21177. Its basic purposes are to: inform governmental decision makers and the public about the potential significant environmental effects of proposed activities; identify ways that environmental damage can be avoided or significantly reduced; require changes in projects through the use of alternatives or mitigation measures when feasible; and disclose to the public the reasons why a project was approved if significant environmental effects are involved. Although CEQA is a legal tool of disclosure it does not replace the City's General Plan as a planning tool.

Determining whether or not a project may result in a significant adverse impact is one of the key aspects of CEQA. CEQA guidelines allow lead agencies to adopt *Thresholds of Significance* to indicate the point at which an impact within their jurisdiction will be considered significant. Therefore, it's important that the City develops and adopts CEQA guidelines which will serve West Hollywood's unique goals, objectives and policies of the new General Plan. This recommendation is the first step in imprinting the City's own values, specifically of sustainability, on CEQA by moving away from simply identifying vehicle trip impacts to promoting alternative transportation options and providing measurable transportation system improvements.

One of the areas West Hollywood has historically evaluated for impacts is traffic. The City's current and proposed overall approach to analyzing traffic project impacts and cumulative impacts is consistent with CEQA which uses standards designed for suburban areas. The Transportation Commission and staff are proposing to modify the method currently used to better address the traffic impacts specific to West Hollywood and to streamline the traffic study portion of the development process allowing staff and applicants to concentrate time and resources on making improvements to the City's transportation infrastructure.

BASIC OVERVIEW OF TRAFFIC STUDY PROCESS

The City's current practice for reviewing a project's traffic begins with the submittal to the Planning Division of either a pre-submittal meeting or an application for a discretionary action, such as a master development plan, planned development, conditional use permit, variance, or intensification of existing use. Once an application has been deemed complete, Transportation begins the formal review of the type and size of project and its potential for traffic impacts that could be subject to environmental review under the California Environmental Quality Act. Transportation staff has two processes for reviewing a proposed project's traffic impacts, including a Transportation Assessment (TA) and a Traffic Impact Study (TIS). All submitted development applications undergo a TA. Subsequent to the TA, projects determined to generate 100 or more peak hour trips and/or cause a decrease in intersection capacity are required to conduct a TIS. The primary difference between the two types of transportation review is the level of detail in the intersection analysis. Generally the TA is done in-house by Transportation staff (with the exception of a project requiring a shared-parking analysis). The TIS is done by an outside Traffic Consultant based upon a proposal process, hired by the City and paid for by the applicant.

Existing traffic conditions are first documented. Normally this is accomplished with new traffic counts in order to provide the latest information. Then future traffic growth is estimated.

A future baseline condition is forecast for the target year of completion for the proposed development project. This is called the "Future Without Project" condition. It represents cumulative traffic growth from approved, proposed and reasonably foreseeable future development projects and sets a baseline against which specific impacts of the proposed development project can be measured.

Forecasting of this future baseline comprises two components; 1) by identifying other future development projects in the general study area that reasonably may be completed in the time frame of the subject project, and forecasting traffic growth from those projects. These projects are often called "related" projects or "cumulative" projects; and 2) by defining an "ambient" growth factor representing traffic growth from outside the study area. Adding traffic growth from the related projects, and the "ambient" traffic growth, to the existing traffic volumes, produces a forecast of future traffic conditions without the proposed project - called the cumulative baseline condition, or Future Without Project condition.

The final step is to determine the traffic growth from the subject project and the impacts it may cause (Future With Project). Because traffic growth from other development projects is also considered (as described above), the final impact analysis represents the cumulative traffic impacts of the subject project.

This basic process will remain the same. However, staff is recommending that the analysis approach and the thresholds for determining when the project undergoes a

TIS and/or identifies traffic impacts to be mitigated and/or determined to be unmitigatable under CEQA guidelines be modified.

CURRENT vs. PROPOSED TRAFFIC STUDY APPROACHES

The major change in the way the Transportation Commission and staff is proposing to conduct future TIS involves the shift from analyzing intersection operations based on capacity (CMA – critical movement analysis) to analyzing operations based on delay (HCM – highway capacity manual). The following is a comparison of the current CMA approach to the proposed HCM approach. The numbers coincide with the example in the table on the next page.

EXAMPLE: SMB/Gardner 300 DU and 20k sq ft retail	Current (CMA)		Proposed (HCM)	
	V/C	LOS	Delay (sec)	LOS
1. Without Project	1.04	F	49	D
2. With Project	1.08	F	77	E
3. With Project with longer left-turn pocket	1.08	F	61	E
4. With Project with protected/permitted left-turn phasing	1.08	F	51	D
5. With Project with longer left-turn pocket & protected /permitted left-turn phasing	1.08	F	44	D

1. *Current Approach*:
   Takes into account only the vehicle volumes and capacity of an intersection.
   Proposed Approach:
   Takes into account existing signal timing, minimum green times, vehicle volumes, pedestrian and bike movements, user defined saturation flow rates (capacity), storage bay lengths, etc.

2. *Current Approach*:
   With the project there's an increase in V/C of 0.04, this would be considered a significant impact (current threshold is 0.02 or more). What does the 0.04 capacity decrease mean to the average person?
   Proposed Approach:
   With the project there will be an average increase in delay of 28 seconds. Most people can understand/"visualize" this. This would be considered a significant impact.

3. *Current Approach*:
   The lengthening of the left turn pocket could not be evaluated as a mitigation. The inputs in the CMA methodology do not consider turn pocket lengths. In this case, the significant impact would remain.
   Proposed Approach:
   Under the proposed HCM approach, the lengthening can be identified as an improvement with benefits that can be measured. In this case, the lengthening *reduces* average delay by 16 seconds.

4. *Current Approach*:
   Signal phasing/timing can not be (for most part) evaluated. With CMA, if a "critical" phase is added, it will make V/C worse, not better.

Proposed Approach:
Phasing and timing can be assessed and evaluated with HCM methodology. In this case, the revised phasing would result in a reduction in delay of 26 seconds.

5. *Current Approach*:
   Impact would remain significant, overriding considerations would be needed.
   Proposed Approach:
   With both improvements, the project would not only mitigate its impacts but would improve conditions with the project to better than without the project (reduces delay by 5 secs.). The applicant would then be required to fund the identified improvements (design and striping of the left turn pocket and replacement of the signal head) as part of their project conditions.

The second area the Transportation Commission and staff is suggesting be changed is **thresholds.** Currently, the City has thresholds for when a project would be required to conduct a TIS (based on projected increase in peak hour trips) and when a project impact at a signalized intersection is considered significant (related to volume-to-capacity (V/C) ratio). The **current** thresholds are:

- Need for TIS: Proposed project expected to generate 100 or more peak hour trips.
- Signalized Intersection Significant Impact Criteria: Level of Service E and F (Final V/C is 0.901 or more) and Project Related V/C increase is equal to or greater than 0.020 (Final V/C is the V/C ratio at an intersection, considering impacts from the project, ambient and related project growth, and without proposed traffic impact mitigations.)

The **proposed** thresholds would be:

- Need for TIS: Proposed project would generate 60 or more **net** new vehicle peak hour trips or 500 or more **net** new daily vehicle trips.
- Signalized Intersections Significant Impact Criteria – If the intersection is formed by two commercial corridors, an impact is considered significant if the following criteria are met:
  - The addition of project traffic results in a LOS D and an increase in delay of **12 seconds** or greater.
  - The addition of project traffic results in a LOS E or F and an increase in delay of **8 seconds** or greater.

  For purposes of the TIS the following are considered commercial corridors:
  - Sunset Boulevard
  - Santa Monica Boulevard
  - Melrose Avenue
  - Beverly Boulevard
  - Doheny Drive
  - Robertson Boulevard
  - San Vicente Boulevard (at and/or South of Santa Monica Boulevard)
  - La Cienega Boulevard
  - Fairfax Avenue
  - La Brea Avenue

- At all other signalized and/or 4-way stop intersections, significant impacts will occur if the following criteria are met:
  - The addition of project traffic results in a LOS D and an increase in delay of **8 seconds** or greater.
  - The addition of project traffic results in a LOS E or F and an increase in delay of **5 seconds** or greater.
- Unsignalized Intersections (and/or 1-way or 2-way stops) Significant Impact Criteria – Significant impacts will occur if the following criteria are met:
  - The addition of project traffic results in a LOS D, E, or F and an increase in delay (most constrained approach) of **5** seconds or greater.

Additionally, the City uses a combination of the City of Los Angeles and City of Beverly Hills standards to identify significant traffic impacts on residential street segments. The methodology and threshold for the **residential street segments** is as follows:

- ADT is less than 2,000 and the Project will increase the ADT by 12%
- ADT is 2,001 or greater but less than 3,000 and the Project will increase the ADT by 10%
- ADT is 3,001or greater but less than 6,749 and the Project will increase by ADT by 8%
- ADT is 6,750 and the Project will increase the ADT by 6.25%

Although not formally adopted previously, these thresholds have been used in prior Traffic Studies such as Movietown Plaza, Sunset/Doheny, Pavilions and Palm Restaurant. Staff is recommending that these thresholds are formally adopted.

Once the thresholds have been determined, staff will finalize a *"Traffic Impact Study Guidelines"* handout for applicants and traffic consultants to guide them through project development and to ensure potential impact on traffic, parking, transit usage and pedestrian amenities are identified at the front end of the development process.

NEW TRAVEL DEMAND MODEL

Most of the traffic analyses completed in the past year, especially for projects on Sunset Blvd, have concluded that the projects would result in significant unmitigated impacts requiring the Planning Commission and City Council to find overriding considerations. This is primarily the result of the current use of the CMA methodology in that we have been unable to capture the benefits of signal improvements and alternative travel modes such as bicycling and transit use. Intuitively, we know that adding capacity is not the only way to alleviate traffic congestion and with the use of a delay based methodology we will be able to quantify a broader base of alternatives. In order to get to a delay-based analysis and to specifically use the City's travel characteristics (rather than strictly ITE Trip Generation), staff has undertaken the development of a new City of West Hollywood travel demand model.

WHAT IS A TRAVEL DEMAND MODEL?

The travel demand model is a tool to estimate the future demand for travel in a given area (magnitude, direction, and the interaction between different land uses in different areas).

It is a tool that "forecasts" the supply and demand interaction of transportation where:

- Supply equals: Highway networks, transit networks, etc
- Demand equals: People and all the places they wish to travel to and from

The model will enable staff to quantify the effects of "Smart Growth" Design using the 4Ds:

1. Residential and Job Density
2. Diversity of land uses
3. Walkable Design; and
4. Access to Destinations

And will enable staff to capture the change in travel patterns and land use interaction when multiple developments take place; provide consistency between studies, how future projects will interact with each other; and avoid double counting of trips.

Additionally, the new model will allow staff to test and analyze of impacts non-development traffic concepts on the computer, such as reducing travel lanes to accommodate bike lanes, changing streets to one-way; adding traffic signals etc, rather than going to the expense of testing on the street.

SPECIFIC WEST HOLLYWOOD MODEL BASIC INFO

Currently West Hollywood is represented in the SCAG model by

a. 5 traffic analysis zones (coterminous with census tracts)
b. Major and a couple of minor arterials
c. Census socioeconomic data

The new West Hollywood Model:

a) creates 235 TAZs (191 in City and 44 surrounding) to allow a more precise identification of project impacts
b) All roadways in the City
c) Land use database from recently field collected (2008) parcel level data
d. Trip rates calibrated from SCAG rates to match West Hollywood trip making

The model when coupled with recently approved nexus study will allow staff to identify each development project's "fair share" of traffic impacts and associated mitigations rather than the current "last project in pays" for the required mitigations. This enables staff to collect funds for the implementation of future transportation projects, including traffic calming projects and street and/or traffic signal improvements, from the development projects which help create the need for such improvements limiting the need for use of the City's General Fund monies.

Evaluation

Currently, nearly every development project needs to undergo a CEQA traffic analysis based upon the City's existing use of capacity methodology which ends in significant traffic impacts. In most cases, the result is the need for the Planning Commission and/or City Council to find overriding considerations as the current "toolbox" of mitigation strategies can not be appropriately quantified in order to offset traffic impacts. Evaluation of the new thresholds/travel demand model will be accomplished by the ability to determine both CEQA and non-CEQA traffic impacts of development in a more timely, consistent and understandable manner with less need for findings of overriding considerations while collecting development appropriate fees to offset the cost for implementing neighborhood and/or citywide transportation programs.

Environmental Sustainability and Health

While remaining in compliance with CEQA requirements, staff believes the Transportation Commission recommendations to move to the HCM methodology, revise the traffic thresholds used for determining development traffic impacts and the implementation of the City of West Hollywood Travel Demand Model will provide a much better opportunity for staff to balance the City's desire to encourage responsible development with the concerns of the neighborhoods and allow staff to better quantify the relationships between land use, vehicle trips and their impacts to the environment.

Furthermore, support of these recommendations will simplify the development process, timeline and cost to the applicants relative to the analysis of traffic impacts and enable staff to identify funding opportunities for implementation of traffic calming projects, transit, bicycle, pedestrian and/or infrastructure improvements that promote neighborhood livability.

CONFORMANCE WITH VISION 2020

This item is consistent with the *Primary Strategic Goal* to **Maintain the City's Unique Urban Balance with Emphasis on Residential Neighborhood Livability** and **Fiscal Sustainability** and the *Ongoing Strategic Programs* of **Transportation System Improvement.**

OFFICE OF PRIMARY RESPONSIBILITY

Community Development Department – Transportation Division

FISCAL IMPACT

There is no fiscal impact associated with this report. The travel demand model and nexus study costs have previously been approved by the City Council. Upon City Council action on this report, staff will be able to quantify project specific traffic impacts and collect fees from the project applicant to offset future traffic calming and street and/or traffic signal improvements.

APPENDIX G

CLIMATE CHANGE TECHNICAL DATA

Appendix West Hollywood General Plan GHG Calculations

Air Quality Modeling Output	CO2 Estimates		Conversion Factors				Total CO2 Emissions	
Construction Emissions (Source: URBEMIS)								
2011-2035	17,052.50	tons		0.907	MT/ton		15,470	MT/yr
Total Construction-Generated Emissions							**15,470**	MT
Area-Source Emissions (Source: URBEMIS)								
Operational Year 2035	16,926.48	tons/day	lb/ton	0.907	MT/ton	days/year	15,355	MT/yr
Mobile-Source Emissions (Source: URBEMIS)								
Operational Year 2035	101,650.00	tons/day	lb/ton	0.907	MT/ton	days/year	92,197	MT/yr
Total Direct Operational Emissions							**107,552**	MT/yr

Indirect Emissions from Energy Consumption [1,2]

KWh/du/year	# du	KWh/ksf/year	# ksf Commercial	Total KWh	MWh	Region	Emission Factor (lb CO2/MWh)	GWP	Emission Factor (lb CH4/MWh)	GWP	Emission Factor (lb N2O/MWh)	GWP	Total CO2e (Metric Tons/year)
4274	125	16,000	2,613	42,344,298	42,344	CALI	804.54	1	0.0067	21	0.0037	310	**15,478**

Indirect Emissions from Municipal Water Use (includes conveyance, treatment, distribution, and wastewater treatment) [3,4]

KWh/million gallons/year*	KWh/acre-ft/year	acre-ft/year	Total KWh	MWh	Region	Emission Factor (lb CO2/MWh)	GWP	Emission Factor (lb CH4/MWh)	GWP	Emission Factor (lb N2O/MWh)	GWP	Total CO2e (Metric Tons/year)
12,700	4138	1,166	4,825,090	4,825	CALI	804.54	1	0.0067	23	0.0037	296	**1,764**

*for Southern California

Total Indirect Emissions (MT CO2e/yr)	**17,241**
Total Direct & Indirect Emissions (MT CO2e/yr)	**124,793**

Assumptions:
3.069 acre-ft = 1 Million gallon
0.135 acre-ft/yr

Sources:

1 California Energy Commission [CEC] 2009. California Commercial End Use Survey. Available: http://capabilities.itron.com/CeusWeb/Chart.aspx; California Energy Commission [CEC] 2000. California Energy Demand Staff Report P200-00-002
2 California Climate Action Registry [CCAR] General Reporting Protocol v 3.1 January 2009
3 California Energy Commission [CEC] 2006. California Energy - Water Relationship Staff Report CEC-700-2005-011-SF. Available: http://www.energy.ca.gov/2007publications/CEC-999-2007-008/CEC-999-2007-008.PDF