City of Sherwood Oregon
Home of the Tualatin River National Wildlife Refuge

City of Sherwood
PLANNING COMMISSION
Sherwood City Hall
22560 SW Pine Street
Sherwood, OR 97140
May 26, 2009 – 7 PM
Work Session – 6 PM

Work Session – 6:00 PM

- **Industrial Design Standards**

Business Meeting – 7:00 PM

1. **Call to Order/Roll Call**
2. **Agenda Review**
3. **Consent Agenda** – Draft minutes from April 28, 2009
4. **Staff Announcements**
5. **Council Announcements (**Dave Heironimus, Planning Commission Liaison**)**
6. **Community Comments** (*The public may provide comments on any non-agenda item)*
7. **Old Business:**

   a. **ADM 09-02 Appeal-** On February 25, 2009 the Community Development Director issue a letter to the applicant and the Planning Manager issued a letter to the Building Official indicating that the plans the appellant submitted to the Building Department for covered parking at 22211 SW Pacific Highway were not exempt from site plan review. Written notice dated March 9, 2009 was received by the City indicating that Mr. and Mrs. Claus were appealing the interpretation by the City Manager's designee (in this case, the Community Development Director).

8. **New Business:**

   a. **Adams Avenue Concept Plan-** Concept plan for property owned by Portland General Electric (PGE) totaling approximately 55 acres, 33 of which were added to the urban growth boundary (UGB) in 2002. A comprehensive plan and zone map amendment is proposed to add the zoning designation of light industrial to the portion of the Adams Avenue North Concept Plan area that was brought into the urban growth boundary in 2002. The proposal also involves a change in the zoning for 2S129B, tax lot 1900 from Light Industrial to Office Commercial and 2S129A, tax lot 1100 from light industrial to General Commercial and from Light Industrial to Office Commercial for 2S129A, tax lot 1400

9. **Comments from Commission**
10. **Next Meeting:** June 9, 2009 – SP 08-13/CUP 08-03 Villa Lucca Public Hearing
11. **Adjourn**

City of Sherwood Oregon

Home of the Tualatin River National Wildlife Refuge

MEMORANDUM

City of Sherwood
22560 SW Pine St.
Sherwood, OR 97140
Tel 503-625-5522
Fax 503-625-5524
www.ci.sherwood.or.us

DATE: May 19, 2009

TO: Planning Commission

FROM: Julia Hajduk, Planning Manager JH

SUBJECT: ADM 09-02 additional information submitted into the record

At the April 28, 2009 Planning Commission meeting, the Commission held a public hearing on the appeal of the director's interpretation that site plan review was required for proposed covered parking structures at 22211 SW Pacific Highway. After hearing from the applicant and holding the public hearing, the Commission left the record open for 7 days to allow the appellant to review information submitted into the record that evening and to submit of additional information. Attached are documents received by Mr. Jim Claus (Attachment 1) and Mr. Eric Postma, representing Mr. Claus (Attachment 2).

The Commission has closed the public hearing and may not accept additional testimony unless the record is re-opened. At the meeting on May 26, 2009 the Commission must consider the information in the record and determine if the Director, in this case the Community Development Director, erred in the determination that the plans submitted to the building department required site plan approval.

Julia Hajduk

From: Julia Hajduk
Sent: Tuesday, May 19, 2009 9:55 AM
To: Julia Hajduk
Subject: FW: ADM 09-02 Appeal of Site Plan Review for 22211 SW Pacific Hwy.

From: claussecretary@aol.com [mailto:claussecretary@aol.com]
Sent: Thursday, April 30, 2009 3:30 PM
To: Julia Hajduk
Cc: ClausSL@aol.com
Subject: ADM 09-02 Appeal of Site Plan Review for 22211 SW Pacific Hwy.

MEMORANDUM

DATE: April 30, 2009
TO: Sherwood Planning Commission
FROM: Jim Claus
SUBJECT: ADM 09-02 Appeal of Site Plan Review for 22211 SW Pacific Hwy.

Members of the Planning Commission:

At Tuesday night's Planning Commission meeting, Julia Hajduk insisted that she had not specified the locations for our proposed parking bays, and that we simply misunderstood her. Yet she chose those locations at two separate meetings in front of other people who also interpreted her comments as specifying the locations for the parking bays. Based on her specification of locations, we spent money drawing them.

In the event that you are having difficulty discerning whether to believe Ms. Hajduk or the other people who were present when she specified those locations, most notably Robert Johnson of Steeltech, I would ask you to simply recall the last Council meeting on the proposed sign code amendments. The Council became very disturbed about the abandoned sign section, which Ms. Hajduk was supposed to have rewritten. If we understand her testimony, and I believe we do, she insisted that she had not edited that section. Yet her edits were right there for everyone to see.

Perhaps Ms. Hajduk has a memory problem. With all the money being spent on continuing education for the City staff, perhaps some might be made available to send Ms. Hajduk to some courses on improving memory so this disturbing behavior does not continue.

Attachment 1

GARY M. BULLOCK and ASSOCIATES, P.C.
ATTORNEYS AT LAW
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PORTLAND, OREGON 97205

TELEPHONE: (503) 228-6277
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♦ Gary M. Bullock

• Meredith Boyden
• Joanna L. Dorchuck
Arthur B. Fowler V
★ Eric S. Postma

♦ Admitted in Oregon, Washington, Idaho and California

★ Admitted in Oregon and California

• Admitted in Oregon and Washington

May 5, 2009

VIA FACSIMILE (503) 625-5524

Planning Commission
City of Sherwood
22560 S.W. Pine Street
Sherwood, Oregon 97140

Re: 22211 SW Pacific Hwy., Sherwood, Oregon
Covered Parking Request
Case No. ADM 09-02 Appeal
Dr. Robert James Claus and Susan Lynn Claus

Dear Commissioners:

Several months ago Dr. and Mrs. Claus met with members of the planning staff for something akin to a pre-application meeting to determine the procedure they needed to follow in order to construct covered parking on the above-referenced property. Throughout their quest, in their discussions with the City they have remained flexible. Those discussions culminated in the memorandum of February 9, 2009 from Julia Hajduk, Planning Manager.

As discussed at the recent public hearing, Section 16.90.020 provides discretion to the planning staff to decide what constitutes a substantial alteration requiring site plan review. That discretion is highlighted by the fact a substantial alteration is defined as requiring a building permit and "may" exhibit one or more of several characteristics including involvement of non-conforming uses or altering the appearance of a property.

In her February 9, 2009 memorandum, Ms. Hajduk, as planning manager, appeared to have exercised the discretion of the planning staff to determine that a site plan review would not be required. She stated in that memorandum that Dr. and Mrs. Claus would be able to place 18 covered parking spaces on their site. The letter closed with a simple indication that a building permit application should be submitted so that a review of the location, dimensions, and number of covered parking spaces could be confirmed.

As discussed at the public hearing, relevant ordinances set a minimum parking space size, without specifying a maximum size. Based upon the evidence in the record showing that Dr. and Mrs. Claus expected larger vehicles or equipment to be parked in the covered spaces, the inclusion of the requirement to review the dimensions of the parking spaces is illusory at best.

Attachment 2

With respect to location, the declaration of Robert Johnson shows that the specific locations designated for the covered parking were selected at the request of City staff. Those locations were chosen to avoid disturbing mature trees. At the public hearing, Dr. Claus expressed his willingness to site the covered parking bays at another location on the property. My clients are amenable to siting the proposed parking however the planning commission or staff deems best suited for the property. Thus, again, the need to review the location of the covered parking is illusory since staff chose the current location and Dr. Claus has confirmed his willingness to locate the covered parking pursuant to the recommendation of staff and the planning commission.

Finally, with regard to the number of spaces, the memorandum dictated that Dr. and Mrs. Claus would be allotted 18 parking spaces. Dr. Claus indicated at the hearing that he is willing to proceed with the 18 spaces confirmed available by staff, even though he believes he may be entitled to a greater number of spaces.

On several occasions as this matter has progressed Dr. and Mrs. Claus have asked City staff if it would be necessary for them to complete a site plan review. They have never been provided with an indication of the applicable standard for site plan review. I, too, have made the same request. In a telephone conversation with Julia Hajduk I enquired about the possibility of refiling with a site plan review. At the conclusion of our conversation she advised me she would get back to me with the standard for such a site plan review. I have yet to receive her response regarding the applicable standard.

As indicated at the hearing, it appears the neighboring property owners no longer have any objection to the covered parking bays proposed by Dr. and Mrs. Claus. With her memorandum of February 9, 2009 Julia Hajduk exercised staff discretion to proceed without a site plan review, with the simple submission of a building permit application. That is precisely the procedure that Dr. and Mrs. Claus followed. For that reason, the appeal should be granted, so that Dr. and Mrs. Claus can proceed with their planned construction without the need for a site plan review and based upon submission of the building permit application currently under consideration by the City of Sherwood.

Sincerely,

Eric S. Postma

ESP:dj
cc: Julia Hajduk
Tom Pessemier
Chris Crean
Dr. and Mrs. Claus
x:esp:Claus:City:PlanningComm 5-5-09

City of Sherwood Oregon

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MEMORANDUM

City of Sherwood
22560 SW Pine St.
Sherwood, OR 97140
Tel 503-625-5522
Fax 503-625-5524
www.ci.sherwood.or.us

DATE: February 9, 2009

TO: Building Department

FROM: Julia Hajduk, Planning Manager JH

SUBJECT: Covered parking request at 22211 SW Pacific Highway

Jim and Susan Claus have been talking with the City about providing covered parking on their property at 22211 SW Pacific Highway and had asked the Planning Department how much they could place on the property and whether site plan review was required. We reviewed the information on file via building permits and land use permits and provided them with preliminary information indicating the number of parking spaces they can have based on the current acknowledged uses on the property. Based on the information that we have to date they can place up to 18 parking spaces on their site. We anticipate that as they provide additional information the number of parking spaces they can place will likely increase. We also informed them that, provided the location of covered parking is within an area currently being used for parking, the proposed covered parking structure would be exempt from site plan review. We therefore anticipate that they will be submitting building permits in the near future for their proposed covered parking.

When they submit their building permit application, please provide a copy to the Planning Department so that we can review the location of covered parking, dimensions and number to confirm that it is in fact exempt from site plan approval.

Thank you.

CC. Jim Patterson
Tom Pessemier
Scott McKie
Michelle Miller
Jim and Susan Claus

Exhibit 5

MEMORANDUM

DATE: May 4, 2009
TO: Sherwood Planning Commission
FROM: Jim Claus
SUBJECT: ADM 09-02 Appeal of Site Plan Review for 22211 SW Pacific Hwy.

Members of the Planning Commission:

I am writing the memo as a follow-up to the hearing on Tuesday April 28, 2009 because, in my opinion, the way in which Pat Allen conducted the meeting made it nearly impossible to get at the core issue of the hearing. Mr. Allen's expertise at manipulating process and procedure, regardless of the impact on Due Process and Equal Treatment, was on full display. And it was a sight to behold.

I want to be certain that all members of the commission understand some basic points that are key in this matter because I believe Mr. Allen made certain these points were never properly addressed:

1. The Building Department received our application after it had been deemed complete by Julia Hajduk.
2. The total number of 18 parking spaces was determined after four months of meetings and our having finally agreed to move forward based on Ms. Hajduk's interpretation that only 3,404 square feet of our property was in retail/commercial use, despite the fact that we dispute her conclusions. That number does not preclude other portions of the property being added to the total once someone is able to tell us the evidentiary standard that will be accepted as proof that the property is being used for retail/commercial activity.
3. Ms. Hajduk elected to allow only the minimum number of spaces per 1,000 square feet of use, having ignored the present and past uses that actually exist on the property and which would have required more parking.
4. Ms. Hajduk herself, in front of others, specifically told us where to place the parking bays and we had drawings made showing the bays in precisely those locations.
5. After we had been told we were exempt from site plan review and had met all the requirements in the code, and the application had been deemed complete by Ms. Hajduk, it was sent to the Building Department. Only then was the decision made that we needed a site plan review.
6. After repeatedly asking what specifically is meant by "site plan review," which is not defined in the code, we still have not received an explanation from Ms. Hajduk. We are willing to comply, but we were not told the process to comply.

I believe that Pat Allen never once dealt with these matters, nor did he ever show any indication that he understood the essence of our complaint.

In my opinion, Pat Allen needs to appear to be an expert in codes for his job for the State of Oregon. He must have the persona of authority. In my opinion, he was deliberately attempting to thwart our appeal because he is still embarrassed over having done such a shoddy job on the sign code when he has made himself out to be a code expert. Of course, that is just my opinion.

Attached is a memo in which I am asking Pat Allen to recuse himself from any further hearings in which I am involved. I believe that once you have read it, you will understand the gravamen of my complaint against him.

MEMORANDUM

ADM 09-02 Appeal

DATE: May 4, 2009
TO: Patrick Allen
CC: Sherwood Planning Commission
FROM: Jim Claus
SUBJECT: Request for recusal from any hearing involving Jim Claus

Dear Commissioner Allen –

For a considerable period of time, I have watched with interest as you have held forth on your code writing expertise. The first major incident I had with you was when you wrote a blatantly unconstitutional sign code, restrictive of rights, and an attack on the entire concept of the First Amendment. When we met, you asked me what I thought of your sign code and I told you the entire code should be trash-canned. You puffed up and threw me out of the room. Considering my background as a nationally recognized expert in the area, I found the episode rather amusing, to say the least.

I don't have to tell you the outcome of your ignorance, but I will anyway. The outdoor advertising companies came into town and attacked the code, and the same law firm that advised you your code was legal proceeded to negotiate to allow the construction of several billboards in town – something which you thought your masterpiece had prevented.

Since that time, you have managed to continue to convince people that your position with the State makes you an authority in code-writing and have assured the Council that your latest crack at the sign code met all of Oregon's requirements. It is a rather arrogant assertion, considering that you have no training or specialty in the area, and no law degree, and yet somehow feel qualified to manipulate people's civil rights – an area of law where even seasoned attorneys fear to tread. When it was time to try to repair the damage done to the sign code, I again offered to help, and again was rebuffed. The code-writing "expert" knew all and did not need anyone's help.

This time around, your work encoded the violation of Fourteenth Amendment rights, not just First Amendment rights. And once again, the City's ever-so-reliable law firm advised you that the code was sound and could be defended in court. When I had to point out to you that it encoded unlawful restraint of trade by outright requiring people to obtain the services of a particular for-profit entity – Underwriters Laboratory – it was, no doubt, a public embarrassment to you. When I told the business community what you had done and they responded in a less than grateful manner to you, you were also publicly embarrassed. Having offered to assist you in writing that code, I cannot say I did not enjoy watching you squirm.

All of that is the stuff of human nature, and all will be worked out one way or another in time. The real problem here is that it appears to me that you used our hearing before the Planning Commission on April 28, 2009 as an opportunity to get even with me for embarrassing you. The majority of the Commissioners were more than willing to try to protect our rights to due process and to tell us what was required for a site plan review. You continually injected yourself into the situation, throwing the discussion off track and obfuscating issues to the point where none of our questions were answered and the Commission was also left without answers – or even an understanding of the questions at hand.

Tuesday night's hearing convinced me that it is not possible for me to have a fair hearing if you are participating. So for the balance of this hearing, would you be kind enough to recuse yourself from the process?

City of Sherwood **May 19, 2009**
STAFF REPORT: File No: PA 09-02 – Adams Avenue North Concept Plan

Signed: Julia Hajduk, Planning Manger

I. INTRODUCTION

The preferred alternative concept plan for Adams Avenue North has been completed. The May 26th, 2009 Planning Commission hearing will be the first evidentiary hearing on the Adams Avenue North Concept Plan. The Planning Commission will make recommendation to the City Council for final decision. The City Council hearing is tentatively scheduled for June 16th, 2009.

Planning for the Adams Avenue North Concept Plan began in the fall of 2008. Engineering design for Adams Avenue is being done concurrently with the planning effort. Construction is planned to start as early as Spring of 2010.

Comments from three stakeholder involvement meetings, one open house, two work sessions with the Planning Commission and one joint work session with the Planning Commission and City Council were used in shaping the preferred alternative.

The report is organized into the following sections:

I. Introduction
II. Background (Public Involvement & Proposal Overview)
III. Affected Agency, Measure 56 Public Notice, and Public Comments
IV. Type 5 – Legislative Plan Amendment Criteria and Findings of Fact
   A. Local standards
   B. State standards
   C. Regional standards
V. Recommendation
VI. Attachments/record

II. BACKGROUND

Background

The purpose of the Adams Avenue North Concept Plan is to provide a conceptual guide to the area's development as a new addition to Sherwood. Title 11 of Metro's Urban Growth Functional Plan requires that a concept plan be developed and adopted by the City Council prior to allowing urban development and zoning. The Concept Plan implements Metro's decision in 2002 to expand the regional urban growth boundary (Metro Ordinance 2002-986A). The Sherwood City Council initiated the public process to comprehensively plan for the area prior to annexation and development. The Concept Plan identifies future land uses, parks and trails, natural resource areas, transportation improvements – all guided by planning efforts developed with public involvement.

The Adams Avenue North Concept Plan is a guide to development of 55.5 acres southeast of Highway 99W and north of Tualatin-Sherwood Road. Of this 55.5 acres, 34.2 acres were added to the regional urban growth boundary in 2002. The remaining 21.3 acres of property is not required to be included in the concept plan but was included since these areas are undeveloped and interconnected. Therefore, the City, decided to look at this 55.5 acre area as one concept plan study area.

Process and Public Involvement

A stakeholder working group was established for the project. This group consisted of local property and business owners as well as affected agencies. The stakeholders met on three occasions and made recommendations to the Planning Commission who acted as the steering committee for the project. The Planning Commission was updated during three work sessions meetings and one joint City Council/Planning Commission work session where the City Council and Planning Commission provided feedback on the refined alternative presented by staff. The results of this work is .the preferred alternative concept plan map and plan document.

In addition to these Committee meetings, additional process steps and community involvement included:

- A public open house
- Project website with regular updates
- Monthly updates in the Sherwood Gazette
- Direct mail to property owners within 100 feet of the proposed development

Early and continuous public outreach and involvement was coordinated and timed to coincide with project tasks and key outcomes. The major milestones in the process were:

- Development of a public involvement plan
- Inventory of base conditions and opportunities and constraints
- Interview key stakeholders
- Establishment of project and concept plan goals and objectives
- Development of three alternative concept plans
- Evaluation of alternatives and development of a draft concept plan incorporating the most desired elements
- Refinement of the concept plan
- Selection of a preferred alternative concept plan

Appendix 5 to the Draft Concept Plan document is the public involvement plan used for public outreach and decision making.

Proposal Overview

The Comprehensive Plan was amended in 2006 with the implementation of the Area 59 Concept Plan to provide a framework for future concept plan approvals. This proposal is to adopt the Adams Avenue North Concept Plan by reference and incorporate the key findings and recommendations from that concept plan into Chapter 8 of the Comprehensive Plan (Urban Growth Boundary Additions). Implementation of the Concept Plan as part of this proposal will also include the adoption of amendments to the Comprehensive Plan Map to include new zoning designations for the Adams Avenue North area (see Attachment 6).

Three development opportunity sites have been identified within the concept plan. Due to site constraints from the power substation and high voltage power lines and easements much of the property is not developable. Of the 55.5 total acres only 15.7 is unconstrained. This proposal would rezone 0.9 acres from Light Industrial to General Commercial, 7.2 acres from Light Industrial to Office Commercial and would establish 34.2 mostly constrained acres within the 2002 UGB expansion as Light Industrial.

Annexation is anticipated to be placed on the November 2009 ballot. If the annexation is approved by the Council and the Sherwood voters, the 34.2 mostly constrained acres not currently within the City limits will be annexed and City zoning established consistent with the concept plan.

III. AFFECTED AGENCY, PUBLIC NOTICE, AND PUBLIC COMMENTS

The City of Sherwood sent notice to DLCD on March 26, 2009, more than 45 days prior to the first evidentiary hearing. Metro's Title 11 (Chapter 3.07.1140) requires notice sixty (60) days prior to adoption. Notice was sent to Metro on April 2, 2009 meeting this requirement. Mailed public notice, including Measure 56 notice, was provided on May 5, 2009, which exceeds the City requirement of 10 days prior to the first evidentiary hearing. Notice was posted near the concept plan area and at five (5) locations in the City on May 5, 2009 and were published or are set to be published in The Times on May14th and May 21st. The City has continued to stay in contact with DLCD, Metro and ODOT throughout this process to ensure they are up-to-date on the status and potential issues as the hearing process has progressed.

Agency Comments

Formal agency comments are included in the record and attached as Attachment 8. The following is a summary of agency and public comments received:

Department of Land Conservation and Development (DLCD)

Meg Fernekees of DLCD commented in an e-mail dated April 14, 2009. Ms. Fernekees indicated that DLCD preferred existing industrial but is ok with the Office Commercial zoning on Highway 99W. DLCD would not support General Commercial zoning for the 99W location. DLCD understood the reasons for establishing General Commercial zoning on the small parcel on Tualatin-Sherwood Road as long as it stays limited in scale and the City's overall supply continues to be in keeping with the Comprehensive Plan and associated Economic Opportunities Analysis and Economic Development Strategy.

Oregon Department of Transportation (ODOT)

ODOT commented in a memo dated April 13, 2009. The comments indicated that Edy Road should be included in the transportation study but Cipole Road could be excluded. ODOT is applying the 0.99 volume to capacity v/c ratio as opposed to the 1.1 v/c ratio used in town centers. Future details on changes to the intersection at Highway 99W need to be coordinated with ODOT.

Marah Danielson of ODOT commented in an e-mail dated April 27, 2009. Ms. Danielson indicates that the 0.99 v/c applies and the 1.1 v/c for town centers does not since the City does not have an adopted plan for the Sherwood Town Center. The traffic analysis indicates that the Adams Avenue Concept Plan may not be able to meet the more restrictive 0.99 v/c ratio without improvements to the 99W/Edy Road intersection. ODOT recognizes that this project would not be able to bear the full cost of the needed improvements at 99W/Edy and would not be proportional. Future industrial growth Area 48 that will add 300+ acres of urban land to Sherwood would need to establish a way to fund traffic improvements at 99W/Edy. ODOT will allow the project to move forward if the City will commit to a way to fund the 99W/Edy improvements as well as identify the specifics of the improvements. ODOT encourages the City to apply for a Transportation and Growth Management (TGM) grant to fund a planning process for the town center where a boundary and uses can be established and the mobility standard clearly identified.

Kinder Morgan Energy indicated that they have not conflicts with the proposal.

The City sent request for comments to the following agencies and did not receive formal comments: Tri-met, NW Natural, Division of State Lands, Bonneville Power Administration[1], Clean Water Services[1], TVF&R, Pride Disposal, Raindrops2Refuge, Portland General Electric[1], Washington County[1], Metro[1]

[1] While the City did not receive formal comments from this agency, coordination throughout the process was provided to ensure the plan is consistent with their standards.

Public Comments

The City mailed notice to property owners within 100 feet of the subject parcels as well as interested parties. The following summarizes the comments received at the time of this report:

Ray Paul submitted comments encouraging approval and indicating that Section 1100 should be zoned "commercial" indicating that it is too valuable to be anything else.

IV. REQUIRED FINDINGS FOR A PLAN TEXT AMENDMENT

A. Local Standards

The City shall find that the following criterion is met by the proposed amendment:

1. Section 4.203.01 Text Amendment Review Criteria

"An amendment to the text of the Comprehensive Plan shall be based upon the need for such an amendment as identified by the Council or the Commission. Such an amendment shall be consistent with the intent of the Comprehensive Plan, and with all other provisions of the Plan and Code, and with any applicable State or City statutes and regulations."

FINDING: The following section of this report addresses the need for the plan map and text amendments as well as consistency with the Plan policies and applicable regional and state standards.

2. Section 4.203.02 Map Amendment Review Criteria

A. The proposed amendment is consistent with the goals and policies of the Comprehensive Plan.

Compliance with the Comprehensive Plan policies is discussed below in IV.A.3

B. There is an existing and demonstrable need for the particular uses and zoning proposed, taking into account the importance of such uses to the economy of the City, the existing market demand for any goods or services which such uses will provide, the presence or absence and location of other such uses or similar uses in the area, and the general public good.

The construction of Adams Avenue from Tualatin-Sherwood Road to Highway 99W is the overwhelming driver of public need for the Concept Plan. Sherwood has limited north-south connections throughout the City and this project will provided additional connectivity between Highway 99W and Old Town Sherwood. The City has over two miles of frontage on Highway 99W but only four crossings. Further, Sherwood Boulevard is the only direct north-south connection from Old Town Sherwood to 99W. Adams Avenue North would add an additional direct connection from Highway 99W to Old Town improving connectivity to the City's core. Adams Avenue is identified in the City's Transportation System Plan in its proposed location.

The 2002 decision that added this area to the growth boundary added the minimal amount of property necessary to accommodate the road improvements. The net developable area within the UGB expansion and currently outside the City limits is only 6.5 acres due to the power substation, power easements and wetland. This area is proposed to be industrial.

Although not required by Metro, the City decided to include additional property already zoned and within the City as part of the concept plan. Three development areas were identified that are currently within the City limits and include a 5.8 acre site on 99W, a 0.9 acre site on Tualatin-Sherwood Road and a 1.4 acre site on 99W adjacent to Home Depot. It has been determined that the property on Highway 99W would be best used as Office Commercial. This area will act as a gateway into the City and the Office Commercial is believed to provide more opportunity for an economically viable and aesthetically inviting gateway than a light industrial site. Further the parcels small size does not lend itself to a use that would have high employment. The small 0.9 acre parcel on Tualatin-Sherwood Road is found to be too small to work as a light industrial site and lends itself better to a small general commercial property that will be adjacent existing and future commercial properties. The commercial and industrial buildable lands in Sherwood were reviewed in the 2006 Economic Opportunities Analysis. Further analysis was conducted as part of this concept plan process to factor in adjustments since 2006. This analysis found that with the proposed zone changes, the 20-year land supply for industrial and commercial would continue to meet or exceed the demand, particularly due to the expected employment uses in Area 48. See Draft Concept Plan Document Appendix 1 for further detail.

FINDING: In consideration of the EOA, adequate demonstration for the amount of commercial and industrial land is met by this proposal. The small amount of land involved will have a minimal and temporary impact on the overall land supply. Further, this proposal greatly serves the public good by providing a collector street connection identified on the City's Transportation System Plan.

C. The proposed amendment is timely, considering the pattern of development in the area, surrounding land uses, any changes which may have occurred in the neighborhood or community to warrant the proposed amendment, and the availability of utilities and services to serve all potential uses in the proposed zoning district.

The concept plan has three distinct development areas, therefore the surrounding area of each unique development opportunity area is defined as follows:

Development Opportunity 1 and 4

Development Opportunity 1 and 4 (aka The 99W Parcels) are proposed to be rezoned from Light Industrial to Office Commercial. The surrounding area of this site is bounded by the BPA power line easement to the west, the PGE power substation to the south, and the urban growth boundary line to then north and east. This area is crossed by Highway 99W and separated from other urban development by power infrastructure and the urban growth boundary line. The area is zoned Light Industrial but has not developed as such. In the 1990s the Sherwood Commercial Center was constructed and is located on the north side of Highway 99W adjacent the BPA power line easement. At the time of development, the Light Industrial zone allowed General Commercial uses and the good visibility available from the highway led to this flexible tenant space to develop with commercial uses. The site north and east of this property, also zoned Light Industrial, has developed as professional office space with two, two to three story office buildings being constructed. In 2001, the Home Depot store was constructed in the Light Industrial zone based on a land use decision made outside the City's control in circuit court. All of these developments has resulted in this area being more office and commercial oriented than Light Industrial. It is questionable whether the decision to zone this area Light Industrial was the best decision in light of the relatively small size of the area and parcels and the fact that it is somewhat isolated from the other industrial areas in the City located further to the south and east along Tualatin Sherwood. Further, access restrictions expected to occur from Adams Avenue make industrial development more challenging. Therefore these changes within the surrounding area do not lend themselves well to development of the property as light industrial given the changes and pattern of land uses that have occurred over the last 10 to 15 years.

Development Opportunity 2 – Central Parcel
This 7.6 acre site is bounded by the BPA power line easement to the west, the power substation to the north and light industrial property to the south. The eastern tip of the property, which is mostly wetlands, is bounded by the urban growth boundary to the east. The majority of this property is within the 2002 UGB expansion and is currently outside the City limits and does not have urban zoning. This site is proposed to be zoned Light Industrial. This is consistent with previous discussion made in 2002 and is also consistent with surrounding land uses. The BPA easement and PGE substation act as a border between proposed commercial zones and the site while east of the site is industrial property developed and zoned as light industrial. Therefore zoning this site Light Industrial is consistent with the surrounding area.

Development Opportunity 3 – Tualatin Sherwood Road Parcel
Although this is the smallest development area at 0.9 acres, the surrounding area for this parcel is much larger than the other development areas. The eastern edge of this parcel is the BPA power line easement that forms a boundary between industrial and commercial uses. North and west of this parcel are areas developed as or zoned to accommodate commercial uses. These commercial uses stretch the length of Tualatin-Sherwood Road west and north to Highway 99W. This parcel is at the intersection of Tualatin-Sherwood Road and Adams Avenue. Currently the southwest corner is developed as commercial and includes the Target store. The northwest contains a mini-storage facility and southeast corner is vacant. Both these large parcels at the northwest and southeast corners are zoned Light Industrial but due to a 1990s Planned Unit Development decision these parcels can be developed as commercial. It is anticipated that the mini storage and large undeveloped area will be commercial. Therefore allowing this parcel to develop as commercial is consistent with the pattern of land uses and development within the surround area of this parcel.

Utilities and Services
Services and utilities are adequate to serve the proposed concept plan or will be made available with the extension of Adams Avenue. A detailed review of utilities is provided in the draft concept plan document and is included as Attachment 1.

FINDING: Each development area within the concept plan has a distinct surrounding area. A different zoning designation is proposed for each development opportunity to address the unique land use and zoning pattern that exists around each development opportunity. The proposal is timely given that Adams Avenue will be extended to serve the concept planning area with access and utilities and allow development.

D. Other lands in the City already zoned for the proposed uses are either unavailable or unsuitable for immediate development due to location, size or other factors.

This criterion is intended for zone change applications for land inside the city limits instead of new UGB additions and therefore this standard is only applicable to the two areas inside the city limits.

Development Opportunity #1 and #4 (99W parcels) are proposed to be zoned Office Commercial (OC). There is only one other area within the City zoned OC and is located on the south side of Highway 99W, north of Woodhaven at the south west end of the City. Within that area the only part that has development or redevelopment potential consists of four tax lots of approximately 7.7 acres. The property has been zoned as OC for many years. The property has limited right-in/right-out access to Highway 99W and would likely need to access through the developed OC property to the south. Also approximately 1.2 acres of the property are constrained by a wetland that is shown on the local wetland inventory. This is shown as a linear wetland feature that segregates the southern 1.3 acre parcel from the remaining developable area. Further this southern parcel is partially developed with a residence and stump removal business. The access constraints, existing use and wetlands make this property less suitable for immediate development since the proposed OC property has better access and is not constrained by wetlands and existing development.

Development Opportunity #2 is only a 0.9 acre parcel and is proposed to be zoned General Commercial (GC). There are other undeveloped GC zoned properties within the City limits. These include areas near the 99W and Meinecke Road intersection and contiguous GC property north of 99W and west of Meinecke Road and property located in the northeast corner of 99W and Tualatin-Sherwood Road.

General Commercial provides for a wide range of land uses. Suitability and availability will depend on many factors including visibility, access, constraint, market demand, owner's willingness to sell or develop and parcel size. The decision to rezone the property to GC commercial is based less on the need of the property and more on the suitability of the parcel as commercial and that fact that it is not a viable industrial parcel. Although there are other available General Commercial parcels there are really no other uses for this site that would make it more viable. Further, the construction of Adams Avenue will provide a four-way intersection with good access to the property and it will be located adjacent to other commercial properties. No other parcels of this relative size within the City have these desirable features making it more suitable than other properties for development as a small -scale commercial property.

FINDING: As discussed above, this standard is satisfied.

3. Comprehensive Plan Policies

Chapter 4:

Section I.2 (Commercial Planning Designations)

Policy 1 - Commercial activities will be located so as to most conveniently service customers.

Policy 2 - Commercial uses will be developed so as to complement rather than detract from adjoining uses.

Policy 3 - Highway 99W is an appropriate location for commercial development at the highway's intersections with City arterial and major collector roadways.

The concept plan is consistent with the applicable commercial designation policies by providing for commercial uses within close proximity to 99W and along Adams Avenue, a designated Collector. The locations are conveniently located to serve residents who will be traveling from the 99W to Adams Avenue and into the City. A multi-use path is proposed next to the road to accommodate pedestrians and cyclists who will work in or patron these business and who do not choose to drive.

FINDING: The concept plan and proposed map and text amendment are consistent with these policies.

<u>Section K.2 (Industrial Planning Designation)</u>
Policy 1 - Industrial uses will be located in areas where they will be compatible with adjoining uses, and where necessary services and natural amenities are favorable.
Policy 2 - The City will encourage sound industrial development by all suitable means to provide employment and economic stability to the community.

The plan proposes light industrial uses in the central area of the concept plan. This is appropriate as light industrial uses are located to the east and the power line easements and substation provide a boundary to the west between commercial and industrial uses.

FINDING: The concept plan and proposed map and text amendment are consistent with these policies as proposed.

<u>Section O (Community Design)</u>
Policy 1 -The City will seek to enhance community identity, foster civic pride, encourage community spirit, and stimulate social interaction through regulation of the physical design and visual appearance of new development.
Policy 2 - The formation of identifiable residential neighborhoods will be encouraged.
Policy 3 - The natural beauty and unique visual character of Sherwood will be conserved.
Policy 4 - Promote creativity, innovation and flexibility in structural and site design.

The concept plan and plan policies meet the above policy goals by establishing a conceptual plan that includes preservation of open spaces, parks, an integrated trail system, industrial and commercial uses that are in harmony with surroundings. The proposed concept plan provides for a gateway into Sherwood that provides for community identity.

FINDING: The concept plan and proposed map and text amendment are consistent with these policies.

Chapter 5:
<u>Section C.3 (Natural resources and Hazards)</u>
Policy 2 - Habitat friendly development shall be encouraged for developments with Regionally Significant Fish and Wildlife Habitats identified as Map V-2
Policy 3 - Prime agricultural soils will be reserved from development until required for other uses
Policy 4 - Provide drainage facilities and regulate development in areas of runoff or erosion hazard.

The 2002 UGB expansion in this area included lands zoned at the time for Exclusive Farm Use (EFU). However, this was the amount of land minimally necessary to support the extension of Adams Avenue. Much of the 34.2 acres added to the UGB was already developed as a power substation. As part of the road project a wetland has been identified and delineated in the field. This wetland will be protected as part of the road project. Additional wetlands may exist within the concept plan boundary and outside the proposed road right-of-way that will need to be identified prior to development. Drainage for the road will be constructed with the project.

FINDING: The concept plan and proposed map and text amendment is consistent with these policies.

Section E.3 (Recreational Resources Policies)

Policy 1 - Open Space will be linked to provide greenway areas.

Policy 2 - The City will maximize shared use of recreational facilities to avoid cost duplication.

Policy 5 - The City will protect designated historic and cultural landmarks in accordance with the Code standards.

The Concept Plan identifies potential trails and a dog park underneath the power lines. In discussion with BPA and PGE officials these are uses that have been approved in other locations and potentially could be approved for use in this location. The trails under the power lines could be linked to the proposed multi-use path along Adams Avenue. Other than the PGE substation and training facility there are no structures, therefore no historic or cultural landmarks have been inventoried within the Concept Planning Area.

FINDING: The concept plan and proposed map and text amendment are consistent with these policies.

Section F.(Energy Resources)

Policy 4 - The City will encourage energy efficiency in the design and use of sites, structures, transportation systems and utilities.

The new road connection will provide for connectivity within the City and reduce travel times. The multi-use path will encourage use by cyclists and pedestrians.

FINDING: The concept plan and proposed map and text amendment are consistent with these policies.

Chapter 6, Goal 1

Provide a supportive transportation network to the land use plan that provides opportunities for transportation choices and the use of alternative modes serving all neighborhoods and businesses.

Policy 1 – The City will ensure that public roads and streets are planned to provide safe, convenient, efficient and economic movement of persons, goods and services between and within the major land use activities. Existing rights of way shall be classified and improved and new streets built based on the type, origin, destination and volume of current and future traffic.

Policy 2 – Through traffic shall be provided with routes that do not congest local streets and impact residential areas. Outside traffic destined for Sherwood business and industrial areas shall have convenient and efficient access to commercial and industrial areas without the need to use residential streets.

Policy 3 – Local traffic routes within Sherwood shall be planned to provide convenient circulation between home, school, work, recreation and shopping.

Convenient access to major out-of-town routes shall be provided from all areas of the city.

Policy 4 – The City shall encourage the use of more energy-efficient and environmentally-sound alternatives to the automobile by:

- **The designation and construction of bike paths and pedestrian ways;**
- **The scheduling and routing of existing mass transit systems and the development of new systems to meet local resident needs; and**
- **Encouraging the development of self-contained neighborhoods, providing a wide range of land use activities within a single area.**

Policy 6 – The City shall work to ensure the transportation system is developed in a manner consistent with state and federal standards for the protection of air, land and water quality, including the State Implementation Plan for complying with the Clean Air Act and the Clean Water Act.

Policy 7 – The City of Sherwood shall foster transportation services to the transportation-disadvantaged including the young, elderly, handicapped, and poor.
Policy 8 – The City of Sherwood shall consider infrastructure improvements with the least impact to the environment.

The proposed alignment of Adams Avenue is within the location identified on the Transportation System Plan (TSP). The road provides for a new north-south collector street connection between Old Town Sherwood and Highway 99W. This will provide for a convenient and direct connection through the City. The construction of a multi-use path next to the road will promote alternative means of transportation consistent with these policies. The road alignment will be outside the delineated wetland and 50-foot buffer avoiding impacts to sensitive areas. Further, the plan identifies the local street extension of Arrow Steering and does not preclude potential future street connections to the west/northwest.

FINDING: The concept plan and proposed map and text amendment are consistent with these policies.

Chapter 7:

Objective 1 – Develop and implement policies and plans to provide the following public facilities and services: public safety fire protection, sanitary facilities, water supply, governmental services, health services, energy and communication services, and recreation facilities
Objective 2 - Establish service areas and service area policies so as to provide the appropriate kinds and levels of services and facilities to existing and future urban areas. (Page 2)
Objective 3 - Coordinate public facility and service plans with established growth management policy as a means to achieve orderly growth. (Page 2)
Objective 4 - Coordinate public facility and service provision with future land use policy as a means to provide an appropriate mix of residential, industrial and commercial uses. (Page 2)

The City of Sherwood will be the primary provider of urban services. Service areas will not extend outside the urban growth boundary. Utilities will be extended consistent with utility master plans for the area (see the Concept Plan document for further details).

FINDING: The concept plan and proposed map and text amendment is consistent with these policies.

Chapter 8 (Urban Growth Boundary Additions)

Policy 1 - Focus growth into areas contiguous to existing development rather than "leap frogging" over developable property.

Policy 2 - Encourage development within areas that have access to public facility and street extensions in the existing city limits.

Policy 6 - Provide multi-modal access and traffic circulation to all new development that reduces reliance on single occupant vehicles (SOV) and encourages alternatives to cars as a primary source of transportation.

Policy 7 - Establish policies for the orderly extension of community services and public facilities to areas added for new growth consistent with the ability of the community to provide necessary services. New public facilities should be available in conjunction or concurrently with urbanization in order to meet future needs. The City, Washington County, and special service districts should cooperate in the development of a capital improvements program in areas of mutual concern. Lands within the urban growth boundary shall be available for urban development concurrent with the provision of the key urban facilities and services.

Policy 8 - Provide for phased and orderly transition from rural to suburban or urban uses. Larger UGB expansion areas shall include a phased development plan to achieve a sustainable transition over time.

The concept planning areas are bounded by existing development and the area has access to public utilities that will be extended with the road construction. Multi-model transportation will be provided by a multi-use path constructed in conjunction with road project. The commercial development to the west is used as a park and ride lot providing access to a bus line that runs through Tigard to downtown Portland (Route #94). The proposed expansion area is small with the majority of the public infrastructure provided with the road project, therefore phasing is not necessary.

FINDING: The concept plan and proposed map and text amendment is consistent with these policies.

B. State Standards

1. **Transportation Planning Rule (TPR):** The City finds that the proposed concept plan complies with applicable requirements of the state Transportation Planning Rule (OAR 660-12-0060) Plan and Land Use Regulation Amendments:

   (1) Amendments to functional plans, acknowledged comprehensive plans, and land use regulations which significantly affect a transportation facility shall assure that allowed land uses are consistent with the identified function, capacity, and performance standards (e.g. level of service, volume to capacity ratio, etc.) of the facility. This shall be accomplished by either:

   (a) Limiting allowed land uses to be consistent with the planned function, capacity, and performance standards of the transportation facility;
   (b) Amending the TSP to provide transportation facilities adequate to support the proposed land uses consistent with the requirements of this division;

(c) Altering land use designations, densities, or design requirements to reduce demand for automobile travel and meet travel needs through other modes; or
(d) Amending the TSP to modify the planned function, capacity and performance standards, as needed, to accept greater motor vehicle congestion to promote mixed use, pedestrian friendly development where multimodal travel choices are provided.

(2) A plan or land use regulation amendment significantly affects a transportation facility if it:

(a) Changes the functional classification of an existing or planned transportation facility;
(b) Changes standards implementing a functional classification system;
(c) Allows types or levels of land uses which would result in levels of travel or access which are inconsistent with the functional classification of a transportation facility; or
(d) Would reduce the performance standards of the facility below the minimum acceptable level identified in the TSP.

A transportation analysis has been completed that analyzed the preferred alternative in accordance with TPR requirements (see Appendix 3 of the Concept Plan document). ODOT standards allow for use of a higher volume to capacity ratio v/c within a Metro designated town center. Sherwood's Town Center is located adjacent to the project and encompasses both the Highway 99W/Tualatin-Sherwood Road intersection and the Highway 99W/Edy Road-Sherwood Boulevard intersection. The City's initial traffic analysis was prepared using the higher v/c ratio of 1.1. ODOT commented that the City does not have an adopted plan for the Town Center and therefore must use the more restrictive v/c standard of 0.99. City staff does not agree with this determination and ODOT and Metro are discussing this matter further. However, in order to ensure TPR compliance regardless of the ultimate outcome of these conversations, the traffic analysis was modified to consider the more restrictive 0.99 v/c ratio as requested by ODOT. Use of the more restrictive 0.99 v/c standard triggers the need for capacity mitigation (such as the construction of a north-eastbound right-turn lane) at the intersection of Highway 99W/Edy Road-Sherwood Boulevard for the proposed zone change. This improvement is costly and the City does not find that this improvement is proportional to the impacts caused by this proposal. The traffic generated from this proposal is a very small fraction of the overall traffic using this intersection (less than a 1% increase in PM peak hour traffic volume)

After further discussions, ODOT has indicated that it would be reasonable for the City to provide documentation as to why the City is confident that the City will establish a funding mechanism for improvements at the Highway 99W/Edy Road-Sherwood Boulevard intersection within the next 2 years and provide information on the proposed improvements to the intersection. ODOT indicated that documentation would include the time frame for the in-process Tonquin Employment Area (Area 48) concept planning and legislative amendments as well as the different funding mechanisms that the City is exploring. ODOT will then consider making a "reasonably likely" determination for the improvements at the Highway 99W/Edy Road-Sherwood Boulevard intersection so that the City can make findings of no significant effect for the TPR 060 based on the Oregon Highway Plan 0.99 v/c mobility standard. It is anticipated that concept planning for the Tonquin Employment Area will be complete by the end of 2009, at which time mitigation measures and funding solutions will be specifically identified for applicable intersections. In addition, the I-5 to 99W Connector Project forwarded a recommendation to Metro to include in the Regional

Transportation Plan (RTP) update that provides additional roadway capacity within the area. While the I-5 to 99W Connector Project recommendation was not achieved by consensus, it is anticipated that funding for elements of the preferred alternative may be identified and become available in upcoming RTP updates. For these reasons it is highly likely that funding for long term solutions to congestion at the 99W/Edy Road intersection will be identified within the next 2 years.

It should be noted that while the City continues to believe that the 1.1 v/c is the appropriate ratio at intersections within Sherwood's designated town center, the City does want to minimize congestion within Sherwood as much as possible. While the City does not believe the small amount of traffic impact at this intersection justifies expensive and extensive short term fixes, the City is committed to findings and obtaining funding to secure a long term solution.

FINDING: As discussed above, if a 1.1 v/c ratio is acknowledged as the appropriate standard within Sherwood's Town Center boundary, intersection performance standards continue to be met with the preferred alternative and TPR compliance is met. In the event the 0.99 v/c ratio is required, the Highway 99W/Edy Road-Sherwood Boulevard intersection does not currently meet the standard and would be slightly worsened, however it is highly likely that funding will be identified within the next 2 years as part of the Tonquin Employment Area concept planning, the implementation of the I-5 to 99W Connector Project, or other planning efforts, therefore, this requirement is met.

2. Statewide Land Use Planning Goals

Goal 1: Citizen Involvement – This Goal calls for "the opportunity for citizens to be involved in all phases of the planning process." It requires each city and county to have a citizen involvement program containing six components specified in the goal. It also requires local governments to have a committee for citizen involvement (CCI) to monitor and encourage public participation in planning.

Appendix 5 to the concept plan document provides a summary of the citizen involvement opportunities provided through the development of the Stakeholder Involvement Group recommendation. The Planning Commission, which is the designated Citizen Involvement Committee under this goal, provides advisory recommendations to the City Council for review and adoption.

FINDING: The plan has been developed consistent with this Goal.

Goal 2: Land Use Planning - outlines the basic procedures of Oregon's statewide planning program. It says that land use decisions are to be made in accordance with a comprehensive plan, and that suitable "implementation ordinances" to put the plan's policies into effect must be adopted. It requires that plans be based on "factual information"; that local plans and ordinances be coordinated with those of other jurisdictions and agencies; and that plans be reviewed periodically and amended as needed. Goal 2 also contains standards for taking exceptions to statewide goals. An exception may be taken when a statewide goal cannot or should not be applied to a particular area or situation.

The concept planning process weighed a number of land uses and zoning designations that address the local, state and regional standards. The plan was developed based on factual information regarding existing conditions and projected demands. The plan was developed with Washington County, Metro, DLCD and ODOT input.

FINDING: The plan has been developed consistent with this Goal.

Goal 3: Agriculture
This goal does not apply.

Goal 4: Forestry
This goal does not apply.

Goal 5: Natural Resources - covers more than a dozen natural and cultural resources such as wildlife habitats and wetlands. It establishes a process for each resource to be inventoried and evaluated. If a resource or site is found to be significant, a local government has three policy choices: preserve the resource, allow proposed uses that conflict with it, or strike some sort of a balance between the resource and the uses that would conflict with it.

The plan was developed using the Metro inventory of significant natural resources and, once brought into the City, the Tualatin Basin Program as implemented by the City will apply. The City implemented the Basin program in 2007 after over 5 years of regional, county-wide and local discussion of the resource values compared to the ESEE consequences of prohibiting development in those resources. Because the Basin program as implemented by the City is compliant with Goal 5 at both the Regional and State level, additional Goal 5 analysis was not conducted for this project in respect to natural resources. A wetland was identified on the site near the road alignment. This wetland has been delineated in the field and surveyed. A natural resources report is being prepared and will be submitted to Clean Water Services for approval. A 50-foot buffer or vegetated corridor will be preserved. No cultural or historic resources have been identified.

FINDING: The plan has been developed consistent with this Goal.

Goal 6: Air and Water Quality - requires local comprehensive plans and implementing measures to be consistent with state and federal regulations on matters such as groundwater pollution.

Sherwood is located in the Portland Metropolitan Air Quality Management Attainment Area. The proposal encourages alternative modes of transportation through construction of a multi-use path as part of the road project.

FINDING: The plan has been developed consistent with this Goal.

Goal 7: Natural Hazards - deals with development in places subject to natural hazards such as floods or landslides. It requires that jurisdictions apply "appropriate safeguards" (floodplain zoning, for example) when planning for development there.

FINDING: No natural hazards have been identified. The property does not contain steep slopes, floodplains or unstable soils.

Goal 8: Recreation - This goal calls for each community to evaluate its areas and facilities for recreation and develop plans to deal with the projected demand for

them. It also sets forth detailed standards for expedited siting of destination resorts.

The City considered identified park needs under the power lines to ensure that uses under the lines occurred that would provide for a well maintained and compatible use. Initially the City considered ball fields; however comments back from the utility agencies indicated a concern with these uses. There was, however support from PGE and BPA for establishing a dog park and walking trails under the power lines. PGE and BPA officials have indicated that these uses are possible but further approvals and details would be needed. City staff discussed the opportunity with the Parks Board. The Parks Board is supportive of the concept if funding is obtained from private sources, grants, etc.

FINDING: The plan has been developed consistent with this Goal.

Goal 9: Economic Development - **calls for diversification and improvement of the economy and family wage jobs. It asks communities to inventory commercial and industrial lands, project future needs for such lands, and plan and zone enough land to meet those needs**

The concept planning area was expanded to include vacant areas outside the 34.2-acre UGB expansion and includes a total of 55.5 acres within the planning area. Of this 55.5 acres, only 15.7 acres are available for development due to land already in use by a power substation and high voltage power line easements. Three distinct and segregated development areas were identified in the concept planning process. It was apparent that each of these development areas had unique conditions that warranted separate zoning for each area to fit in with uses and zoning adjacent to each area. Due to the limited amount of land available for development it was most prudent to look at what the best use for each specific site is in context of its surroundings being that the small amount of land would have limited impacts on the overall land inventory for the City.

The commercial and industrial land supply was inventoried in the 2006 Economic Opportunities Analysis. For the purposes of the concept plan, the inventory was updated and the preferred alternative evaluated in terms of industrial and commercial land needs and available supply. It was determined that although the proposed rezoning would remove a net of 1.6 acres of industrial land from the City supply (after adding the change from FD-20 to LI), Area 48 will add approximately 348 acres of industrial. With Area 48 and with the proposed zoning for this concept plan the City will be meeting or exceeding its 20-year commercial and industrial land supply (see Appendix 1 of the Concept Planning Document for a Goal 9 Inventory and Analysis).

FINDING: The plan has been developed consistent with this Goal.

Goal 10: Housing - **This goal specifies that each city must plan for and accommodate needed housing types, such as multifamily and manufactured housing. It requires each city to inventory its buildable residential lands, project future needs for such lands, and plan and zone enough buildable land to meet those needs. It also prohibits local plans from discriminating against needed housing types.**

FINDING: No housing proposed. This goal does not apply.

<u>Goal 11: Public Facilities</u> - calls for efficient planning of public services such as sewers, water, law enforcement, and fire protection. The goal's central concept is that public services should to be planned in accordance with a community's needs and capacities rather than be forced to respond to development as it occurs.

This goal is addressed by the existing water, sanitary and storm sewer master plans that already have anticipated development within this area and identified projects that will ensure this area will be adequately served. Utilities will be extended within Adams Avenue consistent with these master plans.

FINDING: The plan has been developed consistent with this Goal.

<u>Goal 12: Transportation</u> - The goal aims to provide "a safe, convenient and economic transportation system." It asks for communities to address the needs of the "transportation disadvantaged."

FINDING: The proposed concept plan was reviewed using the TPR standards. This staff report evaluates TPR criteria to make findings of fact and demonstrate compliance as discussed previously in this report.

<u>Goal 13: Energy Conservation</u> - declares that "land and uses developed on the land shall be managed and controlled so as to maximize the conservation of all forms of energy, based upon sound economic principles."

Compliance with Goal 13 is addressed through compliance of the City's Comprehensive Plan Policy (Chapter 3, Section F, Policy 4) regarding energy resources. As discussed previously the road project will include a multi-use path to promote alternative means of transportation.

FINDING: The plan has been developed consistent with this Goal.

<u>Goal 14: Urbanization</u> - This goal requires cities to estimate future growth and needs for land and then plan and zone enough land to meet those needs. It calls for each city to establish an "urban growth boundary" (UGB) to "identify and separate urbanizable land from rural land." It specifies seven factors that must be considered in drawing up a UGB. It also lists four criteria to be applied when undeveloped land within a UGB is to be converted to urban uses.

FINDING: In the Portland Metropolitan Area, Metro has the burden and authority to conduct growth and land need projections and determine whether and where to expand the Urban Growth Boundary, therefore, Sherwood cannot address urbanization criteria outside the existing Comprehensive Plan policies.

C. Regional Standards

1. Title 11

All territory added to the Urban Growth Boundary as either a major amendment or a legislative amendment pursuant to Metro Code Chapter 3.01 shall be subject to adopted comprehensive plan provisions consistent with the requirements of all applicable titles of the Metro Urban Growth Management Functional Plan and in particular this Title 11. The comprehensive plan provisions shall be fully coordinated with all other applicable plans. The comprehensive plan provisions shall contain an

urban growth plan diagram and policies that demonstrate compliance with the RUGGO, including the Metro Council adopted 2040 Growth Concept design types. Comprehensive plan amendments shall include:

A. Specific plan designation boundaries derived from the general boundaries of design type designations assigned by the Council in the Ordinance adding the territory to the UGB.

The area brought into the UGB is identified as industrial on the 2040 Growth Concept Map. No other specifics were given in Ordinance N0. 02-986A in regards to land uses. This area is planned to be zoned Light Industrial (LI) and used for industrial consistent with the Metro design type.

FINDING: As discussed above this standard has been met.

B. Provision for annexation to the district and to a city or any necessary service districts prior to the urbanization of the territory or incorporation of a city or necessary service districts to provide all required urban services.

The City intends to annex the property into the City limits following adoption of the concept plan consistent with Washington County/Sherwood Urban Planning Area Agreement (UPAA). Further, the area is planned to be annexed into Clean Water Services' boundary for storm and sanitary sewer services. The City will provide urban services as part of any urban development. Utilities will be extended with the proposed north Adams Avenue extension that will serve this area. As shown on the Development Opportunities map contained within the Concept Plan document, due to the presence of a large power substation only 6.5 acres are available for urban development within the UGB expansion area.

FINDING: As discussed above, the concept plan is consistent with this standard.

C. Provision for average residential densities of at least 10 dwelling units per net developable residential acre or such other densities that the Council specifies pursuant to Section 3.01.040 of the Urban Growth Boundary Functional Plan.

FINDING: Housing is not proposed, this standard is not applicable.

D. Demonstrable measures that will provide a diversity of housing stock that will fulfill needed housing requirements as defined by ORS 197.303. Measures may include, but are not limited to, implementation of recommendations in Title 7 of the Urban Growth Management Functional Plan.

FINDING: Housing is not proposed, this standard is not applicable.

E. Demonstration of how residential development will include, without public subsidy, housing affordable to households with incomes at or below area median incomes for home ownership and at or below 80 percent of area median incomes for rental as defined by U.S. Department of Housing and Urban Development for the adjacent urban jurisdiction. Public subsidies shall not be interpreted to mean the following: density bonuses, streamlined permitting processes, extensions to the time at which systems development charges (SDCs) and other fees are collected, and other exercises of the regulatory and zoning powers.

FINDING: Housing is not proposed, this standard is not applicable.

F. Provision for sufficient commercial and industrial development for the needs of the area to be developed consistent with 2040 Growth Concept design types. Commercial and industrial designations in nearby areas inside the Urban Growth Boundary shall be considered in comprehensive plans to maintain design type consistency.

Light Industrial is proposed for the area added to the UGB in 2002 and is consistent with the 2040 Growth Concept Map. General Commercial and Office Commercial is being considered for areas already inside the city limits. These areas are listed as employment on the 2040 Growth Concepts map. As detailed within this report and in Appendix 1 to the concept plan, the amount of industrial land provided is consistent with the identified need.

FINDING: As demonstrated above, this standard has been met.

G. A conceptual transportation plan consistent with the applicable provision of the Regional Transportation Plan, Title 6 of the Urban Growth Management Functional Plan, and that is also consistent with the protection of natural resources, either identified in acknowledged comprehensive plan inventories or as required by Title 3 of the Urban Growth Management Functional Plan. The plan shall, consistent with OAR Chapter 660, Division 11, include preliminary cost estimates and funding strategies, including likely financing approaches.

North Adams Avenue is listed as a collector street on the City's Transportation System Plan (TSP). The road alignment shown on the concept plan follows the TSP alignment. The City is within Clean Water Services' jurisdiction and the City intends to bring the area into the Clean Water Services District boundary prior to development of the road or property. Clean Water Services, through compliance with the design standards, implements Title 3 within the City of Sherwood and surrounding area.

A wetland specialist has performed a wetland delineation and did not identify any jurisdiction wetlands within the road corridor. There are no significant Tile 3 resources within the concept planning area that have been mapped or identified on-site by a wetland specialist. Part of a wetland and its buffer exist within the concept planning area at the east boundary. This wetland and buffer has been delineated in the field and surveyed for use in the design of the road project. A natural resources report is being prepared for submittal to Clean Water Services.

FINDING: As demonstrated above, this standard has been met.

H. Identification, mapping and a funding strategy for protecting areas from development due to fish and wildlife habitat protection, water quality enhancement and mitigation, and natural hazards mitigation. A natural resource protection plan to protect fish and wildlife habitat, water quality enhancement areas and natural hazard areas shall be completed as part of the comprehensive plan and zoning for lands added to the Urban Growth Boundary prior to urban development. The plan shall include a preliminary cost estimate and funding strategy, including likely financing approaches, for options such as mitigation, site acquisition, restoration, enhancement, or easement dedication to ensure that all significant natural resources are protected.

Of the 34.2 acres added to the UGB in this location, 16.6 acres are developed as a power substation. With the exception of the small wetland and buffer and a power linemen training facility the remaining area is currently being farmed.

Sherwood is part of the Partners for Natural Places (Partners) alliance. The Partners represent an alliance of eight cities and Washington County working together with Metro and Clean Water Services to meet federal, state and regional requirements for protecting riparian corridors and wildlife habitat in the Tualatin Basin. Sherwood is working through the Partners adopted amendments to the City's comprehensive plan and zoning code to be incompliance with Metro's Title 13 (Nature in Neighborhoods) which implements the latest requirements of the State's Goal 5 (Natural Resources, Scenic And Historic Areas, And Open Spaces). Implementation through Clean Water Services and City regulatory requirements ensures compliance with habitat conservation planning.

Fieldwork was conducted to delineate wetland boundaries and to determine wetland buffers. A small jurisdictional wetland was identified on the site by Mason Bruce & Girard. Mason Bruce & Girard did not note any high quality habitat areas within the jurisdictional wetland. A natural resource assessment was conducted to determine the vegetated corridor buffer. This report is currently being completed and will be submitted to Clean Water Services for approval. The vegetated corridor is rated as degraded per Clean Water Services Standards RO-07, and is a currently active agricultural operation.

The area does not fall within the Rock Creek floodplain located to the east, does not contain steep or hazardous slopes, and areas not farmed contain extensive non-native/invasive plant species. There does not appear to be a direct, surface water linkage to Rock Creek and the jurisdictional wetland is located on a terrace approximately 40 feet above the Rock Creek floodplain.

The development of the roadway infrastructure project does not impact the jurisdictional wetland nor its vegetated corridor buffer. The wetland and buffers are indicated on the concept plan as undevelopable areas to be preserved with future development.

FINDING: As demonstrated above, this standard has been met.

I. A conceptual public facilities and services plan for the provision of sanitary sewer, water, storm drainage, transportation, parks and police and fire protection. The plan shall, consistent with OAR Chapter 660, Division 11, include preliminary cost estimates and funding strategies, including likely financing approaches.

The expansion area consists of only 6.5 acres of net developable land and will be zoned Light Industrial (LI) and will have little to no impact on utilities capacity. Utilities will be provided with the Adams Avenue road project construction. The area will be brought into the Clean Water Service's boundary. Clean Water Services will provide sanitary sewer and storm drainage. The area will be annexed to the City of Sherwood who will provide parks, police and other urban services. The area is within the Tualatin Valley Fire & Rescue District who provides fire protection services. The light industrial, office commercial and general commercial zones will have no impact on school services. Right-of-way for the road is expected to be dedicated at no cost by Portland General Electric and road construction is anticipated to be paid by a private developer as documented in a memo of understanding between the City, PGE and the developer.

FINDING: As demonstrated above, this standard has been met.

J. A conceptual school plan that provides for the amount of land and improvements needed, if any, for school facilities on new or existing sites that will serve the territory added to the UGB. The estimate of need shall be coordinated with affected local governments and special districts.

FINDING: No housing is proposed and therefore no need for schools have been identified.

K. An urban growth diagram for the designated planning area showing, at least, the following, when applicable:
1. General locations of arterial, collector and essential local streets and connections and necessary public facilities such as sanitary sewer, storm sewer and water to demonstrate that the area can be served;
2. Location of steep slopes and unbuildable lands including, but not limited, to wetlands, floodplains and riparian areas;
3. General locations for mixed use areas, commercial and industrial lands;
4. General locations for single and multi-family housing;
5. General locations for public open space, plazas and neighborhood centers; and
6. General locations or alternative locations for any needed school, park or fire hall sites.

Street connections, buildable lands, sensitive areas, open space, commercial and Industrial areas are shown on the Concept Plan map. None of the other standards apply including steep slopes, housing and schools.

FINDING: A concept plan has been prepared meeting these standards.

L. A determination of the zoned dwelling unit capacity of zoning districts that allow housing.

FINDING: Does not apply, housing is not proposed.

M. The plan amendments shall be coordinated among the city, county, school district and other service districts.

As stated previously, the concept plan process included extensive public involvement overseen by the steering committee comprised of the Planning Commission.

FINDING: As demonstrated above, this standard has been met.

<u>Other Metro conditions</u>

<u>*Condition #2 -*</u> *The city or county with land use planning responsibility for an area brought into thc UGB shall apply the 2040 Growth concept design types shown on Exhibit C of this ordinance to the planning study area.*

FINDING: In reviewing Exhibit C, all of the findings and discussion are in regards to the needs for a transportation connection between Tualatin-Sherwood Road and Highway 99W as well as expansion of Teal Road north of 99W. There is no discussion of land uses for this area mainly because the developable land is limited and the primary purpose of the UGB expansion is to establish transportation connections. The land is shown as industrial on the 2040 Growth Concept map and is intended to be zoned Light Industrial. Other contiguous property already inside the City limits has been being studied for rezoning from Light Industrial to Office Commercial and/or General Commercial. These areas are not required to be part of the concept plan but have been added in the interest of good planning and looking at this area as a whole. As evidenced by Appendix 1 of the Concept Plan, the changes from industrial to commercial land can be accommodated over the next 20 years.

Condition #3 - The city or county with land use planning responsibility for an area included in the UGB shall apply interim protection standards in Metro Code Title 11, UGMFP, section 3.07.1100, to the study area.

FINDING: The land is currently under Washington County jurisdiction and is zoned Future Development 20-acres (FD-20). Urban development will not be approved for this area until the concept plan is adopted by the City, the area annexed into the City and urban zoning is assigned to the property by the City. This condition is satisfied.

Condition #4 - No urbanization shall occur in this area until the actual alignment of the Adams Road Extension has been determined and adopted in the City of Sherwood TSP

FINDING: The alignment has been adopted into the TSP. Adams Avenue is intended to be the first improvement in the area that will allow urban development to occur. This condition is satisfied.

Condition #5 - In the application of statewide planning Goal 5 (Natural Resources, Scenic and Historic Areas and Open Spaces) to Title 11 planning, the city shall comply with those provisions of Title 3 of the UGMFP acknowledged by the Land Conservation and Development Commission (LCDC) to comply with Goal 5. If LCDC has not acknowledged those provisions of Title 3 intended to comply with Goal 5 within four years following the effective date of this ordinance the city shall consider any inventory of regionally significant Goal 5 resources adopted by resolution of the Metro Council in the county's Goal 5 process.

FINDING: The area will be brought into the Clean Water Services District boundary. Clean Water Services is in compliance with Title 3 and will implement Title 3 for this area. Sherwood is part of the Partners for Natural Places (Partners), an alliance of eight cities and Washington County working together with Metro and Clean Water Services to meet federal, state and regional requirements for protecting riparian corridors and wildlife habitat in the Tualatin Basin. Sherwood working through the Partners adopted amendments to the City's comprehensive plan and zoning code to be in compliance with Metro's Title 13 and therefore the latest requirements of the State's Planning Goal 5. Implementation through Clean Water Services and City regulatory requirements ensures compliance with habitat conservation planning and Goal 5. This condition is satisfied.

Condition #6 - Copies of all applicable comprehensive plan provisions and implementing ordinances as proposed to be amended.

FINDING: The City intends to use existing zoning designations. Findings of compliance are within this report. Proposed text amendments for Sherwood Comprehensive Plan Chapter 8: Urban Growth Boundary Additions are attached as Attachment 5 and proposed development code changes are attached as Attachment 7.

V. RECOMMENDATIONS

Based on the above findings of fact, and the conclusion of law based on the applicable criteria, staff recommends the City Council approve the concept plan and the plan amendment (PA 09-02), subject to any additional amendments

VI. ATTACHMENTS

Exhibits – these are part of the record and have been presented to the Commission during the course of their review.

1. Draft Concept Plan Map – Preferred Alternative
2. Draft concept plan document
3. Appendix to the Concept Plan document including:
   A. Zoning and Buildable Lands Memorandum (Goal 9 Compliance Memorandum) dated May 18, 2009
   B. Stakeholder Meetings Summaries
   C. Open House Survey
   D. Existing Conditions Report
   E. Public Involvement Plan
4. Technical Appendix to the Concept Plan document including:
   A. Traffic Existing and Future Memorandum
   B. Traffic Alternatives Analysis Memorandum
   C. Traffic Analysis of Preferred Alternative
5. Proposed Comprehensive Plan Changes - Chapter 8
6. Proposed Comprehensive Map
7. Proposed Zoning Text Changes - OC Zone
8. Agency Comments
   8a – DLCD e-mail from Meg Fernekees dated April 14, 2009
   8b – ODOT memo from Doug Baumgartner & Seth Brumley dated April 13, 2009
   8c – ODOT e-mail from Marah Danielson dated April 27, 2009
   8d – memo from Tom Nelson, City of Sherwood Economic Development Manager
9. Public Comments
   9a – Ray Paul

ADAMS AVENUE NORTH EXTENSION - PREFERRED CONCEPT PLAN

SHERWOOD, OREGON

MAY 18, 2009

Harper Houf Peterson Righellis Inc.

Attachment 1

Adams Avenue North Concept Plan

City of Sherwood Oregon

HHPR Harper Houf Peterson Righellis Inc.

ENGINEERS ◆ PLANNERS
LANDSCAPE ARCHITECTS ◆ SURVEYORS

Draft #3 - May 18, 2009

Attachment 2

ADAMS AVENUE NORTH CONCEPT PLAN

Summary and Recommendations

Prepared by:
Harper Houf Peterson Righellis Inc. (HHPR)

Prepared for:
City of Sherwood

Consultant Team:
Cogan Owens Cogan, LLC
DKS Associates

Draft #3 – May 18, 2009

PROJECT PARTICIPANTS

Stakeholder Involvement Group

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Cam Durrel	Les Schwab
Jim Morse	Juniper Ridge Investments LLC
Roger Fulop	Home Depot
Matt Langer	Langer Family LLC
Matt Grady	Gramor Development
Bill Blakeslee	Bilet Products Company Inc.
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APPENDIX

1. Zoning and Buildable Lands Memorandum dated May 18th, 2009
2. Stakeholder Meetings Summaries
3. Open House Survey
4. Existing Conditions Report
5. Public Involvement Plan

TECHNICAL APPENDIX

1. Traffic Existing and Future Memorandum
2. Traffic Alternatives Analysis Memorandum
3. Traffic Analysis of Preferred Alternative

REFERENCES

1. City of Sherwood Economic Development Strategy
2. Downtown Sherwood Market Study

I. EXECUTIVE SUMMARY

The Adams Avenue North Concept Plan is a guide to development of 55.5 acres southeast of Highway 99W and north of Tualatin-Sherwood Road. Of this 55.5 acres, 34.2 acres were added to the regional urban growth boundary by Metro in 2002 at the request of the City of Sherwood. The primary objective in adding this land to the urban growth boundary was to allow construction of a collector street and alternative route between Highway 99W/Tualatin-Sherwood Road and Old Town/Downtown Sherwood. Although not the primary purpose for expanding the urban growth boundary, this additional land will become available for urban development once the concept plan is finalized and implemented.

The purpose of this concept plan report is to document the following:

- Inventory key opportunities and constraints
- Present the input received from the stakeholder involvement group
- Make a recommendation of a final concept plan for adoption by the Sherwood Planning Commission and City Council
- Meet Metro Title 11 requirements for creation of a concept plan

Key features of the recommended concept plan are:

- Allow for gateway-oriented commercial development along Highway 99W and Tualatin-Sherwood Road
- Allow for industrial development in the interior of the plan area
- Encourage use of power line easements for trails, dog park and parking areas
- Encourage visual buffering of the power substation
- Encourage roads and trails that interconnect existing development to adjacent roads and property
- Encourage placement of buildings near roads and parking behind buildings

II. BACKGROUND

Introduction

The Adams Avenue North planning area was brought into the Sherwood urban growth boundary (UGB) in 2002 to allow construction of a collector street and alternative route between Highway 99W Tualatin-Sherwood Road and Old Town/Downtown Sherwood. Although not the primary purpose for expanding the UGB, approximately 34.2 acres of land owned by Portland General Electric (PGE) will become available for urban development once the concept plan is finalized and implemented. However, much of this property is encumbered by a large electrical substation, high voltage transmission lines and tall transmission line towers. Much of the PGE infrastructure was constructed in the 1950s and 1960s prior to the development boom in Sherwood that took place over the last 20 years. Therefore, the area has grown up around this existing infrastructure.

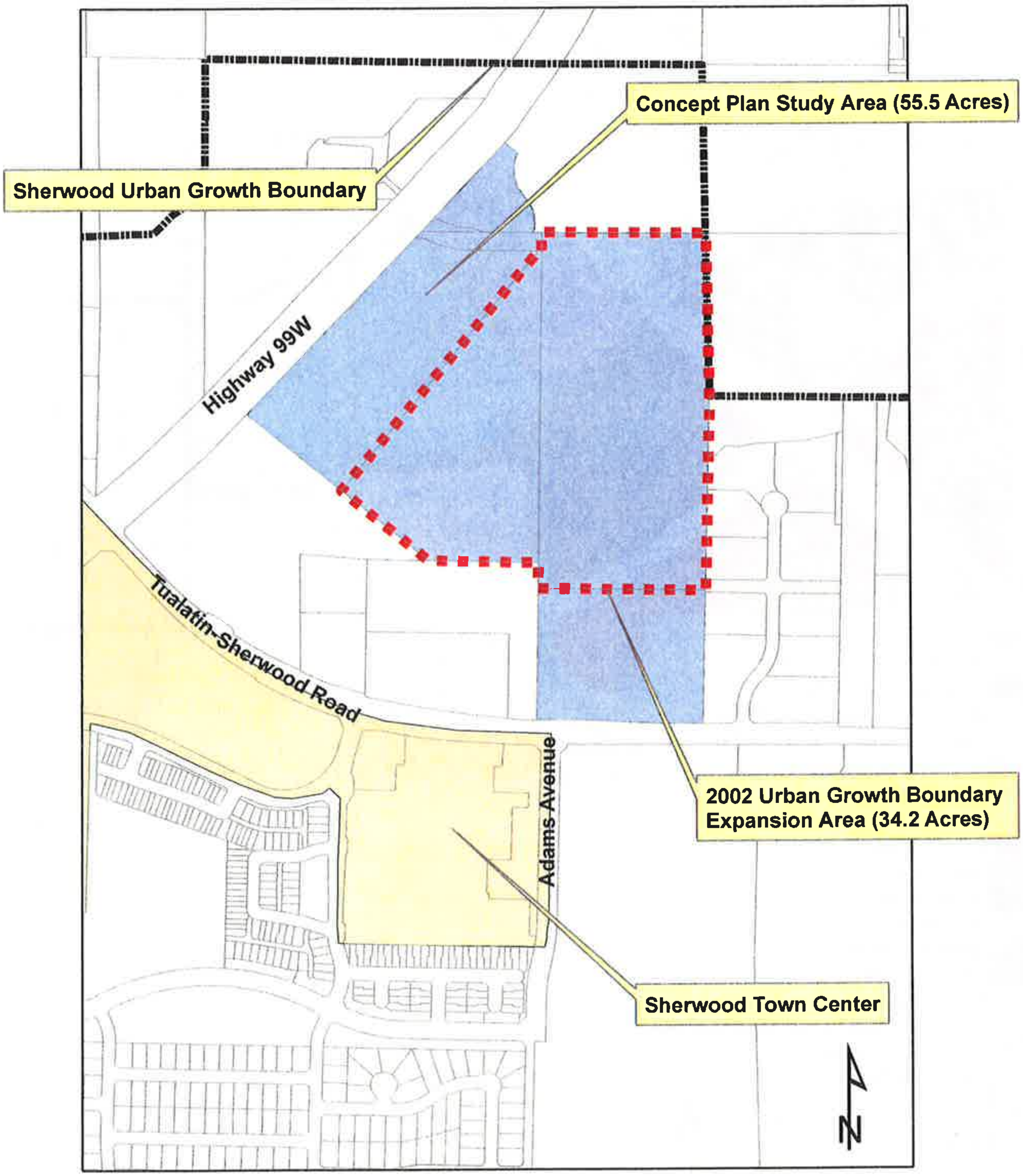
Site Description

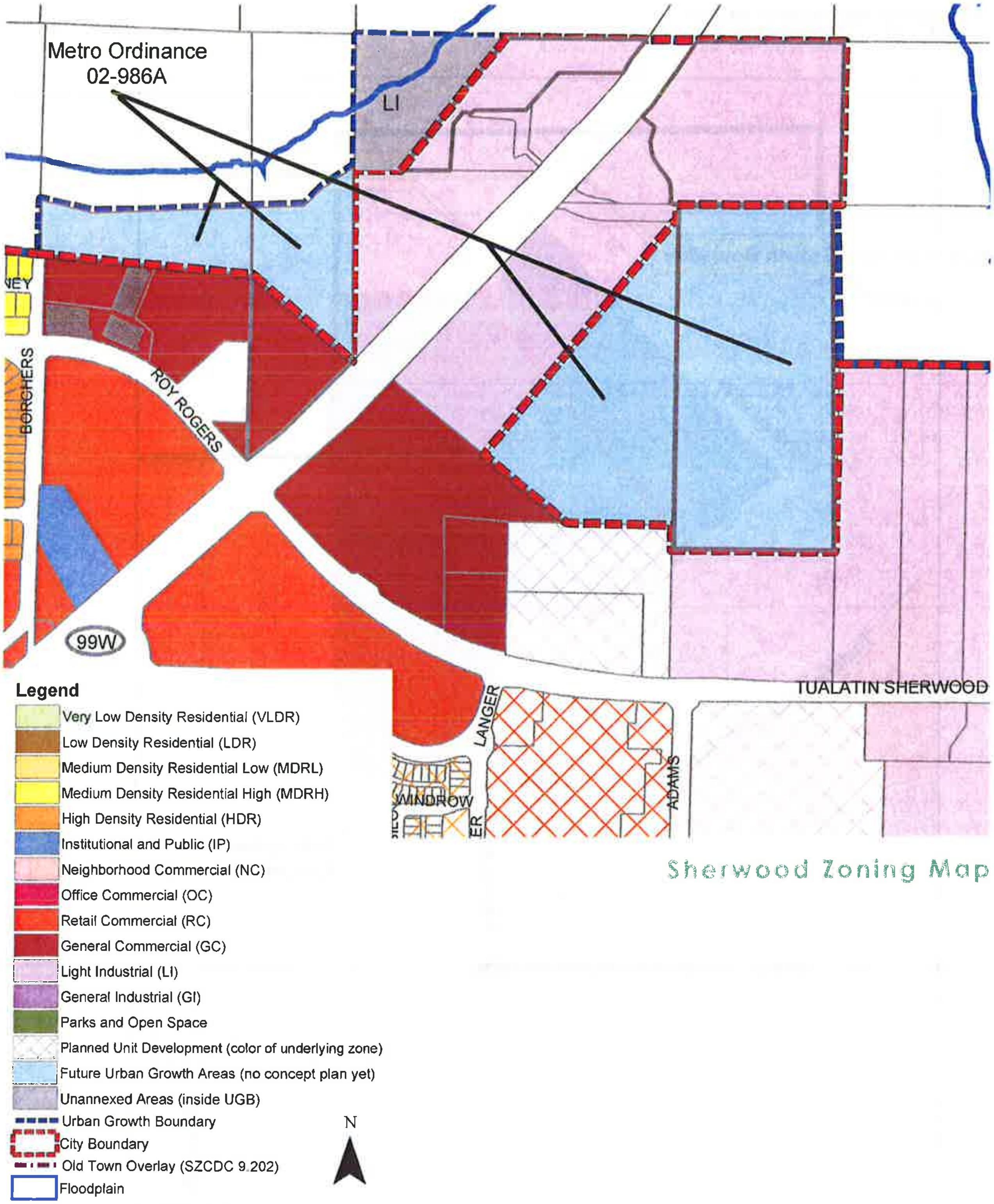
In general, the area is bounded by Highway 99W to the northwest, Tualatin-Sherwood Road to the south and the urban growth boundary to the east. There is a Portland General Electric (PGE) transmission facility located in the middle of the project area and a PGE training facility on the eastern portion. Large PGE and Bonneville Power Administration transmission towers and lines cross the project area. The area is mostly flat and areas not covered by the transmission towers, substation and training facility are currently being farmed. The project area parcels are currently zoned Light Industrial within the city limits and Future Development-20 (FD-20) by the County in areas not within the city limits. FD-20 acts as a holding zone until the City annexes the property and rezones it for urban development.

Areas to the west, across Highway 99W are mostly developed with office or professional and personal service uses but are zoned Light Industrial. The parcel to the north, although zoned for Light Industrial, is developed with a Home Depot, a commercial use. Much of these properties were allowed commercial uses at a time when the City allowed commercial uses within industrial zoning. The City has since revised the zoning code to no longer allow commercial uses in industrial zones. The City considers the 99W and Adams Avenue intersection as a visual gateway to the Sherwood community. Areas to the east and north, outside the UGB, are agricultural and resource lands while property south and east is industrial. The area to the east and inside the city limits is zoned Light Industrial and is a developing industrial subdivision. There are large tracts of undeveloped Light Industrial property south of the study area on the opposite side of Tualatin-Sherwood Road that is expected to develop with commercial uses consistent with a prior Planned Unit Development approval.

See vicinity map on the next page.

Project Vicinity Map





Sherwood Zoning Map

Regional and Local Context

The Adams Avenue North Concept Plan area is 55.5 acres of land located at the northeastern edge of Sherwood and the UGB. It marks a transition point between the City's current edge of urbanization and the rural and resource lands to the north and east.

The majority (34.2 of the 55.5 acres) was added to the Metro UGB in 2002. An additional 20.2 acres of undeveloped land already within the City limits was added to the concept plan study area. The Concept Plan area carries Metro design type designations of Employment and Industrial on the Region 2040 Growth Concept Map. Employment design type areas, as defined by Metro, allow various types of employment with some residential development and limited commercial uses. Industrial design type areas are set aside by Metro primarily for industrial activities with limited supporting uses.

The primary objective of planning this area is for a road connection between Highway 99W and Tualatin-Sherwood Road and completion of Adams Avenue that will eventually extend from Oregon Street near Sherwood's Old Town to Highway 99W. The UGB was expanded at the request of the City and the following findings were made by the Metro Council in the ordinance that expanded the urban growth boundary in this area:

- "Whereas, transportation improvements that make areas work is part of the transportation priorities of the Metro Council."
- "Whereas, this road alignment and extension of Adams road has the goal to relieve congestion"

Unlike larger areas that have been added to the Sherwood UGB such as the Brookman Road area, Area 59 and Area 48, the North Adams Avenue Concept Plan is limited in development potential and therefore does not carry as high of importance as a development area. Nevertheless, the area does serve as an important transportation connection and as an eventual new gateway to the City as people leave the highway and enter the City limits at the north end of the project area.

Existing Cond itions Inventory – Policy and Regulatory Background

Development of a successful concept plan begins with inventorying existing conditions. A detailed existing conditions report was completed before commencement of the project and is attached for reference. Review of existing conditions should identify categories that have policy and regulatory requirements for land use. These categories start at the state level as the 19 Statewide Planning Goals. Metro is responsible at a regional level for implementing these goals and does so through the 2040 Growth Concept. Each community in Metro, including Sherwood must be in compliance with the State and Metro in applying zoning and land use regulations. Sherwood implements the 2040 Plan and Statewide Planning Goals through the City's Comprehensive Plan, Transportation System Plan and utility and facility master plans.

The following land use categories were studied in review of existing conditions:

1. *Public Involvement*

The following groups were established to solicit input for the plan:

Stakeholder Working Group (SWG) – an advisory committee comprised of property owners, business owners, institutional partners, and developers charged with providing input and advice to the Project Design Team and ultimately to the City Council.

Planning Commission (PC) – charged with providing on-going input and guidance to the Project Team about technical aspects of the concept plan and recommendation to the City Council.

Three meetings were held with the stakeholder working group to develop a preferred plan. Work sessions were held with the Planning Commission to review the stakeholder work group's refined alternative. A public open house was held to inform the public of the stakeholder working group's refined alternative. Updates were provided on the City's webpage.

A public involvement plan was developed to identify stakeholders and interested parties. The public involvement plan is attached. Further discussion of the stakeholder involvement process is provided in Section III of this report.

2. Natural Resources

Wetlands, streams and sensitive areas are regulated by four agencies in Sherwood. The Army Corps of Engineers and Oregon Division of State Lands regulate what is termed as jurisdictional streams and wetlands. While these agencies regulate the wetland itself, Clean Water Services regulates mandatory vegetated corridors or buffers from these features. These regulations are aimed at the protection of riparian habitats. In addition to these riparian protections, the City of Sherwood has voluntary regulations for projects with upland habitats that may be in excess of the riparian protections. These additional upland regulations were developed to be in compliance with Nature in Neighborhoods, Title 13 of Metro's 2040 Urban Growth Management Functional Plan.

Fieldwork was conducted to delineate wetland boundaries and to determine wetland buffers. A small jurisdictional wetland was identified on the site by the project team. The project team did not note any high quality habitat areas near the jurisdictional wetland. A Natural Resource Assessment is being prepared to determine the vegetated corridor buffer. This fieldwork was done along the road corridor for Adams Avenue. No significant features of note have been identified within the concept plan boundaries but specific field work must be done prior to development of areas outside the road corridor as required by Clean Water Services.

3. Natural Hazards

Statewide Planning Goal 7 identifies natural hazards as floods, landslides, earthquakes and related hazards as well as tsunamis, coastal erosion, and wildfires. The City of Sherwood Comprehensive Plan Part II, Chapter 5 indentifies the following potential hazards for Sherwood where development should be restricted and/or limited:

- 100-year floodplains
- Areas with slopes which have slide or erosion potential
- Areas with weak foundation soils
- Wetlands

The study area is not within a 100-year floodplain, is mostly flat and does not contain steep slopes or weak foundation soils. Construction within wetlands is not contemplated by the concept plan. Wetlands have been delineated and will be protected as described above.

4. *Parks and Historic Resources*

The adopted Sherwood Parks and Recreation Master Plan shows no parks or recreation facilities proposed for the study area. The Bonneville Power Administration easement is identified as open space on the Master Plan. The City adopted the Sherwood Cultural Resource Inventory as an appendix to the Comprehensive Plan. No historic or cultural resources have been identified within the study area.

5. *Economic Development*

The City of Sherwood completed an Economic Development Strategy in 2007. Economic Development Policy 5 states that, "The City will seek to diversify and expand commercial and industrial development in order to provide nearby job opportunities, and expand the tax base."

Residential and institutional uses have not been considered for the site as industrial and commercial uses are most appropriate next to the power infrastructure and existing commercial and industrial developments. The proposed commercial and industrial land is consistent with the policies of the Economic Development Strategy.

6. *Public Facilities and Services*

The City of Sherwood Comprehensive Plan Part II, Chapter 7 – Community Facilities and Services lists public facility and services as follows:

- Public Utilities
- Private/Semi-Public Utilities
- Transportation (Listed in Item 7 below)
- Public Health and Safety
- Recreation (Listed in Item 4 above)
- Schools

The concept plan impacts these areas as follows:

A. Public Utilities

Public utilities include water, sanitary sewer and stormwater. The City of Sherwood updated these utility master plans in 2005 and 2007. The City works in conjunction with Clean Water Services (CWS) and Tualatin Valley Water District (TVWD) to provide these services through intergovernmental agreements. The master plan updates done after the area was added to the growth boundary in 2002 reviewed this area for utility service and did not identify deficiencies. The area will be able to be serviced by utilities provided with the Adams Avenue Street extension. These utilities are addressed as follows:

Water: The City's primary water supply is from four groundwater wells owned by the City and operated by TVWD. The City also supplements supply from the groundwater wells through a 24-inch diameter connection to the City of Tualatin's 36-inch diameter Tualatin- Portland supply main.

For the project area, there is currently an 8-inch water line in Highway 99W and an 8-inch water line in Tualatin-Sherwood Road. The Master Plan recommends upsizing the 8-inch in Tualatin-Sherwood Road to a 12-inch and installing a 16-inch water line in Adams Avenue North for connectivity and service.

Sanitary: The City owns, operates and maintains the wastewater collection system within the City limits. Wastewater is collected from residential, commercial, and industrial services and is discharged into interceptor sewers owned and operated by CWS. Wastewater is then pumped by CWS for treatment at their Durham Advanced Wastewater Treatment Facility located in the City of Tigard. The City is responsible for all wastewater collection piping smaller than 24 inches in diameter located within the City limits, and CWS owns and maintains interceptor sewers 24 inches and larger, as well as all pump stations and force mains.

For the project area, sanitary sewer can be provided from existing lines north and south of the study area. These lines drain to the Rock Creek trunk line. Although the proposed development of the concept plan does not adversely impact capacity, future development of the industrial zones in Area 48, a large urban growth boundary expansion in northeastern Sherwood, will lead to capacity issues that will need to be addressed with the eventual planning and development of Area 48.

Stormwater: Stormwater treatment is typically done on a project-by-project basis with each developer creating their own facility. In some cases, the developer or the City builds regional treatment facilities that are maintained by the City and that cover larger areas.

The study area generally has one low point. A storm drainage system will be constructed with Adams Avenue to convey runoff to this location at the east end of the study area near the wetland. Use of the storm drainage system installed with construction of Adams Avenue as a regional facility for the entire study area is being reviewed.

B. Private/Semi-Public Utilities

These include power, natural gas, telephone, fiber optic and cable television. The design team is coordinating with these service providers. These services will be located in underground conduit within the Adams Avenue extension. No deficiencies have been identified.

C. Public Health and Safety

This includes police and fire services. The study area is within Tualatin Valley Fire & Rescue (TVF&R) District and fire and emergency services will be provided by TVF&R. The City of Sherwood has a police department that will provide police services. No deficiencies have been identified.

D. Schools

The Sherwood School District provides public K-12 education within the City limits. The proposed industrial and commercial use will have no impact on school capacity or school facilities.

7) ***Transportation***

The Transportation System Plan (TSP), adopted in March 2005, is a master plan for all modes of transportation. The TSP identifies the need for local street connectivity in the industrial areas of Sherwood north of Tualatin-Sherwood Road, specifically connecting Highway 99W to Tualatin-Sherwood Road. The TSP analysis identified the Adams Avenue North Extension as a necessary improvement to mitigate forecasted circulation issues on Tualatin-Sherwood Road and Highway 99W by the year 2020.

Updated transportation studies based upon build-out scenarios for the comprehensive plan have been completed to a 20-year time horizon as required by the State's Transportation Planning Rule (TPR). No deficiencies have been identified.

Tualatin-Sherwood Road is a Washington County-maintained road and Highway 99W is an Oregon Department of Transportation (ODOT) facility. These agencies must approve connection of Adams Avenue to their roadways and therefore have interest in any rezoning of property that can have impacts to these facilities. The City of Sherwood has prepared transportation reports to Washington County and ODOT standards and is coordinating with these agencies.

A multi-use path is proposed on the eastside of the road. This path is planned to extend the length of Adams Avenue and will eventually connect Highway 99W to Oregon Street.

TriMet provides bus service from Sherwood to Downtown Portland and the movie theater parking lot east of the study area is park-and-ride lot for this bus line.

Opportunities and Constraints

Stakeholders identified opportunities and constraints at a November 19th, 2008 meeting as well as answered questions on a project web page. The project team, together with the stakeholder working group, identified the following key opportunities and constraints:

Opportunities:

1. Reduce traffic congestion between Highway 99W and Old Town Sherwood
2. Provide access to underdeveloped property
3. Provide alternative access to developed property
4. Provide a continuous pedestrian pathway between Old Town Sherwood and Highway 99W
5. Promote economic development by providing additional land to be developed within the City
6. Improve visibility of the Home Depot store
7. Provide for internal road opportunities
8. Allow for development of the property (after easements) along Tualatin-Sherwood Road
9. Provide for conduit in Tualatin-Sherwood Road that will improve signal timing
10. Allow for compatible development under power lines such as parks, fields, parking lots
11. Allow for access for property to redevelop
12. Potential for "new" zone that allows focus of type of use that is a lower trip generator

Constraints:

1. Limited development allowed near and under power lines
2. Large power substation that must remain
3. Need for road to curve around existing power lines structures
4. Additional traffic conflicting with trucks off-site
5. Change of access and circulation on the Home Depot site
6. Property owner existing agreements that may limit access options
7. Intersections that are already over capacity for traffic
8. Existing intersection configuration at Tualatin-Sherwood Road and Highway 99W that is near capacity
9. Finding compatible development with existing power infrastructure
10. Existing light industrial zoning near major roads
11. Traffic signal spacing and potential need to remove signals on Tualatin-Sherwood Road

Opportunities Development Mapping

From stakeholder input, including a meeting with PGE engineers and planners, a Development Opportunities map was produced. The map reveals that within the study area after the substation, transmission line easements and land needed for the road improvement, three development sites are available. The map marks these sites as Development Opportunity 1 (5.8 acres), Development Opportunity 2 (7.6 acres), Development Opportunity 3 (0.9 acres) and Development Opportunity 4 (1.4 acres).

See Development Opportunities map on the next page.

ADAMS AVENUE NORTH CONCEPT PLAN - DEVELOPMENT OPPORTUNITIES

SHERWOOD, OREGON

City of Sherwood Oregon

Background

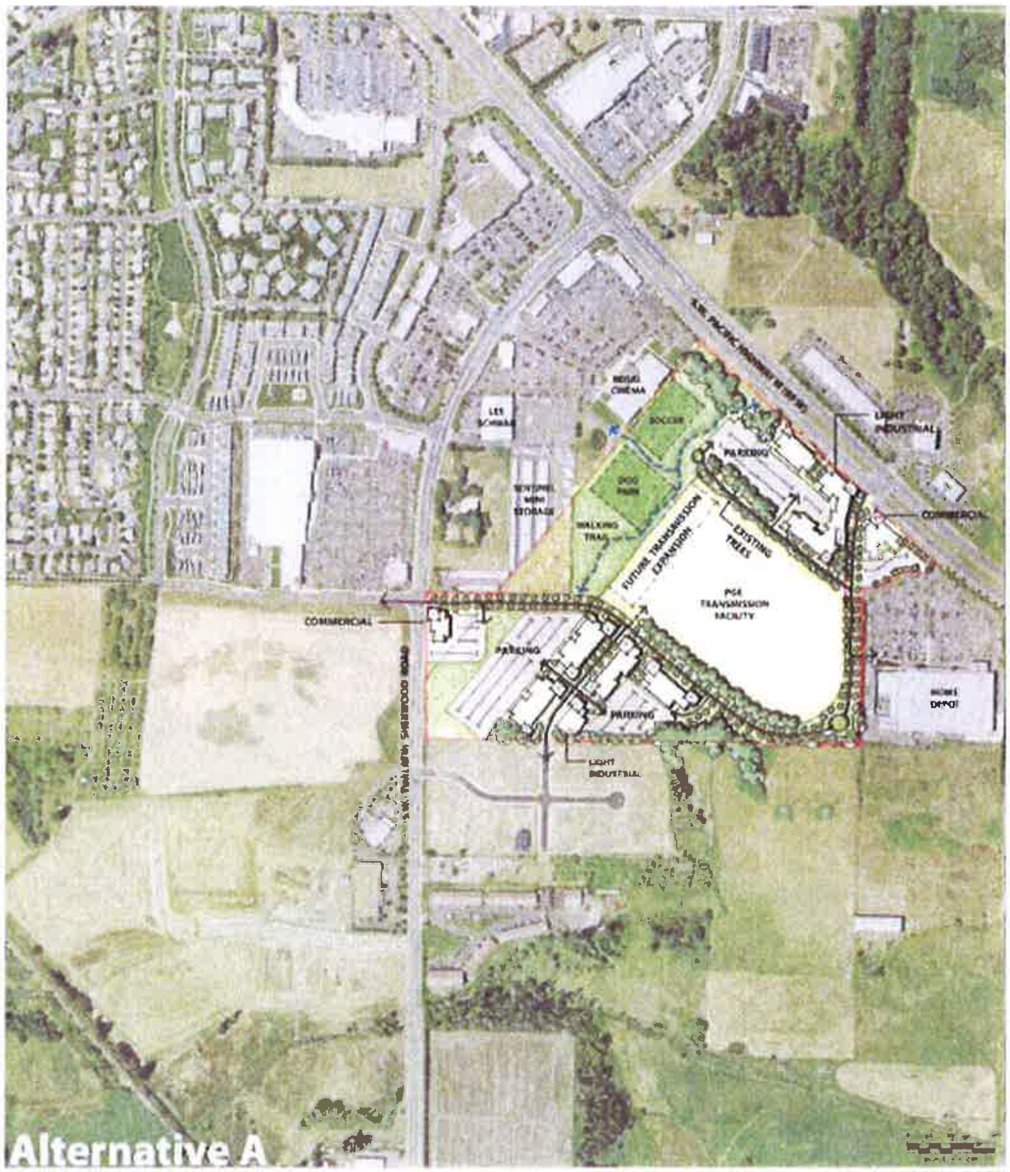
III. CONCEPT PLAN SELECTION PROCESS

Stakeholder Working Group

The project team, as part of the public involvement plan, established a stakeholder working group. This group consisted of surrounding business owners, developers and agency staff. The group met three times. Through this process, a preferred concept plan was created along with project goals and objectives for the concept plan. The Sherwood Planning Commission was selected to act as the project's steering committee to provide final direction on a preferred concept plan alternative after consideration of project team, stakeholder and public and agency comments.

Three alternatives were presented for stakeholder review. These alternatives included zoning and development options for vacant developable land, options for development of open spaces and options for access to surrounding properties. From these options, the stakeholders selected elements from each to create a refined alternative.

See alternative maps on following pages.

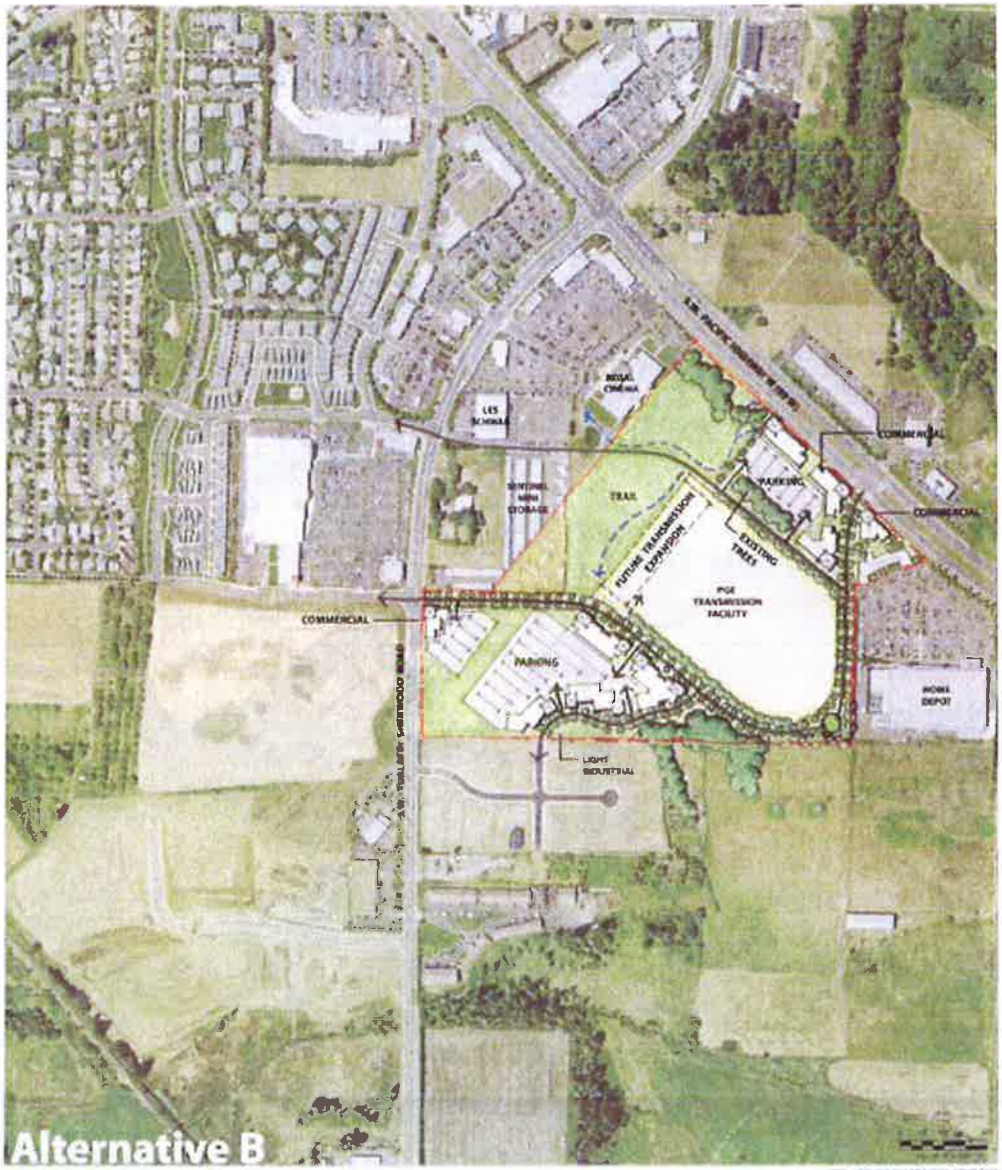


ADAMS AVENUE NORTH EXTENSION - CONCEPT DRAWING

SHERWOOD, OREGON

FEB 04, 2009

Harper Houf Peterson Righellis Inc



ADAMS AVENUE NORTH EXTENSION - CONCEPT DRAWING

SHERWOOD, OREGON

FEB 04, 2009

Harper Houf Peterson Righellis Inc

ADAMS AVENUE NORTH EXTENSION - CONCEPT DRAWING

SHERWOOD, OREGON

FEB 04, 2009

Project Goals and Objectives

The project team, with consultation from the stakeholder involvement group and the Sherwood Planning Commission, established the following goal and objectives for the project:

Project Goal

The Adams Avenue North extension is intended to give local traffic an alternative connection between 99W and Old Town Sherwood and reduce reliance on the 99W/Tualatin-Sherwood intersection. The road will provide secondary access to developed property between Tualatin-Sherwood Road and 99W and provide access for undeveloped land added to the Sherwood urban growth boundary in 2002.

Project Objectives

The concept plan should consider the following:

1. **Gateways**
   The area will act as an entrance to Sherwood and eventually a major route to Old Town. The area has the potential to act as a gateway for the community.

2. **Access**
   Access within the study area and to neighboring developments should be addressed.

3. **Zoning and Compatibility**
   Development should be compatible with surrounding development.

IV. FINAL PLAN

The Adams Avenue North Concept Plan purpose is to provide a framework for future development of the area. The plan is comprised of generalized maps and policies that address land use, transportation and open space. The concept plan is intended to be implemented by adoption of comprehensive plan zoning designations and through existing City regulations.

The plan goals, objectives and map are intended to be used as a guide for development. Key features of the plan include the following:

Use of Roundabouts

Roundabouts have been proposed as an access alternative, particularly as a way to access Development Opportunity 1 on Highway 99W. Due to the existing substation, the parcel's access will be close to the highway and may be required to have limited access. A roundabout will provide an alternative way to turnaround or access the site where a full access point cannot be provided.

Eastern Connections

The concept plan shows a connection to the east via an existing street stub to Arrow Street. This will provide an eventual connection for all properties north of Tualatin-Sherwood Road and west of Rock Creek to access Adams Avenue North and the proposed traffic signal at Tualatin-Sherwood Road. Currently, these properties do not have access to a traffic light.

Use of Power line Easements

The plan indicates the potential to use the power line easements for parking, a dog park and open spaces where full development is restricted.

Use of Commercial Development

The plan suggests rezoning existing light industrial properties along Highway 99W and Tualatin-Sherwood Road to commercial. These parcels that have access and visibility from major roads are best served with commercial uses and have greater opportunity to provide a physical and aesthetic gateway into the City. Gateway treatments are proposed to mark a symbolic entrance to the city and draw attention to the business environment. Gateway elements can include physical gateways or arches; flowers, trees and other landscaping; benches or other public space; public art or natural sculptural features; unique fencing or walls; and signage. Gateways should reflect the history, culture and character of Sherwood and its residents.

For the parcel that fronts Highway 99W (Development Opportunity 1) and the vacant 1.4-acre parcel next to Home Depot (Development Opportunity #4), a General Commercial or Office Commercial is being considered. The project team believes that Office Commercial is the best use for these parcels. Sherwood's designated Town Center is at the intersection of Highway 99W and Tualatin-Sherwood Road and boarders this parcel to the west. The City currently does not have any properties zoned Office Commercial within the Town Center. This would provide office and limited retail uses that are in support of the Town Center as well as offices and workers consistent with the Metro design type designation of employment. The Adams Avenue North project will provide a multi-use path that will connect the site to Sherwood's Old Town for those who bike and walk. The movie theater parking lot west of the site is the park-and-ride lot for TriMet Bus Line 94 that runs from Sherwood to Downtown Portland through Tigard.

For the development area that fronts Tualatin-Sherwood Road (Development Opportunity 3) a 0.9 acre site, the project team believes that General Commercial is the best use for this site. The site is too small to support light industrial and is not adjacent to other offices areas. Therefore, a small retail user would likely be best for this site that is adjacent to existing and future commercial areas to the south and west.

Recent market studies including the "Downtown Sherwood Market Study" from June of 2008 shows a high demand for retail within the City. The Economic Opportunities Analysis completed in 2005 shows demand for land for industrial and commercial. As evidenced by the attached memorandum from Cogan Owens Cogan dated May 18th, 2009, there is adequate land supply for industrial if these parcels area rezoned (see attachment).

Use of Industrial Development

Industrial development is proposed within the interior of the project area where visibility from major road is limited. The internal area is also contiguous to industrial property to the east and is close to the power lines and substation that make an industrial use more compatible.

See preferred concept plan map on the next page.


ADAMS AVENUE NORTH EXTENSION - PREFERRED CONCEPT PLAN
SHERWOOD, OREGON
HOME DEPOT
PGE TRANSMISSION FACILITY
FUTURE TRANSMISSION EXPANSION
DOG PARK
REGAL CINEMA
LES SCHWAB
SENTINEL MINI STORAGE
WALKING TRAIL
TOWER 1
TOWER 3
TOWER 4
PARKING
CONCEPT PLAN STUDY AREA
POTENTIAL FUTURE ROAD CONNECTIONS
FUTURE GATEWAY

V. IMPLEMENTATION

The construction of Adams Avenue will drive development of the project area. Adams Avenue will bring access and utilities to the area. Portland General Electric owns all the property within the study area and will need to sell property to private developers who will fully fund construction of developable areas. At this time, the construction of Adams Avenue is proposed to be funded by private development as mitigation for construction of the large undeveloped commercial property south of Tualatin-Sherwood Road.

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ENVIRONMENTAL PROJECT MANAGEMENT
GOVERNMENTAL/COMMUNITY RELATIONS

MEMORANDUM

DATE: May 18, 2009

TO: Meg Fernekees, Department of Land Conservation and Development

CC: Julia Hajduk, City of Sherwood; Keith Jones, Harper Houf Peterson Righellis, Inc.

FROM: Kirstin Greene, AICP and Steve Faust, AICP

RE: **North Adams Avenue Concept Plan – Goal 9 Compliance**

The City of Sherwood is developing a concept plan to guide the development of 55.5 acres in the North Adams Avenue Area. Of these 55.5 acres, 34.2 acres were added to the regional urban growth boundary (UGB) by Metro in 2002 at the request of the City of Sherwood. The primary objective in adding this land to the UGB was to allow construction of a collector street and alternative route between Highway 99W and Tualatin-Sherwood Road. Although not the primary purpose for expanding the UGB, this additional land will become available for urban development once the concept plan is finalized and implemented.

When the North Adams Avenue Area was initially brought into the UGB, Metro designated this land as industrial on the 2040 Growth Concept Map. The North Adams Avenue Area Concept Plan proposes changing the planning designation for two of three opportunity areas. In accordance with Oregon Administrative Rule 660-009-0010(4), the City of Sherwood is required to show that the proposed plan amendment is consistent with the existing comprehensive plan. This memorandum presents findings to support that the proposed amendment complies with the City of Sherwood's most recent Economic Opportunities Analysis (EOA) from 2006 and therefore with OAR 660-009-0010(4).

City of Sherwood Comprehensive Plan

Commercial and Industrial Lands Supply

On September 20, 2006, the Sherwood Urban Renewal Policy Advisory Committee (SURPAC) endorsed a preferred growth strategy consistent with a medium growth forecast as described in the 2006 EOA. This forecast projects the following commercial and industrial needs and means for accommodating those needs for the City of Sherwood over the next 20 years:

- An additional 27 acres of commercial land to be accommodated in the long term by "integrated commercial development within future master-planned employment and neighborhood districts, including areas 28, 54-55 and 59."[1] Since the EOA was adopted, the former Driftwood Mobile Home Park was rezoned to Retail Commercial, adding 5.74 acres to the commercial lands supply, decreasing the need to 21.26 acres. In addition, the 52-acres Langer property zoned Light Industrial has a planned

[1] 2006 City of Sherwood Economic Opportunities Analysis, p.41

Attachment 3A

unit development (PUD) overlay that allows commercial development. This could potentially add 52 acres to the supply of commercial land eliminating the need for additional commercial lands.

- An additional 74 acres of industrial land to be accommodated in the long term by "planning for new industrial sites (with integrated commercial and residential development) within future master planned employment districts in Area 48."[2] As mentioned in the description of commercial land needs, the Langer PUD could result in a 52-acre reduction of industrial land supply. This could potentially increase the 20-year need for additional light industrial lands to 126 acres.

These land needs are expressed as gross buildable acres, and exclude land that is constrained by environmental factors including wetlands, floodplains, and steep slopes.

A concurrent concept planning process for the Brookman Road employment area <u>is not</u> included in this analysis. The Brookman Road Concept Plan area has 28.71 acres of employment land, which includes both commercial and industrial uses.

Urban Growth Boundary Additions

Chapter 8 of Sherwood's Comprehensive Plan addresses urban growth boundary additions. The Chapter indicates that the Metro Region 2040 Growth Concept Map designates land use for future urban growth areas. Table 1 summarizes the acreage and planned land use designations for land that was brought into the urban growth boundary (UGB).[3]

Table 1 (Comprehensive Plan Table VIII -1). Summary of UGB Additions 2002-2004

UGB Addition	Year	Acres	2040 Land Use Type
Area 59 (Edy and Elwert)	2002	85	Neighborhood Commercial
Area 54-55 (Brookman)	2002	235	Inner Neighborhood
99W Areas	2002	23	Employment/Industrial
Area 48 (Tonquin)	2004	354	Industrial

As shown in Table 1 above, 354 acres will be added to the UGB with Area 48 (Tonquin Industrial Area). The concept planning process for Area 48 is currently underway. The supply provided in Area 48 exceeds the 20-year industrial land need of 126 acres.

<u>North Adams Avenue Concept Plan</u>

The North Adams Avenue Concept Plan involves 34.2 acres within the 2002 UGB expansion area, but outside Sherwood's city limits. The study area includes an additional 21.3 acres that are within the city limits. Of the 21.3 acres, 8.4 are undeveloped and 12.9 have limited development potential due to high voltage overhead power lines and easements. The Concept Plan identifies four development opportunity areas within the concept plan study area. Table 2 provides a summary of the location relevant to city limits, acreage, existing zoning designation, proposed zoning designation and net result for each development opportunity area. These area correspond to the Development Opportunities map contained with the draft concept plan document.

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[2] 2006 City of Sherwood Economic Opportunities Analysis, p.43

[3] City of Sherwood Comprehensive Plan, Ch. 8 "Urban Growth Boundary Additions", p. 2

Table 2. Summary of North Adams Avenue Concept Plan Zoning Designations

Development Opportunity Area	**Area #1**	**Area #2**	**Area #3**	**Area #4**
Description	99W Parcel	Central Area	Tualatin/Sherwood Road	Triangle next to Home Depot
City Limits	Inside	Outside (6.5 acres) Inside (1.1 acres)	Inside	Inside
Buildable Acreage	5.8 acres	7.6 total acres	0.9 acres	1.4 acres
Existing Zone	Light Industrial	FD-20 (6.5 acres) Light Industrial (1.1 acres)	Light Industrial	Light Industrial
Proposed Zone	Office Commercial	Light Industrial	General Commercial	Office Commercial
Net Result	-5.8 acres Light Industrial +5.8 acres Office Commercial	+6.5 acres Light Industrial	-0.9 acres Light Industrial +0.9 acres General Commercial	-1.4 acres Light Industrial +1.4 acres Office Commercial

The plan suggests rezoning existing light industrial properties along Highway 99W and Tualatin-Sherwood Road to Office Commercial and General Commercial respectively. These parcels have access and visibility from major roads and are best served by office/commercial employment uses and provide a greater opportunity to provide a physical and aesthetic gateway into the city. Recent market studies conducted by Marketek in 2007 and 2008 also show a high demand for office and retail space.

- Office Commercial is recommended for the parcel that fronts Highway 99W (5.8 acres) and the Home Depot parcel (1.4 acres). These parcels would provide office and limited retail uses to support the city's adjacent town center. These uses also are consistent with the Metro's employment design type designation and are expected to mark a new gateway into to the City.

- General Commercial is recommended for the development area that fronts Tualatin-Sherwood Road (0.9 acres). The site is too small to reasonably support light industrial uses and is not adjacent to other office areas. A small retail user would likely be best for this site that is adjacent to and compatible with existing and future commercial areas to the south and west.

Industrial development is proposed within the interior of the project area where visibility from major roads is limited. The internal area also is contiguous to industrial property to the east and is close to power lines and a substation that make an industrial use more compatible.

North Adams Avenue Concept Plan: Findings of Goal 9 Compliance

An analysis of zoning changes proposed in the North Adams Avenue Concept Plan shows that net changes in Sherwood's commercial and industrial land supplies will not affect the City's ability to accommodate the projected demand over the next 20 years and are therefore consistent with the 2006 EOA. Proposed zoning changes in the Concept Plan could result in an 8.1-acre increase in commercial land supply (0.9 acres General Commercial; 7.2 acres Office Commercial). The existing commercial land supply is more than enough to accommodate the commercial land demand identified in the EOA. North Adams Avenue related zoning changes may result in a 1.6-acre decrease in industrial lands. Despite this reduction in industrial land supply, Area 48 will more than accommodate the industrial land demand for the City in the medium growth scenario.

Table 3. North Adams Avenue Zoning Designation Impact on Employment Land Supply

	Commercial	Industrial
2006 Economic Opportunities Analysis (EOA)		
City-wide Demand	40 acres	276 acres
City-wide Supply	13 acres	202 acres
City-wide Need	27 acres	74 acres
2008 (Includes Driftwood Zone Change and Langer PUD)		
Driftwood Zone Changes	+5.74 acres	No change
1995 Langer PUD[4]	+52 acres	-52 acres
Demand	40 acres	276 acres
Revised Supply	70.74 acres	150 acres
Revised Need	0 acres	126 acres
2009 (Includes Potential Adams Avenue Zone Changes)		
Proposed Adams Avenue Concept Plan	+8.1 acres	-1.6 acres
Demand	40 acres	276 acres
Proposed Revised Supply[5]	78.84	148.4 acres
Proposed Revised Need	0 acres	127.6 acres
Supply to Meet Need	None Needed	354 acres (Area 48)

Conclusion

As shown in Table 3, the proposed changes to supply will not impact the City's ability to accommodate the 20-year employment land demand. A need of 127.6 acres of industrial will be well accommodated within the future development Area 48 that proposes 354 acres of industrial land. Further, Area 48 will better serve industrial uses as it will be one large consolidated area adjacent to Tualatin's large-scale industrial properties to the east of Area 48.

[4] The Langer PUD was approved in 1995 to allow commercial zoning on industrial property. The undeveloped portions of the PUD (52 acres) still allow General Commercial uses. Since this land is zoned industrial, the potential for commercial uses was not reflected in the 2006 EOA and therefore adjusted here.

[5] 28.71 acres of commercial and industrial land within the Brookman Road Concept Plan employment area is not included in this analysis.

City of Sherwood Oregon
Home of the Tualatin River National Wildlife Refuge

MEETING NOTES

MEETING TITLE:	Stakeholder Meeting #1
PROJECT NAME & NUMBER:	Adams Avenue North (Job 8041, HHPR SHR-08)
DATE & TIME:	November 19th, 2008, from 10:00 to 11:00 AM
LOCATION:	Sherwood Police Dept Conference Room
FACILITATOR:	Keith Jones (HHPR)
NOTES TAKEN BY:	Stephanie Guediri

AGENDA

1. Introduction and Stakeholders' Perspectives – 5 to 15 minutes
2. Project Overview and Goals – 5 minutes
3. Project Timeline and Schedule – 5 to 10 minutes
4. Opportunities and Constraints Overview – 5 minutes
5. Questions and Group Discussion – Remaining Time

ATTENDEES

Matt Langer	Langer Family, LLC
Judy Crafton	PGE
Doug Baumgartner	ODOT
Seth Brumley	ODOT
Bill Blakeslee	Bilet Products
Roger Furley	Home Depot
Jim Morse	Commercial Property Owner (Cinema)
Ben Austin	HHPR
Keith Jones	HHPR
Kirstin Greene	Cogan Owens Cogan
Jason Waters	City of Sherwood
Julia Hajduk	City of Sherwood
Tom Nelson	City of Sherwood
Stephanie Guediri	City of Sherwood

MEETING NOTES

Keith Jones introduced the project and briefly explained the UGB expansion area from 2002. He also outlined the project overview and goals, the schedule and timeline as well as some initial opportunities and constraints that the stakeholder group would expand upon.

Julia Hajduk added that project information is currently available on the City's web site, and will be updated after the stakeholder meeting.

Attachment 3B

The stakeholder working group identified the following opportunities and constraints at the meeting:

Opportunities
1) Reduce traffic congestion between 99W and downtown Sherwood
2) Provide access to underdeveloped property
3) Provide alternative access to developed property
4) Provide a continuous pedestrian pathway between downtown Sherwood and 99W
5) Promote economic development by providing additional land to develop within the City
6) Home Depot - great visibility
7) Internal road opportunities
8) Triangle property (minus easements) along Tualatin-Sherwood road
9) Put conduit in Tualatin-Sherwood Road for future signal timing
10) Compatible development - parks, fields, parking
11) Access/development of adjacent Langer property will eliminate multiple accesses to Tualatin-Sherwood Road
12) Evaluate properties beyond plan scope for access to have cohesive plan
13) Potential for "new" zone that allows focus of type of use that is a lower trip generator

Constraints
1) Limited development near power lines
2) Large power substation that must remain
3) Need for road to curve around existing power lines structures
4) Additional traffic conflicting with trucks off-site
5) Home Depot - L-turn light may be needed to ensure Home Depot can be accessed
6) Property owner existing agreements
7) Intersections already over capacity - zoning should be minimal traffic impact
8) Existing intersection configuration at Tualatin-Sherwood Road and 99W
9) Compatible development
10) Existing code/zone

Seth Brumley asked if a traffic study was available. Ben Austin stated DKS is finishing the existing conditions and future 2030 baseline report; it should be available in early December.

Bill Blakeslee expressed concern regarding increased vehicular traffic mixing with the large trucks accessing Billet Products. Although his entrance(s) will be modified during road construction, mixed traffic could be a problem.

Jim Morse explained that he didn't have any major concerns about this project.

Roger Furley expressed concern about eastbound left turns into Home Depot from Adams Ave, specifically if signal cues at 99W on northbound Adams Ave will block turns into HD. He has 200 employees and 1,000 customers per day. The additional traffic will ultimately boost his business. Ben stated that DKS will be looking at left hand turns into HD.

Judy Crafton expressed concern about the access road around PGE's transmission facility. Modifications to the existing gravel access road will be discussed with PGE.

Jim Morse asked about the possibility of a second road that wraps around the west side of PGE's transmission facility near the HD entrance to the back of the storage facility near T-S Road.

Matt Langer stated his family is developing most of the property adjacent to Adams Ave South as well as the parcels containing the residential home and storage facility along T-S Road. The Langer family will be constructing both legs of Adams Avenue (North & South) as part of their development project.

Doug Baumgartner stated there may be fiber and/or signal conduit along T-S Rd that may be available for connection during this project. City/HHPR will look at the existing infrastructure located in T-S Rd and 99W, and hopes to have Adams North integrated with any of Washington County and ODOT's ITS programs.

Judy Crafton asked if the access road around the transmission facility will be retained; the City affirmed that there were no plans to delete the gravel access road because PGE expressed that it should not be moved. Julia mentioned that a cosmetic wall around the transmission facility should be considered, and if a wall were constructed, it could impact the gravel access road. Judy is concerned about employee safety and access to their site. She wants to meet with the City and PGE's substation engineer to discuss additional constraints for the transmission facility and non-movable towers. Jason added that the City already consulted with PGE's substation engineers for the schematic design, but now that the project is moving toward final design with a new consultant that the team might want to meet with the substation engineers again. Judy concluded by stating PGE employees don't need access all the time; maybe once or twice per year or during power outages. She is open to discussing additional constraints with the City. Judy and Jason agreed to meet again.

Matt Langer expressed concern about access to the parcels along T-S Road; currently there are multiple driveway accesses along T-S Road and this project may be an opportunity to combine multiple access points along T-S Road, while providing additional access from Adams Ave North.

Julia mentioned that the Langer owned parcels are zoned Light Industrial (LI), but have a Planned Unit Development (PUD 95-997) overlay that allows for General Retail Trade uses. The two PGE parcels adjacent to the UGB area, currently within the city limits along T-S Road and 99W, are zoned LI.

Matt asked if the wetlands in the area were considered and Julia affirmed that they were. Other than the sensitive lands to the east, Matt is not aware of any other issues for this project.

Jason asked Doug if ODOT has proposed any signal changes at Tualatin-Sherwood Road. Doug responded that they may have some flexibility, but Doug expressed concern about modifications to signal phasing along 99W and spacing along T-S Road. The City and HHPR will schedule a separate traffic meeting with ODOT, Washington County, and DKS to discuss potential impacts on 99W, T-S Road, at the T-S/99W intersection, and signal spacing & phasing issues.

Roger added that Home Depot may need another access to the store but they can meet with the City later to discuss this. The City/HHPR will schedule a follow up meeting with HD.

Keith ended the meeting with a brief summary of future action items including:

- Memorandum/notes summarizing the stakeholder meeting
- Opportunity & Constraints Map
- Present stakeholder meeting #1 summary and ops & constraints map to the Planning Commission (PC will act as the Advisory Committee)
- Setup a meeting with Metro
- Coordinate and schedule stakeholder meeting #2 in January

Meeting adjourned at 11:05 AM.

ACTION ITEMS

Action Item	Person Responsible	Due Date
Memo Summary	Jason Waters/Keith Jones	TBD
Opportunity/Constraints Map	Keith Jones	TBD
Planning Commission Meeting	Julia Hajduk	TBD
Metro Meeting	City/HHPR/COC	TBD
2nd Stakeholder Meeting	City/HHPR/COC/stakeholders	TBD

City of Sherwood Oregon

Home of the Tualatin River National Wildlife Refuge

MEETING NOTES

MEETING TITLE:	Stakeholder Meeting #2
PROJECT NAME & NUMBER:	Adams Avenue North (Job 8041, HHPR SHR-08)
DATE & TIME:	February 11th, 2009, from 10:00 to 11:50 AM
LOCATION:	Sherwood Police Dept Conference Room
FACILITATOR:	Keith Jones (HHPR)
NOTES TAKEN BY:	Stephanie Guediri

AGENDA

Introductions – 5 minutes
Overview of Project Schedule & Meeting Objectives – 5 minutes
Opportunities and Constraints Map Overview – 10 minutes
Alternatives Overview and Discussion – 30 minutes
Summary – Next Steps – 10 minutes

ATTENDEES

Seth Brumley	ODOT
Doug Baumgartner	ODOT
Nicki Langer	Langer Family, LLC
Pete Schmidt	Tualatin Wildlife Refuge
Roger Fulop	Home Depot
Mike Livingston	PGE
Cam Durrell	Les Schwab
Matt Grady	Gramor Development/Langer Family, LLC
Steve L Kelley	Washington County Planning Dept.
Keith Jones	HHPR
Chris Anuszkiewicz	HHPR
Chris Maciejewski	DKS
Kirstin Greene	Cogan Owens Cogan
Steve Faust	Cogan Owens Cogan
Julia Hajduk	City of Sherwood
Jason Waters	City of Sherwood
Stephanie Guediri	City of Sherwood

MEETING NOTES

Keith Jones introduced the project and briefly recapped that Adams Avenue North would create a North-South connection between Tualatin-Sherwood Road and Hwy 99 and this project was originally envisioned in 2002 when the area was brought into the UGB for transportation purposes. He added that METRO requires a concept-planning process whereby alternatives are presented with the goal of a preferred alternative being chosen. Keith showed the stakeholders a conceptual road cross section for Adams North and explained that it would consist of two 14 ft wide travel lanes, a landscaping strip and a shared bicycle/pedestrian path.

Jason Waters added that Adams Avenue South project's design is at 90%. This project was modified slightly from the original TSP in that the Adams South project combines a separate bike path and pedestrian path into one 12 ft wide path; the Adams North and Adams South road cross sections will be similar.

Roger Fulop asked if there will be two lanes all the way to Home Depot (HD). Keith responded that they are working on the traffic numbers regarding this. Chris Maciejewski suggested that there may be additional turn lanes required near Home Depot and a roundabout is also being looked at near the existing HD entrance. The TSP shows two lanes with a turning median between T-S Road and the existing HD access.

Keith went over the project schedule handout and made sure that all stakeholders had a copy for their reference. He pointed out that there will be a Public Open House on February 25th and a Planning Commission Work Session on March 24th; all of this information would be posted on the website for future reference.

Chris A (HHPR) began covering the three preliminary concepts:

1. **Alternative A**: Baseline with Light Industrial (LI) uses, parking possibilities, building facades close to street, park amenities such as a dog park or soccer field and a walking trail. Pete Schmidt asked if there would be access to these areas from Adams and Julia responded that we're exploring the possibility. Mike Livingston thought the PGE parcel across from Home Depot would be zoned for commercial use. Chris-HHPR stated that other options are available. Julia reiterated that this was a concept plan and pieces from each alternative can be used to present the preferred alternative; LI is the existing baseline use and the feasibility of commercial at the PGE parcel will be evaluated. Julia clarified that the objective is to create one hybrid alternative using elements of Alternatives A through C. Keith added that as a whole, we are looking at zoning, parking, connectivity and trails and parkways. He added that LI generates fewer trips than commercial. Julia indicated if anything was completely off the table. Mike responded that BPA may have some sensitive issues that need to be looked at. Keith said he will be meeting with BPA next week. Jason clarified that that access to parcels within the concept plan area is not assumed off of 99W; access to those parcels is assumed to be off of Adams Avenue only.

2. **Alternative B**: Road alignment connecting to the industrial development to the east hugs the east boundary to allow for a larger single parcel, limited recreation use, a possible trail, and building facades close to street with parking behind them. No comments were given from stakeholders.

3. **Alternative C**: This option includes additional options for internal connectivity to the west, three roundabouts, building facades close to street with parking behind them, larger buffer for PGE substation, small dog park, and a connector to two parking areas. Roger asked about the roundabouts and if they work with the

traffic for Home Depot. Keith responded that HHPR/DKS will be looking at traffic data because the main roundabout is 400 ft from Hwy 99. This may ultimately be an ODOT concern. Chris Maciejewski added that we'll try to build our way out of a right in/right out only configuration, full access is preferred. He added that the TSP shows the signal at Baler being converted to right-in/right-out, although keeping that signal in place with a north-south road at Baler extending north of T-S Road may be a viable option to explore as the area develops. Chris added that the City/DKS/HHPR is meeting with Washington County on Friday regarding their plans for T-S Road/99W and the signals.

Mike L asked who will ultimately make the decision regarding the final concept plan. Julia responded that Planning Commission and the City Council will approve and adopt the plan, which will be driven by land-use & traffic impacts and the preferred alternative that the stakeholders choose. Mike commented that PGE will be evaluating the plan to ensure dedication of the road is counter balanced with PGE's ability to develop the property in a manner that benefits the ratepayers; development must benefit or protect the ratepayers.

Matt Grady asked if there was any flexibility in the road design. Keith responded that that transmission towers and sensitive lands to the east prevent much deviation for Adams Avenue between T-S Road and 99W.

Steve Kelley asked if the roundabouts would really help the design speed of a collector. Jason stated the posted speed will be 25mph, 30mph design, but final horizontal and vertical curves may be designed at 35mph, 40mph design in case the speed designation for Adams increases in the future.

Steve stated that Tualatin-Sherwood Road ultimately is shown as 5 lanes with interconnected signals. Keith added that there are very few collectors with north-south connectivity in the city and those types of connections will play an important part in the future.

There was a 10 minute break for stakeholders to come up and examine the alternatives being presented. The group reconvened at 10:55 AM.

Seth Brumley stated additional internal connectivity may be helpful and that the roundabout near the existing Home Depot entrance should be considered although that roundabout may be difficult due to the proximity to 99W and queuing.

Nicki Langer stated her concerns were over the access to their properties on the north side of T-S Road. Matt Grady recommended 2 access points off of Adams North to the mini-storage site, if their existing T-S Road access points will be removed when they develop.

There was a question about whether the CAP would apply to new land annexed into the City's limits. Keith stated that the City initiated the Hwy 99 CAP about 7-8 years ago and assigns trips based on the 43 trips per net acre to limit traffic overload. Julia indicated that the CAP would be applied to any land zone commercial or industrial.

Matt Grady questioned if the medians would be broken up to allow for access. He also stated that parks are great but do they fit with the Parks Master Plan and/or have they been approved by the Parks Board; City may want to run it by them? He is also concerned with emissions from BPA power lines and who is going to pay to maintain the parks. Matt was also concerned about any public roads we are showing that don't show up in the TSP; who is going to pay for those as it affects SDC's, the project should be affordable for everyone involved.

Julia responded that the area under the power lines, if not maintained, is a concern because it may be an un-desirable area for users and it could be an eyesore. The Planning Commission indicated a desire to maintain quality low maintenance landscaping. Also, this area is not on the Parks Board plan as it's currently not within City limits. Keith added that the area in question is currently leased as farm land and could be set up to be a destination, possibly a dog park.

Matt wants to be sure that the Langers get access to their parcels from Adams Avenue and they would consider relinquishing access points if the road gets built with those access points. He thinks that double lane stacks at Adams/T-S Road would allow access from Adams closer to T-S Road.

Pete stated that from prior unrelated meetings he has attended, the public has a large demand for places to walk dogs. Currently, the Refuge does not allow dogs and they have to turn away lots of people who bring their dogs with them.

Roger voiced concern over Home Depot's trucks access and if they will have to use the roundabout. Full tractor trailers will need access to Home Depot. Roger clarified that trucks can currently drive around the back of the building.

Jason asked if a secondary access for Home Depot would work on the SE corner of the HD parcel. Julia asked for clarification on the amount of truck traffic and delivery times. Roger indicated trucks would be in and out, Monday through Friday all day long. Jason stated the city will look into a full secondary access to the Home Depot site at the SE corner of the parcel, possibly off of a roundabout.

Mike made the comment that the City has done a good job working with everyone involved in this project. Kirstin asked Mike if PGE is interested in the highest-use allowed and he said yes and that he wanted a fair value for the rate payers.

Cam Durrell stated that Alternatives B and C propose a through intersection at Baler which would cut off the main access to Les Schwab. He added that 5-10 and sometimes 5-20 trucks a day need access to Les Schwab for maintenance. The trucks pull in to the truck bay and exit via the through-way. He thinks that Alternative A suits Les Schwab's purpose in that it keeps the store's vehicular access points, and he doesn't want to lose access. Cam mentioned an easement may exist between the Les Schwab site and the Langer property to the east, but could not confirm.

Julia reminded everyone that the items shown on the Concept Plan Alternatives are conceptual and that development on the private side won't happen immediately, therefore it should not be assumed that because something is shown on an alternative that it will happen as soon as the plan is adopted. In addition, because most of the improvements outside of the Adams North public corridor require involvement from a private developer, any alternative needs to work without off-site private improvements.

Matt stated that Alternative C gives great visibility to the Langer property and that setbacks and access are important issues.

Keith stated that we are looking at LI zoning as the baseline for the project since it is the existing land-use and we will be looking at the feasibility of commercial as part of this process in order to obtain the highest & best use for the area.

Julia indicated that she wasn't sure if the California company who owned the small triangular piece of property along Hwy 99 had an access agreement with Home Depot or PGE and asked Roger if he was aware of any easements through HD property for that parcel. Roger indicated he did not know.

Matt added that roundabouts are a learned behavior for drivers and that it's a creative idea but not ideal. Keith explained that the roundabout shown at the SE corner of the HD parcel would act as a turnaround if the PGE site across from HD is limited to right-in/right-out.

Chris A (HHPR) asked the group if any existing trees in the area were a concern to anyone. Julia suggested we use some of the existing trees to provide a screen for the PGE substation.

Pete would like to see native plants in the planting strips due to easier maintenance and lower costs associated with that, versus landscaping similar to Roy Rogers Road that requires significant maintenance during the year.

Keith stated that an Open House will take place two weeks from today (2/25/09) and invited all the stakeholders to attend. He will also send out the revised alternatives (A thru B) via email to all of the stakeholders today and would like comments back from them by Friday 2/13/09. He will also tentatively schedule another Stakeholder Meeting for late March or early April.

ACTION ITEMS

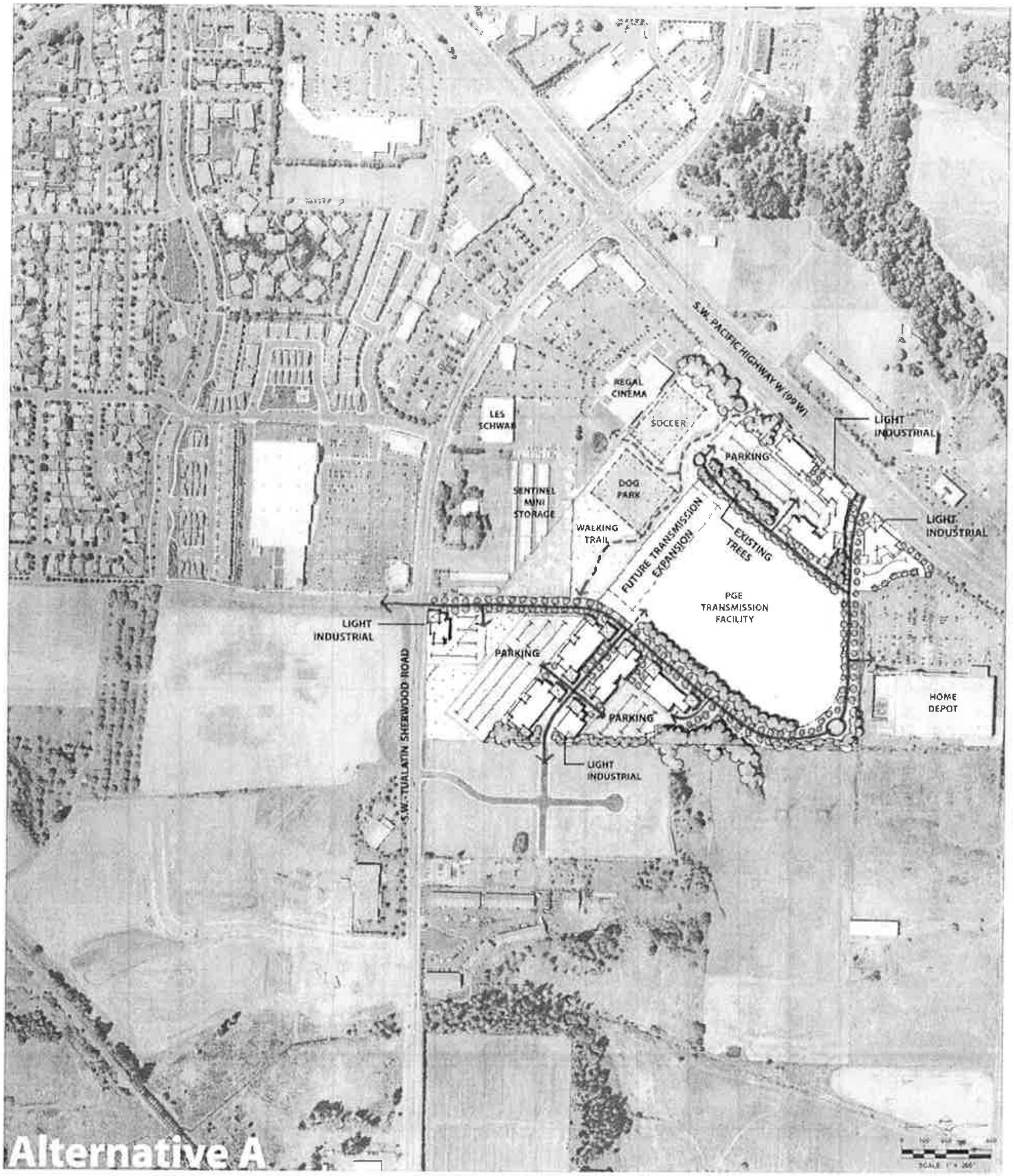
Action Item	Person Responsible	Due Date
Open House	Keith, Julia and Jason	TBD
Alternative options sent via email to all stakeholders	Keith	2/11/09
Comments due from stakeholders regarding alternative options	Stakeholders	2/13/09

Agenda
Stakeholder Meeting #2
North Adams Avenue Extension & Area Concept Plan
2/11/2009

1) Introduction	5 minutes
2) Overview of Project Schedule & Meeting Objectives	5 minutes
3) Opportunities and Constraints Map Overview	10 minutes
4) Alternatives Overview and Questions	30 minutes
5) Summary – Next Steps	10 minutes

North Adams Avenue Extension
Stakeholder Meeting #2
February 11, 2009

Name	Address	Phone Number	E-mail
Doug Baumgartner	123 NW Flanders, Portland OR	503-731-8225	douglas.g.baumgartner@odot.state.or.us
Seth Brumley	123 NW Flanders St, Portland OR	503-731-8234	seth.a.brumley@odot.state.or.us
Pete Schmidt	19255 SW Pacific Hwy Sherwood	503 625 5944	Peter_Schmidt@fws.gov
Nikki Langer	12358 SE Eagle Glen Dr OR Happy Valley OR	503-956-7640	nlanger05@comcast.net
Mike Livingston	121 SW Salmon, Portland OR	503-464-8127	mike.livingston@PGN.com
Cam Durrell	15905 SW Tualatin-Sherwood Rd Sherwood	503 925-0570	
Steve Kelley	~~[illegible]~~ Wash. Co.	503-846-3764	Steve_Kelley@co.washington.or.us
MATT GRADY	19767 SW 72nd AVE, SUITE 100 TUALATIN, OR	503-245-1976	matt@gramor.com



NOTE: WETLAND INVESTIGATION COMPLETED FOR ROAD CORRIDOR ONLY

ADAMS AVENUE NORTH EXTENSION - CONCEPT DRAWING

SHERWOOD, OREGON

FEB 04, 2009

City of Sherwood Oregon

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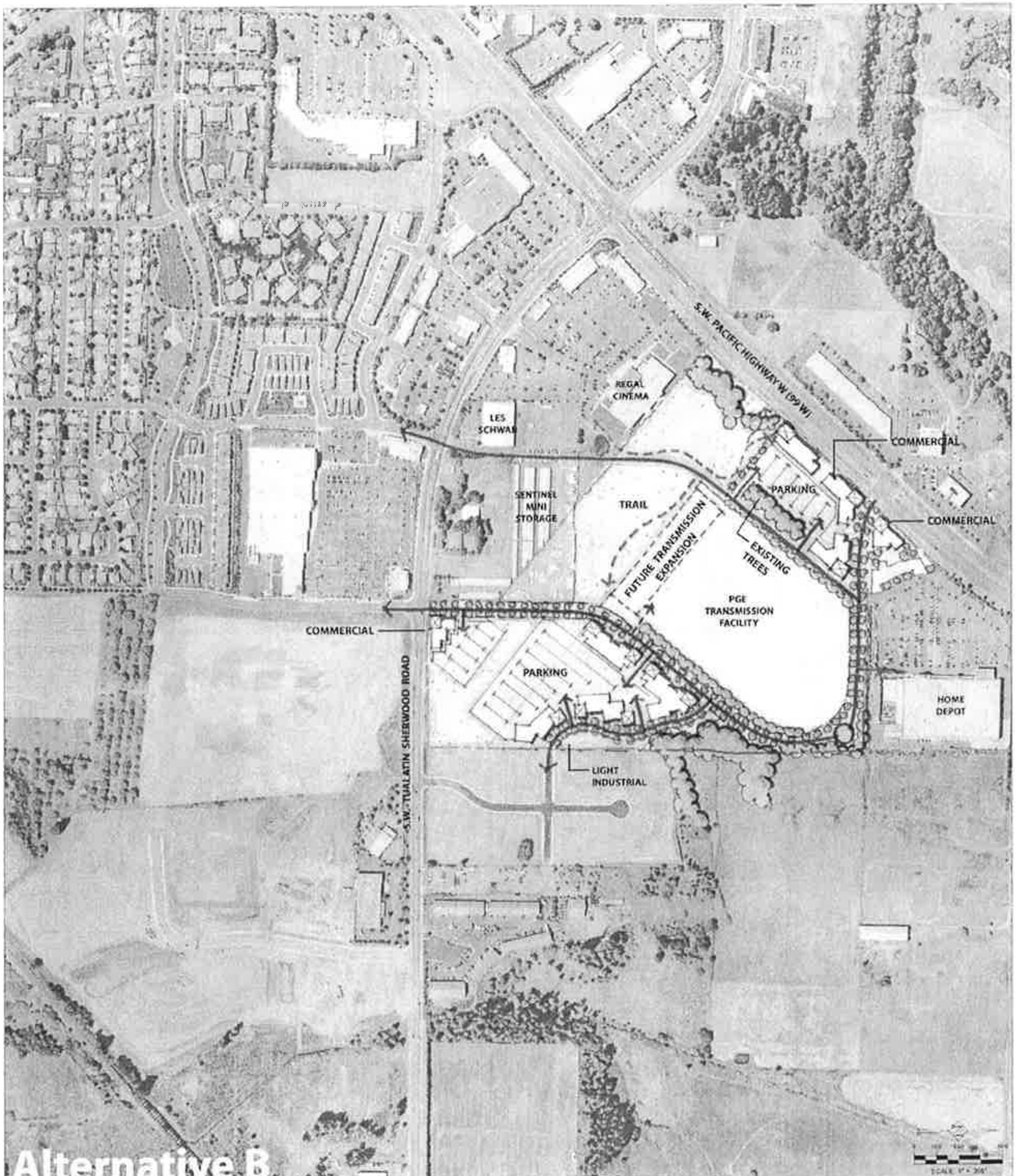


NOTE: WETLAND INVESTIGATION COMPLETED FOR ROAD CORRIDOR ONLY

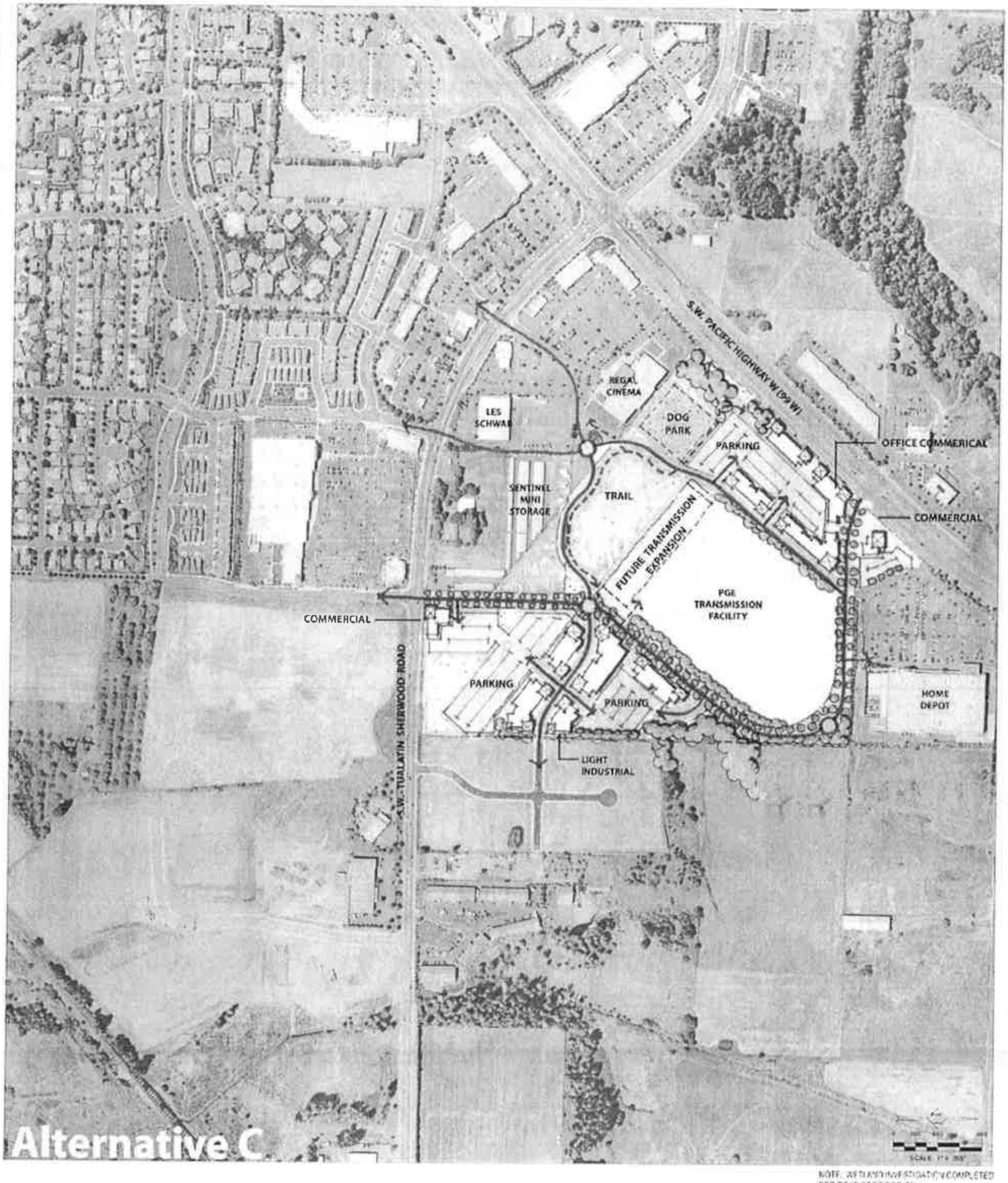
ADAMS AVENUE NORTH EXTENSION - CONCEPT DRAWING

SHERWOOD, OREGON

FEB 04, 2009

City of Sherwood Oregon

Harper Houf Peterson Righellis Inc.



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ADAMS AVENUE NORTH EXTENSION - CONCEPT DRAWING

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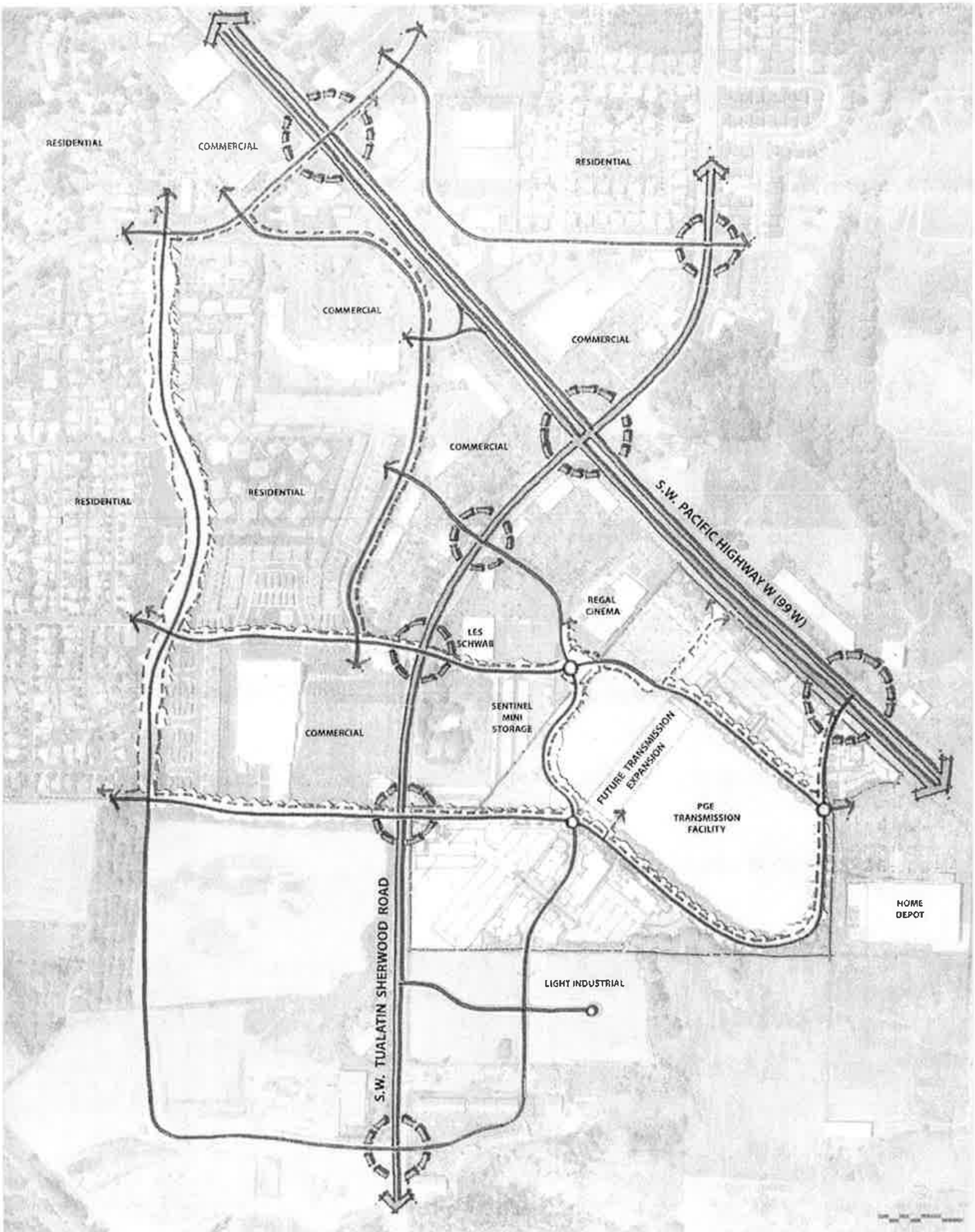


NOTE: WETLAND INVESTIGATION COMPLETED FOR ROAD CORRIDOR ONLY

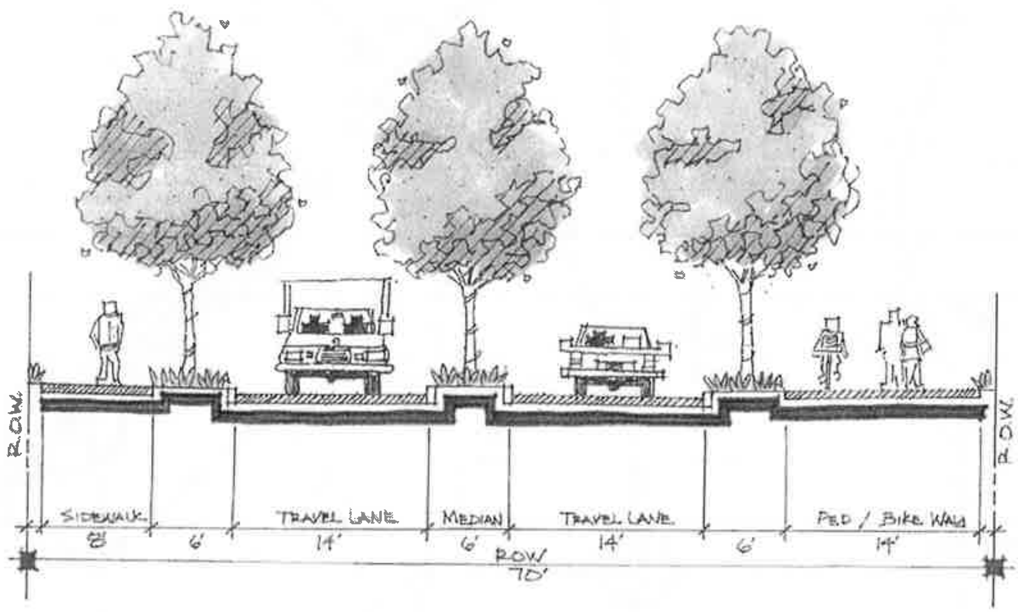
ADAMS AVENUE NORTH EXTENSION - CIRCULATION DIAGRAM

SHERWOOD, OREGON

FEB 11, 2009

City of Sherwood Oregon

HHPR Harper Houf Peterson Righellis Inc.



ADAMS AVENUE TYPICAL STREET SECTION
1/4" - 1' - 0"

ADAMS AVENUE NORTH EXTENSION

SHERWOOD, OREGON

FEB 04, 2009

City of Sherwood Oregon

Harper Houf Peterson Righellis Inc.

NOTE: WETLAND INVESTIGATION COMPLETED FOR ROAD CORRIDOR ONLY

ADAMS AVENUE NORTH EXTENSION - OPPORTUNITIES AND CONSTRAINS

SHERWOOD, OREGON

FEB 11, 2009

City of Sherwood Oregon

HHPR Harper Houf Peterson Righellis Inc.

City of Sherwood Oregon

Home of the Tualatin River National Wildlife Refuge

MEETING NOTES

MEETING TITLE:	**PGE - Coordination Meeting #3**
PROJECT NAME & NUMBER:	Adams Avenue North (COS#8041)
DATE & TIME:	**5/1/09, 9-10am**
LOCATION:	PGE Offices – One World Trade Center 121 SW Salmon St
FACILITATOR:	Keith Jones
NOTES TAKEN BY:	Jason Waters

ATTENDEES

Jason Waters (City), Keith Jones (HHPR), Ben Austin (HHPR), Julia Hajduk (City), Mike Livingston (PGE), Rob Butenschoen (PGE)

MEETING NOTES

The following list identifies the key discussion items or decisions made at the meeting:

The purpose of this meeting was to follow up on with PGE on the draft concept plan, specifically the zone changes for two PGE lots located adjacent to the UGB expansion area. Also, to discuss the next steps necessary to obtain PUC approval for a right-of-way dedication exchange.

PGE started the meeting off by stating the draft concept plan looks good, including OC along 99W and GC along T-S Road, although the T-S Road parcel was not included in the MOU. Mike acknowledged the letter from the DLCD makes sense and it is understandable that GC may not get approved along 99W.

The next logical step is to move the process toward PUC approval, and hopefully a positive net benefit can be passed onto the rate payers (positive delta between before and after). The group discussed when it makes sense to start the appraisal process; it makes sense to start the process after the City Council adopts the plan, but prior to actual annexation.

The City/HHPR and PGE should begin coordinating with an appraiser after City Council approval of the plan, to clarify/coordinate a "before" annexation appraisal and "after" annexation/zone change appraisal.

Mike clarified that it will take PGE about 2 weeks to turn around signatures for the legal descriptions and annexation petition, so get those to him soon.

Mike suggested presenting the entire plan for PUC approval including the dog park shown on the exhibits. It is possible that PGE may see little developmental value in that area, so it might make sense for PGE to lease the land to the City for a dog park and create the necessary PGE/BPA easements over the leased land. This should also be included for accurate appraisals.

He would like to discuss this process further with PUC representatives.

It was agreed that the appraisal component is key for PUC approval, so each party (City and PGE) should be on the same page with the appraiser.

ACTION ITEMS

Action Item	Person Responsible	Due Date
Agree to a particular appraiser	City/PGE	6/1/09
Follow up meeting with appraiser, PGE, City/HHPR	All	6/19/09

AGENDA

No agenda provided. Open discussion.

North Adams Avenue Concept Plan Public Comment Form Summary

1. Does the proposed street layout provide needed connections within the planning area? Why of why not?
   - Looks good. Not sure a round-about by Home Depot would work. Would stop traffic / delay flow.
   - No. There needs to be connectivity between the movie parking lot and North Adams.
   - Yes – connecting 99W to T-S Road.
   - Yes.

2. Does the proposed street layout provide needed connections to areas surrounding the concept plan area? Why or why not?
   - Yes – good buffer behind cinema and other businesses.
   - Only if Adams is extended to Oregon Street at the same time.
   - Yes – walking path is adequate. Road to east is adequate.
   - Yes.

3. A. The City has identified several potential uses under existing power lines that do not require structures. Should any of these uses not be considered? Why or why not? Are there other uses that should be considered?
   - Ok.
   - Dog park. Soccer would be nice and is needed. If not allowed, the field needs to be broken up with shrubs (not trees) to prevent this being a play field.
   - Your uses are fine. Archery shooting range under power lines should be considered.
   - Looks ok.

   B. Are there other uses that should be considered?
   - Not at this time.
   - Archery shooting range under power lines.

4. A. Which zoning option is most appropriate for Opportunity Area #1? Why?
   - Office Commercial. Better use of property provides jobs like Kruse Meadows – Lake Oswego.
   - Office Commercial. Adams Ave North Area 2 needs higher building appearance standards than what Sherwood has currently. We have some ugly metal LI developments in town. South of T-S Rd is supposed to be General Commercial.
   - General Commercial.
   - General Commercial.

B. Is Light Industrial the most appropriate zoning option for Opportunity Area #2? Why or why not?

- Yes. Because of traffic impact. Road is already maxed out.
- Yes. Fewer car trips on T-S Rd. Need more LI land.
- Yes.
- No. Next door we can hardly sell anything – interest has gone away.

C. Which zoning option is most appropriate for Opportunity Area #3? Why?

- General Commercial. Better visibility / building set up a standard for job – view of Sherwood.
- General Commercial. Would be a good restaurant location near LI and kitty-corner from Red Robin.
- General Commercial.
- General Commercial. No one wants to buy LI.

5. Which aspects of the refined concept plan alternative are most important to you?
    - The gateway to Sherwood. The other side of 99W (North) looks screwed up.
    - Adams Ave completed. Dog Park.
    - Connecting T-S Rd to 99W. Access to NW corner of Adams and T-S Rd.
    - Connection to our property and would still like to change to General Commercial or <<illegible>> 2 lots.

6. Do you have other comments about the refined concept plan alternative?
    - Looks like a well thought out plan. Good use of areas.
    - Need to define access change to mini-storage on NW corner of T-S Rd & Adams. Most likely on T-S to the west of current address.
    - Access to the storage facility on the NW corner of T-S Road and Adams Avenue must be maintained with full access near the existing gate. Access to this facility looks difficult and should be discussed.

7. Would you like to add yourself or anyone else to the project mailing list?
    - Gary Langer, 14020 SW 98th, Tigard. 503-620-6649.
    - Matt Langer, 15585 SW Tualatin-Sherwood Rd, Sherwood, 97140. mlanger05@comcast.net
    - Ray Paul, 6141 SW Orchid Drive, Portland, 97219. RLPLEP@yahoo.com

City of Sherwood Oregon

COMMENT FORM

North Adams Avenue Concept Plan

The Adams Avenue North concept planning area was brought into the Sherwood Urban Growth Boundary (UGB) in 2002 to allow construction of a collector street and alternative route between Highway 99W and Tualatin-Sherwood Road. The concept plan area encompasses industrial and/or commercial uses supported by the North Adams Avenue extension. The concept plan will establish a vision and framework for how new development should occur in the 33-acre planning area.

Please answer the questions on this comment form and return to us before you leave.

1. Does the proposed street layout provide needed connections within the planning area? Why or why not?

   Looks good - Not sure a round about by Home Depot would work. Would stop traffic / delay the flow

2. Does the proposed street layout provide needed connections to areas surrounding the concept plan area? Why or why not?

   Yes - Good buffer behind Cinema and other buffers

3. The City has identified several potential uses under existing power lines that do not require structures. Should any of these uses not be considered? Why or why not?

   OK

   Are there other uses that should be considered?

   Not at this time -

4. a. Which zoning option is most appropriate for Opportunity Area #1?
   - ☐ General Commercial
   - ☒ Office Commercial
   - ☐ Light Industrial

Why? Better use of property
Provides Jobs like Kruz
Meadows - Lake Oswego

b. Is light industrial the most appropriate zoning option for Opportunity Area #2?
- ☒ Yes
- ☐ No

Why or why not? Because of traffic impact
Road is already maxed out.

c. Which zoning option is most appropriate for Opportunity Area #3?
- ☒ General Commercial
- ☐ Light Industrial

Why? Better visibility of building
Set up a standard for
Tele- View of Sherwood

5. Which aspects of the refined concept plan alternative are most important to you?
All - The gateway to Sherwood
The other side of 99 W. (North)
Side looks screwed up.

6. Do you have any other comments about the refined concept plan alternative?
Looks like a well
Thought out plan. Good
use of areas.

7. Would you like to add yourself or anyone else to the project mailing list?

Name: Gary Langer
Address: 14020 SW 98th Tigard
Email: 503-620-6649

Thank you!

If you need more time, please return by March 5 to Jason Waters, City of Sherwood: 22560 SW Pine Street, Sherwood, OR 97140 FAX: 503-625-4254

City of Sherwood Oregon

COMMENT FORM

North Adams Avenue Concept Plan

The Adams Avenue North concept planning area was brought into the Sherwood Urban Growth Boundary (UGB) in 2002 to allow construction of a collector street and alternative route between Highway 99W and Tualatin-Sherwood Road. The concept plan area encompasses industrial and/or commercial uses supported by the North Adams Avenue extension. The concept plan will establish a vision and framework for how new development should occur in the 33-acre planning area.

Please answer the questions on this comment form and return to us before you leave.

1. Does the proposed street layout provide needed connections within the planning area? Why or why not?

   No. There needs to be connectivity between the movie Parking Lot and N. Adams

2. Does the proposed street layout provide needed connections to areas surrounding the concept plan area? Why or why not?

   Only if Adams is extended to Oregon St at the same time

3. The City has identified several potential uses under existing power lines that do not require structures. Should any of these uses not be considered? Why or why not?

   Dog Park Soccer would be nice - and is needed if not allowed the field needs to be broken up with shrubs (not trees) to prevent this being a play field.

   Are there other uses that should be considered?

4. a. Which zoning option is most appropriate for Opportunity Area #1?
   - ☐ General Commercial
   - ☒ Office Commercial
   - ☐ Light Industrial

   Adams Ave North Area 2 Needs higher building apperance Standards than what Sherwood has currently. We have some ugly metal LI Developments in town.

Why? South of Tu Shwd Rd is supposed to be Gen Comm

b. Is light industrial the most appropriate zoning option for Opportunity Area #2?

- ☑ Yes
- ☐ No

Why or why not? Fewer car trips on Tu-Sh. Rd - Need more LI land.

c. Which zoning option is most appropriate for Opportunity Area #3?

- ☑ General Commercial
- ☐ Light Industrial

Why? Would be a good restaurant location near LI and kitty corner from Red Robin

5. Which aspects of the refined concept plan alternative are most important to you?
Adam's Ave completed
Dog Park

6. Do you have any other comments about the refined concept plan alternative?

7. Would you like to add yourself or anyone else to the project mailing list?

Name:

Address:

Email:

Thank you!

If you need more time, please return by March 5 to Jason Waters, City of Sherwood: 22560 SW Pine Street, Sherwood, OR 97140 FAX: 503-625-4254

City of Sherwood Oregon

COMMENT FORM

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Please answer the questions on this comment form and return to us before you leave.

1. Does the proposed street layout provide needed connections within the planning area? Why or why not?

   YES - connecting 99W TO T-S ROAD

2. Does the proposed street layout provide needed connections to areas surrounding the concept plan area? Why or why not?

   YES - WALKING PATH IS ADEQUATE
   - ROAD TO EAST IS ADEQUATE

3. The City has identified several potential uses under existing power lines that do not require structures. Should any of these uses not be considered? Why or why not?

   YOUR USES ARE FINE

   Are there other uses that should be considered?

   Archery shooting range under powerlines.

4. a. Which zoning option is most appropriate for Opportunity Area #1?
   - [x] General Commercial
   - [ ] Office Commercial
   - [ ] Light Industrial

Why?

b. Is light industrial the most appropriate zoning option for Opportunity Area #2?
- ☒ Yes
- ☐ No

Why or why not?

c. Which zoning option is most appropriate for Opportunity Area #3?
- ☒ General Commercial
- ☐ Light Industrial

Why?

5. Which aspects of the refined concept plan alternative are most important to you?
   Connecting T-S to 99W
   ACCESS TO N.W. corner of ADAMS + T-S

6. Do you have any other comments about the refined concept plan alternative?
   Need to define access change to mini-storage on N.W. Corner T-S & ADAMS. Most Likely on T-S to the west of current access

7. Would you like to add yourself or anyone else to the project mailing list?

Name: MATT LANGER
Address: 15585 SW TUAL-SHRWD RD. Sherwood, 97140
Email: MLANGER05 @ COMCAST.NET

Thank you!

If you need more time, please return by March 5 to Jason Waters, City of Sherwood: 22560 SW Pine Street, Sherwood, OR 97140 FAX: 503-625-4254

City of Sherwood Oregon

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Please answer the questions on this comment form and return to us before you leave.

1. Does the proposed street layout provide needed connections within the planning area? Why or why not?

   Yes

2. Does the proposed street layout provide needed connections to areas surrounding the concept plan area? Why or why not?

   Yes

3. The City has identified several potential uses under existing power lines that do not require structures. Should any of these uses not be considered? Why or why not?

   List O.K.

   Are there other uses that should be considered?

4. a. Which zoning option is most appropriate for Opportunity Area #1?
   - [x] General Commercial
   - [ ] Office Commercial
   - [ ] Light Industrial

Why?

____

____

____

b. Is light industrial the most appropriate zoning option for Opportunity Area #2?
- ☐ Yes
- ☒ No

Why or why not?
next door we can hardly sell anything — interest has gone away

c. Which zoning option is most appropriate for Opportunity Area #3?
- ☒ General Commercial
- ☐ Light Industrial

Why?
No one wants to buy it

5. Which aspects of the refined concept plan alternative are most important to you?
connection to our property and would still like to change to general commercial on our front 2 lots

6. Do you have any other comments about the refined concept plan alternative?

____

____

____

7. Would you like to add yourself or anyone else to the project mailing list?

Name: Roy Barr

Address: 6341 SW Orchard Drive Portland OR 97219

Email: RLPLEP@yahoo.com

Thank you!

If you need more time, please return by March 5 to Jason Waters, City of Sherwood: 22560 SW Pine Street, Sherwood, OR 97140 FAX: 503-625-4254

City of Sherwood Oregon

COMMENT FORM

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Please answer the questions on this comment form and return to us before you leave.

1. Does the proposed street layout provide needed connections within the planning area? Why or why not?

2. Does the proposed street layout provide needed connections to areas surrounding the concept plan area? Why or why not?

3. The City has identified several potential uses under existing power lines that do not require structures. Should any of these uses not be considered? Why or why not?

   Are there other uses that should be considered?

4. a. Which zoning option is most appropriate for Opportunity Area #1?
   - ❑ General Commercial
   - ❑ Office Commercial
   - ❑ Light Industrial

Why?

b. Is light industrial the most appropriate zoning option for Opportunity Area #2?
- ❑ Yes
- ❑ No

Why or why not?

c. Which zoning option is most appropriate for Opportunity Area #3?
- ❑ General Commercial
- ❑ Light Industrial

Why?

5. Which aspects of the refined concept plan alternative are most important to you?

6. Do you have any other comments about the refined concept plan alternative?

ACCESS TO THE STORAGE FACILITY ON THE NW CORNER OF T-S ROAD & ADAMS AVENUE MUST BE MAINTAINED w/ FULL ACCESS NEAR THE EXISTING GATE. ACCESS TO THIS FACILITY LOOKS DIFFICULT & SHOULD BE DISCUSSED

7. Would you like to add yourself or anyone else to the project mailing list?

Name:

Address:

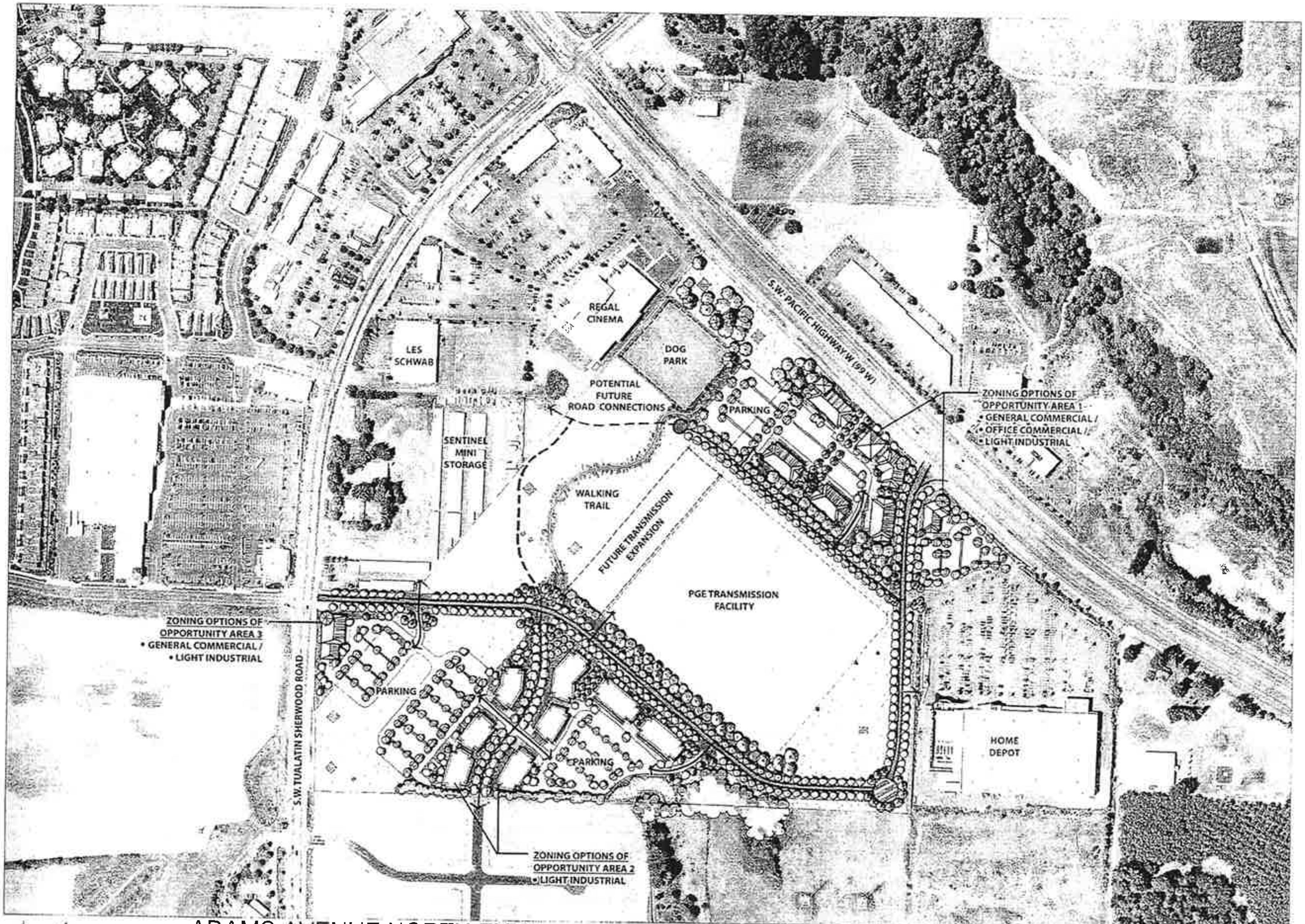
Email:

Thank you!

If you need more time, please return by March 5 to Jason Waters, City of Sherwood: 22560 SW Pine Street, Sherwood, OR 97140 FAX: 503-625-4254

North Adams Avenue Concept Plan
Open House Meeting
February 25, 2009

Name	Address	Phone Number	E-mail
JASON WATERS	22560 SW PINE ST.	503-925-2304	watersj@ci.sherwood.or.us
Gary Langer	14020 SW 98th Tigard	503 620 6649	
Pam Langer	15585 SW Tualatin-Sherwood Rd	503-625-7070	pamela.langer@verizon.net



ADAMS AVENUE NORTH EXTENSION - REFINED CONCEPT DRAWING

SHERWOOD, OREGON

FEBRUARY 25 2009

Harper Houf Peterson Righellis Inc

City of Sherwood Oregon

Home of the Tualatin River National Wildlife Refuge

CONCEPT PLAN OF PGE PROPERTIES ADJACENT TO ADAMS AVENUE NORTH EXTENSION- EXISTING CONDITIONS REPORT

Introduction

In December 2007, the Sherwood City Council passed Resolution 2007-081 authorizing the City Manager to enter into a development agreement with Clarence and Pamela Langer and the Langer Family LLC for the construction of Adams Avenue in Sherwood. This agreement included the City's commitment to acquire right-of-way, design the road layout, secure permits and mitigate any wetlands associated with the Adams Drive North Extension. The agreement also included the Langer's commitment to construct the North Extension of Adams Avenue (see "Development Agreement", attached to Resolution 2007-081).

The proposed Adams Avenue North Extension connects SW Pacific Highway with SW Tualatin-Sherwood Road. The alignment of the northern extension of Adams Avenue, as shown in Figure 8-8 of the Transportation System Plan, requires the annexation of Tax Lot 2S129B001800 and approximately 21.5 acres of Tax Lot 2S129A001600 to the City of Sherwood. These parcels were brought into the Metro Urban Growth Boundary (UGB) in 2002 by Metro Ordinance 02-986A for the purposes of providing transportation connections (i.e. the northern extension of Adams Avenue). Portland General Electric (PGE) owns both parcels, Lots 1600 and 1800, as well as Tax Lots 2S129A001100 and 2S129B001900. **Table 1** identifies the tax lots by acreage, existing zone and existing development.

Tax Lot	Acreage	Existing Zoning	Existing Development
1600	21.51	Future Development-20	Partially developed with PGE substation and PGE training facility
1800	11.69	Future Development-20	Partially developed with PGE substation
1100	8.08	Light Industrial	Undeveloped, bisected by north-south access road to PGE substation
1900	11.07	Light Industrial	Undeveloped

Table 1- Subject Parcels

The primary goal of this concept planning process is to designate zoning for Lots 1600 and 1800 and annex these parcels to the City of Sherwood for the purpose of constructing the Adams Avenue North Extension. The zoning will be determined by looking within and beyond the Urban Growth Boundary to assess the most appropriate zone for these parcels. In addition, this process will look at the current zoning of Lot 1900 (Light Industrial) to assess whether a commercial zoning would be more appropriate for this parcel adjacent to commercially zoned property and fronting Highway 99W. Tax Lot 1100 is included with this report because Adams Avenue North will traverse this parcel to its southern boundary at SW Tualatin-Sherwood Road.

Attachment 3D

Location
Lots 1600 and 1800 are located south of the Home Depot on SW Pacific Highway and north of the Sentinel Storage facility on SW Tualatin-Sherwood Road. There is a PGE transmission facility located on both of these parcels and a PGE training facility on the southern portion of Lot 1600. Lot 1100 is located directly south of Lot 1600 and has its southern boundary adjacent to SW Tualatin-Sherwood Road. Lot 1900 is located south of the Home Depot and adjacent to SW Pacific Highway. Lot 1900 is currently undeveloped. **Figure 1** below identifies the location of the properties.

Land Use
Lots 1900 is zoned Light Industrial. The property adjacent and to the north is zoned Light Industrial but is developed with the Home Depot store, a use not permitted in the Light Industrial zone (this use is permitted in the commercial zones because of the retail nature of the business). The property adjacent and to the south is zoned General Commercial (GC) and is developed with a movie theater and several small restaurants and businesses.

Lot 1100 is zoned Light Industrial, as are the properties to the east and west of this parcel. The adjacent property to the west is developed with a mini-storage facility and the properties to the east are part of the Sherwood Commercial Center, an industrial subdivision platted in 2006.

Lots 1600 and 1800, which are currently in unincorporated Washington County, are zoned Future Development-20 (FD-20) by the County because they are within the Urban Growth Boundary and intended to be annexed to the City of Sherwood, with a current minimum lot size of twenty acres. The properties on all sides of these parcels are zoned Light Industrial. Some are developed industrially and some are vacant. In addition, Lot 1600 is adjacent to the Home Depot site which, as discussed above, is zoned industrially but developed commercially.

Figure 1- Location of Tax Lots 1600, 1800 and 1900

Natural Resources
The Metro Inventory of Regionally Significant Habitat shows Class A wildlife habitat, the highest value habitat, located on a portion of Lot 1600 (see **Figure 2**). The Local Wetland Inventory (LWI) shows no wetlands located on any of the three parcels; however, a wetlands analysis will be performed during the concept planning process to ensure that the LWI data is correct. A possible wetland exists on Lot 1600 in the location of the Class A Wildlife Habitat.

The 100-year floodplain, as determined by the Federal Emergency Management Agency (FEMA), runs in a north-south direction over the portion of Lot 1600 that is not within the UGB. As shown in Figure 1 above, there are trees on portions of Lot 1900. No other significant natural resources have been identified on any of these four parcels.

All four parcels are relatively flat, with an average slope of 0-3%. The soil types are generally loam (Hillsboro, Quatama and Aloha Silt), which are generally well-draining and not a potential flood hazard. The area of Class A Wildlife Habitat, depicted in Figure 2 below, coincides with the one area of steep slopes (12-20%). This area is also comprised of loam soils.

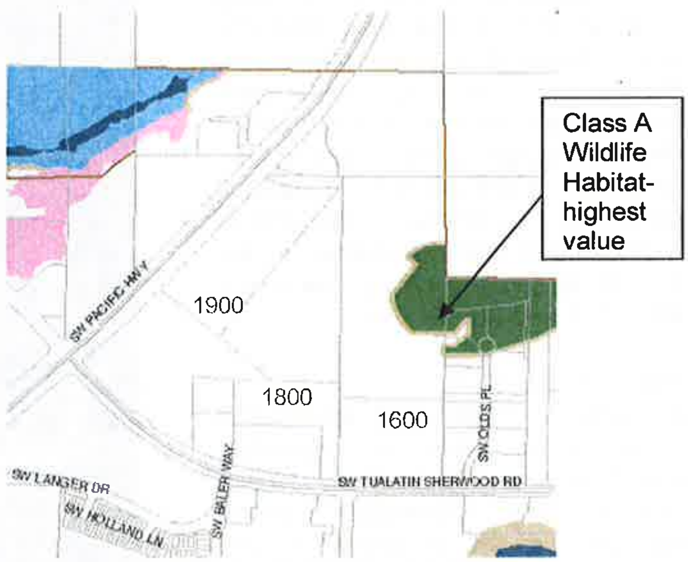


Figure 2- Metro Regionally Significant Habitat

Transportation
The Transportation System Plan (TSP), adopted in March 2005[1], is a master plan for all modes of transportation. The TSP identifies the need for local street connectivity in the industrial areas of Sherwood north of SW Tualatin-Sherwood Road, specifically connecting SW Pacific Highway to SW Tualatin-Sherwood Road. **Figure 3** shows the local street connectivity identified in Figure 8-8 of the TSP for this portion of Sherwood. Planned connections include a new east-west street that connects this northern extension of Adams Avenue to SW Olds Place within the Sherwood Commercial Center industrial subdivision to the east.

The TSP analysis identified the Adams Avenue North Extension as a necessary improvement to mitigate forecasted circulation issues on Tualatin-Sherwood Road and Highway 99W by the year 2020.

[1] Adopted by the City Council March 15, 2005 (Ordinance 2005-006)

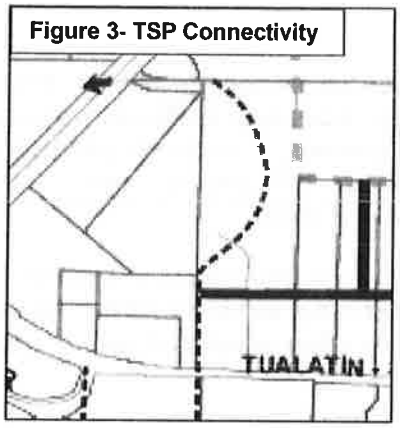
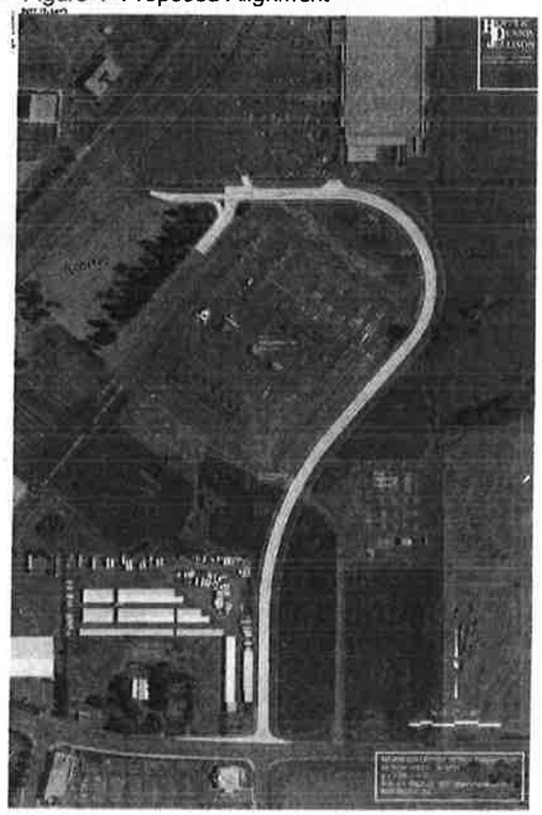


Figure 4 shows one potential alignment for the Adams Avenue North Extension. This potential alignment was developed by Hopper Dennis Jellison after detailed consideration of traffic volumes associated with the Langer project and is based on the location of the PGE facilities (particularly large power line towers), the existing PGE transmission facility, the need to link existing improvements at Highway 99W and Tualatin-Sherwood Road, and the City of Sherwood's Design and Construction Standards for horizontal radius of the road curvature. The proposed alignment, design and right-of-way width, as shown in Figure 4, substantially conforms to the standards in Figure 8-4 of the TSP.

Figure 4- Proposed Alignment



The connection of SW Adams Avenue to SW Pacific Highway is shown in Figure 4 connects to the existing private road serving the Home Depot site. There is an existing traffic signal controlling traffic at the intersection of this road and SW Pacific Highway. The road is in two tracts, one owned by PGE and one owned by Home Depot. PGE has granted a perpetual access easement over their portion of the road to Home Depot and, conversely, Home Depot has granted a perpetual access easement over their portion of the road to PGE. These documents are maintained in the Washington County Recorder's Office (document numbers 2000067342 and 2001003415).

Parks and Historic Resources
The adopted Sherwood Parks and Recreation Master Plan shows no parks or recreation facilities proposed for any of these four parcels. The City adopted the Sherwood Cultural Resource Inventory as an appendix to the Comprehensive Plan update in March 1991.[2] No historic or cultural resources are identified on any of these three parcels.

Public Facilities
Eight-inch sanitary sewer main lines exist along SW Tualatin-Sherwood Road, along the road providing access to Home Depot (the future connection of SW Adams Avenue to SW Pacific Highway) and on the General Commercial site to the south (the movie theater site). A thirty-inch storm sewer main line exists along SW Tualatin-Sherwood Road. Water main lines exist along SW Pacific Highway, SW Tualatin-Sherwood Road, the road providing access to Home Depot, and on the General Commercial site to the south (the movie theater site).

[2] Adopted March 13, 1991 (Ordinance 91-922); Planning file PA 91-12.

Job No.: SHR-08

Date: November 21, 2008

To: Julia Hajduk, City of Sherwood

From: Keith Jones

Harper Houf Peterson Righellis Inc.
ENGINEERS ◆ PLANNERS
LANDSCAPE ARCHITECTS ◆ SURVEYORS

Project/Subject: **North Adams Avenue Concept Plan Public Involvement Plan**

☐ Fax - Number:________________; Number of pages__________
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This plan will guide public involvement activities during the development of the North Adams Avenue Area Concept Plan. Public involvement is integral to the development of the concept plan which will establish a vision and framework for how new development should occur in the planning area. The planning area is located southeast of Highway 99W and northeast of Tualatin-Sherwood Road. Approximately 33 acres were added to the City's Urban Growth Boundary (UGB) in 2002. The area will encompass industrial and/or commercial uses supported by the North Adams Avenue extension that will provide a collector street connection between Tualatin-Sherwood Road and Highway 99W.

The concept planning phase will also include approximately 27 acres of undeveloped Light Industrial zoned property. Options for rezoning some of the existing industrial to commercial or mixed-use will also be evaluated.

Overview and Approach

Public involvement activities will be jointly carried out by the consultant team Harper Houf Peterson and Righellis Inc. (HHPR) and the City of Sherwood, collectively referred to as the Project Design Team. This public involvement plan lays out activities that will be completed jointly by the Project Design Team.

A. Goal and objectives

The goal of the public involvement plan is to produce a concept plan that addresses community issues and concerns and meets City, Metro and state requirements. The objectives of the public involvement plan include:

- Provide on-going opportunities for community members and stakeholders to participate in the development of the plan
- Establish and maintain productive partnerships with individuals and organizations affected by the plan
- Provide timely and complete information to the public and stakeholders
- Promote early involvement by public stakeholders and agencies in identifying issues and opportunities, weighing tradeoffs and identifying a plan that can be implemented
- Maintain a record of public input and ensure that input is considered during the planning process

B. Stakeholders

Key stakeholders fall into three categories:

1) Property owners and developers within the study area
2) Businesses that currently operate within the study area
3) Institutional partners, such as Metro, Washington County and ODOT and jurisdictional service providers.

C. Committee structure and decision-making

The planning work will involve the following committees:

1) Stakeholder Work Group (SWG) – an advisory committee comprised of property owners, business owners, institutional partners, and developers charged with providing input and advice to the Project Design Team and ultimately to the City Council.
2) Planning Commission (PC) – charged with providing on-going input and guidance to the Project Team about technical aspects of the concept plan and recommendation to the City Council.

Final decision will be made by the City of Sherwood City Council. The Project Design Team will make day-to-day project management and work plan decisions. Public comment will be taken at all the SWG and PC meetings as well as at the Council meeting when brought forward at a public hearing.

Public involvement tools and methods

A. Stakeholder Interviews

The consultant team will interview up to twelve interested parties to identify their hopes and concerns. The interested party interviews will also be an opportunity to gather information about how to best engage the public in the planning process. The City will identify interested parties to be interviewed, and the interviews will be conducted by the consultant team via a project comment webpage.

Consultant Deliverables:
- Up to twelve interested party interviews
- Summary report

B. Stakeholder Work Group (SWG) meetings

The SWG is comprised of property owners, developers and institutional stakeholders. The SWG will meet a total of two to three times during the development of the concept plan. SWG meetings will be facilitated by HHPR. The consultant team will prepare agendas, materials and meeting summaries. Draft materials will generally be provided to the City of Sherwood seven days before each SWG meeting. The City of Sherwood will secure a meeting room for each SWG meeting.

Consultant deliverables:

- Agendas, meeting materials, facilitation and meeting summaries

C. Planning Commission meetings and Hearings

The Planning Commission will be kept informed of the Design Team progress through updates and workshops prior to the public hearing recommendation to the City Council.

D. Open house workshop

One open house workshop will be held during the development of the concept plan to present project alternatives. This community meeting is an opportunity for community members to learn about the project and provide input. The open house will be facilitated by HHPR. HHPR will provide project maps, questionnaires and meeting summary. HHPR will prepare an invite flyer to be mailed to property owners within 100 feet of the project area. The City will secure meeting location.

E. Project web page

The City will post information including plans, agendas and background reports on the City's webpage.

F. Printed Media

The City will provide updates within the Sherwood Archer and Sherwood Chamber newsletter

DKS *Associates*

TRANSPORTATION SOLUTIONS

TECHNICAL MEMORANDUM

TO: Ben Austin, P.E., Harper Houf Peterson Righellis

FROM: Chris Maciejewski, P.E.
France Campbell, E.I.T.

DATE: May 8, 2009

SUBJECT: **Sherwood Adams Avenue North Improvements**
Transportation Tech Memo #1: Existing and Future Conditions

P08232-000

The memorandum presents the results of an updated existing and future conditions analysis for the Sherwood Adams Avenue North Improvements Project. It includes documentation of existing facilities, documentation of applicable agency transportation standards, existing operations analysis, future no-build operations analysis, and future operations analysis with the Adams Avenue North extension.

This project consists of the extension of Adams Avenue from Tualatin-Sherwood Boulevard to the Home Depot access along Highway 99W. The initial project study area is shown in Figure 1.

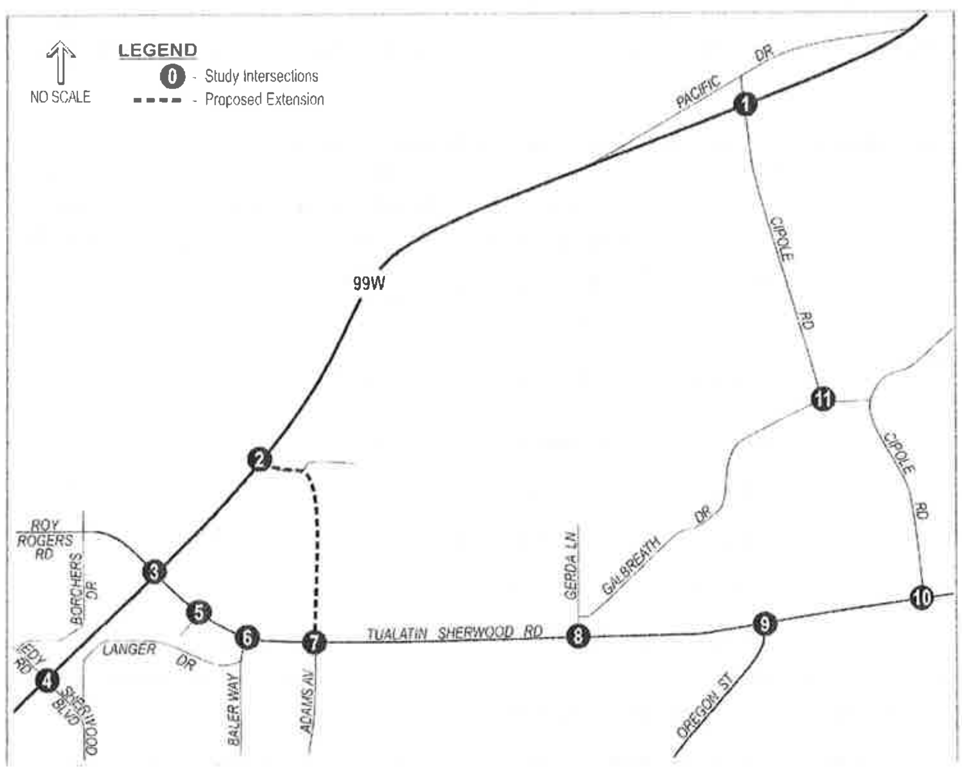

Figure 1: Study Area

Attachment 4A

Existing Facilities

The following sections discuss the existing transportation facilities in the project area, including a review of existing pedestrian, bicycle, and motor vehicle facilities.

Pedestrian Facilities

An inventory of sidewalks along key roadways within the study area was conducted. Currently, Tualatin-Sherwood Road has sidewalks on both sides through the study area. Highway 99W has sidewalks on both sides until just north of the Home Depot store, where the sidewalks terminate with the beginning of the rural highway section. Edy Road and Sherwood Boulevard also have sidewalks near the intersection with Highway 99W in the study area.

Bicycle Facilities

To assess the adequacy of bicycle facilities within the study area, a brief field inventory of designated bike lanes and shoulder bikeways along key roadways was conducted. There are bike lanes in both directions along Highway 99W, Tualatin-Sherwood Road, Edy Road, and Sherwood Boulevard through the study area. No other key study area roads have bike lanes.

Motor Vehicle Facilities

Field inventories were conducted to determine characteristics of roadways within the study area. Data collected included posted speed limits, roadway lanes, lane configurations, and intersection controls. These characteristics define corridor capacity and operating speeds through the street system, which affect travel path choices for drivers in the study area. The results are listed in Table 1.

Table 1: Existing Key Study Area Roadway Characteristics

Roadway	Agency	Functional Classification	Posted Speed Limit (mph)	Number of Lanes	Lane Width (ft)	Shoulder Width (ft)
Highway 99W	ODOT	Principal Arterial	45/55[a]	4	12	6.0
Tualatin-Sherwood Road	County	Arterial	35/45[a]	3/4	12	6.0
Edy Rd	ODOT/City	Collector	40	2/3	12	6.0
Sherwood Blvd	City	Arterial	25	3	12	6.0
Oregon Street	City	Arterial	35	3	12	1.5
Cipole Road	County	Collector	45	2	11	1.5
Adams Road	City	Collector	35	2/3	11	2.0

[a] Highway 99W is posted as 45 south of Home Depot and 55 mph to the north. Tualatin-Sherwood Road is posted at 35 mph west of Adams Avenue and 45 mph to the east.

Agency Transportation Standards

Two key agency transportation standards that are required to be addressed for this project include intersection operations/mobility standards and access management standards. An explanation of each is given in the following sections, along with the applicable standards.

Intersection Operations and Mobility Standards

Level of service (LOS) and volume to capacity (v/c) ratios as defined in the *2000 Highway Capacity Manual*[1] (HCM) are two measures of effectiveness (MOEs) that are used as the basis for intersection operations and mobility standards. Explanations of each are given below.

LOS is similar to a "report card" rating based upon average vehicle delay. Level of Service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of Service D and E are progressively worse peak hour operating conditions. Level of Service F represents conditions where average vehicle delay exceeds 80 seconds per vehicle entering a signalized intersection and demand has exceeded capacity. This condition is typically evident in long queues and delays. Unsignalized intersections provide levels of service for major and minor street turning movements. For this reason, LOS E and even LOS F can occur for a specific turning movement; however, the majority of traffic may not be delayed (in cases where major street traffic is not required to stop). LOS E or F conditions at unsignalized intersections generally provide a basis to study intersections further to determine availability of acceptable gaps, safety and traffic signal warrants.

Volume to capacity (v/c) ratio is the peak hour traffic volume at an intersection divided by the maximum volume that intersection can handle. For example, when a v/c is 0.80, peak hour traffic is using 80 percent of the intersection capacity. If traffic volumes exceed capacity, excessive queues will form and will lengthen until demand subsides below the available capacity (e.g. vehicles waiting to travel through a signalized intersection may have to wait for multiple signal cycles). When the v/c approaches 1.0, intersection operation becomes unstable and small disruptions can cause traffic flow to break down.

The minimum operational standard specified in the City of Sherwood Transportation System Plan is LOS D[2]. The maximum v/c ratio specified by Washington County is 0.99 for signalized intersections.[3] The minimum operational standard for unsignalized intersections specified by Washington County is LOS E. In the case of Highway 99W, ODOT operating performance standards for the study area utilize a v/c ratio of 0.99 for intersections not in a town center and 1.1 for those that are.[4] The intersections of Highway 99W/Tualatin-Sherwood Road and Highway 99W/Edy Road-Sherwood Boulevard are within the Town Center limits.[5] Based on recent conversations and meetings, ODOT has decided to not acknowledge the Town Center limits without the City completing a Town Center Plan. Therefore, ODOT intends to use a maximum v/c ratio of 0.99 for all of Highway 99W through Sherwood.

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[1] *Highway Capacity Manual*, Transportation Research Board, 2000.
[2] Page 8-25, City of Sherwood Transportation System Plan, March 15, 2005.
[3] Washington County 2020 Transportation Plan, Adopted October 29, 2002, Table 5.
[4] 1999 Oregon Highway Plan, Amendment to Table 7, December 13, 2000.
[5] This is according to the Metro Regional and Town Center Map.
(http://www.oregonmetro.gov/index.cfm/go/by.web/id=15467&x=7599901&y=629257&locID=27)

Access Management Standards

Proper roadway access spacing is important to maintain operating characteristics and safety. While all parcels are allowed access, it is desired that access to parcels along major roadways be limited to side streets or consolidated. When roadway access points are located too frequently along a roadway, safety and roadway capacity are diminished. Access management practices can help roadways operate more efficiently and include closure, consolidation, or relocation of accesses. It is best to incorporate appropriate access spacing practices upon initial development or redevelopment to limit the amount of management required in the future.

The ODOT access management standards, as defined in OAR 734-051, call for minimum distances between access points on the same side of statewide highways. The standards vary depending on posted speed on the roadway. Highway 99W is a 45 mph statewide highway that meets ODOT access spacing standards for all roadway intersections and driveways located along the highway within the study area. Additional access spacing standards for study area roadways are identified in the Sherwood TSP and are included in Table 2.

Table 2: Access Management Standards

Facility (by Agency)	Minimum Access Spacing (ft)	Maximum Access Spacing (ft)
ODOT [a]		
- Statewide Highway (45 mph)	990	-
Washington County [b]		
- Arterial	600	-
- Collector	100	-
City of Sherwood [c]		
- Arterial	600	1,000
- Collector	100	400

[a]Source: Oregon Highway Plan, Table 13, ODOT (1999)
[b]Source: Washington County Community Development Code, Article V. Section 01-8.5.B
[c]Source: Sherwood TSP, Table 8-12

HCM Delay vs. Micro-Simulation Delay

Agency delay standards are based on the results of a HCM analysis. However, the HCM methodology treats intersections as isolated nodes that are not impacted by operations at other nearby intersections. The project study area includes seven intersections along Tualatin-Sherwood Road that, under peak hour traffic conditions, experience excessive vehicle queuing impacts that significantly increase driver delay. Therefore, the HCM delay is not an accurate measure of the true intersection delay. While agencies do not have adopted standards for micro-simulation delay, the micro-simulation delay can give a more accurate picture of congestion. Therefore, the intersection operations analysis for this study reports both HCM and micro-simulation delay.

Existing Intersection Operations

The existing intersection operations analysis includes a summary of the existing study intersection volumes and an analysis of the existing intersection operations.

Existing Volumes

An inventory of peak hour traffic conditions was performed in the fall of 2008. Eleven study intersections within the study area were selected for focused analysis in order to address areas of concern along major roadways and to monitor impacts of potential built-out within the Concept Plan area. During the AM peak hour (7:00 to 9:00 a.m.) and the PM peak hour (4:00 to 6:00 p.m.), turn movement counts were conducted at the study intersections. The count data was then used as a basis for evaluating traffic performance at the study intersections for existing PM peak hour conditions. The existing AM and PM peak hour traffic volumes at study intersections are shown in Figure 2.

The traffic volumes were compared to year 2006 historic data in the study area documented in the I-5 to 99W Connector Project[6]. Current traffic volumes were found to have decreased significantly during the PM peak hour on Tualatin-Sherwood Road in the westbound direction, with reductions up to 300 vehicles per hour. While these reductions in traffic volume could be a result of day-to-day or seasonal fluctuation, they could also be the result of decreased traffic volumes in the area due to current economic conditions or they could reflect driver route changes to other less congested corridors.

Existing Operations

The 30th highest hour intersection volumes[7] were used to determine the existing study intersection operating conditions based on the HCM methodology for signalized and unsignalized intersections. The results of this analysis are listed in Table 3 for the AM peak hour and Table 4 for the PM peak hour. As listed, each of the signalized study intersections meets mobility standards during both the AM and PM peak hour, with the exception of Highway 99W/Tualatin Sherwood Road. If ODOT applies a standard v/c ratio of 0.99, the intersection of Highway 99W/Tualatin Sherwood Road fails under existing conditions. The unsignalized intersections of Tualatin-Sherwood Road/Gerda Lane and Tualatin-Sherwood Road/Adams Avenue fail to meet LOS standards due to the side-street movements.

The micro-simulation results for the study intersections indicate a few locations where particular traffic movements are over capacity, which cause significant increased to driver delay. During the AM peak hour, the eastbound approach of Tualatin-Sherwood Road (Roy Rogers Road) at Highway 99W experiences traffic signal cycles that fail to clear all of the queued vehicles. During the PM peak hour, westbound traffic volumes on Tualatin-Sherwood Road approaching Highway 99W queue back through the Shopping Center signal and significantly increases driver delay.

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[6] I-5 to 99W Connector Project: Baseline Transportation Conditions Report, David Evans and Associates and DKS Associates, April 2007.

[7] 30th Highest Hour Volumes (30th HHVs) are used to account for seasonal trends in traffic patterns. . A seasonal adjustment factor of 1.09 was applied to Highway 99W through volumes based on local traffic trends and ODOT procedures for calculating a seasonal adjustment factor.

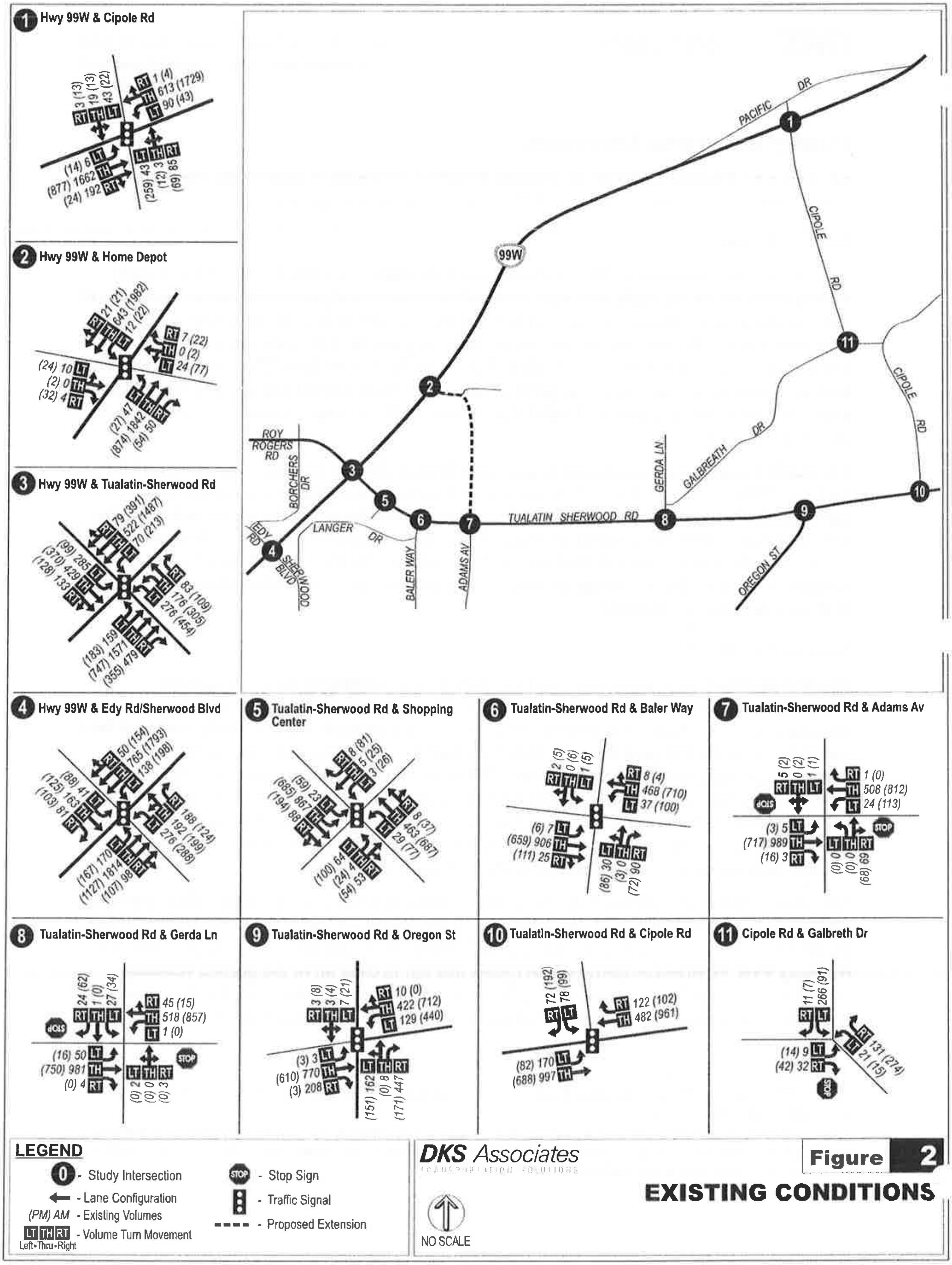


Figure 2

EXISTING CONDITIONS

Table 3: 2008 Existing Intersection Performance (AM Peak Hour)

Intersection	HCM Delay (sec)	Simulation Delay (sec)	LOS	v/c Ratio	MOEs Agency	MOEs Standard
-Signalized intersections						
Highway 99W/Cipole Rd	31.3	25.7	C	0.90	ODOT	v/c ≤ 0.99
Highway 99W/Home Depot	7.8	6.3	A	0.72	ODOT	v/c ≤ 0.99
Highway 99W/Tualatin-Sherwood Rd	59.0	55.6	E	0.81	ODOT	v/c ≤ 0.99*
Highway 99W/Edy Road/ Sherwood Blvd	52.2	>100	D	0.94	ODOT	v/c ≤ 0.99*
Tualatin-Sherwood Rd/Shopping Center	11.3	10.9	B	0.47	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Baler Wy	9.8	12.4	A	0.43	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Oregon St	31.5	44.3	C	0.79	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Cipole Rd	9.3	12.5	A	0.71	County	v/c ≤ 0.99
- Unsignalized Intersections						
Tualatin-Sherwood Rd/Adams Ave	>100	57.2	D/F	1.00	County	LOS E
Tualatin-Sherwood Rd/Gerda Ln	76.3	18.5	B/F	0.66	County	LOS E
Cipole Rd/Galbreath Rd	11.6	4.3	A/B	0.18	County	LOS E

Signalized intersection:

HCM Delay = Average Intersection Delay (sec.)

Simulation Delay = Simulation Average Intersection Delay (sec.)

LOS = Level of Service

V/C = Volume-to-Capacity Ratio

Bold values do not meet standards.

Unsignalized intersection:

HCM Delay = Critical Movement Approach Delay (sec.)

Simulation Delay = Simulation Critical Movement Approach Delay (sec.)

LOS = Major Street LOS/Minor Street LOS

V/C = Critical Movement Volume-to-Capacity Ratio

* The v/c ratio standard for Highway 99W in the Sherwood Town Center is being discussed by ODOT, Metro, and the City to determine if a standard of 1.1 should apply.

Table 4: 2008 Existing Intersection Performance with 30th HV (PM Peak Hour)

Intersection	HCM Delay (sec)	Simulation Delay (sec)	LOS	v/c Ratio	MOEs Agency	MOEs Standard
-Signalized intersections						
Highway 99W/Cipole Rd	28.7	30.1	C	0.89	ODOT	v/c ≤ 0.99
Highway 99W/Home Depot	14.1	19.2	B	0.81	ODOT	v/c ≤ 0.99
Highway 99W/Tualatin-Sherwood Rd	70.1	61.6	E	1.00	ODOT	v/c ≤ 0.99
Highway 99W/Edy Road/ Sherwood Blvd	41.0	60.5	D	0.85	ODOT	v/c ≤ 0.99
Tualatin-Sherwood Rd/Shopping Center	16.6	35.9	B	0.45	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Baler Wy	12.9	19.5	B	0.57	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Oregon St	22.2	39.7	C	0.76	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Cipole Rd	14.8	21.8	B	0.69	County	v/c ≤ 0.99
- Unsignalized Intersections						
Tualatin-Sherwood Rd/Adams Ave	>100	20.0	B/F	0.50	County	LOS E
Tualatin-Sherwood Rd/Gerda Ln	32.5	18.2	B/D	0.53	County	LOS E
Cipole Rd/Galbreath Rd	10.1	4.0	A/B	0.09	County	LOS E

Signalized intersection:

HCM Delay = Average Intersection Delay (sec.)

Simulation Delay = Simulation Average Intersection Delay (sec.)

LOS = Level of Service

V/C = Volume-to-Capacity Ratio

Bold values do not meet standards.

Unsignalized intersection:

HCM Delay = Critical Movement Approach Delay (sec.)

Simulation Delay = Simulation Critical Movement Approach Delay (sec.)

LOS = Major Street LOS/Minor Street LOS

V/C = Critical Movement Volume-to-Capacity Ratio

* The v/c ratio standard for Highway 99W in the Sherwood Town Center is being discussed by ODOT, Metro, and the City to determine if a standard of 1.1 should apply.

Future No-Build Operations

Future operations analysis was performed for the study intersections under the no-build scenario, which assumes the completion of financially constrained roadway improvements but does not include the extension of Adams Avenue to the north. In addition, the lands with the Concept Plan area for the project were assumed to develop under existing zoning. The planned roadway improvements include:

- Signalization of Tualatin-Sherwood Road/Adams Avenue
- Conversion of Tualatin-Sherwood Road/Baler Way to right-in/right-out and signal removal
- Widening of Tualatin-Sherwood Road and Roy Rogers Road to 5-lanes from Teton Avenue to west of Highway 99W (tapers to three lanes east of Borchers Drive)
- Completion of the Adams Avenue South Extension from Oregon Street to Century Drive
- Intersection geometric, turn lane, and signal phasing improvements at Highway 99W/Tualatin-Sherwood Road
- Completion of the 124th Avenue extension from Tualatin-Sherwood Road to Tonquin Road
- Widening of Tonquin Road to 3-lanes
- Signalization of Tualatin-Sherwood Road/Gerda Lane

The existing zoning of the lands within the City of Sherwood in the Concept Plan area is light industrial. The Concept Plan area outside of the City limit is zoned for rural density (e.g., one home per 20 acres). The Metro 2030 travel demand model includes approximately 150 non-retail employees in the Concept Plan area, which is equivalent to a floor-area-ratio (FAR) of 0.30 for the lands not restricted by the BPA easements. Therefore, the base Metro forecast for the area represents a reasonable build-out of existing zoning.

The following sections include a summary of the future intersection volume forecasting and the resulting intersection operations.

Future Volumes

Future year 2030 turning movement volumes were estimated for the study intersections using the travel demand model developed by Metro, Washington County, and the I-5 to 99W Connector Project team. To further refine the forecasts, a sub-area model was developed for the study area that includes all public streets and utilizes HCM node delays for trip assignment in order to evaluate changes in circulation and traffic control. The boundaries for the sub-area model include Highway 99W to the northeast, Roy Rogers Road to the northwest, Oregon Street to the southeast, Sherwood Boulevard/Edy Road to the southwest, and Cipole Road to the east.

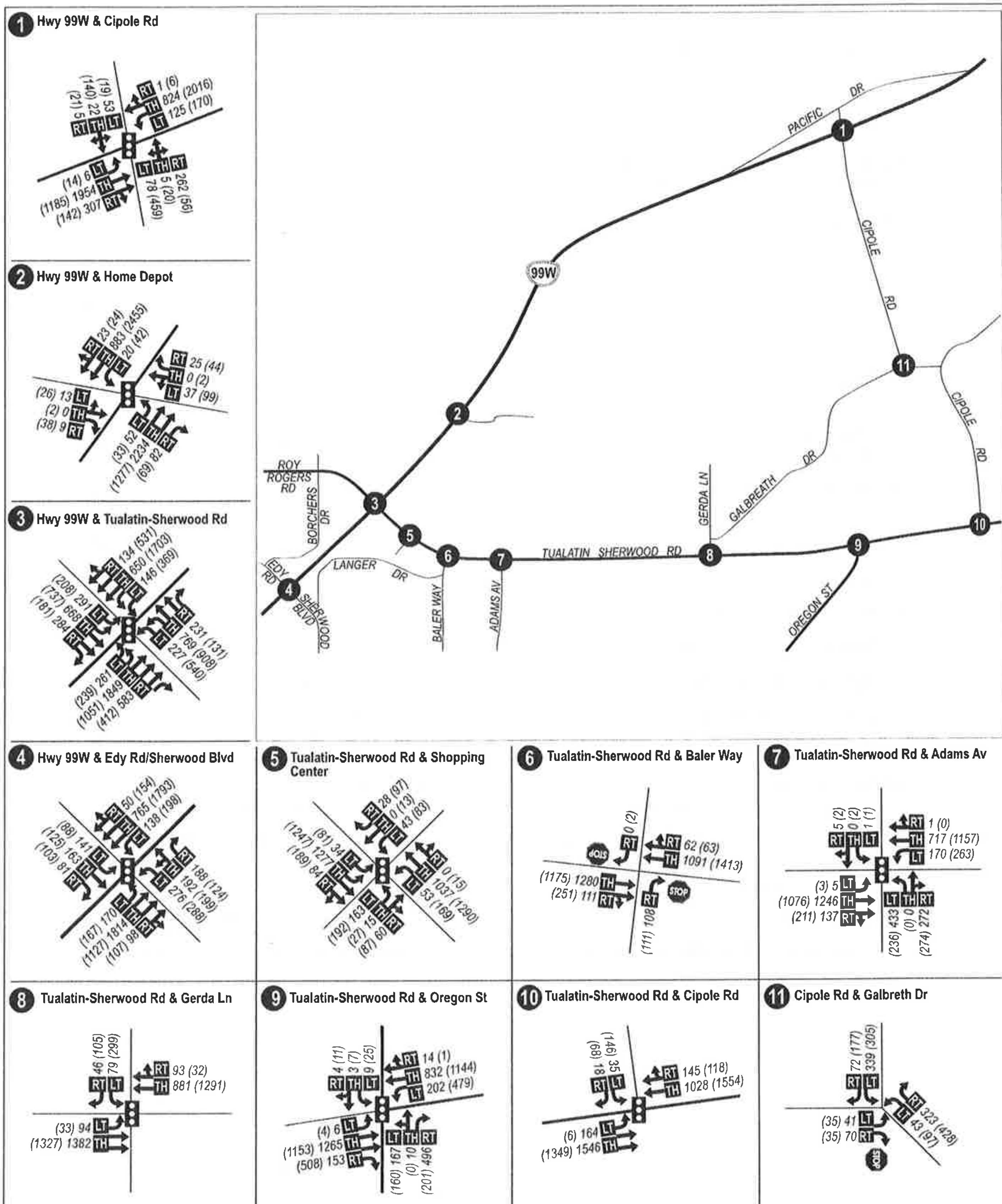
Calibration was performed on the enhanced 2005 base year model using the existing 30th highest hourly volumes (30th HV) at the study intersections. A future year 2030 sub-area model was then developed by coding the planned improvements into the model network re-assigning the 2030 Metro model trip tables. The 2030 future year volumes were then estimated by a post-processing methodology that includes adding the growth increment between the 2005 base year and 2030 future year models for each turn movement to the 2008 existing year 30th HV. The future volumes under the future no-build scenario are shown in Figure 3.

Future Operations

The traffic volumes forecasted for the 2030 No-Build Scenario were used to analyze operating conditions at the study intersections. The results of this analysis are listed in Table 5 for the AM peak hour and Table 6 for the PM peak hour. As shown in the tables, operating standards are exceeded at Highway 99W/Cipole Road and Highway 99W/Edy Road/ Sherwood Blvd during the AM and PM peak hours.

There are three main differences between the future and existing operations. First, the Highway 99W/Cipole Road and Highway 99W/Edy Road/ Sherwood Blvd intersections were not failing under existing operations but are expected to fail in the future. Second, the intersections of Tualatin-Sherwood Road/Adams Avenue and Tualatin-Sherwood Road/Gerda Lane were failing under the existing conditions, and no longer fail in the 2030 No-Build scenario; this is because the intersections will be signalized and also because of the Tualatin-Sherwood Road widening. Third, the intersection of Highway 99W/Tualatin-Sherwood Road was failing under existing PM peak conditions but would no longer fail in the future due to roadway widening, additional turn lanes, and in improved signal phasing. Significant increases in vehicle delay and v/c ratios were found at the majority of study intersections due to future growth.

The simulation delay attained from micro-simulation runs holds distinctly different results due to corridor congestion. Both Highway 99W through the study area and Tualatin-Sherwood Road from Highway 99W through Adams Avenue would experience substantial congestion with average vehicle delays well above acceptable levels.



LEGEND

- 0 - Study Intersection
- ← - Lane Configuration
- (PM) AM - Future Volumes
- LT TH RT - Volume Turn Movement (Left-Thru-Right)
- STOP - Stop Sign
- Traffic Signal

DKS Associates
TRANSPORTATION SOLUTIONS

NO SCALE

Figure 3

2030 FUTURE CONDITIONS WITHOUT ADAMS AVENUE NORTH EXTENSION

Table 5: 2030 Intersection Performance without Adams Ave Extension (AM Peak Hour)

Intersection	HCM Delay (sec)	Simulation Delay (sec)	LOS	v/c Ratio	MOEs Agency	MOEs Standard
-Signalized intersections						
Highway 99W/Cipole Rd	>100	54.6	F	**1.15**	ODOT	v/c ≤ 0.99
Highway 99W/Home Depot	18.0	7.9	B	0.80	ODOT	v/c ≤ 0.99
Highway 99W/Tualatin-Sherwood Rd	52.4	>100	D	0.98	ODOT	v/c ≤ 0.99
Highway 99W/Edy Road/ Sherwood Blvd	74.4	>100	E	**1.03**	ODOT	v/c ≤ 0.99
Tualatin-Sherwood Rd/Shopping Center	23.0	25.6	C	0.66	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Adams Ave	30.4	>100	C	0.89	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Gerda Ln	4.3	11.5	A	0.54	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Oregon St	18.9	22.8	B	0.78	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Cipole Rd	4.4	6.7	A	0.54	County	v/c ≤ 0.99
- Unsignalized Intersections						
Tualatin-Sherwood Rd/Baler Wy	13.3	10.3	A/B	0.55	County	LOS E
Cipole Rd/Galbreath Rd	16.1	9.9	A/C	0.27	County	LOS E

Signalized intersection:

HCM Delay = Average Intersection Delay (sec.)

Simulation Delay = Simulation Average Intersection Delay (sec.)

LOS = Level of Service

V/C = Volume-to-Capacity Ratio

Bold values do not meet standards.

Unsignalized intersection:

HCM Delay = Critical Movement Approach Delay (sec.)

Simulation Delay = Simulation Critical Movement Approach Delay (sec.)

LOS = Major Street LOS/Minor Street LOS

V/C = Critical Movement Volume-to-Capacity Ratio

Table 6: 2030 Intersection Performance without Adams Ave Extension (PM Peak Hour)

Intersection	HCM Delay (sec)	Simulation Delay (sec)	LOS	v/c Ratio	MOEs Agency	MOEs Standard
-Signalized intersections						
Highway 99W/Cipole Rd	92.5	>100	F	**1.29**	ODOT	v/c ≤ 0.99
Highway 99W/Home Depot	25.7	19.7	C	0.88	ODOT	v/c ≤ 0.99
Highway 99W/Tualatin-Sherwood Rd	61.2	>100	E	0.93	ODOT	v/c ≤ 0.99
Highway 99W/Edy Road/ Sherwood Blvd	84.0	>100	F	**1.08**	ODOT	v/c ≤ 0.99
Tualatin-Sherwood Rd/Shopping Center	23.0	>100	C	0.74	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Adams Ave	17.5	40.2	B	0.71	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Gerda Ln	13.7	27.3	B	0.64	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Oregon St	18.0	34.5	B	0.85	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Cipole Rd	9.1	12.0	A	0.67	County	v/c ≤ 0.99
- Unsignalized Intersections						
Tualatin-Sherwood Rd/Baler Wy	13.2	19.2	A/B	0.57	County	LOS E
Cipole Rd/Galbreath Rd	20.7	>100	A/C	0.32	County	LOS E

Signalized intersection:

HCM Delay = Average Intersection Delay (sec.)

Simulation Delay = Simulation Average Intersection Delay (sec.)

LOS = Level of Service

V/C = Volume-to-Capacity Ratio

Bold values do not meet standards.

Unsignalized intersection:

HCM Delay = Critical Movement Approach Delay (sec.)

Simulation Delay = Simulation Critical Movement Approach Delay (sec.)

LOS = Major Street LOS/Minor Street LOS

V/C = Critical Movement Volume-to-Capacity Ratio

Future Operations with Adams Avenue North Extension

Future 2030 forecasting and operations analysis was performed for a scenario that includes the Adams Avenue North extension between the Tualatin-Sherwood Road/Adams Avenue intersection and the Home Depot access to Highway 99W. The financially constrained roadway improvements that were included in the future no-build scenario and the base land use for the Concept Plan area were maintained for this scenario.

Future Volumes with Adams Avenue North Extension

The forecasted traffic volumes that were estimated are shown in Figure 4. With the addition of the Adams Avenue North Extension, a portion of traffic moves between Tualatin-Sherwood Road and Highway 99W to utilize Adams Avenue and avoid the congested intersection of Highway 99W/Tualatin-Sherwood Road. During the AM Peak hour, approximately 500 vehicles would use Adams Avenue North. During the PM peak hour, approximately 700 vehicles use Adams Avenue North.

Future Operations with Adams Avenue North Extension

In addition to the volume analysis, study intersection operations were analyzed and are summarized in Table 7 for the AM peak hour and Table 8 for the PM peak hour. As shown in the tables, operating standards are exceeded at Highway 99W/Cipole Road in AM and PM peak hours.

The future operations are consistent with the no-build scenario, with Highway 99W/Cipole Road and Highway 99W/Edy Road/ Sherwood Blvd failing to meet operating standards with and without the Adams Avenue north extension. Traffic operations at Highway 99W/Cipole Road did slightly improve with the Adams Avenue North Extension.

The micro-simulation delay is fairly consistent with the no-build scenario, as study intersections do not show major differences in average vehicle delay. As with the no-build scenario, the Highway 99W and Tualatin-Sherwood Road corridors continue to be over-capacity with excessive queues creating additional vehicle delays at upstream intersections.

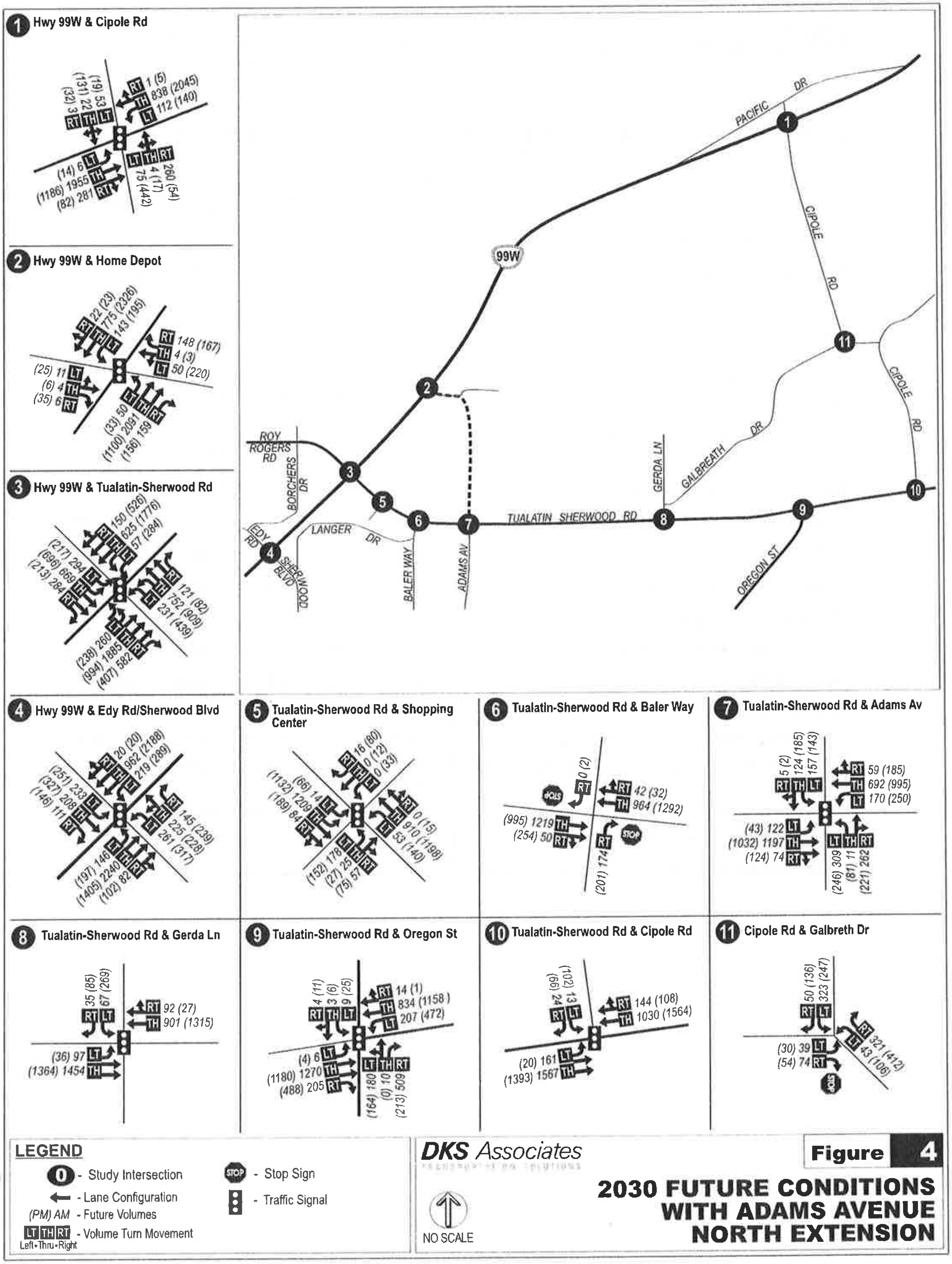


Figure 4

2030 FUTURE CONDITIONS WITH ADAMS AVENUE NORTH EXTENSION

Table 7: 2030 Intersection Performance with Adams Ave Extension (AM Peak Hour)

Intersection	HCM Delay (sec)	Simulation Delay (sec)	LOS	v/c Ratio	MOEs Agency	MOEs Standard
-Signalized intersections						
Highway 99W/Cipole Rd	>100	49.8	F	**1.12**	ODOT	v/c ≤ 0.99
Highway 99W/Adams Ave	33.8	12.0	C	0.85	ODOT	v/c ≤ 0.99
Highway 99W/Tualatin-Sherwood Rd	52.1	>100	D	0.96	ODOT	v/c ≤ 0.99
Highway 99W/Edy Road/ Sherwood Blvd	71.3	>100	E	**1.03**	ODOT	v/c ≤ 0.99
Tualatin-Sherwood Rd/Shopping Center	17.6	21.2	B	0.62	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Adams Ave	28.1	51.8	C	0.83	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Gerda Ln	3.7	9.6	A	0.53	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Oregon St	19.3	22.2	B	0.79	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Cipole Rd	3.1	5.8	A	0.52	County	v/c ≤ 0.99
- Unsignalized Intersections						
Tualatin-Sherwood Rd/Baler Wy	13.7	12.9	A/B	0.52	County	LOS E
Cipole Rd/Galbreath Rd	15.3	6.9	A/C	0.26	County	LOS E

Signalized intersection:

HCM Delay = Average Intersection Delay (sec.)

Simulation Delay = Simulation Average Intersection Delay (sec.)

LOS = Level of Service

V/C = Volume-to-Capacity Ratio

Bold values do not meet standards.

Unsignalized intersection:

HCM Delay = Critical Movement Approach Delay (sec.)

Simulation Delay = Simulation Critical Movement Approach Delay (sec.)

LOS = Major Street LOS/Minor Street LOS

V/C = Critical Movement Volume-to-Capacity Ratio

Table 8: 2030 Intersection Performance with Adams Ave Extension (PM Peak Hour)

Intersection	HCM Delay (sec)	Simulation Delay (sec)	LOS	v/c Ratio	MOEs Agency	MOEs Standard
-Signalized intersections						
Highway 99W/Cipole Rd	87.4	>100	F	**1.27**	ODOT	v/c ≤ 0.99
Highway 99W/Adams Ave	40.5	37.1	D	0.98	ODOT	v/c ≤ 0.99
Highway 99W/Tualatin-Sherwood Rd	55.4	98.3	E	0.97	ODOT	v/c ≤ 0.99
Highway 99W/Edy Road/ Sherwood Blvd	81.0	>100	F	**1.07**	ODOT	v/c ≤ 0.99
Tualatin-Sherwood Rd/Shopping Center	19.4	56.7	B	0.64	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Adams Ave	29.1	69.2	C	0.74	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Gerda Ln	11.3	21.9	B	0.63	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Oregon St	19.9	34.1	B	0.86	County	v/c ≤ 0.99
Tualatin-Sherwood Rd/Cipole Rd	7.4	10.2	A	0.64	County	v/c ≤ 0.99
- Unsignalized Intersections	92.0					
Tualatin-Sherwood Rd/Baler Wy	12.8	9.8	A/B	0.52	County	LOS E
Cipole Rd/Galbreath Rd	16.6	>100	A/C	0.25	County	LOS E

Signalized intersection:

HCM Delay = Average Intersection Delay (sec.)

Simulation Delay = Simulation Average Intersection Delay (sec.)

LOS = Level of Service

V/C = Volume-to-Capacity Ratio

Bold values do not meet standards.

Unsignalized intersection:

HCM Delay = Critical Movement Approach Delay (sec.)

Simulation Delay = Simulation Critical Movement Approach Delay (sec.)

LOS = Major Street LOS/Minor Street LOS

V/C = Critical Movement Volume-to-Capacity Ratio

Progression Analysis

In addition to the intersection operations analysis presented in the previous sections, ODOT also requires a corridor progression analysis to assure travel times and corridor through capacity will be maintained. To establish a baseline for the alternatives analysis, a traffic signal progression analysis was conducted for the Highway 99W corridor section that includes the following signalized and coordinated intersections:

- Highway 99W/Home Depot
- Highway 99W/Tualatin-Sherwood Road
- Highway 99W/Sherwood Boulevard-Edy Road

The signal analysis progression analysis is based on the 2008 existing and 2030 future no-build traffic signal system operations during both the AM peak hour and the PM peak hour. The through traffic bandwidths (i.e., the window of time where a platoon of vehicles can travel through all three signals without stopping) along Highway 99W in the study corridor for the 2008 Existing and 2030 future no-build conditions are shown in Table 9.

The through traffic bandwidths shown in Table 9 were used to determine the study area corridor progression volume to capacity (V/C) ratios[8]. These maximum bandwidths assume that each signal reaches its maximum initial phase time, which is the worst case scenario.

Table 9: Signal Progression Bandwidths on Highway 99W

	AM Peak				PM Peak			
	Northbound		Southbound		Northbound		Southbound	
Scenario	BW	V/C	BW	V/C	BW	V/C	BW	V/C
2008 Existing	30	2.11	30	0.74	18	1.67	20	3.41
2030 without Adams Ave Ext.	29	2.43	30	0.93	18	2.24	21	3.69
2030 with Adams Ave Ext.	22	3.00	30	0.82	18	1.93	21	3.50

BW = Traffic bandwidth
V/C = Corridor progression volume to capacity ratio

As shown in Table 9, the corridor progression volume to capacity ratio is above 1.00 for many of the existing and future time periods, indicating that there is not enough bandwidth to efficiently serve existing and projected traffic volumes in the coordinated system.

The critical intersection in the study corridor (the intersection carrying the highest through volume per lane) is the Highway 99W/Home Depot intersection. The intersections in the study corridor had a common cycle length of 120 seconds. Adequate pedestrian timing was provided at the intersections where appropriate.

[8] ((Volume/Saturation Flow Rate)*(Cycle Length/Arterial Bandwidth))

Appendix

Intersection Traffic Counts
Intersection Operational Analysis Worksheets
Progression Time-Space Diagrams

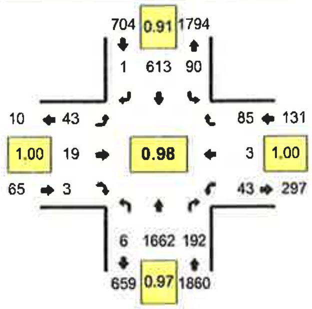
Intersection Traffic Counts

Type of peak hour being reported: System Peak

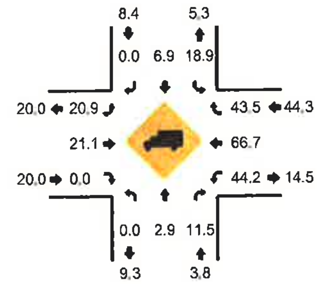
Method for determining peak hour: Total Entering Volume

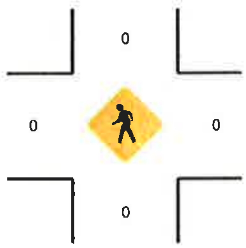
LOCATION: Hwy 99W -- Cipole Rd
CITY/STATE: Sherwood, OR

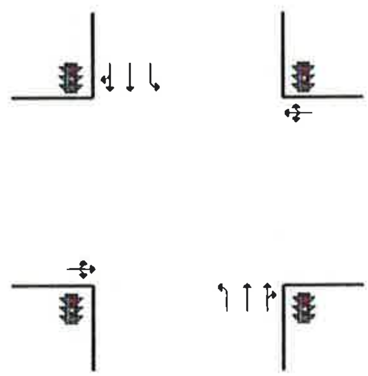
QC JOB #: 10393701
DATE: 11/5/2008

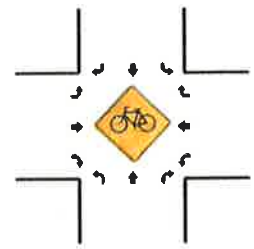


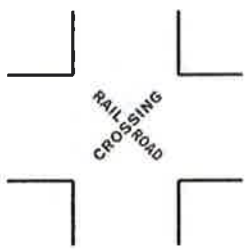
Peak-Hour: 7:10 AM -- 8:10 AM
Peak 15-Min: 7:35 AM -- 7:50 AM

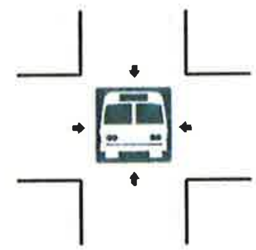












5-Min Count Period Beginning At	Hwy 99W (Northbound)				Hwy 99W (Southbound)				Cipole Rd (Eastbound)				Cipole Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	123	26	0	9	36	0	2	2	1	0	0	3	0	5	0	208	
7:05 AM	0	132	12	0	6	38	0	0	6	2	0	0	2	0	2	0	200	
7:10 AM	0	130	14	0	8	42	0	1	1	3	0	0	5	0	4	0	208	
7:15 AM	2	151	13	0	7	52	0	0	7	1	1	0	2	0	11	0	247	
7:20 AM	0	185	7	0	3	52	0	0	3	2	1	0	5	0	9	0	267	
7:25 AM	1	153	19	0	10	57	0	0	7	1	0	0	2	1	7	0	258	
7:30 AM	0	124	18	0	5	47	0	0	6	4	0	0	3	1	9	0	217	
7:35 AM	1	135	14	0	8	57	0	0	5	0	0	0	2	0	4	0	226	
7:40 AM	0	147	19	0	5	45	0	1	1	1	0	0	4	1	8	0	232	
7:45 AM	0	143	18	0	10	67	0	0	0	0	0	0	4	0	5	0	247	
7:50 AM	0	130	17	0	10	48	0	0	4	1	0	0	5	0	4	0	219	
7:55 AM	2	120	27	0	7	56	0	1	4	1	0	0	1	0	10	0	229	2758
8:00 AM	0	134	16	0	7	46	1	0	3	3	0	0	4	0	6	0	220	2770
8:05 AM	0	110	10	0	6	44	0	1	2	2	1	0	6	0	8	0	190	2760
8:10 AM	0	101	13	0	6	36	0	0	2	0	0	0	5	1	11	0	175	2727
8:15 AM	0	122	10	0	3	59	0	1	1	0	0	0	1	0	10	0	207	2687
8:20 AM	0	87	9	0	8	50	0	2	5	0	0	0	3	2	6	0	172	2592
8:25 AM	3	96	9	0	9	67	0	0	2	0	0	0	3	0	12	0	201	2535
8:30 AM	0	103	3	0	5	58	0	0	4	0	0	0	3	0	5	0	181	2499
8:35 AM	0	89	3	0	2	60	0	0	1	1	0	0	5	0	6	0	167	2440
8:40 AM	0	78	5	0	5	53	0	0	2	1	1	0	1	1	14	0	161	2369
8:45 AM	0	87	10	0	6	74	0	0	1	0	0	0	4	0	7	0	189	2311
8:50 AM	0	87	6	0	5	48	0	2	0	2	0	0	1	0	3	0	154	2246
8:55 AM	1	69	2	0	8	40	0	1	3	0	0	0	2	1	5	0	132	2149

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	1700	204	0	92	676	0	4	24	4	0	0	40	4	68	0	2820
Heavy Trucks	0	56	16		16	52	0		4	0	0		20	0	20		184
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/11/2008 10:18 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

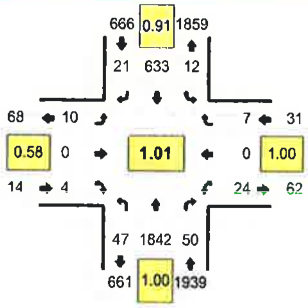
Method for determining peak hour: Total Entering Volume

LOCATION: Hwy 99W -- Home Depot Dwy

CITY/STATE: Sherwood, OR

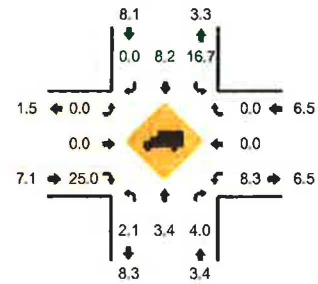
QC JOB #: 10393703

DATE: 11/5/2008

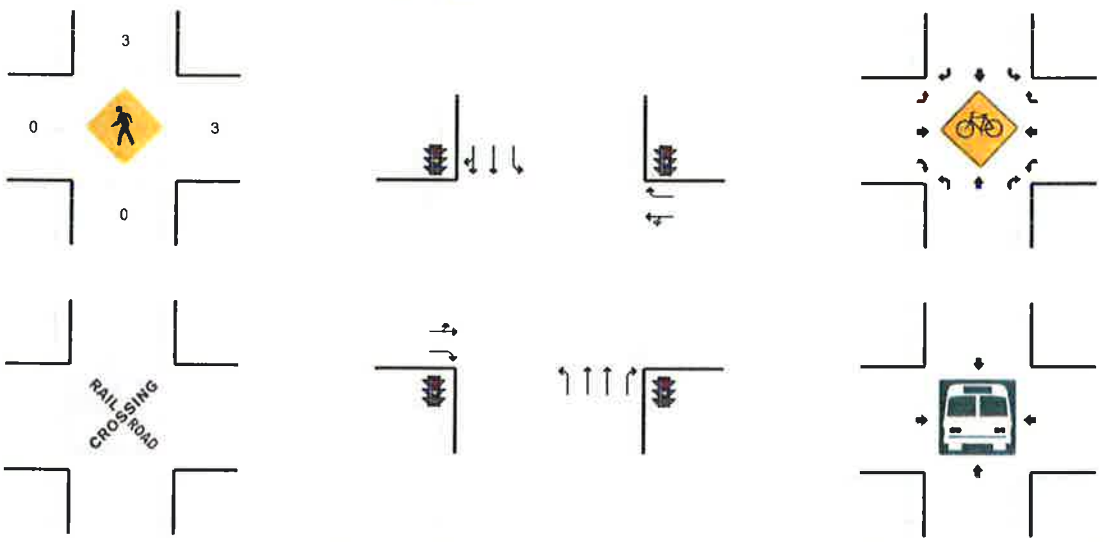


Peak-Hour: 7:10 AM -- 8:10 AM

Peak 15-Min: 7:35 AM -- 7:50 AM



Quality Counts



5-Min Count Period Beginning At	Hwy 99W (Northbound)				Hwy 99W (Southbound)				Home Depot Dwy (Eastbound)				Home Depot Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	5	159	4	0	1	49	1	0	0	0	3	0	2	0	0	0	224	
7:05 AM	2	134	0	0	2	32	1	0	0	0	1	0	1	0	1	0	174	
7:10 AM	3	174	4	0	1	58	2	0	1	0	0	0	0	0	0	0	243	
7:15 AM	0	161	2	0	2	44	1	0	2	0	0	0	1	0	1	0	214	
7:20 AM	1	174	4	0	2	48	1	0	0	0	0	0	3	0	1	0	234	
7:25 AM	3	153	1	0	0	66	3	0	0	0	0	0	3	0	0	0	229	
7:30 AM	5	166	2	0	0	38	0	0	1	0	1	0	2	0	4	0	219	
7:35 AM	1	132	4	0	1	67	2	0	3	0	0	0	1	0	0	0	211	
7:40 AM	4	177	2	0	1	50	2	0	0	0	2	0	0	0	0	0	238	
7:45 AM	4	140	4	0	0	59	0	0	1	0	0	0	2	0	0	0	210	
7:50 AM	8	173	10	0	2	71	0	0	0	0	0	0	0	0	0	0	264	
7:55 AM	7	143	7	0	0	53	4	0	0	0	1	0	7	0	0	0	222	2682
8:00 AM	8	147	7	0	1	45	6	0	0	0	0	0	2	0	0	0	216	2674
8:05 AM	3	102	3	0	2	34	0	0	2	0	0	0	3	0	1	0	150	2650
8:10 AM	2	119	9	0	2	64	1	1	0	0	0	0	7	0	1	0	206	2613
8:15 AM	0	105	4	0	1	40	1	0	0	0	0	0	2	0	2	0	155	2554
8:20 AM	2	111	5	1	2	54	1	0	0	0	0	0	5	0	1	0	182	2502
8:25 AM	5	103	11	1	3	69	3	0	1	0	1	0	1	0	4	0	202	2475
8:30 AM	2	96	3	0	1	53	6	0	1	0	1	0	3	0	2	0	168	2424
8:35 AM	4	89	4	0	0	50	0	0	0	0	2	0	5	0	3	0	157	2370
8:40 AM	5	81	6	0	2	70	2	0	1	0	1	0	9	0	4	0	181	2313
8:45 AM	3	95	7	0	2	50	1	0	2	0	1	0	4	0	2	0	167	2270
8:50 AM	3	85	13	0	1	59	1	0	0	0	1	0	3	0	2	0	168	2174
8:55 AM	1	80	7	0	1	40	0	0	0	0	0	0	1	0	1	0	131	2083

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	36	1796	40	0	8	704	16	0	16	0	8	0	12	0	0	0	2636
Heavy Trucks	0	64	4		0	60	0		0	0	0		0	0	0		128
Pedestrians		0				8				0				8			16
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/11/2008 10:18 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

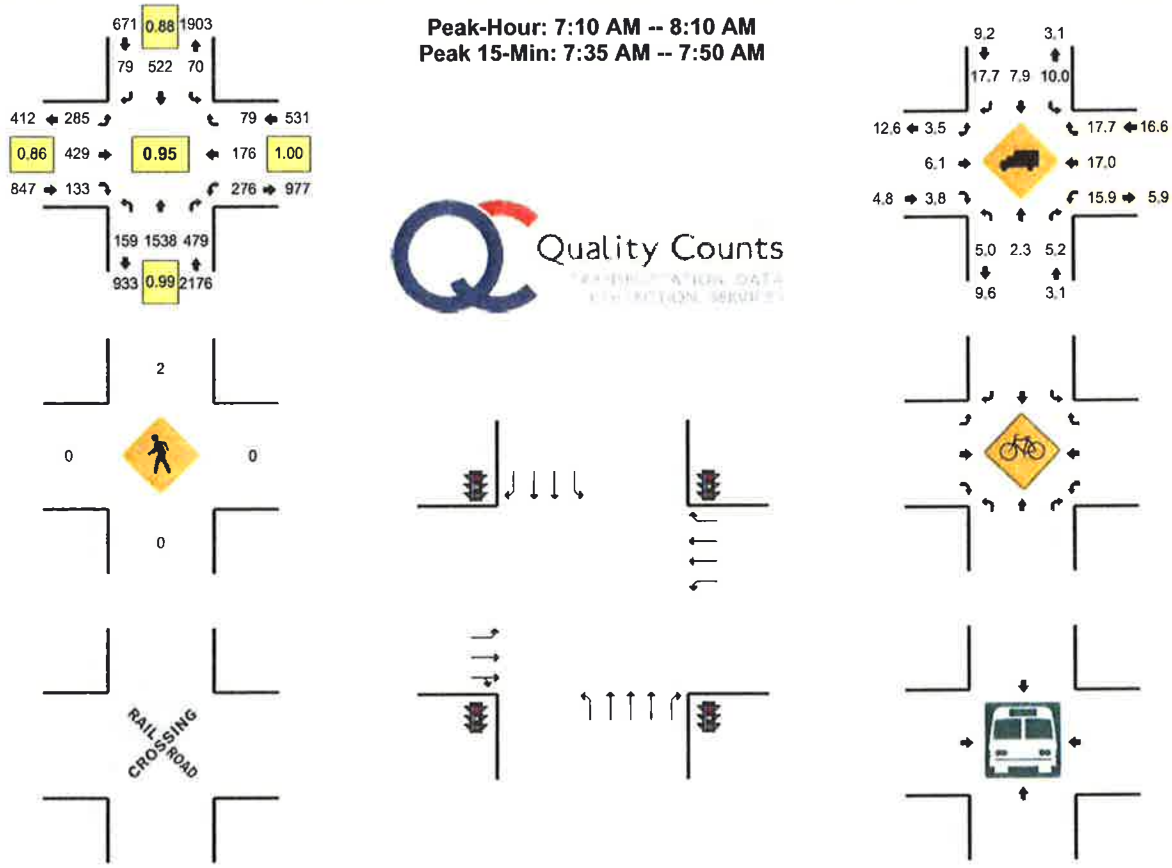
LOCATION: Hwy 99W -- Tualatin Sherwood Rd

CITY/STATE: Sherwood, OR

QC JOB #: 10393705

DATE: 11/5/2008

Peak-Hour: 7:10 AM -- 8:10 AM
Peak 15-Min: 7:35 AM -- 7:50 AM



5-Min Count Period Beginning At	Hwy 99W (Northbound)				Hwy 99W (Southbound)				Tualatin Sherwood Rd (Eastbound)				Tualatin Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	18	109	45	0	9	28	10	0	25	40	11	0	24	12	8	0	339	
7:05 AM	12	132	26	0	1	32	6	0	12	17	4	0	10	6	5	0	263	
7:10 AM	14	126	43	0	7	38	5	0	28	27	10	0	31	12	4	0	345	
7:15 AM	13	150	47	0	2	43	5	0	16	24	12	0	14	15	7	0	348	
7:20 AM	21	132	52	0	3	37	10	0	32	34	7	0	26	13	6	0	373	
7:25 AM	11	134	38	0	6	66	5	1	21	42	16	0	18	7	7	0	372	
7:30 AM	17	124	44	0	2	26	5	0	20	31	11	0	29	20	7	0	336	
7:35 AM	13	131	41	1	6	67	4	0	24	61	13	0	27	15	9	0	402	
7:40 AM	13	122	37	0	8	40	5	0	26	38	14	0	29	15	7	0	354	
7:45 AM	9	147	33	0	6	46	8	0	27	44	9	0	18	9	4	0	360	
7:50 AM	7	122	41	0	7	41	12	0	33	46	11	0	31	25	7	0	383	
7:55 AM	7	138	41	1	13	51	4	0	25	28	8	0	16	9	9	0	350	4225
8:00 AM	20	110	36	0	5	23	9	0	17	35	8	0	27	21	9	0	320	4206
8:05 AM	12	102	26	0	4	44	7	0	16	29	14	0	10	15	3	0	282	4225
8:10 AM	18	88	26	1	7	40	6	0	21	29	8	0	32	12	15	0	303	4183
8:15 AM	9	105	37	0	9	44	7	0	13	33	11	0	24	16	7	0	315	4150
8:20 AM	16	77	29	0	6	47	9	0	24	29	13	0	21	19	4	0	294	4071
8:25 AM	15	95	26	0	11	54	10	0	14	31	10	0	22	16	5	0	309	4008
8:30 AM	18	80	34	0	4	43	10	0	17	23	4	0	22	22	5	0	282	3954
8:35 AM	15	76	23	0	4	44	10	0	14	20	6	0	19	15	6	0	252	3804
8:40 AM	9	74	33	2	13	58	7	0	15	20	6	0	32	11	5	0	285	3735
8:45 AM	11	97	33	0	9	36	11	0	9	23	10	0	20	12	6	0	277	3652
8:50 AM	13	69	29	0	6	49	10	0	15	29	7	0	29	15	6	0	277	3546
8:55 AM	13	59	20	0	10	27	4	0	17	12	5	0	40	18	8	0	233	3429

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	140	1600	444	4	80	612	68	0	308	532	144	0	296	156	80	0	4464
Heavy Trucks	8	36	20		8	48	12		16	20	4		40	12	24		248
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/11/2008 10:18 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Shopping Center -- Tualatin Sherwood Rd

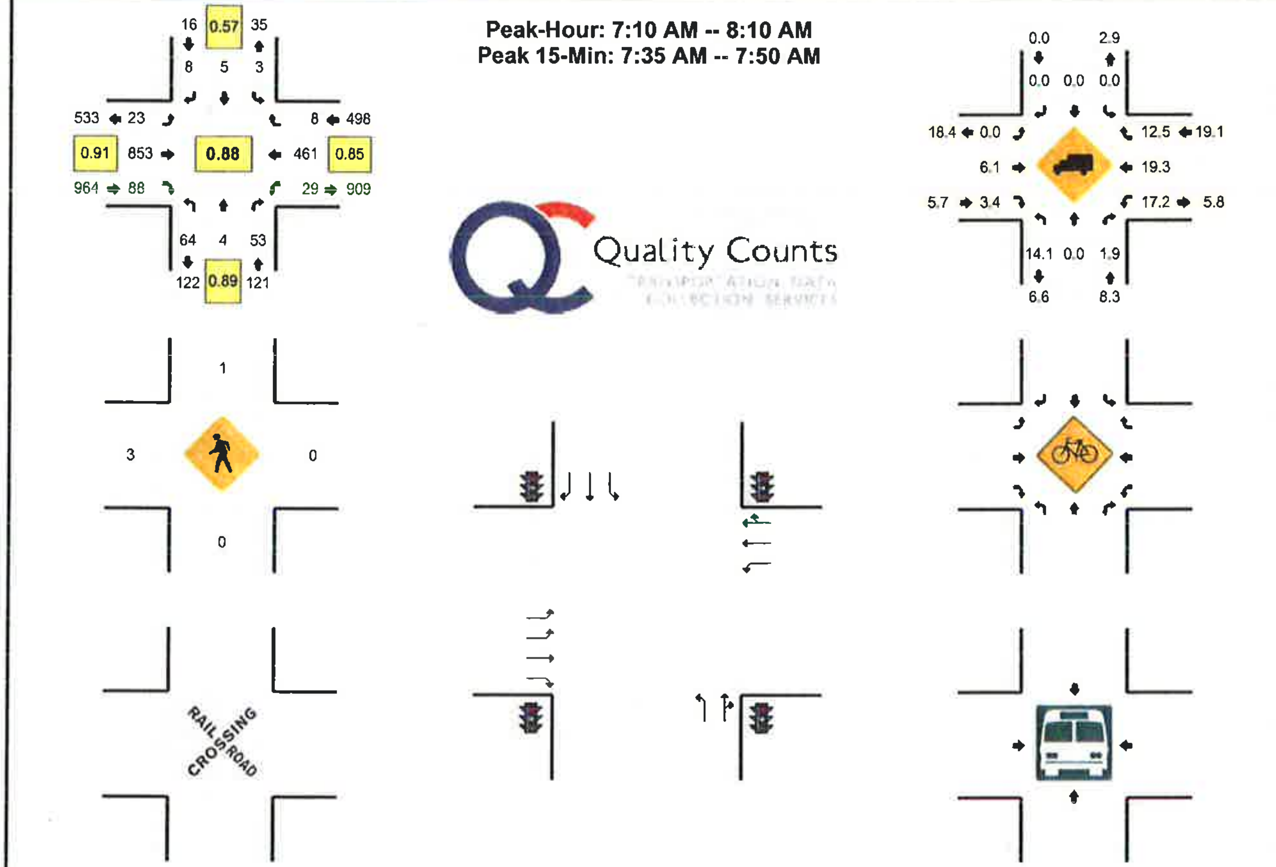
CITY/STATE: Sherwood, OR

QC JOB #: 10393707

DATE: 11/5/2008

Peak-Hour: 7:10 AM -- 8:10 AM

Peak 15-Min: 7:35 AM -- 7:50 AM



5-Min Count Period Beginning At	Shopping Center (Northbound)				Shopping Center (Southbound)				Tualatin Sherwood Rd (Eastbound)				Tualatin Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	5	0	2	0	0	0	2	0	8	69	8	0	4	33	1	0	132	
7:05 AM	10	1	3	0	0	0	1	0	4	48	2	0	1	28	0	0	98	
7:10 AM	3	0	4	0	0	0	1	0	1	64	4	0	3	34	0	0	114	
7:15 AM	5	0	4	0	0	0	0	0	2	77	2	0	1	33	1	0	125	
7:20 AM	6	0	2	0	0	0	0	0	1	76	3	0	1	38	0	0	127	
7:25 AM	5	0	3	0	0	0	0	0	2	85	4	0	1	39	0	0	139	
7:30 AM	5	0	2	0	0	2	0	0	3	59	9	0	1	30	1	0	112	
7:35 AM	4	2	5	0	2	0	2	0	2	92	6	0	5	52	0	0	172	
7:40 AM	6	0	8	0	0	1	2	0	4	59	10	0	3	45	0	0	138	
7:45 AM	3	0	6	0	0	0	0	0	1	77	15	0	3	38	0	0	143	
7:50 AM	8	1	4	0	0	0	1	0	1	73	15	0	3	42	1	0	149	
7:55 AM	8	0	4	0	1	0	0	0	1	78	10	0	4	41	0	0	147	1596
8:00 AM	6	1	6	0	0	0	0	0	4	62	3	0	4	29	2	0	117	1581
8:05 AM	5	0	5	0	0	2	2	0	1	51	7	0	0	40	3	0	116	1599
8:10 AM	4	1	8	0	1	0	0	0	2	50	9	0	4	40	0	0	119	1604
8:15 AM	8	0	2	0	1	0	0	0	0	69	11	0	1	47	0	0	139	1618
8:20 AM	5	0	5	0	0	0	0	0	3	55	8	0	1	40	2	0	119	1610
8:25 AM	5	1	5	0	0	0	1	0	1	55	4	0	5	34	1	0	112	1583
8:30 AM	7	1	2	0	0	0	1	0	1	63	6	0	2	39	1	1	124	1595
8:35 AM	3	0	3	0	0	0	1	0	0	37	7	0	3	40	0	0	94	1517
8:40 AM	5	0	1	0	0	0	0	0	3	54	8	0	1	44	1	0	117	1496
8:45 AM	2	2	2	0	2	0	1	0	3	54	7	0	5	44	0	0	122	1475
8:50 AM	4	2	3	0	1	1	1	0	3	54	3	0	2	41	2	0	117	1443
8:55 AM	2	0	2	0	1	1	1	0	4	41	8	0	1	55	2	0	118	1414

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	52	8	76	0	8	4	16	0	28	912	124	0	44	540	0	0	1812
Heavy Trucks	0	0	0		0	0	0		0	48	0		8	92	0		148
Pedestrians		0				4				0				0			4
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/11/2008 10:18 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

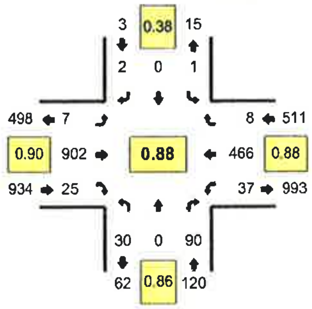
Method for determining peak hour: Total Entering Volume

LOCATION: Baler Way -- Tualatin Sherwood Rd

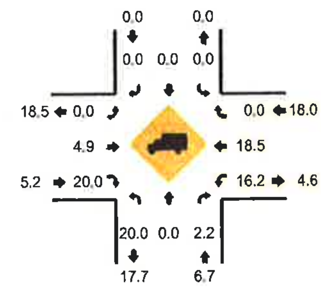
CITY/STATE: Sherwood, OR

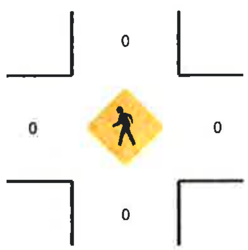
QC JOB #: 10393709

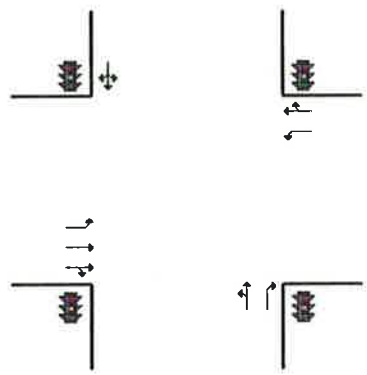
DATE: 11/5/2008

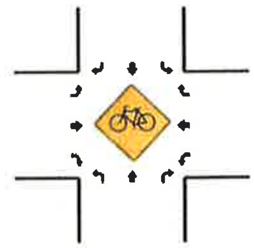


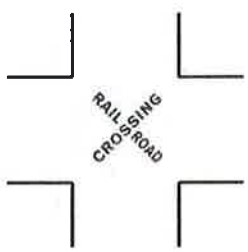
Peak-Hour: 7:10 AM -- 8:10 AM
Peak 15-Min: 7:35 AM -- 7:50 AM

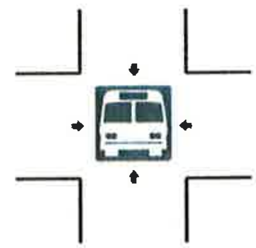












5-Min Count Period Beginning At	Baler Way (Northbound) Left	Thru	Right	U	Baler Way (Southbound) Left	Thru	Right	U	Tualatin Sherwood Rd (Eastbound) Left	Thru	Right	U	Tualatin Sherwood Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	2	0	9	0	0	0	0	0	0	68	0	0	1	41	0	0	121	
7:05 AM	3	0	3	0	0	0	0	0	0	61	1	0	1	25	0	0	94	
7:10 AM	1	0	8	0	0	0	0	0	0	63	2	0	5	36	0	0	115	
7:15 AM	4	0	5	0	0	0	0	0	1	84	1	0	0	34	1	0	130	
7:20 AM	5	0	7	0	0	0	0	0	0	78	1	0	4	29	0	0	124	
7:25 AM	4	0	7	0	0	0	0	0	1	75	2	0	5	40	0	0	134	
7:30 AM	4	0	6	0	0	0	0	0	0	68	3	0	3	37	0	0	121	
7:35 AM	1	0	11	0	0	0	2	0	1	90	6	0	1	48	0	0	160	
7:40 AM	2	0	10	0	0	0	0	0	1	78	0	0	2	42	2	0	137	
7:45 AM	0	0	11	0	0	0	0	0	0	83	1	0	5	44	2	0	146	
7:50 AM	3	0	2	0	1	0	0	0	1	68	3	0	2	45	1	0	126	
7:55 AM	2	0	9	0	0	0	0	0	1	87	0	0	3	39	0	0	141	1549
8:00 AM	1	0	7	0	0	0	0	0	0	69	4	0	6	32	1	0	120	1548
8:05 AM	3	0	7	0	0	0	0	0	1	59	2	0	1	40	1	0	114	1568
8:10 AM	5	0	5	0	0	0	0	0	1	61	1	0	3	42	0	0	118	1571
8:15 AM	2	1	13	0	0	0	0	0	0	70	3	0	2	44	0	0	135	1576
8:20 AM	1	0	9	0	1	0	1	0	1	53	4	0	1	48	0	0	119	1571
8:25 AM	2	1	1	0	2	0	0	0	1	54	4	0	6	32	0	0	103	1540
8:30 AM	2	0	3	0	1	0	2	0	1	70	2	0	3	36	0	0	120	1539
8:35 AM	1	0	3	0	0	1	0	0	1	36	0	0	1	44	0	0	87	1466
8:40 AM	2	0	4	0	0	0	2	0	1	56	2	0	1	38	1	0	107	1436
8:45 AM	5	1	10	0	0	0	0	0	1	53	5	0	1	45	1	0	122	1412
8:50 AM	1	0	5	0	0	0	1	0	1	53	5	0	4	54	0	0	124	1410
8:55 AM	3	0	5	0	0	0	1	0	0	50	3	0	7	44	2	0	115	1384

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	12	0	128	0	0	0	8	0	8	1004	28	0	32	536	16	0	1772
Heavy Trucks	8	0	0		0	0	0		0	40	8		4	84	0		144
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/11/2008 10:18 AM

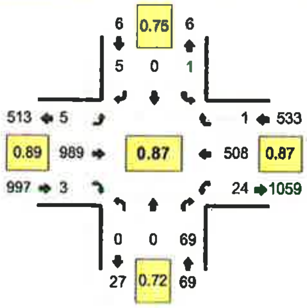
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

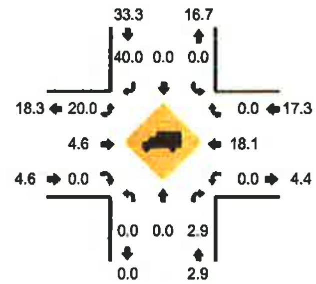
Method for determining peak hour: Total Entering Volume

LOCATION: Adams Ave -- Tualatin Sherwood Rd
CITY/STATE: Sherwood, OR

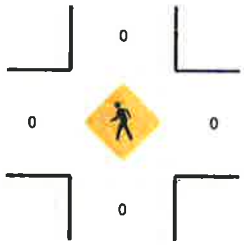
QC JOB #: 10393711
DATE: 11/5/2008

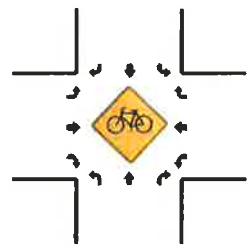


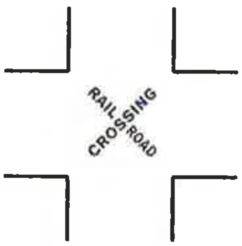
Peak-Hour: 7:10 AM -- 8:10 AM
Peak 15-Min: 7:35 AM -- 7:50 AM

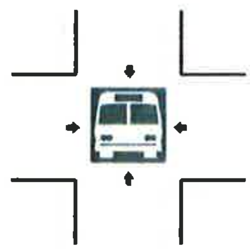


Quality Counts









5-Min Count Period Beginning At	Adams Ave (Northbound) Left	Thru	Right	U	Adams Ave (Southbound) Left	Thru	Right	U	Tualatin Sherwood Rd (Eastbound) Left	Thru	Right	U	Tualatin Sherwood Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	5	0	0	0	0	0	1	70	1	0	1	42	0	0	120	
7:05 AM	0	0	2	0	0	0	0	0	0	67	0	0	1	28	0	0	98	
7:10 AM	0	0	0	0	0	0	0	0	0	69	0	0	1	39	0	0	109	
7:15 AM	0	0	5	0	0	0	1	0	0	95	0	0	1	38	0	0	140	
7:20 AM	0	0	7	0	0	0	0	0	0	83	0	0	1	31	0	0	122	
7:25 AM	0	0	5	0	0	0	0	0	0	75	0	0	0	46	0	0	126	
7:30 AM	0	0	3	0	0	0	0	0	0	82	0	0	2	42	0	0	129	
7:35 AM	0	0	4	0	0	0	1	0	1	95	0	0	3	45	0	0	149	
7:40 AM	0	0	8	0	0	0	0	0	1	90	0	0	2	48	0	0	149	
7:45 AM	0	0	12	0	1	0	0	0	1	92	1	0	1	54	0	0	162	
7:50 AM	0	0	6	0	0	0	0	0	0	76	0	0	3	47	0	0	132	
7:55 AM	0	0	5	0	0	0	1	0	1	90	1	0	3	40	0	0	141	1577
8:00 AM	0	0	8	0	0	0	1	0	1	81	1	0	7	36	0	0	135	1592
8:05 AM	0	0	6	0	0	0	1	0	0	61	0	0	0	42	1	0	111	1605
8:10 AM	0	0	4	0	0	0	0	0	0	70	0	0	3	46	0	0	123	1619
8:15 AM	0	0	2	0	0	0	1	0	0	84	0	0	1	47	0	0	135	1614
8:20 AM	0	0	6	0	0	0	0	0	1	60	0	0	3	47	0	0	117	1609
8:25 AM	0	0	6	0	0	0	1	0	0	61	2	0	4	34	0	0	108	1591
8:30 AM	0	0	4	0	0	0	0	0	0	70	0	0	2	40	0	0	116	1578
8:35 AM	0	0	3	0	0	0	0	0	0	39	0	0	4	48	0	0	94	1523
8:40 AM	0	0	2	0	0	0	0	0	0	59	0	0	6	41	0	0	108	1482
8:45 AM	1	0	1	0	0	0	0	0	1	63	0	0	3	44	0	0	113	1433
8:50 AM	0	0	2	0	0	0	0	0	1	61	1	0	2	61	0	0	128	1429
8:55 AM	0	0	2	0	0	0	1	0	1	54	0	0	6	48	0	0	112	1400

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	96	0	4	0	4	0	12	1108	4	0	24	588	0	0	1840
Heavy Trucks	0	0	0		0	0	0		4	40	0		0	88	0		132
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/11/2008 10:18 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

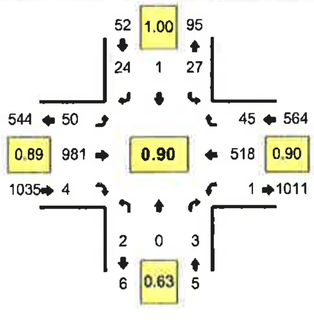
Method for determining peak hour: Total Entering Volume

LOCATION: Gerda Ln -- Tualatin Sherwood Rd

CITY/STATE: Sherwood, OR

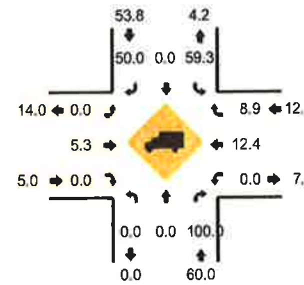
QC JOB #: 10393713

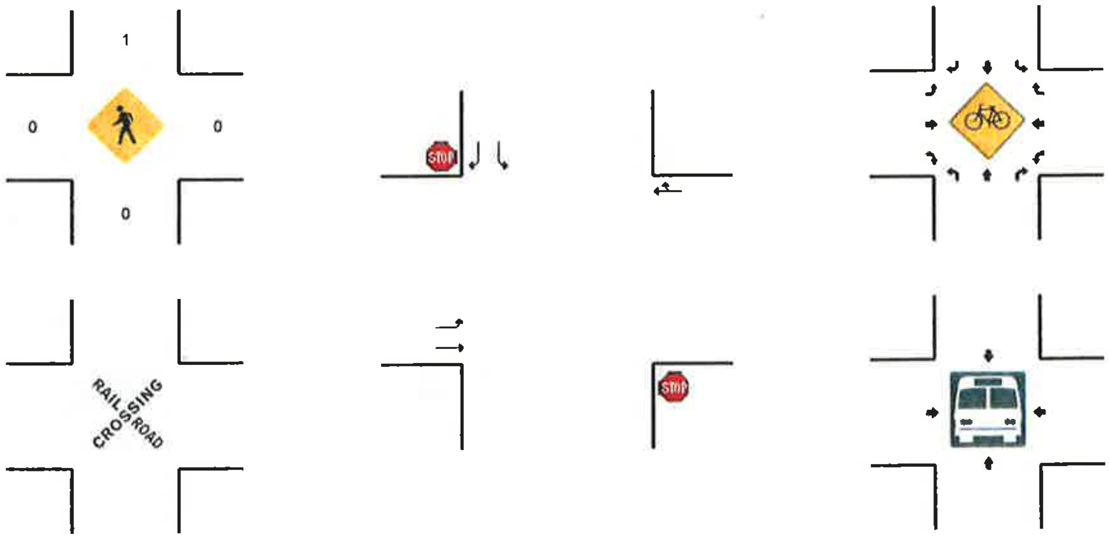
DATE: 11/5/2008



Peak-Hour: 7:10 AM -- 8:10 AM

Peak 15-Min: 7:35 AM -- 7:50 AM





5-Min Count Period Beginning At	Gerda Ln (Northbound)				Gerda Ln (Southbound)				Tualatin Sherwood Rd (Eastbound)				Tualatin Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	2	0	4	80	1	0	0	40	3	0	130	
7:05 AM	0	0	0	0	0	0	0	0	5	72	1	0	0	38	3	0	119	
7:10 AM	0	0	0	0	0	0	1	0	2	58	0	0	0	34	3	0	98	
7:15 AM	0	0	0	0	1	0	3	0	7	91	0	0	0	37	6	0	145	
7:20 AM	0	0	1	0	6	0	1	0	0	87	0	0	0	34	4	0	133	
7:25 AM	0	0	0	0	2	0	2	0	3	76	0	0	0	48	3	0	134	
7:30 AM	0	0	0	0	4	0	0	0	4	79	0	0	0	41	4	0	132	
7:35 AM	0	0	0	0	1	1	0	0	2	94	0	0	0	48	3	0	149	
7:40 AM	0	0	0	0	1	0	5	0	3	84	1	0	0	50	2	0	146	
7:45 AM	1	0	1	0	1	0	1	0	8	99	1	0	0	52	2	0	166	
7:50 AM	1	0	1	0	2	0	2	0	4	89	0	0	1	52	5	0	157	
7:55 AM	0	0	0	0	3	0	2	0	7	81	1	0	0	41	4	0	139	1648
8:00 AM	0	0	0	0	1	0	2	0	4	75	0	0	0	37	6	0	125	1643
8:05 AM	0	0	0	0	5	0	5	0	6	68	1	0	0	44	3	0	132	1656
8:10 AM	0	0	0	0	2	0	1	0	4	62	0	0	0	50	5	0	124	1682
8:15 AM	0	0	1	0	2	0	8	0	3	76	0	0	0	31	2	0	123	1660
8:20 AM	0	0	0	0	3	0	2	0	3	63	0	0	0	54	3	0	128	1655
8:25 AM	0	0	0	0	4	0	3	0	10	57	0	0	0	44	8	0	126	1647
8:30 AM	0	0	0	0	2	0	5	0	9	55	0	0	0	29	1	0	101	1616
8:35 AM	0	0	0	0	1	0	3	0	3	45	0	0	0	54	1	0	107	1574
8:40 AM	0	0	0	0	2	0	7	0	6	49	0	0	0	39	4	0	107	1535
8:45 AM	0	0	0	0	1	0	2	0	4	62	0	0	0	40	0	0	109	1478
8:50 AM	0	0	0	0	1	0	4	0	5	59	0	0	0	67	3	0	139	1460
8:55 AM	0	0	0	0	3	0	5	0	7	43	0	0	1	40	1	0	100	1421

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	0	4	0	12	4	24	0	52	1108	8	0	0	600	28	0	1844
Heavy Trucks	0	0	4		8	0	16		0	56	0		0	64	12		160
Pedestrians		0				4				0				0			4
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/11/2008 10:18 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Oregon St -- Tualatin Sherwood Rd

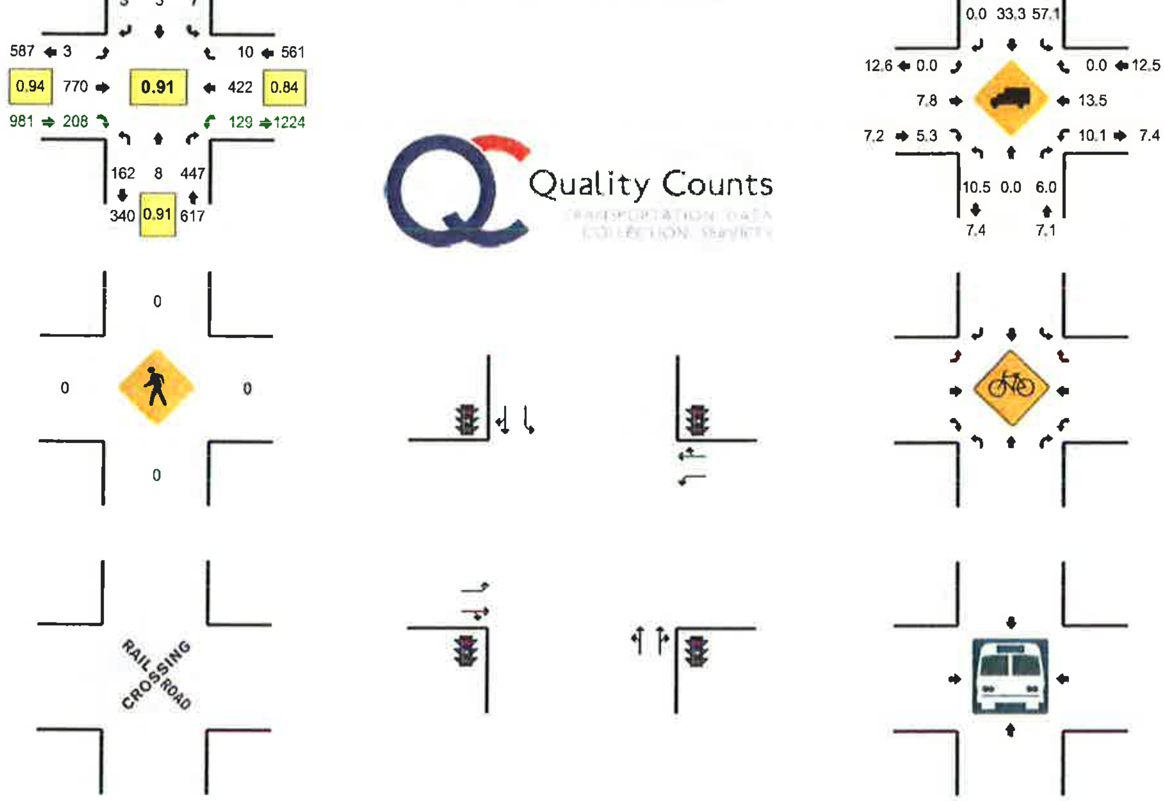
CITY/STATE: Sherwood, OR

QC JOB #: 10393715

DATE: 11/5/2008

Peak-Hour: 7:10 AM -- 8:10 AM

Peak 15-Min: 7:35 AM -- 7:50 AM



5-Min Count Period Beginning At	Oregon St (Northbound)				Oregon St (Southbound)				Tualatin Sherwood Rd (Eastbound)				Tualatin Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	3	1	27	0	0	0	0	0	0	11	8	0	12	37	1	0	100	
7:05 AM	5	0	41	0	0	0	1	0	0	64	11	0	15	30	1	0	168	
7:10 AM	7	0	39	0	0	0	0	0	0	52	11	0	7	34	1	0	151	
7:15 AM	12	0	42	0	2	0	0	0	0	63	17	0	4	36	2	0	178	
7:20 AM	10	0	24	0	0	0	0	0	1	77	12	0	12	34	0	0	170	
7:25 AM	14	0	38	0	0	0	0	0	0	71	19	0	11	37	1	0	191	
7:30 AM	14	0	42	0	0	0	0	0	0	61	14	0	13	32	1	0	177	
7:35 AM	19	0	44	0	1	1	0	0	1	63	21	0	10	38	2	0	200	
7:40 AM	10	1	39	0	0	0	0	0	1	73	26	0	13	51	2	0	216	
7:45 AM	15	0	41	0	1	0	0	0	0	60	15	0	14	37	0	0	183	
7:50 AM	13	5	28	0	0	1	2	0	0	66	22	0	6	31	1	0	175	
7:55 AM	21	1	38	0	1	1	0	0	0	45	18	0	10	31	0	0	166	2075
8:00 AM	13	1	41	0	1	0	0	0	0	70	20	0	16	31	0	0	193	2168
8:05 AM	14	0	31	0	1	0	1	0	0	69	13	0	13	30	0	0	172	2172
8:10 AM	9	1	38	0	0	0	1	0	0	58	13	0	8	39	0	0	167	2188
8:15 AM	14	0	34	0	1	0	0	0	0	48	23	0	14	28	0	0	162	2172
8:20 AM	10	0	28	0	0	0	0	0	1	63	11	0	8	46	0	0	167	2169
8:25 AM	8	0	17	0	0	0	0	0	1	56	14	0	14	45	1	0	156	2134
8:30 AM	2	0	22	0	0	0	0	0	1	46	17	0	11	29	1	0	129	2086
8:35 AM	14	1	21	0	0	0	0	0	2	34	6	0	7	41	1	0	127	2013
8:40 AM	4	0	19	0	1	0	0	0	0	44	5	0	15	36	0	0	124	1921
8:45 AM	6	0	15	0	0	0	0	0	1	54	10	0	2	39	0	0	127	1865
8:50 AM	9	0	22	0	0	1	0	0	0	61	7	0	15	61	0	0	176	1866
8:55 AM	15	1	20	0	1	0	0	0	0	35	6	0	15	27	3	0	123	1823

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	176	4	496	0	8	4	0	0	8	784	248	0	148	504	16	0	2396
Heavy Trucks	8	0	20		8	4	0		0	60	12		8	60	0		180
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

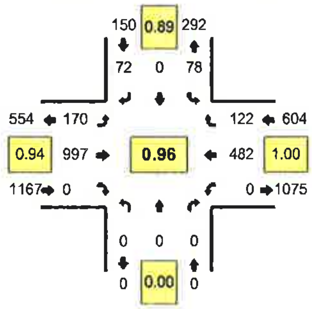
Report generated on 11/11/2008 10:18 AM

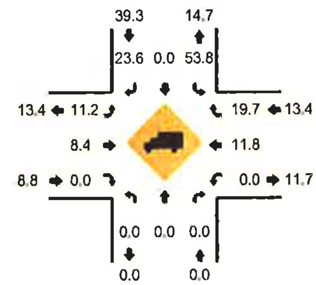
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

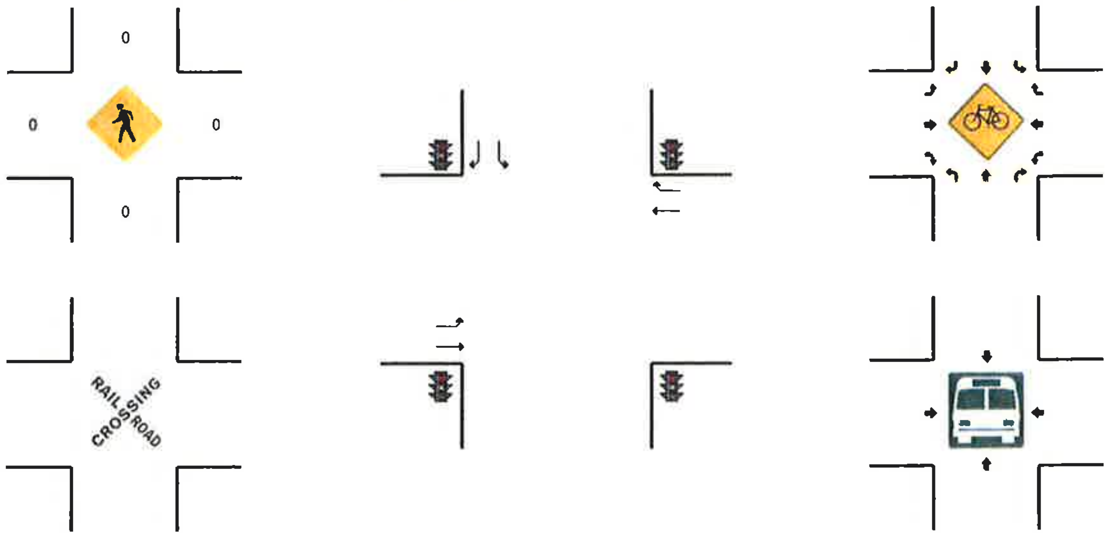
Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Cipole Rd -- Tualatin Sherwood Rd | **QC JOB #:** 10393717
CITY/STATE: Sherwood, OR | **DATE:** 11/5/2008

Peak-Hour: 7:10 AM -- 8:10 AM
Peak 15-Min: 7:35 AM -- 7:50 AM







5-Min Count Period Beginning At	Cipole Rd (Northbound) Left	Thru	Right	U	Cipole Rd (Southbound) Left	Thru	Right	U	Tualatin Sherwood Rd (Eastbound) Left	Thru	Right	U	Tualatin Sherwood Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	3	0	16	0	7	80	0	0	0	33	17	0	156	
7:05 AM	0	0	0	0	8	0	5	0	15	84	0	0	0	35	8	0	155	
7:10 AM	0	0	0	0	5	0	3	0	12	78	0	0	0	42	7	0	147	
7:15 AM	0	0	0	0	4	0	3	0	13	88	0	0	0	38	18	0	164	
7:20 AM	0	0	0	0	7	0	6	0	13	82	0	0	0	38	12	0	158	
7:25 AM	0	0	0	0	9	0	8	0	16	82	0	0	0	33	10	0	158	
7:30 AM	0	0	0	0	7	0	6	0	14	79	0	0	0	53	10	0	169	
7:35 AM	0	0	0	0	4	0	5	0	8	98	0	0	0	37	5	0	157	
7:40 AM	0	0	0	0	6	0	5	0	23	86	0	0	0	53	6	0	179	
7:45 AM	0	0	0	0	14	0	8	0	16	78	0	0	0	42	6	0	164	
7:50 AM	0	0	0	0	9	0	7	0	14	76	0	0	0	36	15	0	157	
7:55 AM	0	0	0	0	4	0	5	0	13	78	0	0	0	42	14	0	156	1920
8:00 AM	0	0	0	0	2	0	10	0	13	90	0	0	0	39	6	0	160	1924
8:05 AM	0	0	0	0	7	0	6	0	15	82	0	0	0	29	13	0	152	1921
8:10 AM	0	0	0	0	4	0	4	0	16	93	0	0	0	45	5	0	167	1941
8:15 AM	0	0	0	0	0	0	5	0	12	72	0	0	0	37	7	0	133	1910
8:20 AM	0	0	0	0	5	0	5	0	10	73	0	0	0	53	9	0	155	1907
8:25 AM	0	0	0	0	7	0	5	0	4	65	0	0	0	48	7	0	136	1885
8:30 AM	0	0	0	0	3	0	8	0	8	67	0	0	0	33	9	0	128	1844
8:35 AM	0	0	0	0	4	0	4	0	5	57	0	0	0	49	9	0	128	1815
8:40 AM	0	0	0	0	10	0	5	0	7	50	0	0	0	41	10	0	123	1759
8:45 AM	0	0	0	0	10	0	3	0	5	62	0	0	0	51	3	0	134	1729
8:50 AM	0	0	0	0	5	0	4	0	10	66	0	0	0	57	8	0	150	1722
8:55 AM	0	0	0	0	5	0	7	0	13	52	0	0	0	45	11	0	133	1699

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	96	0	72	0	188	1048	0	0	0	528	68	0	2000
Heavy Trucks	0	0	0		56	0	12		20	88	0		0	40	8		224
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/11/2008 10:18 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

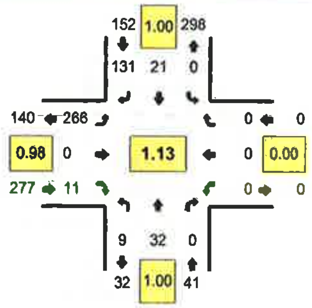
Method for determining peak hour: Total Entering Volume

LOCATION: Cipole Rd -- Cipole Rd

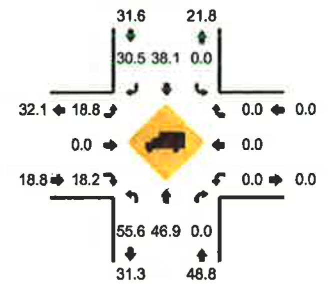
CITY/STATE: Sherwood, OR

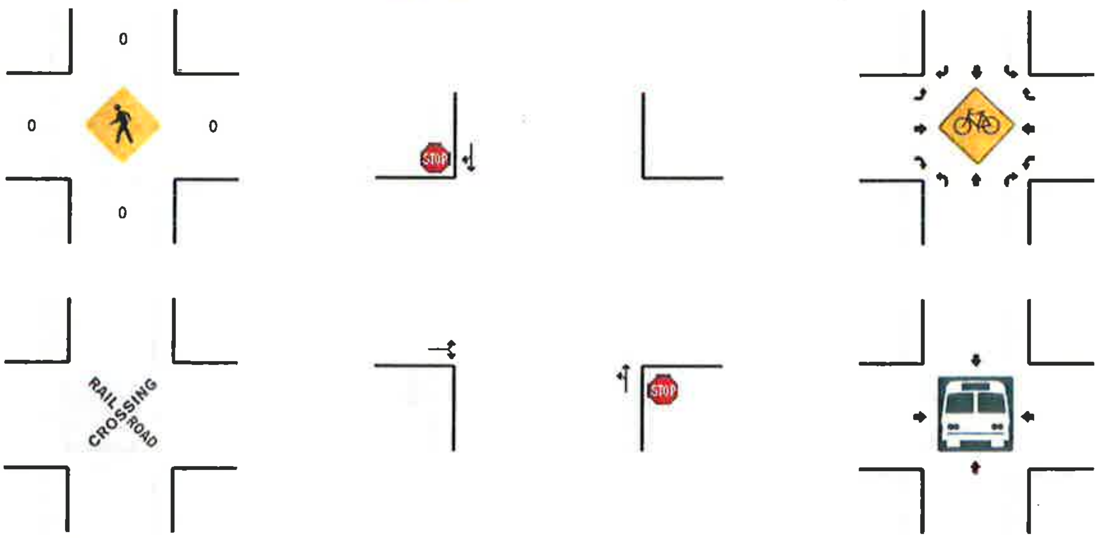
QC JOB #: 10393719

DATE: 11/5/2008



Peak-Hour: 7:10 AM -- 8:10 AM
Peak 15-Min: 7:35 AM -- 7:50 AM





5-Min Count Period Beginning At	Cipole Rd (Northbound)				Cipole Rd (Southbound)				Cipole Rd (Eastbound)				Cipole Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	12	4	0	0	0	1	9	0	29	0	2	0	0	0	0	0	57	
7:05 AM	4	3	0	0	0	3	6	0	20	0	1	0	0	0	0	0	37	
7:10 AM	2	3	0	0	0	3	12	0	27	0	0	0	0	0	0	0	47	
7:15 AM	1	3	0	0	0	1	8	0	17	0	0	0	0	0	0	0	30	
7:20 AM	3	6	0	0	0	2	15	0	10	0	0	0	0	0	0	0	36	
7:25 AM	1	6	0	0	0	0	13	0	28	0	0	0	0	0	0	0	48	
7:30 AM	1	2	0	0	0	2	6	0	21	0	1	0	0	0	0	0	33	
7:35 AM	1	4	0	0	0	0	6	0	22	0	2	0	0	0	0	0	35	
7:40 AM	0	0	0	0	0	0	12	0	19	0	1	0	0	0	0	0	32	
7:45 AM	0	2	0	0	0	1	7	0	23	0	4	0	0	0	0	0	37	
7:50 AM	0	0	0	0	0	3	12	0	31	0	1	0	0	0	0	0	47	
7:55 AM	0	3	0	0	0	0	14	0	28	0	0	0	0	0	0	0	45	484
8:00 AM	0	2	0	0	0	4	5	0	25	0	1	0	0	0	0	0	37	464
8:05 AM	0	1	0	0	0	5	21	0	15	0	1	0	0	0	0	0	43	470
8:10 AM	0	3	0	0	0	2	9	0	10	0	2	0	0	0	0	0	26	449
8:15 AM	0	0	0	0	0	1	9	0	14	0	1	0	0	0	0	0	25	444
8:20 AM	0	5	0	0	0	1	10	0	10	0	1	0	0	0	0	0	27	435
8:25 AM	2	4	0	0	0	3	10	0	13	0	1	0	0	0	0	0	33	420
8:30 AM	0	1	0	0	0	2	8	0	5	0	1	0	0	0	0	0	17	404
8:35 AM	0	0	0	0	0	3	12	0	3	0	0	0	0	0	0	0	18	387
8:40 AM	1	2	0	0	0	1	12	0	13	0	0	0	0	0	0	0	29	384
8:45 AM	0	1	0	0	0	4	5	0	15	0	1	0	0	0	0	0	26	373
8:50 AM	0	1	0	0	0	3	6	0	13	0	1	0	0	0	0	0	24	350
8:55 AM	0	1	0	0	0	5	16	0	7	0	0	0	0	0	0	0	29	334

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	24	0	0	0	4	100	0	256	0	28	0	0	0	0	0	416
Heavy Trucks	0	12	0		0	0	16		36	0	4		0	0	0		68
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/11/2008 10:18 AM

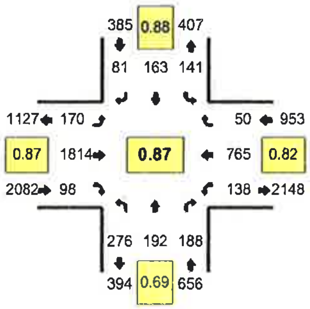
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: User-Defined

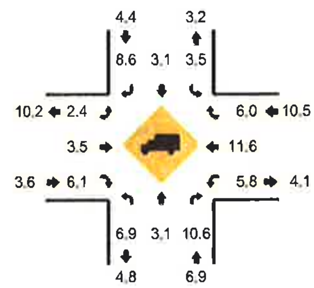
Method for determining peak hour: Total Entering Volume

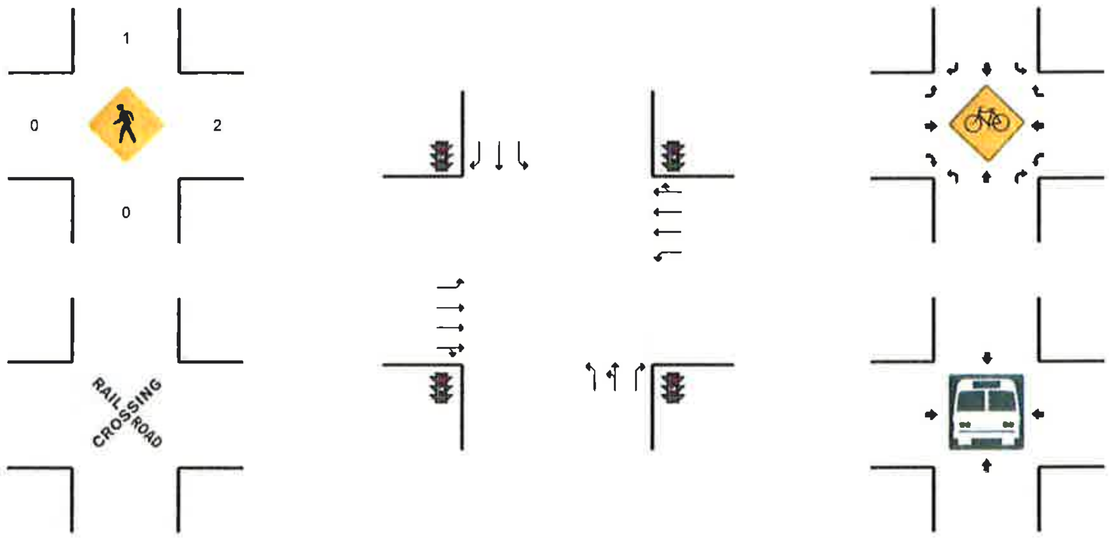
LOCATION: Edy Rd -- Hwy 99W
CITY/STATE: Sherwood, OR

QC JOB #: 10396127
DATE: 11/18/2008



Peak-Hour: 7:10 AM -- 8:10 AM
Peak 15-Min: 7:45 AM -- 8:00 AM





5-Min Count Period Beginning At	Edy Rd (Northbound) Left	Thru	Right	U	Edy Rd (Southbound) Left	Thru	Right	U	Hwy 99W (Eastbound) Left	Thru	Right	U	Hwy 99W (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	5	12	14	0	13	7	10	0	7	97	3	0	6	56	6	1	237	
7:05 AM	13	6	13	0	9	4	9	0	20	174	4	0	7	44	8	0	311	
7:10 AM	13	14	7	0	20	16	8	0	12	138	7	0	7	46	2	0	290	
7:15 AM	10	8	15	0	8	7	8	0	17	203	1	0	5	86	3	1	372	
7:20 AM	21	13	14	0	18	16	8	0	9	145	5	0	13	47	1	0	310	
7:25 AM	12	15	11	0	8	13	5	0	16	198	6	1	9	66	2	1	363	
7:30 AM	20	14	17	0	9	19	6	0	11	115	7	1	16	48	3	0	286	
7:35 AM	17	9	15	0	14	19	6	0	18	157	10	0	10	80	4	0	359	
7:40 AM	39	16	16	0	10	16	9	0	13	123	10	0	15	49	8	1	325	
7:45 AM	36	12	16	0	9	14	8	0	14	185	12	1	15	84	6	1	413	
7:50 AM	44	22	20	0	10	12	3	0	11	137	9	0	16	73	3	1	361	
7:55 AM	26	14	19	0	16	15	6	0	16	180	12	0	15	70	7	0	396	4023
8:00 AM	32	36	23	0	7	12	7	0	9	99	8	2	7	37	4	0	283	4069
8:05 AM	6	19	15	0	12	4	7	0	19	134	11	0	5	79	7	0	318	4076
8:10 AM	15	19	11	0	12	11	9	0	12	102	8	0	12	50	6	0	267	4053
8:15 AM	6	8	13	0	7	2	9	0	13	164	3	0	6	71	8	2	312	3993
8:20 AM	6	11	7	0	11	8	8	0	14	110	8	1	5	56	6	1	252	3935
8:25 AM	7	7	7	0	4	9	6	0	10	116	5	0	15	59	2	0	247	3819
8:30 AM	5	17	4	0	8	7	8	0	10	113	4	1	6	43	7	0	233	3766
8:35 AM	14	8	9	0	12	5	5	0	11	96	5	0	8	63	5	2	243	3650
8:40 AM	13	5	15	0	6	6	6	0	7	125	4	0	5	74	4	0	270	3595
8:45 AM	9	6	7	0	6	13	7	0	10	100	8	0	11	53	6	0	236	3418
8:50 AM	8	5	8	0	5	5	8	0	6	100	6	4	10	71	2	0	238	3295
8:55 AM	14	3	10	0	6	8	7	0	12	95	7	0	8	55	4	2	231	3130

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	424	192	220	0	140	164	68	0	164	2008	132	4	184	908	64	8	4680
Heavy Trucks	12	4	32		0	4	4		0	76	12		8	120	4		276
Pedestrians		0				0				0				8			8
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

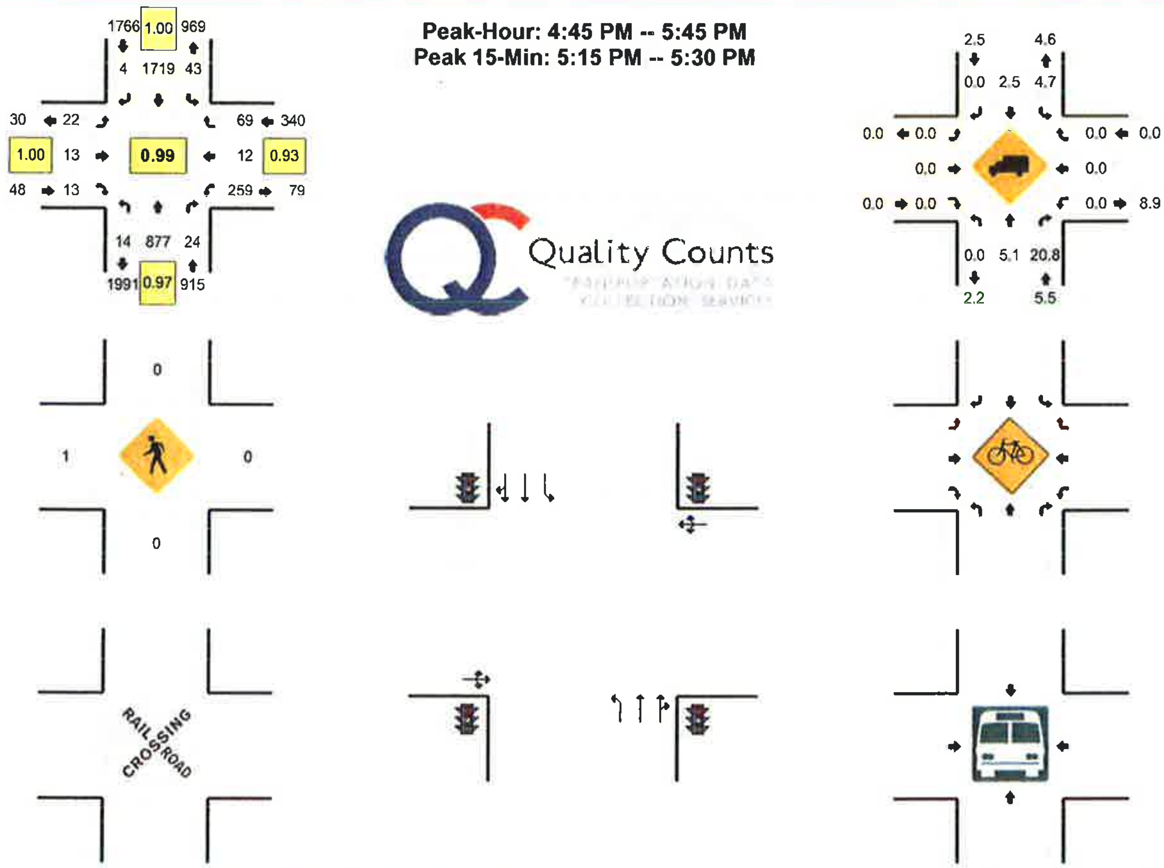
Report generated on 11/21/2008 2:41 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Hwy 99W -- Cipole Rd | **QC JOB #:** 10393702
CITY/STATE: Sherwood, OR | **DATE:** 11/5/2008

Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM



5-Min Count Period Beginning At	Hwy 99W (Northbound)				Hwy 99W (Southbound)				Cipole Rd (Eastbound)				Cipole Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	74	6	0	10	120	0	0	1	3	0	0	15	1	8	0	238	
4:05 PM	0	83	2	0	6	127	0	0	2	2	1	0	22	3	8	0	256	
4:10 PM	0	75	5	0	6	130	0	0	3	0	2	0	25	2	6	0	254	
4:15 PM	1	86	6	0	6	131	0	0	1	2	1	0	18	2	8	0	262	
4:20 PM	0	71	6	0	15	128	0	0	2	0	0	0	3	0	5	0	230	
4:25 PM	0	77	8	0	6	132	0	0	2	0	3	0	16	2	7	0	253	
4:30 PM	0	41	2	0	3	123	0	0	2	1	2	0	20	1	6	0	201	
4:35 PM	0	84	2	1	7	129	0	0	3	1	2	0	27	3	4	0	263	
4:40 PM	2	86	2	0	3	127	0	0	1	0	0	0	27	0	6	0	254	
4:45 PM	0	64	2	0	4	155	0	0	4	1	2	0	16	2	9	0	259	
4:50 PM	3	77	2	0	2	166	0	0	2	1	2	0	19	4	7	0	285	
4:55 PM	1	61	1	0	4	132	0	0	1	2	0	0	29	0	6	0	237	2992
5:00 PM	0	72	5	0	5	145	0	1	2	0	1	0	25	1	9	0	266	3020
5:05 PM	1	70	0	0	4	136	0	0	4	3	2	0	23	1	5	0	249	3013
5:10 PM	1	83	2	0	2	160	0	0	2	2	2	0	26	0	6	0	286	3045
5:15 PM	1	61	0	0	5	153	1	0	0	1	0	0	31	0	2	0	255	3038
5:20 PM	1	62	2	0	4	126	0	0	1	0	1	0	27	0	5	0	229	3037
5:25 PM	1	104	4	0	0	153	0	0	1	1	1	0	21	0	5	0	291	3075
5:30 PM	0	85	3	0	3	130	0	0	1	1	0	0	18	0	4	0	245	3119
5:35 PM	4	78	2	0	4	135	2	0	2	0	1	0	7	3	2	0	240	3096
5:40 PM	1	60	1	0	5	128	1	0	2	1	1	0	17	1	9	0	227	3069
5:45 PM	1	52	2	0	8	139	1	1	2	0	0	0	7	0	8	0	221	3031
5:50 PM	2	62	3	0	6	114	0	0	0	2	1	0	10	0	7	0	207	2953
5:55 PM	0	61	2	0	6	122	0	0	0	1	1	0	9	0	4	0	206	2922

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	908	24	0	36	1728	4	0	8	8	8	0	316	0	48	0	3100
Heavy Trucks	0	36	0		0	40	0		0	0	0		0	0	0		76
Pedestrians		0				0				4				0			4
Bicycles																	
Railroad																	
Stopped Buses																	

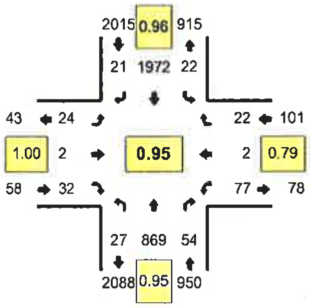
Comments:

Report generated on 11/10/2008 5:19 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

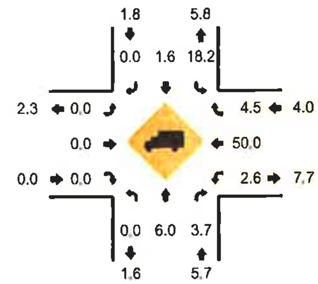
Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

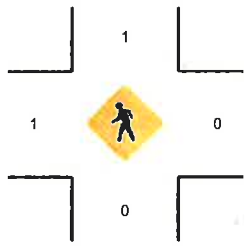
LOCATION: Hwy 99W -- Home Depot Dwy
CITY/STATE: Sherwood, OR

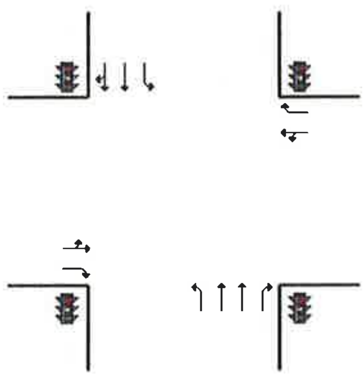
QC JOB #: 10393704
DATE: 11/5/2008

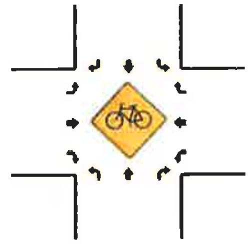


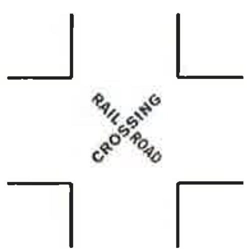
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

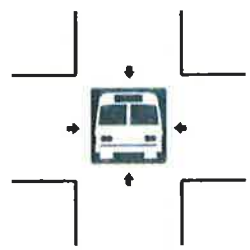












5-Min Count Period Beginning At	Hwy 99W (Northbound) Left	Thru	Right	U	Hwy 99W (Southbound) Left	Thru	Right	U	Home Depot Dwy (Eastbound) Left	Thru	Right	U	Home Depot Dwy (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	6	85	4	0	3	138	0	0	1	0	5	0	7	0	0	0	249	
4:05 PM	0	69	2	0	2	155	1	0	3	0	2	0	2	0	2	0	238	
4:10 PM	0	81	4	0	2	142	1	0	0	0	0	0	10	0	0	0	240	
4:15 PM	3	69	6	0	1	175	0	0	0	0	0	0	4	0	0	0	258	
4:20 PM	1	90	5	0	1	128	0	0	1	1	3	0	7	0	0	0	237	
4:25 PM	1	63	2	0	1	137	1	1	0	0	1	0	4	1	1	0	213	
4:30 PM	4	69	6	1	10	132	1	1	4	0	2	0	6	0	1	0	237	
4:35 PM	1	71	2	0	2	174	1	0	0	0	5	0	5	0	1	0	262	
4:40 PM	1	76	4	0	3	165	0	0	4	0	3	0	8	0	0	0	264	
4:45 PM	0	67	6	0	0	175	1	0	1	0	1	0	6	1	0	0	258	
4:50 PM	6	75	2	2	3	133	1	0	2	0	6	0	6	0	1	0	237	
4:55 PM	3	59	2	1	4	203	4	0	0	0	4	0	2	0	4	0	286	2979
5:00 PM	2	71	4	0	0	147	3	0	6	0	2	0	7	0	3	0	245	2975
5:05 PM	1	72	11	0	5	173	4	0	3	0	1	0	6	0	1	0	277	3014
5:10 PM	1	79	4	1	0	153	2	0	5	1	1	0	8	0	2	0	257	3031
5:15 PM	0	56	7	1	2	200	1	0	1	0	1	0	5	0	3	0	277	3050
5:20 PM	1	97	3	0	1	147	1	0	0	0	5	0	11	0	1	0	267	3080
5:25 PM	4	76	5	0	0	173	0	0	1	0	3	0	9	0	3	0	274	3141
5:30 PM	1	87	5	0	2	146	2	0	5	0	3	0	6	1	0	0	258	3162
5:35 PM	0	70	3	0	1	175	1	0	0	0	2	0	3	0	2	0	257	3157
5:40 PM	1	60	2	2	4	147	1	0	0	1	3	0	8	0	2	0	231	3124
5:45 PM	3	59	3	0	1	165	1	0	0	0	1	0	3	0	0	0	236	3102
5:50 PM	3	72	3	0	1	117	1	0	1	0	1	0	4	0	1	0	204	3069
5:55 PM	1	53	2	0	1	129	0	0	1	0	1	0	2	0	1	0	191	2974

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	20	916	60	4	12	2080	8	0	8	0	36	0	100	0	28	0	3272
Heavy Trucks	0	44	0		0	28	0		0	0	0		4	0	0		76
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/10/2008 5:19 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

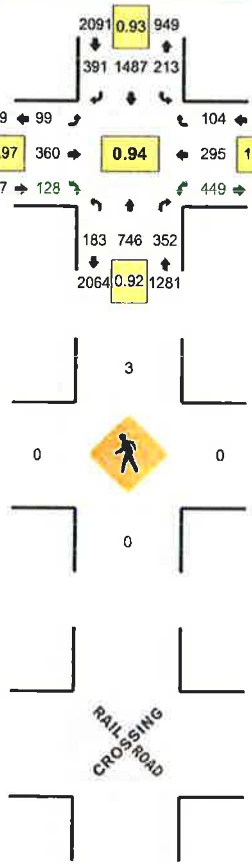
Method for determining peak hour: Total Entering Volume

LOCATION: Hwy 99W -- Tualatin Sherwood Rd

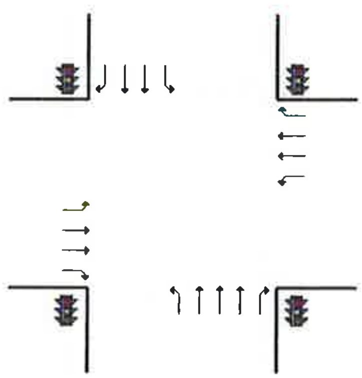
CITY/STATE: Sherwood, OR

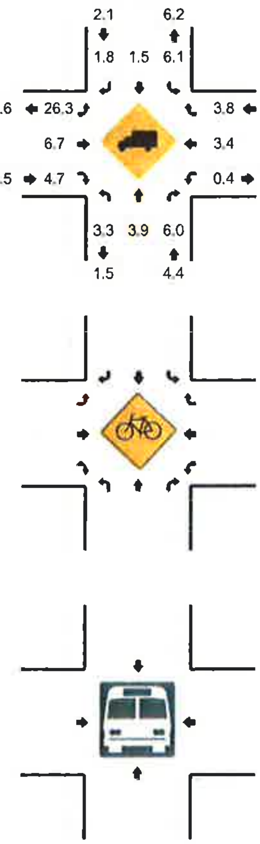
QC JOB #: 10393706

DATE: 11/5/2008



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM





5-Min Count Period Beginning At	Hwy 99W (Northbound)				Hwy 99W (Southbound)				Tualatin Sherwood Rd (Eastbound)				Tualatin Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	14	62	27	0	15	98	16	0	11	23	8	0	37	26	4	0	341	
4:05 PM	18	58	22	0	18	117	24	0	4	18	5	0	13	13	11	0	321	
4:10 PM	15	73	30	0	13	95	31	0	12	26	10	0	48	27	9	0	389	
4:15 PM	10	69	28	0	15	132	40	0	7	25	9	0	32	16	8	0	391	
4:20 PM	5	69	29	0	13	92	19	0	11	26	11	0	39	30	6	0	350	
4:25 PM	10	55	28	0	19	122	25	0	8	18	6	0	16	18	7	0	332	
4:30 PM	15	58	34	0	12	94	25	0	9	36	5	0	29	19	7	0	343	
4:35 PM	12	57	21	0	28	130	30	0	14	27	8	0	37	21	10	0	395	
4:40 PM	14	57	32	0	19	83	36	0	8	25	8	0	43	26	6	0	357	
4:45 PM	11	65	21	0	25	138	43	0	10	32	12	0	29	19	5	0	410	
4:50 PM	20	51	39	0	19	97	24	0	10	36	16	0	40	26	9	0	387	
4:55 PM	11	61	21	0	20	149	32	0	5	29	10	0	32	21	10	0	401	4417
5:00 PM	19	66	32	0	17	109	33	0	7	20	15	0	54	29	5	0	406	4482
5:05 PM	14	58	27	0	22	136	33	0	12	31	9	0	35	22	10	0	409	4570
5:10 PM	19	59	35	0	12	106	26	0	9	27	9	0	38	29	5	0	374	4555
5:15 PM	11	66	29	0	20	148	41	0	5	33	1	0	34	20	8	0	416	4580
5:20 PM	17	73	35	0	12	103	30	0	11	34	13	0	55	32	9	0	424	4654
5:25 PM	15	75	29	0	16	154	41	0	11	32	11	0	26	17	11	0	438	4760
5:30 PM	18	80	30	0	9	92	34	0	5	26	7	0	51	29	13	0	394	4811
5:35 PM	10	52	18	0	23	158	32	0	6	28	12	0	17	21	13	0	390	4806
5:40 PM	18	40	36	0	18	97	22	0	8	32	13	0	38	30	6	0	358	4807
5:45 PM	11	63	35	0	18	137	34	0	7	29	14	0	26	19	6	0	399	4796
5:50 PM	19	52	32	0	11	101	9	0	12	29	17	0	44	33	5	0	364	4773
5:55 PM	13	46	25	0	16	108	18	0	6	21	9	0	39	25	8	0	334	4706

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	172	856	372	0	192	1620	448	0	108	396	100	0	460	276	112	0	5112
Heavy Trucks	8	36	24		0	28	4		20	44	4		4	8	4		184
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/10/2008 5:19 PM

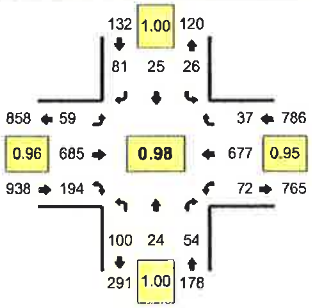
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

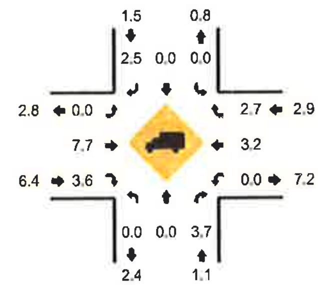
Method for determining peak hour: Total Entering Volume

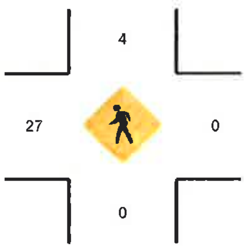
LOCATION: Shopping Center -- Tualatin Sherwood Rd
CITY/STATE: Sherwood, OR

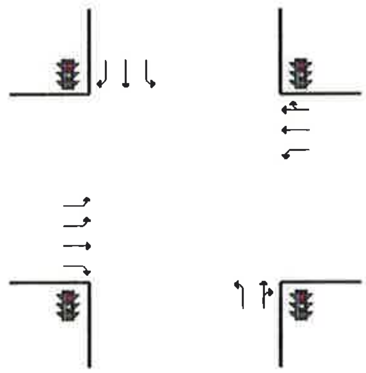
QC JOB #: 10393708
DATE: 11/5/2008

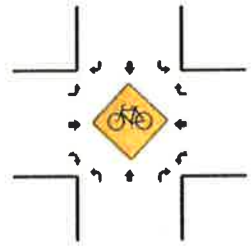


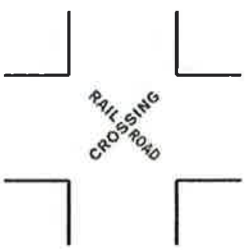
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

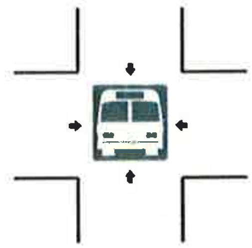












5-Min Count Period Beginning At	Shopping Center (Northbound)				Shopping Center (Southbound)				Tualatin Sherwood Rd (Eastbound)				Tualatin Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	10	2	6	0	0	1	7	0	1	60	15	0	9	43	1	0	155	
4:05 PM	5	3	3	0	1	2	6	0	4	38	12	0	10	45	1	0	130	
4:10 PM	9	1	5	0	0	3	7	0	3	62	17	0	0	70	9	0	186	
4:15 PM	5	1	3	0	0	0	6	0	2	55	12	0	5	47	2	0	138	
4:20 PM	5	3	8	0	0	3	2	0	3	48	18	0	8	41	1	0	140	
4:25 PM	11	1	3	0	1	6	4	0	3	49	14	0	12	37	2	0	143	
4:30 PM	6	2	7	0	2	2	4	0	8	53	16	0	6	42	4	0	152	
4:35 PM	7	2	6	0	2	0	5	0	5	53	20	0	4	67	1	0	172	
4:40 PM	6	3	5	0	0	3	2	0	9	52	9	0	5	57	0	0	151	
4:45 PM	5	1	5	0	3	2	5	0	1	55	19	0	7	50	2	0	155	
4:50 PM	10	1	3	0	1	1	7	0	4	67	27	0	5	65	3	0	194	
4:55 PM	6	1	5	0	0	4	13	0	7	48	26	0	3	64	3	0	180	1896
5:00 PM	8	2	2	0	2	2	7	0	8	52	9	0	8	50	9	0	159	1900
5:05 PM	9	1	4	0	4	2	5	0	5	54	16	0	5	58	3	0	166	1936
5:10 PM	4	5	10	0	2	0	6	0	5	58	10	0	6	57	1	0	164	1914
5:15 PM	9	2	3	0	2	3	7	0	4	50	16	0	7	66	1	0	170	1946
5:20 PM	9	3	2	0	1	1	5	0	6	68	11	0	4	61	4	0	175	1981
5:25 PM	10	0	4	0	2	1	4	0	4	72	14	0	5	55	4	0	175	2013
5:30 PM	14	3	4	0	2	3	7	0	5	51	7	0	5	52	4	0	157	2018
5:35 PM	6	2	8	0	4	2	4	0	2	49	24	0	7	54	3	0	165	2011
5:40 PM	10	3	4	0	3	4	11	0	8	61	15	0	10	45	0	0	174	2034
5:45 PM	8	3	2	0	2	2	5	0	5	65	10	0	3	55	4	0	164	2043
5:50 PM	5	3	2	0	5	6	8	0	5	49	11	0	3	53	0	0	150	1999
5:55 PM	12	1	2	0	0	5	16	0	5	50	14	0	7	62	3	0	177	1996

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	112	20	36	0	20	20	64	0	56	760	164	0	64	728	36	0	2080
Heavy Trucks	0	0	4		0	0	4		0	72	4		0	24	0		108
Pedestrians		0				4				4				0			8
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/10/2008 5:19 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

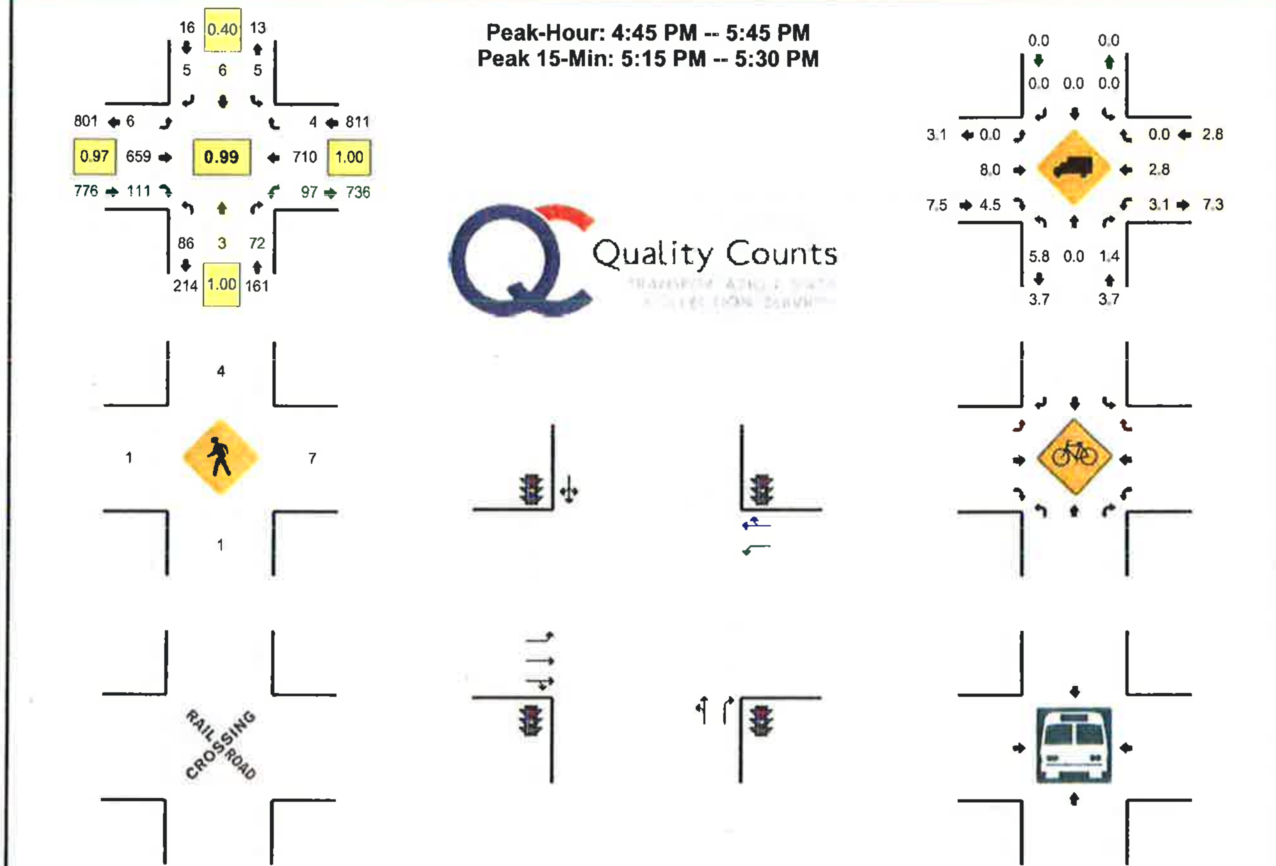
Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Baler Way -- Tualatin Sherwood Rd
CITY/STATE: Sherwood, OR

QC JOB #: 10393710
DATE: 11/5/2008

Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM



5-Min Count Period Beginning At	Baler Way (Northbound) Left	Thru	Right	U	Baler Way (Southbound) Left	Thru	Right	U	Tualatin Sherwood Rd (Eastbound) Left	Thru	Right	U	Tualatin Sherwood Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	2	0	5	0	0	0	0	0	0	58	11	0	8	46	1	0	131	
4:05 PM	9	0	4	0	1	1	2	0	0	33	8	0	8	70	1	0	137	
4:10 PM	8	1	7	0	1	0	0	0	0	57	8	0	1	48	1	0	132	
4:15 PM	4	0	8	0	0	0	1	0	0	46	6	0	4	47	1	0	117	
4:20 PM	6	0	5	0	0	0	0	0	0	52	14	0	5	45	1	0	128	
4:25 PM	3	0	11	0	0	1	1	0	0	44	8	0	7	47	0	0	122	
4:30 PM	10	0	1	0	0	1	0	0	0	61	6	0	12	46	0	0	137	
4:35 PM	8	0	4	0	0	1	1	0	2	45	9	0	8	59	0	0	137	
4:40 PM	9	1	10	0	1	1	4	0	2	51	11	0	4	56	0	0	150	
4:45 PM	6	0	6	0	1	0	0	0	0	56	6	0	12	53	0	0	140	
4:50 PM	11	0	6	0	0	1	0	0	1	60	7	0	5	68	2	0	161	
4:55 PM	9	0	4	0	0	1	0	0	0	42	6	0	7	60	0	0	129	1621
5:00 PM	3	0	9	0	0	0	1	0	0	52	14	0	8	53	1	0	141	1631
5:05 PM	5	0	4	0	0	0	0	0	0	57	7	0	9	65	1	0	148	1642
5:10 PM	10	0	4	0	0	1	0	0	3	59	8	0	3	51	0	0	139	1649
5:15 PM	5	2	6	0	0	0	2	0	0	49	7	0	6	75	0	0	152	1684
5:20 PM	6	0	4	0	4	2	1	0	2	56	10	0	6	56	0	0	147	1703
5:25 PM	8	0	4	0	0	1	0	0	0	60	15	0	8	52	0	0	148	1729
5:30 PM	6	0	7	0	0	0	0	0	0	45	12	0	7	57	0	0	134	1726
5:35 PM	9	1	9	0	0	0	0	0	0	60	9	0	16	62	0	0	166	1755
5:40 PM	8	0	9	0	0	0	1	0	0	63	10	0	10	58	0	0	159	1764
5:45 PM	10	3	7	0	0	0	0	0	0	57	9	0	9	48	1	0	144	1768
5:50 PM	9	2	7	0	0	0	2	0	0	40	17	0	7	55	0	0	139	1746
5:55 PM	7	0	2	0	0	0	1	0	0	46	9	0	5	50	0	0	120	1737

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	76	8	56	0	16	12	12	0	8	660	128	0	80	732	0	0	1788
Heavy Trucks	4	0	0		0	0	0		0	84	0		0	28	0		116
Pedestrians		0				12				0				12			24
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/10/2008 5:19 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

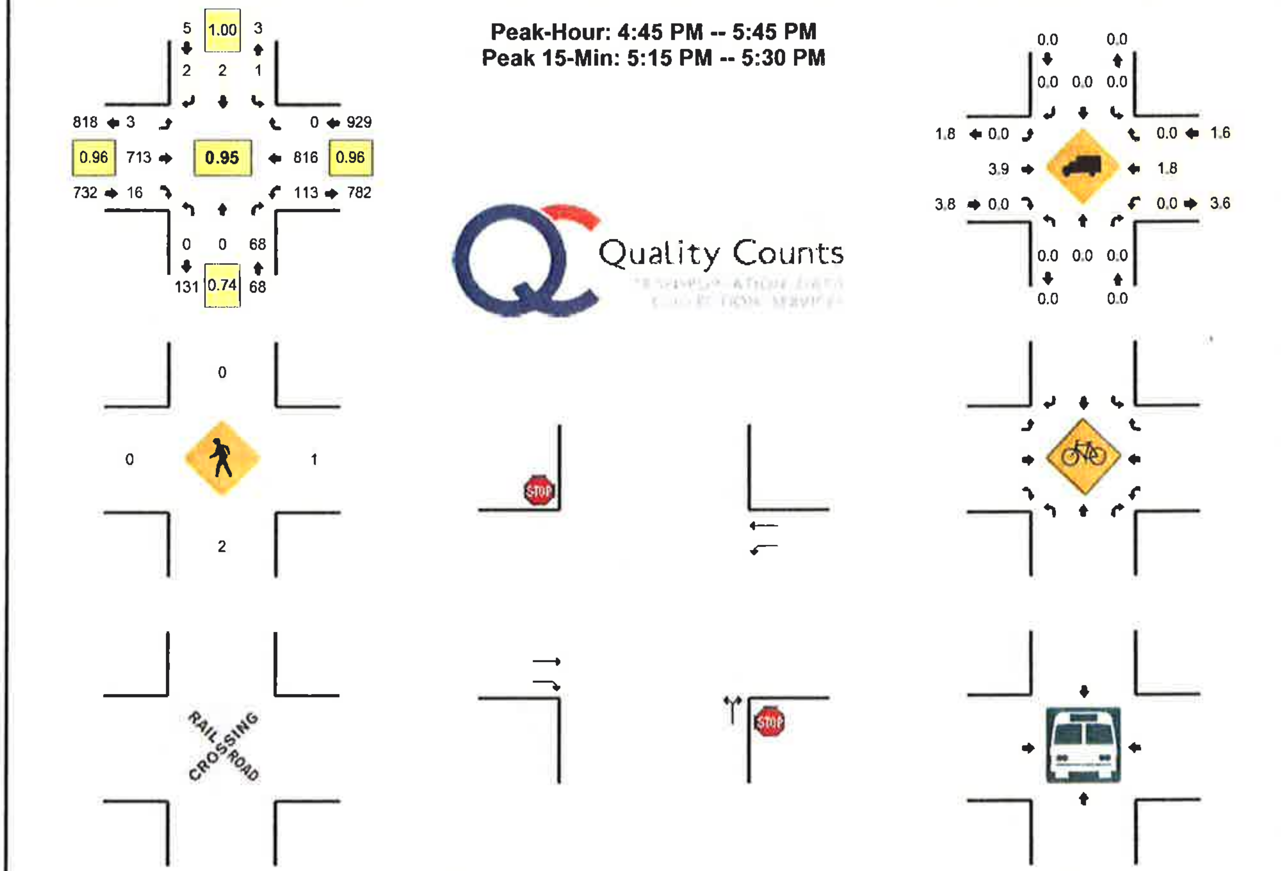
Method for determining peak hour: Total Entering Volume

LOCATION: Adams Ave -- Tualatin Sherwood Rd

CITY/STATE: Sherwood, OR

QC JOB #: 10393712

DATE: 11/5/2008



5-Min Count Period Beginning At	Adams Ave (Northbound)				Adams Ave (Southbound)				Tualatin Sherwood Rd (Eastbound)				Tualatin Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	4	0	0	0	1	0	2	59	0	0	9	54	1	0	130	
4:05 PM	2	0	6	0	0	0	0	0	0	39	2	0	5	75	0	0	129	
4:10 PM	0	0	4	0	0	1	0	0	0	58	3	0	3	49	0	0	118	
4:15 PM	0	0	9	0	0	1	0	0	1	50	1	0	10	57	1	0	130	
4:20 PM	0	0	3	0	0	0	0	0	0	58	1	0	11	43	0	0	116	
4:25 PM	0	0	1	0	0	0	0	0	1	45	0	0	16	61	0	0	124	
4:30 PM	0	0	6	0	0	0	2	0	0	65	0	0	7	56	0	0	136	
4:35 PM	1	0	4	0	0	0	0	0	1	48	4	0	7	59	0	0	124	
4:40 PM	1	0	3	0	0	0	1	0	0	62	1	0	5	55	0	0	128	
4:45 PM	0	0	7	0	0	1	0	0	1	54	1	0	9	66	0	0	139	
4:50 PM	0	0	9	0	0	0	0	0	0	74	1	0	4	75	0	0	163	
4:55 PM	0	0	6	0	0	0	0	0	0	43	1	0	8	66	0	0	124	1561
5:00 PM	0	0	1	0	0	1	0	0	0	54	3	0	8	64	0	0	131	1562
5:05 PM	0	0	4	0	0	0	0	0	0	54	2	0	11	73	0	0	144	1577
5:10 PM	0	0	7	0	0	0	0	0	0	59	0	0	10	49	0	0	125	1584
5:15 PM	0	0	7	0	0	0	0	0	0	64	0	0	11	86	0	0	168	1622
5:20 PM	0	0	7	0	0	0	0	0	2	58	2	0	7	60	0	0	136	1642
5:25 PM	0	0	9	0	0	0	1	0	0	63	2	0	14	65	0	0	154	1672
5:30 PM	0	0	3	0	0	0	0	0	0	51	2	0	12	62	0	0	130	1666
5:35 PM	0	0	5	0	0	0	0	0	0	63	1	0	7	76	0	0	152	1694
5:40 PM	0	0	3	0	1	0	1	0	0	76	1	0	12	74	0	0	168	1734
5:45 PM	0	0	9	0	0	0	0	0	0	59	3	0	5	75	0	0	151	1746
5:50 PM	1	0	6	0	0	0	0	0	1	42	1	0	10	39	0	0	100	1683
5:55 PM	0	0	4	0	0	0	0	0	0	49	0	0	6	50	0	0	109	1668

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	92	0	0	0	4	0	8	740	16	0	128	844	0	0	1832
Heavy Trucks	0	0	0		0	0	0		0	48	0		0	16	0		64
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/10/2008 5:19 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Gerda Ln -- Tualatin Sherwood Rd

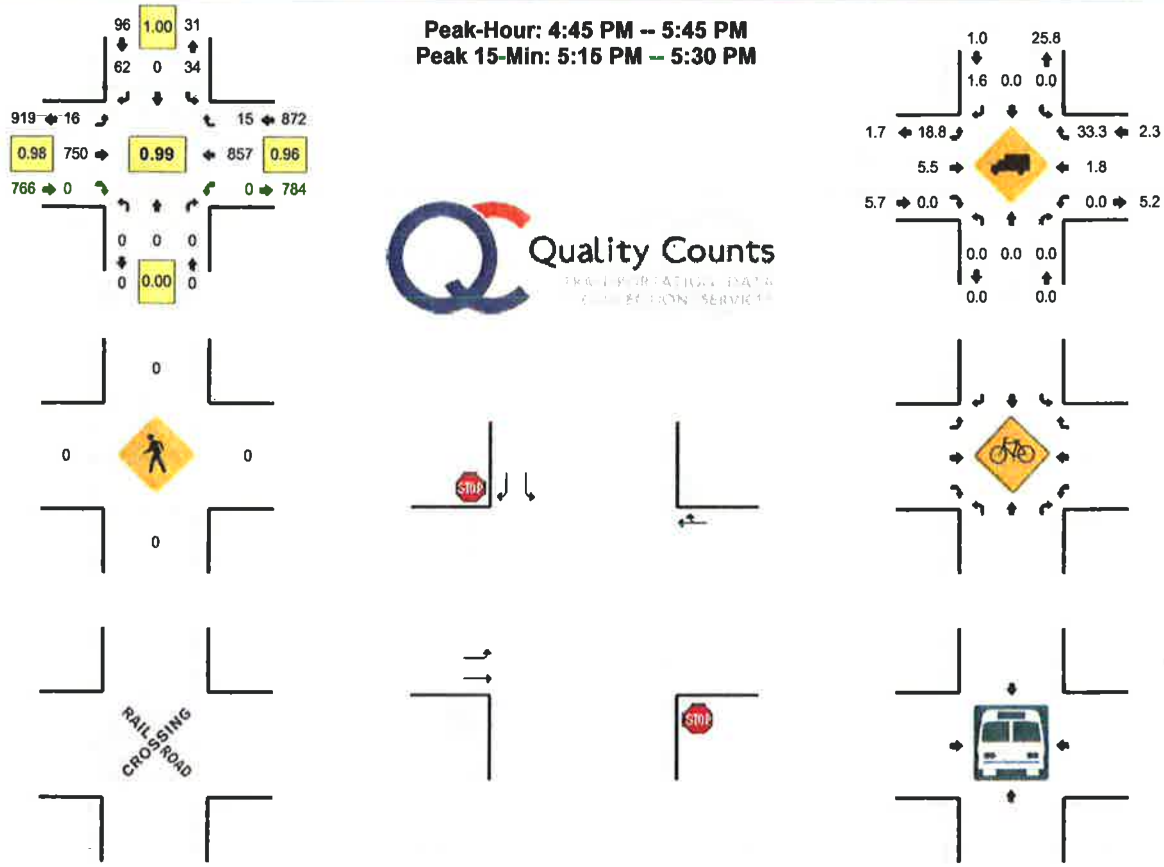
CITY/STATE: Sherwood, OR

QC JOB #: 10393714

DATE: 11/5/2008

Peak-Hour: 4:45 PM -- 5:45 PM

Peak 15-Min: 5:15 PM -- 5:30 PM



5-Min Count Period Beginning At	Gerda Ln (Northbound)				Gerda Ln (Southbound)				Tualatin Sherwood Rd (Eastbound)				Tualatin Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	6	0	11	0	4	57	0	0	0	50	4	0	132	
4:05 PM	0	0	0	0	2	0	5	0	1	42	0	0	0	66	2	0	118	
4:10 PM	0	0	0	0	3	0	7	0	3	57	0	0	0	49	3	0	122	
4:15 PM	0	0	0	0	5	0	4	0	5	63	0	0	0	64	3	0	144	
4:20 PM	0	0	0	0	3	0	1	0	1	58	0	0	0	59	2	0	124	
4:25 PM	0	0	0	0	5	0	6	0	1	38	0	0	0	52	5	0	107	
4:30 PM	0	0	0	0	3	0	9	0	5	65	0	0	0	61	3	0	146	
4:35 PM	0	0	0	0	6	0	5	0	1	60	0	0	0	60	3	0	135	
4:40 PM	0	0	0	0	0	0	5	0	2	51	0	0	0	57	3	0	118	
4:45 PM	0	0	0	0	3	0	5	0	1	65	0	0	0	68	2	0	144	
4:50 PM	0	0	0	0	2	0	4	0	3	69	0	0	0	74	1	0	153	
4:55 PM	0	0	0	0	3	0	6	0	3	62	0	0	0	66	1	0	141	1584
5:00 PM	0	0	0	0	1	0	5	0	1	54	0	0	0	73	1	0	135	1587
5:05 PM	0	0	0	0	7	0	8	0	2	47	0	0	0	68	2	0	134	1603
5:10 PM	0	0	0	0	4	0	5	0	1	74	0	0	0	59	2	0	145	1626
5:15 PM	0	0	0	0	3	0	7	0	0	73	0	0	0	82	2	0	167	1649
5:20 PM	0	0	0	0	1	0	2	0	1	51	0	0	0	66	0	0	121	1646
5:25 PM	0	0	0	0	3	0	3	0	2	68	0	0	0	74	2	0	152	1691
5:30 PM	0	0	0	0	4	0	5	0	0	59	0	0	0	74	2	0	144	1689
5:35 PM	0	0	0	0	2	0	6	0	1	68	0	0	0	70	0	0	147	1701
5:40 PM	0	0	0	0	1	0	6	0	1	60	0	0	0	83	0	0	151	1734
5:45 PM	0	0	0	0	2	0	3	0	1	63	0	0	0	65	1	0	135	1725
5:50 PM	0	0	0	0	1	0	4	0	1	66	0	0	0	55	3	0	130	1702
5:55 PM	0	0	0	0	0	0	1	0	1	48	0	0	0	57	1	0	108	1669

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	28	0	48	0	12	768	0	0	0	888	16	0	1760
Heavy Trucks	0	0	0		0	0	0		4	52	0		0	20	0		76
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/10/2008 5:19 PM

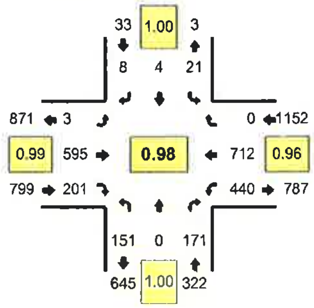
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

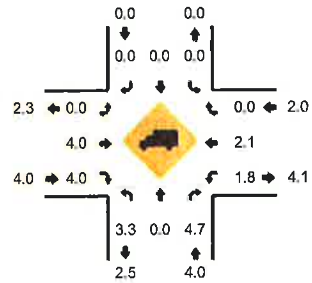
Method for determining peak hour: Total Entering Volume

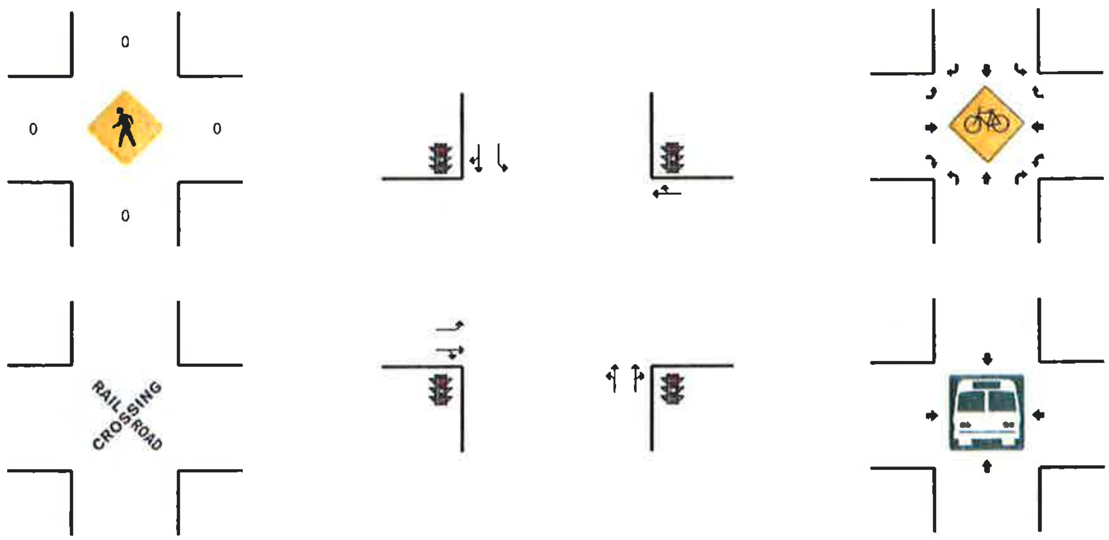
LOCATION: Oregon St -- Tualatin Sherwood Rd
CITY/STATE: Sherwood, OR

QC JOB #: 10393716
DATE: 11/5/2008



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM





5-Min Count Period Beginning At	Oregon St (Northbound)				Oregon St (Southbound)				Tualatin Sherwood Rd (Eastbound)				Tualatin Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	0	14	0	1	0	0	0	0	59	17	0	22	52	1	0	173	
4:05 PM	11	0	21	0	4	1	0	0	0	34	10	0	29	59	2	0	171	
4:10 PM	3	0	14	0	3	1	0	0	0	57	11	0	21	54	1	0	165	
4:15 PM	12	0	18	0	0	0	0	0	0	37	24	0	29	48	1	0	169	
4:20 PM	11	0	13	0	2	0	0	0	1	40	17	0	38	49	1	0	172	
4:25 PM	8	0	16	0	2	0	0	0	1	48	11	0	18	49	1	0	154	
4:30 PM	8	0	9	0	3	1	0	0	0	59	13	0	17	61	0	0	171	
4:35 PM	10	0	13	0	1	1	0	0	3	51	17	0	40	51	2	0	189	
4:40 PM	9	0	18	0	0	0	3	0	1	34	11	0	36	46	0	0	158	
4:45 PM	16	0	11	0	3	1	0	0	0	61	15	0	30	59	0	0	196	
4:50 PM	6	0	16	0	3	0	3	0	1	54	22	0	29	62	0	0	196	
4:55 PM	11	0	8	0	4	0	0	0	0	49	11	0	32	59	0	0	174	2088
5:00 PM	15	0	13	0	1	0	0	0	0	40	5	0	47	54	0	0	175	2090
5:05 PM	10	0	17	0	0	0	2	0	0	50	18	0	30	62	0	0	189	2108
5:10 PM	8	0	17	0	4	0	1	0	1	57	24	0	39	49	0	0	200	2143
5:15 PM	13	0	17	0	2	1	0	0	0	48	22	0	36	68	0	0	207	2181
5:20 PM	7	0	13	0	0	2	2	0	1	40	20	0	48	56	0	0	189	2198
5:25 PM	14	0	16	0	1	0	0	0	0	50	21	0	29	64	0	0	195	2239
5:30 PM	14	0	12	0	0	0	0	0	0	55	16	0	44	59	0	0	200	2268
5:35 PM	15	0	9	0	2	0	0	0	0	52	16	0	37	54	0	0	185	2264
5:40 PM	22	0	22	0	1	0	0	0	0	39	11	0	39	66	0	0	200	2306
5:45 PM	8	0	12	0	2	0	0	0	0	49	9	0	43	53	1	0	177	2287
5:50 PM	2	1	12	0	0	0	0	0	0	63	14	0	37	45	0	0	174	2265
5:55 PM	10	0	8	0	1	1	0	0	0	45	13	0	24	53	1	0	156	2247

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	136	0	184	0	12	12	8	0	4	552	252	0	452	752	0	0	2364
Heavy Trucks	4	0	12		0	0	0		0	24	24		12	20	0		96
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/10/2008 5:19 PM

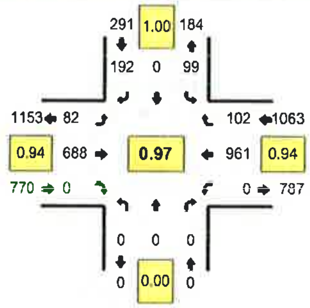
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

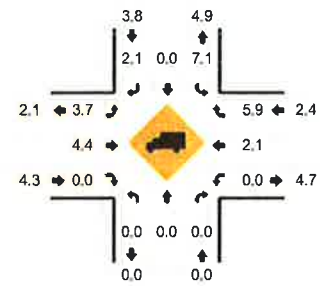
Method for determining peak hour: Total Entering Volume

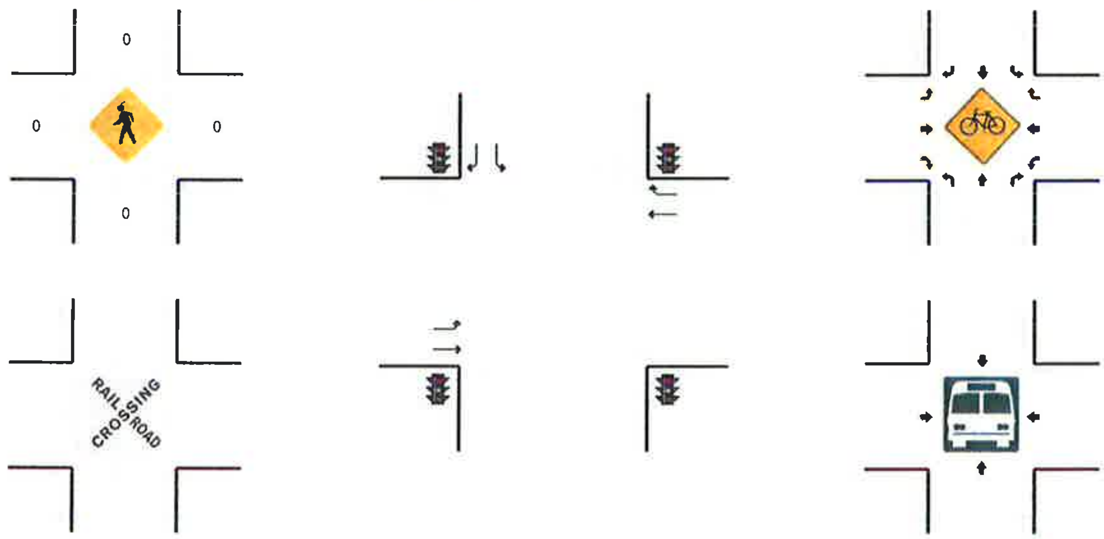
LOCATION: Cipole Rd -- Tualatin Sherwood Rd
CITY/STATE: Sherwood, OR

QC JOB #: 10393718
DATE: 11/5/2008



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM





5-Min Count Period Beginning At	Cipole Rd (Northbound) Left	Thru	Right	U	Cipole Rd (Southbound) Left	Thru	Right	U	Tualatin Sherwood Rd (Eastbound) Left	Thru	Right	U	Tualatin Sherwood Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	0	0	25	0	18	0	9	57	0	0	0	68	12	0	189	
4:05 PM	0	0	0	0	22	0	14	0	10	44	0	0	0	67	3	0	160	
4:10 PM	0	0	0	0	11	0	19	0	9	55	0	0	0	47	13	0	154	
4:15 PM	0	0	0	0	6	0	26	0	14	64	0	0	0	56	6	0	172	
4:20 PM	0	0	0	0	6	0	16	0	6	50	0	0	0	75	4	0	157	
4:25 PM	0	0	0	0	8	0	9	0	11	52	0	0	0	61	8	0	149	
4:30 PM	0	0	0	0	17	0	22	0	6	52	0	0	0	56	6	0	159	
4:35 PM	0	0	0	0	13	0	19	0	7	59	0	0	0	62	7	0	167	
4:40 PM	0	0	0	0	10	0	22	0	6	57	0	0	0	71	16	0	182	
4:45 PM	0	0	0	0	10	0	11	0	6	60	0	0	0	80	17	0	184	
4:50 PM	0	0	0	0	9	0	26	0	12	54	0	0	0	70	2	0	173	
4:55 PM	0	0	0	0	12	0	14	0	8	65	0	0	0	77	5	0	181	2027
5:00 PM	0	0	0	0	10	0	17	0	6	52	0	0	0	83	9	0	177	2015
5:05 PM	0	0	0	0	16	0	17	0	9	54	0	0	0	68	13	0	177	2032
5:10 PM	0	0	0	0	10	0	20	0	4	49	0	0	0	71	14	0	168	2046
5:15 PM	0	0	0	0	5	0	18	0	4	62	0	0	0	80	6	0	175	2049
5:20 PM	0	0	0	0	8	0	11	0	9	66	0	0	0	90	7	0	191	2083
5:25 PM	0	0	0	0	5	0	14	0	4	60	0	0	0	91	9	0	183	2117
5:30 PM	0	0	0	0	7	0	20	0	6	57	0	0	0	78	6	0	174	2132
5:35 PM	0	0	0	0	4	0	16	0	7	43	0	0	0	75	5	0	150	2115
5:40 PM	0	0	0	0	3	0	8	0	7	66	0	0	0	98	9	0	191	2124
5:45 PM	0	0	0	0	7	0	18	0	9	60	0	0	0	78	4	0	176	2116
5:50 PM	0	0	0	0	2	0	10	0	5	70	0	0	0	65	4	0	156	2099
5:55 PM	0	0	0	0	2	0	5	0	1	53	0	0	0	70	1	0	132	2050

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	72	0	172	0	68	752	0	0	0	1044	88	0	2196
Heavy Trucks	0	0	0		8	0	4		4	32	0		0	20	0		68
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/10/2008 5:19 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Cipole Rd -- Galbreath Dr

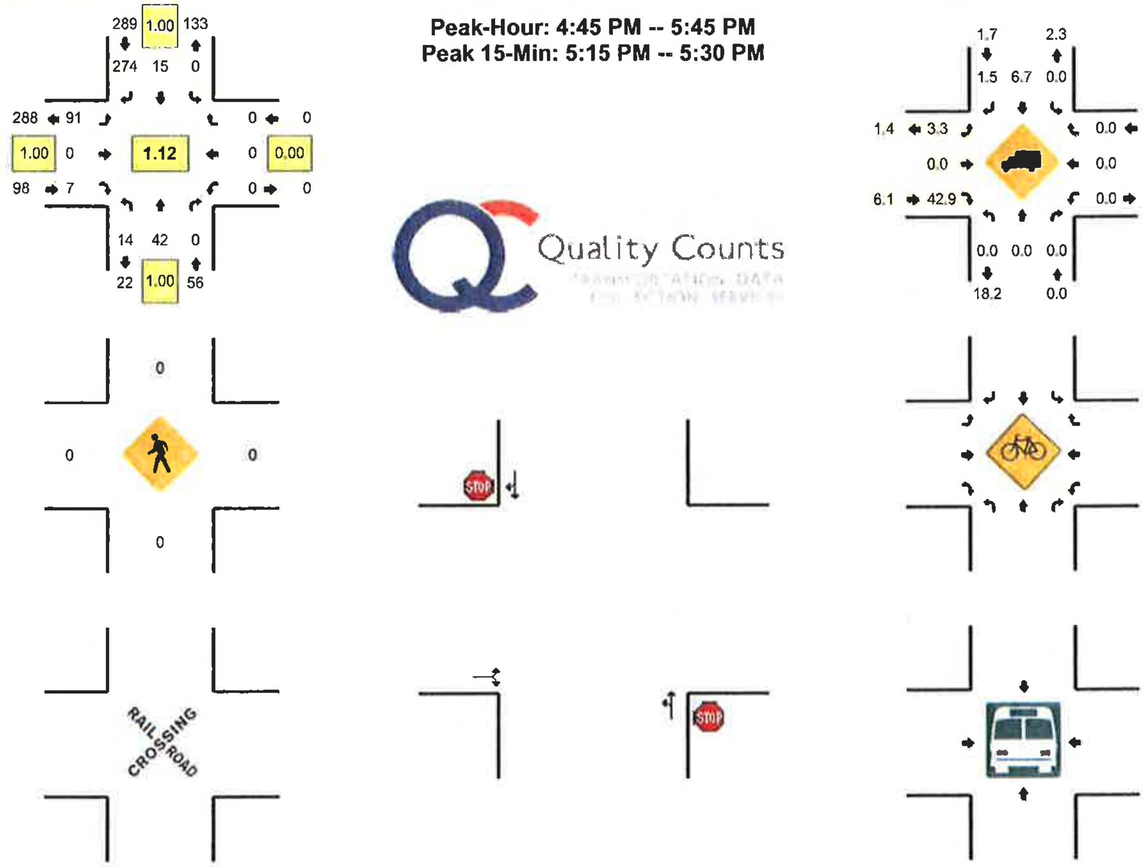
CITY/STATE: Sherwood, OR

QC JOB #: 10393720

DATE: 11/5/2008

Peak-Hour: 4:45 PM -- 5:45 PM

Peak 15-Min: 5:15 PM -- 5:30 PM



5-Min Count Period Beginning At	Cipole Rd (Northbound)				Cipole Rd (Southbound)				Galbreath Dr (Eastbound)				Galbreath Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	4	0	0	0	2	25	0	16	0	1	0	0	0	0	0	50	
4:05 PM	3	3	0	0	0	3	23	0	11	0	2	0	0	0	0	0	45	
4:10 PM	1	2	0	0	0	1	27	0	14	0	1	0	0	0	0	0	46	
4:15 PM	0	3	0	0	0	1	10	0	11	0	5	0	0	0	0	0	30	
4:20 PM	1	2	0	0	0	2	18	0	16	0	2	0	0	0	0	0	41	
4:25 PM	2	4	0	0	0	2	21	0	7	0	1	0	0	0	0	0	37	
4:30 PM	3	5	0	0	0	5	28	0	8	0	1	0	0	0	0	0	50	
4:35 PM	3	4	0	0	0	5	28	0	10	0	1	0	0	0	0	0	51	
4:40 PM	1	4	0	0	0	1	31	0	9	0	1	0	0	0	0	0	47	
4:45 PM	1	3	0	0	0	1	28	0	7	0	2	0	0	0	0	0	42	
4:50 PM	1	3	0	0	0	1	19	0	8	0	1	0	0	0	0	0	33	
4:55 PM	4	9	0	0	0	5	23	0	9	0	0	0	0	0	0	0	50	522
5:00 PM	3	9	0	0	0	3	23	0	13	0	1	0	0	0	0	0	52	524
5:05 PM	0	2	0	0	0	0	29	0	8	0	0	0	0	0	0	0	39	518
5:10 PM	0	4	0	0	0	0	31	0	5	0	0	0	0	0	0	0	40	512
5:15 PM	1	3	0	0	0	1	23	0	11	0	0	0	0	0	0	0	39	521
5:20 PM	0	2	0	0	0	0	25	0	7	0	0	0	0	0	0	0	34	514
5:25 PM	1	3	0	0	0	1	16	0	5	0	0	0	0	0	0	0	26	503
5:30 PM	0	3	0	0	0	0	18	0	7	0	0	0	0	0	0	0	28	481
5:35 PM	2	0	0	0	0	2	23	0	5	0	3	0	0	0	0	0	35	465
5:40 PM	1	1	0	0	0	1	16	0	6	0	0	0	0	0	0	0	25	443
5:45 PM	2	0	0	0	0	2	13	0	9	0	0	0	0	0	0	0	26	427
5:50 PM	1	1	0	0	0	1	14	0	7	0	0	0	0	0	0	0	24	418
5:55 PM	1	1	0	0	0	1	7	0	7	0	0	0	0	0	0	0	17	385

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	32	0	0	0	8	256	0	92	0	0	0	0	0	0	0	396
Heavy Trucks	0	0	0		0	0	4		0	0	0		0	0	0		4
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/10/2008 5:19 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: User-Defined

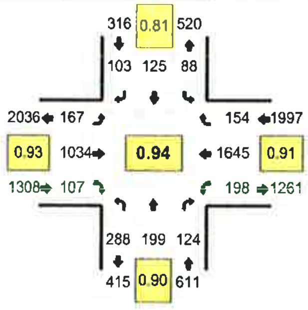
Method for determining peak hour: Total Entering Volume

LOCATION: Hwy 99W -- Edy Rd

CITY/STATE: Sherwood, OR

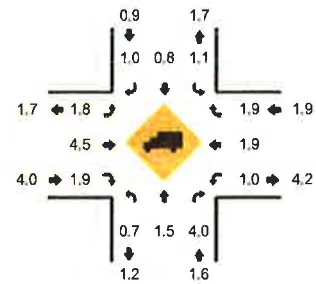
QC JOB #: 10396128

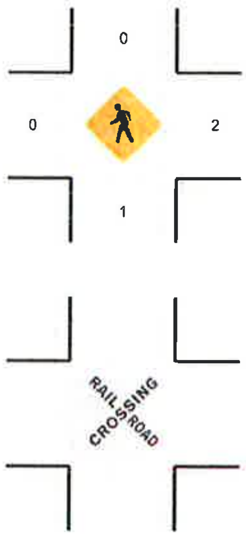
DATE: 11/20/2008

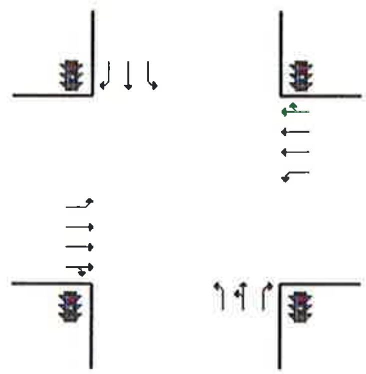


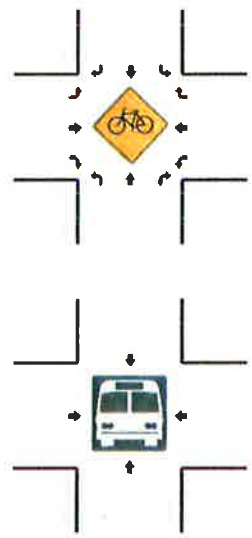
Peak-Hour: 4:50 PM -- 5:50 PM

Peak 15-Min: 5:20 PM -- 5:35 PM









5-Min Count Period Beginning At	Hwy 99W (Northbound)				Hwy 99W (Southbound)				Edy Rd (Eastbound)				Edy Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	22	14	6	0	8	9	9	0	9	64	5	0	12	122	9	1	290	
4:05 PM	20	11	15	0	6	10	6	0	4	98	5	0	17	127	8	1	328	
4:10 PM	23	26	18	0	11	12	12	0	10	59	4	0	15	105	4	0	299	
4:15 PM	16	19	5	0	6	9	8	0	5	119	9	0	10	129	17	1	353	
4:20 PM	20	20	15	0	7	15	11	0	12	70	5	0	14	103	6	2	300	
4:25 PM	19	14	12	0	6	10	13	0	13	71	8	0	8	147	10	3	334	
4:30 PM	33	19	12	0	7	13	14	0	9	90	6	0	17	124	9	1	354	
4:35 PM	16	17	8	0	6	13	9	0	13	92	6	0	9	135	12	1	337	
4:40 PM	22	20	5	0	11	19	12	0	12	63	8	0	17	98	6	1	294	
4:45 PM	17	16	9	0	5	8	9	0	20	105	8	0	15	126	13	1	352	
4:50 PM	30	21	2	0	8	11	16	0	15	78	9	0	21	136	11	3	361	
4:55 PM	23	10	7	0	8	7	12	0	18	96	14	0	6	155	15	2	373	3975
5:00 PM	28	24	11	0	8	15	13	0	15	66	2	0	21	124	12	1	340	4025
5:05 PM	12	11	13	0	10	10	12	0	18	107	6	0	8	131	6	0	344	4041
5:10 PM	26	19	22	0	10	12	8	0	9	70	8	0	14	127	11	0	336	4078
5:15 PM	22	15	9	0	6	12	3	0	9	72	3	0	14	121	14	0	300	4025
5:20 PM	23	19	15	0	5	7	0	0	12	129	13	0	17	158	18	0	416	4141
5:25 PM	22	10	6	0	2	5	12	0	14	84	10	0	20	154	11	0	350	4157
5:30 PM	34	20	11	0	8	15	8	0	12	69	7	0	23	128	18	3	356	4159
5:35 PM	24	9	6	0	7	10	4	0	18	95	8	0	10	144	13	2	350	4172
5:40 PM	26	24	13	0	9	13	8	0	11	78	14	0	18	126	9	3	352	4230
5:45 PM	18	17	9	0	7	8	7	0	16	90	13	0	11	141	16	1	354	4232
5:50 PM	30	18	7	0	9	12	3	0	9	56	8	0	24	98	14	0	288	4159
5:55 PM	17	16	9	0	2	9	4	0	13	109	11	0	12	132	11	1	346	4132

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	316	196	128	0	60	108	80	0	152	1128	120	0	240	1760	188	12	4488
Heavy Trucks	8	0	0		4	4	0		8	76	0		0	8	0		108
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 11/21/2008 2:52 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

2008 Existing Conditions
Study Intersections Operational Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.91			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1805	3426		1517	3373			1180			1522	
Flt Permitted	0.95	1.00		0.95	1.00			0.88			0.60	
Satd. Flow (perm)	1805	3426		1517	3373			1056			938	
Volume (vph)	6	1812	192	90	668	1	43	3	85	43	19	3
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	7	2036	216	101	751	1	48	3	96	48	21	3
RTOR Reduction (vph)	0	4	0	0	0	0	0	60	0	0	2	0
Lane Group Flow (vph)	7	2248	0	101	752	0	0	87	0	0	70	0
Heavy Vehicles (%)	0%	3%	12%	19%	7%	0%	44%	67%	44%	21%	21%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	1.1	71.8		10.1	80.8			13.6			13.6	
Effective Green, g (s)	1.6	73.8		10.6	82.8			15.6			15.6	
Actuated g/C Ratio	0.01	0.66		0.09	0.74			0.14			0.14	
Clearance Time (s)	4.5	6.0		4.5	6.0			6.0			6.0	
Vehicle Extension (s)	2.3	4.8		2.3	4.8			2.5			2.5	
Lane Grp Cap (vph)	26	2257		144	2494			147			131	
v/s Ratio Prot	0.00	c0.66		c0.07	0.22							
v/s Ratio Perm								c0.08			0.07	
v/c Ratio	0.27	1.00		0.70	0.30			0.59			0.54	
Uniform Delay, d1	54.6	19.0		49.2	4.9			45.2			44.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.2	17.9		12.8	0.1			5.2			3.3	
Delay (s)	57.9	36.9		61.9	5.0			50.4			48.1	
Level of Service	E	D		E	A			D			D	
Approach Delay (s)		36.9			11.8			50.4			48.1	
Approach LOS		D			B			D			D	

Intersection Summary			
HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	112.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.0%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1805	1258		1642	1615	1770	3505	1494	1543	3335	
Flt Permitted		0.74	1.00		0.75	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1407	1258		1297	1615	1770	3505	1494	1543	3335	
Volume (vph)	10	0	4	24	0	7	47	2008	50	12	701	21
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	11	0	4	26	0	8	51	2159	54	13	754	23
RTOR Reduction (vph)	0	0	4	0	0	8	0	0	9	0	1	0
Lane Group Flow (vph)	0	11	0	0	26	0	51	2159	45	13	776	0
Confl. Peds. (#/hr)			3	3					3	3		
Heavy Vehicles (%)	0%	0%	25%	8%	0%	0%	2%	3%	4%	17%	8%	0%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)		5.3	5.3		5.3	5.3	6.8	96.7	96.7	1.5	91.4	
Effective Green, g (s)		7.3	7.3		7.3	7.3	7.3	98.7	98.7	2.0	93.4	
Actuated g/C Ratio		0.06	0.06		0.06	0.06	0.06	0.82	0.82	0.02	0.78	
Clearance Time (s)		6.0	6.0		6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	
Lane Grp Cap (vph)		86	77		79	98	108	2883	1229	26	2596	
v/s Ratio Prot							c0.03	c0.62		0.01	0.23	
v/s Ratio Perm		0.01	0.00		c0.02	0.00			0.03			
v/c Ratio		0.13	0.00		0.33	0.00	0.47	0.75	0.04	0.50	0.30	
Uniform Delay, d1		53.3	52.9		54.0	52.9	54.5	4.9	1.9	58.5	3.8	
Progression Factor		1.00	1.00		1.00	1.00	1.13	2.73	1.21	1.00	1.00	
Incremental Delay, d2		0.5	0.0		1.8	0.0	1.2	1.2	0.0	8.5	0.3	
Delay (s)		53.8	52.9		55.8	53.0	62.8	14.6	2.4	67.0	4.1	
Level of Service		D	D		E	D	E	B	A	E	A	
Approach Delay (s)		53.6			55.1			15.4			5.2	
Approach LOS		D			E			B			A	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.96	
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)	1719	5085	1538	1641	4663		3019	1624	1336	1736	3300	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1719	5085	1538	1641	4663		3019	1624	1336	1736	3300	
Volume (vph)	159	1712	479	70	569	79	276	176	83	285	429	133
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)	167	1802	504	74	599	83	291	185	87	300	452	140
RTOR Reduction (vph)	0	0	226	0	21	0	0	0	74	0	24	0
Lane Group Flow (vph)	167	1802	278	74	661	0	291	185	13	300	568	0
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	5%	2%	5%	10%	8%	18%	16%	17%	18%	4%	6%	4%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	40.8	53.1	53.1	8.6	20.9		16.5	16.5	16.5	21.8	21.8	
Effective Green, g (s)	41.3	54.6	54.6	9.1	22.4		17.5	17.5	17.5	22.8	22.8	
Actuated g/C Ratio	0.34	0.46	0.46	0.08	0.19		0.15	0.15	0.15	0.19	0.19	
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7		2.3	2.3	2.3	2.3	2.3	
Lane Grp Cap (vph)	592	2314	700	124	870		440	237	195	330	627	
v/s Ratio Prot	0.10	c0.35		0.05	c0.14		0.10	c0.11		c0.17	0.17	
v/s Ratio Perm			0.18						0.01			
v/c Ratio	0.28	0.78	0.40	0.60	0.76		0.66	0.78	0.07	0.91	0.91	
Uniform Delay, d1	28.6	27.6	21.8	53.7	46.2		48.4	49.4	44.2	47.6	47.5	
Progression Factor	0.32	0.26	0.15	0.90	0.92		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.8	0.3	5.7	6.0		3.2	14.5	0.1	27.2	16.5	
Delay (s)	9.2	8.0	3.5	54.2	48.5		51.6	63.9	44.3	74.8	64.0	
Level of Service	A	A	A	D	D		D	E	D	E	E	
Approach Delay (s)		7.2			49.0			54.5			67.7	
Approach LOS		A			D			D			E	

Intersection Summary			
HCM Average Control Delay	31.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.3%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	3360		1543	3029		1583	1607		1805	1900	1590
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	3360		1543	3029		1583	1607		1805	1900	1590
Volume (vph)	23	867	88	29	463	8	64	4	53	3	5	8
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	26	985	100	33	526	9	73	5	60	3	6	9
RTOR Reduction (vph)	0	6	0	0	1	0	0	56	0	0	0	9
Lane Group Flow (vph)	26	1079	0	33	534	0	73	9	0	3	6	0
Confl. Peds. (#/hr)			1	1			3					3
Heavy Vehicles (%)	0%	6%	3%	17%	19%	12%	14%	0%	2%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	0.9	45.6		2.1	46.5		2.1	2.9		0.9	1.3	1.3
Effective Green, g (s)	3.2	47.5		4.1	48.4		4.8	4.6		3.2	3.0	3.0
Actuated g/C Ratio	0.04	0.63		0.05	0.64		0.06	0.06		0.04	0.04	0.04
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7		6.3	5.7	5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8		2.7	1.8	1.8
Lane Grp Cap (vph)	149	2117		84	1944		101	98		77	76	63
v/s Ratio Prot	0.01	c0.32		c0.02	0.18		c0.05	c0.01		0.00	0.00	
v/s Ratio Perm												0.00
v/c Ratio	0.17	0.51		0.39	0.27		0.72	0.09		0.04	0.08	0.01
Uniform Delay, d1	34.8	7.6		34.4	5.9		34.6	33.4		34.6	34.9	34.8
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	0.2		2.5	0.1		21.4	0.1		0.2	0.2	0.0
Delay (s)	35.3	7.8		37.0	6.0		56.0	33.6		34.8	35.0	34.8
Level of Service	D	A		D	A		E	C		C	D	C
Approach Delay (s)		8.5			7.8			45.4			34.9	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	75.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	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			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3412		1556	1610			1504	1583	1805	1615	
Flt Permitted	0.95	1.00		0.95	1.00			0.76	1.00	0.73	1.00	
Satd. Flow (perm)	1805	3412		1556	1610			1198	1583	1396	1615	
Volume (vph)	7	906	25	37	468	8	30	0	90	1	0	2
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	8	1030	28	42	532	9	34	0	102	1	0	2
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	89	0	2	0
Lane Group Flow (vph)	8	1057	0	42	541	0	0	34	13	1	0	0
Heavy Vehicles (%)	0%	5%	20%	16%	18%	0%	20%	0%	2%	0%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	1.2	45.5		3.6	47.9			7.3	7.3	7.3	7.3	
Effective Green, g (s)	3.3	47.2		5.7	49.6			9.6	9.6	9.6	9.6	
Actuated g/C Ratio	0.04	0.63		0.08	0.67			0.13	0.13	0.13	0.13	
Clearance Time (s)	6.1	5.7		6.1	5.7			6.3	6.3	6.3	6.3	
Vehicle Extension (s)	2.7	4.5		2.7	4.5			2.6	2.6	2.7	2.7	
Lane Grp Cap (vph)	80	2162		119	1072			154	204	180	208	
v/s Ratio Prot	0.00	0.31		c0.03	c0.34						0.00	
v/s Ratio Perm								c0.03	0.01	0.00		
v/c Ratio	0.10	0.49		0.35	0.50			0.22	0.06	0.01	0.00	
Uniform Delay, d1	34.2	7.2		32.6	6.3			29.1	28.5	28.3	28.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.3		1.5	0.6			0.6	0.1	0.0	0.0	
Delay (s)	34.6	7.5		34.2	6.9			29.7	28.6	28.3	28.3	
Level of Service	C	A		C	A			C	C	C	C	
Approach Delay (s)		7.8			8.9			28.9			28.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	989	3	24	508	1	0	0	62	0	0	5
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	6	1137	3	28	584	1	0	0	71	0	0	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		688										
pX, platoon unblocked				0.39			0.39	0.39	0.39	0.39	0.39	
vC, conflicting volume	585			1140			1793	1789	1137	1859	1791	584
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	585			1359			3033	3021	1351	3202	3028	584
tC, single (s)	4.3			4.1			7.1	6.5	6.2	7.1	6.5	6.6
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	3.5	4.0	3.7
p0 queue free %	99			86			100	100	0	100	100	99
cM capacity (veh/h)	907			200			3	4	71	0	4	447

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	6	1137	3	28	585	0	71	6
Volume Left	6	0	0	28	0	0	0	0
Volume Right	0	0	3	0	1	0	71	6
cSH	907	1700	1700	200	1700	1700	71	447
Volume to Capacity	0.01	0.67	0.00	0.14	0.34	0.00	1.00	0.01
Queue Length 95th (ft)	0	0	0	12	0	0	129	1
Control Delay (s)	9.0	0.0	0.0	25.9	0.0	0.0	205.5	13.2
Lane LOS	A			D		A	F	B
Approach Delay (s)	0.0			1.2		205.5		13.2
Approach LOS						F		B

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	50	981	518	45	27	24
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	57	1115	589	51	31	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	640				1843	614
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	640				1843	614
tC, single (s)	4.1				7.0	6.7
tC, 2 stage (s)						
tF (s)	2.2				4.0	3.8
p0 queue free %	94				45	93
cM capacity (veh/h)	954				55	414

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	57	1115	640	31	27
Volume Left	57	0	0	31	0
Volume Right	0	0	51	0	27
cSH	954	1700	1700	55	414
Volume to Capacity	0.06	0.66	0.38	0.55	0.07
Queue Length 95th (ft)	5	0	0	55	5
Control Delay (s)	9.0	0.0	0.0	131.5	14.3
Lane LOS	A			F	B
Approach Delay (s)	0.4		0.0	76.3	
Approach LOS				F	

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	61.6%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1759	1538	1641	1666			1656	1524	1150	1509	
Flt Permitted	0.95	1.00	1.00	0.13	1.00			0.73	1.00	0.38	1.00	
Satd. Flow (perm)	1805	1759	1538	222	1666			1271	1524	463	1509	
Volume (vph)	3	770	208	129	422	10	162	8	447	7	3	3
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	3	846	229	142	464	11	178	9	491	8	3	3
RTOR Reduction (vph)	0	0	32	0	1	0	0	0	94	0	3	0
Lane Group Flow (vph)	3	846	197	142	474	0	0	187	397	8	3	0
Heavy Vehicles (%)	0%	8%	5%	10%	14%	0%	10%	0%	6%	57%	33%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	7.6	80.3	80.3	88.1	88.1			20.3	35.7	20.3	20.3	
Effective Green, g (s)	9.6	82.3	82.3	90.1	90.1			22.3	39.7	22.3	22.3	
Actuated g/C Ratio	0.07	0.61	0.61	0.67	0.67			0.17	0.30	0.17	0.17	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	129	1080	945	334	1120			212	497	77	251	
v/s Ratio Prot	0.00	c0.48		0.06	0.28				c0.10		0.00	
v/s Ratio Perm			0.13	0.23				c0.15	0.16	0.02		
v/c Ratio	0.02	0.78	0.21	0.43	0.42			0.88	0.80	0.10	0.01	
Uniform Delay, d1	57.8	19.2	11.4	18.1	10.1			54.6	43.5	47.4	46.7	
Progression Factor	1.00	1.00	1.00	1.37	1.45			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	3.6	0.1	0.3	1.1			31.3	8.2	0.2	0.0	
Delay (s)	57.9	22.9	11.5	25.2	15.7			85.9	51.7	47.6	46.7	
Level of Service	E	C	B	C	B			F	D	D	D	
Approach Delay (s)		20.6			17.9			61.1			47.2	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM Average Control Delay	31.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	134.0	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	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
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	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1626	1759	1696	1346	1172	1302
Flt Permitted	0.41	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	707	1759	1696	1346	1172	1302
Volume (vph)	170	997	482	122	78	72
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1049	507	128	82	76
RTOR Reduction (vph)	0	0	0	22	0	63
Lane Group Flow (vph)	179	1049	507	106	82	13
Heavy Vehicles (%)	11%	8%	12%	20%	54%	24%
Turn Type	pm+pt			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			6		4
Actuated Green, G (s)	109.9	109.9	96.8	96.8	12.1	19.2
Effective Green, g (s)	111.9	111.9	98.8	98.8	14.1	23.2
Actuated g/C Ratio	0.84	0.84	0.74	0.74	0.11	0.17
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.5	2.5	2.5	2.5	2.0
Lane Grp Cap (vph)	653	1469	1250	992	123	264
v/s Ratio Prot	0.02	c0.60	0.30		c0.07	0.00
v/s Ratio Perm	0.21			0.08		0.01
v/c Ratio	0.27	0.71	0.41	0.11	0.67	0.05
Uniform Delay, d1	3.0	4.5	6.6	5.0	57.7	46.2
Progression Factor	0.80	0.68	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	1.7	0.2	0.0	11.6	0.0
Delay (s)	2.4	4.8	6.8	5.1	69.3	46.2
Level of Service	A	A	A	A	E	D
Approach Delay (s)		4.5	6.4		58.2	
Approach LOS		A	A		E	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	134.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	266	11	21	131	9	32
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	292	12	23	144	10	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			304		488	298
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			304		488	298
tC, single (s)			4.5		7.0	6.7
tC, 2 stage (s)						
tF (s)			2.5		4.0	3.7
p0 queue free %			98		98	95
cM capacity (veh/h)			1078		444	647

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	304	167	45
Volume Left	0	23	10
Volume Right	12	0	35
cSH	1700	1078	588
Volume to Capacity	0.18	0.02	0.08
Queue Length 95th (ft)	0	2	6
Control Delay (s)	0.0	1.3	11.6
Lane LOS		A	B
Approach Delay (s)	0.0	1.3	11.6
Approach LOS			B

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1845	1482	1603	1720	1455	1770	4944		1703	4604	
Flt Permitted	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1845	1482	1603	1720	1455	1770	4944		1703	4604	
Volume (vph)	141	163	81	276	192	188	170	1814	98	138	765	50
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	162	187	93	317	221	216	195	2085	113	159	879	57
RTOR Reduction (vph)	0	0	83	0	0	145	0	5	0	0	6	0
Lane Group Flow (vph)	162	187	10	257	281	71	195	2193	0	159	930	0
Heavy Vehicles (%)	4%	3%	9%	7%	3%	11%	2%	4%	6%	6%	12%	6%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	12.1	12.1	12.1	21.9	21.9	21.9	10.5	54.5		11.5	55.5	
Effective Green, g (s)	13.1	13.1	13.1	22.9	22.9	22.9	11.0	56.0		12.0	57.0	
Actuated g/C Ratio	0.11	0.11	0.11	0.19	0.19	0.19	0.09	0.47		0.10	0.48	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	190	201	162	306	328	278	162	2307		170	2187	
v/s Ratio Prot	0.09	c0.10		0.16	c0.16		c0.11	c0.44		c0.09	0.20	
v/s Ratio Perm			0.01			0.05						
v/c Ratio	0.85	0.93	0.06	0.84	0.86	0.26	1.20	0.95		0.94	0.43	
Uniform Delay, d1	52.5	53.0	47.9	46.8	47.0	41.3	54.5	30.7		53.6	20.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.64	0.33	
Incremental Delay, d2	28.5	43.9	0.1	17.5	18.8	0.3	135.9	9.8		40.2	0.4	
Delay (s)	81.0	96.9	48.0	64.3	65.8	41.6	190.4	40.5		74.6	7.2	
Level of Service	F	F	D	E	E	D	F	D		E	A	
Approach Delay (s)		80.8			58.4			52.7			17.0	
Approach LOS		F			E			D			B	

Intersection Summary			
HCM Average Control Delay	47.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			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			0.96			0.98	
Satd. Flow (prot)	1805	3411		1719	3538			1780			1789	
Flt Permitted	0.95	1.00		0.95	1.00			0.77			0.88	
Satd. Flow (perm)	1805	3411		1719	3538			1431			1605	
Volume (vph)	14	956	24	43	1885	4	259	12	69	22	13	13
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	15	996	25	45	1964	4	270	12	72	23	14	14
RTOR Reduction (vph)	0	1	0	0	0	0	0	8	0	0	11	0
Lane Group Flow (vph)	15	1020	0	45	1968	0	0	346	0	0	40	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	0%	5%	21%	5%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.6	62.7		5.1	65.2			21.1			21.1	
Effective Green, g (s)	3.1	64.7		5.6	67.2			23.1			23.1	
Actuated g/C Ratio	0.03	0.61		0.05	0.64			0.22			0.22	
Clearance Time (s)	4.5	6.0		4.5	6.0			6.0			6.0	
Vehicle Extension (s)	2.3	4.8		2.3	4.8			2.5			2.5	
Lane Grp Cap (vph)	53	2094		91	2256			314			352	
v/s Ratio Prot	0.01	0.30		c0.03	c0.56							
v/s Ratio Perm								c0.24			0.02	
v/c Ratio	0.28	0.49		0.49	0.87			1.10			0.11	
Uniform Delay, d1	50.1	11.2		48.5	15.6			41.2			33.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.7	0.3		2.5	4.3			81.2			0.1	
Delay (s)	51.8	11.6		51.0	19.9			122.3			33.1	
Level of Service	D	B		D	B			F			C	
Approach Delay (s)		12.1			20.6			122.3			33.1	
Approach LOS		B			C			F			C	

Intersection Summary			
HCM Average Control Delay	28.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	105.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.8%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1816	1591		1730	1553	1805	3406	1553	1530	3534	
Flt Permitted		0.65	1.00		0.71	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1242	1591		1291	1553	1805	3406	1553	1530	3534	
Volume (vph)	24	2	32	77	2	22	27	953	54	22	2160	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)	25	2	34	81	2	23	28	1003	57	23	2274	22
RTOR Reduction (vph)	0	0	31	0	0	21	0	0	13	0	0	0
Lane Group Flow (vph)	0	27	3	0	83	2	28	1003	44	23	2296	0
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	0%	0%	0%	3%	50%	4%	0%	6%	4%	18%	2%	0%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)		9.7	9.7		9.7	9.7	4.6	90.5	90.5	3.3	89.2	
Effective Green, g (s)		11.7	11.7		11.7	11.7	5.1	92.5	92.5	3.8	91.2	
Actuated g/C Ratio		0.10	0.10		0.10	0.10	0.04	0.77	0.77	0.03	0.76	
Clearance Time (s)		6.0	6.0		6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	
Lane Grp Cap (vph)		121	155		126	151	77	2625	1197	48	2686	
v/s Ratio Prot							c0.02	0.29		0.02	c0.65	
v/s Ratio Perm		0.02	0.00		c0.06	0.00			0.03			
v/c Ratio		0.22	0.02		0.66	0.01	0.36	0.38	0.04	0.48	0.85	
Uniform Delay, d1		50.0	49.0		52.2	48.9	55.9	4.5	3.2	57.1	9.9	
Progression Factor		1.00	1.00		1.00	1.00	0.68	3.03	3.70	1.00	1.00	
Incremental Delay, d2		0.7	0.0		10.6	0.0	1.5	0.4	0.1	4.3	3.7	
Delay (s)		50.6	49.0		62.8	49.0	39.8	13.9	12.1	61.5	13.6	
Level of Service		D	D		E	D	D	B	B	E	B	
Approach Delay (s)		49.7			59.8			14.5			14.1	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.7%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.97	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.96	
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)	1752	4988	1524	1703	4937		3502	1845	1507	1433	3260	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	4988	1524	1703	4937		3502	1845	1507	1433	3260	
Volume (vph)	183	814	355	213	1621	391	454	305	109	99	370	128
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	195	866	378	227	1724	416	483	324	116	105	394	136
RTOR Reduction (vph)	0	0	237	0	34	0	0	0	88	0	29	0
Lane Group Flow (vph)	195	866	141	227	2106	0	483	324	28	105	501	0
Confl. Peds. (#/hr)									3	3		
Heavy Vehicles (%)	3%	4%	6%	6%	2%	2%	0%	3%	4%	26%	7%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	12.5	43.4	43.4	18.0	48.9		19.0	19.0	19.0	19.6	19.6	
Effective Green, g (s)	13.0	44.9	44.9	18.5	50.4		20.0	20.0	20.0	20.6	20.6	
Actuated g/C Ratio	0.11	0.37	0.37	0.15	0.42		0.17	0.17	0.17	0.17	0.17	
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7		2.3	2.3	2.3	2.3	2.3	
Lane Grp Cap (vph)	190	1866	570	263	2074		584	308	251	246	560	
v/s Ratio Prot	c0.11	0.17		0.13	c0.43		0.14	c0.18		0.07	c0.15	
v/s Ratio Perm			0.09						0.02			
v/c Ratio	1.03	0.46	0.25	0.86	1.02		0.83	1.05	0.11	0.43	0.89	
Uniform Delay, d1	53.5	28.4	25.9	49.5	34.8		48.3	50.0	42.4	44.4	48.6	
Progression Factor	0.88	0.69	3.49	1.16	0.96		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	62.3	0.2	0.3	15.0	18.9		9.1	65.6	0.1	0.7	16.5	
Delay (s)	109.1	19.9	90.8	72.7	52.5		57.4	115.6	42.6	45.1	65.1	
Level of Service	F	B	F	E	D		E	F	D	D	E	
Approach Delay (s)		50.6			54.4			76.0			61.8	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM Average Control Delay	58.0	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	90.8%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	3238		1805	3478		1805	1656		1805	1900	1513
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	3238		1805	3478		1805	1656		1805	1900	1513
Volume (vph)	59	685	194	77	687	37	100	24	54	26	25	81
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	721	204	81	723	39	105	25	57	27	26	85
RTOR Reduction (vph)	0	24	0	0	4	0	0	50	0	0	0	77
Lane Group Flow (vph)	62	901	0	81	758	0	105	32	0	27	26	8
Confl. Peds. (#/hr)			4	4			27					27
Heavy Vehicles (%)	0%	8%	4%	0%	3%	3%	0%	0%	4%	0%	0%	2%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	3.2	37.7		3.2	37.4		3.2	6.9		2.1	5.4	5.4
Effective Green, g (s)	5.5	39.6		5.2	39.3		5.9	8.6		4.4	7.1	7.1
Actuated g/C Ratio	0.07	0.54		0.07	0.53		0.08	0.12		0.06	0.10	0.10
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7		6.3	5.7	5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8		2.7	1.8	1.8
Lane Grp Cap (vph)	261	1737		127	1852		144	193		108	183	146
v/s Ratio Prot	0.02	c0.28		c0.04	0.22		c0.06	c0.02		0.01	0.01	
v/s Ratio Perm												0.01
v/c Ratio	0.24	0.52		0.64	0.41		0.73	0.16		0.25	0.14	0.06
Uniform Delay, d1	32.2	11.0		33.4	10.3		33.2	29.4		33.1	30.6	30.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.3		9.3	0.2		16.0	0.1		1.0	0.1	0.1
Delay (s)	32.6	11.3		42.7	10.5		49.2	29.5		34.1	30.7	30.4
Level of Service	C	B		D	B		D	C		C	C	C
Approach Delay (s)		12.6			13.6			40.6			31.2	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	73.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	0.99	1.00	
Frt	1.00	0.98		1.00	1.00			1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3274		1752	1843			1710	1566	1791	1753	
Flt Permitted	0.95	1.00		0.95	1.00			0.73	1.00	0.70	1.00	
Satd. Flow (perm)	1805	3274		1752	1843			1300	1566	1313	1753	
Volume (vph)	6	659	111	100	710	4	86	3	72	5	6	5
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	6	686	116	104	740	4	90	3	75	5	6	5
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	63	0	4	0
Lane Group Flow (vph)	6	791	0	104	744	0	0	93	12	5	7	0
Confl. Peds. (#/hr)	1		4	4		1	1		7	7		1
Heavy Vehicles (%)	0%	8%	4%	3%	3%	0%	6%	0%	1%	0%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	1.1	42.1		6.8	47.8			9.6	9.6	9.6	9.6	
Effective Green, g (s)	3.2	43.8		8.9	49.5			11.9	11.9	11.9	11.9	
Actuated g/C Ratio	0.04	0.57		0.12	0.65			0.16	0.16	0.16	0.16	
Clearance Time (s)	6.1	5.7		6.1	5.7			6.3	6.3	6.3	6.3	
Vehicle Extension (s)	2.7	4.5		2.7	4.5			2.6	2.6	2.7	2.7	
Lane Grp Cap (vph)	75	1872		204	1191			202	243	204	272	
v/s Ratio Prot	0.00	0.24		c0.06	c0.40						0.00	
v/s Ratio Perm								c0.07	0.01	0.00		
v/c Ratio	0.08	0.42		0.51	0.62			0.46	0.05	0.02	0.02	
Uniform Delay, d1	35.3	9.3		31.8	8.0			29.4	27.5	27.4	27.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.3		1.7	1.3			1.3	0.1	0.0	0.0	
Delay (s)	35.7	9.5		33.5	9.3			30.7	27.6	27.5	27.5	
Level of Service	D	A		C	A			C	C	C	C	
Approach Delay (s)		9.7			12.3			29.3			27.5	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.1%	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												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	3	717	16	113	812	0	0	0	68	1	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	755	17	119	855	0	0	0	72	1	2	2
Pedestrians					1						2	
Lane Width (ft)					12.0						12.0	
Walking Speed (ft/s)					4.0						4.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		688										
pX, platoon unblocked				0.77			0.77	0.77	0.77	0.77	0.77	
vC, conflicting volume	857			772			1857	1856	756	1928	1873	857
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	857			705			2108	2106	684	2200	2128	857
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			83			100	100	80	94	93	99
cM capacity (veh/h)	791			698			24	33	349	17	32	359

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	3	755	17	119	855	0	72	5
Volume Left	3	0	0	119	0	0	0	1
Volume Right	0	0	17	0	0	0	72	2
cSH	791	1700	1700	698	1700	1700	349	40
Volume to Capacity	0.00	0.44	0.01	0.17	0.50	0.00	0.20	0.13
Queue Length 95th (ft)	0	0	0	15	0	0	19	10
Control Delay (s)	9.6	0.0	0.0	11.2	0.0	0.0	17.9	108.8
Lane LOS	A			B		A	C	F
Approach Delay (s)	0.0			1.4		17.9		108.8
Approach LOS						C		F

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	16	750	857	15	34	62
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	16	773	884	15	35	64
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	899				1697	891
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	899				1697	891
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	98				65	81
cM capacity (veh/h)	689				100	341

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	16	773	899	35	64
Volume Left	16	0	0	35	0
Volume Right	0	0	15	0	64
cSH	689	1700	1700	100	341
Volume to Capacity	0.02	0.45	0.53	0.35	0.19
Queue Length 95th (ft)	2	0	0	34	17
Control Delay (s)	10.4	0.0	0.0	59.0	18.0
Lane LOS	B			F	C
Approach Delay (s)	0.2		0.0	32.5	
Approach LOS				D	

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	56.5%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1827	1553	1770	1863			1752	1538	1805	1710	
Flt Permitted	0.95	1.00	1.00	0.25	1.00			0.75	1.00	0.44	1.00	
Satd. Flow (perm)	1805	1827	1553	459	1863			1383	1538	835	1710	
Volume (vph)	3	610	201	440	712	0	151	0	171	21	4	8
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	629	207	454	734	0	156	0	176	22	4	8
RTOR Reduction (vph)	0	0	43	0	0	0	0	0	117	0	7	0
Lane Group Flow (vph)	3	629	164	454	734	0	0	156	59	22	5	0
Heavy Vehicles (%)	0%	4%	4%	2%	2%	0%	3%	0%	5%	0%	0%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	3.1	75.3	75.3	94.5	94.5			18.4	40.7	18.4	18.4	
Effective Green, g (s)	5.1	77.3	77.3	96.5	96.5			20.4	44.7	20.4	20.4	
Actuated g/C Ratio	0.04	0.58	0.58	0.72	0.72			0.15	0.33	0.15	0.15	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	69	1054	896	568	1342			211	559	127	260	
v/s Ratio Prot	0.00	c0.34		c0.14	0.39				0.02		0.00	
v/s Ratio Perm			0.11	c0.43				c0.11	0.02	0.03		
v/c Ratio	0.04	0.60	0.18	0.80	0.55			0.74	0.11	0.17	0.02	
Uniform Delay, d1	62.1	18.3	13.4	15.1	8.7			54.3	30.8	49.5	48.3	
Progression Factor	1.00	1.00	1.00	1.08	1.62			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.8	0.1	5.3	1.2			11.1	0.0	0.2	0.0	
Delay (s)	62.2	19.1	13.5	21.6	15.2			65.3	30.9	49.7	48.3	
Level of Service	E	B	B	C	B			E	C	D	D	
Approach Delay (s)		17.8			17.6			47.1			49.2	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	134.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
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	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1736	1827	1863	1524	1687	1583
Flt Permitted	0.17	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	319	1827	1863	1524	1687	1583
Volume (vph)	82	688	961	102	99	192
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	85	709	991	105	102	198
RTOR Reduction (vph)	0	0	0	9	0	67
Lane Group Flow (vph)	85	709	991	96	102	131
Heavy Vehicles (%)	4%	4%	2%	6%	7%	2%
Turn Type	pm+pt			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			6		4
Actuated Green, G (s)	109.6	109.6	96.4	96.4	12.4	19.6
Effective Green, g (s)	111.6	111.6	98.4	98.4	14.4	23.6
Actuated g/C Ratio	0.83	0.83	0.73	0.73	0.11	0.18
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	2.0	2.5	2.5	2.5	2.5	2.0
Lane Grp Cap (vph)	363	1522	1368	1119	181	326
v/s Ratio Prot	0.02	c0.39	c0.53		c0.06	0.03
v/s Ratio Perm	0.18			0.06		0.06
v/c Ratio	0.23	0.47	0.72	0.09	0.56	0.40
Uniform Delay, d1	10.3	3.1	10.1	5.0	56.8	48.9
Progression Factor	2.42	0.63	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.9	1.8	0.0	3.2	0.3
Delay (s)	25.1	2.8	11.9	5.1	60.0	49.2
Level of Service	C	A	B	A	E	D
Approach Delay (s)		5.2	11.3		52.9	
Approach LOS		A	B		D	

Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	134.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	91	7	15	274	14	42
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	115	9	19	347	18	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			124		504	120
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			124		504	120
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			99		97	94
cM capacity (veh/h)			1432		524	937

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	124	366	71
Volume Left	0	19	18
Volume Right	9	0	53
cSH	1700	1432	783
Volume to Capacity	0.07	0.01	0.09
Queue Length 95th (ft)	0	1	7
Control Delay (s)	0.0	0.5	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	0.5	10.1
Approach LOS			B

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	31.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1698	1756	1553	1770	4888		1787	5025	
Flt Permitted	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1881	1599	1698	1756	1553	1770	4888		1787	5025	
Volume (vph)	88	125	103	288	199	124	167	1127	107	198	1793	154
Peak-hour factor, PHF	0.90	0.92	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	98	136	110	306	212	132	178	1199	114	211	1907	164
RTOR Reduction (vph)	0	0	100	0	0	112	0	11	0	0	8	0
Lane Group Flow (vph)	98	136	10	254	264	20	178	1302	0	211	2063	0
Heavy Vehicles (%)	1%	1%	1%	1%	2%	4%	2%	5%	2%	1%	2%	2%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	9.7	9.7	9.7	17.0	17.0	17.0	13.2	42.4		30.9	60.1	
Effective Green, g (s)	10.7	10.7	10.7	18.0	18.0	18.0	13.7	43.9		31.4	61.6	
Actuated g/C Ratio	0.09	0.09	0.09	0.15	0.15	0.15	0.11	0.37		0.26	0.51	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	159	168	143	255	263	233	202	1788		468	2580	
v/s Ratio Prot	0.05	c0.07		0.15	c0.15		c0.10	0.27		0.12	c0.41	
v/s Ratio Perm			0.01			0.01						
v/c Ratio	0.62	0.81	0.07	1.00	1.00	0.08	0.88	0.73		0.45	0.80	
Uniform Delay, d1	52.7	53.6	50.1	51.0	51.0	43.9	52.3	32.9		37.1	24.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.01	1.03	
Incremental Delay, d2	5.5	23.3	0.1	54.9	56.5	0.1	32.7	1.8		0.1	0.8	
Delay (s)	58.2	77.0	50.2	105.9	107.5	44.0	85.0	34.7		37.4	25.6	
Level of Service	E	E	D	F	F	D	F	C		D	C	
Approach Delay (s)		63.1			94.0			40.7			26.7	
Approach LOS		E			F			D			C	

Intersection Summary			
HCM Average Control Delay	42.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

2030 No-Build Conditions
Study Intersections Operational Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.90			1.00	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1805	3406		1517	3405			1348			1539	
Flt Permitted	0.95	1.00		0.95	1.00			0.91			0.48	
Satd. Flow (perm)	1805	3406		1517	3405			1238			757	
Volume (vph)	6	1954	307	125	824	1	78	5	262	53	22	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	2124	334	136	896	1	85	5	285	58	24	0
RTOR Reduction (vph)	0	9	0	0	0	0	0	89	0	0	0	0
Lane Group Flow (vph)	7	2449	0	136	897	0	0	286	0	0	82	0
Heavy Vehicles (%)	0%	3%	9%	19%	6%	0%	25%	30%	25%	21%	15%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	1.2	69.0		14.4	82.2			30.4			30.4	
Effective Green, g (s)	1.7	71.0		14.9	84.2			32.4			32.4	
Actuated g/C Ratio	0.01	0.54		0.11	0.65			0.25			0.25	
Clearance Time (s)	4.5	6.0		4.5	6.0			6.0			6.0	
Vehicle Extension (s)	2.3	4.8		2.3	4.8			2.5			2.5	
Lane Grp Cap (vph)	24	1856		173	2200			308			188	
v/s Ratio Prot	0.00	c0.72		c0.09	0.26							
v/s Ratio Perm								c0.23			0.11	
v/c Ratio	0.29	1.32		0.79	0.41			0.93			0.44	
Uniform Delay, d1	63.7	29.7		56.1	11.1			47.8			41.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.9	147.8		19.6	0.2			33.0			1.2	
Delay (s)	67.6	177.4		75.7	11.3			80.8			42.4	
Level of Service	E	F		E	B			F			D	
Approach Delay (s)		177.1			19.8			80.8			42.4	
Approach LOS		F			B			F			D	

Intersection Summary			
HCM Average Control Delay	124.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	130.3	Sum of lost time (s)	12.0
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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00	1.00	1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1805	1262		1642	1615	1770	3505	1494	1612	3367	
Flt Permitted		0.73	1.00		0.75	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1390	1262		1293	1615	1770	3505	1494	1612	3367	
Volume (vph)	13	0	9	37	0	25	52	2234	82	20	883	23
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)	14	0	9	39	0	26	55	2352	86	21	929	24
RTOR Reduction (vph)	0	0	8	0	0	24	0	0	15	0	1	0
Lane Group Flow (vph)	0	14	1	0	39	2	55	2352	71	21	952	0
Confl. Peds. (#/hr)			3	3					3	3		
Heavy Vehicles (%)	0%	0%	25%	8%	0%	0%	2%	3%	4%	12%	7%	0%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)		7.5	7.5		7.5	7.5	7.1	92.9	92.9	3.1	88.9	
Effective Green, g (s)		9.5	9.5		9.5	9.5	7.6	94.9	94.9	3.6	90.9	
Actuated g/C Ratio		0.08	0.08		0.08	0.08	0.06	0.79	0.79	0.03	0.76	
Clearance Time (s)		6.0	6.0		6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	
Lane Grp Cap (vph)		110	100		102	128	112	2772	1182	48	2551	
v/s Ratio Prot							c0.03	c0.67		0.01	0.28	
v/s Ratio Perm		0.01	0.00		c0.03	0.00			0.05			
v/c Ratio		0.13	0.01		0.38	0.02	0.49	0.85	0.06	0.44	0.37	
Uniform Delay, d1		51.4	50.9		52.5	50.9	54.3	8.0	2.8	57.2	4.9	
Progression Factor		1.00	1.00		1.00	1.00	1.13	2.40	1.54	1.00	1.00	
Incremental Delay, d2		0.4	0.0		1.7	0.0	1.0	1.8	0.0	3.7	0.4	
Delay (s)		51.8	50.9		54.2	51.0	62.3	21.0	4.3	60.9	5.3	
Level of Service		D	D		D	D	E	C	A	E	A	
Approach Delay (s)		51.4			52.9			21.3			6.5	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	*0.75	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	3400	5085	1538	3213	4803	1442	3019	2436	1446	3367	3406	1553
Flt Permitted	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 (perm)	3400	5085	1538	3213	4803	1442	3019	2436	1446	3367	3406	1553
Volume (vph)	261	1849	583	146	650	134	231	769	227	291	668	284
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	266	1887	595	149	663	137	236	785	232	297	682	290
RTOR Reduction (vph)	0	0	210	0	0	110	0	0	109	0	0	226
Lane Group Flow (vph)	266	1887	385	149	663	27	236	785	123	297	682	64
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	3%	2%	5%	9%	8%	12%	16%	17%	9%	4%	6%	4%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	39.2	51.1	51.1	9.9	21.8	21.8	13.6	32.0	32.0	7.0	25.4	25.4
Effective Green, g (s)	39.7	52.6	52.6	10.4	23.3	23.3	14.6	33.0	33.0	8.0	26.4	26.4
Actuated g/C Ratio	0.33	0.44	0.44	0.09	0.19	0.19	0.12	0.28	0.28	0.07	0.22	0.22
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7	4.7	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	1125	2229	674	278	933	280	367	670	398	224	749	342
v/s Ratio Prot	0.08	c0.37		0.05	c0.14		0.08	c0.32		c0.09	0.20	
v/s Ratio Perm			0.25			0.02			0.08			0.04
v/c Ratio	0.24	0.85	0.57	0.54	0.71	0.10	0.64	1.17	0.31	1.33	0.91	0.19
Uniform Delay, d1	29.1	30.1	25.3	52.5	45.2	39.7	50.2	43.5	34.5	56.0	45.6	38.1
Progression Factor	0.60	0.52	0.29	0.89	0.89	1.00	0.86	0.90	1.26	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.8	0.4	1.3	4.4	0.6	2.6	90.2	0.2	174.2	15.1	0.2
Delay (s)	17.5	16.3	7.6	47.9	44.7	40.2	46.0	129.4	43.7	230.2	60.7	38.2
Level of Service	B	B	A	D	D	D	D	F	D	F	E	D
Approach Delay (s)		14.6			44.6			97.8			95.3	
Approach LOS		B			D			F			F	

Intersection Summary			
HCM Average Control Delay	52.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.8%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		1.00	0.95		1.00	1.00		1.00		1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00		0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00		1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.88		1.00		0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	3502	3375		1597	3034		1641	1645		1787		1570
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	3502	3375		1597	3034		1641	1645		1787		1570
Volume (vph)	34	1277	84	53	1037	0	163	15	60	43	0	28
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	1388	91	58	1127	0	177	16	65	47	0	30
RTOR Reduction (vph)	0	3	0	0	0	0	0	60	0	0	0	29
Lane Group Flow (vph)	37	1476	0	58	1127	0	177	21	0	47	0	1
Confl. Peds. (#/hr)			1	1			3					3
Heavy Vehicles (%)	0%	6%	3%	13%	19%	12%	10%	0%	2%	1%	1%	1%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	4.2	72.0		6.0	73.5		14.4	8.0		10.1		3.3
Effective Green, g (s)	6.5	73.9		8.0	75.4		17.1	9.7		12.4		5.0
Actuated g/C Ratio	0.05	0.62		0.07	0.63		0.14	0.08		0.10		0.04
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7		6.3		5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8		2.7		1.8
Lane Grp Cap (vph)	190	2078		106	1906		234	133		185		65
v/s Ratio Prot	0.01	c0.44		0.04	c0.37		c0.11	0.01		c0.03		
v/s Ratio Perm												0.00
v/c Ratio	0.19	0.71		0.55	0.59		0.76	0.16		0.25		0.02
Uniform Delay, d1	54.2	15.7		54.2	13.2		49.4	51.4		49.5		55.1
Progression Factor	0.76	1.11		1.04	1.12		1.00	1.00		1.00		1.00
Incremental Delay, d2	0.3	1.4		3.7	1.0		12.6	0.2		0.6		0.0
Delay (s)	41.3	18.8		59.9	15.8		62.0	51.6		50.1		55.2
Level of Service	D	B		E	B		E	D		D		E
Approach Delay (s)		19.4			17.9			58.7			52.1	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.4%	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												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1280	111	0	1091	62	0	0	108	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1391	121	0	1186	67	0	0	117	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		597			688							
pX, platoon unblocked	0.87			0.70			0.76	0.76	0.70	0.76	0.76	0.87
vC, conflicting volume	1253			1512			2045	2705	756	2033	2732	627
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1144			1301			1554	2421	218	1539	2456	425
tC, single (s)	4.1			4.4			7.9	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.4			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	79	100	100	100
cM capacity (veh/h)	539			320			49	25	549	48	24	509

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	928	584	791	463	117	0
Volume Left	0	0	0	0	0	0
Volume Right	0	121	0	67	117	0
cSH	1700	1700	1700	1700	549	1700
Volume to Capacity	0.55	0.34	0.47	0.27	0.21	0.00
Queue Length 95th (ft)	0	0	0	0	20	0
Control Delay (s)	0.0	0.0	0.0	0.0	13.3	0.0
Lane LOS					B	A
Approach Delay (s)	0.0		0.0		13.3	0.0
Approach LOS					B	A

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1504	3403		1805	3059		1805	1583		1805	1154	
Flt Permitted	0.25	1.00		0.07	1.00		0.57	1.00		0.58	1.00	
Satd. Flow (perm)	402	3403		142	3059		1086	1583		1100	1154	
Volume (vph)	5	1246	137	170	717	1	433	0	272	1	0	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	1354	149	185	779	1	471	0	296	1	0	5
RTOR Reduction (vph)	0	7	0	0	0	0	0	176	0	0	4	0
Lane Group Flow (vph)	5	1496	0	185	780	0	471	120	0	1	1	0
Heavy Vehicles (%)	20%	5%	0%	0%	18%	0%	0%	0%	2%	0%	0%	40%
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)	54.6	54.6		66.1	66.1		34.7	27.9		11.3	10.5	
Effective Green, g (s)	56.6	56.6		68.1	68.1		36.7	29.9		15.3	12.5	
Actuated g/C Ratio	0.47	0.47		0.57	0.57		0.31	0.25		0.13	0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	219	1605		284	1736		453	394		157	120	
v/s Ratio Prot	0.00	c0.44		c0.08	0.25		c0.17	0.08		0.00	0.00	
v/s Ratio Perm	0.01			0.29			c0.14			0.00		
v/c Ratio	0.02	0.93		0.65	0.45		1.04	0.31		0.01	0.00	
Uniform Delay, d1	17.8	29.9		41.7	15.1		40.1	36.6		45.7	48.2	
Progression Factor	0.46	0.43		0.64	0.33		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	9.5		4.8	0.2		53.0	0.4		0.0	0.0	
Delay (s)	8.3	22.3		31.5	5.2		93.1	37.1		45.7	48.2	
Level of Service	A	C		C	A		F	D		D	D	
Approach Delay (s)		22.3			10.2			71.5			47.8	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM Average Control Delay	30.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	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	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	3438	3185		1245	1242
Flt Permitted	0.23	1.00	1.00		0.95	1.00
Satd. Flow (perm)	436	3438	3185		1245	1242
Volume (vph)	94	1382	881	93	79	46
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	1502	958	101	86	50
RTOR Reduction (vph)	0	0	4	0	0	45
Lane Group Flow (vph)	102	1502	1055	0	86	6
Heavy Vehicles (%)	0%	5%	12%	9%	45%	30%
Turn Type	pm+pt					Perm
Protected Phases	7	4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	98.8	98.8	88.9		13.2	13.2
Effective Green, g (s)	98.8	98.8	88.9		13.2	13.2
Actuated g/C Ratio	0.82	0.82	0.74		0.11	0.11
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	426	2831	2360		137	137
v/s Ratio Prot	0.01	c0.44	0.33		c0.07	
v/s Ratio Perm	0.19					0.00
v/c Ratio	0.24	0.53	0.45		0.63	0.04
Uniform Delay, d1	3.0	3.3	6.0		51.1	47.7
Progression Factor	0.35	0.36	0.26		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.6		8.7	0.1
Delay (s)	1.2	1.3	2.1		59.7	47.9
Level of Service	A	A	A		E	D
Approach Delay (s)		1.3	2.1		55.4	
Approach LOS		A	A		E	

Intersection Summary			
HCM Average Control Delay	4.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3343	1568	1671	3165			1659	1538	1150	1522	
Flt Permitted	0.95	1.00	1.00	0.08	1.00			0.73	1.00	0.42	1.00	
Satd. Flow (perm)	1805	3343	1568	135	3165			1274	1538	504	1522	
Volume (vph)	6	1265	153	202	832	14	167	10	496	9	3	4
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	1332	161	213	876	15	176	11	522	9	3	4
RTOR Reduction (vph)	0	0	33	0	1	0	0	0	15	0	3	0
Lane Group Flow (vph)	6	1332	128	213	890	0	0	187	507	9	4	0
Heavy Vehicles (%)	0%	8%	3%	8%	14%	0%	10%	0%	5%	57%	33%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	5.1	62.0	62.0	77.6	77.6			19.3	40.0	19.3	19.3	
Effective Green, g (s)	7.1	64.0	64.0	79.6	79.6			21.3	44.0	21.3	21.3	
Actuated g/C Ratio	0.06	0.53	0.53	0.66	0.66			0.18	0.37	0.18	0.18	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	107	1783	836	380	2099			226	615	89	270	
v/s Ratio Prot	0.00	c0.40		0.11	0.28				c0.16		0.00	
v/s Ratio Perm			0.08	0.27				0.15	0.17	0.02		
v/c Ratio	0.06	0.75	0.15	0.56	0.42			0.83	0.83	0.10	0.01	
Uniform Delay, d1	53.3	21.7	14.2	26.5	9.5			47.6	34.5	41.3	40.7	
Progression Factor	0.82	0.40	0.26	0.74	0.94			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.4	0.1	1.0	0.6			20.4	8.4	0.2	0.0	
Delay (s)	44.0	10.2	3.8	20.5	9.4			68.0	42.9	41.5	40.7	
Level of Service	D	B	A	C	A			E	D	D	D	
Approach Delay (s)		9.6			11.6			49.6			41.2	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1656	3343	3136		1172	1324
Flt Permitted	0.20	1.00	1.00		0.95	1.00
Satd. Flow (perm)	345	3343	3136		1172	1324
Volume (vph)	164	1546	1028	145	35	18
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	167	1578	1049	148	36	18
RTOR Reduction (vph)	0	0	4	0	0	16
Lane Group Flow (vph)	167	1578	1193	0	36	2
Heavy Vehicles (%)	9%	8%	12%	20%	54%	22%
Turn Type	pm+pt					pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2					4
Actuated Green, G (s)	101.9	101.9	89.6		6.1	12.4
Effective Green, g (s)	103.9	103.9	91.6		8.1	16.4
Actuated g/C Ratio	0.87	0.87	0.76		0.07	0.14
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	2.0	2.5	2.5		2.5	2.0
Lane Grp Cap (vph)	389	2894	2394		79	225
v/s Ratio Prot	0.03	c0.47	0.38		c0.03	0.00
v/s Ratio Perm	0.34					0.00
v/c Ratio	0.43	0.55	0.50		0.46	0.01
Uniform Delay, d1	2.8	2.0	5.4		53.8	44.8
Progression Factor	2.02	0.62	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.5	0.1		3.0	0.0
Delay (s)	5.9	1.7	5.5		56.8	44.8
Level of Service	A	A	A		E	D
Approach Delay (s)		2.1	5.5		52.8	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	4.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	339	72	43	323	41	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	357	76	45	340	43	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			433		825	395
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			433		825	395
tC, single (s)			4.4		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.5		3.7	3.5
p0 queue free %			95		86	88
cM capacity (veh/h)			972		298	607

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	433	385	117
Volume Left	0	45	43
Volume Right	76	0	74
cSH	1700	972	439
Volume to Capacity	0.25	0.05	0.27
Queue Length 95th (ft)	0	4	26
Control Delay (s)	0.0	1.5	16.1
Lane LOS		A	C
Approach Delay (s)	0.0	1.5	16.1
Approach LOS			C

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1845	1482	1603	1736	1455	1770	4958		1703	4622	
Flt Permitted	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1845	1482	1603	1736	1455	1770	4958		1703	4622	
Volume (vph)	209	238	108	261	228	147	141	2218	82	247	964	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)	220	251	114	275	240	155	148	2335	86	260	1015	21
RTOR Reduction (vph)	0	0	101	0	0	126	0	3	0	0	2	0
Lane Group Flow (vph)	220	251	13	246	269	29	148	2418	0	260	1034	0
Heavy Vehicles (%)	4%	3%	9%	7%	3%	11%	2%	4%	6%	6%	12%	6%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	12.7	12.7	12.7	21.3	21.3	21.3	10.5	54.5		11.5	55.5	
Effective Green, g (s)	13.7	13.7	13.7	22.3	22.3	22.3	11.0	56.0		12.0	57.0	
Actuated g/C Ratio	0.11	0.11	0.11	0.19	0.19	0.19	0.09	0.47		0.10	0.48	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	198	211	169	298	323	270	162	2314		170	2195	
v/s Ratio Prot	0.13	c0.14		0.15	c0.15		0.08	c0.49		c0.15	0.22	
v/s Ratio Perm			0.01			0.02						
v/c Ratio	1.11	1.19	0.08	0.83	0.83	0.11	0.91	1.04		1.53	0.47	
Uniform Delay, d1	53.2	53.2	47.5	47.0	47.1	40.6	54.0	32.0		54.0	21.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.87	0.44	
Incremental Delay, d2	96.9	122.6	0.1	16.3	16.1	0.1	45.8	31.7		260.8	0.6	
Delay (s)	150.1	175.7	47.6	63.3	63.2	40.7	99.8	63.7		307.8	9.9	
Level of Service	F	F	D	E	E	D	F	E		F	A	
Approach Delay (s)		141.1			58.0			65.8			69.7	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM Average Control Delay	74.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.4%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1770	3340		1736	3538			1761			1824	
Flt Permitted	0.95	1.00		0.95	1.00			0.53			0.96	
Satd. Flow (perm)	1770	3340		1736	3538			982			1768	
Volume (vph)	14	1185	142	170	2016	6	459	20	56	19	140	21
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	14	1209	145	173	2057	6	468	20	57	19	143	21
RTOR Reduction (vph)	0	7	0	0	0	0	0	3	0	0	4	0
Lane Group Flow (vph)	14	1347	0	173	2063	0	0	542	0	0	179	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	2%	5%	15%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.6	60.8		15.0	73.2			35.2			35.2	
Effective Green, g (s)	3.1	62.8		15.5	75.2			37.2			37.2	
Actuated g/C Ratio	0.02	0.49		0.12	0.59			0.29			0.29	
Clearance Time (s)	4.5	6.0		4.5	6.0			6.0			6.0	
Vehicle Extension (s)	2.3	4.8		2.3	4.8			2.5			2.5	
Lane Grp Cap (vph)	43	1645		211	2087			287			516	
v/s Ratio Prot	0.01	0.40		c0.10	c0.58							
v/s Ratio Perm								c0.55			0.10	
v/c Ratio	0.33	0.82		0.82	0.99			1.89			0.35	
Uniform Delay, d1	61.2	27.5		54.6	25.7			45.2			35.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.6	3.7		20.7	17.0			413.0			0.3	
Delay (s)	63.7	31.2		75.4	42.7			458.1			35.9	
Level of Service	E	C		E	D			F			D	
Approach Delay (s)		31.6			45.2			458.1			35.9	
Approach LOS		C			D			F			D	

Intersection Summary			
HCM Average Control Delay	92.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	127.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	112.2%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1815	1591		1750	1568	1805	3438	1583	1719	3534	
Flt Permitted		0.64	1.00		0.71	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1219	1591		1301	1568	1805	3438	1583	1719	3534	
Volume (vph)	26	2	38	99	2	44	33	1277	69	42	2455	24
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	27	2	39	101	2	45	34	1303	70	43	2505	24
RTOR Reduction (vph)	0	0	35	0	0	40	0	0	19	0	1	0
Lane Group Flow (vph)	0	29	4	0	103	5	34	1303	51	43	2528	0
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	0%	0%	0%	2%	50%	3%	0%	5%	2%	5%	2%	0%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)		11.8	11.8		11.8	11.8	4.8	85.0	85.0	6.7	86.9	
Effective Green, g (s)		13.8	13.8		13.8	13.8	5.3	87.0	87.0	7.2	88.9	
Actuated g/C Ratio		0.12	0.12		0.12	0.12	0.04	0.72	0.72	0.06	0.74	
Clearance Time (s)		6.0	6.0		6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	
Lane Grp Cap (vph)		140	183		150	180	80	2493	1148	103	2618	
v/s Ratio Prot							0.02	0.38		c0.03	c0.72	
v/s Ratio Perm		0.02	0.00		c0.08	0.00			0.03			
v/c Ratio		0.21	0.02		0.69	0.03	0.42	0.52	0.04	0.42	0.97	
Uniform Delay, d1		48.1	47.1		51.0	47.1	55.9	7.3	4.7	54.4	14.2	
Progression Factor		1.00	1.00		1.00	1.00	0.80	2.70	4.38	1.00	1.00	
Incremental Delay, d2		0.5	0.0		11.3	0.0	1.7	0.6	0.1	1.6	11.2	
Delay (s)		48.7	47.2		62.3	47.2	46.2	20.4	20.6	56.0	25.4	
Level of Service		D	D		E	D	D	C	C	E	C	
Approach Delay (s)		47.8			57.7			21.0			25.9	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.5%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	*0.75	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Flt Permitted	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 (perm)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Volume (vph)	239	1051	412	369	1703	531	540	908	131	208	737	181
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	244	1072	420	377	1738	542	551	927	134	212	752	185
RTOR Reduction (vph)	0	0	169	0	0	111	0	0	53	0	0	150
Lane Group Flow (vph)	244	1072	251	377	1738	431	551	927	81	212	752	35
Confl. Peds. (#/hr)									3	3		
Heavy Vehicles (%)	3%	4%	6%	6%	2%	2%	0%	3%	4%	12%	7%	4%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	11.7	42.1	42.1	17.0	47.4	47.4	18.9	32.4	32.4	8.5	23.0	23.0
Effective Green, g (s)	12.2	43.6	43.6	17.5	48.9	48.9	19.9	33.4	33.4	9.5	23.0	23.0
Actuated g/C Ratio	0.10	0.36	0.36	0.15	0.41	0.41	0.17	0.28	0.28	0.08	0.19	0.19
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7	4.7	2.3	2.3	2.3	2.3	3.0	3.0
Lane Grp Cap (vph)	346	1812	554	482	2072	645	581	770	419	248	647	298
v/s Ratio Prot	0.07	c0.21		0.11	c0.34		c0.16	c0.34		0.07	0.22	
v/s Ratio Perm			0.16			0.27			0.05			0.02
v/c Ratio	0.71	0.59	0.45	0.78	0.84	0.67	0.95	1.20	0.19	0.85	1.16	0.12
Uniform Delay, d1	52.2	31.0	29.1	49.4	32.0	29.0	49.5	43.3	33.0	54.6	48.5	40.1
Progression Factor	0.85	0.69	1.08	1.17	0.97	0.97	0.79	0.86	0.97	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.4	0.6	3.0	1.7	2.1	20.6	101.2	0.1	23.4	89.3	0.2
Delay (s)	47.2	21.9	32.1	61.0	32.6	30.3	59.6	138.5	32.1	77.9	137.8	40.3
Level of Service	D	C	C	E	C	C	E	F	C	E	F	D
Approach Delay (s)		27.9			36.1			102.7			111.1	
Approach LOS		C			D			F			F	

Intersection Summary			
HCM Average Control Delay	61.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.8%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	3278		1805	3499		1805	1632		1805	1900	1481
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	3278		1805	3499		1805	1632		1805	1900	1481
Volume (vph)	81	1247	189	169	1290	15	192	27	89	83	13	97
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	83	1272	193	172	1316	15	196	28	91	85	13	99
RTOR Reduction (vph)	0	9	0	0	0	0	0	80	0	0	0	91
Lane Group Flow (vph)	83	1456	0	172	1331	0	196	39	0	85	13	8
Confl. Peds. (#/hr)			4	4			27					27
Heavy Vehicles (%)	0%	8%	4%	0%	3%	3%	0%	0%	4%	0%	0%	2%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	6.9	63.1		12.5	68.4		12.5	12.8		7.7	7.6	7.6
Effective Green, g (s)	9.2	65.0		14.5	70.3		15.2	14.5		10.0	9.3	9.3
Actuated g/C Ratio	0.08	0.54		0.12	0.59		0.13	0.12		0.08	0.08	0.08
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7		6.3	5.7	5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8		2.7	1.8	1.8
Lane Grp Cap (vph)	268	1776		218	2050		229	197		150	147	115
v/s Ratio Prot	0.02	c0.44		c0.10	0.38		c0.11	c0.02		0.05	0.01	
v/s Ratio Perm												0.01
v/c Ratio	0.31	0.82		0.79	0.65		0.86	0.20		0.57	0.09	0.07
Uniform Delay, d1	52.4	22.7		51.3	16.6		51.3	47.5		52.9	51.4	51.3
Progression Factor	0.96	0.52		0.81	0.67		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	1.8		15.0	1.4		25.3	0.2		4.3	0.1	0.1
Delay (s)	50.7	13.6		56.6	12.5		76.6	47.7		57.2	51.5	51.4
Level of Service	D	B		E	B		E	D		E	D	D
Approach Delay (s)		15.6			17.6			65.7			53.9	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.2%	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		↑↑↱			↑↑↱				↱			↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1175	251	0	1413	63	0	0	111	0	0	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	1199	256	0	1442	64	0	0	113	0	0	2
Pedestrians		1			7			4			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		597			688							
pX, platoon unblocked	0.81			0.65			0.74	0.74	0.65	0.74	0.74	0.81
vC, conflicting volume	1507			1459			2055	2838	739	2195	2934	755
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1395			1165			1323	2380	53	1512	2510	472
tC, single (s)	4.1			4.2			7.6	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	82	100	100	100
cM capacity (veh/h)	404			381			81	26	646	51	21	442

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	799	656	961	545	113	2
Volume Left	0	0	0	0	0	0
Volume Right	0	256	0	64	113	2
cSH	1700	1700	1700	1700	646	442
Volume to Capacity	0.47	0.39	0.57	0.32	0.18	0.00
Queue Length 95th (ft)	0	0	0	0	16	0
Control Delay (s)	0.0	0.0	0.0	0.0	11.8	13.2
Lane LOS					B	B
Approach Delay (s)	0.0		0.0		11.8	13.2
Approach LOS					B	B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	56.0%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.85		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3407		1805	3539		1805	1593		1801	1758	
Flt Permitted	0.24	1.00		0.08	1.00		0.77	1.00		0.77	1.00	
Satd. Flow (perm)	454	3407		161	3539		1462	1593		1458	1758	
Volume (vph)	3	1076	211	263	1157	0	236	0	274	1	2	2
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	3	1098	215	268	1181	0	241	0	280	1	2	2
RTOR Reduction (vph)	0	12	0	0	0	0	0	231	0	0	2	0
Lane Group Flow (vph)	3	1301	0	268	1181	0	241	49	0	1	2	0
Confl. Peds. (#/hr)	2					2			1	1		
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	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)	58.5	57.4		82.8	75.7		18.1	18.1		6.3	6.3	
Effective Green, g (s)	62.5	59.4		84.8	77.7		20.1	20.1		8.3	8.3	
Actuated g/C Ratio	0.52	0.50		0.71	0.65		0.17	0.17		0.07	0.07	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	271	1686		407	2292		287	267		110	122	
v/s Ratio Prot	0.00	c0.38		c0.12	0.33		c0.10	0.03		0.00	c0.00	
v/s Ratio Perm	0.01			0.35			c0.04			0.00		
v/c Ratio	0.01	0.77		0.66	0.52		0.84	0.18		0.01	0.02	
Uniform Delay, d1	13.8	24.8		27.9	11.2		48.2	42.9		52.0	52.1	
Progression Factor	0.49	0.41		1.35	0.16		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	1.6		3.2	0.2		18.9	1.5		0.0	0.3	
Delay (s)	6.8	11.8		41.1	2.0		67.1	44.4		52.1	52.3	
Level of Service	A	B		D	A		E	D		D	D	
Approach Delay (s)		11.8			9.2			54.9			52.3	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1517	3406	3511		1787	1583
Flt Permitted	0.14	1.00	1.00		0.95	1.00
Satd. Flow (perm)	225	3406	3511		1787	1583
Volume (vph)	33	1327	1291	32	299	105
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	34	1354	1317	33	305	107
RTOR Reduction (vph)	0	0	1	0	0	85
Lane Group Flow (vph)	34	1354	1349	0	305	22
Heavy Vehicles (%)	19%	6%	2%	20%	1%	2%
Turn Type	pm+pt					Perm
Protected Phases	7	4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	87.2	87.2	76.6		24.8	24.8
Effective Green, g (s)	87.2	87.2	76.6		24.8	24.8
Actuated g/C Ratio	0.73	0.73	0.64		0.21	0.21
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	235	2475	2241		369	327
v/s Ratio Prot	0.01	c0.40	c0.38		c0.17	
v/s Ratio Perm	0.10					0.01
v/c Ratio	0.14	0.55	0.60		0.83	0.07
Uniform Delay, d1	15.2	7.4	12.7		45.5	38.3
Progression Factor	0.73	0.60	0.75		1.00	1.00
Incremental Delay, d2	0.2	0.2	1.1		14.0	0.1
Delay (s)	11.3	4.6	10.6		59.6	38.4
Level of Service	B	A	B		E	D
Approach Delay (s)		4.8	10.6		54.1	
Approach LOS		A	B		D	

Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.9%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3471	1568	1770	3539			1752	1538	1805	1726	
Flt Permitted	0.95	1.00	1.00	0.10	1.00			0.75	1.00	0.44	1.00	
Satd. Flow (perm)	1805	3471	1568	188	3539			1376	1538	835	1726	
Volume (vph)	4	1153	508	479	1144	1	160	0	201	25	7	11
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	4	1177	518	489	1167	1	163	0	205	26	7	11
RTOR Reduction (vph)	0	0	114	0	0	0	0	0	11	0	9	0
Lane Group Flow (vph)	4	1177	404	489	1168	0	0	163	194	26	9	0
Heavy Vehicles (%)	0%	4%	3%	2%	2%	0%	3%	0%	5%	0%	0%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	1.0	56.6	56.6	84.4	84.4			16.6	45.4	16.6	16.6	
Effective Green, g (s)	3.0	58.6	58.6	86.4	86.4			18.6	49.4	18.6	18.6	
Actuated g/C Ratio	0.02	0.49	0.49	0.72	0.72			0.16	0.41	0.16	0.16	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	45	1695	766	541	2548			213	684	129	268	
v/s Ratio Prot	0.00	c0.34		c0.23	0.33				0.07		0.01	
v/s Ratio Perm			0.26	c0.42				c0.12	0.05	0.03		
v/c Ratio	0.09	0.69	0.53	0.90	0.46			0.77	0.28	0.20	0.03	
Uniform Delay, d1	57.2	23.8	21.2	32.4	7.0			48.6	23.5	44.2	43.1	
Progression Factor	0.88	0.73	0.62	0.74	0.32			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.9	0.4	14.4	0.4			13.7	0.1	0.3	0.0	
Delay (s)	50.5	18.4	13.5	38.3	2.7			62.3	23.6	44.5	43.1	
Level of Service	D	B	B	D	A			E	C	D	D	
Approach Delay (s)		17.0			13.2			40.7			43.9	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	3471	3492		1687	1583
Flt Permitted	0.09	1.00	1.00		0.95	1.00
Satd. Flow (perm)	157	3471	3492		1687	1583
Volume (vph)	6	1349	1554	118	146	68
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	6	1377	1586	120	149	69
RTOR Reduction (vph)	0	0	3	0	0	25
Lane Group Flow (vph)	6	1377	1703	0	149	44
Heavy Vehicles (%)	4%	4%	2%	6%	7%	2%
Turn Type	pm+pt					pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2					4
Actuated Green, G (s)	93.0	93.0	83.3		15.0	18.7
Effective Green, g (s)	95.0	95.0	85.3		17.0	22.7
Actuated g/C Ratio	0.79	0.79	0.71		0.14	0.19
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	2.0	2.5	2.5		2.5	2.0
Lane Grp Cap (vph)	199	2748	2482		239	352
v/s Ratio Prot	0.00	c0.40	c0.49		c0.09	0.01
v/s Ratio Perm	0.02					0.02
v/c Ratio	0.03	0.50	0.69		0.62	0.12
Uniform Delay, d1	7.7	4.3	9.8		48.5	40.4
Progression Factor	0.14	0.10	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.5	0.7		4.3	0.1
Delay (s)	1.1	1.0	10.5		52.8	40.5
Level of Service	A	A	B		D	D
Approach Delay (s)		1.0	10.5		48.9	
Approach LOS		A	B		D	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	305	177	97	428	35	35
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	339	197	108	476	39	39
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			536		1128	437
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			536		1128	437
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		81	94
cM capacity (veh/h)			1022		203	621

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	536	583	78
Volume Left	0	108	39
Volume Right	197	0	39
cSH	1700	1022	306
Volume to Capacity	0.32	0.11	0.25
Queue Length 95th (ft)	0	9	25
Control Delay (s)	0.0	2.7	20.7
Lane LOS		A	C
Approach Delay (s)	0.0	2.7	20.7
Approach LOS			C

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1698	1754	1553	1770	4899		1787	5078	
Flt Permitted	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1881	1599	1698	1754	1553	1770	4899		1787	5078	
Volume (vph)	237	347	139	334	218	238	202	1401	103	304	2172	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)	249	365	146	352	229	251	213	1475	108	320	2286	21
RTOR Reduction (vph)	0	0	115	0	0	213	0	7	0	0	1	0
Lane Group Flow (vph)	249	365	31	284	297	38	213	1576	0	320	2306	0
Heavy Vehicles (%)	1%	1%	1%	1%	2%	4%	2%	5%	2%	1%	2%	2%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	11.0	11.0	11.0	17.0	17.0	17.0	13.5	48.7		23.3	58.5	
Effective Green, g (s)	12.0	12.0	12.0	18.0	18.0	18.0	14.0	50.2		23.8	60.0	
Actuated g/C Ratio	0.10	0.10	0.10	0.15	0.15	0.15	0.12	0.42		0.20	0.50	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	179	188	160	255	263	233	207	2049		354	2539	
v/s Ratio Prot	0.14	c0.19		0.17	c0.17		c0.12	0.32		0.18	c0.45	
v/s Ratio Perm			0.02			0.02						
v/c Ratio	1.39	1.94	0.19	1.11	1.13	0.16	1.03	0.77		0.90	0.91	
Uniform Delay, d1	54.0	54.0	49.6	51.0	51.0	44.4	53.0	29.9		47.0	27.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.87	0.84	
Incremental Delay, d2	206.5	442.6	0.3	90.3	94.8	0.2	70.3	2.1		17.0	3.8	
Delay (s)	260.5	496.6	49.9	141.3	145.8	44.6	123.3	32.0		58.1	26.9	
Level of Service	F	F	D	F	F	D	F	C		E	C	
Approach Delay (s)		333.4			113.8			42.8			30.7	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM Average Control Delay	84.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.2%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.90			1.00	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1805	3414		1517	3405			1347			1542	
Flt Permitted	0.95	1.00		0.95	1.00			0.91			0.48	
Satd. Flow (perm)	1805	3414		1517	3405			1238			761	
Volume (vph)	6	1955	281	112	838	1	75	4	260	53	22	3
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	2125	305	122	911	1	82	4	283	58	24	3
RTOR Reduction (vph)	0	8	0	0	0	0	0	93	0	0	1	0
Lane Group Flow (vph)	7	2422	0	122	912	0	0	276	0	0	84	0
Heavy Vehicles (%)	0%	3%	9%	19%	6%	0%	25%	30%	25%	21%	15%	0%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	1.2	69.3		13.4	81.5			29.3			29.3	
Effective Green, g (s)	1.7	71.3		13.9	83.5			31.3			31.3	
Actuated g/C Ratio	0.01	0.55		0.11	0.65			0.24			0.24	
Clearance Time (s)	4.5	6.0		4.5	6.0			6.0			6.0	
Vehicle Extension (s)	2.3	4.8		2.3	4.8			2.5			2.5	
Lane Grp Cap (vph)	24	1894		164	2213			302			185	
v/s Ratio Prot	0.00	c0.71		c0.08	0.27							
v/s Ratio Perm								c0.22			0.11	
v/c Ratio	0.29	1.28		0.74	0.41			0.91			0.46	
Uniform Delay, d1	62.8	28.6		55.6	10.8			47.3			41.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.9	129.8		15.4	0.2			30.3			1.3	
Delay (s)	66.7	158.4		70.9	11.0			77.6			42.6	
Level of Service	E	F		E	B			E			D	
Approach Delay (s)		158.1			18.1			77.6			42.6	
Approach LOS		F			B			E			D	

Intersection Summary			
HCM Average Control Delay	111.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	128.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.2%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00	1.00	1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1831	1265		1662	1615	1770	3505	1494	1612	3366	
Flt Permitted		0.79	1.00		0.73	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1498	1265		1269	1615	1770	3505	1494	1612	3366	
Volume (vph)	11	4	6	50	4	148	50	2091	159	143	775	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)	12	4	6	53	4	156	53	2201	167	151	816	23
RTOR Reduction (vph)	0	0	5	0	0	141	0	0	47	0	1	0
Lane Group Flow (vph)	0	16	1	0	57	15	53	2201	120	151	838	0
Confl. Peds. (#/hr)			3	3					3	3		
Heavy Vehicles (%)	0%	0%	25%	8%	0%	0%	2%	3%	4%	12%	7%	0%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)		9.9	9.9		9.9	9.9	7.0	79.5	79.5	14.1	86.6	
Effective Green, g (s)		11.9	11.9		11.9	11.9	7.5	81.5	81.5	14.6	88.6	
Actuated g/C Ratio		0.10	0.10		0.10	0.10	0.06	0.68	0.68	0.12	0.74	
Clearance Time (s)		6.0	6.0		6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	
Lane Grp Cap (vph)		149	125		126	160	111	2380	1015	196	2485	
v/s Ratio Prot							0.03	c0.63		c0.09	0.25	
v/s Ratio Perm		0.01	0.00		c0.04	0.01			0.08			
v/c Ratio		0.11	0.00		0.45	0.10	0.48	0.92	0.12	0.77	0.34	
Uniform Delay, d1		49.2	48.7		51.0	49.2	54.4	16.6	6.7	51.1	5.5	
Progression Factor		1.00	1.00		1.00	1.00	1.02	2.15	4.06	1.00	1.00	
Incremental Delay, d2		0.2	0.0		1.9	0.2	1.1	4.6	0.1	16.0	0.4	
Delay (s)		49.4	48.7		52.9	49.4	56.2	40.4	27.4	67.1	5.8	
Level of Service		D	D		D	D	E	D	C	E	A	
Approach Delay (s)		49.2			50.3			39.9			15.2	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM Average Control Delay	33.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.4%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	*0.75	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	3400	5085	1538	3213	4803	1442	3019	2436	1446	3367	3406	1553
Flt Permitted	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 (perm)	3400	5085	1538	3213	4803	1442	3019	2436	1446	3367	3406	1553
Volume (vph)	260	1885	582	57	625	150	231	752	121	294	669	284
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	265	1923	594	58	638	153	236	767	123	300	683	290
RTOR Reduction (vph)	0	0	241	0	0	125	0	0	59	0	0	226
Lane Group Flow (vph)	265	1923	353	58	638	28	236	767	64	300	683	64
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	3%	2%	5%	9%	8%	12%	16%	17%	9%	4%	6%	4%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	40.9	55.3	55.3	5.7	20.1	20.1	13.6	32.0	32.0	7.0	25.4	25.4
Effective Green, g (s)	41.4	56.8	56.8	6.2	21.6	21.6	14.6	33.0	33.0	8.0	26.4	26.4
Actuated g/C Ratio	0.34	0.47	0.47	0.05	0.18	0.18	0.12	0.28	0.28	0.07	0.22	0.22
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7	4.7	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	1173	2407	728	166	865	260	367	670	398	224	749	342
v/s Ratio Prot	0.08	c0.38		0.02	c0.13		0.08	c0.31		c0.09	0.20	
v/s Ratio Perm			0.23			0.02			0.04			0.04
v/c Ratio	0.23	0.80	0.48	0.35	0.74	0.11	0.64	1.14	0.16	1.34	0.91	0.19
Uniform Delay, d1	27.9	26.8	21.6	55.0	46.5	41.1	50.2	43.5	33.0	56.0	45.7	38.1
Progression Factor	0.63	0.54	0.41	0.88	0.90	1.00	0.94	1.03	1.38	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.2	0.1	0.7	5.4	0.8	2.8	80.2	0.1	179.6	15.2	0.2
Delay (s)	17.7	14.8	8.9	48.9	47.1	41.9	50.0	125.1	45.6	235.6	60.9	38.2
Level of Service	B	B	A	D	D	D	D	F	D	F	E	D
Approach Delay (s)		13.8			46.3			100.7			96.9	
Approach LOS		B			D			F			F	

Intersection Summary			
HCM Average Control Delay	52.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.3%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0				4.0
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	1.00				1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00				0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00				1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.90				0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00				1.00
Satd. Flow (prot)	3502	3374		1597	3034		1641	1678				1570
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00				1.00
Satd. Flow (perm)	3502	3374		1597	3034		1641	1678				1570
Volume (vph)	14	1209	84	53	910	0	178	25	57	0	0	16
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	1314	91	58	989	0	193	27	62	0	0	17
RTOR Reduction (vph)	0	3	0	0	0	0	0	49	0	0	0	16
Lane Group Flow (vph)	15	1402	0	58	989	0	193	40	0	0	0	1
Confl. Peds. (#/hr)			1	1			3					3
Heavy Vehicles (%)	0%	6%	3%	13%	19%	12%	10%	0%	2%	1%	1%	1%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	2.0	70.7		7.4	75.8		15.6	24.3				2.0
Effective Green, g (s)	4.3	72.6		9.4	77.7		18.3	26.0				3.7
Actuated g/C Ratio	0.04	0.60		0.08	0.65		0.15	0.22				0.03
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7				5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8				1.8
Lane Grp Cap (vph)	125	2041		125	1965		250	364				48
v/s Ratio Prot	0.00	c0.42		c0.04	c0.33		c0.12	c0.02				
v/s Ratio Perm												0.00
v/c Ratio	0.12	0.69		0.46	0.50		0.77	0.11				0.01
Uniform Delay, d1	56.0	16.0		52.9	11.1		48.8	37.7				56.4
Progression Factor	1.00	0.83		0.76	0.74		1.00	1.00				1.00
Incremental Delay, d2	0.3	1.3		1.3	0.5		13.3	0.0				0.0
Delay (s)	56.3	14.5		41.3	8.7		62.2	37.8				56.4
Level of Service	E	B		D	A		E	D				E
Approach Delay (s)		15.0			10.5			54.5			56.4	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1219	50	0	964	42	0	0	174	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1325	54	0	1048	46	0	0	189	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		597			688							
pX, platoon unblocked	0.77			0.72			0.83	0.83	0.72	0.83	0.83	0.77
vC, conflicting volume	1093			1379			1876	2446	690	1922	2450	547
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	819			1136			1017	1700	177	1073	1705	107
tC, single (s)	4.1			4.4			7.9	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.4			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	69	100	100	100
cM capacity (veh/h)	628			385			140	78	601	101	77	716

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	883	496	699	395	189	0
Volume Left	0	0	0	0	0	0
Volume Right	0	54	0	46	189	0
cSH	1700	1700	1700	1700	601	1700
Volume to Capacity	0.52	0.29	0.41	0.23	0.31	0.00
Queue Length 95th (ft)	0	0	0	0	34	0
Control Delay (s)	0.0	0.0	0.0	0.0	13.7	0.0
Lane LOS					B	A
Approach Delay (s)	0.0		0.0		13.7	0.0
Approach LOS					B	A

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.86		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1504	3418		1805	3060		1805	1596		1805	1863	
Flt Permitted	0.14	1.00		0.07	1.00		0.36	1.00		0.35	1.00	
Satd. Flow (perm)	216	3418		139	3060		692	1596		670	1863	
Volume (vph)	122	1197	74	170	962	59	309	11	262	157	124	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	133	1301	80	185	1046	64	336	12	285	171	135	5
RTOR Reduction (vph)	0	4	0	0	4	0	0	144	0	0	1	0
Lane Group Flow (vph)	133	1377	0	185	1106	0	336	153	0	171	139	0
Heavy Vehicles (%)	20%	5%	0%	0%	18%	0%	0%	0%	2%	0%	0%	40%
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)	70.5	56.7		62.1	52.5		35.7	22.3		20.8	13.4	
Effective Green, g (s)	74.3	58.7		66.1	54.5		37.7	24.3		24.8	15.4	
Actuated g/C Ratio	0.62	0.49		0.55	0.45		0.31	0.20		0.21	0.13	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	303	1672		238	1390		387	323		227	239	
v/s Ratio Prot	0.06	c0.40		c0.08	0.36		c0.13	0.10		0.06	0.07	
v/s Ratio Perm	0.21			0.35			c0.14			0.10		
v/c Ratio	0.44	0.82		0.78	0.80		0.87	0.47		0.75	0.58	
Uniform Delay, d1	31.9	26.2		43.5	28.0		35.4	42.2		42.2	49.3	
Progression Factor	0.44	0.41		0.76	0.74		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	4.1		14.1	3.1		18.2	1.1		13.2	3.6	
Delay (s)	14.8	14.8		47.3	23.9		53.5	43.3		55.4	52.9	
Level of Service	B	B		D	C		D	D		E	D	
Approach Delay (s)		14.8			27.3			48.7			54.3	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	3438	3186		1245	1242
Flt Permitted	0.23	1.00	1.00		0.95	1.00
Satd. Flow (perm)	439	3438	3186		1245	1242
Volume (vph)	97	1454	901	92	35	67
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	105	1580	979	100	38	73
RTOR Reduction (vph)	0	0	3	0	0	68
Lane Group Flow (vph)	105	1580	1076	0	38	5
Heavy Vehicles (%)	0%	5%	12%	9%	45%	30%
Turn Type	pm+pt					Perm
Protected Phases	7	4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	103.1	103.1	93.0		8.9	8.9
Effective Green, g (s)	103.1	103.1	93.0		8.9	8.9
Actuated g/C Ratio	0.86	0.86	0.78		0.07	0.07
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	447	2954	2469		92	92
v/s Ratio Prot	0.01	c0.46	0.34		c0.03	
v/s Ratio Perm	0.19					0.00
v/c Ratio	0.23	0.53	0.44		0.41	0.06
Uniform Delay, d1	2.1	2.2	4.6		53.1	51.7
Progression Factor	0.65	0.47	0.43		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.5		3.0	0.3
Delay (s)	1.5	1.1	2.5		56.1	51.9
Level of Service	A	A	A		E	D
Approach Delay (s)		1.2	2.5		53.3	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	3.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3343	1568	1671	3165			1658	1538	1150	1522	
Flt Permitted	0.95	1.00	1.00	0.07	1.00			0.73	1.00	0.40	1.00	
Satd. Flow (perm)	1805	3343	1568	132	3165			1272	1538	485	1522	
Volume (vph)	6	1270	205	207	834	14	180	10	509	9	3	4
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	1337	216	218	878	15	189	11	536	9	3	4
RTOR Reduction (vph)	0	0	44	0	1	0	0	0	15	0	3	0
Lane Group Flow (vph)	6	1337	172	218	892	0	0	200	521	9	4	0
Heavy Vehicles (%)	0%	8%	3%	8%	14%	0%	10%	0%	5%	57%	33%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	5.1	61.9	61.9	76.5	76.5			20.4	40.1	20.4	20.4	
Effective Green, g (s)	7.1	63.9	63.9	78.5	78.5			22.4	44.1	22.4	22.4	
Actuated g/C Ratio	0.06	0.53	0.53	0.65	0.65			0.19	0.37	0.19	0.19	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	107	1780	835	365	2070			237	616	91	284	
v/s Ratio Prot	0.00	c0.40		0.11	0.28				c0.15		0.00	
v/s Ratio Perm			0.11	0.28				0.16	0.19	0.02		
v/c Ratio	0.06	0.75	0.21	0.60	0.43			0.84	0.85	0.10	0.01	
Uniform Delay, d1	53.3	21.9	14.7	28.0	10.0			47.1	34.8	40.4	39.8	
Progression Factor	0.75	0.38	0.13	0.87	0.84			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.5	0.1	1.6	0.6			22.2	10.0	0.2	0.0	
Delay (s)	40.0	9.7	2.0	26.0	9.0			69.3	44.8	40.6	39.8	
Level of Service	D	A	A	C	A			E	D	D	D	
Approach Delay (s)		8.7			12.4			51.5			40.3	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1656	3343	3136		1172	1324
Flt Permitted	0.21	1.00	1.00		0.95	1.00
Satd. Flow (perm)	357	3343	3136		1172	1324
Volume (vph)	161	1567	1030	144	13	24
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	164	1599	1051	147	13	24
RTOR Reduction (vph)	0	0	4	0	0	22
Lane Group Flow (vph)	164	1599	1194	0	13	2
Heavy Vehicles (%)	9%	8%	12%	20%	54%	22%
Turn Type	pm+pt					pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2					4
Actuated Green, G (s)	106.3	106.3	94.2		1.7	7.8
Effective Green, g (s)	108.3	108.3	96.2		3.7	11.8
Actuated g/C Ratio	0.90	0.90	0.80		0.03	0.10
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	2.0	2.5	2.5		2.5	2.0
Lane Grp Cap (vph)	410	3017	2514		36	174
v/s Ratio Prot	0.03	c0.48	0.38		c0.01	0.00
v/s Ratio Perm	0.33					0.00
v/c Ratio	0.40	0.53	0.48		0.36	0.01
Uniform Delay, d1	1.8	1.1	3.8		57.0	48.8
Progression Factor	3.11	0.58	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.4	0.1		4.5	0.0
Delay (s)	5.7	1.0	3.9		61.4	48.9
Level of Service	A	A	A		E	D
Approach Delay (s)		1.5	3.9		53.3	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	3.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	323	50	43	321	39	74
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	340	53	45	338	41	78
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			393		795	366
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			393		795	366
tC, single (s)			4.4		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.5		3.7	3.5
p0 queue free %			96		87	88
cM capacity (veh/h)			1007		312	630

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	393	383	119
Volume Left	0	45	41
Volume Right	53	0	78
cSH	1700	1007	466
Volume to Capacity	0.23	0.04	0.26
Queue Length 95th (ft)	0	4	25
Control Delay (s)	0.0	1.5	15.3
Lane LOS		A	C
Approach Delay (s)	0.0	1.5	15.3
Approach LOS			C

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1845	1482	1603	1735	1455	1770	4958		1703	4622	
Flt Permitted	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1845	1482	1603	1735	1455	1770	4958		1703	4622	
Volume (vph)	233	208	111	261	225	148	146	2240	82	219	962	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)	245	219	117	275	237	156	154	2358	86	231	1013	21
RTOR Reduction (vph)	0	0	104	0	0	127	0	3	0	0	2	0
Lane Group Flow (vph)	245	219	13	245	267	29	154	2441	0	231	1032	0
Heavy Vehicles (%)	4%	3%	9%	7%	3%	11%	2%	4%	6%	6%	12%	6%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	12.8	12.8	12.8	21.2	21.2	21.2	10.5	54.5		11.5	55.5	
Effective Green, g (s)	13.8	13.8	13.8	22.2	22.2	22.2	11.0	56.0		12.0	57.0	
Actuated g/C Ratio	0.12	0.12	0.12	0.18	0.18	0.18	0.09	0.47		0.10	0.48	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	200	212	170	297	321	269	162	2314		170	2195	
v/s Ratio Prot	c0.14	0.12		0.15	c0.15		0.09	c0.49		c0.14	0.22	
v/s Ratio Perm			0.01			0.02						
v/c Ratio	1.23	1.03	0.08	0.82	0.83	0.11	0.95	1.05		1.36	0.47	
Uniform Delay, d1	53.1	53.1	47.4	47.0	47.1	40.7	54.2	32.0		54.0	21.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.89	0.46	
Incremental Delay, d2	137.4	70.7	0.1	16.3	16.1	0.1	55.8	35.2		189.1	0.6	
Delay (s)	190.5	123.8	47.5	63.3	63.2	40.8	110.0	67.2		237.2	10.3	
Level of Service	F	F	D	E	E	D	F	E		F	B	
Approach Delay (s)		136.6			58.0			69.7			51.7	
Approach LOS		F			E			E			D	

Intersection Summary			
HCM Average Control Delay	71.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1770	3379		1736	3538			1760			1809	
Flt Permitted	0.95	1.00		0.95	1.00			0.54			0.96	
Satd. Flow (perm)	1770	3379		1736	3538			984			1747	
Volume (vph)	14	1186	82	140	2045	5	442	17	54	19	131	32
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	14	1210	84	143	2087	5	451	17	55	19	134	33
RTOR Reduction (vph)	0	4	0	0	0	0	0	3	0	0	6	0
Lane Group Flow (vph)	14	1290	0	143	2092	0	0	520	0	0	180	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	2%	5%	15%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.6	59.3		13.5	70.2			35.2			35.2	
Effective Green, g (s)	3.1	61.3		14.0	72.2			37.2			37.2	
Actuated g/C Ratio	0.02	0.49		0.11	0.58			0.30			0.30	
Clearance Time (s)	4.5	6.0		4.5	6.0			6.0			6.0	
Vehicle Extension (s)	2.3	4.8		2.3	4.8			2.5			2.5	
Lane Grp Cap (vph)	44	1664		195	2052			294			522	
v/s Ratio Prot	0.01	0.38		c0.08	c0.59							
v/s Ratio Perm								c0.53			0.10	
v/c Ratio	0.32	0.78		0.73	1.02			1.77			0.35	
Uniform Delay, d1	59.7	25.9		53.4	26.1			43.6			34.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.4	2.7		12.2	24.9			359.8			0.3	
Delay (s)	62.1	28.6		65.6	51.1			403.4			34.4	
Level of Service	E	C		E	D			F			C	
Approach Delay (s)		29.0			52.0			403.4			34.4	
Approach LOS		C			D			F			C	

Intersection Summary			
HCM Average Control Delay	87.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	124.5	Sum of lost time (s)	12.0
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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1826	1592		1754	1568	1805	3438	1583	1719	3534	
Flt Permitted		0.29	1.00		0.71	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		547	1592		1299	1568	1805	3438	1583	1719	3534	
Volume (vph)	25	6	35	220	3	167	33	1100	156	195	2326	23
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	26	6	36	224	3	170	34	1122	159	199	2373	23
RTOR Reduction (vph)	0	0	32	0	0	149	0	0	56	0	1	0
Lane Group Flow (vph)	0	32	5	0	227	21	34	1122	103	199	2395	0
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	0%	0%	0%	2%	50%	3%	0%	5%	2%	5%	2%	0%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)		13.0	13.0		13.0	13.0	4.8	76.0	76.0	14.5	85.7	
Effective Green, g (s)		15.0	15.0		15.0	15.0	5.3	78.0	78.0	15.0	87.7	
Actuated g/C Ratio		0.12	0.12		0.12	0.12	0.04	0.65	0.65	0.12	0.73	
Clearance Time (s)		6.0	6.0		6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.3	4.8	4.8	2.3	4.8	
Lane Grp Cap (vph)		68	199		162	196	80	2235	1029	215	2583	
v/s Ratio Prot							0.02	0.33		c0.12	c0.68	
v/s Ratio Perm		0.06	0.00		c0.17	0.01			0.07			
v/c Ratio		0.47	0.02		1.40	0.11	0.42	0.50	0.10	0.93	0.93	
Uniform Delay, d1		48.8	46.1		52.5	46.6	55.9	10.9	7.9	51.9	13.5	
Progression Factor		1.00	1.00		1.13	2.12	0.83	1.67	3.99	1.00	1.00	
Incremental Delay, d2		3.7	0.0		209.9	0.2	1.8	0.7	0.2	40.7	7.3	
Delay (s)		52.5	46.1		269.4	98.8	48.3	18.9	31.6	92.6	20.8	
Level of Service		D	D		F	F	D	B	C	F	C	
Approach Delay (s)		49.1			196.3			21.2			26.3	
Approach LOS		D			F			C			C	

Intersection Summary			
HCM Average Control Delay	40.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.4%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	*0.75	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Flt Permitted	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 (perm)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Volume (vph)	238	994	407	284	1776	526	439	909	82	217	696	213
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	243	1014	415	290	1812	537	448	928	84	221	710	217
RTOR Reduction (vph)	0	0	176	0	0	111	0	0	33	0	0	152
Lane Group Flow (vph)	243	1014	239	290	1812	426	448	928	51	221	710	65
Confl. Peds. (#/hr)									3	3		
Heavy Vehicles (%)	3%	4%	6%	6%	2%	2%	0%	3%	4%	12%	7%	4%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	11.7	45.0	45.0	14.5	47.8	47.8	16.8	32.0	32.0	8.5	23.7	23.7
Effective Green, g (s)	12.2	46.5	46.5	15.0	49.3	49.3	17.8	33.0	33.0	9.5	24.7	24.7
Actuated g/C Ratio	0.10	0.39	0.39	0.12	0.41	0.41	0.15	0.28	0.28	0.08	0.21	0.21
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7	4.7	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	346	1933	591	413	2089	650	519	761	414	248	694	320
v/s Ratio Prot	c0.07	0.20		0.09	c0.36		c0.13	c0.34		0.07	0.21	
v/s Ratio Perm			0.16			0.27			0.03			0.04
v/c Ratio	0.70	0.52	0.40	0.70	0.87	0.66	0.86	1.22	0.12	0.89	1.02	0.20
Uniform Delay, d1	52.1	28.3	26.7	50.4	32.4	28.5	49.9	43.5	32.6	54.7	47.6	39.5
Progression Factor	0.85	0.66	1.12	1.17	0.96	0.96	0.81	0.78	0.80	1.00	1.00	1.00
Incremental Delay, d2	3.0	0.2	0.4	1.7	1.9	1.8	11.6	108.7	0.1	30.0	40.1	0.2
Delay (s)	47.5	18.9	30.4	60.7	32.8	29.2	51.9	142.6	26.2	84.7	87.8	39.7
Level of Service	D	B	C	E	C	C	D	F	C	F	F	D
Approach Delay (s)		25.9			35.2			108.1			78.1	
Approach LOS		C			D			F			E	

Intersection Summary			
HCM Average Control Delay	55.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.2%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	3272		1805	3498		1805	1643		1805	1900	1481
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	3272		1805	3498		1805	1643		1805	1900	1481
Volume (vph)	66	1132	189	140	1198	15	152	27	75	33	12	80
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	67	1155	193	143	1222	15	155	28	77	34	12	82
RTOR Reduction (vph)	0	9	0	0	0	0	0	66	0	0	0	76
Lane Group Flow (vph)	67	1339	0	143	1237	0	155	39	0	34	12	6
Confl. Peds. (#/hr)			4	4			27					27
Heavy Vehicles (%)	0%	8%	4%	0%	3%	3%	0%	0%	4%	0%	0%	2%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	6.4	64.4		13.7	71.4		11.0	15.0		3.0	6.6	6.6
Effective Green, g (s)	8.7	66.3		15.7	73.3		13.7	16.7		5.3	8.3	8.3
Actuated g/C Ratio	0.07	0.55		0.13	0.61		0.11	0.14		0.04	0.07	0.07
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7		6.3	5.7	5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8		2.7	1.8	1.8
Lane Grp Cap (vph)	254	1808		236	2137		206	229		80	131	102
v/s Ratio Prot	0.02	c0.41		0.08	c0.35		c0.09	c0.02		0.02	0.01	
v/s Ratio Perm												0.00
v/c Ratio	0.26	0.74		0.61	0.58		0.75	0.17		0.42	0.09	0.06
Uniform Delay, d1	52.6	20.3		49.2	14.1		51.5	45.5		55.9	52.3	52.2
Progression Factor	0.96	0.48		0.81	0.81		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	1.5		3.1	0.9		13.8	0.1		3.0	0.1	0.1
Delay (s)	50.5	11.3		43.1	12.3		65.3	45.7		58.9	52.4	52.3
Level of Service	D	B		D	B		E	D		E	D	D
Approach Delay (s)		13.2			15.5			57.4			54.0	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↱			↑↱				↱			↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	995	254	0	1292	32	0	0	201	0	0	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	1015	259	0	1318	33	0	0	205	0	0	2
Pedestrians		1			7			4			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		597			688							
pX, platoon unblocked	0.76			0.71			0.83	0.83	0.71	0.83	0.83	0.76
vC, conflicting volume	1352			1278			1811	2501	648	2055	2614	678
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1149			985			910	1740	99	1204	1876	262
tC, single (s)	4.1			4.2			7.6	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	69	100	100	100
cM capacity (veh/h)	468			490			184	73	663	81	60	564

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	677	598	879	472	205	2
Volume Left	0	0	0	0	0	0
Volume Right	0	259	0	33	205	2
cSH	1700	1700	1700	1700	663	564
Volume to Capacity	0.40	0.35	0.52	0.28	0.31	0.00
Queue Length 95th (ft)	0	0	0	0	33	0
Control Delay (s)	0.0	0.0	0.0	0.0	12.8	11.4
Lane LOS					B	B
Approach Delay (s)	0.0		0.0		12.8	11.4
Approach LOS					B	B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	55.6%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.89		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3429		1805	3455		1805	1675		1803	1897	
Flt Permitted	0.15	1.00		0.07	1.00		0.75	1.00		0.75	1.00	
Satd. Flow (perm)	294	3429		142	3455		1434	1675		1433	1897	
Volume (vph)	43	1032	124	250	995	185	246	81	221	143	185	2
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	44	1053	127	255	1015	189	251	83	226	146	189	2
RTOR Reduction (vph)	0	8	0	0	12	0	0	87	0	0	0	0
Lane Group Flow (vph)	44	1172	0	255	1192	0	251	222	0	146	191	0
Confl. Peds. (#/hr)	2					2			1	1		
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	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)	51.5	47.7		68.8	59.0		21.2	21.2		17.3	17.3	
Effective Green, g (s)	55.5	49.7		70.8	61.0		23.2	23.2		19.3	19.3	
Actuated g/C Ratio	0.46	0.41		0.59	0.51		0.19	0.19		0.16	0.16	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	209	1420		321	1756		333	324		274	305	
v/s Ratio Prot	0.01	0.34		c0.11	0.34		c0.11	0.13		0.06	c0.10	
v/s Ratio Perm	0.09			c0.36			c0.03			0.02		
v/c Ratio	0.21	0.83		0.79	0.68		0.75	0.68		0.53	0.63	
Uniform Delay, d1	19.1	31.3		33.5	22.1		45.5	45.0		45.6	47.0	
Progression Factor	0.60	0.52		1.36	0.48		1.00	1.00		1.22	1.22	
Incremental Delay, d2	0.4	3.4		11.0	0.9		9.3	11.2		1.6	7.8	
Delay (s)	11.9	19.8		56.4	11.6		54.8	56.2		57.4	65.3	
Level of Service	B	B		E	B		D	E		E	E	
Approach Delay (s)		19.5			19.4			55.6			61.8	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM Average Control Delay	29.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1517	3406	3516		1787	1583
Flt Permitted	0.14	1.00	1.00		0.95	1.00
Satd. Flow (perm)	220	3406	3516		1787	1583
Volume (vph)	36	1364	1315	27	269	85
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	37	1392	1342	28	274	87
RTOR Reduction (vph)	0	0	1	0	0	71
Lane Group Flow (vph)	37	1392	1369	0	274	16
Heavy Vehicles (%)	19%	6%	2%	20%	1%	2%
Turn Type	pm+pt					Perm
Protected Phases	7	4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	89.4	89.4	81.4		22.6	22.6
Effective Green, g (s)	89.4	89.4	81.4		22.6	22.6
Actuated g/C Ratio	0.74	0.74	0.68		0.19	0.19
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	207	2537	2385		337	298
v/s Ratio Prot	0.01	c0.41	c0.39		c0.15	
v/s Ratio Perm	0.13					0.01
v/c Ratio	0.18	0.55	0.57		0.81	0.05
Uniform Delay, d1	7.1	6.6	10.2		46.7	39.9
Progression Factor	1.29	0.73	0.51		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.9		13.9	0.1
Delay (s)	9.4	5.0	6.1		60.6	40.0
Level of Service	A	A	A		E	D
Approach Delay (s)		5.1	6.1		55.6	
Approach LOS		A	A		E	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3471	1568	1770	3539			1752	1538	1805	1716	
Flt Permitted	0.95	1.00	1.00	0.10	1.00			0.75	1.00	0.43	1.00	
Satd. Flow (perm)	1805	3471	1568	178	3539			1377	1538	823	1716	
Volume (vph)	4	1180	488	472	1158	1	164	0	213	25	6	11
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	4	1204	498	482	1182	1	167	0	217	26	6	11
RTOR Reduction (vph)	0	0	108	0	0	0	0	0	11	0	9	0
Lane Group Flow (vph)	4	1204	390	482	1183	0	0	167	206	26	8	0
Heavy Vehicles (%)	0%	4%	3%	2%	2%	0%	3%	0%	5%	0%	0%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	1.0	57.0	57.0	84.1	84.1			16.9	45.0	16.9	16.9	
Effective Green, g (s)	3.0	59.0	59.0	86.1	86.1			18.9	49.0	18.9	18.9	
Actuated g/C Ratio	0.02	0.49	0.49	0.72	0.72			0.16	0.41	0.16	0.16	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	45	1707	771	527	2539			217	679	130	270	
v/s Ratio Prot	0.00	c0.35		c0.23	0.33				0.08		0.00	
v/s Ratio Perm			0.25	c0.43				c0.12	0.06	0.03		
v/c Ratio	0.09	0.71	0.51	0.91	0.47			0.77	0.30	0.20	0.03	
Uniform Delay, d1	57.2	23.7	20.6	33.4	7.2			48.5	24.0	44.0	42.8	
Progression Factor	1.05	0.82	0.88	0.81	0.31			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	1.0	0.3	16.5	0.5			13.7	0.1	0.3	0.0	
Delay (s)	60.0	20.4	18.5	43.6	2.7			62.2	24.1	44.3	42.8	
Level of Service	E	C	B	D	A			E	C	D	D	
Approach Delay (s)		19.9			14.5			40.6			43.7	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
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		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3471	3496		1687	1583
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3471	3496		1687	1583
Volume (vph)	0	1393	1564	108	102	66
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1421	1596	110	104	67
RTOR Reduction (vph)	0	0	3	0	0	25
Lane Group Flow (vph)	0	1421	1703	0	104	42
Heavy Vehicles (%)	4%	4%	2%	6%	7%	2%
Turn Type	pm+pt					pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2					4
Actuated Green, G (s)		96.0	86.3		12.0	15.7
Effective Green, g (s)		98.0	88.3		14.0	19.7
Actuated g/C Ratio		0.82	0.74		0.12	0.16
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		2.5	2.5		2.5	2.0
Lane Grp Cap (vph)		2835	2572		197	313
v/s Ratio Prot		c0.41	c0.49		c0.06	0.01
v/s Ratio Perm						0.02
v/c Ratio		0.50	0.66		0.53	0.13
Uniform Delay, d1		3.4	8.2		49.9	42.9
Progression Factor		0.12	1.00		1.00	1.00
Incremental Delay, d2		0.5	0.6		1.9	0.1
Delay (s)		0.9	8.8		51.8	42.9
Level of Service		A	A		D	D
Approach Delay (s)		0.9	8.8		48.3	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	247	136	106	412	30	54
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	274	151	118	458	33	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			426		1043	350
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			426		1043	350
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			90		85	91
cM capacity (veh/h)			1123		228	696

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	426	576	93
Volume Left	0	118	33
Volume Right	151	0	60
cSH	1700	1123	402
Volume to Capacity	0.25	0.10	0.23
Queue Length 95th (ft)	0	9	22
Control Delay (s)	0.0	2.7	16.6
Lane LOS		A	C
Approach Delay (s)	0.0	2.7	16.6
Approach LOS			C

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1698	1757	1553	1770	4899		1787	5078	
Flt Permitted	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1881	1599	1698	1757	1553	1770	4899		1787	5078	
Volume (vph)	251	327	146	317	228	239	197	1405	102	289	2188	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)	264	344	154	334	240	252	207	1479	107	304	2303	21
RTOR Reduction (vph)	0	0	129	0	0	214	0	7	0	0	1	0
Lane Group Flow (vph)	264	344	25	281	293	38	207	1579	0	304	2323	0
Heavy Vehicles (%)	1%	1%	1%	1%	2%	4%	2%	5%	2%	1%	2%	2%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	11.0	11.0	11.0	17.0	17.0	17.0	13.5	48.7		23.3	58.5	
Effective Green, g (s)	12.0	12.0	12.0	18.0	18.0	18.0	14.0	50.2		23.8	60.0	
Actuated g/C Ratio	0.10	0.10	0.10	0.15	0.15	0.15	0.12	0.42		0.20	0.50	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	179	188	160	255	264	233	207	2049		354	2539	
v/s Ratio Prot	0.15	c0.18		0.17	c0.17		c0.12	0.32		0.17	c0.46	
v/s Ratio Perm			0.02			0.02						
v/c Ratio	1.47	1.83	0.16	1.10	1.11	0.16	1.00	0.77		0.86	0.91	
Uniform Delay, d1	54.0	54.0	49.4	51.0	51.0	44.4	53.0	30.0		46.5	27.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.90	0.87	
Incremental Delay, d2	241.3	393.4	0.3	86.4	88.1	0.2	62.6	2.1		11.6	4.1	
Delay (s)	295.3	447.4	49.7	137.4	139.1	44.6	115.6	32.1		53.4	28.3	
Level of Service	F	F	D	F	F	D	F	C		D	C	
Approach Delay (s)		314.4			109.7			41.7			31.2	
Approach LOS		F			F			D			C	

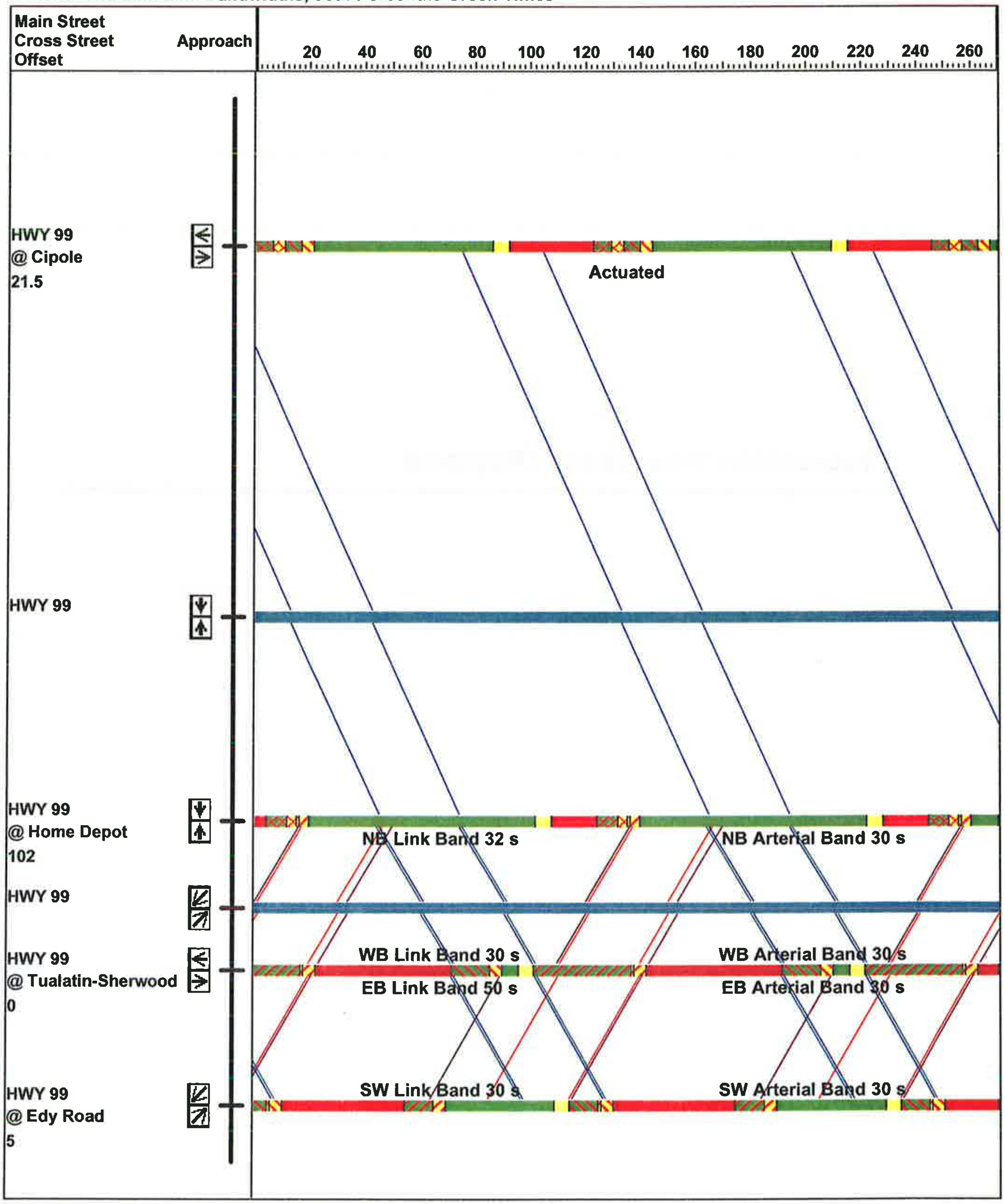
Intersection Summary			
HCM Average Control Delay	81.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	98.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Progression Time-Space Diagrams

Time-Space Diagram - HWY 99

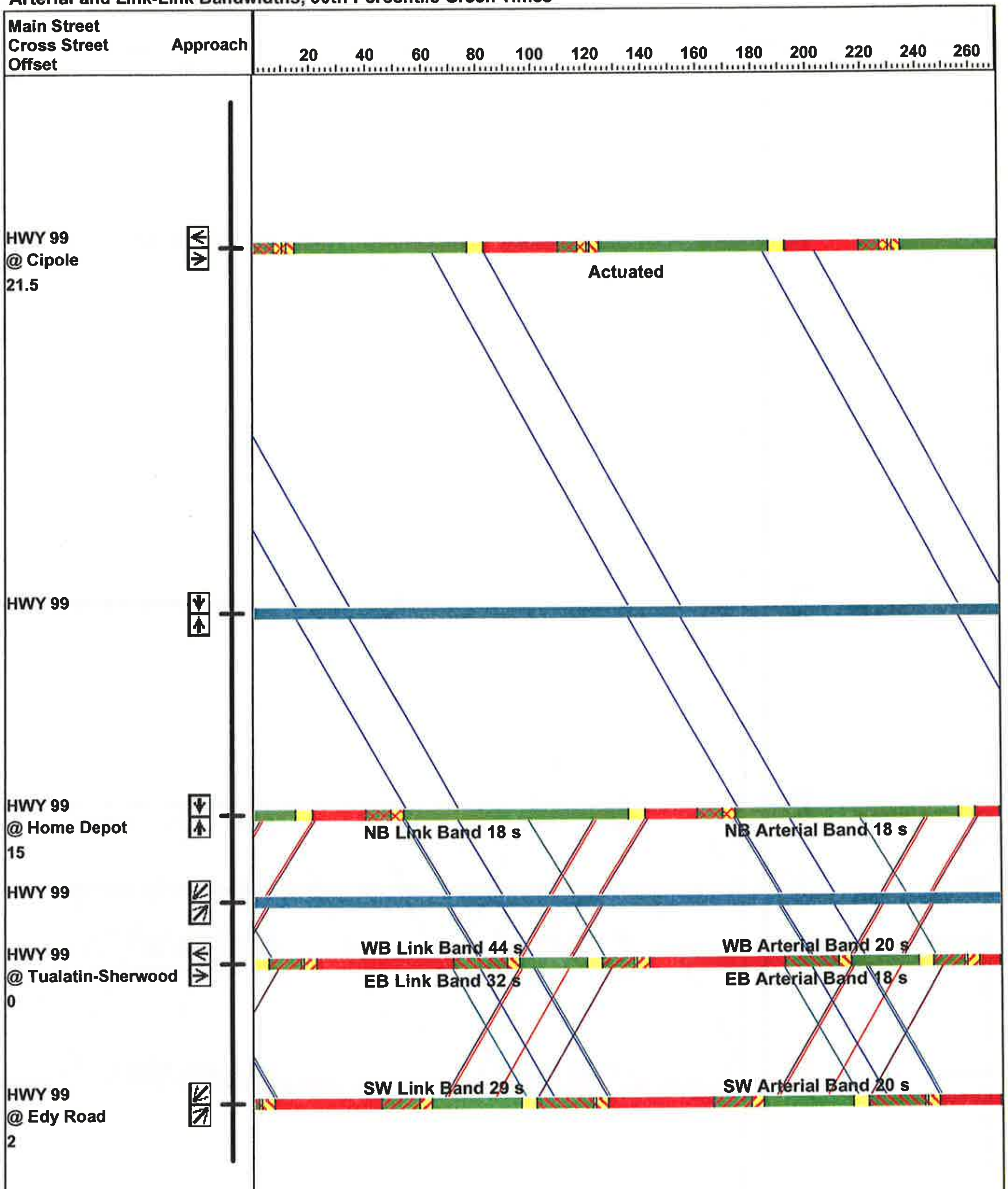
Arterial and Link-Link Bandwidths, 90th Percentile Green Times 3/10/2009



Sherwood Adams Ave N Extension 2008 Existing AM

Time-Space Diagram - HWY 99
Arterial and Link-Link Bandwidths, 90th Percentile Green Times

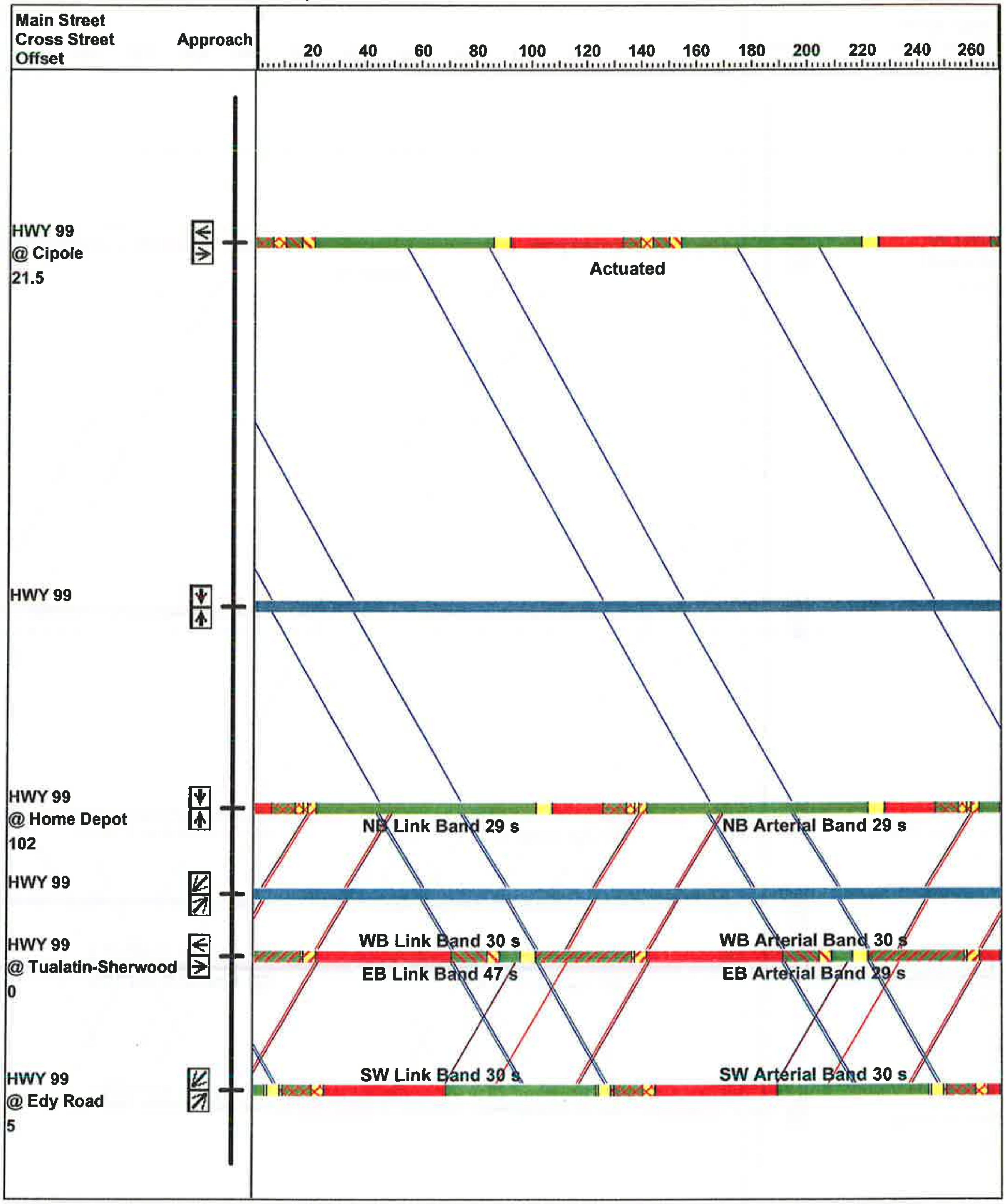
3/10/2009



Sherwood Adams Ave N Extension 2008 Existing 30th HV

Time-Space Diagram - HWY 99

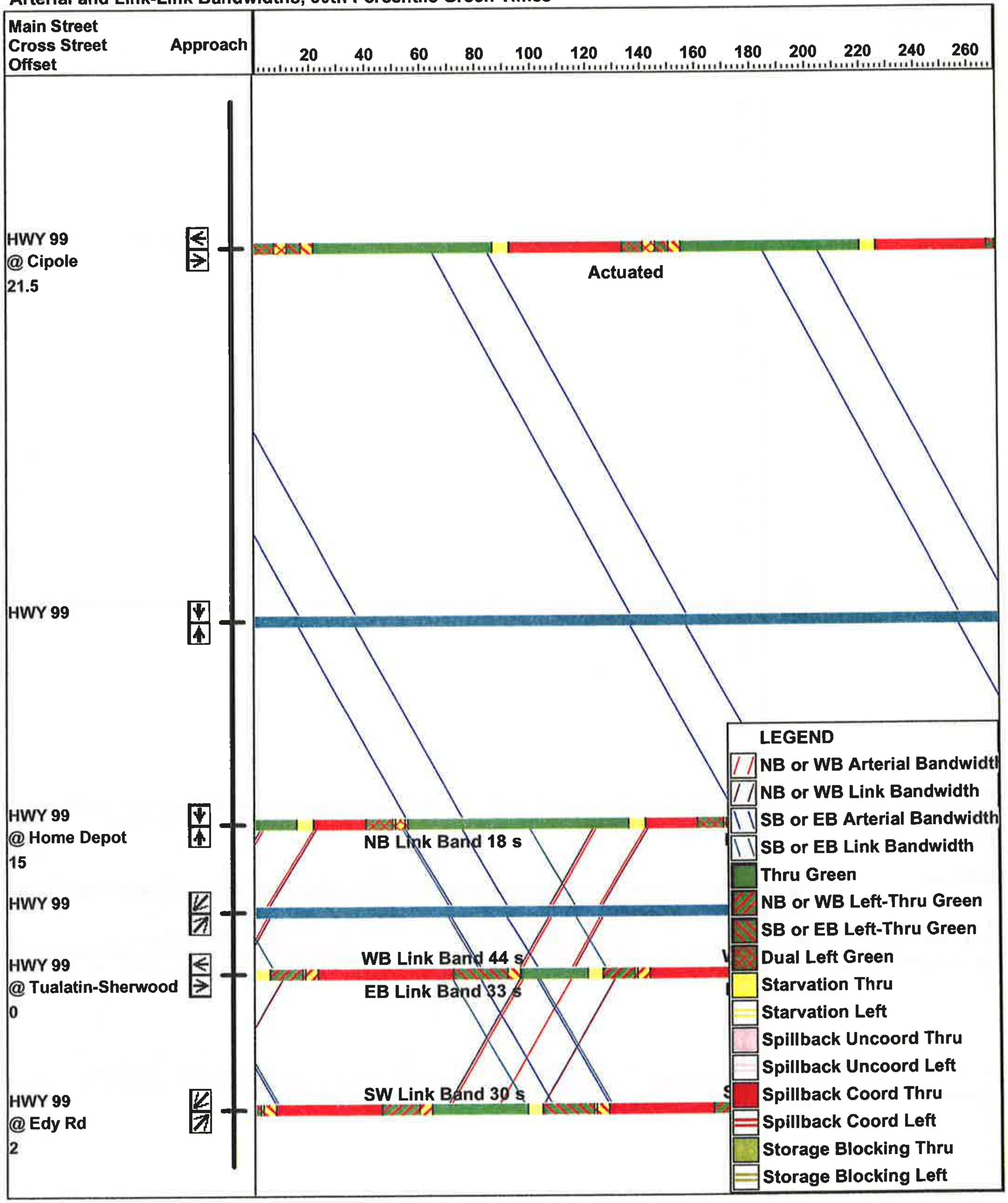
Arterial and Link-Link Bandwidths, 90th Percentile Green Times 3/10/2009



Sherwood Adams Ave N Extension 2030 AM without Adams Extension

Time-Space Diagram - HWY 99
Arterial and Link-Link Bandwidths, 90th Percentile Green Times

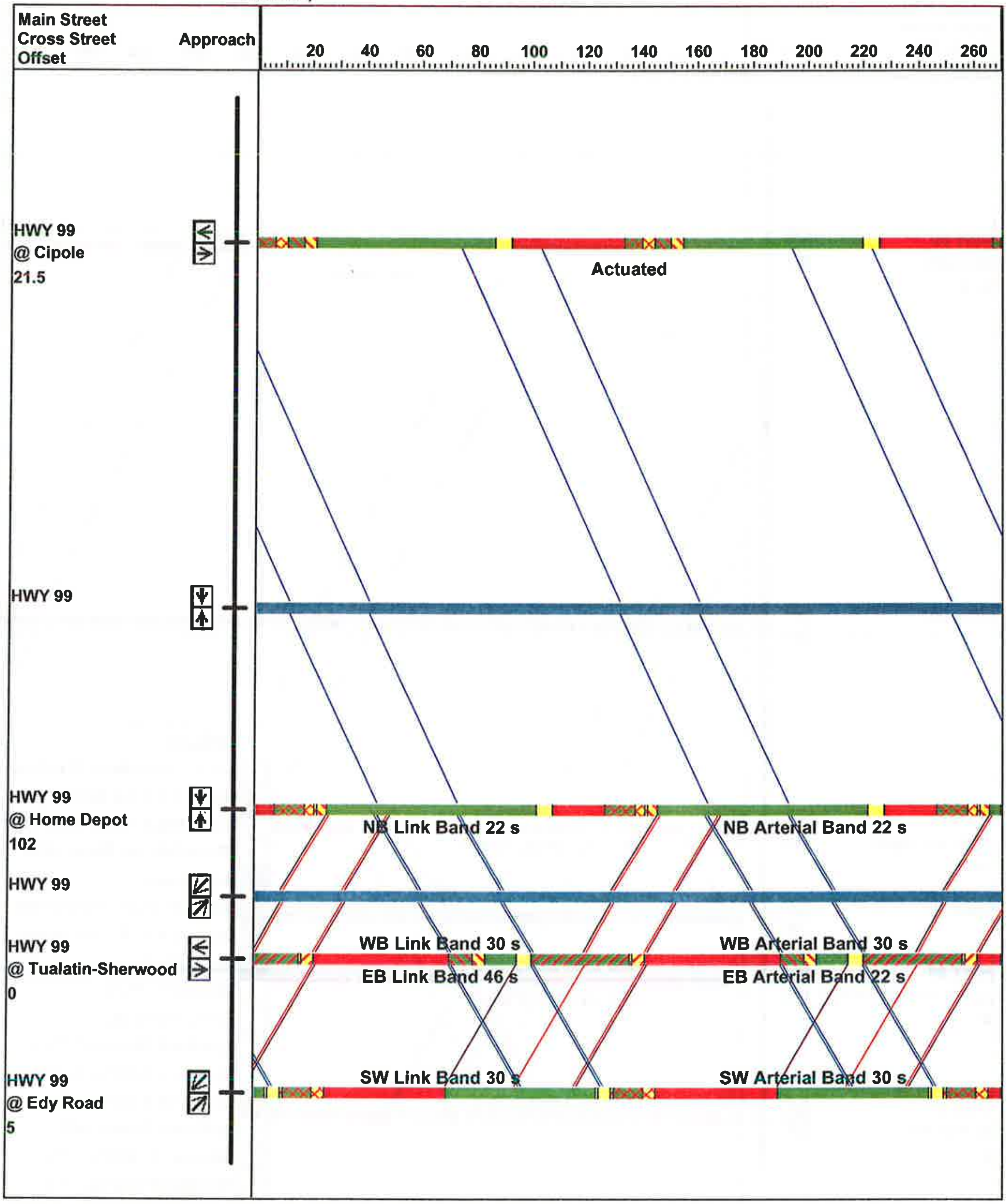
3/10/2009



Sherwood Adams Ave N Extension 2030 PM without Adams Extension

Time-Space Diagram - HWY 99

Arterial and Link-Link Bandwidths, 90th Percentile Green Times 3/10/2009

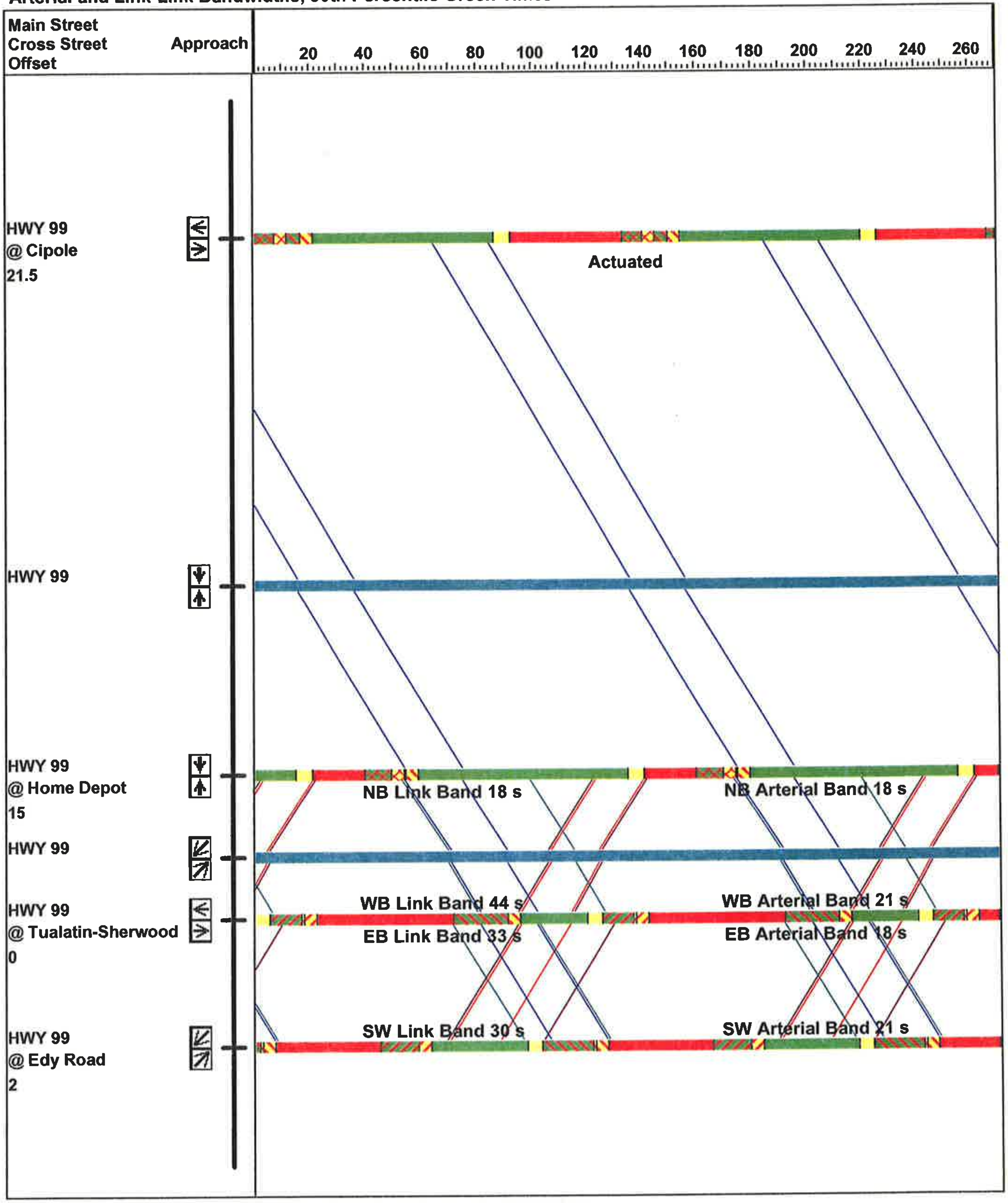


Sherwood Adams Ave N Extension 2030 AM with Adams Extension

Time-Space Diagram - HWY 99

Arterial and Link-Link Bandwidths, 90th Percentile Green Times

3/10/2009



Sherwood Adams Ave N Extension 2030 PM with Adams Extension

DKS *Associates*

TRANSPORTATION SOLUTIONS

TECHNICAL MEMORANDUM

TO: Ben Austin, P.E., Harper Houf Peterson Righellis

FROM: Chris Maciejewski, P.E.
France Campbell, E.I.T.

DATE: May 11, 2009

SUBJECT: **Sherwood Adams Avenue North Concept Plan**
Transportation Tech Memo #2: Preliminary Concept Alternatives Analysis

P08232-000

The purpose of this memorandum is to review the transportation performance of the five land use alternatives created for the Sherwood Adams Avenue North Concept Plan. The first two sections of this memorandum discuss compliance of the proposed alternatives with City functional classification and access spacing standards. The final three sections discuss the traffic impacts of the alternatives, including land use and trip generation, study area operations analysis, and recommended mitigation measures. The traffic impact analysis for the potential land use addresses long term issues (to address TPR[1] requirements) utilizing a forecast year of 2030.

Functional Classification

Highway 99W is classified as a statewide highway in the Oregon Highway Plan[2] and a principle arterial in the City of Sherwood Transportation Plan (TSP)[3]. The City's TSP identifies Tualatin-Sherwood Road, Sherwood Boulevard, and Oregon Street as arterials and Edy Road, Cipole Street, Gerda Lane, Galbreath Drive, and Adams Road as collectors. The proposed Adams Avenue North Extension is classified as a collector in each of the five Concept Plan Alternatives, which is consistent with the City's adopted TSP.

Access Spacing Review

The functional classification establishes the access spacing standards for transportation facilities. Along the proposed Adams Avenue north extension, a collector roadway, access spacing should be a minimum of 100 feet and a maximum of 400 feet[3]. In addition, access should be limited within the influence area of other intersections (i.e., not allowing full access near Tualatin-Sherwood Road or Highway 99W where vehicle queues would block the access). In all of the alternatives, access along Adams Avenue can be designed to meet the minimum spacing

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[1]Transportation Planning Rule, Oregon DLCD, http://www.oregon.gov/ODOT/TD/TP/TPR.shtml
[2] *1999 Oregon Highway Plan*, Oregon Department of Transportation, January 2006.
[3] *City of Sherwood Transportation System Plan*, Prepared by DKS Associates, March 2005.

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Attachment 4B

standard. Maximum spacing standards may not be met along the PGE substation and the UGB boundary, where land would not develop and access is not needed.

Land Use and Trip Generation

Five land use alternatives were generated to represent the range of land use and traffic impact for the plan area. The Concept Plan development areas are displayed in Figure 1 and the corresponding land use assumption for each alternative is shown in Table 2. The BPA/PGE transmission easement and the PGE facility were assumed to be used as public facility, open space or parking to support the developable areas with no potential for generating significant additional future motor vehicle traffic. Alternative 1 assumes that the land within the study area fully develops according to the existing zoning. A portion of the Concept Plan area east of the proposed Adams Avenue north extension (Area C in Figure 1) is currently outside of the City limit and is zoned for rural density. Therefore, Alternative 1 did not include development in the portion of the Concept Plan area outside of the City limits. The total new PM peak hour trips generated by the concept plan alternatives range from approximately 150 trips to 480 trips.

To determine the impact of rezoning the study area, the amount of motor vehicle traffic generated by each alternative was determined. Trip generation was estimated based on rates provided by the Institute of Transportation Engineers[4] (ITE) for similar land use types (e.g. light industrial, restaurants, retail uses, and office uses). Table 2 lists the estimated PM peak hour trips for each of the alternatives. Pass-by trips[5] for Alternatives 3 through 5 are also listed in Table 2 and the total new trips account for the estimated pass-by trips. The total number of new trips was used to verify that the City's 43 trips per net developable acre CAP[6] was not exceeded in any of the Concept Plan development areas shown in Figure 1 for the five alternatives. Any locations exceeding the City's trip CAP were scaled down to conformance.

[4] *Trip Generation Manual, 8th Edition*, Institute of Transportation Engineers, 2008.
[5] *Trip Generation Handbook, 2nd Edition*, Institute of Transportation Engineers, 2004.
[6] City of Sherwood Municipal Code Chapter 16.108.070 (CAP), Section D4.

Figure 1: Adams Avenue North Concept Plan Developable Areas

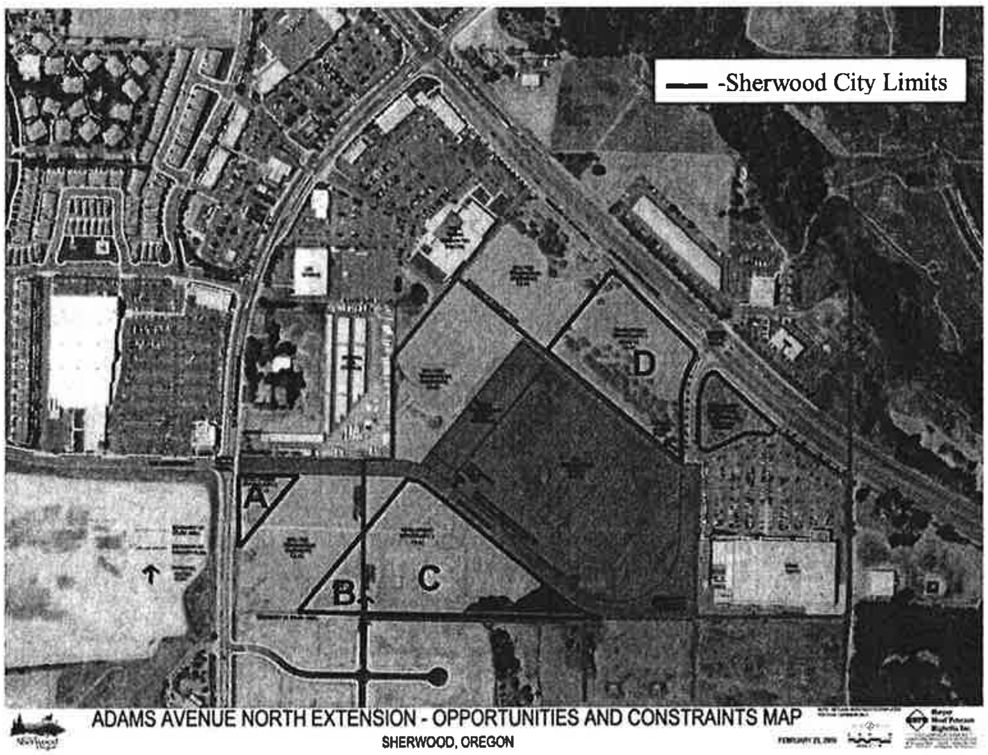

Table 1: Alternatives Land Use Scenarios

Alternative	Concept Area (See Figure 1)				
	A	B	C	D	E
1	LI	LI	R	LI	LI
2	LI	LI	LI	LI	LI
3	LI	LI	LI	GC	LI
4	GC*	LI	LI	OC	OC
5	GC*	LI	LI	GC	GC*

* Area developed was limited by City's 43 trips per acre CAP
GC – General Commercial
LI – Light Industrial
OC – Office Commercial
R – Rural

Table 2: Motor Vehicle Trip Generation Comparison – PM Peak Hour

Scenario / Land Use (ITE Code)	Acres	KSF*	PM Trips In	PM Trips Out	PM Trips Total
Alternative 1					
Light Industrial (710)	9.4	102.4	26	111	153
Total New Trips			26	111	153
Alternative 2					
Light Industrial (710)	15.9	173.2	44	214	258
Total New Trips			44	214	258
Alternative 3					
General Commercial (820, 934)	5.8	63.2	210	206	416
Light Industrial (710)	10.1	110.0	28	136	164
Pass-by Trips			88	86	174
Total New Trips			150	256	406
Alternative 4					
General Commercial (934)	0.9	2.3**	40	36	76
Light Industrial (710)	7.6	82.8	21	102	123
Office Commercial (710, 934)	7.4	80.6	124	190	314
Pass-by Trips			73	67	140
Total New Trips			112	261	373
Alternative 5					
General Commercial (820, 934)	8.3	82.8**	317	309	626
Light Industrial (710)	7.6	82.8	21	102	123
Pass-by Trips			138	132	270
Total New Trips			200	279	479

*KSF – Building area, thousand square feet
** Area developed was limited by City's 43 trips per acre CAP

Operations Analysis

The following sections describe the future forecasting and operations analysis completed for the Adams Avenue North Concept Plan alternatives. The future conditions evaluation includes future forecasting, identification of funded study area improvements, and motor vehicle intersection capacity analysis.

Future Forecasting

Future travel demand forecasting for the Adams Avenue North study area utilized the latest 2030 VISUM travel demand model developed by Metro, Washington County, and DKS Associates for the I-5 to 99W Connector Study. As part of the model development for the I-5 to 99W Connector Study, the Sherwood TSP travel demand model zone structure and network detail was used as a guideline to refine the regional model. In addition, a detailed focus model was created for the

Adams Avenue North Concept Plan study area, which incorporates the use of *HCM 2000 Methodology* for turn delays (instead of the regional model macroscopic delay functions).

Future 2030 PM peak hour volumes at study intersections were developed for the five Adams Avenue North Concept Plan land use scenarios by adjusting the travel demand model trip tables to reflect the trip rates listed in Table 2. These volumes were then used to analyze and determine future impacts from the proposed Adams Avenue North area on the planned roadway network.

Planned Study Area Roadway Improvements

Assumed transportation improvements in the study area were limited to Metro 2035 Regional Transportation Plan (RTP)[7] financially constrained roadway improvements and the extension of Adams Avenue to the north. Other capacity improvement projects in Metro's RTP or other plans without committed funding were not included in any of the future analysis scenarios in order to meet OAR 660-012-060 requirements. The planned roadway improvements include:

- Signalization of Tualatin-Sherwood Road/Adams Avenue
- Conversion of Tualatin-Sherwood Road/Baler Way to right-in/right-out and signal removal
- Widening of Tualatin-Sherwood Road and Roy Rogers Road to 5-lanes from Teton Avenue to west of Highway 99W (tapers to three lanes east of Borchers Drive)
- Completion of the Adams Avenue South Extension from Oregon Street to Century Drive
- Intersection geometric, turn lane, and signal phasing improvements at Highway 99W/Tualatin-Sherwood Road
- Completion of the 124th Avenue extension from Tualatin-Sherwood Road to Tonquin Road
- Widening of Tonquin Road to 3-lanes
- Signalization of Tualatin-Sherwood Road/Gerda Lane

In addition, the operations analysis found that turn lane and signal timing improvements would be required under any scenario (including 2030 Baseline Conditions) at Highway 99W/Adams Avenue. Therefore, construction of a dual westbound left-turn lane from Adams Avenue westbound to Highway 99W southbound and conversion to protected left phasing was assumed for all scenarios.

Capacity Analysis

In order to provide a baseline comparison to the future Adams Avenue North Concept Plan alternatives, the 2030 Alternative 1 scenario evaluates future traffic volumes assuming the planned roadway geometry and full development of the Adams Avenue North Concept Plan area under existing zoning. Each alternative was then evaluated to determine impacts to the study area. Intersections that do not meet performance standards must be mitigated to the level of performance (per Oregon's Transportation Planning Rule (TPR)) that would occur under development of the area with existing zoning (Alternative 1) or that would meet mobility standards, whichever is higher.

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[7] Metro 2035 Regional Transportation Plan, http://www.oregonmetro.gov/index.cfm/go/by.web/id=25037.

The maximum v/c ratio specified by Washington County is 0.99 for signalized intersections.[8] The minimum operational standard for unsignalized intersections specified by Washington County is LOS E. In the case of Highway 99W, ODOT operating performance standards for the study area is a v/c ratio of 0.99 for intersections not in a town center and 1.1 for those that are located within a Town Center.[9] The intersections of Highway 99W/Tualatin-Sherwood Road and Highway 99W/Edy Road-Sherwood Boulevard are within the Town Center limits. [10] Based on recent conversations and meetings, ODOT has decided to not acknowledge the Town Center limits without the City completing a Town Center Plan. Therefore, ODOT intends to use a maximum v/c ratio of 0.99 for all of Highway 99W through Sherwood.

As listed in Table 3, with the addition of land development in the Adams Avenue North Concept Plan, all study intersections except for the Highway 99W/Edy Road/ Sherwood Blvd and Highway 99W/Tualatin-Sherwood Rd intersections meet ODOT/County standards in all alternatives.

Mitigation Measures

With the addition of land development in the Adams Avenue North Concept Plan, the Highway 99W/Edy Road/Sherwood Blvd (Alternatives 1 through 5) and Highway 99W/Tualatin-Sherwood Rd (Alternative 5) study intersections will not meet ODOT/County standards. Therefore, off-site transportation mitigations are required at Highway 99W/Edy Road/Sherwood Blvd and 99W/Tualatin-Sherwood Rd to offset the impacts of the Adams Avenue North Concept Plan for TPR compliance.

As listed in Table 3, the Highway 99W/Edy Road/Sherwood Blvd intersection operates above the v/c ratio standard of 0.99 and mitigations are required to bring the intersection to the level of performance that would occur under Alternative 1. To determine if mitigations are required for the alternatives, the software TRAFFIX (which provides v/c ratios to the nearest 0.001) was used to determine the increase in the v/c ratio from Alternative 1 for Alternatives 2, 3, 4, and 5, as a change in v/c of less than 0.01 may not require mitigation.

To offset the impacts of the Adams Avenue North Concept Plan at Highway 99W/Edy Road/Sherwood Blvd, a north-eastbound right turn lane along Highway 99W is adequate for Alternatives 2 and 4. The necessary mitigation for Alternative 5 includes widening Sherwood Boulevard to provide two left turn lanes, one through lane, and one right turn lane approaching Highway 99W. This would also likely require widening of the Edy Road approach to Highway 99W to install a median or second left turn lane to align the through lanes across the Highway 99W. Signal, signing, and striping modifications are required for all mitigations.

The intersection of Highway 99W/Tualatin-Sherwood Rd is forecasted to operate above the v/c ratio standard of 0.99 for Alternative 5. Mitigations such as additional turn lanes would not be feasible at the intersection as all turn lane improvements (dual left turn lanes and right turn pockets) and signal phasing improvements are already included in the baseline analysis. The

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[8] Washington County 2020 Transportation Plan, Adopted October 29, 2002, Table 5.
[9] 1999 Oregon Highway Plan, Amendment to Table 7, December 13, 2000.
[10] This is according to the Metro Regional and Town Center Map.
(http://www.oregonmetro.gov/index.cfm/go/by.web/id=15467&x=7599901&y=629257&locID=27)

remaining deficient critical movement at this intersection is the westbound Tualatin-Sherwood Road through movement to Roy Rogers Road, which is limited by lane utilization (both through lanes would not be fully utilized as the outside through lane merges into the inside lane just west of Highway 99W). To improve the westbound approach and meet the 0.99 v/c ratio standard, the Roy Rogers widening would likely need to be carried further west (e.g., through the Borchers Drive intersection) to improve the lane utilization across Highway 99W.

Table 3: 2030 PM Peak Hour Intersection Performance

			Intersection Performance (Delay LOS V/C)				
Intersection	**Agency**	**Standard**	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Signalized Intersections							
Highway 99W/Adams Ave	ODOT	v/c ≤ 0.99	30.1 C 0.86	30.7 C 0.87	31.3 C 0.87	31.0 C 0.87	31.6 C 0.87
Highway 99W/Tualatin-Sherwood Rd	ODOT	v/c ≤ 0.99	66.2 E 0.98	66.3 E 0.99	68.2 E 0.99	68.3 E 0.99	69.7 E **1.00**
Highway 99W/Edy Road/ Sherwood Blvd	ODOT	v/c ≤ 0.99	71.5 E **1.06**	72.4 E **1.07**	75.4 E **1.08**	74.8 E **1.08**	77.7 E **1.09**
Tualatin-Sherwood Rd/Shopping Center	County	v/c ≤ 0.99	19.5 B 0.73	20.2 C 0.74	20.1 C 0.75	20.0 B 0.74	20.3 C 0.75
Tualatin-Sherwood Rd/Adams Ave	County	v/c ≤ 0.99	46.4 D 0.92	46.7 D 0.93	48.9 D 0.94	50.5 D 0.94	51.1 D 0.94
Tualatin-Sherwood Rd/Gerda Ln	County	v/c ≤ 0.99	9.6 A 0.62	9.7 A 0.62	9.7 A 0.63	9.7 A 0.63	9.6 A 0.63
Tualatin-Sherwood Rd/Oregon St	County	v/c ≤ 0.99	22.3 C 0.90	22.4 C 0.90	22.6 C 0.90	22.5 C 0.90	22.6 C 0.90
Unsignalized Intersections							
Tualatin-Sherwood Rd/Baler Wy	County	LOS E	13.8 A/B 0.67	14.1 A/B 0.67	14.1 A/B 0.68	14.0 A/B 0.68	14.1 A/B 0.69

Changes in V/C at Highway 99W/Edy Road/ Sherwood Blvd compared to Alternative 1:

Alternative 2: +0.001

Alternative 3: +0.018

Alternative 4: +0.013

Alternative 5: +0.028

Signalized intersection:
HCM Delay = Average Intersection Delay (sec.)
LOS = Level of Service
V/C = Volume-to-Capacity Ratio
Bold values do not meet standards.

Unsignalized intersection:
HCM Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS/Minor Street LOS
V/C = Critical Movement Volume-to-Capacity Ratio

Appendix

- 2030 Intersection Operational Analysis Worksheets
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative 4
  - Alternative 5
- Sensitivity Analysis Worksheets

Alternative 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1770	3343		1736	3538			1760			1834	
Flt Permitted	0.95	1.00		0.95	1.00			0.52			0.95	
Satd. Flow (perm)	1770	3343		1736	3538			954			1759	
Volume (vph)	15	1210	140	125	2050	5	315	15	40	20	160	15
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	15	1235	143	128	2092	5	321	15	41	20	163	15
RTOR Reduction (vph)	0	6	0	0	0	0	0	4	0	0	2	0
Lane Group Flow (vph)	15	1372	0	128	2097	0	0	373	0	0	196	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	2%	5%	15%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.6	61.5		13.0	71.9			35.2			35.2	
Effective Green, g (s)	3.1	63.5		13.5	73.9			37.2			37.2	
Actuated g/C Ratio	0.02	0.50		0.11	0.59			0.29			0.29	
Clearance Time (s)	4.5	6.0		4.5	6.0			6.0			6.0	
Vehicle Extension (s)	2.3	4.8		2.3	4.8			2.5			2.5	
Lane Grp Cap (vph)	43	1682		186	2072			281			519	
v/s Ratio Prot	0.01	0.41		c0.07	c0.59							
v/s Ratio Perm								c0.39			0.11	
v/c Ratio	0.35	0.82		0.69	1.01			1.33			0.38	
Uniform Delay, d1	60.6	26.4		54.3	26.2			44.5			35.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.8	3.6		8.8	22.8			170.6			0.3	
Delay (s)	63.4	30.0		63.2	48.9			215.1			35.6	
Level of Service	E	C		E	D			F			D	
Approach Delay (s)		30.3			49.8			215.1			35.6	
Approach LOS		C			D			F			D	

Intersection Summary			
HCM Average Control Delay	57.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	126.2	Sum of lost time (s)	12.0
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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.97	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1624		3433	1552		1805	3438	1583	1719	3535	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1805	1624		3433	1552		1805	3438	1583	1719	3535	
Volume (vph)	25	5	35	210	5	125	30	1220	100	100	2280	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	26	5	36	214	5	128	31	1245	102	102	2327	20
RTOR Reduction (vph)	0	34	0	0	116	0	0	0	42	0	0	0
Lane Group Flow (vph)	26	7	0	214	17	0	31	1245	60	102	2347	0
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	0%	0%	0%	2%	50%	3%	0%	5%	2%	5%	2%	0%
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	7.2	4.4		11.9	9.1		4.6	68.2	68.2	15.0	78.6	
Effective Green, g (s)	7.2	6.4		11.9	11.1		5.1	70.2	70.2	15.5	80.6	
Actuated g/C Ratio	0.06	0.05		0.10	0.09		0.04	0.59	0.59	0.13	0.67	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.3	4.8	4.8	2.3	4.8	
Lane Grp Cap (vph)	108	87		340	144		77	2011	926	222	2374	
v/s Ratio Prot	c0.01	0.00		c0.06	0.01		0.02	c0.36		0.06	c0.66	
v/s Ratio Perm									0.04			
v/c Ratio	0.24	0.08		0.63	0.12		0.40	0.62	0.06	0.46	0.99	
Uniform Delay, d1	53.8	54.0		51.9	50.0		56.0	16.2	10.7	48.4	19.2	
Progression Factor	1.00	1.00		1.04	1.58		0.98	0.49	0.36	1.00	1.00	
Incremental Delay, d2	1.2	0.3		3.5	0.3		1.6	1.2	0.1	0.9	16.0	
Delay (s)	55.0	54.3		57.7	79.0		56.3	9.0	4.0	49.3	35.2	
Level of Service	D	D		E	E		E	A	A	D	D	
Approach Delay (s)		54.5			65.8			9.7			35.8	
Approach LOS		D			E			A			D	

Intersection Summary			
HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.7%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	*0.75	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Flt Permitted	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 (perm)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Volume (vph)	195	940	435	325	1765	460	605	995	180	255	705	205
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	199	959	444	332	1801	469	617	1015	184	260	719	209
RTOR Reduction (vph)	0	0	174	0	0	116	0	0	67	0	0	152
Lane Group Flow (vph)	199	959	270	332	1801	353	617	1015	117	260	719	57
Confl. Peds. (#/hr)									3	3		
Heavy Vehicles (%)	3%	4%	6%	6%	2%	2%	0%	3%	4%	12%	7%	4%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	11.1	42.7	42.7	15.9	47.5	47.5	19.4	32.0	32.0	9.4	22.0	22.0
Effective Green, g (s)	11.6	44.2	44.2	16.4	49.0	49.0	20.4	33.0	33.0	10.4	23.0	23.0
Actuated g/C Ratio	0.10	0.37	0.37	0.14	0.41	0.41	0.17	0.28	0.28	0.09	0.19	0.19
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7	4.7	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	329	1837	561	451	2076	646	595	761	414	271	647	298
v/s Ratio Prot	0.06	c0.19		0.10	c0.35		c0.18	c0.37		0.08	0.21	
v/s Ratio Perm			0.18			0.22			0.08			0.04
v/c Ratio	0.60	0.52	0.48	0.74	0.87	0.55	1.04	1.33	0.28	0.96	1.11	0.19
Uniform Delay, d1	52.0	29.6	29.1	49.7	32.5	27.0	49.8	43.5	34.2	54.6	48.5	40.7
Progression Factor	0.80	0.60	1.00	0.97	0.69	0.48	0.76	0.86	0.92	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.3	0.7	2.4	2.3	1.4	40.3	156.3	0.1	42.9	70.0	0.2
Delay (s)	43.3	18.0	29.7	50.8	24.8	14.5	78.0	193.7	31.7	97.5	118.5	40.9
Level of Service	D	B	C	D	C	B	E	F	C	F	F	D
Approach Delay (s)		24.4			26.2			138.0			100.2	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	66.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.7%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.99		1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	3275		1805	3485		1805	1661		1805	1900	1481
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	3275		1805	3485		1805	1661		1805	1900	1481
Volume (vph)	70	1200	190	115	1560	60	135	30	65	50	30	85
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	71	1224	194	117	1592	61	138	31	66	51	31	87
RTOR Reduction (vph)	0	9	0	0	2	0	0	58	0	0	0	82
Lane Group Flow (vph)	71	1409	0	117	1651	0	138	39	0	51	31	5
Confl. Peds. (#/hr)			4	4			27					27
Heavy Vehicles (%)	0%	8%	4%	0%	3%	3%	0%	0%	4%	0%	0%	2%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	6.5	66.7		12.4	72.3		10.9	12.6		4.4	5.7	5.7
Effective Green, g (s)	8.8	68.6		14.4	74.2		13.6	14.3		6.7	7.4	7.4
Actuated g/C Ratio	0.07	0.57		0.12	0.62		0.11	0.12		0.06	0.06	0.06
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7		6.3	5.7	5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8		2.7	1.8	1.8
Lane Grp Cap (vph)	257	1872		217	2155		205	198		101	117	91
v/s Ratio Prot	0.02	c0.43		0.06	c0.47		c0.08	0.02		0.03	c0.02	
v/s Ratio Perm												0.00
v/c Ratio	0.28	0.75		0.54	0.77		0.67	0.20		0.50	0.26	0.06
Uniform Delay, d1	52.6	19.3		49.7	16.6		51.1	47.7		55.0	53.7	53.0
Progression Factor	0.97	0.52		0.89	0.79		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	1.3		1.3	1.6		7.8	0.2		3.3	0.4	0.1
Delay (s)	51.2	11.3		45.3	14.7		58.9	47.8		58.3	54.1	53.1
Level of Service	D	B		D	B		E	D		E	D	D
Approach Delay (s)		13.2			16.7			54.3			54.9	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.6%	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		↑↑↱			↑↑↱				↱			↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1115	205	0	1665	15	0	0	230	0	0	15
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	1138	209	0	1699	15	0	0	235	0	0	15
Pedestrians		1			7			4			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		597			688							
pX, platoon unblocked	0.72			0.69			0.83	0.83	0.69	0.83	0.83	0.72
vC, conflicting volume	1715			1351			2112	2962	684	2518	3059	859
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1605			1065			1128	2147	104	1615	2263	416
tC, single (s)	4.1			4.2			7.6	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	63	100	100	96
cM capacity (veh/h)	297			446			123	41	642	37	34	425

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	759	588	1133	582	235	15
Volume Left	0	0	0	0	0	0
Volume Right	0	209	0	15	235	15
cSH	1700	1700	1700	1700	642	425
Volume to Capacity	0.45	0.35	0.67	0.34	0.37	0.04
Queue Length 95th (ft)	0	0	0	0	42	3
Control Delay (s)	0.0	0.0	0.0	0.0	13.8	13.8
Lane LOS					B	B
Approach Delay (s)	0.0		0.0		13.8	13.8
Approach LOS					B	B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	59.1%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.86		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3408		1805	3490		1805	1603		1805	1886	
Flt Permitted	0.14	1.00		0.07	1.00		0.00	1.00		0.00	1.00	
Satd. Flow (perm)	259	3408		138	3490		0	1603		0	1886	
Volume (vph)	70	1075	210	290	1190	120	400	10	230	100	95	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	71	1097	214	296	1214	122	408	10	235	102	97	5
RTOR Reduction (vph)	0	13	0	0	6	0	0	213	0	0	2	0
Lane Group Flow (vph)	71	1298	0	296	1330	0	408	32	0	102	100	0
Confl. Peds. (#/hr)	2					2			1	1		
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	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)	54.1	49.0		74.2	63.1		18.1	9.4		18.4	9.7	
Effective Green, g (s)	58.1	51.0		76.2	65.1		20.1	11.4		20.4	11.7	
Actuated g/C Ratio	0.48	0.42		0.64	0.54		0.17	0.10		0.17	0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	217	1448		382	1893		302	152		307	184	
v/s Ratio Prot	0.02	c0.38		c0.14	0.38		c0.23	0.02		0.06	c0.05	
v/s Ratio Perm	0.14			0.35								
v/c Ratio	0.33	0.90		0.77	0.70		1.35	0.21		0.33	0.54	
Uniform Delay, d1	18.1	32.1		34.4	20.3		50.0	50.2		43.8	51.6	
Progression Factor	0.78	0.55		1.27	0.53		1.00	1.00		0.87	0.88	
Incremental Delay, d2	0.7	6.4		8.1	1.0		178.3	3.2		0.6	10.7	
Delay (s)	14.8	24.1		51.8	11.8		228.2	53.3		38.8	55.9	
Level of Service	B	C		D	B		F	D		D	E	
Approach Delay (s)		23.6			19.1			162.6			47.4	
Approach LOS		C			B			F			D	

Intersection Summary			
HCM Average Control Delay	46.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1517	3406	3531		1787	1583
Flt Permitted	0.12	1.00	1.00		0.95	1.00
Satd. Flow (perm)	197	3406	3531		1787	1583
Volume (vph)	35	1360	1455	10	195	120
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	36	1388	1485	10	199	122
RTOR Reduction (vph)	0	0	0	0	0	104
Lane Group Flow (vph)	36	1388	1495	0	199	18
Heavy Vehicles (%)	19%	6%	2%	20%	1%	2%
Turn Type	pm+pt					Perm
Protected Phases	7	4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	94.3	94.3	86.1		17.7	17.7
Effective Green, g (s)	94.3	94.3	86.1		17.7	17.7
Actuated g/C Ratio	0.79	0.79	0.72		0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	201	2677	2533		264	233
v/s Ratio Prot	0.01	c0.41	c0.42		c0.11	
v/s Ratio Perm	0.13					0.01
v/c Ratio	0.18	0.52	0.59		0.75	0.08
Uniform Delay, d1	6.1	4.6	8.3		49.1	44.1
Progression Factor	3.02	0.83	0.49		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.9		11.5	0.1
Delay (s)	18.8	3.9	4.9		60.6	44.3
Level of Service	B	A	A		E	D
Approach Delay (s)		4.3	4.9		54.4	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3471	1568	1770	3539			1752	1538	1805	1710	
Flt Permitted	0.95	1.00	1.00	0.08	1.00			0.75	1.00	0.40	1.00	
Satd. Flow (perm)	1805	3471	1568	149	3539			1379	1538	766	1710	
Volume (vph)	5	1145	445	545	1270	0	180	0	205	25	5	10
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	1168	454	556	1296	0	184	0	209	26	5	10
RTOR Reduction (vph)	0	0	111	0	0	0	0	0	11	0	8	0
Lane Group Flow (vph)	5	1168	343	556	1296	0	0	184	198	26	7	0
Heavy Vehicles (%)	0%	4%	3%	2%	2%	0%	3%	0%	5%	0%	0%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	1.0	51.0	51.0	83.1	83.1			17.9	51.0	17.9	17.9	
Effective Green, g (s)	3.0	53.0	53.0	85.1	85.1			19.9	55.0	19.9	19.9	
Actuated g/C Ratio	0.02	0.44	0.44	0.71	0.71			0.17	0.46	0.17	0.17	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	45	1533	693	580	2510			229	756	127	284	
v/s Ratio Prot	0.00	c0.34		c0.28	0.37				0.08		0.00	
v/s Ratio Perm			0.22	c0.40				c0.13	0.05	0.03		
v/c Ratio	0.11	0.76	0.49	0.96	0.52			0.80	0.26	0.20	0.02	
Uniform Delay, d1	57.2	28.2	23.9	35.0	8.0			48.2	20.0	43.2	41.9	
Progression Factor	0.86	0.77	0.79	0.85	0.31			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	1.9	0.3	21.9	0.6			17.2	0.1	0.3	0.0	
Delay (s)	49.5	23.6	19.3	51.8	3.1			65.4	20.1	43.5	41.9	
Level of Service	D	C	B	D	A			E	C	D	D	
Approach Delay (s)		22.5			17.7			41.3			42.9	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
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		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3471	3523		1687	1583
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3471	3523		1687	1583
Volume (vph)	0	1345	1635	40	165	175
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1372	1668	41	168	179
RTOR Reduction (vph)	0	0	1	0	0	20
Lane Group Flow (vph)	0	1372	1708	0	168	159
Heavy Vehicles (%)	4%	4%	2%	6%	7%	2%
Turn Type	pm+pt					pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2					4
Actuated Green, G (s)		91.7	80.8		16.3	21.2
Effective Green, g (s)		93.7	82.8		18.3	25.2
Actuated g/C Ratio		0.78	0.69		0.15	0.21
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		2.5	2.5		2.5	2.0
Lane Grp Cap (vph)		2710	2431		257	385
v/s Ratio Prot		c0.40	c0.48		c0.10	0.02
v/s Ratio Perm						0.08
v/c Ratio		0.51	0.70		0.65	0.41
Uniform Delay, d1		4.8	11.2		47.9	41.0
Progression Factor		0.10	1.00		1.00	1.00
Incremental Delay, d2		0.5	0.9		5.2	0.3
Delay (s)		1.0	12.1		53.1	41.3
Level of Service		A	B		D	D
Approach Delay (s)		1.0	12.1		47.0	
Approach LOS		A	B		D	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	310	145	60	280	15	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	344	161	67	311	17	56
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			506		869	425
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			506		869	425
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		94	91
cM capacity (veh/h)			1049		303	631

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	506	378	72
Volume Left	0	67	17
Volume Right	161	0	56
cSH	1700	1049	505
Volume to Capacity	0.30	0.06	0.14
Queue Length 95th (ft)	0	5	12
Control Delay (s)	0.0	2.1	13.3
Lane LOS		A	B
Approach Delay (s)	0.0	2.1	13.3
Approach LOS			B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1698	1763	1553	1770	4902		1787	5073	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1881	1599	1698	1763	1553	1770	4902		1787	5073	
Volume (vph)	210	335	145	310	270	170	110	1470	100	335	2215	35
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)	221	353	153	326	284	179	116	1547	105	353	2332	37
RTOR Reduction (vph)	0	0	125	0	0	151	0	7	0	0	1	0
Lane Group Flow (vph)	221	353	28	299	311	28	116	1645	0	353	2368	0
Heavy Vehicles (%)	1%	1%	1%	1%	2%	4%	2%	5%	2%	1%	2%	2%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	11.0	11.0	11.0	17.0	17.0	17.0	10.8	50.0		22.0	61.2	
Effective Green, g (s)	12.8	12.8	12.8	18.8	18.8	18.8	12.1	52.3		23.3	63.5	
Actuated g/C Ratio	0.11	0.11	0.11	0.16	0.16	0.16	0.10	0.44		0.19	0.53	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	191	201	171	266	276	243	178	2136		347	2684	
v/s Ratio Prot	0.12	c0.19		0.18	c0.18		0.07	c0.34		c0.20	c0.47	
v/s Ratio Perm			0.02			0.02						
v/c Ratio	1.16	1.76	0.16	1.12	1.13	0.12	0.65	0.77		1.02	0.88	
Uniform Delay, d1	53.6	53.6	48.7	50.6	50.6	43.5	51.9	28.7		48.3	24.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.88	0.87	
Incremental Delay, d2	113.8	360.0	0.3	92.7	92.7	0.1	7.0	2.0		38.8	2.4	
Delay (s)	167.4	413.6	49.0	143.3	143.3	43.6	58.9	30.8		81.6	24.2	
Level of Service	F	F	D	F	F	D	E	C		F	C	
Approach Delay (s)		262.0			120.7			32.6			31.6	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM Average Control Delay	71.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	120.0	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

Alternative 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1770	3331		1736	3538			1759			1834	
Flt Permitted	0.95	1.00		0.95	1.00			0.52			0.95	
Satd. Flow (perm)	1770	3331		1736	3538			955			1760	
Volume (vph)	15	1205	160	125	2050	5	320	15	45	20	160	15
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	15	1230	163	128	2092	5	327	15	46	20	163	15
RTOR Reduction (vph)	0	7	0	0	0	0	0	4	0	0	2	0
Lane Group Flow (vph)	15	1386	0	128	2097	0	0	384	0	0	196	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	2%	5%	15%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.6	61.8		13.0	72.2			35.2			35.2	
Effective Green, g (s)	3.1	63.8		13.5	74.2			37.2			37.2	
Actuated g/C Ratio	0.02	0.50		0.11	0.59			0.29			0.29	
Clearance Time (s)	4.5	6.0		4.5	6.0			6.0			6.0	
Vehicle Extension (s)	2.3	4.8		2.3	4.8			2.5			2.5	
Lane Grp Cap (vph)	43	1680		185	2075			281			518	
v/s Ratio Prot	0.01	0.42		c0.07	c0.59							
v/s Ratio Perm								c0.40			0.11	
v/c Ratio	0.35	0.82		0.69	1.01			1.37			0.38	
Uniform Delay, d1	60.7	26.6		54.5	26.1			44.6			35.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.8	3.8		9.4	22.4			186.8			0.3	
Delay (s)	63.5	30.4		63.9	48.5			231.5			35.8	
Level of Service	E	C		E	D			F			D	
Approach Delay (s)		30.8			49.4			231.5			35.8	
Approach LOS		C			D			F			D	

Intersection Summary			
HCM Average Control Delay	59.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	126.5	Sum of lost time (s)	12.0
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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.97	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1624		3433	1551		1805	3438	1583	1719	3535	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1805	1624		3433	1551		1805	3438	1583	1719	3535	
Volume (vph)	25	5	35	220	5	120	30	1250	85	95	2295	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	26	5	36	224	5	122	31	1276	87	97	2342	20
RTOR Reduction (vph)	0	34	0	0	111	0	0	0	35	0	0	0
Lane Group Flow (vph)	26	7	0	224	16	0	31	1276	52	97	2362	0
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	0%	0%	0%	2%	50%	3%	0%	5%	2%	5%	2%	0%
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	7.3	4.3		12.0	9.0		4.6	68.4	68.4	14.8	78.6	
Effective Green, g (s)	7.3	6.3		12.0	11.0		5.1	70.4	70.4	15.3	80.6	
Actuated g/C Ratio	0.06	0.05		0.10	0.09		0.04	0.59	0.59	0.13	0.67	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.3	4.8	4.8	2.3	4.8	
Lane Grp Cap (vph)	110	85		343	142		77	2017	929	219	2374	
v/s Ratio Prot	c0.01	0.00		c0.07	0.01		0.02	c0.37		0.06	c0.67	
v/s Ratio Perm									0.03			
v/c Ratio	0.24	0.08		0.65	0.11		0.40	0.63	0.06	0.44	0.99	
Uniform Delay, d1	53.7	54.1		52.0	50.0		56.0	16.3	10.6	48.4	19.5	
Progression Factor	1.00	1.00		1.04	1.41		0.99	0.49	0.30	1.00	1.00	
Incremental Delay, d2	1.1	0.3		4.3	0.3		1.6	1.2	0.1	0.8	17.3	
Delay (s)	54.8	54.4		58.3	71.0		56.9	9.3	3.3	49.2	36.8	
Level of Service	D	D		E	E		E	A	A	D	D	
Approach Delay (s)		54.6			62.9			10.0			37.3	
Approach LOS		D			E			A			D	

Intersection Summary			
HCM Average Control Delay	30.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.3%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	*0.75	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Flt Permitted	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 (perm)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Volume (vph)	195	950	440	325	1770	475	610	995	180	255	705	200
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	199	969	449	332	1806	485	622	1015	184	260	719	204
RTOR Reduction (vph)	0	0	174	0	0	116	0	0	67	0	0	152
Lane Group Flow (vph)	199	969	275	332	1806	369	622	1015	117	260	719	52
Confl. Peds. (#/hr)									3	3		
Heavy Vehicles (%)	3%	4%	6%	6%	2%	2%	0%	3%	4%	12%	7%	4%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	11.1	42.7	42.7	15.9	47.5	47.5	19.4	32.0	32.0	9.4	22.0	22.0
Effective Green, g (s)	11.6	44.2	44.2	16.4	49.0	49.0	20.4	33.0	33.0	10.4	23.0	23.0
Actuated g/C Ratio	0.10	0.37	0.37	0.14	0.41	0.41	0.17	0.28	0.28	0.09	0.19	0.19
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7	4.7	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	329	1837	561	451	2076	646	595	761	414	271	647	298
v/s Ratio Prot	0.06	c0.19		0.10	c0.36		c0.18	c0.37		0.08	0.21	
v/s Ratio Perm			0.18			0.23			0.08			0.03
v/c Ratio	0.60	0.53	0.49	0.74	0.87	0.57	1.05	1.33	0.28	0.96	1.11	0.17
Uniform Delay, d1	52.0	29.7	29.2	49.7	32.6	27.4	49.8	43.5	34.2	54.6	48.5	40.6
Progression Factor	0.80	0.60	1.00	0.97	0.70	0.49	0.75	0.88	0.93	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.3	0.7	2.4	2.3	1.5	42.2	156.1	0.1	42.9	70.0	0.2
Delay (s)	43.3	18.1	29.9	50.8	24.9	15.0	79.4	194.4	32.1	97.5	118.5	40.7
Level of Service	D	B	C	D	C	B	E	F	C	F	F	D
Approach Delay (s)		24.5			26.4			138.7			100.5	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	66.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.0	4.0		4.0	4.0		4.0	8.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.99		1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	3276		1805	3484		1805	1661		1805	1900	1481
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	3276		1805	3484		1805	1661		1805	1900	1481
Volume (vph)	70	1210	190	115	1560	65	135	30	65	55	25	85
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	71	1235	194	117	1592	66	138	31	66	56	26	87
RTOR Reduction (vph)	0	8	0	0	2	0	0	60	0	0	0	82
Lane Group Flow (vph)	71	1421	0	117	1656	0	138	37	0	56	26	5
Confl. Peds. (#/hr)			4	4			27					27
Heavy Vehicles (%)	0%	8%	4%	0%	3%	3%	0%	0%	4%	0%	0%	2%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	7.9	68.1		11.1	71.0		10.9	12.6		4.3	5.6	5.6
Effective Green, g (s)	6.2	70.0		13.1	72.9		13.6	10.3		6.6	7.3	7.3
Actuated g/C Ratio	0.05	0.58		0.11	0.61		0.11	0.09		0.06	0.06	0.06
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7		6.3	5.7	5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8		2.7	1.8	1.8
Lane Grp Cap (vph)	181	1911		197	2117		205	143		99	116	90
v/s Ratio Prot	0.02	c0.43		0.06	c0.48		c0.08	0.02		0.03	c0.01	
v/s Ratio Perm												0.00
v/c Ratio	0.39	0.74		0.59	0.78		0.67	0.26		0.57	0.22	0.06
Uniform Delay, d1	55.1	18.4		50.9	17.6		51.1	51.3		55.3	53.7	53.1
Progression Factor	1.06	0.52		0.90	0.80		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	1.2		2.6	1.8		7.8	0.3		6.4	0.4	0.1
Delay (s)	58.8	10.9		48.2	16.0		58.9	51.6		61.7	54.0	53.2
Level of Service	E	B		D	B		E	D		E	D	D
Approach Delay (s)		13.1			18.1			55.9			56.2	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.2%	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		↑↑↱			↑↑↱				↱			↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1135	210	0	1665	15	0	0	220	0	0	15
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	1158	214	0	1699	15	0	0	224	0	0	15
Pedestrians		1			7			4			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		597			688							
pX, platoon unblocked	0.72			0.70			0.84	0.84	0.70	0.84	0.84	0.72
vC, conflicting volume	1715			1376			2135	2985	697	2518	3084	859
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1605			1107			1159	2172	134	1616	2291	415
tC, single (s)	4.1			4.2			7.6	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	64	100	100	96
cM capacity (veh/h)	297			432			117	39	618	37	33	425

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	772	600	1133	582	224	15
Volume Left	0	0	0	0	0	0
Volume Right	0	214	0	15	224	15
cSH	1700	1700	1700	1700	618	425
Volume to Capacity	0.45	0.35	0.67	0.34	0.36	0.04
Queue Length 95th (ft)	0	0	0	0	41	3
Control Delay (s)	0.0	0.0	0.0	0.0	14.1	13.8
Lane LOS					B	B
Approach Delay (s)	0.0		0.0		14.1	13.8
Approach LOS					B	B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	59.2%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.86		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3405		1805	3494		1805	1603		1805	1887	
Flt Permitted	0.14	1.00		0.07	1.00		0.00	1.00		0.00	1.00	
Satd. Flow (perm)	262	3405		139	3494		0	1603		0	1887	
Volume (vph)	60	1075	220	295	1195	110	400	10	230	100	100	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	61	1097	224	301	1219	112	408	10	235	102	102	5
RTOR Reduction (vph)	0	13	0	0	5	0	0	213	0	0	2	0
Lane Group Flow (vph)	61	1308	0	301	1326	0	408	32	0	102	105	0
Confl. Peds. (#/hr)	2					2			1	1		
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	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)	53.4	48.5		73.8	62.9		18.2	9.4		18.8	10.0	
Effective Green, g (s)	57.4	50.5		75.8	64.9		20.2	11.4		20.8	12.0	
Actuated g/C Ratio	0.48	0.42		0.63	0.54		0.17	0.10		0.17	0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	214	1433		384	1890		304	152		313	189	
v/s Ratio Prot	0.02	c0.38		c0.14	0.38		c0.23	0.02		0.06	c0.06	
v/s Ratio Perm	0.12			0.36								
v/c Ratio	0.29	0.91		0.78	0.70		1.34	0.21		0.33	0.56	
Uniform Delay, d1	18.3	32.7		34.7	20.4		49.9	50.2		43.5	51.5	
Progression Factor	0.66	0.56		1.26	0.53		1.00	1.00		0.88	0.88	
Incremental Delay, d2	0.6	7.6		8.6	1.0		174.4	3.2		0.6	11.1	
Delay (s)	12.6	26.0		52.2	11.7		224.3	53.3		38.9	56.5	
Level of Service	B	C		D	B		F	D		D	E	
Approach Delay (s)		25.4			19.2			160.2			47.9	
Approach LOS		C			B			F			D	

Intersection Summary			
HCM Average Control Delay	46.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1517	3406	3524		1787	1583
Flt Permitted	0.12	1.00	1.00		0.95	1.00
Satd. Flow (perm)	197	3406	3524		1787	1583
Volume (vph)	35	1360	1445	20	195	115
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	36	1388	1474	20	199	117
RTOR Reduction (vph)	0	0	1	0	0	100
Lane Group Flow (vph)	36	1388	1493	0	199	17
Heavy Vehicles (%)	19%	6%	2%	20%	1%	2%
Turn Type	pm+pt					Perm
Protected Phases	7	4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	94.3	94.3	86.1		17.7	17.7
Effective Green, g (s)	94.3	94.3	86.1		17.7	17.7
Actuated g/C Ratio	0.79	0.79	0.72		0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	201	2677	2528		264	233
v/s Ratio Prot	0.01	c0.41	c0.42		c0.11	
v/s Ratio Perm	0.13					0.01
v/c Ratio	0.18	0.52	0.59		0.75	0.07
Uniform Delay, d1	6.1	4.6	8.3		49.1	44.1
Progression Factor	3.07	0.85	0.53		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.9		11.5	0.1
Delay (s)	19.0	4.1	5.3		60.6	44.2
Level of Service	B	A	A		E	D
Approach Delay (s)		4.4	5.3		54.5	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱			↰↑	↱	↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3471	1568	1770	3539			1752	1538	1805	1710	
Flt Permitted	0.95	1.00	1.00	0.08	1.00			0.75	1.00	0.40	1.00	
Satd. Flow (perm)	1805	3471	1568	150	3539			1379	1538	766	1710	
Volume (vph)	5	1135	455	550	1265	0	180	0	205	25	5	10
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	1158	464	561	1291	0	184	0	209	26	5	10
RTOR Reduction (vph)	0	0	116	0	0	0	0	0	11	0	8	0
Lane Group Flow (vph)	5	1158	348	561	1291	0	0	184	198	26	7	0
Heavy Vehicles (%)	0%	4%	3%	2%	2%	0%	3%	0%	5%	0%	0%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	1.0	50.7	50.7	83.1	83.1			17.9	51.3	17.9	17.9	
Effective Green, g (s)	3.0	52.7	52.7	85.1	85.1			19.9	55.3	19.9	19.9	
Actuated g/C Ratio	0.02	0.44	0.44	0.71	0.71			0.17	0.46	0.17	0.17	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	45	1524	689	584	2510			229	760	127	284	
v/s Ratio Prot	0.00	c0.33		c0.28	0.36				0.08		0.00	
v/s Ratio Perm			0.22	c0.40				c0.13	0.05	0.03		
v/c Ratio	0.11	0.76	0.51	0.96	0.51			0.80	0.26	0.20	0.02	
Uniform Delay, d1	57.2	28.3	24.3	35.0	8.0			48.2	19.8	43.2	41.9	
Progression Factor	0.86	0.76	0.79	0.88	0.31			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	1.8	0.4	22.1	0.5			17.2	0.1	0.3	0.0	
Delay (s)	49.4	23.3	19.4	52.7	3.0			65.4	19.9	43.5	41.9	
Level of Service	D	C	B	D	A			E	B	D	D	
Approach Delay (s)		22.3			18.1			41.2			42.9	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
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		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3471	3523		1687	1583
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3471	3523		1687	1583
Volume (vph)	0	1340	1640	40	185	175
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1367	1673	41	189	179
RTOR Reduction (vph)	0	0	1	0	0	19
Lane Group Flow (vph)	0	1367	1713	0	189	160
Heavy Vehicles (%)	4%	4%	2%	6%	7%	2%
Turn Type	pm+pt					pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2					4
Actuated Green, G (s)		90.2	79.3		17.8	22.7
Effective Green, g (s)		92.2	81.3		19.8	26.7
Actuated g/C Ratio		0.77	0.68		0.16	0.22
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		2.5	2.5		2.5	2.0
Lane Grp Cap (vph)		2667	2387		278	405
v/s Ratio Prot		c0.39	c0.49		c0.11	0.02
v/s Ratio Perm						0.08
v/c Ratio		0.51	0.72		0.68	0.39
Uniform Delay, d1		5.3	12.1		47.1	39.8
Progression Factor		0.10	1.00		1.00	1.00
Incremental Delay, d2		0.5	1.0		5.9	0.2
Delay (s)		1.0	13.1		53.0	40.0
Level of Service		A	B		D	D
Approach Delay (s)		1.0	13.1		46.7	
Approach LOS		A	B		D	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	330	145	50	285	25	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	367	161	56	317	28	56
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			528		875	447
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			528		875	447
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		91	91
cM capacity (veh/h)			1029		304	613

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	528	372	83
Volume Left	0	56	28
Volume Right	161	0	56
cSH	1700	1029	458
Volume to Capacity	0.31	0.05	0.18
Queue Length 95th (ft)	0	4	16
Control Delay (s)	0.0	1.8	14.6
Lane LOS		A	B
Approach Delay (s)	0.0	1.8	14.6
Approach LOS			B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1698	1764	1553	1770	4902		1787	5075	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1881	1599	1698	1764	1553	1770	4902		1787	5075	
Volume (vph)	215	335	145	310	275	170	115	1470	100	335	2225	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)	226	353	153	326	289	179	121	1547	105	353	2342	32
RTOR Reduction (vph)	0	0	125	0	0	151	0	7	0	0	1	0
Lane Group Flow (vph)	226	353	28	301	314	28	121	1645	0	353	2373	0
Heavy Vehicles (%)	1%	1%	1%	1%	2%	4%	2%	5%	2%	1%	2%	2%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	11.0	11.0	11.0	17.0	17.0	17.0	10.9	50.0		22.0	61.1	
Effective Green, g (s)	12.8	12.8	12.8	18.8	18.8	18.8	12.2	52.3		23.3	63.4	
Actuated g/C Ratio	0.11	0.11	0.11	0.16	0.16	0.16	0.10	0.44		0.19	0.53	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	191	201	171	266	276	243	180	2136		347	2681	
v/s Ratio Prot	0.13	c0.19		0.18	c0.18		0.07	c0.34		c0.20	c0.47	
v/s Ratio Perm			0.02			0.02						
v/c Ratio	1.18	1.76	0.16	1.13	1.14	0.12	0.67	0.77		1.02	0.89	
Uniform Delay, d1	53.6	53.6	48.7	50.6	50.6	43.5	52.0	28.7		48.3	25.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.89	0.88	
Incremental Delay, d2	123.2	360.0	0.3	95.3	96.5	0.1	8.2	2.0		38.6	2.5	
Delay (s)	176.8	413.6	49.0	145.9	147.1	43.6	60.2	30.8		81.4	24.4	
Level of Service	F	F	D	F	F	D	E	C		F	C	
Approach Delay (s)		264.3			123.3			32.8			31.8	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM Average Control Delay	72.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Alternative 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1770	3338		1736	3538			1763			1834	
Flt Permitted	0.95	1.00		0.95	1.00			0.51			0.95	
Satd. Flow (perm)	1770	3338		1736	3538			947			1760	
Volume (vph)	15	1220	150	125	2060	5	325	15	35	20	160	15
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	15	1245	153	128	2102	5	332	15	36	20	163	15
RTOR Reduction (vph)	0	7	0	0	0	0	0	3	0	0	2	0
Lane Group Flow (vph)	15	1391	0	128	2107	0	0	380	0	0	196	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	2%	5%	15%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.6	61.8		13.0	72.2			35.2			35.2	
Effective Green, g (s)	3.1	63.8		13.5	74.2			37.2			37.2	
Actuated g/C Ratio	0.02	0.50		0.11	0.59			0.29			0.29	
Clearance Time (s)	4.5	6.0		4.5	6.0			6.0			6.0	
Vehicle Extension (s)	2.3	4.8		2.3	4.8			2.5			2.5	
Lane Grp Cap (vph)	43	1684		185	2075			278			518	
v/s Ratio Prot	0.01	0.42		c0.07	c0.60							
v/s Ratio Perm								c0.40			0.11	
v/c Ratio	0.35	0.83		0.69	1.02			1.37			0.38	
Uniform Delay, d1	60.7	26.6		54.5	26.1			44.6			35.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.8	3.9		9.4	23.7			186.7			0.3	
Delay (s)	63.5	30.5		63.9	49.8			231.4			35.8	
Level of Service	E	C		E	D			F			D	
Approach Delay (s)		30.8			50.6			231.4			35.8	
Approach LOS		C			D			F			D	

Intersection Summary			
HCM Average Control Delay	59.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	126.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.1%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.97	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.87		1.00	0.85		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1625		3433	1555		1805	3438	1583	1719	3534	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1805	1625		3433	1555		1805	3438	1583	1719	3534	
Volume (vph)	25	5	35	260	5	160	30	1210	140	145	2255	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	26	5	36	265	5	163	31	1235	143	148	2301	20
RTOR Reduction (vph)	0	34	0	0	147	0	0	0	61	0	0	0
Lane Group Flow (vph)	26	7	0	265	21	0	31	1235	82	148	2321	0
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	0%	0%	0%	2%	50%	3%	0%	5%	2%	5%	2%	0%
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	7.1	4.6		12.5	10.0		4.6	67.2	67.2	15.2	77.8	
Effective Green, g (s)	7.1	6.6		12.5	12.0		5.1	69.2	69.2	15.7	79.8	
Actuated g/C Ratio	0.06	0.06		0.10	0.10		0.04	0.58	0.58	0.13	0.66	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.3	4.8	4.8	2.3	4.8	
Lane Grp Cap (vph)	107	89		358	156		77	1983	913	225	2350	
v/s Ratio Prot	c0.01	0.00		c0.08	0.01		0.02	c0.36		0.09	c0.66	
v/s Ratio Perm									0.05			
v/c Ratio	0.24	0.08		0.74	0.14		0.40	0.62	0.09	0.66	0.99	
Uniform Delay, d1	53.9	53.8		52.2	49.3		56.0	16.8	11.3	49.6	19.6	
Progression Factor	1.00	1.00		1.04	1.51		0.98	0.47	0.44	1.00	1.00	
Incremental Delay, d2	1.2	0.3		7.8	0.3		1.6	1.2	0.2	5.7	15.9	
Delay (s)	55.1	54.1		62.2	74.5		56.6	9.1	5.2	55.3	35.5	
Level of Service	E	D		E	E		E	A	A	E	D	
Approach Delay (s)		54.5			66.9			9.7			36.7	
Approach LOS		D			E			A			D	

Intersection Summary			
HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	*0.75	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Flt Permitted	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 (perm)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Volume (vph)	195	970	435	330	1775	480	615	1000	190	255	720	195
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	199	990	444	337	1811	490	628	1020	194	260	735	199
RTOR Reduction (vph)	0	0	173	0	0	116	0	0	70	0	0	152
Lane Group Flow (vph)	199	990	271	337	1811	374	628	1020	124	260	735	47
Confl. Peds. (#/hr)									3	3		
Heavy Vehicles (%)	3%	4%	6%	6%	2%	2%	0%	3%	4%	12%	7%	4%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	11.1	42.6	42.6	16.1	47.6	47.6	19.3	32.0	32.0	9.3	22.0	22.0
Effective Green, g (s)	11.6	44.1	44.1	16.6	49.1	49.1	20.3	33.0	33.0	10.3	23.0	23.0
Actuated g/C Ratio	0.10	0.37	0.37	0.14	0.41	0.41	0.17	0.28	0.28	0.09	0.19	0.19
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7	4.7	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	329	1833	560	457	2081	648	592	761	414	268	647	298
v/s Ratio Prot	0.06	c0.20		0.10	c0.36		c0.18	c0.37		0.08	0.22	
v/s Ratio Perm			0.18			0.24			0.08			0.03
v/c Ratio	0.60	0.54	0.48	0.74	0.87	0.58	1.06	1.34	0.30	0.97	1.14	0.16
Uniform Delay, d1	52.0	29.9	29.2	49.6	32.5	27.4	49.8	43.5	34.4	54.7	48.5	40.4
Progression Factor	0.80	0.60	0.98	0.98	0.72	0.50	0.76	0.84	0.92	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.3	0.7	2.4	2.4	1.6	47.4	159.0	0.2	46.5	79.2	0.1
Delay (s)	43.3	18.3	29.4	50.9	25.8	15.4	85.3	195.5	31.6	101.2	127.7	40.6
Level of Service	D	B	C	D	C	B	F	F	C	F	F	D
Approach Delay (s)		24.4			27.1			140.6			107.4	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	68.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.6%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.99		1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	3277		1805	3484		1805	1661		1805	1900	1481
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	3277		1805	3484		1805	1661		1805	1900	1481
Volume (vph)	70	1225	190	115	1590	65	140	30	65	55	35	80
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	71	1250	194	117	1622	66	143	31	66	56	36	82
RTOR Reduction (vph)	0	8	0	0	2	0	0	58	0	0	0	77
Lane Group Flow (vph)	71	1436	0	117	1686	0	143	39	0	56	36	5
Confl. Peds. (#/hr)			4	4			27					27
Heavy Vehicles (%)	0%	8%	4%	0%	3%	3%	0%	0%	4%	0%	0%	2%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	6.5	67.2		11.7	72.1		11.0	13.1		4.1	5.8	5.8
Effective Green, g (s)	8.8	69.1		13.7	74.0		13.7	14.8		6.4	7.5	7.5
Actuated g/C Ratio	0.07	0.58		0.11	0.62		0.11	0.12		0.05	0.06	0.06
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7		6.3	5.7	5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8		2.7	1.8	1.8
Lane Grp Cap (vph)	257	1887		206	2148		206	205		96	119	93
v/s Ratio Prot	0.02	c0.44		0.06	c0.48		c0.08	0.02		0.03	c0.02	
v/s Ratio Perm												0.00
v/c Ratio	0.28	0.76		0.57	0.78		0.69	0.19		0.58	0.30	0.06
Uniform Delay, d1	52.6	19.2		50.3	17.1		51.1	47.2		55.5	53.8	52.9
Progression Factor	0.95	0.55		0.89	0.80		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	1.3		1.8	1.7		9.1	0.2		7.9	0.5	0.1
Delay (s)	50.3	11.8		46.9	15.5		60.3	47.4		63.4	54.3	53.0
Level of Service	D	B		D	B		E	D		E	D	D
Approach Delay (s)		13.6			17.5			55.1			56.6	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.7%	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		↑↑↱			↑↑↱				↱			↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1150	200	0	1695	15	0	0	235	0	0	15
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	1173	204	0	1730	15	0	0	240	0	0	15
Pedestrians		1			7			4			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		597			688							
pX, platoon unblocked	0.71			0.69			0.83	0.83	0.69	0.83	0.83	0.71
vC, conflicting volume	1746			1382			2161	3025	700	2572	3120	874
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1643			1098			1150	2192	103	1645	2306	418
tC, single (s)	4.1			4.2			7.6	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	62	100	100	96
cM capacity (veh/h)	284			428			118	38	635	34	32	419

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	782	595	1153	592	240	15
Volume Left	0	0	0	0	0	0
Volume Right	0	204	0	15	240	15
cSH	1700	1700	1700	1700	635	419
Volume to Capacity	0.46	0.35	0.68	0.35	0.38	0.04
Queue Length 95th (ft)	0	0	0	0	44	3
Control Delay (s)	0.0	0.0	0.0	0.0	14.1	13.9
Lane LOS					B	B
Approach Delay (s)	0.0		0.0		14.1	13.9
Approach LOS					B	B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	60.2%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.86		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3404		1805	3491		1805	1609		1805	1887	
Flt Permitted	0.13	1.00		0.07	1.00		0.00	1.00		0.00	1.00	
Satd. Flow (perm)	244	3404		137	3491		0	1609		0	1887	
Volume (vph)	75	1090	225	290	1215	120	405	15	230	105	100	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	77	1112	230	296	1240	122	413	15	235	107	102	5
RTOR Reduction (vph)	0	14	0	0	5	0	0	213	0	0	2	0
Lane Group Flow (vph)	77	1328	0	296	1357	0	413	37	0	107	105	0
Confl. Peds. (#/hr)	2					2			1	1		
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	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)	54.4	49.4		74.3	63.3		17.6	9.2		18.5	10.1	
Effective Green, g (s)	58.4	51.4		76.3	65.3		19.6	11.2		20.5	12.1	
Actuated g/C Ratio	0.49	0.43		0.64	0.54		0.16	0.09		0.17	0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	210	1458		378	1900		295	150		308	190	
v/s Ratio Prot	0.02	c0.39		c0.14	0.39		c0.23	0.02		0.06	c0.06	
v/s Ratio Perm	0.16			0.36								
v/c Ratio	0.37	0.91		0.78	0.71		1.40	0.25		0.35	0.55	
Uniform Delay, d1	18.3	32.2		34.8	20.4		50.2	50.5		43.9	51.4	
Progression Factor	0.96	0.54		1.27	0.53		1.00	1.00		0.91	0.91	
Incremental Delay, d2	0.9	7.5		8.6	1.1		199.3	3.9		0.6	10.2	
Delay (s)	18.5	24.8		52.9	11.8		249.5	54.4		40.3	56.7	
Level of Service	B	C		D	B		F	D		D	E	
Approach Delay (s)		24.5			19.1			175.9			48.5	
Approach LOS		C			B			F			D	

Intersection Summary			
HCM Average Control Delay	48.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1517	3406	3532		1787	1583
Flt Permitted	0.12	1.00	1.00		0.95	1.00
Satd. Flow (perm)	191	3406	3532		1787	1583
Volume (vph)	35	1380	1475	10	195	120
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	36	1408	1505	10	199	122
RTOR Reduction (vph)	0	0	0	0	0	104
Lane Group Flow (vph)	36	1408	1515	0	199	18
Heavy Vehicles (%)	19%	6%	2%	20%	1%	2%
Turn Type	pm+pt					Perm
Protected Phases	7	4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	94.3	94.3	86.1		17.7	17.7
Effective Green, g (s)	94.3	94.3	86.1		17.7	17.7
Actuated g/C Ratio	0.79	0.79	0.72		0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	197	2677	2534		264	233
v/s Ratio Prot	0.01	c0.41	c0.43		c0.11	
v/s Ratio Perm	0.14					0.01
v/c Ratio	0.18	0.53	0.60		0.75	0.08
Uniform Delay, d1	6.3	4.7	8.4		49.1	44.1
Progression Factor	3.06	0.85	0.52		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.9		11.5	0.1
Delay (s)	19.5	4.1	5.3		60.6	44.3
Level of Service	B	A	A		E	D
Approach Delay (s)		4.5	5.3		54.4	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3471	1568	1770	3539			1752	1538	1805	1710	
Flt Permitted	0.95	1.00	1.00	0.08	1.00			0.75	1.00	0.40	1.00	
Satd. Flow (perm)	1805	3471	1568	149	3539			1379	1538	766	1710	
Volume (vph)	5	1155	460	550	1280	0	180	0	205	25	5	10
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	1179	469	561	1306	0	184	0	209	26	5	10
RTOR Reduction (vph)	0	0	114	0	0	0	0	0	11	0	8	0
Lane Group Flow (vph)	5	1179	355	561	1306	0	0	184	198	26	7	0
Heavy Vehicles (%)	0%	4%	3%	2%	2%	0%	3%	0%	5%	0%	0%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	1.0	50.9	50.9	83.1	83.1			17.9	51.1	17.9	17.9	
Effective Green, g (s)	3.0	52.9	52.9	85.1	85.1			19.9	55.1	19.9	19.9	
Actuated g/C Ratio	0.02	0.44	0.44	0.71	0.71			0.17	0.46	0.17	0.17	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	45	1530	691	581	2510			229	757	127	284	
v/s Ratio Prot	0.00	c0.34		c0.28	0.37				0.08		0.00	
v/s Ratio Perm			0.23	c0.40				c0.13	0.05	0.03		
v/c Ratio	0.11	0.77	0.51	0.97	0.52			0.80	0.26	0.20	0.02	
Uniform Delay, d1	57.2	28.4	24.3	35.2	8.0			48.2	19.9	43.2	41.9	
Progression Factor	0.88	0.76	0.79	0.87	0.30			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	2.0	0.4	23.1	0.6			17.2	0.1	0.3	0.0	
Delay (s)	50.6	23.8	19.5	53.8	3.0			65.4	20.0	43.5	41.9	
Level of Service	D	C	B	D	A			E	C	D	D	
Approach Delay (s)		22.6			18.3			41.3			42.9	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
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		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3471	3523		1687	1583
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3471	3523		1687	1583
Volume (vph)	0	1355	1655	40	175	175
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1383	1689	41	179	179
RTOR Reduction (vph)	0	0	1	0	0	19
Lane Group Flow (vph)	0	1383	1729	0	179	160
Heavy Vehicles (%)	4%	4%	2%	6%	7%	2%
Turn Type	pm+pt					pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2					4
Actuated Green, G (s)		90.9	80.0		17.1	22.0
Effective Green, g (s)		92.9	82.0		19.1	26.0
Actuated g/C Ratio		0.77	0.68		0.16	0.22
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		2.5	2.5		2.5	2.0
Lane Grp Cap (vph)		2687	2407		269	396
v/s Ratio Prot		c0.40	c0.49		c0.11	0.02
v/s Ratio Perm						0.08
v/c Ratio		0.51	0.72		0.67	0.40
Uniform Delay, d1		5.1	11.8		47.4	40.4
Progression Factor		0.09	1.00		1.00	1.00
Incremental Delay, d2		0.5	1.0		5.5	0.2
Delay (s)		1.0	12.8		52.9	40.6
Level of Service		A	B		D	D
Approach Delay (s)		1.0	12.8		46.8	
Approach LOS		A	B		D	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	320	150	50	290	15	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	356	167	56	322	17	56
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			522		872	439
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			522		872	439
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		95	91
cM capacity (veh/h)			1034		305	620

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	522	378	72
Volume Left	0	56	17
Volume Right	167	0	56
cSH	1700	1034	501
Volume to Capacity	0.31	0.05	0.14
Queue Length 95th (ft)	0	4	13
Control Delay (s)	0.0	1.8	13.4
Lane LOS		A	B
Approach Delay (s)	0.0	1.8	13.4
Approach LOS			B

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1698	1763	1553	1770	4900		1787	5075	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1881	1599	1698	1763	1553	1770	4900		1787	5075	
Volume (vph)	210	350	140	315	275	175	110	1480	105	340	2225	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)	221	368	147	332	289	184	116	1558	111	358	2342	32
RTOR Reduction (vph)	0	0	115	0	0	155	0	7	0	0	1	0
Lane Group Flow (vph)	221	368	32	304	317	29	116	1662	0	358	2373	0
Heavy Vehicles (%)	1%	1%	1%	1%	2%	4%	2%	5%	2%	1%	2%	2%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	11.0	11.0	11.0	17.0	17.0	17.0	10.8	49.9		22.1	61.2	
Effective Green, g (s)	12.8	12.8	12.8	18.8	18.8	18.8	12.1	52.2		23.4	63.5	
Actuated g/C Ratio	0.11	0.11	0.11	0.16	0.16	0.16	0.10	0.44		0.19	0.53	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	191	201	171	266	276	243	178	2132		348	2686	
v/s Ratio Prot	0.12	c0.20		0.18	c0.18		0.07	c0.34		c0.20	c0.47	
v/s Ratio Perm			0.02			0.02						
v/c Ratio	1.16	1.83	0.19	1.14	1.15	0.12	0.65	0.78		1.03	0.88	
Uniform Delay, d1	53.6	53.6	48.9	50.6	50.6	43.5	51.9	29.0		48.3	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.89	0.88	
Incremental Delay, d2	113.8	392.7	0.3	99.3	100.4	0.1	7.0	2.1		41.4	2.4	
Delay (s)	167.4	446.3	49.2	149.9	151.0	43.6	58.9	31.1		84.3	24.4	
Level of Service	F	F	D	F	F	D	E	C		F	C	
Approach Delay (s)		283.2			126.1			32.9			32.3	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM Average Control Delay	75.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Alternative 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1770	3335		1736	3538			1759			1834	
Flt Permitted	0.95	1.00		0.95	1.00			0.52			0.95	
Satd. Flow (perm)	1770	3335		1736	3538			955			1760	
Volume (vph)	15	1210	155	125	2055	5	320	15	45	20	160	15
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	15	1235	158	128	2097	5	327	15	46	20	163	15
RTOR Reduction (vph)	0	7	0	0	0	0	0	4	0	0	2	0
Lane Group Flow (vph)	15	1386	0	128	2102	0	0	384	0	0	196	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	2%	5%	15%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.6	61.8		13.0	72.2			35.2			35.2	
Effective Green, g (s)	3.1	63.8		13.5	74.2			37.2			37.2	
Actuated g/C Ratio	0.02	0.50		0.11	0.59			0.29			0.29	
Clearance Time (s)	4.5	6.0		4.5	6.0			6.0			6.0	
Vehicle Extension (s)	2.3	4.8		2.3	4.8			2.5			2.5	
Lane Grp Cap (vph)	43	1682		185	2075			281			518	
v/s Ratio Prot	0.01	0.42		c0.07	c0.59							
v/s Ratio Perm								c0.40			0.11	
v/c Ratio	0.35	0.82		0.69	1.01			1.37			0.38	
Uniform Delay, d1	60.7	26.6		54.5	26.1			44.6			35.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.8	3.8		9.4	23.0			186.8			0.3	
Delay (s)	63.5	30.4		63.9	49.2			231.5			35.8	
Level of Service	E	C		E	D			F			D	
Approach Delay (s)		30.7			50.0			231.5			35.8	
Approach LOS		C			D			F			D	

Intersection Summary			
HCM Average Control Delay	59.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	126.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.3%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.97	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1624		3433	1553		1805	3438	1583	1719	3535	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1805	1624		3433	1553		1805	3438	1583	1719	3535	
Volume (vph)	25	5	35	240	5	135	30	1230	120	115	2280	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	26	5	36	245	5	138	31	1255	122	117	2327	20
RTOR Reduction (vph)	0	34	0	0	125	0	0	0	50	0	0	0
Lane Group Flow (vph)	26	7	0	245	18	0	31	1255	72	117	2347	0
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	0%	0%	0%	2%	50%	3%	0%	5%	2%	5%	2%	0%
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	7.3	4.4		12.3	9.4		4.6	68.0	68.0	14.8	78.2	
Effective Green, g (s)	7.3	6.4		12.3	11.4		5.1	70.0	70.0	15.3	80.2	
Actuated g/C Ratio	0.06	0.05		0.10	0.10		0.04	0.58	0.58	0.13	0.67	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.3	4.8	4.8	2.3	4.8	
Lane Grp Cap (vph)	110	87		352	148		77	2006	923	219	2363	
v/s Ratio Prot	c0.01	0.00		c0.07	0.01		0.02	c0.37		0.07	c0.66	
v/s Ratio Perm									0.05			
v/c Ratio	0.24	0.08		0.70	0.12		0.40	0.63	0.08	0.53	0.99	
Uniform Delay, d1	53.7	54.0		52.0	49.7		56.0	16.4	10.9	49.0	19.6	
Progression Factor	1.00	1.00		1.04	1.46		1.00	0.48	0.37	1.00	1.00	
Incremental Delay, d2	1.1	0.3		5.7	0.3		1.6	1.2	0.1	1.7	17.0	
Delay (s)	54.8	54.3		59.8	72.7		57.4	9.0	4.2	50.7	36.6	
Level of Service	D	D		E	E		E	A	A	D	D	
Approach Delay (s)		54.5			64.5			9.7			37.3	
Approach LOS		D			E			A			D	

Intersection Summary			
HCM Average Control Delay	31.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.4%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	*0.75	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Flt Permitted	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 (perm)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Volume (vph)	195	970	445	330	1785	480	620	1000	185	255	715	190
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	199	990	454	337	1821	490	633	1020	189	260	730	194
RTOR Reduction (vph)	0	0	173	0	0	116	0	0	68	0	0	152
Lane Group Flow (vph)	199	990	281	337	1821	374	633	1020	121	260	730	42
Confl. Peds. (#/hr)									3	3		
Heavy Vehicles (%)	3%	4%	6%	6%	2%	2%	0%	3%	4%	12%	7%	4%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	11.1	42.7	42.7	16.0	47.6	47.6	19.3	32.0	32.0	9.3	22.0	22.0
Effective Green, g (s)	11.6	44.2	44.2	16.5	49.1	49.1	20.3	33.0	33.0	10.3	23.0	23.0
Actuated g/C Ratio	0.10	0.37	0.37	0.14	0.41	0.41	0.17	0.28	0.28	0.09	0.19	0.19
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7	4.7	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	329	1837	561	454	2081	648	592	761	414	268	647	298
v/s Ratio Prot	0.06	c0.20		0.10	c0.36		c0.18	c0.37		0.08	0.22	
v/s Ratio Perm			0.18			0.24			0.08			0.03
v/c Ratio	0.60	0.54	0.50	0.74	0.88	0.58	1.07	1.34	0.29	0.97	1.13	0.14
Uniform Delay, d1	52.0	29.9	29.4	49.7	32.6	27.4	49.8	43.5	34.3	54.7	48.5	40.3
Progression Factor	0.81	0.61	0.99	0.98	0.71	0.50	0.76	0.87	0.92	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.3	0.8	2.6	2.4	1.6	50.3	159.1	0.2	46.5	76.3	0.1
Delay (s)	43.4	18.4	29.7	51.0	25.6	15.2	88.3	196.8	31.7	101.2	124.8	40.4
Level of Service	D	B	C	D	C	B	F	F	C	F	F	D
Approach Delay (s)		24.6			26.9			142.5			105.8	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	68.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.8%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.99		1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	3277		1805	3484		1805	1661		1805	1900	1481
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	3277		1805	3484		1805	1661		1805	1900	1481
Volume (vph)	70	1225	190	115	1585	65	135	30	65	55	30	85
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	71	1250	194	117	1617	66	138	31	66	56	31	87
RTOR Reduction (vph)	0	9	0	0	2	0	0	58	0	0	0	82
Lane Group Flow (vph)	71	1435	0	117	1681	0	138	39	0	56	31	5
Confl. Peds. (#/hr)			4	4			27					27
Heavy Vehicles (%)	0%	8%	4%	0%	3%	3%	0%	0%	4%	0%	0%	2%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	6.5	66.8		12.3	72.3		10.9	12.9		4.1	5.7	5.7
Effective Green, g (s)	8.8	68.7		14.3	74.2		13.6	14.6		6.4	7.4	7.4
Actuated g/C Ratio	0.07	0.57		0.12	0.62		0.11	0.12		0.05	0.06	0.06
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7		6.3	5.7	5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8		2.7	1.8	1.8
Lane Grp Cap (vph)	257	1876		215	2154		205	202		96	117	91
v/s Ratio Prot	0.02	c0.44		0.06	c0.48		c0.08	0.02		0.03	c0.02	
v/s Ratio Perm												0.00
v/c Ratio	0.28	0.77		0.54	0.78		0.67	0.19		0.58	0.26	0.06
Uniform Delay, d1	52.6	19.5		49.8	16.9		51.1	47.4		55.5	53.7	53.0
Progression Factor	0.96	0.54		0.90	0.80		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	1.3		1.4	1.7		7.8	0.2		7.9	0.4	0.1
Delay (s)	51.0	11.9		46.1	15.2		58.9	47.6		63.4	54.1	53.1
Level of Service	D	B		D	B		E	D		E	D	D
Approach Delay (s)		13.7			17.2			54.2			56.6	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.4%	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		↑↑↱			↑↑↱				↱			↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1170	190	0	1690	15	0	0	220	0	0	15
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	1194	194	0	1724	15	0	0	224	0	0	15
Pedestrians		1			7			4			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		597			688							
pX, platoon unblocked	0.72			0.68			0.82	0.82	0.68	0.82	0.82	0.72
vC, conflicting volume	1741			1392			2173	3036	705	2562	3125	872
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1640			1109			1192	2240	104	1664	2349	435
tC, single (s)	4.1			4.2			7.6	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	64	100	100	96
cM capacity (veh/h)	288			422			109	35	632	34	30	414

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	796	592	1150	590	224	15
Volume Left	0	0	0	0	0	0
Volume Right	0	194	0	15	224	15
cSH	1700	1700	1700	1700	632	414
Volume to Capacity	0.47	0.35	0.68	0.35	0.36	0.04
Queue Length 95th (ft)	0	0	0	0	40	3
Control Delay (s)	0.0	0.0	0.0	0.0	13.8	14.0
Lane LOS					B	B
Approach Delay (s)	0.0		0.0		13.8	14.0
Approach LOS					B	B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	59.5%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.86		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)	1805	3399		1805	3492		1805	1609		1805	1860	
Flt Permitted	0.14	1.00		0.07	1.00		0.00	1.00		0.00	1.00	
Satd. Flow (perm)	260	3399		136	3492		0	1609		0	1860	
Volume (vph)	70	1075	245	295	1205	115	405	15	230	115	90	15
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	71	1097	250	301	1230	117	413	15	235	117	92	15
RTOR Reduction (vph)	0	15	0	0	5	0	0	214	0	0	5	0
Lane Group Flow (vph)	71	1332	0	301	1342	0	413	36	0	117	102	0
Confl. Peds. (#/hr)	2					2			1	1		
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	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)	54.7	49.8		75.0	64.1		17.1	8.6		18.4	9.9	
Effective Green, g (s)	58.7	51.8		77.0	66.1		19.1	10.6		20.4	11.9	
Actuated g/C Ratio	0.49	0.43		0.64	0.55		0.16	0.09		0.17	0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	216	1467		382	1924		287	142		307	184	
v/s Ratio Prot	0.02	c0.39		c0.14	0.38		c0.23	0.02		0.06	c0.05	
v/s Ratio Perm	0.14			0.37								
v/c Ratio	0.33	0.91		0.79	0.70		1.44	0.25		0.38	0.55	
Uniform Delay, d1	17.7	31.9		34.9	19.7		50.4	51.0		44.2	51.5	
Progression Factor	0.81	0.54		1.26	0.52		1.00	1.00		0.89	0.89	
Incremental Delay, d2	0.7	7.0		8.8	0.9		216.3	4.2		0.8	10.9	
Delay (s)	15.1	24.2		52.9	11.2		266.8	55.2		40.1	56.7	
Level of Service	B	C		D	B		F	E		D	E	
Approach Delay (s)		23.8			18.8			187.0			48.0	
Approach LOS		C			B			F			D	

Intersection Summary			
HCM Average Control Delay	50.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1517	3406	3528		1787	1583
Flt Permitted	0.12	1.00	1.00		0.95	1.00
Satd. Flow (perm)	194	3406	3528		1787	1583
Volume (vph)	35	1380	1460	15	195	115
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	36	1408	1490	15	199	117
RTOR Reduction (vph)	0	0	0	0	0	100
Lane Group Flow (vph)	36	1408	1505	0	199	17
Heavy Vehicles (%)	19%	6%	2%	20%	1%	2%
Turn Type	pm+pt					Perm
Protected Phases	7	4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	94.3	94.3	86.1		17.7	17.7
Effective Green, g (s)	94.3	94.3	86.1		17.7	17.7
Actuated g/C Ratio	0.79	0.79	0.72		0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	199	2677	2531		264	233
v/s Ratio Prot	0.01	c0.41	c0.43		c0.11	
v/s Ratio Perm	0.14					0.01
v/c Ratio	0.18	0.53	0.59		0.75	0.07
Uniform Delay, d1	6.2	4.7	8.4		49.1	44.1
Progression Factor	2.97	0.88	0.52		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.9		11.5	0.1
Delay (s)	18.7	4.2	5.2		60.6	44.2
Level of Service	B	A	A		E	D
Approach Delay (s)		4.6	5.2		54.5	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3471	1568	1770	3539			1752	1538	1805	1710	
Flt Permitted	0.95	1.00	1.00	0.08	1.00			0.75	1.00	0.40	1.00	
Satd. Flow (perm)	1805	3471	1568	149	3539			1379	1538	766	1710	
Volume (vph)	5	1150	460	550	1275	0	180	0	205	25	5	10
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	1173	469	561	1301	0	184	0	209	26	5	10
RTOR Reduction (vph)	0	0	115	0	0	0	0	0	11	0	8	0
Lane Group Flow (vph)	5	1173	354	561	1301	0	0	184	198	26	7	0
Heavy Vehicles (%)	0%	4%	3%	2%	2%	0%	3%	0%	5%	0%	0%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	1.0	50.9	50.9	83.1	83.1			17.9	51.1	17.9	17.9	
Effective Green, g (s)	3.0	52.9	52.9	85.1	85.1			19.9	55.1	19.9	19.9	
Actuated g/C Ratio	0.02	0.44	0.44	0.71	0.71			0.17	0.46	0.17	0.17	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	45	1530	691	581	2510			229	757	127	284	
v/s Ratio Prot	0.00	c0.34		c0.28	0.37				0.08		0.00	
v/s Ratio Perm			0.23	c0.40				c0.13	0.05	0.03		
v/c Ratio	0.11	0.77	0.51	0.97	0.52			0.80	0.26	0.20	0.02	
Uniform Delay, d1	57.2	28.3	24.2	35.2	8.0			48.2	19.9	43.2	41.9	
Progression Factor	0.87	0.76	0.78	0.87	0.31			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	1.9	0.4	23.1	0.5			17.2	0.1	0.3	0.0	
Delay (s)	50.1	23.3	19.3	53.7	3.1			65.4	20.0	43.5	41.9	
Level of Service	D	C	B	D	A			E	C	D	D	
Approach Delay (s)		22.3			18.3			41.3			42.9	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	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	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	3471	3523		1687	1583
Flt Permitted	0.08	1.00	1.00		0.95	1.00
Satd. Flow (perm)	139	3471	3523		1687	1583
Volume (vph)	5	1355	1650	40	175	180
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	1383	1684	41	179	184
RTOR Reduction (vph)	0	0	1	0	0	19
Lane Group Flow (vph)	5	1383	1724	0	179	165
Heavy Vehicles (%)	4%	4%	2%	6%	7%	2%
Turn Type	pm+pt					pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2					4
Actuated Green, G (s)	90.9	90.9	80.0		17.1	22.0
Effective Green, g (s)	92.9	92.9	82.0		19.1	26.0
Actuated g/C Ratio	0.77	0.77	0.68		0.16	0.22
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)	2.0	2.5	2.5		2.5	2.0
Lane Grp Cap (vph)	199	2687	2407		269	396
v/s Ratio Prot	0.00	c0.40	c0.49		c0.11	0.02
v/s Ratio Perm	0.02					0.08
v/c Ratio	0.03	0.51	0.72		0.67	0.42
Uniform Delay, d1	9.4	5.1	11.8		47.4	40.5
Progression Factor	0.15	0.10	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.5	1.0		5.5	0.3
Delay (s)	1.5	1.0	12.7		52.9	40.7
Level of Service	A	A	B		D	D
Approach Delay (s)		1.0	12.7		46.8	
Approach LOS		A	B		D	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	325	145	50	285	25	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	361	161	56	317	28	56
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			522		869	442
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			522		869	442
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		91	91
cM capacity (veh/h)			1034		306	618

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	522	372	83
Volume Left	0	56	28
Volume Right	161	0	56
cSH	1700	1034	461
Volume to Capacity	0.31	0.05	0.18
Queue Length 95th (ft)	0	4	16
Control Delay (s)	0.0	1.8	14.5
Lane LOS		A	B
Approach Delay (s)	0.0	1.8	14.5
Approach LOS			B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1698	1763	1553	1770	4902		1787	5075	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1881	1599	1698	1763	1553	1770	4902		1787	5075	
Volume (vph)	215	345	140	315	275	175	110	1475	100	340	2230	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)	226	363	147	332	289	184	116	1553	105	358	2347	32
RTOR Reduction (vph)	0	0	117	0	0	155	0	7	0	0	1	0
Lane Group Flow (vph)	226	363	30	304	317	29	116	1651	0	358	2378	0
Heavy Vehicles (%)	1%	1%	1%	1%	2%	4%	2%	5%	2%	1%	2%	2%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	11.0	11.0	11.0	17.0	17.0	17.0	10.8	49.8		22.2	61.2	
Effective Green, g (s)	12.8	12.8	12.8	18.8	18.8	18.8	12.1	52.1		23.5	63.5	
Actuated g/C Ratio	0.11	0.11	0.11	0.16	0.16	0.16	0.10	0.43		0.20	0.53	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	191	201	171	266	276	243	178	2128		350	2686	
v/s Ratio Prot	0.13	c0.19		0.18	c0.18		0.07	c0.34		c0.20	c0.47	
v/s Ratio Perm			0.02			0.02						
v/c Ratio	1.18	1.81	0.18	1.14	1.15	0.12	0.65	0.78		1.02	0.89	
Uniform Delay, d1	53.6	53.6	48.8	50.6	50.6	43.5	51.9	29.0		48.2	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.89	0.89	
Incremental Delay, d2	123.2	381.8	0.3	99.3	100.4	0.1	7.0	2.1		39.3	2.4	
Delay (s)	176.8	435.4	49.1	149.9	151.0	43.6	58.9	31.1		82.3	24.6	
Level of Service	F	F	D	F	F	D	E	C		F	C	
Approach Delay (s)		278.8			126.1			32.9			32.1	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM Average Control Delay	74.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Alternative 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			✥			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1770	3344		1736	3538			1763			1834	
Flt Permitted	0.95	1.00		0.95	1.00			0.52			0.95	
Satd. Flow (perm)	1770	3344		1736	3538			948			1760	
Volume (vph)	15	1225	140	125	2065	5	325	15	35	20	160	15
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	15	1250	143	128	2107	5	332	15	36	20	163	15
RTOR Reduction (vph)	0	6	0	0	0	0	0	3	0	0	2	0
Lane Group Flow (vph)	15	1387	0	128	2112	0	0	380	0	0	196	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	2%	5%	15%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	2.6	61.7		13.0	72.1			35.2			35.2	
Effective Green, g (s)	3.1	63.7		13.5	74.1			37.2			37.2	
Actuated g/C Ratio	0.02	0.50		0.11	0.59			0.29			0.29	
Clearance Time (s)	4.5	6.0		4.5	6.0			6.0			6.0	
Vehicle Extension (s)	2.3	4.8		2.3	4.8			2.5			2.5	
Lane Grp Cap (vph)	43	1685		185	2074			279			518	
v/s Ratio Prot	0.01	0.41		c0.07	c0.60							
v/s Ratio Perm								c0.40			0.11	
v/c Ratio	0.35	0.82		0.69	1.02			1.36			0.38	
Uniform Delay, d1	60.7	26.6		54.4	26.2			44.6			35.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.8	3.8		9.4	24.5			184.6			0.3	
Delay (s)	63.5	30.3		63.8	50.6			229.2			35.8	
Level of Service	E	C		E	D			F			D	
Approach Delay (s)		30.7			51.4			229.2			35.8	
Approach LOS		C			D			F			D	

Intersection Summary			
HCM Average Control Delay	59.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	126.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.3%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.97	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.87		1.00	0.85		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1625		3433	1555		1805	3438	1583	1719	3534	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1805	1625		3433	1555		1805	3438	1583	1719	3534	
Volume (vph)	25	5	35	270	5	165	30	1195	175	155	2255	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	26	5	36	276	5	168	31	1219	179	158	2301	20
RTOR Reduction (vph)	0	34	0	0	151	0	0	0	77	0	0	0
Lane Group Flow (vph)	26	7	0	276	22	0	31	1219	102	158	2321	0
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	0%	0%	0%	2%	50%	3%	0%	5%	2%	5%	2%	0%
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	7.0	4.6		12.6	10.2		4.6	66.2	66.2	16.1	77.7	
Effective Green, g (s)	7.0	6.6		12.6	12.2		5.1	68.2	68.2	16.6	79.7	
Actuated g/C Ratio	0.06	0.06		0.10	0.10		0.04	0.57	0.57	0.14	0.66	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.3	4.8	4.8	2.3	4.8	
Lane Grp Cap (vph)	105	89		360	158		77	1954	900	238	2347	
v/s Ratio Prot	c0.01	0.00		c0.08	0.01		0.02	c0.35		0.09	c0.66	
v/s Ratio Perm									0.06			
v/c Ratio	0.25	0.08		0.77	0.14		0.40	0.62	0.11	0.66	0.99	
Uniform Delay, d1	54.0	53.8		52.3	49.1		56.0	17.3	11.9	49.1	19.7	
Progression Factor	1.00	1.00		1.04	1.52		0.99	0.45	0.53	1.00	1.00	
Incremental Delay, d2	1.2	0.3		9.1	0.3		1.6	1.2	0.2	5.8	16.1	
Delay (s)	55.2	54.1		63.4	74.8		56.7	9.0	6.6	54.9	35.8	
Level of Service	E	D		E	E		E	A	A	D	D	
Approach Delay (s)		54.5			67.8			9.7			37.0	
Approach LOS		D			E			A			D	

Intersection Summary			
HCM Average Control Delay	31.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.4%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	*0.75	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Flt Permitted	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 (perm)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Volume (vph)	195	985	435	330	1780	480	620	1005	195	255	730	185
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	199	1005	444	337	1816	490	633	1026	199	260	745	189
RTOR Reduction (vph)	0	0	173	0	0	115	0	0	72	0	0	152
Lane Group Flow (vph)	199	1005	271	337	1816	375	633	1026	127	260	745	37
Confl. Peds. (#/hr)									3	3		
Heavy Vehicles (%)	3%	4%	6%	6%	2%	2%	0%	3%	4%	12%	7%	4%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	11.1	42.7	42.7	16.0	47.6	47.6	19.3	32.0	32.0	9.3	22.0	22.0
Effective Green, g (s)	11.6	44.2	44.2	16.5	49.1	49.1	20.3	33.0	33.0	10.3	23.0	23.0
Actuated g/C Ratio	0.10	0.37	0.37	0.14	0.41	0.41	0.17	0.28	0.28	0.09	0.19	0.19
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7	4.7	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	329	1837	561	454	2081	648	592	761	414	268	647	298
v/s Ratio Prot	0.06	c0.20		0.10	c0.36		c0.18	c0.37		0.08	0.22	
v/s Ratio Perm			0.18			0.24			0.08			0.02
v/c Ratio	0.60	0.55	0.48	0.74	0.87	0.58	1.07	1.35	0.31	0.97	1.15	0.12
Uniform Delay, d1	52.0	30.0	29.1	49.7	32.6	27.4	49.8	43.5	34.4	54.7	48.5	40.2
Progression Factor	0.80	0.60	0.97	0.98	0.72	0.51	0.76	0.85	0.92	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.3	0.7	2.5	2.3	1.6	50.0	162.4	0.2	46.5	85.1	0.1
Delay (s)	43.1	18.4	29.0	51.2	25.9	15.5	88.0	199.3	31.8	101.2	133.6	40.3
Level of Service	D	B	C	D	C	B	F	F	C	F	F	D
Approach Delay (s)		24.2			27.2			143.5			111.8	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	69.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.2%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.99		1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	3277		1805	3484		1805	1661		1805	1900	1481
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	3277		1805	3484		1805	1661		1805	1900	1481
Volume (vph)	70	1235	190	125	1605	65	140	30	65	55	35	80
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	71	1260	194	128	1638	66	143	31	66	56	36	82
RTOR Reduction (vph)	0	9	0	0	2	0	0	58	0	0	0	77
Lane Group Flow (vph)	71	1446	0	128	1702	0	143	39	0	56	36	5
Confl. Peds. (#/hr)			4	4			27					27
Heavy Vehicles (%)	0%	8%	4%	0%	3%	3%	0%	0%	4%	0%	0%	2%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	6.5	67.1		11.9	72.2		10.9	13.1		4.0	5.8	5.8
Effective Green, g (s)	8.8	69.0		13.9	74.1		13.6	14.8		6.3	7.5	7.5
Actuated g/C Ratio	0.07	0.57		0.12	0.62		0.11	0.12		0.05	0.06	0.06
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7		6.3	5.7	5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8		2.7	1.8	1.8
Lane Grp Cap (vph)	257	1884		209	2151		205	205		95	119	93
v/s Ratio Prot	0.02	c0.44		0.07	c0.49		c0.08	0.02		0.03	c0.02	
v/s Ratio Perm												0.00
v/c Ratio	0.28	0.77		0.61	0.79		0.70	0.19		0.59	0.30	0.06
Uniform Delay, d1	52.6	19.4		50.5	17.2		51.2	47.2		55.6	53.8	52.9
Progression Factor	0.95	0.56		0.89	0.79		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	1.3		2.6	1.7		9.3	0.2		8.1	0.5	0.1
Delay (s)	50.1	12.1		47.5	15.3		60.5	47.4		63.7	54.3	53.0
Level of Service	D	B		D	B		E	D		E	D	D
Approach Delay (s)		13.8			17.6			55.2			56.7	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.1%	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		↑↑↱			↑↑↱				↱			↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1175	190	0	1720	15	0	0	230	0	0	15
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	1199	194	0	1755	15	0	0	235	0	0	15
Pedestrians		1			7			4			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		597			688							
pX, platoon unblocked	0.71			0.68			0.83	0.83	0.68	0.83	0.83	0.71
vC, conflicting volume	1771			1397			2194	3071	707	2605	3161	887
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1677			1113			1174	2236	100	1672	2344	428
tC, single (s)	4.1			4.2			7.6	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	63	100	100	96
cM capacity (veh/h)	274			418			112	35	633	33	30	410

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	799	594	1170	600	235	15
Volume Left	0	0	0	0	0	0
Volume Right	0	194	0	15	235	15
cSH	1700	1700	1700	1700	633	410
Volume to Capacity	0.47	0.35	0.69	0.35	0.37	0.04
Queue Length 95th (ft)	0	0	0	0	43	3
Control Delay (s)	0.0	0.0	0.0	0.0	14.0	14.1
Lane LOS					B	B
Approach Delay (s)	0.0		0.0		14.0	14.1
Approach LOS					B	B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	60.2%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.87		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)	1805	3402		1805	3492		1805	1628		1805	1860	
Flt Permitted	0.13	1.00		0.07	1.00		0.00	1.00		0.00	1.00	
Satd. Flow (perm)	238	3402		135	3492		0	1628		0	1860	
Volume (vph)	80	1090	235	290	1230	120	410	30	220	120	90	15
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	82	1112	240	296	1255	122	418	31	224	122	92	15
RTOR Reduction (vph)	0	14	0	0	5	0	0	203	0	0	5	0
Lane Group Flow (vph)	82	1338	0	296	1372	0	418	52	0	122	102	0
Confl. Peds. (#/hr)	2					2			1	1		
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	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)	55.0	50.1		74.7	63.8		17.2	9.3		18.0	10.1	
Effective Green, g (s)	59.0	52.1		76.7	65.8		19.2	11.3		20.0	12.1	
Actuated g/C Ratio	0.49	0.43		0.64	0.55		0.16	0.09		0.17	0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	207	1477		373	1915		289	153		301	188	
v/s Ratio Prot	0.02	c0.39		c0.14	0.39		c0.23	0.03		0.07	c0.05	
v/s Ratio Perm	0.17			0.37								
v/c Ratio	0.40	0.91		0.79	0.72		1.45	0.34		0.41	0.54	
Uniform Delay, d1	18.1	31.7		35.1	20.2		50.4	50.9		44.7	51.3	
Progression Factor	1.07	0.53		1.31	0.53		1.00	1.00		0.95	0.94	
Incremental Delay, d2	1.0	6.9		9.4	1.1		219.3	6.0		0.8	9.8	
Delay (s)	20.4	23.5		55.2	11.8		269.7	56.8		43.1	58.2	
Level of Service	C	C		E	B		F	E		D	E	
Approach Delay (s)		23.3			19.5			189.1			50.2	
Approach LOS		C			B			F			D	

Intersection Summary			
HCM Average Control Delay	51.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1517	3406	3532		1787	1583
Flt Permitted	0.12	1.00	1.00		0.95	1.00
Satd. Flow (perm)	188	3406	3532		1787	1583
Volume (vph)	35	1390	1485	10	195	115
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	36	1418	1515	10	199	117
RTOR Reduction (vph)	0	0	0	0	0	100
Lane Group Flow (vph)	36	1418	1525	0	199	17
Heavy Vehicles (%)	19%	6%	2%	20%	1%	2%
Turn Type	pm+pt					Perm
Protected Phases	7	4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	94.3	94.3	86.1		17.7	17.7
Effective Green, g (s)	94.3	94.3	86.1		17.7	17.7
Actuated g/C Ratio	0.79	0.79	0.72		0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	194	2677	2534		264	233
v/s Ratio Prot	0.01	c0.42	c0.43		c0.11	
v/s Ratio Perm	0.14					0.01
v/c Ratio	0.19	0.53	0.60		0.75	0.07
Uniform Delay, d1	6.4	4.7	8.4		49.1	44.1
Progression Factor	2.96	0.86	0.50		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.9		11.5	0.1
Delay (s)	19.2	4.1	5.1		60.6	44.2
Level of Service	B	A	A		E	D
Approach Delay (s)		4.5	5.1		54.5	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3471	1568	1770	3539			1752	1538	1805	1710	
Flt Permitted	0.95	1.00	1.00	0.08	1.00			0.75	1.00	0.39	1.00	
Satd. Flow (perm)	1805	3471	1568	151	3539			1379	1538	750	1710	
Volume (vph)	5	1155	460	550	1290	0	185	0	215	25	5	10
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	1179	469	561	1316	0	189	0	219	26	5	10
RTOR Reduction (vph)	0	0	115	0	0	0	0	0	11	0	8	0
Lane Group Flow (vph)	5	1179	354	561	1316	0	0	189	208	26	7	0
Heavy Vehicles (%)	0%	4%	3%	2%	2%	0%	3%	0%	5%	0%	0%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	1.0	50.5	50.5	82.8	82.8			18.2	51.5	18.2	18.2	
Effective Green, g (s)	3.0	52.5	52.5	84.8	84.8			20.2	55.5	20.2	20.2	
Actuated g/C Ratio	0.02	0.44	0.44	0.71	0.71			0.17	0.46	0.17	0.17	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	45	1519	686	583	2501			232	763	126	288	
v/s Ratio Prot	0.00	c0.34		c0.28	0.37				0.08		0.00	
v/s Ratio Perm			0.23	c0.40				c0.14	0.06	0.03		
v/c Ratio	0.11	0.78	0.52	0.96	0.53			0.81	0.27	0.21	0.02	
Uniform Delay, d1	57.2	28.7	24.5	35.1	8.2			48.1	19.8	43.0	41.7	
Progression Factor	0.87	0.76	0.80	0.85	0.31			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	2.1	0.4	22.5	0.6			18.4	0.1	0.3	0.0	
Delay (s)	50.2	23.9	19.9	52.4	3.1			66.5	19.9	43.3	41.7	
Level of Service	D	C	B	D	A			E	B	D	D	
Approach Delay (s)		22.9			17.8			41.5			42.7	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
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		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3471	3523		1687	1583
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3471	3523		1687	1583
Volume (vph)	0	1370	1660	40	165	175
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1398	1694	41	168	179
RTOR Reduction (vph)	0	0	1	0	0	19
Lane Group Flow (vph)	0	1398	1734	0	168	160
Heavy Vehicles (%)	4%	4%	2%	6%	7%	2%
Turn Type	pm+pt					pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2					4
Actuated Green, G (s)		91.7	80.8		16.3	21.2
Effective Green, g (s)		93.7	82.8		18.3	25.2
Actuated g/C Ratio		0.78	0.69		0.15	0.21
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		2.5	2.5		2.5	2.0
Lane Grp Cap (vph)		2710	2431		257	385
v/s Ratio Prot		c0.40	c0.49		c0.10	0.02
v/s Ratio Perm						0.08
v/c Ratio		0.52	0.71		0.65	0.42
Uniform Delay, d1		4.8	11.4		47.9	41.0
Progression Factor		0.10	1.00		1.00	1.00
Incremental Delay, d2		0.5	0.9		5.2	0.3
Delay (s)		1.0	12.3		53.1	41.3
Level of Service		A	B		D	D
Approach Delay (s)		1.0	12.3		47.0	
Approach LOS		A	B		D	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	310	150	50	290	15	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	344	167	56	322	17	56
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			511		861	428
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			511		861	428
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		95	91
cM capacity (veh/h)			1044		310	629

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	511	378	72
Volume Left	0	56	17
Volume Right	167	0	56
cSH	1700	1044	508
Volume to Capacity	0.30	0.05	0.14
Queue Length 95th (ft)	0	4	12
Control Delay (s)	0.0	1.8	13.3
Lane LOS		A	B
Approach Delay (s)	0.0	1.8	13.3
Approach LOS			B

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1698	1763	1553	1770	4900		1787	5077	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1881	1599	1698	1763	1553	1770	4900		1787	5077	
Volume (vph)	210	360	135	315	275	180	110	1490	105	340	2230	25
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)	221	379	142	332	289	189	116	1568	111	358	2347	26
RTOR Reduction (vph)	0	0	108	0	0	159	0	7	0	0	1	0
Lane Group Flow (vph)	221	379	34	304	317	30	116	1672	0	358	2372	0
Heavy Vehicles (%)	1%	1%	1%	1%	2%	4%	2%	5%	2%	1%	2%	2%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	11.0	11.0	11.0	17.0	17.0	17.0	10.8	50.2		21.8	61.2	
Effective Green, g (s)	12.8	12.8	12.8	18.8	18.8	18.8	12.1	52.5		23.1	63.5	
Actuated g/C Ratio	0.11	0.11	0.11	0.16	0.16	0.16	0.10	0.44		0.19	0.53	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	191	201	171	266	276	243	178	2144		344	2687	
v/s Ratio Prot	0.12	c0.20		0.18	c0.18		0.07	c0.34		c0.20	c0.47	
v/s Ratio Perm			0.02			0.02						
v/c Ratio	1.16	1.89	0.20	1.14	1.15	0.12	0.65	0.78		1.04	0.88	
Uniform Delay, d1	53.6	53.6	48.9	50.6	50.6	43.5	51.9	28.8		48.4	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.89	0.88	
Incremental Delay, d2	113.8	416.7	0.3	99.3	100.4	0.1	7.0	2.1		44.9	2.4	
Delay (s)	167.4	470.3	49.3	149.9	151.0	43.6	58.9	30.9		88.0	24.4	
Level of Service	F	F	D	F	F	D	E	C		F	C	
Approach Delay (s)		299.5			125.6			32.8			32.8	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM Average Control Delay	77.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Sensitivity Analysis Worksheets

For Sensitivity Analysis Only

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Hwy 99W/Edy Road

Cycle (sec):	120	Critical Vol./Cap.(X):	1.010
Loss Time (sec):	16	Average Delay (sec/veh):	63.6
Optimal Cycle:	180	Level Of Service:	E

Street Name:	Hwy 99W						Edy Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2	1 0	1 0	2	1 0	1 0	1	0 1	1 1	0	0 1
Volume Module:												
Base Vol:	111	1470	103	338	2175	40	208	336	147	345	269	169
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	111	1470	103	338	2175	40	208	336	147	345	269	169
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	111	1470	103	338	2175	40	208	336	147	345	269	169
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	117	1547	108	356	2289	42	219	354	155	363	283	178
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	117	1547	108	356	2289	42	219	354	155	363	283	178
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	117	1547	108	356	2289	42	219	354	155	363	283	178
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	0.94	0.94	0.93	0.98	0.98	0.94	0.99	0.84	0.95	0.95	0.83
Lanes:	1.00	2.80	0.20	1.00	2.95	0.05	1.00	1.00	1.00	1.12	0.88	1.00
Final Sat.:	1718	5020	352	1769	5469	101	1787	1881	1599	2036	1587	1583
Capacity Analysis Module:												
Vol/Sat:	0.07	0.31	0.31	0.20	0.42	0.42	0.12	0.19	0.10	0.18	0.18	0.11
Crit Moves:		****		****				****		****		
Green/Cycle:	0.07	0.31	0.31	0.20	0.43	0.43	0.19	0.19	0.19	0.18	0.18	0.18
Volume/Cap:	0.97	1.01	1.01	1.01	0.97	0.97	0.66	1.01	0.52	1.01	1.01	0.64
Uniform Del:	55.6	41.7	41.7	48.1	33.1	33.1	45.3	48.8	44.0	49.4	49.4	45.8
IncremntDel:	70.7	24.8	24.8	50.6	11.4	11.4	4.8	50.8	1.6	38.2	38.2	4.8
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	126.4	66.5	66.5	98.7	44.5	44.5	50.1	99.6	45.6	87.6	87.6	50.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	126.4	66.5	66.5	98.7	44.5	44.5	50.1	99.6	45.6	87.6	87.6	50.7
LOS by Move:	F	E	E	F	D	D	D	F	D	F	F	D
HCM2kAvgQ:	7	27	27	19	34	34	8	19	6	17	17	7

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Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Hwy 99W/Edy Road

Cycle (sec):	120	Critical Vol./Cap.(X):	0.998
Loss Time (sec):	16	Average Delay (sec/veh):	62.1
Optimal Cycle:	180	Level Of Service:	E

Street Name:	Hwy 99W						Edy Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 2 1 0			1 0 2 1 0			1 0 1 0 1			1 1 0 0 1		
Volume Module:												
Base Vol:	113	1468	102	337	2224	28	213	334	144	310	274	169
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	113	1468	102	337	2224	28	213	334	144	310	274	169
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	113	1468	102	337	2224	28	213	334	144	310	274	169
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	119	1545	107	355	2341	29	224	352	152	326	288	178
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	119	1545	107	355	2341	29	224	352	152	326	288	178
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	119	1545	107	355	2341	29	224	352	152	326	288	178
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	0.94	0.94	0.93	0.98	0.98	0.94	0.99	0.84	0.95	0.95	0.83
Lanes:	1.00	2.81	0.19	1.00	2.96	0.04	1.00	1.00	1.00	1.06	0.94	1.00
Final Sat.:	1718	5023	349	1769	5506	69	1787	1881	1599	1925	1702	1583
Capacity Analysis Module:												
Vol/Sat:	0.07	0.31	0.31	0.20	0.43	0.43	0.13	0.19	0.09	0.17	0.17	0.11
Crit Moves:		****		****				****		****		
Green/Cycle:	0.07	0.31	0.31	0.20	0.44	0.44	0.19	0.19	0.19	0.17	0.17	0.17
Volume/Cap:	0.97	1.00	1.00	1.00	0.97	0.97	0.67	1.00	0.51	1.00	1.00	0.66
Uniform Del:	55.6	41.5	41.5	47.9	33.0	33.0	45.3	48.7	43.8	49.8	49.8	46.6
IncremntDel:	71.9	21.5	21.5	47.0	12.1	12.1	5.2	47.2	1.4	35.6	35.6	6.0
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	127.5	63.0	63.0	94.9	45.1	45.1	50.5	96.0	45.2	85.4	85.4	52.6
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	127.5	63.0	63.0	94.9	45.1	45.1	50.5	96.0	45.2	85.4	85.4	52.6
LOS by Move:	F	E	E	F	D	D	D	F	D	F	F	D
HCM2kAvgQ:	8	27	27	18	34	34	9	18	6	16	16	7

For Sensitivity Analysis Only

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Hwy 99W/Edy Road

Cycle (sec):	120	Critical Vol./Cap.(X):	1.015
Loss Time (sec):	16	Average Delay (sec/veh):	65.1
Optimal Cycle:	180	Level Of Service:	E

Street Name:	Hwy 99W						Edy Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 1	0	1 0	2 1	0	1 0	1 0	1	1 1	0 0	1
Volume Module:												
Base Vol:	111	1482	103	339	2224	32	208	350	140	316	274	174
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	111	1482	103	339	2224	32	208	350	140	316	274	174
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	111	1482	103	339	2224	32	208	350	140	316	274	174
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	117	1560	108	357	2341	34	219	368	147	333	288	183
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	117	1560	108	357	2341	34	219	368	147	333	288	183
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	117	1560	108	357	2341	34	219	368	147	333	288	183
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	0.94	0.94	0.93	0.98	0.98	0.94	0.99	0.84	0.95	0.95	0.83
Lanes:	1.00	2.81	0.19	1.00	2.96	0.04	1.00	1.00	1.00	1.07	0.93	1.00
Final Sat.:	1718	5023	349	1769	5496	79	1787	1881	1599	1943	1684	1583
Capacity Analysis Module:												
Vol/Sat:	0.07	0.31	0.31	0.20	0.43	0.43	0.12	0.20	0.09	0.17	0.17	0.12
Crit Moves:		****		****				****			****	
Green/Cycle:	0.07	0.31	0.31	0.20	0.44	0.44	0.19	0.19	0.19	0.17	0.17	0.17
Volume/Cap:	0.98	1.01	1.01	1.01	0.98	0.98	0.63	1.01	0.48	1.01	1.01	0.69
Uniform Del:	55.7	41.6	41.6	48.1	33.3	33.3	44.5	48.4	43.0	49.9	49.9	46.9
IncremntDel:	75.3	25.9	25.9	51.8	13.5	13.5	3.9	51.0	1.2	40.1	40.1	7.2
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	131.1	67.5	67.5	99.8	46.9	46.9	48.4	99.4	44.2	90.0	90.0	54.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	131.1	67.5	67.5	99.8	46.9	46.9	48.4	99.4	44.2	90.0	90.0	54.1
LOS by Move:	F	E	E	F	D	D	D	F	D	F	F	D
HCM2kAvgQ:	8	27	27	19	35	35	8	19	5	17	17	8

For Sensitivity Analysis Only

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-----------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*****************************************************************************
Intersection #1 Hwy 99W/Edy Road
*****************************************************************************
Cycle (sec):          120              Critical Vol./Cap.(X):         1.010
Loss Time (sec):       16              Average Delay (sec/veh):        64.7
Optimal Cycle:        180              Level Of Service:                  E
*****************************************************************************
Street Name:                Hwy 99W                          Edy Road
Approach:       North Bound      South Bound      East Bound      West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected       Split Phase     Split Phase
Rights:            Include          Include          Include         Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  1  0   1  0  2  1  0   1  0  1  0  1   1  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     112 1476   102   338 2229    32   216  347   140   314  274   173
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  112 1476   102   338 2229    32   216  347   140   314  274   173
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  112 1476   102   338 2229    32   216  347   140   314  274   173
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:   118 1554   107   356 2346    34   227  365   147   331  288   182
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  118 1554   107   356 2346    34   227  365   147   331  288   182
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  118 1554   107   356 2346    34   227  365   147   331  288   182
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.90 0.94  0.94  0.93 0.98  0.98  0.94 0.99  0.84  0.95 0.95  0.83
Lanes:       1.00 2.81  0.19  1.00 2.96  0.04  1.00 1.00  1.00  1.07 0.93  1.00
Final Sat.:  1718 5025   347  1769 5496    79  1787 1881  1599  1937 1690  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.07 0.31  0.31  0.20 0.43  0.43  0.13 0.19  0.09  0.17 0.17  0.12
Crit Moves:       ****        ****                  ****        ****
Green/Cycle: 0.07 0.31  0.31  0.20 0.44  0.44  0.19 0.19  0.19  0.17 0.17  0.17
Volume/Cap:  0.98 1.01  1.01  1.01 0.98  0.98  0.66 1.01  0.48  1.01 1.01  0.68
Uniform Del: 55.7 41.6  41.6  48.0 33.4  33.4  44.8 48.5  43.1  49.9 49.9  46.8
IncremntDel: 75.7 24.6  24.6  50.4 14.0  14.0   4.8 49.8   1.2  38.8 38.8   7.0
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Delay/Veh:  131.4 66.2  66.2  98.5 47.3  47.3  49.6 98.3  44.3  88.7 88.7  53.8
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh: 131.4 66.2  66.2  98.5 47.3  47.3  49.6 98.3  44.3  88.7 88.7  53.8
LOS by Move:    F    E     E     F    D     D     D    F     D     F    F     D
HCM2kAvgQ:      8   27    27    19   35    35     9   19     5    17   17     8
```

For Sensitivity Analysis Only

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Hwy 99W/Edy Road

Cycle (sec):	120	Critical Vol./Cap.(X):	1.025
Loss Time (sec):	16	Average Delay (sec/veh):	67.4
Optimal Cycle:	180	Level Of Service:	E

Street Name:	Hwy 99W						Edy Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2	1 0	1 0	2	1 0	1 0	1	0 1	1 1	0	0 1
Volume Module:												
Base Vol:	111	1489	103	340	2228	26	208	362	137	317	275	181
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	111	1489	103	340	2228	26	208	362	137	317	275	181
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	111	1489	103	340	2228	26	208	362	137	317	275	181
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	117	1567	108	358	2345	27	219	381	144	334	289	191
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	117	1567	108	358	2345	27	219	381	144	334	289	191
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	117	1567	108	358	2345	27	219	381	144	334	289	191
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	0.94	0.94	0.93	0.98	0.98	0.94	0.99	0.84	0.95	0.95	0.83
Lanes:	1.00	2.81	0.19	1.00	2.97	0.03	1.00	1.00	1.00	1.07	0.93	1.00
Final Sat.:	1718	5025	348	1769	5511	64	1787	1881	1599	1942	1685	1583
Capacity Analysis Module:												
Vol/Sat:	0.07	0.31	0.31	0.20	0.43	0.43	0.12	0.20	0.09	0.17	0.17	0.12
Crit Moves:		****		****				****			****	
Green/Cycle:	0.07	0.30	0.30	0.20	0.43	0.43	0.20	0.20	0.20	0.17	0.17	0.17
Volume/Cap:	0.98	1.03	1.03	1.03	0.98	0.98	0.62	1.03	0.46	1.03	1.03	0.72
Uniform Del:	55.8	41.7	41.7	48.2	33.6	33.6	44.0	48.1	42.5	49.9	49.9	47.3
IncremntDel:	77.4	29.0	29.0	54.8	14.7	14.7	3.4	53.3	1.0	43.1	43.1	9.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	133.2	70.7	70.7	103.0	48.4	48.4	47.4	101	43.5	93.1	93.1	56.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	133.2	70.7	70.7	103.0	48.4	48.4	47.4	101	43.5	93.1	93.1	56.4
LOS by Move:	F	E	E	F	D	D	D	F	D	F	F	E
HCM2kAvgQ:	8	28	28	19	35	35	8	20	5	17	17	8

TECHNICAL MEMORANDUM

TO: Ben Austin, P.E., Harper Houf Peterson Righellis

FROM: Chris Maciejewski, P.E.
France Campbell, E.I.T.

DATE: May 18, 2009

SUBJECT: **Sherwood Adams Avenue North Concept Plan**
Transportation Tech Memo #3: Preferred Concept Alternative Analysis

P08232-000

The purpose of this memorandum is to review the transportation performance of the preferred land use alternative created for the Sherwood Adams Avenue North Concept Plan. The first two sections of this memorandum discuss compliance of the Preferred Alternative with City functional classification and access spacing standards. The final three sections discuss the traffic impacts of the Preferred Alternative, including land use and trip generation, study area operations analysis, and recommended mitigation measures. The traffic impact analysis for the preferred land use addresses long term issues (to address TPR[1] requirements) utilizing a forecast year of 2030.

Functional Classification

Highway 99W is classified as a statewide highway in the Oregon Highway Plan[2] and a principle arterial in the City of Sherwood Transportation Plan (TSP)[3]. The City's TSP identifies Tualatin-Sherwood Road, Sherwood Boulevard, and Oregon Street as arterials and Edy Road, Gerda Lane, and Adams Avenue as collectors. The proposed Adams Avenue North Extension is classified as a collector in the Preferred Concept Plan Alternative, which is consistent with the City's adopted TSP.

Access Spacing Review

The functional classification establishes the access spacing standards for transportation facilities. Along the proposed Adams Avenue North extension, a collector roadway, access spacing should be a minimum of 100 feet and a maximum of 400 feet[3]. In addition, access should be limited within the influence area of other intersections (i.e., not allowing full access near Tualatin-Sherwood Road or Highway 99W where vehicle queues would block the access). In the Preferred Alternative, access along Adams Avenue can be designed to meet the minimum

[1] Transportation Planning Rule, Oregon DLCD, http://www.oregon.gov/ODOT/TD/TP/TPR.shtml
[2] *1999 Oregon Highway Plan*, Oregon Department of Transportation, January 2006.
[3] *City of Sherwood Transportation System Plan*, Prepared by DKS Associates, March 2005.

spacing standard. Maximum spacing standards may not be met along the PGE substation and the UGB boundary, where land would not develop and access is not needed.

Land Use and Trip Generation

The land use for the Alternative 1 and the Preferred Alternative were evaluated to determine the traffic impacts for the plan area. The Concept Plan development areas are displayed in Figure 1 and the corresponding land use assumptions for the Preferred Alternative are shown in Tables 1 and 2. The BPA/PGE transmission easement and the PGE facility were assumed to be used as a public facility, open space or parking to support the developable areas with no potential for generating significant additional future motor vehicle traffic. Alternative 1 assumes that the land within the study area fully develops according to the existing zoning. A portion of the Concept Plan area east of the proposed Adams Avenue North extension (Area C in Figure 1) is currently outside of the City limit and is zoned for rural density. Therefore, Alternative 1 did not include development in the portion of the Concept Plan area outside of the City limits. The total new PM peak hour trips generated by the Preferred Concept Plan Alternative are approximately 300 trips.

To determine the impact of rezoning the study area, the amount of motor vehicle traffic generated by Alternative 1 and the Preferred Alternative was determined. Trip generation was estimated based on rates provided by the Institute of Transportation Engineers[4] (ITE) for similar land use types (e.g. light industrial, restaurants, retail uses, and office uses). Table 2 lists the estimated PM peak hour trips for Alternative 1 and the Preferred Alternative. Pass-by trips[5] are also listed in Table 2 and the total new trips account for the estimated pass-by trips. The total number of new trips was used to verify that the City's 43 trips per net developable acre CAP[6] was not exceeded in any of the Concept Plan development areas shown in Figure 1 for the alternatives. Any locations exceeding the City's trip CAP were scaled down to conformance.

[4] *Trip Generation Manual, 8th Edition*, Institute of Transportation Engineers, 2008.
[5] *Trip Generation Handbook, 2nd Edition*, Institute of Transportation Engineers, 2004.
[6] City of Sherwood Municipal Code Chapter 16.108.070 (CAP), Section D4.

Figure 1: Adams Avenue North Concept Plan Developable Areas

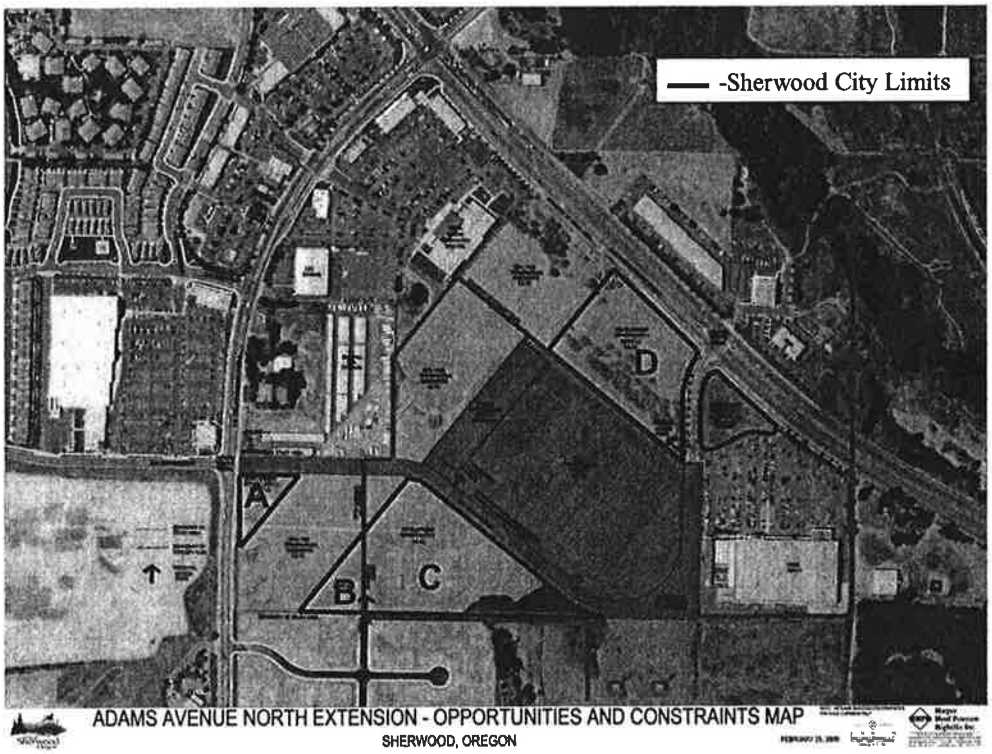

Table 1: Alternatives Land Use Scenarios

Alternative	Concept Area (See Figure 1)				
	A	B	C	D	E
1	LI	LI	R	LI	LI
Preferred	GC*	LI	LI	OC	OC

* Area developed was limited by City's 43 trips per acre CAP
GC – General Commercial
LI – Light Industrial
OC – Office Commercial
R – Rural

Table 2: Motor Vehicle Trip Generation Comparison – PM Peak Hour

Scenario / Land Use (ITE Code)	Acres	KSF*	PM Trips In	PM Trips Out	PM Trips Total
Alternative 1					
Light Industrial (710)	9.4	102.4	26	111	153
Total New Trips			26	111	153
Preferred Alternative					
General Commercial (934)	0.9	2.3**	40	36	76
Light Industrial (710)	7.6	82.8	21	102	123
Office Commercial (710, 934)	7.4	80.6	58	120	178
Pass-by Trips			40	32	72
Total New Trips			79	226	305

*KSF – Building area, thousand square feet
** Area developed was limited by City's 43 trips per acre CAP

Operations Analysis

The following sections describe the future forecasting and operations analysis completed for the Adams Avenue North Concept Plan. The future conditions evaluation includes future forecasting, identification of funded study area improvements, and motor vehicle intersection capacity analysis.

Future Forecasting

Future travel demand forecasting for the Adams Avenue North study area utilized the latest 2030 VISUM travel demand model developed by Metro, Washington County, and DKS Associates for the I-5 to 99W Connector Study. As part of the model development for the I-5 to 99W Connector Study, the Sherwood TSP travel demand model zone structure and network detail was used as a guideline to refine the regional model. In addition, a detailed focus model was created for the Adams Avenue North Concept Plan study area, which incorporates the use of *HCM 2000 Methodology* for turn delays (instead of the regional model macroscopic delay functions).

Future 2030 PM peak hour volumes at study intersections were developed for Adams Avenue North Concept Plan land use scenario by adjusting the travel demand model trip tables to reflect the trip rates listed in Table 2. These volumes were then used to analyze and determine future impacts from the proposed Adams Avenue North area on the planned roadway network. The future 2030 PM peak hour scenarios include:

- Alternative 1 - 2030 development according to the existing zoning in the Adams Avenue North area
- Preferred Alternative - 2030 with Adams Avenue North Concept Plan

Planned Study Area Roadway Improvements

Assumed transportation improvements in the study area were limited to Metro 2035 Regional Transportation Plan (RTP)[7] financially constrained roadway improvements and the extension of Adams Avenue to the north. Other capacity improvement projects in Metro's RTP or other plans without committed funding were not included in any of the future analysis scenarios in order to meet OAR 660-012-060 requirements. The planned roadway improvements include:

- Signalization of Tualatin-Sherwood Road/Adams Avenue
- Widening of Tualatin-Sherwood Road and Roy Rogers Road to 5-lanes from Teton Avenue to west of Highway 99W (tapers to three lanes east of Borchers Drive)
- Completion of the Adams Avenue South Extension from Oregon Street to Century Drive
- Intersection geometric, turn lane, and signal phasing improvements at Highway 99W/Tualatin-Sherwood Road
- Completion of the 124th Avenue extension from Tualatin-Sherwood Road to Tonquin Road
- Widening of Tonquin Road to 3-lanes
- Signalization of Tualatin-Sherwood Road/Gerda Lane

Conversion of Tualatin-Sherwood Road/Baler Way to right-in/right-out and signal removal is an identified Metro 2035 RTP financially constrained improvement as was included in the prior alternatives analysis, but based on coordination with Washington County the likelihood of removing the signal is uncertain and as part of Adams Avenue improvements and is therefore not appropriate for inclusion in this analysis.

In addition, the operations analysis found that turn lane improvements would be required under any scenario (including 2030 Alternative 1 Baseline Conditions) at Highway 99W/Adams Avenue. Therefore, construction of a westbound left-turn lane from Adams Avenue westbound to Highway 99W southbound is required, which is added to the existing shared westbound left-thru lane and right turn pocket. The signal phasing in the future conditions assumes split phasing for Adams Avenue, which is consistent with the existing conditions.

Capacity Analysis

In order to provide a baseline comparison to the future Adams Avenue North Concept Plan Preferred Alternative, the 2030 Alternative 1 scenario evaluates future traffic volumes assuming the planned roadway geometry and full development of the Adams Avenue North Concept Plan area under existing zoning. The Preferred Concept Plan Alternative was then evaluated to determine impacts to the study area. Intersections that do not meet performance standards must be mitigated to the level of performance (per Oregon's Transportation Planning Rule (TPR)) that would occur under development of the area with existing zoning (Alternative 1) or that would meet mobility standards, whichever is higher.

The maximum v/c ratio specified by Washington County is 0.99 for signalized intersections.[8] The minimum operational standard for unsignalized intersections specified by Washington

[7] Metro 2035 Regional Transportation Plan, http://www.oregonmetro.gov/index.cfm/go/by.web/id=25037.

[8] Washington County 2020 Transportation Plan, Adopted October 29, 2002, Table 5.

County is LOS E. In the case of Highway 99W, ODOT operating performance standards for the study area is a v/c ratio of 0.99 for intersections not in a Town Center and 1.1 for those that are located within a Town Center.[9] The intersection of Highway 99W/Tualatin-Sherwood Road and Highway 99W/Edy Road-Sherwood Boulevard are within the Town Center designation.[10] Based on recent conversations and meetings, ODOT has decided to not acknowledge the Town Center limits without the City completing a Town Center Plan. The City and Metro contend that this is inconsistent with past practices and the Sherwood Town Center boundaries have been part of the adopted Functional Plan and used for local needs and regional modeling efforts since 2000. However, ODOT intends to use a maximum v/c ratio of 0.99 for all of Highway 99W through Sherwood.

As listed in Table 3, with the addition of land development in the Adams Avenue North Concept Plan, all study intersections except for the Highway 99W/Edy Road-Sherwood Blvd intersection meet ODOT/County standards in Alternative 1 and the Preferred Concept Plan Alternative. If the Town Center v/c ratio standard of 1.1 is used, all intersections in the preferred alternative meet ODOT/County standards.

Mitigation Measures

While the City continues to disagree with ODOT's current interpretation that only an adopted Town Center Plan is considered a Town Center, in order to demonstrate compliance, analysis of potential mitigation was done relative to a 0.99 v/c ratio standard. With the addition of land development in the Adams Avenue North Concept Plan Preferred Alternative, only the Highway 99W/Edy Road-Sherwood Blvd study intersection will not meet the ODOT 0.99 v/c ratio standard in the alternatives. Therefore, off-site transportation mitigations could be required at Highway 99W/Edy Road-Sherwood Blvd to offset the impacts of the Adams Avenue North Concept Plan for TPR compliance.

To determine if mitigations are required for the Preferred Alternative, the software TRAFFIX (which provides v/c ratios to the nearest 0.001) was used to determine the increase in the v/c ratio from Alternative 1 (reasonable worst-case of existing zoning) for the Preferred Alternative, as a change in v/c of less than 0.01 may not require mitigation. The analysis found that the v/c ratio changed by 0.014, which indicates mitigation would be required.

To offset the impacts of the Adams Avenue North Concept Plan at Highway 99W/Edy Road-Sherwood Blvd, an improvement such as a north-eastbound right-turn lane along Highway 99W is adequate for the Preferred Alternative (including signal, signing, and striping modifications). While the construction of the right-turn lane would provide adequate capacity mitigation, the City should consider completing a study at the intersection to determine the ultimate geometry/configuration and funding mechanisms before conditioning specific improvements that may not be compatible with or proportional to build-out of the intersection.

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[9] 1999 Oregon Highway Plan, Amendment to Table 7, December 13, 2000.
[10] This is according to the Metro Regional and Town Center Map.
(http://www.oregonmetro.gov/index.cfm/go/by.web/id=15467&x=7599901&y=629257&locID=27)

Table 3: 2030 PM Peak Hour Intersection Performance

			Intersection Performance (Delay LOS V/C)	
Intersection	**Agency**	**Standard**	**Alternative 1**	**Preferred Alternative**
Signalized Intersections				
Highway 99W/Adams Ave	ODOT	v/c ≤ 0.99	42.1 D 0.91	44.1 D 0.92
Highway 99W/Tualatin-Sherwood Rd	ODOT	v/c ≤ 0.99	63.1 E 0.98	63.8 E 0.98
Highway 99W/Edy Road-Sherwood Blvd	ODOT	v/c ≤ 0.99	74.9 E **1.07**	79.4 E **1.09**
Tualatin-Sherwood Rd/Shopping Center	County	v/c ≤ 0.99	17.1 B 0.73	22.2 C 0.72
Tualatin-Sherwood Rd/Baler Wy	County	LOS E	12.4 B 0.67	11.4 B 0.67
Tualatin-Sherwood Rd/Adams Ave	County	v/c ≤ 0.99	30.6 C 0.85	31.3 C 0.86
Tualatin-Sherwood Rd/Gerda Ln	County	v/c ≤ 0.99	8.7 A 0.62	8.5 A 0.63
Tualatin-Sherwood Rd/Oregon St	County	v/c ≤ 0.99	22.1 C 0.90	21.8 C 0.90

Change in V/C at Highway 99W/Edy Road-Sherwood Blvd compared to Alternative 1:
Preferred Alternative: +0.014

Signalized intersection:
HCM Delay = Average Intersection Delay (sec.)
LOS = Level of Service
V/C = Volume-to-Capacity Ratio

Note: The performance listed for the intersection of Highway 99W/Edy Road-Sherwood Blvd in Alternative 1 has changed from the value reported in Technical Memorandum #2 (Alternatives Analysis), which reported a v/c ratio of 1.06. The revised v/c ratio of 1.07 reflects the update to the analysis that maintains the existing signal at the intersection of Tualatin-Sherwood Road/Baler Way.

Appendix

- **2030 Intersection Operational Analysis Worksheets**
  - **Alternative 1**
  - **Preferred Alternative**
- **Sensitivity Analysis Worksheets**

Alternative 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1626		1681	1646	1568	1805	3438	1583	1719	3534	
Flt Permitted	0.95	1.00		0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1805	1626		1681	1646	1568	1805	3438	1583	1719	3534	
Volume (vph)	25	5	35	205	5	75	30	1280	100	100	2275	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	26	5	36	209	5	77	31	1306	102	102	2321	20
RTOR Reduction (vph)	0	34	0	0	0	55	0	0	36	0	0	0
Lane Group Flow (vph)	26	7	0	125	89	22	31	1306	66	102	2341	0
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	0%	0%	0%	2%	50%	3%	0%	5%	2%	5%	2%	0%
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	5.8	5.8		13.5	13.5	32.0	4.6	59.7	73.2	18.5	73.6	
Effective Green, g (s)	7.8	7.8		15.5	15.5	34.5	5.1	61.7	77.2	19.0	75.6	
Actuated g/C Ratio	0.06	0.06		0.13	0.13	0.29	0.04	0.51	0.64	0.16	0.63	
Clearance Time (s)	6.0	6.0		6.0	6.0	4.5	4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.3	2.3	4.8	2.5	2.3	4.8	
Lane Grp Cap (vph)	117	106		217	213	451	77	1768	1071	272	2226	
v/s Ratio Prot	c0.01	0.00		c0.07	0.05	0.01	0.02	c0.38	0.01	0.06	c0.66	
v/s Ratio Perm						0.01			0.03			
v/c Ratio	0.22	0.07		0.58	0.42	0.05	0.40	0.74	0.06	0.38	1.05	
Uniform Delay, d1	53.2	52.7		49.2	48.1	30.9	56.0	22.8	7.9	45.2	22.2	
Progression Factor	1.00	1.00		1.14	1.14	1.71	0.74	0.57	0.01	1.00	1.00	
Incremental Delay, d2	0.7	0.2		2.9	0.9	0.0	1.6	2.3	0.0	0.5	34.3	
Delay (s)	53.9	52.9		58.9	55.9	52.7	43.0	15.4	0.1	45.7	56.5	
Level of Service	D	D		E	E	D	D	B	A	D	E	
Approach Delay (s)		53.3			56.4			14.9			56.1	
Approach LOS		D			E			B			E	

Intersection Summary			
HCM Average Control Delay	42.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.3%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	*0.75	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Flt Permitted	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 (perm)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Volume (vph)	195	940	425	320	1755	460	585	990	240	255	700	205
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	199	959	434	327	1791	469	597	1010	245	260	714	209
RTOR Reduction (vph)	0	0	175	0	0	116	0	0	90	0	0	152
Lane Group Flow (vph)	199	959	259	327	1791	353	597	1010	155	260	714	57
Confl. Peds. (#/hr)									3	3		
Heavy Vehicles (%)	3%	4%	6%	6%	2%	2%	0%	3%	4%	12%	7%	4%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	11.1	42.9	42.9	15.7	47.5	47.5	19.4	32.0	32.0	9.4	22.0	22.0
Effective Green, g (s)	11.6	44.4	44.4	16.2	49.0	49.0	20.4	33.0	33.0	10.4	23.0	23.0
Actuated g/C Ratio	0.10	0.37	0.37	0.13	0.41	0.41	0.17	0.28	0.28	0.09	0.19	0.19
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7	4.7	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	329	1846	564	446	2076	646	595	761	414	271	647	298
v/s Ratio Prot	0.06	c0.19		0.10	c0.35		c0.17	c0.37		0.08	0.21	
v/s Ratio Perm			0.17			0.22			0.10			0.04
v/c Ratio	0.60	0.52	0.46	0.73	0.86	0.55	1.00	1.33	0.37	0.96	1.10	0.19
Uniform Delay, d1	52.0	29.5	28.7	49.8	32.4	27.0	49.8	43.5	35.2	54.6	48.5	40.7
Progression Factor	0.80	0.59	1.01	0.95	0.58	0.38	0.75	0.87	0.92	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.3	0.7	1.8	1.7	1.1	30.8	153.3	0.2	42.9	67.2	0.2
Delay (s)	43.2	17.7	29.5	49.2	20.5	11.4	68.1	191.4	32.6	97.5	115.7	40.9
Level of Service	D	B	C	D	C	B	E	F	C	F	F	D
Approach Delay (s)		24.1			22.4			130.6			98.5	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	63.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.8%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	3251		1805	3484		1805	1654		1805	1900	1481
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	3251		1805	3484		1805	1654		1805	1900	1481
Volume (vph)	70	1110	255	75	1600	65	125	25	60	50	35	85
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	71	1133	260	77	1633	66	128	26	61	51	36	87
RTOR Reduction (vph)	0	14	0	0	2	0	0	55	0	0	0	82
Lane Group Flow (vph)	71	1379	0	77	1697	0	128	32	0	51	36	5
Confl. Peds. (#/hr)			4	4			27					27
Heavy Vehicles (%)	0%	8%	4%	0%	3%	3%	0%	0%	4%	0%	0%	2%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	6.5	72.2		8.0	73.4		9.7	10.6		5.3	5.8	5.8
Effective Green, g (s)	8.8	74.1		10.0	75.3		12.4	12.3		7.6	7.5	7.5
Actuated g/C Ratio	0.07	0.62		0.08	0.63		0.10	0.10		0.06	0.06	0.06
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7		6.3	5.7	5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8		2.7	1.8	1.8
Lane Grp Cap (vph)	257	2007		150	2186		187	170		114	119	93
v/s Ratio Prot	0.02	c0.42		0.04	c0.49		c0.07	0.02		0.03	c0.02	
v/s Ratio Perm												0.00
v/c Ratio	0.28	0.69		0.51	0.78		0.68	0.19		0.45	0.30	0.06
Uniform Delay, d1	52.6	15.2		52.7	16.2		51.9	49.3		54.2	53.8	52.9
Progression Factor	0.91	0.66		0.80	0.53		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.9		1.9	2.1		9.3	0.2		2.3	0.5	0.1
Delay (s)	48.2	11.0		44.1	10.8		61.2	49.5		56.5	54.3	53.0
Level of Service	D	B		D	B		E	D		E	D	D
Approach Delay (s)		12.8			12.2			56.4			54.3	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.3%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	0.99	1.00	
Frt	1.00	0.98		1.00	1.00			1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3320		1752	3502			1709	1558	1790	1745	
Flt Permitted	0.95	1.00		0.95	1.00			0.72	1.00	0.41	1.00	
Satd. Flow (perm)	1805	3320		1752	3502			1298	1558	770	1745	
Volume (vph)	10	1090	135	80	1550	10	190	5	160	10	5	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	10	1112	138	82	1582	10	194	5	163	10	5	5
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	132	0	4	0
Lane Group Flow (vph)	10	1244	0	82	1592	0	0	199	31	10	6	0
Confl. Peds. (#/hr)	1		4	4		1	1		7	7		1
Heavy Vehicles (%)	0%	7%	3%	3%	3%	0%	6%	0%	1%	0%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	1.4	72.9		12.3	83.8			22.8	22.8	22.8	22.8	
Effective Green, g (s)	1.4	72.9		12.3	83.8			22.8	22.8	22.8	22.8	
Actuated g/C Ratio	0.01	0.61		0.10	0.70			0.19	0.19	0.19	0.19	
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)	21	2017		180	2446			247	296	146	332	
v/s Ratio Prot	0.01	0.37		c0.05	c0.45						0.00	
v/s Ratio Perm								c0.15	0.02	0.01		
v/c Ratio	0.48	0.62		0.46	0.65			0.81	0.10	0.07	0.02	
Uniform Delay, d1	58.9	14.8		50.7	10.0			46.5	40.2	39.9	39.5	
Progression Factor	0.93	0.23		0.84	0.63			1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.5	1.1		1.1	0.8			17.2	0.2	0.2	0.0	
Delay (s)	67.2	4.5		43.7	7.1			63.7	40.3	40.1	39.5	
Level of Service	E	A		D	A			E	D	D	D	
Approach Delay (s)		5.0			8.9			53.1			39.8	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.0%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.86		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3412		1805	3489		1805	1603		1805	1886	
Flt Permitted	0.12	1.00		0.07	1.00		0.00	1.00		0.00	1.00	
Satd. Flow (perm)	222	3412		134	3489		0	1603		0	1886	
Volume (vph)	5	1065	190	235	1270	130	360	10	235	105	95	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	1087	194	240	1296	133	367	10	240	107	97	5
RTOR Reduction (vph)	0	11	0	0	5	0	0	163	0	0	2	0
Lane Group Flow (vph)	5	1270	0	240	1424	0	367	87	0	107	100	0
Confl. Peds. (#/hr)	2					2			1	1		
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	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)	52.1	50.9		72.3	65.1		21.4	8.8		20.9	8.3	
Effective Green, g (s)	56.1	52.9		74.3	67.1		23.4	10.8		22.9	10.3	
Actuated g/C Ratio	0.47	0.44		0.62	0.56		0.19	0.09		0.19	0.09	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	146	1504		325	1951		352	144		344	162	
v/s Ratio Prot	0.00	c0.37		c0.11	0.41		c0.20	0.05		0.06	c0.05	
v/s Ratio Perm	0.02			0.35								
v/c Ratio	0.03	0.84		0.74	0.73		1.04	0.60		0.31	0.62	
Uniform Delay, d1	18.7	29.9		32.8	19.7		48.3	52.5		41.8	53.0	
Progression Factor	0.56	0.42		1.33	0.50		1.00	1.00		0.81	0.82	
Incremental Delay, d2	0.1	3.8		7.2	1.2		59.5	17.4		0.5	16.1	
Delay (s)	10.6	16.4		50.9	11.0		107.8	70.0		34.2	59.7	
Level of Service	B	B		D	B		F	E		C	E	
Approach Delay (s)		16.4			16.7			92.5			46.6	
Approach LOS		B			B			F			D	

Intersection Summary			
HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1517	3406	3535		1787	1583
Flt Permitted	0.12	1.00	1.00		0.95	1.00
Satd. Flow (perm)	193	3406	3535		1787	1583
Volume (vph)	35	1360	1475	5	195	135
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	36	1388	1505	5	199	138
RTOR Reduction (vph)	0	0	0	0	0	117
Lane Group Flow (vph)	36	1388	1510	0	199	21
Heavy Vehicles (%)	19%	6%	2%	20%	1%	2%
Turn Type	pm+pt					Perm
Protected Phases	7	4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	94.0	94.0	86.1		18.0	18.0
Effective Green, g (s)	94.0	94.0	86.1		18.0	18.0
Actuated g/C Ratio	0.78	0.78	0.72		0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	194	2668	2536		268	237
v/s Ratio Prot	0.01	c0.41	c0.43		c0.11	
v/s Ratio Perm	0.14					0.01
v/c Ratio	0.19	0.52	0.60		0.74	0.09
Uniform Delay, d1	6.3	4.8	8.4		48.8	43.9
Progression Factor	1.88	0.54	0.41		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.9		10.6	0.2
Delay (s)	12.1	2.7	4.3		59.4	44.1
Level of Service	B	A	A		E	D
Approach Delay (s)		2.9	4.3		53.1	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.4%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3471	1568	1770	3539			1752	1538	1805	1710	
Flt Permitted	0.95	1.00	1.00	0.08	1.00			0.75	1.00	0.40	1.00	
Satd. Flow (perm)	1805	3471	1568	153	3539			1379	1538	766	1710	
Volume (vph)	5	1145	445	530	1275	0	180	0	205	25	5	10
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	1168	454	541	1301	0	184	0	209	26	5	10
RTOR Reduction (vph)	0	0	106	0	0	0	0	0	9	0	8	0
Lane Group Flow (vph)	5	1168	348	541	1301	0	0	184	200	26	7	0
Heavy Vehicles (%)	0%	4%	3%	2%	2%	0%	3%	0%	5%	0%	0%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	1.0	52.4	52.4	83.1	83.1			17.9	49.6	17.9	17.9	
Effective Green, g (s)	3.0	54.4	54.4	85.1	85.1			19.9	53.6	19.9	19.9	
Actuated g/C Ratio	0.02	0.45	0.45	0.71	0.71			0.17	0.45	0.17	0.17	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	45	1574	711	563	2510			229	738	127	284	
v/s Ratio Prot	0.00	c0.34		c0.27	0.37				0.08		0.00	
v/s Ratio Perm			0.22	c0.41				c0.13	0.05	0.03		
v/c Ratio	0.11	0.74	0.49	0.96	0.52			0.80	0.27	0.20	0.02	
Uniform Delay, d1	57.2	27.0	23.0	35.2	8.0			48.2	20.9	43.2	41.9	
Progression Factor	0.95	0.80	0.81	0.77	0.40			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	1.6	0.3	23.0	0.6			17.2	0.1	0.3	0.0	
Delay (s)	54.9	23.2	19.0	50.3	3.7			65.4	21.0	43.5	41.9	
Level of Service	D	C	B	D	A			E	C	D	D	
Approach Delay (s)		22.2			17.4			41.8			42.9	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1698	1760	1553	1770	4900		1787	5072	
Flt Permitted	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1881	1599	1698	1760	1553	1770	4900		1787	5072	
Volume (vph)	210	335	145	345	270	170	110	1470	105	340	2175	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)	221	353	153	363	284	179	116	1547	111	358	2289	42
RTOR Reduction (vph)	0	0	125	0	0	151	0	7	0	0	1	0
Lane Group Flow (vph)	221	353	28	317	330	28	116	1651	0	358	2330	0
Heavy Vehicles (%)	1%	1%	1%	1%	2%	4%	2%	5%	2%	1%	2%	2%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	11.0	11.0	11.0	17.0	17.0	17.0	10.8	49.8		22.2	61.2	
Effective Green, g (s)	12.8	12.8	12.8	18.8	18.8	18.8	12.1	52.1		23.5	63.5	
Actuated g/C Ratio	0.11	0.11	0.11	0.16	0.16	0.16	0.10	0.43		0.20	0.53	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	191	201	171	266	276	243	178	2127		350	2684	
v/s Ratio Prot	0.12	c0.19		0.19	c0.19		0.07	c0.34		c0.20	c0.46	
v/s Ratio Perm			0.02			0.02						
v/c Ratio	1.16	1.76	0.16	1.19	1.20	0.12	0.65	0.78		1.02	0.87	
Uniform Delay, d1	53.6	53.6	48.7	50.6	50.6	43.5	51.9	29.0		48.2	24.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.88	0.87	
Incremental Delay, d2	113.8	360.0	0.3	117.2	117.8	0.1	7.0	2.1		40.8	2.2	
Delay (s)	167.4	413.6	49.0	167.8	168.4	43.6	58.9	31.1		83.1	23.7	
Level of Service	F	F	D	F	F	D	E	C		F	C	
Approach Delay (s)		262.0			141.1			32.9			31.6	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM Average Control Delay	74.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Preferred Alternative

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↰	↱	↰	↑↑	↱	↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1626		1681	1648	1568	1805	3438	1583	1719	3535	
Flt Permitted	0.95	1.00		0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1805	1626		1681	1648	1568	1805	3438	1583	1719	3535	
Volume (vph)	25	5	35	215	5	85	30	1290	105	100	2290	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	26	5	36	219	5	87	31	1316	107	102	2337	20
RTOR Reduction (vph)	0	34	0	0	0	62	0	0	38	0	0	0
Lane Group Flow (vph)	26	7	0	130	94	25	31	1316	69	102	2357	0
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	0%	0%	0%	2%	50%	3%	0%	5%	2%	5%	2%	0%
Turn Type	Split			Split		pm+ov	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8	1	5	2	8	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	5.8	5.8		13.8	13.8	32.2	4.6	59.5	73.3	18.4	73.3	
Effective Green, g (s)	7.8	7.8		15.8	15.8	34.7	5.1	61.5	77.3	18.9	75.3	
Actuated g/C Ratio	0.06	0.06		0.13	0.13	0.29	0.04	0.51	0.64	0.16	0.63	
Clearance Time (s)	6.0	6.0		6.0	6.0	4.5	4.5	6.0	6.0	4.5	6.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.3	2.3	4.8	2.5	2.3	4.8	
Lane Grp Cap (vph)	117	106		221	217	453	77	1762	1072	271	2218	
v/s Ratio Prot	c0.01	0.00		c0.08	0.06	0.01	0.02	c0.38	0.01	0.06	c0.67	
v/s Ratio Perm						0.01			0.04			
v/c Ratio	0.22	0.07		0.59	0.43	0.06	0.40	0.75	0.06	0.38	1.06	
Uniform Delay, d1	53.2	52.7		49.0	48.0	30.8	56.0	23.1	7.9	45.3	22.4	
Progression Factor	1.00	1.00		1.07	1.07	1.28	0.70	0.60	0.00	1.00	1.00	
Incremental Delay, d2	0.7	0.2		3.1	1.0	0.0	1.6	2.4	0.0	0.5	38.3	
Delay (s)	53.9	52.9		55.5	52.3	39.5	40.9	16.2	0.0	45.8	60.6	
Level of Service	D	D		E	D	D	D	B	A	D	E	
Approach Delay (s)		53.3			50.1			15.5			60.0	
Approach LOS		D			D			B			E	

Intersection Summary			
HCM Average Control Delay	44.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	*0.75	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Flt Permitted	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 (perm)	3400	4988	1524	3303	5085	1583	3502	2767	1507	3127	3374	1553
Volume (vph)	195	950	425	325	1775	470	590	1000	240	260	705	195
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	199	969	434	332	1811	480	602	1020	245	265	719	199
RTOR Reduction (vph)	0	0	173	0	0	116	0	0	88	0	0	152
Lane Group Flow (vph)	199	969	261	332	1811	364	602	1020	157	265	719	47
Confl. Peds. (#/hr)									3	3		
Heavy Vehicles (%)	3%	4%	6%	6%	2%	2%	0%	3%	4%	12%	7%	4%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	11.1	42.9	42.9	15.8	47.6	47.6	19.3	32.0	32.0	9.3	22.0	22.0
Effective Green, g (s)	11.6	44.4	44.4	16.3	49.1	49.1	20.3	33.0	33.0	10.3	23.0	23.0
Actuated g/C Ratio	0.10	0.37	0.37	0.14	0.41	0.41	0.17	0.28	0.28	0.09	0.19	0.19
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7	4.7	2.3	4.7	4.7	2.3	2.3	2.3	2.3	2.3	2.3
Lane Grp Cap (vph)	329	1846	564	449	2081	648	592	761	414	268	647	298
v/s Ratio Prot	0.06	c0.19		0.10	c0.36		c0.17	c0.37		0.08	0.21	
v/s Ratio Perm			0.17			0.23			0.10			0.03
v/c Ratio	0.60	0.52	0.46	0.74	0.87	0.56	1.02	1.34	0.38	0.99	1.11	0.16
Uniform Delay, d1	52.0	29.6	28.7	49.8	32.5	27.2	49.9	43.5	35.2	54.8	48.5	40.4
Progression Factor	0.80	0.59	1.00	0.96	0.57	0.36	0.78	0.77	0.67	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.3	0.7	1.8	1.7	1.1	33.4	158.7	0.2	51.3	70.0	0.1
Delay (s)	43.2	17.8	29.3	49.7	20.3	10.8	72.5	192.4	24.0	106.1	118.5	40.6
Level of Service	D	B	C	D	C	B	E	F	C	F	F	D
Approach Delay (s)		24.1			22.3			131.6			102.6	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	63.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.5%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3502	3257		1805	3485		1805	1654		1805	1900	1481
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3502	3257		1805	3485		1805	1654		1805	1900	1481
Volume (vph)	70	1135	240	75	1615	65	125	25	60	50	35	90
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	71	1158	245	77	1648	66	128	26	61	51	36	92
RTOR Reduction (vph)	0	13	0	0	2	0	0	55	0	0	0	84
Lane Group Flow (vph)	71	1390	0	77	1712	0	128	32	0	51	36	8
Confl. Peds. (#/hr)			4	4			27					27
Heavy Vehicles (%)	0%	8%	4%	0%	3%	3%	0%	0%	4%	0%	0%	2%
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	6.5	69.4		7.8	70.4		9.7	10.0		8.9	8.8	8.8
Effective Green, g (s)	8.8	71.3		9.8	72.3		12.4	11.7		11.2	10.5	10.5
Actuated g/C Ratio	0.07	0.59		0.08	0.60		0.10	0.10		0.09	0.09	0.09
Clearance Time (s)	6.3	5.9		6.0	5.9		6.7	5.7		6.3	5.7	5.7
Vehicle Extension (s)	2.7	3.2		2.7	3.2		2.6	1.8		2.7	1.8	1.8
Lane Grp Cap (vph)	257	1935		147	2100		187	161		168	166	130
v/s Ratio Prot	0.02	c0.43		0.04	c0.49		c0.07	0.02		c0.03	0.02	
v/s Ratio Perm												0.01
v/c Ratio	0.28	0.72		0.52	0.82		0.68	0.20		0.30	0.22	0.06
Uniform Delay, d1	52.6	17.2		52.9	18.6		51.9	49.8		50.8	50.9	50.2
Progression Factor	0.78	1.12		0.83	0.62		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	1.1		2.2	2.8		9.3	0.2		0.9	0.2	0.1
Delay (s)	41.2	20.5		46.2	14.4		61.2	50.1		51.6	51.2	50.3
Level of Service	D	C		D	B		E	D		D	D	D
Approach Delay (s)		21.5			15.8			56.7			50.9	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.8%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	0.99	1.00	
Frt	1.00	0.98		1.00	1.00			1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3321		1752	3502			1709	1558	1790	1745	
Flt Permitted	0.95	1.00		0.95	1.00			0.72	1.00	0.41	1.00	
Satd. Flow (perm)	1805	3321		1752	3502			1299	1558	781	1745	
Volume (vph)	10	1115	135	90	1565	10	185	5	160	10	5	5
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	10	1138	138	92	1597	10	189	5	163	10	5	5
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	133	0	4	0
Lane Group Flow (vph)	10	1269	0	92	1607	0	0	194	30	10	6	0
Confl. Peds. (#/hr)	1		4	4		1	1		7	7		1
Heavy Vehicles (%)	0%	7%	3%	3%	3%	0%	6%	0%	1%	0%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	1.4	70.0		15.6	84.2			22.4	22.4	22.4	22.4	
Effective Green, g (s)	1.4	70.0		15.6	84.2			22.4	22.4	22.4	22.4	
Actuated g/C Ratio	0.01	0.58		0.13	0.70			0.19	0.19	0.19	0.19	
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)	21	1937		228	2457			242	291	146	326	
v/s Ratio Prot	0.01	0.38		c0.05	c0.46						0.00	
v/s Ratio Perm								c0.15	0.02	0.01		
v/c Ratio	0.48	0.66		0.40	0.65			0.80	0.10	0.07	0.02	
Uniform Delay, d1	58.9	16.9		47.9	9.9			46.7	40.5	40.2	39.8	
Progression Factor	0.93	0.10		0.83	0.59			1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.2	1.3		0.6	0.8			17.1	0.2	0.2	0.0	
Delay (s)	66.8	2.9		40.3	6.5			63.8	40.6	40.4	39.8	
Level of Service	E	A		D	A			E	D	D	D	
Approach Delay (s)		3.4			8.4			53.2			40.1	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.1%	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)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.86		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)	1805	3408		1805	3493		1805	1615		1805	1860	
Flt Permitted	0.10	1.00		0.07	1.00		0.00	1.00		0.00	1.00	
Satd. Flow (perm)	197	3408		136	3493		0	1615		0	1860	
Volume (vph)	20	1065	205	240	1280	120	365	20	230	115	90	15
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	20	1087	209	245	1306	122	372	20	235	117	92	15
RTOR Reduction (vph)	0	12	0	0	5	0	0	165	0	0	5	0
Lane Group Flow (vph)	20	1284	0	245	1423	0	372	90	0	117	102	0
Confl. Peds. (#/hr)	2					2			1	1		
Heavy Vehicles (%)	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	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)	51.9	49.9		70.6	62.6		21.6	10.1		21.3	9.8	
Effective Green, g (s)	55.9	51.9		72.6	64.6		23.6	12.1		23.3	11.8	
Actuated g/C Ratio	0.47	0.43		0.60	0.54		0.20	0.10		0.19	0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	145	1474		315	1880		355	163		350	183	
v/s Ratio Prot	0.00	c0.38		c0.11	0.41		c0.21	0.06		0.06	c0.05	
v/s Ratio Perm	0.06			0.36								
v/c Ratio	0.14	0.87		0.78	0.76		1.05	0.55		0.33	0.56	
Uniform Delay, d1	19.7	31.0		33.8	21.6		48.2	51.4		41.7	51.6	
Progression Factor	0.71	0.41		1.36	0.47		1.00	1.00		0.83	0.84	
Incremental Delay, d2	0.4	4.9		9.8	1.5		60.8	12.7		0.6	11.4	
Delay (s)	14.2	17.6		55.8	11.7		109.0	64.0		35.2	54.8	
Level of Service	B	B		E	B		F	E		D	D	
Approach Delay (s)		17.6			18.1			90.7			44.6	
Approach LOS		B			B			F			D	

Intersection Summary			
HCM Average Control Delay	31.3	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	88.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1517	3406	3535		1787	1583
Flt Permitted	0.12	1.00	1.00		0.95	1.00
Satd. Flow (perm)	191	3406	3535		1787	1583
Volume (vph)	35	1360	1480	5	195	120
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	36	1388	1510	5	199	122
RTOR Reduction (vph)	0	0	0	0	0	104
Lane Group Flow (vph)	36	1388	1515	0	199	18
Heavy Vehicles (%)	19%	6%	2%	20%	1%	2%
Turn Type	pm+pt					Perm
Protected Phases	7	4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	94.0	94.0	86.1		18.0	18.0
Effective Green, g (s)	94.0	94.0	86.1		18.0	18.0
Actuated g/C Ratio	0.78	0.78	0.72		0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	193	2668	2536		268	237
v/s Ratio Prot	0.01	c0.41	c0.43		c0.11	
v/s Ratio Perm	0.14					0.01
v/c Ratio	0.19	0.52	0.60		0.74	0.08
Uniform Delay, d1	6.4	4.8	8.4		48.8	43.9
Progression Factor	1.87	0.60	0.36		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.9		10.6	0.1
Delay (s)	12.2	3.0	3.9		59.4	44.0
Level of Service	B	A	A		E	D
Approach Delay (s)		3.2	3.9		53.5	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱			↰↑	↱	↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3471	1568	1770	3539			1752	1538	1805	1710	
Flt Permitted	0.95	1.00	1.00	0.08	1.00			0.75	1.00	0.40	1.00	
Satd. Flow (perm)	1805	3471	1568	155	3539			1379	1538	766	1710	
Volume (vph)	5	1135	455	535	1285	0	180	0	215	25	5	10
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	1158	464	546	1311	0	184	0	219	26	5	10
RTOR Reduction (vph)	0	0	108	0	0	0	0	0	9	0	8	0
Lane Group Flow (vph)	5	1158	356	546	1311	0	0	184	210	26	7	0
Heavy Vehicles (%)	0%	4%	3%	2%	2%	0%	3%	0%	5%	0%	0%	0%
Turn Type	Prot		Perm	pm+pt			Perm		pm+ov	Perm		
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2	6			8		8	4		
Actuated Green, G (s)	1.0	52.1	52.1	83.1	83.1			17.9	49.9	17.9	17.9	
Effective Green, g (s)	3.0	54.1	54.1	85.1	85.1			19.9	53.9	19.9	19.9	
Actuated g/C Ratio	0.02	0.45	0.45	0.71	0.71			0.17	0.45	0.17	0.17	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	1.0	2.5	2.5	1.0	2.5			1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	45	1565	707	568	2510			229	742	127	284	
v/s Ratio Prot	0.00	c0.33		c0.27	0.37				0.08		0.00	
v/s Ratio Perm			0.23	c0.41				c0.13	0.06	0.03		
v/c Ratio	0.11	0.74	0.50	0.96	0.52			0.80	0.28	0.20	0.02	
Uniform Delay, d1	57.2	27.2	23.4	35.1	8.1			48.2	20.9	43.2	41.9	
Progression Factor	0.95	0.79	0.81	0.71	0.47			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	1.5	0.4	22.6	0.6			17.2	0.1	0.3	0.0	
Delay (s)	54.8	22.9	19.3	47.5	4.3			65.4	20.9	43.5	41.9	
Level of Service	D	C	B	D	A			E	C	D	D	
Approach Delay (s)		22.0			17.0			41.2			42.9	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰	↑	↱	↰	↰↑	↱	↰	↑↑↑↱		↰	↑↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1881	1599	1698	1759	1553	1770	4900		1787	5072	
Flt Permitted	0.95	1.00	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1881	1599	1698	1759	1553	1770	4900		1787	5072	
Volume (vph)	210	355	145	350	270	170	110	1475	105	340	2185	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)	221	374	153	368	284	179	116	1553	111	358	2300	42
RTOR Reduction (vph)	0	0	118	0	0	151	0	7	0	0	1	0
Lane Group Flow (vph)	221	374	35	319	333	28	116	1657	0	358	2341	0
Heavy Vehicles (%)	1%	1%	1%	1%	2%	4%	2%	5%	2%	1%	2%	2%
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases			7			8						
Actuated Green, G (s)	11.0	11.0	11.0	17.0	17.0	17.0	10.8	49.9		22.1	61.2	
Effective Green, g (s)	12.8	12.8	12.8	18.8	18.8	18.8	12.1	52.2		23.4	63.5	
Actuated g/C Ratio	0.11	0.11	0.11	0.16	0.16	0.16	0.10	0.44		0.19	0.53	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.5	5.5		4.5	5.5	
Vehicle Extension (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.7		2.3	4.7	
Lane Grp Cap (vph)	191	201	171	266	276	243	178	2132		348	2684	
v/s Ratio Prot	0.12	c0.20		0.19	c0.19		0.07	c0.34		c0.20	c0.46	
v/s Ratio Perm			0.02			0.02						
v/c Ratio	1.16	1.86	0.21	1.20	1.21	0.12	0.65	0.78		1.03	0.87	
Uniform Delay, d1	53.6	53.6	49.0	50.6	50.6	43.5	51.9	28.9		48.3	24.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.89	0.88	
Incremental Delay, d2	113.8	405.8	0.3	120.1	122.0	0.1	7.0	2.1		42.0	2.2	
Delay (s)	167.4	459.4	49.3	170.7	172.6	43.6	58.9	31.0		84.8	24.0	
Level of Service	F	F	D	F	F	D	E	C		F	C	
Approach Delay (s)		289.2			144.1			32.9			32.1	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM Average Control Delay	79.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Sensitivity Analysis Worksheets

For Sensitivity Analysis Only

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Hwy 99W/Edy Road

Cycle (sec):	120	Critical Vol./Cap.(X):	1.010
Loss Time (sec):	16	Average Delay (sec/veh):	63.6
Optimal Cycle:	180	Level Of Service:	E

Street Name:	Hwy 99W						Edy Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2	1 0	1 0	2	1 0	1 0	1	0 1	1 1	0	0 1
Volume Module:												
Base Vol:	111	1470	103	338	2175	40	208	336	147	345	269	169
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	111	1470	103	338	2175	40	208	336	147	345	269	169
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	111	1470	103	338	2175	40	208	336	147	345	269	169
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	117	1547	108	356	2289	42	219	354	155	363	283	178
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	117	1547	108	356	2289	42	219	354	155	363	283	178
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	117	1547	108	356	2289	42	219	354	155	363	283	178
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	0.94	0.94	0.93	0.98	0.98	0.94	0.99	0.84	0.95	0.95	0.83
Lanes:	1.00	2.80	0.20	1.00	2.95	0.05	1.00	1.00	1.00	1.12	0.88	1.00
Final Sat.:	1718	5020	352	1769	5469	101	1787	1881	1599	2036	1587	1583
Capacity Analysis Module:												
Vol/Sat:	0.07	0.31	0.31	0.20	0.42	0.42	0.12	0.19	0.10	0.18	0.18	0.11
Crit Moves:		****		****				****		****		
Green/Cycle:	0.07	0.31	0.31	0.20	0.43	0.43	0.19	0.19	0.19	0.18	0.18	0.18
Volume/Cap:	0.97	1.01	1.01	1.01	0.97	0.97	0.66	1.01	0.52	1.01	1.01	0.64
Uniform Del:	55.6	41.7	41.7	48.1	33.1	33.1	45.3	48.8	44.0	49.4	49.4	45.8
IncremntDel:	70.7	24.8	24.8	50.6	11.4	11.4	4.8	50.8	1.6	38.2	38.2	4.8
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	126.4	66.5	66.5	98.7	44.5	44.5	50.1	99.6	45.6	87.6	87.6	50.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	126.4	66.5	66.5	98.7	44.5	44.5	50.1	99.6	45.6	87.6	87.6	50.7
LOS by Move:	F	E	E	F	D	D	D	F	D	F	F	D
HCM2kAvgQ:	7	27	27	19	34	34	8	19	6	17	17	7

For Sensitivity Analysis Only

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Hwy 99W/Edy Road

Cycle (sec):	120	Critical Vol./Cap.(X):	1.024
Loss Time (sec):	16	Average Delay (sec/veh):	67.0
Optimal Cycle:	180	Level Of Service:	E

Street Name:	Hwy 99W						Edy Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 2 1 0			1 0 2 1 0			1 0 1 0 1			1 1 0 0 1		
Volume Module:												
Base Vol:	111	1476	103	338	2186	41	208	353	143	348	270	172
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	111	1476	103	338	2186	41	208	353	143	348	270	172
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	111	1476	103	338	2186	41	208	353	143	348	270	172
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	117	1554	108	356	2301	43	219	372	151	366	284	181
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	117	1554	108	356	2301	43	219	372	151	366	284	181
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	117	1554	108	356	2301	43	219	372	151	366	284	181
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	0.94	0.94	0.93	0.98	0.98	0.94	0.99	0.84	0.95	0.95	0.83
Lanes:	1.00	2.80	0.20	1.00	2.94	0.06	1.00	1.00	1.00	1.13	0.87	1.00
Final Sat.:	1718	5022	350	1769	5467	103	1787	1881	1599	2040	1583	1583
Capacity Analysis Module:												
Vol/Sat:	0.07	0.31	0.31	0.20	0.42	0.42	0.12	0.20	0.09	0.18	0.18	0.11
Crit Moves:		****		****				****			****	
Green/Cycle:	0.07	0.30	0.30	0.20	0.43	0.43	0.19	0.19	0.19	0.18	0.18	0.18
Volume/Cap:	0.98	1.02	1.02	1.02	0.98	0.98	0.64	1.02	0.49	1.02	1.02	0.65
Uniform Del:	55.8	41.9	41.9	48.2	33.8	33.8	44.5	48.4	43.1	49.5	49.5	46.1
IncremntDel:	76.2	28.7	28.7	54.6	14.1	14.1	3.9	53.6	1.2	42.0	42.0	5.5
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	132.0	70.6	70.6	102.8	47.9	47.9	48.4	102	44.4	91.5	91.5	51.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	132.0	70.6	70.6	102.8	47.9	47.9	48.4	102	44.4	91.5	91.5	51.5
LOS by Move:	F	E	E	F	D	D	D	F	D	F	F	D
HCM2kAvgQ:	8	28	28	19	35	35	8	20	5	18	18	7

Mitigated, For Sensitivity analysis only.

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Hwy 99W/Edy Road

Cycle (sec):	120	Critical Vol./Cap.(X):	0.998
Loss Time (sec):	16	Average Delay (sec/veh):	65.3
Optimal Cycle:	180	Level Of Service:	E

Street Name:	Hwy 99W						Edy Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Protected			Protected			Split Phase			Split Phase	
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:		1 0 3 0 1			1 0 2 1 0			1 0 1 0 1			1 1 0 0 1	
Volume Module:												
Base Vol:	111	1476	103	338	2186	41	208	353	143	348	270	172
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	111	1476	103	338	2186	41	208	353	143	348	270	172
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	111	1476	103	338	2186	41	208	353	143	348	270	172
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	117	1554	108	356	2301	43	219	372	151	366	284	181
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	117	1554	108	356	2301	43	219	372	151	366	284	181
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	117	1554	108	356	2301	43	219	372	151	366	284	181
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	0.95	0.81	0.93	0.98	0.98	0.94	0.99	0.84	0.95	0.95	0.83
Lanes:	1.00	3.00	1.00	1.00	2.94	0.06	1.00	1.00	1.00	1.13	0.87	1.00
Final Sat.:	1718	5426	1537	1769	5467	103	1787	1881	1599	2040	1583	1583
Capacity Analysis Module:												
Vol/Sat:	0.07	0.29	0.07	0.20	0.42	0.42	0.12	0.20	0.09	0.18	0.18	0.11
Crit Moves:		****		****				****			****	
Green/Cycle:	0.07	0.29	0.29	0.20	0.42	0.42	0.20	0.20	0.20	0.18	0.18	0.18
Volume/Cap:	1.00	1.00	0.25	1.00	1.00	1.00	0.62	1.00	0.48	1.00	1.00	0.64
Uniform Del:	55.9	42.7	32.8	47.9	34.8	34.8	44.0	48.1	42.6	49.2	49.2	45.6
IncremntDel:	83.4	22.2	0.3	47.0	18.7	18.7	3.3	45.9	1.1	34.6	34.6	4.7
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	139.3	64.9	33.1	94.8	53.5	53.5	47.3	94.0	43.7	83.8	83.8	50.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	139.3	64.9	33.1	94.8	53.5	53.5	47.3	94.0	43.7	83.8	83.8	50.2
LOS by Move:	F	E	C	F	D	D	D	F	D	F	F	D
HCM2kAvgQ:	8	25	3	18	36	36	8	19	5	17	17	7

Text Amendments for Adams Avenue Concept Plan

Chapter 8, Part 2 of the Comprehensive Plan "Urban Growth Boundary Additions"

B. URBAN GROWTH BOUNDARY DATA & ASSUMPTIONS

The Sherwood Urban Growth Boundary (UGB) is currently defined as the area west of Cipole Road, east of Elwert Road, north of Brookman Road, and south of the Tualatin River National Wildlife Refuge and is included within the regionally adopted Metro Urban Growth Boundary.

The growth assumptions developed and selected for Sherwood during the previous Plan preparation in 1991 were low. At that time, the Plan projected 5,355 people in the urban area by 1988 as opposed to an actual 10,600 people by 2000 projected in the 1980 Plan. This difference arose from a projected 7% to 12% annual increase anticipated by connection of the Sherwood sewer system to the Durham Sewage Treatment Plant owned and operated by Clean Water Services. Since then growth has overwhelmed Sherwood: the population according to the 2000 US Census was 11,791 and 14,410 in 2005 inside the City limits, according to an estimate by Portland State University's Population Research Center.

Sherwood has become a bedroom community for families that work elsewhere in the Portland Metro area. According to the Washington County Tax Assessor's Office, the residential to non-residential tax base ratio is 80 percent residential and 20 percent non-residential. This jobs housing imbalance does not provide a sustainable economy for providing urban services and has repercussions on providing cost-effective urban services.

The Metro Region 2040 Growth Concept Map designates land use for future urban growth areas. The following table summarizes the acreage, planned land use designation, applicable planned densities, and the year the land was brought into the UGB.

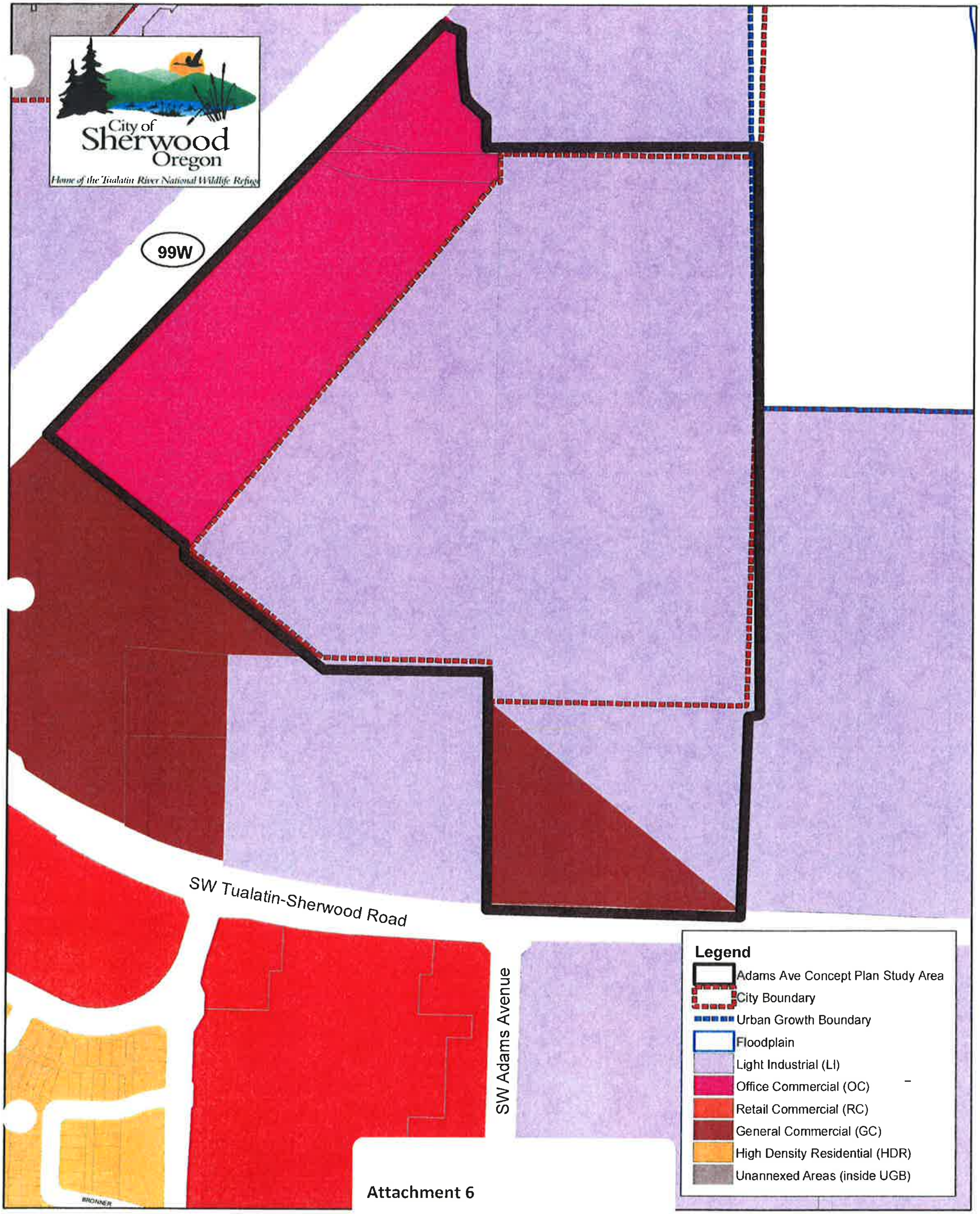
Table VIII -1 - Summary of UGB Additions 2002-2004

UGB Addition	Year	Acres	2040 Land Use Type	Planned Density*
Area 59	2002	85	Outer Neighborhood	7.3 to 10 units per acre
Area 54-55	2002	235	Inner Neighborhood	9.6 to 10 units per acre
99W Areas	2002	23	Employment/Industrial	N/A
Area 48	2004	354	Industrial	N/A

*Metro Code 3.07.170 describes the design type as persons per acre versus units per acre. This metric is converted to planned density for comparison purposes.

As the above table illustrates, the design types provide a range of net densities within developable areas. The Metro Housing Rule (OAR 600-007-035) requires Sherwood to plan for six (6) units per acre. The maximum density of ten (10) units per acre is a requirement under Title 11 of the Metro Functional Plan where the minimum density threshold is set by the design type in the 2040 Growth Concept Map. Concept plans for UGB additions will need to account for these minimum and maximum ranges. For the purposes of concept planning UGB additions, 25 percent of each subject area is netted from the gross density calculation to plan for public facilities, including streets, utilities, stormwater retention, and dedicated open space. Dedicated parks and civic uses are not counted towards a density calculation.

Adams Ave Concept Plan Zoning



Attachment 6

May 18, 2009

PA 09-02 – Adams Avenue Concept Plan
Proposed Development Code Amendments
Updated - May 15, 2009

16.22 - OFFICE COMMERCIAL

16.22.010 Purpose

The OC zoning district provides areas for business and professional offices and related uses in locations where they can be closely associated with residential areas and adequate major streets.
(Ord. 90-921 § 1)

16.22.020 Permitted Uses

The following uses are permitted outright, provided such uses meet the applicable environmental performance standards contained in Division VIII:

A. Offices, studios or clinics of architects, artists, attorneys, dentists, engineers, physicians, or other similar professional services, excepting veterinarians.

B. Offices of educational, financial, governmental, non-profit, real estate, research, or other similar service organizations whose activities are such that few visitors, other than employees, have reason to come to the premises.

C. Restaurants, taverns and lounges (except as limited in 16.22.060).

D. Other similar office uses, subject to Chapter 16.88.

E. PUDs, subject to Chapter 16.40.

F. Temporary uses, including but not limited to portable construction and real estate sales offices, subject to Chapter 16.86.

G. Multi-family housing within a Planned Unit Development (PUD) subject to the provisions of Section 16.20.040 High Density Residential (HDR) Dimensional Standards.

(Ord. 90-921 § 1)

16.22.030 Conditional Uses

The following uses are permitted as conditional uses, provided such uses meet the applicable environmental performance standards contained in Division VIII, and are approved in accordance with Chapter 16.82:

A. Hotels and motels.

B. Apartments when located on the upper floors, in the rear of, or otherwise clearly secondary to a commercial building.

C. Uses permitted outright in the RC zone, pursuant to Chapter 16.28 and as limited in 16.22.060. .

D. Public recreational facilities including parks, trails, playfields and sports and racquet courts on publicly owned property or under power line easements.

(Ord. 90-921 § 1)

16.22.040 Prohibited Uses

The following uses are expressly prohibited:

A. Adult entertainment businesses.

(Ord. 90-921 § 1)

16.22.050 Dimensional Standards

No lot area, setback, yard, landscaped area, open space, off-street parking or loading area, or other site dimension or requirement, existing on, or after, the effective date of this Code shall be reduced below the minimum required by this Code. Nor shall the conveyance of any portion of a lot, for other than a public use or right-of-way, leave a lot or structure on the remainder of said lot with less than minimum Code dimensions, area, setbacks or other requirements, except as permitted by Chapter 16.84.

A. Lot Dimensions
Except as otherwise provided, required minimum lot areas and dimensions shall be:

1.	Lot area:	10,000 square feet
2.	Lot width at property line:	60 feet
3.	Lot width at building line:	60 feet

B. Setbacks
Except as otherwise provided, required minimum setbacks shall be:

1.	Front yard:	None
2.	Side yards:	None, except ten (10) feet when abutting a residential zone or public park.
3.	Rear yard:	one, except twenty (20) feet when abutting a residential zone or public park.

4. Existing residential uses shall maintain minimum setbacks specified in Section 16.20.040.
(Ord. 90-921 § 1)
C. Height
Except as otherwise provided the maximum height of structures shall be two (2) stories or thirty (30) feet, whichever is less. Chimneys, solar and wind energy devices, radio and TV aerials, and similar structures attached to residential dwellings and accessory buildings, may exceed this height limitation by up to twenty (20) feet.
(Ord. 91-922 § 3; 90-921)

16.22.060 Special Criteria
Within the Adams Avenue Concept Plan study area as identified in Ordinance 2009-00X, retail uses and restaurants, taverns and lounges are limited to no more than 10% of the square footage of each development proposed. Drive-through restaurants are prohibited.

16.22.0~~6~~70 Community Design
For standards relating to off-street parking and loading, energy conservation, historic resources, environmental resources, landscaping, access and egress, signs, parks and open space, on-site storage, and design, see Divisions V, VIII and IX.
(Ord. 91-922 § 3; 90-921)

16.22.0~~7~~80 Flood Plain
Except as otherwise provided, Section 16.134.020 shall apply.
(Ord. 2000-1092 § 3; 90-921)

16.32 - LIGHT INDUSTRIAL

16.32.010 Purpose

The LI zoning district provides for the manufacturing, processing, assembling, packaging and treatment of products which have been previously prepared from raw materials. Industrial establishments shall not have objectionable external features and shall feature well-landscaped sites and attractive architectural design, as determined by the Commission.

(Ord. 93-964 § 3; 86-851)

16.32.020 Permitted Uses

The following uses are permitted outright, provided such uses meet the applicable environmental performance standards contained in Division VIII. Incidental retail sales, limited to 10% of the total floor area of a business, may be permitted as a secondary function of a permitted or conditional use, subject to the review and approval of the Hearing Authority.

(Ord. 2001-1119 § 1; 93-964)

A. Contractor's offices and other offices associated with a use permitted in the LI zone.

B. Public and private utilities, including but not limited to telephone exchanges, electric substations, data centers, gas regulator stations, sewage treatment plants, water wells and public work yards.

C. Glass installation and sales.

D. Laboratories for testing and medical, dental, photographic, or motion picture processing, except as prohibited by Section 16.32.040(E).

E. Industrial hand tool and supply sales primarily wholesaled to other industrial firms or industrial workers.

F. Other similar light industrial uses subject to Chapter 16.88.

G. Dwelling unit for one (1) security person employed on the premises, and their immediate family.

H. PUDs, new and existing, subject to the provisions of Chapter 16.40. New PUDs may mix uses which are permitted within the boundaries of the PUD. Approved PUDs may elect to establish uses which are permitted or conditionally permitted under the base zone text applicable at the time of final approval of the PUD.

(Ord. 98-1051 § 1; 86-851)

I. Temporary uses, including but not limited to construction and real estate sales offices, subject to Chapter 16.86.

J. Wireless communication antennas co-located on an existing tower or on an existing building or structure not exceeding the roof of the structure provided the applicant can demonstrate to the satisfaction of the City that the location of the antenna on City-owned property would be unfeasible.

(Ord. 97-1019 § 1)

K. Business and professional office.

L. Tool and equipment rental.

M. Blueprinting, printing, publishing, or other reproduction services.

N. Farm and garden supply stores and retail plant nurseries, but excluding wholesale plant nurseries, and commercial farm equipment and vehicle sales which are prohibited.

O. Medical, dental and similar laboratories.

P. Manufacture, compounding, processing, assembling, packaging, treatment, fabrication, wholesaling, warehousing or storage of the following articles or products:

1. Food products, including but not limited to candy, dairy products, beverages, coffee, canned goods and baked goods, and meat and poultry, except as prohibited by Section 16.32.040.

2. Appliances, including but not limited to refrigerators, freezers, washing machines, dryers, small electronic motors and generators, heating and cooling equipment, lawn mowers, rototillers, and chain saws, vending machines, and similar products and associated small parts.

3. Cosmetics, drugs, pharmaceuticals, toiletries, chemicals and similar products, except as prohibited by Section 16.32.040.

4. Electrical, radio, television, optical, scientific, hearing aids, electronic, computer, communications and similar instruments, components, appliances and systems, and similar products and associated small parts.

5. Building components and household fixtures, including but not limited to furniture, cabinets, and upholstery, ladders, mattresses, doors and windows, signs and display structures, and similar products and associated small parts.
6. Recreational vehicles and equipment, including but not limited to bicycles, recreational watercraft, exercise equipment, and similar products and associated small parts, but excluding motorized equipment unless otherwise permitted by Section 16.32.020 or 16.32.030.
7. Musical instruments, toys and novelties.
8. Pottery and ceramics, limited to products using previously pulverized clay.
9. Textiles and fiber products.
10. Other small products and tools manufactured from previously prepared or semi-finished materials, including but not limited to bone, fur, leather, feathers, textiles, plastics, glass, wood products, metals, tobacco, rubber, and precious or semi-precious stones.
(Ord. 2002-1136 § 3; 2001-1119; 98-1051; 93-964; 91-922; 86-851)

16.32.030 Conditional Uses
The following uses are permitted as Conditional Uses provided such uses meet the applicable environmental performance standards contained in Division VIII and are approved in accordance with Chapter 16.82:
A. Laundry, dry cleaning, dyeing or rug cleaning plants.
B. Light metal fabrication, machining, welding and electroplating and casting or molding of semi-finished or finished metals.
C. Offices associated with a use conditionally permitted in the LI zone.
D. Sawmills.
E. Radio, television and similar communication stations, including transmitters and wireless communication towers, except for towers located within 1,000 feet of the Old Town District which are prohibited.
F. Restaurants without drive-thru.
G. Hospitals and emergency care facilities.
H. Automotive, recreational vehicle, motorcycle, truck, manufactured home, boat, farm and other equipment repair or service.
I. Commercial trade schools.
J. Wholesale building material sales, lumberyards, contractors storage and equipment yards, building maintenance services, and similar uses.
K. Retail uses for warehousing or manufacturing operations, limited to 10% of the total floor area and not to exceed 60,000 square feet of gross leaseable area per building or business. The retail area shall be physically separated by a wall or other barrier from the manufacturing or warehousing operation. Warehousing and storage areas shall not be used as showrooms.
(Ord. 2000-1092 § 3)
L. Power generation plants and associated facilities.
M. Veterinarians offices and animal hospitals.
N. Automobile, boat, trailer and recreational vehicle storage.
(Ord. 93-964 § 3)
O. Daycares and pre-schools, if fully integrated with and secondary to a use elsewhere permitted in Section 16.32.020 or 16.32.030.
P. Government facilities, including police, fire and vehicle testing stations.
Q. Public recreational facilities including parks, playfields and sports and racquet courts on publicly owned property or under power line easements.
(Ord. 2002-1136 § 3; 2001-1119; 98-1051; 93-964)

16.32.040 Prohibited Uses
The following uses are expressly prohibited:
A. Adult entertainment businesses.
(Ord. 86-851 § 3)

From:	"Meg Fernekees" <meg.fernekees@state.or.us>
To:	"Julia Hajduk" <hajdukj@ci.sherwood.or.us>
CC:	"Angela Lazarean" <angela.lazarean@state.or.us>, "Bill Holmstrom" <bill....
Date:	4/14/2009 2:54 PM
Subject:	RE: Sherwood - Adams Avenue Concept Plan/Sherwd 001-09

DLCD File: Sherwood 001-09

Hello, Julia:

I understand that the City of Sherwood Planning Commission is conducting a workshop session on the above tonight. if you could share the contents of this email with the Planning Commission, I would certainly appreciate it.

Thank you for providing me the opportunity to review the Adams Avenue Concept Plan last week when we met. I would like to offer the some comments and observations:

When the subject area was initially brought into the Urban Growth Boundary (UGB), Metro conceived the future land use as Industrial land, although the main driver was to provide transportation connectivity to state highway 99W.

We support the following zones/land uses:

With regard to Opportunity Area 1: (a.k.a. 99W parcel): Among the options of General Commercial, Office Commercial and Light Industrial, the Department believes the General Commercial zone would be the most deleterious to the City of Sherwood's urban form and functionality of the on-site and off-site transportation system. Nor would selecting that zone be helpful in providing family-wage jobs. We would encourage the City to apply the light industrial zone, as good employment land with highway access is shrinking in the metropolitan region. We would hope that the City could supplement the approval of light industrial with design and architectural standards so that the subsequent development of the site does not sustain visual blight. Our second choice would be office commercial, again with design guidance that would translate into Class A office space. As the largest opportunity site, our main point is that the City really must consider the land uses that support the highest job intensities, and retail commercial does not achieve that.

With regard to Opportunity Area 2: We concur with the concept plan's recommendation of light industrial.

With regard to Opportunity Area 3: The Department believes that of all three opportunity sites, if Sherwood wanted to allow general commercial uses, this would be the most appropriate area for it, as long as it is relatively small-scale, and with the parking behind the buildings, as the concept plan depicts.

Goal 9 Compliance:
When a plan amendment changes the plan designation of land in excess of two acres within an existing urban growth boundary from an industrial use designation to a non-industrial use designation, or an other employment use designation to any other use designation, OAR 660-009-0010(4) requires a city or county to make findings that the proposal is consistent with its comprehensive plan or amend its comprehensive plan to be consistent with the proposed amendment. In reviewing this proposal, Sherwood must rely on the most recently adopted Economic Opportunities Analysis (EOA) (OAR 660-009-0015). The EOA should contain the factual information and data for determining whether or not the proposal will result in a deficit of industrial or commercial land for the planning area for the planning period. This applies to the 99W parcel.

Here is the citation from the State Administrative Rule:

Oregon Administrative Rule 660-009-0010(4) states:

For a plan amendment (zoning change)under OAR chapter 660, division 18, that changes the plan designation of land in excess of two acres within an existing urban growth boundary from an industrial use designation to a non-industrial use designation, or an other employment use designation to any other use designation, a city or county must address all applicable planning requirements, and:
(a) Demonstrate that the proposed amendment is consistent with its most recent economic opportunities analysis and the parts of its acknowledged comprehensive plan which address the requirements of this division; or
(b) Amend its comprehensive plan to incorporate the proposed amendment, consistent with the requirements of this division; or
(c) Adopt a combination of the above, consistent with the requirements of this division.

Thanks again.
Meg

Attachment 8a

Meg A. Fernekees, M.A. | Portland Metro Area (West) Regional Representative
Community Services Division
OregonDept. of Land Conservation and Development
800 NE Oregon Street, Suite 1145, MS 18 | Portland, OR 97232
Office: (971) 673-0965 | Cell: (503) 804-0902 | Fax: (971) 673-0911
meg.fernekees@state.or.us | www.oregon.gov/LCD

Oregon
Theodore R. Kulongoski, Governor

Oregon Department of Transportation
ODOT Region 1
123 NW Flanders St
Portland, OR 97209 - 4037
Telephone (503) 731-8200
FAX (503) 731-8259

TO: Julia Hajduk, City of Sherwood Planning Manager

FROM: Doug Baumgartner, E.I.T., ODOT Region 1 Traffic
Seth Brumley, ODOT Region 1 Planning

DATE: April 13, 2009

RE: North Adams Avenue Concept Plan
HWY 91 (OR 99W)
Washington County, Oregon

The following comments summarize preliminary ODOT comments regarding the review of the Transportation Tech Memo #2: Preliminary Concept Alternatives from the North Adams Avenue Concept Plan.

- The Highway 99W / SW Edy Road intersection should be included in the traffic analysis for the project. The Highway 99W / SW Cipole Road intersection can be excluded from the traffic analysis for the Concept Plan.

- ODOT is interpreting the mobility standard of Highway 99W through the City of Sherwood to be a v/c ratio of 0.99 or "no further degradation" if this standard cannot be met under the current Comprehensive Plan..

- The feasibility (geometrically) of the proposed improvements to the North Adams Avenue intersection with Highway 99W that were included in the traffic analysis for the Concept Plan, including the effects of any changes to intersection geometry, signal timing, and traffic progression, will need to be coordinated with ODOT Region 1 Traffic Signal Manager Doug Anderson.

If there are any questions regarding the contents of this memorandum, please contact Doug Baumgartner at (503) 731-8225 or Seth Brumley at (503) 731-8234.

Attachment 8b

From: DANIELSON Marah B [mailto:Marah.B.DANIELSON@odot.state.or.us]
Sent: Monday, April 27, 2009 12:13 PM
To: Julia Hajduk; csm@dksassociates.com
Cc: SMITH Elaine * Lainie; RAHMAN Lidwien; TAYAR Abraham * Avi; BRUMLEY Seth A; BAUMGARTNER Douglas G; Joshua Naramore
Subject: Sherwood Concept Plan for Adams St Extension

Good morning Julia,
It was a pleasure to speak to you this morning regarding the ODOT mobility standards and the City's planning efforts for the industrial area around the Adams St extension. As discussed, regarding previous land use cases in the City of Sherwood with respect to the intersection of OR 99W/Edy Rd, ODOT has been applying the standard of "no further degradation" since the intersection has been operating close to or above .99 v/c for years and this standard has always been met. The analysis for the proposed concept planning and subsequent legislative plan amendments brought to light that ODOT and the City have been applying different interpretations of the mobility standards in the Oregon Highway Plan. The City has been applying the 1.1 v/c ration standard based on the 2040 Concept Plan map. ODOT maintains that a plan has not yet been completed by the City with ODOT participation to identify the land uses and boundaries of the town center and therefore the .99 v/c standard applies.

This is import to the City in part because the 6 acres of rural land that is being planned to be urban would be unable to meet the .99 v/c mobility standard or the standard of "no further degradation" to make the finding of no significant effect for TPR 060. Through the Adams St Extension Concept Plan effort, the City's traffic consultant is working on identifying improvements to the OR 99W/Edy Rd intersection that would make it possible to mitigate for the impact of the 6 acre parcel to "no further degradation". ODOT and the City recognize that the full cost of the improvement would likely not be proportionate to the traffic impact. The City has also just begun a new planning effort for 300 acres of land recently brought into the UGB for industrial purposes along Tualatin-Sherwood Rd. As part of this larger planning effort, even if the mobility standard was 1.1 v/c at the OR 99W/Edy Rd intersection meeting the "no further degradation" standard would be difficult without improvements to the intersection. The City and ODOT recognize that as part of this larger planning effort for the 300 acres of industrial property, that a funding mechanism for improvements at the OR 99W/Edy Rd intersection will need to be established to meet the TPR as well as to maintain mobility at the intersection to the extent possible.

Together we recognize that the discussion regarding what standard applies is part of a larger conversation that Metro and ODOT will be having with regards to center designations throughout the Metro planning boundary. The City is currently going through a thorough planning process for the Adams Street Extension Concept Plan to bring 6 acres of industrial land into the City boundary. As part of the larger planning effort that has recently begun for the additional 300 acres of industrial land, the City has begun exploration of possible funding mechanisms for improvements to the OR 99W/Edy Rd intersection. The City is also working on identifying improvements to the intersection for which the funding mechanism will be identified for.

I have discussed this dilemma with my manager Lainie Smith, and we believe that it would be reasonable for the City to provide documentation as to why the City is confident that the City will establish a funding mechanism for improvements at the OR 99W/Edy Rd intersection within the next 2 years and provide information on the proposed improvements to the intersection. Documentation would include the time frame for the 300 acre concept planning and legislative amendments as well as the different funding mechanisms that the City is exploring. ODOT will than consider making a "reasonably likely" determination for the improvements at OR 99W/Edy Rd intersections so that the City can make findings of no significant effect for the TPR 060 based on the Oregon Highway Plan .99 v/c mobility standard. This will defer the conversation between Metro, ODOT and the City regarding the town center designation and mobility standards outside of this planning process.

ODOT encourages the City of Sherwood to apply for a Transportation and Growth Management grant next year to fund a planning process for the town center that has been identified on OR 99W. Through this process, the City can identify the vision for this area as well as identify land uses and a boundary to meet the intent of the town center land use designation. It is through this process that the mobility standard for the town center can be clearly established.

Please forward the identified mitigation and supporting documentation for the funding mechanisms and planning efforts in the City.

Again, as always I appreciate working together to address issues of mutual concern. Please let me know if you have any more questions or would like to discuss this further.

Thanks,
Marah Danielson
ODOT Region 1 Planning
503-731-8258

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City of Sherwood Oregon

Home of the Tualatin River National Wildlife Refuge

Date: April 14, 2009

To: Sherwood Planning Commission
From: Tom Nelson, Economic Development Manager
CC: SURPAC

RE: Sherwood Industrial Land Analysis

As the Planning Commission deliberates over Concept Plans for Adams Avenue, Brookman Road, and Area 48, I have noticed a thread of concern that Sherwood will not have sufficient employment lands, and more specifically, industrial lands, in the future. Therefore, I have researched the Economic Opportunities Analysis and Economic Development Strategy that was adopted by the City Council in January/2007.

The table below was taken from this analysis, and updated with changes that have occurred due to rezoning, as well as potential changes that will be seen with the adoption of recommended Concept Plans.

The following changes and assumptions were made:

1. The 28.71 Acres in the recommended Brookman Road Concept plan and 5.8 acres bordering 99W in the Adams Concept Plan were added to General Commercial.

2. Langer's PUD is a total of 57 acres, but 6 acres is designated by them for Office, and 6.5 acres is designated as Light Industrial. Since the Strategy initially showed all 57 acres as Light Industrial, the net amount (50.5) was subtracted from Light Industrial and 6 acres added to Office Commercial and 44.5 acres was added to Retail Commercial.

3. The 5.74 acre change at Driftwood Mobile Home Park is also reflected in Retail Commercial.

4. The three parcels totaling 9.29 Acres identified by Cogan Owens Cogan in the Adams Concept Plan were also added to Light Industrial.

5. According to recent and on-going work for the Area 48 Concept Plan, a net of 235 acres appears to be developable, and has been added to the total for General Industrial.

Table 2. Existing Employment Lands								
Zone	Total Acres	Total Developed Acres	Total Constrained Acres	Total Vacant Acres	Total Redevelopable Acres	Project or Expansion	Change in Acres	Revised Total with Changes & UGB Expansion
General Commercial	72.54	37.38	1.41	4.38	30.78	*Adams & Brookman*	34.51	69.67
Retail Commercial	84.72	43.57	0	4.3	36.85	*Langer and Driftwood*	97.14	138.29
Office Commercial	17.38	9.68	1.89	4.73	2.97	*Langer*	6	13.7
Neighborhood Commercial	1.04	0	0	0	1.04			1.04
Office Retail	0	0	0	0	0			0
General Industrial	276.79	153.58	10.78	48.71	74.5	*Area 48*	283	406.21
Light Industrial	271.77	87.8	50.11	153.6	30.37	*Langer & Adams*	-40.4	143.57
Total Commercial	175.68	90.63	3.3	13.41	71.64		137.65	222.7
Total Industrial	548.56	241.38	60.89	202.31	104.87		242.6	549.78
Total Employment Lands	724.24	332.01	64.19	215.72	176.51		380.25	772.48

With this analysis it becomes apparent that there is a net gain of over 240 acres of industrial land, as well as 380 acres in total employment land. Total re-developable or vacant land also exceeds even the High Growth Demand projections made by Cogan Owens Cogan and Otak in the Economic Development Strategy. (See attached excerpt)

I also reviewed an analysis conducted by Johnson Gardner, LLC in March/2007 that concluded significant demand existed for office space, reinforcing the Economic Development Strategy. The General Commercial and Office Commercial projected in the Adams Concept and the Langer PUD should help to meet this need.

Finally, I reviewed the 2008 study completed by Marketek. It concluded an immediate demand for an additional 221,282 of retail space with that demand growing to a total of 447,770 by 2013. The proposed Langer and Cannery developments should be able to satisfy this demand.

In conclusion, it is important to point out that these growth projections were based on population growth in Sherwood, which also required residential growth.

City of
Sherwood
Oregon
Home of the Tualatin River National Wildlife Refuge

MAILED NOTICE – PUBLIC COMMENTS
PA 09-02 Adams Avenue North Concept Plan

The Planning Department has received an application for approval for a concept plan for 50 acres that were brought into the UGB in 2002. There will be three zone changes as a result of this application. The applicable criteria are identified on the front page of this notice. This request is a Type V land use application, requiring review and a recommendation by the Sherwood Planning Commission.

The submitted materials will be available at the Sherwood City Hall and may be able to be provided via email depending on size. If you would like to obtain additional information, please contact Julia Hajduk, Planning Manager in the Planning Department at (503) 625-4204 or via email at hajdukj@ci.sherwood.or.us

- ☐ No comment.
- ☒ We encourage approval of this request.
- ☐ Please address the following concerns should this application be approved:
  Section 1100 should be zoned "Commercial"
  Reasons: Too valuable to be anything else.
- ☐ We encourage denial of this request for the following reasons:

Please feel free to attach additional sheets as needed to complete your comments.

Comments by: [illegible] Date: 5/6/09
Address: 6141 SW [illegible] Dr. Tel.: 503-866-0491 (optional)
Portland OR 97219 Email: ____________ (optional)

Notice to mortgagee, lien holder, vendor or seller: The City of Sherwood requests that you promptly forward this notice to the purchaser if this notice is received.

For comments to be addressed in the staff report please submit comments by **May 18, 2009** to:

Planning Department
Sherwood City Hall
22560 SW Pine Street
Sherwood, OR 97140

Attachment 9a

City of Sherwood, Oregon
Planning Commission Minutes
May 26, 2009

Commission Members Present:

Chair Allen
Jean Lafayette
Matt Nolan

Staff:

Julia Hajduk, Planning Manager
Heather Austin, Senior Planner
Karen Brown, Recording Secretary

Commission Members Absent: Raina Volkmer, Adrian Emery, Todd Skelton

Council Liaison – not present

1. **Call to Order/Roll Call – Chair Allen** called the meeting to order at 7:10. **Karen Brown** called roll. Chair Allen made an announcement that due to the fact that there were only 3 of the 6 currently appointed Commission members present there was not a quorum so regular business could not be conducted and all agenda items requiring a quorum would be heard at the next meeting on June 9th, however there were items that could be conducted without the presence of a quorum. He asked for any staff announcements. There were none presented at this time

2. **Agenda Review –**

3. **Consent Agenda –**

4. **City Council Comments – None given**

5. **Community Comments –**

Patrick Lucas addressed the Commission about a notice he had received regarding the Industrial Design Standards update. (note: a work session on Industrial Design Standards was held prior to the regular meeting.) He commended the Commission for working on these standards. His main objective would be to ask that the standards could be written in a way that would make it simpler for business to come to Sherwood. When residential builders want to build in Sherwood, most know exactly what guidelines and limitations need to be followed. Items like what the setbacks are in the rear and side yards and the height limitations for new Single Family Homes. When they submit the plans for review they are turned around very quickly because the plans include all of the details. He feels that Industrial and Commercial developments are entail way too much. He asks the staff and the Commission keep in mind simplicity while working on the standards for Commercial and Industrial. He believes that Sherwood could attract many more businesses if the development process was not so daunting. He sees developers that have come to Sherwood and once they find out all of the requirements they look elsewhere to find a place that exists that they can just move into. If it were master planned up front so a developer would not have to do everything, he thinks Sherwood would have a better chance of attracting more business.

Susan Claus addressed the Commission first by saying that she thinks it is very important that the Commission just received feedback from a local person who has industrial interests and she thinks that his comments should be written up and tracked. Her second item for comment was packet preparation for Planning Commission and City Council and the time frame that they are available to the public. She asked if the Planning Commission gets their packets a week early. Chair Allen confirmed that the Commission gets them about a week prior to the meeting and that they go up on the web site at the same time. Mrs. Claus' comments were that the current packet is 341 pages and downloading a file that large in a dial-up system is very difficult. The back-up to that historically has been that there is a copy in the library. That has not happened since January. In this case the weekend prior to this meeting was a three day weekend, so on the day of the meeting she was still trying to obtain a copy of the material. She also thought that since they were on the agenda they would be given a copy of the information. She was given a copy today at City Hall and was charged for the copies. She is asking that the process be more clear and made easier to obtain the information. When there are hundreds of pages of studies on large projects perhaps that could be split up incrementally. That way if someone is interested in just reviewing the staff report for an example, they don't have to view the entire package. She asked that the Planning Commission direct Staff that way because she has appeared before the Commission before and has made suggestions which she feels have not been followed up on.

Chair Allen asked how difficult it would be to divide large packets into multiple PDFs. Julia feels that it would not be difficult, that it would just require coordination with the IT department. Commissioner Lafayette asked if Julia could also communicate that request with the City Council as well.

Robert James Claus gave community comments which have been transcribed verbatim. "Every since I've been in Sherwood I've seen City Managers literally try to take over and run this town. The first guy we were here almost bankrupted with his LIDs. He came very, very close to doing that. It finally became so contentious with Mr. Rapp he had to leave. Mr. Bormet took Home Depot, just as one example, which was industrial and called it a lumber yard, deemed their application complete and then the City Council had to sue their own staff. Now why does that happen? It happens because the City Manager is in control of the staff, you're not. You have really no control, none. In fact if an elected official is found talking to him, they need to resign about their job. So what ends up happening is structural decisions get made by the staff and then they try to force them. That is so evident on every single thing they do it is not even funny because the one thing you never hear is cost. You never hear hard costs anyplace, anyplace. Now you tell me how someone can claim to have done a traffic study on the impacts and use the Institute of Transportation Standards and not have given you the cost of those alternatives. They can't have, unless they were instructed not to, and that is exactly what's happening here. Ross Schultz, that's why he's not on the Council, and a group of people decided they were going to run this city. They took Urban Renewal money and they started making one decision after another and anybody on Urban Renewal knows that and then making those decisions stick and the staff started going along with that. What I'm telling you be very, very careful, because the Supreme Court looked into a case like this called Del Monte Development Corporation where the city decided to play games. They not only end up buying the property they paid massive damages and that's what happens when the city becomes a developer and that is exactly what we've got going on now. As a Planning Commission it is absolutely unforgivable if they have done a study where they claim they know trip generations and can't walk in and tell you costs. That's a simple computer program and there are any number of them that are easier to run than all that other stuff and tell you this is the cost of the alternatives. Why are you not seeing the costs of the alternatives? I'll tell you why you're not. Because you are being sold a decision by the City Manager and his staff, and they want it, and that's what's going to happen, and then anybody that objects to it, they are going to delay, they are going to harm, they are going to put fees on until they get what they want, and I'm pleading with this Commission understand that won't go on forever, it never has. There is particular chaos by the way when they fire a City Manager and they get into the books. Then there is real chaos. You'd be surprised at what Mr. Wieslogel was going to do for me when he was acting City Manager after what Bormet had done to me. Gimmine Christmas. I could have asked for an ice cream sundae and gotten it. But what I'm telling you is you'd better understand this is a far realer problem than you think it is. Thank you."

6. Old Business – none – due to lack of quorum

8. New business – none – due to lack of quorum

7. Next Meeting: June 9th, 2009

Chair Allen apologized again for the fact that it was not identified that there would not be a quorum until late in the day. The items that are on business agenda will be carried over to the June 9th, meeting. He then adjourned the meeting

End of minutes.