Main Street Master Plan

Planned Action Final Environmental Impact Statement

City of Ferndale

December 2011

CITY OF FERNDALE
P.O. Box 936, 2095 Main Street, Ferndale, WA 98248 - (360) 384-4006

December 12, 2011

Subject: Main Street Master Plan Planned Action Final Environmental Impact Statement

Dear Interested Citizen:

The City of Ferndale has completed the Main Street Master Plan Planned Action Final Environmental Impact Statement (EIS). The Main Street area addressed in this EIS is located in the four quadrants surrounding the Interstate-5/Main Street interchange (exit 262). If implemented, the proposed action considered in the EIS would implement the City's vision for the Main Street Corridor, using existing land use designations and zoning regulations and streamlining future environmental review through adoption of a planned action ordinance.

The Final EIS provides some additional information and clarification about the Proposal and responds to comments on the Draft EIS. Comments received did not result in modification of the Proposal. However, the Final EIS includes clarifications, makes factual corrections and provides supplemental information.

Electronic copies of the Final EIS on a compact disc can be obtained from the City of Ferndale, 2095 Main Street, at a cost of $5.00. You may also view the Final EIS and additional information about this project at the project website at http://www.cityofferndale.org/cdd/exit262.php.

Your interest in the City of Ferndale is greatly appreciated. If you would like more information about this proposal, please contact me at 360-685-2367 or joriburnett@cityofferndale.org.

Sincerely,

Jori Burnett, Director
Department of Community Development
SEPA Responsible Official
City of Ferndale

FACT SHEET

Name of Proposal
Main Street Master Plan

Proponent
City of Ferndale

Location
The Main Street Master Plan study area consists of approximately 450 acres located in the four quadrants surrounding the Interstate 5/Main Street interchange (Exit 262), all within existing Ferndale City limits. For purpose of analysis, the study area has been divided into the four quadrants surrounding the interchange. The northwest quadrant is generally bounded by the Nooksack River, the southwest quadrant by Hovander Road and the existing commercial land use designation, extended to Interstate 5; the northeast quadrant by the northeast municipal boundary; and the southeast quadrant by the Mixed Use Commercial zoning district boundary.

Proposal
The action proposed by the City of Ferndale consists of the following related actions:

1. Adoption of the Main Street Master Plan, consistent with the City's Comprehensive Plan and the Washington State Growth Management Act (GMA).
2. Adoption of an ordinance designating the Ferndale Main Street Master Plan area as a planned action for the purposes of the State Environmental Policy Act (SEPA) compliance, pursuant to RCW 43.21.031 and WAC 197-11-164. The planned action designation would apply to development of proposed retail, office, residential and hotel uses of the type and up to the intensity established in the ordinance and considered in this EIS.
3. Amendments to other City of Ferndale adopted policies and regulations, including the Ferndale Comprehensive Plan and development regulations, based on the findings of this environmental analysis.

Proposed Alternatives
The Draft EIS evaluated three alternative scenarios for the Main Street Master Plan area, generally reflecting different levels of retail, office, hotel, residential, and open space growth. The Draft EIS alternatives included:

- **Alternative 1** (No Action) – Assumes future growth consistent with Comprehensive Plan forecasts (as defined in the 2010 update of the Transportation Element), with no new measures to promote economic development or adoption of a planned action ordinance. Alternative 1 evaluates the least amount of new development among the alternatives.
- **Alternative 2** (Moderate Growth Scenario) – Compared to the No Action Alternative, Alternative 2 provides for increased retail, office, hotel and residential development. Similar to Alternative 3, Alternative 2 includes proposed open space along the Nooksack River and adoption of a planned action ordinance addressing development considered in this EIS. Relative to all alternatives Alternative 2 evaluates an intermediate level of new development.
- **Alternative 3** (High Growth Scenario) – Evaluates the greatest amount of new retail, office, hotel and residential growth. Similar to Alternative 2, Alternative 3 includes proposed open space along the Nooksack River and adoption of a planned action ordinance addressing development considered in this EIS.

This Final EIS identifies a preferred alternative that is similar to Alternative 2 analyzed in the Draft EIS.

Lead Agency

City of Ferndale
Community Development Department

SEPA Responsible Official

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EIS Contact Person

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Final Action

Approval of the Main Street Master Plan and Planned Action Ordinance

Required Approvals and/or Permits

Approval of the Main Street Master Plan and implementing polices and regulations, including the Planned Action Ordinance by the Ferndale City Council.

Authors and Principal Contributors to this EIS

The **Main Street Master Plan Planned Action EIS** has been prepared under the direction of the City of Ferndale Community Development Department. Research and analysis associated with this EIS were provided by the following consulting firms:

- **inova –** lead EIS consultant; land use
- **EA|Blumen** –document preparation; public services; greenhouse gas analysis
- **ATSI** – natural environment
- **Chris Webb & Associates** – utilities
- **Transpo** – transportation
- **Weinman Consulting** – SEPA strategy, alternatives development

Location of Background Data

City of Ferndale Community Development

Attn: Jori Burnett	Telephone: (360) 685-2367
2095 Main Street	Email: joriburnett@cityofferndale.org
Ferndale, WA 98248	

Date of Issuance of this Final EIS

December 12, 2011

Availability of this Final EIS

Copies and Notices of Availability of this Final EIS have been distributed to agencies, organizations and individuals noted on the Distribution List (Chapter 5). Notice of Availability of the Final EIS has been provided to organizations and individuals that requested to become parties of record.

The Final EIS can be reviewed at the following public locations:

- Ferndale City Hall
- Ferndale Branch Library

This Final EIS is also available online at:
www.cityofferndale.gov/CDD/exit262.php

Additional copies may be purchased at the City of Ferndale for the cost of reproduction.

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Chapter 1—Descripton of the Proposal and Alternatives

1. DESCRIPTION OF PROPOSAL AND ALTERNATIVES

1.1 Introduction

Overview of the Proposed Action

The action proposed by the City of Ferndale consists of the following related actions:

1. Adoption of the Main Street Master Plan, consistent with the City's Comprehensive Plan and the Washington State Growth Management Act (GMA).
2. Adoption of an ordinance designating the Ferndale Main Street Master Plan area, shown in Figure 1-1, as a planned action for the purposes of the State Environmental Policy Act (SEPA) compliance, pursuant to RCW 43.21.031 and WAC 197-11-164. The planned action designation would apply to development of proposed retail, office, residential and hotel uses of the type and up to the intensity established in the ordinance and considered in this EIS.
3. Amendments to other City of Ferndale adopted policies and regulations, including the Ferndale Comprehensive Plan and implementing regulations, based on the findings of this environmental analysis. Potential amendments include:

   a. Amendments to the Ferndale Comprehensive Plan Transportation element to address the following:

      - Roundabouts as the preferred intersection control approach along some or all of the Main Street corridor
      - Adopted level of service;
      - Revisions to Section B, Travel Forecasts and Alternatives Evaluation, to incorporate updated land use forecasts for the Master plan area and travel forecasts.
      - Revisions to Section C, Transportation Systems Plans, to incorporate recommended transportation projects and costs and remove improvements and costs for projects that have been superseded.
      - Revisions to Section D, Financing Program, to incorporate recommended project costs and remove improvements that have been superseded. Update financing strategy

based on revised costs and developer mitigation programs including transportation impact fees.

b. Amendments to the Comprehensive Plan Transportation Element and Ferndale Municipal Code 15.40 to allow extension of the concurrency period to match the maximum period allowed by the state.

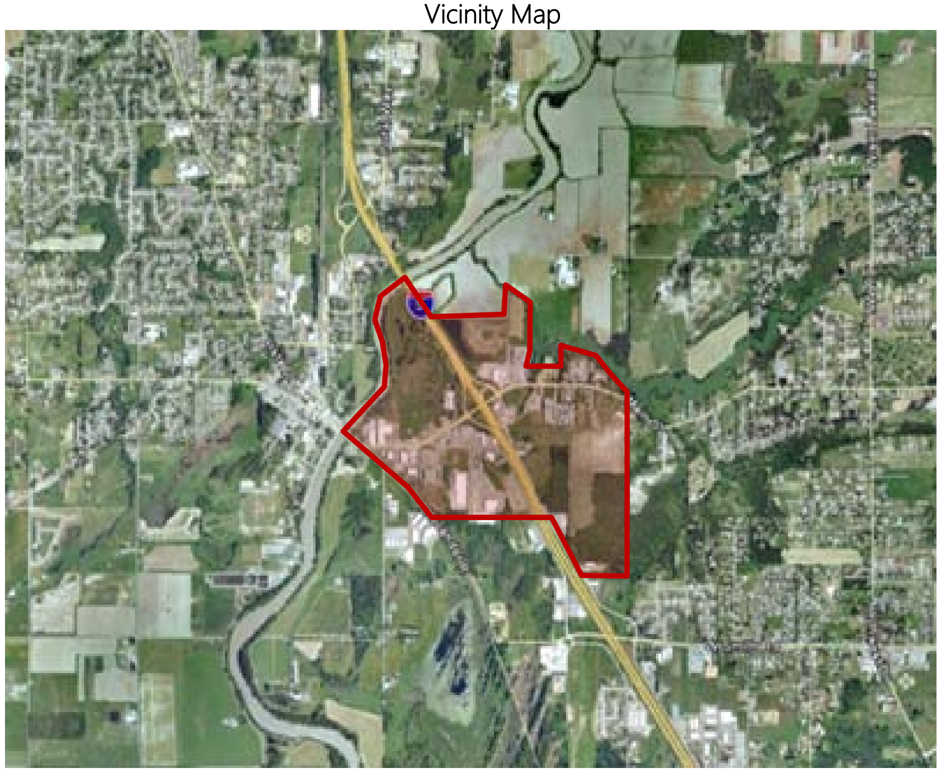
Study Area

The Main Street area consists of approximately 450 acres located in the four quadrants surrounding the Interstate 5/Main Street interchange (Exit 262), all within existing Ferndale City limits (see Figure 1-1). The northwest quadrant is generally bounded by the Nooksack River, the southwest quadrant by Hovander Road and the existing commercial land use designation, extended to Interstate 5; the northeast quadrant by the northeast municipal boundary; and the southeast quadrant by the Mixed Use Commercial zoning district boundary. See Figure 1-2.

Planning Horizon

The analysis in this EIS assumes a planning horizon of 2034.

Figure 1-1
Vicinity Map



Source: EA|Blumen, 2011

Objectives of the Proposal

The Proposed Action is intended to achieve the following objectives:

- Provide for implementation of the Comprehensive Plan vision in the Main Street study area, supported by regulatory controls and guidelines designed to accomplish that vision.
- Support and encourage economic development in the Main Street study area.
- Provide for a streamlined SEPA review process for future project-level development proposals, consistent with the findings of this EIS and future planned action ordinance adopted by the City.
- Provide greater certainty to potential developers, City decision-makers, and the public regarding the future development pattern in the study area.
- Encourage a mixture of land uses throughout the study area, including retail, office, residential, and open space.
- Provide for coordinated land use and transportation improvements in the study area.
- Promote businesses that offer goods and services to current and future City residents and the traveling public.
- Preserve and enhance the City's existing sense of place and community.
- Protect sensitive areas of high value, while providing opportunities for coordinated mitigation of impacted areas within the study area.
- Provide for continued access and mobility in the study area.

Fiscal Analysis

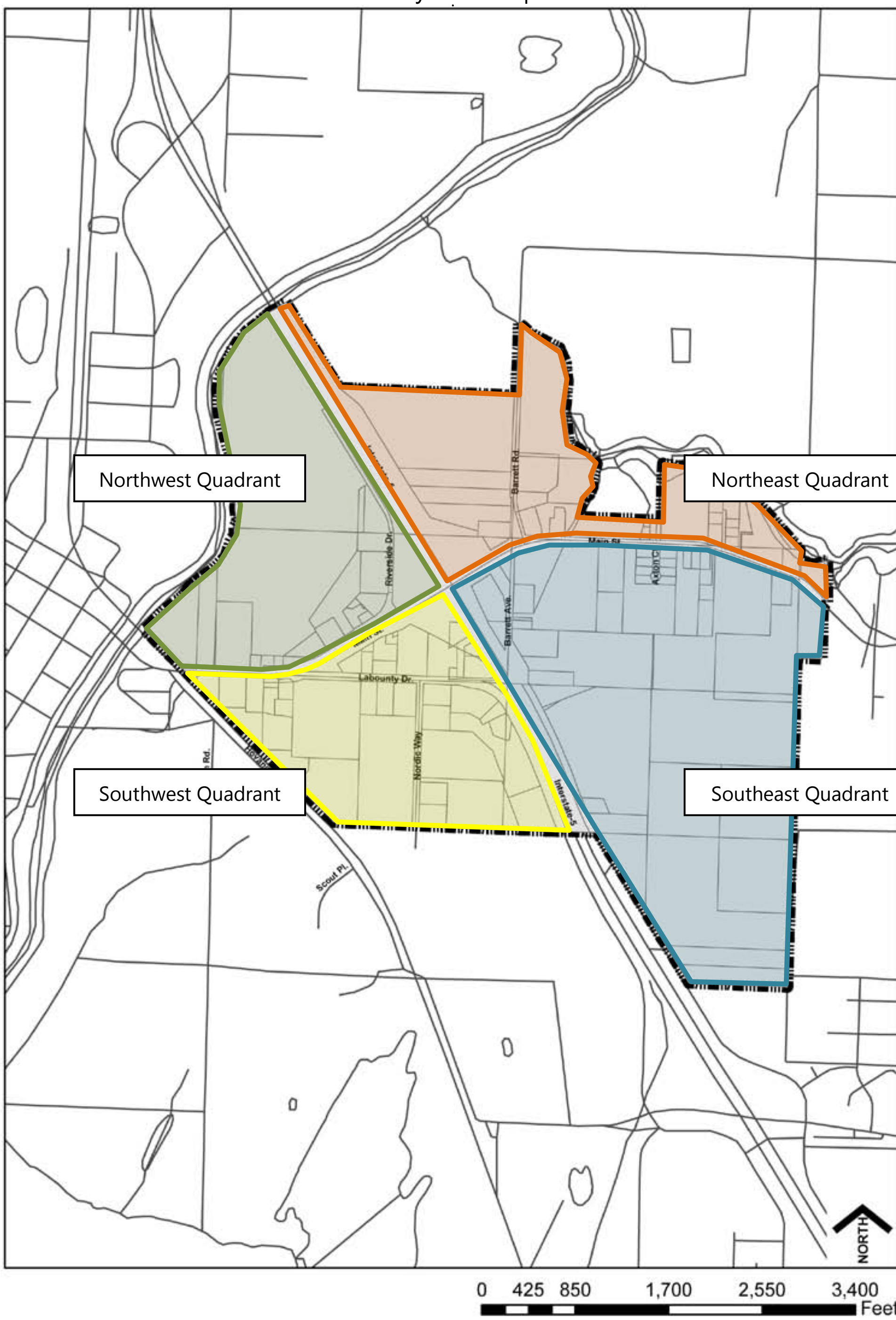
Separate from the EIS process, the City has conducted a fiscal analysis for future development in the planned action area. The fiscal analysis looked at whether or not the City would generate enough new revenues from proposed development to offset the cost of capital/infrastructure and general government services to support the development. Capital/infrastructure costs include the capital projects needed to support development and meet the City's level-of-service standards. General government services include ongoing services, such as public safety and maintenance and operations of facilities, needed to serve new development.

Key findings of the fiscal analysis include the following:

- **The emphasis on retail in the Preferred Land Use Alternative generates significant General Fund tax revenues for the City and outpaces total capital and on-going service costs.** The $21 million in General Fund revenues and $10.5 million in capital restricted revenues leaves the City with an approximate $4.9 million revenue surplus over the 20 years.

- **Revenues for capital improvements do not cover the needed capital improvements.** Because the current impact fee programs and other capital revenues do not cover the cost of necessary capital improvements to serve new development, the City will need additional gap funding to provide these improvements.
- **The City will experience an annual impact on the demand (and cost) of general services.** Future increased costs are concentrated in the need for additional public safety due to increased commercial and residential activity.

Figure 1-2
Study Area Map



Source: EA|Blumen, 2011

1.2 Environmental Review

Scope of Review

Pursuant to SEPA Rules (WAC 197-11-408 through 410), a Determination of Significance was issued by the City on February 9, 2011 for the proposed action and the associated Planned Action level of review. A public workshop was held on February 17, 2011. The public workshop provided an opportunity for interested parties to obtain information on the SEPA process, to ask questions of staff and the consultant team working on the project, and to provide input on the scope of the EIS. In addition, an agency workshop was held on February 28, 2011, with invitations sent to agencies from the federal, state, local and tribal governments.

Interested citizens, agencies, organizations, and affected tribes were invited to submit comments on the scope of the Draft EIS during the scoping period, which closed on March 2, 2011. Comments received during the comment period addressed habitat, wetland, floodway, stormwater, transportation, economic development, fiscal impacts and overall development level issues. The Determination of Significance and Scoping notice are included in Appendix A of the Draft EIS.

SEPA/GMA Integration

WAC 197-11-210 authorizes GMA jurisdictions to integrate the requirements of SEPA and GMA. The goal is to ensure that environmental analysis under SEPA occurs concurrently with, and as an integral part of, the planning and decision-making process under GMA. At a minimum, environmental analysis at each stage of the GMA planning process should address impacts associated with planning decisions. Analysis of environmental impacts in the GMA planning process can result in better-informed GMA planning decision as well as avoid delays and duplication.

WAC 197-11-228 states that the appropriate scope and level of detail of environmental review should be tailored to the GMA action under consideration; jurisdictions may modify SEPA phased review as necessary to track the phasing of GMA actions; and the process of integrating SEPA and GMA should begin at the early stages of plan development.

The City of Ferndale has elected to follow the principles of integration for the Main Street Master Plan and Planned Action EIS. Integration of the environmental analysis with the planning process informs the preparation of a GMA compliant subarea plan and facilitates coordination of public involvement activities. However, for the purpose of formal agency review and comment on the draft Main Street Master Plan, the City is providing multiple opportunities for comment. A 47-day comment period was provided during the Draft EIS comment period and a 60-day agency comment period was provided for review of the Draft Master Plan.

Public Involvement

Public outreach and involvement is an important part of the environmental review process. Public involvement activities are intended to meet the following objectives.

- To obtain input from all interested members of the community through all aspects of the environmental and planning process.
- To encourage two-way communication between the City, its partner agencies, and community stakeholders.
- To provide early opportunities for interested members of the public, agencies and other stakeholders to comment on the Planned Action EIS and ordinance.
- To provide a transparent and easily understood process for all stakeholders.

The following discussion summarizes public involvement activities that have already occurred and those that are planned for the future.

Main Street Interstate 5 Corridor Webpage

The Main Street Interstate 5 Corridor Planning website, located at http://www.cityofferndale.org/CDD/exit262.php on the City's website, provides information on project status, future meeting dates, published documents and analysis, contact people and other key information.

Stakeholder Meetings

Over the course of the planning process, the project team conducted interviews with individual stakeholders, property owners, businesses and special interest group representatives. The interviews provided the project team with an expanded understanding of priorities and concerns in the area as well as an opportunity to provide updated project information to those who were interviewed about the planning process.

Scoping and Vision Public Meeting

A workshop was held on February 17, 2011 to invite comments on the scope of the DEIS and the Comprehensive Plan vision statement. This meeting included an informal open house, with informational displays and staff available to meet one-on-one with participants, as well as a short presentation and question/answer session. An agency meeting was held on February 28, 2011 to obtain comments on the scope of the DEIS. Please see the discussion of the scoping process, under Scope of Review, above.

A public meeting was held on August 3, 2011 to invite public comment on the Draft EIS. In addition, written public comments were invited during the 30-day comment period of this EIS. Please see Appendix A of this Final EIS for the summary of the public meeting and Chapter 3 for all written comments and responses received during the comment period.

City Council and Planning Commission Review

In addition to the public workshops described above, the City has conducted a series of public meetings and hearings on the proposed Draft Master Plan and implementing regulations. Key meetings included the following:

- **September 6, 2011.** City Council Study Session fiscal impact and budget overview.
- **September 14, 2011.** Planning Commission study session on the planned action ordinance.
- **October 12, 2011.** Planning Commission workshop session on the draft Master Plan and planned action process.
- **October 24, 2011.** Joint City Council and Planning Commission study session focused on potential transportation mitigation in the planned action area.
- **November 16, 2011.** Planning Commission workshop session on the fiscal analysis of potential development in the planned action area
- **November 21, 2011.** City Council Study Session fiscal impact discussion.
- **November 30, 2011.** Planning Commission public hearing on the Draft Master Plan and related Comprehensive Plan amendments and prepared a recommendation to the City Council.

Prior to formal City action on the Comprehensive Plan and implementing regulations, including the planned action ordinance, the City Council will invite public comment at a public hearing. Please see the project website at http://www.cityofferndale.org/CDD/exit262.php for updated public meeting information.

1.3 Proposed Action and Alternatives

Draft EIS Alternatives Overview

The Draft EIS evaluated three alternative scenarios for the Main Street Master Plan area, but did not identify a preferred alternative. The alternatives generally reflect different levels of retail, office, hotel, residential, and open space growth. Draft EIS alternatives included:

- **Alternative 1** (No Action) – Assumes future growth consistent with Comprehensive Plan forecasts (as used in the 2010 update of the Transportation Element), with no new measures to promote economic development or adoption of a planned action ordinance. Alternative 1 evaluates the least amount of new development among the alternatives.

- **Alternative 2** (Moderate Growth Scenario) – Compared to the No Action Alternative, Alternative 2 provides for increased retail, office, hotel and residential development. Similar to Alternative 3, Alternative 2 includes proposed open space along the Nooksack River and other locations and adoption of a planned action ordinance addressing development considered in this EIS. Relative to all alternatives Alternative 2 provides for an intermediate level of new development.
- **Alternative 3** (High Growth Scenario) – Provides for the greatest amount of new retail, office, hotel and residential growth. Similar to Alternative 2, Alternative 3 includes proposed open space along the Nooksack River and other locations and adoption of a planned action ordinance addressing development considered in this EIS.

Future growth assumed through the year 2034 for each alternative is summarized in Table 1-1, below. Note that that the development levels shown for the action alternatives (Alternatives 2 and 3) would be in addition to the growth assumed for the No Action Alternative. For all alternatives future growth is assumed to be in addition to current existing development in the study area. Projected development levels are based on assumptions regarding potential for development in the study area.

Table 1-1
Alternatives Overview

Features	Growth Alternatives				
	1 No Action	2 Moderate Growth[1]		3 High Growth[1]	
	Additional Development	Additional Development	Total Development	Additional Development	Total Development
Retail	209,260 sf[2]	900,000 sf	1,109,260 sf	1,340,000 sf	1,549,260 sf
Office/Service	95,430 sf	100,000 sf	195,430sf	150,000 sf	245,430 sf
Hotel	Not specified	160 rooms	160 rooms	260 rooms	260 rooms
Residential	105 units	50 units	155 units	75 units	180 units
Proposed Open Space	No[3]	Yes		Yes	
Planned Action Ordinance	No[4]	Yes		Yes	

Source: City of Ferndale, inova, 2011

1. Alternatives 2 and 3 include development levels shown for the No Action alternative.

2. Sf = square feet of building area
3. Open space may be provided subject to existing City requirements for open space, landscaping, buffers and site-specific EAGLE compliance.
4. Site-specific development proposals would be subject to individual project-level SEPA review. As per Ferndale Municipal Code 18.58.030, an Environmental Impact Statement (EIS) is required for individual retail projects exceeding 125,000 square feet of building area.

Main Street Master Plan

The Draft Main Street Master Plan is based on the description of the proposal in the Draft EIS and describes the natural environment, planned land use, development character, open space, transportation and utilities guidance for the Master Plan area. It should be noted that the Master Plan proposes measures to ensure effective implementation of the existing Comprehensive Plan, but does not propose any changes to fundamental land use designations. The Draft Main Street Master Plan can be found at the City's project website: http://www.cityofferndale.org/CDD/exit262.php.

Preferred Land Use Alternative

The Preferred Alternative is the same as Draft EIS Alternative 2, which describes an intermediate level of growth above the No Action Alternative. The Preferred Alternative would provide an additional 900,000 square feet of new retail development, 100,000 square feet of new office development, 50 units of housing and 160 hotel rooms. With 300,000 square feet, the majority of the additional retail development would occur in the Southeast quadrant. The remaining quadrants would each provide for an additional 100,000 to 150,000 square feet of retail development. Office development would be focused in the southwest quadrant. Housing and hotel units would be provided in the northwest quadrant, with additional hotel rooms in the southeast quadrant (see Table 1-2). See also Table 1-3, which shows total growth, comprised of the no action baseline plus the Preferred Alternative.

Table 1-2
Preferred Alternative: Additional Growth[1]

	Retail	Office/Service	Residential	Hotel
Alternative 2 (Mid-range)				
Northwest	100,000 sf		50 units	80 rooms
Southwest	150,000	100,000 sf		
Northeast	150,000			
Southeast	500,000		0	80
Total	***900,000sf***	***100,000 sf***	***50 units***	***160 rooms***

Source: City of Ferndale, inova, 2011.
1. Includes additional growth beyond that assumed for No Action
sf = square feet of building area

Table 1-3
Preferred Alternative: Total Growth[1]

	Retail	Office/Service	Residential	Hotel
Alternative 2 (Mid-range)				
Northwest	116,204 sf[2]	8,286 sf	100 units	80 rooms
Southwest	242,593	149,714		
Northeast	166,667	10,286	10	
Southeast	583,796	27,143	45	80
Total	***1,109,260sf***	***195,430 sf***	***155 units***	***160 rooms***

Source: City of Ferndale, inova, 2011
1. Includes No Action growth assumptions plus additional growth under each action alternative.
2. Sf = square feet of building area
3. Totals have been rounded.

Transportation Options

The Draft EIS described transportation impacts resulting from development under each of the alternatives and mitigation measures to address significant impacts. As described in the Draft EIS, the mitigation strategy would replace the existing traffic signals and turn lanes along Main Street and other corridors with a series of roundabouts. The Draft EIS describes the potential benefits of roundabouts as including reduced congestion and idle time, improved safety, energy efficiency and lower long-term maintenance costs.

Public comment on the roundabout strategy described in the Draft EIS suggested that the mitigation strategy should focus on upgrading the existing traffic signals instead of construction of new roundabouts. Comments suggested that upgrading the existing system of traffic signals is a more cost effective mitigation approach, provides greater pedestrian safety at street crossings, and would have fewer impacts to adjacent properties. Supplemental analysis in this Final EIS summarizes the additional improvements recommended for both traffic signal and roundabout strategies to address transportation potential impacts. Please see Chapter 2, Supplemental Analysis, for this discussion.

As described in the Draft EIS, City staff recommends installation of roundabouts as the preferred mitigation strategy for the Main Street Corridor. On November 30, 2011, the Planning Commission recommended installation of roundabouts at the Interstate 5/Main Street interchange ramps and improvements to existing signalized intersections west of Interstate-5.

1.4 Major Issues to be Resolved

Key issues to be resolved by the City of Ferndale in the decision-making process include the overall magnitude of development that should be planned for, the potential to mitigate transportation, stormwater and other impacts, and the ability to fund necessary public improvements to mitigate impacts. These issues have been reviewed through public comment on the Draft EIS and at Planning Commission and City Council public meetings and hearings. It is anticipated that these issues will be resolved by the City Council at a future public meeting.

Chapter 2—Supplemental Analysis

2. SUPPLEMENTAL ANALYSIS

This chapter of the Final EIS provides supplemental analysis to the July 2011 Draft EIS, based on comments received and other updated information. This supplemental analysis is also reflected in the applicable responses to comments in Chapter 4.

2.1 Transportation

A number of comments on the Draft EIS addressed the transportation improvement strategies for the Action Alternatives. Many of the comments suggested that intersection improvements should focus on upgrading the existing traffic signals through addition of turn lanes. Other comments indicated that the City's level of service (LOS) C standard was not appropriate for the City intersections within a developing commercial area and suggested that a LOS D standard be considered for the City standard. This would be consistent with the WSDOT LOS D standard for intersections of Highways of Statewide Significance (HSS) in urban areas. Other comments also noted that the EIS should report the resulting corridor level of service, consistent with the City's Transportation Element. Comments also noted the need for a comparison of costs for the roundabout improvement strategies with the costs for traffic signal options. Comparisons of costs based on the LOS C and LOS D standards also were requested.

In addition, comments identified a need for defining the improvements at the intersections of the new collector roads with the existing arterials. Last, commenters requested expansion of the information on the potential strategies for assessing new development within the Planned Action area for the additional improvements needed to mitigate the transportation impacts of the higher levels of growth.

Additional transportation analyses were prepared to address these comments. The additional analyses are based on Draft EIS Alternative 2 (Moderate Growth) which is identified as the Preferred Alternative in this Final EIS. The travel forecasts presented in the Draft EIS are the basis for the additional analyses. The additional analyses are organized as follows:

- Transportation Improvement Strategy Options
- New Collector Road Intersection Improvements
- Corridor Levels of Service
- Comparison of Improvement Costs
- Transportation Mitigation Program Options

Transportation Improvement Strategy Options

Four improvement scenarios for the Preferred Alternative are presented in the Final EIS. The first scenario is consistent with the Draft EIS for Alternative 2 and is based on installing roundabouts to meet LOS C for City intersections and LOS D for WSDOT intersections at the I-5 interchanges. The second option is based on improvements using traffic signals to meet LOS C for City intersections and LOS D at WSDOT intersections. The other two strategies are based on roundabouts or traffic signal improvements based on an LOS D standard for City intersections.

Improvements for LOS C Standard for City Intersections

Draft EIS Alternative 2 (Moderate Growth) is identified as the Preferred Alternative in this Final EIS. The Draft EIS identified improvements for intersections along Main Street, Smith Road, and Slater Road based on constructing multiple roundabouts to achieve LOS C or better based on the 2034 weekday PM peak hour forecasts. In addition to meeting the LOS C criteria, the improvements also addressed any potential significant impacts of traffic queues between the intersections.

As an alternative to the roundabout strategy, the existing signalized intersections could be improved to meet the LOS C standard (LOS D at the WSDOT interchange ramps). This would include adding turn lanes at existing signalized intersections and installing new traffic signals at several intersections.

Table 2-1 summarizes the additional improvements recommended for the roundabout and traffic signal strategies to meet LOS C at City intersections for the Preferred Alternative. These are in addition to the improvements identified in the City's adopted Transportation Element, which were assumed in the analyses of the No Action alternative reported in the Draft EIS. The City could choose to adopt a combination of roundabouts and traffic signals. The forecast traffic volumes are consistent with those presented in the Draft EIS and assume completion of the extension of Thornton Road to provide an alternative to Main Street. The resulting 2034 PM peak hour intersection levels of service with improvements are summarized in Table 2-2. The level of service worksheets for all alternatives are included in Appendix B of this Final EIS.

Table 2-1
Preferred Alternative Additional Improvements for LOS C City Standard[1]

	Location[3]	Roundabouts	Signals
City	(7) Walgreens Drwy / Main St	Construct 2 lane roundabout. (*Improvement is not needed to mitigate Preferred Alternative, but is recommended for consistency of traffic controls in the corridor and to reduce potential impacts of traffic queues.)	No additional improvement identified.
City	(8) Main St / LaBounty Dr	Construct 2 lane roundabout, including NB and EB slip lanes and two southbound approach lanes.	Add EB right-turn lane, add NB right turn lane plus overlap signal head, add SB left turn lane, remove split phasing.
City	(11) Main St / Barrett Rd	See description for combined roundabout improvement with Main Street and I-5 NB Ramps (#10).	Existing WB right turn changed to WB through/right turn lane.
City	(16) Smith Rd / LaBounty Dr	Construct 1 lane roundabout per Transportation Element.	Install signal in lieu of roundabout identified in Transportation Element.
City	(17) Smith Rd / Barrett Rd	Widen single lane roundabout (as proposed in Transportation Element) to provide second lane for all approaches.	Install signal; add EB left turn lane, WB right turn lane and SB left turn lanes in lieu of roundabout identified in Transportation Element.
City	(21) Slater Rd / Rural Ave	Convert to 1 to 2 lane roundabout with EB and NB right turn slip lanes.	Install NB right overlap signal head, extend WB left and NB right turn lanes.
City	(24) Slater Rd / Pacific Hwy	Construct 1 to 2 lane roundabout in lieu of traffic signal and turn lanes identified in Transportation Element.	Add 2nd EB left turn lane and widen Pacific Hwy north of Slater Road to support dual turn lanes, add WB right turn lane.
City	(26) LaBounty Dr / Nordic Wy	Construct 1 to 2 lane roundabout.	Install signal, add EB right turn lane, add NB right turn lane.
City	Main St/SE Connector	Construct 1 lane roundabout with EB and NB right turn lanes.	Install signal; add NB and EB right-turn lanes, and WB left turn lanes.
City	Barrett Rd/SE Connector	Construct 1 lane roundabout.	Install signal.
State	(9) Main St / I-5 SB Ramps	Construct 2 to 3 lane roundabout. Widen SB on and off ramps. Provide SB right turn slip lane.	Add EB right turn lane, add SB left turn lane.
State	(10) Main St / I-5 NB Ramps	Realign and widen Barrett Road to develop a 2 to 3 lane roundabout intersection with Main Street and I-5 NB ramps, with 2 SB from Barrett Road, 2 SB from I-5 Off-ramp, 2 NB, 3 EB and 3 WB approach lanes.	Reconstruct EB approach to include 2 left turn lanes, 1 through lane, 1 through/right lane; WB approach to include 1 left turn lane, 1 through lane, 1 through/right turn lane.
State	(22) Slater Rd / I-5 SB Ramps	Construct 1 lane roundabout with EB right turn slip lane in lieu of traffic signals and turn lanes as identified in the City's Transportation Element (or alternative improvement as identified by WSDOT).	Construct traffic signals and turn lanes as identified in the City's Transportation Element (or alternative improvement as identified by WSDOT).
State	(23) Slater Rd / I-5 NB Ramps	Construct 1 to 2 lane roundabout in lieu of traffic signals and turn lanes as identified in the City's Transportation Element (or alternative improvement as identified by WSDOT).	Construct traffic signals and turn lanes as identified in the City's Transportation Element (or alternative improvement as identified by WSDOT).

Source: Transpo Group, 2011

1. *Additional improvements beyond those identified in the City of Ferndale Transportation Element.*
2. *Travel direction - NB = northbound, SB = southbound, WB = westbound, EB = eastbound.*
3. *(X) = References study intersections identified on Figure 3.3-2 in Draft EIS.*

Table 2-2
Preferred Alternative with Improvements – 2034 PM Peak Hour Levels of Service
(LOS C City Standard)

	ID	Intersection	LOS Standard[1]	Roundabout Improvements			Signalized Improvements		
				LOS[2]	Delay[3]	V/C[4] or WM[5]	LOS	Delay	V/C or WM
City	6	Main St/ Hovander Rd	C		-6		B	19.3	0.92
City	7	Main St/Walgreen Drwy	C	A	8.1	0.66	B	19.2	0.80
City	8	Main St/ LaBounty Dr	C	B	14.0	0.93	C	34.4	0.90
City	11	Main St/ Barrett Rd	C	*See #10 (Main St/I-5 NB Ramp)			C	21.3	0.67
City	16	Smith Rd/ LaBounty Dr	C	A	9.2	0.56	B	17.8	0.81
City	17	Smith Rd/ Barrett Rd	C	C	22.4	0.94	C	21.3	0.86
City	21	Slater Rd/ Rural Ave	C	B	14.8	0.89	C	28.9	0.90
City	24	Slater Rd/ Pacific Hwy	C	B	13.3	0.75	C	28.6	0.87
City	26	LaBounty Dr/Nordic Wy	D	A	8.0	0.59	C	23.7	0.92
State	9	Main St/ I-5 SB Ramp	D	B	13.3	0.92	C	30.7	0.85
State	10	Main St/ I-5 NB Ramp	D	B	14.7	0.83	D	43.9	0.97
State	22	Slater Rd/ I-5 SB Ramp	D	B	11.5	0.69	B	13.1	0.69
State	23	Slater Rd/ I-5 NB Ramp	D	B	13.7	0.85	C	20.4	0.81

Source: Transpo Group, 2011

1. *LOS Standard varies by jurisdictions and control type, see text in Draft EIS for description.*
2. *Level of service, based on 2000 Highway Capacity Manual methodology.*
3. *Average delay in seconds per vehicle.*
4. *Volume-to-capacity ratio reported for signalized intersections.*
5. *Worst movement reported for two-way stop-controlled intersections. Travel direction - NB = northbound, SB = southbound, WB = westbound, EB = eastbound. Left-turn = (L).*
6. *Traffic signal identified in the Transportation Element is not included under the roundabout alternative.*

Roundabout Concept with LOS C Standard for City Intersections

Figure 2-1 shows a conceptual roundabout improvement strategy for Main Street based on LOS C at City intersections and LOS D at state highway intersections. As shown on Figure 2-1 the conceptual roundabout improvement strategy would replace four existing traffic signals along Main Street with multiple lane roundabouts. Additional auxiliary lanes would be required on some approaches to reduce traffic queues and help provide for smoother traffic flows. Although not needed as mitigation for the Preferred Alternative, the improvement concept would likely include a roundabout at the intersection of Main Street and the Walgreen's Driveway.

Due to the close proximity of intersections, the concept shows a combined roundabout at the intersection of Main Street/I-5 Northbound ramps/Barrett Road. This improvement will require realigning Barrett Road (north and south of Main Street) and modification of the I-5 northbound ramps. These drawings are conceptual and specific design and location studies would be required prior to finalizing the improvement project.

The improvement strategy also includes four new roundabouts along Slater Road, including at the north and southbound interchange ramps at I-5. These roundabouts would be 1 to 2 lanes, as shown in Appendix B of the FEIS.

As shown in Table 2-2, all of the study intersections in the immediate vicinity of the Planned Action can be improved to operate at LOS C or better with the roundabout improvement strategy. Most of the intersections are forecast to operate at LOS B or better. The higher level of service results from the additional lanes incorporated into the improvements necessary to reduce the potential impacts of traffic queues blocking adjacent intersections or extending into the proposed developments.

Traffic Signal Concept with LOS C Standard for City Intersections

As an alternative to the roundabout improvement strategy, LOS C at City intersections could be provided by improving the existing signalized intersections and installing additional traffic signals. The improvements would include adding or modifying turn lanes at existing signalized intersections. The traffic signals also would need to be modified and upgraded to operate efficiently and safely with the additional turn lanes. New traffic signals would be installed at several locations including Main Street/Barrett Road, LaBounty Drive/Nordic Way, and at the I-5 interchange ramps along Slater Road.

Figure 2-1
Potential Main Street Improvement Concept for the Preferred Alternative – Roundabouts with LOS C Standard for City Intersections

Figure 2-2 shows a conceptual improvement strategy for Main Street based on LOS C at City intersections and LOS D at state intersections with traffic signals. These are only conceptual illustrations and specific design studies would be required prior to constructing the improvements. The improvements include adding turn lanes at LaBounty Drive/Main Street and turn lanes and through lanes at the I-5 interchange ramp intersections with Main Street. The overcrossing of I-5 would need to be widened to 5 to 6 lanes to accommodate the added turn and through lanes. The City's Transportation Element identifies a project for widening the overcrossing to 4 to 5 lanes. A new traffic signal would be constructed at Main Street/ Barrett Road. Due to the close proximity to the I-5 northbound ramp intersection, additional turn lanes were incorporated to reduce the potential impacts of traffic queues on the adjacent intersections. A new traffic signal and additional turn lanes also would be also be constructed at Nordic Way/LaBounty Drive to serve increased growth in the southwest quadrant.

Additional turn lanes also would be constructed at the intersections of Slater Road/Rural Avenue and Slater Road/Pacific Highway beyond those identified in the Transportation Element. New signals and turn lanes also would be needed at the interchange ramps of Slater Road at I-5.

Under this alternative, the roundabouts identified in the Transportation Element for Smith Road at LaBounty Drive and Barrett Road would be developed as traffic signals instead of the roundabouts identified in the Transportation Element. In addition, turn lanes would be required at the intersection of Smith Road/Barrett Road.

As summarized in Table 2-2, all of the intersections under the City's jurisdiction would operate at LOS C or better with the identified improvements. The I-5 interchange ramp intersections at Main Street and Slater Road would all operate at LOS D or better. The signal improvement strategy would result in somewhat lower levels of service and higher delays than the roundabout strategy, but would still meet the city and state level of service standards.

Figure 2-2
Potential Main Street Improvement Concept for the Preferred Alternative – Traffic Signals with LOS C Standard for City Intersections

Improvements for LOS D Standard for City Intersections

As part of the consideration of the Planned Action, the City might choose to revise its level of service standards. Reassessment of adopted LOS is identified as part of the planned action review is identified in Policy 7.I. of the City's Transportation Element which was adopted in January 2011. To support that reassessment of the level of service standard, the Final EIS evaluated improvements needed to meet LOS D at intersections under the City's jurisdiction within the vicinity of the Planned Action. The existing LOS D standard at state controlled intersections at the Main Street and Slater Road interchanges was maintained for the analyses.

Similar to the above discussion based on the LOS C standard, the LOS D analyses considered both roundabout and traffic signal improvement strategies. The forecast traffic volumes are consistent with those presented in the Draft EIS and assume completion of the extension of Thornton Road to provide an alternative to Main Street. The improvements needed to meet an LOS D standard at City intersections with roundabouts or traffic signals are summarized in Table 2-3. These can be compared to the improvements in Table 2-1 to identify the changes resulting from the reduced level of service standard. The City could choose to adopt a combination of roundabouts and traffic signals.

Table 2-4 summarizes the resulting intersection levels of service for the LOS D improvement scenarios. Unlike the LOS C scenarios, potential impacts of long traffic queues were not addressed under the LOS D standard. In most cases, the additional improvements that would be required to mitigate the potential queue impacts would be very similar to those shown for the LOS C standard. Because of this, queues were not fully incorporated in the LOS D scenarios. The resulting LOS D scenarios demonstrate that applying the LOS D standard without considering queuing does not fully address the impacts of increases in traffic volumes. The footnotes in Table 2-4 identify the most significant potential traffic queue impacts with the LOS D analyses. Appendix B includes the level of service worksheets for both scenarios.

Table 2-3
Preferred Alternative Additional Improvements for LOS D City Standard[1]

	Location[3]	Roundabouts	Signals
City	(7) Walgreens Drwy / Main St	Construct 2 lane roundabout. (*Improvement not needed to mitigate Preferred Alternative, but is recommended for consistency of traffic controls in the corridor and to reduce potential impacts of traffic queues.)	No additional improvement identified.
	(8) Main St / LaBounty Dr	Construct 2 lane roundabout with NB right turn slip lane.	Add NB right turn lane plus overlap signal head, remove split phasing.
	(11) Main St / Barrett Rd	See description for combined roundabout improvement with Main Street and I-5 NB Ramps (#10).	No additional improvement identified.
	(16) Smith Rd / LaBounty Dr	Construct 1 lane roundabout per Transportation Element	Install signal in lieu of roundabout identified in Transportation Element.
	(17) Smith Rd / Barrett Rd	Widen roundabout (as proposed in Transportation Element) to add EB right turn lane, WB right and NB right turn lanes.	Install signal, add EB left turn lane and WB right turn lane in lieu of roundabout identified in Transportation Element.
	(21) Slater Rd / Rural Ave	Convert to 1 lane roundabout with northbound right turn lanes.	Extend WB left and NB right turn lanes.
	(24) Slater Rd / Pacific Hwy	Construct 1 lane roundabout with WB right turn lane in lieu of traffic signal and turn lanes identified in Transportation Element.	Add 2nd EB left turn lane and widen Pacific Hwy north of Slater Road to support the dual turn lanes, add WB right turn lane.
	(26) LaBounty Dr / Nordic Wy	Construct 1 lane roundabout.	Install signal, add EB right turn lane, add NB right turn lane.
	Main St/SE Connector	Construct 1 lane roundabout.	Install signal, add NB right-turn and WB left turn lanes.
	Barrett Rd/SE Connector	Construct 1 lane roundabout.	Install signal without turn lanes, or add SB right turn lane on SE Connector and two-way left turn lane on Barrett Rd.
State	(9) Main St / I-5 SB Ramps	Construct 2 to 3 lane roundabout without SB right turn slip lane.	Add EB right turn lane. Rechannelize SB off ramp to a left turn lane and a shared left/through/right turn lane.
	(10) Main St / I-5 NB Ramps	Realign and widen Barrett Road to develop a 2 to 3 lane roundabout intersection with Main Street and I-5 NB ramps with 1 SB from Barrett Road, 2 SB from I-5 Off-ramp, 2 NB, 3 EB, and 2 WB approach lanes.	Reconstruct EB approach to include 2 left turn lanes, 1 through lane, 1 through/right lane; WB approach to include 1 left turn lane, 1 through lane, 1 through/right turn lane.
	(22) Slater Rd / I-5 SB Ramps	Construct 1 lane roundabout with EB right turn slip lane in lieu of traffic signals and turn lanes as identified in the City's Transportation Element (or alternative improvement as identified by WSDOT).	Construct traffic signals and turn lanes as identified in the City's Transportation Element (or alternative improvement as identified by WSDOT).
	(23) Slater Rd / I-5 NB Ramps	Construct 1 to 2 lane roundabout in lieu of traffic signals and turn lanes as identified in the City's Transportation Element (or alternative improvement as identified by WSDOT).	Construct traffic signals and turn lanes as identified in the City's Transportation Element (or alternative improvement as identified by WSDOT).

Source: Transpo Group, 2011

1. *Additional improvements beyond those identified in the City of Ferndale Transportation Element.*

2. *Travel direction - NB = northbound, SB = southbound, WB = westbound, EB = eastbound.*
3. *(X) = References study intersections identified on Figure 3.3-2 in Draft EIS*

Table 2-4
Preferred Alternative with Improvements - PM Peak Hour Levels of Service (LOS D City Standard)

	ID	Intersection	LOS Standard[1]	Roundabout Improvements LOS[2]	Roundabout Improvements Delay[3]	Roundabout Improvements V/C[4] or WM[5]	Signalized Improvements LOS	Signalized Improvements Delay	Signalized Improvements V/C or WM
City	6	Main St/ Hovander Rd	D		-6		B	19.4	0.92
City	7	Main St/Walgreen Drwy	D	A	8.1	0.66	B	19.4	0.80
City	8	Main St/ LaBounty Dr	D	D7	41.1	1.47	D	54.1	1.08
City	11	Main St/ Barrett Rd	D	*See #10 (Main St/I-5 NB Ramp)			D	42.4	0.93
City	16	Smith Rd/ LaBounty Dr	D	A	9.2	0.56	B	17.8	0.81
City	17	Smith Rd/ Barrett Rd	D	C8	33.2	1.06	D	54.6	1.13
City	21	Slater Rd/ Rural Ave	D	D9	42.6	1.17	D	42.5	1.03
City	24	Slater Rd/ Pacific Hwy	D	D10	48.4	1.15	D	39.0	0.98
City	26	LaBounty Dr/Nordic Wy	D	B11	18.4	0.97	C	23.7	0.92
State	9	Main St/ I-5 SB Ramp	D	C14	34.5	1.04	D	42.4	1.02
State	10	Main St/ I-5 NB Ramp	D	D15	47.4	1.53	D	40.1	0.97
State	22	Slater Rd/ I-5 SB Ramp	D	B	11.5	0.69	B	13.1	0.69
State	23	Slater Rd/ I-5 NB Ramp	D	B	13.7	0.85	C	20.4	0.81

Source: Transpo Group, 2011

1. *LOS Standard varies by jurisdictions and control type, see text in Draft EIS for description.*
2. *Level of service, based on 2000 Highway Capacity Manual methodology.*
3. *Average delay in seconds per vehicle.*
4. *Volume-to-capacity ratio reported for signalized intersections.*
5. *Worst movement reported for two-way stop-controlled intersections. Travel direction - NB = northbound, SB = southbound, WB = westbound, EB = eastbound. Left-turn = (L).*
6. *Traffic signal assumed in the No Action alternative presented in Draft EIS is not included under the roundabout scenario.*
7. *SB Riverplace Dr queue = 1,385 ft.; EB Main St queue = 535 ft.*
8. *SB Barrett Rd queue = 900 ft.; NB Barrett Rd queue = 525 ft.*
9. *EB Slater Rd queue = 1,340 ft.; WB Slater Rd queue = 550 ft.*
10. *EB Slater Rd queue = 1,300 ft.; WB Slater Rd queue = 615 ft.; NB Slater Rd queue = 695 ft.; SB Pacific Hwy queue = 615 ft.*

11. *WB LaBounty Dr queue = 640 ft.; EB LaBounty Dr queue = 235 ft.; NB Nordic Way queue = 260 ft.*
12. *NB SE-Connector queue = 1,200 ft.; WB Main St queue = 440 ft.; EB Main St queue = 570 ft.*
13. *Barrett Rd/SE Connector not required for signalization for LOS D. Instead: construct two-way left-turn lane on Barrett Rd and SB right turn lane.*
14. *EB Main St queue = 825 ft.; SB I-5 Off-Ramp queue = 580 ft.*
15. *SB Barrett Rd queue = 1,485 ft.; WB Main St (Axton Rd) queue = 655 ft.*

Roundabout Concept with LOS D Standard at City Intersections

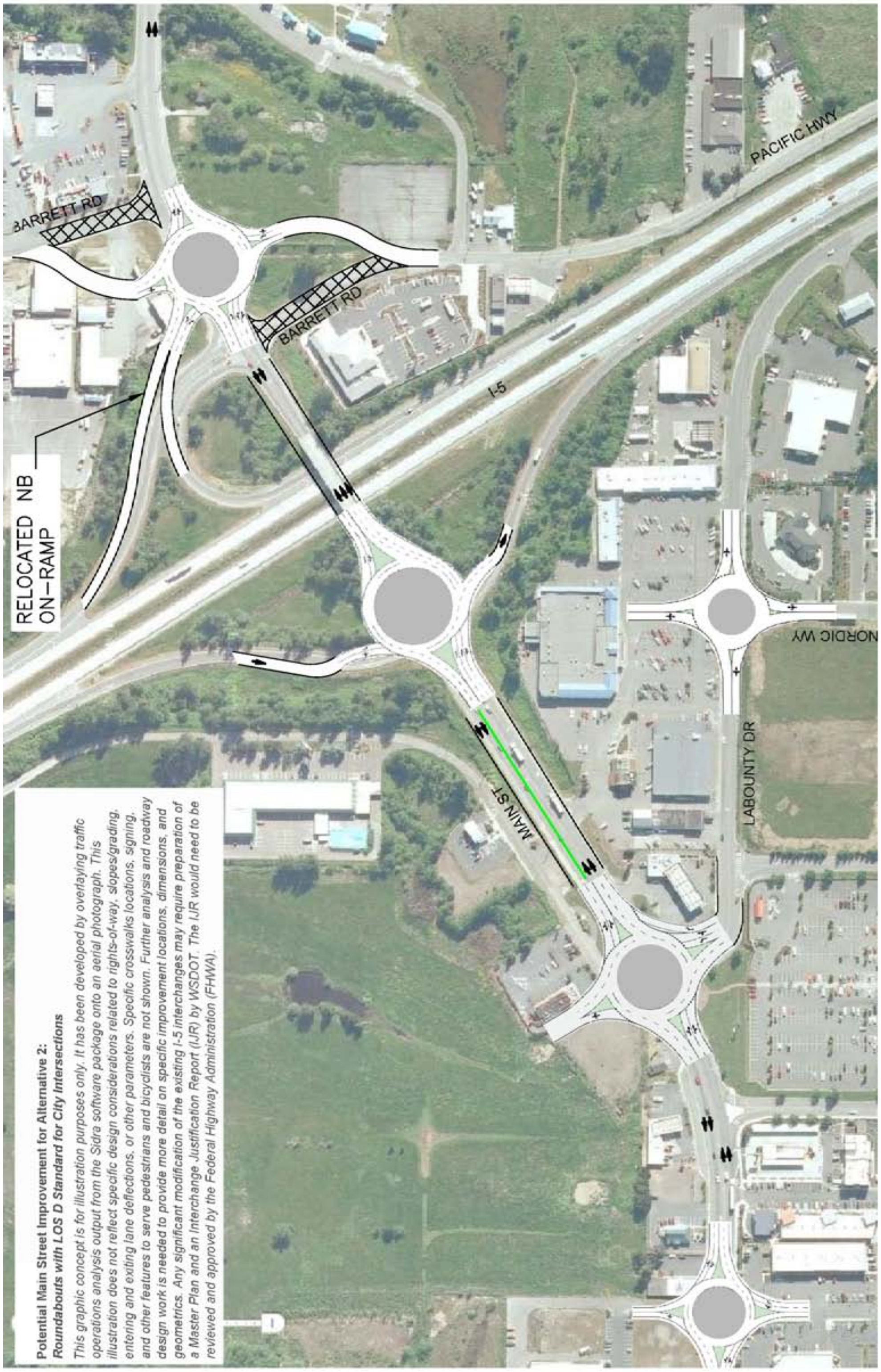
Figure 2-3 shows the conceptual improvements along the Main Street corridor based on roundabouts at LOS D for City intersections. Comparing Figure 2-3 with Figure 2-1 shows the primary differences between the two level of service standards as they apply along Main Street. At the key intersection of Main Street/LaBounty Drive the east-to-south slip lane and second southbound lane into the roundabout would not be constructed. The elimination of these improvements would significantly increase traffic queues, especially for the southbound approach. The southbound queue could extend over one-quarter mile into the golf course site development, which would not likely be acceptable and the roundabout would not operate efficiently. Fairly long traffic queues could also develop eastbound on Main Street, reducing the efficiency of this roundabout and the overall traffic flow along the corridor.

No significant changes would be needed at the I-5/Main Street interchange ramps because the original analysis assumed LOS D based on the WSDOT standard for Highways of Statewide Significant in urban areas. Some reductions in the improvements included in the LOS C standard analyses were, however, incorporated for the LOS D analyses. These reduced improvements would still provide LOS D but would result in longer traffic queues. The conceptual design illustrated in Figure 2-3 shows the elimination of a south-to-west slip lane from Barrett Road to Main Street/I-5 northbound ramps and includes only a two-lane approach to westbound Main Street. These changes would result in long queues that would impact property access on southbound Barrett Road. This would result in queues of almost 600 feet on the southbound off-ramp. The conceptual designs for the LOS D scenario eliminated the south-to-west slip lane at the southbound ramp.

The roundabout at Nordic Way/LaBounty Drive could be reduced to a single lane facility. This would still provide LOS B, but would result in lengthy traffic queues. The westbound queue would be over 600 feet and the eastbound queue on LaBounty Drive would extend up to 235 feet. These queues would be significantly longer than those under the LOS C mitigation strategy with the additional lanes on the eastbound, northbound, and westbound approaches of the roundabout.

The roundabout improvements at the I-5 interchange ramps with Slater Road would be the same as presented previously. The state highway intersections have an LOS D standard and the identified improvements would result in LOS B.

Figure 2-3
Potential Main Street Corridor Improvement Concept for Preferred Alternative – Roundabouts with LOS D Standard for City Intersections



The size of the roundabout at Slater Road/Pacific Highway could be reduced by eliminating the extra southbound and eastbound approaches from two eastbound traffic lanes to one lane and still provide LOS D. However, extensive traffic queues would form and would extend back into the Slater Road/I-5 northbound ramps. Queues on the northbound and southbound approaches of Pacific Highway would extend 600 to 700 feet under this design option.

The eastbound-to-southbound slip lane at the intersection of Slater Road/Rural Avenue could be eliminated and still provide LOS D or better. However, the maximum eastbound traffic queues would extend over 1/4 mile. The east-to-south slip lane is primarily needed to serve proposed development south of Slater Road. The eastbound approach would operate at LOS F during the PM peak hour. Westbound queues would be expected to extend more than 500 feet.

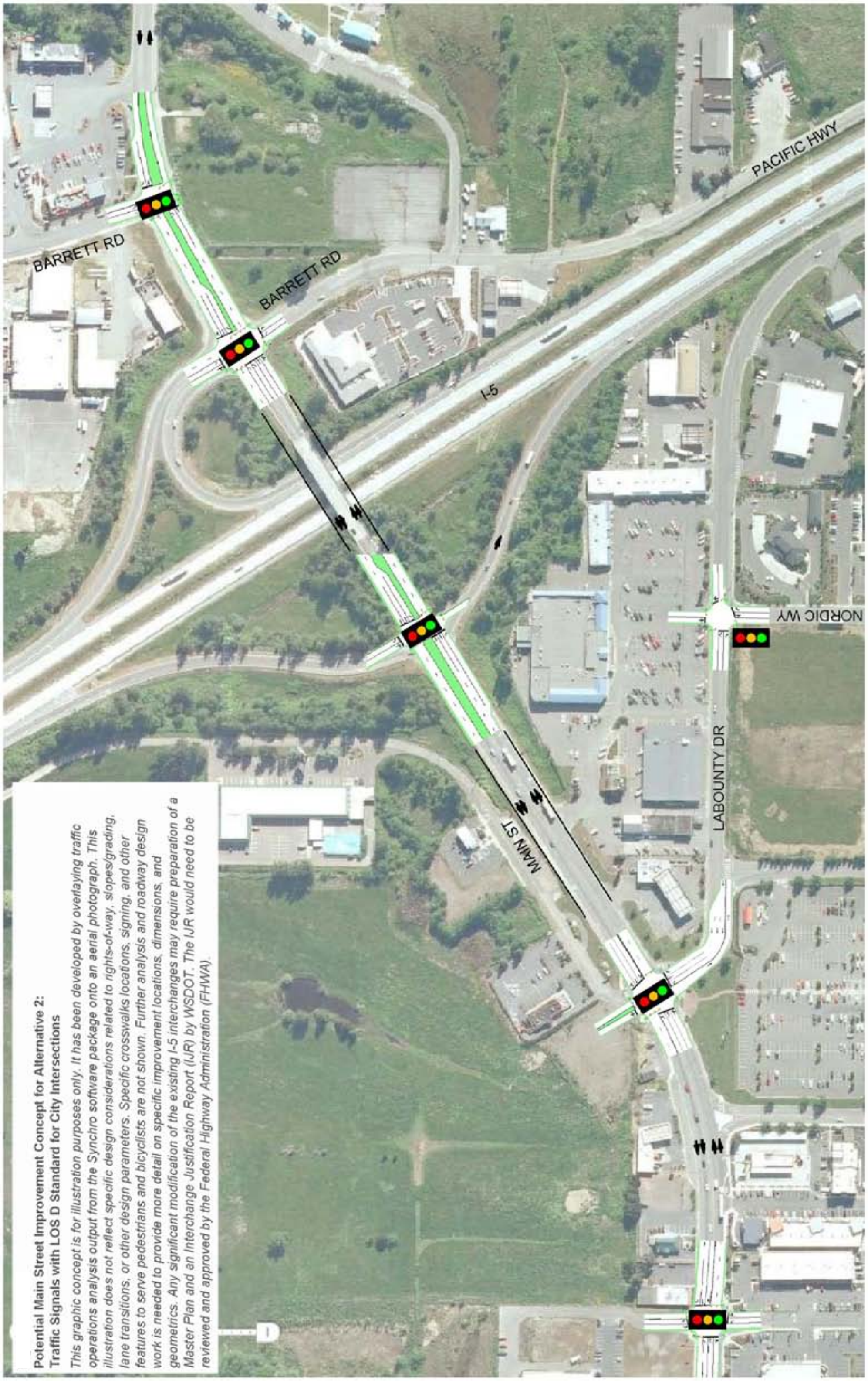
Eliminating the second southbound approach lane at the roundabout at Smith Road/Barrett Road would maintain LOS C at that intersection. However, the southbound traffic would operate at LOS E and queues would extend up to 900 feet. With the second southbound approach lane the queues would be 300 feet.

Traffic Signal Concept with LOS D Standard at City Intersections

Mitigation also could be provided using traffic signals with a LOS D standard for City intersections. LOS D also would be maintained for the WSDOT controlled intersections at the I-5/Main Street and I-5/Slater Road interchange ramps. Figure 2-4 illustrates the conceptual improvements along Main Street for this scenario.

Comparing Figure 2-4 with Figure 2-2 shows that the east-to-south right turn lane and south-to-east left turn lanes at the Main Street/LaBounty Drive intersection could be dropped and still provide LOS D. The elimination of the southbound left-turn lane would result in extensive (470 feet) traffic queues that would need to be accounted for in the development of the properties north of Main Street. Eastbound traffic queues of 530 feet would also be longer, but would not be expected to block the adjacent Walgreen's access driveway.

Figure 2-4
Potential Main Street Improvement Concept for the Preferred Alternative – Traffic Signals with LOS D Standard for City Intersections



The state highway standard would remain at LOS D under this option and the same improvements would be recommended at the Main Street/I-5 interchange ramps.

Improvements at the intersection of Main Street/Barrett Road could be modified and still provide LOS D. The westbound approach could be configured to include a through lane and a west-to-north right-turn lane. This would not significantly change the types of improvements that are needed, but would more than double the length of the maximum westbound traffic queues.

Improvements at the I-5/Slater Road interchange ramps under this strategy would be the same as discussed under the LOS C City standard. At Slater Road/Rural Avenue, the previously identified north-to-east right-turn overlap signal phase could be eliminated and still provide LOS D. This would reduce the efficiency of the signal and result in slightly longer traffic queues. At the intersection of Slater Road/Pacific Highway the west-to-north right-turn lane could be dropped and still maintain LOS D. This would result in longer westbound traffic queues.

New Collector Road Intersection Improvements

The Draft EIS identified a system of new collector roadways to provide local access and circulation for the additional growth under the action alternatives. Figure 2-5 shows the general location of the identified collector roads. Specific alignments have not been determined which provides property owners and applicants flexibility for locating the new roadways. The roadways should, however, be open to all traffic to promote circulation without impacting the arterials. The alignments will consider property boundaries, intersection spacing, grade, potential environmental impacts, and other design elements.

The new connector roadway serving the southeast quadrant will create new intersections with Main Street and with Barrett Road. The new connector in the southwest quadrant will create a new intersection with LaBounty Drive east of Nordic Way. The connector roadway in the northwest quadrant will connect with the existing Main Street intersections at the Walgreen's driveway and at LaBounty Drive.

The three new intersections created with the new collector roadways in the southeast and southwest quadrants will require some additional improvements Table 2-5 summarizes the levels of service and improvement options based on roundabout and traffic signal strategies. Both LOS C and LOS D standards were evaluated. The level of service worksheets are included in Appendix B of the Final EIS.

Figure 2-5
General Alignment for New Connector Roads

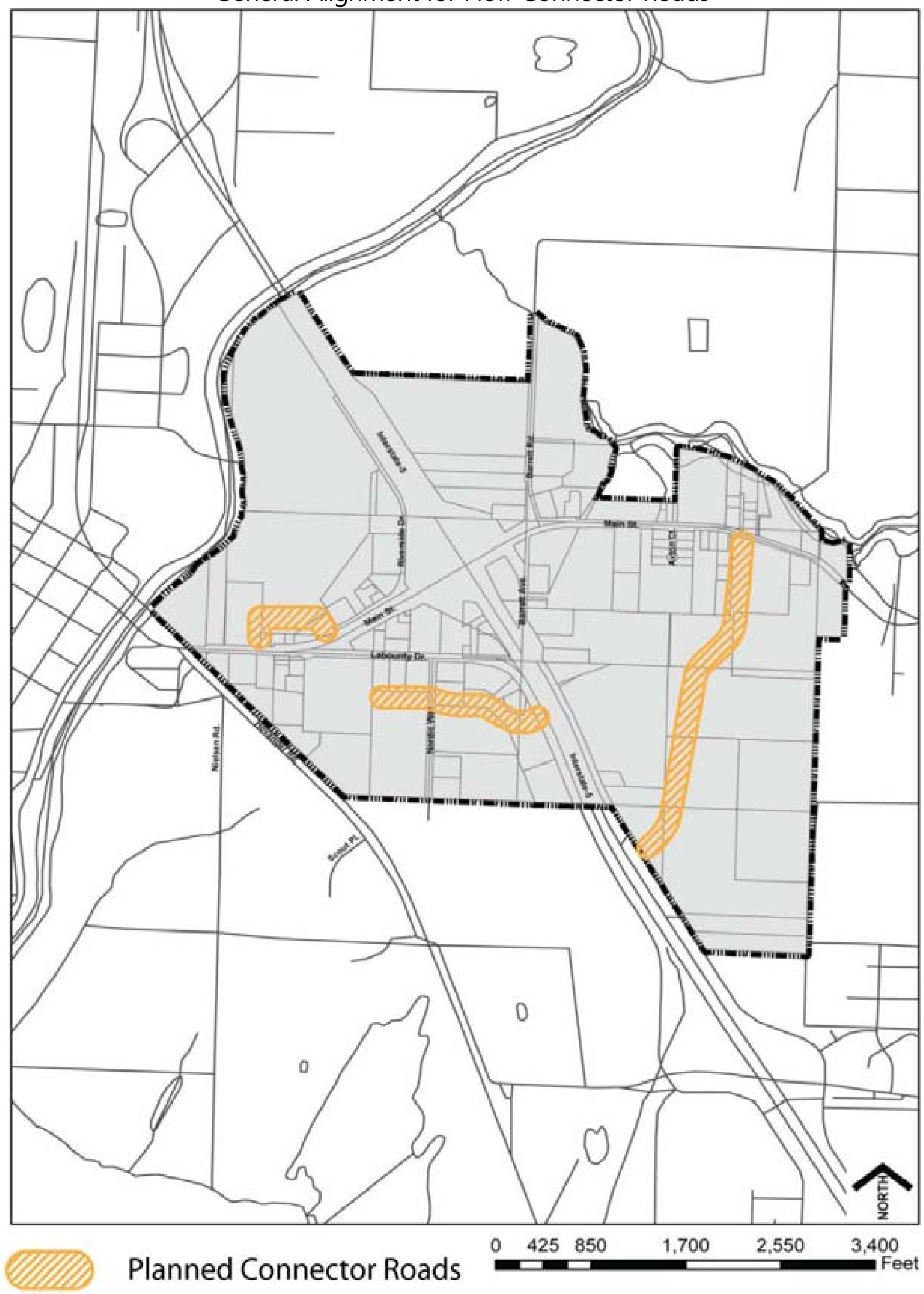


Table 2-5
Connector Roadway Intersection 2034 PM Peak Hour Levels of Service

Intersection	Improvement	LOS[2]	Delay[3]	V/C[4] or WM[5]
LaBounty Drive/E-W Connector Road	Stop Sign	B	12.2	EB
Main Street/SE Connector Road	Stop Sign	F	>180	NB
	Roundabout with additional lanes6	B	13.3	0.92
	Roundabout without additional lanes6	D	39.1	1.18
	Traffic Signal and Turn lanes on All Approaches7	C	21.0	0.85
	Traffic Signal and Turn Lanes on northbound and westbound approaches7	D	43.7	0.99
Barrett Road/SE Connector Road	Stop Sign	F	>180	WB
	Stop sign with turn/accel lane on Barrett Road8	D	30.7	WB
	Roundabout9	A	7.0	0.63
	Traffic Signal10	B	14.9	0.77

Source: Transpo Group, 2011

1. *LOS Standard varies by jurisdictions and control type, see text for description.*
2. *Level of service, based on 2000 Highway Capacity Manual methodology.*
3. *Average delay in seconds per vehicle.*
4. *Volume-to-capacity ratio reported for signalized intersections.*
5. *Worst movement report for two-way stop-controlled intersections. Travel direction – NB = northbound, SB = southbound, WB = westbound, EB = eastbound. Left-turn = (L).*
6. *Main/ SE Connector roundabout mitigation improvements include: a single-lane roundabout with separate turn lanes on the northbound and eastbound approaches.*
7. *Main/SE Connector signalized mitigation improvements include separate turn lanes on all intersection approaches to meet a LOS C standard. If a LOS D standard is applied, EBR turn lane would not be required.*
8. *Barrett Rd/SE Connector unsignalized mitigation improvements include: separate WBL and WBR stop-controlled lanes, a SBL lane, and a refuge lane on the NW approach for WBL to turn into.*
9. *Barrett Rd/SE Connector roundabout mitigation improvements include only a single lane roundabout. No additional channelization is required.*
10. *Barrett Rd/SE Connector signalized mitigation improvements do not require any additional channelization at the intersection.*

The intersection of the new east-west connector roadway with LaBounty Drive in the southwest quadrant will operate at LOS B as a two-way stop controlled intersection. Final designs should consider addition of a north-to-west left-turn lane on LaBounty Drive to minimize the impacts on through traffic. The turn lane is not, however, needed for level of service.

The intersection of Barrett Road with the new southeast connector would operate at LOS D with construction of a south-to-east left turn lane and west-to-south acceleration/merge lane on Barrett Road. The westbound approach (southeast connector road) would have separate left and right turn lanes. Construction of a single-lane roundabout at the intersection would provide LOS A. Installation of a traffic signal without any additional turn lanes would provide LOS B.

A roundabout or traffic signal would be required at the intersection of Main Street with the southeast connector roadway. A roundabout with two eastbound, two northbound, and one westbound approach lanes would result in LOS B. Westbound traffic queues could extend over 550 feet during the PM peak hour. Constructing only a single-lane roundabout would result in LOS D but traffic queues would be significantly longer (almost 1,200 feet on the northbound approach). Alternatively, a traffic signal with turn lanes could be constructed at the Main Street/southeast connector road intersection. LOS C would result with left-turn lanes on the north and west approaches to the intersection and an east-to-south right-turn lane. Under a LOS D standard, the east-to-south right turn lane would not be needed, but still would likely be desirable to reduce delays for traffic entering the new development.

Corridor Levels of Service

The City of Ferndale has adopted a corridor travel speed level of service standard for primary travel corridors including Main Street, Slater Road, and Vista Drive. The corridor level of service standard is used to assure that the primary through traffic movements operate at an overall travel speed based on type of facility.

The City's level of service standards are based on corridor travel speeds identified in the Highway Capacity Manual, TRB, 2000. The City has adopted a concurrency level of service standard as being 2 mph higher than the minimum threshold identified in the Highway Capacity Manual for each classification of roadway. The City's currently adopted corridor standard is LOS C with 15 mph for Class IV streets and 20 mph for Class III streets. The corresponding LOS D speeds are 11 mph (Class IV) and 16 mph (Class III).

Table 2-6 summarizes the resulting travel speeds along Main Street, Slater Road, and Vista Drive for the roundabout and traffic signal options at LOS C and LOS D. The forecast speeds along Main Street east of I-5 also account for the new intersection of Main Street with the southeast connector road. For comparison, the 2011 travel speeds based on field measurements and forecasts for the 2034 No Action alternative are shown. All of the corridors meet the City LOS C standard under the 2011 conditions. The 2034 No Action alternative would also meet the adopted standards assuming completion of the improvements identified in the adopted Transportation Element. No changes were assumed in the LOS standard for Vista Drive (i.e. LOS C standard was maintained).

Table 2-6
Corridor Travel Speeds and Levels of Service

Location	Urban Street Class	Concurrency Standard (LOS C)	Concurrency Standard (LOS D)	2011 Existing	2034 No Action	2034 Mid Growth (LOS C w/RABs)	2034 Mid Growth (LOS C w/Sigs)	2034 Mid Growth (LOS D w/RABs)	2034 Mid Growth (LOS D w/Sigs)
EB Main Street w/o I-5	IV	15 mph	11 mph	20.5 mph	18.0 mph	20.9 mph	15.1 mph	16.4 mph	12.4 mph
WB Main Street w/o I-5	IV	15 mph	11 mph	19.7 mph	18.1 mph	20.2 mph	17.3 mph	20.2 mph	17.1 mph
EB Main Street e/o of I-5	III	20 mph	16 mph	27.3 mph	24.9 mph	30.0 mph	19.4 mph	28.5 mph	16.9 mph
WB Main Street e/o of I-5	III	20 mph	16 mph	26.6 mph	22.7 mph	23.6 mph	16.2 mph	17.5 mph	11.8 mph
EB Slater Road	III	20 mph	16 mph	26.6 mph	20.0 mph	23.0 mph	19.5 mph	12.8 mph	18.7 mph
WB Slater Road	III	20 mph	16 mph	30.9 mph	20.4 mph	23.4 mph	20.4 mph	22.5 mph	18.6 mph
NB Vista Drive s/o Parkland(1)	IV	15 mph	-(1)	24.4 mph	23.2 mph	23.0 mph	23.0 mph	23.0 mph	23.0 mph
SB Vista Drive s/o Parkland (1)	IV	15 mph	-(1)	24.3 mph	23.8 mph	23.5 mph	23.5 mph	23.5 mph	23.5 mph

Note: Concurrency LOS standard set at 2 mph higher than HCM Urban Street minimum speed for level of service range (Exhibits 15-2 of Highway Capacity Manual, 2000)

1. *Levels of service for Vista Drive corridor assume improvements identified in Transportation Element. No changes to the level of service standard or improvements were developed for the analysis Planned Action alternatives.*

With the roundabout improvements for the City LOS C standard, all of the corridors are forecast to meet the adopted standard. This reflects the additional lanes that were incorporated to reduce traffic queue impacts; these also will improve travel speeds and capacity of the corridor.

The traffic signal improvements for the LOS C would not meet the adopted LOS standard for Main Street east of I-5. Eastbound traffic would be just below the 20 mph standard at 19.4 mph. Traffic in the westbound direction on Main Street, east of I-5, would operate at LOS D almost 4 mph below the adopted standard of 20 mph. In addition, eastbound Slater Road is forecast to be just below the 20 mph adopted standard, at 19.5 mph.

Under an LOS D standard, the roundabout improvements are forecast to meet the standard for all but eastbound Slater Road. The actual travel speeds would likely be slower because the potential impacts of traffic queues are not fully accounted for in the assessment of travel speeds using the Sidra software. As noted above, several of the improvements under the LOS C scenario were incorporated to address traffic queues and not levels of service. Many of these improvements would also be desirable under the LOS D standard to address traffic queues and corridor travel speeds.

The LOS D with traffic signals concept is forecast to meet the standard for all segments except westbound Main Street east of I-5. The high levels of delays at the intersections of Main Street at Barrett Road and Main Street/I-5 northbound ramps results in an overall speed of 11.8 mph. This is well below the 16 mph standard based on LOS D (including the 2 mph cushion adopted by the City).

Comparison of Improvement Costs

Appendix D to the Draft EIS included ranges of costs for the roundabout improvement scenarios based on a LOS C City standard. Comments on the Draft EIS requested similar estimates for signalized options. Commenters also indicated that the estimates for the roundabouts were incorrect and too low. The rationale noted for the costs being too low are basically related to:

- The need for significant fill and stabilization near the I-5 interchanges
- Right-of-way needs, including impacts to developed properties
- Need for stormwater detention and treatment due to the increase in impervious surface
- Cost of demolishing existing traffic signals and intersection improvements

These potential impacts on the cost estimates for roundabouts are noted. Similar elements would also affect some of the more significant signal improvement strategies discussed above. More refined cost estimates will need to be prepared as project designs are developed based on the selected improvement strategy and level of service standard. Future design studies will identify specific property impacts and options to reduce costs and impacts.

Tables 2-7 and 2-8 provide estimated ranges of the additional costs for each of the four improvement concepts discussed above (roundabouts and signals at LOS C and LOS D, respectively). The costs ranges included in Table 2-7 and 2-8 are based on planning level estimates and provide a relative comparison of the improvement strategies; preliminary engineering analyses have not been conducted. The cost estimates shown in the tables are updated from the preliminary values presented in the Draft EIS. Tables 2-7 and 2-8 also include cost estimates for improvements at the new collector road intersections. The adjustments generally take into account the factors, at a planning level, discussed in the comment letters. Costs for specific improvements could be higher or lower than the cost range depending on the specific property impacts, grading/fill, and other design features. The cost ranges do, however, provide for a relative comparison of improvement costs between the alternatives.

The City's Transportation Element includes over $9.8 million in improvements in the primary study corridors. These include over $6.8 million in improvements at the WSDOT interchanges at Main Street and Slater Road. As shown in the tables, the need for some of these improvements would be reduced under the roundabout improvement strategy, reducing the base cost. The Transportation Element includes projects to install a signal interconnect system along Main Street and installation of a new signal and other operational improvements at Hovander Road. Under the roundabout scenario, the signal interconnect project would not be required, which results in a decrease in the cost of the improvements identified in the Transportation Element. The proposed signal at Hovander Road also would not be needed, but some other safety and operational improvements would still be needed.

Costs with LOS C City Standard

As shown on Table 2-7, the roundabout improvement strategy for LOS C at City intersections would result in an additional $30.3 to $37.7 million in improvements at these study locations. Approximately one-third of the additional costs ($10.8 to $13.3 million) are related to additional improvements at the I-5/Main Street and I-5/Slater Road interchanges. These costs are in addition to the $6 million included in the Transportation Element for widening the Main Street overcrossing.

Table 2-7
Preliminary Cost Estimate Range for Transportation Improvements within City of Ferndale – LOS C Standard for City Intersections

	Location[2,3]	Adopted Transportation Element	Preferred Alternative – Costs of Additional Improvements[5]	
			Roundabout[1]	Signal[1]
	Main St Signal ITS Upgrades	$500,000	-$500,000[5]	$0
	Main St / Hovander Dr	$460,000	-$160,000 to -$110,000[6]	$0
	Main St / Walgreens Drwy	$0	$1,250,000 to $1,500,000[7]	$0
	(8) Main St / LaBounty Dr	$220,000	$1,380,000 to $1,730,000	$480,000 to $630,000
	(11) Main St / Barrett Rd	$310,000	--[8]	$10,000 to $20,000
	(16) Smith Rd / LaBounty Dr	$400,000	$0[10]	$300,000 to $450,000
	(17) Smith Rd / Barrett Rd	$350,000	$1,050,000 to $1,350,000	$1,050,000 to $1,350,000
	(21) Slater Rd / Rural Ave	$0	$1,700,000 to $2,050,000	$50,000 to $100,000
City	(24) Slater Rd / Pacific Hwy	$710,000	$340,000 to $590,000	$440,000 to $740,000
	(26) LaBounty Dr / Nordic Wy	$0	$1,050,000 to $1,300,000	$1,200,000 to $1,450,000
	Main Street (Barrett Road to east City limits)	$0	$2,450,000 to $3,000,000	$2,450,000 to $3,000,000
	Barrett Road (Smith Road to north City limits)	$0	$5,250,000 to $6,450,000	$5,250,000 to $6,450,000
	LaBounty Drive (Main Street to Smith Road)	$0	$3,850,000 to $4,700,000	$3,850,000 to $4,700,000
	Main St Connector Rd/SE Connector Rd[4]	$0	$1,150,000 to $1,450,000	$1,400,000 to $1,700,000
	Barrett Rd/SE Connector Rd[4]	$0	$700,000 to $850,000	$700,000 to $850,000
	City Subtotal	**$2,950,000**	**$19,510,000 to $24,360,000**	**$17,180,000 to $21,440,000**
	(9) Main St / I-5 SB Ramps	$0	$2,100,000 to $2,550,000	$450,000 to $550,000
	(10) Main St / I-5 NB Ramps	$6,000,000[10]	$6,750,000 to $8,200,000	$250,000 to $300,000
State	(22) Slater Rd / I-5 SB Ramps	$420,000	$880,000 to $1,130,000	$980,000 to $1,280,000
	(23) Slater Rd / I-5 NB Ramps	$420,000	$1,080,000 to $1,430,000	$980,000 to $1,280,000
	State Subtotal	**$6,840,000**	**$10,810,000 to $13,310,000**	**$2,660,000 to $3,410,000**
	Grand Total	**$9,790,000**	**$30,320,000 to $37,670,000**	**$19,840,000 to $24,850,000**

Source: Transpo Group, 2011

1. *Additional costs, in 2011 dollars, of improvements beyond those identified in the City of Ferndale Transportation Element, January 2011. The cost estimate ranges are intended to provide a general estimate of costs. They are not based on specific design studies. They account for generalized, planning level estimates for costs related to rights-of-way, slopes/grading, lane transitions, or other design parameters. Further analysis and roadway design work is needed to provide more detail on specific improvement locations, dimensions, and geometrics. Any significant modification of the existing I-5 interchanges may require preparation of a Master Plan and an Interchange Justification Report (IJR) by WSDOT. The IJR would need to be reviewed and approved by the Federal Highway Administration (FHWA).*
2. *Mitigation descriptions identified on Table 2-1.*
3. *(X) = References study intersections identified on Figure 3.3-2 of Draft EIS. Quadrant connector roads are not included.*
4. *Costs shown are for the connector road intersections; costs for the connector roads would be a condition of development permit issuance for adjacent properties.*
5. *Signal upgrade and interconnect along Main Street would not be needed with roundabout option.*
6. *Traffic signal improvement assumed in No Action alternative would not be constructed under roundabout option. Other intersection improvements would still likely be constructed to restrict some or all of the left turn movements at the intersection and improve safety.*
7. *Improvement not needed to mitigate impacts of Preferred Alterantive but is recommended to provide consistency along the corridor and to reduce the potential impacts of traffic queues at adjacent intersections. Costs would not be included in Planned Action mitigation.*
8. *Costs for roundabout at this intersection are incorporated with estimate for Main Street/I-5 Northbound Ramps (#10) as shown below.*
9. *No additional improvements identified for the Preferred Alternative*
10. *Preliminary cost estimate related to widening Main Street overcrossing of I-5. Does not include improvements to ramp intersections.*

Additional improvements for the Preferred Alternative within the City of Ferndale's jurisdiction would add $19.5 to $24.4 million. Approximately 60 percent of the City costs are related to upgrading Main Street (east of Barrett Road, Barrett Road (between Smith Road and north City limits) and LaBounty Drive (Main Street to Smith Road). These streets need to be upgraded to City standards to accommodate the increased level of traffic generated within the Planned Action area.

The remaining City costs are related to constructing roundabouts at several intersections. The costs also include the additional improvements for constructing a larger roundabout at Smith Road/Barrett Road compared to the single lane roundabout included in the Transportation Element. As noted above, constructing the roundabouts along Main Street would eliminate the need for a traffic signal at Hovander Road, although some operational and safety improvements would still be required. Under the roundabout strategy, the traffic signal interconnect system project identified in the Transportation Element also would be eliminated. The cost estimates also include constructing a roundabout at Main

Street/Walgreens Driveway. This improvement is not needed to mitigate traffic impacts under the Preferred Alternative, but is recommended to provide consistency in traffic controls along the corridor. The roundabout at the Walgreen's driveway would also help reduce potential effects of traffic queues between intersections. The timing of this improvement would be tied to actual levels of development and traffic growth and the potential for traffic queues between intersections.

Table 2-7 also shows that providing LOS C at City intersections with traffic signals would require an additional $19.8 to $24.9 million above the Transportation Element. Improvements to the I-5 interchange ramp intersections at Main Street and Slater Road would cost approximately $2.7 to $3.4 million more than the intersection improvements identified in the Transportation Element (which were based on the No Action alternative levels of development). Improvements at locations under the City of Ferndale's jurisdiction would be $17.2 to $21.4 million higher than those reported in the Transportation Element. Upgrading Main Street (east of I-5), Barrett Road, and LaBounty Drive would account for $11.6 to $14.2 million of the added City-based improvement costs. Upgrading existing signalized intersections and installing new signals would account for the rest of the added costs.

The primary difference between the costs for the roundabout and signal options are related to the intersection improvements, especially at the interchange ramps. The roundabout improvements at the Main Street and Slater Road interchanges are estimated at $8 to $10 million more than upgrading the existing traffic signals. This reflects the impacts on adjacent properties and anticipated realignment of roadways, and structural needs to accommodate roundabouts at the existing ramp intersections. Construction of a roundabout at Main Street /LaBounty Drive is estimated to be approximately $1 million more than modifying the existing traffic signal intersection. The additional costs will, however, be partially offset by eliminating the traffic signal upgrade improvement project included in the adopted Transportation Element.

Costs with LOS D City Standard

Table 2-8 shows the additional improvement costs based on a LOS D standard at City intersections based on roundabout or traffic signal improvement strategies. As discussed above, the improvements identified in Table 2-3 do not fully mitigate potential impacts of traffic queues which would need to be considered in selecting a final improvement project for specific intersections.

Table 2-8

Preliminary Cost Estimate Range for Mitigation within City of Ferndale – LOS D

	Location[2,3]	Adopted Transportation Element	Preferred Alternative – Costs of Additional Improvements[5]	
			Roundabout[1]	Signal[1]
City	Main St Signal ITS Upgrades	$500,000	-$500,000[5]	$0
	Main St / Hovander Dr	$460,000	-$160,000 to -$110,000[6]	$0
	Main St / Walgreens Drwy	$0	$1,250,000 to $1,500,000[7]	$0
	(8) Main St / LaBounty Dr	$220,000	$1,030,000 to $1,280,000	$30,000 to $80,000
	(11) Main St / Barrett Rd	$310,000	--[8]	$0
	(16) Smith Rd / LaBounty Dr	$400,000	$0[9]	$300,000 to $450,000
	(17) Smith Rd / Barrett Rd	$350,000	$950,000 to $1,200,000	$800,000 to $1,100,000
	(21) Slater Rd / Rural Ave	$0	$1,100,000 to $1,350,000	$50,000
	(24) Slater Rd / Pacific Hwy	$710,000	$240,000 to $440,000	$440,000 to $740,000
	(26) LaBounty Dr / Nordic Wy	$0	$800,000 to $1,000,000	$1,150,000 to $1,450,000
	Main Street (Barrett Road to east City limits)	$0	$2,450,000 to $3,000,000	$2,450,000 to $3,000,000
	Barrett Road (Smith Road to north City limits)	$0	$5,250,000 to $6,450,000	$5,250,000 to $6,450,000
	LaBounty Drive (Main Street to Smith Road)	$0	$3,850,000 to $4,700,000	$3,850,000 to $4,700,000
	Main St Connector Rd/SE Connector Rd[4]	$0	$700,000 to $850,000	$1,150,000 to $1,450,000
	Barrett Rd/SE Connector Rd[4]	$0	$700,000 to $850,000	$700,000 to $850,000
	City Subtotal	**$2,950,000**	**$17,660,000 to $22,010,000**	**$16,170,000 to $20,320,000**
State	(9) Main St / I-5 SB Ramps	$0	$2,000,000 to $2,450,000	$250,000 to $350,000
	(10) Main St / I-5 NB Ramps	$6,000,000[10]	$5,300,000 to $6,500,000	$250,000 to $300,000
	(22) Slater Rd / I-5 SB Ramps	$420,000	$880,000 to $1,130,000	$980,000 to $1,280,000
	(23) Slater Rd / I-5 NB Ramps	$420,000	$1,080,000 to $1,430,000	$980,000 to $1,280,000
	State Subtotal	**$6,840,000**	**$9,260,000 to $11,510,000**	**$2,460,000 to $3,210,000**
	Grand Total	**$9,790,000**	**$26,920,000 to $33,520,000**	**$18,630,000 to $23,530,000**

Source: Transpo Group, 2011

1. *Additional costs, in 2011 dollars, of improvements beyond those identified in the City of Ferndale Transportation Element, January 2011. The cost estimate ranges are intended to provide a general estimate of costs. They are not based on specific design studies. They account for generalized, planning level estimates for costs related to rights-of-way, slopes/grading, lane transitions, or other design parameters. Further analysis and roadway design work is needed to provide more detail on specific improvement locations, dimensions, and geometrics. Any significant modification of the existing I-5 interchanges may require preparation of a Master Plan and an Interchange Justification Report (IJR) by WSDOT. The IJR would need to be reviewed and approved by the Federal Highway Administration (FHWA).*
2. *Mitigation descriptions identified on Table 2-3.*
3. *(X) = References study intersections identified on Figure 3.3-2 of Draft EIS. Quadrant connector roads are not included.*
4. *Costs shown are for the connector road intersections; costs for the connector roads would be a condition of development permit issuance for adjacent properties.*
5. *Signal upgrade and interconnect along Main Street would not be needed with roundabout option.*
6. *Traffic signal improvement assumed in No Action alternative would not be constructed under roundabout option. Other intersection improvements would still likely be constructed to restrict some or all of the left turn movements at the intersection and improve safety.*
7. *Improvement not needed to mitigate impacts of Preferred Alternative but is recommended to provide consistency along the corridor and to reduce the potential impacts of traffic queues at adjacent intersections. Costs would not be included in Planned Action mitigation.*
8. *Costs for roundabout at this intersection are incorporated with estimate for Main Street/I-5 Northbound Ramps (#10) as shown below.*
9. *No additional improvements identified for the Preferred Alternative.*
10. *Preliminary cost estimate related to widening Main Street overcrossing of I-5. Does not include improvements to ramp intersections.*

Comparing the values in Table 2-8 with those in Table 2-7 shows a reduction of approximately $3.5 to $4.5 million for LOS D versus LOS C based on roundabouts. Based on the traffic signal options, LOS D standard at City intersections would reduce costs by $1 to $1.5 million compared to the costs based on the LOS C standard. The reductions in overall costs for the LOS D standard are due to eliminating some of the additional turn lanes at the intersections. The costs for upgrading Main Street (east of I-5), Barrett Road, and LaBounty Drive to accommodate higher volumes of traffic would not change between LOS C and LOS D options.

Transportation Mitigation Program Strategy Options

Adoption of the Master Plan will require in an updated list of transportation improvement projects and their associated costs needed to serve growth in the City. The primary basis for mitigation of the impacts would include modification of the City's existing Transportation Impact

Fee (TIF) to incorporate the costs, or some portion of the costs, of these additional improvements. As a minimum, the City's existing TIF will need to be revised to account for the additional traffic generation growth within the City. The Preferred Alternative would increase the forecast growth in PM peak hour trip generation within the City by approximately 4,500 trip ends. The higher number of trips generated within the City will result in a lower cost per trip assuming no changes to the existing TIF improvement projects and their costs.

Updating the existing TIF program to incorporate the additional improvement costs and growth in trip generation would provide a straight-forward mechanism for assessing transportation mitigation for growth within the Master Plan. The revised TIF fees would apply to developments within the Planned Action area as well as growth in the City outside of the Planned Action subarea. Similar to the existing TIF program, the revised program would fund only a portion of the costs of the additional improvements related to the Preferred Alternative. The City would need to fund the other share through grants, WSDOT funding, other City revenues, or other revenues. The final impact fee rates will be defined based on the selected improvement strategy and level of service standard. These will require modification of the City's TIF ordinance, following approval of needed amendments to the Comprehensive Plan to incorporate the Planned Action modifications.

In revising the TIF, the City will need to review the structure of the TIF program and which projects and associated costs would be covered by the program. The City's concurrency program requirements also need to be reviewed for the Planned Action area. The updated TIF also would identify any periodic needs for updating cost estimates and TIF rates as development occurs.

Service Areas

The City has adopted a single, citywide service area for its TIF program. This structure was selected to keep the program simpler and to acknowledge that development throughout the City receives benefits from transportation improvements in all parts of the City even if their traffic does not directly use some of the improvements. One option would be for the City to maintain the existing TIF program as a single citywide service area (revised to account for the increased number of trips and Planned Action improvement costs). This would provide a single fee for all growth in the City and would not specifically assess growth in the Planned Action area for the additional improvements costs.

Alternatively, the TIF program could be revised to by adding one or more additional service areas. Because the improvement projects and associated costs are primarily needed to serve the additional growth within the Planned Action study area, creating a second service area representing the Planned Action area would allow the City to most directly allocate the additional costs proportional to the benefit of developments within the Planned Action area. Based on the travel forecasts used in preparing the EIS, this process would assign a higher percentage of the costs of the additional improvements in Tables 2-1 and 2-3 to the future development within the Planned Action area. On the other hand, this process would reduce the proportional share of the costs of the Thornton Road Extension project allocated to the growth in the Planned Action area.

Additional service areas could also be created within the TIF. For example a revised TIF program could include two service areas for the Planned Action area – one west of I-5 and one east of I-5. A separate service area for the area south of the Planned Action study area also could be incorporated at this time. This would provide the structure for a potential Slater Road Master Plan which might be considered by the City in the future.

Alternatively, a TIF "overlay" could be developed which would only be applied to developments within the Planned Action area. The overlay TIF would be used to help fund the additional improvement projects and costs necessitated by the increased growth within the Planned Action area, as evaluated in the EIS. The City could elect not to charge the "overlay" fee to developments outside the Planned Action area. This option would reduce the share of the costs recovered via the TIF for the additional improvements. The City could fund the TIF cost share associated for growth in other areas of the City through the increases in sales tax generated by the growth in the Planned Action area, grants, WSDOT funding, or other revenues, based on additional fiscal analyses.

WSDOT Improvement Projects

As discussed above, installation of roundabouts at the I-5/Main Street interchange ramp intersections are identified in the Draft EIS. Alternatively, the Final EIS evaluates options for upgrading the existing signalized intersections at the ramps. Both of these strategies for upgrading the interchange ramps will add some significant costs. The costs of the roundabouts or signal improvements will be in addition to the $6 million already included in the City's existing TIF program for the widening of the Main Street overcrossing of I-5. Constructing roundabouts or traffic signal improvements at the Slater Road/I-5 interchange ramps also would have fairly significant costs. These improvements also are currently not funded by WSDOT. At this time, WSDOT has no funding for interchange improvements on I-5 in Ferndale, nor is there any expectation of funding.

The I-5 interchange ramps at Main Street and Slater Road will serve traffic generated within the Planned Action area, as well as other areas of Ferndale and traffic generated outside of the City. The City will need to determine how much, if any, of these costs for the improvements at the two WSDOT interchanges should be included in an updated TIF. WSDOT will need to agree to accept the TIF generated funding and could possibly apply them toward funding of a Master Plan study and Interchange Justification Report (IJR) for this segment of I-5. These studies have been identified by WSDOT as being required prior to establishing a specific set of improvements for these interchanges. TIF funding also could be directed by WSDOT for design, property acquisition, and construction of the improvements. WSDOT and the City will need to work together to define and implement the improvements.

One option would be to include all of the WSDOT costs in the TIF based on the roundabout strategy. This would provide the highest level of potential City development funding toward WSDOT improvements. Since WSDOT has not confirmed the use of roundabouts at these interchanges, the City could choose to only include the lower costs based on the strategy for modifying the traffic signals and constructing turn lanes. If and when WSDOT selects a preferred strategy, the TIF program and costs could be updated to effect that decision. The City could specifically target a portion of the TIF for WSDOT improvements.

The City also could choose to not include any additional costs of WSDOT improvements in an updated TIF program at this time. The City would work with WSDOT to develop and agree to a Memorandum of Understanding (MOU) or Interlocal Agreement (IA) regarding traffic mitigation at these locations. Upon approval of such program agreements, the TIF would need to be updated.

The Planned Action ordinance will include traffic generation thresholds, or triggers, based on potential impacts at the WSDOT interchanges. The triggers could establish specific actions that would be needed to support growth in the Planned Action area. These could include construction of improvements, phasing of improvements, or delaying approval of additional development. These triggers also would be incorporated into the MOU or IA. The City and WSDOT would need to work together to define the triggers and required actions at the trigger points. The planned action ordinance will also include a period review of traffic conditions to reassess the improvement needs, costs, and phasing/timing of improvements at the interchanges.

Concurrency and Phasing

Payment of the revised TIF would ultimately help fund and construct the identified improvements. Using the TIF, the City could pool the funding from a citywide TIF or just from the Planned Action overlay option to help fund the additional improvements needed to meet the City's level of service standards to comply with concurrency for the Planned Action. Improvement projects would be prioritized for completion based on the location and pace of development. The planned action ordinance will also include a periodic review of traffic conditions to reassess the priority for improvements and phasing/timing of improvements.

Given the relatively high costs of some of the improvements, the City could amend its concurrency policy to require improvements within six years instead of two. This would allow more time for additional studies, engineering design, acquisition of right of ways, and construction of the improvements.

It is likely that the collected fees will not be able to fully fund needed improvements to meet concurrency requirements. The TIF could identify traffic thresholds which when reached would require one or more developers to construct the improvements at City intersections/roadways or WSDOT interchanges. The City or WSDOT would likely need to be responsible for acquiring most of the needed rights-of-way. When a development has been conditioned to construct the improvements, they would be eligible for credits against their impact fee, consistent with state law. The TIF also could define a threshold for traffic generation which would allow smaller developments to pay the TIF and not require construction of major improvements. This would allow TIF revenues to continue to increase for leveraging bonds, loans, or other financing mechanisms.

2.2 Stormwater

The 2005 WSDOE Stormwater Management Manual for Western Washington was adopted as the City code as per FMC 13.34.030. Among the ten minimum requirements of the manual are #6 for run-off treatment (water quality) and #7 for flow control (peak run-off rates and durations). These requirements currently apply to all projects in the City of Ferndale including any in the study area. The code allows for these requirements to be met via an on-site system of treatment and flow control or via a regional system, both are allowed by code.

The Draft EIS recommends that all stormwater quality treatment for the projects built in the study area be met on-site with LID practices.

With respect to detention/flow control requirements of the code, there are three ways this requirement can be met, 1) on-site, 2) regionally, or for only those areas which qualify 3) via direct discharge. This flow control code provision is intended to protect downstream streams and wetlands from erosion caused by increased peak run-off rates and durations resulting from land development and are not related to flooding impacts.[1] Each of the approaches meets the requirements of the code. Because much of the areas to be developed are currently not forested and do not have any stormwater flow control, the implementation of the required detention may result in an actual decrease in peak flows rates over current conditions, and thus result in improved downstream capacity and reduced stream-bank erosion.

1. On-site detention & flow control – This approach requires each project to build a detention/flow control system at each project at the time of that project being built serving only that project. This approach does not require a basin-wide analysis.
2. Regional detention & flow control – This approach requires a basin-wide study to evaluate the constraints and opportunities of the current stormwater system and then sites regional stormwater detention facilities to serve the anticipated development. From a property owner and City perspective, this may be a preferred approach due to the efficient use of land/ and development cost. However, from a stormwater code point of view, this approach does not confer additional benefit in terms of mitigation of impacts.
3. Direct discharge – This approach requires a sub-basin study to evaluate the constraints and opportunities of the current stormwater system and then identifies conveyance upgrades necessary to serve the anticipated development. For the basins that are able to directly discharge to the Nooksack, this will mitigate water quantity impacts and may provide a slight additional level of flood impact mitigation by releasing more local stormwater earlier in a storm before the flood surge from upstream

The Draft EIS recommends performing the stormwater analysis necessary to allow approaches #2 and #3 to be used, since there appears to be some efficiency to this approach. The City has initiated a stormwater basin study, the Ferndale Gateway Stormwater Study, to be completed in 2012,

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[1] Certain areas adjacent to the Nooksack River are mapped as having flood risk. The incidence and severity of flood events in these areas is related to the entire Nooksack River basin and the influence of the proposed development within the study area is very small, based on 2011 revisions to the City's Floodplain Management requirements (FMC 15.24).

that will provide the information to support these approaches. However proposed development could be served with approach #1 in all areas. This approach would mitigate stormwater impacts, comply with current code, and would not require the basin study discussion in the Draft EIS.

Mitigation Measures

The first Stormwater mitigation measure listed on Draft EIS page 3.5-18 erroneously stated that there is insufficient information as to the condition and capacity of the stormwater conveyance system. As described above, there is sufficient information to provide on-site detention and flow control. In addition, nothing in the EIS precludes individual applicants from conducting the stormwater analysis necessary for the direct discharge approach. Therefore, this measure is revised to read as follows:

- Much of the study area is in basins that discharge directly to the Nooksack River. Stormwater quantity impacts in this area may be mitigated through downstream conveyance improvements so detention and flow control would not need to be provided on-site, thus making land available for additional development or open space. ~~However, there is insufficient information as to the condition and capacity of the existing stormwater conveyance systems.~~ Therefore, a comprehensive stormwater plan should be developed for direct discharge basins. This plan should identify the required conveyance improvements. The City will be updating the Stormwater Comprehensive Plan beginning in 2011 ~~but~~ and most likely finishing sometime during 2012.

In addition, in response to a comment from the Whatcom County Surface Water Division (Comment Letter No. 2), the following mitigating measure is added:

- The City will continue work with Whatcom County River and Flood, FEMA, ACOE, and other qualified agencies to determine the most accurate flood boundaries based on best available science.

2.3 Air Quality

One comment letter identified air quality as an environmental topic that should be addressed. Although not included in the scope of the EIS or identified by any public or agency comments on the proposed scope of the EIS, this section provides a brief qualitative summary of existing air quality conditions and potential impacts associated with the proposal. This section is based primarily on extracted information from the air quality analysis contained in the Whatcom County 10-Year UGA Review EIS (2009). Because the Whatcom County EIS considers potential air quality impacts from a regional countywide perspective, it is applicable to the Ferndale proposal.

Affected Environment

Particulate Matter (PM10 and PM2.5)

Total suspended particulate matter (TSP) is the total amount of particulate matter in ambient air. Until 1987, there were federal and state ambient standards for TSP, but in 1987 the federal TSP standards were replaced with standards for particulate matter smaller than 10 microns in diameter (PM10). In the 1990s, the U.S. Environmental Protection Agency (EPA) adopted standards for particulate matter smaller than 2.5 microns in diameter (PM2.5). PM10 and PM2.5 are the most important ambient particulate sizes because they contribute the most to human health effects, regional haze, and acid deposition.

Particulate matter (PM10 and PM2.5) is generated by industrial emissions, residential wood combustion, motor vehicle tailpipes, and fugitive dust from roadways and unpaved surfaces. The highest ambient concentrations generally occur near the emission sources.

Ozone

Ozone (O3) is a highly reactive form of oxygen created by an atmospheric chemical reaction of nitrogen oxides (NOx) and hydrocarbons, both of which are emitted directly from industrial and mobile sources. Because it takes several hours for these chemical reactions to take place, the highest ambient O3 concentrations can occur far downwind of the original emission sources of NOx and hydrocarbons. Ozone concentrations in Whatcom County have historically been less than allowable ambient standards.

Carbon Monoxide

Carbon monoxide (CO) is a product of incomplete combustion generated by mobile sources, residential wood combustion, and industrial fuel-burning sources. CO is generally of greatest concern when it is emitted by mobile sources at congested urban intersections because the emissions in those cases occur at ground level in areas surrounded by pedestrians during stagnant weather conditions. For those reasons, ambient CO monitoring stations operated by the Northwest Clean Air Agency (NWCAA) and the Washington State Department of Ecology (Ecology) have generally been placed near congested intersections.

Exceedances of the National Ambient Air Quality Standards (NAAQS) for CO were fairly common at densely populated areas throughout Washington State until the early 1990s. However, as older, more polluting cars have been replaced with new, more efficient cars, exceedances of the NAAQS limits for CO are rare.

Nitrogen Oxides and Sulfur Oxides (NOx and SOx)

NOx and sulfur oxides (SOx) are emitted by mobile sources and fuel-burning stationary sources. Although the ambient concentrations of these pollutants have never approached the NAAQS limits, NOx from regional tailpipe emissions is one of the O3 precursors that have contributed to ongoing O3 concerns in the Vancouver metropolitan area and central Puget Sound region.

Air Quality Regulations

Three agencies have jurisdiction over ambient air quality: EPA, Ecology, and NWCAA. Table 2-9 lists the NAAQS as adopted by EPA and Ecology. The list of air pollutants for which EPA has developed NAAQS are referred to as "criteria pollutants." The NAAQS consist of primary standards designed to protect public health and secondary standards designed to protect public welfare (e.g., preventing air pollution damage to vegetation). The more stringent secondary standards are used in Washington State to regulate air quality.

Table 2-9
National and State of Washington Ambient Air Quality Standards

Pollutant	National (EPA) Primary	National (EPA) Secondary	Washington State
Carbon Monoxide			
8-hour average	9 ppm	9 ppm	9 ppm
1-hour average	35 ppm	35 ppm	35 ppm
Particulate Matter			
PM10			
Annual average	50 $\mu g/m^3$	50 $\mu g/m^3$	50 $\mu g/m^3$
24-hour average	150 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$
PM2.5			
Annual average	15 $\mu g/m^3$	15 $\mu g/m^3$	15 $\mu g/m^3$
24-hour average	35 $\mu g/m^3$	35 $\mu g/m^3$	35 $\mu g/m^3$
Lead			
Quarterly average	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$
Sulfur Dioxide			
Annual average	0.03 ppm	No standard	0.02 ppm
24-hour average	0.14 ppm	No standard	0.10 ppm
3-hour average	No standard	0.50 ppm	No standard
1-hour average	No standard	No standard	0.40 ppm[a]
Ozone (O_3)			
8-hour average[b]	0.075 ppm	0.075 ppm	0.075 ppm
Nitrogen Dioxide			
Annual average	0.05 ppm	0.05 ppm	0.05 ppm

Notes: Annual standards never to be exceeded. Short-term standards not to be exceeded more than once per year unless noted.

ppm = parts per million
PM10 = particles 10 microns or less in size
PM2.5 = particles 2.5 microns or less in size
$\mu g/m^3$ = micrograms per cubic meter

[a] 0.25 ppm not to be exceeded more than two times in 7 consecutive days.

[b] Not to be exceeded on more than 1 day per calendar year as determined under the conditions indicated in Chapter 173-475 Washington Administrative Code (WAC).

Existing Air Quality and Attainment Status

NWCAA operates five air quality monitoring stations in its three-county region, including three monitoring stations in Whatcom County. Stations closest to Ferndale are located in Bellingham and Lynden. Existing air quality throughout the County is good; measured concentrations at all monitoring stations have been well below the NAAQS limits. As a result, Whatcom County, in its entirety, is classified as an "attainment area" for all regulated air pollutants.

Environmental Impacts

Localized Transportation Impacts at Congested Intersections

Under any of the alternatives, localized CO impacts could occur at intersections that experience significant traffic congestion. However, as described previously, measured exceedances of the NAAQS for CO are now extremely rare even at the most heavily congested downtown intersections in the state, so it is unlikely any intersections in Ferndale could experience enough future congestion to cause significant CO impacts.

Regional Emissions Resulting from Vehicle Travel

On-road vehicles are one of the largest sources of emissions within the County. From a regional perspective, vehicle miles traveled may increase with increased activity associated with new commercial development. This increase may be partially compensated for by a reduction in vehicle miles traveled as trips by persons in Ferndale, northern Whatcom County and Canada who might otherwise need to travel farther for commercial services are intercepted. Proposed transportation improvements may also reduce emissions generated by vehicles in a "stop and go" transportation environment, especially if roundabouts are selected as the preferred intersection improvement. In addition, ongoing federal EPA emission control requirements for on-road cars and trucks have provided a dramatic improvement in per-vehicle tailpipe emissions. That beneficial trend is expected to continue into the future as drivers gradually replace old vehicles with new, clean-burning ones.[2] As a result of EPA's tailpipe emission standards and the potential for shorter vehicles trips for some residents and visitors, vehicle travel would not be expected to cause significant impacts to regional air quality.

Residential Wood Burning

Because residential development may include installation of fireplaces or wood stoves, there is a potential for air quality impacts from wood burning. However, NWCAA's existing regulations and policies are

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[2] Data compiled by EPA and the Federal Highway Administration (FHWA) illustrate the substantial reductions in per-vehicle emissions that are forecast to result from EPA's current tailpipe emission standards (FHWA 2004). By the year 2030, average per-vehicle tailpipe emissions from passenger cars are expected to decrease by 77% to 95% compared to current levels. Similarly, EPA's current tailpipe standards for heavy diesel trucks are expected to reduce their per-vehicle emissions by up to 90% compared to existing levels.

designed to reduce the potential impacts of residential wood stove and fireplace emissions. NWCAA requires all new wood stoves to be certified by EPA for low emissions. Open burning is illegal within the Urban Growth Area and NWCAA can impose burn bans during unusually stagnant weather conditions, to prevent ambient pollutant concentrations in heavily populated areas from approaching NAAQS health-based limits. Continued enforcement of these regulations and policies would ensure that future emissions from residential wood combustion would not cause significant impacts. In addition, because residential development is a relatively small component of the proposal, residential wood burning is not expected to result in significant air quality impacts.

Mitigation Measures

No mitigation measures are required or proposed to address potential impacts to air quality associated with the proposal or alternatives.

Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to air quality are anticipated under the proposal or alternatives.

2.4 Greenhouse Gases

The following section provides a qualitative discussion of the potential impacts of the alternatives on global climate change in terms of greenhouse gas emissions (GHG) estimates. The worksheets calculating GHG estimates for each of the alternatives is provided in Appendix C to this EIS.

Background

The global climate is continuously changing, as evidenced by repeated episodes of warming and cooling documented in the geologic record. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. Scientists have observed, however, an unprecedented increase in the rate of warming in the past 150 years. This recent warming has coincided with the Industrial Revolution, which resulted in widespread deforestation to accommodate development and agriculture and an increase in the use of fossil fuels, which has released substantial amounts of GHG into the atmosphere.

GHG, such as carbon dioxide, methane, and nitrous oxide are emitted by both natural processes and human activities and trap heat in the atmosphere. The accumulation of GHG in the atmosphere affects the earth's temperature. While research has shown that the Earth's climate has natural warming and cooling cycles, evidence indicates that human activity has elevated the concentration of GHG in the atmosphere beyond the level of naturally- occurring concentrations resulting in more heat being held within the atmosphere. The Intergovernmental Panel on Climate Change (IPCC), an international group of scientists from 130 governments, has concluded that it is "very likely" - a probability listed at more than 90 percent - that human activities and fossil fuels explain most of the warming over the past 50 years."[3]

Regulatory Context

United States Environmental Protection Agency

The United States Environmental Protection Agency (EPA) is charged with enforcing the Clean Air Act and has established air quality standards for common pollutants. In addition, on September 15, 2009, the EPA issued a joint proposal with the Department of Transportation's Highway Traffic Safety Administration to set emissions standards for passenger cars, light-duty trucks, and medium-duty passenger vehicles.

On May 13, 2010, the EPA released final regulations establishing GHG emissions thresholds for new and existing industrial facilities that define when permitting under Clean Air Act (CAA) programs is necessary. Covered facilities include the nation's largest GHG emitters such as power plants, refineries and cement production. Individual development projects, such as the alternatives discussed in this EIS, are not subject to these regulations.

State of Washington

In February of 2007, Executive Order No. 07-02 was signed by the Governor establishing goals for Washington regarding reductions in climate pollution, increases in jobs, and reductions in expenditures on imported fuel.[4] This Executive Order established Washington's goals for reducing GHG emissions as the following: to reach 1990 levels by 2020, 25 percent below 1990 levels by 2035 and 50 percent below 1990 levels by 2050. This order was intended to address climate change, grow the clean energy economy and move Washington toward energy independence.

In 2007, the Washington legislature passed SB 6001, which among other things, adopted the Executive Order No. 07-02 goals into statute.

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[3] IPCC, Fourth Assessment Report, February 2, 2007.

[4] http://www.governor.wa.gov/execorders/eo_07-02.pdf

In 2008, the Washington Legislature built on SB 6001 by passing E2SHB 2815, the Greenhouse Gas Emissions Bill. While SB 6001 set targets to reduce emissions, the E2SHB 2815 made those state-wide requirements (see RCW 70.235.020) and directed the state to submit a comprehensive GHG reduction plan to the Legislature by December 1, 2008. As part of the plan, the Department of Ecology was mandated to develop a system for reporting and monitoring GHG emissions within the state and a design for a regional multi-sector, market-based system to reduce statewide GHG emissions consistent with the requirements in RCW 70.235.020.

In 2008,[5] the Department of Ecology issued a memorandum stating that climate change and GHG emissions should be included in all State Environmental Policy Act (SEPA) analyses and committed to providing further clarification and analysis tools. No regulatory guidance regarding thresholds for significance has been issued to date, however.

In 2009, Executive Order 09-05 was signed ordering Washington State agencies to reduce climate-changing GHG emissions, to increase transportation and fuel-conservation options for Washington residents, and protect the State's water supplies and coastal areas. The Executive Order directs state agencies to develop a regional emissions reduction program; develop emission reduction strategies and industry emissions benchmarks to make sure 2020 reduction targets are met; work on low-carbon fuel standards or alternative requirements to reduce carbon emissions from the transportation sector; address rising sea levels and the risks to water supplies; and, increase transit options, such as buses, light rail, and ride-share programs, and give Washington residents more choices for reducing the effect of transportation emissions.

On December 1, 2010, the Department of Ecology adopted Chapter 173-441 WAC – Reporting of Emission of Greenhouse Gases. This rule aligns the State's GHG reporting requirements with EPA regulations, and requires facilities and transportation fuel suppliers that emit 10,000 metric tons carbon dioxide equivalents (MTCO2e) or more per year, to report their GHG emissions to Ecology. Requirements for reporting are to begin on January 1, 2012.

On June 3, 2011, the Department of Ecology issued the document *Guidance for Ecology Including Greenhouse Gas Emissions in SEPA Reviews* that is intended to assist Ecology staff in determining which projects should be evaluated for greenhouse gas emissions and how to evaluate

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5 Manning, Jay. RE: Climate Change - SEPA Environmental Review of Proposals, April 30, 2008.

those emissions when Ecology is the lead agency. The guidance also discusses how to determine if impacts are "significant" and appropriate mitigation measures.

City of Ferndale

Through its EAGLE Program, the City of Ferndale provides a menu of measures that individual developments may incorporate to help reduce greenhouse gas emissions. These include measures related to energy efficiency, advanced technologies, and low impact development. The City has also adopted measures to allow electric vehicle charging stations throughout the City, and has incorporated a series of commute trip and travel demand reduction techniques into its Transportation Element such as carpooling, flex schedules, the use of multi-modal transportation, and other measures.

The City has not adopted specific policies regarding the evaluation of greenhouse gas emissions as part of the SEPA process.

Environmental Impacts

The following analysis estimates the GHG emissions associated with the three *City of Ferndale Main Street Master Plan* alternatives. The emissions estimates are not adjusted to account for any mitigation factors incorporated into the site design, such as LEED Certification or the use of sustainable materials.

The scale of global climate change is so large that a project's impacts can only be considered on a "cumulative" scale. It is not anticipated that a single project would have an individually discernable impact on global climate change. It is more appropriate to conclude that *City of Ferndale Main Street Master Plan* GHG emissions would combine with emissions across the state, country and planet to cumulatively contribute to global climate change.

Methodology

As stated previously, the City of Ferndale (the SEPA lead agency) has not adopted specific greenhouse gas emissions reporting or evaluation requirements. For purposes of this EIS analysis, the optional guidance provided by the Department of Ecology's June 3, 2011, *Guidance for Ecology Including Greenhouse Gas Emissions in SEPA Reviews* and *SEPA GHG Calculation Tool* were used to guide this analysis. Worksheets pertaining to each site alternative are contained in Appendix C of this EIS, and GHG emission summaries are detailed in Table 2.4-1, below.

Table 2-10
Greenhouse Gas Emissions by Alternative
(measured in $MtCO_2e$*)

	Alternative 1	Alternative 2	Alternative 3
Stationary	907.7	3,078.4	4,183.6
Electricity Use	2,232.6	9,007.5	12,412.7
Transportation	12,391	58,328	81,072
Non-Combustion Emissions	0	0	0
TOTAL	**15,531.8 $MtCO_2e$**	**70,413.7 $MtCO_2e$**	**97,668.4 $MtCO_2e$**

Source: EA Blumen, 2011
**$MtCO_2e$ stands for Metric Tonne (ton) Carbon Dioxide Equivalent. This is the standard measurement of the amount of CO2 emissions that are reduced or secluded from the environment.*

As demonstrated above, Alternative 1 would produce the least amount of greenhouse gas emissions and Alternative 3 would produce the most emissions of greenhouse gases.

Mitigation Measures

As identified in Table 2.4-1, the GHG emissions associated with Alternatives 2 and 3 would exceed 25,000 MTCO2e per year, which is above the level of potential significance identified in the current Department of Ecology Guidance. A variety of mitigation measures are available to reduce energy use, increase sustainable building design and reduce GHG emissions. It is likely that numerous features would be incorporated into the design of individual development projects to, among other things, conserve energy and reduce GHG emissions. Specific mitigation measures for all alternatives would include the following:

- The use of roundabouts versus signalized intersections within the study area to reduce vehicle idling due to intersection delays.[6]
- Implementation of the City's EAGLE program; an indicator-based program that assesses the manner in which individual development projects will achieve outcomes associated with EAGLE categories, defined as **E**nergy efficient design, **A**dvanced technologies, **G**reater good, **L**ow impact and **E**conomic development.

[6] While there are limited studies that quantify exact reductions in emissions modern roundabouts hold over conventional intersections. However, compiled studies have found that when conventional intersections are converted to roundabouts, there is an average reduction of 30 percent in carbon monoxide and nitrogen oxides.

- The adoption of comprehensive low impact development (LID) standards for storm water treatment for all public and private areas on the site (See DEIS Section 3.5.3)

It is important to remember that the GHG emissions estimates identified for the alternatives are based on programmatic assumptions; no individual development project would be expected to exceed the Department of Ecology's Guidance, and the threshold for potential significance.

Significant Unavoidable Adverse Impacts

With implementation of the above identified mitigation measures, no significant unavoidable GHG-related impacts would be anticipated.

Chapter 3—Comment Letters and Responses

3. COMMENT LETTERS AND RESPONSES

The Draft EIS (Draft EIS) was issued on July 14, 2011, with public comments due August 30, 2011. On August 3rd, 2011, a public meeting was held to give the public an opportunity to informally meet with the project team, hear about the proposal and key environmental issues and provide written comments on the Draft EIS.

During the Draft EIS public comment period, 20 written comment letters and e-mail correspondence were received from 3 public agencies and 17 organizations, businesses, law firms, or individuals.

This chapter of the Final EIS (Final EIS) contains comments received on the July 2011 Draft EIS (Draft EIS) and responses to the comments, including the verbal comments at the public meeting. Each comment letter, including the minutes from the public meeting, is included in this section of the Final EIS. Comment letters/numbers are noted in the margins of the letters.

Letter Number	Commenter Name
1	Washington State Department of Ecology
2	Washington State Department of Transportation
3	Whatcom County Surface Water Division
4	Borden Ladner Gervais
5	Ronald Templeton, PS
6	Gibson Traffic Consultants
7	SAS Consulting
8	Belcher|Swanson Law Firm, PLLC
9	Jake Traffic Engineering, Inc.
10	Belcher|Swanson Law Firm, PLLC
11	Haggen, Inc.
12	Sauder Mouldings, Inc.
13	Old Standard Life Insurance Company
14	Bricklin & Newman, LLP
15	RE Sources for Sustainable Communities
16	Garin Wallace
17	Cathy Watson
18	Wayne Larson
19	Wendi Larson
20	Dean Mostrom

Letter 1

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Bellingham Field Office • 1440 10th Street, Suite 102 • Bellingham, Washington 98225
(360) 715-5200 • FAX (360) 715-5225

August 30, 2011

Jori Burnett
City of Ferndale
PO Box 936
Ferndale, WA 98248

RE: **Ferndale Main Street Master Plan Planned Action DEIS; I-5 & Main St.**
DOE file# 201103471

Dear Mr. Burnett:

Thank you for the opportunity to provide comments on the above referenced Determination. Based on review of the State Environmental Policy Act (SEPA) checklist associated with this Determination we offer the following comments:

Overview of comments

There are far too many outstanding "unknowns" and proposed studies "to be completed" in 1
this Draft of the Planned Action Ordinance and Draft Environmental Impact Statement (DEIS) for a complete review informed by actual analysis of the proposed Alternatives. Once the background studies (Stormwater, Water use, wastewater, and transportation) are completed, then specific mitigation projects proposed will contain detailed information to ensure that significant adverse impacts for each of the Alternatives will be mitigated.
Ecology concludes at this time, August 30, 2011, that based on the lack of actual analyses and feasibility studies completed prior to writing this Planned Action Ordinance and Draft Environmental Impact Statement, another Draft Environmental Impact Statement must be written with *completed environmental and cost analyses* included. Another public comment period is required. Also, due to the amount of unknown costs associated with the different alternatives, and proposed mitigation for each, it would be difficult for any potential developer to qualify a site specific project in this proposed Planned Action area without having to go through a SEPA review on a project level.

<u>Planned Action Ordinance</u>

For a Planned Action ordinance to be adopted it must meet 3 criteria. After reviewing the 2
Ordinance and DEIS, this Planned Action Ordinance and DEIS as submitted fail to adequately meet the three main points of the definition.

WAC 197-11-168 requires the ordinance designating the Planned Action to include the following: 2 cont
• a description of the type of project action being designated as a Planned Action;
• a finding that the probable significant environmental impacts of the Planned Action have been identified and adequately addressed in an EIS; and
• the identification of mitigation measures that must be applied to a project for it to qualify as a Planned Action.

Ferndale's current Comprehensive plan only supports the No Action alternative as proposed in the DEIS. The cover letter is confusing when it states, that only the "No Action alternative is consistent with the current Comp Plan". However, it goes on to state that there are, "potential amendments to the Comp Plan", for Moderate and High growth alternatives. The Comprehensive Plan needs to address Alternative 2/ Alternative 3 growth projections, and appropriate development regulations for these higher levels *before* they can be approved in a Planned Action Ordinance. This information on potential amendments to the Comp Plan to allow for increased growth potential is missing from the DEIS. The City of Ferndale must amend the Comprehensive Plan to include Alternative 2 and 3 growth projections, prior to adopting the Planned Action Ordinance. 3

The Planned Action Ordinance includes 443 acres with a development horizon of 23 years. Given the lack of specific projects, this seems like too large an area to designate as a Planned Action area at this time. Ecology recommends the Planned Action Ordinance include where in the EIS the environmental impacts have been addressed, and needs to reference mitigation measures which will be required for a project to qualify as a planned action project. 4

The level of service that has been accepted in the subarea plan for traffic impacts needs to be stated in the ordinance. 5

The City of Ferndale must set a time limit in the Planned Action Ordinance during which the planned action designation is valid. This should include an expiration date for site specific permits. 6

The City of Ferndale wants to encourage economic development in this" SEPA free" zone, but without enough details included in the current DEIS, this Planned Action Ordinance does not give developers or the public any certainty that adequate mitigation has been considered and proposed for each Alternative. This will lead to the City needing "additional analysis" and a SEPA determination on a project by project basis, which the Planned Action hopes to avoid. 7

The existing development regulations are insufficient for a project by project level review. 8
The Alternatives proposed may pass the Comprehensive Plan analysis, but are not more detailed to account for consideration at the project or site level. This requires additional mitigation at the permit level for Construction Stormwater General permits.
For many planned actions specific developments are envisioned that drive the Planned Action Ordinance and process. In this Planned Action only certain *levels* of development are envisioned, not actual projects.

- The Planned Action ordinance is not site specific in regard to mitigation for each alternative proposed. This is not sufficient information to provide adequate mitigation on a site by site basis. 9
- The City of Ferndale must address the following concerns on the Planned Action . 10
  – Lack of tracking by local and state agencies and citizens once the initial planned action ordinance is adopted.
  – Lack of written guidance in the Planned Action Ordinance section 3D 5.Elements of the Environment and 3D.6 Changed Conditions for determining for when a site specific development action that does not follow the planned action ordinance triggers additional analysis and a SEPA review and when all elements have been addressed by the planned action. 11

  – When economic factors lead to different levels of development then proposed in any of the alternatives the City needs written guidance on how the determination will be made to do a site specific SEPA review. 12

<u>Shoreline Management</u>

Under Section 3.2 on page 10, Land Use, the city's Shoreline Master Program is described as providing "policy direction" when in reality it also provides specific regulations for different types of uses as well as development standards that must be met. The existing text may create a mis-perception for readers that are not familiar with the Shoreline Management Act. In addition, the shoreline environment designation map, Figure 3.2-3 needs to be corrected to include the portion of the floodplain (shoreline floodway plus 200 ft) adopted in the SMP as Conservancy shoreline jurisdiction running from approximately the Main Street bridge (except Urban to corner of Samuel's Furniture store) around to the I-5 bridge abutment. The wetlands located in the NW, NE and SE quadrants and designated with environment designations in the SMP maps should also be shown. The differences in the zoning and shoreline designation maps need to be addressed in the EIS to reconcile any conflicts in allowed uses and other standards. 13

It is not clear how the proposed roundabout at the west end of Labounty Road would connect to proposed development on the riverside of Main Street. Due to the limited space available between the shoreline Conservancy designation, running roughly parallel to Main Street, and the existing development there does not appear to be a need for a roundabout spur pointing to the river. 14

<u>Chapter 1 – Summary</u>

Pg. 1-10 Mitigation measures proposed - Development Alternatives 2 and 3 estimate that the impervious areas within this site will be increased by 70 - 80%." 15
The City of Ferndale is currently under a NPDES Phase II Municipal Stormwater permit. The development standards and requirements in this permit are missing from the DEIS. The City needs to specify that the City stormwater code will be modified prior to adopting the Planned Action Ordinance for requiring LID measures to meet water quality treatment and flow control requirements for each of the Alternatives proposed. Information is lacking with regard to how the City plans to meet all of their permit requirements under all of the proposed alternatives. Further, the City needs to require vertical or below ground parking structures in specific

locations on the site to reduce the amount of impervious surfaces utilized for parking (1100 – 5100 parking spaces estimated) to the greatest extent possible. 15 cont

Pg 1-11 Land use mitigation

The additional development requirements in use for parcels over 3 acres are missing from the planned unit development ordinance. 16

There is insufficient information comparing and contrasting project development review under the City's "EAGLE program" to the NPDES Phase II site plan review requirements and the stormwater code 13.34 and Ordinance 1560 currently in place. 17

Pg 1-18 Transportation impacts – "Fiscal Analysis". The DEIS does not adequately address costs from projected new development on required new transportation facilities, including regional facilities. This fiscal analysis must be included. The DEIS does not adequately address appropriate mitigation fees for the percentage of costs that will be paid by the project proponents, DOT, and city residents to construct the transportation projects required for each of the proposed alternatives. The DEIS must address additional information on stormwater runoff from transportation improvements and mitigation fees for transportation improvements for each Alternative proposed. 18

<u>Chapter 2 – Description of development alternatives</u>

2-5 - Floodway land use designation - Maps provided are confusing as the Army Corps of Engineers "floodway" area overlap with maps with "100 year floodplain". Maps must clearly delineate the ACOE floodway designation, 100 year flood plain designation, and areas of the shoreline floodway plus 200 feet adopted in the SMP. Currently the DEIS is confusing as these terms are not clearly defined in the text either. The DEIS does not provide sufficient description of the shoreline/ floodplain habitat areas to be protected from development. Mitigation measures must be described in the EIS for parcels that fall partially in this shoreline floodway. 19

Chpt 2-16- Floodway

- Planned Action does not consider site specific environmental review including ACOE or FEMA, and therefore adequate site mitigation measures are not addressed in EIS. There is insufficient information to determine whether site specific projects will be required to undergo SEPA at the site specific project level of review. 20

<u>Wetlands</u>

- Low Impact Development (LID) measures have been identified in the EIS as an option e.g., Page 1-10) to reduce stormwater impacts. LID is also a valuable tool to reduce impacts to wetlands and other natural resources. The images portrayed of various retail scenarios (Pages 2-20 through 20-25) show single story shops and stores with large parking areas. Converting these retail developments into two or more stories with underground parking or a few multi-story parking garages would significantly reduce the footprint of the developments, thereby reducing wetland impacts, stormwater impacts, and allowing more open space and mitigation options. This design alternative would still meet the Retail Design Guidelines and Standards described on Page 2-8. The 21

Redmond Town Center in Redmond, Washington is an example of where this technique was used very successfully. 21 cont

- Although there seems to be an idea of the amount of possible wetland impacts from the three alternatives within the boundaries of the planned area, there will surely be additional impacts from roadway widenings, new roadways, and other infrastructure needs outside of the planned area for which mitigation would be necessary. The DEIS must address additional mitigation options within the planned area to accommodate those additional impacts on wetlands. 22

- We understand the concepts for locating an active recreation area in the floodway of the Nooksack River (Northwest Quadrant). However, we also believe that this area, formerly a developed golf course, is an optimal area for a City-managed In-Lieu Fee wetland and buffer mitigation area. If developed and administered properly, this area could provide resource mitigation for most developments within and even outside the City limits. Ecology would be pleased to discuss this option further with City staff. 23

- Section 3.1.3 lists a number of mitigation options for wetland impacts, including the Fisher-Ferndale Road mitigation site. This site could be a viable option if an In-Lieu Fee or mitigation banking agreement is sought. At this time, there is no organized plan that has been accepted by the federal, state and local agencies for this site. 24

- Recognizing that much of the planning area has been developed in the past, but also noting some areas that remain in a more natural, undeveloped state, we encourage the City to maintain habitat corridors wherever feasible. 25

- Page 3.1-8 provides a fairly long discussion of the Pioneer Plaza project and the implication that it will proceed as previously proposed. Based on the amount of time that has elapsed since the proposal was reviewed, Ecology would require a new wetland delineation and function assessment/rating. The proposed mitigation would also need to be re-evaluated to ensure that it is consistent with best available science and newer guidance that has evolved in recent years. 26

- Although some future development proposals may be exempt from future SEPA review through the local process, both federal and state permitting processes would still be necessary, including projects involving impacts to isolated and prior converted cropland wetlands. 27

Utilities 3.5

Without more background information on the current stormwater system capacity and condition, an updated Stormwater Comprehensive Plan, an engineering and cost analysis comparing on-site stormwater facilities and regional facilities, the DEIS cannot reasonably conclude that stormwater and associated site runoff from 70-80% increased impervious surfaces proposed in Alternative 3, will be mitigated and not create a probable significant adverse impact. The DEIS must include adequate baseline information on the current stormwater 28 system and upgrades necessary to mitigate stormwater runoff from development levels proposed in Alternative 2 or Alternative 3.

- The DEIS does not adequately mitigate probable significant adverse impacts from stormwater pollution. 29

- The City cannot adopt a "Planned Action" which includes no adverse impacts from stormwater, when there is, "insufficient information on capacity of the existing stormwater system", and the update of the Stormwater Comprehensive plan will not be completed until 2012. 30

- The DEIS must be re-written with a completed stormwater comprehensive plan for the condition and capacity of the existing infrastructure, so an accurate cost estimate and detailed description of stormwater mitigation measures for each alternative proposed can be provided to potential project proponents and citizens. 31

- The DEIS must clearly delineate the size and map the location of direct discharge basins where no stormwater system or stormwater outfalls will be located. 32

- The DEIS must clearly identify downstream conveyance improvements should no flow control / detention requirement be required for specific areas included in the planned action. 33

- The DEIS makes general statements that LID "should" be used for meeting water quality treatment standards for direct stormwater discharges for each Alternative proposed. Instead, the DEIS must require LID as the standard for the stormwater mitigation section, so potential developers and citizens know the level of mitigation expected for direct stormwater discharges under each proposed alternative in the planned action proposal. 34

- Since direct discharges to the Nooksack have high potential to carry fecal coliform bacteria, there needs to be site specific mitigation to ensure Ferndale meets its wasteload allocation under the Lower Nooksack River Watershed TMDL. 35

- For basins that discharge to Tenmile and Deer Creeks or to the Tenant Lake system both detention/flow-control and stormwater treatment will need to be provided. The areas proposed for regional detention facilities should be clearly identified on a map, as the decision to provide *regional* detention rather than *on-site* detention will determine site layout and future development capacity. Also, cost estimates for regional detention facilities and ongoing maintenance cost to site developers or city residents must be clearly stated with a funding source for these costs provided. Given that there is no engineering study completed at this time, the City does not provide certainty for project developers and citizens on the costs and mitigation required with installing regional treatment, versus on-site flow control facilities and the costs associated with on-going maintenance for either option. 36

- "A wetlands scientist would need to determine the scope of a hydroperiod study. Based on prior review of the probable wetlands in the study area, many of them may not be sensitive to inflow hydroperiod changes but sensitivity should be confirmed at time of site-specific project proposals". DEIS acknowledges that further project review by state agencies will be required following the SEPA checklist as the proposed "planned action" ordinance and DEIS do not adequately address wetlands mitigation on the site. 37

- Low Impact Development stormwater practices have been shown to match or provide higher levels of treatment than more traditional methods such as wet ponds, wet vaults, bioswales, manufactured filters and the like. LID BMPs are consistent with the City's goals as stated in section 13.34.060 of the Stormwater Ordinance. Planned Action should require LID for stormwater treatment. However, designs must provide adequate treatment despite the poor underlying soils and potential for high groundwater on the site. 38

Water use / potable water supply – Mitigation measures

Based on the City's own analysis performed by Reichardt & Ebe in 2011, the City will require additional water storage by 2015. "Planning for this additional storage should begin immediately and due to additional water demand, new storage will be required by 2015, and a new water treatment plant by 2034 regardless of development Alternative." 39

- In order to provide adequate mitigation for increased water use under Alternatives 2 and 3, the DEIS needs to include a cost estimate plan for purchasing new storage capacity and expanding the Water Treatment plant and distribution system. The DEIS needs to include cost estimates for developing new groundwater wells and the different level of capacity needed for each Alternative proposed. After providing a cost estimate for increasing the potable water supply, a description of how costs will be paid, whether by the site developer, or by City residents needs to be provided in the DEIS.

"Because the current Water Plan does not cover a future population scenario consistent with the planning horizon for this Planned Action EIS, all alternatives could have potential impacts to the City's existing water system infrastructure above and beyond what was addressed in the Water Plan." 40

- A probable significant adverse impact not addressed in the DEIS , namely this increase in water system demands from Alternative 2 and 3 exists, and must be quantified to assure that adequate costs and mitigation has been addressed for all proposed alternatives. In addition, the DEIS must include an updated hydraulic analysis of the existing water mains in the planned action area.

Wastewater

Given that improvements to the City's wastewater treatment and conveyance system will be *required*, the DEIS must quantify the increase in the discharge from the Wastewater treatment plant for each proposed Alternative, and address whether this will trigger a new NPDES Wastewater discharge permit due to additional pollution loading to the Nooksack River. The DEIS does not adequately address mitigation for this additional discharge to the Nooksack River which is under a TMDL for fecal coliform bacteria. The Comprehensive Sewer Plan must 41 be updated and include specific load estimates for Alternatives 2 and 3 in the Planned Action. In addition, the City's Sewer Plan should be updated to include the recommended alternative, so the required improvements to the City's wastewater conveyance system can be considered by potential developers and citizens. 41 cont

Construction Stormwater

Stormwater runoff can have a significant impact on water quality, introducing sediment and other pollutants into waters of the state. Such pollutants can impair or eliminate aquatic habitat and prevent such waters from having multiple beneficial uses (e.g., fishing, swimming, drinking, etc). 42

From the SEPA register, it appears that this project may be subject to one of Ecology's National Pollutant Discharge Elimination System (NPDES) General Permits for Stormwater Discharges.

NPDES Construction Stormwater General Permit

Permit coverage is necessary if the project meets the following criteria:

- Any land disturbing activities such as clearing, grading, excavating, and/or demolition that:
    1. Disturb one or more acres of land;
    2. Are "part of a larger common plat of development or sale," that will ultimately disturb one or more acres of land; AND
    3. Discharge stormwater from the site into state surface waters or into storm drainage systems which discharge to state surface waters. (Surface waters may include wetlands, ditches, rivers, unnamed creeks, lakes, estuaries, marine waters).

Information regarding the NPDES Construction Stormwater General Permit can be found at:

http://www.ecy.wa.gov/programs/wq/stormwater/construction/

NPDES Industrial Stormwater General Permit

Permit Coverage is necessary if the industrial activity at the proposed facility meets the following criteria:

- Industrial activities that:
    1. Are listed in 40 CFR Subpart 122.26(b) (14)
    2. Discharge stormwater from the site into state surface waters or into storm drainage systems which discharge to state surface waters. (Surface waters may include wetlands, ditches, rivers, unnamed creeks, lakes, estuaries, marine waters).

Information regarding the NPDES Industrial Stormwater General Permit can be found at:

http://www.ecy.wa.gov/programs/wq/stormwater/industrial/index.html

If you have questions about determining the need for NPDES coverage or you need information regarding applying for and implementing an NPDES please contact us.

Thank you for considering these comments from the Department of Ecology. If you have questions please call the appropriate Ecology employee listed below.

Sincerely,

Susan Meyer, Wetlands Specialist, 425-649-7000

Barry Wenger, Environmental Planner, Shorelands Specialist, 360-715-5220

Christina Maginnis, Municipal Stormwater Specialist, 360-715-5212

Kurt Baumgarten, Water Quality Specialist, 360-715-5210

Mark A. “Mak” Kaufman, Water Quality Specialist, 360-715-5221

cc: BFO SEPA File

Response to Draft EIS Letter 1: Washington State Department of Ecology

1. **Level of analysis.** The analysis in the Draft EIS is consistent with the scope of review established for this project and appropriate for a sub-area plan. The state SEPA rules specifically identify sub-area plans as appropriate for planned actions (WAC 197-11-164(b)(1)). It is acknowledged that the analysis provides an area-wide review of the elements of the environment. This level of analysis is appropriate for review of a sub-area plan. No specific projects are proposed at this time, and site-specific analysis is neither possible nor required.

   Because the specific nature and timing of development at any particular site is not known, site specific mitigation requirements would be speculative and inappropriate in a subarea-wide analysis. Instead, the mitigation measures establish the applicable regulations and requirements, proposed plan features and other measures needed to ensure that impacts are adequately mitigated. Such measures would become conditions of approval of any subsequent projects.

   It should also be noted that this Final EIS contains supplemental analysis of some elements of the environment addressed in the comment (see Chapter 2).

2. **Planned Action Ordinance.** The draft ordinance that was included as an appendix to the Draft EIS was intended to provide early information on the overall structure of the planned action process. Until completion of the environmental review process, it is not possible for the planned action ordinance to be prepared in full. The complete planned action ordinance that will be prepared for City consideration, public comment, and action will include all elements identified in the comment and described below.

   - **Description of type of project action.** The framework for this description is established in Section 3.D of the draft ordinance shown in Appendix A of the Draft EIS. It is anticipated that the description contained in the ordinance will be consistent with the Preferred Alternative described in Chapter 1 of this Final EIS.

   - **Finding that significant impacts have been adequately addressed.** Prior to adopting the planned action ordinance, the City will make a finding that probable significant adverse impacts have been identified and adequately mitigated in the

EIS. Please see draft text in Section 2.D of the draft ordinance shown in Appendix A of the Draft EIS.

- **Mitigation measures.** The complete planned action ordinance will include a mitigation document that incorporates all mitigation measures identified in the EIS and that must be applied in order for a project to quality as a planned action. In the draft planned action ordinance, this mitigation document is referenced as Appendix B to the planned action ordinance.

The Draft and Final EIS provide all necessary background information to support the planned action ordinance. The EIS includes a description of the proposal and alternatives (including the preferred alternative), provides mitigating measures for all identified impacts and establishes that probable significant impacts have been adequately mitigated.

3. **Comprehensive Plan.** The action alternatives considered in the Draft EIS and the preferred alternative described in this Final EIS, do not propose or require any amendments to existing Comprehensive Plan land use or implementing zoning designations. However, the Preferred Action (and the action alternatives described in the Draft EIS) would require amendments to the Transportation element of the Comprehensive Plan. Each is briefly described below.

   Land Use Element. The Preferred Alternative is based on existing Comprehensive Plan land use and zoning designations and potential growth would be permitted under current zoning. Potential population capacity is within the range of the City's population projection allocated by Whatcom County and the assumptions for the Comprehensive Plan Transportation element. The Preferred Alternative would result in increased employment growth over existing Comprehensive Plan assumptions and Whatcom County assumptions for the City of Ferndale. The GMA does not explicitly require employment forecasts and the City's Comprehensive Plan does not include a specific employment projection. The EIS considers the potential impacts of the increased employment growth in the transportation, public services and utilities analyses.

   Transportation Element. The potential need for amendments to the Transportation element associated with the proposal was anticipated and is documented in Transportation element Policy 7.I, which calls for review of transportation standards and regulations as part of the planned action review process. As established through this policy, Draft EIS Section 3.3 Transportation and Final EIS Section 2.1 provide an analysis of transportation standards and regulations for consideration by the City. Final EIS Chapter 1 provides a complete list of all specific Transportation element amendments proposed as part of the Preferred Alternative.

All proposed amendments are considered in the EIS, have been reviewed at public meetings and a hearing in front of the Ferndale Planning Commission and will be considered and acted upon by the Ferndale City Council prior to action on the planned action ordinance.

4. **Size of planned action area.** As the comment notes, the proposed planned action area is approximately 450 acres. Except to establish that the planned action area shall be less than the jurisdictional boundaries, SEPA does not limit the size of a planned action area (WAC 197-11-164). Planned action designations in the Puget Sound region range widely, from as small as 20 acres or less to over 4,000 acres. The size of the proposed Main Street planned action area is well within this range.

   The analysis in the Draft EIS is consistent with the scope of review established for this project and appropriate for a sub-area plan. The state SEPA rules specifically identify sub-area plans as appropriate for planned actions (WAC 197-11-164(b)(1)). It is acknowledged that the analysis provides an area-wide review of the elements of the environment. This level of analysis is appropriate for review of a sub-area plan. Because the specific nature and timing of development at any particular site is not known, site specific mitigation requirements would be speculative and inappropriate in a subarea-wide analysis. Instead, the mitigation measures establish the applicable regulations and requirements, proposed plan features and other measures needed to ensure that impacts are adequately mitigated. Such measures would become conditions of approval of any subsequent projects.

5. **Transportation Level of Service.** The comment is noted. The transportation level of service and all related mitigation will be addressed in the mitigation document that will be referenced and included as Attachment B to the planned action ordinance. Please see draft planned action ordinance Section 3.D(4) in Appendix A of the Draft EIS.

6. **Expiration date.** As established in Chapter 2 of the Draft EIS, the planned action horizon is assumed to be 2034. A time horizon may be included in the final planned action ordinance. Expiration dates for

site-specific permits would be consistent with applicable local, state and federal requirements.

7. **Additional analysis.** The comment is noted. Please note that the proposal is not to create a “SEPA free” zone, but rather to provide early and comprehensive SEPA review of potential future development in the study area. Please see response to Comment #4 in this letter, above.

8. **Regulatory controls.** SEPA review for the master plan does not and is not intended to satisfy local, state and federal regulatory requirements for specific projects. For each element of the environment, the mitigating measures discussion includes a description of applicable regulations and requirements that will help mitigate impacts for individual projects.

   Although the comment states that existing development regulations are insufficient for project-level review, the comment did not identify specific insufficient regulations. The analysis of plans, policies and regulations in Section 3.2 of the Draft EIS did not identify any regulatory gaps.

   As noted in the comment, planned actions range from relatively specific development proposals to broader subarea plans that identify the overall mix of uses and levels of development that could occur in the planned action area. The state SEPA rules (WAC 197-11-164) specifically allow this range in type of planned action.

9. **Site specific mitigation.** The analysis in the Draft EIS is consistent with the scope of review established for this project and appropriate for a sub-area plan. The state SEPA rules specifically identify sub-area plans as appropriate for planned actions (WAC 197-11-164(b)(1)). Because the specific nature and timing of development at any particular site is not known, site specific mitigation requirements would be speculative and inappropriate in a subarea-wide analysis. Instead, the mitigation measures establish the applicable regulations and requirements, proposed plan features and other measures needed to ensure that impacts are adequately mitigated. Such measures would become conditions of approval of any subsequent projects. The City's regulatory framework, including existing regulations and proposed amendments that are included as part of the proposed action, are sufficient to address all site-specific mitigation.

10. **Planned action project tracking.** As shown in Figure 2-5 of the Draft EIS, the City anticipates tracking and monitoring of planned action projects. It is anticipated that the administrative tracking system will be developed following adoption of the planned action ordinance. Although not a required element of the planned action ordinance, monitoring and tracking is described in Section 4 of the draft planned action ordinance, Appendix A of the Draft EIS.

11. **Planned Action Ordinance Sections 3D.5 and 3D.6.** The comment is noted. Although not a required element of the planned action ordinance, the City will consider additional guidance for these sections prior to future action. It should be noted that there will be additional opportunity for public and agency comment on the planned action ordinance prior to any City action.

12. **Site-specific review.** As shown in Figure 2-5 of the Draft EIS and described in the draft planned action ordinance, site-specific proposals that are not consistent with the alternatives analyzed in the EIS and the land use, development and transportation thresholds established in the planned action ordinance would not qualify as a planned action and would be required to follow the SEPA review process established by the City's SEPA regulations.

13. **Shoreline Master Program.** It is acknowledged that the Shoreline Master Program includes development standards and regulations. The corrected shoreline jurisdiction map is shown in revised Figure 3.2-3.

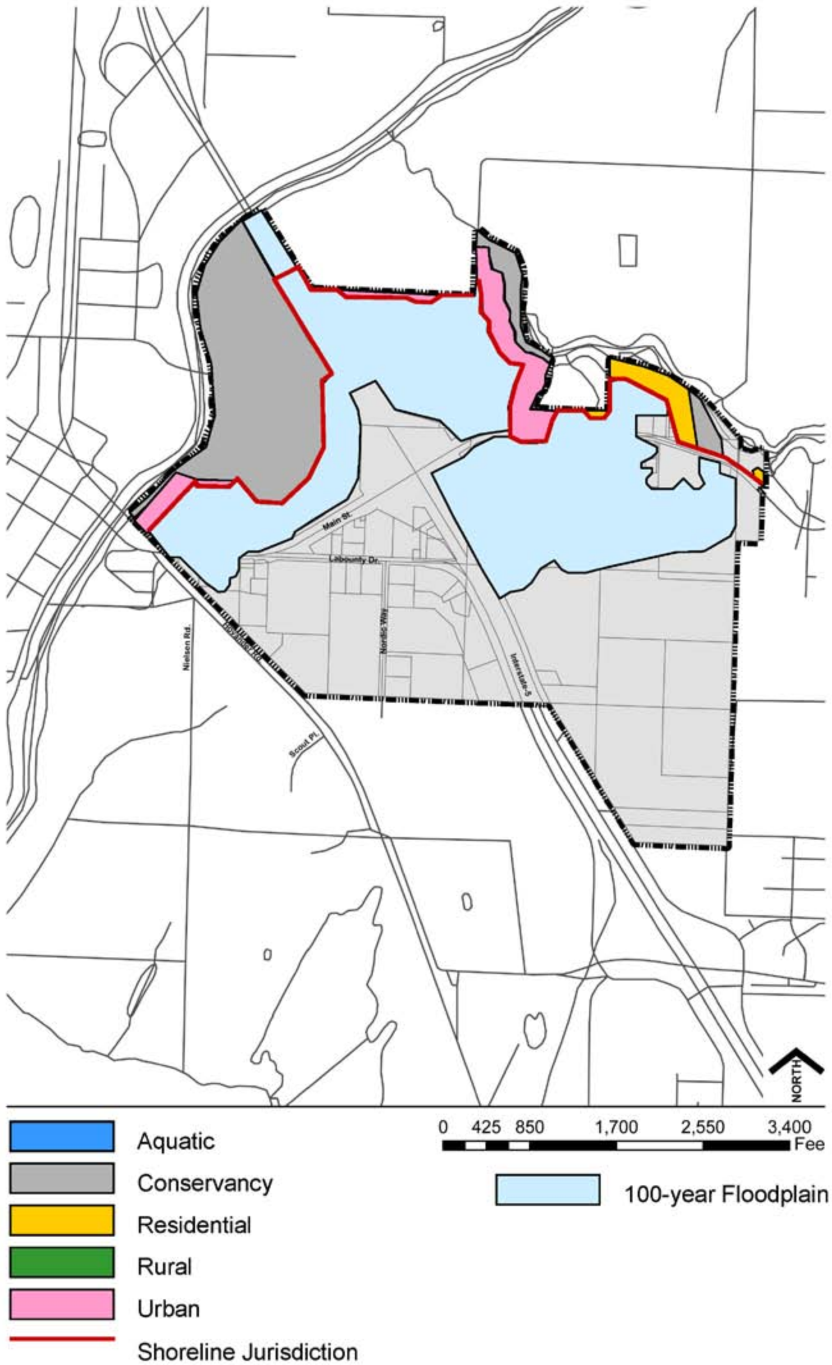
14. **Proposed roundabout at LaBounty Road.** The comment is noted. Roundabouts shown in the EIS are concept-level only. Illustrations do not reflect specific design considerations related to rights-of-way, regulatory requirements, slopes/grading, lane transitions, or other design parameters. Specific crosswalks locations, signing, and other features to serve pedestrians and bicyclists are not shown. Future analysis and roadway design work will address specific improvement locations, dimensions, and geometrics.

    A roundabout at this location could serve redevelopment of the golf course area was specifically identified as a topic of special interest by the Shoreline Master Program and is included as one of its goals.

15. **Stormwater Regulations.** Specific stormwater mitigating measures are found in Draft EIS pp 1-28 through 1-31 and in Draft EIS Section 3.5. These sections cite the City of Ferndale's development regulations relative to stormwater and include adoption of the

Western Washington Stormwater Manual. Mitigation identified in the Draft EIS supplements and is additive to these requirements and the NPDES Phase II Municipal Stormwater permit. The comments regarding LID and vertical and below ground parking structures are noted.

Figure 3.2-3
Study Area Shoreline Designations



Source: EA|Blumen, 2011

16. **Planned Unit Development Ordinance.** The comment references a mitigating measure that notes that development proposals on parcels of three acres or larger will be reviewed through the City's planned unit development or binding site plan requirements. In the interest of brevity, this EIS references and summarizes pertinent code requirements; refer to Ferndale Municipal Code 18.69 (Planned Unit Development – Commercial and Industrial) for a complete description of all requirements for planned unit developments.

17. **EAGLE program.** The EAGLE program review is additive to the minimum current code requirements and is summarized in Draft EIS Section 3.2, pp 3.2-18 and -19.

18. **Fiscal Analysis.** A fiscal analysis is not a required element of SEPA review and the relative merits of alternative need not be displayed in a monetary cost benefit analysis (WAC 197-11-450). However, as noted in the Draft EIS and concurrent with the preparation of the EIS, the City undertook a fiscal analysis to help define the preferred alternative and final mitigation and financing program for the additional improvements identified in the EIS. This analysis is briefly summarized in Chapter 1.

    The City will be adopting a final mitigation and financing program for the improvements identified in the EIS. The Supplemental Transportation Analyses presented in the Final EIS (see Section 2.1) includes additional discussion of mitigation strategies. The City and WSDOT will need to work together to define funding programs and the relative funding from developments in the Planned Action for improvements to the I-5 interchanges.

    The costs relative to drainage will be related to the amount of impervious surface, which can vary between signals and roundabouts. For example, the need for an additional right-turn lane at a signalized intersection will increase the amount of pavement.

19. **Floodway land use designation.** The comment refers to the City's floodway land use designation, which is described on Draft EIS page 2-6 and shown in the City's Comprehensive Plan (Draft EIS Figure 2-3) and Zoning Map (Draft EIS Figure 2-4). As noted in the text on Draft EIS page 2-6, the City's Floodway designation is a local land use designation that is not the same as the ACOE floodway designation or FEMA floodway designations. The City's floodway designations are significantly larger than the ACOE or FEMA floodway designations.

Shoreline and floodplain areas are discussed in greater detail in Draft EIS Section 3.1, Natural Environment and Appendix C. As noted in this section, specific mitigation for floodway and shoreline areas would be subject to USACE, WDOE and City of Ferndale requirements. Because the specific nature and timing of development at any particular site is not known, site specific mitigation requirements would be speculative and inappropriate in a subarea-wide analysis. Instead, the mitigation measures establish the applicable regulations and requirements, proposed plan features and other measures needed to ensure that impacts are adequately mitigated.

20. **Floodway.** The comment refers to background description of the alternatives. For analysis of potential impacts, please refer to Draft EIS Section 3.1, Natural Environment, Draft EIS Appendix C, and to response to Comment #19 in this letter, above.

    As noted previously, specific mitigation for floodway and shoreline areas would be subject to USACE, WDOE and City of Ferndale requirements. Because the specific nature and timing of development at any particular site is not known, site specific mitigation requirements would be speculative and inappropriate in a subarea-wide analysis. Instead, the mitigation measures establish the applicable regulations and requirements, proposed plan features and other measures needed to ensure that impacts are adequately mitigated.

    It should be noted that FEMA requirements have been recently addressed in the letter from FEMA to the City of Ferndale. In this letter, dated August 30, 2011 from Mark Carey, Director, Mitigation Division, Mr. Carey stated, "In accordance with the Floodplain Management and Endangered Species Act checklist for Programmatic Compliance, FEMA has reviewed your current submittal and has concluded your amendments to Chapter 15.24 Floodplain Management of the Ferndale Municipal Code meet or exceed the performance standards of the Biological Opinion".

    ACOE permits will be addressed at the site-specific level through the JARPA 404 application process. Local permit requirements would be subject to all applicable City of Ferndale Municipal Code requirements.

21. **Low Impact Development.** The comment is noted.

22. **Wetland impacts.** This Planned Action EIS only addresses wetland impacts within the Planned Action study area. Wetland impacts will

also be addressed on a site/project specific basis through the JARPA (404 and 401) permitting process. This includes impacts to wetlands and other waters of the state by either current stormwater requirements for water quality or wetland mitigation.

23. **Northwest quadrant.** The comment is noted.

24. **Mitigation sites.** The comment is noted.

25. **Habitat corridors.** The comment is noted.

26. **Pioneer Plaza/Southeast Quadrant.** It is acknowledged that an update for the wetlands, project design, and probable mitigation areas for the southeast quadrant, i.e. the "Pioneer Plaza" design will be prepared. It should also be noted that the vested status of the prior Pioneer Plaza proposal has expired.

27. **Federal and state permit requirements.** The comment is noted.

28. **Comprehensive stormwater study.** The analysis in the Draft EIS is consistent with the scope of review established for this project and appropriate for a sub-area plan. The state SEPA rules specifically identify sub-area plans as appropriate for planned actions (WAC 197-11-164(b)(1)). It is acknowledged that the analysis provides an area-wide review of the elements of the environment. This level of analysis is appropriate for review of a sub-area plan. Because the specific nature and timing of development at any particular site is not known, site specific mitigation requirements would be speculative and inappropriate in a subarea-wide analysis. Instead, the mitigation measures establish the applicable regulations and requirements, proposed plan features and other measures needed to ensure that impacts are adequately mitigated. Such measures would become conditions of approval of any subsequent projects.

    With regard to cost, a fiscal analysis is not a required element of SEPA review and the relative merits of alternative need not be displayed in a monetary cost benefit analysis (WAC 197-11-450). As noted above, site-specific mitigation measures and associated costs would be speculative and inappropriate in a subarea-wide analysis.

    Please see the supplemental discussion of stormwater in Section 2.2 of this Final EIS.

29. **Water quality mitigation.** Draft EIS mitigation includes compliance with all applicable regulations, use of LID measures, consideration of

regional stormwater detention and direct discharge to the Nooksack River following a stormwater inventory update, and site specific review of wetlands that are sensitive to fluctuations in water level. Collectively, these measures provide adequate mitigation for potential stormwater impacts.

30. **Stormwater.** The Draft EIS statement of …"insufficient information on capacity of the existing stormwater system" was incorrect and is hereby corrected in this Final EIS (See Section 2.2). The City's Stormwater Ordinance and Plan contain complete information to review stormwater management practices on a project by project basis for the development described in the Draft EIS. Additional information would allow implementation of a regional detention/flow control system and/or the direct discharge (conveyance only) approach. The ongoing Ferndale Gateway Stormwater Study, planned for completion in 2012, is intended provide the necessary information to allow implementation of these latter two approaches. Prior to completion of this study, there is nothing in the EIS or local or state regulations that would preclude an individual property owner from conducting the necessary analysis to allow direct discharge to the Nooksack River. Please see Section 2.2 of this Final EIS for a supplemental discussion of stormwater.

31. **Comprehensive stormwater study.** See response to Comment 28 of this letter.

32. **Direct discharge locations.** Please see Section 2.2 of this Final EIS for a supplemental discussion of stormwater. Although there may be some efficiency in the direct discharge approach, it is not specifically proposed or required in order to adequately mitigate potential stormwater impacts.

33. **Downstream conveyance improvements.** Please see Section 2.2 of this Final EIS for a supplemental discussion of stormwater. Although there may be some efficiency in the regional detention/flow control system and/or direct discharge approaches, these are not specifically proposed or required in order to adequately mitigate potential stormwater impacts. The ongoing Ferndale Gateway Stormwater Study, planned for completion in 2012, is intended provide the necessary information to allow implementation of these two approaches. Prior to completion of this study, there is nothing in the EIS or local or state regulations that would preclude an individual property owner from conducting the necessary analysis to allow direct discharge to the Nooksack River.

34. **LID requirement.** The City is awaiting adoption of the updated Western Washington Stormwater Manual, which is expected to include an emphasis on LID measures in areas with feasible soils. If the Manual is approved, the City expects to incorporate such measures into its development review regulations.

35. **Lower Nooksack River Watershed TMDL.** Please see the response to Comment 33, this letter. Measures to ensure that the City meets its wasteload allocation under the Lower Nooksack River Watershed TMDL will be enacted prior to permitting direct discharge to the Nooksack River. However, such measures are not required as part of this EIS.

36. **Detention and flow control.** Please see the response to Comment 30, this letter. At this time, the City has not planned for, nor is required to plan for, the construction of regional detention facilities in this area. If regional facilities are proposed and paid for by private development, they will be reviewed based on the applicable regulations in effect at that time.

37. **Site specific wetland review.** As noted in the Draft EIS, all site-specific regulatory requirements, including those required by the USACE, WDOE, and the City of Ferndale, would continue to apply at a site-specific level.

38. **LID requirement.** See the response to Comment 34 of this letter.

39. **Water System Plan update.** Draft EIS Table 3.5-1 describes estimated water demand for each alternative. As noted in the accompanying narrative, the estimated demand shows that additional water rights would be required by 2029 under Alternative 2 (identified as the preferred alternative in this Final EIS). This will be addressed through the planned action ordinance, which will include this mitigation as part of the mitigation requirements in Appendix B.

    As cited in the Draft EIS, this estimate was based on an updated analysis performed in 2011. Mitigating measures identified in the Draft EIS state that the City's Water System Plan should be updated no later than 2014 to identify required improvements to the City's water system to serve proposed development. An additional mitigating measure states that planning for additional water storage should begin immediately. Cost estimates will be included as part of the Water System Plan, but are not required as part of SEPA review.

40. **Water System Plan update.** Please see the response to Comment #39, this letter, above.

41. **Updated sewer data.** Draft EIS Table 3.5-2 describes estimated sewer demand for each alternative. As noted in the accompanying narrative, the estimated demand for Alternative 2 (identified as the preferred alternative in Chapter 1 of this Final EIS) is an additional 0.232 million gallons per day (mgd). The Draft EIS states that, with Phase III wastewater treatment plant upgrades to 6.37 mgd capacity, the plant will have 1.19 mgd of excess capacity in 2034. Depending on whether the background growth assumptions hold true, the treatment plant may have adequate capacity to meet sewer treatment demand for the preferred alternative in 2034. Nevertheless, it is acknowledged that the City's sewer plan should be updated to incorporate the preferred alternative growth projects and the Draft EIS identifies this as a mitigating measure. Such an update is not required to be completed as part of this EIS process.

42. **NPDES Permit.** See the response to Comment 15 of this letter.

Washington State
Department of Transportation
Paula J. Hammond, P.E.
Secretary of Transportation

Northwest Region / Mount Baker Area
Skagit, Island, San Juan & Whatcom Counties
1043 Goldenrod Road, Suite 101
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August 30, 2011

Jori Burnett
Community Development Director
City of Ferndale
PO Box 936
Ferndale, WA 98248

RE: Planned Action EIS, Main Street/Axton Corridor Master Plan

Dear Mr. Burnett:

Thank you for the opportunity to comment on the city's draft Main Street/Axton Corridor Planned Action EIS. The Washington State Department of Transportation (WSDOT), as a regional partner in transportation planning, supports your efforts to address local land use and transportation issues that affect the state highway and we thank you for including us in this process. Future development in the Main Street/Axton Corridor will have substantial impacts on state highways, and it is important that WSDOT and the city work together to determine the level of mitigation to be required from proposed development.

The city of Ferndale's Transportation Element, adopted in Winter 2011, calls for substantial growth in coming years, particularly growth in retail and other types of development that generate high traffic volumes. The plan anticipates that significant improvements to state highways, including Interstate 5, will be needed to support and facilitate that growth. In our comments provided at that time, we voiced our general support for the improvements identified but that we were concerned about the lack of funding for implementation. Those concerns remain in the DEIS. 1

The following are our specific comments to the DEIS:

- It appears that the methodology used to determine future impacts is appropriate. At this point it is unknown what specific types and sizes of development are going to occur, but the report does a good job of describing what has been assumed. These assumptions appear to be reasonable for the various development areas and the new trip generation associated with the development has been calculated correctly. It is our opinion that the traffic analysis has been performed using the appropriate tools, and we agree with the findings. 2

  However, we are concerned that when development does occur, it could take the form of something very different than what has been assumed, which could cause a significant change in trip generation and distribution. This could render the findings of future operations moot, and require a different type of mitigation.

- Generally, the DEIS describes the types of improvements for the I-5 interchange and ramp intersections that WSDOT could support. It does not, however, include sufficient detail about the types and cost of I-5 improvement needs to account for the impacts of proposed development and to assess mitigation requirements. Therefore it is not an adequate substitute for the case-by-case evaluation of traffic impacts we typically do under SEPA. We are concerned that the city's adoption of a planned action ordinance which exempts future developments from additional review under SEPA would not be appropriate for the state highways. 3

- The DEIS assumes that projects identified in the Transportation Element, on local streets and I-5, are needed to address level-of-service deficiencies. 4

  As we noted in our February 2011 comments to the city, WSDOT does not have funding for the improvements identified in Ferndale's transportation element and current plans for the state highways do not identify improvement priorities at these locations. We should work together to evaluate improvement options and develop realistic cost estimates to assist with seeking funds.

- The DEIS notes that other improvement strategies involving changes to I-5 interchanges would require a master plan and Interchange Justification Report. The document suggests that development within the study area and other parts of the region could be asked to help pay for those studies. 5

  We support this approach.

- Requirement that prior to approval major developments within the study area, conceptual circulation plans should be developed for each quadrant and approved by the city with review by WSDOT, as applicable. 6

  We support this proactive approach and look forward to reviewing these plans.

- Since these projects are addressing the likely impacts of the city's plan for substantial retail development, we anticipate that traffic impacts to state highways will need to be addressed as development occurs. We generally evaluate impacts on a case-by-case basis to assess and mitigate reasonable and proportionate impacts on the state highway that result from proposed development. We look forward to continuing to work with the city of Ferndale on evaluating these developments as they occur. 7

Thank you again for the opportunity to comment on the preliminary draft EIS. Please do not hesitate to contact me at 360.757.5961 or stormer@wsdot.wa.gov if you have any questions or if I can be of assistance.

Sincerely,

Roland Storme
Development Services Engineer
WSDOT/Mount Baker Area

Cc: Kerri Woehler, WSDOT NWR/Mount Baker Area Planning
Mike Koidal, WSDOT NWR/Mount Baker Area Traffic
Doug Peters, CTED Growth Management Services
Cliff Hall, WSDOT Planning
Katherine Klockentager, WSDOT Planning

Response to Draft EIS Letter 2: Washington State Department of Transportation

1. **Funding for state improvements.** The comment is noted. The draft EIS acknowledges that the improvements to state highways identified in the Transportation Element and under the Planned Action alternatives are not funded. The City of Ferndale has adopted a revised Transportation Impact Fee which includes some costs related to widening the Main Street overcrossing of I-5 which could help fund future improvements at the interchange. The Planned Action review process identifies optional strategies for mitigating additional traffic impacts. The City of Ferndale will continue to work with WSDOT to identify funding options for developers to mitigate impacts at state highways.

2. **Methodology.** The comment is noted. The City of Ferndale has coordinated with WSDOT in the development of the EIS and methodologies. The Planned Action review would only cover the level of development and/or trip generation covered in the EIS. Development levels or trip generation above those assumed in the EIS for the selected alternative would require additional environmental review. Similarly, an application for a different type of development activity (e.g. 1,000 housing units) also would not be fully covered by this environmental review.

3. **Improvement cost estimates.** Appendix D-10 of the Draft EIS includes preliminary cost estimates for improvements to the state highway interchanges. These have been updated as part of the Supplemental Transportation Analyses presented in the Final EIS (see Section 2.1). These values can provide the initial basis of developer mitigation. The Planned Action ordinance can also include requirements for the costs estimates and mitigation programs to be revised when more detailed cost estimates are available following completion of preliminary and final design studies. Adoption of a Planned Action ordinance and associated mitigation program can provide a more balanced approach for funding WSDOT improvements compared to the current case-by-case review because all or most new development would pay toward the improvement projects instead of just the development application that triggered the level of service or other deficiency.

4. **Need for future improvements.** The EIS acknowledges that the improvements to these state highways are not funded. The City of Ferndale will continue to work with WSDOT to evaluate improvement options, cost estimates, and funding programs, as discussed in the

Supplemental Transportation Analyses in the Final EIS (see Section 2.1). In addition, it is anticipated that the planned action ordinance will include one or more points for reassessment of transportation improvements and funding options.

5. **Interstate 5 Master Plan.** The comment is noted. As identified in the Supplemental Transportation Analyses in the Final EIS (Section 2.1), the City of Ferndale envisions entering into a Memorandum of Understanding or Interlocal Agreement with WSDOT toward that objective.

6. **Future review process.** The comment is noted and consistent with City of Ferndale recommendations.

7. **Future review process.** The comment is noted. The City of Ferndale will continue to work with WSDOT in defining an approach for mitigating development impacts at state highways through the Planned Action process.

Jori Burnett

From: James Lee <jlee@co.whatcom.wa.us>
Sent: Tuesday, August 30, 2011 4:52 PM
To: Jori Burnett
Subject: Main Street Master Plan Planned Action Draft Environmental Impact Statement

Jori - thank you for the opportunity to provide comments to this Planned Action EIS process. We have reviewed the available information and provide the following comments.

The Planned Action Study Area (PASA) includes four quadrants centered around the Main Street and Interstate 5 intersection located in the left bank floodplain of the Nooksack River. There are significant portions of the PASA located in the effective FEMA flood insurance rate map of the Lower Nooksack River. The PASA includes areas that are very sensitive to flooding as well as areas that flood frequently. 1

The Lower Nooksack River Comprehensive Flood Hazard Management Plan (CFHMP) recommends evaluating the impacts of additional development in the Ferndale area to ensure that off-site properties are not impacted. We recommend that future proposed developments covered under this Planned Action EIS, once clearly defined, should be adequately analyzed to ensure that no off-site properties are impacted during a range of flood events including the 100-yr event. This should include an analysis of the relationship between floodwater conveyance, storage, and development and should also analyze the potential for I-5 overtopping.

Whatcom County has begun work on a detailed flood study for the Lower Nooksack River utilizing the recently updated lower Nooksack River one dimensional, unsteady flow FEQ model. Preliminary draft 100-year mapping in the area of the PASA shows areas where the floodplain might be larger than that shown in the effective FEMA maps. We recommend that the City of Ferndale coordinate with Whatcom County as future developments are proposed so that the best available information can be utilized in analyzing the potential impacts of these proposed developments. 2

We look forward to working with the City of Ferndale as we work collaboratively to reduce future flood damages along the Lower Nooksack River.

Should you have any questions or comments don't hesitate to give me a call.

James

James E. Lee, P.E.
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Response to Draft EIS Letter 3: Whatcom County Surface Water Division

1. **Off-site flood potential.** Because the proposal is for a subarea, the specific nature and timing of development at any particular site is not known. To the extent possible, the City is committed to continuing coordination with Whatcom County to share available site specific development and stormwater information.

   MC 15.24, which was accepted by FEMA on August 30, 2011, includes provisions for site specific review and modeling, including requirements for demonstration that no net increase in rate and volume of offsite storm runoff is generated (or that it is mitigated), (FMC 15.24.180) as well as stipulations that "New development shall not reduce the effective flood storage volume of the regulatory floodplain and/or shall not create a net increase in flood level." (FMC 15.24.190)

2. **Floodplain.** The comment is noted. Please see Section 2.2, which has added this recommendation as an additional mitigation measure.

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File No. 554898/000001

August 26, 2011

Email: joriburnett@cityofferndale.org

Mr. Jori Burnett, Director
Department of Community Development
City of Ferndale
2095 Main Street
P.O. Box 936
Ferndale, WA 98248

Dear Mr. Burnett:

Re: Re: Main Street Master Plan, Planned Action Draft Environmental Impact Statement

This letter provides comments on behalf of my client, 268 Holdings, LLC. owners of a substantial property at the SE Qudrant of the Interstate-5/Main Street interchange and a participant in the cost of the PAEIS.

My client's property was a majority participant (approximately 90%) in the proposed Pioneer Plaza PUD project. Pioneer Plaza PUD was a denser development proposal than either Alternative 2 or 3. Extensive studies were performed and an Environmental Impact Statement was prepared for the Pioneer Plaza PUD. The EIS was completed and a Final EIS was issued addressing all impacts and proposed mitigation.

It appears to us that the Main Street Master Plan PADEIS has not fully utilized the information developed and the mitigation actions proposed in the Pioneer Plaza FEIS. Specifically we note the following:

1. The PADEIS as a mitigation measure proposes to dead end Barrett Road in favor of a new on ramp. This proposal, if adopted, would discourage any kind of commercial development of my client's property since Barrett Road is a critical and essential part of access and circulation of a successful commercial development of said property. 1
2. The PADEIS suggests the possibility of creating different impact fees for different Quadrants or for the west side and east side. This proposal has not been fully substantiated in the PADEIS and does not appear to have any validity. The increased traffic could, and most likely would, travel to all four quadrants, therefore impacting the 2

entire transportation system. The only fair and equitable method for sharing the cost of traffic mitigation is a flat rate mitigation fee regardless of which quadrant generates the traffic. 2 cont

Yours truly,

Borden Ladner Gervais LLP

Gary J. Wilson

GJW/ni

Response to Draft EIS Letter 4: Borden Ladner Gervais

1. **Barrett Road.** The Final EIS recommends Alternative 2 (Moderate Growth) as the preferred alternative which does not require dead-ending the existing Barrett Road south of Main Street. Under Alternative 3 presented in the Draft EIS, Barrett Road would have been reconfigured to connect with a new north-south roadway connecting to Main Street further to the east. Properties north of the realignment would be accessed via the realigned roadway or from Smith Road. As noted in the Draft EIS, future WSDOT studies for the improvements at the Main Street/I-5 interchange could consider and result in other options than those presented in the Draft EIS.

2. **Transportation mitigation structure.** A final mitigation approach has not been defined. Options for revising the City's transportation impact fees are discussed in the Supplemental Transportation Analyses in the Final EIS (see Section 2.1). The impact fee program could treat the Planned Action area as a single service area. Alternatively, the impact fee program could assess fees for each quadrant or for developments east or west of I-5. The allocation of cost shares and resulting rates would be based on the relative impact/benefit of improvements as calculated based on the assumed growth assumed in the travel demand model used in developing the forecasts for the Planned Action EIS.

Letter 5

RONALD C. TEMPLETON, P.S.
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August 29, 2011

Jori Burnett, Director
Department of Community Development
City of Ferndale
P.O. Box 936
Ferndale, WA 98248
via email: joriburnett@cityofferndale.org

Re: *Main Street Master Plan*
Planned Action Draft Environmental impact Statement

Dear Mr. Burnett:

I represent Ferndale Development Group, LLC which proposes to undertake a new development in the SE Quadrant of the I-5/Main Street Interchange.

I write this letter to comment on the proposed Transportation Impact Fees and Traffic Mitigation Improvement alternatives. We urge the City to adopt a "flat rate" Traffic Mitigation Impact Fee and to adopt the Roundabout version of the Alternative 2 Mainstreet Traffic Mitigation Scenario set forth in the *Additional Transportation Analysis Materials* presented to the public on August 3, 2011.

1. Flat-Rate Impact Fees. With this letter, please find a copy of Memorandum dated August 26, 2011 prepared by my client's traffic consultant, Brad Lincoln of Gibson Traffic Consultants, Inc. (hereafter, the "Gibson Report"). 1

   As noted in the Gibson Report, traffic generated by potential development of all four Quadrants and the traffic improvements necessitated thereby, are interrelated. Accordingly, a flat-rate mitigation fee should be calculated and applied to all development trips regardless of the Quadrant in which they are generated. The rate should be based on the total costs of the required traffic improvements divided by the total trips generated in all four Quadrants.

2. The Preferred Traffic Mitigation Improvement Scenario: Alternative 2 (Roundabout Version). My client strongly urges the City to adopt Alternative 2 (Roundabout Version) of the Mainstreet Mitigation Improvement Scenarios set forth in the August 3 materials. 2

   As noted in Part 2 of the Gibson Report, Alternative 3 is not a desirable alternative because it dead-ends at Barrett Road, thereby funneling more SE Quadrant traffic through the residential development off Main Street.

Moreover, according to the Gibson Report (see Part 3), the signalization option of Alternative 3 will likely require further adjustments in order to obtain WSDOT approval. 2 cont

The Alternative 2 Scenario is clearly the superior alternative and we urge the City to adopt it.

In responding to our comments, could you please include a response to all the points set forth in the Gibson Report? In advance, thank you for your consideration.

Very truly yours,

RONALD C. TEMPLETON

RCT/ds
cc: Paul Pazooki
Byron Harris

Response to Draft EIS Letter 5: Ronald Templeton, PS

1. **Transportation mitigation structure.** Please see additional discussion in the supplemental Transportation Analyses in the Final EIS (Section 3.1) and the response to Comment #1, Letter #6, Gibson Traffic Consultants. It should be noted that there will be additional public comment opportunity on the final proposed transportation impact fee ordinance prior to action by the City Council. See the public involvement discussion in Chapter 1 of this Final EIS.

2. **Support for Alternative 2 with roundabouts.** The Final EIS recommends Alternative 2 (Moderate Growth) as the preferred alternative. The Supplemental Transportation Analyses included in the Final EIS (see Section 2.1) provides a comparison of improvement needs, traffic operations, and costs based on improvements using roundabouts and traffic signals. As described in the Draft EIS, City staff recommends installation of roundabouts as the preferred mitigation strategy for the Main Street Corridor. On November 30, 2011, the Planning Commission recommended installation of roundabouts at the Interstate 5/Main Street interchange ramps and improvements to existing signalized intersections west of Interstate-5.

   Alternative 2 does not require dead-ending the existing Barrett Road south of Main Street. This would not require traffic from I-5 or west of I-5 to travel through the residential areas along Main Street to access the proposed developments in the southeast quadrant.

GTC Gibson Traffic Consultants, Inc.
Transportation Planners and Traffic Engineers

MEMORANDUM

To: Paul Pazooki
From: Brad Lincoln, PE
Subject: Main Street Master Plan Planned Action EIS
Date: August 26, 2011

This memorandum is a summary of traffic comments regarding the Main Street Master Plan Planned Action EIS analysis performed by Transpogroup. GTC has reviewed the trip generation, trip distribution, analysis and improvement alternatives. Based on this review, GTC recommends the implementation of the Alternative 2 growth forecast and the Alternative 2 improvements. The Alternative 2 growth scenario accounts for approximately 75% of the Alternative 3 growth scenario, but has significantly reduced improvements and costs.

GTC has the following comments:

1. Flat-Rate Mitigation Fee

A flat-rate mitigation fee should be calculated and applied to all development trips, regardless of which quadrant they are generated in. The rate should be based on the total fees for all improvements divided by the total trips generated by the quadrants. The rate can be based on either ADT or PM peak-hour trips. A flat-rate fee will ensure that all developments are treated equally since all of the trips and all of the improvements are inter-related. This process will allow the prioritization of improvements so that the most important improvements are constructed, regardless of where the improvements are in relation to the developments. Creating separate mitigation fees for different quadrants or having the west side be responsible for west side improvements and vice versa for the east side could result in a situation where one side develops and the other side does not. If this were to happen, necessary improvements may not have the funding to be completed (i.e. Main Street improvements may be completed, but customers may not be able to get there if the I-5 improvements are not completed). 1

If a flat rate mitigation fee is not applied to all development and separate mitigation fees for each quadrant (or each side) is the preferred methodology, a detailed report needs to be produced to show how trips from each quadrant are applied to each study intersection. The EIS does a good job of evaluating the overall trip generation and impacts within the study area, but does not give enough detail to establish and evaluate separate mitigation fees. The report for separate mitigation fees will require additional time for review and comments.

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2. Barrett Road Connection

A connection between Main Street and Barrett Road needs to be maintained for the viability of 2
development in the southeast quadrant, especially land in the south half of the southeast quadrant. Without a Barrett Road connection (similar to what is proposed with the Alternative 3 roundabout), customers will be required to travel east along Main Street to access the area. This is problematic since customers will be required to travel through residential areas before getting to the commercial access. This could lead to confusion for customers and unnecessary traffic through residential areas. This is different from the separation between I-5 and Labounty Road since the area between I-5 and Labounty Road is all commercial.

3. Approval of I-5 Ramp Improvements

The ramp intersection improvements presented in the EIS will need to go through a review process 3
with WSDOT and potentially FHWA. The alternatives presented are therefore likely to change. However, GTC did find two issues with the signals in the Alternative 3 growth scenario. The Alternative 3 signal improvements allow the I-5 ramp intersections to operate at acceptable levels, but there are likely to be queuing issues between intersections and the intersections were analyzed with a cycle length (80 seconds) that WSDOT will not approve. WSDOT ramp intersections typically run at 120 seconds or more. The intersections will not operate acceptably and there will be queue spillback across adjacent intersections with a 120 seconds cycle length. GTC therefore recommends that WSDOT be contacted if the signal alternatives for the ramps are chosen to ensure they are feasible to obtain approval from WSDOT.

Response to Draft EIS Letter 6: Gibson Traffic Consultants

1. **Transportation mitigation structure.** Please see response to letter 5, comment 1.

2. **Barrett Road connection.** Please refer to response to Letter #5, Comment #2.

3. **Interstate 5 ramp improvements.** This comment cites issues related to Alternative 3. It should be noted that the final EIS recommends Alternative 2 as the preferred land use alternative.

   Under any alternative, WSDOT will need to review and approve final improvements at the interchanges with I-5. The City of Ferndale has been coordinating with WSDOT in developing and review of the transportation analyses and will continue to coordinate with WSDOT on improvements to the interchanges serving Ferndale. As noted in WSDOT's comment letter (see Letter #2, Comment #2), WSDOT notes that the methodology to determine future impacts appears to be appropriate. Use of longer cycle lengths typically results in longer traffic queues which would result in additional congestion and other operational impacts.

   As described in the Draft EIS, City staff recommends installation of roundabouts as the preferred mitigation strategy for the Main Street Corridor. On November 30, 2011, the Planning Commission recommended installation of roundabouts at the Interstate 5/Main Street interchange ramps and improvements to existing signalized intersections west of Interstate-5.

Jori Burnett

From: Serge Slagle <serge@fribergconstruction.com>
Sent: Tuesday, August 30, 2011 4:34 PM
To: Jori Burnett
Cc: Chet Lackey; dkr@belcherswanson.com; Mark J. Jacobs; Alberto Martini; Jean-Paul Slagle
Subject: PA EIS. Main and Axton. Comments
Attachments: Ferndale.PA EIS.Property Owners.docx; Comments to Jori Burnett.PA EIS.Main & Axton Corridor.pdf

Hello Jori.

Please accept my comments regarding the Axton/Main PA EIS.

Will we have future opportunities to provide you with additional comments? I simply ran out of time.

Thank you so much for all your good work.

Serge A. Slagle

August 30, 2011

Mr. Jori Burnett
City of Ferndale Planning Director

VIA E-Mail

Re: **COMMENTS RELATIVE TO THE MAIN/AXTON CORRIDOR PA EIS**

1. SIZE OF PA EIS STUDY AREA.

The PA EIS Team published a list of property owners impacted by the PA EIS, under the heading of ***Impacted Property Owners***. This list does not include the Whatcom County Assessor Tax Parcel Number of each affected property. From this list, I could not accurately confirm the land parcels affected, nor do I believe that anyone else could do so. I could not, therefore, confirm accuracy of the PA EIS Team acreage conclusions. 1

To confirm accuracy of PA EIS acreage conclusions, I reviewed Whatcom County Assessor's Tax Parcel records and arrived at following conclusions:

Table 1: **PA EIS STUDY AREA**

QUADRANT	SAS CONSULTING[1]	PA EIS TEAM[2]
SE	181.75	183.80
SW	80.04	88.80
NW	94.72	93.20
NE	74.45	77.60
Totals	**430.96**	**443.40**

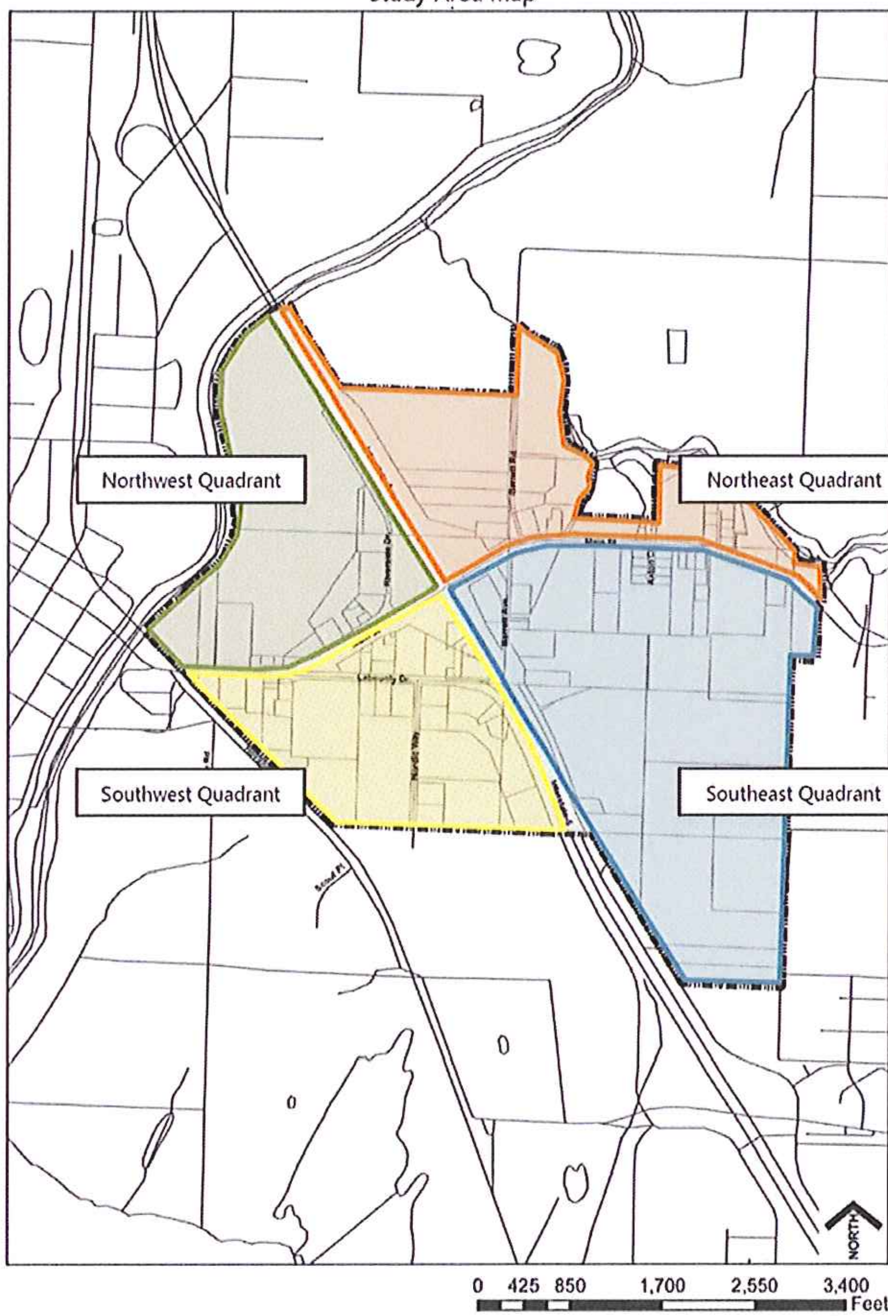
[1] Whatcom County Assessor records
[2] Main Street Master Plan. Planned Action Environmental Impact Statement. July 2011

The 12.44 acres deficiency is not huge, but I believe that the record should be accurate. I will submit to you, under separate transmission, copy of my work product. I would appreciate your review of same, to determine its accuracy.

I've attached Map 1 – showing Figure 2-2 of PA EIS, Study Area, prepared by the PA EIS Team, and Map 2 – showing Study Area boundaries prepared by the city of Ferndale. These maps guided my review of the Whatcom County Assessor tax records.

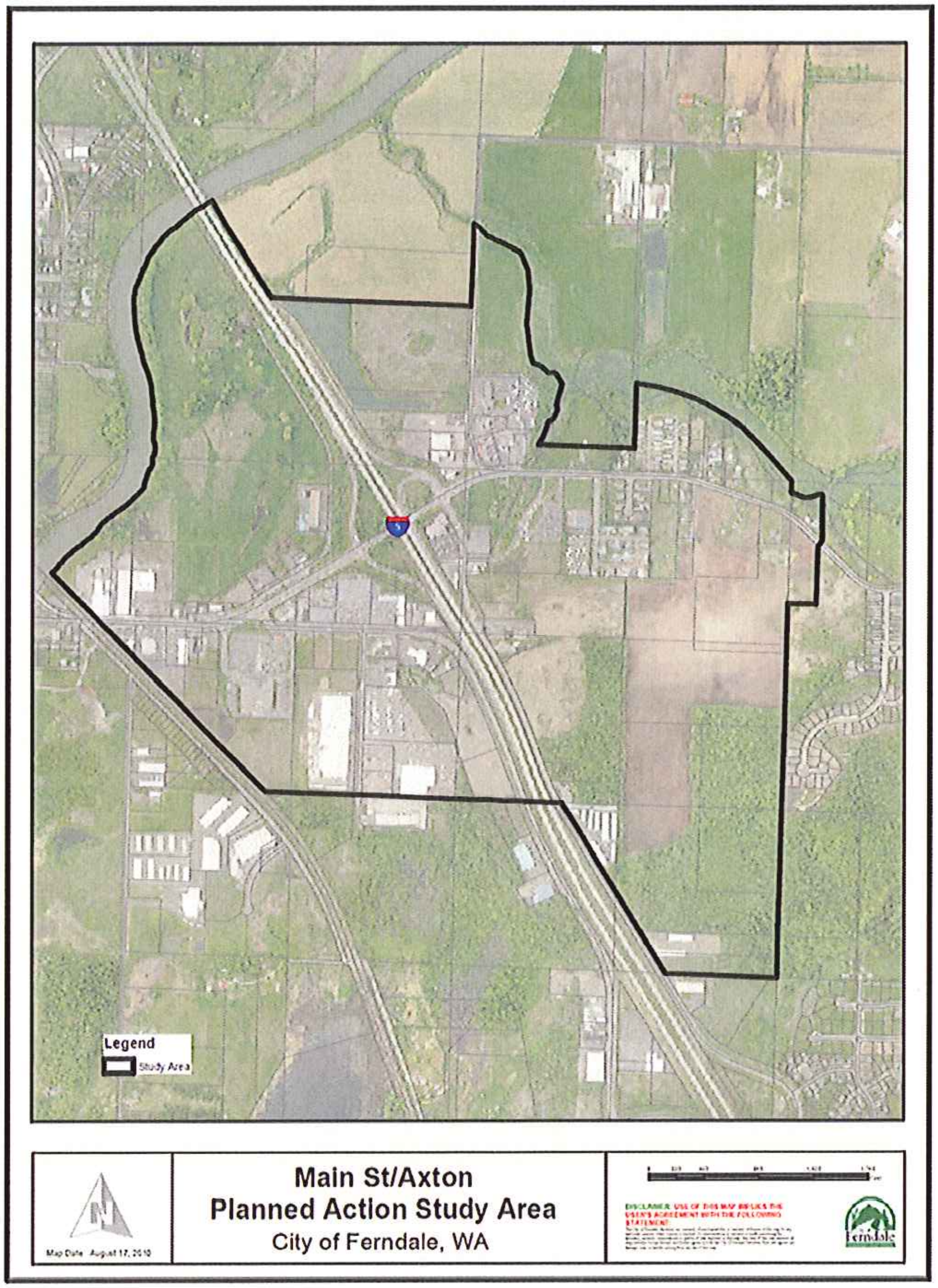
Map 1: **PA EIS STUDY AREA – BY PA EIS TEAM**

Figure 2-2
Study Area Map



Source: EA|Blumen, 2011

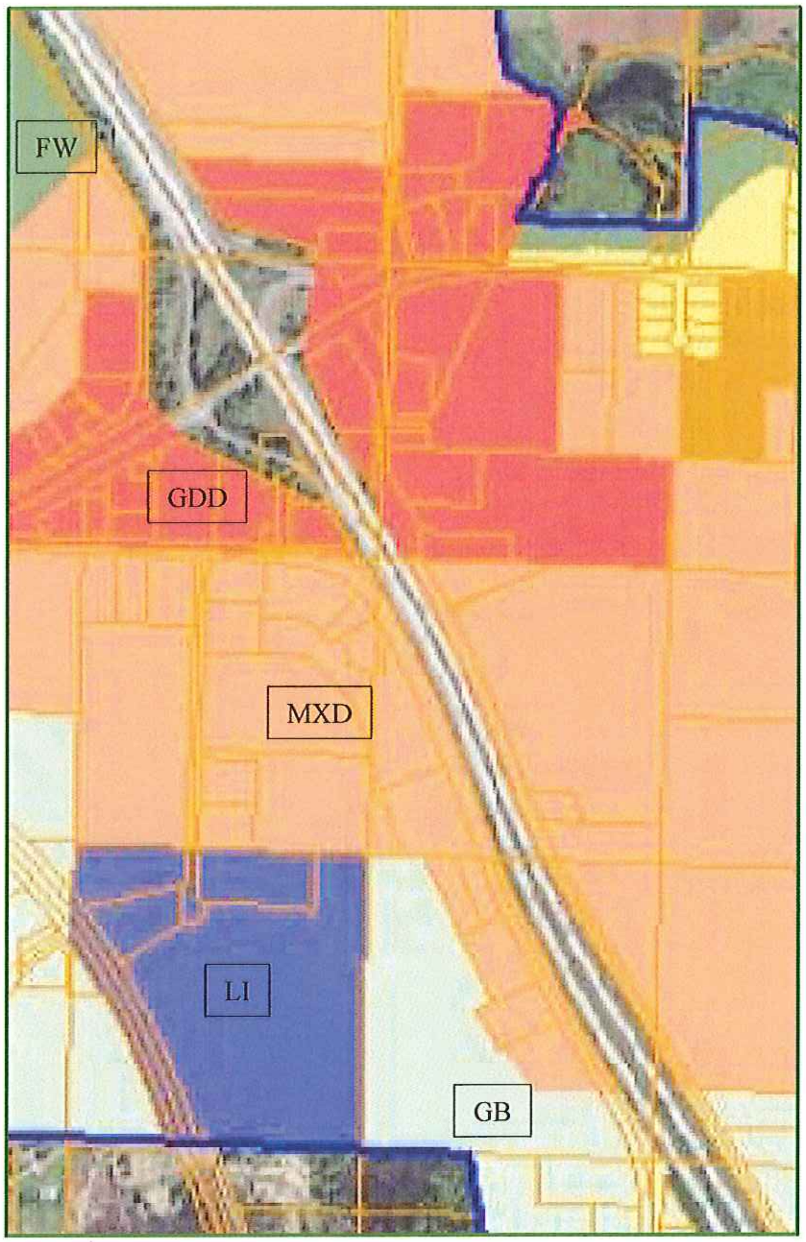
Map 2: **PA EIS STUDY AREA – BY CITY OF FERNDALE**



2. CITY OF FERNDALE ZONING CLASSIFICATIONS.

PA EIS identifies certain Comprehensive Plan/Zoning land use designations, but should including descriptive paragraph of the Light Industrial zoning classification – as such affects the properties noted under paragraph 3, below. 2

Map 3: **ZONING CLASSIFICATIONS.**



Source: City of Ferndale GIS Web Site
Graphics: SAS Consulting

3. **PROPERTIES SHOULD BE INCLUDED IN PA EIS STUDY AREA.**

I have not reviewed all properties that might have been included in the PA EIS Study Area. I note, however, two properties situated at the southerly terminus of Nordic Way that clearly should have been included in this Study, in my opinion. I refer to the properties owned by Bellingham Marine Inc. and Sacks Industrial Corp. [SEE MAP 4] 2 cont

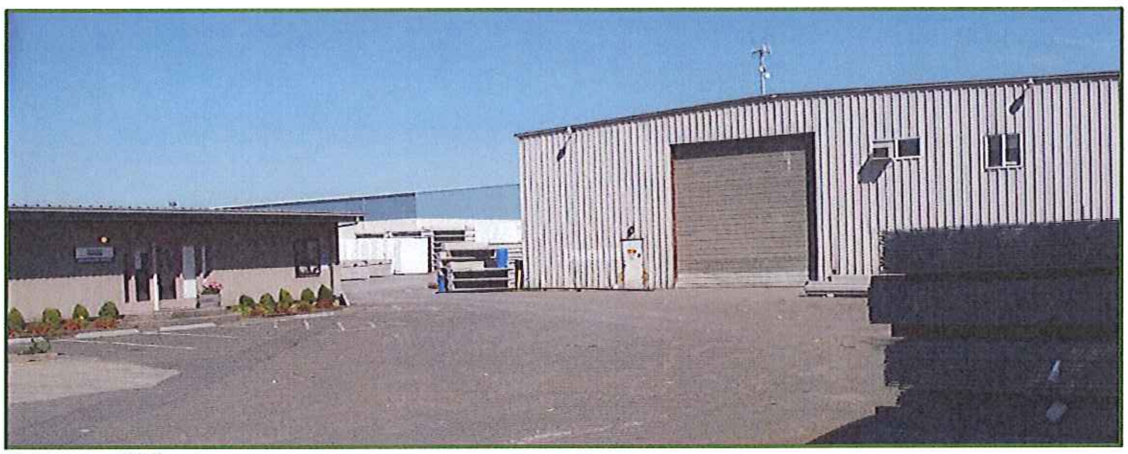
According the city of Ferndale GIS web site, the Light Industrial zoning classification has been assigned to each such parcel. [SEE MAP 3]

a. **BELLINGHAM MARINE INC. PROPERTY.**

This property is situated at 5500 Nordic Way, near the southerly terminus of Nordic, abutting the Sawarne Lumber and Sacks Industrial properties – being Whatcom County Tax Parcel No. 390229-485260 and Lot B, Amended Northwest Industrial Short Plat. [see Map 4]

The property is comprised of 3.10 acres and includes two buildings:

a. Office: 30'X50' = 1,500 SF; and
b. Warehouse, measuring approximately 26,000 SF.

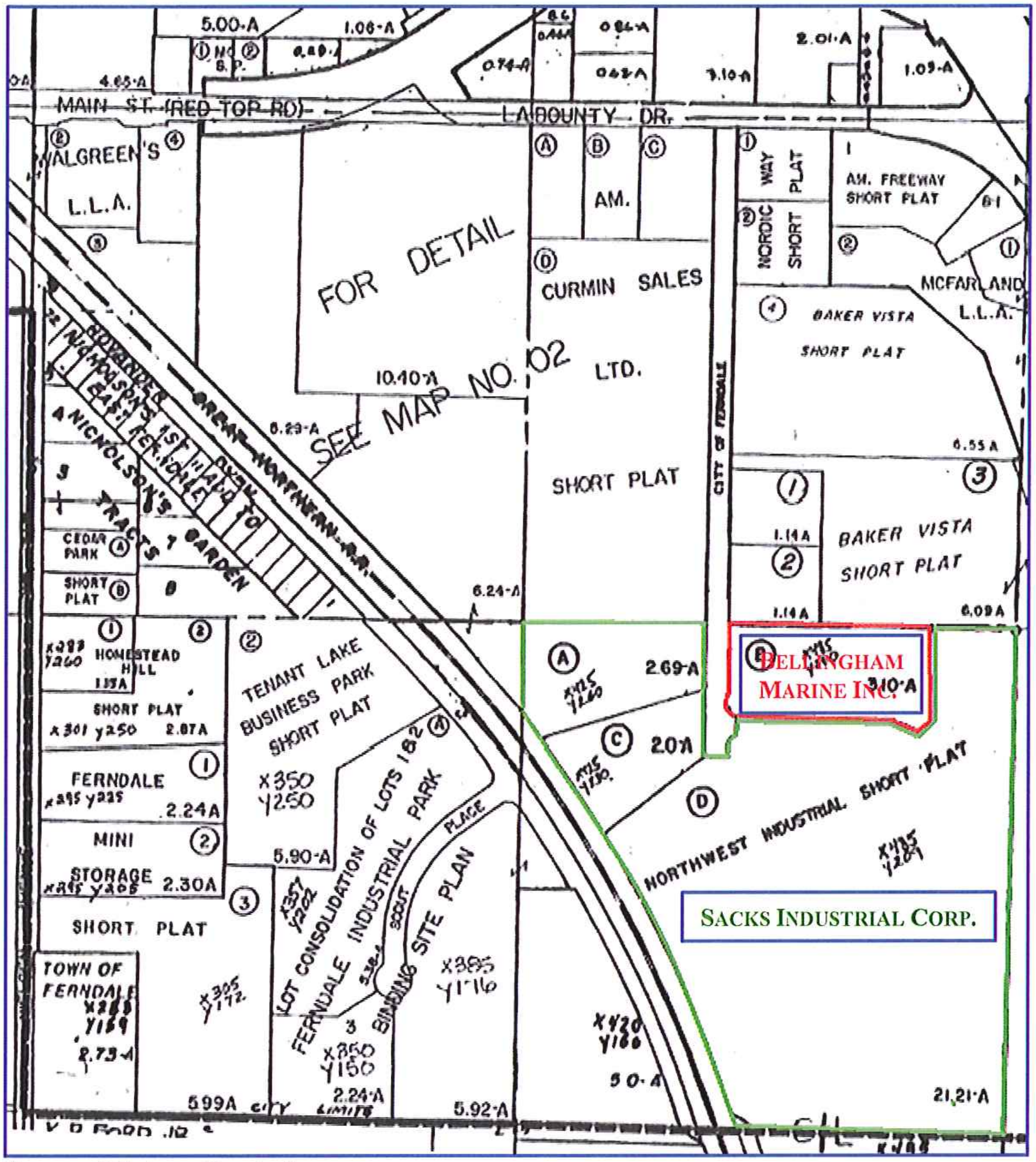


Office and Warehouse

Warehouse

Photos courtesy SAS Consulting. August 28, 2011

Map 4: **PROPERTIES SHOULD BE INCLUDED IN PA EIS STUDY AREA.**



Source: Whatcom County Assessor
Graphics: SAS Consulting

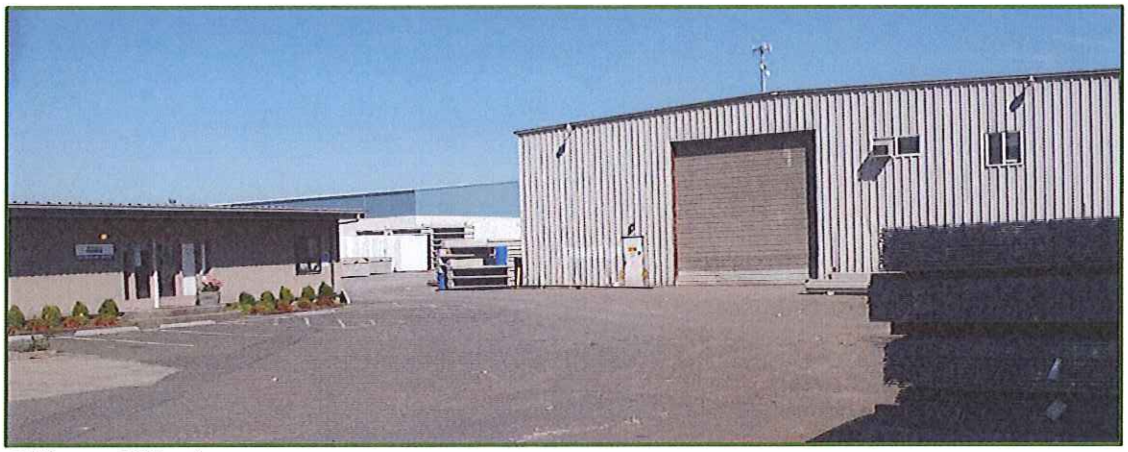
a. **BELLINGHAM MARINE INC. PROPERTY.**

This property is situated at 5500 Nordic Way, near the southerly terminus of Nordic, abutting the Sawarne Lumber and Sacks Industrial properties – being Whatcom County Tax Parcel No. 390229-485260 and Lot B, Amended Northwest Industrial Short Plat. [see Map 4] 2 cont

The property is comprised of 3.10 acres and includes two buildings:

a. Office: 30'X50' = 1,500 SF; and

b. Warehouse, measuring approximately 26,000 SF.



Office and Warehouse

Warehouse

Photos courtesy SAS Consulting. August 28, 2011

BMI employs, perhaps, 15 people, or more, at this Ferndale site.

Access to the BMI property is via Nordic Way, Labounty Drive, Main Street, and I-5. Traffic counts indicated in PA EIS would have had to include traffic generated by this BMI facility. I do not understand the rationale supporting omission of this property from the PA EIS Study Area.

b. **SACKS INDUSTRIAL CORP. PROPERTY.**

This property is situated at the southerly terminus of Nordic Way, abutting the Sawarne Lumber, Bellingham Marine, and Sauder Wood Products properties – being Whatcom County Tax Parcel Nos. 390229-425260, 390229-425230, and 390229-485289. This property includes Lots A, C, and D, Amended Northwest Industrial Short Plat, and borders the southern corporate limit of the city of Ferndale, at that region. [see Map 4] 2 cont

This property is situated off Nordic Way, contains 25.90 acres, and represents the largest single ownership on Nordic Way.

Lot A: 2.69 acres; Lot C: 2.00 acres; Lot D: 21.21 acres

Sacks have been working with the city of Ferndale since approximately December 2009, seeking a Shoreline Substantial Development Permit to build a 119,744 square foot mesh plant; a 99,000 square foot mineral processing plant; a 75,000 square foot paper plant; and associated parking areas. Approval for a Shoreline Substantial Development Permit was granted Sacks by the city's Hearing Examiner, on is granted on January 25, 2010.

Building Permits have not yet been granted for this project by the city of Ferndale.

This 293,744 SF plant will be the largest in this region and will have a significant impact upon the Main/Axton travel corridor. Why this property is not included in the Study Area of this PA EIS is very puzzling.

Nordic Way entrance

Property: East of Nordic Way

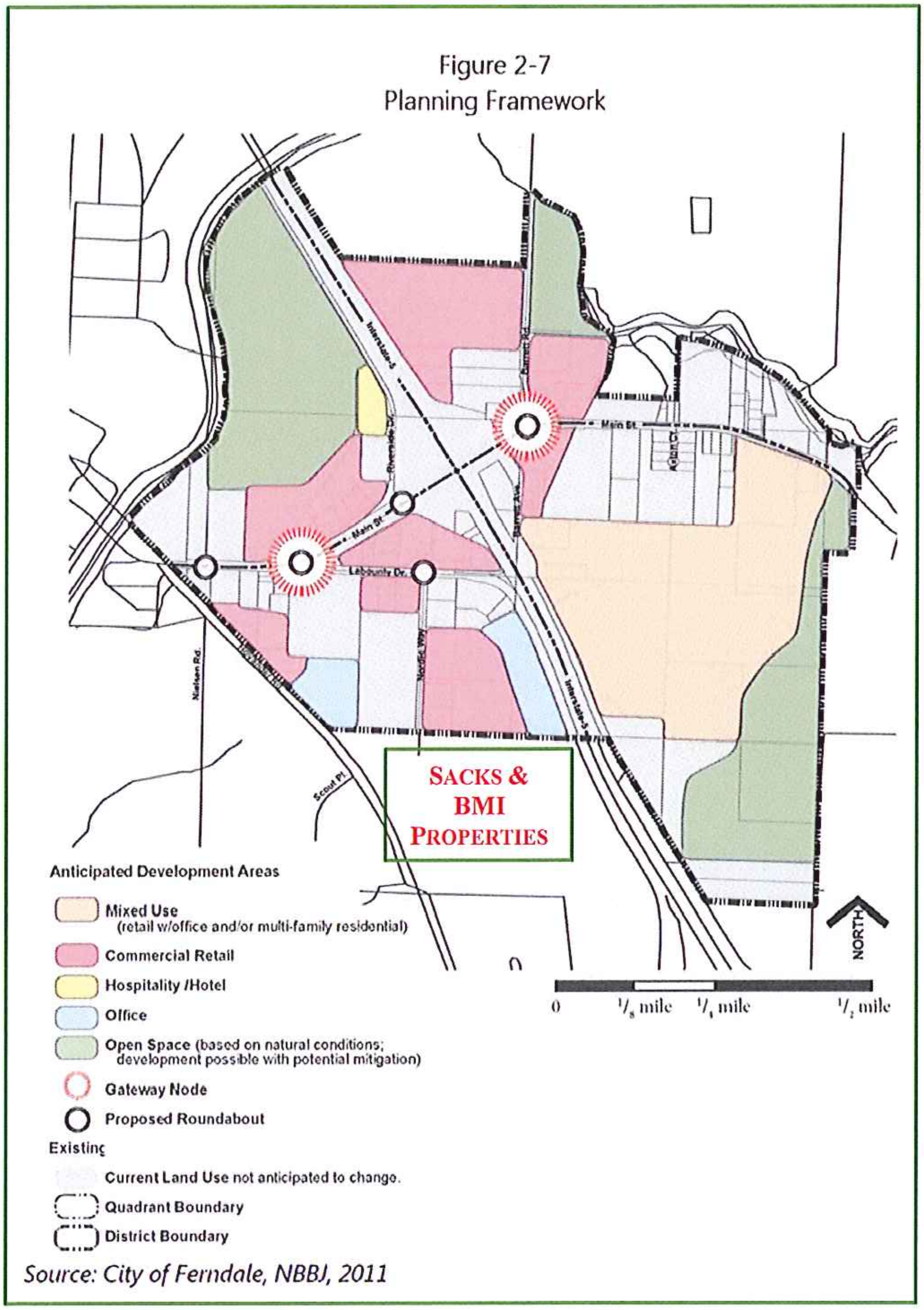
Property: West of Nordic Way
Photos courtesy SAS Consulting. August 28, 2011

2 cont

I show following statement contained under PA EIS, at page 2-18:
Figure 2-7 [MY MAP 4] ***also shows anticipated development areas, based on City of Ferndale best available information. This information is intended to show likely locations of new development, but does not preclude development in other parts of the study area.***

Clearly, Sacks applied for site development permit around December 2009 and was granted permission by the Hearings Examiner on January 25, 2010 – long before the start of this PA EIS. As this project proposes to be the largest in the region, when built, I would expect it to be shown on Figure 2-7 map, and its property included in PA EIS Study Area.

Map 5: **DEVELOPMENT AREAS.**



4. **RIVERPLACE PROJECT.**

Riverplace project property is shown, among other places, on Figure 2-6, PA EIS, 3
Conceptual Open Space Plan. [SEE MAP 7]

While many of the Riverplace planned activities are noted at page 2-16, PA EIS, Figure 2-6 fails to confirm city of Ferndale zoning classification of this property being Mixed-Use Commercial at portions of the area identified as Open Space under this Open Space plan. The result, it seems to me, is very ambiguous to the public. At best, and should be clarified. [SEE MAP 6]

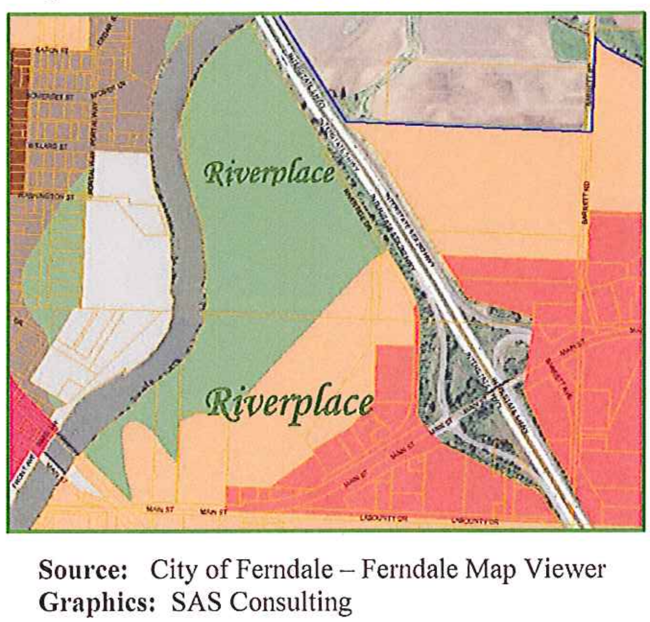
While Figure 2-6 may show the flood-storage nature of this property, it seems to me that current city of Ferndale zoning should also be clarified by super-imposing, or highlighting elsewhere. The need for such activity is all the more important, given following PA EIS text

"*Floodway*
Future development in portions of the study area designated as Floodway by the ACOE and FEMA may require review and approval through the ACOE, FEMA, and/or other agencies. If required, these potential future permit and environmental review processes will be conducted separately from the proposed action considered in this EIS and are not addressed in this EIS. However, <u>information contained in this EIS may be used to inform these separate permit processes.</u> The federal floodway definition should not be interpreted as the same as the City's Floodway zone or land use designation." [MY EMPHASIS]

Map 6: **RIVERPLACE ZONING MAP**

ZONING CLASSIFICATIONS:

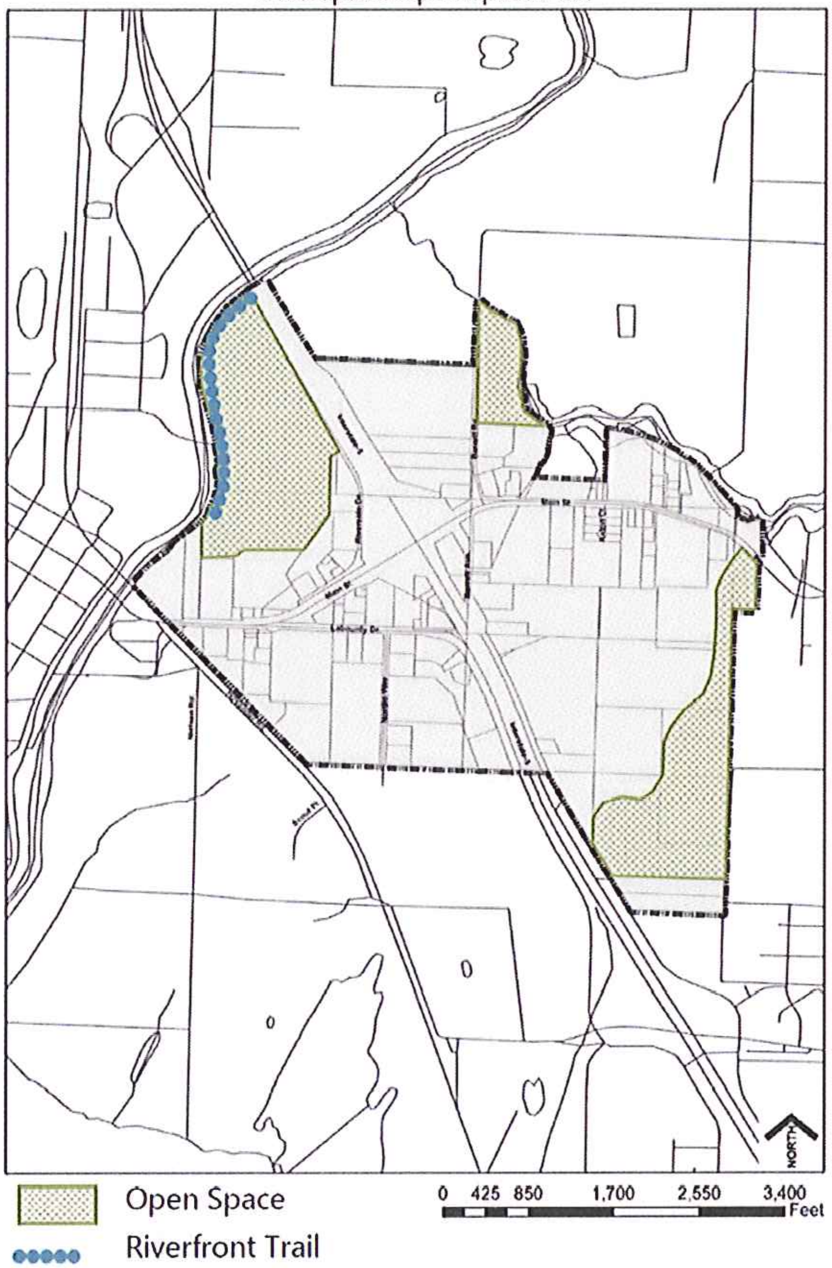
Floodplain | **Mixed-Use Commercial** | **Gateway Development**



Source: City of Ferndale – Ferndale Map Viewer
Graphics: SAS Consulting

Map 7: **PA EIS CONCEPTUAL OPEN SPACE PLAN.**

Figure 2-6
Conceptual Open Space Plan

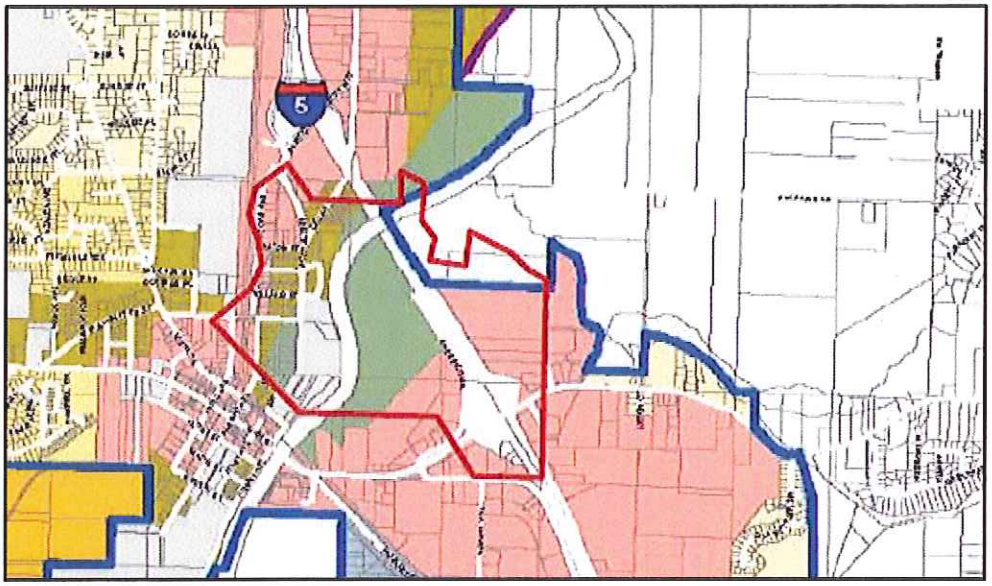


Source: EA|Blumen, 2011

5. **PA EIS MAP CORRECTIONS.**

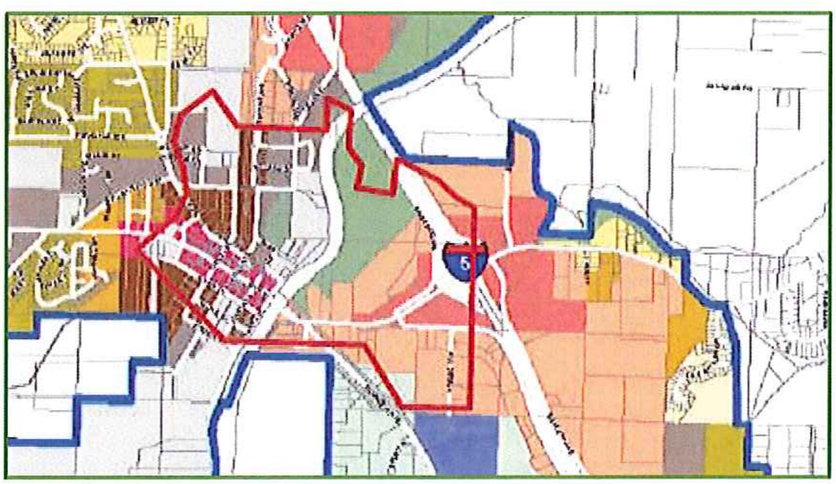
Mapping errors made to certain PA EIS maps are the result of poor work product and should be corrected. 4

a. Map 8: **STUDY AREA COMPREHENSIVE PLAN DESIGNATIONS**
PA EIS – FIGURE 2-3



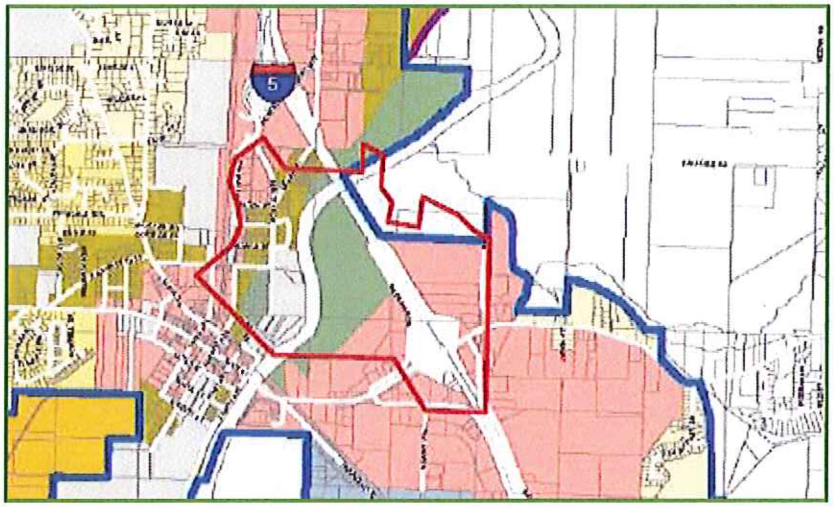
Correctly re-position outline of PA EIS Study Area, as such is shown at page 2-5.

b. Map 9: **ZONING DESIGNATIONS. PA EIS – FIGURE 2-4**



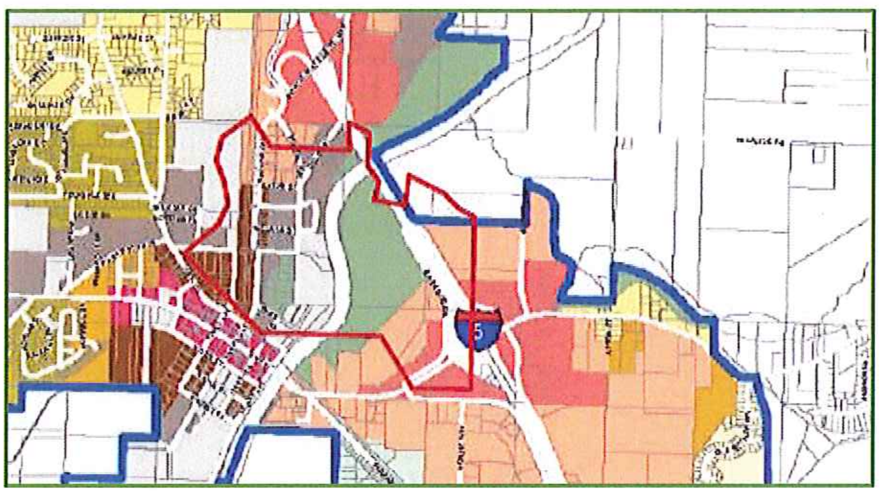
Correctly re-position outline of PA EIS Study Area, as such is shown at page 2-7.

c. Map 10: **STUDY AREA. PA EIS FIGURE 3.2-2** 4 cont



Correctly re-position outline of PA EIS Study Area, as such is shown at page 3.2-6.

d. Map 11: **STUDY AREA. PA EIS FIGURE 3.2-4**



Correctly re-position outline of PA EIS Study Area, as such is shown at page 3.2-15.

6. Ferndale Traffic Safety.

The traffic safety record for the city of Ferndale is one of the worst of the seven (7) cities of Whatcom County – between the years 2006 to 2009 – as told by collision statistics prepared by WSDOT and posted on their web site. [2010 STATISTICS WERE NOT AVAILABLE TO ME.] 5

In some respects, this city's traffic record may share with the city of Bellingham the unenviable accolade of being the worst. You should note that the city of Bellingham has adopted LOS of E for its arterials. Nevertheless, Ferndale's traffic safety record may be considered proportionately worse than that of Bellingham.

The PA EIS goes to some lengths focusing on accidents occurring between the years 2007 and 2010. [PA EIS – COLLISION HISTORY, BEGINNING AT PAGE 3.3-8] Clearly, Transpo have better access to WSDOT statistics. That is good. But Transpo have also missed the opportunity to inform and educate the people of Ferndale in the context of the reported collisions on a wider scale – comparing to the other cities of Whatcom County.

Why, for instance, are the collision statistics greater every year in Ferndale than in Lynden – two cities of similar population size, or other cities of Whatcom County?

Transpo suggests "[d]***uring the three year period*** [2007 – 2010]***, approximately 240 collisions were reported.***" [PA EIS PAGE 3.3-8] The statistics I viewed on the WSDOT web site suggested a much higher number. [SEE TABLE 2]

Of course, statistics reported by Transpo may represent different categories of accidents, but statistics reported on Table 2 suggest that Transpo data may be low – as years 2008 and 2009 produced 282 Collisions in Ferndale, according to WSDOPT. I am aware of 2010 statistics. To confirm, the PA EIS should attach the WSDOT data, and let the people of Ferndale decide for themselves.

Table 2: **All Collisions in Ferndale**

Year	All Collisions
2006	144
2007	148
2008	132
2009	150

Data Source: WSDOT – Washington State Collision Data Summary for the Years 2006 – 2009.

I have displayed on Tables 3 and 4 the traffic collision statistics reported by WSDOT, for the seven (7) cities of Whatcom County, during the years 2006 to 2009.

Table 3 data – ***Collision Rate of Whatcom County Cities*** – includes all collision that are reported by WSDOT for the target period: Fatalities, Serious Accidents, Minor Accidents, Property Damage Only Accidents. 5 cont

TABLE 3: **COLLISION RATE OF WHATCOM COUNTY CITIES**

CITY	2006		2007		2008		2009	
	Rate	*Rank	Rate	*Rank	Rate	*Rank	Rate	*Rank
Bellingham	2.193%	Worst	2.112%	Worst	1.861%	Worst	1.714%	Worst
Ferndale	1.401%	2	1.404%	2	1.191%	2	1.354%	2
Blaine	0.982%	3	1.290%	3	0.949%	3	1.097%	3
Lynden	0.902%	4	0.798%	4	0.770%	6	0.744%	4
Everson	0.598%	5	0.651%	5	0.438%	**Best**	0.481%	5
Sumas			0.600%	6	0.830%	4	0.302%	6
Nooksack	0.562%	**Best**	0.588%	**Best**	0.774%	5	0.172%	**Best**

***Rank** = 1 is highest Collision Rate, 7 has lowest Collision Rate.
Data Source: WSDOT – Washington State Collision Data Summary for the Years 2006 – 2009.
Tabulated by: SAS Consulting

Table 4 data – ***Fatalities and Serious Injuries by Whatcom County Cities*** – demonstrate that the city of Ferndale may have a worst traffic safety record than the city of Bellingham and all other cities of Whatcom County, during the target period. [Note that this category of collisions omits Minor Accidents and Property Damage Only Accidents.]

TABLE 4: **FATALITY & SERIOUS INJURIES – BY WHATCOM COUNTY CITY**

CITY	2006		2007		2008		2009	
	Rate	*Rank	Rate	*Rank	Rate	*Rank	Rate	*Rank
Bellingham	0.211%	Worst	0.029%	2	0.024%	3	0.024%	3
Ferndale	0.136%	3	0.057%	Worst	0.018%	4	0.045%	Worst
Blaine	0.089%	4	0.000%	4	0.084%	Worst	0.000%	**Best**
Lynden	0.084%	5	0.027%	3	0.017%	5	0.017%	4
Everson	0.199%	2	0.000%	**Best**	0.044%	2	0.044%	2
Sumas			0.000%	**Best**	0.000%	**Best**	0.000%	**Best**
Nooksack	0.047%	**Best**	0.000%	**Best**	0.000%	**Best**	0.000%	**Best**

***Rank** = 1has highest rate of Fatalities & Serious Accidents, 7 has the lowest.
Data Source: WSDOT – Washington State Collision Data Summary for the Years 2006 – 2009.
Tabulated by: SAS Consulting

7. COMMENTING ON FERNDALE'S PA EIS TRAFFIC SUGGESTIONS.

I will let Mr. Mark Jacobs, PE, PTOE, and principal of Jake Traffic Engineering, Inc. discuss with you the issues surrounding statistics and conclusions advanced under this PA EIS. Mr. Jacobs is eminently qualified to rebut the PA EIS statistics and conclusions. 6

Mr. Jacobs is professional and very knowledgeable in traffic matters occurring in Ferndale; has authored numerous traffic studies which have been accepted by City Staff; brings a responsible and balanced social view to matters of municipal transportation; and is very passionate regarding the safety and opportunity of all citizens using the city's streets – drivers, pedestrians, cyclists, and so on. 6 cont

8. **INCREASED SPEEDS AND WIDER CITY STREETS CAUSE MORE ACCIDENTS.**

The written record is replete with published studies done by many organizations for many cities of this land, confirming that wider and faster streets promote increasing rates of accidents – both vehicular and pedestrians. 7

We know also, from similar studies, that wider and faster streets promote more traffic and more traffic congestion – resulting in a need to continually widen such streets in order to maintain the previously achieved levels of traffic mobility. That would be bad planning.

The PA EIS premise is that the Axton/Main Corridor – and surrounding areas – need to be widened, adding a series of terribly expensive infrastructure improvements to reduce or remove perceived traffic congestion.

To paraphrase Mr. Greg Young, Ferndale City Administrator – ***other cities would kill to have the low levels of traffic congestion enjoyed in Ferndale.*** Such statements suggest that Mr. Young has a fundamental awareness that traffic congestion does not exist in Ferndale to such crisis proportions that would require raising the city's LOS level, increasing speed limits, and bankrupting this city by spending the millions of dollars it doesn't have.

To summarize a few of the published reports that examined the issue of street width and increased accident rate, I suggest you review the following:

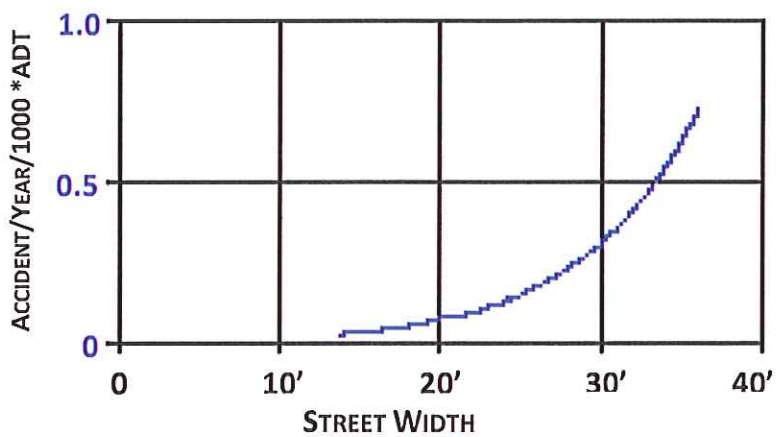
a. Study by Oregon's Transportation and Growth Management program found that a typical 36-foot wide residential street produced nearly 4 times more accidents than a 24 foot wide street.

b. The Transportation Research Board, under its "***Questionable Concepts in Neotraditional Subdivision Design***", confirmed that more accidents occur on wider streets.

c. Under the "***Residential Street Typology and Injury Accident Frequency***," by Peter Swift, P. E., Dan Painter, AICP, Matthew Goldstein, Summer of 2006, this Longmont, CO study concluded that a typical 36-foot wide residential street experienced a 487% increase in accidents over a 24-foot wide street. 7 cont

In this study of some 20,000 police accident reports, researchers concluded that the most significant relationship to injury accidents was street width. Accidents per mile per year increased exponentially with wider street widths. The safest residential street widths were found to be the narrowest.

MEDIAN ACCIDENT RATE AND STREET WIDTH



"Clear relationships are evident between accident frequency and street width. The findings support the premise that narrower, so called "skinny" streets, are safer than standard width local streets."

9. **POPULATION GROWTH AND INCREASED RATE OF TRAFFIC CONGESTION.**

Traffic congestion will increase at a faster rate than population growth. There is no mystery. Numerous societal factors combine to generate this phenomenon. 8

September 18, 2006, Mr. Tom Black [then Planning Director for the city of Ferndale] and Mr. Robb Milspaw [a consultant hired by the city of Ferndale] testified before City Council that traffic volumes were increasing in Ferndale at the rate of about 5% per year in excess of the population growth rate.

Messrs. Black and Milspaw also testified that citywide road capacity-miles had increased by an overall amount of 56% in the same period – and that most of this capacity had been on major and minor arterials. Still, traffic congestion persists in Ferndale.

Mr. Dave Christensen, testifying before the Bellingham City Council in support of ordinance proposing LOS F standards said: "***We cannot continue to build wider roads to build our way out of capacity.***" As Mr. Christensen understood – this is the crux of the issue. And this concept applies equally in Bellingham, Ferndale, Seattle, or wherever in this land. 8 cont

There are many reasons why the rate in growth of traffic congestion will continue to exceed the rate of population increase. Many of these reasons can be mitigated, however, by improving on this city's modes of transportation. Rather than building wider roads and more expensive roundabouts, this city needs serious commitment to improving travel by walking, bicycles, transit, share-riding, Safe Routes to School, marine, and others.

We can improve on mobility, by adopting simple measures as those recommended by Mr. Mark Jacobs, in his report to you, and by synchronizing the street control lights system on Main Street.

We can also improve on mobility by committing to construct the Thornton mid-town bypass – as this city and its consultants have been recommending for about 35 years.

We can reduce trips by increasing this city's share of retail opportunities and, in the process, also increasing this city's share of taxable revenues.

10. THORNTON MID-TOWN BYPASS.

Some 35 years ago, perhaps more, the city of Ferndale embarked on a process to construct a mid-town bypass at Thornton Road – connecting Swede Hill to Portal Way. The architect of this plan was Mr. Birdsall – the city's then-traffic consultant. Over the years, this plan has been tweaked and revised, persists on the city's books, and is ignored under this PA EIS. 9

I would surmise that the city has received millions of dollars from developers, over this time span, due to this plan, as this plan has been the largest single contributor to establishing the traffic mitigation rate – which was, at times, one-third to one-half of the recommended improvements for each TIP period. Notwithstanding the moneys received by the city, due in part to this plan, infrastructure improvements made to convert this plan to reality have been negligible.

While some components of this proposal may require further study, the important aspects of this plan – in the context of this PA EIS – is that every city of Ferndale administration since its inception has promoted that this plan will cause substantial reduction in traffic volumes on the Main/Axton Corridor. Accordingly, every administration has placed this plan atop its list of transportation improvements for each succeeding TIP.

Today, Mr. Jori Burnett, Ferndale Planning Director, set the aggregate price of this plan at about $32 million. [MINUTES, FERNDALE CITY COUNCIL, JANUARY 5, 2010] 9 cont

For example, during the public hearings on the Pioneer Plaza project, Mr. Birdsall testified that this plan would reduce traffic volumes on Main Street so much that, together with other congestion-mitigating measures cited, no traffic increase would result on the Main/Axton corridor when the 1.1 million SF project was built, at the city's east end of Axton.

Yet, today, this PA EIS seems to have totally ignored Mr. Birdsall's plan and its traffic volume-mitigating measures for the Main/Axton Corridor – save for improvements suggested to improve on local traffic conditions.

I believe you must require of the PA EIS Team to analyze the benefits in traffic reduction to be derived at the Main/Axton Corridor by this proposed Thornton Mid-town Bypass before proceeding with another $35+ million expenditure, and building unsafe streets.

Thank you so much,

Serge A. Slagle
SAS Consulting – principal
Can-America Exports, Ltd. – Authorized Representative for Washington
American Planning Association – member
Urban Land Institute – member

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Ferndale, WA 98248
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City of Ferndale - PA EIS Property Owners

Whatcom County Assessor Research - March 8 to March 15, 2011, and July 14 and 15, 2011 - by SAS Consulting. Certain acreages verified by Whatcom County Assessor staff July 20, 2011.

Southeast Quadrant, page 1

Geocode	Acreage	Address	Owner Name	Address.1	Address.2	Zip Code
390228215141	3.70	5410 BARRETT RD	BARRETT VENTURES LL	2928 ST CLAIR ST		WA 98226-6108
390228214157	4.04	5420 BARRETT RD	BAR-CONSTRUCTION LLC	4936 LAKE TERRELL RD		WA 98248-9017
390228174213	19.66	5426 BARRETT RD	268 Holdings LLC	850 W IRONWOOD DR STE 101	COEUR D'ALENE	ID 83814-4903
390228234234	10.00	5428 BARRETT RD	268 Holdings LLC	850 W IRONWOOD DR STE 101	COEUR D'ALENE	ID 83814-4903
390228120249	3.64	5484 BARRETT RD	THREE-D SAC SELF-STORAGE LP	U-HAUL INTERNATIONAL	1250 East MISSOURI AVE, Phoenix	AZ 85014-2912
390228105274	1.98	5494 BARRETT RD	NORTHWEST PROPANE SALES LLC	P 0 BOX 652	LYNDEN	WA 98264-0652
390228084288	0.59	0 BARRETT RD	NORTHWEST PROPANE SALES LLC	P0 BOX 652	LYNDEN	WA 98264-0652
390228165297	10.00	5438 BARRETT RD	268 Holdings LLC	850 W IRONWOOD DR STE 101	COEUR D'ALENE	ID 83814-4903
390228232299	10.00	5436 BARRETT RD	268 Holdings LLC	850 W IRONWOOD DR STE 101	COEUR D'ALENE	ID 83814-4903
390228095350	19.05	5600 BARRETT RD	OLD STANDARD LIFE INSURANCE CO	P 0 BOX 1520	VERADALE	WA 99037-1520
390228195367	18.96	0 BARRETT RD	268 Holdings LLC	850 W IRONWOOD DR STE 101	COEUR D'ALENE	ID 83814-4903
390228044392	1.07	5588 BARRETT RD	EIFORD FAMILY LLC	1837 NW 201ST ST	SEATTLE	WA 98177-2244
390228043406	1.20	5610 BARRETT RD	DON'T MAIL			
390228083423	10.36	5684 BARRETT RD	OLD STANDARD LIFE INSURANCE CO	P 0 BOX 1520	VERADALE	WA 99037-1520
390228022435	2.19	5628 BARRETT RD	OLD STANDARD LIFE INSURANCE CO	P 0 BOX 1520	VERADALE	WA 99037-1520
390228194465	13.95	1537 AXTON RD	268 HOLDINGS LLC	850 W IRONWOOD DR STE 10I	COEUR D'ALENE	ID 83814-4903
390228225421	11.95	1515 AXTON RD	RONALD-MARILYN BENNETT LLC 1/2	SHERWOOD EQUITIES LLC 1/2	1919 CORNWALL AVE	WA 98225-3659
390228312496	3.06	1450 AXTON RD	Ronald - Marilyn BENNETT LLC 1/2	SHERWOOD EQUITIES LLC 1/2	1919 CORNWALL AVE	WA 98225-3659
390228243495	1.10	1515 AXTON RD	DIMITRIOS & KAREN PANTOLEON	1515 MAIN ST	FERNDALE	WA 98248-9437
390228176464	1.01	0 AXTON RD	268 HOLDINGS LLC	850 W IRONWOOD DR STE 101	COEUR D'ALENE	ID 83814-4903
390228177490	0.55	0 AXTON RD	BRENT & JAN HOELZLE	1565 MAIN ST	FERNDALE	WA 98248-9437
390228177503	0.45	1565 AXTON RD	BRENT & JAN HOELZLE	1565 MAIN ST	FERNDALE	WA 98248-9437
390228176519	0.40	1567 MAIN ST ST	PEREZ EILENE C	1567 MAIN ST	FERNDALE	WA 98248-9437
390228167524	0.34	1573 AXTON RD	BRENT & JAN HOELZLE	1565 MAIN ST	FERNDALE	WA 98248-9437
390228160524	0.32	1575 MAIN ST	DAVID L & JUDY N BOZARTH	1575 MAIN ST	FERNDALE	WA 98248-9437
390228163485	3.24	0 AXTON RD	EUGENE R & JOAN M MARBLE &	CURT E MARBLE DBA EMC	573 KLAMATH DR, La Conner	WA 98257-9612

City of Ferndale - PA EIS Property Owners

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Southwest Quadrant, page 1

Geocode	Acreage	Address	Owner Name	Address.1	Address.2	Zip Code
390229240428	0.14	1899 MAIN ST	B & R OXFORD LLC	PO BOX 2551	Ferndale	WA 982488-2551
390229260423	0.81	1895 MAIN ST	PEOPLES BANK	ATTN TAX DEPT	PO BOX 233	WA 98264-0233
390229318417	1.42	1901 MAIN ST	FERNDALE DRUG LORDS LLC	WALGREEN CO #7782	PO BOX 901	IL 60015-0901
390229338415	1.14	1873 MAIN ST	HARRY LAWSON TRUST	LYNN E GITLIN TR &	2339 11TH AVE E, seattle	WA 98102-4013
390229330393	1.51	0 MAIN ST	FERNDALE SHOPS LLC	218 MAIN ST., PMB 539	KIRKLAND	WA 98033-6108
390229351426	0.26	1867 Main Street	KT Ferndale Station LLC	510 Lakeway Drive	Bellingham	WA 98225-5234
390229365421	0.57	1851 Main Street	KT Ferndale Station LLC	510 Lakeway Drive	Bellingham	WA 98225-5234
390229351411	0.65	1863 Main Street	KT Ferndale Station LLC	510 Lakeway Drive	Bellingham	WA 98225-5234
390229363404	0.57	1855 Main Street	KT Ferndale Station LLC	510 Lakeway Drive	Bellingham	WA 98225-5234
390229358381	1.96	1869 Main Street	KT Ferndale Station LLC	510 Lakeway Drive	Bellingham	WA 98225-5234
390229366353	1.27	Main Street	KT Ferndale Station LLC	510 Lakeway Drive	Bellingham	WA 98225-5234
390229403395	10.40	1815 MAIN ST	BRIAR DEVELOPMENT CO	PO BOX 9704	Bellingham	WA 98227-9704
390229408329	6.24	0 MAIN ST	JOANNE D B NOLAN 21/66 &	MERRIL NOLAN 12/66 &	P 0 BOX 1002	WA 98248-1002
390229441416	1.04	1799 LABOUNTY DR	HEATHER J. RETTMER &	LARSON INVESTMENTS LLC &	LISA J BECK	WA 98248-1297
390229456416	1.04	0 LABOUNTY DR	HEATHER JRETTMER&	LARSON INVESTMENTS LLC &	LISA J BECK	WA 98248-1297
390229474416	1.43	0 LABOUNTY DR	HEATHER J RETTMER&	LARSON INVESTMENTS LLC &	LISA J. BECK	WA 98248-1297
390229458350	11.45	5575 NORDIC WAY	SAUDER WOOD PRODUCTS INC	ATTN LOREA RAMSEY	P0 BOX 1336, TACOMA	WA 98401-1336
390229502421	1.10	1739 LABOUNTY DR	INDUSTRIAL CREDIT UNION	P.O. BOX 1767	BELLINGHAM	98227-1767
390229502400	1.31	5580 NORDIC WAY	HRUBY-SAFFORD MEDICAL FACILITIES LLC	7401 VALLEY VIEW RD	FERNDALE	WA 98248-8705
390229560414	2.15	1731 LABOUNTY DR	S F P-B LIMITED PARTNERSHIP	P0 BOX 5350	BEND	OR 97708-5350
390229570378	5.13	5545 LABOUNTY DR	LABOUNTY CENTER LLC	7022 DAHLBERG RD	FERNDALE	WA 98248-9744
390229560406	0.52	1711 LABOUNTY DR	V DARDIN & TERESA L PRICE	9138 GLENEAGLE DR	BLAINE	WA 98230-5706
390229564395	0.80	5575 LABOUNTY DR	LABOUNTY CENTER LLC	7022 DAHLBER G RD	FERNDALE	WA 98248-9744
390229521364	6.55	0 NORDIC WAY	SAWARNE LUMBER CO INC	12900 MITCHELL RD	RICHMOND BC	V6V 1M8
390229500328	1.14	0 NORDIC WAY	SAWARNE LUMBER CO INC	12900 MITCHELL RD	RICHMOND BC	V6V 1M8

City of Ferndale - PA EIS Property Owners

City of Ferndale - PA EIS Property Owners

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Northwest Quadrant

Geocode	Acreage	Address	Owner Name	Address.1	Address.2	Zip Code
390229235466	5.90	1920 MAIN ST	B&R Oxford LLC	P 0 BOX 2551	FERNDALE	WA 98248-2551
390229259478	3.30	1904 MAIN ST	JAFFA HOLDINGS LTD	101-5520 MINORU BLVD	RICHMOND BC	V6X 2A9
390229318466	4.65	220 MAIN ST	JAFFA HOLDINGS LTD	101-5520 MINORU BLVD	RICHMOND BC	V6X 2A9
390229339445	0.30	1874 MAIN ST	GILBERT ELLEN M	P 0 BOX 1167	Ferndale	WA 98248-1167
390229349445	0.27	1860 MAIN ST	BAS AT-1 INC	1621 CORNWALL AVE	Bellingham	WA 98225-4634
390229360445	0.18	1850 MAIN ST.	RIVERSIDE GOLF COURSE INC	812 POPLAR DR	Bellingham	WA 98226-4408
390229373448	0.30	1846 MAIN ST.	MAGDY & TAHANY AWADALLA	1846 MAIN ST	Ferndale	WA 98248-9454
390229389449	0.10	1820 MAIN ST.	DAVE FORCE TRUST	1111 W HOLLY ST #D	Bellingham	WA 98225-2922
390229385461	1.07	0 RIVERSIDE DR	Can-America Exports, Ltd.	PO Box 1406	Ferndale	WA98248-1406
390229405473	0.92	5631 RIVERSIDE DR	LES SCHWAB PROFIT SHARING TR	5631 RIVERSIDE DR	Ferndale	WA 98248-9443
390229380510	3.46	0 RIVERSIDE DR	Can-America Exports, Ltd.	PO Box 1406	Ferndale	WA98248-1406
390229429486	0.57	0 RIVERSIDE DR	NORTH COAST CREDIT UNION	ATTN TAX DEPT, 1100 Dupont St.	Bellingham	WA 98225-3190
390229437484	0.38	5657 RIVERSIDE DR	NORTH COAST CREDIT UNION	ATTN TAX DEPT	1100 DUPONT ST, Bellingham	WA 98225-3190
390229442501	0.82	0 RIVERSIDE DR	ABRAHAM & DANIEL KOLB JT	8551 FIARFAX CRES	RICHMOND BC	V7C 1X9
390229443522	2.28	5671 RIVERSIDE DR	OH GEORGE	1237 S SUNSET DR	TACOMA	WA 98465-1230
390229380510	3.54	0 RIVERSIDE DR	Can-America Exports, Ltd.	PO Box 1406	Ferndale	WA 98248 - 1406
390229360475	5.00	0 RIVERSIDE DR	Can-America Exports, Ltd.	PO Box 1406	Ferndale	WA 98248 - 1406
390229457545	1.07	5669 RED TOP RD	WASHINGTON STATE	P0 BOX 47014	OLYMPIA	WA 98504-7014
390229365535	61.68	100 RIVERSIDE DR	CAN-AMERICA EXPORTS, LTD.	PO BOX 1406	FERNDALE	WA 98248-1406
	95.79	**-1.07**	**= 94.72**			

City of Ferndale - PA EIS Property Owners

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Northeast Quadrant, page 2

390221200025	0.22	1554 MAIN ST	BLAKESLEY DIANNE M	1554 MAIN ST	FERNDALE	WA 98248-9437
390221184010	0.58	1560 MAIN ST	RONALD E & DIANNE M BLAKESLEY	1554 MAIN ST	FERNDALE	WA 98248-9437
390221200015	0.22	1552 MAIN ST	RONALD E & DIANNE M BLAKESLEY	1554 MAIN ST	FERNDALE	WA 98248-9437
390221200005	0.39	1548 MAIN ST	VERDELL N & CAROL SILSBEE	1548 MAIN ST	FERNDALE	WA 98248-9437
390221211024	0.59	1540 MAIN ST	ALAN B & MARYANN DUNCAN	1540 MAIN ST	FERNDALE	WA 98248-9437
390221224013	2.73	1538 MAIN ST	JENSEN A LOWELL	3120 BILL MCDONALD PKWY #11	BELLINGHAM	WA 98225-6048
390228316547	1.84	1496 AXTON RD	JAMES S & DIANNE M WYNGAERT	1496 MAIN ST	FERNDALE	WA 98248-9446
390228251522	0.88	1516 AXTON RD	KOVACEVICH ALBERT B	1516 MAIN ST	FERNDALE	WA 98248-9437
390228223526	1.22	1538 AXTON RD	JENSEN A LOWELL	3120 BILL MCDONALD PRKW #11	Bellingham	WA 98225 - 6048
	74.45	PA EIS Reprt: **77.6-acre northeast quadrant by the northeast municipal boundary;**				

Response to Draft EIS Letter 7: SAS Consulting

1. **Study Area Acreage.** The acreages utilized in this EIS were obtained from the City of Ferndale's GIS system. It is acknowledged that there are differences in how acreages are tracked and calculated. However, it should be noted that the planned action area defined in the ordinance is based on the mapped boundaries rather than an acreage total. The City has confirmed that the mapped boundaries as shown in the EIS are correct.

   Because of the reliance on the mapped boundaries, the exact acreage is not a critical factor in establishing the planned action area. The EIS acreage information is identified as approximate and intended to provide a general sense of the size and magnitude of the study area.

   The "impacted property owners" list referred to in the comment was a list of property owners within the study area, generated from the City's GIS system, who received notice of the public scoping meeting for this EIS.

2. **Light Industrial Uses.** The comment is noted. Because light industrial uses differ significantly from the mix of retail/office commercial and residential uses contemplated in the planned action area, the City concluded that light industrial development should not be included in the planned action area. It should be noted that the traffic generation associated with all surrounding development, including the light industrial area, was assumed in the transportation analysis.

   With respect to the specific properties noted in the Comment, Bellingham Marine is considered fully developed at this time and land use approvals for development of the Sacks Industrial property have been recently submitted and approved.

3. **Open Space Map.** The comment is noted. The conceptual open space map was intended to identify areas that have been proposed for open space. It is acknowledged that this map does not convey zoning designations. Zoning designations are shown in Draft EIS Figure 2-4. In the case of property in the northwest quadrant, zoning designations include Floodway, Mixed Use Commercial and Gateway Development.

4. **Map correction.** The study area boundary was shifted to its proper position in the noted figures. Please see Figures 1-3 and 1-4 in the Final EIS.

5. **Collision data.** The comments are noted. The collision data discussed in the comment are based on the same WSDOT collision data presented in the Draft EIS. However, the data represent different geographic areas. The data in the comment appear to reflect all collisions within the City of Ferndale during that time period. The data presented in the Draft EIS represent collisions only at the study intersections (see page 3.3-8 of Draft EIS) and not all of the City of Ferndale. Appendix B includes the request to WSDOT and the data provided by WSDOT for the study intersections. The collision summaries cover intersections in the City and in the County, including study intersections along SR 539, Aldrich Road, and Northwest Drive. The data reported in the Draft EIS do not include collisions that occurred on the I-5 mainline freeway or on the freeway ramps, not associated with the intersections. The collision data do, however, include collisions that occurred at the intersections of the interchange ramps with Main Street and with Slater Road. Based on the data from WSDOT, a total of 240 collisions were reported at the 26 study intersections depicted on Figure 3.3-2 of the draft EIS. Of these 83 collisions were reported at intersections with Main Street at 4th Avenue, 3rd Avenue, 2nd Avenue, 1st Avenue, Hovander Road, Walgreen's intersection, and LaBounty Drive. A total of 26 collisions were reported at the intersection of LaBounty Drive and Main Street, which was higher than any other study intersection. Other study intersections with 15 or more collisions during that time period include Main Street/ I-5 Northbound Ramp (24), Main Street/ I-5 Southbound Ramp (16), SR 539 / Smith Road (23), and SR 539/Axton Road (15). These data are reported in Table 3.3-2 of the Draft EIS (rounded values are reported in the table).

   The collision data from WSDOT presented in the Draft EIS are included in the Appendix B to this Final EIS. The Draft EIS presents a summary of the collision data to identify locations where traffic safety has been a problem and also identifies where potential impacts to safety may occur under the different alternatives. Increases in forecast traffic can increase the number of collisions at a location, especially if increased congestion results. The purpose of the EIS is not to compare Ferndale with other communities, but to assess the potential impacts of the alternatives on traffic safety. Based on the traffic forecasting, it is unlikely that the increased development in Ferndale would have a significant impact on traffic safety in Everson or other communities noted in the comments. The data provided in the tables in the comment are included in the Final EIS and can be considered in the City's decision on selecting an alternative.

6. **Reference to Comment Letter #9.** The comments are noted.

7. **Roadway width and accidents.** The comments are noted. The EIS does not include recommendations to significantly widen roadways to add capacity. It also does not promote changing speed limits, which was proposed by Mr. Jacobs (Letter 9, Comment 3) to improve travel times along Main Street. The improvements identified in the EIS include upgrading arterials and collectors to urban standards (Main Street east of I-5, Barrett Road, and LaBounty Road). These improvements would include non-motorized facilities and turn lanes, which would likely improve safety with the increased volumes of traffic generated under the action alternatives.

   The EIS also identifies strategies for intersections using roundabouts or traffic signals. The intersection improvements were identified to reduce traffic delays and impacts of traffic queues between intersections to meet the City of Ferndale's and WSDOT's currently adopted level of service standards. The *Highway Safety Manual, 1st Edition*, American Association of State Highway and Transportation Officials (AASHTO), 2010, includes crash modification factors for different types of roadway and intersection improvements. The *Highway Safety Manual* shows that addition of turn lanes at signalized or unsignalized intersection can reduce the frequency and severity of collisions. The *Highway Safety Manual and Roundabouts: An Informational Guide*, *Second Edition, NCHRP Report 672*, Transportation Research Board, 2010 also show the positive effects of converting signalized intersections to roundabouts, as related to reducing the number and severity of collisions. The NHCRP report identifies a 66 percent reduction in total collisions at locations converted from traffic signals to roundabouts at suburban locations. The standard deviation at these locations was 4.4. As reported on the WSDOT web site (http://www.wsdot.wa.gov/Safety/roundabouts/benefits.htm), studies by the Insurance Institute of Highway Safety (IIHS) showed that roundabouts reduced injury crashes by 75 percent at intersections that were previously controlled by traffic signals or stop signs. Studies by the IIHS and Federal Highway Administration (FHWA) also reported a 90 percent decrease in fatality crashes and a 40 percent reduction in pedestrian related crashes. On page 5-9 of the NHCRP report it is noted that the number of conflict points increase with multilane roundabouts compared to single-lane roundabouts, but the severity (and often the number) of collisions is typically less than intersections with other types of traffic controls. The relative safety benefits of roundabouts also have been reported to diminish with higher traffic volumes. As noted in the studies, the separation of traffic flows, the requirement for all traffic to slow as it approaches the intersection, and the reduced number of conflict points all factor into to the reduced number and severity of collisions at a roundabout intersection compared to an intersection with traffic signal controls. Roundabouts are designed to provide for the continuous flow of traffic; this reduces the urge or need for drivers to speed up to "beat the light" which also helps improve safety at the roundabouts versus a traffic signal intersection.

The analyses of collisions and traffic safety, and identified improvements, address arterials and collector roadways. The three studies cited in the comment related to travel speeds and widths on residential streets and are not comparable to the facilities discussed in the EIS.

It should be noted that the City is not proposing to change the adopted Level of Service, but instead to retain the adopted LOS C standard.

8. **Population increase and traffic congestion.** The comments are noted. The Draft EIS summarizes existing traffic operations at intersections along Main Street and in the broader study area, As shown in Table 3.3-1, the majority of intersections along Main Street operate at LOSB or better. The two exceptions are the intersections of Main Street with Hovander Road and Main Street at Barrett Road (north). The poor level of service at these two intersections currently controlled with stop signs is for the left-turns from the minor street entering Main Street. A small number of vehicles are affected by this poor level of service. The level of service analyses is not consistent with the statement in the comment that traffic congestion persists in this major corridor serving the study area.

   The Supplemental Transportation Analyses included in the Final EIS (see Section 2.1) includes improvement options based on roundabouts or traffic signals to meet the LOS C or LOS D at City intersections. The signal strategy assumes coordination of traffic signals along Main Street, consistent with the City's Transportation Element.

   The Transportation Element of the City's Comprehensive Plan identifies strategies and improvement projects to enhance travel by other modes. In addition, the EIS notes the need for upgrading several corridors to improve the connectivity, circulation, and safety for pedestrians and accessibility to transit. Designs of identified improvements would need to incorporate other travel modes. The extension of Thornton Road is also included in the Transportation Element and assumes that by 2034 improvements would be completed for all three land use alternatives presented in the EIS.

9. **Thornton Road.** The comments are noted. The Transportation element of the City's Comprehensive Plan recommends the extension of Thornton Road. A portion of the cost of extending Thornton Road is also included in the revised Transportation Impact Fee. In developing the traffic forecasts, the extension of Thornton Road was assumed completed under all three land use alternatives presented in the Draft EIS.

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August 30, 2011

VIA EMAIL

Jori Burnett, Comm. Dev. Dir.
City of Ferndale
2095 Main Street
Post Office Box 936
Ferndale, WA 98248

Re: Comment – Draft Planned Action-Environmental Impact Statement

Dear Jori:

Please accept these as written comments to the draft PA-EIS (DEIS) submitted on behalf of my clients, Ferndale Town Center LLC and Sawarne Lumber Company, Inc. We greatly appreciate the process that the city is moving through in its attempt to plan for the anticipated development of this area. But we would ask the city as the lead agency in this matter to seriously consider these comments and significantly revise the proposed mitigation alternatives as noted below.

I. SUMMARY OF COMMENTS

A. Stormwater: The DEIS must be revised to provide additional information regarding the possible location, cost and service capacity of a regional stormwater facility(s). The DEIS is completely devoid of any such analysis and that was the intended purpose of including stormwater within the scope of the DEIS. 1

B. Traffic: The DEIS must be revised to include the following:

- Recommend adoption of a signalized Main Street corridor as set forth in the Jake Traffic Engineering letter submitted with these comments; 2
- Recommend re-adoption of LOS-D in the City of Ferndale's Comprehensive Plan/Transportation Element (TE); 3
- Adopt a phasing plan for traffic improvements, allowing property owners to construct the same in lieu of or in credit for traffic impact fees (TIF's); 4
- Adopt a program allocating a portion of all TIF's generated in the PA-EIS area for "seed money" to obtain state/federal funding for construction of the I-5 overpass improvements; 5

- Adopt a program allocating a significant portion of sales tax generated in the EIS area to be spent on I-5 overpass improvements only. 6

II. STORMWATER COMMENTS

The scope of the DEIS included evaluating potential mitigating alternatives for environmental impacts created by the anticipated development in the PA-EIS planning area. An obvious impact is the creation of impervious surface, causing the need for increased stormwater treatment and/or detention. To meet this goal, the DEIS must recognize and evaluate the economies of scale in developing regional stormwater treatment/detention facilities, consider possible locations for a regional stormwater facility, and evaluate the feasibility and economics of regional stormwater facilities and coordinated funding for the same. 7

Frankly, I and my clients were surprised and disappointed that no such analysis was done. Instead, there was a simple recitation of already known stormwater regulations and codes. This provided no insight into coordinated planning for mitigating the anticipated impacts.

Accordingly, the DEIS must be revised to include additional information regarding:

- Feasibility of a regional stormwater facility servicing one or more of the quadrants of the PA-EIS service area;
- Possible locations for such regional facilities along with estimated service areas;
- Estimated sizing options available for such regional facilities;
- Possible funding alternatives that are available;
- Analysis of methods to convey stormwater to the Nooksack River without detention.

With that additional information, the DEIS should then propose adoption of a plan that would promote the siting, creation and funding of regional stormwater facilities within the PA-EIS.

III. TRAFFIC COMMENTS

A. Background: The analysis of possible mitigating strategies and the proposal of a mitigating strategy **MUST** comply with current city code and the adopted city Comprehensive Plan/Transportation Element (TE). And obviously, any proposed mitigation strategy must be consistent with the decades of planning that the City of Ferndale has already incorporated into the development of the Main Street corridor, be 8 consistent with the expenditures of millions of dollars creating the existing infrastructure, and fully utilize all the improvements and strategies that have been built into this corridor. 8 cont

Without question, the city has planned for and formally adopted a plan for a signalized Main Street corridor.[1] First and foremost, that is what has been adopted into the TE (nary a roundabout along Main Street found in that planning document). But of equal importance is that millions of dollars have been invested to expand the Main Street corridor to a multi-lane, signalized corridor. The expenditure of these funds (both the city's and private property owners' money) was only done after careful planning and decades of expectation for a long-term signalized corridor.

Unfortunately, all of the traffic mitigation strategies of the DEIS are based upon a **flawed statement** that the "city has adopted roundabouts as its preferred alternative."[2] That is clearly incorrect – the city has never adopted roundabouts as a preferred strategy. That flawed assumption violates the TE and is inconsistent with the years of planning and construction along the Main Street corridor.

As noted below, there is absolutely no support for this "wrong turn." The DEIS provided no empirical data establishing roundabouts as the appropriate mitigation strategy. There has never been any discussion, let alone decision, by elected city officials to change the existing, adopted signalized plan. Instead, there is one repeated paragraph that is devoid of objective analysis.

Constructing the DEIS upon this flawed assumption has, unfortunately, resulted in the consumption of significant amount of consultant dollars, created much angst in the community and created an unadoptable DEIS. A DEIS based upon direct conflicts with the TE and decades of planning would not withstand judicial review, will cause wasteful delay, and effectively derail what was to be a coordinated planning effort. If the planned action process is to be successful, this "wrong turn" must be corrected now. The city must revise the DEIS to be consistent with decades of planning, decades of construction and its adopted TE.

Based upon the foregoing, our comments are separated into identifications of error, additional information required and alternative mitigation proposed.

B. Identification of Errors: The following is an identification of errors in the DEIS. These do not point to all of the numeric inaccuracies in specific tables, incorrect references to documents or other minor details. Instead, these are limited to the significant 9

[1] As used here, the Main Street corridor is from the Nooksack Bridge east to Barrett Road.

[2] DEIS 3.3-46. Also flawed are the references in Chapter 2 that recommend converting the corridor to roundabouts.

errors that have lead to the DEIS proposing mitigation strategies that violate the city's TE and are inconsistent with the requirements of the Growth Management Act and the purposes of this PA-EIS. 9 cont

1. *Roundabout as a Preferred Option*[3]: This is simply wrong. The city has never adopted roundabouts as a preferred option. In fact, the TE identifies no such preferred option and instead confirms that Main Street shall be a signalized corridor.

2. *"Roundabout Promotes Operational Efficiency"*[4]: This too is an error that lacks any factual support. While the city may not have to maintain traffic lights, the other operational expenses associated with roundabouts were never even considered. First, the construction of roundabouts will create enormous amounts of additional impervious surface, requiring other stormwater ponds which require construction and maintenance expenses. Second, if there are center areas that are not to be paved, these will have to be maintained by the city through the parks budget.[5] Third, all studies show that roundabouts increase the number of accidents (although the severity of accidents decreases). Because the number of accidents will increase, the operational load shifted to police/EMS will increase significantly. Finally, operational efficiency will decrease. As we can see from the problems with the roundabouts on Guide Meridian, these are relatively incapable of handling semi-truck traffic at any speed. So operational costs must consider the negative impact upon the city's productivity by slowing down truck traffic. 10

3. *Roundabout Travel Times*: The DEIS states travel speeds in the roundabouts that exceed reality and the speed limit. Unfortunately, there are no page numbers in Appendix D, so specific reference is not possible. But the tables indentified as "Movement Summary" with "SIDRA Intersection" at the lower right hand corner are factually incorrect. It appears that the models were programmed to list speeds of 25 to 30 m.p.h. through roundabouts, or that was the result of the computer program. Everyone knows that this is simply not true. Even on the Guide with posted speed limits of 50 m.p.h., traffic proceeds through those enormously large roundabouts at under 20 m.p.h. If you look at the roundabouts in Cordata or Northwest Road near the freeway, the through speed of roundabout travel is closer to 5 to 10 m.p.h, with traffic often coming to a complete stop. That distinction is enormous when looking at levels of service defined by corridor throughput. These errors must be corrected to reflect reality. 11

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[3] DEIS 3.3-46. This identical paragraph is restated in numerous locations.

[4] DEIS 1.19, 2-15, 3.3-46. The same or similar language is used throughout, yet without any factual support.

[5] But yet they will be unusable as public open space, as surrounded by the din of traffic. An apparent pointless waste of the Parks Department's maintenance services.

4. *Roundabout Meets LOS-C*[6]: The city's TE has two measurements for LOS: Delay times at intersection and corridor travel times. There is simply no identification in the DEIS that the roundabout solution could ever meet the Main Street throughput travel times. And certainly, if the computer program is assuming a 25 to 30 m.p.h. speed through the roundabout, any conclusion is simply not reality. 12

5. *Estimated Roundabout Costs*[7]: We have had basic discussions with civil engineers and confirmed that the cost estimates for the roundabout are incorrect, underestimating the actual cost enormously. The following are some of cost considerations that could not have been included in those cost estimates: 13

- The roundabouts in and near I-5 would be built on a grade and at a significant slope. This will require huge amounts of fill and stabilization before construction of the roundabout can even begin;
- Each of the roundabouts will require the city to condemn a significant amount of private property. In many locations, the private property is fully developed commercial property that will be very expensive to condemn;
- Each of these roundabouts will create significant amounts of additional impervious surface. This will require offsite stormwater treatment and detention. Yet the cost estimates in the plan do not accommodate for this requirement;
- Installation of roundabouts will require tearing out all the existing intersection infrastructure and much of the roadway leading to the intersections. Destruction of millions of dollars of built infrastructure is a direct cost and must be recognized as a cost of the proposed roundabouts.

6. *Failure to Include Cost Comparisons*: The TE provides the following as the overall goal for transportation planning in Ferndale: 14

> *The city will provide a safe, dependable, properly maintained multi-modal transportation system that promotes economic development and environmental vitality, and will explore innovative methods of resolving transportation-related issues.*[8]

Importantly, this goal lists as its first promotional purpose "*economic development.*" Further, the TE recognizes that a financial analysis of options is absolutely mandatory to transportation planning.

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[6] For example, Table 3.3-8.

[7] Table 8 in Appendix D.

[8] TE page 65.

The purpose of the [funding analysis of capital projects] is to ensure that the city's transportation system plans are affordable and achievable.[9] 14 cont

But most importantly, the entire PA-EIS process is to provide necessary information for the citizens and decision makers of Ferndale to make an informed decision.

The failure of the city to include cost comparisons between the existing signalized corridor and the redesigned roundabout corridor is an error. No decision maker or citizen can possibly make an informed decision to adopt the roundabouts if they are not presented the marginal costs of the change. If constructing the roundabouts was as efficient and did not cost any additional money, decision makers would consider the option. But if it costs twice as much, four times as much, or ten times as much as improving the existing signalized system, no decision maker would even contemplate such a change. The city has limited funds that must serve a multitude of purposes. If some vast amount of city funds are dedicated to move to the gold plated option of roundabouts, then other necessary city services must be left behind. Such an election requires a cost comparison.

It was a basic error of the DE-EIS not to provide cost comparisons of improving the signalized system vs. the roundabout solution to its decision makers.

7. *Multi-Modal Transportation*: Roundabouts are a car-centric option. 15
Anyone who has ever attempted to negotiate a roundabout as a pedestrian knows that it is close to impossible. At no point is traffic stopped to allow a pedestrian to proceed. This means that stepping into even a crosswalk in a roundabout is of significant risk.

Additionally, riding a bicycle through a roundabout is a life threatening event. I personally have ridden a bicycle through roundabouts throughout the world.[10] Some of these roundabouts are centuries old with a population used to driving through them. And I can say that there is one constant about roundabouts – they are never bike-friendly. The cars are constantly moving and the drivers are facing conflicting flows with their attention completely diverted toward merging with other moving cars. Bicycle riders (like pedestrians) are simply left out of the equation.

Roundabouts are made for cars. All other multimodal users are not accommodated. The failure of the roundabout solution to address this principal purpose of the TE is an error.

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[9] TE page 1.

[10] This includes many states in the US, as well as in Canada, Scotland, England, France, Germany, Switzerland, old Yugoslavia, Greece, China, Hong Kong, Malaysia, Bali, Australia and New Zealand.

8. *Conclusion*: The above-noted errors define that the DEIS and its proposed mitigation are flawed at their foundation. The DEIS cannot be adopted as a final EIS until these errors are corrected.

C. Additional Information Required:

1. *Corrected Cost of Roundabout Mitigation Proposal*: As noted above, 16
the cost estimates were in error (not simply inaccurate). These errors must be corrected to include a more accurate cost for the construction and condemnation needed for roundabouts. In addition, the lost opportunity cost of the destroyed existing infrastructure must be included as well.

2. *Cost Estimate of Signalized Mitigation Solution*: As required by the TE, 17
our roads must be affordable and promote economic development. Such goal can be met only if the cost of promoting a signalized corridor is established in the DEIS.

3. *Cost Comparison*: The above two corrected cost analyses must then be 18
compared between mitigation options. This is the only foundation upon which the citizens and decision makers can decide what is "affordable" and what will promote economic development.

4. *Main Street Corridor Throughput Times*: Any mitigation alternative 19
must establish Main Street corridor throughput times to comply with the TE. If a roundabout solution is to be proposed, such information must be prepared for roundabouts[11].

D. Alternate Proposed Mitigation:

1. *Plan for Alternate 2 Growth Level*: The city should adopt Alternate 2 20
growth levels. It is extremely, if not completely, unlikely that the development in the southeast quadrant will occur within the planning horizon for this PA-EIS. The inclusion of all of that development along with the rest of the development in the planning area is simply not economically feasible in this planning horizon. But overstating growth will result in overstating mitigation need and the resulting costs.

2. *Adopt Signalized Platform for Main Street Corridor*: Submitted 21
separately is the Jake Traffic Engineering signalized alternative for the Main Street corridor. This alternative is consistent with all of the planning documents, fully utilizes the fully constructed corridor as it exists, and will be the only affordable option that promotes economic development.

[11] Throughput times for a signalized solution have been prepared by JTE.

3. *Confirm I-5 Overpass to be Paid Principally with State and Federal Funding and Not Local Funding*: The TE assumed that as much as $20MM of funding for I-5 related improvements must come from other sources.[12] As the TE recognized, the cost of improving the Main Street overpass is daunting and beyond the community's capability. The TE identified that the city must undertake efforts to obtain funds from other funding sources and to do so actively.[13] Further, to qualify, local jurisdictions must show local matching funds to obtain such funding/grants. This requires the city to generate the funds to pursue the grants and build matching funds. If no such provisions are required, TIF's will be paid and used with no confidence they will ever be set aside for the necessary I-5 improvements. Instead, the DEIS must be amended to: 22

- Allocate a significant portion of TIF's from within the planning area (25-30%) to be set aside and reserved, expended only for "seed money" to obtain state or federal funding. As identified in the TE, the city must work diligently to obtain state/local funding which requires such seed money;
- Allocate a portion of sales tax generated from the PA-EIS planning area to pay for such seed money and/or overpass improvements. If development occurs in this area, it will generate significant amounts of sales tax. The EIS must propose that at least one quarter of additional sales tax from this development be specifically set aside for improvements of the I-5 overpass.

These amounts must be included in the cost comparison analysis so decision makers can determine if such improvements are "achievable and affordable" as required by the TE.

If such formal procedures are adopted locally, the city will have much greater success much earlier in obtaining state/federal funding to construct the I-5 overpass improvements as needed.

4. *Re-adopt LOS-D*: As noted in the TE, the City of Ferndale had adopted LOS-D (effectively) until December 2010. In an unplanned, unfortunate process, the updated TE was adopted with an LOS-C with little opportunity for public input and comment. The EIS must recognize that the marginal cost of moving from an LOS-D to an LOS-C is something that the City of Ferndale cannot afford. The EIS must adopt as a mitigating measure that the city amend its TE to re-adopt LOS-D as had existed prior to December 2010. 23

5. *Provide for Phasing of Improvements and Development.* Near-term commercial development in the planning area is likely to occur west of I-5. The city's 24

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[12] TE, page 58-61.

[13] TE, page 58.

existing transportation network has existing excess capacity to accommodate some level of near-term development without the need for larger-scale improvements to the system. The PA-EIS should identify the level of development west of I-5 that could occur in such a "phase one" scenario, and should also identify the more limited project mitigation improvements that might be required for such development. Promoting this kind of phased development will help to accelerate the collection of impact fees under the new program, thereby increasing the likelihood of near-term construction of system improvements under the program. 24 cont

IV. PA-EIS ORDINANCE

The entire ordinance will have to be re-developed to address the significant revisions to the DEIS that is proposed above. It is not worthwhile or appropriate to comment on the ordinance until such revisions are made.

Regardless of these issues, any ordinance must provide:

- That the final PA-EIS will fulfill any SEPA/EIS requirement imposed upon a development in the PA-EIS area; 25
- That the TE shall be amended to adopt an LOS-D. 26

V. CONCLUSION

I recognize that many of the above comments are very pointed and negative. This tone arises because of the significant deficiency in the DEIS, as noted above. Notwithstanding all of this, my clients and I will work diligently with the city to develop a Planned Action EIS that would accurately and appropriately propose and adopt mitigation measures that will affordably address the environmental impact anticipated from the proposed development.

Very truly yours,

DOUGLAS K. ROBERTSON
Attorney at Law

DKR:kms
cc: *clients*

Response to Draft EIS Letter 8: Belcher|Swanson Law Firm, PLLC

1. **Additional Stormwater Information.** The evaluation of scenarios for regional stormwater management was not proposed as part of the action or required in order to mitigate stormwater impacts. The City's Stormwater Ordinance and Plan contain complete information to review stormwater management practices on a project by project basis for the development described in the Draft EIS. The ongoing Ferndale Gateway Stormwater Study, planned for completion in 2012, is intended provide the necessary information to allow implementation of a regional detention/flow control system and/or the direct discharge (conveyance only) approach. It should be noted that the EIS does not preclude individual applicants from preparing the necessary analysis for the direct discharge approach, as described in Section 2.2 of this Final EIS, which contains a supplemental discussion of stormwater.

2. **Signalized Main Street corridor.** The comment is noted. The option of signalization of Main Street was presented at the Draft EIS public meeting on August 3 and is discussed in the Supplemental Transportation Analyses in this Final EIS, Section 2.1. As described in the Draft EIS, City staff recommends installation of roundabouts as the preferred mitigation strategy for the Main Street Corridor. On November 30, 2011, the Planning Commission recommended installation of roundabouts at the Interstate 5/Main Street interchange ramps and improvements to existing signalized intersections west of Interstate-5.

3. **LOS D.** The comment is noted. The Supplemental Transportation Analyses presented in the Final EIS provides comparisons of improvements needed with for the Preferred Land Use Alternative based on level of service (LOS) C or LOS D standard at City intersections. As described in the Draft EIS, City staff recommends installation of roundabouts as the preferred mitigation strategy for the Main Street Corridor. On November 30, 2011, the Planning Commission recommended installation of roundabouts at the Interstate 5/Main Street interchange ramps and improvements to existing signalized intersections west of Interstate-5.

4. **Transportation improvement phasing.** The comment is noted. The Supplemental Transportation Analyses presented in the Final EIS notes that transportation improvements may need to be constructed by applicants which could be eligible for credits against mitigation fees. In general, the City's preference is to construct the majority of public improvements.

5. **Interstate 5 funding strategy.** The comment is noted. The City's current Transportation Impact Fee program includes up to $6 million in costs associated with widening the Main Street overcrossing of I-5. The Supplemental Transportation Analyses presented in the Final EIS identifies that a portion of the impact fee mitigation could be directed toward initial studies by WSDOT and as a developer mitigation share for improving the interchanges serving Ferndale. The City and WSDOT will need to develop agreements for use of such funding. These options may be addressed in the planned action ordinance.

6. **Interstate 5 funding strategy.** The comment is noted. The City is conducting additional financial analyses. The studies are consistent with the development assumptions used in the EIS. The City will consider a range of funding options for the improvements within the City and for locations under the jurisdiction of WSDOT.

7. **Regional Stormwater Management.** See response to Comment 1 of this letter.

8. **Signalized Main Street corridor.** The comment is noted. The Draft EIS identified roundabouts as the City's preferred improvement strategy; it did not indicate that this was adopted. It is correct that the City has not yet adopted roundabouts as the preferred alternative. The City's adopted Transportation Element does show traffic signals along Main Street. This is consistent with the No Action alternative presented in the Draft EIS based on lower levels of development than the two action alternatives. The Supplemental Transportation Analyses presented in the Final EIS provides comparisons of traffic signal and roundabout options for meeting the City of Ferndale's level of service (LOS) C standard (or reducing the City's standard to LOS D).

   As described in the Draft EIS, City staff recommends installation of roundabouts as the preferred mitigation strategy for the Main Street Corridor. On November 30, 2011, the Planning Commission recommended installation of roundabouts at the Interstate 5/Main Street interchange ramps and improvements to existing signalized intersections west of Interstate-5.

9. **Roundabouts not preferred.** The comment is noted. See response to Comment #8, this letter, above.

10. **Roundabouts and operational efficiency.** The comments are noted. *Roundabouts: An Informational Guide, Second Edition*, *NCHRP Report*

672, Transportation Research Board, 2010 notes that roundabouts typically reduce the overall costs associated with maintenance and operations compared to traffic signals. Traffic signals have higher operational costs for power, maintenance of the traffic signals, and operations (such as revising signal timing). Roundabouts can have higher operations and maintenance costs related to signing, markings, illumination, and landscaping. The costs relative to drainage will be related to the amount of impervious surface, which can vary between signals and roundabouts. For example, the need for an additional right-turn lane at a signalized intersection will increase the amount of pavement.

Chapter 5 of *Roundabouts: An Informational Guide, Second Edition*, *NCHRP Report 672*, Transportation Research Board, 2010 discusses the safety of roundabouts versus other traffic control devices, including traffic signals. Roundabouts improve safety by reducing the number and types of conflicts and requiring drivers to reduce speeds as they proceed into and through the intersection. Also refer to response to Letter #7, comment #7 for additional references related to the relative safety of roundabouts versus traffic signals.

Designs of roundabouts, including multi-lane facilities, need to take into account the type and number of trucks. Design of turn lanes and traffic signals also must consider those factors. Travel speeds for trucks and other vehicles along Main Street, Smith Road, and Slater Road in the vicinity of the of the Planned Action are much slower than the speeds along the Guide Meridian north of Bellingham. The type and number of trucks is also different between these facilities.

11. **Roundabout travel times.** The evaluation of roundabout levels of service have been updated in the Supplemental Transportation Analyses included in the Final EIS. The travel speeds shown in the roundabout worksheets are estimated by the Sidra software package and are based on the radius of the roundabout island, the design speed, and entering/existing travel speeds. Where available (such as along Main Street and Slater Road) the entering /exiting travel speeds were based on field measurements from the corridor travel time studies. Where field data were not available, the posted speed limits were used for the entering/exiting speeds in level of service results presented in the Final EIS. For example, the field data showed the average of existing travel speeds on eastbound Main Street at over 30 mph and average westbound speeds at 28.5 mph. These speeds were input as the entering/exiting speeds in the analyses software. These speeds were also used in estimating corridor travel

speeds/level of service for both the roundabout and traffic signal, providing a consistent comparison of the alternatives.

12. **Roundabout LOS**. Please refer to the response to Comment #11, this letter, above. The Supplemental Transportation Analyses presented in the Final EIS provides a comparison of the estimated travel speeds along the City's concurrency corridors for roundabouts and traffic signals at LOS C or LOS D standards for City intersections.

13. **Roundabout costs.** The Supplemental Transportation Analyses presented in the Final EIS includes updated planning level cost estimates for the roundabouts and traffic signal options. These are intended to provide a relative comparison of the improvement options and level of service standards. More detailed cost estimates will need to be prepared proceed to design and construction based on the adopted improvement strategy and level of service standard.

14. **Cost comparisons.** The Supplemental Transportation Analyses presented in the Final EIS includes comparisons of planning level cost estimates for the roundabouts and traffic signal options based on LOS C and LOS D standards for City intersections.

    Separate from the EIS process, the City has conducted a fiscal analysis for future development in the planned action area. This is summarized in Chapter 1 of this Final EIS.

15. **Roundabouts and travel modes.** Comments noted. Designs of roundabouts and traffic signal intersections need to consider a range of travel modes. Chapter 5 of *Roundabouts: An Informational Guide, Second Edition*, *NCHRP Report 672*, Transportation Research Board, 2010 discusses the safety of roundabouts for pedestrians. Chapter 6 of that report discusses design factors for accommodating pedestrians and bicycles at roundabouts. These factors will need to be reviewed and addressed in the design and construction of roundabouts. Also refer to response to Letter #7, Comment #7 for additional references related to the relative safety of roundabouts versus traffic signals.

16. **Roundabout costs.** Please refer to response to Comment #13, this letter, above.

17. **Signalized mitigation costs.** Please refer to response Comments #13 and #14, this letter, above.

18. **Cost comparison.** Please refer to response Comments #13 and #14, this letter, above.

19. **Main Street throughput.** The Supplemental Transportation Analyses presented in the Final EIS includes comparisons of travel speeds of roundabout and traffic signal options for based on LOS C and LOS D standards for City intersections. As noted in the Supplemental Transportation Analyses, the improvements under the LOS D standard do not fully address traffic queue impacts.

20. **Support Alternative 2.** The comment is noted.

21. **Signalized Main Street corridor.** The comments are noted. The City Council will make a final decision on the improvement strategy. As described in the Draft EIS, City staff recommends installation of roundabouts as the preferred mitigation strategy for the Main Street Corridor. On November 30, 2011, the Planning Commission recommended installation of roundabouts at the Interstate 5/Main Street interchange ramps and improvements to existing signalized intersections west of Interstate-5.

22. **Interstate 5 funding sources.** The comments are noted. The City has not yet defined a final mitigation and financing program for the additional improvements identified in the EIS. The Supplemental Transportation Analyses presented in the Final EIS includes additional discussion of mitigation strategies. The City and WSDOT will work together to define funding programs and the relative funding from developments in the Planned Action for improvements to the I-5 interchanges.

    Separate from the EIS process, the City has prepared a fiscal analysis to evaluate options for funding transportation improvements and other elements related to development in the Planned Action area. This is summarized in Chapter 1 of this Final EIS.

23. **LOS D.** The Supplemental Transportation Analyses presented in the Final EIS includes comparisons of planning level cost estimates for the roundabouts and traffic signal options based on LOS C and LOS D standards for City intersections.

24. **Phased improvements.** The comment is noted. Improvement needs at specific locations will depend on the location, type, and intensity of development included as a "phase one". Due to the large number of potential development scenarios it is not possible to specify a level of development and improvements. However, the Planned Action

mitigation program could include a phasing mechanism in order to meet concurrency and funding of improvements. Proposed amendments to the Transportation Element of the Comprehensive Plan would provide for the full use of concurrency time periods. The EIS also notes that a monitoring/reassessment process could be incorporated into the transportation mitigation requirements to support such a phasing program.

25. **Planned action ordinance.** The comment is noted. Please see response to Comment#2, Letter #1.

26. **LOS D.** The Supplemental Transportation Analyses presented in the Final EIS compares the different improvements and costs associated with a LOS D versus LOS C standard for City intersections. City staff has recommended retention of the LOS standard; this recommendation was affirmed by the Planning Commission on November 30.

Letter 9

Ferndale
DRAFT PAEIS
TRAFFIC REVIEW COMMENTS
August 28, 2011

JTE . Jake Traffic Engineering, Inc.
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August 28, 2011

Jori Burnett, Community Development Director
CITY OF FERNDALE
2095 Main Street
Ferndale, WA 98248

Re: Draft PAEIS - Ferndale
Traffic Review Comments

Dear Mr. Burnett,

I have reviewed the Draft PAEIS prepared by The Transpo Group on behalf of the property owners in the northwest and northeast quadrants of the PAEIS area. My review focused on the Main Street corridor from just west of 1st Avenue to just east of Barrett Road north. Below is an aerial view of the focus corridor obtained from Google: 1

The draft PAEIS includes more analysis intersections and corridors than depicted in the above areal. I have focused my review and analysis effort on the Main Street corridor. My Clients have raised concerns about the feasibility and cost of the potential improvements depicted in the draft PAEIS. 1 cont

Generally speaking the Main Street corridor is developed 5 – lanes wide from west of the Walgreen Signal to east of Barrett Road. The section between the SR - 5 SB and NB ramp junctions is not completed. The City's PAEIS failed to evaluate the corridor to best utilize the constructed Main Street corridor. In layman's terms; what cost effective improvements need to be installed to allow the corridor to operate satisfactorily.

The City's Comprehensive Plan identifies an LOS standard of C (D at stop controlled intersections worst movement). The typical LOS standard for Agencies in Washington is LOS D with some fully developed intersections allowed to operate at E or simply noted as fully developed. I believe the cost difference between LOS C and D is substantial and needs to be documented appropriately.

Technical Analysis

The Transpo Group technical files (Synchro (signal option) and Sidra (roundabout option) for the draft PAEIS were provided to me. The The Transpo Group Synchro Traffic Model files included all of the study intersections and corridors and included both LOS C and D analysis. I reduced the The Transpo Group Synchro files to the Main Street corridor from west of 1st Avenue and to the east of Barrett Road north. The Nordic Way/Labounty Drive intersection is also included. 2

The The Transpo Group Synchro files have some minor coding errors and do not appear to have been thoroughly vetted. It appears to me that the The Transpo Group focused their analysis presuming roundabout option. Roundabouts typically require substantially more right of way and in a developed urban corridor such as Main Street would not appear to be a cost effective or practical option.

I have conducted operational analysis of the Main Street corridor in a manner that best utilizes the existing infrastructure. My 2034 analysis presumed the same baseline improvements included in the The Transpo Group's High Growth Scenario analysis. Attached in the appendix is a graphic depicting my street geometrics and resultant LOS. 3

The improvements I depict at the Main Street intersections (excluding the SR – 5 interchange) require little revision to Main Street itself that is a pragmatic cost effective option. I did add some channelization at the Main Street/Labounty Drive intersection north bound (NB) to east bound (EB) right turn (RT) pocket and added Riverside Drive to the north that includes both a RT and left turn (LT) pocket as well as a through travel lane). At the Labounty Drive/Nordic Way I simply re-striped Labounty Drive to provide EB and west bound (WB) LT pockets (The Transpo Group provided an EB to SB right turn pocket). My signal timings use a typical 120 second cycle length with appropriate RT overlap and protected/permitted LT phasing.

The following table summarizes the general improvements, my refinements and the resultant LOS: 3 cont

Intersection	Comprehensive Plan Improvement/Transpo Analysis[1]	JTE, Inc revisions (Mitigation 1)	LOS (delay, seconds)
Main/1st	None	none	B (10.6)
Main/Hovander	I-6: signal presumed (per Transpo)	none	C (22.2)
Main/Walgreens	None	none	C (26.1)
Main/Labounty	I-7: modify channelization and signal operations	Optimize signal phasing and assign 50 WB to SB LT's to the preceding access driveway. Remove dual LT's	D (49.8)
Main/SR - 5 SB	R-5: Widen overcrossing	none	D (39.3)
Main/SR – 5 NB	R-5: Widen overcrossing	none	D (42.7)
Main/Barrett north	I-8: Signalize	Optimize signal phasing. Remove dual EB to NB LT's	C (27.5)
Labounty/Nordic	Signalize and stripe in an EB to SB RT pocket	Re-stripe Labounty to provide LT pocket's and signalize	C (22.4)

Another item I reviewed in the projected WB and EB travel time to travel from just west of 1st Avenue to just east of Barrett Road north. The following table provides the travel times for the Transpo Group results and JTE, Inc.

Analysis Scenario (signalized improvements)	Travel Time (seconds)
Transpo LOS C	EB – 329.8
	WB – 324.5
Transpo LOS D	EB 328.9
	WB – 353
JTE, Inc. LOS D Mitigation 1	EB – 332.8
	WB – 356.2
JTE Inc. LOS D Mitigation 1 + Arterial 30 MPH	EB – 284.8
	WB – 310.8

[1] - From Figure 13 and Table 8 City of Ferndale Transportation Element and as gleaned from the The Transpo Group technical analysis

My analysis indicates that the travel time EB, the non-peak direction, is nominal. Travel time WB, during peak times, could be about 30 seconds more (about 10%) under a LOS D criteria versus C. During off-peak times the travel time difference would be less. 3 cont

The City of Ferndale posted speed limit on Main Street, a Principal Arterial, is 25 MPH that is not consistent with Traffic Engineering or driver expectancy criteria. It is typical practice by many jurisdictions to have higher speed limits on Arterial Streets versus unclassified streets. This makes good traffic engineering sense. Simply revising the Speed Limit on Main Street to 30 MPH and conducting the street improvements as I have generally identified reduces my LOS D travel times to less than the LOS C travel times as noted by the The Transpo Group analysis. Revising the Speed Limit is without a doubt the most cost effective revision that can be made to reduce travel time incurred by motorists on Main Street.

Improvement Costs

My proposed mitigation provides LOS D traffic operations for the most part and best utilizes the existing Main Street corridor as is. The SR – 5 interchange and ramp junction intersections would need to be widened eventually because of the huge expense those improvements would happen when funding is available. Utilizing Main Street "as is" with appropriate signal and channelization at the street intersections is cost effective and minimizes requirements for added right of way (ROW). Any ROW needed to accommodate the LOS D improvements would be minimal if any. 4

Street improvements noted in the City's draft PAEIS to provide for LOS C operations would be exceedingly costly and are unlikely to be funded based on current resources. The improvements to achieve LOS D using existing Main Street facility as I have discussed are far more cost effective and practical to construct and consistent with what was clearly the long term plan for the Main Street corridor.

Timing of the SR – 5 Interchange Improvements

The Main Street corridor from west of the Walgreens intersection to the east of the Barrett Road north intersection is for the most part a fully constructed 5-lane street. The SR – 5 interchange is not complete. 5

I have conducted operational analysis presuming the Main Street/City street intersection improvements are constructed and the interchange is not yet completed to ascertain how much traffic can be added to SR – 5 interchange ramp operations within the capacity limits. My analysis indicates that the traffic loading of the no-action growth scenario is a reasoned value to use for planning purposes.

The City in conjunction with WSDOT should provide a cost estimate for the interchange improvement. Traffic impact fees for this PAEIS could then be earmarked for the interchange improvements. This money can then be used to leverage added funding to fund the needed interchange widening.

Jori Burnett, Community Development Director
CITY OF FERNDALE
August 28, 2011
Page -5-

Summary, Conclusions and Recommendations

I have reviewed the City's PAEIS. The City of Ferndale Transportation Element identifies a LOS C criterion (D for stop control worst movement) for the City. The typical LOS standard is LOS D with some fully developed intersections allowed to operate at E or simply noted as fully developed. 6

My operational analysis used traditional signals and the existing constructed Main Street corridor, the SR – 5 interchange is projected to eventually be widened. The analysis I conducted projects that LOS D can be achieved for with modest signal and channelization revisions. The travel time difference during peak time periods is about 30 seconds more (10%) westbound from east of Barrett Road north to west of 1st Avenue during the PM peak travel times. The eastbound, off-peak, travel time is not materially affected. Reducing the travel time can easily and cost effectively be done simply by setting the Arterial Speed limit at 30 MPH that makes both Traffic Engineering and Driver Expectancy sense.

The cost difference to achieve LOS C versus D needs to be clearly delineated in the PAEIS. My initial review of the City's PAEIS LOS C network versus the LOS D system as I have analyzed is probably in the millions of dollars.

The SR – 5/Main Street interchange is a critical piece that eventually needs to be widened. 7
My analysis indicates that the existing interchange capacity is adequate to serve up to the no-action traffic volumes. A per trip traffic fee should be determined to start the funding process for the interchange widening.

I would recommend that the City adopt a LOS D standard in the PAEIS area that is the typical 8
criteria used in Washington.

Please contact me at 206.762.1978 or email me at jaketraffic@comcast.net if you have any questions.

EXPIRES 4/3/2012

Sincerely,

Mark J. Jacobs, PE, PTOE, President
JAKE TRAFFIC ENGINEERING, INC

08.28.2011

MJJ: mjj

APPENDIX

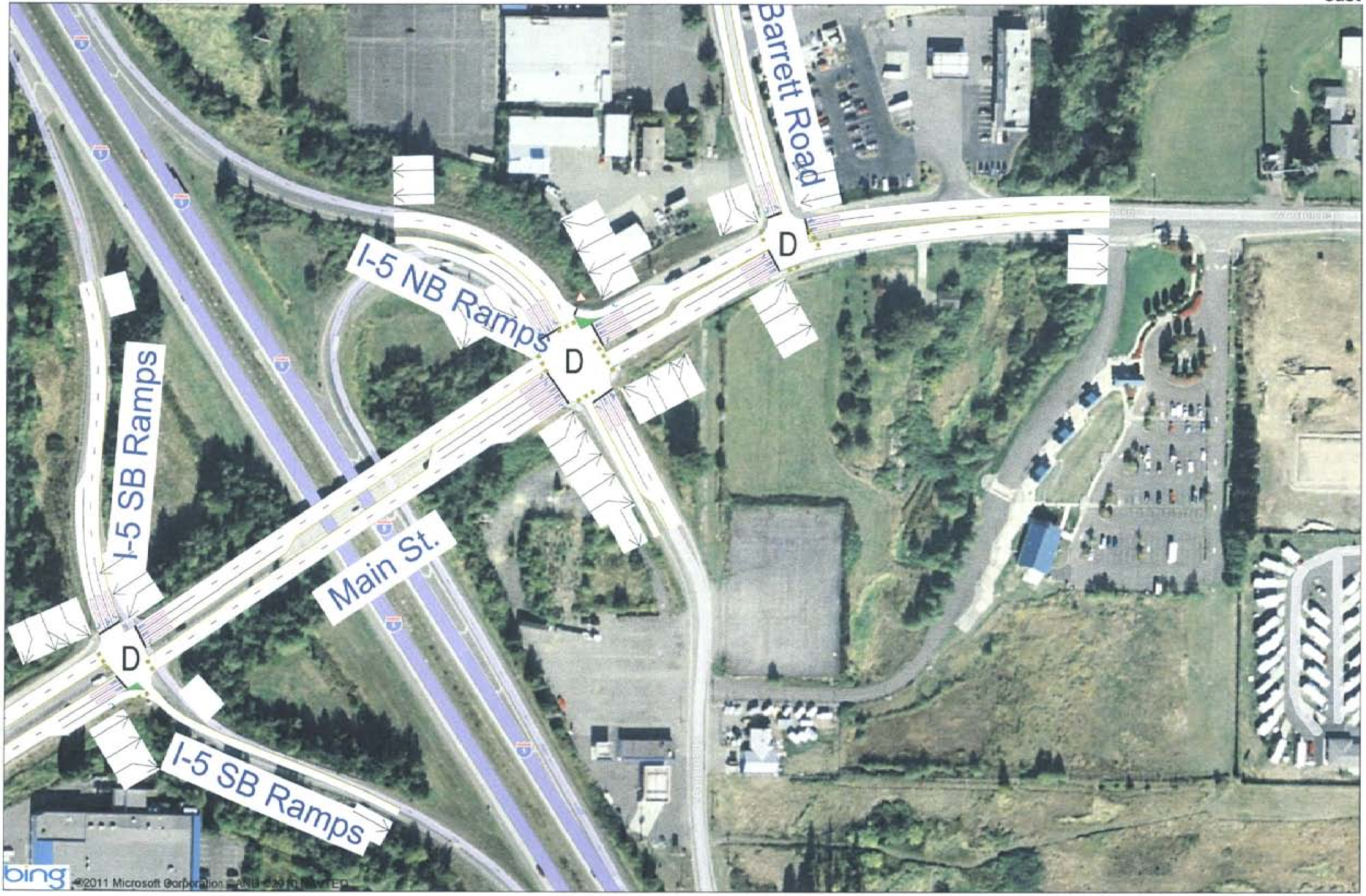
JTE LOS D Network
Main Street Corridor

based on 2034 Alternative 3 Traffic Volumes


I-5 SB R
D
I-5 SB Ra
Walgreens
D
Labounty Drive
Nordic Way
C
C
Main St.
St.
Walgreens
No
bing
©2011 Microsoft Corporation ©AND ©2010 NAVTEQ

JTE LOS D Network
Main Street Corridor

based on 2034 Alternative 3 Traffic Volumes
east



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	980	35	155	1135	5	30	5	170	10	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	1.00	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	1.00		0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1787	1866		1787	1880			1786	1599		1722	
Flt Permitted	0.15	1.00		0.21	1.00			0.83	1.00		0.91	
Satd. Flow (perm)	288	1866		387	1880			1540	1599		1592	
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)	16	1065	38	168	1234	5	33	5	185	11	11	22
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	166	0	20	0
Lane Group Flow (vph)	16	1102	0	168	1239	0	0	38	19	0	24	0
Confl. Peds. (#/hr)	2		17	17		2	3					3
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Parking (#/hr)			0									
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1		1	1		
Actuated Green, G (s)	101.6	101.6		101.6	101.6			9.4	9.4		9.4	
Effective Green, g (s)	101.1	101.1		101.1	101.1			8.9	8.9		8.9	
Actuated g/C Ratio	0.84	0.84		0.84	0.84			0.07	0.07		0.07	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	243	1572		326	1584			114	119		118	
v/s Ratio Prot		0.59			c0.66							
v/s Ratio Perm	0.06			0.43				c0.02	0.01		0.01	
v/c Ratio	0.07	0.70		0.52	0.78			0.33	0.16		0.20	
Uniform Delay, d1	1.6	3.6		2.6	4.4			52.7	52.1		52.2	
Progression Factor	1.00	1.00		0.93	0.88			1.00	1.00		1.00	
Incremental Delay, d2	0.5	2.6		3.3	2.3			1.7	0.6		0.8	
Delay (s)	2.1	6.3		5.7	6.1			54.5	52.7		53.0	
Level of Service	A	A		A	A			D	D		D	
Approach Delay (s)		6.2			6.1			53.0			53.0	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	960	180	30	1095	215	55
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		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1832		1787	1881	1787	1599
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	1832		1787	1881	1787	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1043	196	33	1190	234	60
RTOR Reduction (vph)	5	0	0	0	0	50
Lane Group Flow (vph)	1234	0	33	1190	234	10
Confl. Peds. (#/hr)		3	3			
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	85.9		2.4	92.3	19.7	19.7
Effective Green, g (s)	85.9		2.4	92.3	19.7	19.7
Actuated g/C Ratio	0.72		0.02	0.77	0.16	0.16
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)	1311		36	1447	293	263
v/s Ratio Prot	c0.67		0.02	c0.63	c0.13	
v/s Ratio Perm						0.01
v/c Ratio	0.94		0.92	0.82	0.80	0.04
Uniform Delay, d1	14.8		58.7	8.7	48.2	42.2
Progression Factor	0.78		0.95	0.71	1.00	1.00
Incremental Delay, d2	10.4		90.8	2.6	20.0	0.3
Delay (s)	22.0		146.6	8.8	68.2	42.4
Level of Service	C		F	A	E	D
Approach Delay (s)	22.0			12.5	62.9	
Approach LOS	C			B	E	

Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	920	80	240	855	170	235	15	140	160	20	35
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	5.0	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	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	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		0.99	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.86		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3522		1787	1881	1563	1805	1613		1796	1720	
Flt Permitted	0.16	1.00		0.18	1.00	1.00	0.72	1.00		0.51	1.00	
Satd. Flow (perm)	309	3522		333	1881	1563	1364	1613		968	1720	
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)	27	1000	87	261	929	185	255	16	152	174	22	38
RTOR Reduction (vph)	0	5	0	0	0	59	0	119	0	0	30	0
Lane Group Flow (vph)	27	1082	0	261	929	126	255	49	0	174	30	0
Confl. Peds. (#/hr)	1		6	6		1			5	5		
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	71.5	67.9		84.6	76.0	76.0	25.4	25.4		25.4	25.4	
Effective Green, g (s)	73.5	68.9		85.6	77.0	76.0	26.4	26.4		26.4	26.4	
Actuated g/C Ratio	0.61	0.57		0.71	0.64	0.63	0.22	0.22		0.22	0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	246	2022		391	1207	990	300	355		213	378	
v/s Ratio Prot	0.00	0.31		c0.07	c0.49			0.03			0.02	
v/s Ratio Perm	0.06			0.41		0.08	c0.19			0.18		
v/c Ratio	0.11	0.54		0.67	0.77	0.13	0.85	0.14		0.82	0.08	
Uniform Delay, d1	14.1	15.7		10.8	15.2	8.8	44.9	37.7		44.5	37.2	
Progression Factor	0.80	0.51		1.73	1.56	3.25	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.4		3.0	3.3	0.2	19.9	0.2		20.9	0.1	
Delay (s)	11.4	8.4		21.7	27.0	28.7	64.8	37.8		65.4	37.3	
Level of Service	B	A		C	C	C	E	D		E	D	
Approach Delay (s)		8.5			26.2			54.1			58.2	
Approach LOS		A			C			D			E	

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Volume (vph)	100	900	225	360	755	285	395	100	595	295	80	120
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	5.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	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	1.00
Frt	1.00	0.97		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	3451		1787	3427		1767	1863	1583	1752	1845	1543
Flt Permitted	0.12	1.00		0.12	1.00		0.53	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	222	3451		222	3427		984	1863	1583	1267	1845	1543
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)	109	978	245	391	821	310	429	109	647	321	87	130
RTOR Reduction (vph)	0	18	0	0	31	0	0	0	31	0	0	111
Lane Group Flow (vph)	109	1205	0	391	1100	0	429	109	616	321	87	19
Confl. Peds. (#/hr)			1	1			2					2
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pt+ov	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	8 1	7	4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	41.1	41.1		54.9	54.9		42.9	26.9	47.9	27.3	16.3	16.3
Effective Green, g (s)	42.1	42.1		55.9	55.9		43.9	27.9	47.9	29.3	17.3	17.3
Actuated g/C Ratio	0.35	0.35		0.47	0.47		0.37	0.23	0.40	0.24	0.14	0.14
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	0.2	4.0		0.2	4.0		0.2	0.2		3.0	3.0	3.0
Lane Grp Cap (vph)	185	1211		390	1596		507	433	632	358	266	222
v/s Ratio Prot	0.04	c0.35		c0.18	0.32		c0.16	0.06	c0.39	0.09	0.05	
v/s Ratio Perm	0.17			0.28			0.15			0.13		0.01
v/c Ratio	0.59	0.99		1.00	0.69		0.85	0.25	0.97	0.90	0.33	0.08
Uniform Delay, d1	30.9	38.8		44.5	25.2		32.4	37.5	35.4	42.6	46.1	44.5
Progression Factor	0.92	0.82		0.99	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	22.7		39.9	1.8		11.9	0.1	29.1	23.8	0.7	0.2
Delay (s)	30.9	54.5		83.9	25.7		44.3	37.7	64.5	66.4	46.8	44.7
Level of Service	C	D		F	C		D	D	E	E	D	D
Approach Delay (s)		52.6			40.6			54.7			58.0	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM Average Control Delay	49.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	113.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑↑					↰	↰	↱
Volume (vph)	0	1235	670	290	1230	0	0	0	0	830	5	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	5.0	3.5	4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95					0.95	0.95	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		3574	1599	1787	3574					1649	1654	1553
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		3574	1599	1787	3574					1649	1654	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1342	728	315	1337	0	0	0	0	902	5	457
RTOR Reduction (vph)	0	0	150	0	0	0	0	0	0	0	0	40
Lane Group Flow (vph)	0	1342	578	315	1337	0	0	0	0	451	456	417
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	4%	4%	4%
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Actuated Green, G (s)		46.9	46.9	22.5	73.4					36.6	36.6	36.6
Effective Green, g (s)		47.9	46.9	23.0	74.4					37.6	37.6	37.6
Actuated g/C Ratio		0.40	0.39	0.19	0.62					0.31	0.31	0.31
Clearance Time (s)		5.0	5.0	4.0	5.0					5.0	5.0	5.0
Vehicle Extension (s)		4.0	4.0	3.0	4.0					3.5	3.5	3.5
Lane Grp Cap (vph)		1427	625	343	2216					517	518	487
v/s Ratio Prot		c0.38		c0.18	0.37					0.27	c0.28	
v/s Ratio Perm			0.36									0.27
v/c Ratio		0.94	0.92	0.92	0.60					0.87	0.88	0.86
Uniform Delay, d1		34.7	34.9	47.6	13.8					38.9	39.1	38.7
Progression Factor		1.00	1.04	0.86	0.83					1.00	1.00	1.00
Incremental Delay, d2		6.6	10.9	22.0	0.9					15.3	16.3	14.1
Delay (s)		41.3	47.0	63.0	12.4					54.2	55.3	52.8
Level of Service		D	D	E	B					D	E	D
Approach Delay (s)		43.3			22.0			0.0			54.1	
Approach LOS		D			C			A			D	

Intersection Summary			
HCM Average Control Delay	39.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	102.3%	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												
Volume (vph)	485	1120	455	65	875	460	190	365	75	240	50	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.0	4.0	4.0	4.0	4.5	3.5	4.0		3.5	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3467	3574	1599	1770	3539	1583	1805	3517		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3467	3574	1599	1770	3539	1583	1805	3517		1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	527	1217	495	71	951	500	207	397	82	261	54	495
RTOR Reduction (vph)	0	0	126	0	0	161	0	15	0	0	0	38
Lane Group Flow (vph)	527	1217	369	71	951	339	207	464	0	261	54	457
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	18.0	53.6	53.6	6.1	42.2	42.2	16.5	21.9		20.9	26.3	44.3
Effective Green, g (s)	18.5	54.1	54.1	6.6	42.7	42.2	17.0	22.4		21.4	26.8	44.3
Actuated g/C Ratio	0.15	0.45	0.45	0.06	0.36	0.35	0.14	0.19		0.18	0.22	0.37
Clearance Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.0	4.5		4.0	4.5	4.0
Vehicle Extension (s)	3.0	4.0	4.0	2.5	4.0	4.0	3.0	2.5		3.0	3.5	3.0
Lane Grp Cap (vph)	534	1611	721	97	1259	557	256	657		316	416	584
v/s Ratio Prot	c0.15	c0.34		0.04	0.27		0.11	0.13		c0.15	0.03	c0.12
v/s Ratio Perm			0.23			0.21						0.17
v/c Ratio	0.99	0.76	0.51	0.73	0.76	0.61	0.81	0.71		0.83	0.13	0.78
Uniform Delay, d1	50.6	27.4	23.5	55.8	34.0	32.1	49.9	45.7		47.5	37.3	33.6
Progression Factor	0.91	0.75	1.00	0.74	1.25	1.67	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	21.7	0.9	0.3	14.0	1.6	1.2	16.9	6.3		16.0	0.6	6.8
Delay (s)	67.6	21.4	23.9	55.2	44.1	55.0	66.8	52.0		63.5	37.9	40.4
Level of Service	E	C	C	E	D	D	E	D		E	D	D
Approach Delay (s)		32.8			48.2			56.5			47.6	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM Average Control Delay	42.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	560	875	905	115	115	495
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
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		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)	1752	3505	3504		1641	1468
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1752	3505	3504		1641	1468
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	609	951	984	125	125	538
RTOR Reduction (vph)	0	0	8	0	0	7
Lane Group Flow (vph)	609	951	1101	0	125	531
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	3%	3%	1%	1%	10%	10%
Turn Type	Prot	NA	NA		NA	pt+ov
Protected Phases	7	4	8		6	6 7
Permitted Phases						
Actuated Green, G (s)	46.2	91.0	40.8		21.0	71.2
Effective Green, g (s)	46.2	91.0	40.8		21.0	71.2
Actuated g/C Ratio	0.38	0.76	0.34		0.18	0.59
Clearance Time (s)	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	675	2658	1191		287	871
v/s Ratio Prot	c0.35	0.27	c0.31		0.08	c0.36
v/s Ratio Perm						
v/c Ratio	0.90	0.36	0.92		0.44	0.61
Uniform Delay, d1	34.8	4.8	38.1		44.2	15.6
Progression Factor	0.55	0.20	1.00		1.00	1.00
Incremental Delay, d2	11.3	0.3	13.3		1.1	1.3
Delay (s)	30.5	1.2	51.4		45.3	16.8
Level of Service	C	A	D		D	B
Approach Delay (s)		12.7	51.4		22.2	
Approach LOS		B	D		C	

Intersection Summary			
HCM Average Control Delay	27.5	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	86.4%	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												
Volume (vph)	20	225	430	140	420	45	465	20	125	20	20	70
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	1.00	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	1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.90		1.00	0.99		1.00	0.87			0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1769	1679		1787	1850		1752	1606			1722	
Flt Permitted	0.34	1.00		0.19	1.00		0.77	1.00			0.94	
Satd. Flow (perm)	629	1679		348	1850		1422	1606			1640	
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)	22	245	467	152	457	49	505	22	136	22	22	76
RTOR Reduction (vph)	0	145	0	0	8	0	0	84	0	0	38	0
Lane Group Flow (vph)	22	567	0	152	498	0	505	74	0	0	82	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.6	21.6		21.6	21.6		18.4	18.4			18.4	
Effective Green, g (s)	21.6	21.6		21.6	21.6		18.4	18.4			18.4	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.38	0.38			0.38	
Clearance Time (s)	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	
Lane Grp Cap (vph)	283	756		157	833		545	616			629	
v/s Ratio Prot		0.34			0.27			0.05				
v/s Ratio Perm	0.03			c0.44			c0.36				0.05	
v/c Ratio	0.08	0.75		0.97	0.60		0.93	0.12			0.13	
Uniform Delay, d1	7.5	11.0		12.9	9.9		14.2	9.6			9.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.1	4.1		61.6	1.2		21.9	0.1			0.1	
Delay (s)	7.6	15.1		74.4	11.1		36.0	9.7			9.7	
Level of Service	A	B		E	B		D	A			A	
Approach Delay (s)		14.8			25.7			29.7			9.7	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	105.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Response to Draft EIS Letter 9: Jake Traffic Engineering, Inc.

1. **Introductory comments.** The comment is noted. The Supplemental Transportation Analyses presented in the Final EIS provides comparisons of traffic signal and roundabout options for meeting the City of Ferndale's level of service standards. It also compares the different improvements needed under LOS C or LOS D standards for City intersections. As described in the Draft EIS, City staff recommends installation of roundabouts as the preferred mitigation strategy for the Main Street Corridor. On November 30, 2011, the Planning Commission recommended installation of roundabouts at the Interstate 5/Main Street interchange ramps and improvements to existing signalized intersections west of Interstate-5.

2. **Transportation analysis.** The comments are noted. The Supplemental Transportation Analyses presented in the Final EIS provides comparisons of traffic operations of traffic signals and roundabouts and comparisons of cost estimates for the different improvement strategies.

3. **Main Street intersection analysis.** The comments are noted. The Final EIS focuses on Alternative 2 as the preferred land use alternative. The Supplemental Transportation Analyses presented in the Final EIS (see Section 2.1) provides additional traffic operations analyses for Alternative 2 based on roundabouts and traffic signal improvement options. Improvements have been identified which show that the calculated levels of service will meet the currently adopted level of service standards. In addition the traffic operations analyses need to address the potential for traffic queues to spill back into adjacent intersections, which were not provided in the level of service worksheets included with JTE's comments. For example, JTE's adjustments to remove the second east-to-north left turn lane at the intersection of Barrett Road/Main Street would likely result in queues backing into the Main Street/I-5 northbound ramp intersection.

   The JTE process to reassign forecast traffic from the intersection of Main Street/LaBounty Drive to another location appears to be arbitrary and without documentation. The forecasting process must be consistent between alternatives to provide a comparison between alternatives. In the extreme one could simply move traffic to eliminate any need for improvements, or to locations where improvements were less expensive to reduce mitigation requirements.

The Supplemental Transportation Analyses includes estimated travel speeds for the Main Street corridor based on Alternative 2 with the different improvement strategies and level of service standards. The differences in travel speeds between LOS C and LOS D standards based on traffic signal improvements are shown as 3 mph or less for Main Street between I-5 and 4th Avenue.

The City has set the speed limit on Main Street at 25 mph. At this time the City is not considering a change to the posted speed limit. The travel speed evaluation included in the Supplemental Transportation Analyses combines field measurements for the mid-block speeds/travel times (conducted in 2011) with the changes in estimated delays at intersections from the Synchro and Sidra operations analyses to estimate future travel speeds for the various alternatives.

4. **Improvement costs.** The comments are noted. The Supplemental Transportation Analyses presented in the Final EIS provides a comparison of planning level cost estimates for roundabouts and traffic signal options based on LOS C and LOS D standards. The analyses are based on the Alternative 2 land use scenario.

   Separate from the EIS process, the City has prepared a fiscal analysis to evaluate options for funding transportation improvements and other elements related to development in the Planned Action area. This is summarized in Chapter 1 of this Final EIS.

5. **Interstate 5 interchange improvements.** The comments are noted. The analysis of the No Action alternative presented in the Draft EIS assumes widening of the overcrossing consistent with the City's Transportation Element. Without the widening of the overcrossing, the intersections of I-5/ Main Street interchange would meet the WSDOT LOS D standard; however, the analysis showed that extensive traffic queues would develop and extend into adjacent intersections. The Supplemental Transportation Analyses presented in the Final EIS provides additional discussion of mitigation strategies, including options for the City to work with WSDOT.

6. **Summary comments.** The comments are noted. Please see responses to Letter #9, Comments #1 through #4.

7. **Interstate 5 interchange.** The comment is noted. Please see responses to Letter #9, Comment #5.

8. **LOS D.** The comment is noted. The Supplemental Transportation Analyses presented in the Final EIS compares the different improvements and costs associated with a LOS D versus LOS C standard for City intersections. . City staff has recommended retention of the LOS standard; this recommendation was affirmed by the Planning Commission on November 30.

John C. Belcher
Jack O. Swanson
Chester T. Lackey
Terrance G. Lewis
Douglas K. Robertson
Jeffery J. Solomon

Belcher | Swanson
LAW FIRM, PLLC

Bradley D. Swanson
Scot S. Swanson
Peter R. Dworkin
Mark A. Lackey
Hugh C. Klinedinst

August 30, 2011

Mr. Jori Burnett
Community Development Director
City of Ferndale
2095 Main Street
Ferndale, WA 98248

Re: Comment – Draft Planned Action EIS

Dear Jori:

The comments contained in this letter are made on behalf of Can-America Exports, Ltd.

Four of the property owners within the Planned Action – Environmental Impact Statement ("PA-EIS) area agreed with the City that joint planning for infrastructure was appropriate to efficiently develop the new infrastructure that will be required to support anticipated growth within the PA-EIS area.

The cost of preparation of the PA-EIS was funded primarily by the four land owners, including Can-American Exports, Ltd. Can-America Exports, Ltd., Sawarne Lumber Company, Inc., and Ferndale Town Center, L.L.C., caused Jake Traffic Engineering, Inc., to submit comments to the draft PA-EIS.

The two main areas that were of interest to the participants were traffic and stormwater. 1
The stormwater section of the PA-EIS is not adequate. The PA-EIS states the obvious, that a comprehensive stormwater plan should be developed for the area. Unfortunately, no engineering was done and the report concludes that if all stormwater regulations are complied with there will be no significant environmental impact. The conclusion that the projects within the PA-EIS area should comply with federal, state and local regulations is not helpful as such compliance is required in any event.

Traffic is a bigger problem. I have discussed with matter with Doug Robertson of the 2
Belcher Swanson Law Firm, P.L.L.C., and have reviewed the comments that he has made on the PA-EIS and I agree with his comments. Please accept them as comments from Can-America Exports, Ltd.

During the meeting of the Ferndale City Council, at which the City of Ferndale 3
Transportation element of the comprehensive plan was adopted, I requested on behalf of Can-America Exports, Ltd., that the City delay in adopting its transportation element until a better understanding of the impact of LOS C on the Main Street corridor could be analyzed. As I understand it, the last paragraph of the transportation element[1] was included to allow council to address this issue in more detail after the Main Street / Axton Road Planned Action EIS had been completed.

It is clear from the PA-EIS and the comments from Jake Engineering that LOS C cannot 4
be achieved in this isolated corridor without the construction of improvements that are not realistic given the developed nature of the corridor and future monies that will need to be expended to improve the freeway overpass. This cost analysis needs to be done to satisfy the existing comprehensive plan requirements.

Very truly yours,

CHESTER T. LACKEY

CTL:db

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[1] With the completion and adoption of the Main Street / Axton Road planned action ordinance, the City will reassess its level of service standards, transportation concurrency management program, and other development regulations based on growth and funding level.

Response to Draft EIS Letter 10: Belcher|Swanson Law Firm, PLLC

1. **Stormwater analysis.** The analysis in the Draft EIS is consistent with the scope of review established for this project and appropriate for a sub-area plan. The state SEPA rules specifically identify sub-area plans as appropriate for planned actions (WAC 197-11-164(b)(1)). It is acknowledged that the analysis provides an area-wide review of the elements of the environment. This level of analysis is appropriate for review of a sub-area plan. No specific projects are proposed at this time, and site-specific analysis is neither possible nor required.

   Because the specific nature and timing of development at any particular site is not known, site specific mitigation requirements would be speculative and inappropriate in a subarea-wide analysis. Instead, the mitigation measures establish the applicable regulations and requirements, proposed plan features and other measures needed to ensure that impacts are adequately mitigated. Such measures would become conditions of approval of any subsequent projects.

   Draft EIS mitigation includes compliance with all applicable regulations, use of LID measures, consideration of regional stormwater detention and direct discharge to the Nooksack River following a stormwater inventory update, and site specific review of wetlands that are sensitive to fluctuations in water level. Collectively, these measures provide adequate mitigation for potential stormwater impacts.

   Please see Section 2.2 of this Final EIS for a supplemental discussion of stormwater.

2. **Reference to Comment Letter #8.** The comment is noted. Please see the responses to transportation comments in Letter #8.

3. **Consideration of LOS D.** The comment is noted. The Supplemental Transportation Analyses presented in the Final EIS provides comparisons of LOS C and LOS D standards at City intersections for both traffic signal and roundabout improvement strategies. City staff has recommended retention of the LOS standard; this recommendation was affirmed by the Planning Commission on November 30.

4. **Level of service.** The comment is noted. The Supplemental Transportation Analyses presented in the Final EIS provides

comparisons of LOS C and LOS D standards at City intersections for both traffic signal and roundabout improvement strategies for Alternative 2, which has been identified in the Final EIS as the preferred land use alternative. In addition to simply meeting the LOS standard, the final improvements need to take into account the potential impacts of traffic queues that can block adjacent intersections. The roundabout and signal improvement strategies based on the LOS C standard address the potential impacts of traffic queues while the LOS D scenarios do not fully consider queues. The additional improvements needed to address the impact of traffic queues under the LOS D standard generally resulted in improvements similar to the LOS C scenarios. Because of this, queues were not fully incorporated in the LOS D scenarios. The resulting LOS D scenarios demonstrate that applying the LOS D standard without considering queuing does not fully address the impacts of increases in traffic volumes. Planning level cost estimates are provided to allow comparison of the different improvement options and level of service standards.

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Jori C. Burnett, Director
Department of Community Development
City of Ferndale
2095 Main Street
P.O. Box 936
Ferndale, WA 980248

August 24, 2011

Subject: Main Street Master Plan Planned Action Draft Environmental Impact Statement

Dear Mr. Burnett,

Thank you for the opportunity to comment on the subject Master Plan Draft Environmental Impact Statement (DEIS). The purpose of this letter is to express the serious concern of Haggen Food and Pharmacy that the Master Plan DEIS has overlooked probable significant adverse impacts relating to existing business and economic development impacts that have not been identified, analyzed, or mitigated.

On behalf of Haggen Food and Pharmacy, I am writing to express our concern about the planned transportation "improvements" that are being considered as part of the Main Street Master Plan Planned Action DEIS. This will significantly and adversely impact our core customer base, the ability of our business to operate and the associated economic impact on the City. 1

Specifically, we are concerned that the proposed roundabouts will preclude left turn egress onto LaBounty Drive from our easterly site access. Even with the alternative of traffic signal improvements all westbound customer traffic exiting from Haggen Food and Pharmacy will be forced to use private access easements through adjacent properties, the easterly of which is not yet developed.

When Haggen Food and Pharmacy originally opened, we had two driveways that permitted left turns in and out of our site. The easterly driveway was off LaBounty Drive and the westerly driveway was directly onto Main Street. When the property to our west developed, a new traffic signal on Main Street was installed as part of that development and our westerly driveway was restricted to right turns in and right turns out only. We worked with the City and the adjacent property owner to secure reciprocal access provisions. Access across that westerly property was tolerable and we agreed to the restricted left turn egress.

With the planned Main Street Master Planned improvements, we can see that roundabout and traffic signal designs will likely require raised barriers down the center of the La Bounty Drive. These raised center medians will eliminate left turns in and out of our easterly driveway where it intersects LaBounty Drive. This will now force all our customers destined to the west (the location of our core customer base) to travel through the adjacent westerly development or back track through a currently undeveloped property located east of our site. Such circuitous access is exceedingly detrimental to a business like Haggen or any other full service business. These are very significant probable adverse impacts. We do not find that these impacts have been considered or disclosed in the DEIS. 1 cont

We appreciate and support the intent of the Main Street Master Plan EIS to reduce impediment of piecemeal environmental review and mitigation. Further, we do not question the adequacy of the traffic analysis but believe the DEIS, in its attempt to streamline the environmental review requirements for future development, has not considered the significant environmental and economic impacts to existing developments.

Haggen Food and Pharmacy has contributed significantly to the economic well being of the community and wants to work with the City of Ferndale to promote logical land use planning and sound economic development. Nonetheless, we believe the Master Plan and the associated EIS has overlooked probable significant adverse impacts to existing properties and businesses. We believe the policy direction that would be implied by an approved FEIS does not eliminate the need for supplemental environmental review of certain elements like the proposed transportation improvements.

Again, we thank you for the opportunity to comment on the DEIS and anticipate that the provision for supplemental environmental review of the transportation improvements will be included in the FEIS. If you would like to discuss our concerns further, we would be happy to meet with you.

Sincerely,

Glen Foresman, Vice President
Retail Support
Haggen, Inc

CC: Mayor Gary Jensen
David Markley

Response to Draft EIS Letter 11: Haggen, Inc.

1. **Roundabout impacts.** The comments are noted. The transportation system improvements identified in the EIS take into consideration potential impacts of traffic queues on adjacent intersections and driveways. The Supplemental Transportation Analyses presented in the Final EIS includes both roundabout and traffic signal improvement strategies. Under the LOS C standard, additional slip lanes or right-turn lanes are identified at the intersection of Main Street/LaBounty Drive to reduce the potential adverse impacts of traffic queues on adjacent intersections including Haggen's eastern driveway. At this time, the analyses do not indicate a need for installing a raised median along LaBounty Drive that would preclude left-turns from the Haggen's Driveway. The potential impacts of traffic queues and need for such a median will be further addressed in additional studies required for the final design of improvements based on the final improvement strategy selected for the corridor. In addition, with installation of a roundabout, westbound egress from Haggen's could also utilize the western Haggen's driveway and to make an eastbound-to-westbound U-turn at the Main Street/LaBounty Drive. The EIS also identifies additional local roadways to improve access and circulation to properties within the Planned Action study area.

MOULDING & MILLWORK
A SAUDER COMPANY

SAUDER MOULDINGS, INC.
5575 NORDIC WAY
FERNDALE, WA
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PHONE: (360) 384-4774
FAX: (360) 384-4943

August 19, 2011

City of Ferndale
Community Development Department
Attn: Jori Burnett, Director
2095 Main Street
Ferndale, WA. 98248

Re: Main Street Master Planned Action EIS

Dear Jori,

Thank you for the opportunity to provide comments to this planning process. It is nice to see the City of Ferndale work to develop a comprehensive plan that will address the challenges of these potential large scale developments.

As a proud member of the Ferndale community for over 22 years, and the employer of more than 100 full time employees, we are naturally concerned about any actions by the city that might impact our operations.

Based on our understanding of the information available, we would be very concerned about traffic and congestion from the freeway through to the entrance of our property for our employees, our semi traffic inbound and outbound, and for our various service providers. Congestion translates into delay and cost for us which is of critical importance as we compete globally to sell our products. When we breakdown the issue of access, we identify a number of key points that need to be addressed:

- **Intersection of Main and LaBounty** – this is already a terrible choke point at certain times of day. This intersection has been overwhelmed by the volume of traffic coming from Haggen's, and from general growth in our quadrant of the interchange. The current plan does not seem to improve the capacity of this intersection so any significant new growth is likely to add substantially to the congestion problem. We believe the City needs to find more than one point of access to this quadrant if major retail is to be added. 1

- **Intersection of LaBounty and Nordic** – this is currently a reasonably well functioning intersection with current volumes. However, the current plan would suggest that this intersection is intended to service an entire major retail development with a new roundabout as the only improvement to this single point of access. We believe that this plan is entirely inadequate and will have problems with semi-trucks in the roundabout, and gridlock up and down the dead-ended Nordic Way. We believe the City needs to find multiple points of access to the Nordic Way properties designated retail in the plan, ideally with access directly from LaBounty east of the proposed site. 2

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- **Main Street/I-5 Interchange** – this area is already congested at many different times of day. While the addition of roundabouts may help this congestion, we are concerned that the significant new volume of traffic, coupled with congestion in the intersections downstream, will lead to even worse congestion at the freeway. 3

Other than access, we would have some concern about Storm Drainage from the SW quadrant – our area currently has no issues with flooding, even in periods of very heavy rainfall. With all the hard surfacing that goes with parking for major retail, there could be an issue with the ability of the storm drains in our area becoming overwhelmed with runoff. We believe the City needs to ensure there is adequate storm water drainage to prevent any kind of flooding in the SW quadrant. 4

We have quietly gone about our business of manufacturing world class wood moulding and millwork for more than 20 years in Ferndale. We have provided stable manufacturing jobs with a substantial payroll and quality benefits to many in the community. Over the years, we have been impressed by the quality of development in the City so we are pleased to have the opportunity to share our concerns as you develop the overall plan for our area. We look forward to many more successful years in Ferndale as we grow, and the community grows around us.

Thank you again for the opportunity to provide comment to this process.

Paul Douglas
General Manager
Sauder Mouldings; Inc.

Response to Draft EIS Letter 12: Sauder Mouldings, Inc.

1. **Main Street/LaBounty intersection.** The EIS analysis addresses the existing and forecast traffic operations at the intersection on Main Street/LaBounty Drive. The Supplemental Transportation Analyses presented in the Final EIS provides comparisons of improvements and traffic operations for both traffic signal and roundabout improvement strategies, based on the growth assumptions for the Preferred Land Use Alternative. These strategies provide for traffic operations consistent with the City's adopted level of service (LOS) C standard, as well as an option for reducing the City standard to LOS D. Designs for the improvements will need to take into account the number and sizes of trucks using the intersection. The EIS also identifies the need for additional access and circulation roadways, including extension of the east-west access roadway between the Haggen's driveway and LaBounty Drive (see Figure 2-5 in the Supplemental Transportation Analyses).

2. **LaBounty Drive/Nordic Way intersection.** The comment is noted. The Supplemental Transportation Analyses presented in the Final EIS provides options for improving the intersection of LaBounty Drive/Nordic Way with either roundabouts or traffic signals/turn lanes. The EIS also recommends development of an additional east-west access/circulation roadway to connect between the Haggen's driveway and LaBounty Drive east of Nordic Way (see Figure 2-5 in the Supplemental Transportation Analyses).

3. **Main Street/Interstate 5 interchange.** The comment is noted. The Supplemental Transportation Analyses presented in the Final EIS provides options for improving the I-5/Main Street interchanges with roundabouts or traffic signal options assuming development under Preferred Land Use Alternative to meet the WSDOT LOS D standard and address potential impacts of traffic queues. WSDOT has indicated a need for additional studies, such as an Interchange Justification Report, to define the actual improvements. The City will continue to work with WSDOT on these studies.

4. **Stormwater Drainage.** Draft EIS mitigation includes compliance with all applicable regulations, use of LID measures, consideration of regional stormwater detention and direct discharge to the Nooksack River following a stormwater inventory update, and site specific review of wetlands that are sensitive to fluctuations in water level. Collectively, these measures provide adequate mitigation for potential stormwater impacts. Please see Section 2.2 of this Final EIS for a supplemental discussion of stormwater.

Old Standard Life Insurance Company

In Liquidation

August 26, 2011

Via electronic mail

Jori Burnett
Community Development Director
City of Ferndale
PO Box 936
Ferndale, WA 98248
e-mail: joriburnett@cityofferndale.org.

RE: Main Street Master Plan Planned Action EIS Comments

Dear Mr. Burnett:

As you are aware, Old Standard Life Insurance Company, (OSL) owns property within the Main St./Axton-Interstate 5 Corridor Planning area and has been notified by the City of a PAEIS affecting its property. For your reference, OSL owns 31.7 acres consisting of tax parcel numbers 3902280224350000, 3902280834230000 & 3902280953500000.

We have reviewed the draft PAEIS and have the following comments, concerns and questions.

I. Main Street / Axton Road Active Participant

a. We understand an Active Participant is someone with development plans within the PAEIS and who has paid a fee to participate. We are informed that these Active Participants are Pioneer Plaza, Ferndale Town Center LLC, Riverplace at the Nooksack, and the Sawarne Lumber Company/Sawmill. Please advise if this is incorrect. 1

It appears the mitigation impacts for Alternative 2 and 3 are directly related to the Active Participants which make up the parameters of the PAEIS. All other developable commercial land in the study area seems to be included for the purpose of collecting impact fees and direct impacts caused by the Active Participant's mitigations.

Following are questions and comments related to the Active Participants:

i. Under the Development Thresholds in the proposed Planned Action Ordinance, what are the anticipated land uses and development amounts, in gross square feet, for each of the Active Participant's developments? What is left under the Development Thresholds after they are allocated to the Active Participants? 2
ii. What are the development plans and timing for each development?
iii. How far along in the development/planning application process are these Active Participants with obtaining the necessary City approvals before a building permit can be issued?
iv. What are the anticipated traffic impact fees going to be for the Active Participant's developments?

II. Traffic

a. Existing Traffic Issue 3

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i. Are existing businesses being charged with some of the proposed road improvement fees? If not, why not? There was more than one public comment on existing traffic issues around the Intestate 5/Main Street intersections. These improvements would benefit the existing businesses in this area. 3 cont

b. Barrett Road Realignment – South of Main Street

i. Barrett Road is a freeway frontage road and should remain one. For that reason alone it should stay aligned with Interstate 5 and its ramps. It would maintain its easy left/right access onto Main Street and stay connected from Main Street to Smith Street. Any other deviation of this road will devalue the land on this frontage road, and no compensation for this loss was addressed in the PAEIS. 4

c. Traffic Impact Fees

i. Please explain how the Traffic Impact Fees will be imposed on new development in this area, including which traffic mitigations will be applied to which quadrants. 5

ii. The Main Street/Interstate 5 interchange is the main way into downtown Ferndale and any improvements here would benefit all quadrants. Are such benefits being considered when looking at TIF allocations between quadrants? 6

iii. How will shifting the development threshold from one quadrant to another affect the way the traffic impact fees will be allocated? 7

iv. Will or has the city looked at the traffic impacts of having a big-box type business in one of these quadrants? 8

d. How and when will the City and/or WADOT contact land owners of right of way acquisitions or major road deviations if any variation of Alternative 2 or 3 is chosen? 9

III. Wetland Mitigation

a. Will all quadrants within the study area be able to use the designated open spaces for off-site wetland mitigation? 10

b. Will there be any off-site wetland mitigation opportunities onto the open space areas for land owners that are not Active Participants? 11

c. How are the wetland mitigation costs being addressed if they are not being handled by the developer? 12

IV. Zoning/Comprehensive Plan Compatibility

a. Figure 2-7 Land Planning Framework, depicts anticipated development areas.

i. Why are the land use designations different on this map than those established in the comprehensive plan and zoning map? 13

ii. Will this map be incorporated into comprehensive plan? 14

1. If yes, will it change the current comprehensive land use designations and how will it affect the existing zoning land use designations?

iii. Describe the amendments being made to the Comprehensive Plan and development regulations. 15

1. Will public notice and meetings be held regarding these changes?

V. Planned Action Ordinance

a. Development Agreement

i. Will development amounts, under the Development Threshold, be allocated in this agreement? 16

            1. If yes, under what terms and for what length of time? 16 cont
            2. This would seem to alleviate the first-come-first-served development as earlier discussed with the city.
        ii. At what stage in permitting would the agreement be allowed?
        iii. Will the public be notified of such agreements?
    b. Additional SEPA/EIS requirements
        i. If a separate SEPA and/or EIS is required if a development does not meet the Planned Action Review Criteria, will the development also be subject to the impact fees from the Planned Action Ordinance? 17
        ii. Why is the city including commercial property that already requires a separate EIS in this Planned Action Ordinance? 18
    c. Are site-specific development proposals that do not currently require an FEIS, or can be waived from a FEIS per Ferndale Municipal Code 18.58.030, subject to the Planned Action Ordinance? 19
        i. If yes, are their impact fees less than those developments requiring an EIS?
        ii. If not, please explain the justification for this decision.
    d. Development Threshold
        i. It was OSL's understanding that the Planned Action Ordinance will expire when the Development Threshold is met. Is that still accurate? 20
            1. If not, is new development still subject to the impact fees under the Planned Action Ordinance once the threshold is met?
    e. Will the public and individual land owners in the Planned Action Ordinance area be notified and have time to comment on the final version? 21

VI. Mapping

    a. All the conceptual traffic maps should be clearly labels as concept in large letters. 22
    b. Figure 2.3, 2-4, 3.2-2, and 3.2-4 do not accurately outline the study area. 23

Please contact the undersigned at (509) 990-2007 should you have any questions.

Sincerely,

Tina M. Zinkgraf

Tina Zinkgraf
Old Standard Life Insurance Company
In Liquidation

Response to Draft EIS Letter 13: Old Standard Life Insurance Company

1. **Active Participants.** The EIS does not refer to active participants. However, the entities listed in the comment are those who helped to fund the EIS. The planned action ordinance, if adopted, would apply to all properties in the planned action area.

2. **Development Assumptions.** The development assumptions in the Draft EIS were based on existing Comprehensive Plan designations and public input. Development assumptions are not allocated or reserved for specific developments. Specific development plans and timing is unknown and, as of the date of the Final EIS issuance, the City has not received any major new or redevelopment proposals for the planned action area. Traffic impact fees have not been calculated for any specific developments.

3. **Existing traffic issues.** Mitigation in the EIS does not propose to assess existing businesses for existing traffic congestion. Pursuant to SEPA requirements, the EIS analysis identifies mitigating measures to address significant impacts of the proposal, but does not require mitigation for existing conditions that are unrelated to the proposal. In general, the City's Transportation Element of the Comprehensive Plan addresses transportation issues and needs from a comprehensive basis and identifies projects needed to improve existing conditions were adopted levels are service are not being met.

4. **Barrett Road.** Comments noted. The Supplemental Transportation Analyses presented in the Final EIS is based on Alternative 2 (Moderate Growth) and maintaining the connection of Barrett Road with Main Street as the preferred alternative.

5. **Transportation impact fee.** A final mitigation approach has not been defined. Options for revising the City's transportation impact fees are discussed in the Supplemental Transportation Analyses in the Final EIS (see Section 2.1). The impact fee program could treat the Planned Action area as a single service area. Alternatively, the impact fee program could assess fees for each quadrant or for developments east or west of I-5. The allocation of cost shares and resulting rates would be based on the relative impact/benefit of improvements as calculated based on the assumed growth assumed in the travel demand model used in developing the forecasts for the Planned Action EIS.

6. **Main Street/Interstate 5 interchange.** Please refer to the response to Letter #13, Comment #5. The relative benefit/impacts of growth are considered in defining a mitigation program for the I-5/Main Street interchange improvements, and all other improvements needed to provide acceptable traffic operations for the additional growth in Planned Action area. The City also will continue to work with WSDOT to identify funding and developer mitigation requirements for the interchange improvements.

7. **Traffic Impact Fees.** If assumptions about the amount of development changes the volume and distribution of trips may also change. Because the transportation impact fee is based, in part, on projected volume and distribution of trips, changes to these underlying assumptions could impact the structure of the impact fee. Ultimately, the design of the traffic impact fee is a City policy decision. It is anticipated that the transportation impact fee will be based on a variety of factors, including establishing a clear connection between the impact and the fee or mitigation cost, providing equity and fairness in the structure, providing flexibility and ease in administration and maximizing simplicity for the user. There will be an opportunity for comment on the proposed transportation impact fee prior to any action by the City Council. Please see also the response to Comment #5, this letter, above.

8. **Big box retail development.** The land use assumptions used in developing the travel demand model assume a range of potential types of retail development and include the potential for fast food restaurants, shopping centers and big-box stores. The identified improvements and resulting mitigation requirements are based on estimates of trip generation during the weekday PM peak hour. The Planned Action area may develop with different types of retail land uses. The City will need to monitor the level of traffic generation to assure that future growth stays within the impact thresholds of the Planned Action EIS.

9. **Right of way requirements.** As more specific roadway improvements are designed, the City will notify and work with affected property owners and other interested parties. It should be noted that the FEIS contains planning-level analysis, and once a preferred alternative is selected, the City will proceed to more specific analysis, including engineering analysis which would identify the need for right of way acquisition. This analysis would be initiated based on the extent and location of developments that are proposed.

10. **Off-site wetland mitigation.** For any development where wetlands are impacted and a permit is required from the City, ACOE, or Ecology, a wetland mitigation plan will need to be prepared by the applicant. As described in the Draft EIS, off-site mitigation will be explored on a case-by-case basis for impacts to habitat and wetlands that cannot be mitigated on-site. Any use of off-site open space areas will require agreements with the respective land owners. The open space areas shown in Draft EIS Figure 2-6 were not intended to imply availability or exclusivity for off-site mitigation.

11. **Off-site wetland mitigation.** Please see the response to Comment #10, this letter, above.

12. **Wetland mitigation.** Wetland mitigation will be the responsibility of the individual development proposal consistent with review by the City and partnering agencies.

13. **Draft EIS Figure 2-7 Planning Framework.** This figure was intended to illustrate the proposed land use and development character in the study area. Land uses shown are consistent with existing Comprehensive Plan and zoning designations. The map is intended to provide a slightly higher level of detail by identifying specific types of development that may occur, consistent with the range of uses permitted by the Comprehensive Plan and Zoning Code.

14. **Draft EIS Figure 2-7 Planning Framework.** A revised version of the map, based on comments from the City and public, will be adopted as part of the Main Street Master Plan. The revisions will not change any of the existing Comprehensive Plan or zoning designations in the study area.

15. **Comprehensive Plan and development regulations.** Potential amendments to the Comprehensive Plan and development regulations include the following:

    a. Adoption of the Main Street Master Plan.

    b. Amendments to the Ferndale Comprehensive Plan Transportation element to address the following:

        - Roundabouts as the preferred intersection control approach along the Main Street corridor
        - Adopted level of service
        - Revisions to Section B, Travel Forecasts and Alternatives Evaluation, to incorporate updated land use forecasts for the Master plan area and travel forecasts.

- Revisions to Section C, Transportation Systems Plans, to incorporate recommended transportation projects and costs and remove improvements and costs for projects that have been superseded.
- Revisions to Section D, Financing Program, to incorporate recommended project costs and remove improvements that have been superseded. Update financing strategy based on revised costs and developer mitigation programs including transportation impact fees.

c. Amendments to the Comprehensive Plan Transportation Element and Ferndale Municipal Code 15.40 to allow extension of the concurrency period to match the maximum period allowed by the state.

The Planning Commission considered the potential Comprehensive Plan amendments at a public hearing on November 30, 2011. In addition to the City's standard notice process, direct notice was provided to property owners in the study area and commenters on this EIS. The Planning Commission may consider implementing ordinances, including the planned action ordinance, at future public meetings and hearings. The City Council will consider Planning Commission recommendations for the Main Street Master Plan, proposed Comprehensive Plan amendments and implementing ordinances at future public hearings. The City will provide public notice for all public hearings and meetings.

16. **Development Agreement.** An individual development agreement would not change the development threshold or allocation of development identified in the planned action ordinance. The City may wish to consider development agreements, but the potential for such agreements is unknown.

17. **Transportation impact fees.** The transportation impact fee ordinance is separate from the planned action ordinance. Development in the planned action area will be subject to the transportation impact fee ordinance regardless of whether it qualifies as a planned action.

18. **EIS requirements.** Any development that qualifies as a planned action would not be required to prepare a separate EIS.

19. **Site specific SEPA Requirements.** All development must be reviewed through SEPA, either as a qualified project under the planned action ordinance or through a separate SEPA review. Please see the response to Comment #17, above regarding transportation impact fees.

20. **Development threshold.** When the total development amount identified in the planned action ordinance is reached or by a specific date, if established by the City, whichever comes sooner, the ordinance will expire. Please see the response to Comment #17, this letter, above regarding the transportation impact fee ordinance.

21. **Planned action ordinance.** There will be a public hearing and public notice provided prior to City action on the planned action ordinance.

22. **Transportation graphics.** The comment is noted. The additional graphics included in the Supplemental Transportation Analyses in the Final EIS include notes that they are for illustration only and further analysis and design will be needed prior to constructing any of the improvements.

23. **Study area boundaries.** The study area boundary was shifted to its proper position in the noted figures. Please see Figures 1-3 and 1-4 in the Final EIS.

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August 30, 2011

City of Ferndale
Community Development Department
Attn: Jori Burnett, Director
2095 Main Street
Ferndale, WA 98248

Re: Comments on the Ferndale Draft "Main Street Master Plan – Planned Action Environmental Impact Statement"

Dear Mr. Burnett:

I am writing on behalf of Citizens for a Livable Ferndale to submit comments on the Draft Main Street Master Plan – Planned Action Environmental Impact Statement (DEIS) issued in July 2011. This letter addresses a number of issues regarding the DEIS, including its analysis, or lack of analysis, of transportation, water quantity and quality, waterways and wetlands, floodways/floodplains, channel migration zones, air quality (including climate impacts), utilities (including potable water and stormwater), along with inconsistencies with adopted comprehensive planning documents. 1

In essence, the DEIS is flawed in that it does not provide the public and the decision-makers with an adequate discussion of the probable significant environmental impacts of the City of Ferndale's decision so that an informed decision can be made. Proper disclosure and analysis must be prepared so that the decision-makers truly understand the impacts this proposal will have not only on the City of Ferndale, but also on the surrounding community, especially given the regional emphasis of the proposed action.

As you know, this DEIS relates to a master plan development for a 443-acre area surrounding the Interstate 5/Main Street interchange so as to allow development of retail, office, residential, hotel, and open space uses in order to implement the City's vision for economic development in this "Gateway" area as provided for in its Comprehensive Plan. The study area has been divided into four quadrants[1] which overlay two existing sub-areas.[2] The DEIS provides for three

[1] The quadrants are labeled as Northwest, Northeast, Southwest, and Southeast.

[2] Subarea 4 Southeast Ferndale Neighborhood and Subarea 5 South Ferndale Neighborhood.

alternatives to facilitate mixed-use development within the study area.[3] Although termed mixed-use, the majority of development under any of the alternatives is retail. 1 cont

Decades ago, the Legislature enacted two laws which guide development in Washington. In the 1970s, the Legislature enacted the State Environmental Policy Act (SEPA), RCW 43.21C. SEPA's legislative purpose and policy declared in RCW 43.21C.010 are implemented by RCW 43.21C.030(2)(c), which provides the requirement for preparing an Environmental Impact Statement - the heart of SEPA's procedural requirements.[4] The analysis of environmental issues allows people to shape their future environment by deliberation, not by default,[5] with the key point of an EIS being to provide decision-makers and the public with information about potential adverse impacts of a proposed action.[6] It is also meant to require governments to fully consider environmental and ecological factors *before* taking actions that significantly affect the quality of the environment.[7] 2

The SEPA Rules, at WAC 197-11-400, further describe the purpose and function of an EIS, including the need to inform decision makers and the public of reasonable alternatives and mitigation measures; a requirement for the EIS to be concise, clear, and to the point; a requirement for the EIS to be supported by the necessary analysis; and the recognition that an EIS is more than a disclosure document, but is to be utilized in conjunction with other materials and considerations to plan actions and make decisions.

Subsequently, in the 1990s, the Legislature enacted the Growth Management Act (GMA), RCW 36.70A. The Legislature's intent behind the GMA was to address uncoordinated and unplanned growth that posed a threat to the environment and the health, safety, and high quality of life enjoyed by Washington residents. The GMA is founded on several goals including those related to the environment, public services and facilities, and transportation. Shortly after the GMA was enacted, the Legislature put in place various aspects of regulatory reform so as to integrate SEPA and GMA.[8] The intent of SEPA/GMA integration was to ensure that environmental considerations inform decision-making at every GMA step from early policy development

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3 Citizens for a Livable Ferndale recognize the three alternatives presented represent growth at the current level of planning to a high growth scenario, with no preferred alternative selected. Rather, a final alternative will be developed that falls within the range of alternatives analyzed.

4 *Juanita Bay Valley Community Association v. City of Kirkland,* 9 Wn. App. 59 (1973).

5 *Stempel v. Dept. of Water Resources,* 82 Wn.2d 109 (1973).

6 *Glasser v. City of Seattle,* 139 Wn. App. 728, 736 (2007) (*citing Save Our Rural Environment v. Snohomish County,* 99 Wn.2d 363 (1983).

7 *King County v. King County Boundary Review Board,* 122 Wn.2d 648, 666 (1993); *Public Utility District No. 1 of Clark County v. Pollution Control Hearings Board,* 137 Wn. App. 150, 158 (2007) (*citing King County v. King County Boundary Review Board,* 122 Wn.2d 648 (1993)).

8 ESHB 1724.

through project permit review. Thus, the importance environmental review plays at this stage of the comprehensive planning process is exemplified by the legislative intent behind SEPA/GMA integration. 2 cont

It must be noted that the duties SEPA has established for environmental review and the mandates of the GMA for planned, coordinated growth are not negated by the fact that this is a Planned Action[9] nor, is Ferndale's duty lessened by the fact that this is a non-project proposal.[10]

With these guidelines in mind, Citizens for a Livable Ferndale submit the following comments:

A. RELATIONSHIP TO THE COMPREHENSIVE PLAN AND DEVELOPMENT REGULATIONS 3

Although the City's Comprehensive Plan identifies subareas, there are currently no separate and distinct subarea plans that relate to these areas.[11] Thus, with its Planned Action DEIS Ferndale now seeks to establish what can only be seen as its first subarea plan. Subarea plans are optional elements of a comprehensive plan. While a jurisdiction has discretion to utilize subarea plans, RCW 36.70A.080(2) requires that subarea plans be consistent with the comprehensive plan and such plans are subject to the goals and requirements of the GMA.[12] This, of course, is in line with RCW 36.70A.070(Preamble), which mandates that a comprehensive plan is to be internally consistent.

The current Comprehensive Plan has a 20-year planning horizon of 2025 whereas the alternatives presented by this DEIS are based on a future growth assumption through the year 2034.[13] Thus, any sub-area plan adopted based on this DEIS would automatically be inconsistent with the Comprehensive Plan because one is premised on a 2025 planning horizon while the other, a sub-element, is based on a 2034 horizon.[14]

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[9] RCW 43.21C.031 and WAC 197-11-164.

[10] WAC 197-11-704(2)(b).

[11] Ferndale Comprehensive Plan, Chapter 2 – Land Use at 17.

[12] *Campbell v. San Juan County,* Case No. 09-2-0014, Final Decision and Order, at 21 (Jan. 27, 2010).

[13] *See* DEIS at 2-14 noting 2034 planning year.

[14] *Evergreen v. Skagit County,* WWGMHB Case No. 00-2-0046c, Final Decision and Order (Feb. 6, 2001) (Holding that internal consistency requires all elements of a CP to be based upon the same planning period and the same population projections);*Fallgatter v. City of Sultan,* CPSGMHB Case No. 06-3-0003, Final Decision and Order (June 29, 2006) (Board held City violated the GMA when water and sewer plan were premised on a population allocation different than its comprehensive plan and, also noted that the County's growth allocation was binding on the City).

In addition, although the City of Ferndale is free to craft its Comprehensive Plan on its preferred 4
growth scenario, it must do so within the range of population allocated to it by Whatcom County based on OFM population projections.[15] The No Action Alternative presumably does this because its assumption for future growth is based on the adopted Comprehensive Plan's land use forecast. However, both of the "action" alternatives go beyond the adopted level of growth by accepting further growth within the City's planning area that is above and beyond not only the population planned for in the City's adopted Comprehensive Plan, but also that which has been allocated to it by Whatcom County.

For these two reasons – inconsistent planning horizon and inconsistent growth allocation – the intended "action" alternatives within the Master Plan would result in an internally inconsistent document in violation of RCW 36.70A.070 (Preamble).

Lastly, Citizens for a Livable Ferndale also would like to voice some concern about the regional 5
nature of the proposal. Under current zoning, neither the Gateway Development District zone, FMC 18.50, nor the Mixed-Use Commercial District, FMC 18.45, speak to such a regional emphasis. The Gateway zone does include uses necessary to serve the "traveling public" and "destination uses," which hotels, restaurants, convenience stores, and service stations would provide; it makes no reference to large scale retail formats. Similarly, although the Mixed-Use zone does allow for various wholesale and retail establishments, its purpose is to provide uses compatible with the core of the City and limited in scope to reflect the needs of the community. Thus, in this regard Citizens for a Livable Ferndale questions the consistency of the action alternatives with the purpose and use of these zoning districts.

B. NATURAL ENVIRONMENT

Although SEPA defines the natural environment to encompass earth, air, water, plants, animals, 6
energy, and natural resources, the DEIS limits its discussion to water (rivers/streams, wetlands, flooded areas) and biota (aquatic and terrestrial plants and animals). Citizens for a Livable Ferndale believes the DEIS's analysis as to the natural environment is flawed not only because it fails to address other elements, such as air quality, but also because the analysis that has been done is inadequate.

1. Air - Quality and Climate

Citizens for a Livable Ferndale finds it immensely surprising a DEIS that sets forth an alternative 7
that could allow 180 new residential units, over a million square feet of new retail/office space, almost 4,400 new employees, and seeking to promote a regional draw of shoppers traveling to

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[15] *See Petree, et al v. Whatcom County,* Case No. 08-2-0021c at 19 -36 (Oct. 13, 2008) for general background discussion as to the designation and sizing of UGAs and the County's duty as of population allocation; RCW 36.70A.110; Whatcom County County-Wide Planning Policy C3a; *Land Capacity & Demand Results,* Whatcom 2031 – Urban Growth Area Review – August 14, 2009; *Ferndale UGA Residential Land Capacity Analysis Summary of Options* – August 14, 2009.

the area on a daily basis would not address the significant impacts on the area in regards to air quality. WAC 197-11-444(1)(b) includes both air quality and climate within the meaning of the natural environment element of air.[16] Climate and air quality are closely related as many known pollutants contribute to climate change. In addition, WAC 197-11-444(2)(b) incorporates air pollution under the built environment given its impact on public health and infrastructure. 7 cont

The average passenger car emits 77 pounds of hydrocarbons, 575 pounds of carbon monoxide, and 38 pounds of oxides of nitrogen each year.[17] Carbon dioxide is the transportation sector's primary contributor to climate change and the annual emission for this pollutant per passenger car is 11,450 pounds.[18] Thus, to add a total of 7,040 Peak Hour Trips in the PM hours alone[19] would undeniably result in thousands of pounds of these regulated pollutants fouling Ferndale's and the surrounding communities' air.[20] Plus, given the intended, primary uses proposed, diesel trucks will frequent the area not only to make deliveries but to utilize the off-freeway facilities, such as hotels and retail operations.

Numerous scientific studies have linked air pollution to an array of health problems including respiratory problems, neurological issues, and cancer.[21] Studies have revealed that diesel engines are a major source of nitrogen oxides emissions that react with volatile organic compounds (VOC) to form ground-level ozone (smog) that can trigger a variety of respiratory health problems.[22] In addition, diesel particulate matter not only contributes to visibility-

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16 Washington Department of Ecology has guidance on Climate Change, which includes Greenhouse Gas Emissions during SEPA review: http://www.ecy.wa.gov/climatechange/sepa.htm; U.S. Environmental Protection Agency – Emissions Facts: Calculating emissions of Greenhouse Gases: Key Facts and Figures, EPA420-F-05-003, February 2005; U.S. Environmental Protection Agency – Greenhouse Gas Emissions from a Typical Passenger Vehicle EPA420-F-05-004, February 2005; U.S. Environmental Protection Agency – Greenhouse Gas Emissions from the U.S. Transportation Sector 1990-2003, EPA 420-R-06-0003, March 2006.

17 U.S. Environmental Protection Agency – Emissions Facts: Average Annual Emissions and Fuel Consumption for Passenger Cars and Light Trucks, EPA 410-F-00-103, April 2000; U.S. Environmental Protection Agency – Emission Facts: Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel, EPA420-F-05-001, February 2005.

18 U.S. Environmental Protection Agency – Emissions Facts: Average Annual Emissions and Fuel Consumption for Passenger Cars and Light Trucks, EPA 410-F-00-103, April 2000; U.S. Environmental Protection Agency – Emission Facts: Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel, EPA420-F-05-001, February 2005.

19 DEIS, Transportation Element Table 3.3-4 Alternative 3 High Growth; U.S. Environmental Protection Agency – Emission Facts: Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel, EPA420-F-05-001, February 2005.

20 U.S. Environmental Protection Agency – Emissions Facts: Average Annual Emissions and Fuel Consumption for Passenger Cars and Light Trucks, EPA 410-F-00-103, April 2000.

21 U.S. Environmental Protection Agency – Our Nation's Air, Status and Trends through 2008.

22 *Assessing the Effects of Freight Movement on Air Quality at the National and Regional Level,* Federal Highway Administration (Updated July 6, 2011).

reducing haze, but has both health impacts and the potential to cause erosion of structures.[23] Studies have also shown that numerous other air toxins are emitted from motor vehicles (both gasoline and diesel) such as Benzene, formaldehyde, acetaldehyde, and 1,3-butadiene all known to be or thought probable of being a human carcinogen.[24] 7 cont

Given the known impacts of these pollutants, SEPA's recognition that every person has a fundamental and inalienable right to a healthful environment, and SEPA's acknowledgment that this generation is a trustee of the environment for succeeding generations establishes a dictate for the consideration of air quality during SEPA review.[25] However, with the exception of the Transportation Section of the DEIS identifying roundabouts as the preferred mitigation strategy because they can reduce idle times so as to lead to relatively lower emissions of vehicular exhaust and greenhouse gases,[26] Citizens for a Livable Ferndale find no reference to and no analysis of any of the alternatives' impacts on air quality or climate change that would arise from this proposal leaving the final decision-makers devoid of the information necessary to make a fully informed decision.

2. Waterways and Wetlands

a. Rivers and Streams

The 443 acres that are the subject of the DEIS are adjacent to portions of the Nooksack River and one of its tributaries, Tenmile Creek.[27] The regional and local importance of these waterways for a variety of reasons – water supply for local residents, habitat for fish and wildlife, and recreational purposes – cannot be underestimated. 8

Under the Shoreline Management Act (SMA), RCW 90.58, both of these waterways are shorelines of the state and rate as Type S waters.[28] The SMA was born on the belief that the

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[23] *Assessing the Effects of Freight Movement on Air Quality at the National and Regional Level,* Federal Highway Administration (Updated July 6, 2011).

[24] Benzene is a known human carcinogen while the others are probably human carcinogens. U.S. Environmental Protection Agency - Air Toxics from Motor Vehicles, EPA 400-F-92-004 February 1995.

[25] RCW 43.21C.020(3).

[26] DEIS, Transportation Element at 3.3-46.

[27] The northwest portion of the Northwest Quadrant is adjacent to the Nooksack River. The northeast portion of the Northeast Quadrant is adjacent to Tenmile Creek.

[28] RCW 90.58.030(f)(v)(A); WAC 173-18-410; WAC 222-16-030(1). Ferndale's code provisions still utilize the old stream typing system (Type I to Type IV). Current stream typing under WAC 222-16 uses alpha characters with a Type S stream representing former Type I streams and a Type F stream representing former Type II or Type III streams. However, under the new typing system, Type S streams include all rivers/streams that are designated as

shorelines of Washington State are among the most valuable and fragile of its natural resources and, therefore, policy premised on promoting and enhancing the public interest was established that contemplates protecting against adverse effects to the public health, the land and its vegetation and wildlife, and the waters of the state and their aquatic life.[29] Ferndale's SMP was recently updated[30] and assurances as to the application of these new regulations is imperative. 8 cont

The City's Critical Areas Ordinance, FMC 16.08, designates these waterways as Fish and Wildlife Habitat Conservation Areas, with the Nooksack River having a 200 foot buffer and Tenmile Creek having a 150 foot buffer.[31] Within these waterways reside many species of salmon and trout, including federally and state-listed species such as Puget Sound Chinook salmon.[32] Terrestrial species also utilize the adjacent banks of these waterways for habitat and similarly include federally and state-listed species, such as Great Blue Heron.[33] As Citizens for a Livable Ferndale has noted within these comments, the level of development will have a proportional impact, including the removal of hundreds of acres of vegetation that serves as habitat, the introduction of various pollutants into the air and water, and introduction of people and their associated impact. However, other than making generalized comments and proposing undefined mitigation measures, the DEIS fails to disclose not only the impacts themselves, but also how they proportionately change as development levels increase.

As required by Section 303(d) of the Clean Water Act,[34] portions of these two waterways have been identified as "water quality limited waters," with the Nooksack qualifying in three categories[35] and Tenmile Creek in three categories.[36] Although the area under consideration for 9

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shorelines of the state under the SMA. Thus, both the Nooksack River and Tenmile Creek would be Type S waters. *See* Washington Department of Natural Resources: http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesApplications/Pages/fp_watertyping.aspx (accessed Aug. 28, 2011).

29 RCW 90.58.020.

30 Washington Department of Ecology approved the updated SMP in June 2009.

31 FMC 16.08.310(A)(4).

32 DEIS at 3.1-12 to 3.1.-13.

33 .DEIS at 3.1-13

34 33 U.S.C. §1251 *et. seq.* Under section 303(d) of the Clean Water Act, state government is required to develop lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet the water quality standards set by the state.

35 DEIS at Chapter 3: Category 2 – Water body of concern but has dissolved oxygen issue; Category 4A – Polluted water that has an approved TMDL being implemented but has fecal coliform issue; Category 5 Polluted water body that requires a TMDL due to dissolved oxygen issue.

the DEIS's Master Plan is largely undeveloped, this identification shows these waterways are exhibiting conditions generally associated with suburban and urban areas. Given the fact that Ferndale's water source is the Nooksack River, Citizens for a Livable Ferndale are gravely concerned about how an increase in development will exacerbate the impairment. But, the DEIS fails to fully discuss this impairment or mitigate for any impact. The DEIS does propose to "avoid development in environmentally regulated areas and their buffers such as the Nooksack River and Tenmile Creek" and to "modify the City stormwater code to support the use of Low Impact Development (LID) measures ... thus reducing pollutant loads" but it fails to fully inform decision-makers and the public of specific measures that can be taken to ensure Ferndale's water supply will not be further impaired. 9 cont

b. Wetlands

Wetlands serve a vital function within the ecosystem. According to the Washington State Department of Ecology, wetlands perform a "dazzling array of ecological functions that we have only recently begun to appreciate ... [with] our understanding of the complexities of wetland ecosystems [still under development] ... the more we learn, the more valuable wetlands become."[37] Some of the environmental benefits wetlands serve are water purification, flood protection, shoreline stabilization, groundwater recharge, stream flow maintenance, and habitat for fish and wildlife.[38] In addition to these functions, wetlands have value for other purposes such as recreational or aesthetic purposes. Ferndale's Shoreline Master Plan recognizes the functions and values wetlands provides[39] and also labels those related to the Nooksack River and within the Nooksack and Tenmile Creek's 100-year floodplain as shorelines of state-wide significance.[40] 10

Wetlands are located within all four of the quadrants of the study area and include wetlands categorized as Category II and Category IV.[41] Identified wetlands are as follows:[42]

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36 DEIS at Chapter 3: Category 1- Water body that meets clean water standards but has ammonia; Category 2 – Water body of concern due to pH and temperature; Category 5 Polluted water body that requires a TMDL due to dissolved oxygen.

37 http://www.ecy.wa.gov/programs/sea/wetlands/functions.html.

38 http://www.ecy.wa.gov/programs/sea/wetlands/functions.html.

39 Ferndale SMP (2008) at 14 (Flood attenuation, water quality, maintenance of base flows, nutrient filtering, and habitat).

40 Ferndale SMP (2008) at 23; SMP at Section 7.2.

41 DEIS, at 3.1-7.

42 DEIS, at 3.1-7 to 3.1-9.

- *Northeast Quadrant*: a Category II emergent wetland, which is part on Tenmile Creek and a probable wetland in the northeast portion of the quadrant. 10 cont
- *Northwest Quadrant:* a total of six wetlands were identified, three are classified as Category II and one is a Category III wetland. As to the other two, one is a wetland mitigation site and the other is comprised of fill material.
- *Southeast Quadrant*: a total of 10 wetlands were identified, two are classified as Category II and six as Category III. Additional wetlands are likely in the northwest portion of the quadrant (Category II, Category III, and Category IV Palustrine Emergent.
- *Southwest Quadrant*: two wetlands identified, both Category III, and additional wetlands are likely in the eastern portion of the quadrant.

The DEIS states that wetland information for the Southeast Quadrant was based, in part, on the Pioneer Plaza Planned Unit Development Draft EIS (2008). However, the DEIS states wetlands were identified utilizing methods set forth in the US Army Corps of Engineers; *Wetland Delineation Manual* (1987) and *Regional Supplement* (2010) to that manual and Ecology's *Wetland Rating System* (2004) for categorization. Were these the methods by which wetlands were identified and categorized in the 2008 Pioneer Plaza DEIS? This quadrant is heavily impacted by wetlands, thus, a current and uniform process for identification and categorization is vital to providing an understanding of impacts. As noted *supra,* our understanding (and appreciation) of wetlands has grown throughout the years and ensuring that identification and categorization of wetland is utilizing the best available science is critical to protecting these important resources.

In addition, the DEIS generally speaks of wetlands within the quadrant, but fails to discuss where these wetlands are in relationship to the development corridor. The DEIS also does not discuss the size (in acres) of the wetlands, which would directly relate to available mitigation measures. For the reasons noted in this section, Citizens for a Livable Ferndale concludes the DEIS fails to provide the public and the decision-makers with adequate information to make a reasoned, informed decision.

3. Floodplains/Floodways

a. Floodplain Development

With this proposal, the City seeks to facilitate development within areas known to be impacted by flooding from the Nooksack River and its tributary, Tenmile Creek. The Federal Emergency Management Agency's (FEMA) shows the 100-year floodplain covering almost all of the northeast and northwest quadrants as well as a small portion of the southeast quadrant. The Flood Insurance Rate Map (FIRM) designates land within the northern quadrants as Zone AE and land within the southern quadrants as Zone X.[43] Thus, from Citizens for a Livable 11

[43] Zone AE is used for the 1-percent-annual-change (base flood) floodplains and are areas of inundation for which mandatory flood insurance purchase requirements apply. Zone X represents areas of 0.2-percent-annual-

Ferndale's perspective, approximately 45 percent of the land intended to be utilized for this proposal falls within areas that have the propensity to flood. 11 cont

The City of Ferndale recognizes the impact the Nooksack River can have on this area as it has applied Floodway Zoning, FMC 18.20, within the area and its Critical Areas Ordinance, FMC 16.08, seeks to protect these areas by applying FMC 15.24, the City's Floodplain Management regulations. According to FMC 15.24.230, the floodway is an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles and erosion potential. Yet a large percentage of the northwest quadrant is within the floodway thereby creating the potential for development that is directly impacted during flood events.

In addition, it is well known that an increase in impervious surface changes the hydrology of the land, as water is no longer free to infiltrate the soils at any location. The DEIS erroneously concludes no direct impact would result, apparently not recognizing the impact development itself would have on the historic ability of these waterways to address flood events.

b. Endangered Species

An area of specific concern for Citizens for a Livable Ferndale in regards to floodplains is the presence of endangered species within the Nooksack River and its tributaries. The DEIS notes the presence of such species.[44] The DEIS also briefly cites the September 22, 2008 Biological Opinion (BiOp) issued by the National Marine Fisheries Service (NMFS). This BiOp concluded that FEMA's National Insurance Flood Program (NFIP) has been implemented in a manner that leads to floodplain development thereby jeopardizing the continued existence of species protected under the Endangered Species Act (ESA).[45] The BiOp also determined that the implementation of the NFIP destroys or adversely modifies critical habitat for protected species.[46] 12

The BiOp established various Reasonable and Prudent Alternatives (RPAs) to avoid jeopardy and habitat modification. This included amending the NFIP's Floodplain Management Criteria so as to preclude development in the floodway, the channel migration zone (CMZ), and the riparian buffer zone (RBZ) or, if development was to proceed, the local permitting jurisdiction must demonstrate that development does not adversely impact habitat.[47] In addition, FEMA was

chance floodplain and are areas of sheet flow flooding, base flood stream flooding, or areas protected by a levee for which insurance is not required. FEMA FAQs - http://www.fema.gov/plan/prevent/fhm/fq_genin.shtm#in8.

44 DEIS Natural Environment (Fish) at 3.1-12 to 3.1-13.

45 DEIS, Natural Environment at 3.1-10; *see also* September 22, 2008 NMFS Biological Opinion.

46 BiOp at 149-150.

47 BiOp RPA 3A. Habitat impacts were to water quality, water quantify, flood volumes, flood velocities, spawning substrate, and/or floodplain refugia. NOAA Fisheries Service *Reasonable & Prudent Alternative Element*

to either prohibit development in the 100-year floodplain or, if development was permitted, to require any loss of floodplain storage or habitat be avoided, rectified, or compensated for.[48] The BiOp, recognizing the imperiled status of the salmon populations, directed FEMA to implement RPA 3A by ensuring that communities enact land-use management measures consistent with the criteria no later than three years from the date of the BiOp, which will be September 22, 2011.[49] 12 cont

To address the BiOp's RPAs, FEMA's created a Model Ordinance.[50] According to the Model Ordinance, the BiOp offered two ways to meet the ESA requirement – (1) Prohibit all development or (2) Enact regulations (adopt FEMA's Model Ordinance or enforcing the same requirements in other local ordinances) that allow development which meets the criteria specific in the BiOp.[51] Based on statements in the DEIS, it would appear Ferndale believes development can continue to occur despite the fact that it has not achieved compliance with the modifications to the NFIP brought about by the BiOp by either adopting the model ordinance or similar requirements.[52] While RPA 3C does provide for interim actions between the issuance of the BiOp and full implementation of RPA 3A, impacts of development (direct and indirect) must be mitigated in comport with NMFS/Corp of Engineer's *Washington State Fish Passage and Habitat Enhancement Restoration Programmatic,* NMFS Tracking No. 2008—03598.[53] However, the DEIS is devoid of any discussion about the impending deadline for compliance with the BiOp and the BiOp's extensive requirements for any development to occur in the floodplain.

For example, development within the areas deemed to be protected by the BiOp is subject to a determination as to habitat value for important fish life cycle needs within the floodplain. The DEIS' superficial treatment of the BiOps requirements prevents the public and decision-makers from understanding whether development could even be permitted within the impacted study area quadrants as it makes no determination as to the habitat value for any of the study area.

3: Floodplain Management Criteria February 2011 – http://www.fema.gov/pdf/about/regions/regionx/NMFS_RPA.pdf.

48 BiOp RPA A3; NOAA Fisheries Service *Reasonable & Prudent Alternative Element 3: Floodplain Management Criteria February 2011* – http://www.fema.gov/pdf/about/regions/regionx/NMFS_RPA.pdf.

49 BiOp RPA b; NOAA Fisheries Service *Reasonable & Prudent Alternative Element 3: Floodplain Management Criteria February 2011* – http://www.fema.gov/pdf/about/regions/regionx/NMFS_RPA.pdf.

50 In January 2010, FEMA issued a Model Ordinance for Floodplain Management. Although optional, it provides example regulatory language to address the BiOp's requirements.

51 FEMA Model Ordinance at 3.

52 DEIS, Natural Environment at 3.1-10; *Demystifying NFIP Alignment with the ESA (March 2011) – FEMA FAQs* - http://www.fema.gov/pdf/about/regions/regionx/NMFS_FEMA_FAQs.pdf.

53 BiOp RPA 3C; NOAA Fisheries Service *Reasonable & Prudent Alternative Element 3: Floodplain Management Criteria February 2011* – http://www.fema.gov/pdf/about/regions/regionx/NMFS_RPA.pdf.

Such an assessment is vital to deciding how much development should be authorized and, if development was permitted, the extent of mitigation measures required. 12 cont

4. Channel Migration Zones

The DEIS is devoid of any discussion related to the channel migration zone (CMZ) for the impacted waterways.[54] In the simplest of terms,[55] a CMZ is a corridor of variable widths that includes the current stream or river channel plus the adjacent areas through which the channel has migrated or is likely to migrate within a given timeframe. The migration of a stream or river creates hazards to both private and public property while at the same time, when not restricted, provides for aquatic and riparian habitat by ensuring the fluvial process is accommodated. Thus, the principal goal of establishing a CMZ is to predict areas at risk for future channel erosion due to fluvial processes thereby guiding development in and along river and stream systems away from these areas. 13

Although methodologies for delineating CMZs have been developed to assist in flood hazard management, a CMZ is not the same thing as a floodplain or floodway as these areas focus on inundation, while the CMZ represents areas both within and outside of floodplains and floodways that are susceptible to channel erosion. Thus, the DEIS's discussion as to floodways/floodplains, along with Ferndale's existing regulations, does not adequately address the issue of CMZs.

The delineation of CMZs should be based on an analysis of historical information and field data to interpret past and current channel conditions in order to predict future channel behavior and areas at risk of channel movement. The delineation process takes into account trends in channel movement, context of disturbance history and changes in boundary conditions, as well as topography, bank erodibility, hydrology, sediment supply, and wood debris loading. A CMZ is comprised of several zones[56] from which the probability of risk for migration is generally developed that recognizes that risk is not equal in a mapped CMZ.[57]

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54 The DEIS, at page 3.1-10, does state the City is in the process of achieving compliance with recent changes to the National Flood Insurance Program (NFIP) which includes CMZ data. But, despite the recent approval of its SMP in June 2009, Citizens for a Livable Ferndale finds no reference in that document as to CMZs despite the need to address these areas. *See e.g.,* WAC 173-26-201(3)(c)(vii) Shoreline Inventory includes CMZs; WAC 173-26-221(2)(a)(iv) CMZs are part of a shoreline's critical habitat.

55 Discussion as to what a CMZ is and how it is delineated is based on: Washington Department. of Ecology *A Framework for Delineating Channel Migration Zones 2003; see also* Nooksack Tribe Natural Resource Department *Nooksack River Watershed Riparian Function Assessment 2001.*

56 Historic Migration Zone, Avulsion Hazard Zone, Erosion Hazard Zone, and Disconnected Migration Area – Ecology's *Framework for Delineating Channel Migration Zones,* Chapter 1.

57 Risk levels are generally termed severe, high, moderate, and low - Ecology's *Framework for Delineating Channel Migration Zones,* Section 4.5.

As the City should be well aware, the Nooksack River has relocated its river channel before. In 13 cont
the 1990s, an avulsion on the Middle Fork Nooksack River relocated the river channel from the west side of its valley to the east side, placing a county road at severe risk.[58] Delineating CMZ hazard zones and analyzing risk probabilities provides planners, engineers, and managers with a valuable tool for identifying risk areas and determining where structures (buildings and roads) should be located so as to reduce future economic loss.

C. BUILT ENVIRONMENT

1. Transportation

Although all of the alternatives, even the No Action Alternative, will result in an increase in 14
traffic impacts overall, the amount caused by the action alternatives could be as much as 25 percent more than current planning allows, with Barrett Road experiencing up to a 90 percent increase in traffic alone. In addition, given the regional aspect of Ferndale's endeavor, traffic impacts will be widespread, affecting roadways outside of Ferndale's jurisdictional authority.[59]

For a Planned Action EIS, this DEIS is too vague and lacks precision. The DEIS does not 15
adequately expose transportation planning issues. A classic problem in transportation planning is a failure to reserve/secure land for right-of-ways necessary to facilitate needed roadways in the future. Without these right-of-ways, once development commences a jurisdiction moves into a reactive mode of planning, seeking to "bandage" the impacts, but with no options available that could actually cure those impacts given the failure to proactively secure land.

The land use program for the action alternatives is primarily a retail program. One of the 16
consequences of developing such a singularly-focused plan is that traffic volume is maximized, whereas the potential for traffic reductions due to internal trip making and shared-trip making is greater with a broader mix of uses. Parking is similarly affected since the potential for shared parking diminishes as the mix of uses diminishes. Such singular types of development tend to maximize the amount of infrastructure required to serve them.

Citizens for a Livable Ferndale submits the follow comments in regards to the DEIS analysis as 17
to transportation. These comments are based on a review conducted by Mr. Ross Tilghman of Tilghman Group Transportation Planning:[60]

a. The DEIS notes the City of Ferndale's Corridor Level of Service (LOS)[61] requirements which apply to key study-area roads, but fails to calculate corridor

[58] *Id.;* Washington Department of Transportation *Site and Reach Assessment North Fork Nooksack River 2008.*

[59] DEIS at Section 3.3.

[60] Memorandum from Tilghman Group Transportation Planning (August 29, 2011).

LOS for existing conditions or for any of the development alternatives.[62] The EIS should calculate corridor LOS.[63] 17 cont

b. The DEIS would better aid readers and decision makers by illustrating the types and general locations of the new connector roadways it recommends, as well as their impacts. For example, the DEIS notes that "…the forecasting process assumed a new collector road connection between Axton Rd. and Barrett Road under Alternatives 2 and 3."[64] However, no intersection levels of service were provided for what would be new intersections on existing arterials, nor were other potential impacts from a new road examined. It should be noted that the DEIS references this collector road as being in the Southwest Quadrant, when it would be in the Southeast Quadrant, and states that it would connect Main Street to Barrett Road.[65] These differing references to Main Street and to Axton Road lead to confusion and uncertainty about the road's possible location. 18

c. Access to some existing properties would be limited under proposed mitigation for Alternatives 2 and 3.[66] Additional analysis for affected properties will be warranted to determine whether less burdensome results can be found. 19

d. Alternative 3 would double volumes on Main Street crossing over Interstate 5, and Alternative 2 would nearly double volumes. Even with roundabouts serving the interstate's ramps, the widened (five-lane) bridge will be nearing capacity. The large increase in volume results from both additional local circulation on Main Street and from 60 percent of new development trips using 20

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[61] LOS is 1) A qualitative assessment of a road's operating conditions. For local government comprehensive planning purposes, level of service means an indicator of the extent or degree of service provided by, or proposed to be provided by, a facility based on and related to the operational characteristics of the facility. Level of service indicates the capacity per unit of demand for each public facility. 2) This term refers to a standard measurement used by transportation officials which reflects the relative ease of traffic flow on a scale of A to F, with free-flow being rated LOS-A and congested conditions rated as LOS-F. Federal Highway Administration - http://www.fhwa.dot.gov/planning/glossary/glossary_listing.cfm?sort=definition&TitleStart=L.

[62] DEIS at 3.3-6.

[63] Transportation planning at the corridor level looks the needs of a broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways and transit route alignments. In contrast, planning at the intersection level looks just to a specific, defined intersection or intersections impacted by the proposal. Federal Highway Administration - http://www.fhwa.dot.gov/planning/glossary/glossary_listing.cfm?TitleStart=I.

[64] DEIS at 3.3-19.

[65] *See* DEIS at Table 3.3-14.

[66] *See* DEIS at 3.3-48 and 3.3-50.

Interstate 5. The EIS should consider alternative crossings of Interstate 5 between the southwest and southeast quadrants to test the effect on local traffic distribution and on the ability to relieve congestion on Main Street. Additional interchanges would not be a viable option given the location of present interstate interchanges. 20 cont

e. The magnitude of roadway improvements and their costs documented in the DEIS as necessary to mitigate traffic impacts suggest that changes would be needed in the City of Ferndale's Traffic Impact Fee requirements. The range of mitigation costs appear to run from a low of about $2,400 per new trip to a high of nearly $4,900 per new trip, for Alternatives 2 and 3, respectively. These additional costs represent substantial increases above current impact fees. Furthermore, the pass-by trip reduction applied to new development trips may not be entirely appropriate for large-scale development in the Main Street Master Plan area. 21

2. Utilities

Ferndale's Comprehensive Plan includes water supply, sewage waste disposal, natural gas, electricity, and telecommunications under its discussion of utilities.[67] WAC 197-11-444 includes utilities under the category of "built environment," but also incorporates similar subject matter as part of the "natural environment." For example, public water supply and energy are listed under the natural environment. The DEIS's discussion of utilities is limited to three – potable water, wastewater, and stormwater. Citizens for a Livable Ferndale question the lack of discussion on other utilities. 22

a. Electricity

The average Washington commercial operation uses 7140 kWh per month.[68] The average Washington residence uses 1,091 kWh per month.[69] Nationwide, demand for electricity (including retail sales and direct use) increased 2.4 percent per year in the 1990s. From 2000 to 2009 (including the 2008-2009 economic downturn) demand grew by 0.5 percent per year.[70] With the proposal's focus on commercial (retail) development, electrical consumption will rise given today's 24-hour schedule of operations and computerized technology necessary to run such enterprises, even with energy conservation and efficiency measures. Although the provision of electricity to Ferndale is via Puget Sound Energy, consideration of the impact (and possible 23

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67 Comprehensive Plan, Chapter 5.

68 U.S. Energy Information Administration Table 5B Commercial Use 2009 - http://www.eia.gov/cneaf/electricity/esr/table5_b.html (accessed Aug. 28, 2011).

69 *Id.* at Table 5A.

70 Annual Energy Outlook 2011 – Electric Power, Report DOE/EIA-0383 (2011) - http://www.eia.gov/forecasts/aeo/sector_electric_power.cfm (accessed Aug. 28, 2011).

limitation) on electricity should have been evaluated given the importance electricity plays in the everyday lives of today's individuals and businesses. 23 cont

b. Domestic Water Supply

As noted *supra* in our discussion of water quality, the current purveyor of water to the City, 24 Public Utility District No. 1 of Whatcom County, draws water from the Nooksack River. Apparently, the City does not plan to continue the contract with PUD No. 1 for this service, rather, it intends to develop two current, but not utilized, groundwater wells. These two wells currently have a combined permitted millions gallons of water per day (MGD) of 4.13 MGD with a pumping capacity of 2,870 gallons per minute (GPM). However, one of the well sites is not currently connected to the City's water system and both have high levels of iron and manganese, which lessens the water's value.[71] Although the DEIS notes the lack of connectively, it failed to advise of high levels of these minerals present in the wells; wells that the City now states will be used as opposed to PUD No. 1 to provide drinking water.

In addition, the City's Water Plan, which is part of the Comprehensive Plan, sets 2026 as its 25 horizon and calculates a 2026 demand of 4.606 MGD, resulting in the need to secure additional water rights prior to that time in order to meet expected demand. It must be remembered the analysis as to water demand contained in the Water Plan is undoubtedly based on the current Comprehensive Plan's growth scenario (the No Action Alternative) and not on a moderate or high growth level above that baseline. Thus, even more demand will be present because of the proposed master plan development, resulting in the need to secure additional water rights sooner. However, the DEIS references an undefined level of new water rights and that those rights would be needed no earlier than 2027, contrary to the existing Water Plan.

Also, much of the DEIS analysis was premised on statistics from the City's Water Plan. But, 26 that plan is based on the growth scenarios from the existing Comprehensive Plan and Buildable Lands Report(s), which included the continuation of PUD No. 1's provision of water. The proposed Master Plan speaks to elimination of PUD No.1's involvement and the City's reliance on groundwater – creating an inconsistency in analysis. The DEIS notes additional water rights will need to be secured, but fails to address the availability of rights along with aesthetic quality of its groundwater.

It also must be noted that the City's water treatment facility, which has been undergoing 27 conversion to a groundwater plant, only has a treatment capacity of 3.12 MGD. Yet, how the City will address this lack of treatment capacity is unanswered within the DEIS.

Lastly, the DEIS fails to address any hydrological connectively issues between its groundwater 28 source and the Nooksack River. The City has not been utilizing its groundwater resources thus far and drawing from this source may result in adverse impacts to the Nooksack River

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71 Comprehensive Plan, Chapter 5 at 7.

Watershed. Also, since groundwater is generally replenished via precipitation as its percolates into the water table or aquifer,[72] the DEIS should have discussed how the increase in impervious surface within the planning area will impact the recharge of groundwater the City now states it will be relying upon. If, for example, stormwater run-off is discharged directly to the Nooksack River or Tenmile Creek,[73] thus precluding its opportunity to percolate into the soil,[74] how will this impact the volume of groundwater available to the City. Or, if allowed to percolate, given the soil types, will the amount of pervious surface provide for adequate infiltration? Lastly, as noted *infra*, increased development equates to increased pollutions and, therefore, if precipitation is permitted to recharge the groundwater, how would that pollutant loading impact the quality of the water? The DEIS fails to discuss these issues. 28 cont

c. Wastewater

Unlike most of the other planning documents relied upon for analysis in the DEIS, at least the City's Sewer Plan's planning horizon aligns with that of the 2034 horizon for the master plan.[75] 29
Although the Sewer Plan denotes a peak flow monthly capacity of 6.37 MGD, from which the DEIS opines will result a 1.19 MGD excess for the 2034 projection. The DEIS provides no support for this calculation which differs from the Sewer Plan's 4.78 monthly peak flow, thereby leading to some confusion.[76] Treatment facility development and discharge, of course, is premised on securing financing and being able to modify the NPDES permit to allow for discharge of effluent.

It is this speculative "will get financing ... NPDES permit will be revised" – that concerns Citizens for a Livable Ferndale. Similar to transportation impacts, the provisions of sewer is a fundamental requirement for urban levels of development. Ensuring the ability to provide for the capacity improvements is important to the overall planning scheme and the City should be diligent in its efforts. Citizens for a Livable Ferndale is also concerned about the additional pollutant loading resulting from a high level of retail development, especially since effluent discharges are directed to a submerged outfall in the Nooksack River – a river which is already impaired.

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72 *Washington Groundwater – A Vital Resource:* http://cru.cahe.wsu.edu/CEPublications/eb1622/eb1622.html; Washington Department of Ecology Groundwater Program - http://www.ecy.wa.gov/programs/wq/grndwtr/.

73 From the DEIS it appears direct discharge is the method to be utilized. *See* DEIS 3.6-18.

74 It should be noted the soils are mapped as "till soils" with a relatively low infiltration rate. *See* DEIS 3.5-8.

75 2011 Comprehensive Sewer Plan at 1 (Scope and Objective).

76 2011 Comprehensive Sewer Plan at Table 6.

d. Stormwater

The proposed Master Plan covers several stormwater basins – the Tenmile & Deer Creek Basin, the Riverside Golf Basin, the Riverside Drive basin, the Creighton Basin , and Tennant Basin.[77] The DEIS expressly acknowledges that much of the study area is in basins that discharge directly to the Nooksack River but discharges also occur to creeks and wetlands in the study area as well. The DEIS then concludes there is "insufficient information as to the condition and capacity of the existing stormwater conveyance systems" and suggests, as mitigation, that a comprehensive stormwater plan should be developed so as to identify required improvements.[78] The master plan is approving up to approximately 1.5 million square feet of retail spaces, 245,000 square feet of office/service space, 260 hotel rooms, and 180 residential units that will introduce hundreds of acres of impervious surface in the area that will have significant impact. A comprehensive analysis of the impacts of that must be performed as part of the DEIS. Without such an analysis, the public and decision-makers do not have information by which to make a fully informed and reasoned choice amongst the alternatives. 30

As the DEIS appears to note, stormwater control is necessary because if it is unmitigated, it can change the hydroperiod of wetlands, reduce groundwater recharge, increase stream bank erosion, and reduce stream base flows.[79] Therefore, comprehensive planning decisions for development at the level proposed in this Master Plan should not be made without an understanding as to the requirements – both structurally and financially – for providing such a vital component of development.[80]

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77 City of Ferndale – Map of Stormwater Basins.

78 DEIS at 3.5-17.

79 DEIS at 3.5-14.

80 WAC 197-11-080 Incomplete or unavailable information should be obtained if essential to a reasoned choice.

D. CONCLUSION

Thank you for your consideration of Citizens for a Livable Ferndale's comments on the Main Street Master Plan Planned Action Environmental Impact Statement (July 2011). If you should have any questions in regards to these comments or the attached exhibits, please do not hesitate to contact me. Citizens for a Livable Ferndale looks forward to continuing the process of environmental review with the City of Ferndale.

Very truly yours,

BRICKLIN & NEWMAN, LLP

Julie Ainsworth-Taylor
Attorneys for Citizens for a Livable Ferndale

JAT:psc

Enclosures

cc: Client

CLF\DEIS Comment Letter-Final

List of Exhibits

Not included in this listing of exhibits are the following types of documents – court and administrative board decisions; RCW/WAC provisions, FMC provisions, City of Ferndale Comprehensive Plan, City of Ferndale Shoreline Master Program, City of Ferndale Water System Plan, City of Ferndale Sewer System Plan. These documents were not expressly included as exhibits, either in whole or in part, because they are either laws/regulations or were considered core documents for the preparation of the Draft Environmental Impact Statement.

1. Whatcom County County-Wide Planning Policies (excerpt).
   Land Capacity & Demand Results, Whatcom 2031 Urban Growth Area Review (Aug. 14, 2009).
   Ferndale UGA Residential Land Capacity Analysis Summary of Options (Aug. 14, 2009).

2. Washington State Department of Ecology – Climate Change: *Guidance for Ecology – Including Greenhouse Gas Emissions in SEPA Review.*
   U.S. Environmental Protection Agency – *Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle*, EPA420-F-05-004, February 2005.
   U.S. Environmental Protection Agency – *Emission Facts: Calculating Emissions of Greenhouse Gases: Key Facts and Figures*, EPA420-F-05-003, February 2005.
   U.S. Environmental Protection Agency – *Greenhouse Gas Emissions from the U.S. Transportation Section 1990-2003*, EPA420-R-05-003, March 2006 (excerpts).

3. U.S. Environmental Protection Agency – *Emission Facts: Average Annual Emissions and Fuel Consumption for Passenger Cars and Light Trucks*, EPA420-F-00-013, April 2000.
   U.S. Environmental Protection Agency – *Emission Facts: Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel*, EPA420-F-05-001, February 2005.

4. U.S. Environmental Protection Agency – *Our Nation's Air, Status and Trends Through 2008,* EPA454/R-09-002, February 2010 (excerpts).

5. U.S. Federal Highway Administration – *Assessing the Effects of Freight Movement on Air Quality at the National and Regional Level*, April 2005 (excerpts).

6. U.S. Environmental Protection Agency – *Air Toxics from Motor Vehicles*, EPA400-F-92-004, February 1995.

7. Washington State Department of Natural Resources – *Forest Practices Water Typing.*

8. Washington State Department of Ecology – *Functions and Values of Wetlands.*

9. FEMA Floodplain Mapping, FIRM Flood Insurance Rate Map, and FEMA zone designation definitions for FIRM.

10. U.S. Department of Commerce, NOAA/NMFS - *Biological Opinion for National Flood Insurance Program*, September 22, 2008 (excerpts).

11. NOAA Fisheries Services – *Reasonable & Prudent Alternative Element 3: Floodplain Management Criteria,* February 2011.
    FEMA FAQs – *Demystifying NFIP Alignment with the ESA*, March 2011.

12. FEMA *Floodplain Management and the Endangered Species Act – A Model Ordinance*, April 2011 (excerpts).

13. Washington State Department of Ecology – *A Framework for Delineating Channel Migration Zones*, Publication 03-06-027, November 2003 (excerpts).
    Natural Resource Department of Nooksack Indian Tribe – *Nooksack River Watershed Riparian Function Assessment*, Report 2001-001, October 2001 (excerpts).

14. Washington State Department of Transportation – *Site and Reach Assessment North Fork Nooksack River*, June 2008 (excerpts).

15. Tilghman Group Transportation Planning – *Comments on Transportation Section of Ferndale Planned Action DEIS*, August 29, 2011.

16. U.S. Department of Transportation – Federal Highway Administration: Planning Glossary.

17. U.S. Energy Information Administration – *Electric Sales, Revenue, and Price – Tables 5A and 5B.*
    U.S. Energy Information Administration – *Annual Energy Outlook 2011* (excerpts).

18. Washington State University – Clean Water for Washington, *Washington Groundwater: A Vital Resource*, R. Hermanson.
    Washington State Department of Ecology – *Ground Water Quality Information.*

The previously listed exhibits may be viewed on the City of Ferndale website at:

http://www.cityofferndale.org/CDD/PAEIS/deiscomments/padeiscflfexhibits.php

The exhibits may also be viewed in person at Ferndale City Hall, 2095 Main Street, Ferndale.

Please contact Jori Burnett at (360) 685-2367 or JoriBurnett@cityofferndale.org

Response to Draft EIS Letter 14: Bricklin & Newman, LLP

1. **Overview comments.** The comments are noted; specific issues raised in this comment are addressed in the balance of the responses to comments in this letter. It is acknowledged that the analysis provides an area-wide review of the elements of the environment. The analysis in the Draft EIS is consistent with the scope of review established for this project and appropriate for a sub-area plan. The state SEPA rules specifically identify sub-area plans as appropriate for planned actions (WAC 197-11-164(b)(1)). No specific projects are proposed at this time, and site-specific analysis is neither possible nor required.

2. **SEPA and GMA Overview.** The comments are noted.

3. **Planning horizon.** As the commenter notes, the EIS planning horizon is 2034, consistent with the adopted Comprehensive Plan Transportation Element and beyond the 2025 population assumptions described in the Comprehensive Plan Land Use Element. While the proposed Master Plan does not identify a specific planning horizon, it does incorporate the development capacity associated with the Final EIS Preferred Land Use Alternative, which is also consistent with Draft EIS Alternative 2.

   It is acknowledged that consistent planning horizon is the clearest approach to the planning process and, when the Comprehensive Plan is next updated, the City intends to establish a single planning horizon for all elements of the Comprehensive Plan. However, the lack of a consistent planning horizon does not automatically result in an inconsistency. WAC 365-196-500 states that the internal consistency requirement means that differing parts of the comprehensive plan must fit together so that no one feature precludes the achievement of any other. In this case, the Master Plan assumes existing Comprehensive Plan land use and implementing zoning designations and does not preclude achievement of Plan goals and policies. The extension of planning for transportation improvements through 2034 provides for an improved understanding of transportation impacts and ability to plan for and mitigate potential impacts.

   No other elements of the Comprehensive Plan would be affected by the master plan. The master plan, for example, would be within the 2025 population forecast, and therefore within the demand projected for capital facilities and services. The master plan is based on development capacity (i.e., buildout) and is not tied to a specific year. The City will monitor growth to ensure that it remains consistent with Comprehensive Plan assumptions.

4. **Population allocation.** As noted in the response to Comment #3, this letter, above, the proposed Main Street Master Plan is based on existing Comprehensive Plan land use and zoning designations, is consistent with the population assumptions in the adopted Transportation element of the Comprehensive Plan and is within the range of the City's population projection allocated by Whatcom County. The Preferred Alternative would result in increased employment growth over existing Comprehensive Plan assumptions. The GMA does not explicitly require employment forecasts and the City's Comprehensive Plan does not include a specific employment projection. The EIS considers the potential impacts of the increased employment growth in the transportation, public services and utilities analyses.

   It should be noted that the Preferred Alternative would focus growth in the study area and would not require increased UGA capacity or geographic expansion. Rather, the proposal supports a development scenario of a compact development pattern that may help preclude future UGA expansions.

5. **Zoning consistency.** As noted in the responses to Comments #3 and #4, the proposal would not change existing Comprehensive Plan land use and implementing zoning designations. Development considered in the EIS is consistent with permitted uses in the Gateway Development District and the Mixed Use Commercial District.

6. **Natural environment analysis.** The analysis in the Draft EIS is consistent with the scope of review established for this project and appropriate for a sub-area plan. The state SEPA rules specifically identify sub-area plans as appropriate for planned actions (WAC 197-11-164(b)(1)). It is acknowledged that the analysis provides an area-wide review of the elements of the environment. This level of analysis is appropriate for review of a sub-area plan. No specific projects are proposed at this time, and site-specific analysis is neither possible nor required.

   Regarding air quality, see response to Comment #7, below. For responses to comments related to other elements of the natural environment, see responses to Comments #8 - #13, below.

7. **Air quality.** Scoping for the EIS was conducted from February 9 through March 2, 2011. The scoping announcement stated that the elements of the environment to be considered in the EIS included plants and animals, land use, transportation, public services, and utilities. During the scoping period, the City invited comment on the proposed scope of the EIS and held a public meeting on February 17 and an agency meeting on February 28. No comments requesting inclusion of an air quality analysis in the EIS were received. Therefore, the Draft EIS did not include this analysis. The Northwest Clean Air Agency was provided notice of availability of the Draft EIS and did not comment. However, in order to respond to this comment, a brief discussion of potential air quality and greenhouse gas impacts is included in Section 2.3 and 2.4 of this Final EIS.

8. **Analysis of rivers and streams.** Please see the response to Comment 1 of this letter, above.

   Because the specific nature and timing of development at any particular site is not known, site specific mitigation requirements would be speculative and inappropriate in a subarea-wide analysis. Instead, the mitigation measures establish the applicable regulations and requirements, proposed plan features and other measures needed to ensure that impacts are adequately mitigated. Such measures would become conditions of approval of any subsequent projects.

9. **Nooksack River and Tenmile Creek impacts.** The comments are noted. See response to Comment #8, this letter, above. Also, please see the Draft EIS discussion of water supply, which notes that the City has recently elected to fully development the City's groundwater capacity as the primary source of City water. Based on this direction, groundwater will replace the Nooksack River as the City's primary source of water supply.

10. **Wetland impacts.** As noted in the Draft EIS, all site-specific development will be designed and implemented in accordance with applicable regulations, with potential impacts addressed through the avoidance, minimization, and mitigation requirements set forth in federal, and state laws and the City's critical areas ordinance. See also response to Comment #8, this letter, above.

11. **Floodway development.** As noted in the comment, portions of the study area contain FEMA 100-year floodplain. Consistent with all federal, state and local requirements, the City will continue to regulate floodplain development according to FMC Chapter 15.24

and the Shoreline Master Program. The proposed planned action does not reduce or eliminate these requirements. See response to Comment #10, this letter, above.

12. **National Marine Fisheries Service Biological Opinion.** The City of Ferndale has achieved compliance with the NMFS Biological Opinion. On August 30, 2011, Mark Carey, Director, Mitigation Division sent a letter to the City stating "*In accordance with the Floodplain Management and Endangered Species Act checklist for Programmatic Compliance, FEMA has reviewed your current submittal and has concluded your amendments to Chapter 15.24 Floodplain Management of the Ferndale Municipal Code meet or exceed the performance standards of the Biological Opinion*".

    The City's Shoreline Master Program and Critical Areas Ordinance also address the concerns raised in the comment. Where there is a federal nexus, a Biological Assessment that addresses proposed impacts to listed species will be required by the Corps and prepared by the applicant.

13. **Channel Migration Zone.** As described in the City's Shoreline Management Program, the presence of Interstate 5, the Burlington Northern Railroad bridge and the Main Street bridge means that the channel of the Nooksack River in this area is well-defined, armored and not permitted to migrate into the historic channel migration zone. In other words, the river will not be allowed to migrate in this area because of the vital infrastructure that is in place. See also responses to Comments 11 and 12 of this letter, above.

14. **Traffic impacts.** The comments are noted.

15. **Level of analysis.** The comment is noted. Please see the response to Comment #1, this letter, above. The transportation analysis in the Planned Action EIS provides an evaluation of long term transportation system needs and potential needs for widening intersections and developing new circulation roadways to accommodate the increased growth of the alternatives based on adopted level of service standards. The analyses build from the City's adopted Transportation Element and the Whatcom Council of Governments' (WCOG) regional travel demand model.

16. **Mix of uses.** The transportation system analyses are based on a mix of land uses as presented in Chapter 2 of the Draft EIS. The transportation improvements identified in the EIS are based on the trip generation and traffic impacts of those land uses.

17. **Corridor analysis.** The Supplemental Transportation Analyses presented in the Final EIS includes a comparison of corridor travel speeds and levels of service for Alternative 2 under different improvement strategies and level of service standards.

18. **Connector roadway locations**. The Supplemental Transportation Analyses presented in the Final EIS includes a graphic showing the general alignment of the recommended circulation roads. It also includes analyses of the levels of service and alternative improvement strategies at the intersections of the circulation roadways with the arterials in the study area.

19. **Property access.** The comment is noted. Potential impacts on property access will need to occur as part of the design of transportation improvements. The potential of those impacts is reduced with the identification of Alternative 2 (Moderate Growth) as the preferred land use alternative.

20. **Main Street/Interstate 5 interchange.** The comments are noted. The Supplemental Transportation Analyses presented in the Final EIS provides improvements at the interchange ramps that will meet the WSDOT LOS D standard and address impacts of traffic queues. Smith Road, located approximately 1 mile to the south of Main Street, provides an alternative crossing of I-5. As noted in the EIS, WSDOT has indicated that an Interchange Justification Report will likely be required to finalize the recommended improvements. WSDOT and the City of Ferndale have previously evaluated the potential for an interchange at Smith Road and have not incorporated such a change into their plans.

21. **Costs and impact fees.** The comments are noted. The Supplemental Transportation Analyses presented in the Final EIS provides updated cost estimates. The costs of the improvements will likely result in higher impact fee rates depending on the level of funding from other sources. There will be an opportunity for to comment on a proposed amendment to the transportation impact fee prior to any action by the City Council. See discussion of public involvement in Chapter 1 of this Final EIS.

22. **Utilities.** The EIS analysis of utilities is based on the scope of the EIS established through public scoping process as authorized by SEPA. Please see the responses to Comments #23 through #30 below for specific utilities comments raised in this letter.

23. **Electricity.** Scoping for the EIS was conducted from February 9 through March 2, 2011. The scoping announcement stated that the elements of the environment to be considered in the EIS included plants and animals, land use, transportation, public services, and utilities. During the scoping period, the City invited comment on the proposed scope of the EIS and held a public meeting on February 17 and an agency meeting on February 28. No comments on electricity supply and demand EIS were received. Therefore, the Draft EIS did not include this analysis. Puget Sound Energy was provided notification of Draft EIS availability and did not provide comment.

    As described in the City's Comprehensive Plan, Puget Sound Energy provides electrical service to the City and has excess capacity through 2020. No deficiencies are projected and no expansion of service is planned. An analysis of electrical service demand was also conducted in the EIS analysis of the Whatcom County 10-Year Urban Growth Area Review (Whatcom County, 2009). In this EIS, no deficiencies in the electrical supply system to the City of Ferndale were identified. The EIS further notes that demand forecasting for electric service is partially based on economic conditions and it is quite likely that PSE's short-term demand forecasts are higher than actual demand. PSE anticipates the majority of this increased demand to be generated by new commercial customers, which are anticipated to grow at a faster rate than residential customers.[1]

24. **Domestic Water Quality.** When the City assumes responsibility for domestic water service, it will be required to demonstrate that water quality meets all applicable Department of Health standards. It should be noted that this change is unrelated to the proposed planned action and demonstration of water quality would be required independent of the planned action proposal.

25. **Water System Plan Update.** Draft EIS Table 3.5-1 describes estimated water demand for each alternative. As noted in the accompanying narrative, the estimated demand shows that additional water rights would be required by 2029 under Alternative 2 (identified as the preferred alternative in this Final EIS). As cited in the Draft EIS, this estimate was based on an updated analysis performed in 2011. Mitigating measures identified in the Draft EIS state that the City's Water System Plan should be updated no later than 2014 to identify required improvements to the City's water system to serve proposed development. An additional mitigating

[1] Whatcom County. 10-Year Urban Growth Area Review Draft EIS. 2009.

measure states that planning for additional water storage should begin immediately.

26. **Water System Plan Update.** Please see the responses to Comments #24 and 25, this letter, above.

27. **Water Treatment Plant Capacity.** Please see the responses to Comments #24 and #25, this letter, above.

28. **Hydrogeologic Connectivity.** The City's current water supply comes directly from the Nooksack River as discussed in the Draft EIS. Transitioning from withdrawing water from the Nooksack River to withdrawing water from groundwater wells further downstream in the watershed will add more water to the Nooksack River and thus more water to infiltrate into the ground. The Draft EIS did discuss that, in general, the soils within the study area are poorly draining soils and also encouraged the use of Low-Impact Development practices including pervious pavements and raingardens where soils may be suitable for infiltration. Because of the poorly draining soils in the study area, aquifer recharge may not be as significant as other areas with well draining soils.

    Regarding pollutants, all new development and redevelopment greater than 5,000 sf is required to treat stormwater runoff from pollution-generating impervious surfaces in the state of Washington. The suggested stormwater management of pervious pavements and raingardens, and the more conventional stormwater treatment methods of wet ponds, sand filters, and cartridge filters all provide treatment of stormwater runoff as well. Pollutants are removed in pervious pavement as stormwater percolates through the pavement section and through the first layer of soil beneath the pavement sub-base. Raingardens utilize specially amended soils to remove pollutants as stormwater percolates down through the raingarden. Wetponds are designed to settle out pollutants by providing sufficient detention time. Sand filters and cartridge filters provide a media to filter out pollutants.

29. **Updated Sewer Data.** Please see the response to Comment 41 of Letter 1.

30. **Regional Stormwater Plan.** The Draft EIS statement of …"insufficient information on capacity of the existing stormwater system" was incorrect and is hereby corrected in this Final EIS. The City's Stormwater Ordinance and Plan contain complete information to review stormwater management practices on a project by project

basis for the development described in the Draft EIS. Additional information would allow implementation of a regional detention/flow control system and/or the direct discharge (conveyance only) approach. The ongoing Ferndale Gateway Stormwater Study, planned for completion in 2012, is intended provide the necessary information to allow implementation of these two approaches. It should also be noted that the EIS does not preclude individual applicants from conducting the necessary analysis for the direct discharge approach. Please see Section 2.2 of this Final EIS for a supplemental discussion of stormwater.

Jori Burnett

From: Matt Krogh <mattk@re-sources.org>
Sent: Tuesday, August 30, 2011 3:05 PM
To: Jori Burnett
Subject: Comments on the Draft "Main Street Master Plan – Planned Action Environmental Impact Statement"

City of Ferndale

Community Development Department

Attn: Jori Burnett, Director

2095 Main St

Ferndale, WA 98248

joriburnett@cityofferndale.org

Dear Mr. Burnett,

RE Sources for Sustainable Communities is a non-profit environmental education organization founded in 1982 as Bellingham Community Recycling, with a mission to promote sustainable communities through recycling, education, advocacy, and conservation of natural resources. The North Sound Baykeeper is a project of RE Sources with a goal of safeguarding the marine and fresh waters of Whatcom and Skagit County.

It is in this role that we request that you attach this letter in support of comments on the Draft Environmental Impact Statement submitted by Claudia Newman on behalf of Citizens for a Livable Ferndale. 1

Regards,

Matt Krogh, North Sound Baykeeper

Bob Ferris, Executive Director, RE Sources for Sustainable Communities

--

Matt Krogh, North Sound Baykeeper
RE Sources for Sustainable Communities
2309 Meridian St.
Bellingham, WA 98225
http://www.re-sources.org

360 733-8307 (office)
360 820-2938 (cell)

Check out the new North Sound Baykeeper team blog
Or join us on Facebook

Response to Draft EIS Letter 15: RE Sources for Sustainable Communities

1. **Support comments submitted on behalf of Citizens for a Livable Ferndale.** The comment, which refers to Comment Letter No. 14, is noted.

Jori Burnett

From: Garin Wallace <garin@wallywonderswhy.com>
Sent: Monday, August 29, 2011 6:00 PM
To: Jori Burnett
Subject: Comment on Draft Environmental Impact Statement for growth areas surrounding exit 262

Garin Wallace

5981 Longdin Rd

Ferndale, WA 98248

360-224-5907

August 29, 2011

Jori Burnett, Director

City of Ferndale, Community Development Department

2095 Main Street

Ferndale, WA 98248

Dear Jori Burnett:

Thankfully I am a layman to the whole land use/GMA bureaucracy, but I did my best to review the Draft Environmental Impact Statement found on the City of Ferndale website. My interest is as a Ferndale resident whose family traverses this area daily for work, school, shopping and recreation. To be clear, I am not against growth in and around the I5 exit 262 area, but I don't think this plan offers the best, most responsible way for the growth to occur. 1

I found that all of the outlined alternatives for growth around exit 262 seem to result in increased traffic along the Axton/I5 Overpass, Axton, Northwest, Smith and adjacent side streets. Especially in the higher growth alternatives it is noted that traffic is expected to be increased significantly, with traffic expected to be backed up on streets well outside the study area. The pushing of traffic out of the growth area instead of dealing with the problem in the growth area has several inherent problems:

Storm water pollution:

DEIS addresses development and storm water issues in the designated areas which is good, but I don't see where the city deals with storm water issues that it forces on adjacent areas that will see significantly increased traffic. 2

Traffic:

The EIS addresses many transportation issues within the defined area, but in addition to the normal vehicle traffic delays, I didn't see noted that the Axton overpass is the primary route for Ferndale School District buses to reach students East of I5. Currently my kids typically take 30 minutes to reach Cascadia from Laurel Grove, what increases will be expected in each of the 3 growth alternatives? 3

Noise:

The areas adjacent to the Northeast quadrant are primarily residences. Currently traffic along Axton, Barrett, Smith, Northwest, etc tends to die down in the late afternoon leaving relative quiet for those residents. Retail growth east of I5 without much improved traffic access to and from I5 will mean that residents will now deal with traffic noise much later into the evening and night. 4

Sprawl:

In general by increasing growth along I5 without increasing access to and from I5, these plans encourage traffic to find alternative routes and future business tends to push out along these traveled routes. That would be sprawl, the antithesis of managed growth. 5

In short, my general comment on the DEIS proposal is that it identifies potential problems, but doesn't offer the best, most responsible way for the growth to occur. In my view, the only sound alternative is one which would improve I5 access to these areas as well as improved traffic flow between the four growth quadrants so that areas and residents just outside the defined areas are not left to suffer the brunt of the growth. 6

I hope you will take these thoughts into consideration

Sincerely,

Garin Wallace

Response to Draft EIS Letter 16: Garin Wallace

1. **Does not support plan.** The comment is noted.

2. **Stormwater Analysis.** The Draft EIS recommends a stormwater basin study so that regional strategies can be developed that are potentially more cost-effective and provides higher environmental protection and the City has undertaken the Ferndale Gateway Stormwater Study. However, current local, state and federal regulatory requirements allow site-specific development in the study area with adequate protections for water quality and quantity.

3. **Impacts on school bus transportation.** The EIS evaluates transportation flows and operations during the weekday PM peak hour, which typically has the highest level of traffic volumes. Travel times before and after school hours is not specifically evaluated.

   However, the peak hour analysis in the Supplemental Transportation Analyses may provide a sense of the proportional impact during off-peak hours. This information is included as Section 2.1 in the Final EIS provides corridor travel speeds during the weekday PM peak hour for existing (2011) conditions based on field measurements. It also provides estimates for Alternative 1 (No Action) and Alternative 2 (Moderate Growth) based on the land use assumptions presented in Chapter 2 of the Draft EIS. Alternative 2 has been identified as the preferred land use alternative in the Final EIS. The travel speeds for Alternative 2 reflect different improvement strategies (roundabouts versus traffic signals) and level of service (LOS) standards at City intersections.

4. **Noise.** It is acknowledged that increased traffic would result in increased noise levels. However, given the anticipated traffic levels, together with the relatively low travel speed anticipated through the corridor, noise levels are anticipated to be typical of those in an urban and suburban area near a freeway interchange.

   It should be noted that, during the public scoping period for this EIS, no comments from the public or agencies were received on potential noise impacts and the Draft EIS did not include this analysis.

5. **Sprawl.** The proposal seeks to focus more intensive development in the area immediately around the Main Street/Interstate 5 interchange. By concentrating growth in a focused area, it is anticipated that future sprawl would be reduced.

6. **Improve Interstate 5 access.** The transportation analysis identifies improvements to intersections and roadways that will meet the city of Ferndale and WSDOT level of service standards.

Jori Burnett

From:	Catherine Watson <kd4swf@yahoo.com>
Sent:	Monday, August 29, 2011 9:50 PM
To:	Jori Burnett
Subject:	Comments Re: Planned Action EIS

My comments are below. Thanks for all your hard work on this, Jori.

Cathy Watson
6225 Argyle St.
383-0837

Process:

How will you ensure each future project requires no additional environmental review? 1

Who will modify the generic SEPA checklist for City use? Do you have a sample of the modified checklist? 2

Who determines a submitted development plan meets the Planned Action Ordinance EIS – the Development Director or the Planning Commission? 3

Who will be the City's 'SEPA Responsible Official' and who will appoint that individual? 4

Environmental:

How long will the current environmental review be valid? 5

Does the "relatively low infiltration rates" of the study area soils mean this is not an aquifer recharge area? 6

Where would the City recommend wetlands be "relocated" should they be filled for development? 7

How many acres of wetlands can the City lose from the Planned Action area before creating long-term damage to the Nooksack ecosystem? 8

Can some existing wetlands be saved by designating them stormwater abatement systems via existing LID techniques? 9

Will areas of current flooding be noted in the EIS to protect the City should landowners claim new development is causing increased local flooding and seek restitution? 10

Economic:

Will new developments be scored on how they might affect existing businesses, e.g., a warehouse-type grocery store that hires part-time, non-union employees wants to build on the east side of I-5 –> how will that affect the two existing grocery stores with better-paid, union employees? Are we willing to lose good-paying jobs for no additional sales tax revenue? 11

Transportation:

How much, in 2011 dollars, will the recommended Traffic mitigations cost the City and WSDOT for 12
Options 2 and 3?

If developer mitigation fees pay for improving and/or building roads in the Planned Action area, who 13
pays to maintain the roads over time?

Who will determine the transportation mitigation fees and how much money could they generate for 14
Options 2 and 3?

Would the City approve development in the northern portion of the Planned Action area before we
have an agreement with WSDOT to update/widen the Main St. I-5 overpass and the related on/off 15
ramps?

If WSDOT does not have the funds to complete the needed updates, how can additional traffic be 16
expected to flow through the chokepoints created by Options 2 and 3?

Some of the future traffic access/circulation issues are implied to be fixed by the addition of a new 17
interchange in the southeast quadrant – how will the City cope with extra traffic if that construction does not occur?

Bottom Line:

3.3.4 Significant Unavoidable Adverse Impacts

Implementation of any of the alternatives would result in increased traffic in the study area. With 18
planned improvements, the effects of additional vehicles on traffic congestion can be mitigated to varying degrees. However, ***there will be a net increase in congestion under any alternative***.

Services:

Options 2 and 3 could cost the City \$400k or \$560k for an additional 5 or 7 officers, respectively. How 19
much retail space (in square feet) would be required to generate that sort of sales tax revenue? Ditto for additional Fire and Emergency services.

How much would it cost to modify Station 41 for the additional staff required under Options 2 or 3? 20
Would this cost be paid with a one-time mitigation fee(s) or out of sales tax revenue.

Utilities:

How much will it cost to provide the "replacement and/or upsizing of existing water lines, installation of 21
new water lines, and connections between existing water lines," as well as the additional water storage, wastewater conveyance infrastructure, and pump station upgrades required by Options 2 and 3?

Where does the City expect to get an additional 169k or 311k gallons/day of water as required by
Options 2 or 3? Will these additional water rights be secured before any development is allowed via 22
Options 2 or 3?

Stormwater:

Will development begin in this area before the City completes its Stormwater Comprehensive Plan? If yes, will that plan be incorporated into the Planned Action EIS Ordinance and will developers be grandfathered in (i.e., not have to follow the latest stormwater abatement rules)? 23

Response to Draft EIS Letter 17: Cathy Watson

1. **Project qualification as a planned action.** If adopted, the planned action ordinance will identify the total development and trip thresholds that can qualify as a planned action. The ordinance will also identify the required mitigation that would be applicable to future site-specific development actions. Future site-specific development proposals would be reviewed to make sure that they are consistent with all of the requirements of the planned action ordinance. If consistent, no further SEPA review is required; however all applicable local, state and federal regulations still apply. In order to satisfy regulatory requirements, additional site specific review (such as wetland or other site review) may be required.

   If a planned action ordinance is adopted, the City will create a standard review form to ensure that developments are reviewed in consistent manner. This form will also be used to track development amounts and trip counts to ensure that cumulative growth does not exceed the thresholds established by the ordinance.

2. **Planned action checklist.** The City will review the SEPA Checklist to determine whether it should be modified. All modifications must be approved by the Department of Ecology.

3. **Planned action review.** Determination as to whether a project qualifies as a planned action will be an administrative decision by the Planning Director.

4. **SEPA Responsible Official.** The City's SEPA Responsible Official is Jori Burnett, Planning Director.

5. **Duration of the ordinance.** The planned action ordinance is anticipated to in effect until development and trip thresholds are met and may identify a specific date for expiration. Note that the ordinance will include a monitoring provision to determine the continuing relevance of it assumptions and findings with respect to environmental conditions in the planned action area, the impacts of development and required mitigation measures. Based on this review, the City may proposed amendments to the ordinance, or may supplement or revise the EIS.

6. **Soils and aquifer recharge area.** The Draft EIS did discuss that, in general, the soils within the study area are poorly draining soils and also encouraged the use of Low-Impact Development practices including pervious pavements and raingardens where soils may be

suitable for infiltration. Because of the poorly draining soils in the study area, aquifer recharge may not be as significant as other areas with well draining soils.

7. **Off-site wetland mitigation.** As described in the Draft EIS, off-site mitigation will be explored on a case-by-case basis for impacts to habitat and wetlands that cannot be mitigated on-site.

8. **Nooksack ecosystem.** There are too many variables to allow a single definitive response to the comment. However, because of the existing low biological functions of potential development areas, and the higher functioning biological areas that will not be developed but proposed as mitigation areas, there will not likely be a net loss of ecological functions. The northwest quadrant is historically developed as a golf course and the most "valuable" habitat being adjacent to the river will be protected. Generally, the buffer of the river will remain undeveloped however the use of this area for education or public uses is allowed within the City's SMP.

   The northeast quadrant is primarily developed. The only remaining area for development is on the western side of Barrett Road with the eastern side of Barrett Road, the area adjacent to Ten Mile Creek, is currently being designed as a wetland/habitat mitigation area.

   The southeast quadrant is described and illustrated in the Pioneer Plaza Environmental Impact Statement where the eastern portion will remain as open space and used as a wetland mitigation area.

   The southwest quadrant is primarily developed.

9. **Wetlands and stormwater.** Wetlands can potentially be used for stormwater abatement. Use in this way requires review and permitting processes through the City of Ferndale, Ecology and the USACE because the use of wetlands for stormwater purposes is considered an impact.

10. **Flooding patterns.** Designated FEMA floodplain and City floodway areas are noted in the EIS. Any development in the designated FEMA floodway will requires mitigation for floodwater displacement impacts. Please see the response to Letter No. 14, Comment 12, above.

11. **Existing businesses.** The EIS does not evaluate employee hiring patterns of different uses and the City's development regulations cannot distinguish between uses based on employment practices.

12. **Transportation improvement costs.** The Supplemental Transportation Analyses presented in the Final EIS (see Section 2.1) includes updated planning level cost estimates for the roundabouts and traffic signal options in 2011 dollars. These are intended to provide a relative comparison of the improvement options and level of service standards. More detailed cost estimates will need to be prepared as the improvements proceed to design and construction based on the adopted improvement strategy and level of service standard. The City has not yet defined a final mitigation and financing program for the additional improvements identified in the EIS. The Supplemental Transportation Analyses presented in the Final EIS includes additional discussion of mitigation strategies. The City and WSDOT will need to work together to define funding programs and the relative funding from developments in the Planned Action for improvements to the I-5 interchanges.

13. **Roadway maintenance.** The City and WSDOT would have maintenance responsibility for public roadways under their respective jurisdictions. Maintenance for private roadways would be the responsibility of the property owner.

14. **Transportation impact fees.** The City of Ferndale City Council will be responsible for adopting any changes to the transportation impact fees based on the Planned Action EIS. The City and WSDOT will need to work together to define funding programs and the relative funding from developments in the Planned Action for improvements to the I-5 interchanges. The Final EIS notes that the City could work with WSDOT to develop a Memorandum of Understanding or Interlocal Agreement. There will be an opportunity to comment on a proposed amendment to the transportation impact fee prior to any action by the City Council. See discussion of public involvement in Chapter 1 of this Final EIS.

15. **Main Street Interchange.** The City of Ferndale could approve developments in the northern portion of the Planned Action area prior to an agreement with WSDOT. The Planned Action ordinance may or may not establish thresholds based on levels of traffic that may be allowed prior to such an agreement.

16. **WSDOT improvements.** The City will continue to work with WSDOT identify funding programs and development mitigation for associated with improvements to the I-5 interchanges at Main Street and at Slater Road.

17. **Southeast quadrant interchange.** No new interchanges are contemplated in the transportation analyses in the Draft or Final EIS documents. The Draft EIS identified the potential for new northbound off-ramp at the Main Street interchange under Alternative 3. The Final EIS recommends Alternative 2 as the preferred land use alternative and the new off-ramp is no longer identified. Please refer to the Supplemental Transportation Analyses in the Final EIS for additional discussion and illustrations of the conceptual improvements at the Main Street interchange for Alternative 2.

18. **Significant unavoidable adverse impacts.** The comments are noted. The transportation improvements identified in the Final EIS would meet the City of Ferndale and WSDOT level of service standards.

19. **Fiscal Impact.** As part of the Main Street planning effort, the City has undertaken a fiscal impact analysis to calculate the potential revenues that would be generated from the three alternatives. Please see Chapter 1 for a brief summary of the analysis.

20. **Modification of Station 41.** A specific cost has not been developed for the potential modification of Station 41. The Section 3.4.2.3 of the Draft EIS states that when the No Action threshold is reached, then the City will evaluate the increased tax revenues from new development to determine whether mitigation fees should be assessed.

21. **Water Supply.** Please see responses to Comments # 39 and #41, Letter No. 1.

22. **Water Rights.** Please see the response to Comment #39, Letter No. 1.

23. **Regional Stormwater Strategy.** The Draft EIS recommends a basin study so that regional strategies can be developed that are potentially more cost-effective and provides higher environmental protection. The ongoing Ferndale Gateway Stormwater Study, planned for completion in 2012, is intended provide the necessary information to allow implementation of regional detention and flow control and/or direct discharge approach to stormwater detention/flow control requirements. However, current local, state and federal regulatory requirements allow site-specific development in the study area with adequate protections for water quality and quantity. In addition, there is nothing in the EIS or local or state regulations that would preclude an individual property owner from

conducting the necessary analysis to allow direct discharge to the Nooksack River.

Letter 18

A

City of Ferndale WASHINGTON

COMMENT AND SUGGESTION SHEET

8/28/11

Business Name:	LARSON/NOLAN & LARSON "3 SISTERS CUMMIN SHORT PLAT"
Name	WAYNE LARSON
Address	3096 THORNTON RD FERNDALE, WA • 1800 LABOUNTY &
Phone	384-4909 961-0914 • BEHIND HAGGEN FOODS
E-mail	
Comments:	STUDIES ARE SHOW ALTERNATE WITH INSUFFICENT INFORMATION OR READY FOR A "FINAL" DESISSIONS BY DEC. 2011
Questions:	WHY SO MANY ROUNDABOUTS? TRAFFIC MOVING THRU THE ROUNDABOUTS WILL BE TRAVELING FASTER WITH NO BREAK IN BETWEEN CARS TO ALLOW CROSS OR ENTRANCE TO MAIN ST WILL PLUG-UP DOWNTOWN
Suggestions:	INFORMATION ON PROJECT IS NOT CLEAR OR ADEQUATE TO MAKE A "FINAL" DESISION WITH ONLY 3 MO. BEFORE FINAL APPROVAL

1 2 3

☒ I would like to be contacted regarding my ideas and/or questions from above

RECEIVED
AUG 29 2011
BY: JW

Letter 19

8/28/11

B

City of Ferndale WASHINGTON

COMMENT AND SUGGESTION SHEET

Business Name:	LARSON, REITMER & LARSON 1800 LABOUNTY
Name:	WENDI LARSON
Address:	3096 THORNTON RD. FERNDALE
Phone:	384-4909
E-mail:	
Comments:	DRAINAGE BACKUP. @ MARK/PACK FILL IN NATURAL FLOW SEE A
Questions:	
Suggestions:	

1

☐ I would like to be contacted regarding my ideas and/or questions from above

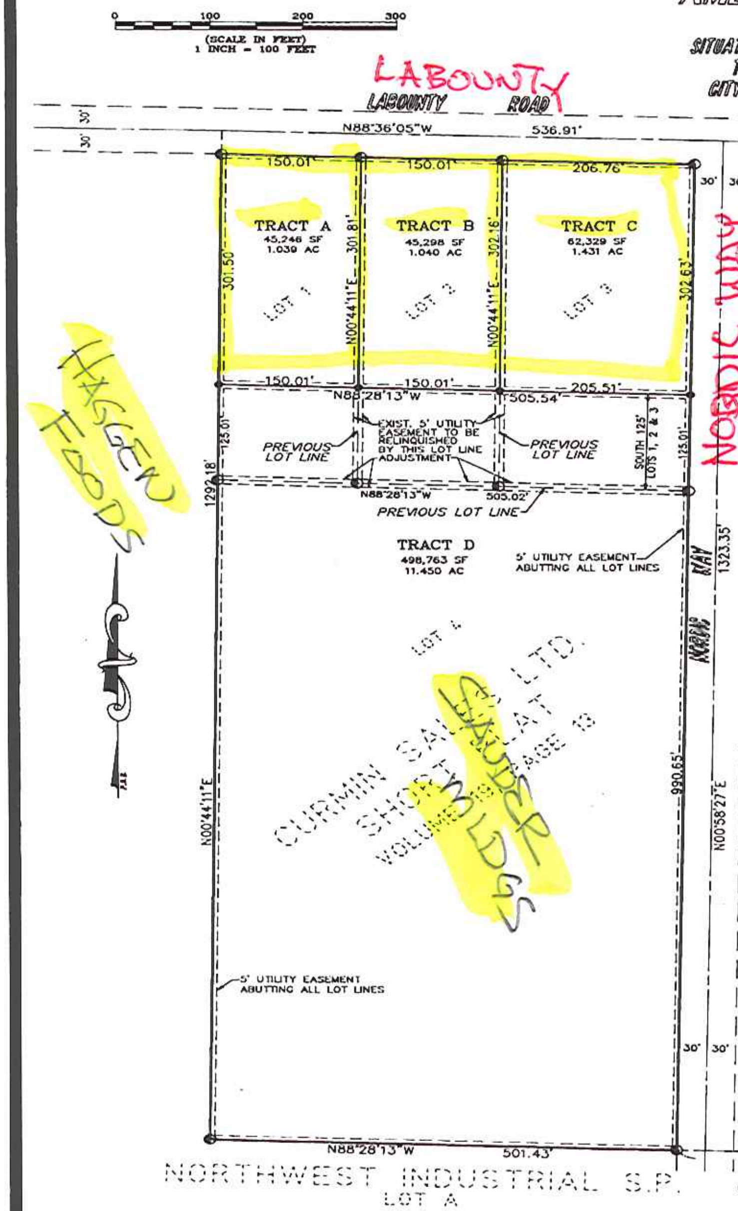
RECEIVED
AUG 29 2011
BY: JW

941221027

AMENDED CURMIN SALES LTD. SHORT PLAT

SITUATE IN A PORTION OF SE 1/4, NE 1/4, SECTION 29, TOWNSHIP 39 NORTH, RANGE 2 EAST OF W.M. CITY OF FERNDALE, WHATCOM COUNTY, WASHINGTON

SHORT PLAT NO. ________



◐ = EXIST. REBAR & CAP
● = SET 5/8" REBAR & CAP (PLS#24218)

BASIS OF BEARING: CURMIN SALES LTD SHORT PLAT RECORDED IN VOLUME 19, PAGE 13, UNDER A.F.#1644429. HELD NORTH LINE (BEARING=N88°36'05"W)

DATA FOR THIS SURVEY GATHERED BY ELECTRONIC DATA COLLECTION.

INSTRUMENT USED: WILD THEOMAT T1600 .00'01" WILD D.I. 2000 EDM ±1PPM,±2 MM

CORNERS SET ON OR ABOUT

L.I.D. AGREEMENT

THE OWNERS, HEIRS, DEVISEES, SUCESSONS, AND ASSIGNS OF THIS LOT LINE ADJUSTMENT, HEREBY PROMISE AND COVENANT TO THE CITY OF FERNDALE: TO SUPPORT WITHOUT OBJECTION A LOCAL ROAD IMPROVEMENT DISTRICT; TO IMPROVE CITY STREET RIGHT-OF-WAY KNOWN AS LABOUNTY ROAD ALONG THE NORTH LINE OF THIS SHORT PLAT.

DEVELOPMENT FEE

DEVELOPMENT FEE OF 6.645 CENTS/SQUARE FOOT HAS BEEN ASSESSED TO THE PROPERTY. THIS FEE, ON A GIVEN LOT, SHALL BE PAID TO THE CITY OF FERNDALE PRIOR TO ISSUING A BUILDING PERMIT FOR THAT LOT.

NOTE:
THE PURPOSE OF THIS AMENDED SHORT PLAT IS TO REVISE THE LOT LINE BETWEEN LOT 4 AND LOTS 1, 2 & 3.

APPROVALS

EXAMINED AND APPROVED BY THE FERNDALE CITY CLERK ON THIS 16 DAY OF December, 1994.

CITY CLERK

EXAMINED AND APPROVED BY THE CITY OF FERNDALE PLANNING ADMINISTRATOR THIS 16 DAY OF December, 1994.

SHORT PLAT ADMINISTRATOR

EXAMINED AND APPROVED BY THE COTY OF FERNDALE PUBLIC DIRECTOR THIS 16 DAY OF December, 1994.

PUBLIC WORKS DIRECTOR

AUDITOR'S SEAL — WHATCOM COUNTY WASHINGTON

LEGAL DESCRIPTION-TOTAL PROPERTY

(PER FIRST AMERICAN TITLE COMPANY PLAT CERTIFICATE/ORDER NO. 60973 & 60974)

PARCEL A:
LOTS 1, 2 AND 3 OF "CURMIN SALES LTD SHORT PLAT", RECORDED IN VOLUME 19 OF SHORT PLATS, PAGE 13, UNDER WHATCOM COUNTY AUDITOR'S FILE NO. 1644429, RECORDS OF WHATCOM COUNTY, WASHINGTON, BEING A PORTION OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 29, TOWNSHIP 39 NORTH, RANGE 2 EAST OF W.M.

SITUATE IN COUNTY OF WHATCOM, STATE OF WASHINGTON.

PARCEL B:
LOT 4 AS DELINEATED ON "CURMIN SALES LTD SHORT PLAT", RECORDED UNDER WHATCOM COUNTY RECORDING NO. 1644429 AND VOLUME 19, PAGE 13 OF SHORT PLATS, BEING A PORTION OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 29, TOWNSHIP 39 NORTH, RANGE 2 EAST.

SITUATE IN COUNTY OF WHATCOM, STATE OF WASHINGTON.

LEGAL DESCRIPTION-PARCEL A TO PARCEL B (PER A.F.# 941221028)

THE SOUTH 125.00 FEET OF OF LOTS 1, 2 AND 3 OF "CURMIN SALES LTD SHORT PLAT", RECORDED IN VOLUME 19 OF SHORT PLATS, PAGE 13, UNDER WHATCOM COUNTY AUDITOR'S FILE NO. 1644429, RECORDS OF WHATCOM COUNTY, WASHINGTON, BEING A PORTION OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 29, TOWNSHIP 39 NORTH, RANGE 2 EAST OF W.M.

SITUATE IN COUNTY OF WHATCOM, STATE OF WASHINGTON.

DECLARATION

KNOW ALL MEN BY THESE PRESENT THAT WE, THE UNDERSIGNED, BEING OWNERS IN FEE SIMPLE, OR MORTGAGEES, OF THE LAND HEREIN BEING SHORT PLATTED, DO HEREBY DECLARE THAT THIS AMENDED CURMIN SHORT PLAT IS MADE WITH OUR FREE CONSENT AND IN ACCORDANCE WITH OUR WISHES.

SAUDER WOOD PRODUCTS INC., A WASHINGTON CORPORATION

CURMIN SALES LTD, A CANADIAN CORPORATION

Richard D Pickett V-P
SEATTLE-FIRST NATIONAL BANK

ACKNOWLEDGEMENT

ON THIS 9th DAY OF December, 1994, BEFORE ME, THE UNDERSIGNED, PERSONALLY APPEARED Lawrence Sauder KNOWN TO ME TO BE THE President OF Sauder Wood Products Inc, THE CORPORATION THAT EXECUTED THE FOREGOING INSTRUMENT AND ACKNOWLEDGED THE SAID INSTRUMENT TO BE THE FREE AND VOLUNTARY ACT AND DEED OF SAID CORPORATION FOR THE USES AND PURPOSES THEREIN MENTIONED, AND ON OATH STATED THAT he IS AUTHORIZED TO EXECUTE THE SAID INSTRUMENT AND OFFICIAL CORPORATE SEAL OF SAID CORPORATION.

WITNESS MY HAND AND OFFICIAL SEAL HERETO AFFIXED THE DAY AND YEAR ABOVE WRITTEN.

NOTARY PUBLIC IN AND FOR THE ~~STATE OF WASHINGTON~~ Province of British Columbia
RESIDING AT Vancouver, British Columbia

F. BRIAN [illegible]
BOX 49304 FOUR BENTALL [illegible]
SUITE 3354 - 4066 DUNSMUIR [illegible]
[redacted]

ON THIS 9th DAY OF DECEMBER, 1994, BEFORE ME, THE UNDERSIGNED, PERSONALLY APPEARED ROBERT MURRAY KNOWN TO ME TO BE THE PRESIDENT OF CURMIN SALES LTD, THE CORPORATION THAT EXECUTED THE FOREGOING INSTRUMENT AND ACKNOWLEDGED THE SAID INSTRUMENT TO BE THE FREE AND VOLUNTARY ACT AND DEED OF SAID CORPORATION FOR THE USES AND PURPOSES THEREIN MENTIONED, AND ON OATH STATED THAT HE IS AUTHORIZED TO EXECUTE THE SAID INSTRUMENT AND OFFICIAL CORPORATE SEAL OF SAID CORPORATION.

WITNESS ~~MY HAND AND~~ OFFICIAL SEAL HERETO AFFIXED THE DAY AND YEAR ABOVE WRITTEN.

PROVINCE OF BRITISH COLUMBIA
NOTARY PUBLIC IN AND FOR THE ~~STATE OF WASHINGTON~~
RESIDING AT [illegible], B.C.

BRENT A. McLEAN
Barrister & Solicitor
Metrotower II
#803 - 4720 Kingsway
Burnaby, B.C. V5H 4N2
FAX 437-3065

ON THIS 13 DAY OF December, 1994, BEFORE ME, THE UNDERSIGNED, PERSONALLY APPEARED Richard D Pickett KNOWN TO ME TO BE THE V. Pres. OF Seattle First National Bank, THE CORPORATION THAT EXECUTED THE FOREGOING INSTRUMENT AND ACKNOWLEDGED THE SAID INSTRUMENT TO BE THE FREE AND VOLUNTARY ACT AND DEED OF SAID CORPORATION FOR THE USES AND PURPOSES THEREIN MENTIONED, AND ON OATH STATED THAT he IS AUTHORIZED TO EXECUTE THE SAID INSTRUMENT AND OFFICIAL CORPORATE SEAL OF SAID CORPORATION.

WITNESS MY HAND AND OFFICIAL SEAL HERETO AFFIXED THE DAY AND YEAR ABOVE WRITTEN.

M. Christine Suter
NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON
RESIDING AT Tacoma

M. CHRISTINE SUTER NOTARY PUBLIC STATE OF WASHINGTON

SURVEYOR'S CERTIFICATE

I, KYLE T. HAGGITH, PROFESSIONAL LAND SURVEYOR, DO HEREBY CERTIFY THAT THIS "AMENDED CURMIN SHORT PLAT" AS SHOWN, IS BASED UPON AN ACTUAL SURVEY, BY ME, OR UNDER MY DIRECTION, IN CONFORMANCE WITH THE SURVEY RECORDING ACT, THAT THE DISTANCES, COURSES AND ANGLES ARE SHOWN CORRECTLY HEREON, AND THAT THE LOT CORNERS HAVE BEEN SET IN THE GROUND AS SHOWN.

Kyle T. Haggith
KYLE T. HAGGITH, PLS
CERTIFICATE NO. 24218
DATE: 12/15/94

AUDITOR'S CERTIFICATE

FILED FOR RECORD THIS 21 DAY OF December, 1994 AT 10:24 A.M., IN VOLUME 31 OF SHORT PLATS, PAGE 59, AT THE REQUEST OF PACIFIC SURVEY & ENGINEERING, INC.

Shirley Forslof
WHATCOM COUNTY AUDITOR
BY DEPUTY

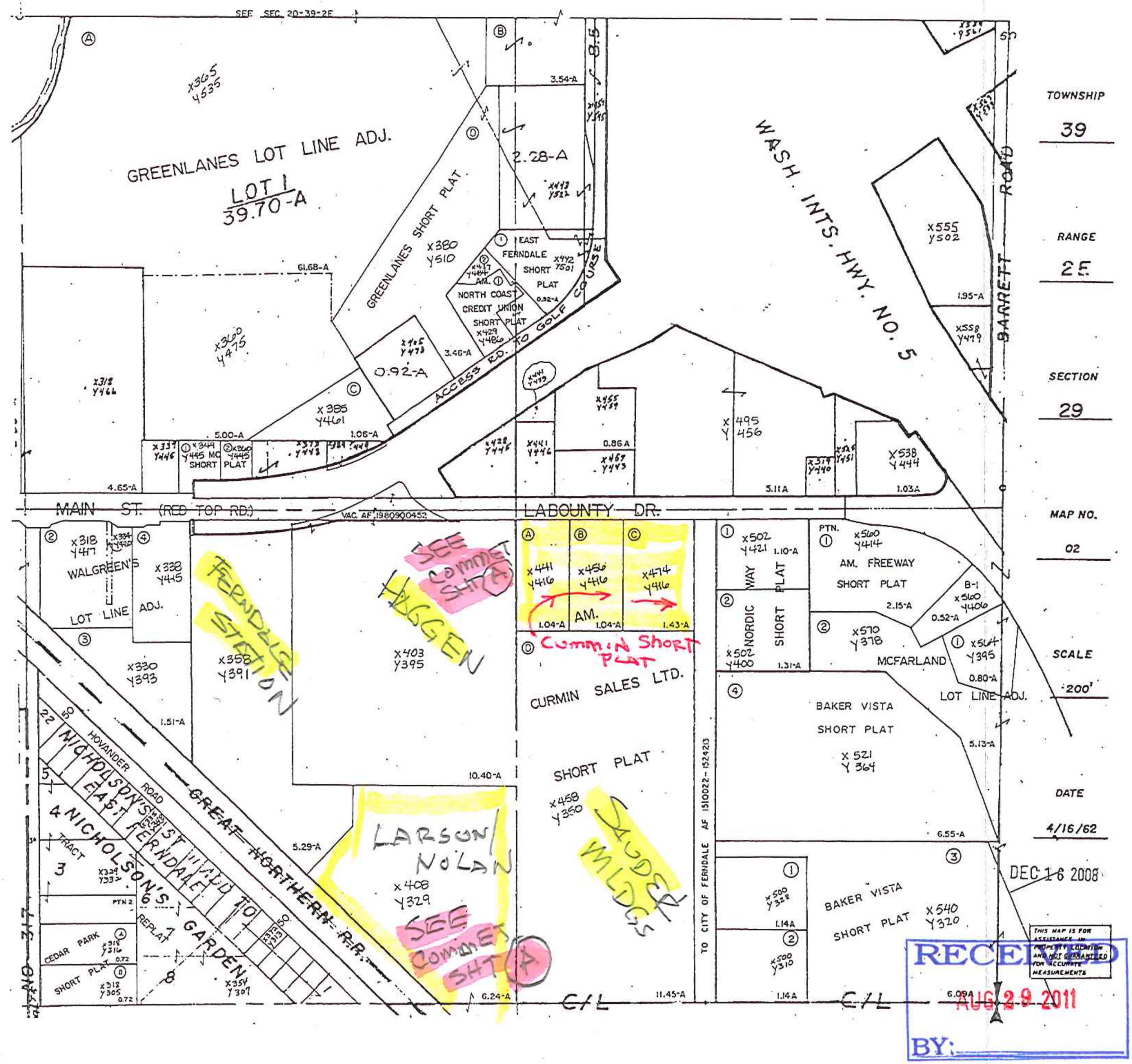
KYLE T. HAGGITH — PROFESSIONAL LAND SURVEYOR — EXPIRES 12-06-96

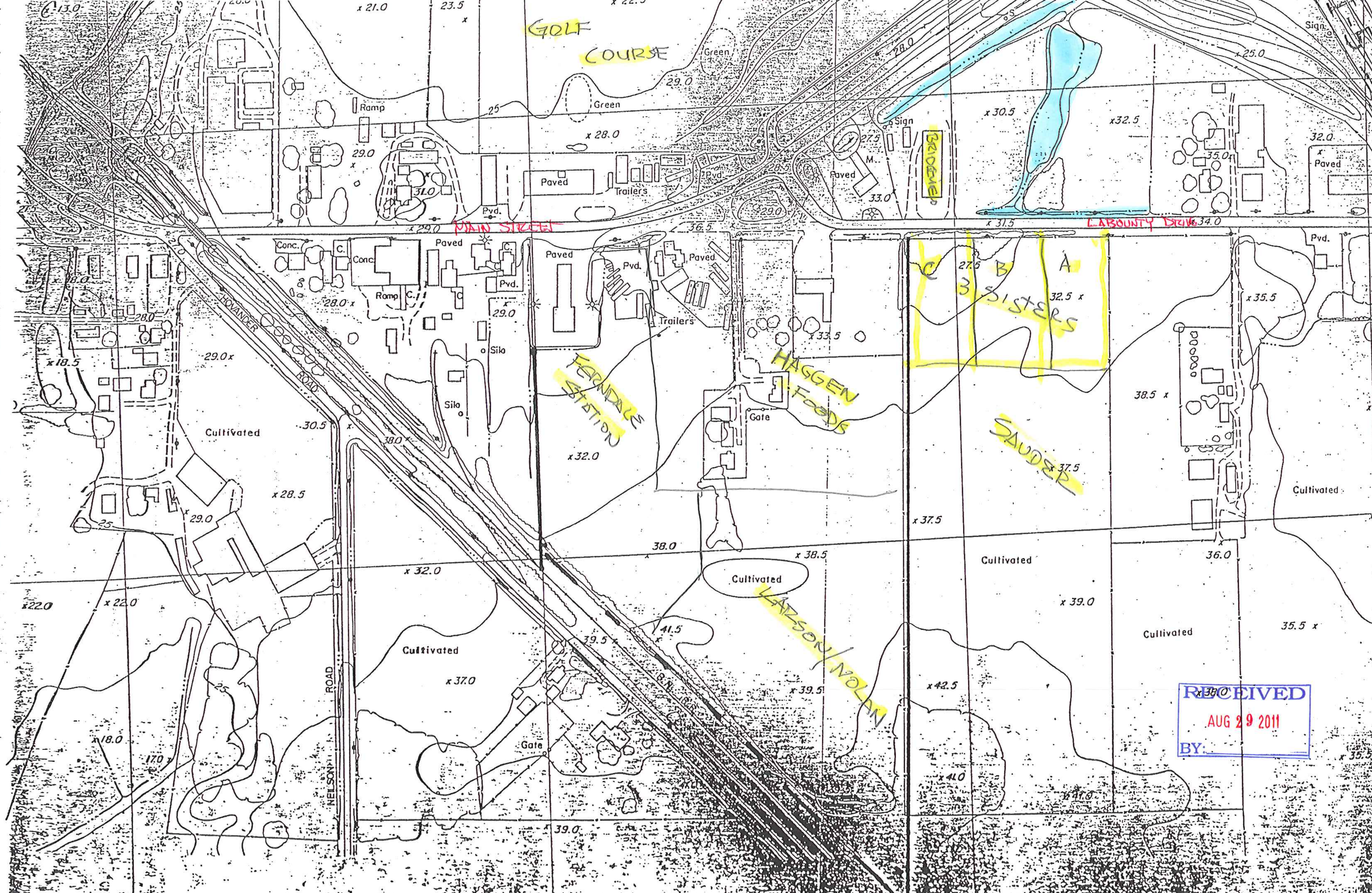
PACIFIC SURVEYING & ENGINEERING INCORPORATED
215 WEST HOLLY, SUITE B-25 (BAY ST.)
BELLINGHAM, WASHINGTON 98225
PHONE 671-7387
FAX LINE 671-4685

SITUATE IN A PORTION OF SE 1/4, NE 1/4, SECTION 29, TOWNSHIP 39 NORTH, RANGE 2 EAST OF W.M. CITY OF FERNDALE, WASHINGTON

DRAWN BY:	J.E.W.	DATE:	10/18/94	JOB NO.	94100
				DWG NO.	94100LL1
CHK. BY:	K.T.H.	F.B.#		SHEET NO.	1 OF 1

V. 31 P. 59

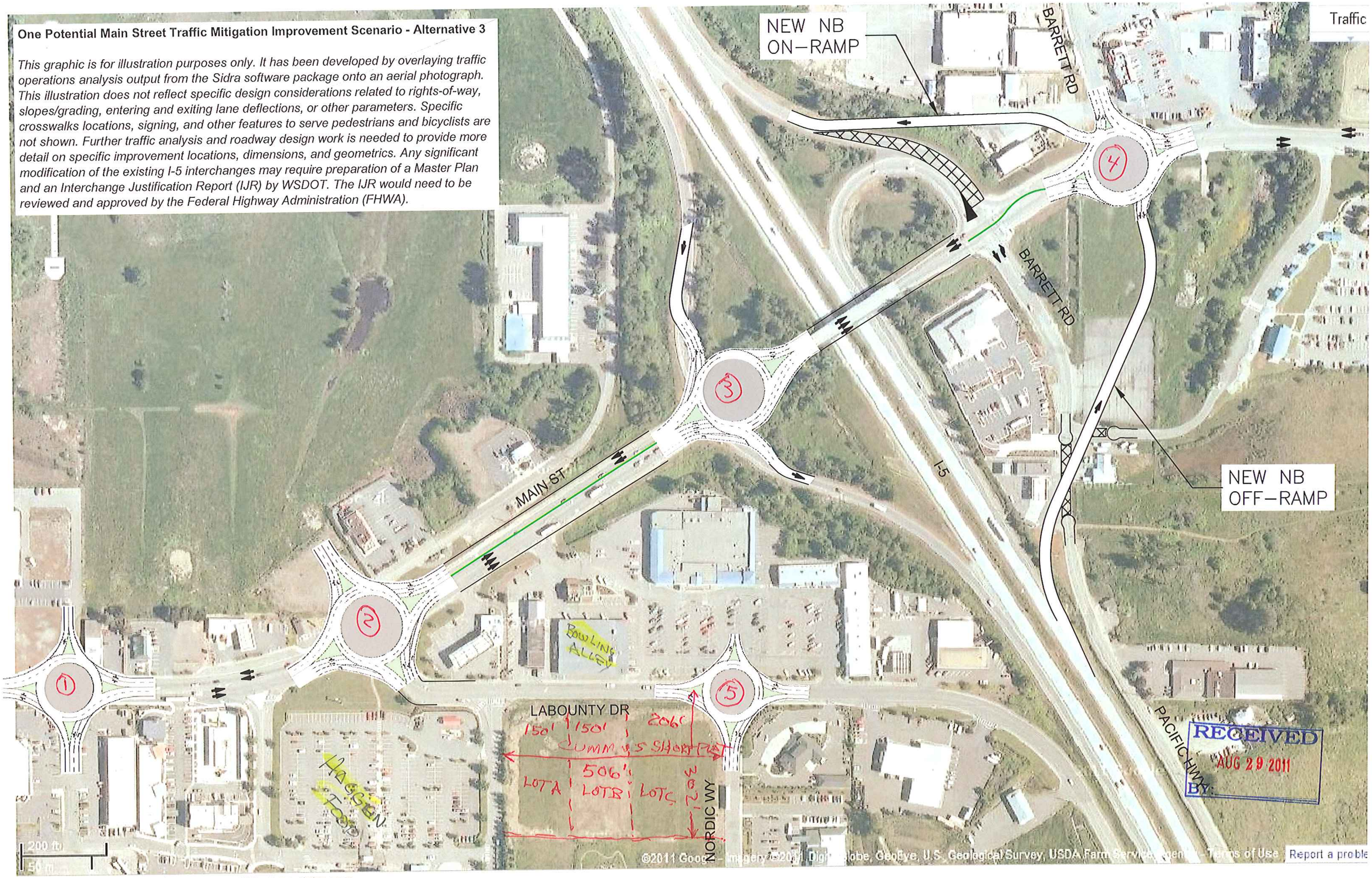

SEE SEC. 20-39-2E
GREENLANES LOT LINE ADJ.
LOT 1
39.70-A
GREENLANES SHORT PLAT
X380 Y510
2.28-A
EAST FERNDALE SHORT PLAT
NORTH COAST CREDIT UNION SHORT PLAT
X429 Y486
ACCESS RD. TO GOLF COURSE
0.92-A
X385 Y461
61.68-A
5.00-A
1.06-A
3.46-A
3.54-A
4.65-A
SHORT PLAT
WASH. INTS. HWY. NO. 5
X555 Y502
BARRETT ROAD
1.95-A
X558 Y479
X495 Y456
X538 Y444
5.11A
1.03A
0.86A
MAIN ST. (RED TOP RD.)
LABOUNTY DR.
VAC. AF 1980900452
X318 Y417
WALGREEN'S
X338 Y415
LOT LINE ADJ.
X330 Y393
1.51-A
FERNDALE STATION
X358 Y391
SEE COMMENT SHT A
HAGGEN
X403 Y395
10.40-A
X441 Y416
X456 Y416
X474 Y416
AM.
1.04-A
1.43-A
CUMMIN SHORT PLAT
CURMIN SALES LTD.
SHORT PLAT
X458 Y350
SAUDER BLDGS
LARSON/NOLAN
X408 Y329
SEE COMMENT SHT A
5.29-A
6.24-A
11.45-A
TO CITY OF FERNDALE AF 1510022-152423
GREAT NORTHERN R.R.
HOVANDER ROAD
NICHOLSON'S 1ST ADD TO EAST FERNDALE
NICHOLSON'S GARDEN
TRACT 3
REPLAT
CEDAR PARK SHORT PLAT
X312 Y305
X354 Y307
X502 Y421
1.10-A
NORDIC WAY SHORT PLAT
X502 Y400
1.31-A
AM. FREEWAY SHORT PLAT
X560 Y414
2.15-A
B-1 X560 Y406
0.52-A
X570 Y378
MCFARLAND
X564 Y395
0.80-A
LOT LINE ADJ.
BAKER VISTA SHORT PLAT
X521 Y364
5.13-A
6.55-A
BAKER VISTA SHORT PLAT
X540 Y320
X500 Y328
X500 Y310
1.14A
6.09A
C/L
TOWNSHIP
39
RANGE
2E
SECTION
29
MAP NO.
02
SCALE
200'
DATE
4/16/62
DEC 16 2008
THIS MAP IS FOR ASSISTANCE IN PROPERTY LOCATION AND NOT GUARANTEED FOR ACCURATE MEASUREMENTS
RECEIVED
AUG 29 2011
BY:



GOLF COURSE
Green
Ramp
Sign
Paved
Pvd.
Trailers
MAIN STREET
LABOUNTY DRIVE
Conc.
C.
Silo
Gate
HOVANDER ROAD
NELSON ROAD
FERNDALE STATION
HAGGEN FOODS
A
B
C
3 SISTERS
SAUDER
LARSON/NOLAN
Cultivated
B.N. RR
RECEIVED
AUG 29 2011
BY:

One Potential Main Street Traffic Mitigation Improvement Scenario - Alternative 3

This graphic is for illustration purposes only. It has been developed by overlaying traffic operations analysis output from the Sidra software package onto an aerial photograph. This illustration does not reflect specific design considerations related to rights-of-way, slopes/grading, entering and exiting lane deflections, or other parameters. Specific crosswalks locations, signing, and other features to serve pedestrians and bicyclists are not shown. Further traffic analysis and roadway design work is needed to provide more detail on specific improvement locations, dimensions, and geometrics. Any significant modification of the existing I-5 interchanges may require preparation of a Master Plan and an Interchange Justification Report (IJR) by WSDOT. The IJR would need to be reviewed and approved by the Federal Highway Administration (FHWA).



Response to Draft EIS Letter 18: Wayne Larson

1. **Insufficient information.** The analysis in the Draft EIS is consistent with the scope of review established for this project and appropriate for a sub-area plan. The state SEPA rules specifically identify sub-area plans as appropriate for planned actions (WAC 197-11-164(b)(1)). It is acknowledged that the analysis provides an area-wide review of the elements of the environment. This level of analysis is appropriate for review of a sub-area plan. No specific projects are proposed at this time, and site-specific analysis is neither possible nor required.

   Because the specific nature and timing of development at any particular site is not known, site specific mitigation requirements would be speculative and inappropriate in a subarea-wide analysis. Instead, the mitigation measures establish the applicable regulations and requirements, proposed plan features and other measures needed to ensure that impacts are adequately mitigated. Such measures would become conditions of approval of any subsequent projects

2. **Roundabouts.** The Supplemental Transportation Analyses presented in the Final EIS includes analyses of improvement strategies based on roundabouts and traffic signals. The level of service worksheets included in appendix B of the Final EIS also shows the level of service for the various traffic movements, including side streets, at the roundabouts and signals. As described in the Draft EIS, City staff recommends installation of roundabouts as the preferred mitigation strategy for the Main Street Corridor. On November 30, 2011, the Planning Commission recommended installation of roundabouts at the Interstate 5/Main Street interchange ramps and improvements to existing signalized intersections west of Interstate-5.

3. **Insufficient information.** The comment is noted. See response to Comment #1, this letter, above.

Response to Draft EIS Letter 19: Wendi Larson

1. **Stormwater impacts.** Draft EIS mitigation includes compliance with all applicable regulations, use of LID measures, consideration of regional stormwater detention and direct discharge to the Nooksack River following a stormwater inventory update, and site specific review of wetlands that are sensitive to fluctuations in water level. Collectively, these measures provide adequate mitigation for potential stormwater impacts. Please see Section 2.2 of this Final EIS for a supplemental discussion of stormwater.

Letter 20

City of Ferndale WASHINGTON

COMMENT AND SUGGESTION SHEET

Business Name:	
Name	DEAN MOSTROM
Address	1595 MAIN ST.
Phone	384-1919
E-mail	DEANMOSTROMSR@GMAIL.COM
Comments:	I LIKE ROUNDABOUTS I FEEL ALTERNATIVE #3 LOOKS TO BE THE BEST
Questions:	IT WOULD BE NICE TO SEE AN ON OFF RAMP AT SMITH RD. IT MIGHT CREAT OTHER PROBLEMS, ALTHOUGH MANY PEOPLE LIVE ON THE SMITH RD. AND THEY WOULD NOT
Suggestions:	HAVE TO GET OFF AT EXIT 262 ANY MORE.

1

2

Response to Draft EIS Letter 20: Dean Mostrom

1. **Roundabouts.** The comment is noted.

2. **Smith Road interchange.** WSDOT and the City of Ferndale have previously evaluated the potential for an interchange at Smith Road and have not incorporated such a change into their plans. An interchange at Smith Road could also be reconsidered by WSDOT as an alternative as part of a future Interchange Justification Report.

Verbal Comment Period Opened

Bonnie Steinauer, 5665 Axton Ct., Ferndale – She stated she was concerned because she moved from Seattle four years ago after living there for 51 years and she and her husband moved to this area because of the way it is now, not the way it might be with no retail development. She is very pleased 1
with Ferndale's community spirit and concerned that potential new development may create additional traffic, noise and crime.

Steinauer explained that she and her husband are enjoying where they are right now and they have everything they could possibly use or need. There is a mall 10 miles away in Bellingham and major retail there that people can travel to if they wish.

She would hate to see the additional growth because Ferndale is a "wonderful family community."

Eugene Steinauer, 5665 Axton Ct., Ferndale – Steinauer noted that it was four years ago to the day since he and his wife moved to Ferndale from Seattle. He explained that they have a nice picture window and a front window in their home with good views.

He thoroughly enjoys his neighbors and believes his neighborhood has a "wonderful set up." 2

Now people are saying we will have to take out the window or even move the house. He's 83-years-old and at this stage in life it is disturbing that he'd have to pick up and move. He spent a lot of time looking for the perfect house and this is what they found.

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He very honestly is not on the favorable side of the situation. Steinauer said he's not the first one who 3
would say the city doesn't need additional funding to maintain the city and preserve what the
community has, especially for the children.

He would like an answer of what would happen to him and his wife, however. 4

Director Burnett explained to Mr. Steinauer that a private developer cannot force a property owner to
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WSDOT in the past was supposed to construct a five-lane overpass on Main Street over Interstate 5 and
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some potential development out of the city.

Hoelzle spoke against roundabouts, which he said "are a pain." 6

Hoelzle said that there must be development in Ferndale to grow, and the city can't survive without it; 7
Ferndale cannot survive on housing construction alone. The retail revenue will be steady, whereas
housing construction revenues are a one-time payment to the city.

The resident noted that he has three properties within the Planned Action area and he understands it's 8
likely he will have to move, but he knew that eventually the area would be developed.

The freeway interchange must be fixed no matter what, and the state should have addressed that issue 9
years ago.

Hoelzle advocated for more interchanges, perhaps with roundabouts, but he prefers signalized
intersections.

Craig Bryant, 1620 Main St. – Bryant explained that the property he was speaking about was right next 10
to the overpass and traffic is the biggest concern. Flooding is also a major concern for him.

Bryant argued that on the east side of the freeway water does not come in from Barrett Lake or 10 Mile 11
Creek, it comes from the Nooksack River. Detention ponds will simply fill up during flooding and water
will flow over those ponds. If river dikes were softened and allowed into land where water used to flow,
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If dikes continue to be raised, that simply moves the water elsewhere.

At the freeway interchange, 70-foot trucks can't make turns with other vehicles moving the other way 12
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Jolene Lagerway, 5673 Axton Ct., Ferndale – Lagerway shared that she moved into the house five years 13
ago and lost her husband three years ago. She really likes it there, but something must be done with
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Craig Bryant, 1620 Main St. – Bryant asked if a private developer could make property owners pay for frontage improvements along a developed area. 14

City Administrator Greg Young stated that if a homeowner wants to improve they would pay, but if the city requires a developer to improvement the road, the development would have to pay.

Bryant wondered about latecomers agreements and if those might require a property owner to help pay for those improvements.

Young said that is a possibility.

Official Verbal Comment Period Closed

Response to Comments at August 3, 2011 Public Meeting

1. **Concerned about growth.** The comment is noted.

2. **Impacts of growth.** The comments are noted. The proposed planned action would not require changes to existing single family zoned areas.

3. **Does not support proposal.** The comment is noted.

4. **Impacts of development.** The comments are noted. It should be noted that a private developer cannot force a property owner to move.

5. **Traffic and Interstate 5 access.** Regarding Thornton Road, the Transportation element of the City's Comprehensive Plan recommends the extension of Thornton Road. A portion of the cost of extending Thornton Road is also included in the revised Transportation Impact Fee. In developing the traffic forecasts, the extension of Thornton Road was assumed completed under all three land use alternatives presented in the EIS.

   Regarding the Smith Road interchange, WSDOT and the City of Ferndale have previously evaluated the potential for an interchange at Smith Road and have not incorporated such a change into their plans. An interchange at Smith Road may be considered by WSDOT as an alternative as part of a future Interchange Justification Report.

   Regarding the Main Street interchange, the improvements have not been constructed due primarily to lack of funding and WSDOT focus in other areas. The City will continue to work with WSDOT identify funding programs and development mitigation for associated with improvements to the I-5 interchanges at Main Street and at Slater Road.

6. **Does not support roundabouts.** The comment is noted.

7. **City needs revenue from retail development.** The comment is noted.

8. **Future development impacts.** The comment is noted. However, as noted in the response to Comment #4, above, a private developer cannot force a property owner to move.

9. **Interstate 5 interchange.** The comment is noted. Please see the response to Comment #5, above.

10. **Flooding and traffic.** The comments are noted. Please see the discussion of traffic and stormwater in the Draft and Final EIS documents.

11. **Stormwater on the east side of Interstate 5.** The comments are noted. Draft EIS mitigation includes compliance with all applicable regulations, use of LID measures, consideration of regional stormwater detention and direct discharge to the Nooksack River following a stormwater inventory update, and site specific review of wetlands that are sensitive to fluctuations in water level. Collectively, these measures provide adequate mitigation for potential stormwater impacts. Please see Section 2.2 of this Final EIS for a supplemental discussion of stormwater.

12. **Main Street interchange.** The comment is noted.

13. **Traffic.** The comment is noted.

14. **Frontage improvements.** The comments are noted.

Chapter 4—Acronyms

4. ACRONYMS

AF/YR	Acre-Feet Per Year
ALS	Advanced Life Services
BLS	Basic Life Services
BMP	Best Management Practice
BO	Biological Opinion
CAA	Clean Air Act
CAO	Critical Areas Ordinance
CFR	Code of Federal Regulations
CMZ	Channel Migration Zone
CO	Carbon monoxide
CPTED	Crime Prevention Through Environmental Design
CTR	Commute Trip Reduction
EMS	Emergency Medical Services
EPA	Environmental Protecting Agency
ERU	Equivalent Residential Units
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FMC	Ferndale Municipal Code
FPD	Ferndale Police Department
FSD	Ferndale School District
GHG	Greenhouse gases
HCM	Highway Capacity Manual
HSS	Highway of Statewide Significance
IJR	Interchange Justification Report
IPCC	International Panel on Climate Change
LF	Lineal Feet
LID	Low Impact Development
LOS	Level of service
MDD	Maximum Daily Water Demand
MG	Million Gallon
MGD	Million Gallons Of Water Per Day
$MTCO_2e$	Metric tons of carbon dioxide equivalent

NAAQS	National Ambient Air Quality Standars
NCRS	Natural Resources Conservation Service
NFIP	National Flood Insurance Program
NHP	Natural Heritage Program
NMFS	National Marine Fisheries Service
NOx	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NWCAA	Northwest Clean Air Agency
NWI	National Wetlands Inventory
O_3	Ozone
PEM	Palustrine Emergent
PEM/SSCH	Palustrine Emergent/Scrub Shrub Seasonally Flooded Permanently Flooded
PEMC	Palustrine Emergent Seasonally Flooded
PFO	Palustrine Forested
PGIS	Pollution-Generating Impervious Surfaces
PGPS	Pollution Generating Pervious Surfaces
PM2.5	Particulate matter smaller than 2.5 microns in diameter
PM10	Particulate matter smaller than 10 microns in diameter
PPM	Parts per million
PUB/EMHH	Palustrine Unconsolidated Bottom/Emergent Permanently Flooded Diked/Impounded
PUD 1	Public Utility District No. 1
R2EMA	Riverine Lower Perennial Emergent Temporarily Flooded
RCW	Revised Code of Washington
SF	Square Feet
SMP	Shoreline Master Program
SOx	Sulfur oxides
TAZ	Transportation Analysis Zones
TDM	Transportation Demand Management
TESC	Temporary Erosion and Sediment Control Plan
TMDL	Total Maximum Daily Load
TRB	Transportation Research Board
TSP	Total suspended particulate matter
USACE	United States Army Corps of Engineers
USFWS	United States Department of Fish and Wildlife
V/C	Volume-To-Capacity

VPH	Vehicles Per Hour
WAC	Washington Administrative Code
WCOG	Whatcom Council of Governments
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WDOE	Washington Department of Ecology
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation
WTA	Whatcom Transit Authority
WWTP	Wastewater Treatment Plant

Chapter 5—Distribution List

5. DISTRIBUTION LIST

The following parties have been provided a notice of availability or copy of the Final EIS. An asterisk indicates that a copy of the document was provided.

Federal Agencies

Federal Emergency Management Agency, Region 10
United States Army Corps of Engineers*
United States Environmental Protection Agency
United States Fish & Wildlife Service
United States National Oceanic and Atmospheric Administration

State Agencies

Washington State Department of Archaeology & Historic Preservation
Washington State Department of Commerce*
Washington State Department of Ecology* (2 copies)
Washington State Department of Fish and Wildlife*
Washington State Department of Natural Resources
Washington State Department of Transportation*
Washington State Office of Financial Management

Tribes

Lummi Nation*
Nooksack Tribe*

Regional and Local Governments

Northwest Clean Air Agency
Whatcom Council of Governments*
City of Bellingham Office of the Mayor*
City of Bellingham Public Works Department*
Whatcom County Council*
Whatcom County Executive's Office*
Whatcom County River and Flood Division*
Whatcom County Parks and Recreation*
Whatcom County Planning and Development Services*
Whatcom County Public Works*

Special Purpose Governments

Cascade Natural Gas*
Ferndale School District*
PUD 1 of Whatcom County*
Port of Bellingham
Puget Sound Energy
Whatcom County Fire District No. 7*
Whatcom Transit Authority

Public Libraries

Ferndale Branch Library*

Community Organizations

Ferndale Chamber of Commerce
Ferndale Economic Development Commission

Private Firms and Individuals

Dianne Blakesley
Thomas Brakke
Cleo Callen
Paul Douglas
Phil Dyer
Julia and Terry Fitzgerald
Connie Faria
John Flarry
Michelle Fox
Mel Hansen
Jeremiah Harlan
Byron Harris
Don Imhof
Chet Lackey
Wayne Larson
Wendy Lawrence
Matt List
Jensen Lowell
Steve Lydolph
Mike Kohl
Jack McCullough
Jon Mutchler
Rozanne Olson Stevens
Brad and Rhonda Oxford
Paul Pazooki
Carl Reichhardt
Davy Sangara
Serge Slagle
Cathy Watson

Media

Bellingham Herald
Cascade Radio Group
Ferndale Record

Additional DEIS Commenters not listed above

Gary Wilson, Borden Ladner Gervais
Ronald Templeton, PS
Brad Lincoln, Gibson Traffic Consultants
Doug Roberston, Belcher|Swanson Law Firm, PLLC
Mark Jacobs, Jake Traffic Engineering

Chester Lakey, Belcher|Swanson Law Firm, PLLC
Glen Foresman, Haggen, Inc.
Paul Douglas, Sauder Mouldings, Inc.
Tina Zinkgraf, Old Standard Life Insurance Company
Julie Ainsworth-Taylor, Bricklin & Newman, LLP
Matt Krogh, RE Sources for Sustainable Communities
Wendi Larson
Dean Mostrom

Appendix A—DEIS Public Meeting Minutes

Planned Action
Draft Environmental Impact Statement
Public Comment Meeting Minutes
6 p.m. August 3, 2011

Staff Present: **Community Development Director Jori Burnett**
Planning Coordinator Jenny Welters
City Clerk Sam Taylor
City Administrator Greg Young

6 p.m. – Introduction: Director Burnett introduced the topic and told members of the public present the first portion of the meeting would involve an open house review of the information boards at the back of the meeting space and an opportunity to discuss one-on-one with city staff and consultants about details on the Planned Action initiative the city is undertaking for the Main Street/Axton Way-Interstate 5 corridor. Burnett told the public the open house portion would last approximately 45 minutes and then a presentation would begin by staff and consultants, followed by public comments.

6:21 p.m. – Noting that no members of the public were still reviewing informational boards or talking to staff, and sitting at the tables ready for the presentation, Director Burnett introduced Deborah Munkberg of inova LLC, the main consulting firm helping to craft the Planned Action Environmental Impact Statement and city ordinances that go along with the Planned Action process.

Burnett stated that, to the best of his knowledge, the City of Ferndale's Planned Action process is the first that has been done in Whatcom County. He noted that the process for the Draft Environmental Impact Statement is an objective, technical review of potential development in the Planned Action area, and is not for or against development.

The director stated that the goal of tonight's meeting is to provide background on the draft environmental review document and then to receive verbal comments from the public. Once the verbal comment period was closed at the end of the meeting, only written and e-mail comments would be accepted by the city.

Burnett then turned the floor over to Munkberg of inova LLC.

Munkberg provided basic background on the Planned Action area, which she explained consists of about 440 acres located around the Main Street/Axton Way-Interstate 5 interchange. There are four quadrants being assessed by the Planned Action process.

Two things are being assessed through the Planned Action, Munkberg noted, both a master plan for the area as well as the Environmental Impact Statement.

The draft EIS identified a certain amount of development that could occur in the area, and the main goal of that assessment is to then determine potential impacts and potential mitigation for those impacts.

The goals of the process included maintaining current zoning and land-use designations in the Planned Action area, Munkberg offered. She said that the process allows a property owner to engage in environmental review for their proposed development through the Planned Action Environmental Impact Statement rather than through the more oft-used State Environmental Policy Act procedures.

Munkberg outlined the various level of development that could potentially happen in the Planned Action area over the next two decades:

1) A “No Action” alternative, which doesn’t mean no growth, but takes into consideration the projected growth of the area already within the city’s Comprehensive Plan.

2) The “Moderate” alternative projects about 1.1 million square feet of retail and commercial development.

3) The “High” growth alternative projects about 1.5 million square feet of retail and commercial development.

The environmental review projects that there would be open space areas in both the “moderate” and “high” growth alternatives. Much of that open space is passive, natural or wetland areas. There are other open space areas, for instance, a proposed soccer field being constructed on one property.

Munkberg noted that all U.S. Federal Emergency Management Agency requirements would still apply to the area even with the environmental review procedures locked in by the Planned Action ordinance.

The consultant also stated that it is likely there will be proposed comprehensive plan amendments considered as part of the process, including that roundabouts may be the preferred traffic relieving measure in the corridor.

Munkberg then introduced Jim Wiggins, a consultant who assessed the natural environment of the area.

Wiggins stated that he looked at the fish and wetlands of the Planned Action area. He stated that the biggest issue is the Nooksack River, and while there are wetlands, the mitigation would large be done on site of the potential developments under the Environmental Impact Statement.

Wiggins said there are no stream or fish and wildlife impacts that were identified, and even if there were, he was not sure how they would even be caused when FEMA regulations are taken into account.

All impacts to fish and wildlife would be required to be assessed by the City of Ferndale, the state Department of Ecology and the U.S. Army Corps of Engineers, Wiggins noted. Any floodplain impacts would be regulated by a biological opinion from the U.S. Dept. of Fisheries that is used by FEMA, he pointed out.

Munkberg explained to the attendees that because the alternatives proposed are consistent with current zoning and land use policies, that there are no projected impacts due to a change in zoning. There may be some impact to smaller properties that abut the Planned Action area, she noted.

The goals are to use the city’s EAGLE development standards, buffers and monitoring between the Planned Action properties and those abutting the identified area.

Public services assessed for the Planned Action review included police, fire, parks and open space and schools, Munkberg shared.

She explained that regarding parks and open space, because of what's being proposed, that there is no potential impact considered, because there is a lot being proposed for future development.

Based on coordinated assessment with the Ferndale School District, there is little to no impact on the district's current schools plan, Munkberg said.

Fire and police services were identified in the assessment as being impacted by future development.

Generally, she noted, new revenues from projected new development would adequately address new impacts to those city services. There is no guarantee of that, however, but she pointed out that the City of Ferndale has commissioned a fiscal study to better assess that.

Chris Webb studied utilities for the environmental impact statement. He stated there would be a significant increase in water and sewer demand based on his assessment.

Webb explained that the west half of the Planned Action area would be exempt from flow control for stormwater as most of the west half of the area drains into the river.

The east side, particularly in the southwest quadrant, mostly drains into Barrett Lake and 10 Mile Creek. That drainage would require flow control. He recommended low-impact retention measures, like bioretention including rain gardens to help mitigate those stormwater flows.

Larry Toedtli of Transpo Group provided assessment of the transportation system impacts within the Planned Action area.

Toedtli offered that transportation was one of the major driving forces of the Planned Action ordinance and Environmental Impact Statement. He explained that the city was seeking a way to identify a comprehensive list of needs in the area and how to fund proposed projects.

Transpo Group assessed 25 intersections around the area, primarily Main Street, Smith and Slater roads as well as some areas further into the county and over to the Guide Meridian.

The interchange area is perhaps the key issue, Toedtli offered. To compare the development level alternatives, Transpo modified the travel demand model adopted as part of the city's Comprehensive Plan Transportation Element that was approved in January 2011.

Based on the study, impacts dissipated quickly toward the Guide Meridian, but there are larger impacts toward Main Street. The EIS does include traffic volumes for every intersection studied, he pointed out.

Improvements were projected to be required under the assessment, and potential projects included the Thornton Road extension. The modeling was decides to meet the currently-adopted level of service "C" for signalized intersections within the city limits.

The city identified a preference for roundabouts to alleviate traffic congestion in Alternatives 2 and 3, Toedtli shared. Signalization would also be included as an option in the final Environmental Impact Statement.

The consultant had been working with the Washington State Department of Transportation on the project, he noted, with WSDOT agreeing "in concept" but they haven't fully agreed without doing their own, independent study.

The best option at this point was to develop concepts and see if they were reasonable to WSDOT staff.

In addition to those improvements there are some proposed upgrades to city arterial streets such as LaBounty Drive and Barrett Road. Those upgrades would include added sidewalks and turn lanes.

A new collector road would be constructed in the southeast quadrant from Barrett Road to Main Street to provide circulation through the former proposed Pioneer Plaza site. The goal is to help provide walkability to adjacent developments.

Costs associated with each of the alternatives for transportation mitigation are projected to be:

1) Alternative I "No Action": $700,000 to $1.5 million, which includes upgrading Main Street east of Barrett Road.

2) Alternative II "Moderate" growth: $11.1 million to $25 million, which includes the roundabouts as preferred currently.

3) Alternative III "High" growth: $20 million to $35 million, which includes reworked the northbound off ramp.

Toedtli reiterated that the real purpose of the draft EIS is to identify mitigation and the best way to implement those proposed solutions to impacts.

Part of that means that development may not have an initial impact that triggers required mitigation, but it would contribute to the overall impacts as more development comes in. The goal is to provide a mechanism for all developments to be assessed in a way that accounts for overall contributions to the Planned Action area in terms of impacts and required mitigation.

The goal also is not to force one large bill on the initial property developers, Toedtli explained. Instead the city would work toward spreading out the costs of mitigation.

One way to allocate costs is to modify the city's impact fees specifically for the Planned Action area. This provides a more straightforward process for potential developments, Toedtli said.

The consultant said that the Planned Action is a SEPA process and through this process the city's Comprehensive Plan will be changed for new impact fee costs. It could be, also that the SEPA fees may change through the Comprehensive Plan.

One major concern will be mitigation concurrency. State law and city law currently require immediate concurrency to address impacts of developments prior to opening of the facility. The Level of Service C sets the bar differently than another level of service, and it may be through this process that within the Planned Action area that one option is to allow a level of service D because the city knows that funding must be available for mitigation to happen in the first place. Those are some policy discussions that will continue in the future through the process.

The consultant shared that there is ongoing discussion with WSDOT regarding analysis from Grandview to Bellingham to ensure what happens within Ferndale's Planned Action area is consistent with the current state Transportation Master Plan. Coordination with the federal government will also occur because it will impact freeway traffic.

Deborah Munkberg took the floor again and provided information as to the next steps.

The written comment period will remain open until 5 p.m. August 31.

The Final Environmental Impact Statement is currently planned to be released in November and will contain a preferred alternative of the three as well as any corrections or updates based on additional research and citizen comments.

Once issued, it's likely that there will be some comprehensive plan amendments reviewed by the Ferndale Planning Commission and then the Planned Action ordinance itself will move to the City Council.

There will be additional opportunity for public comments on the process both during the Planning Commission and City Council's next processes.

Munkberg then introduced the format of the verbal comment period.

Verbal Comment Period Opened

Bonnie Steinauer, 5665 Axton Ct., Ferndale – She stated she was concerned because she moved from Seattle four years ago after living there for 51 years and she and her husband moved to this area because of the way it is now, not the way it might be with no retail development. She is very pleased with Ferndale's community spirit and concerned that potential new development may create additional traffic, noise and crime.

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Bryant wondered about latecomers agreements and if those might require a property owner to help pay for those improvements.

Young said that is a possibility.

Official Verbal Comment Period Closed

Eugene Steinauer spoke again and said he wants to make it clear that he doesn't want to stop progress but he wants information on his specific situation.

Brent Hoelzle noted that Axton Court where Steinauer resides is not commercial zoning and therefore is cannot have commercial or retail development there. He stated Steinauer is "pretty safe."

Director Burnett said the goal is that if development comes it will be very well publicized for the community.

It might be that development does happen, but it would be unfair for the city and developer to not let the community know what's happening.

Burnett stated that the city, like residents, has heard rumors like everyone else, but until those property owners or developers walk through the door of City Hall and apply for permits, they're the same rumors that have been happening for 10 years.

Deborah Munkberg of inova LLC reinforced that the proposal changes no zoning, and if a property is within a residentially-zoned area, it will not change.

Brent Hoelzle said that the city is just getting ready in case, whether it's one year or 10 years from the time development happens, the city is more prepared.

Director Burnett stated that Hoelzle's comments were correct, and that the city in the past may not have been ready for potential development, and the goal now is to be proactive and ready.

Larry Toedtli of Transpo Group offered that everything within the plan is simply conceptual at this point, and no design has happened on any of the proposals, nor has any engineering been done.

There will be a lot of public comment opportunities and notifications. The plan would ultimately set the framework but will require more study, including design and compliance review.

Hoelzle asked why the state did not widen the Main Street-Interstate 5 overpass.

Toedtli said that he could only surmise that the state determined the money would be better spent elsewhere.

Meeting Adjourned

Appendix B—LOS Worksheets and Collision Data

Appendix B

Collision Data From WSDOT

Washington State Department of Transportation

Request for Collision Data

Please complete this request form and mail or fax to the address shown below. In order to ensure efficient service, please provide as much information as you can. In most cases we respond on a first come – first serve basis, with an average turnaround time of 10 working days.

Collision Data Availability (approximately 120 days prior to today's date):

- 2001 to current is available for city streets, county roads and miscellaneous traffic ways.
- 1993 to current* is available for interstates and state highways.

Collision records for 1997 & 1998 are not completely available, and the records that do exist are considered incomplete.

Federal highway safety laws require the state to create this collision database for use in obtaining federal safety improvement funds. Under Section 409 of Title 23 of the United States Code, collision data is prohibited from use in any litigation against state, tribal or local government that involves the location(s) mentioned in the collision data. By checking the box below, you agree to comply with these terms – failure to do so will be grounds for denying your request.

☒ I hereby affirm that I am not requesting this collision data for use in any current, pending or future litigation against state, tribal or local government involving a collision at the location(s) mentioned in the data.

Requester Information

Name Taryn Kristof	Company/Agency Name Transpo Group		
Address 11730 118th Ave NE, Ste 600	City Kirkland	State WA	Zip Code 98034
Phone No. (425) 821-3665	Email taryn.kristof@transpogroup.com		

Collision Data Requested Use the space below to describe your request and the basic data elements desired. A history report gives details about each collision; a summary is totals by years, months, etc.

Date Range Most recent 3 complete years	City or County In and around Ferndale, WA
Specific Roadway -or- Roadway Type ☐ State Routes ☐ City Streets ☐ County Roads ☒ All Roads See attached for specific intersections needed.	
Report Type Requested (Report Type Samples) Summary Report	Format Desired (Excel, PDF, etc.) Excel
Additional Comments	

Mail or Fax your completed request form to:

COLLISION DATA & ANALYSIS BRANCH
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
P.O. BOX 47381
OLYMPIA WA 98504-47381
Fax: 360-570-2449

faxed 3/22/11
10:37 am

If you have any questions, please call (360) 570-2454

DOT Form 780-032 EF
Revision 12/2010

WSDOT Collision Data Request
T. Kristof – 3/22/2011

Collision data for the most recent complete 3 year period (ex 1/1/2009 to 12/31/2011 or 12/1/2008 to 11/30/2011 or 11/1/2008 to 10/31/2011, etc)

Collision data is requested at the following intersections:

1) Main St & 4th Ave
2) Vista Dr & 3rd Ave
3) Main St & 3rd Ave
4) Main St & 2nd Ave
5) Main St & 1st Ave
6) Main St & Hovander Rd
7) Main St & Walgreens Driveway (Signal)
8) Main St & Labounty Dr
9) W Axton Rd & I-5 SB Ramp
10) W Axton Rd & I-5 NB Ramp
11) W Axton Rd & Barrett Rd
12) W Axton Rd & Dear Creek Dr
13) W Axton Rd & Northwest Dr
14) W Axton Rd & Aldrich Rd
15) W Axton Rd & SR 539/Guide Meridian Rd
16) W Smith Rd & Labounty Dr
17) W Smith Rd & Pacific Hwy
18) W Smith Rd & Northwest Dr
19) W Smith Rd & Aldrich Rd
20) W Smith Rd & SR 539/Guide Meridian Rd
21) Slater Rd & Rural Ave
22) Slater Rd & I-5 SB Ramp
23) Slater Rd & I-5 NB Ramp
24) Slater Rd & Pacific Hwy
25) Slater Rd & Northwest Dr
26) Labounty Dr & Nordic Place

***Note – as we are in a time crunch, if it is faster to send collision data for the entire county, please do that and I will sort out what I need. Thank you!**

Washington State Department of Transportation
Paula J. Hammond, P.E.
Secretary of Transportation

Transportation Building
310 Maple Park Avenue SE
Olympia, WA 98504-7300
360-705-7000
TTY: 1-800-833-6388
www.wsdot.wa.gov

March 30, 2011

Ms. Taryn Kristof – Transpo Group
11730 118th Ave NE Suite 600 – Kirkland WA 98034

Re: Collision Data

Dear Ms. Kristof:

In response to your March 22 request, we have prepared a history of reported collisions that occurred on various road segments in the City of Ferndale vicinity for the period of 10/1/2007 – 9/30/2010 (2010 is preliminary).

Federal law 23 United States Code Section 409 governs use of the data you requested. Under this law, data maintained for purposes of evaluating potential highway safety enhancements:

> " . . . *shall not be subject to discovery* or admitted into evidence in a federal or state court proceeding *or considered for other purposes in any action for damages* arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data." [*Emphasis* added.]

The Washington State Department of Transportation (WSDOT) is releasing this data to you with the understanding that you will not use this data contrary to the restrictions in Section 409, which means you will not use this data in discovery or as evidence at trial in any action for damages against the WSDOT, the State of Washington, or any other jurisdiction involved in the locations mentioned in the data. If you should attempt to use this data in an action for damages against WSDOT, the State of Washington, or any other jurisdiction involved in the locations mentioned in the data, these entities expressly reserve the right, under Section 409, to object to the use of the data, including any opinions drawn from the data.

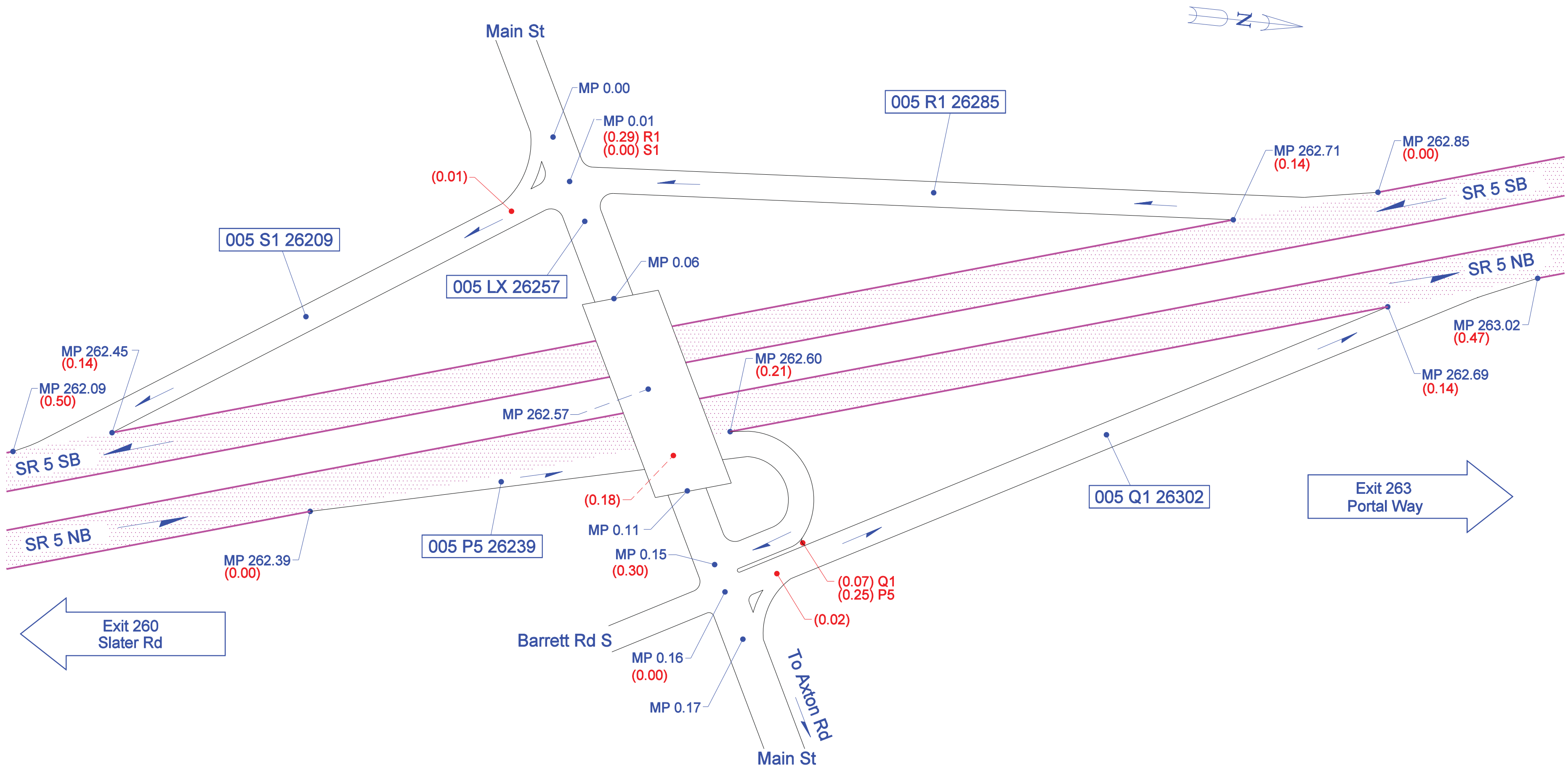
If we may be of any further assistance, please contact Mr. Dan Davis, Collision Data and Analysis Supervisor, Collision Data and Analysis Branch at (360) 570-2451, or e-mail address davisd@wsdot.wa.gov.

Sincerely,

Daniel M. Davis
Collision Data Analysis Supervisor
Statewide Travel & Collision Data Office / Strategic Planning Division

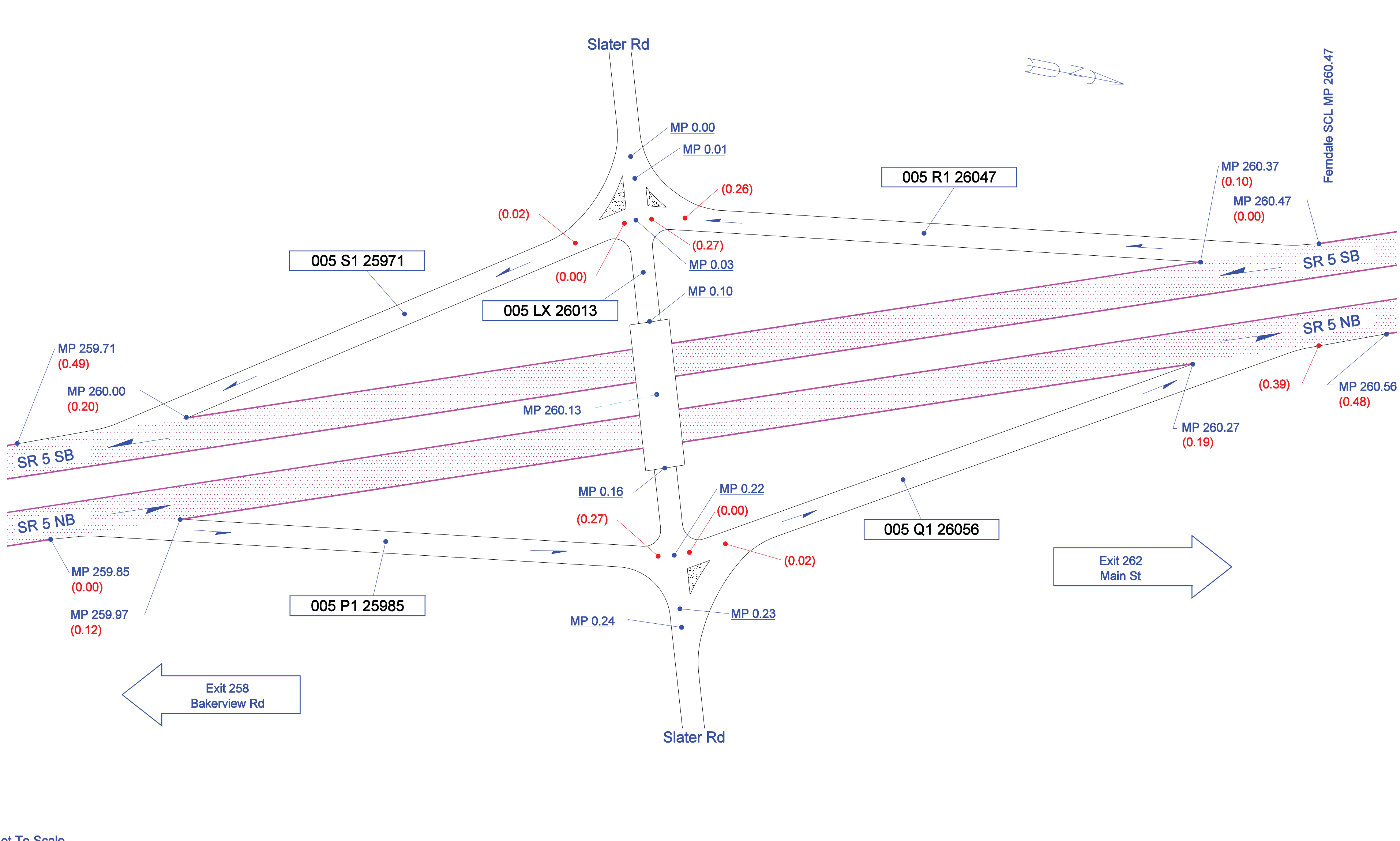
DMD:grh

Ccwe: Nafisa Peshtaz, Mark Voth & Lauretta Lew, WSDOT Northwest Region
Cc: Dave Hower, Whatcom County



Not To Scale

10/18/2010	KLK	WSDOT NORTHWEST REGION	FERNDALE, WHATCOM COUNTY	JUNCTION MAIN ST	SR 5 - EXIT 262



9/16/2004	KLK	WSDOT NORTHWEST REGION	WHATCOM COUNTY	JUNCTION SLATER RD/LUMMI ISLAND	SR 5 - EXIT 260

REPORTED COLLISIONS THAT OCCURRED ON CITY STREETS IN THE CITYOF FERNDALE
10/1/2007 - 9/30/2010 (2010 is preliminary)
*As of 1/1/2009 Citizen Reports are no longer being captured (Report # begins with "C")

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	CITY AND MISC ONLY SECONDARY TRAFFICWAY 1	CITY AND MISC ONLY SECONDARY TRAFFICWAY 2	STATE ROUTE & CO RD MILE POST	A/B	*REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# PEDAL	VEHICLE 1 TYPE
City Street	1 AV		ALDER ST									2631001	12/16/2008	14:54	No Injury	0	0	2			Passenger Car
City Street	1 AVE	5600		150	F	S	ALDER ST					E029289	10/12/2009	20:33	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	1 AVE	5600		21	F	N	CHERRY ST					2630930	12/21/2008	11:16	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	1 AVE	5700		30	F	N	MAIN ST					2630993	2/14/2009	1:44	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	2 AV	5800		0	F	N	SOMMERSET AV					2630926	10/31/2008	16:04	Possible Injury	1	0	3			Passenger Car
City Street	2 AV		ALDER ST									E052595	5/15/2010	10:59	No Injury	0	0	2			Passenger Car
City Street	2 AV		MAIN ST									2488081	4/28/2009	17:46	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	2 AV		VISTA DR									2488497	12/20/2007	18:49	Unknown	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	2 AV		WILLARD ST									2488174	6/20/2008	23:55	Possible Injury	1	0	1			Passenger Car
City Street	2 AVE	5600		50	F	S	VISTA DR					E033399	10/27/2009	19:51	Possible Injury	1	0	1		1	Passenger Car
City Street	2 AVE			150	F	S	MAIN ST	MAIN ST	ALDER ST			C714669	12/19/2008	0:01	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	3 AV		MAIN ST									2488336	3/8/2008	17:10	No Injury	0	0	2			Passenger Car
City Street	3 AVE	5700		30	F	N	VISTA DR					2488718	4/16/2008	11:14	Possible Injury	1	0	3			Passenger Car
City Street	3 AVE	5600		30	F	W	VISTA DR					E042819	2/16/2010	17:42	No Injury	0	0	2			Passenger Car
City Street	3 AVE	5600		21	F	S	VISTA DRIVE					E029290	9/28/2009	19:18	Evident Injury	1	0	1	1		Pickup,Panel Truck or Vanette under 10,000 lb
City Street	3 AVE					S	VISTA DR					2630995	2/15/2009	16:00	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	4 AV	5706		200	F	N	MAIN ST					2630928	12/10/2008	0:59	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	4 AV		MAIN ST									E056049	5/31/2010	6:11	No Injury	0	0	2			Passenger Car
City Street	ALDER ST	5600										E065050	8/29/2010	12:30	No Injury	0	0	2			Passenger Car
City Street	ALDER ST	1991		200	F	E	FIRST AV					2488166	6/3/2008	8:00	No Injury	0	0	2			Not Stated
City Street	ALDER ST		2 AV									E053435	5/21/2010	10:02	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	ALDERGROVE RD		CHURCH RD									3146014	3/9/2010	16:44	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	AQUARIUS AVE	6129		200	F	N	THORNSON RD					2488140	7/29/2008	13:48	No Injury	0	0	2			Not Stated
City Street	AXTON RD	1500		1	M	E	BARRETT RD					E035987	12/14/2009	8:30	Serious Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	BARRETT RD	5500		0.4	M	S	MAIN ST					E049766	4/19/2010	21:15	Dead at Scene	0	1	1	1		Pickup,Panel Truck or Vanette under 10,000 lb
City Street	BARRETT RD	5700	MAIN ST									2488159	5/10/2008	15:34	Evident Injury	1	0	1			Motorcycle
City Street	BARRETT RD		MAIN ST									E030172	10/22/2009	21:33	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	BARRETT RD		W SMITH RD									2630988	12/8/2008	15:53	Possible Injury	1	0	3			Passenger Car
City Street	BARRETT RD	5400	YMCA	600	F	S	MAIN ST					E046735	3/10/2010	9:12	No Injury	0	0	2			Passenger Car
City Street	BASS ST	5700		200	F	N	MAIN ST					2488413	9/11/2010	7:00	Possible Injury	1	0			1	
City Street	BROWN RD	2100		0.1	M	W	PORTAL WY					2684172	9/19/2008	20:02	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	BROWN RD			150	F	W	PORTAL WAY					3146011	12/31/2009	9:07	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	BROWN RD		MALLOY AV									E070060	9/30/2010	14:44	No Injury	0	0	2			Passenger Car
City Street	CHURCH RD			50	F	N	MOUNTAINVIEW RD					E051663	5/7/2010	15:26	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	CHURCH RD	5900	LAKERIDGE DR									2630945	3/17/2009	15:07	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	CHURCH RD		PACIFIC HIGHLANDS AV									2488170	6/12/2008	12:51	Unknown	0	0	1			Not Stated
City Street	CHURCH RD		PACIFIC HIGHLANDS AVE									E016041	3/9/2009	9:08	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	CHURCH RD		PACIFIC HIGHLANDS DR									E035986	12/13/2009	18:30	No Injury	0	0	1			Passenger Car
City Street	CHURCH RD		PACIFIC HIGHLANDS DR									E035981	12/13/2009	18:36	No Injury	0	0	2			Passenger Car
City Street	CHURCH RD		THORNTON ST									2630958	9/25/2009	14:27	Evident Injury	2	0	2			Passenger Car
City Street	ENTERPRISE RD	6500		0.05	M	N	PORTAL WAY					2528034	2/2/2008	3:12	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	FALLBROOK LN	5700		50	F	N	WASHINGTON ST					2488088	8/6/2009	9:00	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	FERNDALE RD	5500		200	F	S	CHERRY ST					2488723	11/5/2008	17:30	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	FERNDALE TERRACI	2300	SHERRY PL									2488489	11/28/2007	14:43	No Injury	0	0	2			Passenger Car
City Street	GROUSE CIR	6100		500	F	E	CHURCH RD					2630933	1/5/2009	6:00	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	HEATHER DR	2386		400	F	E	S BAKERVIEW PARK DR					E052594	5/16/2010	13:00	No Injury	0	0	2			Passenger Car
City Street	HENDRICKSON AV	5700		150	F	S	FERNDALE TERRACE					2488637	12/20/2007	15:39	Evident Injury	1	0	1	1		Pickup,Panel Truck or Vanette under 10,000 lb
City Street	HENDRICKSON AVE	5700		150	F	S	FERNDALE TER					E048851	4/13/2010	15:25	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	HOVANDER RD	5300		0.5	M	N	WEST SMITH RD					3457054	11/24/2009	17:35	Unknown	0	0	1			Truck Tractor & Semi-Trailer
City Street	HOVANDER RD	5400		50	F	E	SCOUT PL					2488398	10/17/2008	16:03	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	HOVANDER RD	5600	MAIN ST									2488132	7/2/2008	16:07	Evident Injury	1	0	1		1	Pickup,Panel Truck or Vanette under 10,000 lb
City Street	IMHOFF RD	5600	DOULGAS RD									2488380	8/29/2008	17:43	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	JENSEN ST	2100		100	F	W	MALLOY AV					2488382	9/10/2008	7:24	No Injury	0	0	1			Passenger Car
City Street	JUNO PL	6100		100	F	E	SUNSHINE DR					2488092	9/12/2009	12:00	No Injury	0	0	2			Passenger Car
City Street	KAAS RD	1800		300	F	E	PORTAL WAY					E054784	6/1/2010	5:41	Possible Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	LABOUNTY DR	5600		50	F	S	MAIN ST					2630981	11/24/2008	12:55	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	LABOUNTY DR	1700		100	F	S	MAIN ST					2488339	3/28/2008	11:40	No Injury	0	0	2			Passenger Car
City Street	LABOUNTY DR	1700		300	F	E	MAIN ST					E048237	4/6/2010	12:23	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	LABOUNTY DR	1700	HAGGENS	250	F	E	MAIN ST					2631002	12/17/2008	15:25	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	LABOUNTY DR		MAIN ST									2488090	8/29/2009	14:57	Evident Injury	1	0	1			Motorcycle
City Street	LABOUNTY DR		MAIN ST									2630938	2/13/2009	17:52	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	LABOUNTY DR	5387	PROPANE GAS INC									E037132	12/22/2009	16:16	Possible Injury	1	0	2			Passenger Car
City Street	LABOUNTY DR AT SU	5000										2488161	5/27/2008	19:13	No Injury	0	0	2			Not Stated
City Street	LABOUNTY RD AT SU	5000										2488639	8/22/2008	21:54	Possible Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	LEGUE AVE			100	F	S	FERNDALE TERRACE					2488721	9/7/2008	4:08	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK
City Street	1 AV		ALDER ST	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	1 AVE	5600		Passenger Car	Not at Intersection and Not Related	Dry	Dark-Street Lights On	One car entering parked position
City Street	1 AVE	5600		Not Stated	Not at Intersection and Not Related	Snow/Slush	Daylight	One parked--one moving
City Street	1 AVE	5700		Passenger Car	Not at Intersection and Not Related	Dry	Dark-Street Lights On	One parked--one moving
City Street	2 AV	5800		Passenger Car	Intersection Related but Not at Intersection	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	2 AV		ALDER ST	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	2 AV		MAIN ST	Passenger Car	At Intersection and Related	Dry	Daylight	One parked--one moving
City Street	2 AV		VISTA DR	Passenger Car	At Intersection and Related	Dry	Dark-Street Lights On	From opposite direction - one left turn - one straight
City Street	2 AV		WILLARD ST		At Intersection and Related	Dry	Dark-Street Lights Off	Mailbox
City Street	2 AVE	5600			At Driveway	Dry	Dark-Street Lights On	Vehicle - Pedalcyclist
City Street	2 AVE			Not Stated	Not at Intersection and Not Related	Ice	Dark-Street Lights On	One parked--one moving
City Street	3 AV		MAIN ST	Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	3 AVE	5700		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From opposite direction - all others
City Street	3 AVE	5600		Passenger Car	Not at Intersection and Not Related	Dry	Dusk	One car leaving parked position
City Street	3 AVE	5600			Not at Intersection and Not Related	Wet	Dark-Street Lights On	Vehicle going straight hits pedestrian
City Street	3 AVE			Passenger Car	Not at Intersection and Not Related	Dry	Daylight	One parked--one moving
City Street	4 AV	5706			Not at Intersection and Not Related	Wet	Dark-Street Lights On	Building
City Street	4 AV		MAIN ST	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Daylight	From opposite direction - one left turn - one straight
City Street	ALDER ST	5600		Not Stated	Not at Intersection and Not Related	Dry	Other	One parked--one moving
City Street	ALDER ST	1991		Passenger Car	Not at Intersection and Not Related	Wet	Daylight	One parked--one moving
City Street	ALDER ST		2 AV	Passenger Car	At Intersection and Related	Wet	Daylight	Entering at angle
City Street	ALDERGROVE RD		CHURCH RD	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	AQUARIUS AVE	6129		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	One parked--one moving
City Street	AXTON RD	1500			Not at Intersection and Not Related	Ice	Daylight	Vehicle overturned
City Street	BARRETT RD	5500			Not at Intersection and Not Related	Dry	Dark-No Street Lights	Vehicle going straight hits pedestrian
City Street	BARRETT RD	5700	MAIN ST		At Intersection and Related	Oil	Daylight	Vehicle overturned
City Street	BARRETT RD		MAIN ST	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Dark-Street Lights On	From opposite direction - one left turn - one straight
City Street	BARRETT RD		W SMITH RD	Truck & Trailer	At Intersection and Related	Wet	Dusk	Entering at angle
City Street	BARRETT RD	5400	YMCA	Passenger Car	At Driveway	Dry	Daylight	Entering at angle
City Street	BASS ST	5700			Not at Intersection and Not Related	Dry	Daylight	Vehicle - Pedalcyclist
City Street	BROWN RD	2100		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dark-No Street Lights	From opposite direction - both going straight - sideswipe
City Street	BROWN RD				Not at Intersection and Not Related	Ice	Dawn	Tree or Stump (stationary)
City Street	BROWN RD		MALLOY AV	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	CHURCH RD				Not at Intersection and Not Related	Dry	Daylight	Over Embankment - No Guardrail Present
City Street	CHURCH RD	5900	LAKERIDGE DR	Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	CHURCH RD		PACIFIC HIGHLANDS AV		At Intersection and Related	Dry	Daylight	Other object
City Street	CHURCH RD		PACIFIC HIGHLANDS AVE		At Intersection and Related	Snow/Slush	Daylight	Street Light Pole or Base
City Street	CHURCH RD		PACIFIC HIGHLANDS DR		At Intersection and Related	Ice	Dark-Street Lights On	Utility Pole
City Street	CHURCH RD		PACIFIC HIGHLANDS DR	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Ice	Dark-Street Lights On	Entering at angle
City Street	CHURCH RD		THORNTON ST	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	ENTERPRISE RD	6500			Not at Intersection and Not Related	Snow/Slush	Dark-Street Lights On	Roadway Ditch
City Street	FALLBROOK LN	5700		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	One parked--one moving
City Street	FERNDALE RD	5500		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe
City Street	FERNDALE TERRACE	2300	SHERRY PL	Passenger Car	At Intersection and Related	Wet	Daylight	From same direction - all others
City Street	GROUSE CIR	6100		Passenger Car	Not at Intersection and Not Related	Ice	Dark-Street Lights On	One parked--one moving
City Street	HEATHER DR	2386		Passenger Car	At Driveway	Dry	Daylight	Entering at angle
City Street	HENDRICKSON AV	5700			Not at Intersection and Not Related	Dry	Daylight	Vehicle going straight hits pedestrian
City Street	HENDRICKSON AVE	5700		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	One parked--one moving
City Street	HOVANDER RD	5300			At Driveway	Wet	Dark-Street Lights On	Utility Pole
City Street	HOVANDER RD	5400			Not at Intersection and Not Related	Wet	Daylight	Vehicle overturned
City Street	HOVANDER RD	5600	MAIN ST		At Intersection and Related	Dry	Daylight	Vehicle - Pedalcyclist
City Street	IMHOFF RD	5600	DOULGAS RD	Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - all others
City Street	JENSEN ST	2100			Not at Intersection and Not Related	Dry	Daylight	Other object
City Street	JUNO PL	6100		Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Unknown	Daylight	One parked--one moving
City Street	KAAS RD	1800			Not at Intersection and Not Related	Dry	Dawn	Tree or Stump (stationary)
City Street	LABOUNTY DR	5600		Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	LABOUNTY DR	1700		Passenger Car	At Driveway	Wet	Daylight	One car leaving driveway access
City Street	LABOUNTY DR	1700		Passenger Car	At Driveway	Wet	Daylight	Entering at angle
City Street	LABOUNTY DR	1700	HAGGENS	Passenger Car	At Driveway	Snow/Slush	Daylight	One car leaving driveway access
City Street	LABOUNTY DR		MAIN ST		At Intersection and Related	Dry	Daylight	Vehicle overturned
City Street	LABOUNTY DR		MAIN ST	Passenger Car	At Intersection and Related	Dry	Dark-No Street Lights	From same direction - both going straight - one stopped - rear-end
City Street	LABOUNTY DR	5387	PROPANE GAS INC	Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Dry	Dusk	From opposite direction - one left turn - one straight
City Street	LABOUNTY DR AT SU	5000		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From opposite direction - both going straight - sideswipe
City Street	LABOUNTY RD AT SU	5000			Not at Intersection and Not Related	Dry	Dark-Street Lights On	Concrete Barrier/Jersey Barrier - Face
City Street	LEGUE AVE				Intersection Related but Not at Intersection	Dry	Dark-Street Lights On	Fence

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 1 (UNIT 2)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO
City Street	1 AV		ALDER ST	Did Not Grant RW to Vehicle	None	West	North	North	South
City Street	1 AVE	5600		Driver Adjusting Audio or Entertainment	None	North	South	North	South
City Street	1 AVE	5600			Other				
City Street	1 AVE	5700		Under Influence of Alcohol		East	Vehicle Backing		
City Street	2 AV	5800		Inattention	None	North	South	North	Vehicle Stopped
City Street	2 AV		ALDER ST	Disregard Stop Sign - Flashing Red	None	East	West	South	North
City Street	2 AV		MAIN ST	Improper Turn		East	North		
City Street	2 AV		VISTA DR	Did Not Grant RW to Vehicle	None	South	West	North	South
City Street	2 AV		WILLARD ST	Under Influence of Alcohol		East	South		
City Street	2 AVE	5600		None		West	Vehicle Stopped		
City Street	2 AVE								
City Street	3 AV		MAIN ST	Inattention	None	East	West	East	Vehicle Stopped
City Street	3 AVE	5700		Exceeding Stated Speed Limit	None	North	South	South	North
City Street	3 AVE	5600		Failing to Signal	None	West	East	West	East
City Street	3 AVE	5600		None		North	South		
City Street	3 AVE			Improper Backing		South	Vehicle Backing		
City Street	4 AV	5706		Under Influence of Alcohol		Southwest	Northeast		
City Street	4 AV		MAIN ST	Did Not Grant RW to Vehicle	None	North	East	South	North
City Street	ALDER ST	5600			Other				
City Street	ALDER ST	1991		Other		West	East		
City Street	ALDER ST		2 AV	Did Not Grant RW to Vehicle	None	West	East	South	North
City Street	ALDERGROVE RD		CHURCH RD	Did Not Grant RW to Vehicle	None	North	South	East	West
City Street	AQUARIUS AVE	6129		Other		North	South		
City Street	AXTON RD	1500		Exceeding Reas. Safe Speed		East	West		
City Street	BARRETT RD	5500		None		North	South		
City Street	BARRETT RD	5700	MAIN ST	Other		West	North		
City Street	BARRETT RD		MAIN ST	Did Not Grant RW to Vehicle	None	North	East	South	North
City Street	BARRETT RD		W SMITH RD	Did Not Grant RW to Vehicle	None	North	East	West	East
City Street	BARRETT RD	5400	YMCA	Did Not Grant RW to Vehicle	None	East	South	North	South
City Street	BASS ST	5700							
City Street	BROWN RD	2100		Over Center Line	None	West	East	East	West
City Street	BROWN RD			Other		West	East		
City Street	BROWN RD		MALLOY AV	Did Not Grant RW to Vehicle	None	South	West	West	East
City Street	CHURCH RD			Unknown Driver Distraction		South	North		
City Street	CHURCH RD	5900	LAKERIDGE DR	Follow Too Closely	None	South	North	South	Vehicle Stopped
City Street	CHURCH RD		PACIFIC HIGHLANDS AV	Did Not Grant RW to Vehicle		North	South		
City Street	CHURCH RD		PACIFIC HIGHLANDS AVE	Inattention		West	East		
City Street	CHURCH RD		PACIFIC HIGHLANDS DR	Exceeding Reas. Safe Speed		West	South		
City Street	CHURCH RD		PACIFIC HIGHLANDS DR	Exceeding Reas. Safe Speed	None	West	East	North	South
City Street	CHURCH RD		THORNTON ST	Disregard Stop Sign - Flashing Red	None	South	North	East	West
City Street	ENTERPRISE RD	6500		Exceeding Reas. Safe Speed		South	North		
City Street	FALLBROOK LN	5700		Improper Backing		East	Vehicle Backing		
City Street	FERNDALE RD	5500		Improper Passing	None	South	North	South	North
City Street	FERNDALE TERRACE	2300	SHERRY PL	None	Improper Passing	East	West	East	West
City Street	GROUSE CIR	6100		Inattention		West	Northeast		
City Street	HEATHER DR	2386		Improper Backing	None	South	Vehicle Backing	East	West
City Street	HENDRICKSON AV	5700		None		North	South		
City Street	HENDRICKSON AVE	5700		Driver Distractions Outside Vehicle		South	North		
City Street	HOVANDER RD	5300		Improper Backing		South	Vehicle Backing		
City Street	HOVANDER RD	5400		Exceeding Reas. Safe Speed		South	North		
City Street	HOVANDER RD	5600	MAIN ST	Fail to Yield Row to Pedestrian		South	East		
City Street	IMHOFF RD	5600	DOULGAS RD	Operating Defective Equipment	None	South	Vehicle Backing	South	Vehicle Stopped
City Street	JENSEN ST	2100		Inattention		West	East		
City Street	JUNO PL	6100		Improper Backing		South	Vehicle Backing		
City Street	KAAS RD	1800		Apparently Ill		East	West		
City Street	LABOUNTY DR	5600		Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	LABOUNTY DR	1700		Did Not Grant RW to Vehicle	None	South	West	East	West
City Street	LABOUNTY DR	1700		Did Not Grant RW to Vehicle	None	South	North	West	East
City Street	LABOUNTY DR	1700	HAGGENS	Other	None	South	North	South	Vehicle Stopped
City Street	LABOUNTY DR		MAIN ST	Other		South	East		
City Street	LABOUNTY DR		MAIN ST	Under Influence of Alcohol	None	South	North	South	Vehicle Stopped
City Street	LABOUNTY DR	5387	PROPANE GAS INC	Did Not Grant RW to Vehicle	None	South	West	North	South
City Street	LABOUNTY DR AT SU	5000		Over Center Line	None	North	South	South	North
City Street	LABOUNTY RD AT SU	5000		Under Influence of Alcohol		North	South		
City Street	LEGUE AVE			Under Influence of Alcohol		West	South		

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	CITY AND MISC ONLY SECONDARY TRAFFICWAY 1	CITY AND MISC ONLY SECONDARY TRAFFICWAY 2	STATE ROUTE & CO RD MILE POST	A/B	*REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# PEDAL	VEHICLE 1 TYPE
City Street	MADRONA ST	2262		50	F	N	HAWTHORNE ST					C709477	9/6/2008	11:40	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN	1800		300	F	W	LABOUNTY DR					2488328	2/12/2008	12:18	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1900		200	F	E	HOVANDER RD					2488716	4/1/2008	15:52	No Injury	0	0	4			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1800		500	F	E	RIVERSIDE DR					2488082	5/4/2009	14:44	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1700		500	F	E	LABOUNTY DR					E032872	11/16/2009	16:52	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1800										E060647	7/23/2010	18:46	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1900		300	F	W	LABOUNTY DR					2488030	5/23/2009	17:37	Possible Injury	1	0	3			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2207		75	F	W	WASHINGTON ST					2693441	1/30/2008	7:08	No Injury	0	0	3			Truck & Trailer
City Street	MAIN ST	2000		200	F	E	1 AVE					2488360	1/20/2008	7:33	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1900		75	F	E	HOVANDER RD					2488397	10/10/2008	17:34	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1900		130	F	E	HOVANDER RD					E040972	1/26/2010	16:28	Possible Injury	1	0	2			Passenger Car
City Street	MAIN ST	2000		50	F	E	SECOND AVE					E047456	3/31/2010	19:56	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	2200		100	F	W	DOUGLAS RD					E062164	8/3/2010	19:52	Possible Injury	1	0	3			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1700		250	F	E	LABOUNTY DR					E018574	4/27/2009	17:31	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	2000		50	F	E	2 AV					2488049	7/31/2009	13:52	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1800		300	F	W	LABOUNTY DR					2488359	1/16/2008	8:53	No Injury	0	0	2			Passenger Car
City Street	MAIN ST			200	F	W	THIRD AVE					2488330	2/19/2008	10:20	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1900		300	F	E	HOVANDER RD					2488163	5/30/2008	18:03	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1700				W	SR 5					2488354	1/8/2008	16:06	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1780		0.25	M	W	I 5					2488722	10/24/2008	17:47	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1580		100	F	E	AXTON CT					2488145	8/18/2008	16:49	Possible Injury	2	0	3			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2200		21	F	W	WASHINGTON ST					2488363	1/30/2008	6:40	No Injury	0	0	3			Passenger Car
City Street	MAIN ST	1815										2488135	7/14/2008	10:12	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2200		45	F	E	DOUGLAS DR					2488488	11/26/2007	16:20	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1800		100	F	W	LABOUNTY DR					2488157	5/3/2008	12:22	Possible Injury	1	0	2			Passenger Car
City Street	MAIN ST			30	F	W	3 AV					2488348	4/16/2008	18:10	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1800		100	F	W	LABOUNTY DR					2488355	1/10/2008	17:26	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	2300		400	F	E	CHURCH RD					2488031	5/8/2009	13:18	Evident Injury	1	0	1		1	Passenger Car
City Street	MAIN ST	2031		40	F	W	SECOND AVE					E048535	4/11/2010	11:05	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	2000		20	F	W	1 AV					2630966	11/5/2009	12:32	Evident Injury	2	0	3			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2000		0	F	W	2 AV					2630979	11/5/2008	7:56	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1800		60	F	W	LABOUNTY DR					2488337	3/28/2008	17:10	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1700		495.1	F	W	SR 005					2876681	1/13/2009	17:11	Evident Injury	2	0	2			Passenger Car
City Street	MAIN ST			100	F	W	HOVANDER RD					E051664	5/7/2010	14:23	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1781		200	F	E	LABOUNTY DR					E035479	12/1/2009	15:31	Evident Injury	1	0	2			Passenger Car
City Street	MAIN ST	1900		300	F	E	HOVANDER RD					E050234	4/16/2010	15:16	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1700		300	F	W	SR 005					2488390	9/23/2008	20:59	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	2000		50	F	E	2 AVE					E051665	5/7/2010	13:40	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST			200	F	E	LABOUNTY DR					2630999	4/13/2009	17:30	Possible Injury	1	0	1			Motorcycle
City Street	MAIN ST			150	F	W	LABOUNTY DR					E053436	5/21/2010	11:48	Possible Injury	2	0	3			Passenger Car
City Street	MAIN ST	1900		200	F	E	FIRST AV					E038296	1/5/2010	17:47	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	2000		50	F	E	3 AV					E050996	4/30/2010	16:53	Possible Injury	1	0	3			Passenger Car
City Street	MAIN ST	2100		50	F	E	4 AVE					2630997	4/1/2009	17:44	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1846		100	F	E	PRIVATE RD					E031006	10/29/2009	17:01	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	2000		50	F	E	3 AV					2488038	6/20/2009	15:30	Possible Injury	1	0	2			Passenger Car
City Street	MAIN ST	2000		26	F	E	2 ST					2488444	10/16/2007	10:49	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1800		500	F	W	LABOUNTY DR					2488381	9/5/2008	18:02	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1895		300	F	E	HOVANDER RD					E015459	2/24/2009	15:41	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1900		300	F	E	HOVANDER RD					2488493	12/7/2007	17:13	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1688				E	BARRETT RD					2630987	12/7/2008	15:37	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	3200		100	F	W	HENDRICKSON RD					E043979	2/21/2010	14:17	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2200		0	F	W	WASHINGTON ST					E041556	2/3/2010	17:43	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1800		200	F	W	LABOUNTY DR					2488133	7/9/2008	15:30	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1700		100	F	E	LABOUNTY RD					E038605	12/23/2009	18:01	Possible Injury	1	0	2			Passenger Car
City Street	MAIN ST	2000		30	F	E	2 AVE					2630956	9/23/2009	10:57	Serious Injury	2	0	3			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1900										E045565	3/12/2010	15:47	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	2000		50	F	W	3 AVE					2488715	3/27/2008	11:41	No Injury	0	0	3			Passenger Car
City Street	MAIN ST	2000		21	F	E	FIRST AV					2488709	10/20/2007	21:55	Possible Injury	1	0	2			Passenger Car
City Street	MAIN ST	1548		500	F	W	OLD SETTLERS DR					2488076	4/22/2009	10:12	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST		1 AV									E061492	7/30/2010	14:28	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	2000	1 AVE									2488134	7/11/2008	17:58	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2000	1 AVE									2488147	10/2/2008	19:43	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST		1 AVE									E054224	5/31/2010	12:29	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2000	2 AV									2488042	6/27/2009	20:55	No Injury	0	0	3			Passenger Car
City Street	MAIN ST		2 AVE									E057515	6/26/2010	11:27	No Injury	0	0	2			Passenger Car

REPORTED COLLISIONS THAT OCCURRED ON CITY STREETS IN THE CITYOF FERNDALE

10/1/2007 - 9/30/2010 (2010 is preliminary)

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JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK
City Street	MADRONA ST	2262		Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Dry	Daylight	One car leaving driveway access
City Street	MAIN	1800		Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Wet	Daylight	One car leaving driveway access
City Street	MAIN ST	1900		Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1800		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1700		Not Stated	Not at Intersection and Not Related	Wet	Dusk	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1800		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - both moving - rear-end
City Street	MAIN ST	1900		Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2207		Passenger Car	Not at Intersection and Not Related	Ice	Daylight	One parked--one moving
City Street	MAIN ST	2000			Not at Intersection and Not Related	Ice	Daylight	Bridge Rail - Face
City Street	MAIN ST	1900		Passenger Car	At Driveway	Dry	Daylight	One car leaving driveway access
City Street	MAIN ST	1900		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dusk	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Unknown	One car leaving parked position
City Street	MAIN ST	2200		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dusk	From same direction - both going straight - both moving - rear-end
City Street	MAIN ST	1700		Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Dry	Daylight	From opposite direction - one left turn - one straight
City Street	MAIN ST	2000		Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1800		Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Dry	Daylight	One car leaving driveway access
City Street	MAIN ST			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	One parked--one moving
City Street	MAIN ST	1900		Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1700		Passenger Car	At Driveway	Wet	Dusk	One car leaving driveway access
City Street	MAIN ST	1780		Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Wet	Dusk	One car entering driveway access
City Street	MAIN ST	1580		Pickup,Panel Truck or Vanette under 10,000 lb	Driveway Related but Not at Driveway	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2200		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Ice	Dawn	From same direction - all others
City Street	MAIN ST	1815		Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Dry	Daylight	One car entering driveway access
City Street	MAIN ST	2200		Passenger Car	Driveway Related but Not at Driveway	Wet	Dark-Street Lights On	From same direction - all others
City Street	MAIN ST	1800		Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Wet	Daylight	One car leaving driveway access
City Street	MAIN ST			Passenger Car	At Driveway	Dry	Daylight	One car leaving driveway access
City Street	MAIN ST	1800		Passenger Car	Not at Intersection and Not Related	Wet	Dark-Street Lights On	From same direction - both going straight - both moving - sideswipe
City Street	MAIN ST	2300			Not at Intersection and Not Related	Dry	Daylight	Vehicle - Pedalcyclist
City Street	MAIN ST	2031		Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - both moving - rear-end
City Street	MAIN ST	2000		Motorcycle	Intersection Related but Not at Intersection	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1800		Passenger Car	At Driveway	Wet	Daylight	One car leaving driveway access
City Street	MAIN ST	1700		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST			Passenger Car	Not at Intersection and Not Related	Dry	Daylight	Bridge Rail - Face
City Street	MAIN ST	1781		Motorcycle	At Driveway	Dry	Daylight	From opposite direction - one left turn - one straight
City Street	MAIN ST	1900		Passenger Car	At Driveway	Dry	Daylight	Entering at angle
City Street	MAIN ST	1700		Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Dry	Dark-Street Lights On	One car entering driveway access
City Street	MAIN ST	2000		Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST				Not at Intersection and Not Related	Dry	Daylight	Vehicle overturned
City Street	MAIN ST			Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1900		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dark-Street Lights On	From same direction - both going straight - both moving - rear-end
City Street	MAIN ST	2000		Passenger Car	Intersection Related but Not at Intersection	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2100		Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Wet	Daylight	From same direction - one right turn - one straight
City Street	MAIN ST	1846		Pickup,Panel Truck or Vanette under 10,000 lb	Driveway Related but Not at Driveway	Wet	Dusk	From same direction - both going straight - both moving - rear-end
City Street	MAIN ST	2000		Passenger Car	Intersection Related but Not at Intersection	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000		Passenger Car	At Driveway	Dry	Daylight	One car leaving driveway access
City Street	MAIN ST	1800		Passenger Car	At Driveway	Dry	Daylight	One car leaving driveway access
City Street	MAIN ST	1895		Taxi	At Driveway	Dry	Daylight	Entering at angle
City Street	MAIN ST	1900		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dark-No Street Lights	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1688		Truck & Trailer	At Driveway	Dry	Daylight	One car entering driveway access
City Street	MAIN ST	3200		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2200		Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	Wet	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1800		Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Dry	Daylight	One car entering driveway access
City Street	MAIN ST	1700		Passenger Car	At Driveway	Dry	Dark-Street Lights On	Entering at angle
City Street	MAIN ST	2000		Passenger Car	Intersection Related but Not at Intersection	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1900		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000		Passenger Car	Driveway Related but Not at Driveway	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Wet	Dark-Street Lights On	One parked--one moving
City Street	MAIN ST	1548		Truck (Flatbad,Van,etc)	At Driveway	Dry	Daylight	From same direction - one left turn - one straight
City Street	MAIN ST		1 AV	Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000	1 AVE	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000	1 AVE	Passenger Car	At Intersection and Related	Dry	Dark-Street Lights On	From same direction - both going straight - both moving - sideswipe
City Street	MAIN ST		1 AVE	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000	2 AV	Passenger Car	At Intersection and Not Related	Wet	Dusk	One parked--one moving
City Street	MAIN ST		2 AVE	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Same direction -- both turning right -- both moving -- sideswipe

REPORTED COLLISIONS THAT OCCURRED ON CITY STREETS IN THE CITYOF FERNDALE
10/1/2007 - 9/30/2010 (2010 is preliminary)
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JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 1 (UNIT 2)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO
City Street	MADRONA ST	2262				North	Vehicle Stopped	West	Vehicle Backing
City Street	MAIN	1800		Did Not Grant RW to Vehicle	None	South	West	West	East
City Street	MAIN ST	1900		Driver Operating Handheld Telecommunicat	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	1800		Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	1700		Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	1800		Inattention	None	East	West	East	West
City Street	MAIN ST	1900		Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	2207		Exceeding Reas. Safe Speed		West	East		
City Street	MAIN ST	2000		Inattention		East	West		
City Street	MAIN ST	1900		Improper Turn	None	South	West	West	East
City Street	MAIN ST	1900		Driver Distractions Outside Vehicle	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	2000		Did Not Grant RW to Vehicle	None	East	West	East	West
City Street	MAIN ST	2200		Exceeding Reas. Safe Speed	None	East	West	East	West
City Street	MAIN ST	1700		None	Did Not Grant RW to Vehicle	West	East	East	South
City Street	MAIN ST	2000		Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	1800		Did Not Grant RW to Vehicle	None	South	East	West	East
City Street	MAIN ST			Other		West	East		
City Street	MAIN ST	1900		Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	1700		Did Not Grant RW to Vehicle	None	South	West	West	East
City Street	MAIN ST	1780		Did Not Grant RW to Vehicle	None	East	South	West	East
City Street	MAIN ST	1580		Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	2200		Exceeding Reas. Safe Speed	None	West	East	West	East
City Street	MAIN ST	1815		Improper Backing	None	South	Vehicle Backing	South	Vehicle Stopped
City Street	MAIN ST	2200		Improper Backing	None	East	Vehicle Backing	East	Vehicle Stopped
City Street	MAIN ST	1800		Did Not Grant RW to Vehicle	None	South	West	West	East
City Street	MAIN ST			Did Not Grant RW to Vehicle	None	South	West	East	West
City Street	MAIN ST	1800		Did Not Grant RW to Vehicle	None	East	West	East	West
City Street	MAIN ST	2300		Inattention		East	West		
City Street	MAIN ST	2031		Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	2000		Follow Too Closely	Follow Too Closely	West	East	West	East
City Street	MAIN ST	2000		Inattention	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	1800		Inattention	Inattention	North	East	South	West
City Street	MAIN ST	1700		Driver Operating Handheld Telecommunicat	None	West	East	West	Vehicle Stopped
City Street	MAIN ST			Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	1781		Did Not Grant RW to Vehicle	None	East	South	West	East
City Street	MAIN ST	1900		Inattention	None	South	West	West	East
City Street	MAIN ST	1700		Improper Turn	None	West	South	West	East
City Street	MAIN ST	2000		Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MAIN ST			Unknown Driver Distraction		West	East		
City Street	MAIN ST			Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	1900		Follow Too Closely	None	East	West	East	West
City Street	MAIN ST	2000		Inattention	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	2100		Did Not Grant RW to Vehicle	None	Northwest	Southeast	Northwest	Southwest
City Street	MAIN ST	1846		Follow Too Closely	None	West	East	West	East
City Street	MAIN ST	2000		Inattention	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	2000		Did Not Grant RW to Vehicle	None	South	East	West	East
City Street	MAIN ST	1800		Did Not Grant RW to Vehicle	None	South	West	West	East
City Street	MAIN ST	1895		Improper Turn	None	South	East	West	East
City Street	MAIN ST	1900		Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	1688		Improper Backing	None	North	Vehicle Backing	West	North
City Street	MAIN ST	3200		Inattention	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	2200		Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	1800		Improper Turn	None	East	West	East	North
City Street	MAIN ST	1700		Did Not Grant RW to Vehicle	None	South	West	East	South
City Street	MAIN ST	2000		Other Driver Distractions Inside Vehicle	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	1900		Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	2000		Other Driver Distractions Inside Vehicle	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	2000		Apparently Fatigued		East	West		
City Street	MAIN ST	1548		Improper Passing	None	West	East	West	North
City Street	MAIN ST		1 AV	Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	2000	1 AVE	Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	2000	1 AVE	Did Not Grant RW to Vehicle	None	West	East	West	East
City Street	MAIN ST		1 AVE	Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	2000	2 AV	Driver Operating Handheld Telecommunicat		West	East		
City Street	MAIN ST		2 AVE	Improper Passing	None	East	North	East	North

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	CITY AND MISC ONLY SECONDARY TRAFFICWAY 1	CITY AND MISC ONLY SECONDARY TRAFFICWAY 2	STATE ROUTE & CO RD MILE POST	A/B	*REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# PEDAL	VEHICLE 1 TYPE
City Street	MAIN ST		2 AVE									2630976	10/22/2008	13:18	Possible Injury	1	0	1	1		Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST		3 AV									E043800	2/24/2010	6:00	Evident Injury	1	0	1	1		Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST		3 AV									2488401	8/8/2008	14:44	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2000	3 AV									E018852	4/30/2009	14:19	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2000	3 AVE									E048710	4/12/2010	8:47	Possible Injury	1	0	2			Passenger Car
City Street	MAIN ST	2000	3 AVE									2630955	9/22/2009	17:59	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2100	4 AVE									3146276	11/1/2008	17:08	Possible Injury	2	0	2			Passenger Car
City Street	MAIN ST	1900	ALLEY					1 AVE	FRONT AVE			2488026	4/28/2009	19:59	Evident Injury	1	0	1		1	Passenger Car
City Street	MAIN ST	2000	ALLEY									E054225	5/31/2010	13:00	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	2100	CORRELL DR									2630985	11/27/2008	18:44	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1800	COST CUTTER FOODS	100	F	E	LABOUNTY DR					2630934	1/28/2009	16:38	No Injury	0	0	2			Passenger Car
City Street	MAIN ST		DOUGLAS RD									E037034	12/22/2009	21:11	Serious Injury	1	0	2			Motorcycle
City Street	MAIN ST	2200	DOULGAS RD									2488146	9/6/2008	17:55	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1900	DRIVEWAY									2630943	3/2/2009	20:19	No Injury	0	0	2			Passenger Car
City Street	MAIN ST		FIRST AV									2488334	3/1/2008	11:07	No Injury	0	0	3			Passenger Car
City Street	MAIN ST	2000	FIRST AVE									E032302	11/9/2009	11:09	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2000	FIRST AVE									2488638	6/23/2008	11:12	No Injury	0	0	2			Passenger Car
City Street	MAIN ST		HENDRICKSON									E041320	2/1/2010	0:01	Evident Injury	1	0	1	1		Passenger Car
City Street	MAIN ST		HENDRICKSON AVE									2630932	1/3/2009	7:45	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2300	HENDRICKSON AVE									E057226	6/23/2010	15:04	Possible Injury	1	0	2			Passenger Car
City Street	MAIN ST	2200	HENDRICKSON RD									2488142	8/13/2008	8:47	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST		HOVANDER RD									E055604	6/9/2010	16:40	No Injury	0	0	2			Truck & Trailer
City Street	MAIN ST		HOVANDER RD									E020469	5/21/2009	11:23	No Injury	0	0	2			Passenger Car
City Street	MAIN ST		LABOUNTY DR									2630944	3/6/2009	19:57	No Injury	0	0	2			Passenger Car
City Street	MAIN ST		LABOUNTY DR									E036986	12/22/2009	15:05	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1800	LABOUNTY DR									E039565	1/14/2010	14:59	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1700	LABOUNTY DR									2488448	11/12/2007	18:38	Possible Injury	1	0	3			Passenger Car
City Street	MAIN ST		LABOUNTY DR									E067309	9/14/2010	12:59	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1800	LABOUNTY DR									2488126	3/28/2008	13:14	No Injury	0	0	2			Not Stated
City Street	MAIN ST	1800	PEOPLES BANK	200	F	E	HOVANDER RD					2630971	12/15/2009	11:02	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	1900	PEOPLES BANK	100	F	E	HOVANDER RD					E048536	4/10/2010	10:43	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	2000	RITE AID	100	F	W	3 AVE					2488724	12/2/2008	15:00	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST	2000	SECOND AV									2488635	11/5/2007	11:53	Possible Injury	1	0	1	1		Passenger Car
City Street	MAIN ST		SECOND AVE									E058687	7/7/2010	13:00	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MAIN ST		SECOND AVE									2488089	8/18/2009	11:56	No Injury	0	0	2			Passenger Car
City Street	MAIN ST	1900	THRU WY									2488405	11/3/2009	17:17	Possible Injury	1	0	2			Passenger Car
City Street	MAIN ST	1901	WALGREENS									2488032	6/4/2009	13:10	Possible Injury	1	0	2			Passenger Car
City Street	MAIN ST	1900	WALGREENS									E029511	10/13/2009	18:12	No Injury	0	0	2			Passenger Car
City Street	MAIN ST		WASHINGTON ST									2488404	10/31/2009	10:53	No Injury	0	0	2			Passenger Car
City Street	MAIN STREET	1900		150	F	W	LABOUNTY DR					E033723	11/20/2009	16:57	Possible Injury	1	0	2			Passenger Car
City Street	MALLOY AV		GOLDEN EAGLE DR									E044784	3/1/2010	7:43	Evident Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MALLOY AV	6100	JENSEN ST									2631003	1/22/2009	11:00	No Injury	0	0	2			Passenger Car
City Street	MALLOY AVE	6400		200	F	S	ALDERGROVE RD					E040370	1/19/2010	22:07	Evident Injury	1	0	1			Passenger Car
City Street	MALLOY AVE	6000		150	F	N	DONNA LN					E035982	12/13/2009	16:05	Possible Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MALLOY AVE	5800	VISTA DR									E039835	1/15/2010	7:45	Evident Injury	1	0	1	1		Passenger Car
City Street	MALLOY RD	6300		0.5	M	S	ALDERGROVE RD					E035985	12/13/2009	20:05	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MALLOY RD	6400		0.4	M	N	ALDERGROVE RD					E044536	3/2/2010	18:45	No Injury	0	0	1			Passenger Car
City Street	MALLOY RD		BROWN RD									2528184	10/3/2008	1:48	Evident Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MALLOY RD		BROWN RD									2528465	12/17/2008	19:07	Evident Injury	1	0	1			Passenger Car
City Street	MOUNTAINVIEW	2500		500	F	W	CHURCH RD					E067308	9/7/2010	15:53	Serious Injury	2	0	2			Motorcycle
City Street	MT VIEW RD			0	F	E	CHURCH RD					2488412	4/2/2010	9:45	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	MT VIEW RD	3900	RAINBOW RD									3146273	4/23/2009	16:47	Serious Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	NICHOLAS DR		GORDON ST									2488492	12/1/2007	17:24	No Injury	0	0	1			Passenger Car
City Street	OXFORD CT	2092		150	F	E	MALLOY AV					2630984	11/27/2008	11:39	No Injury	0	0	2			Not Stated
City Street	PACIFIC HIGHLANDS	2578		100	F	E	PACIFIC HEIGHTS DR					2488711	12/9/2007	13:55	No Injury	0	0	2			Passenger Car
City Street	PACIFIC HIGHWAY	5300	W SMITH RD									3143079	5/21/2010	19:50	Evident Injury	1	0	1			Motorcycle
City Street	PACIFIC HWY	5200		300	F	S	W SMITH RD					E029914	10/19/2009	17:42	Possible Injury	2	0	2			Passenger Car
City Street	PACIFIC HWY	5000		1	M	N	SLATER RD					E069407	9/27/2010	6:30	No Injury	0	0	1			Passenger Car
City Street	PACIFIC HWY		BYERS RD									2630952	10/22/2008	10:07	No Injury	0	0	1	1		Passenger Car
City Street	PACIFIC HWY		SMITH RD									2693782	3/9/2009	9:09	No Injury	0	0	1			Passenger Car
City Street	POPLAR DR	5300		500	F	S	CORRELL DR					2630998	4/9/2009	13:23	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	PORTAL WAY	6200		0.25	M	S	KAAS RD					2488720	6/10/2008	5:51	Possible Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	PORTAL WAY	6000		500	F	N	INTERSTATE 5					E043678	2/22/2010	10:05	No Injury	0	0	1			Truck Tractor & Semi-Trailer
City Street	PORTAL WAY	6600		0.3	M	S	BROWN RD					2488137	7/21/2008	0:36	Dead at Scene	0	1	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	PORTAL WAY	6700	BROWN RD									2683536	10/17/2007	11:47	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb

REPORTED COLLISIONS THAT OCCURRED ON CITY STREETS IN THE CITYOF FERNDALE
10/1/2007 - 9/30/2010 (2010 is preliminary)
*As of 1/1/2009 Citizen Reports are no longer being captured (Report # begins with "C")

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK
City Street	MAIN ST		2 AVE		At Intersection and Related	Dry	Daylight	Vehicle turning left hits pedestrian
City Street	MAIN ST		3 AV		At Intersection and Related	Wet	Dark-Street Lights On	Vehicle turning left hits pedestrian
City Street	MAIN ST		3 AV	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000	3 AV	Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000	3 AVE	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000	3 AVE	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - one right turn - one straight
City Street	MAIN ST	2100	4 AVE	Passenger Car	At Intersection and Related	Wet	Dusk	Entering at angle
City Street	MAIN ST	1900	ALLEY		At Driveway within Major Intersection	Dry	Daylight	Vehicle - Pedalcyclist
City Street	MAIN ST	2000	ALLEY	Passenger Car	At Intersection and Not Related	Dry	Daylight	From same direction - all others
City Street	MAIN ST	2100	CORRELL DR	Passenger Car	At Intersection and Related	Dry	Dark-Street Lights On	Entering at angle
City Street	MAIN ST	1800	COST CUTTER FOODS	Passenger Car	At Driveway	Dry	Daylight	From opposite direction - one left turn - one straight
City Street	MAIN ST		DOUGLAS RD	Passenger Car	At Intersection and Related	Dry	Dark-Street Lights On	From opposite direction - one left turn - one straight
City Street	MAIN ST	2200	DOULGAS RD	Passenger Car	At Intersection and Related	Dry	Daylight	From opposite direction - one left turn - one straight
City Street	MAIN ST	1900	DRIVEWAY	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Dark-Street Lights On	From opposite direction - one left turn - one straight
City Street	MAIN ST		FIRST AV	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000	FIRST AVE	Passenger Car	At Intersection and Related	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	2000	FIRST AVE	Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST		HENDRICKSON		At Intersection and Related	Other	Dark-Street Lights On	Vehicle going straight hits pedestrian
City Street	MAIN ST		HENDRICKSON AVE	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Ice	Daylight	Entering at angle
City Street	MAIN ST	2300	HENDRICKSON AVE	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Not Related	Dry	Daylight	From same direction - all others
City Street	MAIN ST	2200	HENDRICKSON RD	Motorcycle	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST		HOVANDER RD	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	MAIN ST		HOVANDER RD	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	MAIN ST		LABOUNTY DR	Passenger Car	At Intersection and Related	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST		LABOUNTY DR	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1800	LABOUNTY DR	Passenger Car	At Intersection and Related	Wet	Daylight	From same direction - both going straight - both moving - rear-end
City Street	MAIN ST	1700	LABOUNTY DR	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From opposite direction - all others
City Street	MAIN ST		LABOUNTY DR	Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway within Major Intersection	Dry	Daylight	From opposite direction - one left turn - one straight
City Street	MAIN ST	1800	LABOUNTY DR	Passenger Car	At Intersection and Related	Unknown	Daylight	From same direction - both going straight - one stopped - sideswipe
City Street	MAIN ST	1800	PEOPLES BANK	Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Ice	Daylight	Entering at angle
City Street	MAIN ST	1900	PEOPLES BANK	Passenger Car	At Driveway	Dry	Daylight	Entering at angle
City Street	MAIN ST	2000	RITE AID	Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Wet	Daylight	One car leaving driveway access
City Street	MAIN ST	2000	SECOND AV		At Intersection and Related	Dry	Daylight	Vehicle turning left hits pedestrian
City Street	MAIN ST		SECOND AVE	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST		SECOND AVE	Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1900	THRU WY	Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN ST	1901	WALGREENS	Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Dry	Daylight	Entering at angle
City Street	MAIN ST	1900	WALGREENS	Passenger Car	At Driveway within Major Intersection	Dry	Daylight	Entering at angle
City Street	MAIN ST		WASHINGTON ST	Passenger Car	At Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	MAIN STREET	1900		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Wet	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end
City Street	MALLOY AV		GOLDEN EAGLE DR	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	MALLOY AV	6100	JENSEN ST	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	MALLOY AVE	6400			Not at Intersection and Not Related	Dry	Dark-No Street Lights	Earth Bank or Ledge
City Street	MALLOY AVE	6000			Not at Intersection and Not Related	Ice	Dark-Street Lights On	Fire Hydrant
City Street	MALLOY AVE	5800	VISTA DR		At Roundabout but not Related	Wet	Dark-Street Lights On	Vehicle going straight hits pedestrian
City Street	MALLOY RD	6300		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Ice	Dark-Street Lights On	From opposite direction - all others
City Street	MALLOY RD	6400			Not at Intersection and Not Related	Dry	Dark-No Street Lights	Domestic animal other (cat, dog, etc)
City Street	MALLOY RD		BROWN RD		At Intersection and Related	Dry	Dark-No Street Lights	Tree or Stump (stationary)
City Street	MALLOY RD		BROWN RD		At Intersection and Related	Snow/Slush	Dark-No Street Lights	Roadway Ditch
City Street	MOUNTAINVIEW	2500		Passenger Car	At Driveway	Dry	Daylight	From same direction - one left turn - one straight
City Street	MT VIEW RD				Intersection Related but Not at Intersection	Dry	Daylight	Over Embankment - No Guardrail Present
City Street	MT VIEW RD	3900	RAINBOW RD	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	NICHOLAS DR		GORDON ST		At Intersection and Related	Snow/Slush	Dark-Street Lights On	Street Light Pole or Base
City Street	OXFORD CT	2092		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dark-Street Lights On	One parked--one moving
City Street	PACIFIC HIGHLANDS	2578		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Snow/Slush	Daylight	One parked--one moving
City Street	PACIFIC HIGHWAY	5300	W SMITH RD		At Intersection and Related	Dry	Daylight	Guardrail - Face
City Street	PACIFIC HWY	5200		Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - all others
City Street	PACIFIC HWY	5000			Not at Intersection and Not Related	Dry	Dawn	Fence
City Street	PACIFIC HWY		BYERS RD		At Intersection and Related	Dry	Daylight	Vehicle going straight hits pedestrian
City Street	PACIFIC HWY		SMITH RD		At Intersection and Related	Ice	Daylight	Guardrail - Face
City Street	POPLAR DR	5300		Passenger Car	At Driveway	Dry	Daylight	From opposite direction - all others
City Street	PORTAL WAY	6200			Not at Intersection and Not Related	Wet	Dawn	Utility Pole
City Street	PORTAL WAY	6000			Not at Intersection and Not Related	Dry	Daylight	Utility Pole
City Street	PORTAL WAY	6600			Not at Intersection and Not Related	Dry	Dark-No Street Lights	Tree or Stump (stationary)
City Street	PORTAL WAY	6700	BROWN RD	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Daylight	Entering at angle

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 1 (UNIT 2)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO
City Street	MAIN ST		2 AVE	Fail to Yield Row to Pedestrian		North	East		
City Street	MAIN ST		3 AV	Fail to Yield Row to Pedestrian		West	North		
City Street	MAIN ST		3 AV	Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	2000	3 AV	Inattention	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	2000	3 AVE	Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	2000	3 AVE	Follow Too Closely	None	East	West	East	North
City Street	MAIN ST	2100	4 AVE	Disregard Stop and Go Light	None	West	East	North	East
City Street	MAIN ST	1900	ALLEY	Fail to Yield Row to Pedestrian		North	East		
City Street	MAIN ST	2000	ALLEY	Improper Backing	None	East	Vehicle Backing	East	Vehicle Stopped
City Street	MAIN ST	2100	CORRELL DR	Did Not Grant RW to Vehicle	None	South	West	West	East
City Street	MAIN ST	1800	COST CUTTER FOODS	Did Not Grant RW to Vehicle	None	East	South	West	East
City Street	MAIN ST		DOUGLAS RD	Headlight Violation	None	West	East	East	South
City Street	MAIN ST	2200	DOULGAS RD	Disregard Stop and Go Light	None	West	East	East	Southwest
City Street	MAIN ST	1900	DRIVEWAY	Under Influence of Alcohol	None	East	South	West	East
City Street	MAIN ST		FIRST AV	Exceeding Reas. Safe Speed	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	2000	FIRST AVE	Inattention	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	2000	FIRST AVE	Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN ST		HENDRICKSON	None		East	West		
City Street	MAIN ST		HENDRICKSON AVE	Disregard Stop Sign - Flashing Red	None	North	South	East	West
City Street	MAIN ST	2300	HENDRICKSON AVE	Did Not Grant RW to Vehicle	None	East	East	East	West
City Street	MAIN ST	2200	HENDRICKSON RD	Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MAIN ST		HOVANDER RD	Improper Turn	None	East	South	South	Vehicle Stopped
City Street	MAIN ST		HOVANDER RD	Did Not Grant RW to Vehicle	None	South	West	West	East
City Street	MAIN ST		LABOUNTY DR	Under Influence of Alcohol	None	West	East	West	Vehicle Stopped
City Street	MAIN ST		LABOUNTY DR	Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	1800	LABOUNTY DR	Follow Too Closely	None	West	East	West	East
City Street	MAIN ST	1700	LABOUNTY DR	Over Center Line	None	West	East	East	West
City Street	MAIN ST		LABOUNTY DR	Inattention	None	West	North	East	West
City Street	MAIN ST	1800	LABOUNTY DR	Other	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	1800	PEOPLES BANK	Did Not Grant RW to Vehicle	None	South	West	West	East
City Street	MAIN ST	1900	PEOPLES BANK	Improper Turn	None	South	West	West	East
City Street	MAIN ST	2000	RITE AID	Did Not Grant RW to Vehicle	None	South	West	West	East
City Street	MAIN ST	2000	SECOND AV	Fail to Yield Row to Pedestrian		North	East		
City Street	MAIN ST		SECOND AVE	Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN ST		SECOND AVE	Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN ST	1900	THRU WY	Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MAIN ST	1901	WALGREENS	Other	None	South	West	West	East
City Street	MAIN ST	1900	WALGREENS	Disregard Stop and Go Light	None	East	West	South	North
City Street	MAIN ST		WASHINGTON ST	Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	MAIN STREET	1900		Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	MALLOY AV		GOLDEN EAGLE DR	Did Not Grant RW to Vehicle	None	East	North	South	North
City Street	MALLOY AV	6100	JENSEN ST	Did Not Grant RW to Vehicle	None	West	South	North	South
City Street	MALLOY AVE	6400		Exceeding Reas. Safe Speed		South	North		
City Street	MALLOY AVE	6000		Exceeding Reas. Safe Speed		South	North		
City Street	MALLOY AVE	5800	VISTA DR	Fail to Yield Row to Pedestrian		South	North		
City Street	MALLOY RD	6300		Other	Other	South	Vehicle Backing	North	Vehicle Stopped
City Street	MALLOY RD	6400		None		North	South		
City Street	MALLOY RD		BROWN RD	Under Influence of Alcohol		South	North		
City Street	MALLOY RD		BROWN RD	Exceeding Reas. Safe Speed		South	North		
City Street	MOUNTAINVIEW	2500		Exceeding Stated Speed Limit	None	East	West	East	South
City Street	MT VIEW RD			None		West	East		
City Street	MT VIEW RD	3900	RAINBOW RD	Did Not Grant RW to Vehicle	None	North	East	East	West
City Street	NICHOLAS DR		GORDON ST	Exceeding Reas. Safe Speed		West	South		
City Street	OXFORD CT	2092		Other		West	East		
City Street	PACIFIC HIGHLANDS	2578		Unknown Driver Distraction		West	East		
City Street	PACIFIC HIGHWAY	5300	W SMITH RD	Under Influence of Alcohol		East	North		
City Street	PACIFIC HWY	5200		Improper U-Turn	None	South	South	South	North
City Street	PACIFIC HWY	5000		Other		North	South		
City Street	PACIFIC HWY		BYERS RD	Fail to Yield Row to Pedestrian		South	North		
City Street	PACIFIC HWY		SMITH RD	Exceeding Reas. Safe Speed		East	South		
City Street	POPLAR DR	5300		Inattention	Inattention	South	Vehicle Backing	North	Vehicle Backing
City Street	PORTAL WAY	6200		Driver Interacting with Passengers, Anim		South	North		
City Street	PORTAL WAY	6000		None		South	North		
City Street	PORTAL WAY	6600		Under Influence of Alcohol		South	North		
City Street	PORTAL WAY	6700	BROWN RD	Did Not Grant RW to Vehicle	None	West	North	North	South

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	CITY AND MISC ONLY SECONDARY TRAFFICWAY 1	CITY AND MISC ONLY SECONDARY TRAFFICWAY 2	STATE ROUTE & CO RD MILE POST	A/B	*REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# PEDAL	VEHICLE 1 TYPE
City Street	PORTAL WY	6000		400	F	S	NEWKIRK RD					2488034	6/9/2009	13:37	No Injury	0	0	1			Truck Tractor & Semi-Trailer
City Street	PORTAL WY	6100		100	F	S	NEW KIRK RD					2488341	4/4/2008	14:51	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	PORTAL WY	6300		1,000	F	N	KAAS RD					2488173	6/17/2008	14:40	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	PORTAL WY	6006		1,000	F	N	SR 5					2488045	7/22/2009	12:40	No Injury	0	0	2			Passenger Car
City Street	PORTAL WY		BROWN RD									3456579	10/5/2009	10:23	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	PORTAL WY		ENTERPRISE RD									2488041	6/27/2009	23:14	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	PORTAL WY		PORTAL WY									3145483	7/3/2010	3:15	Possible Injury	1	0	1			Passenger Car
City Street	PORTAL WY		PORTAL WY									3143112	5/10/2010	10:00	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	PORTAL WY	6397	WAYNES AUTO	1,000	F	N	KAAS RD					2488048	7/27/2009	11:21	No Injury	0	0	1			Other
City Street	RIVERSIDE	5631	DAIRY QUEEN									C709392	9/3/2008	13:00	No Injury	0	0	2			Passenger Car
City Street	RIVERSIDE DR	5600										E065972	9/1/2010	16:00	No Injury	0	0	2			Passenger Car
City Street	SEAMOUNT DR	2173		40.5	F	E	WATER GARDEN ST					2877105	4/27/2008	9:00	No Injury	0	0	1			Passenger Car
City Street	SEAMOUNT DR		VISTA DR									2630940	2/20/2009	7:44	No Injury	0	0	2			Passenger Car
City Street	SECOND AV		MAIN ST									2488129	4/19/2008	14:51	No Injury	0	0	2			Not Stated
City Street	SHANNON AV		MAIN ST									E035983	12/13/2009	12:31	No Injury	0	0	2			Passenger Car
City Street	SHANNON AVE	6000		200	F	S	THORTON ST					E028221	9/13/2009	0:15	No Injury	0	0	1			Passenger Car
City Street	SLATER RD	2300				W	IMHOFF RD					2684333	11/10/2009	14:38	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	SLATER RD	1500		200	F	E	LABOUNTY					2877167	4/7/2009	22:15	Possible Injury	2	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	SMITH RD		PACIFIC HWY									2488143	8/14/2008	14:52	Evident Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	SOMERSET		PORTAL									C701112	3/5/2008	12:30	No Injury	0	0	2			Passenger Car
City Street	SPRUCE CRT	2400		50	F	W	SPRUCE AVE					2488150	10/5/2008	0:01	No Injury	0	0	2			Not Stated
City Street	ST HELLENS CT			50	F	N	ST HELLENS LN					E041193	1/31/2010	0:23	No Injury	0	0	2			Passenger Car
City Street	SUNSHINE DR	2469		25	F	S	TYLER LN					E044291	2/28/2010	10:56	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	SUNSHINE DR							JUPITER PL	THORNTON ST			2488362	1/29/2008	15:30	No Injury	0	0	2			Not Stated
City Street	THIRD AVE	5600		20	F	E	MAIN ST					E066507	9/8/2010	13:46	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	THIRD AVE		VISTA DR									2488329	2/17/2008	10:01	No Injury	0	0	2			Passenger Car
City Street	THORNTON RD		VISTA DR									E039836	1/15/2010	9:10	Possible Injury	1	0	2			Passenger Car
City Street	THORNTON RD		VISTA DR									2488708	10/3/2007	8:50	No Injury	0	0	2			Passenger Car
City Street	THORNTON ST	2300		100	F	E	SUNSHINE DR					2630931	12/26/2008	14:57	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	THORTON ST		SUNSHINE DR									2488498	12/27/2007	18:54	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	TRIGGWOODS LN		TRIGG RD									E060589	7/22/2010	16:12	No Injury	0	0	1			Passenger Car
City Street	VISTA DR	5800		50	F	S	FERNDALE TERRACE					2875879	11/18/2007	17:50	Evident Injury	1	0	1			Motorcycle
City Street	VISTA DR	5700										2488027	5/18/2009	15:55	No Injury	0	0	2			Passenger Car
City Street	VISTA DR	2000		25	F	N	SECOND AVE					E034341	11/25/2009	12:00	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	VISTA DR	2000		200	F	S	4 AVE					E065167	8/27/2010	12:00	Serious Injury	1	0	2			Passenger Car
City Street	VISTA DR	5856										E015774	2/27/2009	12:23	No Injury	0	0	2			Passenger Car
City Street	VISTA DR	5600		50	F	W	2 AVE					2630990	2/6/2009	18:23	No Injury	0	0	2			Not Stated
City Street	VISTA DR	5700		25	F	S	WASHINGTON ST					2488394	10/7/2008	18:17	No Injury	0	0	2			Passenger Car
City Street	VISTA DR	5700	4 AV									E039241	1/11/2010	17:35	Possible Injury	1	0	1	1		Passenger Car
City Street	VISTA DR		FERNDALE TERRACE									2630968	11/11/2009	19:00	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	VISTA DR		MALLOY AV									2488391	9/24/2008	7:48	No Injury	0	0	2			Not Stated
City Street	VISTA DR		MALLOY AV									2488377	12/5/2007	14:45	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	VISTA DR		THIRD AV									2488358	1/15/2008	20:11	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	VISTA DR		THIRD AVE									2488496	12/13/2007	18:50	Possible Injury	1	0	1	1		Pickup,Panel Truck or Vanette under 10,000 lb
City Street	VISTA DR	5700	THIRD AVE									E066066	9/3/2010	21:26	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	VISTA DR		WASHINGTON ST									E069522	9/30/2010	14:14	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	VISTA DR		WASHINGTON ST									2630969	11/12/2009	7:36	No Injury	0	0	2			Passenger Car
City Street	VISTA DR		WASHINGTON ST									E045567	3/8/2010	18:11	No Injury	0	0	2			Passenger Car
City Street	VISTA DR	5700	WASHINGTON ST									2488340	3/28/2008	18:03	No Injury	0	0	2			Passenger Car
City Street	VISTA DR		WASHINGTON ST									2488725	12/10/2008	11:44	No Injury	0	0	2			Passenger Car
City Street	VISTA DR	5700	WASHINGTON ST									E057666	6/27/2010	19:46	No Injury	0	0	2			Passenger Car
City Street	VISTA DRIVE	6200		100	F	N	FULTON ST					E046296	3/21/2010	0:34	Evident Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	W AXTON RD	1400		200	F	W	OLD SETTLERS RD					E056081	6/15/2010	15:56	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	W MAIN ST	1500										2488446	10/26/2007	8:55	Unknown	0	0	2			Passenger Car
City Street	W SMITH RD	1300		200	F	W	MEYERS DR					2630950	3/29/2009	20:14	No Injury	0	0	2			Passenger Car
City Street	W SMITH RD			0	F	W	BELLWEST DR					E049767	4/21/2010	18:12	No Injury	0	0	2			Passenger Car
City Street	W SMITH RD	1400		300	F	E	SHIELDS RD					E016808	3/21/2009	11:05	Possible Injury	3	0	2			Passenger Car
City Street	W SMITH RD	1325		300	F	E	SHIELDS RD					2630953	3/19/2009	3:59	No Injury	0	0	1			Passenger Car
City Street	W SMITH RD		LABOUNTY DR									E035984	12/13/2009	13:11	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	W SMITH RD		PACIFIC HWY									2630927	11/7/2008	7:15	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	W SMITH RD		PACIFIC HWY									E035988	12/14/2009	13:53	Evident Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	W SMITH RD		PACIFIC HWY									2488388	9/17/2008	11:16	Possible Injury	2	0	2			Passenger Car
City Street	W SMITH RD	1400	SHIELDS RD									E037810	1/1/2010	1:19	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	WASHINGTON ST	20000				E	GOLDEN EAGLE DR					2488136	7/7/2008	3:00	No Injury	0	0	3			Passenger Car
City Street	WASHINGTON ST	1900		50	F	W	PORTAL WY					2488139	7/26/2008	14:13	No Injury	0	0	1			Passenger Car

REPORTED COLLISIONS THAT OCCURRED ON CITY STREETS IN THE CITYOF FERNDALE
10/1/2007 - 9/30/2010 (2010 is preliminary)
*As of 1/1/2009 Citizen Reports are no longer being captured (Report # begins with "C")

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK
City Street	PORTAL WY	6000			Not at Intersection and Not Related	Dry	Daylight	Utility Pole
City Street	PORTAL WY	6100		Pickup,Panel Truck or Vanette under 10,000 lb	Driveway Related but Not at Driveway	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	PORTAL WY	6300		Passenger Car	Driveway Related but Not at Driveway	Dry	Daylight	From same direction - both going straight - both moving - rear-end
City Street	PORTAL WY	6006		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From same direction - all others
City Street	PORTAL WY		BROWN RD	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	PORTAL WY		ENTERPRISE RD	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Dark-Street Lights On	From opposite direction - one left turn - one straight
City Street	PORTAL WY		PORTAL WY		At Intersection and Related	Dry	Dark-No Street Lights	Metal Sign Post
City Street	PORTAL WY		PORTAL WY	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	PORTAL WY	6397	WAYNES AUTO		At Driveway	Dry	Daylight	Fire Hydrant
City Street	RIVERSIDE	5631	DAIRY QUEEN	Not Stated	At Driveway	Dry	Daylight	One car leaving driveway access
City Street	RIVERSIDE DR	5600		Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	SEAMOUNT DR	2173			Not at Intersection and Not Related	Dry	Daylight	Utility Pole
City Street	SEAMOUNT DR		VISTA DR	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	SECOND AV		MAIN ST	Passenger Car	At Intersection and Related	Dry	Daylight	One parked--one moving
City Street	SHANNON AV		MAIN ST	Passenger Car	At Intersection and Related	Snow/Slush	Daylight	Entering at angle
City Street	SHANNON AVE	6000			Not at Intersection and Not Related	Dry	Dark-Street Lights On	Mailbox
City Street	SLATER RD	2300		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	SLATER RD	1500		Passenger Car	Not at Intersection and Not Related	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end
City Street	SMITH RD		PACIFIC HWY	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	SOMERSET		PORTAL	Not Stated	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	SPRUCE CRT	2400		Passenger Car	Not at Intersection and Not Related	Wet	Unknown	One parked--one moving
City Street	ST HELLENS CT			Not Stated	Not at Intersection and Not Related	Wet	Dark-Street Lights On	One parked--one moving
City Street	SUNSHINE DR	2469		Passenger Car	At Driveway	Dry	Daylight	Entering at angle
City Street	SUNSHINE DR			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Snow/Slush	Daylight	One parked--one moving
City Street	THIRD AVE	5600		Passenger Car	Not at Intersection and Not Related	Dry	Daylight	One parked--one moving
City Street	THIRD AVE		VISTA DR	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	THORNTON RD		VISTA DR	School Bus	At Intersection and Related	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	THORNTON RD		VISTA DR	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	THORNTON ST	2300		Passenger Car	Not at Intersection and Not Related	Snow/Slush	Daylight	One parked--one moving
City Street	THORTON ST		SUNSHINE DR		At Intersection and Not Related	Snow/Slush	Dark-Street Lights On	Tree or Stump (stationary)
City Street	TRIGGWOODS LN		TRIGG RD		At Intersection and Related	Dry	Daylight	Building
City Street	VISTA DR	5800			Roundabout Related but not at Roundabout	Dry	Dark-Street Lights On	Curb, Raised Traffic Island or Raised Median Curb
City Street	VISTA DR	5700		Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	VISTA DR	2000		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	VISTA DR	2000		Passenger Car	At Driveway	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	VISTA DR	5856		Passenger Car	At Driveway	Dry	Daylight	Entering at angle
City Street	VISTA DR	5600		Passenger Car	At Driveway	Dry	Dusk	Entering at angle
City Street	VISTA DR	5700		Passenger Car	At Driveway	Dry	Daylight	One car entering driveway access
City Street	VISTA DR	5700	4 AV		At Intersection and Related	Dry	Dark-Street Lights On	Vehicle going straight hits pedestrian
City Street	VISTA DR		FERNDALE TERRACE	Passenger Car	Entering Roundabout	Dry	Dark-Street Lights On	Entering at angle
City Street	VISTA DR		MALLOY AV	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Daylight	From same direction - all others
City Street	VISTA DR		MALLOY AV	School Bus	Circulating Roundabout	Dry	Daylight	Wood Sign Post
City Street	VISTA DR		THIRD AV	Passenger Car	At Intersection and Related	Wet	Dark-Street Lights On	Entering at angle
City Street	VISTA DR		THIRD AVE		At Intersection and Related	Wet	Dark-Street Lights Off	Vehicle turning left hits pedestrian
City Street	VISTA DR	5700	THIRD AVE	Passenger Car	At Intersection and Related	Dry	Dark-Street Lights On	Entering at angle
City Street	VISTA DR		WASHINGTON ST	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	VISTA DR		WASHINGTON ST	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	VISTA DR		WASHINGTON ST	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Dusk	Entering at angle
City Street	VISTA DR	5700	WASHINGTON ST	Passenger Car	At Intersection and Related	Snow/Slush	Daylight	Entering at angle
City Street	VISTA DR		WASHINGTON ST	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	VISTA DR	5700	WASHINGTON ST	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From opposite direction - one left turn - one straight
City Street	VISTA DRIVE	6200			Not at Intersection and Not Related	Dry	Dark-Street Lights On	Utility Pole
City Street	W AXTON RD	1400		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From opposite direction - both going straight - sideswipe
City Street	W MAIN ST	1500		Pickup,Panel Truck or Vanette under 10,000 lb	Driveway Related but Not at Driveway	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
City Street	W SMITH RD	1300		Passenger Car	Not at Intersection and Not Related	Dry	Dark-Street Lights On	One parked--one moving
City Street	W SMITH RD			Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	Dry	Daylight	From same direction - both going straight - both moving - rear-end
City Street	W SMITH RD	1400		Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From opposite direction - both moving - head-on
City Street	W SMITH RD	1325			At Driveway but Not Related	Wet	Dark-Street Lights On	Culvert and/or other Appurtenance in Ditch
City Street	W SMITH RD		LABOUNTY DR	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Ice	Daylight	Entering at angle
City Street	W SMITH RD		PACIFIC HWY	Passenger Car	At Intersection and Related	Wet	Daylight	Entering at angle
City Street	W SMITH RD		PACIFIC HWY	Passenger Car	At Intersection and Related	Ice	Daylight	Entering at angle
City Street	W SMITH RD		PACIFIC HWY	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
City Street	W SMITH RD	1400	SHIELDS RD	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Dark-Street Lights On	Entering at angle
City Street	WASHINGTON ST	20000		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dark-Street Lights Off	One parked--one moving
City Street	WASHINGTON ST	1900			Not at Intersection and Not Related	Dry	Daylight	Tree or Stump (stationary)

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 1 (UNIT 2)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO
City Street	PORTAL WY	6000		Other		North	South		
City Street	PORTAL WY	6100		Follow Too Closely	None	North	South	North	Vehicle Stopped
City Street	PORTAL WY	6300		Inattention	None	South	North	South	North
City Street	PORTAL WY	6006		Improper Backing	None	West	Vehicle Backing	West	Vehicle Stopped
City Street	PORTAL WY		BROWN RD	None	Inattention	South	Vehicle Stopped	South	North
City Street	PORTAL WY		ENTERPRISE RD	Did Not Grant RW to Vehicle	None	South	West	North	South
City Street	PORTAL WY		PORTAL WY	Under Influence of Alcohol		North	South		
City Street	PORTAL WY		PORTAL WY	Did Not Grant RW to Vehicle	None	Southeast	West	Northeast	Southeast
City Street	PORTAL WY	6397	WAYNES AUTO	Improper Turn		West	South		
City Street	RIVERSIDE	5631	DAIRY QUEEN			West	Vehicle Stopped	North	South
City Street	RIVERSIDE DR	5600		Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	SEAMOUNT DR	2173		Exceeding Reas. Safe Speed		West	East		
City Street	SEAMOUNT DR		VISTA DR	Improper Turn	None	North	East	East	Vehicle Stopped
City Street	SECOND AV		MAIN ST	Improper Turn		East	North		
City Street	SHANNON AV		MAIN ST	Exceeding Reas. Safe Speed	None	North	East	East	West
City Street	SHANNON AVE	6000		Other		South	North		
City Street	SLATER RD	2300		Follow Too Closely	None	West	East	West	Vehicle Stopped
City Street	SLATER RD	1500		Under Influence of Alcohol	None	West	East	West	East
City Street	SMITH RD		PACIFIC HWY	Did Not Grant RW to Vehicle	None	North	South	East	West
City Street	SOMERSET		PORTAL						
City Street	SPRUCE CRT	2400		Improper Backing		North	Vehicle Backing		
City Street	ST HELLENS CT				Other				
City Street	SUNSHINE DR	2469		Did Not Grant RW to Vehicle	None	North	Vehicle Backing	West	East
City Street	SUNSHINE DR			Other					
City Street	THIRD AVE	5600		Other		East	West		
City Street	THIRD AVE		VISTA DR	None	Did Not Grant RW to Vehicle	West	East	North	South
City Street	THORNTON RD		VISTA DR	Apparently Ill	None	West	East	West	Vehicle Stopped
City Street	THORNTON RD		VISTA DR	Disregard Stop Sign - Flashing Red	None	South	North	West	East
City Street	THORNTON ST	2300		Driver Adjusting Audio or Entertainment		West	East		
City Street	THORTON ST		SUNSHINE DR	Exceeding Reas. Safe Speed		East	West		
City Street	TRIGGWOODS LN		TRIGG RD	Exceeding Reas. Safe Speed		South	West		
City Street	VISTA DR	5800		Under Influence of Alcohol		South	North		
City Street	VISTA DR	5700		Operating Defective Equipment	None	South	Vehicle Stopped	South	North
City Street	VISTA DR	2000		Follow Too Closely	Other	Northeast	Southwest	Northeast	Vehicle Stopped
City Street	VISTA DR	2000		Inattention	None	South	North	South	Vehicle Stopped
City Street	VISTA DR	5856		Did Not Grant RW to Vehicle	None	West	Vehicle Backing	South	North
City Street	VISTA DR	5600		Did Not Grant RW to Vehicle	None	Southwest	Northwest	Southeast	Vehicle Stopped
City Street	VISTA DR	5700		Follow Too Closely	None	North	South	North	Vehicle Stopped
City Street	VISTA DR	5700	4 AV	Fail to Yield Row to Pedestrian		Northwest	Southeast		
City Street	VISTA DR		FERNDALE TERRACE	Did Not Grant RW to Vehicle	None	West	East	North	South
City Street	VISTA DR		MALLOY AV	Improper Backing	None	North	Vehicle Backing	North	Vehicle Stopped
City Street	VISTA DR		MALLOY AV	Apparently Ill	None	South	Northeast	Northwest	Vehicle Stopped
City Street	VISTA DR		THIRD AV	Did Not Grant RW to Vehicle	None	Southwest	Northeast	Northwest	Southeast
City Street	VISTA DR		THIRD AVE	Fail to Yield Row to Pedestrian		Northwest	Northeast		
City Street	VISTA DR	5700	THIRD AVE	Other	None	North	East	West	East
City Street	VISTA DR		WASHINGTON ST	Did Not Grant RW to Vehicle	None	East	South	North	East
City Street	VISTA DR		WASHINGTON ST	Follow Too Closely	None	East	West	East	Vehicle Stopped
City Street	VISTA DR		WASHINGTON ST	Inattention	None	West	North	South	West
City Street	VISTA DR	5700	WASHINGTON ST	Did Not Grant RW to Vehicle	None	North	East	East	South
City Street	VISTA DR		WASHINGTON ST	Did Not Grant RW to Vehicle	None	West	North	North	South
City Street	VISTA DR	5700	WASHINGTON ST	Did Not Grant RW to Vehicle	None	South	West	North	South
City Street	VISTA DRIVE	6200		Under Influence of Alcohol		South	North		
City Street	W AXTON RD	1400		Driver Interacting with Passengers, Anim	None	East	West	West	East
City Street	W MAIN ST	1500		Inattention	None	East	West	East	Vehicle Stopped
City Street	W SMITH RD	1300		Other		East	West		
City Street	W SMITH RD			Follow Too Closely	None	West	East	West	East
City Street	W SMITH RD	1400		Unknown Driver Distraction	None	West	East	East	West
City Street	W SMITH RD	1325		Apparently Asleep		East	West		
City Street	W SMITH RD		LABOUNTY DR	Exceeding Reas. Safe Speed	None	East	North	North	Vehicle Stopped
City Street	W SMITH RD		PACIFIC HWY	Did Not Grant RW to Vehicle	None	South	North	East	West
City Street	W SMITH RD		PACIFIC HWY	Did Not Grant RW to Vehicle	None	South	North	East	West
City Street	W SMITH RD		PACIFIC HWY	Did Not Grant RW to Vehicle	None	North	South	West	East
City Street	W SMITH RD	1400	SHIELDS RD	Disregard Stop Sign - Flashing Red	None	North	East	West	East
City Street	WASHINGTON ST	20000		Under Influence of Alcohol		East	West		
City Street	WASHINGTON ST	1900		Exceeding Reas. Safe Speed		East	West		

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	CITY AND MISC ONLY SECONDARY TRAFFICWAY 1	CITY AND MISC ONLY SECONDARY TRAFFICWAY 2	STATE ROUTE & CO RD MILE POST	A/B	*REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# PEDAL	VEHICLE 1 TYPE
City Street	WASHINGTON ST	1900				N	PORTAL					E046906	3/23/2010	17:13	No Injury	0	0	2			Truck Tractor & Semi-Trailer
City Street	WASHINGTON ST		ALLEY					SECOND AV	PORTAL WY			E046295	3/21/2010	11:30	Possible Injury	1	0	2			Passenger Car
City Street	WASHINGTON ST	2000	THIRD AV									2488043	7/12/2009	21:23	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	WASHINGTON ST		THIRD AV									E039833	1/16/2010	0:01	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	WASHINGTON ST		VISTA DR									E017520	4/7/2009	11:52	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
City Street	WASHTINGTON ST		PORTAL WAY									C699185	1/26/2008	14:30	Evident Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK
City Street	WASHINGTON ST	1900		Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From opposite direction - both going straight - sideswipe
City Street	WASHINGTON ST		ALLEY	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Daylight	From same direction - one left turn - one straight
City Street	WASHINGTON ST	2000	THIRD AV	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Dusk	From same direction - both going straight - both moving - rear-end
City Street	WASHINGTON ST		THIRD AV	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From opposite direction - one left turn - one straight
City Street	WASHINGTON ST		VISTA DR	Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - one right turn - one straight
City Street	WASHTINGTON ST		PORTAL WAY	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Ice	Daylight	From opposite direction - all others

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 1 (UNIT 2)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO
City Street	WASHINGTON ST	1900		Over Center Line	None	North	South	South	North
City Street	WASHINGTON ST		ALLEY	Improper Passing	None	West	East	West	North
City Street	WASHINGTON ST	2000	THIRD AV	Inattention	None	East	West	East	West
City Street	WASHINGTON ST		THIRD AV	Did Not Grant RW to Vehicle	None	East	South	West	East
City Street	WASHINGTON ST		VISTA DR	Improper Signal	Other	West	South	West	Vehicle Stopped
City Street	WASHTINGTON ST		PORTAL WAY			North	South	East	North

JURISDICTION	STATE ROUTE	BLOCK NUMBER	INTERSECT TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	CITY AND MISC ONLY SECONDARY TRAFFICWAY 1	CITY AND MISC ONLY SECONDARY TRAFFICWAY 2	MILE POST	A/B	*REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# PEDAL	VEHICLE 1 TYPE
SR 5 @ AXTON RD Exit 262 (MP 262.08 - 263.03) ***See Interchange Drawing for reference***																					
State Route	5									262.16		E036327	6/20/2009	20:15	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									262.23		2854059	3/28/2008	16:40	Possible Injury	2	0	2			Passenger Car
State Route	5									262.31		2854058	3/28/2008	16:40	No Injury	0	0	2			Not Stated
State Route	5									262.32		3142959	4/3/2010	23:40	No Injury	0	0	1			Passenger Car
State Route	5									262.34		2691822	9/11/2008	6:50	Possible Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									262.35		2876283	3/28/2008	17:42	No Injury	0	0	2			Passenger Car
State Route	5									262.35		3145533	3/18/2009	14:15	No Injury	0	0	2			Passenger Car
State Route	5									262.37		2876894	1/12/2009	7:50	No Injury	0	0	2			Passenger Car
State Route	5									262.37		2876488	1/7/2009	16:49	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									262.42		3143479	3/1/2010	21:06	Evident Injury	2	0	1			Passenger Car
State Route	5									262.47		2876012	4/16/2008	7:45	Evident Injury	1	0	2			Passenger Car
State Route	5									262.47		E046225	3/20/2010	5:20	Evident Injury	1	0	1			Passenger Car
State Route	5									262.48		3145558	3/9/2009	9:30	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									262.50		2736011	10/13/2007	17:12	Possible Injury	2	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									262.54		2876037	1/27/2009	13:04	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									262.55		2854064	4/6/2008	18:50	No Injury	0	0	1			Passenger Car
State Route	5									262.59		2875961	12/28/2007	22:40	No Injury	0	0	2			Truck Tractor & Semi-Trailer
State Route	5									262.65		2530886	12/9/2007	10:05	No Injury	0	0	2			Passenger Car
State Route	5									262.67		3143327	8/10/2010	21:47	Possible Injury	2	0	2			Passenger Car
State Route	5									262.71		3143101	11/25/2009	18:15	No Injury	0	0	2			Passenger Car
State Route	5									262.86		3145322	10/23/2009	7:45	No Injury	0	0	1			Passenger Car
State Route	5									262.87		3142982	11/16/2009	16:10	No Injury	0	0	2			Passenger Car
State Route	5									262.87		2876952	9/26/2008	7:45	No Injury	0	0	3			Passenger Car
State Route	5									262.89		3145350	10/23/2009	16:53	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									262.90		3143027	12/17/2009	16:54	Evident Injury	2	0	2			Passenger Car
State Route	5									262.90		3143610	9/1/2010	20:07	Evident Injury	1	0	1			Passenger Car
State Route	5									262.92		3143603	8/9/2010	6:01	No Injury	0	0	2			Truck - Double Trailer Combinations
State Route	5									263.02		3143582	6/16/2010	17:15	No Injury	0	0	1			Passenger Car
State Route	5									263.03		3143583	6/23/2010	11:25	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									263.03		E013934	1/18/2009	9:20	No Injury	0	0	1			Passenger Car
State Route	005LX26257									0.00		2488154	4/24/2008	17:22	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005LX26257									0.00		2488144	8/15/2008	15:53	No Injury	0	0	3			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005LX26257									0.01		2488485	10/11/2007	14:18	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.01		2488450	11/20/2007	17:42	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.01		E038198	1/4/2010	16:33	No Injury	0	0	3			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005LX26257									0.01		2488078	4/22/2009	16:08	Possible Injury	1	0	2			Truck Tractor & Semi-Trailer
State Route	005LX26257									0.01		2630937	2/6/2009	18:05	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.01		2488406	12/2/2009	18:18	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005LX26257									0.01		2488087	8/5/2009	16:27	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.01		2488402	10/16/2009	16:18	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.01		2488378	8/9/2008	13:54	No Injury	0	0	3			Passenger Car
State Route	005LX26257									0.01		2488046	7/22/2009	13:20	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005LX26257									0.08		E065166	8/25/2010	14:30	Possible Injury	1	0	2			Passenger Car
State Route	005LX26257									0.10		2488350	4/16/2008	15:24	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.10		2630994	2/13/2009	17:53	No Injury	0	0	3			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005LX26257									0.15		E050233	4/23/2010	19:08	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.15		2488028	5/20/2009	11:25	No Injury	0	0	3			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005LX26257									0.15		2488487	11/21/2007	17:51	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.15		2630942	3/1/2009	10:28	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.16		2488395	10/7/2008	15:17	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.16		2488379	8/21/2008	0:16	No Injury	0	0	2			Not Stated
State Route	005LX26257									0.16		2630965	10/12/2009	16:16	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.16		2488495	12/11/2007	17:22	Evident Injury	1	0	2			Passenger Car
State Route	005LX26257									0.16		2488449	11/13/2007	20:31	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.16		E059087	7/12/2010	0:01	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005LX26257									0.16		2488408	12/3/2009	18:48	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.16		2630961	10/10/2009	17:07	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.16		E048653	4/10/2010	17:55	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.16		2488083	5/4/2009	21:31	No Injury	0	0	2			Passenger Car

JURISDICTION	STATE ROUTE	BLOCK NUMBER	INTERSECT TRAFFICWAY	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK
SR 5 @ AXTON RD Exit 262 (MP 262.08 - 26								
State Route	5			Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - both moving - sideswipe
State Route	5			Passenger Car	At Intersection and Related	Wet	Daylight	From same direction - both going straight - both moving - rear-end
State Route	5			Passenger Car	At Intersection and Related	Wet	Daylight	From same direction - both going straight - both moving - rear-end
State Route	5				Not at Intersection and Not Related	Dry	Dark-No Street Lights	Roadway Ditch
State Route	5				Not at Intersection and Not Related	Dry	Dawn	Fence
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	5			Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - both moving - sideswipe
State Route	5			Passenger Car	Not at Intersection and Not Related	Wet	Daylight	From same direction - both going straight - both moving - rear-end
State Route	5				Not at Intersection and Not Related	Wet	Dark-No Street Lights	Vehicle overturned
State Route	5				Not at Intersection and Not Related	Dry	Dark-Street Lights On	Tree or Stump (stationary)
State Route	5			Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	5				Not at Intersection and Not Related	Dry	Dark-Street Lights On	Vehicle overturned
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Snow/Slush	Daylight	From same direction - all others
State Route	5			Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - all others
State Route	5			Truck Tractor & Semi-Trailer	Not at Intersection and Not Related	Snow/Slush	Daylight	From same direction - all others
State Route	5				Not at Intersection and Not Related	Dry	Daylight	Cable Barrier
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe
State Route	5				Not at Intersection and Not Related	Ice	Daylight	Cable Barrier
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dark-Street Lights On	From same direction - both going straight - both moving - sideswipe
State Route	5			Truck Tractor & Semi-Trailer	At Intersection and Related	Wet	Dusk	From same direction - both going straight - both moving - sideswipe
State Route	5				Not at Intersection and Not Related	Wet	Daylight	Earth Bank or Ledge
State Route	5			Passenger Car	Not at Intersection and Not Related	Wet	Dusk	From same direction - both going straight - both moving - rear-end
State Route	5			Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - both moving - rear-end
State Route	5				Not at Intersection and Not Related	Wet	Daylight	Cable Barrier
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end
State Route	5				At Intersection and Not Related	Dry	Dusk	Vehicle overturned
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - both moving - sideswipe
State Route	5				At Intersection and Not Related	Dry	Daylight	Other object
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	Vehicle overturned
State Route	5				Not at Intersection and Not Related	Ice	Daylight	Cable Barrier
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Dark-Street Lights On	From same direction - both going straight - both moving - rear-end
State Route	005LX26257			Passenger Car	At Intersection and Related	Wet	Dusk	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Passenger Car	At Intersection and Related	Dry	Daylight	From opposite direction - one left turn - one straight
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Passenger Car	At Intersection and Related	Dry	Unknown	From opposite direction - one left turn - one straight
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Daylight	From same direction - one left turn - one straight
State Route	005LX26257			Passenger Car	At Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Passenger Car	Intersection Related but Not at Intersection	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dark-No Street Lights	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Passenger Car	At Intersection and Related	Wet	Daylight	From opposite direction - one left turn - one straight
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Truck Tractor & Semi-Trailer	At Intersection and Related	Wet	Dark-Street Lights On	Same direction -- both turning left -- both moving -- sideswipe
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
State Route	005LX26257			Passenger Car	At Intersection and Related	Dry	Daylight	From opposite direction - one left turn - one straight
State Route	005LX26257			Passenger Car	At Intersection and Related	Wet	Dark-Street Lights On	Entering at angle
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Dark-No Street Lights	From opposite direction - one left turn - one straight
State Route	005LX26257			Passenger Car	At Intersection and Related	Dry	Unknown	From same direction - all others
State Route	005LX26257			Passenger Car	At Intersection and Related	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From opposite direction - one left turn - one straight
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Dark-Street Lights On	From opposite direction - one left turn - one right turn

JURISDICTION	STATE ROUTE	BLOCK NUMBER	INTERSECT TRAFFICWAY	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 1 (UNIT 2)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO
SR 5 @ AXTON RD Exit 262 (MP 262.08 - 26									
State Route	5			Under Influence of Alcohol	None	South	North	South	North
State Route	5			Did Not Grant RW to Vehicle	None	North	South	North	South
State Route	5			Did Not Grant RW to Vehicle	None	North	South	North	South
State Route	5			Exceeding Stated Speed Limit		South	North		
State Route	5			Apparently Ill		South	North		
State Route	5			Exceeding Reas. Safe Speed	None	North	South	North	Vehicle Stopped
State Route	5			None	Driver Distractions Outside Vehicle	Northwest	Southeast	Northwest	Southeast
State Route	5			Exceeding Reas. Safe Speed	None	North	South	North	South
State Route	5			Other		South	North		
State Route	5			Under Influence of Alcohol		Southeast	Northwest		
State Route	5			Other	Operating Defective Equipment	North	South	North	Vehicle Stopped
State Route	5			Under Influence of Alcohol		Southeast	Northwest		
State Route	5			Other	Other	North	South	North	South
State Route	5			Operating Defective Equipment	None	North	South	North	South
State Route	5			Exceeding Reas. Safe Speed	None	South	North	South	North
State Route	5			Other		North	South		
State Route	5			Did Not Grant RW to Vehicle	None	South	North	South	North
State Route	5			Exceeding Reas. Safe Speed		North	South		
State Route	5			Exceeding Reas. Safe Speed	None	Southeast	Northwest	Southeast	Northwest
State Route	5			Did Not Grant RW to Vehicle	None	Southeast	North	South	North
State Route	5			Exceeding Reas. Safe Speed		North	South		
State Route	5			Follow Too Closely	None	North	South	North	South
State Route	5			Follow Too Closely	None	North	South	North	South
State Route	5			Exceeding Reas. Safe Speed		North	South		
State Route	5			Did Not Grant RW to Vehicle	None	Southeast	Northwest	Southeast	Northwest
State Route	5			None		Southeast	Northwest		
State Route	5			Did Not Grant RW to Vehicle	None	Northwest	Southeast	Northwest	Southeast
State Route	5			None		Southeast	Northwest		
State Route	5			Exceeding Reas. Safe Speed	None	South	North	South	North
State Route	5			Inattention		North	South		
State Route	005LX26257			Follow Too Closely	None	West	East	West	Vehicle Stopped
State Route	005LX26257			Follow Too Closely	None	Northeast	Southwest	Northeast	Vehicle Stopped
State Route	005LX26257			Disregard Stop and Go Light	None	East	West	North	East
State Route	005LX26257			Follow Too Closely	None	East	West	East	West
State Route	005LX26257			Follow Too Closely	None	Southwest	Northeast	Southwest	Vehicle Stopped
State Route	005LX26257			Improper Turn	None	Northeast	Southeast	Southwest	Vehicle Stopped
State Route	005LX26257			Follow Too Closely	None	Southwest	Northeast	Southwest	Vehicle Stopped
State Route	005LX26257			Did Not Grant RW to Vehicle	None	East	South	West	East
State Route	005LX26257			Follow Too Closely	None	Southwest	Northeast	Southwest	Vehicle Stopped
State Route	005LX26257			Improper Turn	None	East	South	East	Vehicle Stopped
State Route	005LX26257			Driver Interacting with Passengers, Anim	None	Northeast	Southwest	Northeast	Vehicle Stopped
State Route	005LX26257			Follow Too Closely	None	East	West	East	Vehicle Stopped
State Route	005LX26257			Inattention	None	Northeast	Southwest	Northeast	Vehicle Stopped
State Route	005LX26257			Follow Too Closely	None	West	East	West	Vehicle Stopped
State Route	005LX26257			Under Influence of Alcohol	None	West	East	West	Vehicle Stopped
State Route	005LX26257			Did Not Grant RW to Vehicle	None	South	West	North	South
State Route	005LX26257			Follow Too Closely	None	Northeast	Southwest	Northeast	Vehicle Stopped
State Route	005LX26257			Improper Turn	None	Northwest	Northeast	Northwest	Northeast
State Route	005LX26257			Other	Other	West	East	North	South
State Route	005LX26257			Did Not Grant RW to Vehicle	None	North	East	South	North
State Route	005LX26257			Improper Turn	None	West	South	South	West
State Route	005LX26257			Follow Too Closely	None	Southwest	Northeast	Southwest	Vehicle Stopped
State Route	005LX26257			Under Influence of Drugs	None	Southeast	Northwest	Southeast	Vehicle Stopped
State Route	005LX26257			Did Not Grant RW to Vehicle	None	West	North	East	West
State Route	005LX26257			Improper Backing	None	Northeast	Vehicle Backing	Northeast	Vehicle Stopped
State Route	005LX26257			Other Driver Distractions Inside Vehicle	None	West	East	West	Vehicle Stopped
State Route	005LX26257			Inattention	None	Northeast	Southwest	Northeast	Vehicle Stopped
State Route	005LX26257			Did Not Grant RW to Vehicle	None	Northwest	Northeast	Southeast	Northwest
State Route	005LX26257			Did Not Grant RW to Vehicle	None	Southeast	Southwest	Northwest	Southwest

JURISDICTION	STATE ROUTE	BLOCK NUMBER	INTERSECT TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	CITY AND MISC ONLY SECONDARY TRAFFICWAY 1	CITY AND MISC ONLY SECONDARY TRAFFICWAY 2	MILE POST	A/B	*REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# PEDAL	VEHICLE 1 TYPE
State Route	005LX26257									0.16		2876407	5/3/2008	15:05	Possible Injury	1	0	2			Passenger Car
State Route	005LX26257									0.16		2488175	6/24/2008	10:39	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.16		2488094	11/21/2009	18:59	No Injury	0	0	2			Passenger Car
State Route	005LX26257									0.16		2488047	7/26/2009	22:50	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005LX26257									0.16		E058922	7/10/2010	11:05	No Injury	0	0	2			Truck Tractor & Semi-Trailer
State Route	005LX26257									0.16		2488149	10/5/2008	12:41	Possible Injury	3	0	2			Passenger Car
State Route	005LX26257									0.16		E029512	10/14/2009	17:23	Possible Injury	1	0	2			Passenger Car
State Route	005P526239									0.14		2876885	12/5/2008	16:55	Possible Injury	1	0	3			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005P526239									0.22		3145391	12/24/2009	0:57	Possible Injury	1	0	1			Passenger Car
State Route	005P526239									0.30		3143557	9/29/2010	12:35	No Injury	0	0	2			Passenger Car
State Route	005P526239									0.30		E052220	5/13/2010	16:44	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005P526239									0.30		E056831	6/21/2010	17:50	No Injury	0	0	1			Truck Tractor & Semi-Trailer
State Route	005Q126302									0.06		E007743	9/7/2008	13:30	No Injury	0	0	2			Passenger Car
State Route	005Q126302									0.09		2876193	8/7/2010	17:35	Possible Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005S126209									0.00		2630982	11/22/2008	2:05	No Injury	0	0	1			Passenger Car
SR 5 @ SLATER RD Exit 260 (mp 259.70 - 260.57) ***See Interchange Drawing for reference***																					
State Route	5									259.73		3145679	10/9/2009	1:50	No Injury	0	0	1			Passenger Car
State Route	5									259.83		3145265	9/3/2009	18:10	No Injury	0	0	2			Passenger Car
State Route	5									259.88		2876867	10/13/2008	7:46	Possible Injury	3	0	2			Passenger Car
State Route	5									259.91		2693195	12/22/2007	22:25	Possible Injury	2	0	2			Not Stated
State Route	5									259.93		2876650	12/1/2007	11:10	Evident Injury	1	0	2			Passenger Car
State Route	5									259.97		2875950	12/17/2008	10:58	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									259.98		3145081	7/11/2009	14:06	Possible Injury	1	0	2			Passenger Car
State Route	5									259.98		3145108	12/26/2008	13:20	No Injury	0	0	1			Passenger Car
State Route	5									259.98		3145107	12/26/2008	11:50	Possible Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									260.00		2735998	10/29/2007	7:53	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									260.00		2736048	7/15/2008	16:00	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									260.02		2876033	1/12/2009	10:42	No Injury	0	0	2			Passenger Car
State Route	5									260.02		3145106	12/26/2008	11:30	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									260.03		2854062	3/28/2008	17:44	No Injury	0	0	1			Passenger Car
State Route	5									260.11		2876341	7/22/2008	16:35	No Injury	0	0	2			Passenger Car
State Route	5									260.12		E066122	7/8/2010	16:30	Evident Injury	1	0	1			Motorcycle
State Route	5									260.12		E068625	9/11/2010	12:20	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									260.12		3145724	8/25/2009	9:16	Possible Injury	1	0	2			Passenger Car
State Route	5									260.13		3145238	10/17/2009	6:05	Possible Injury	3	0	1			Passenger Car
State Route	5									260.13		2876970	12/7/2008	12:28	Evident Injury	1	0	1			Passenger Car
State Route	5									260.13		E009291	10/23/2008	20:45	Possible Injury	1	0	2			Passenger Car
State Route	5									260.14		3456679	12/15/2009	2:51	Evident Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									260.14		2877037	11/14/2008	12:10	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									260.16		3027827	2/26/2009	12:05	No Injury	0	0	1			Passenger Car
State Route	5									260.18		3145584	3/9/2009	8:40	No Injury	0	0	1			Truck Tractor & Semi-Trailer
State Route	5									260.23		2876195	7/8/2010	16:30	Possible Injury	1	0	2			Truck Tractor & Semi-Trailer
State Route	5									260.38		2877060	3/9/2009	6:15	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									260.50		2876484	12/21/2008	16:40	Possible Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	5									260.53		3143510	5/24/2010	15:15	No Injury	0	0	2			Passenger Car
State Route	5									260.57		2736092	3/19/2008	14:42	Serious Injury	1	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005LX26013									0.03		2877304	7/16/2009	11:48	No Injury	0	0	1			Passenger Car
State Route	005LX26013									0.03		2528216	12/19/2007	14:15	No Injury	0	0	2			Passenger Car
State Route	005LX26013									0.03		2684044	9/26/2008	22:30	Possible Injury	1	0	3			Passenger Car
State Route	005LX26013									0.03		E058552	7/6/2010	17:48	No Injury	0	0	2			Truck (Flatbad,Van,etc)
State Route	005LX26013									0.03		2684430	10/16/2008	16:08	Possible Injury	1	0	2			Passenger Car
State Route	005LX26013									0.03		E060594	7/4/2010	22:30	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005LX26013									0.03		3146205	12/3/2008	16:22	No Injury	0	0	2			Passenger Car
State Route	005LX26013									0.03		2876493	1/16/2009	7:45	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005LX26013									0.22		2531371	6/23/2008	15:23	Possible Injury	1	0	2			Truck (Flatbad,Van,etc)
State Route	005LX26013									0.22		2531404	4/13/2010	16:34	No Injury	0	0	2			Passenger Car
State Route	005LX26013									0.22		2736075	2/5/2008	16:35	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005P125985									0.12		3143478	2/19/2010	1:55	No Injury	0	0	1			Passenger Car
State Route	005P125985									0.14		3142988	2/8/2010	13:30	Evident Injury	2	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005P125985									0.27		3143591	8/13/2010	12:10	Possible Injury	2	0	2			Pickup,Panel Truck or Vanette under 10,000 lb

JURISDICTION	STATE ROUTE	BLOCK NUMBER	INTERSECT TRAFFICWAY	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK
State Route	005LX26257			Passenger Car	At Intersection and Related	Dry	Daylight	From opposite direction - one left turn - one straight
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - sideswipe
State Route	005LX26257			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Dark-Street Lights On	From opposite direction - one left turn - one straight
State Route	005LX26257				At Intersection and Related	Dry	Dark-Street Lights On	Traffic Signal Pole or Box
State Route	005LX26257			Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - one right turn - one straight
State Route	005LX26257			Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
State Route	005LX26257			Not Stated	At Intersection and Not Related	Wet	Daylight	From same direction - both going straight - both moving - rear-end
State Route	005P526239			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end
State Route	005P526239				Not at Intersection and Not Related	Dry	Dark-Street Lights On	Vehicle overturned
State Route	005P526239			Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005P526239			Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005P526239				At Intersection and Related	Dry	Daylight	Guardrail - Face
State Route	005Q126302			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005Q126302				Not at Intersection and Not Related	Wet	Daylight	Vehicle overturned
State Route	005S126209				Not at Intersection and Not Related	Wet	Dark-Street Lights On	Guardrail - Face
SR 5 @ SLATER RD Exit 260 (mp 259.70 - 2								
State Route	5				Not at Intersection and Not Related	Dry	Dark-No Street Lights	Vehicle Strikes Deer
State Route	5			Truck Tractor & Semi-Trailer	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - both moving - rear-end
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Wet	Daylight	From same direction - both going straight - both moving - rear-end
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Dark-No Street Lights	From same direction - all others
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Not Related	Snow/Slush	Daylight	From same direction - all others
State Route	5				Not at Intersection and Not Related	Snow/Slush	Daylight	Wood Sign Post
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - both moving - rear-end
State Route	5				Not at Intersection and Not Related	Snow/Slush	Daylight	Vehicle overturned
State Route	5				Not at Intersection and Not Related	Snow/Slush	Daylight	Earth Bank or Ledge
State Route	5			Passenger Car	Not at Intersection and Not Related	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Wet	Daylight	One parked--one moving
State Route	5				Not at Intersection and Not Related	Snow/Slush	Daylight	Roadway Ditch
State Route	5				Not at Intersection and Not Related	Wet	Daylight	Construction Materials
State Route	5			Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - both moving - rear-end
State Route	5				Not at Intersection and Not Related	Dry	Daylight	Vehicle overturned
State Route	5			Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	5			Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - both moving - rear-end
State Route	5				Not at Intersection and Not Related	Standing Water	Dark-No Street Lights	Vehicle overturned
State Route	5				Not at Intersection and Not Related	Wet	Daylight	Vehicle overturned
State Route	5			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end
State Route	5				Not at Intersection and Not Related	Ice	Dark-No Street Lights	Vehicle overturned
State Route	5				Not at Intersection and Not Related	Dry	Daylight	Roadway Ditch
State Route	5				Not at Intersection and Not Related	Snow/Slush	Daylight	All other non-collision
State Route	5				Not at Intersection and Not Related	Snow/Slush	Daylight	All other non-collision
State Route	5			Passenger Car	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	5				At Intersection and Not Related	Snow/Slush	Dark-No Street Lights	Roadway Ditch
State Route	5				Not at Intersection and Not Related	Snow/Slush	Dark-Street Lights On	Vehicle overturned
State Route	5			Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - all others
State Route	5				Not at Intersection and Not Related	Dry	Daylight	Vehicle overturned
State Route	005LX26013				At Intersection and Not Related	Dry	Daylight	Other object
State Route	005LX26013			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005LX26013			Passenger Car	At Intersection and Related	Dry	Dark-Street Lights On	From same direction - both going straight - both moving - rear-end
State Route	005LX26013			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
State Route	005LX26013			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
State Route	005LX26013			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end
State Route	005LX26013			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Dusk	Entering at angle
State Route	005LX26013			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Daylight	From opposite direction - one left turn - one straight
State Route	005LX26013			Passenger Car	At Intersection and Related	Dry	Daylight	Same direction -- both turning right -- both moving -- rear end
State Route	005LX26013			Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
State Route	005LX26013			Truck Tractor & Semi-Trailer	At Intersection and Related	Dry	Daylight	Entering at angle
State Route	005P125985				Not at Intersection and Not Related	Dry	Dark-No Street Lights	Wood Sign Post
State Route	005P125985				Not at Intersection and Not Related	Dry	Daylight	Fence
State Route	005P125985			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end

JURISDICTION	STATE ROUTE	BLOCK NUMBER	INTERSECT TRAFFICWAY	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 1 (UNIT 2)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO
State Route	005LX26257			Disregard Stop and Go Light	None	West	North	East	West
State Route	005LX26257			Did Not Grant RW to Vehicle	None	West	East	West	Vehicle Stopped
State Route	005LX26257			Did Not Grant RW to Vehicle	None	Southwest	Northwest	Northeast	Southwest
State Route	005LX26257			Improper Turn		West	North		
State Route	005LX26257			Improper Turn	None	West	South	West	Vehicle Stopped
State Route	005LX26257			Disregard Stop and Go Light	None	Southwest	Northeast	Southeast	Southwest
State Route	005LX26257			Follow Too Closely	Other	East	West	East	West
State Route	005P526239			Exceeding Reas. Safe Speed	None	South	North	South	Vehicle Stopped
State Route	005P526239			Under Influence of Alcohol		Southeast	North		
State Route	005P526239			Follow Too Closely	None	North	South	North	Vehicle Stopped
State Route	005P526239			Follow Too Closely	None	North	South	North	Vehicle Stopped
State Route	005P526239			Improper Turn		North	West		
State Route	005Q126302			Other	None	Southeast	Northwest	Southeast	Vehicle Stopped
State Route	005Q126302			Operating Defective Equipment		East	West		
State Route	005S126209			Exceeding Reas. Safe Speed		West	Southeast		
SR 5 @ SLATER RD Exit 260 (mp 259.70 - 2									
State Route	5			None		South	North		
State Route	5			Exceeding Reas. Safe Speed	None	South	North	South	North
State Route	5			Follow Too Closely	None	North	South	North	South
State Route	5			Did Not Grant RW to Vehicle	None	Northwest	South	North	South
State Route	5			Exceeding Reas. Safe Speed	None	North	South	North	South
State Route	5			Exceeding Reas. Safe Speed		Southwest	Northeast		
State Route	5			Exceeding Reas. Safe Speed	None	South	North	South	North
State Route	5			Exceeding Reas. Safe Speed		South	North		
State Route	5			Exceeding Reas. Safe Speed		Southeast	Northwest		
State Route	5			Exceeding Reas. Safe Speed	None	North	South	North	Vehicle Stopped
State Route	5			Exceeding Reas. Safe Speed	None	Southeast	Northwest	Southeast	Vehicle Stopped
State Route	5			Improper Parking Location	None			North	South
State Route	5			Exceeding Reas. Safe Speed		North	South		
State Route	5			Exceeding Reas. Safe Speed		South	North		
State Route	5			Follow Too Closely	None	South	North	South	North
State Route	5			Exceeding Reas. Safe Speed		North	South		
State Route	5			Exceeding Reas. Safe Speed	None	North	South	North	Vehicle Stopped
State Route	5			Exceeding Reas. Safe Speed	None	North	South	North	South
State Route	5			Exceeding Reas. Safe Speed		Southeast	Northwest		
State Route	5			Follow Too Closely		Northwest	Southeast		
State Route	5			Exceeding Stated Speed Limit	None	South	North	South	North
State Route	5			Exceeding Stated Speed Limit		South	North		
State Route	5			Other		North	South		
State Route	5			None		South	North		
State Route	5			Exceeding Reas. Safe Speed		North	South		
State Route	5			Follow Too Closely	None	North	South	North	Vehicle Stopped
State Route	5			Exceeding Reas. Safe Speed		South	North		
State Route	5			Exceeding Reas. Safe Speed		South	North		
State Route	5			Did Not Grant RW to Vehicle	None	Southeast	Northwest	Southeast	Northwest
State Route	5			Apparently Asleep		South	North		
State Route	005LX26013			None		East	West		
State Route	005LX26013			Exceeding Reas. Safe Speed	None	Northeast	Southwest	Northeast	Vehicle Stopped
State Route	005LX26013			Under Influence of Alcohol	None	East	West	East	West
State Route	005LX26013			Did Not Grant RW to Vehicle	None	North	South	West	East
State Route	005LX26013			Did Not Grant RW to Vehicle	None	North	East	East	West
State Route	005LX26013			Exceeding Reas. Safe Speed	None	East	West	East	Vehicle Stopped
State Route	005LX26013			Did Not Grant RW to Vehicle	None	North	East	West	East
State Route	005LX26013			Did Not Grant RW to Vehicle	None	East	South	West	East
State Route	005LX26013			Exceeding Reas. Safe Speed	None	South	East	South	East
State Route	005LX26013			Did Not Grant RW to Vehicle	None	South	West	East	West
State Route	005LX26013			Under Influence of Alcohol	None	South	West	West	East
State Route	005P125985			Under Influence of Alcohol		Southeast	Northwest		
State Route	005P125985			Apparently Ill		Southeast	Northwest		
State Route	005P125985			Exceeding Reas. Safe Speed	None	South	North	South	Vehicle Stopped

JURISDICTION	STATE ROUTE	BLOCK NUMBER	INTERSECT TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	CITY AND MISC ONLY SECONDARY TRAFFICWAY 1	CITY AND MISC ONLY SECONDARY TRAFFICWAY 2	MILE POST	A/B	*REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# PEDAL	VEHICLE 1 TYPE
State Route	005P125985									0.27		2691809	4/29/2008	16:18	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005P125985									0.27		E007748	9/9/2008	10:45	Possible Injury	2	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005Q126056									0.01		C706256	6/4/2008	17:10	Possible Injury	2	0	2			Passenger Car
State Route	005Q126056									0.02		3143588	8/7/2010	13:10	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005Q126056									0.25		2877113	7/21/2008	23:35	Possible Injury	1	0	2			Motorcycle
State Route	005Q126056									0.43		E036326	12/13/2009	10:18	No Injury	0	0	1			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005R126047									0.20		E032207	11/1/2009	16:13	No Injury	0	0	1			Passenger Car
State Route	005R126047									0.27		2876435	7/8/2008	15:15	No Injury	0	0	2			Passenger Car
State Route	005R126047									0.27		3142956	12/8/2009	0:20	No Injury	0	0	1			Passenger Car
State Route	005R126047									0.27		3144437	5/14/2010	15:54	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	005S125971									0.02		2683882	2/9/2008	3:55	No Injury	0	0	1			Passenger Car
State Route	005S125971									0.03		3143111	5/9/2010	10:50	No Injury	0	0	2			Passenger Car

SR 539 @ SMITH RD (MP 3.54 - 3.56)

JURISDICTION	STATE ROUTE	BLOCK NUMBER	INTERSECT TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	CITY AND MISC ONLY SECONDARY TRAFFICWAY 1	CITY AND MISC ONLY SECONDARY TRAFFICWAY 2	MILE POST	A/B	*REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# PEDAL	VEHICLE 1 TYPE
State Route	539									3.46		2876000	3/14/2008	13:25	Possible Injury	3	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		2876057	1/24/2008	10:40	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		3143108	5/26/2010	5:00	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		2877094	11/2/2008	12:40	Evident Injury	2	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		2876329	3/10/2008	11:15	No Injury	0	0	2			Passenger Car
State Route	539									3.50		E035823	12/12/2009	17:00	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		E018105	4/14/2009	7:45	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		2736012	10/18/2007	14:55	No Injury	0	0	2			Passenger Car
State Route	539									3.50		2683486	2/23/2008	14:46	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		3143125	2/14/2010	10:49	No Injury	0	0	2			Passenger Car
State Route	539									3.50		3143134	4/16/2010	16:50	No Injury	0	0	1			Passenger Car
State Route	539									3.50		2683445	6/20/2008	12:58	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		3145664	6/30/2009	13:04	No Injury	0	0	2			Passenger Car
State Route	539									3.50		E008478	9/30/2008	9:20	No Injury	0	0	2			Passenger Car
State Route	539									3.50		C710608	9/22/2008	17:44	Unknown	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		3456681	12/31/2009	17:43	No Injury	0	0	2			Passenger Car
State Route	539									3.50		3143579	5/28/2010	0:15	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		3144890	6/23/2009	16:28	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		3145527	1/23/2009	15:30	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		3145127	1/18/2009	17:50	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.50		3144956	3/24/2010	15:12	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									3.55		2875861	11/11/2007	15:45	Possible Injury	1	0	2			Passenger Car
State Route	539									3.55		2875925	4/13/2008	11:46	Possible Injury	3	0	2			Pickup,Panel Truck or Vanette under 10,000 lb

SR 539 @ AXTON RD (MP 4.44 - 4.53)

JURISDICTION	STATE ROUTE	BLOCK NUMBER	INTERSECT TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	CITY AND MISC ONLY SECONDARY TRAFFICWAY 1	CITY AND MISC ONLY SECONDARY TRAFFICWAY 2	MILE POST	A/B	*REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# PEDAL	VEHICLE 1 TYPE
State Route	539									4.50		2736068	12/10/2007	13:25	Possible Injury	2	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									4.50		2876173	3/4/2010	10:00	No Injury	0	0	2			Passenger Car
State Route	539									4.50		2876380	6/10/2008	13:40	No Injury	0	0	2			Passenger Car
State Route	539									4.50		2876466	5/20/2008	5:30	Evident Injury	2	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									4.50		2876686	1/9/2009	15:15	No Injury	0	0	2			Passenger Car
State Route	539									4.50		3143306	9/5/2010	12:27	No Injury	0	0	2			Passenger Car
State Route	539									4.50		3145049	6/12/2009	15:05	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									4.50		3145270	12/13/2009	14:00	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									4.50		3145303	6/22/2009	13:05	No Injury	0	0	2			Passenger Car
State Route	539									4.50		3145359	12/17/2009	15:20	No Injury	0	0	2			Passenger Car
State Route	539									4.50		3145537	3/24/2009	11:15	No Injury	0	0	2			Passenger Car
State Route	539									4.50		3407936	4/22/2010	12:10	Possible Injury	3	0	3			Truck Tractor & Semi-Trailer
State Route	539									4.50		E018627	4/20/2009	8:00	No Injury	0	0	2			Passenger Car
State Route	539									4.50		E021145	6/4/2009	17:45	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
State Route	539									4.50		E057317	6/25/2010	12:35	Possible Injury	2	0	2			Passenger Car

JURISDICTION	STATE ROUTE	BLOCK NUMBER	INTERSECT TRAFFICWAY	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK
State Route	005P125985			Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005P125985			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005Q126056			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005Q126056			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Daylight	From same direction - both going straight - both moving - sideswipe
State Route	005Q126056			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Dark-Street Lights On	From same direction - both going straight - both moving - rear-end
State Route	005Q126056				At Intersection and Not Related	Snow/Slush	Daylight	Street Light Pole or Base
State Route	005R126047				Not at Intersection and Not Related	Dry	Daylight	Guardrail - Leading End
State Route	005R126047			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - sideswipe
State Route	005R126047				At Intersection and Not Related	Dry	Dark-Street Lights On	Street Light Pole or Base
State Route	005R126047			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	005S125971				Intersection Related but Not at Intersection	Wet	Dark-No Street Lights	Roadway Ditch
State Route	005S125971			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Daylight	From same direction - both going straight - both moving - sideswipe
SR 539 @ SMITH RD (MP 3.54 - 3.56)								
State Route	539			Bus or Motor Stage	Intersection Related but Not at Intersection	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway within Major Intersection	Wet	Dawn	Entering at angle
State Route	539			Passenger Car	At Intersection and Related	Wet	Daylight	Entering at angle
State Route	539			Passenger Car	Driveway Related but Not at Driveway	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Dark-Street Lights Off	From same direction - both going straight - one stopped - rear-end
State Route	539			Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
State Route	539			Passenger Car	At Driveway within Major Intersection	Wet	Daylight	One car leaving driveway access
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Passenger Car	At Intersection and Related	Wet	Daylight	From same direction - both going straight - both moving - rear-end
State Route	539				At Intersection and Related	Dry	Daylight	Curb, Raised Traffic Island or Raised Median Curb
State Route	539			Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - both moving - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Dark-Street Lights On	Entering at angle
State Route	539			Passenger Car	At Driveway within Major Intersection	Wet	Dark-Street Lights On	From same direction - one left turn - one straight
State Route	539			Passenger Car	At Driveway within Major Intersection	Dry	Daylight	From same direction - one left turn - one straight
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - both moving - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Dark-No Street Lights	From same direction - both going straight - one stopped - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway within Major Intersection	Dry	Daylight	Entering at angle
State Route	539			Passenger Car	Intersection Related but Not at Intersection	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Passenger Car	Driveway Related but Not at Driveway	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
SR 539 @ AXTON RD (MP 4.44 - 4.53)								
State Route	539			Passenger Car	At Intersection and Related	Dry	Daylight	From opposite direction - one left turn - one straight
State Route	539			Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Truck & Trailer	At Intersection and Related	Dry	Daylight	Entering at angle
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Dawn	Entering at angle
State Route	539			Passenger Car	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Snow/Slush	Daylight	Entering at angle
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Not Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
State Route	539			Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
State Route	539			Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle

JURISDICTION	STATE ROUTE	BLOCK NUMBER	INTERSECT TRAFFICWAY	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 1 (UNIT 2)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO
State Route	005P125985			Exceeding Reas. Safe Speed	None	South	North	South	Vehicle Stopped
State Route	005P125985			Exceeding Reas. Safe Speed	None	Southeast	Northwest	Southeast	Vehicle Stopped
State Route	005Q126056					South	Vehicle Stopped	South	Northwest
State Route	005Q126056			Did Not Grant RW to Vehicle	None	Southwest	Northeast	Southwest	Northeast
State Route	005Q126056			Follow Too Closely	None	Southeast	Northwest	Southeast	Northwest
State Route	005Q126056			Exceeding Reas. Safe Speed		Southeast	Northwest		
State Route	005R126047			Unknown Driver Distraction		North	South		
State Route	005R126047			None	Improper Passing	North	Vehicle Stopped	North	Southwest
State Route	005R126047			Under Influence of Alcohol		Northwest	Southeast		
State Route	005R126047			Follow Too Closely	None	North	West	North	Vehicle Stopped
State Route	005S125971			Under Influence of Alcohol		Northwest	South		
State Route	005S125971			Other	None	Northwest	Southeast	Northwest	Southeast

SR 539 @ SMITH RD (MP 3.54 - 3.56)

State Route	539			Driver Distractions Outside Vehicle	None	South	North	South	Vehicle Stopped
State Route	539			Exceeding Reas. Safe Speed	None	North	South	North	Vehicle Stopped
State Route	539			Did Not Grant RW to Vehicle	None	South	West	West	East
State Route	539			Did Not Grant RW to Vehicle	None	West	North	North	South
State Route	539			Unknown Driver Distraction	None	North	South	North	Vehicle Stopped
State Route	539			Exceeding Reas. Safe Speed	None	South	North	South	Vehicle Stopped
State Route	539			Disregard Stop and Go Light	None	East	South	North	South
State Route	539			Did Not Grant RW to Vehicle	None	East	South	South	North
State Route	539			Exceeding Reas. Safe Speed	None	East	West	East	Vehicle Stopped
State Route	539			Exceeding Reas. Safe Speed	None	South	North	South	North
State Route	539			Exceeding Reas. Safe Speed		South	West		
State Route	539			Exceeding Reas. Safe Speed	None	South	North	South	Vehicle Stopped
State Route	539			Operating Defective Equipment	None	South	North	South	North
State Route	539			Follow Too Closely	None	North	South	North	Vehicle Stopped
State Route	539					East	Vehicle Stopped	East	West
State Route	539			Improper Turn	None	South	East	East	Vehicle Stopped
State Route	539			Under Influence of Alcohol	None	North	East	North	South
State Route	539			Improper Turn	None	East	South	East	West
State Route	539			Exceeding Reas. Safe Speed	None	South	North	South	North
State Route	539			Follow Too Closely	None	South	North	South	Vehicle Stopped
State Route	539			None	Did Not Grant RW to Vehicle	East	West	South	West
State Route	539			Driver Operating Handheld Telecommunic	None	North	South	North	Vehicle Stopped
State Route	539			Follow Too Closely	None	South	North	South	Vehicle Stopped

SR 539 @ AXTON RD (MP 4.44 - 4.53)

State Route	539			Did Not Grant RW to Vehicle	None	South	West	North	South
State Route	539			Exceeding Reas. Safe Speed	None	South	North	South	Vehicle Stopped
State Route	539			Disregard Stop and Go Light	None	West	South	North	South
State Route	539			Improper Passing	None	North	South	East	West
State Route	539			Exceeding Reas. Safe Speed	None	South	North	South	Vehicle Stopped
State Route	539			Exceeding Reas. Safe Speed	None	North	South	North	Vehicle Stopped
State Route	539			Exceeding Reas. Safe Speed	None	South	North	South	Vehicle Stopped
State Route	539			Disregard Stop and Go Light	None	South	North	West	East
State Route	539			Driver Operating Hands-free Wireless Tel	None	North	South	North	Vehicle Stopped
State Route	539			Disregard Stop and Go Light	None	North	South	West	North
State Route	539			Exceeding Reas. Safe Speed	None	South	North	South	Vehicle Stopped
State Route	539			Exceeding Reas. Safe Speed	None	South	North	South	Vehicle Stopped
State Route	539			Exceeding Reas. Safe Speed	None	North	South	North	Vehicle Stopped
State Route	539			Disregard Stop and Go Light	None	South	North	West	East
State Route	539			Under Influence of Drugs	None	South	North	East	West

JURISDICTION	COUNTY ROAD LOG #	BLOCK NUMBER	INTERSECT COUNTY ROAD LOG #	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	CITY AND MISC ONLY SECONDARY TRAFFICWAY 1	CITY AND MISC ONLY SECONDARY TRAFFICWAY 2	MILE POST	A/B	*REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PEDS	# PEDAL	VEHICLE 1 TYPE
SLATER RD (#14760, MP 7.52 - 7.58) & PACIFIC HWY (#71892, MP 2.45 - 2.51)																					
County Road	14760		71892							7.550		2877855	11/12/2007	12:18	No Injury	0	0	2			Passenger Car
County Road	14760		71892							7.550		2877253	3/22/2009	14:09	No Injury	0	0	2			Passenger Car
County Road	14760		71892							7.550		E070477	9/27/2010	16:31	No Injury	0	0	2			Passenger Car
County Road	14760		71892							7.550		E064470	8/19/2010	16:48	Evident Injury	2	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
County Road	14760		71892							7.550		E018602	4/24/2009	17:00	No Injury	0	0	2			Passenger Car
County Road	14760		71892							7.550		2683500	9/5/2008	17:43	Possible Injury	1	0	1			Motorcycle
County Road	14760		71892							7.550		3146268	4/13/2009	15:35	Evident Injury	2	0	2			Passenger Car
County Road	14760									7.560		3457205	5/7/2010	16:42	No Injury	0	0	3			Pickup,Panel Truck or Vanette under 10,000 lb
County Road	71892									2.500		3146288	12/21/2009	7:36	No Injury	0	0	2			Truck (Flatbad,Van,etc)
SLATER RD (#14760, MP 8.26 - 8.32) & NORTHWEST DR (#74050, MP 2.35 - 2.41)																					
County Road	14760		74050							8.290		3143455	6/24/2010	1:37	Evident Injury	1	0	1			Motorcycle
County Road	14760		74050							8.290		3146165	8/26/2009	17:19	Evident Injury	1	0	1			Passenger Car
County Road	74050		14760							2.380		E062200	7/29/2010	6:22	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
County Road	74050		14760							2.380		3144385	12/6/2009	12:12	No Injury	0	0	2			Passenger Car
County Road	74050		14760							2.380		2877508	10/17/2007	21:40	No Injury	0	0	2			Passenger Car
County Road	74050		14760							2.380		2877873	2/18/2008	10:26	No Injury	0	0	1			Passenger Car
County Road	74050		14760							2.380		3146315	8/4/2009	14:40	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
County Road	74050		14760							2.380		3144733	7/7/2009	15:29	Possible Injury	1	0	1			Scooter Bike
County Road	74050		14760							2.380		E055230	5/29/2010	10:16	No Injury	0	0	2			Passenger Car
AXTON RD (#73680, MP 0.97 - 1.03) & DEER CREEK RD (#73411, MP 0.00 - 0.03)																					
County Road	73680		73411							1.000		E062203	7/29/2010	18:45	No Injury	0	0	2			Passenger Car
County Road	73680		73411							1.000		2531401	4/1/2010	8:43	No Injury	0	0	2			Passenger Car
County Road	73680									1.020		3144485	1/24/2010	13:50	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
AXTON RD (#73680, MP 1.64 - 1.70) & NORTHWEST DR (#74050, MP 4.62 - 4.68)																					
County Road	73680		74050							1.670		3457076	12/16/2009	18:19	No Injury	0	0	2			Passenger Car
County Road	73680		74050							1.670		2683685	12/20/2008	11:50	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
County Road	74050									4.630		2877702	2/6/2008	18:46	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
County Road	74050		73680							4.650		3145940	10/21/2009	15:22	Unknown	0	0	1			Truck Tractor & Semi-Trailer
AXTON RD (#73680, MP 2.64 - 2.70) & ALDRICH RD (#73750, MP 4.43 - 4.49)																					
County Road	73680		73570							2.670		2684721	6/27/2009	23:45	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
County Road	73680		73750							2.670		2683941	10/31/2008	20:20	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
County Road	73680		73750							2.670		3142203	7/13/2010	2:52	No Injury	0	0	1			Passenger Car
County Road	73680		73750							2.670		3457153	1/20/2010	15:46	Possible Injury	1	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
County Road	73680		73750							2.670		2877379	12/29/2008	7:29	Possible Injury	1	0	4			Passenger Car
SMITH RD (#75080, MP 1.44 - 1.50) & NORTHWEST DR (#74050, MP 3.62 - 3.68)																					
County Road	75080		74050							1.470		3456953	9/13/2010	10:04	No Injury	0	0	2			Passenger Car
County Road	75080		74050							1.470		2877010	11/11/2008	10:38	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
County Road	75080		74050							1.470		3146292	4/14/2010	6:02	No Injury	0	0	2			Pickup,Panel Truck or Vanette under 10,000 lb
County Road	74050									3.630		3143232	8/8/2010	15:15	Possible Injury	1	0	1			Passenger Car
SMITH RD (#75080, MP 2.45 - 2.51) & ALDRICH RD (#73750, MP 3.43 - 3.49)																					
County Road	75080		73750							2.450		3143441	6/30/2010	15:55	Died in Hospital	0	1	2			Motorcycle
County Road	75080		73750							2.480		2876675	1/23/2008	19:11	Serious Injury	2	0	1			Passenger Car
County Road	75080		73750							2.480		3145140	3/20/2009	18:10	Evident Injury	1	0	2			Passenger Car

JURISDICTION	COUNTY ROAD LOG #	BLOCK NUMBER	INTERSECT COUNTY ROAD LOG #	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK
SLATER RD (#14760, MP 7.52 - 7.58) &								
County Road	14760		71892	Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway within Major Intersection	Wet	Daylight	One car leaving driveway access
County Road	14760		71892	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
County Road	14760		71892	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Daylight	Entering at angle
County Road	14760		71892	Passenger Car	At Intersection and Related	Dry	Daylight	From opposite direction - one left turn - one straight
County Road	14760		71892	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
County Road	14760		71892		At Intersection and Related	Dry	Daylight	Vehicle overturned
County Road	14760		71892	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
County Road	14760			Passenger Car	At Driveway	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
County Road	71892			Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	Dry	Dawn	From opposite direction - both going straight - sideswipe
SLATER RD (#14760, MP 8.26 - 8.32) &								
County Road	14760		74050		Not at Intersection and Not Related	Dry	Dark-No Street Lights	Roadway Ditch
County Road	14760		74050		At Intersection and Related	Dry	Daylight	Utility Pole
County Road	74050		14760	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
County Road	74050		14760	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
County Road	74050		14760	Passenger Car	At Intersection and Related	Wet	Dark-Street Lights On	Entering at angle
County Road	74050		14760		At Intersection and Related	Dry	Daylight	Roadway Ditch
County Road	74050		14760	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - one left turn - one straight
County Road	74050		14760		At Intersection and Related	Wet	Daylight	Vehicle overturned
County Road	74050		14760	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Wet	Daylight	Entering at angle
AXTON RD (#73680, MP 0.97 - 1.03) & I								
County Road	73680		73411	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	Entering at angle
County Road	73680		73411	School Bus	At Intersection and Related	Wet	Daylight	Entering at angle
County Road	73680			Passenger Car	At Driveway	Wet	Daylight	Entering at angle
AXTON RD (#73680, MP 1.64 - 1.70) & I								
County Road	73680		74050	Passenger Car	At Intersection and Related	Wet	Unknown	Entering at angle
County Road	73680		74050	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Ice	Daylight	Entering at angle
County Road	74050			Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	Wet	Dark-Street Lights On	One car leaving driveway access
County Road	74050		73680		At Intersection and Related	Wet	Daylight	Utility Pole
AXTON RD (#73680, MP 2.64 - 2.70) & /								
County Road	73680		73570	Passenger Car	At Intersection and Related	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end
County Road	73680		73750	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Dark-No Street Lights	Entering at angle
County Road	73680		73750		At Intersection and Not Related	Dry	Dark-No Street Lights	Roadway Ditch
County Road	73680		73750	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - one left turn - one straight
County Road	73680		73750	Passenger Car	At Intersection and Related	Wet	Dark-No Street Lights	Entering at angle
SMITH RD (#75080, MP 1.44 - 1.50) & N								
County Road	75080		74050	Passenger Car	At Intersection and Related	Dry	Daylight	Entering at angle
County Road	75080		74050	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - both going straight - one stopped - rear-end
County Road	75080		74050	Truck Tractor & Semi-Trailer	At Intersection and Related	Dry	Dawn	From same direction - both going straight - one stopped - rear-end
County Road	74050				Not at Intersection and Not Related	Dry	Daylight	Utility Pole
SMITH RD (#75080, MP 2.45 - 2.51) & A								
County Road	75080		73750	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From same direction - one left turn - one straight
County Road	75080		73750		At Intersection and Related	Dry	Dark-No Street Lights	Roadway Ditch
County Road	75080		73750	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry	Daylight	From opposite direction - both moving - head-on

JURISDICTION	COUNTY ROAD LOG #	BLOCK NUMBER	INTERSECT COUNTY ROAD LOG #	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 1 (UNIT 2)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO
SLATER RD (#14760, MP 7.52 - 7.58) &									
County Road	14760		71892	Did Not Grant RW to Vehicle	None	South	West	East	West
County Road	14760		71892	Did Not Grant RW to Vehicle	None	North	South	East	West
County Road	14760		71892	Did Not Grant RW to Vehicle	None	South	West	East	West
County Road	14760		71892	Did Not Grant RW to Vehicle	None	West	North	East	West
County Road	14760		71892	Exceeding Reas. Safe Speed	None	West	East	West	Vehicle Stopped
County Road	14760		71892	None		East	West		
County Road	14760		71892	Did Not Grant RW to Vehicle	None	South	North	East	West
County Road	14760			Exceeding Reas. Safe Speed	None	East	West	East	Vehicle Stopped
County Road	71892			Over Center Line	None	South	West	West	East
SLATER RD (#14760, MP 8.26 - 8.32) &									
County Road	14760		74050	Exceeding Reas. Safe Speed		West	East		
County Road	14760		74050	Exceeding Reas. Safe Speed		South	West		
County Road	74050		14760	Did Not Grant RW to Vehicle	None	West	North	North	South
County Road	74050		14760	Did Not Grant RW to Vehicle	None	West	North	North	South
County Road	74050		14760	Did Not Grant RW to Vehicle	None	North	East	East	West
County Road	74050		14760	Improper Passing		Southeast	Northwest		
County Road	74050		14760	Inattention	None	South	North	South	West
County Road	74050		14760	None		South	North		
County Road	74050		14760	Inattention	None	North	South	West	North
AXTON RD (#73680, MP 0.97 - 1.03) & I									
County Road	73680		73411	Did Not Grant RW to Vehicle	None	South	West	West	East
County Road	73680		73411	Did Not Grant RW to Vehicle	None	South	West	West	East
County Road	73680			Did Not Grant RW to Vehicle	None	South	West	West	East
AXTON RD (#73680, MP 1.64 - 1.70) & I									
County Road	73680		74050	Did Not Grant RW to Vehicle	None	West	East	North	South
County Road	73680		74050	Disregard Stop Sign - Flashing Red	None	West	East	South	North
County Road	74050			Did Not Grant RW to Vehicle	None	East	South	South	North
County Road	74050		73680	Improper Turn		North	West		
AXTON RD (#73680, MP 2.64 - 2.70) & /									
County Road	73680		73570	Inattention	Other	East	West	East	West
County Road	73680		73750	Disregard Stop Sign - Flashing Red	None	South	North	East	West
County Road	73680		73750	Apparently Asleep		East	West		
County Road	73680		73750	Improper Passing	None	West	East	West	North
County Road	73680		73750	Disregard Stop Sign - Flashing Red	None	North	South	East	West
SMITH RD (#75080, MP 1.44 - 1.50) & N									
County Road	75080		74050	Did Not Grant RW to Vehicle	None	West	East	South	North
County Road	75080		74050	Under Influence of Alcohol	None	East	West	East	Vehicle Stopped
County Road	75080		74050	Other	None	East	West	East	Vehicle Stopped
County Road	74050			Apparently Ill		South	North		
SMITH RD (#75080, MP 2.45 - 2.51) & A									
County Road	75080		73750	Exceeding Stated Speed Limit	None	East	West	East	South
County Road	75080		73750	Under Influence of Alcohol		East	South		
County Road	75080		73750	Exceeding Reas. Safe Speed	None	West	East	East	West

Appendix B
Final EIS – Supplemental Transportation Analyses

Traffic Operations Analyses

LOS C – Roundabout Level of Service and Queues

MOVEMENT SUMMARY

Site: Barrett-SE Connector

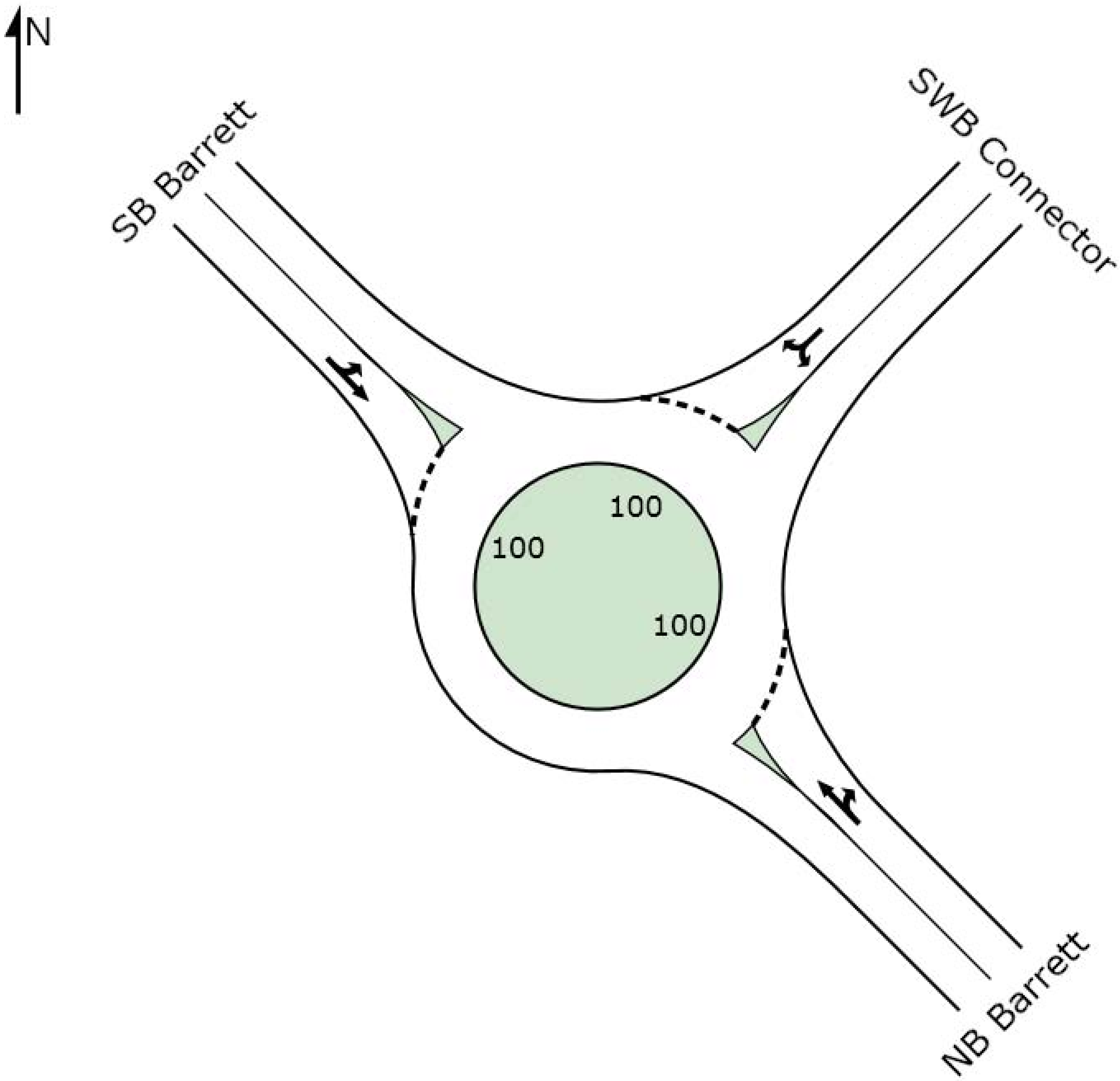
Ferndale Planned Action
2034 PM Peak Hour
Mitigated to LOS C
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South East: NB Barrett											
16T	T	359	2.0	0.625	4.1	LOS A	8.2	208.6	0.46	0.39	29.6
16R	R	429	2.0	0.625	4.6	LOS A	8.2	208.6	0.46	0.46	29.3
Approach		788	2.0	0.625	4.4	LOS A	8.2	208.6	0.46	0.43	29.5
North East: SWB Connector											
17L	L	321	2.0	0.527	12.8	LOS B	5.0	127.7	0.73	0.86	21.4
14R	R	98	2.0	0.529	7.1	LOS A	5.0	127.7	0.73	0.75	22.4
Approach		418	2.0	0.528	11.5	LOS B	5.0	127.7	0.73	0.83	21.6
North West: SB Barrett											
15L	L	71	2.0	0.484	11.4	LOS B	4.3	110.0	0.71	0.90	26.9
12T	T	321	2.0	0.484	6.6	LOS A	4.3	110.0	0.71	0.66	28.5
Approach		391	2.0	0.485	7.4	LOS B	4.3	110.0	0.71	0.70	28.2
All Vehicles		1598	2.0	0.625	7.0	LOS A	8.2	208.6	0.59	0.60	26.5

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION


N
SB Barrett
SWB Connector
NB Barrett
100
100
100

MOVEMENT SUMMARY

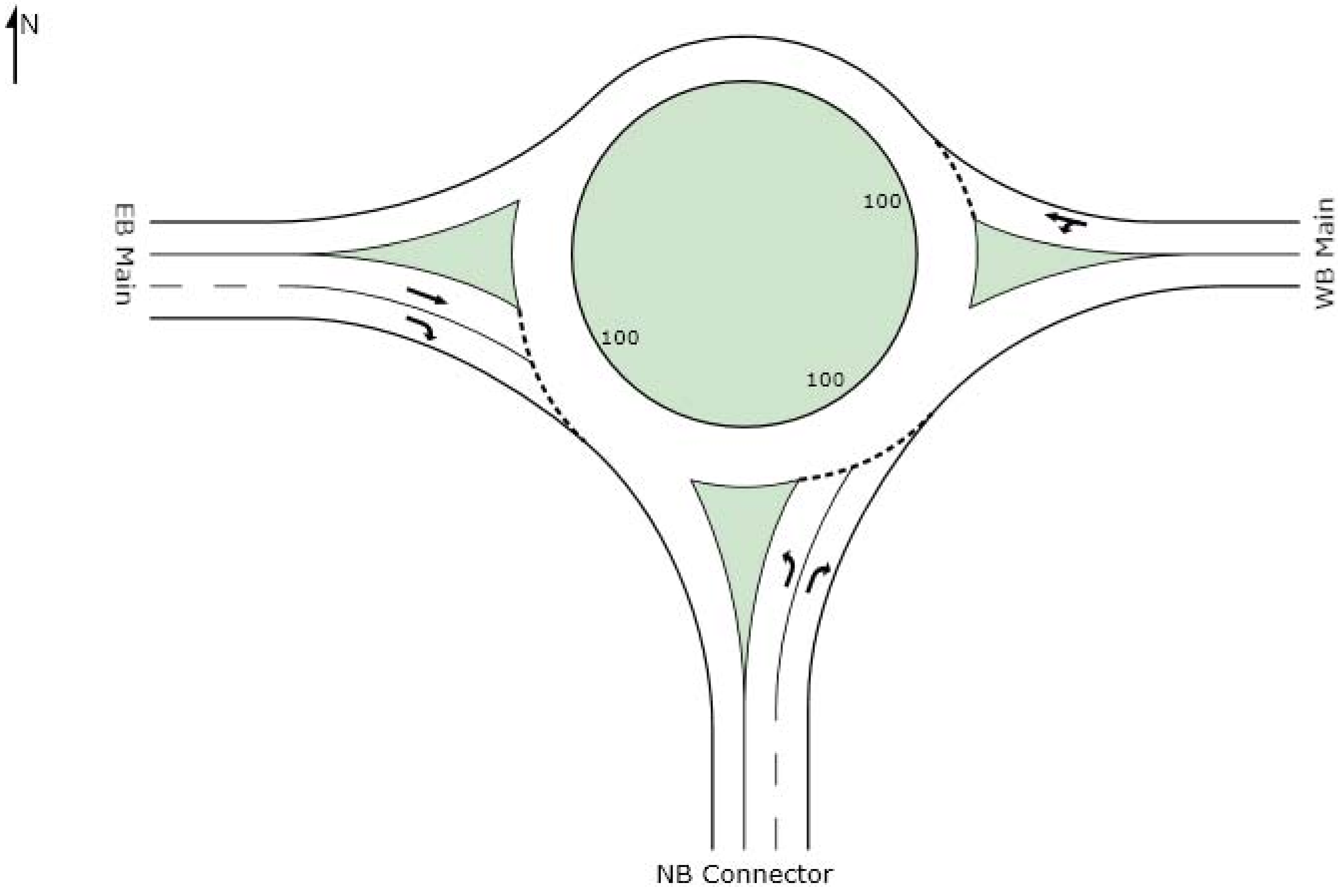
Site: Main-SE Connector

Ferndale Planned Action
2034 PM Peak Hour
Mitigated to LOS C
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Connector											
3L	L	397	2.0	0.556	16.1	LOS B	6.1	155.8	0.90	1.04	20.3
8R	R	185	2.0	0.347	9.5	LOS A	2.6	67.1	0.81	0.86	21.8
Approach		582	2.0	0.556	14.0	LOS B	6.1	155.8	0.87	0.99	20.7
East: WB Main											
1L	L	147	2.0	0.917	28.6	LOS C	22.1	560.5	1.00	1.36	20.1
6T	T	543	2.0	0.920	23.8	LOS C	22.1	560.5	1.00	1.36	21.2
Approach		690	2.0	0.920	24.8	LOS C	22.1	560.5	1.00	1.36	21.0
West: EB Main											
2T	T	679	2.0	0.544	4.5	LOS A	6.2	158.2	0.56	0.44	29.4
2R	R	299	2.0	0.318	5.4	LOS A	2.7	68.6	0.47	0.52	28.8
Approach		978	2.0	0.544	4.8	LOS A	6.2	158.2	0.54	0.47	29.2
All Vehicles		2250	2.0	0.920	13.3	LOS B	22.1	560.5	0.77	0.87	23.7

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.



N
EB Main
WB Main
100
100
100
NB Connector

MOVEMENT SUMMARY

Site: Labounty

2034 PAO Mid

Roundabout

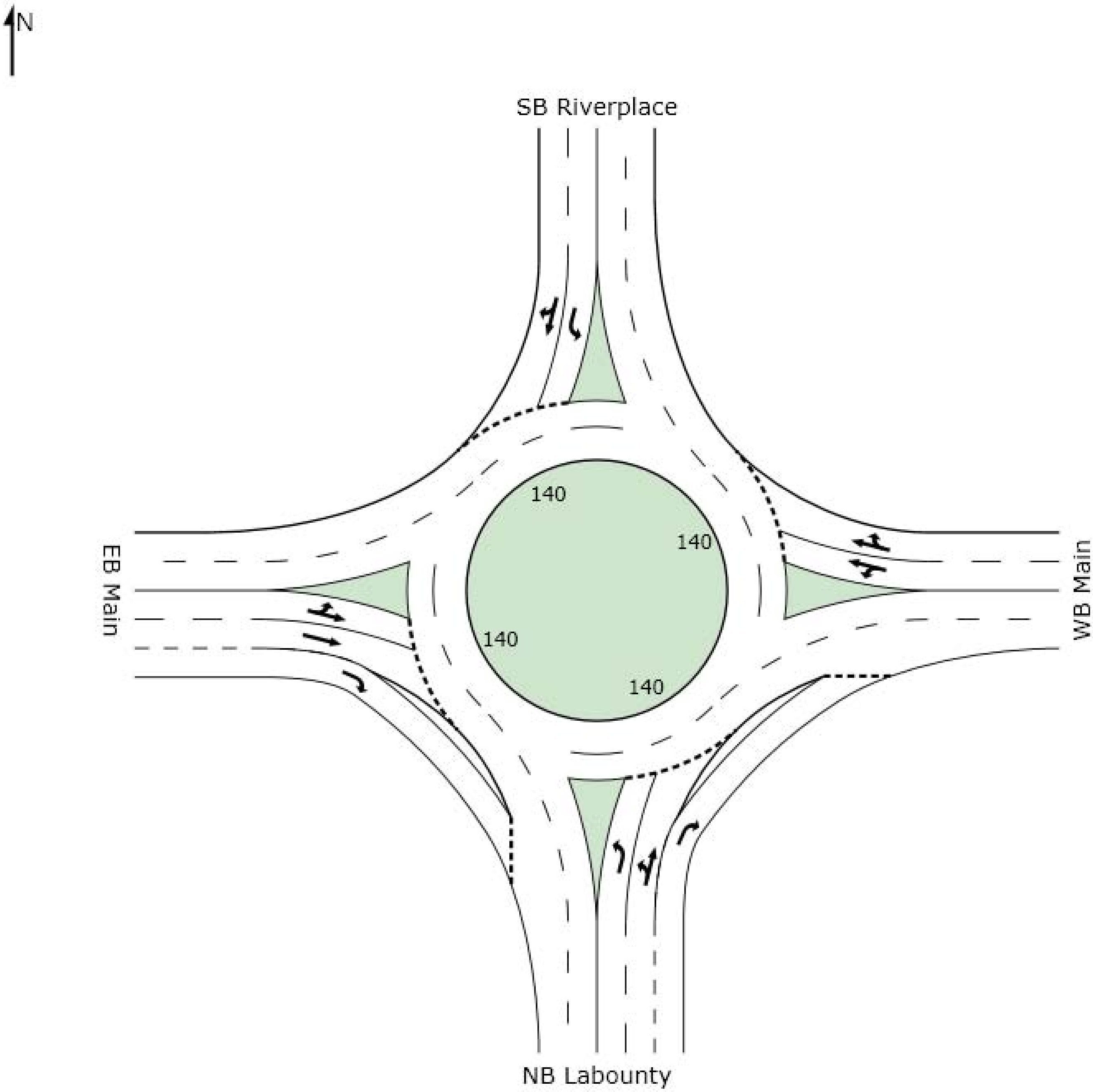
Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Labounty											
3L	L	429	2.0	0.512	16.0	LOS B	4.0	100.8	0.87	1.03	24.3
8T	T	82	2.0	0.513	10.0	LOS B	4.0	100.8	0.87	0.97	25.8
8R	R	614	2.0	0.845	17.5	LOS B	12.4	313.8	1.00	1.33	23.2
Approach		1125	2.0	0.845	16.4	LOS B	12.4	313.8	0.94	1.19	23.8
East: WB Main											
1L	L	435	2.0	0.927	23.9	LOS C	16.8	425.9	1.00	1.47	20.2
6T	T	821	2.0	0.927	14.5	LOS B	17.1	434.0	1.00	1.46	20.6
6R	R	250	2.0	0.926	15.4	LOS B	17.1	434.0	1.00	1.46	20.8
Approach		1505	2.0	0.927	17.4	LOS C	17.1	434.0	1.00	1.46	20.5
North: SB Riverplace											
7L	L	255	2.0	0.617	18.5	LOS B	4.9	125.6	0.92	1.12	19.4
4T	T	71	2.0	0.574	13.8	LOS B	4.0	102.2	0.89	1.03	20.1
4R	R	114	2.0	0.574	14.2	LOS B	4.0	102.2	0.89	1.04	19.8
Approach		440	2.0	0.617	16.6	LOS B	4.9	125.6	0.91	1.08	19.6
West: EB Main											
5L	L	92	2.0	0.629	13.4	LOS B	6.7	170.0	0.87	1.13	23.5
2T	T	967	2.0	0.629	7.1	LOS A	7.3	185.0	0.88	0.98	25.3
2R	R	255	2.0	0.243	4.7	LOS A	2.0	50.2	0.65	0.50	26.3
Approach		1315	2.0	0.629	7.1	LOS B	7.3	185.0	0.83	0.90	25.4
All Vehicles		4386	2.0	0.927	14.0	LOS B	17.1	434.0	0.93	1.18	22.5

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

Processed: Thursday, September 29, 2011 11:40:30 AM
SIDRA INTERSECTION 5.0.5.1510
Project: M:\10\10192 Ferndale Planned Action EIS\Traffic Operations (FEIS)\Sidra\2034 Alt 2 (Mitigated LOS C)\Main Street RABs - Alt (LOS C & w-diameter).sip
8000159, THE TRANSPO GROUP, FLOATING

SIDRA INTERSECTION


N
SB Riverplace
EB Main
WB Main
NB Labounty
140
140
140
140

MOVEMENT SUMMARY

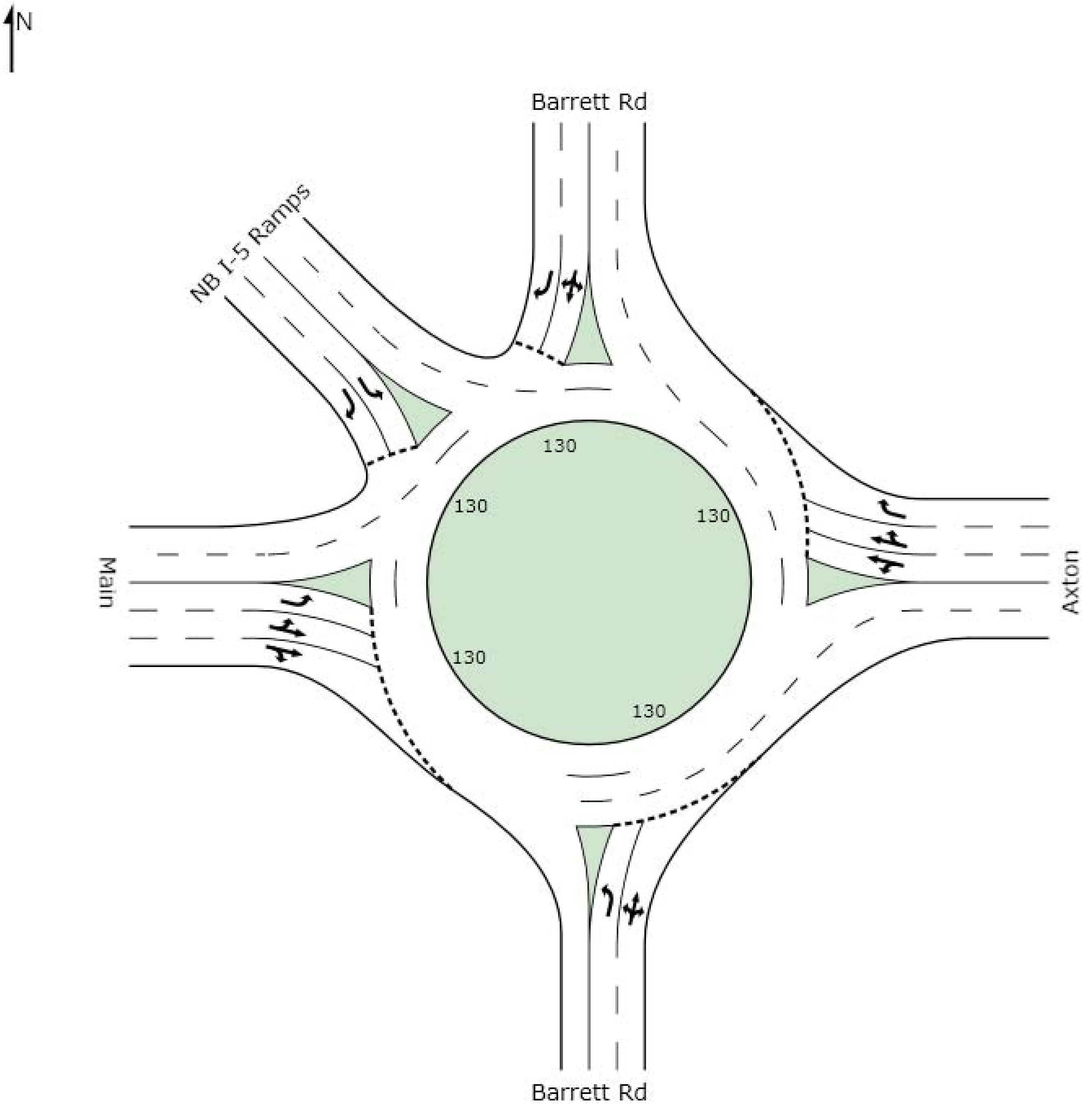
Site: NB Ramps-Barrett Road

2034 Mid PAO - Alt
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Barrett Rd											
3L	L	526	2.0	0.830	32.4	LOS C	7.5	191.6	0.95	1.26	20.3
8T	T	21	2.0	0.842	23.2	LOS C	7.5	191.6	0.95	1.23	20.0
8R	R	53	2.0	0.835	24.2	LOS C	7.5	191.6	0.95	1.24	20.3
Approach		600	2.0	0.830	31.3	LOS C	7.5	191.6	0.95	1.25	20.3
East: Axton											
1L	L	42	2.0	0.561	19.6	LOS B	4.6	116.5	0.86	1.14	22.6
6T	T	605	2.0	0.564	9.8	LOS A	5.3	133.4	0.87	1.02	24.2
6R	R	389	2.0	0.564	12.4	LOS B	5.3	133.4	0.86	1.04	24.6
Approach		1037	2.0	0.564	11.2	LOS B	5.3	133.4	0.87	1.03	24.3
North: Barrett Rd											
7L	L	74	2.0	0.635	30.1	LOS C	4.8	122.5	0.92	1.21	16.8
4T	T	16	2.0	0.632	23.9	LOS C	4.8	122.5	0.92	1.16	17.2
4R	R	347	2.0	0.636	22.5	LOS C	5.4	138.3	0.92	1.18	17.8
Approach		437	2.0	0.636	23.8	LOS C	5.4	138.3	0.92	1.19	17.6
North West: NB I-5 Ramps											
15L	L	195	2.0	0.457	18.6	LOS B	2.7	69.1	0.76	0.97	26.8
12R	R	547	2.0	0.829	18.4	LOS B	9.3	235.4	0.91	1.17	26.8
Approach		742	2.0	0.830	18.4	LOS B	9.3	235.4	0.87	1.11	26.8
West: Main											
5L	L	816	2.0	0.607	13.4	LOS B	6.0	151.5	0.68	0.85	24.5
2T	T	784	2.0	0.607	3.5	LOS A	6.0	151.5	0.67	0.49	26.0
2R	R	416	2.0	0.606	6.5	LOS A	5.9	149.6	0.68	0.71	26.2
Approach		2016	2.0	0.606	8.1	LOS B	6.0	151.5	0.68	0.68	25.3
All Vehicles		4832	2.0	0.830	14.7	LOS B	9.3	235.4	0.80	0.94	23.6

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.


N
Barrett Rd
NB I-5 Ramps
130
130
130
130
130
Main
Axton
Barrett Rd

MOVEMENT SUMMARY

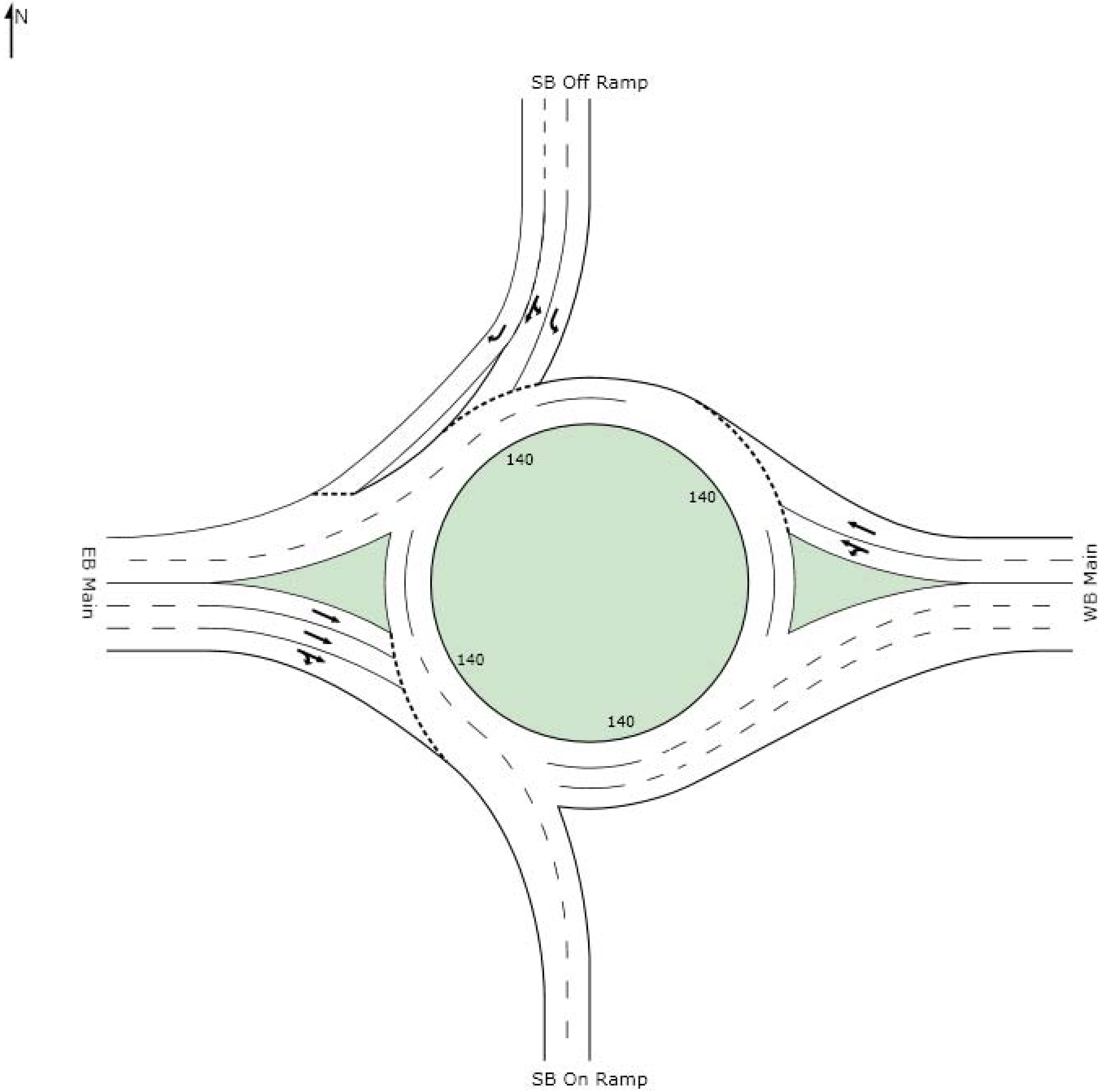
Site: SB Ramps

2034 PAO Mid
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: WB Main											
1L	L	250	2.0	0.476	10.7	LOS B	0.0	0.0	0.00	0.91	25.7
6T	T	1255	2.0	0.476	0.0	LOS A	0.0	0.0	0.00	0.00	28.0
Approach		1505	2.0	0.476	1.8	LOS B	0.0	0.0	0.00	0.15	27.5
North: SB Off Ramp											
7L	L	848	2.0	0.607	19.9	LOS B	4.7	118.3	0.78	1.04	26.4
4T	T	5	2.0	0.604	14.3	LOS B	4.7	118.3	0.78	0.97	29.8
4R	R	435	2.0	0.427	9.8	LOS A	3.0	75.2	0.70	0.85	32.7
Approach		1288	2.0	0.607	16.5	LOS B	4.7	118.3	0.75	0.98	28.1
West: EB Main											
2T	T	1234	2.0	0.915	20.0	LOS C	16.0	407.4	0.99	1.49	20.3
2R	R	701	2.0	0.915	20.1	LOS C	16.0	407.4	1.00	1.51	22.1
Approach		1935	2.0	0.915	20.1	LOS C	16.0	407.4	0.99	1.50	21.0
All Vehicles		4728	2.0	0.915	13.3	LOS B	16.0	407.4	0.61	0.93	24.5

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION



N
SB Off Ramp
140
140
EB Main
WB Main
140
140
SB On Ramp

MOVEMENT SUMMARY

Site: Walgreens

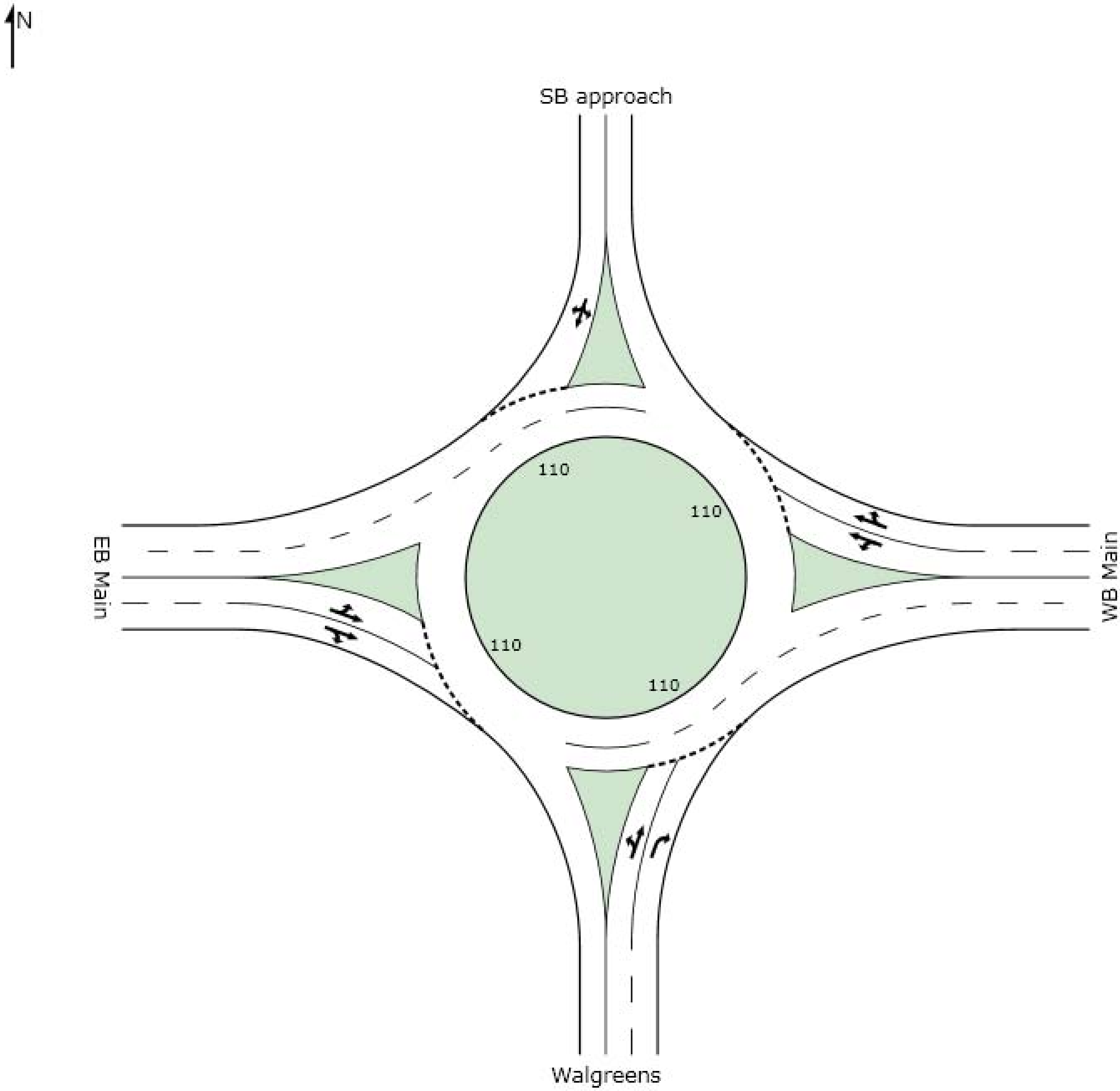
2034 PAO Mid
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Walgreens											
3L	L	255	2.0	0.513	13.3	LOS B	3.7	95.0	0.83	1.02	20.5
8T	T	16	2.0	0.510	6.5	LOS A	3.7	95.0	0.83	0.92	21.0
8R	R	152	2.0	0.368	8.7	LOS A	2.2	56.1	0.78	0.88	21.6
Approach		424	2.0	0.513	11.4	LOS B	3.7	95.0	0.82	0.96	20.9
East: WB Main											
1L	L	261	2.0	0.660	10.5	LOS B	8.6	217.3	0.81	0.88	23.2
6T	T	940	2.0	0.661	4.7	LOS A	8.6	218.6	0.80	0.68	24.2
6R	R	163	2.0	0.660	5.8	LOS A	8.6	218.6	0.80	0.74	24.6
Approach		1364	2.0	0.661	5.9	LOS B	8.6	218.6	0.80	0.72	24.0
North: SB approach											
7L	L	152	2.0	0.631	22.2	LOS C	4.6	117.5	0.89	1.13	18.4
4T	T	22	2.0	0.639	14.9	LOS B	4.6	117.5	0.89	1.05	18.4
4R	R	33	2.0	0.627	16.4	LOS B	4.6	117.5	0.89	1.07	18.6
Approach		207	2.0	0.631	20.5	LOS C	4.6	117.5	0.89	1.11	18.4
West: EB Main											
5L	L	27	2.0	0.618	12.5	LOS B	7.3	184.8	0.83	1.03	24.0
2T	T	1011	2.0	0.619	6.9	LOS A	7.4	187.9	0.82	0.84	25.5
2R	R	87	2.0	0.621	7.7	LOS A	7.4	187.9	0.82	0.86	25.6
Approach		1125	2.0	0.619	7.1	LOS B	7.4	187.9	0.82	0.84	25.5
All Vehicles		3120	2.0	0.661	8.1	LOS A	8.6	218.6	0.82	0.83	23.5

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

Processed: Thursday, September 29, 2011 11:31:19 AM
SIDRA INTERSECTION 5.0.5.1510

Project: M:\10\10192 Ferndale Planned Action EIS\Traffic Operations (FEIS)\Sidra\2034 Alt 2 (Mitigated LOS C)\Main Street RABs - Alt (LOS C & w-diameter).sip
8000159, THE TRANSPO GROUP, FLOATING


N
SB approach
110
110
110
110
EB Main
WB Main
Walgreens

MOVEMENT SUMMARY

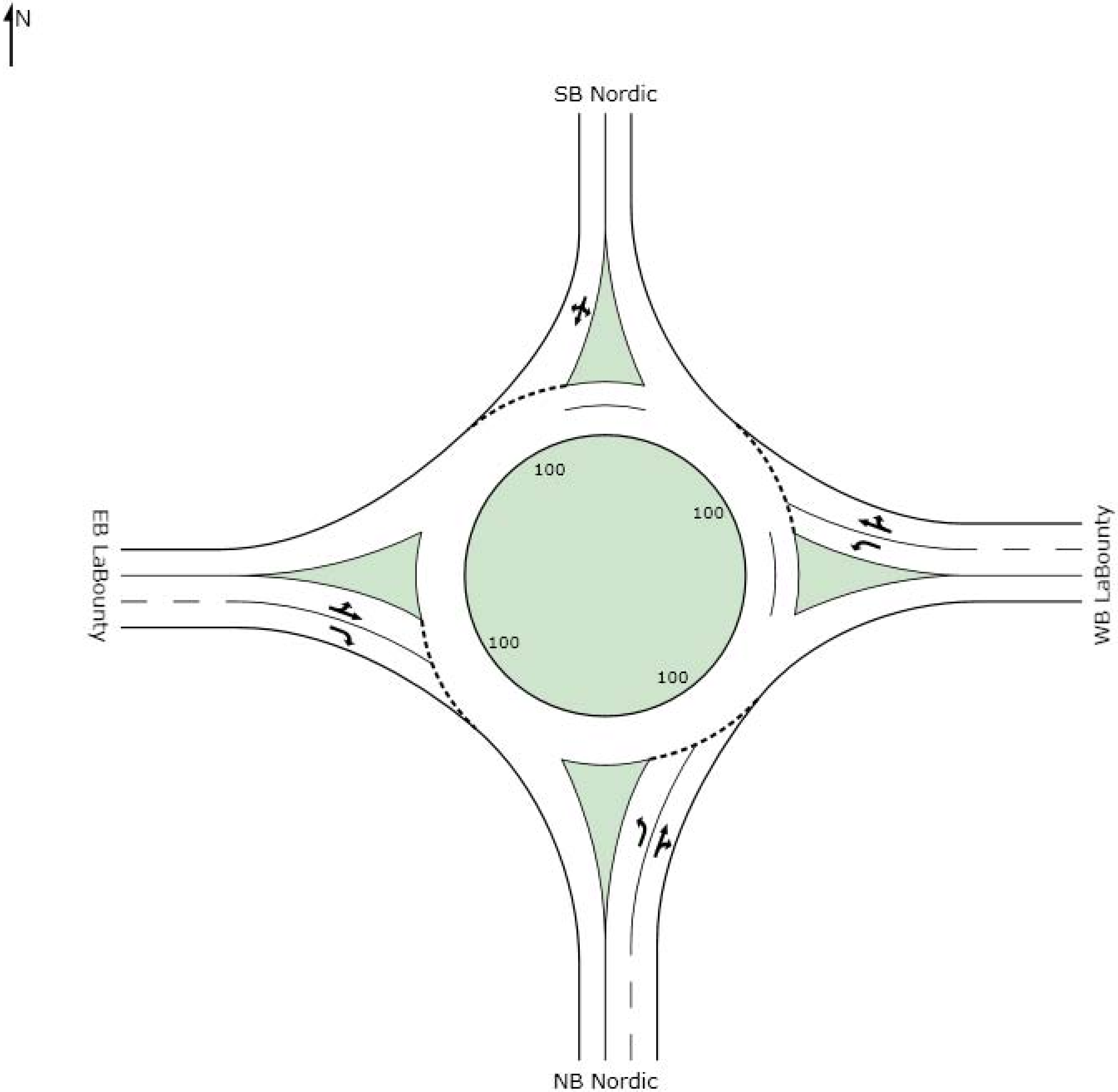
Site: Nordic@Labounty

2034 Mid-Growth
Mitigated to LOS C
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Nordic											
3L	L	478	3.0	0.453	10.5	LOS B	4.0	101.8	0.61	0.71	21.9
8T	T	16	3.0	0.209	3.4	LOS A	1.4	35.2	0.56	0.46	22.7
8R	R	120	3.0	0.209	6.3	LOS A	1.4	35.2	0.56	0.61	23.1
Approach		614	3.0	0.453	9.5	LOS B	4.0	101.8	0.60	0.68	22.1
East: WB LaBounty											
1L	L	141	1.0	0.290	13.1	LOS B	1.7	41.9	0.65	0.87	25.0
6T	T	446	1.0	0.594	8.5	LOS A	5.7	144.3	0.77	0.88	28.4
6R	R	38	1.0	0.594	8.9	LOS A	5.7	144.3	0.77	0.91	28.2
Approach		625	1.0	0.594	9.6	LOS B	5.7	144.3	0.74	0.88	27.5
North: SB Nordic											
7L	L	16	0.0	0.215	15.9	LOS B	1.3	32.3	0.76	0.96	20.7
4T	T	16	0.0	0.215	7.6	LOS A	1.3	32.3	0.76	0.77	21.1
4R	R	60	0.0	0.214	10.0	LOS B	1.3	32.3	0.76	0.83	21.6
Approach		92	0.0	0.213	10.6	LOS B	1.3	32.3	0.76	0.84	21.4
West: EB LaBounty											
5L	L	22	2.0	0.268	9.4	LOS A	2.0	51.9	0.44	0.91	27.7
2T	T	250	2.0	0.269	4.6	LOS A	2.0	51.9	0.44	0.46	29.9
2R	R	451	2.0	0.374	5.2	LOS A	3.2	82.1	0.46	0.51	28.9
Approach		723	2.0	0.374	5.1	LOS A	3.2	82.1	0.45	0.51	29.2
All Vehicles		2054	1.9	0.594	8.0	LOS A	5.7	144.3	0.60	0.69	25.7

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.


N
SB Nordic
100
100
EB LaBounty
WB LaBounty
100
100
NB Nordic

MOVEMENT SUMMARY

Site: NB I-5/Slater

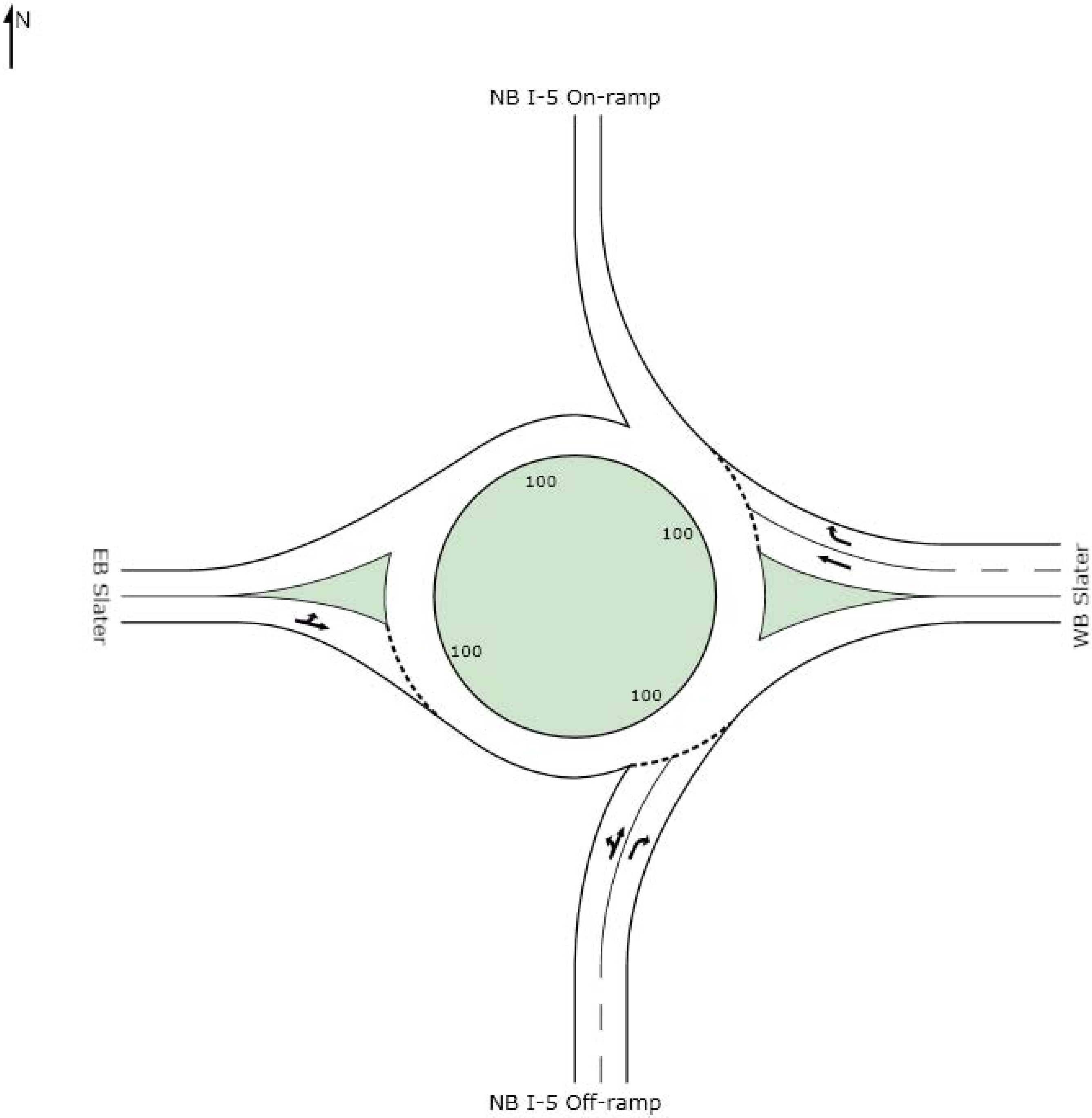
2034 Mid Volumes
NB I-5 Ramps/Slater
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB I-5 Off-ramp											
3L	L	330	1.0	0.503	22.3	LOS C	4.9	123.0	0.85	1.04	25.6
8T	T	1	1.0	0.532	16.8	LOS B	4.9	123.0	0.85	0.99	28.4
8R	R	457	1.0	0.567	16.6	LOS B	6.6	165.2	0.88	1.03	28.1
Approach		788	1.0	0.567	19.0	LOS C	6.6	165.2	0.87	1.03	27.0
East: WB Slater											
6T	T	787	1.0	0.850	17.2	LOS B	17.6	442.5	1.00	1.24	24.0
6R	R	271	1.0	0.433	11.8	LOS B	3.6	90.3	0.78	0.88	28.1
Approach		1059	1.0	0.850	15.8	LOS B	17.6	442.5	0.94	1.15	25.0
West: EB Slater											
5L	L	202	2.0	0.502	12.2	LOS B	0.0	0.0	0.00	0.92	28.6
2T	T	617	2.0	0.502	3.6	LOS A	0.0	0.0	0.00	0.33	32.0
Approach		819	2.0	0.502	5.7	LOS B	0.0	0.0	0.00	0.47	31.0
All Vehicles		2666	1.3	0.850	13.7	LOS B	17.6	442.5	0.63	0.91	27.2

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION



N
NB I-5 On-ramp
100
100
100
100
EB Slater
WB Slater
NB I-5 Off-ramp

MOVEMENT SUMMARY

Site: Pac Hwy/Slater

2034 Mid Volumes
Pacific Hwy/Slater
Roundabout

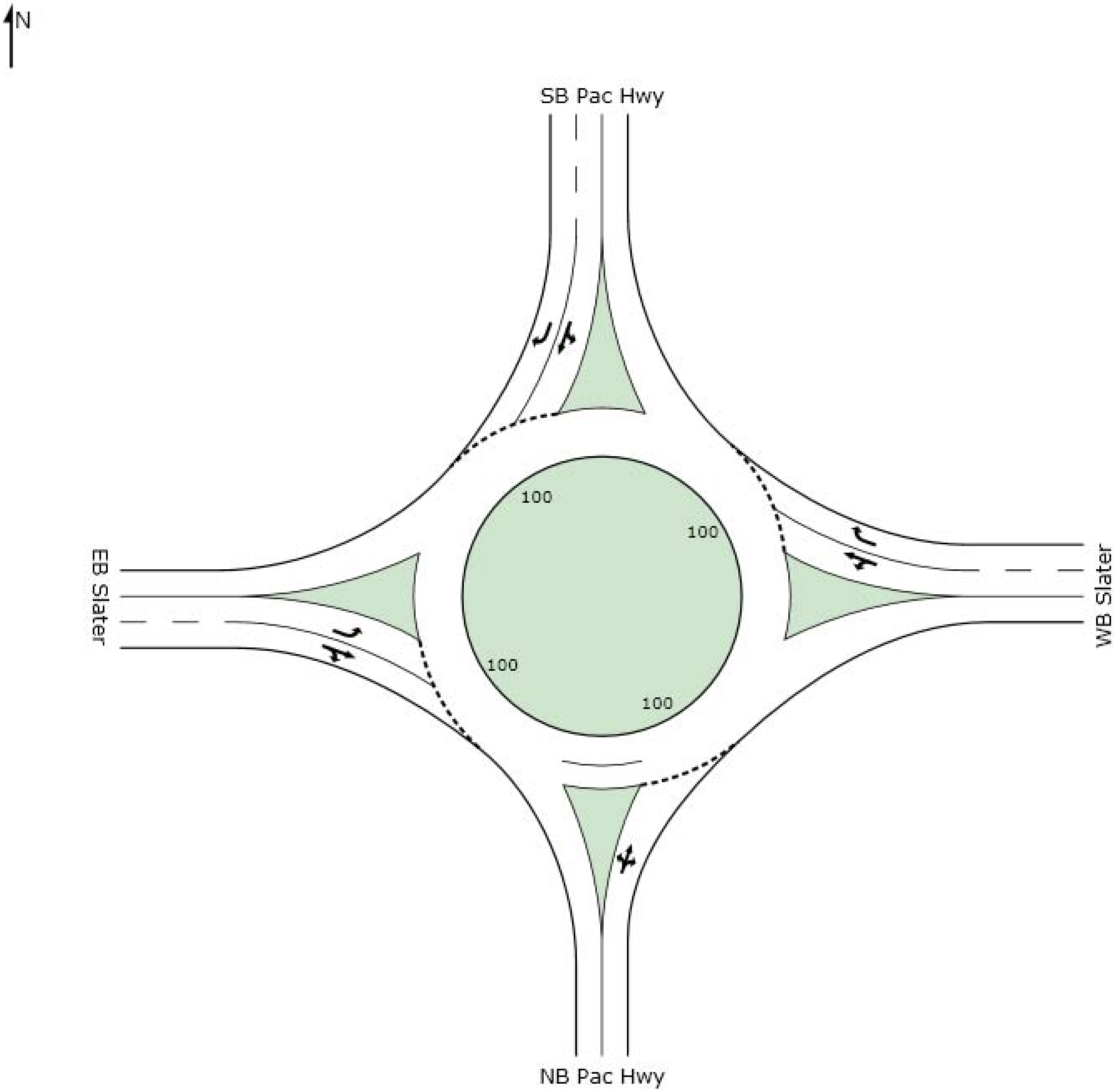
Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Pac Hwy											
3L	L	179	1.0	0.612	22.5	LOS C	4.5	112.2	0.82	1.06	25.8
8T	T	65	1.0	0.615	17.0	LOS B	4.5	112.2	0.82	0.99	28.7
8R	R	33	1.0	0.615	16.8	LOS B	4.5	112.2	0.82	1.00	27.6
Approach		277	1.0	0.613	20.5	LOS C	4.5	112.2	0.82	1.04	26.7
East: WB Slater											
1L	L	11	1.0	0.725	25.5	LOS C	12.0	301.2	0.99	1.23	23.7
6T	T	587	1.0	0.748	16.8	LOS B	12.0	301.2	0.99	1.22	24.1
6R	R	147	1.0	0.312	13.9	LOS B	2.2	55.0	0.79	0.90	27.0
Approach		745	1.0	0.747	16.4	LOS C	12.0	301.2	0.95	1.16	24.7
North: SB Pac Hwy											
7L	L	130	2.0	0.317	18.8	LOS B	2.6	65.7	0.87	0.94	27.5
4T	T	27	2.0	0.316	13.4	LOS B	2.6	65.7	0.87	0.90	30.7
4R	R	315	2.0	0.478	13.7	LOS B	5.0	127.7	0.94	0.96	30.0
Approach		473	2.0	0.479	15.1	LOS B	5.0	127.7	0.92	0.95	29.3
West: EB Slater											
5L	L	478	2.0	0.425	13.5	LOS B	4.0	101.8	0.52	0.68	27.3
2T	T	554	2.0	0.490	4.7	LOS A	5.1	129.4	0.53	0.46	29.4
2R	R	76	2.0	0.491	7.2	LOS A	5.1	129.4	0.53	0.59	29.9
Approach		1109	2.0	0.490	8.7	LOS B	5.1	129.4	0.53	0.56	28.4
All Vehicles		2603	1.6	0.747	13.3	LOS B	12.0	301.2	0.75	0.85	27.2

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

Processed: Thursday, September 29, 2011 2:11:22 PM
SIDRA INTERSECTION 5.0.5.1510

Project: M:\10\10192 Ferndale Planned Action EIS\Traffic Operations (FEIS)\Sidra\2034 Alt 2 (Mitigated LOS C)\Slater RABs - Mid Volumes (LOS C).sip
8000159, THE TRANSPO GROUP, FLOATING


N
SB Pac Hwy
EB Slater
WB Slater
NB Pac Hwy
100
100
100
100

MOVEMENT SUMMARY

Site: Rural/Slater

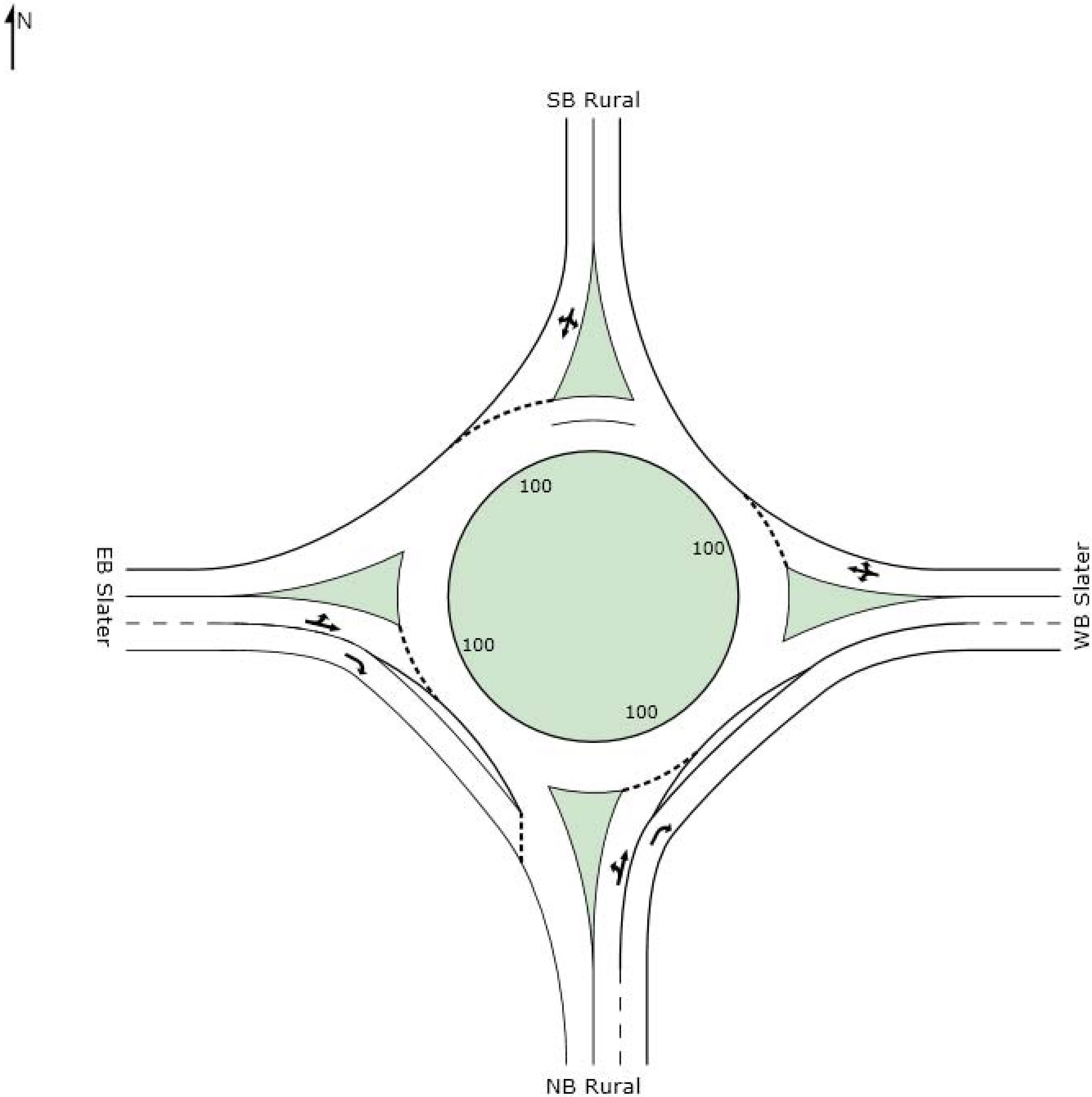
2034 Mid Volumes
Rural/Slater
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Rural											
3L	L	112	7.0	0.299	16.3	LOS B	2.4	62.7	0.88	0.95	20.4
8T	T	16	7.0	0.301	8.0	LOS A	2.4	62.7	0.88	0.88	20.6
8R	R	532	7.0	0.345	1.0	NA[9]	NA[9]	NA[9]	NA[9]	0.13	24.5
Approach		660	7.0	0.345	3.8	LOS B	2.4	62.7	0.17	0.29	23.5
East: WB Slater											
1L	L	431	5.0	0.885	14.2	LOS B	21.8	565.9	1.00	0.76	25.2
6T	T	468	5.0	0.885	9.8	LOS A	21.8	565.9	1.00	0.76	26.8
6R	R	90	5.0	0.887	9.8	LOS A	21.8	565.9	1.00	0.76	26.8
Approach		989	5.0	0.885	11.7	LOS B	21.8	565.9	1.00	0.76	26.1
North: SB Rural											
7L	L	186	6.0	0.862	51.2	LOS D	10.8	282.2	1.00	1.46	13.6
4T	T	16	6.0	0.887	42.9	LOS D	10.8	282.2	1.00	1.46	12.8
4R	R	21	6.0	0.851	45.3	LOS D	10.8	282.2	1.00	1.46	13.5
Approach		223	6.0	0.864	50.0	LOS D	10.8	282.2	1.00	1.46	13.5
West: EB Slater											
5L	L	16	4.0	0.840	23.9	LOS C	15.1	389.8	1.00	1.30	21.8
2T	T	606	4.0	0.823	19.5	LOS B	15.1	389.8	1.00	1.30	23.0
2R	R	59	4.0	0.066	5.5	LOS A	0.5	13.1	0.63	0.57	28.6
Approach		681	4.0	0.823	18.4	LOS C	15.1	389.8	0.97	1.23	23.4
All Vehicles		2553	5.3	0.885	14.8	LOS B	21.8	565.9	0.78	0.82	22.8

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

9 Continuous movement



N
SB Rural
EB Slater
WB Slater
NB Rural
100
100
100
100

MOVEMENT SUMMARY

Site: SB I-5/Slater

2034 Mid Volumes
SB I-5 Ramps/Slater Ave
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: WB Slater											
1L	L	313	4.0	0.679	12.3	LOS B	0.0	0.0	0.00	0.90	28.6
6T	T	776	4.0	0.680	3.6	LOS A	0.0	0.0	0.00	0.32	32.0
Approach		1089	4.0	0.680	6.1	LOS B	0.0	0.0	0.00	0.49	30.8
North: SB I-5 Off-ramp											
7L	L	120	4.0	0.685	43.0	LOS D	8.9	228.5	0.98	1.27	18.9
4T	T	1	4.0	0.521	37.4	LOS D	8.9	228.5	0.98	1.27	20.3
4R	R	172	4.0	0.687	37.4	LOS D	8.9	228.5	0.98	1.27	19.3
Approach		293	4.0	0.686	39.7	LOS D	8.9	228.5	0.98	1.27	19.1
West: EB Slater											
2T	T	682	3.0	0.676	9.6	LOS A	9.0	230.6	0.84	0.89	27.9
2R	R	578	3.0	0.516	9.8	LOS A	4.5	115.3	0.62	0.69	33.4
Approach		1260	3.0	0.676	9.7	LOS A	9.0	230.6	0.74	0.80	30.3
All Vehicles		2642	3.5	0.686	11.5	LOS B	9.0	230.6	0.46	0.72	28.7

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

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SIDRA INTERSECTION 5.0.5.1510

Project: M:\10\10192 Ferndale Planned Action EIS\Traffic Operations (FEIS)\Sidra\2034 Alt 2 (Mitigated LOS C)\Slater RABs - Mid Volumes (LOS C).sip
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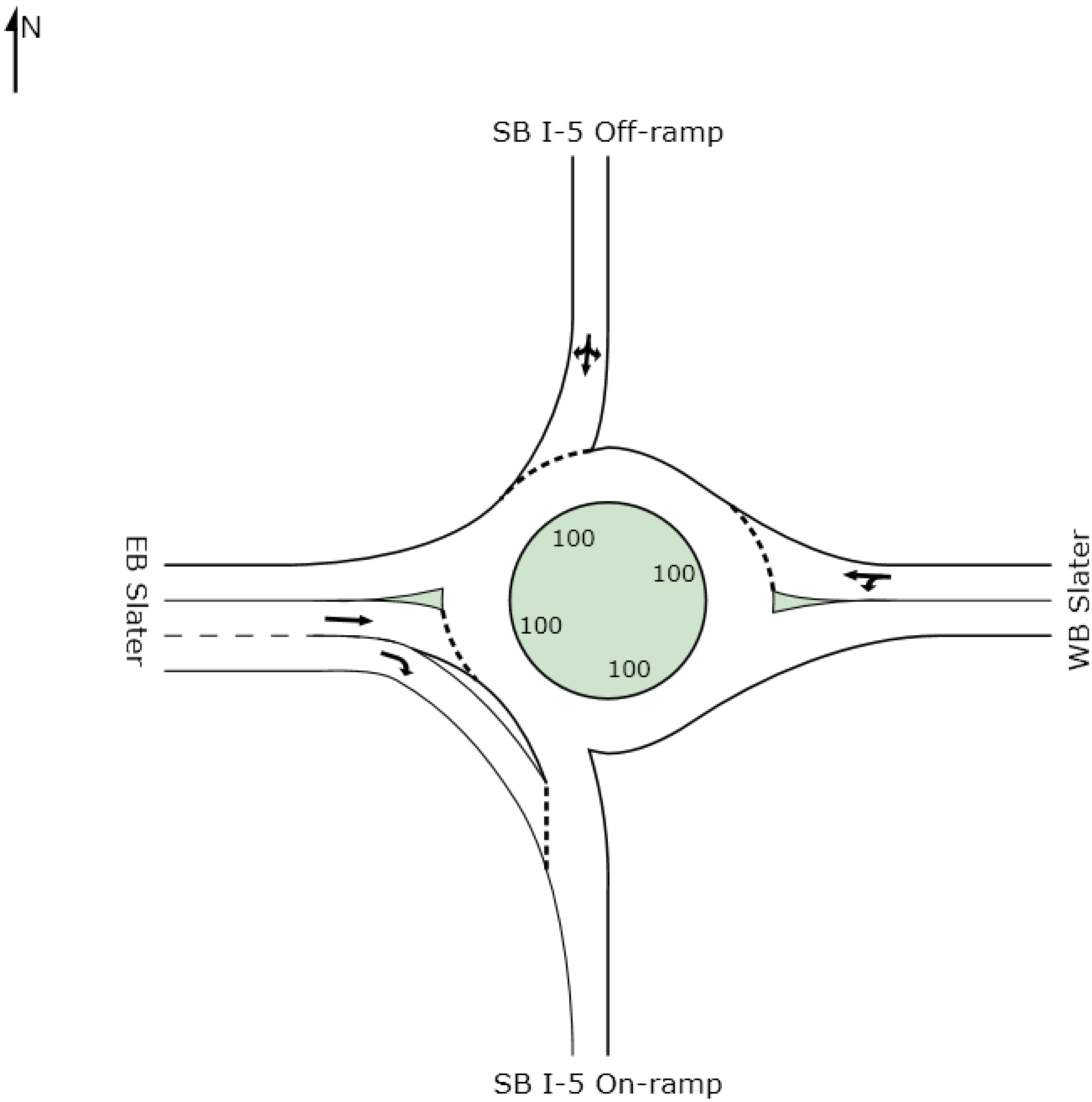

N
SB I-5 Off-ramp
EB Slater
WB Slater
100
100
100
100
SB I-5 On-ramp

MOVEMENT SUMMARY

Site: Smith@Barrett

2034 Mid-Growth
Mitigated to LOS C
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Barrett											
3L	L	174	0.0	0.944	49.9	LOS D	22.6	566.2	1.00	1.55	17.2
8T	T	384	0.0	0.942	43.8	LOS D	22.6	566.2	1.00	1.55	17.5
8R	R	84	0.0	0.260	17.8	LOS B	1.8	44.4	0.84	0.93	27.4
Approach		642	0.0	0.942	42.1	LOS D	22.6	566.2	0.98	1.47	18.3
East: WB Smith											
1L	L	37	2.0	0.624	20.8	LOS C	7.7	196.3	0.96	1.08	25.2
6T	T	389	2.0	0.629	12.9	LOS B	7.7	196.3	0.96	1.06	25.9
6R	R	284	2.0	0.494	13.0	LOS B	4.8	121.5	0.89	0.98	26.0
Approach		711	2.0	0.629	13.4	LOS C	7.7	196.3	0.93	1.03	25.9
North: SB Barrett											
7L	L	300	2.0	0.756	22.3	LOS C	11.6	294.9	1.00	1.18	22.8
4T	T	258	2.0	0.756	17.4	LOS B	11.6	294.9	1.00	1.18	24.9
4R	R	58	2.0	0.143	12.7	LOS B	0.9	23.3	0.73	0.82	26.2
Approach		616	2.0	0.756	19.3	LOS C	11.6	294.9	0.97	1.15	23.9
West: EB Smith											
5L	L	89	1.0	0.733	21.2	LOS C	10.8	271.4	1.00	1.14	23.5
2T	T	432	1.0	0.733	15.0	LOS B	10.8	271.4	1.00	1.14	24.8
2R	R	121	1.0	0.309	14.2	LOS B	2.2	55.0	0.80	0.91	26.7
Approach		642	1.0	0.732	15.7	LOS C	10.8	271.4	0.96	1.10	25.0
All Vehicles		2611	1.3	0.942	22.4	LOS C	22.6	566.2	0.96	1.18	22.9

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

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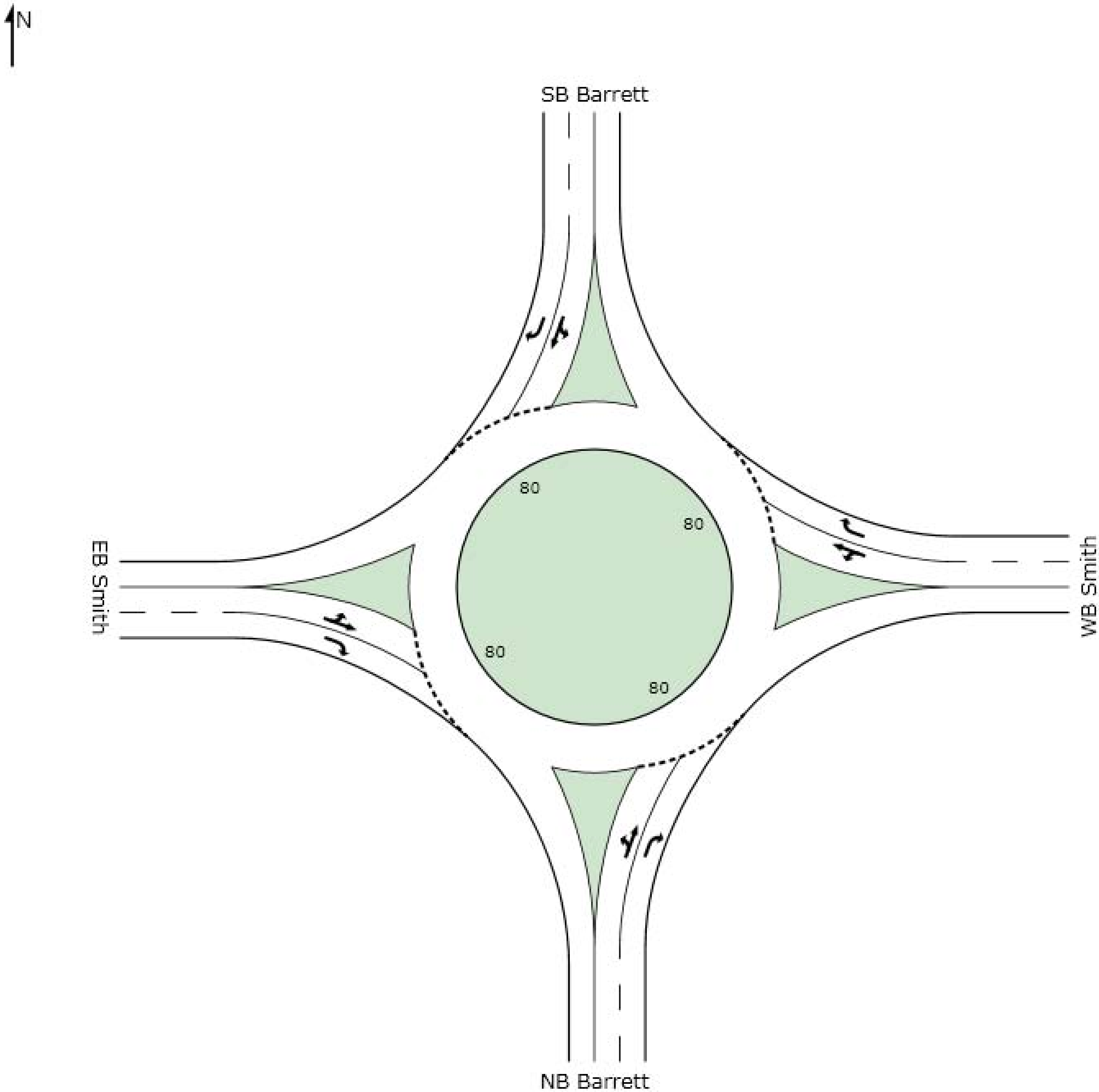
SIDRA INTERSECTION


N
SB Barrett
EB Smith
WB Smith
NB Barrett
80
80
80
80

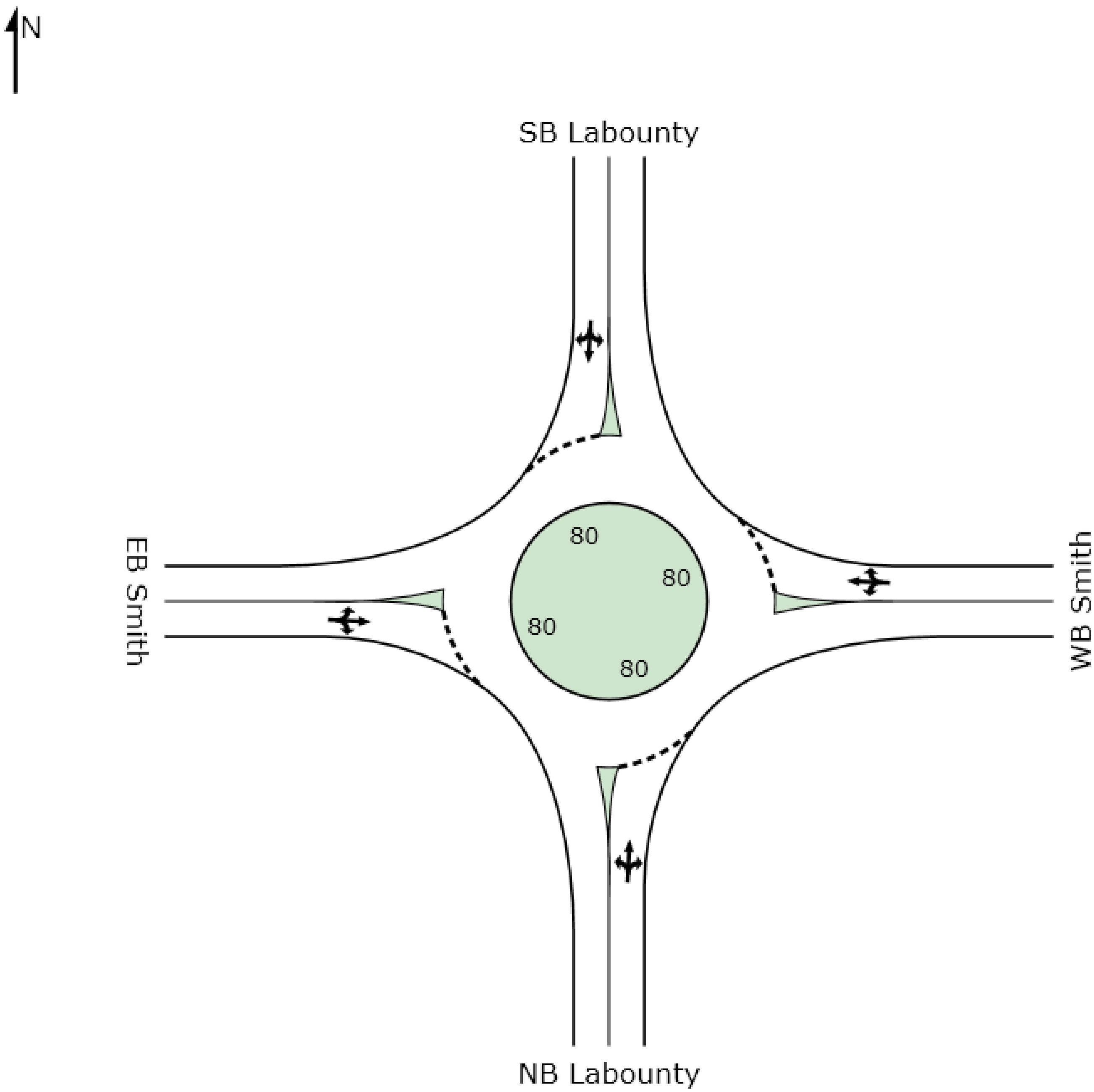
MOVEMENT SUMMARY

Site: Smith@LaBounty

2034 Mid-Growth
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Labounty											
3L	L	21	5.0	0.401	15.5	LOS B	3.1	79.6	0.74	0.93	25.8
8T	T	89	5.0	0.401	9.2	LOS A	3.1	79.6	0.74	0.79	27.8
8R	R	151	5.0	0.400	10.4	LOS B	3.1	79.6	0.74	0.82	27.6
Approach		260	5.0	0.400	10.4	LOS B	3.1	79.6	0.74	0.82	27.5
East: WB Smith											
1L	L	94	2.0	0.558	11.7	LOS B	6.2	156.9	0.53	0.72	27.3
6T	T	156	2.0	0.558	5.5	LOS A	6.2	156.9	0.53	0.49	28.8
6R	R	370	2.0	0.559	6.6	LOS A	6.2	156.9	0.53	0.55	28.7
Approach		620	2.0	0.558	7.1	LOS B	6.2	156.9	0.53	0.56	28.5
North: SB Labounty											
7L	L	313	1.0	0.478	13.1	LOS B	4.2	104.8	0.65	0.78	26.5
4T	T	99	1.0	0.478	6.9	LOS A	4.2	104.8	0.65	0.63	28.0
4R	R	5	1.0	0.473	8.0	LOS A	4.2	104.8	0.65	0.67	28.0
Approach		417	1.0	0.478	11.5	LOS B	4.2	104.8	0.65	0.75	26.9
West: EB Smith											
5L	L	5	4.0	0.306	15.0	LOS B	2.3	60.0	0.71	0.93	26.2
2T	T	177	4.0	0.315	8.8	LOS A	2.3	60.0	0.71	0.76	28.3
2R	R	21	4.0	0.316	9.9	LOS A	2.3	60.0	0.71	0.80	28.1
Approach		203	4.0	0.315	9.1	LOS B	2.3	60.0	0.71	0.77	28.2
All Vehicles		1500	2.5	0.558	9.2	LOS A	6.2	156.9	0.62	0.68	27.8

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.


N
SB Labounty
EB Smith
WB Smith
NB Labounty
80
80
80
80

Appendix B
Final EIS – Supplemental Transportation Analyses

Traffic Operations Analyses

LOS C – Traffic Signal Level of Service

HCM Signalized Intersection Capacity Analysis
1: Main St. & Fourth Avenue

Ferndale - Planned Action EIS
2034 Mid Volumes - Mitigated (LOS C)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	380	45	10	530	80	60	35	20	120	50	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98			0.98		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1770	1833		1787	1844			1773		1805	1750	
Flt Permitted	0.37	1.00		0.48	1.00			0.77		0.66	1.00	
Satd. Flow (perm)	680	1833		902	1844			1407		1262	1750	
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)	21	404	48	11	564	85	64	37	21	128	53	59
RTOR Reduction (vph)	0	3	0	0	4	0	0	9	0	0	50	0
Lane Group Flow (vph)	21	449	0	11	645	0	0	113	0	128	62	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	0%	0%	0%
Parking (#/hr)						0						
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)	66.7	66.7		66.7	66.7			14.3		14.3	14.3	
Effective Green, g (s)	66.2	66.2		66.2	66.2			13.8		13.8	13.8	
Actuated g/C Ratio	0.74	0.74		0.74	0.74			0.15		0.15	0.15	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	500	1348		663	1356			216		194	268	
v/s Ratio Prot		0.24			c0.35						0.04	
v/s Ratio Perm	0.03			0.01				0.08		c0.10		
v/c Ratio	0.04	0.33		0.02	0.48			0.52		0.66	0.23	
Uniform Delay, d1	3.2	4.2		3.2	4.8			35.1		35.9	33.4	
Progression Factor	1.00	1.00		0.23	0.30			1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.7		0.0	1.0			2.3		7.9	0.4	
Delay (s)	3.4	4.8		0.8	2.4			37.3		43.8	33.9	
Level of Service	A	A		A	A			D		D	C	
Approach Delay (s)		4.8			2.4			37.3			39.2	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Vista Drive & Third Avenue

Ferndale - Planned Action EIS
2034 Mid Volumes - Mitigated (LOS C)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	185	160	5	225	105	170	50	20	75	95	25
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	16	197	170	5	239	112	181	53	21	80	101	27

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	383	356	255	207
Volume Left (vph)	16	5	181	80
Volume Right (vph)	170	112	21	27
Hadj (s)	-0.24	-0.17	0.11	0.00
Departure Headway (s)	6.1	6.2	6.9	6.9
Degree Utilization, x	0.65	0.61	0.49	0.40
Capacity (veh/h)	555	535	457	446
Control Delay (s)	19.5	18.5	16.2	14.4
Approach Delay (s)	19.5	18.5	16.2	14.4
Approach LOS	C	C	C	B

Intersection Summary			
Delay	17.6		
HCM Level of Service	C		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	490	35	65	555	215	20	90	50	235	90	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		0.97	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1877		1779	1774		1710	1744		1735	1806	
Flt Permitted	0.23	1.00		0.39	1.00		0.68	1.00		0.64	1.00	
Satd. Flow (perm)	442	1877		729	1774		1230	1744		1166	1806	
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)	10	505	36	67	572	222	21	93	52	242	93	21
RTOR Reduction (vph)	0	3	0	0	13	0	0	24	0	0	10	0
Lane Group Flow (vph)	10	538	0	67	781	0	21	121	0	242	104	0
Confl. Peds. (#/hr)	13		5	5		13	18		13	13		18
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Parking (#/hr)			0			0			0			0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2	2		1			1		
Actuated Green, G (s)	57.8	57.8		57.8	57.8		23.2	23.2		23.2	23.2	
Effective Green, g (s)	57.3	57.3		57.3	57.3		22.7	22.7		22.7	22.7	
Actuated g/C Ratio	0.64	0.64		0.64	0.64		0.25	0.25		0.25	0.25	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Lane Grp Cap (vph)	281	1195		464	1129		310	440		294	456	
v/s Ratio Prot		0.29			c0.44			0.07			0.06	
v/s Ratio Perm	0.02			0.09			0.02			c0.21		
v/c Ratio	0.04	0.45		0.14	0.69		0.07	0.28		0.82	0.23	
Uniform Delay, d1	6.1	8.3		6.5	10.6		25.6	27.0		31.8	26.7	
Progression Factor	0.91	0.76		0.48	0.38		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.2		0.2	1.2		0.1	0.4		17.2	0.3	
Delay (s)	5.8	7.5		3.4	5.2		25.7	27.5		49.0	27.0	
Level of Service	A	A		A	A		C	C		D	C	
Approach Delay (s)		7.5			5.1			27.2			41.9	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	710	15	60	830	300	10	40	45	240	35	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		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	1.00		1.00	0.96		1.00	0.92		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1892		1787	1789		1805	1726		1796	1835	
Flt Permitted	0.07	1.00		0.28	1.00		0.73	1.00		0.70	1.00	
Satd. Flow (perm)	124	1892		523	1789		1379	1726		1322	1835	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	747	16	63	874	316	11	42	47	253	37	11
RTOR Reduction (vph)	0	1	0	0	14	0	0	37	0	0	9	0
Lane Group Flow (vph)	11	762	0	63	1176	0	11	52	0	253	39	0
Confl. Peds. (#/hr)	6		10	10		6			2	2		
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Parking (#/hr)			0			0			0			0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)	61.9	61.9		61.9	61.9		19.1	19.1		19.1	19.1	
Effective Green, g (s)	61.4	61.4		61.4	61.4		18.6	18.6		18.6	18.6	
Actuated g/C Ratio	0.68	0.68		0.68	0.68		0.21	0.21		0.21	0.21	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Lane Grp Cap (vph)	85	1291		357	1220		285	357		273	379	
v/s Ratio Prot		0.40			c0.66			0.03			0.02	
v/s Ratio Perm	0.09			0.12			0.01			c0.19		
v/c Ratio	0.13	0.59		0.18	0.96		0.04	0.14		0.93	0.10	
Uniform Delay, d1	5.0	7.6		5.2	13.3		28.5	29.2		35.0	28.9	
Progression Factor	1.03	1.02		0.53	0.54		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	1.7		0.7	13.5		0.1	0.2		35.6	0.1	
Delay (s)	7.9	9.5		3.4	20.6		28.6	29.4		70.6	29.1	
Level of Service	A	A		A	C		C	C		E	C	
Approach Delay (s)		9.5			19.7			29.3			64.0	
Approach LOS		A			B			C			E	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

5: Main St. & First Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	975	35	150	1115	5	30	5	165	10	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	1.00	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	1.00		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1787	1867		1787	1880			1790	1599		1728	
Flt Permitted	0.14	1.00		0.19	1.00			0.72	1.00		0.91	
Satd. Flow (perm)	268	1867		364	1880			1353	1599		1598	
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)	16	1037	37	160	1186	5	32	5	176	11	11	21
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	143	0	19	0
Lane Group Flow (vph)	16	1073	0	160	1191	0	0	37	33	0	24	0
Confl. Peds. (#/hr)	2		17	17		2	3					3
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Parking (#/hr)			0									
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1		1	1		
Actuated Green, G (s)	72.1	72.1		72.1	72.1			8.9	8.9		8.9	
Effective Green, g (s)	71.6	71.6		71.6	71.6			8.4	8.4		8.4	
Actuated g/C Ratio	0.80	0.80		0.80	0.80			0.09	0.09		0.09	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	213	1485		290	1496			126	149		149	
v/s Ratio Prot		0.57			c0.63							
v/s Ratio Perm	0.06			0.44				c0.03	0.02		0.01	
v/c Ratio	0.08	0.72		0.55	0.80			0.29	0.22		0.16	
Uniform Delay, d1	2.0	4.4		3.4	5.1			38.0	37.8		37.6	
Progression Factor	0.38	0.44		0.86	0.79			1.00	1.00		1.00	
Incremental Delay, d2	0.5	2.4		4.5	2.7			1.3	0.7		0.5	
Delay (s)	1.3	4.4		7.3	6.8			39.3	38.5		38.1	
Level of Service	A	A		A	A			D	D		D	
Approach Delay (s)		4.3			6.8			38.7			38.1	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

6: Main St. & Hovander Road

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	965	170	30	1100	185	60
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		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1835		1787	1881	1787	1599
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	1835		1787	1881	1787	1599
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1016	179	32	1158	195	63
RTOR Reduction (vph)	6	0	0	0	0	53
Lane Group Flow (vph)	1189	0	32	1158	195	10
Confl. Peds. (#/hr)		3	3			
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type			Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	61.6		2.6	68.2	13.8	13.8
Effective Green, g (s)	61.6		2.6	68.2	13.8	13.8
Actuated g/C Ratio	0.68		0.03	0.76	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)	1256		52	1425	274	245
v/s Ratio Prot	c0.65		0.02	c0.62	c0.11	
v/s Ratio Perm						0.01
v/c Ratio	0.95		0.62	0.81	0.71	0.04
Uniform Delay, d1	12.7		43.2	6.9	36.2	32.5
Progression Factor	0.86		0.91	0.83	1.00	1.00
Incremental Delay, d2	12.2		14.0	3.6	8.4	0.1
Delay (s)	23.1		53.4	9.4	44.6	32.5
Level of Service	C		D	A	D	C
Approach Delay (s)	23.1			10.5	41.7	
Approach LOS	C			B	D	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.7%	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												
Volume (vph)	25	930	80	240	865	150	235	15	140	140	20	30
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	5.0	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	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	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	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.86		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3524		1787	1881	1564	1805	1617		1797	1730	
Flt Permitted	0.16	1.00		0.16	1.00	1.00	0.72	1.00		0.57	1.00	
Satd. Flow (perm)	296	3524		297	1881	1564	1374	1617		1072	1730	
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)	26	969	83	250	901	156	245	16	146	146	21	31
RTOR Reduction (vph)	0	6	0	0	0	63	0	112	0	0	24	0
Lane Group Flow (vph)	26	1046	0	250	901	93	245	50	0	146	28	0
Confl. Peds. (#/hr)	1		6	6		1			5	5		
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	45.7	43.3		60.0	52.6	52.6	20.0	20.0		20.0	20.0	
Effective Green, g (s)	47.7	44.3		61.0	53.6	52.6	21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.53	0.49		0.68	0.60	0.58	0.23	0.23		0.23	0.23	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	213	1735		412	1120	914	321	377		250	404	
v/s Ratio Prot	0.00	0.30		c0.09	c0.48			0.03			0.02	
v/s Ratio Perm	0.06			0.33		0.06	c0.18			0.14		
v/c Ratio	0.12	0.60		0.61	0.80	0.10	0.76	0.13		0.58	0.07	
Uniform Delay, d1	13.2	16.5		9.9	14.1	8.3	32.2	27.3		30.6	26.9	
Progression Factor	1.12	0.88		0.83	0.94	1.22	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.7		1.6	4.0	0.1	10.3	0.2		3.5	0.1	
Delay (s)	14.9	15.3		9.8	17.4	10.2	42.5	27.5		34.1	27.0	
Level of Service	B	B		A	B	B	D	C		C	C	
Approach Delay (s)		15.3			15.1			36.5			32.2	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	890	235	400	755	230	395	75	565	235	65	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	5.0	3.0	4.0		3.0	4.0	4.0	3.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00	1.00	0.99	
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	0.96		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	1.00	0.95	1.00	
Satd. Flow (prot)	1787	3574	1564	1787	3449		1769	1863	1583	1752	1657	
Flt Permitted	0.23	1.00	1.00	0.14	1.00		0.28	1.00	1.00	0.70	1.00	
Satd. Flow (perm)	432	3574	1564	259	3449		528	1863	1583	1298	1657	
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)	92	967	255	435	821	250	429	82	614	255	71	114
RTOR Reduction (vph)	0	0	183	0	31	0	0	0	24	0	64	0
Lane Group Flow (vph)	92	967	72	435	1040	0	429	82	590	255	121	0
Confl. Peds. (#/hr)			1	1			2					2
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Turn Type	pm+pt		Perm	pm+pt			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	29.1	25.0	25.0	47.9	39.8		32.1	17.5	36.4	20.7	10.1	
Effective Green, g (s)	31.1	26.0	25.0	48.9	40.8		33.1	18.5	36.4	22.7	11.1	
Actuated g/C Ratio	0.35	0.29	0.28	0.54	0.45		0.37	0.21	0.40	0.25	0.12	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	4.0	4.0	5.0	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0		3.0	0.2	3.0	3.0	3.0	
Lane Grp Cap (vph)	226	1032	434	479	1564		456	383	640	386	204	
v/s Ratio Prot	0.02	0.27		c0.20	0.30		c0.20	0.04	c0.19	0.09	0.07	
v/s Ratio Perm	0.12		0.05	c0.29			c0.15		0.18	0.08		
v/c Ratio	0.41	0.94	0.16	0.91	0.66		0.94	0.21	0.92	0.66	0.59	
Uniform Delay, d1	20.4	31.2	24.6	23.9	19.3		24.3	29.7	25.4	29.4	37.3	
Progression Factor	0.85	0.75	1.37	0.77	0.87		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	14.6	0.7	17.1	1.7		27.8	0.1	18.8	4.2	4.6	
Delay (s)	18.4	38.2	34.5	35.5	18.5		52.1	29.8	44.2	33.7	41.9	
Level of Service	B	D	C	D	B		D	C	D	C	D	
Approach Delay (s)		36.1			23.4			46.1			37.1	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	34.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	119.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

9: Main St. & I-5 SB Ramps

2034 Mid Volumes - Mitigated (LOS C)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1135	645	230	1155	0	0	0	0	780	5	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	5.0	4.0	4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95					0.95	0.95	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		3574	1599	1787	3574					1649	1654	1553
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		3574	1599	1787	3574					1649	1654	1553
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)	0	1220	694	247	1242	0	0	0	0	839	5	430
RTOR Reduction (vph)	0	0	380	0	0	0	0	0	0	0	0	54
Lane Group Flow (vph)	0	1220	314	247	1242	0	0	0	0	419	425	376
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	4%	4%	4%
Turn Type			Perm	Prot						Split		Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Actuated Green, G (s)		36.3	36.3	14.7	55.5					24.5	24.5	24.5
Effective Green, g (s)		37.3	36.3	15.2	56.5					25.5	25.5	25.5
Actuated g/C Ratio		0.41	0.40	0.17	0.63					0.28	0.28	0.28
Clearance Time (s)		5.0	5.0	4.5	5.0					5.0	5.0	5.0
Vehicle Extension (s)		4.0	4.0	2.5	4.0					3.5	3.5	3.5
Lane Grp Cap (vph)		1481	645	302	2244					467	469	440
v/s Ratio Prot		c0.34		c0.14	0.35					0.25	c0.26	
v/s Ratio Perm			0.20									0.24
v/c Ratio		0.82	0.49	0.82	0.55					0.90	0.91	0.85
Uniform Delay, d1		23.4	19.9	36.1	9.6					31.0	31.1	30.5
Progression Factor		0.98	2.16	1.14	0.45					1.00	1.00	1.00
Incremental Delay, d2		3.0	1.4	7.4	0.4					19.9	21.2	15.1
Delay (s)		26.0	44.6	48.7	4.8					50.9	52.3	45.6
Level of Service		C	D	D	A					D	D	D
Approach Delay (s)		32.7			12.0			0.0			49.6	
Approach LOS		C			B			A			D	

Intersection Summary			
HCM Average Control Delay	30.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

10: Main St. & I-5 NB Ramps

2034 Mid Volumes - Mitigated (LOS C)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	465	1055	395	55	790	415	130	370	70	185	50	470
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	
Frt	1.00	0.96		1.00	0.95		1.00	0.98		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	3428		1770	3356		1805	1855		1770	1610	
Flt Permitted	0.95	1.00		0.95	1.00		0.19	1.00		0.28	1.00	
Satd. Flow (perm)	3467	3428		1770	3356		358	1855		517	1610	
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)	484	1099	411	57	823	432	135	385	73	193	52	490
RTOR Reduction (vph)	0	42	0	0	75	0	0	7	0	0	160	0
Lane Group Flow (vph)	484	1468	0	57	1180	0	135	451	0	193	382	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	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)	12.3	38.9		4.1	30.7		33.5	33.5		33.5	33.5	
Effective Green, g (s)	12.8	39.4		4.6	31.2		34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.14	0.44		0.05	0.35		0.38	0.38		0.38	0.38	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	4.0		2.5	4.0		2.5	2.5		3.5	3.5	
Lane Grp Cap (vph)	493	1501		90	1163		135	701		195	608	
v/s Ratio Prot	c0.14	c0.43		0.03	0.35			0.24			0.24	
v/s Ratio Perm							c0.38			0.37		
v/c Ratio	0.98	0.98		0.63	1.01		1.00	0.64		0.99	0.63	
Uniform Delay, d1	38.5	24.9		41.9	29.4		28.0	23.0		27.8	22.8	
Progression Factor	0.93	0.61		0.89	1.10		1.00	1.00		1.00	1.00	
Incremental Delay, d2	24.2	12.0		9.4	26.8		77.5	1.8		60.9	2.1	
Delay (s)	59.9	27.3		46.6	59.2		105.5	24.8		88.8	25.0	
Level of Service	E	C		D	E		F	C		F	C	
Approach Delay (s)		35.2			58.7			43.2			41.7	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM Average Control Delay	43.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	120.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	410	900	915	70	70	345
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	1.00	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		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)	1752	1845	3530		1641	1468
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1752	1845	3530		1641	1468
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	432	947	963	74	74	363
RTOR Reduction (vph)	0	0	5	0	0	323
Lane Group Flow (vph)	432	947	1032	0	74	40
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	3%	3%	1%	1%	10%	10%
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	26.1	72.0	41.9		10.0	10.0
Effective Green, g (s)	26.1	72.0	41.9		10.0	10.0
Actuated g/C Ratio	0.29	0.80	0.47		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)	508	1476	1643		182	163
v/s Ratio Prot	c0.25	c0.51	0.29		c0.05	
v/s Ratio Perm						0.03
v/c Ratio	0.85	0.64	0.63		0.41	0.25
Uniform Delay, d1	30.1	3.7	18.2		37.2	36.6
Progression Factor	1.44	0.58	1.00		1.00	1.00
Incremental Delay, d2	5.0	0.8	1.8		1.5	0.8
Delay (s)	48.5	2.9	20.0		38.7	37.4
Level of Service	D	A	B		D	D
Approach Delay (s)		17.2	20.0		37.6	
Approach LOS		B	B		D	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	690	35	10	615	0	20	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			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)	5	750	38	11	668	0	22	0	22	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)												
pX, platoon unblocked												
vC, conflicting volume	668			788			1470	1470	769	1492	1489	668
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	668			788			1470	1470	769	1492	1489	668
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 %	99			99			79	100	95	100	100	100
cM capacity (veh/h)	926			836			105	126	404	96	123	461

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	793	679	43	0
Volume Left	5	11	22	0
Volume Right	38	0	22	0
cSH	926	836	167	1700
Volume to Capacity	0.01	0.01	0.26	0.00
Queue Length 95th (ft)	0	1	25	0
Control Delay (s)	0.2	0.3	34.1	0.0
Lane LOS	A	A	D	A
Approach Delay (s)	0.2	0.3	34.1	0.0
Approach LOS			D	A

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	520	85	30	460	25	100	195	45	25	105	60
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.98			0.96	
Flt Protected		0.99			1.00			0.99			0.99	
Satd. Flow (prot)		1839			1863			1834			1789	
Flt Permitted		0.89			0.94			0.85			0.94	
Satd. Flow (perm)		1641			1762			1589			1694	
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)	92	565	92	33	500	27	109	212	49	27	114	65
RTOR Reduction (vph)	0	9	0	0	3	0	0	9	0	0	28	0
Lane Group Flow (vph)	0	740	0	0	557	0	0	361	0	0	178	0
Confl. Peds. (#/hr)									1	1		
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.8			27.8			15.6			15.6	
Effective Green, g (s)		27.8			27.8			15.6			15.6	
Actuated g/C Ratio		0.54			0.54			0.30			0.30	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		888			953			482			514	
v/s Ratio Prot												
v/s Ratio Perm		c0.45			0.32			c0.23			0.11	
v/c Ratio		0.83			0.58			0.75			0.35	
Uniform Delay, d1		9.9			7.9			16.1			13.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		6.8			0.9			6.3			0.4	
Delay (s)		16.6			8.8			22.4			14.3	
Level of Service		B			A			C			B	
Approach Delay (s)		16.6			8.8			22.4			14.3	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	51.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	515	5	5	450	5	5	45	5	5	10	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			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)	27	560	5	5	489	5	5	49	5	5	11	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	495			565			1152	1122	562	1149	1122	492
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495			565			1152	1122	562	1149	1122	492
tC, single (s)	4.1			4.1			7.2	6.6	6.3	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	97			99			96	75	99	96	94	95
cM capacity (veh/h)	1064			992			152	196	519	130	190	555

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	592	500	60	43
Volume Left	27	5	5	5
Volume Right	5	5	5	27
cSH	1064	992	202	294
Volume to Capacity	0.03	0.01	0.30	0.15
Queue Length 95th (ft)	2	0	30	13
Control Delay (s)	0.7	0.2	30.1	19.3
Lane LOS	A	A	D	C
Approach Delay (s)	0.7	0.2	30.1	19.3
Approach LOS			D	C

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

15: W Axton Rd & Guide Meridian Rd

2034 Mid Volumes - Mitigated (LOS C)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	150	155	15	110	10	195	1455	25	30	995	190
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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1687	1776	1509	1736	1803		1736	3471	1553	1719	3438	1538
Flt Permitted	0.40	1.00	1.00	0.66	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	711	1776	1509	1200	1803		1736	3471	1553	1719	3438	1538
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)	284	158	163	16	116	11	205	1532	26	32	1047	200
RTOR Reduction (vph)	0	0	119	0	3	0	0	0	11	0	0	113
Lane Group Flow (vph)	284	158	44	16	124	0	205	1532	15	32	1047	87
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	4%	4%	4%	5%	5%	5%
Turn Type	pm+pt		Perm	pm+pt			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	37.3	31.8	31.8	16.5	15.0		17.0	65.3	65.3	2.3	50.6	50.6
Effective Green, g (s)	37.3	31.8	31.8	16.5	15.0		17.0	65.3	65.3	2.3	50.6	50.6
Actuated g/C Ratio	0.32	0.27	0.27	0.14	0.13		0.15	0.56	0.56	0.02	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	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	3.0	3.0	3.0
Lane Grp Cap (vph)	380	483	410	176	231		252	1939	868	34	1488	666
v/s Ratio Prot	c0.12	0.09		0.00	0.07		c0.12	c0.44		0.02	0.30	
v/s Ratio Perm	c0.12		0.03	0.01					0.01			0.06
v/c Ratio	0.75	0.33	0.11	0.09	0.54		0.81	0.79	0.02	0.94	0.70	0.13
Uniform Delay, d1	32.9	34.0	31.9	43.5	47.7		48.4	20.4	11.5	57.2	27.0	19.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.8	0.4	0.1	0.2	2.4		17.9	3.4	0.0	129.7	1.5	0.1
Delay (s)	40.7	34.4	32.0	43.7	50.1		66.3	23.8	11.5	187.0	28.6	20.0
Level of Service	D	C	C	D	D		E	C	B	F	C	C
Approach Delay (s)		36.7			49.4			28.5			31.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	31.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	116.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

16: Smith Rd & Labounty Drive

2034 Mid Volumes - Mitigated (LOS C)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	170	20	90	150	355	20	85	145	300	95	5
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.92			0.92			1.00	
Flt Protected		1.00			0.99			1.00			0.96	
Satd. Flow (prot)		1799			1700			1662			1810	
Flt Permitted		0.99			0.92			0.96			0.63	
Satd. Flow (perm)		1778			1575			1598			1186	
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)	5	177	21	94	156	370	21	89	151	312	99	5
RTOR Reduction (vph)	0	7	0	0	93	0	0	82	0	0	1	0
Lane Group Flow (vph)	0	196	0	0	527	0	0	179	0	0	415	0
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	5%	5%	5%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.0			21.0			22.3			22.3	
Effective Green, g (s)		21.0			21.0			22.3			22.3	
Actuated g/C Ratio		0.41			0.41			0.43			0.43	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		728			645			695			516	
v/s Ratio Prot												
v/s Ratio Perm		0.11			c0.33			0.11			c0.35	
v/c Ratio		0.27			0.82			0.26			0.81	
Uniform Delay, d1		10.1			13.4			9.2			12.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			7.9			0.2			8.9	
Delay (s)		10.3			21.4			9.4			21.5	
Level of Service		B			C			A			C	
Approach Delay (s)		10.3			21.4			9.4			21.5	
Approach LOS		B			C			A			C	

Intersection Summary			
HCM Average Control Delay	17.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	108.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

17: Smith Rd & Barrett Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	410	115	35	370	270	165	365	80	285	245	55
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	1.00	1.00			1.00	1.00		1.00		1.00	1.00	
Frt	1.00	0.97			1.00	0.85		0.98		1.00	0.97	
Flt Protected	0.95	1.00			1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)	1787	1819			1855	1583		1841		1770	1811	
Flt Permitted	0.34	1.00			0.74	1.00		0.79		0.39	1.00	
Satd. Flow (perm)	647	1819			1387	1583		1483		730	1811	
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)	89	432	121	37	389	284	174	384	84	300	258	58
RTOR Reduction (vph)	0	17	0	0	0	179	0	9	0	0	14	0
Lane Group Flow (vph)	89	536	0	0	426	105	0	633	0	300	302	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	20.3	20.3			20.3	20.3		26.6		26.6	26.6	
Effective Green, g (s)	20.3	20.3			20.3	20.3		26.6		26.6	26.6	
Actuated g/C Ratio	0.37	0.37			0.37	0.37		0.48		0.48	0.48	
Clearance Time (s)	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	
Lane Grp Cap (vph)	239	673			513	585		719		354	877	
v/s Ratio Prot		0.29									0.17	
v/s Ratio Perm	0.14				c0.31	0.07		c0.43		0.41		
v/c Ratio	0.37	0.80			0.83	0.18		0.88		0.85	0.34	
Uniform Delay, d1	12.6	15.5			15.7	11.7		12.7		12.4	8.8	
Progression Factor	1.00	1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	1.0	6.5			10.9	0.1		12.1		16.9	0.2	
Delay (s)	13.6	22.0			26.7	11.8		24.8		29.2	9.0	
Level of Service	B	C			C	B		C		C	A	
Approach Delay (s)		20.8			20.7			24.8			18.9	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	54.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	104.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

18: Smith Rd & Northwest Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	565	100	200	495	45	80	245	235	25	135	45
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	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	
Frt		0.98			0.99			1.00	0.85		0.97	
Flt Protected		0.99			0.99			0.99	1.00		0.99	
Satd. Flow (prot)		1814			1819			1858	1599		1809	
Flt Permitted		0.85			0.66			0.82	1.00		0.76	
Satd. Flow (perm)		1544			1214			1543	1599		1380	
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)	96	601	106	213	527	48	85	261	250	27	144	48
RTOR Reduction (vph)	0	9	0	0	4	0	0	0	192	0	17	0
Lane Group Flow (vph)	0	794	0	0	784	0	0	346	58	0	202	0
Confl. Peds. (#/hr)	3		5	5		3	2					2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		38.0			38.0			14.0	14.0		14.0	
Effective Green, g (s)		38.0			38.0			14.0	14.0		14.0	
Actuated g/C Ratio		0.63			0.63			0.23	0.23		0.23	
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)		978			769			360	373		322	
v/s Ratio Prot												
v/s Ratio Perm		0.51			c0.65			c0.22	0.04		0.15	
v/c Ratio		0.81			1.02			0.96	0.16		0.63	
Uniform Delay, d1		8.3			11.0			22.7	18.3		20.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		5.2			37.4			37.1	0.2		3.8	
Delay (s)		13.5			48.4			59.8	18.5		24.5	
Level of Service		B			D			E	B		C	
Approach Delay (s)		13.5			48.4			42.5			24.5	
Approach LOS		B			D			D			C	

Intersection Summary			
HCM Average Control Delay	33.1	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
19: Smith Rd & Aldrich Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	825	5	25	685	10	5	25	60	5	10	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			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)	11	897	5	27	745	11	5	27	65	5	11	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	755			902			1731	1731	899	1802	1728	750
vC1, stage 1 conf vol							921	921		804	804	
vC2, stage 2 conf vol							810	810		997	924	
vCu, unblocked vol	755			902			1731	1731	899	1802	1728	750
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			98	90	81	97	96	99
cM capacity (veh/h)	851			741			236	261	340	169	253	415

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	11	902	27	755	98	22
Volume Left	11	0	27	0	5	5
Volume Right	0	5	0	11	65	5
cSH	851	1700	741	1700	307	246
Volume to Capacity	0.01	0.53	0.04	0.44	0.32	0.09
Queue Length 95th (ft)	1	0	3	0	33	7
Control Delay (s)	9.3	0.0	10.0	0.0	22.1	21.0
Lane LOS	A		B		C	C
Approach Delay (s)	0.1		0.3		22.1	21.0
Approach LOS					C	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
20: Smith Rd & Guide Meridian Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	460	240	170	250	100	330	1325	325	165	845	155
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	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.95		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3357		1770	3387		3433	3539	1583	3400	3505	1568
Flt Permitted	0.44	1.00		0.26	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	814	3357		478	3387		3433	3539	1583	3400	3505	1568
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)	231	495	258	183	269	108	355	1425	349	177	909	167
RTOR Reduction (vph)	0	97	0	0	62	0	0	0	128	0	0	107
Lane Group Flow (vph)	231	656	0	183	315	0	355	1425	221	177	909	60
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Turn Type	pm+pt			pm+pt			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	19.6	15.6		19.6	15.6		9.0	30.0	30.0	4.0	25.0	25.0
Effective Green, g (s)	19.6	15.6		19.6	15.6		9.0	30.0	30.0	4.0	25.0	25.0
Actuated g/C Ratio	0.28	0.22		0.28	0.22		0.13	0.43	0.43	0.06	0.36	0.36
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	284	752		209	759		444	1525	682	195	1259	563
v/s Ratio Prot	0.05	0.20		c0.05	0.09		c0.10	c0.40		0.05	0.26	
v/s Ratio Perm	0.18			c0.20					0.14			0.04
v/c Ratio	0.81	0.87		0.88	0.41		0.80	0.93	0.32	0.91	0.72	0.11
Uniform Delay, d1	22.5	26.0		23.8	23.1		29.4	18.9	13.1	32.6	19.3	14.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.1	10.9		30.9	0.4		9.7	12.0	1.3	39.2	2.1	0.1
Delay (s)	38.6	36.9		54.8	23.5		39.1	30.8	14.4	71.8	21.4	14.9
Level of Service	D	D		D	C		D	C	B	E	C	B
Approach Delay (s)		37.3			33.7			29.5			27.6	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	31.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	69.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: Slater Road & Rural Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	570	55	405	440	85	105	15	500	175	15	20
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1736	1803		1719	1810	1538	1687	1776	1509	1703	1640	
Flt Permitted	0.49	1.00		0.14	1.00	1.00	0.73	1.00	1.00	0.75	1.00	
Satd. Flow (perm)	904	1803		252	1810	1538	1302	1776	1509	1339	1640	
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)	16	606	59	431	468	90	112	16	532	186	16	21
RTOR Reduction (vph)	0	4	0	0	0	30	0	0	61	0	16	0
Lane Group Flow (vph)	16	661	0	431	468	60	112	16	471	186	21	0
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	7%	7%	7%	6%	6%	6%
Turn Type	pm+pt			pm+pt		Perm	Perm		pm+ov	Perm		
Protected Phases	7	4		3	8			2	3		6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	31.4	30.3		46.3	40.2	40.2	14.9	14.9	25.9	14.9	14.9	
Effective Green, g (s)	33.4	31.3		47.3	41.2	41.2	15.9	15.9	27.9	15.9	15.9	
Actuated g/C Ratio	0.47	0.44		0.66	0.58	0.58	0.22	0.22	0.39	0.22	0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	2.5		3.0	2.5	2.5	3.6	3.6	3.0	3.6	3.6	
Lane Grp Cap (vph)	449	793		415	1047	890	291	397	676	299	366	
v/s Ratio Prot	0.00	0.37		c0.18	0.26			0.01	c0.12		0.01	
v/s Ratio Perm	0.02			c0.52		0.04	0.09		0.19	0.14		
v/c Ratio	0.04	0.83		1.04	0.45	0.07	0.38	0.04	0.70	0.62	0.06	
Uniform Delay, d1	10.1	17.6		18.8	8.5	6.6	23.5	21.7	18.1	24.9	21.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	7.4		54.5	0.2	0.0	1.0	0.1	3.1	4.2	0.1	
Delay (s)	10.2	25.0		73.3	8.7	6.6	24.5	21.7	21.2	29.2	21.8	
Level of Service	B	C		E	A	A	C	C	C	C	C	
Approach Delay (s)		24.7			36.7			21.8			28.0	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	28.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
22: Slater Road & I-5 SB Ramps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	655	555	300	745	0	0	0	0	115	0	165
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	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		1845	1568	1736	1827						1736	1553
Flt Permitted		1.00	1.00	0.16	1.00						0.95	1.00
Satd. Flow (perm)		1845	1568	297	1827						1736	1553
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)	0	682	578	312	776	0	0	0	0	120	0	172
RTOR Reduction (vph)	0	0	192	0	0	0	0	0	0	0	0	144
Lane Group Flow (vph)	0	682	386	312	776	0	0	0	0	0	120	28
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	0%	0%	0%	4%	4%	4%
Turn Type			Perm	pm+pt						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4	8						6		6
Actuated Green, G (s)		29.1	29.1	43.6	43.6						10.0	10.0
Effective Green, g (s)		29.1	29.1	43.6	43.6						10.0	10.0
Actuated g/C Ratio		0.47	0.47	0.71	0.71						0.16	0.16
Clearance Time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		872	741	455	1293						282	252
v/s Ratio Prot		c0.37		c0.12	0.42							
v/s Ratio Perm			0.25	0.37							0.07	0.02
v/c Ratio		0.78	0.52	0.69	0.60						0.43	0.11
Uniform Delay, d1		13.6	11.4	9.3	4.6						23.2	22.0
Progression Factor		1.00	1.00	1.00	1.00						1.00	1.00
Incremental Delay, d2		4.6	0.7	4.3	0.8						1.0	0.2
Delay (s)		18.2	12.0	13.5	5.4						24.3	22.2
Level of Service		B	B	B	A						C	C
Approach Delay (s)		15.4			7.7			0.0			23.0	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	61.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

23: Slater Road & I-5 NB Ramps

2034 Mid Volumes - Mitigated (LOS C)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	580	0	0	740	255	310	0	430	0	0	0
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	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)	1770	1863			1881	1599		1787	1599			
Flt Permitted	0.11	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	197	1863			1881	1599		1787	1599			
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)	202	617	0	0	787	271	330	0	457	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	48	0	0	227	0	0	0
Lane Group Flow (vph)	202	617	0	0	787	223	0	330	230	0	0	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases	4					8	2		2			
Actuated Green, G (s)	45.1	45.1			33.9	33.9		17.9	17.9			
Effective Green, g (s)	45.1	45.1			33.9	33.9		17.9	17.9			
Actuated g/C Ratio	0.64	0.64			0.48	0.48		0.25	0.25			
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	285	1183			898	763		451	403			
v/s Ratio Prot	c0.07	0.33			c0.42							
v/s Ratio Perm	0.38					0.14		0.18	0.14			
v/c Ratio	0.71	0.52			0.88	0.29		0.73	0.57			
Uniform Delay, d1	13.5	7.1			16.7	11.3		24.3	23.2			
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	7.8	0.4			9.6	0.2		6.0	2.0			
Delay (s)	21.3	7.5			26.3	11.5		30.4	25.2			
Level of Service	C	A			C	B		C	C			
Approach Delay (s)		10.9			22.5			27.3			0.0	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	71.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

24: Slater Road & Pacific Highway

2034 Mid Volumes - Mitigated (LOS C)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	440	510	70	10	540	135	165	60	30	120	25	290
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	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	0.85	1.00	0.95		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1829		1787	1881	1599	1787	1786		1770	1605	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.34	1.00		0.69	1.00	
Satd. Flow (perm)	3433	1829		1787	1881	1599	637	1786		1292	1605	
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)	478	554	76	11	587	147	179	65	33	130	27	315
RTOR Reduction (vph)	0	5	0	0	0	90	0	23	0	0	223	0
Lane Group Flow (vph)	478	625	0	11	587	57	179	75	0	130	119	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		
Actuated Green, G (s)	12.7	41.3		0.7	29.3	29.3	22.2	22.2		22.2	22.2	
Effective Green, g (s)	12.7	41.3		0.7	29.3	29.3	22.2	22.2		22.2	22.2	
Actuated g/C Ratio	0.17	0.54		0.01	0.38	0.38	0.29	0.29		0.29	0.29	
Clearance Time (s)	4.0	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	3.0	
Lane Grp Cap (vph)	572	991		16	723	615	186	520		376	468	
v/s Ratio Prot	c0.14	0.34		0.01	c0.31			0.04			0.07	
v/s Ratio Perm						0.04	c0.28			0.10		
v/c Ratio	0.84	0.63		0.69	0.81	0.09	0.96	0.14		0.35	0.25	
Uniform Delay, d1	30.7	12.1		37.6	21.0	15.0	26.6	20.0		21.3	20.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.2	1.3		80.1	6.9	0.1	54.7	0.1		0.6	0.3	
Delay (s)	41.0	13.5		117.7	27.9	15.0	81.3	20.1		21.8	20.9	
Level of Service	D	B		F	C	B	F	C		C	C	
Approach Delay (s)		25.3			26.7			59.7			21.2	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	76.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

25: Slater Road & Northwest Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	0	355	0	0	0	420	410	0	0	325	210
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	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.94	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1687	1509				1752	1845			1703	
Flt Permitted		0.76	1.00				0.95	1.00			1.00	
Satd. Flow (perm)		1345	1509				1752	1845			1703	
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)	283	0	386	0	0	0	457	446	0	0	353	228
RTOR Reduction (vph)	0	0	291	0	0	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	283	95	0	0	0	457	446	0	0	552	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	3%	3%	3%	5%	5%	5%
Turn Type	Perm		Perm	Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		19.4	19.4				21.0	51.1			26.1	
Effective Green, g (s)		19.4	19.4				21.0	51.1			26.1	
Actuated g/C Ratio		0.25	0.25				0.27	0.65			0.33	
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)		332	373				469	1201			566	
v/s Ratio Prot							c0.26	0.24			c0.32	
v/s Ratio Perm		c0.21	0.06									
v/c Ratio		0.85	0.26				0.97	0.37			0.98	
Uniform Delay, d1		28.2	23.7				28.5	6.3			25.9	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		18.6	0.4				34.7	0.2			31.4	
Delay (s)		46.8	24.1				63.2	6.5			57.3	
Level of Service		D	C				E	A			E	
Approach Delay (s)		33.7			0.0			35.2			57.3	
Approach LOS		C			A			D			E	

Intersection Summary			
HCM Average Control Delay	40.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	78.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

26: Labounty Drive & Nordic Way

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	230	415	130	410	35	440	15	110	15	15	55
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	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	
Flpb, ped/bikes		1.00	1.00		1.00			1.00	1.00		1.00	
Frt		1.00	0.85		0.99			1.00	0.85		0.91	
Flt Protected		1.00	1.00		0.99			0.95	1.00		0.99	
Satd. Flow (prot)		1855	1583		1843			1760	1568		1718	
Flt Permitted		0.94	1.00		0.85			0.67	1.00		0.91	
Satd. Flow (perm)		1752	1583		1593			1230	1568		1584	
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)	22	250	451	141	446	38	478	16	120	16	16	60
RTOR Reduction (vph)	0	0	254	0	4	0	0	0	69	0	34	0
Lane Group Flow (vph)	0	272	197	0	621	0	0	494	51	0	58	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		25.2	25.2		25.2			24.6	24.6		24.6	
Effective Green, g (s)		25.2	25.2		25.2			24.6	24.6		24.6	
Actuated g/C Ratio		0.44	0.44		0.44			0.43	0.43		0.43	
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		764	690		695			523	667		674	
v/s Ratio Prot												
v/s Ratio Perm		0.16	0.12		c0.39			c0.40	0.03		0.04	
v/c Ratio		0.36	0.28		0.89			0.94	0.08		0.09	
Uniform Delay, d1		10.9	10.5		15.1			15.9	9.9		9.9	
Progression Factor		1.00	1.00		1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.3	0.2		13.9			26.0	0.0		0.1	
Delay (s)		11.2	10.7		29.0			41.9	9.9		9.9	
Level of Service		B	B		C			D	A		A	
Approach Delay (s)		10.9			29.0			35.7			9.9	
Approach LOS		B			C			D			A	

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	57.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	625	275	135	500	365	170
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	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1770	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	679	299	147	543	397	185
RTOR Reduction (vph)	0	176	0	0	0	134
Lane Group Flow (vph)	679	123	147	543	397	51
Turn Type		Perm	Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Actuated Green, G (s)	23.7	23.7	6.0	33.7	15.7	15.7
Effective Green, g (s)	23.7	23.7	6.0	33.7	15.7	15.7
Actuated g/C Ratio	0.41	0.41	0.10	0.59	0.27	0.27
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	769	654	185	1094	484	433
v/s Ratio Prot	c0.36		c0.08	0.29	c0.22	
v/s Ratio Perm		0.08				0.03
v/c Ratio	0.88	0.19	0.79	0.50	0.82	0.12
Uniform Delay, d1	15.6	10.7	25.1	6.9	19.5	15.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.7	0.1	20.5	0.4	10.7	0.1
Delay (s)	27.2	10.9	45.6	7.3	30.2	15.8
Level of Service	C	B	D	A	C	B
Approach Delay (s)	22.2			15.4	25.6	
Approach LOS	C			B	C	

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	295	90	330	395	65	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	1.00		1.00			1.00
Frt	0.97		0.93			1.00
Flt Protected	0.96		1.00			0.99
Satd. Flow (prot)	1737		1726			1846
Flt Permitted	0.96		1.00			0.61
Satd. Flow (perm)	1737		1726			1132
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	321	98	359	429	71	321
RTOR Reduction (vph)	18	0	78	0	0	0
Lane Group Flow (vph)	401	0	710	0	0	392
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	15.4		26.1			26.1
Effective Green, g (s)	15.4		26.1			26.1
Actuated g/C Ratio	0.31		0.53			0.53
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	540		910			597
v/s Ratio Prot	c0.23		c0.41			
v/s Ratio Perm						0.35
v/c Ratio	0.74		0.78			0.66
Uniform Delay, d1	15.3		9.4			8.5
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	5.5		4.4			2.6
Delay (s)	20.8		13.8			11.1
Level of Service	C		B			B
Approach Delay (s)	20.8		13.8			11.1
Approach LOS	C		B			B

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Appendix B
Final EIS – Supplemental Transportation Analyses

Traffic Operations Analyses

LOS C – Traffic Signal Queues

1: Main St. & Fourth Avenue

Lane Group	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
Storage Length (ft)	300		0	200		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		429			620			300			526	
Travel Time (s)		11.7			16.9			8.2			14.3	
Lane Group Flow (vph)	21	452	0	11	649	0	0	122	0	128	112	0
v/c Ratio	0.04	0.33		0.02	0.48			0.54		0.66	0.35	
Control Delay	4.8	5.5		1.1	2.7			39.8		51.4	19.6	
Queue Delay	0.0	0.0		0.0	0.5			0.0		0.0	0.0	
Total Delay	4.8	5.5		1.1	3.1			39.8		51.4	19.6	
Queue Length 50th (ft)	3	71		0	11			59		70	27	
Queue Length 95th (ft)	12	151		m1	109			104		118	68	
Internal Link Dist (ft)		349			540			220			446	
Turn Bay Length (ft)	300			200						300		
Base Capacity (vph)	501	1352		663	1361			383		337	510	
Starvation Cap Reductn	0	0		0	314			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.04	0.33		0.02	0.62			0.32		0.38	0.22	

Intersection Summary

Area Type: Other

m Volume for 95th percentile queue is metered by upstream signal.

2: Vista Drive & Third Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	185	160	5	225	105	170	50	20	75	95	25
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	16	197	170	5	239	112	181	53	21	80	101	27

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	383	356	255	207
Volume Left (vph)	16	5	181	80
Volume Right (vph)	170	112	21	27
Hadj (s)	-0.24	-0.17	0.11	0.00
Departure Headway (s)	6.1	6.2	6.9	6.9
Degree Utilization, x	0.65	0.61	0.49	0.40
Capacity (veh/h)	555	535	457	446
Control Delay (s)	19.5	18.5	16.2	14.4
Approach Delay (s)	19.5	18.5	16.2	14.4
Approach LOS	C	C	C	B

Intersection Summary			
Delay	17.6		
HCM Level of Service	C		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

3: Main St. & Third Avenue

Lane Group	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
Storage Length (ft)	200		0	120		0	75		0	75		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		620			343			331			306	
Travel Time (s)		16.9			9.4			9.0			8.3	
Lane Group Flow (vph)	10	541	0	67	794	0	21	145	0	242	114	0
v/c Ratio	0.04	0.45		0.14	0.69		0.07	0.31		0.82	0.25	
Control Delay	7.7	8.4		4.3	5.7		23.4	21.4		53.6	23.3	
Queue Delay	0.0	0.0		0.0	2.6		0.0	0.1		2.2	0.0	
Total Delay	7.7	8.4		4.3	8.3		23.4	21.6		55.9	23.3	
Queue Length 50th (ft)	1	96		5	54		9	50		127	45	
Queue Length 95th (ft)	m6	203		m6	m100		25	94		#207	83	
Internal Link Dist (ft)		540			263			251			226	
Turn Bay Length (ft)	200			120			75			75		
Base Capacity (vph)	282	1198		464	1143		383	565		362	571	
Starvation Cap Reductn	0	0		0	227		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	66		44	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.45		0.14	0.87		0.05	0.29		0.76	0.20	

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

4: Main St. & Second Avenue

Lane Group	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
Storage Length (ft)	120		0	120		0	75		0	75		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		343			363			326			325	
Travel Time (s)		9.4			9.9			8.9			8.9	
Lane Group Flow (vph)	11	763	0	63	1190	0	11	89	0	253	48	0
v/c Ratio	0.13	0.59		0.18	0.97		0.04	0.23		0.92	0.12	
Control Delay	9.1	9.9		3.7	23.0		28.8	17.5		75.2	24.6	
Queue Delay	0.0	0.4		0.0	5.3		0.0	0.0		0.0	0.0	
Total Delay	9.1	10.3		3.7	28.3		28.8	17.5		75.2	24.6	
Queue Length 50th (ft)	2	217		6	86		5	19		141	17	
Queue Length 95th (ft)	m5	309		m6	#919		19	59		#283	46	
Internal Link Dist (ft)		263			283			246			245	
Turn Bay Length (ft)	120			120			75			75		
Base Capacity (vph)	85	1291		356	1233		291	401		279	396	
Starvation Cap Reductn	0	163		0	2		0	0		0	0	
Spillback Cap Reductn	0	19		0	38		0	1		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.68		0.18	1.00		0.04	0.22		0.91	0.12	

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	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
Storage Length (ft)	120		0	120		0	0		75	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		363			955			322			192	
Travel Time (s)		9.9			26.0			8.8			5.2	
Lane Group Flow (vph)	16	1074	0	160	1191	0	0	37	176	0	43	0
v/c Ratio	0.07	0.72		0.55	0.80			0.29	0.60		0.26	
Control Delay	1.7	4.9		9.6	8.6			42.4	17.4		25.9	
Queue Delay	0.0	0.2		0.0	0.2			0.0	0.0		0.0	
Total Delay	1.7	5.2		9.6	8.8			42.4	17.4		25.9	
Queue Length 50th (ft)	1	61		12	124			20	10		12	
Queue Length 95th (ft)	m1	m256		m52	#375			47	65		40	
Internal Link Dist (ft)		283			875			242			112	
Turn Bay Length (ft)	120			120					75			
Base Capacity (vph)	214	1487		290	1496			218	390		275	
Starvation Cap Reductn	0	67		0	9			0	0		0	
Spillback Cap Reductn	0	0		0	28			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.07	0.76		0.55	0.81			0.17	0.45		0.16	

Intersection Summary

Area Type: Other

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	120		75	0
Storage Lanes		0	1		1	1
Taper Length (ft)		25	25		25	25
Right Turn on Red		Yes				Yes
Link Speed (mph)	25			25	25	
Link Distance (ft)	955			314	322	
Travel Time (s)	26.0			8.6	8.8	
Lane Group Flow (vph)	1195	0	32	1158	195	63
v/c Ratio	0.92		0.33	0.81	0.71	0.21
Control Delay	23.0		44.5	10.9	50.4	10.6
Queue Delay	0.0		0.0	0.1	0.0	0.0
Total Delay	23.0		44.5	11.0	50.4	10.6
Queue Length 50th (ft)	~534		18	227	105	0
Queue Length 95th (ft)	#953		m26	415	174	34
Internal Link Dist (ft)	875			234	242	
Turn Bay Length (ft)			120		75	
Base Capacity (vph)	1294		97	1424	318	336
Starvation Cap Reductn	0		0	14	0	0
Spillback Cap Reductn	0		0	9	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.92		0.33	0.82	0.61	0.19

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	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
Storage Length (ft)	200		0	200		0	200		0	120		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		298			884			374			218	
Travel Time (s)		8.1			24.1			10.2			5.9	
Lane Group Flow (vph)	26	1052	0	250	901	156	245	162	0	146	52	0
v/c Ratio	0.09	0.60		0.61	0.76	0.15	0.76	0.33		0.58	0.12	
Control Delay	8.0	16.7		11.0	18.4	3.0	47.6	7.8		39.6	14.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.0	16.7		11.0	18.4	3.0	47.6	7.8		39.6	14.0	
Queue Length 50th (ft)	6	126		37	329	7	128	7		73	9	
Queue Length 95th (ft)	m7	m207		m85	m#674	m30	205	53		130	36	
Internal Link Dist (ft)		218			804			294			138	
Turn Bay Length (ft)	200			200			200			120		
Base Capacity (vph)	285	1740		466	1183	1024	382	555		298	503	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.09	0.60		0.54	0.76	0.15	0.64	0.29		0.49	0.10	

Intersection Summary

Area Type: Other

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	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
Storage Length (ft)	200		200	200		0	0		0	0		75
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		884			937			190			252	
Travel Time (s)		24.1			25.6			5.2			6.9	
Lane Group Flow (vph)	92	967	255	435	1071	0	429	82	614	255	185	0
v/c Ratio	0.36	0.90	0.40	0.90	0.64		0.97	0.20	0.84	0.70	0.74	
Control Delay	13.1	34.5	6.6	36.8	17.1		62.5	28.0	31.0	38.7	41.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	13.1	34.5	6.6	36.8	17.1		62.5	28.0	31.0	38.7	41.4	
Queue Length 50th (ft)	12	288	43	173	254		197	36	251	104	61	
Queue Length 95th (ft)	m28	#392	83	m#341	m336		#366	73	397	#218	#153	
Internal Link Dist (ft)		804			857			110			172	
Turn Bay Length (ft)	200		200	200								
Base Capacity (vph)	259	1072	632	485	1663		444	476	733	363	267	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.36	0.90	0.40	0.90	0.64		0.97	0.17	0.84	0.70	0.69	

Intersection Summary

Area Type: Other

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	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
Storage Length (ft)	0		200	120		0	0		0	0		120
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		937			759			361			289	
Travel Time (s)		25.6			20.7			8.2			6.6	
Lane Group Flow (vph)	0	1220	694	247	1242	0	0	0	0	419	425	430
v/c Ratio		0.82	0.68	0.82	0.55					0.90	0.90	0.87
Control Delay		27.0	8.3	52.7	4.9					54.8	56.1	44.6
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		27.0	8.3	52.7	4.9					54.8	56.1	44.6
Queue Length 50th (ft)		304	125	119	63					238	242	193
Queue Length 95th (ft)		m381	m169	m142	m86					#415	#423	#362
Internal Link Dist (ft)		857			679			281			209	
Turn Bay Length (ft)			200	120								120
Base Capacity (vph)		1482	1025	318	2242					476	478	503
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.82	0.68	0.78	0.55					0.88	0.89	0.85

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	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
Storage Length (ft)	300		0	100		0	120		0	120		0
Storage Lanes	2		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		759			373			282			266	
Travel Time (s)		20.7			10.2			6.4			6.0	
Lane Group Flow (vph)	484	1510	0	57	1255	0	135	458	0	193	542	0
v/c Ratio	0.98	0.96		0.52	1.01		1.00	0.65		0.99	0.71	
Control Delay	62.3	25.3		50.3	56.2		110.7	27.6		93.8	17.8	
Queue Delay	0.0	1.7		0.0	10.3		0.0	0.3		15.1	0.0	
Total Delay	62.3	27.0		50.3	66.5		110.7	27.9		108.9	17.8	
Queue Length 50th (ft)	130	~314		35	~231		~76	205		107	133	
Queue Length 95th (ft)	m#196	m#584		m54	#484		#194	311		#247	259	
Internal Link Dist (ft)		679			293			202			186	
Turn Bay Length (ft)	300			100			120			120		
Base Capacity (vph)	493	1577		110	1238		135	708		195	768	
Starvation Cap Reductn	0	0		0	37		0	0		0	0	
Spillback Cap Reductn	0	24		0	0		0	37		10	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.98	0.97		0.52	1.04		1.00	0.68		1.04	0.71	

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0			100	0	0
Storage Lanes	1			0	1	1
Taper Length (ft)	25			25	25	25
Right Turn on Red				Yes		Yes
Link Speed (mph)		25	25		25	
Link Distance (ft)		373	521		382	
Travel Time (s)		10.2	14.2		10.4	
Lane Group Flow (vph)	432	947	1037	0	74	363
v/c Ratio	0.85	0.64	0.63		0.41	0.75
Control Delay	49.5	3.5	21.8		42.6	14.4
Queue Delay	3.6	0.8	0.1		0.0	4.0
Total Delay	53.1	4.2	21.8		42.6	18.4
Queue Length 50th (ft)	259	67	227		40	0
Queue Length 95th (ft)	m229	m102	351		76	80
Internal Link Dist (ft)		293	441		302	
Turn Bay Length (ft)						
Base Capacity (vph)	571	1477	1648		292	559
Starvation Cap Reductn	74	239	0		0	0
Spillback Cap Reductn	0	0	54		0	124
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.87	0.76	0.65		0.25	0.83

Intersection Summary

Area Type: Other

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	690	35	10	615	0	20	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			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)	5	750	38	11	668	0	22	0	22	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)												
pX, platoon unblocked												
vC, conflicting volume	668			788			1470	1470	769	1492	1489	668
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	668			788			1470	1470	769	1492	1489	668
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 %	99			99			79	100	95	100	100	100
cM capacity (veh/h)	926			836			105	126	404	96	123	461

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	793	679	43	0
Volume Left	5	11	22	0
Volume Right	38	0	22	0
cSH	926	836	167	1700
Volume to Capacity	0.01	0.01	0.26	0.00
Queue Length 95th (ft)	0	1	25	0
Control Delay (s)	0.2	0.3	34.1	0.0
Lane LOS	A	A	D	A
Approach Delay (s)	0.2	0.3	34.1	0.0
Approach LOS			D	A

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	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
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			50			35			35	
Link Distance (ft)		3990			5242			5377			1732	
Travel Time (s)		68.0			71.5			104.7			33.7	
Lane Group Flow (vph)	0	749	0	0	560	0	0	370	0	0	206	0
v/c Ratio		0.84			0.59			0.76			0.38	
Control Delay		21.1			11.2			29.7			15.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		21.1			11.2			29.7			15.4	
Queue Length 50th (ft)		186			113			111			44	
Queue Length 95th (ft)		#402			191			#240			96	
Internal Link Dist (ft)		3910			5162			5297			1652	
Turn Bay Length (ft)												
Base Capacity (vph)		1135			1215			590			645	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.66			0.46			0.63			0.32	

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	515	5	5	450	5	5	45	5	5	10	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			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)	27	560	5	5	489	5	5	49	5	5	11	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	495			565			1152	1122	562	1149	1122	492
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495			565			1152	1122	562	1149	1122	492
tC, single (s)	4.1			4.1			7.2	6.6	6.3	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	97			99			96	75	99	96	94	95
cM capacity (veh/h)	1064			992			152	196	519	130	190	555

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	592	500	60	43
Volume Left	27	5	5	5
Volume Right	5	5	5	27
cSH	1064	992	202	294
Volume to Capacity	0.03	0.01	0.30	0.15
Queue Length 95th (ft)	2	0	30	13
Control Delay (s)	0.7	0.2	30.1	19.3
Lane LOS	A	A	D	C
Approach Delay (s)	0.7	0.2	30.1	19.3
Approach LOS			D	C

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

15: W Axton Rd & Guide Meridian Rd

2034 Mid Volumes - Mitigated (LOS C)

Lane Group	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
Storage Length (ft)	400		140	200		0	375		375	225		325
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			50			50	
Link Distance (ft)		7862			2160			5362			1864	
Travel Time (s)		107.2			29.5			73.1			25.4	
Lane Group Flow (vph)	284	158	163	16	127	0	205	1532	26	32	1047	200
v/c Ratio	0.75	0.32	0.30	0.08	0.63		0.78	0.76	0.03	0.52	0.70	0.26
Control Delay	46.5	35.5	6.9	30.3	61.5		67.4	22.4	4.8	85.3	30.3	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	35.5	6.9	30.3	61.5		67.4	22.4	4.8	85.3	30.3	4.0
Queue Length 50th (ft)	178	90	0	8	91		149	464	0	24	338	0
Queue Length 95th (ft)	#272	163	53	25	156		#252	595	14	#75	441	45
Internal Link Dist (ft)		7782			2080			5282			1784	
Turn Bay Length (ft)	400		140	200			375		375	225		325
Base Capacity (vph)	385	516	554	195	260		309	2011	911	61	1511	788
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.31	0.29	0.08	0.49		0.66	0.76	0.03	0.52	0.69	0.25

Intersection Summary

Area Type: Other

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

16: Smith Rd & Labounty Drive

2034 Mid Volumes - Mitigated (LOS C)

Lane Group	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
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		356			1439			278			423	
Travel Time (s)		6.9			28.0			7.6			11.5	
Lane Group Flow (vph)	0	203	0	0	620	0	0	261	0	0	416	0
v/c Ratio		0.28			0.85			0.34			0.81	
Control Delay		11.3			23.9			6.5			29.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.3			23.9			6.5			29.8	
Queue Length 50th (ft)		42			138			23			119	
Queue Length 95th (ft)		80			#321			65			#276	
Internal Link Dist (ft)		276			1359			198			343	
Turn Bay Length (ft)												
Base Capacity (vph)		949			909			916			629	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.21			0.68			0.28			0.66	

Intersection Summary

Area Type: Other

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
17: Smith Rd & Barrett Road

Lane Group	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
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1439			852			268			394	
Travel Time (s)		28.0			16.6			7.3			10.7	
Lane Group Flow (vph)	89	553	0	0	426	284	0	642	0	300	316	0
v/c Ratio	0.37	0.80			0.84	0.37		0.89		0.85	0.36	
Control Delay	19.6	27.2			34.3	3.7		30.0		38.9	9.6	
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay	19.6	27.2			34.3	3.7		30.0		38.9	9.6	
Queue Length 50th (ft)	23	166			137	0		182		85	57	
Queue Length 95th (ft)	59	#327			#285	41		#384		#223	104	
Internal Link Dist (ft)		1359			772			188			314	
Turn Bay Length (ft)												
Base Capacity (vph)	265	762			568	816		836		408	1024	
Starvation Cap Reductn	0	0			0	0		0		0	0	
Spillback Cap Reductn	0	0			0	0		0		0	0	
Storage Cap Reductn	0	0			0	0		0		0	0	
Reduced v/c Ratio	0.34	0.73			0.75	0.35		0.77		0.74	0.31	

Intersection Summary	
Area Type:	Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
18: Smith Rd & Northwest Dr

Lane Group	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
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			45			35	
Link Distance (ft)		4352			5247			6852			5377	
Travel Time (s)		84.8			102.2			103.8			104.7	
Lane Group Flow (vph)	0	803	0	0	788	0	0	346	250	0	219	0
v/c Ratio		0.81			1.02			0.96	0.44		0.65	
Control Delay		17.2			52.1			65.9	6.0		29.4	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		17.2			52.1			65.9	6.0		29.4	
Queue Length 50th (ft)		179			~262			124	0		64	
Queue Length 95th (ft)		#430			#507			#269	48		#148	
Internal Link Dist (ft)		4272			5167			6772			5297	
Turn Bay Length (ft)												
Base Capacity (vph)		986			774			360	565		339	
Starvation Cap Reductn		0			0			0	0		0	
Spillback Cap Reductn		0			0			0	0		0	
Storage Cap Reductn		0			0			0	0		0	
Reduced v/c Ratio		0.81			1.02			0.96	0.44		0.65	

Intersection Summary	
Area Type:	Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

19: Smith Rd & Aldrich Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	825	5	25	685	10	5	25	60	5	10	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			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)	11	897	5	27	745	11	5	27	65	5	11	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	755			902			1731	1731	899	1802	1728	750
vC1, stage 1 conf vol							921	921		804	804	
vC2, stage 2 conf vol							810	810		997	924	
vCu, unblocked vol	755			902			1731	1731	899	1802	1728	750
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			98	90	81	97	96	99
cM capacity (veh/h)	851			741			236	261	340	169	253	415

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	11	902	27	755	98	22
Volume Left	11	0	27	0	5	5
Volume Right	0	5	0	11	65	5
cSH	851	1700	741	1700	307	246
Volume to Capacity	0.01	0.53	0.04	0.44	0.32	0.09
Queue Length 95th (ft)	1	0	3	0	33	7
Control Delay (s)	9.3	0.0	10.0	0.0	22.1	21.0
Lane LOS	A		B		C	C
Approach Delay (s)	0.1		0.3		22.1	21.0
Approach LOS					C	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

20: Smith Rd & Guide Meridian Rd

Lane Group	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
Storage Length (ft)	175		115	275		275	400		400	350		350
Storage Lanes	1		0	1		0	2		1	2		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			50			50	
Link Distance (ft)		7852			1710			2267			5362	
Travel Time (s)		153.0			33.3			30.9			73.1	
Lane Group Flow (vph)	231	753	0	183	377	0	355	1425	349	177	909	167
v/c Ratio	0.81	0.89		0.88	0.46		0.80	0.93	0.43	0.91	0.72	0.25
Control Delay	45.2	36.1		61.5	20.2		45.2	32.4	6.9	80.8	23.4	4.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.2	36.1		61.5	20.2		45.2	32.4	6.9	80.8	23.4	4.0
Queue Length 50th (ft)	74	138		57	57		77	296	32	40	174	0
Queue Length 95th (ft)	#173	#236		#155	95		#141	#446	87	#96	241	35
Internal Link Dist (ft)		7772			1630			2187			5282	
Turn Bay Length (ft)	175			275			400		400	350		350
Base Capacity (vph)	284	868		208	840		444	1526	810	195	1259	670
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.87		0.88	0.45		0.80	0.93	0.43	0.91	0.72	0.25

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

21: Slater Road & Rural Avenue

Lane Group	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
Storage Length (ft)	100		0	100		100	100		100	200		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		728			1176			825			774	
Travel Time (s)		14.2			22.9			18.8			17.6	
Lane Group Flow (vph)	16	665	0	431	468	90	112	16	532	186	37	0
v/c Ratio	0.03	0.91		1.01	0.42	0.09	0.36	0.04	0.69	0.58	0.09	
Control Delay	6.5	39.5		67.2	10.5	4.0	24.4	18.8	16.1	30.3	12.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	6.5	39.5		67.2	10.5	4.0	24.4	18.8	16.1	30.3	12.1	
Queue Length 50th (ft)	2	244		~126	78	2	38	5	128	68	5	
Queue Length 95th (ft)	10	#523		#351	250	29	78	18	229	125	25	
Internal Link Dist (ft)		648			1096			745			694	
Turn Bay Length (ft)	100			100		100	100		100	200		
Base Capacity (vph)	547	732		425	1110	971	565	770	772	581	723	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.03	0.91		1.01	0.42	0.09	0.20	0.02	0.69	0.32	0.05	

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

22: Slater Road & I-5 SB Ramps

Lane Group	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
Storage Length (ft)	0		100	150		0	0		0	0		50
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1176			689			507			533	
Travel Time (s)		22.9			13.4			11.5			12.1	
Lane Group Flow (vph)	0	682	578	312	776	0	0	0	0	0	120	172
v/c Ratio		0.79	0.63	0.69	0.60						0.43	0.44
Control Delay		22.5	8.0	17.1	7.3						31.6	9.0
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		22.5	8.0	17.1	7.3						31.6	9.0
Queue Length 50th (ft)		199	46	36	112						42	0
Queue Length 95th (ft)		391	153	#142	246						99	49
Internal Link Dist (ft)		1096			609			427			453	
Turn Bay Length (ft)			100	150								50
Base Capacity (vph)		1193	1142	528	1574						502	572
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.57	0.51	0.59	0.49						0.24	0.30

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

23: Slater Road & I-5 NB Ramps

Lane Group	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
Storage Length (ft)	100		0	0		50	0		175	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		689			633			455			623	
Travel Time (s)		13.4			12.3			10.3			14.2	
Lane Group Flow (vph)	202	617	0	0	787	271	0	330	457	0	0	0
v/c Ratio	0.71	0.52			0.88	0.34		0.73	0.73			
Control Delay	27.4	9.6			30.9	9.1		36.1	16.4			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	27.4	9.6			30.9	9.1		36.1	16.4			
Queue Length 50th (ft)	37	142			312	47		146	62			
Queue Length 95th (ft)	#146	235			#558	99		235	169			
Internal Link Dist (ft)		609			553			375			543	
Turn Bay Length (ft)	100					50			175			
Base Capacity (vph)	284	1346			1060	941		568	715			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.71	0.46			0.74	0.29		0.58	0.64			

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

24: Slater Road & Pacific Highway

Lane Group	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
Storage Length (ft)	150		0	50		0	0		0	0		100
Storage Lanes	2		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		633			3915			410			337	
Travel Time (s)		12.3			76.3			9.3			7.7	
Lane Group Flow (vph)	478	630	0	11	587	147	179	98	0	130	342	0
v/c Ratio	0.80	0.61		0.11	0.88	0.22	0.93	0.17		0.33	0.48	
Control Delay	42.5	15.0		38.9	39.8	4.4	77.2	14.7		23.1	6.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	42.5	15.0		38.9	39.8	4.4	77.2	14.7		23.1	6.1	
Queue Length 50th (ft)	121	183		5	267	0	83	22		48	9	
Queue Length 95th (ft)	#200	362		21	#452	36	#201	56		93	66	
Internal Link Dist (ft)		553			3835			330			257	
Turn Bay Length (ft)	150			50								
Base Capacity (vph)	625	1074		100	764	736	232	671		471	785	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.76	0.59		0.11	0.77	0.20	0.77	0.15		0.28	0.44	

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

25: Slater Road & Northwest Dr

2034 Mid Volumes - Mitigated (LOS C)

Lane Group	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
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		3915			261			1769			6852	
Travel Time (s)		76.3			5.1			26.8			103.8	
Lane Group Flow (vph)	0	283	386	0	0	0	457	446	0	0	581	0
v/c Ratio		0.85	0.58				0.97	0.37			0.98	
Control Delay		53.1	6.8				66.9	7.7			58.8	
Queue Delay		0.0	0.0				0.0	0.0			0.0	
Total Delay		53.1	6.8				66.9	7.7			58.8	
Queue Length 50th (ft)		132	0				228	94			270	
Queue Length 95th (ft)		#259	65				#416	146			#486	
Internal Link Dist (ft)		3835			181			1689			6772	
Turn Bay Length (ft)												
Base Capacity (vph)		360	687				470	1201			594	
Starvation Cap Reductn		0	0				0	0			0	
Spillback Cap Reductn		0	0				0	0			0	
Storage Cap Reductn		0	0				0	0			0	
Reduced v/c Ratio		0.79	0.56				0.97	0.37			0.98	

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

26: Labounty Drive & Nordic Way

2034 Mid Volumes - Mitigated (LOS C)

Lane Group	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
Storage Length (ft)	0		150	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		592			520			696			211	
Travel Time (s)		16.1			14.2			19.0			5.8	
Lane Group Flow (vph)	0	272	451	0	625	0	0	494	120	0	92	0
v/c Ratio		0.36	0.48		0.90			0.94	0.16		0.13	
Control Delay		12.5	3.2		33.8			48.1	3.3		5.8	
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	
Total Delay		12.5	3.2		33.8			48.1	3.3		5.8	
Queue Length 50th (ft)		60	0		190			166	0		7	
Queue Length 95th (ft)		108	43		#383			#345	25		29	
Internal Link Dist (ft)		512			440			616			131	
Turn Bay Length (ft)			150									
Base Capacity (vph)		822	982		751			535	749		722	
Starvation Cap Reductn		0	0		0			0	0		0	
Spillback Cap Reductn		0	0		0			0	0		0	
Storage Cap Reductn		0	0		0			0	0		0	
Reduced v/c Ratio		0.33	0.46		0.83			0.92	0.16		0.13	

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

106: Main St & SE Connector

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	720			684	528	
Travel Time (s)	16.4			15.5	12.0	
Lane Group Flow (vph)	679	299	147	543	397	185
v/c Ratio	0.89	0.36	0.79	0.50	0.82	0.33
Control Delay	32.5	3.1	59.3	9.1	36.5	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	3.1	59.3	9.1	36.5	5.0
Queue Length 50th (ft)	215	0	53	101	132	0
Queue Length 95th (ft)	#406	38	#142	168	#261	39
Internal Link Dist (ft)	640			604	448	
Turn Bay Length (ft)						
Base Capacity (vph)	818	863	187	1146	529	602
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.35	0.79	0.47	0.75	0.31

Intersection Summary

Area Type: Other

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

107: SE Connector & Barrett Rd

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30			30
Link Distance (ft)	528		495			488
Travel Time (s)	12.0		11.3			11.1
Lane Group Flow (vph)	419	0	788	0	0	392
v/c Ratio	0.76		0.80			0.66
Control Delay	27.2		15.3			15.3
Queue Delay	0.0		0.0			0.0
Total Delay	27.2		15.3			15.3
Queue Length 50th (ft)	105		145			83
Queue Length 95th (ft)	#261		282			165
Internal Link Dist (ft)	448		415			408
Turn Bay Length (ft)						
Base Capacity (vph)	675		1283			811
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.62		0.61			0.48

Intersection Summary

Area Type: Other

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Appendix B
Final EIS – Supplemental Transportation Analyses

Traffic Operations Analyses

LOS D – Roundabout Level of Service and Queues

MOVEMENT SUMMARY

Site: Barrett-SE Connector

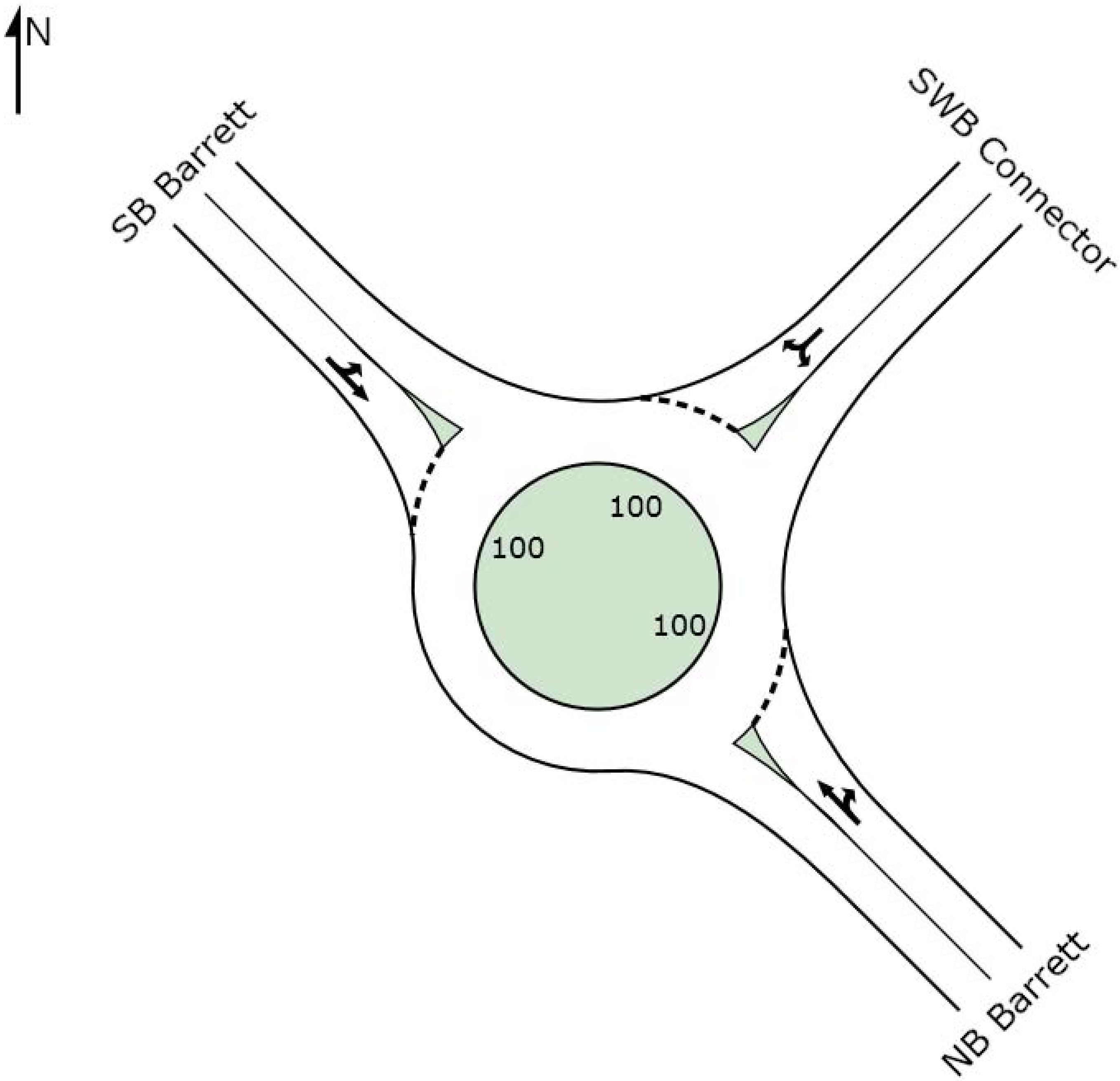
Ferndale Planned Action
2034 PM Peak Hour
Mitigated to LOS C
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South East: NB Barrett											
16T	T	359	2.0	0.625	4.1	LOS A	8.2	208.6	0.46	0.39	29.6
16R	R	429	2.0	0.625	4.6	LOS A	8.2	208.6	0.46	0.46	29.3
Approach		788	2.0	0.625	4.4	LOS A	8.2	208.6	0.46	0.43	29.5
North East: SWB Connector											
17L	L	321	2.0	0.527	12.8	LOS B	5.0	127.7	0.73	0.86	21.4
14R	R	98	2.0	0.529	7.1	LOS A	5.0	127.7	0.73	0.75	22.4
Approach		418	2.0	0.528	11.5	LOS B	5.0	127.7	0.73	0.83	21.6
North West: SB Barrett											
15L	L	71	2.0	0.484	11.4	LOS B	4.3	110.0	0.71	0.90	26.9
12T	T	321	2.0	0.484	6.6	LOS A	4.3	110.0	0.71	0.66	28.5
Approach		391	2.0	0.485	7.4	LOS B	4.3	110.0	0.71	0.70	28.2
All Vehicles		1598	2.0	0.625	7.0	LOS A	8.2	208.6	0.59	0.60	26.5

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION



N
SB Barrett
SWB Connector
100
100
100
NB Barrett

MOVEMENT SUMMARY

Site: Main-SE Connector

Ferndale Planned Action
2034 PM Peak Hour
Mitigated to LOS D
Roundabout

Movement Performance - Vehicles

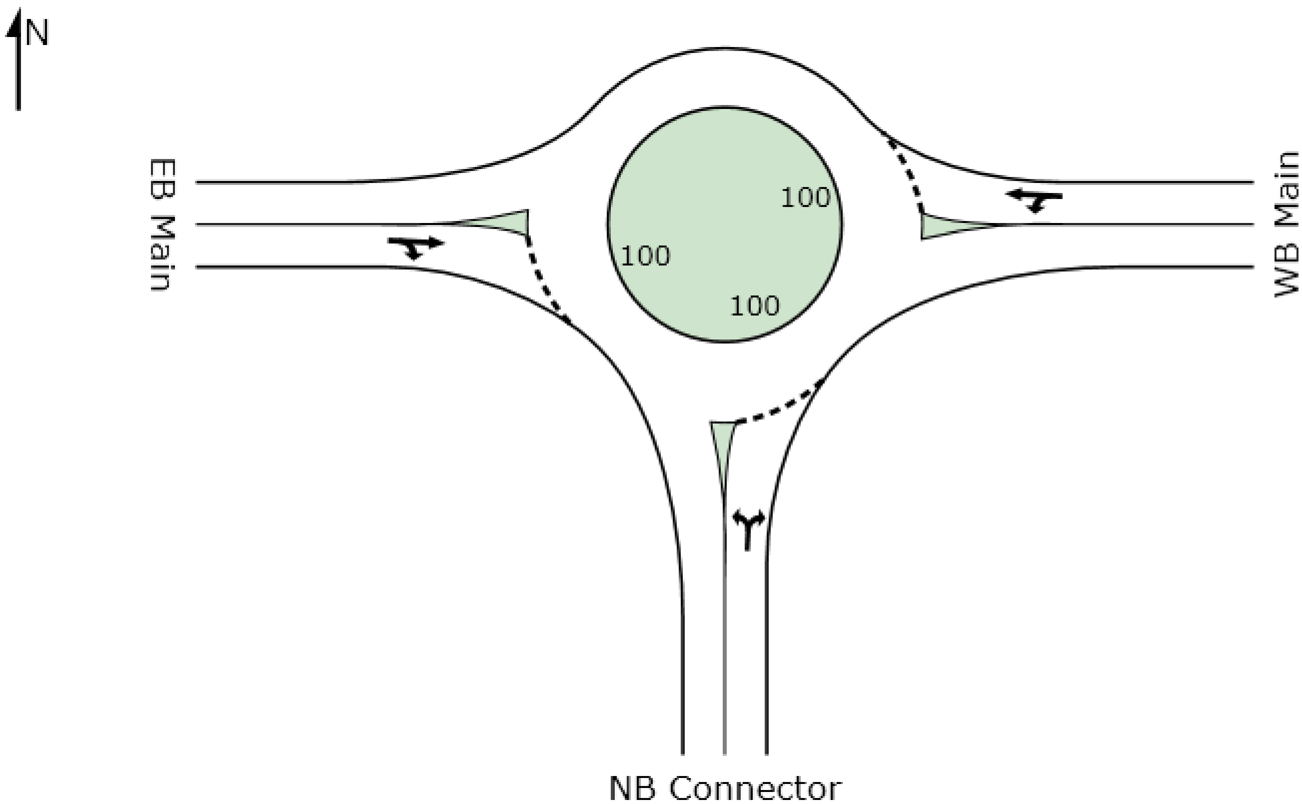
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Connector											
3L	L	397	2.0	1.181	117.1	LOS F	47.2	1199.0	1.00	3.03	8.3
8R	R	185	2.0	1.185	111.5	LOS F	47.2	1199.0	1.00	3.03	8.0
Approach		582	2.0	1.181	115.3	LOS F	47.2	1199.0	1.00	3.03	8.2
East: WB Main											
1L	L	147	2.0	0.853	20.5	LOS C	17.2	437.5	1.00	1.13	23.0
6T	T	543	2.0	0.853	15.7	LOS B	17.2	437.5	1.00	1.13	24.4
Approach		690	2.0	0.853	16.7	LOS C	17.2	437.5	1.00	1.13	24.1
West: EB Main											
2T	T	679	2.0	0.888	9.5	LOS A	22.3	567.6	1.00	0.76	27.3
2R	R	299	2.0	0.887	10.0	LOS B	22.3	567.6	1.00	0.76	27.5
Approach		978	2.0	0.888	9.7	LOS B	22.3	567.6	1.00	0.76	27.4
All Vehicles		2250	2.0	1.181	39.1	LOS D	47.2	1199.0	1.00	1.46	16.3

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

Processed: Friday, September 30, 2011 1:28:18 PM
SIDRA INTERSECTION 5.0.5.1510

Project: M:\10\10192 Ferndale Planned Action EIS\Traffic Operations (FEIS)\Sidra\2034 Alt 2 (Mitigated LOS D)\Connector - Mid Volumes (LOS D).sip
8000159, THE TRANSPO GROUP, FLOATING

SIDRA INTERSECTION


N
EB Main
WB Main
100
100
100
NB Connector

MOVEMENT SUMMARY

Site: Labounty

2034 PAO Mid
Mitigated to LOS D

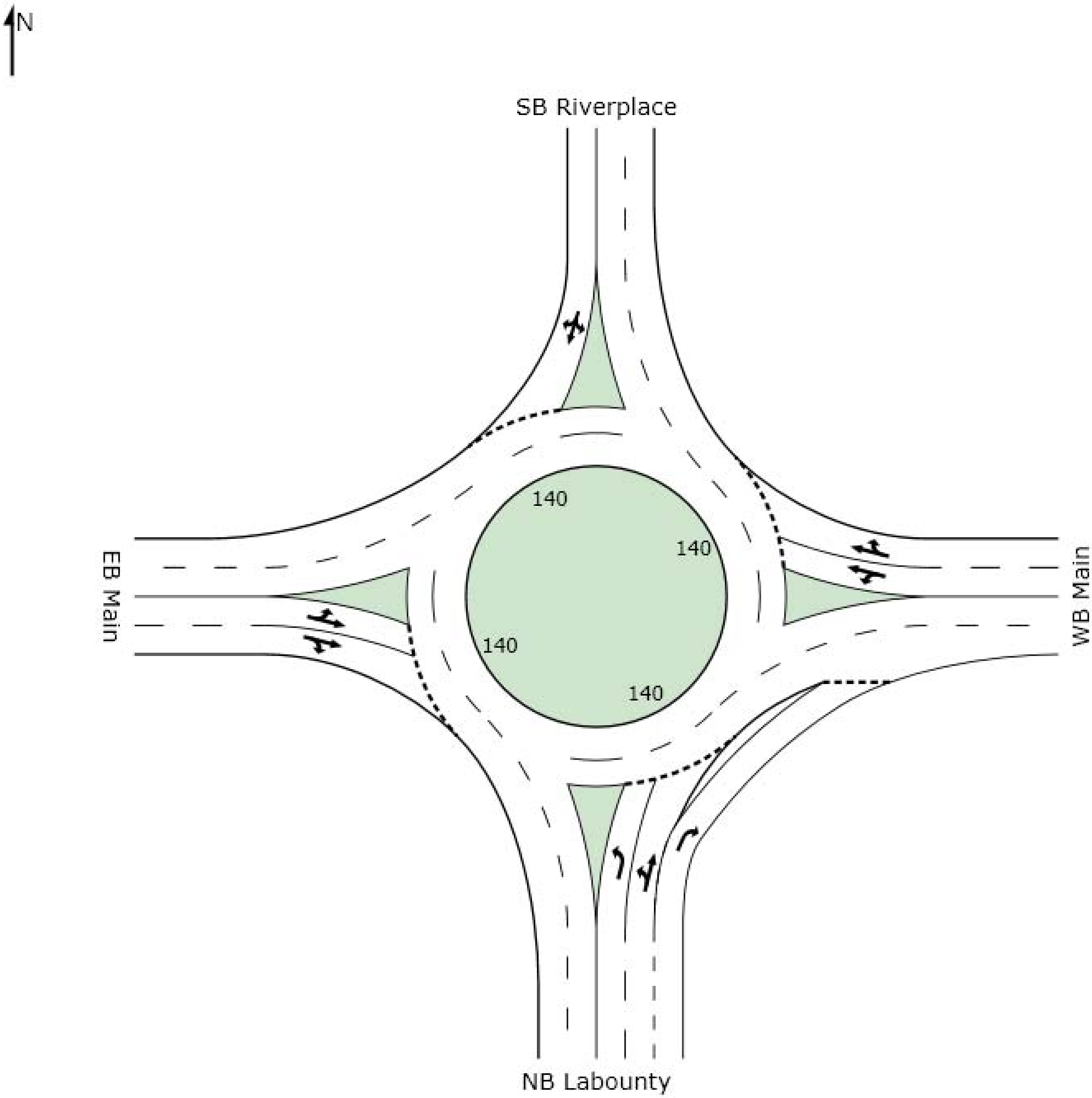
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Labounty											
3L	L	429	2.0	0.524	15.6	LOS B	4.1	105.0	0.89	1.03	24.5
8T	T	82	2.0	0.523	9.6	LOS A	4.1	105.0	0.89	0.98	26.0
8R	R	614	2.0	0.825	13.7	LOS B	10.8	275.3	1.00	1.24	25.0
Approach		1125	2.0	0.826	14.2	LOS B	10.8	275.3	0.95	1.14	24.8
East: WB Main											
1L	L	435	2.0	0.929	24.1	LOS C	16.9	429.3	1.00	1.47	20.1
6T	T	821	2.0	0.928	14.7	LOS B	17.2	437.6	1.00	1.47	20.5
6R	R	250	2.0	0.929	15.6	LOS B	17.2	437.6	1.00	1.46	20.7
Approach		1505	2.0	0.929	17.5	LOS C	17.2	437.6	1.00	1.47	20.4
North: SB Riverplace											
7L	L	255	2.0	1.468	238.0	LOS F	54.6	1385.6	1.00	3.92	4.9
4T	T	71	2.0	1.472	231.8	LOS F	54.6	1385.6	1.00	3.92	4.6
4R	R	114	2.0	1.463	231.9	LOS F	54.6	1385.6	1.00	3.92	4.4
Approach		440	2.0	1.466	235.4	LOS F	54.6	1385.6	1.00	3.92	4.7
West: EB Main											
5L	L	92	2.0	0.933	31.0	LOS C	20.5	520.3	1.00	1.60	18.1
2T	T	967	2.0	0.932	25.2	LOS C	21.1	536.7	1.00	1.60	18.5
2R	R	255	2.0	0.932	27.1	LOS C	21.1	536.7	1.00	1.60	19.0
Approach		1315	2.0	0.932	26.0	LOS C	21.1	536.7	1.00	1.60	18.6
All Vehicles		4386	2.0	1.466	41.1	LOS D	54.6	1385.6	0.99	1.67	15.3

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

Processed: Friday, September 30, 2011 8:07:49 AM
SIDRA INTERSECTION 5.0.5.1510

Project: M:\10\10192 Ferndale Planned Action EIS\Traffic Operations (FEIS)\Sidra\2034 Alt 2 (Mitigated LOS D)\Main Street RABs - Alt (LOS D & w-diameter).sip
8000159, THE TRANSPO GROUP, FLOATING


N
SB Riverplace
EB Main
WB Main
NB Labounty
140
140
140
140

MOVEMENT SUMMARY

Site: NB Ramps-Barrett Road

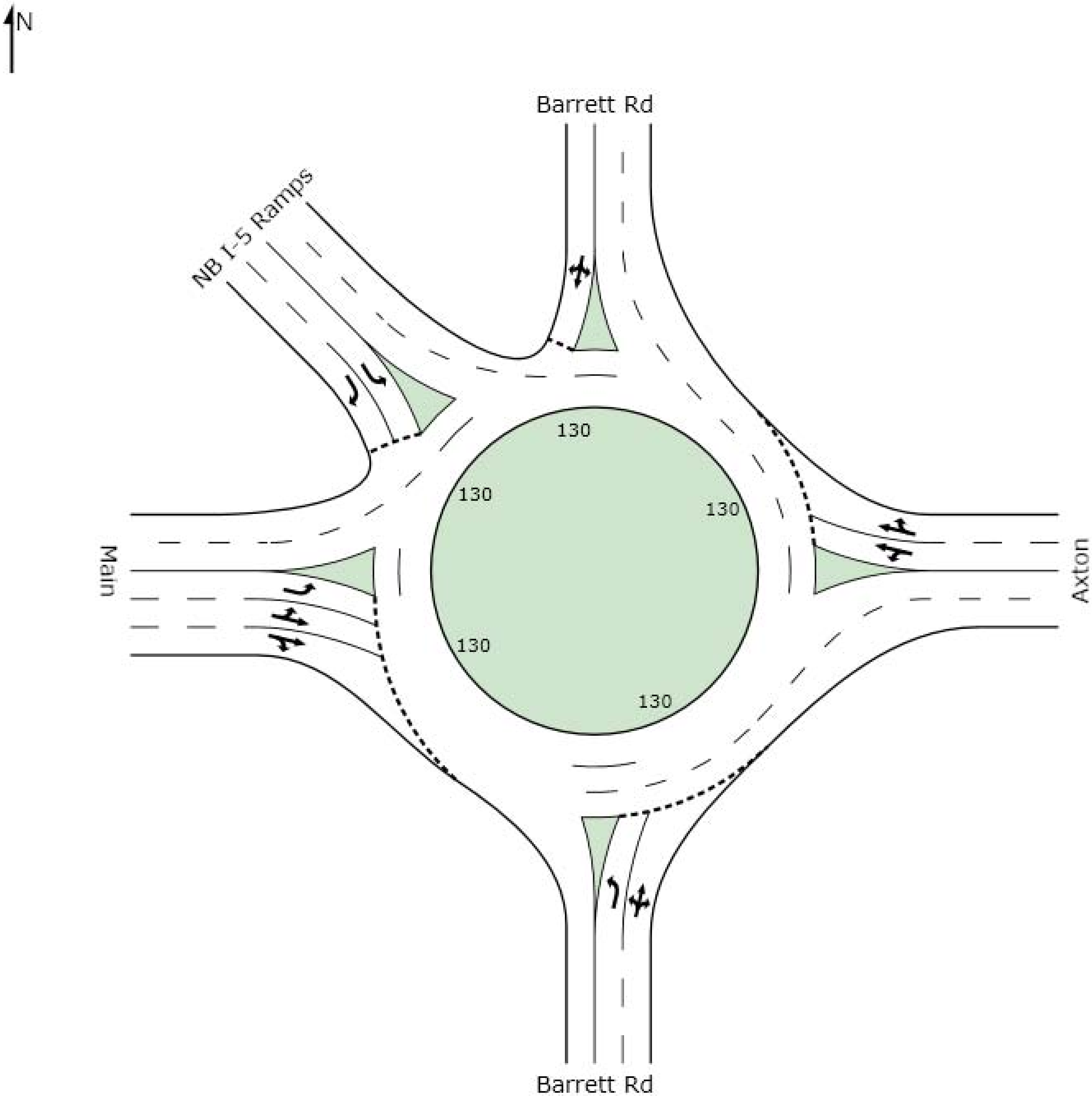
2034 Mid PAO - Alt
Mitigated to LOS D
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Barrett Rd											
3L	L	526	2.0	0.802	29.4	LOS C	6.9	175.0	0.94	1.22	21.2
8T	T	21	2.0	0.810	20.3	LOS C	6.9	175.0	0.93	1.19	21.0
8R	R	53	2.0	0.797	21.3	LOS C	6.9	175.0	0.93	1.19	21.3
Approach		600	2.0	0.802	28.4	LOS C	6.9	175.0	0.94	1.21	21.2
East: Axton											
1L	L	42	2.0	1.053	68.0	LOS E	23.0	582.9	1.00	2.15	13.0
6T	T	605	2.0	1.042	58.6	LOS E	25.8	656.0	1.00	2.18	12.4
6R	R	389	2.0	1.041	58.0	LOS E	25.8	656.0	1.00	2.26	13.6
Approach		1037	2.0	1.041	58.8	LOS E	25.8	656.0	1.00	2.21	12.9
North: Barrett Rd											
7L	L	74	2.0	1.535	275.0	LOS F	58.5	1486.2	1.00	4.12	4.3
4T	T	16	2.0	1.579	268.8	LOS F	58.5	1486.2	1.00	4.12	4.1
4R	R	347	2.0	1.530	270.0	LOS F	58.5	1486.2	1.00	4.12	4.0
Approach		437	2.0	1.533	270.8	LOS F	58.5	1486.2	1.00	4.12	4.1
North West: NB I-5 Ramps											
15L	L	195	2.0	0.473	19.5	LOS B	3.2	81.5	0.80	0.99	26.3
12R	R	547	2.0	0.874	23.9	LOS C	12.7	323.7	0.99	1.29	23.9
Approach		742	2.0	0.874	22.8	LOS C	12.7	323.7	0.94	1.21	24.6
West: Main											
5L	L	816	2.0	0.596	13.0	LOS B	5.8	146.1	0.66	0.82	24.6
2T	T	784	2.0	0.596	3.1	LOS A	5.8	146.1	0.65	0.44	26.1
2R	R	416	2.0	0.596	6.1	LOS A	5.7	144.9	0.67	0.65	26.2
Approach		2016	2.0	0.596	7.8	LOS B	5.8	146.1	0.66	0.64	25.4
All Vehicles		4832	2.0	1.533	47.4	LOS D	58.5	1486.2	0.84	1.45	15.0

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION


N
Barrett Rd
NB I-5 Ramps
130
130
130
130
130
Main
Axton
Barrett Rd

MOVEMENT SUMMARY

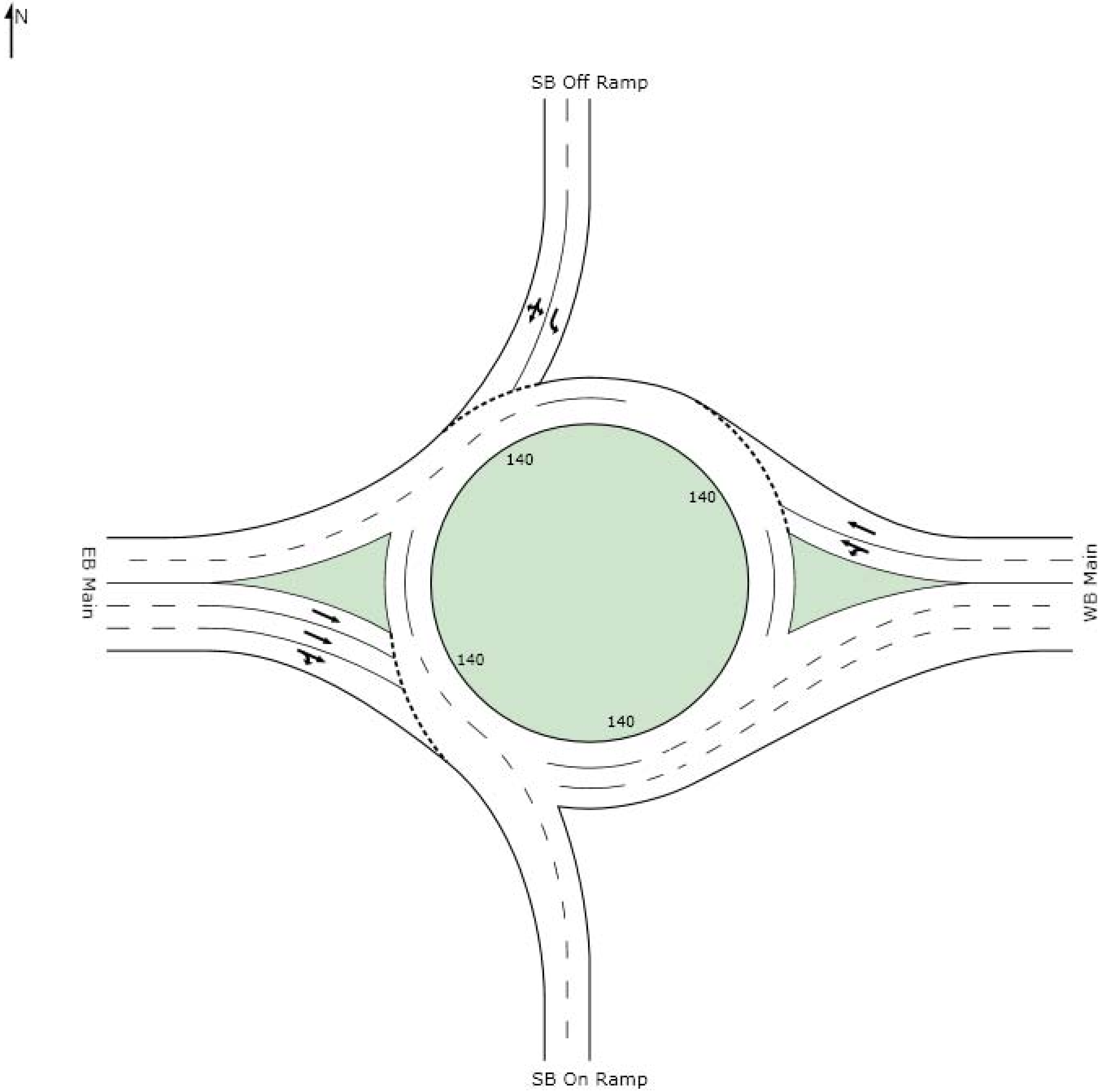
Site: SB Ramps

2034 PAO Mid
Mitigated to LOS D
Roundabout

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
Movement Performance - Vehicles											
East: WB Main											
1L	L	250	2.0	0.476	10.7	LOS B	0.0	0.0	0.00	0.91	25.7
6T	T	1255	2.0	0.476	0.0	LOS A	0.0	0.0	0.00	0.00	28.0
Approach		1505	2.0	0.476	1.8	LOS B	0.0	0.0	0.00	0.15	27.5
North: SB Off Ramp											
7L	L	848	2.0	1.002	50.7	LOS D	22.9	580.9	1.00	1.80	16.8
4T	T	5	2.0	1.087	42.5	LOS D	22.9	580.9	1.00	1.85	18.9
4R	R	435	2.0	1.002	42.7	LOS D	22.9	580.9	1.00	1.85	17.4
Approach		1288	2.0	1.002	48.0	LOS D	22.9	580.9	1.00	1.82	17.0
West: EB Main											
2T	T	1234	2.0	1.041	51.0	LOS D	32.5	824.9	1.00	2.13	13.5
2R	R	701	2.0	1.042	50.7	LOS D	32.5	824.9	1.00	2.27	15.0
Approach		1935	2.0	1.041	50.9	LOS D	32.5	824.9	1.00	2.18	14.1
All Vehicles		4728	2.0	1.041	34.5	LOS C	32.5	824.9	0.68	1.44	17.6

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION



N
SB Off Ramp
140
140
EB Main
WB Main
140
140
SB On Ramp

MOVEMENT SUMMARY

Site: Walgreens

2034 PAO Mid
Roundabout

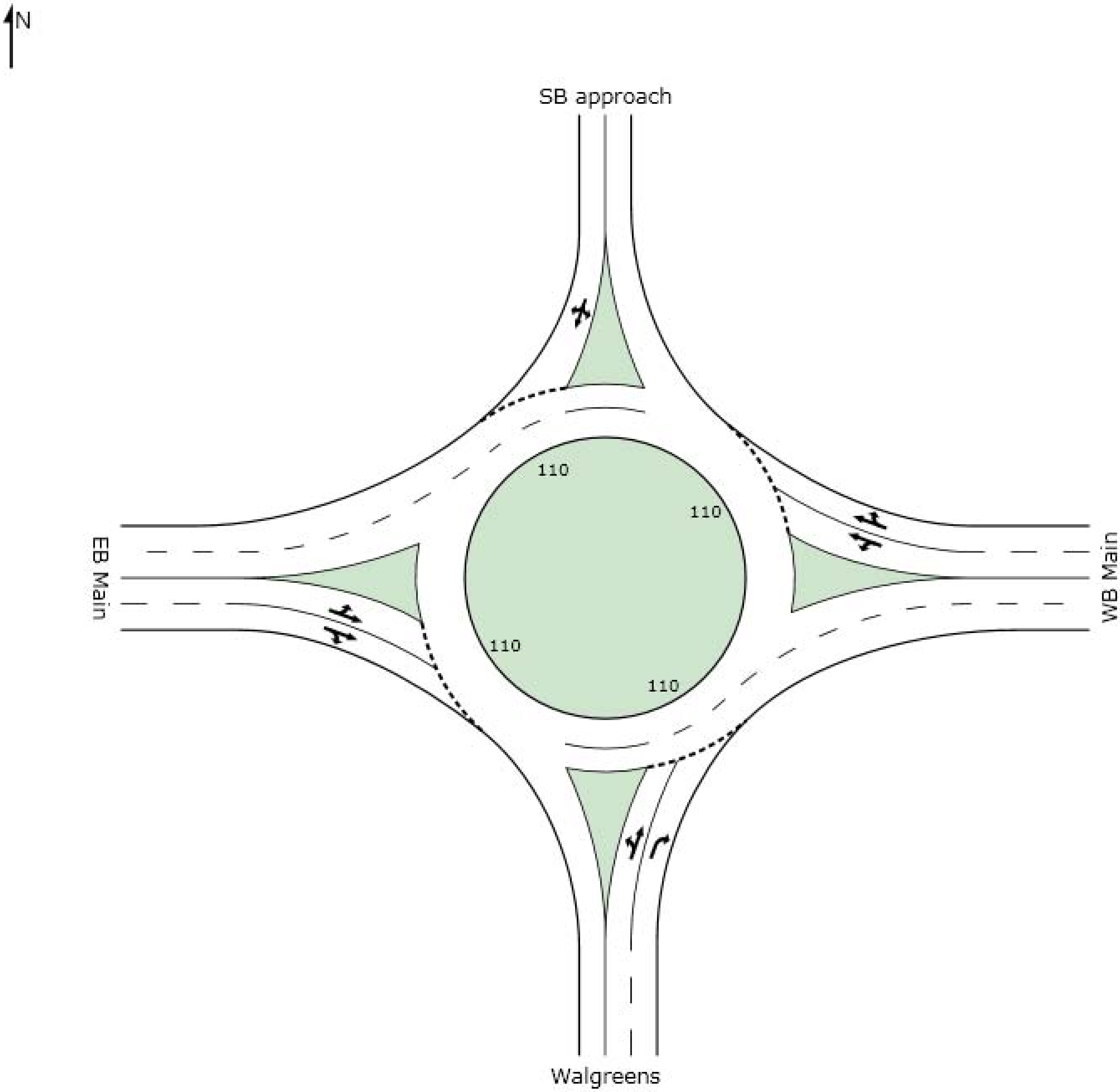
Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Walgreens											
3L	L	255	2.0	0.513	13.3	LOS B	3.7	95.0	0.83	1.02	20.5
8T	T	16	2.0	0.510	6.5	LOS A	3.7	95.0	0.83	0.92	21.0
8R	R	152	2.0	0.368	8.7	LOS A	2.2	56.1	0.78	0.88	21.6
Approach		424	2.0	0.513	11.4	LOS B	3.7	95.0	0.82	0.96	20.9
East: WB Main											
1L	L	261	2.0	0.660	10.5	LOS B	8.6	217.3	0.81	0.88	23.2
6T	T	940	2.0	0.661	4.7	LOS A	8.6	218.6	0.80	0.68	24.2
6R	R	163	2.0	0.660	5.8	LOS A	8.6	218.6	0.80	0.74	24.6
Approach		1364	2.0	0.661	5.9	LOS B	8.6	218.6	0.80	0.72	24.0
North: SB approach											
7L	L	152	2.0	0.631	22.2	LOS C	4.6	117.5	0.89	1.13	18.4
4T	T	22	2.0	0.639	14.9	LOS B	4.6	117.5	0.89	1.05	18.4
4R	R	33	2.0	0.627	16.4	LOS B	4.6	117.5	0.89	1.07	18.6
Approach		207	2.0	0.631	20.5	LOS C	4.6	117.5	0.89	1.11	18.4
West: EB Main											
5L	L	27	2.0	0.618	12.5	LOS B	7.3	184.8	0.83	1.03	24.0
2T	T	1011	2.0	0.619	6.9	LOS A	7.4	187.9	0.82	0.84	25.5
2R	R	87	2.0	0.621	7.7	LOS A	7.4	187.9	0.82	0.86	25.6
Approach		1125	2.0	0.619	7.1	LOS B	7.4	187.9	0.82	0.84	25.5
All Vehicles		3120	2.0	0.661	8.1	LOS A	8.6	218.6	0.82	0.83	23.5

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

Processed: Thursday, September 29, 2011 11:31:19 AM
SIDRA INTERSECTION 5.0.5.1510

Project: M:\10\10192 Ferndale Planned Action EIS\Traffic Operations (FEIS)\Sidra\2034 Alt 2 (Mitigated LOS C)\Main Street RABs - Alt (LOS C & w-diameter).sip
8000159, THE TRANSPO GROUP, FLOATING


N
SB approach
110
110
110
110
EB Main
WB Main
Walgreens

MOVEMENT SUMMARY

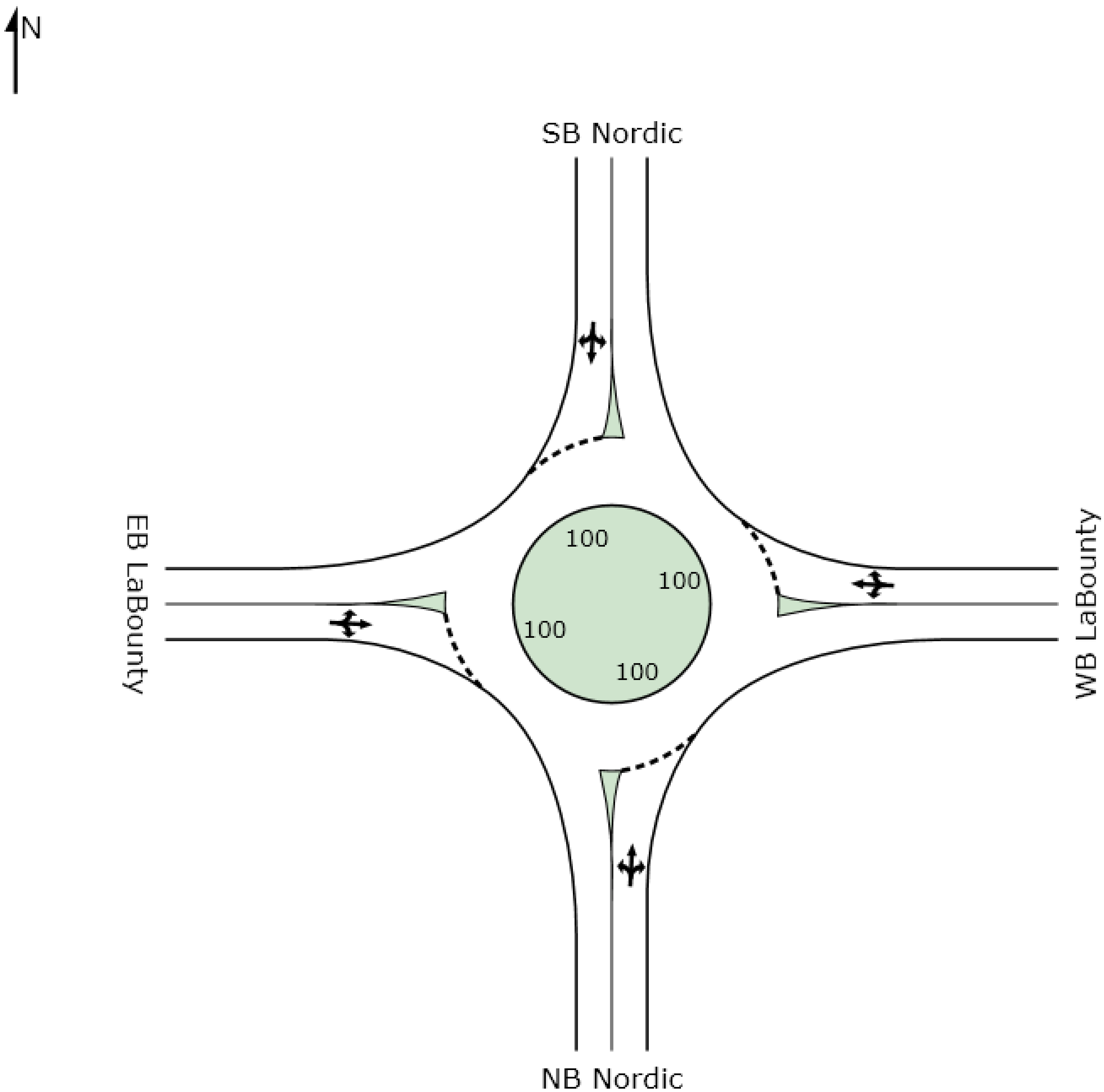
Site: Nordic@Labounty

2034 Mid-Growth
Mitigated to LOS D
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Nordic											
3L	L	478	3.0	0.711	14.4	LOS B	10.1	257.9	0.86	0.93	20.9
8T	T	16	3.0	0.709	6.0	LOS A	10.1	257.9	0.86	0.83	21.2
8R	R	120	3.0	0.712	8.8	LOS A	10.1	257.9	0.86	0.87	21.8
Approach		614	3.0	0.711	13.1	LOS B	10.1	257.9	0.86	0.92	21.1
East: WB LaBounty											
1L	L	141	1.0	0.968	41.6	LOS D	25.4	639.7	1.00	1.64	16.7
6T	T	446	1.0	0.969	36.8	LOS D	25.4	639.7	1.00	1.64	17.5
6R	R	38	1.0	0.975	37.3	LOS D	25.4	639.7	1.00	1.64	16.9
Approach		625	1.0	0.969	37.9	LOS D	25.4	639.7	1.00	1.64	17.3
North: SB Nordic											
7L	L	16	0.0	0.272	20.6	LOS C	2.2	53.8	0.92	0.99	19.4
4T	T	16	0.0	0.272	12.2	LOS B	2.2	53.8	0.92	0.92	19.4
4R	R	60	0.0	0.271	15.0	LOS B	2.2	53.8	0.92	0.95	20.0
Approach		92	0.0	0.271	15.5	LOS C	2.2	53.8	0.92	0.95	19.8
West: EB LaBounty											
5L	L	22	2.0	0.701	10.7	LOS B	9.3	236.1	0.75	0.77	27.1
2T	T	250	2.0	0.694	5.9	LOS A	9.3	236.1	0.75	0.61	28.1
2R	R	451	2.0	0.695	6.4	LOS A	9.3	236.1	0.75	0.64	28.1
Approach		723	2.0	0.695	6.3	LOS B	9.3	236.1	0.75	0.63	28.1
All Vehicles		2054	1.9	0.969	18.4	LOS B	25.4	639.7	0.87	1.04	21.4

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.


N
SB Nordic
EB LaBounty
WB LaBounty
NB Nordic
100
100
100
100

MOVEMENT SUMMARY

Site: NB I-5/Slater

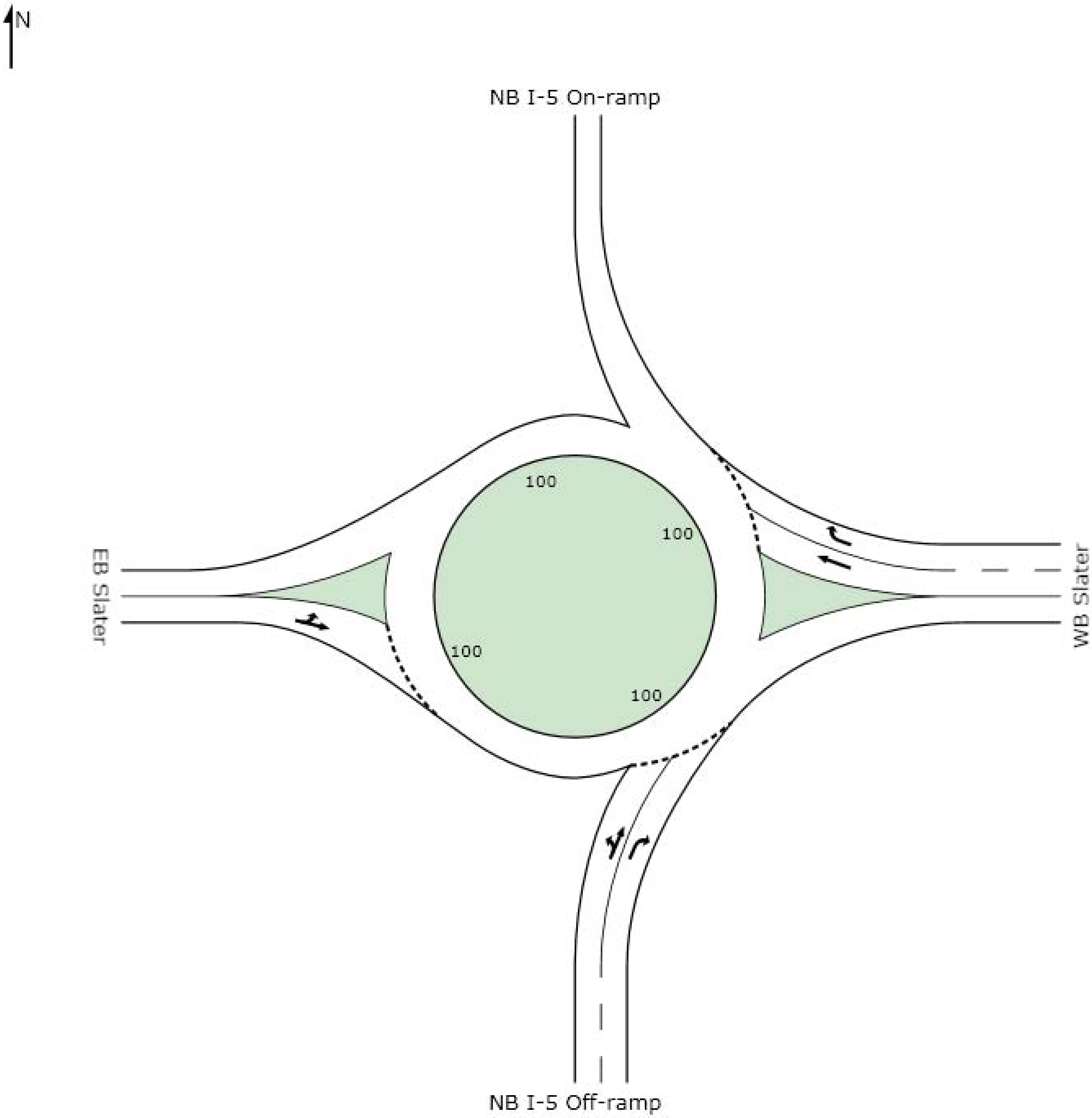
2034 Mid Volumes
NB I-5 Ramps/Slater
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB I-5 Off-ramp											
3L	L	330	1.0	0.503	22.3	LOS C	4.9	123.0	0.85	1.04	25.6
8T	T	1	1.0	0.532	16.8	LOS B	4.9	123.0	0.85	0.99	28.4
8R	R	457	1.0	0.567	16.6	LOS B	6.6	165.2	0.88	1.03	28.1
Approach		788	1.0	0.567	19.0	LOS C	6.6	165.2	0.87	1.03	27.0
East: WB Slater											
6T	T	787	1.0	0.850	17.2	LOS B	17.6	442.5	1.00	1.24	24.0
6R	R	271	1.0	0.433	11.8	LOS B	3.6	90.3	0.78	0.88	28.1
Approach		1059	1.0	0.850	15.8	LOS B	17.6	442.5	0.94	1.15	25.0
West: EB Slater											
5L	L	202	2.0	0.502	12.2	LOS B	0.0	0.0	0.00	0.92	28.6
2T	T	617	2.0	0.502	3.6	LOS A	0.0	0.0	0.00	0.33	32.0
Approach		819	2.0	0.502	5.7	LOS B	0.0	0.0	0.00	0.47	31.0
All Vehicles		2666	1.3	0.850	13.7	LOS B	17.6	442.5	0.63	0.91	27.2

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION



N
NB I-5 On-ramp
100
100
100
100
EB Slater
WB Slater
NB I-5 Off-ramp

MOVEMENT SUMMARY

Site: Pac Hwy/Slater

2034 Mid Volumes
Mitigated to LOS D
Pacific Hwy/Slater
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Pac Hwy											
3L	L	179	1.0	1.150	143.6	LOS F	27.5	693.7	1.00	1.77	8.0
8T	T	65	1.0	1.144	137.9	LOS F	27.5	693.7	1.00	1.77	8.4
8R	R	33	1.0	1.165	138.2	LOS F	27.5	693.7	1.00	1.77	7.7
Approach		277	1.0	1.147	141.6	LOS F	27.5	693.7	1.00	1.77	8.1
East: WB Slater											
1L	L	11	1.0	0.836	31.2	LOS C	16.3	409.8	1.00	1.37	21.8
6T	T	587	1.0	0.849	22.4	LOS C	16.3	409.8	1.00	1.37	21.9
6R	R	147	1.0	0.373	15.5	LOS B	2.8	70.0	0.83	0.94	26.1
Approach		745	1.0	0.849	21.2	LOS C	16.3	409.8	0.97	1.28	22.7
North: SB Pac Hwy											
7L	L	130	2.0	0.996	63.2	LOS E	24.3	616.5	1.00	1.63	14.8
4T	T	27	2.0	1.006	57.6	LOS E	24.3	616.5	1.00	1.63	15.8
4R	R	315	2.0	0.998	57.8	LOS E	24.3	616.5	1.00	1.63	14.8
Approach		473	2.0	0.997	59.3	LOS E	24.3	616.5	1.00	1.63	14.9
West: EB Slater											
5L	L	478	2.0	1.031	43.5	LOS D	51.2	1301.1	1.00	1.31	18.3
2T	T	554	2.0	1.030	34.7	LOS C	51.2	1301.1	1.00	1.31	17.8
2R	R	76	2.0	1.028	37.4	LOS D	51.2	1301.1	1.00	1.31	18.7
Approach		1109	2.0	1.030	38.7	LOS D	51.2	1301.1	1.00	1.31	18.1
All Vehicles		2603	1.6	1.147	48.4	LOS D	51.2	1301.1	0.99	1.41	16.2

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

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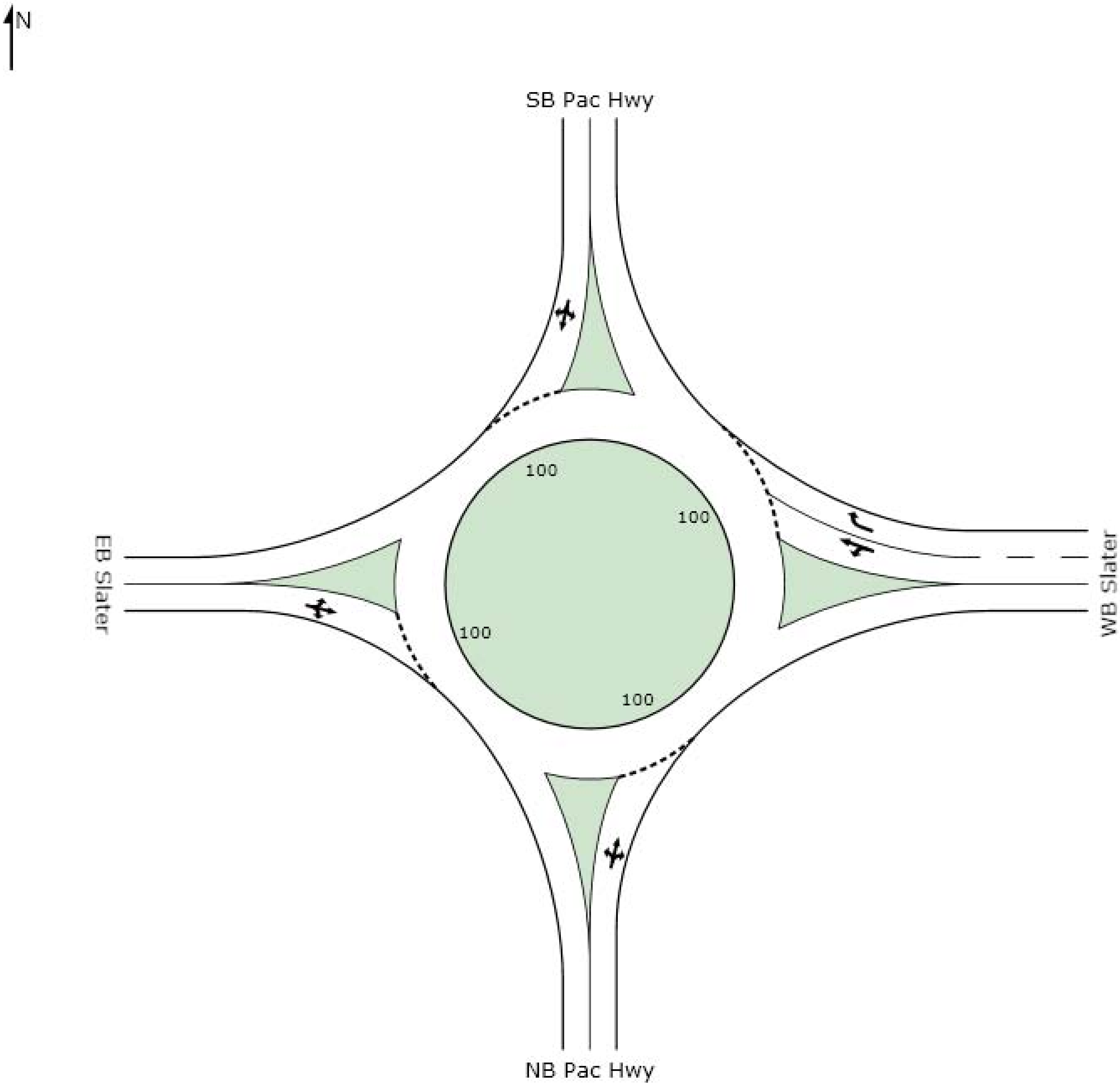
SIDRA INTERSECTION 5.0.5.1510

Project: M:\10\10192 Ferndale Planned Action EIS\Traffic Operations (FEIS)\Sidra\2034 Alt 2 (Mitigated LOS D)\Slater RABs - Mid Volumes (LOS D).sip
8000159, THE TRANSPO GROUP, FLOATING



N
SB Pac Hwy
EB Slater
WB Slater
NB Pac Hwy
100
100
100
100

MOVEMENT SUMMARY

Site: Rural/Slater

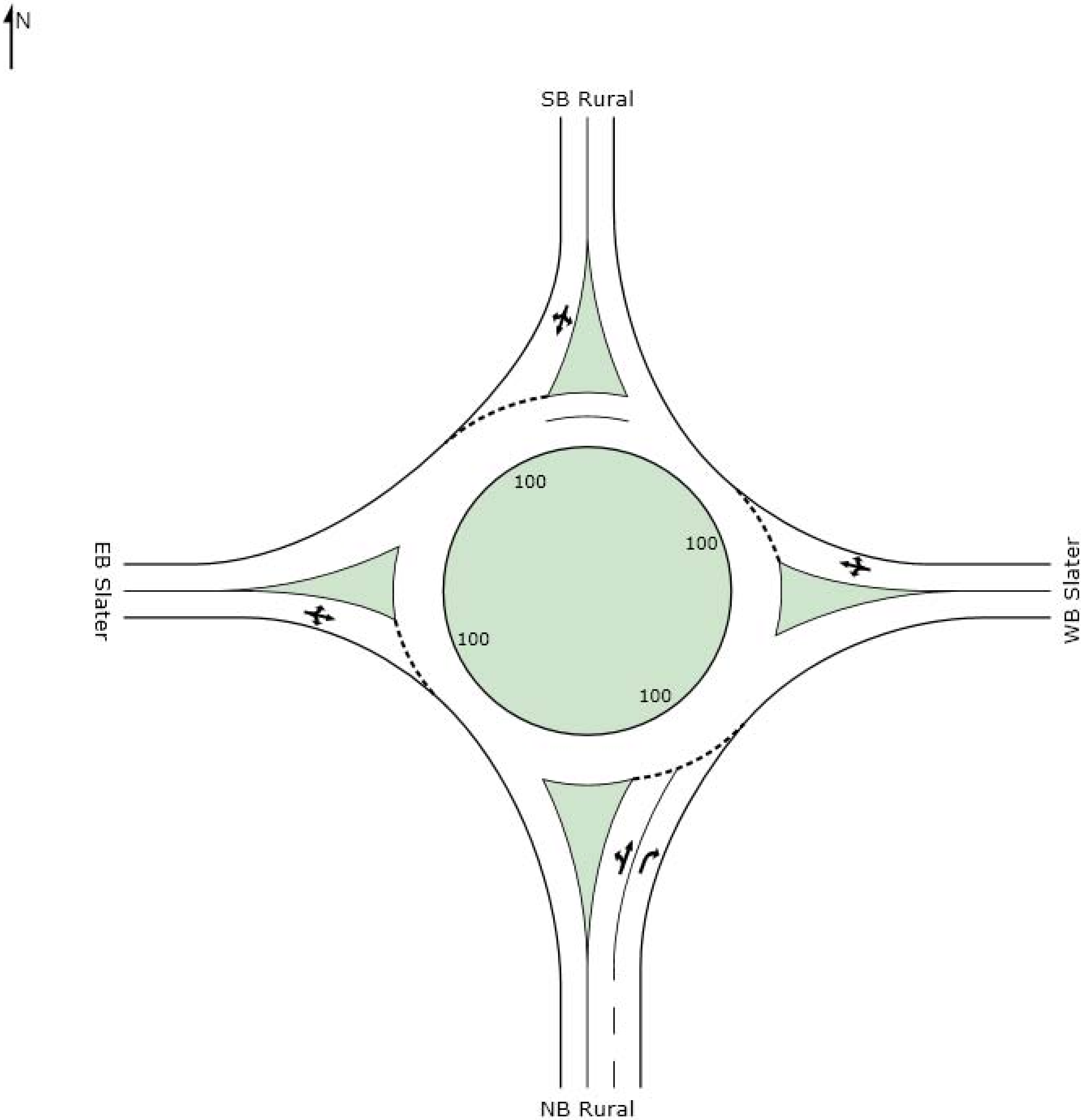
2034 Mid Volumes
Mitigated to LOS D
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Rural											
3L	L	112	7.0	0.338	17.4	LOS B	2.5	65.4	0.84	0.96	20.1
8T	T	16	7.0	0.340	9.2	LOS A	2.5	65.4	0.84	0.86	20.2
8R	R	532	7.0	0.820	21.7	LOS C	14.4	379.7	1.00	1.44	18.1
Approach		660	7.0	0.820	20.7	LOS C	14.4	379.7	0.97	1.35	18.5
East: WB Slater											
1L	L	431	5.0	0.881	13.9	LOS B	21.2	552.1	1.00	0.75	25.4
6T	T	468	5.0	0.882	9.4	LOS A	21.2	552.1	1.00	0.74	26.8
6R	R	90	5.0	0.878	9.5	LOS A	21.2	552.1	1.00	0.75	26.9
Approach		989	5.0	0.881	11.4	LOS B	21.2	552.1	1.00	0.75	26.2
North: SB Rural											
7L	L	186	6.0	0.862	51.2	LOS D	10.8	282.2	1.00	1.46	13.6
4T	T	16	6.0	0.887	42.9	LOS D	10.8	282.2	1.00	1.46	12.8
4R	R	21	6.0	0.851	45.3	LOS D	10.8	282.2	1.00	1.46	13.5
Approach		223	6.0	0.864	50.0	LOS D	10.8	282.2	1.00	1.46	13.5
West: EB Slater											
5L	L	16	4.0	1.140	111.0	LOS F	52.0	1340.6	1.00	2.71	9.0
2T	T	606	4.0	1.171	106.5	LOS F	52.0	1340.6	1.00	2.71	9.1
2R	R	59	4.0	1.170	106.6	LOS F	52.0	1340.6	1.00	2.71	8.6
Approach		681	4.0	1.171	106.6	LOS F	52.0	1340.6	1.00	2.71	9.1
All Vehicles		2553	5.3	1.171	42.6	LOS D	52.0	1340.6	0.99	1.49	15.5

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION


N
SB Rural
100
100
EB Slater
100
100
WB Slater
NB Rural

MOVEMENT SUMMARY

Site: SB I-5/Slater

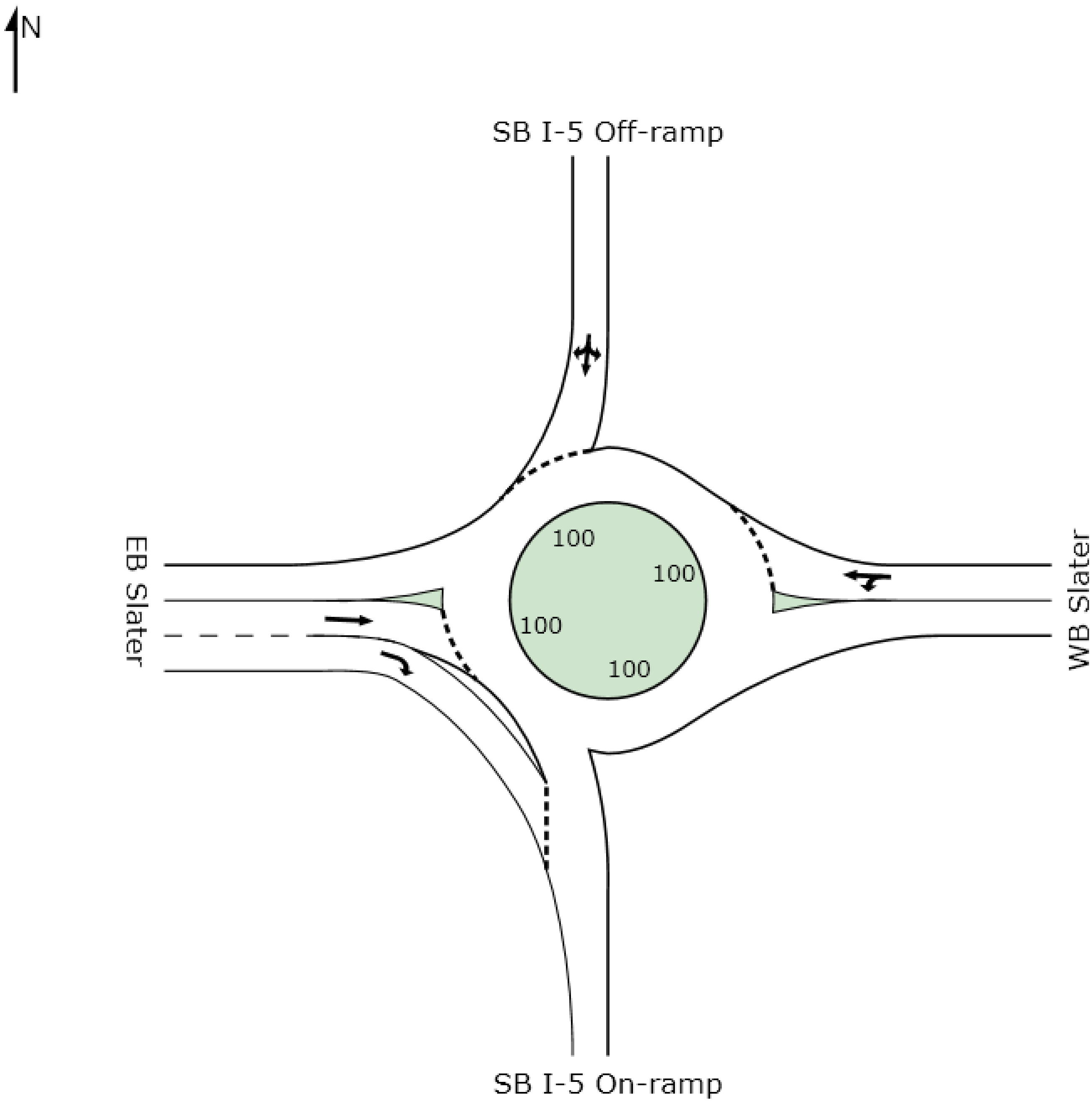
2034 Mid Volumes
SB I-5 Ramps/Slater Ave
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: WB Slater											
1L	L	313	4.0	0.679	12.3	LOS B	0.0	0.0	0.00	0.90	28.6
6T	T	776	4.0	0.680	3.6	LOS A	0.0	0.0	0.00	0.32	32.0
Approach		1089	4.0	0.680	6.1	LOS B	0.0	0.0	0.00	0.49	30.8
North: SB I-5 Off-ramp											
7L	L	120	4.0	0.685	43.0	LOS D	8.9	228.5	0.98	1.27	18.9
4T	T	1	4.0	0.521	37.4	LOS D	8.9	228.5	0.98	1.27	20.3
4R	R	172	4.0	0.687	37.4	LOS D	8.9	228.5	0.98	1.27	19.3
Approach		293	4.0	0.686	39.7	LOS D	8.9	228.5	0.98	1.27	19.1
West: EB Slater											
2T	T	682	3.0	0.676	9.6	LOS A	9.0	230.6	0.84	0.89	27.9
2R	R	578	3.0	0.516	9.8	LOS A	4.5	115.3	0.62	0.69	33.4
Approach		1260	3.0	0.676	9.7	LOS A	9.0	230.6	0.74	0.80	30.3
All Vehicles		2642	3.5	0.686	11.5	LOS B	9.0	230.6	0.46	0.72	28.7

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION


N
SB I-5 Off-ramp
EB Slater
WB Slater
100
100
100
100
SB I-5 On-ramp

MOVEMENT SUMMARY

Site: Smith@Barrett

2034 Mid-Growth
Mitigated to LOS D
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Barrett											
3L	L	174	0.0	0.924	45.3	LOS D	20.9	522.8	1.00	1.49	18.3
8T	T	384	0.0	0.921	39.3	LOS D	20.9	522.8	1.00	1.49	18.7
8R	R	84	0.0	0.254	17.5	LOS B	1.7	43.3	0.83	0.93	27.6
Approach		642	0.0	0.922	38.0	LOS D	20.9	522.8	0.98	1.42	19.4
East: WB Smith											
1L	L	37	2.0	0.624	20.8	LOS C	7.7	196.3	0.96	1.08	25.2
6T	T	389	2.0	0.629	12.9	LOS B	7.7	196.3	0.96	1.06	25.9
6R	R	284	2.0	0.494	13.0	LOS B	4.8	121.5	0.89	0.98	26.0
Approach		711	2.0	0.629	13.4	LOS C	7.7	196.3	0.93	1.03	25.9
North: SB Barrett											
7L	L	300	2.0	1.064	73.2	LOS E	35.4	900.2	1.00	2.10	12.4
4T	T	258	2.0	1.066	68.3	LOS E	35.4	900.2	1.00	2.10	13.2
4R	R	58	2.0	1.072	68.2	LOS E	35.4	900.2	1.00	2.10	12.3
Approach		616	2.0	1.064	70.7	LOS E	35.4	900.2	1.00	2.10	12.7
West: EB Smith											
5L	L	89	1.0	0.705	19.6	LOS B	9.8	247.8	0.98	1.10	24.2
2T	T	432	1.0	0.702	13.3	LOS B	9.8	247.8	0.98	1.08	25.6
2R	R	121	1.0	0.295	13.8	LOS B	2.1	52.3	0.78	0.90	27.0
Approach		642	1.0	0.702	14.3	LOS B	9.8	247.8	0.94	1.05	25.6
All Vehicles		2611	1.3	1.064	33.2	LOS C	35.4	900.2	0.96	1.38	19.4

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

Processed: Friday, September 30, 2011 8:03:37 AM
SIDRA INTERSECTION 5.0.5.1510

Project: M:\10\10192 Ferndale Planned Action EIS\Traffic Operations (FEIS)\Sidra\2034 Alt 2 (Mitigated LOS D)\Ferndale PAO - 2034 Mid Volumes (LOS D & w-dia).sip
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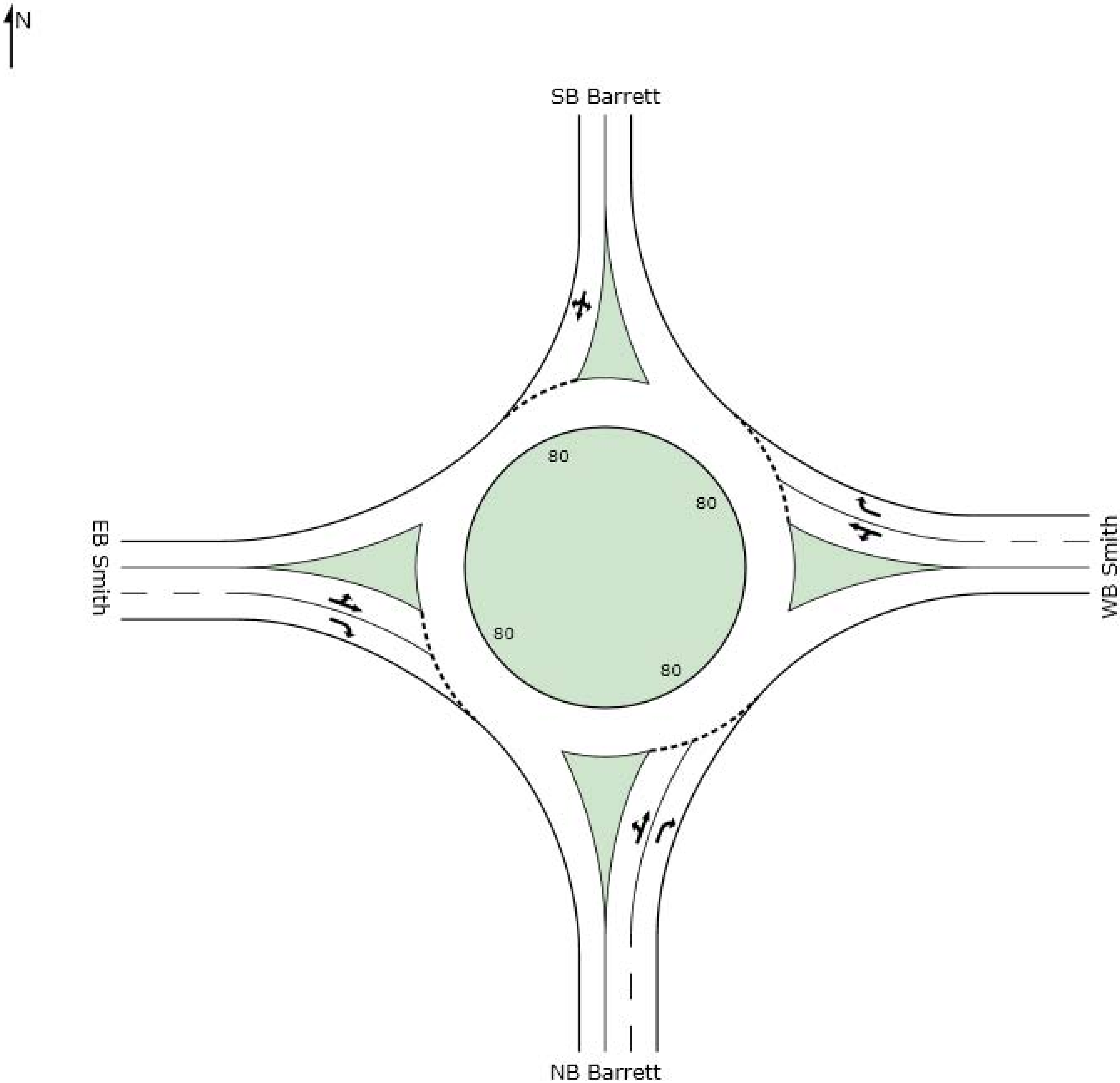


N
SB Barrett
80
80
80
80
EB Smith
WB Smith
NB Barrett

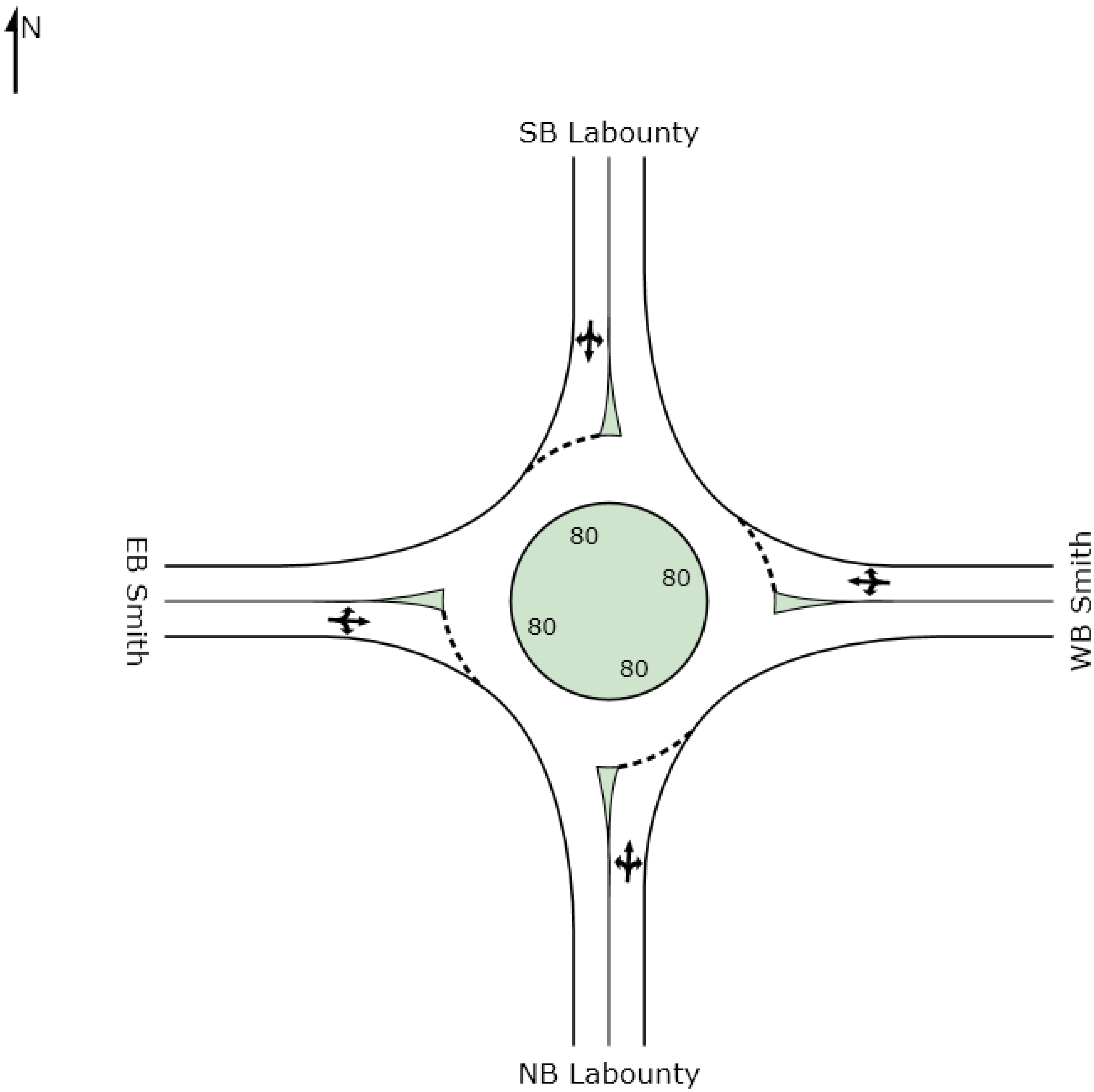
MOVEMENT SUMMARY

Site: Smith@LaBounty

2034 Mid-Growth
Roundabout

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
Movement Performance - Vehicles											
South: NB Labounty											
3L	L	21	5.0	0.401	15.5	LOS B	3.1	79.6	0.74	0.93	25.8
8T	T	89	5.0	0.401	9.2	LOS A	3.1	79.6	0.74	0.79	27.8
8R	R	151	5.0	0.400	10.4	LOS B	3.1	79.6	0.74	0.82	27.6
Approach		260	5.0	0.400	10.4	LOS B	3.1	79.6	0.74	0.82	27.5
East: WB Smith											
1L	L	94	2.0	0.558	11.7	LOS B	6.2	156.9	0.53	0.72	27.3
6T	T	156	2.0	0.558	5.5	LOS A	6.2	156.9	0.53	0.49	28.8
6R	R	370	2.0	0.559	6.6	LOS A	6.2	156.9	0.53	0.55	28.7
Approach		620	2.0	0.558	7.1	LOS B	6.2	156.9	0.53	0.56	28.5
North: SB Labounty											
7L	L	313	1.0	0.478	13.1	LOS B	4.2	104.8	0.65	0.78	26.5
4T	T	99	1.0	0.478	6.9	LOS A	4.2	104.8	0.65	0.63	28.0
4R	R	5	1.0	0.473	8.0	LOS A	4.2	104.8	0.65	0.67	28.0
Approach		417	1.0	0.478	11.5	LOS B	4.2	104.8	0.65	0.75	26.9
West: EB Smith											
5L	L	5	4.0	0.306	15.0	LOS B	2.3	60.0	0.71	0.93	26.2
2T	T	177	4.0	0.315	8.8	LOS A	2.3	60.0	0.71	0.76	28.3
2R	R	21	4.0	0.316	9.9	LOS A	2.3	60.0	0.71	0.80	28.1
Approach		203	4.0	0.315	9.1	LOS B	2.3	60.0	0.71	0.77	28.2
All Vehicles		1500	2.5	0.558	9.2	LOS A	6.2	156.9	0.62	0.68	27.8

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.


N
SB Labounty
EB Smith
80
80
80
80
WB Smith
NB Labounty

Appendix B

Final EIS – Supplemental Transportation Analyses

Traffic Operations Analyses

LOS D – Traffic Signal Level of Service

HCM Signalized Intersection Capacity Analysis
1: Main St. & Fourth Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	380	45	10	530	80	60	35	20	120	50	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98			0.98		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1770	1833		1787	1844			1773		1805	1750	
Flt Permitted	0.37	1.00		0.48	1.00			0.77		0.66	1.00	
Satd. Flow (perm)	680	1833		902	1844			1407		1262	1750	
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)	21	404	48	11	564	85	64	37	21	128	53	59
RTOR Reduction (vph)	0	3	0	0	4	0	0	9	0	0	50	0
Lane Group Flow (vph)	21	449	0	11	645	0	0	113	0	128	62	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	0%	0%	0%
Parking (#/hr)						0						
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)	66.7	66.7		66.7	66.7			14.3		14.3	14.3	
Effective Green, g (s)	66.2	66.2		66.2	66.2			13.8		13.8	13.8	
Actuated g/C Ratio	0.74	0.74		0.74	0.74			0.15		0.15	0.15	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	500	1348		663	1356			216		194	268	
v/s Ratio Prot		0.24			c0.35						0.04	
v/s Ratio Perm	0.03			0.01				0.08		c0.10		
v/c Ratio	0.04	0.33		0.02	0.48			0.52		0.66	0.23	
Uniform Delay, d1	3.2	4.2		3.2	4.8			35.1		35.9	33.4	
Progression Factor	1.00	1.00		0.23	0.30			1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.7		0.0	1.0			2.3		7.9	0.4	
Delay (s)	3.4	4.8		0.8	2.4			37.3		43.8	33.9	
Level of Service	A	A		A	A			D		D	C	
Approach Delay (s)		4.8			2.4			37.3			39.2	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Vista Drive & Third Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	185	160	5	225	105	170	50	20	75	95	25
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	16	197	170	5	239	112	181	53	21	80	101	27

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	383	356	255	207
Volume Left (vph)	16	5	181	80
Volume Right (vph)	170	112	21	27
Hadj (s)	-0.24	-0.17	0.11	0.00
Departure Headway (s)	6.1	6.2	6.9	6.9
Degree Utilization, x	0.65	0.61	0.49	0.40
Capacity (veh/h)	555	535	457	446
Control Delay (s)	19.5	18.5	16.2	14.4
Approach Delay (s)	19.5	18.5	16.2	14.4
Approach LOS	C	C	C	B

Intersection Summary			
Delay	17.6		
HCM Level of Service	C		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	490	35	65	555	215	20	90	50	235	90	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		0.97	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1877		1779	1774		1710	1744		1735	1806	
Flt Permitted	0.23	1.00		0.39	1.00		0.68	1.00		0.64	1.00	
Satd. Flow (perm)	442	1877		729	1774		1230	1744		1166	1806	
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)	10	505	36	67	572	222	21	93	52	242	93	21
RTOR Reduction (vph)	0	3	0	0	13	0	0	24	0	0	10	0
Lane Group Flow (vph)	10	538	0	67	781	0	21	121	0	242	104	0
Confl. Peds. (#/hr)	13		5	5		13	18		13	13		18
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Parking (#/hr)			0			0			0			0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2	2		1			1		
Actuated Green, G (s)	57.8	57.8		57.8	57.8		23.2	23.2		23.2	23.2	
Effective Green, g (s)	57.3	57.3		57.3	57.3		22.7	22.7		22.7	22.7	
Actuated g/C Ratio	0.64	0.64		0.64	0.64		0.25	0.25		0.25	0.25	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Lane Grp Cap (vph)	281	1195		464	1129		310	440		294	456	
v/s Ratio Prot		0.29			c0.44			0.07			0.06	
v/s Ratio Perm	0.02			0.09			0.02			c0.21		
v/c Ratio	0.04	0.45		0.14	0.69		0.07	0.28		0.82	0.23	
Uniform Delay, d1	6.1	8.3		6.5	10.6		25.6	27.0		31.8	26.7	
Progression Factor	0.91	0.76		0.48	0.38		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.2		0.2	1.2		0.1	0.4		17.2	0.3	
Delay (s)	5.8	7.5		3.4	5.2		25.7	27.5		49.0	27.0	
Level of Service	A	A		A	A		C	C		D	C	
Approach Delay (s)		7.5			5.1			27.2			41.9	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	710	15	60	830	300	10	40	45	240	35	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		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	1.00		1.00	0.96		1.00	0.92		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1892		1787	1789		1805	1726		1796	1835	
Flt Permitted	0.07	1.00		0.28	1.00		0.73	1.00		0.70	1.00	
Satd. Flow (perm)	124	1892		523	1789		1379	1726		1322	1835	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	747	16	63	874	316	11	42	47	253	37	11
RTOR Reduction (vph)	0	1	0	0	14	0	0	37	0	0	9	0
Lane Group Flow (vph)	11	762	0	63	1176	0	11	52	0	253	39	0
Confl. Peds. (#/hr)	6		10	10		6			2	2		
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Parking (#/hr)			0			0			0			0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)	61.9	61.9		61.9	61.9		19.1	19.1		19.1	19.1	
Effective Green, g (s)	61.4	61.4		61.4	61.4		18.6	18.6		18.6	18.6	
Actuated g/C Ratio	0.68	0.68		0.68	0.68		0.21	0.21		0.21	0.21	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.6	3.6		3.6	3.6	
Lane Grp Cap (vph)	85	1291		357	1220		285	357		273	379	
v/s Ratio Prot		0.40			c0.66			0.03			0.02	
v/s Ratio Perm	0.09			0.12			0.01			c0.19		
v/c Ratio	0.13	0.59		0.18	0.96		0.04	0.14		0.93	0.10	
Uniform Delay, d1	5.0	7.6		5.2	13.3		28.5	29.2		35.0	28.9	
Progression Factor	1.03	1.02		0.53	0.51		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	1.7		0.7	13.5		0.1	0.2		35.6	0.1	
Delay (s)	7.9	9.5		3.4	20.3		28.6	29.4		70.6	29.1	
Level of Service	A	A		A	C		C	C		E	C	
Approach Delay (s)		9.5			19.4			29.3			64.0	
Approach LOS		A			B			C			E	

Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

5: Main St. & First Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	975	35	150	1115	5	30	5	165	10	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	1.00	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	1.00		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1787	1867		1787	1880			1790	1599		1728	
Flt Permitted	0.14	1.00		0.19	1.00			0.72	1.00		0.91	
Satd. Flow (perm)	268	1867		364	1880			1353	1599		1598	
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)	16	1037	37	160	1186	5	32	5	176	11	11	21
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	143	0	19	0
Lane Group Flow (vph)	16	1073	0	160	1191	0	0	37	33	0	24	0
Confl. Peds. (#/hr)	2		17	17		2	3					3
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Parking (#/hr)			0									
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1		1	1		
Actuated Green, G (s)	72.1	72.1		72.1	72.1			8.9	8.9		8.9	
Effective Green, g (s)	71.6	71.6		71.6	71.6			8.4	8.4		8.4	
Actuated g/C Ratio	0.80	0.80		0.80	0.80			0.09	0.09		0.09	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	213	1485		290	1496			126	149		149	
v/s Ratio Prot		0.57			c0.63							
v/s Ratio Perm	0.06			0.44				c0.03	0.02		0.01	
v/c Ratio	0.08	0.72		0.55	0.80			0.29	0.22		0.16	
Uniform Delay, d1	2.0	4.4		3.4	5.1			38.0	37.8		37.6	
Progression Factor	0.38	0.44		0.85	0.77			1.00	1.00		1.00	
Incremental Delay, d2	0.5	2.4		4.5	2.7			1.3	0.7		0.5	
Delay (s)	1.3	4.4		7.3	6.7			39.3	38.5		38.1	
Level of Service	A	A		A	A			D	D		D	
Approach Delay (s)		4.3			6.7			38.7			38.1	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

6: Main St. & Hovander Road

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	965	170	30	1100	185	60
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		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1835		1787	1881	1787	1599
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	1835		1787	1881	1787	1599
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1016	179	32	1158	195	63
RTOR Reduction (vph)	6	0	0	0	0	53
Lane Group Flow (vph)	1189	0	32	1158	195	10
Confl. Peds. (#/hr)		3	3			
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type			Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	61.6		2.6	68.2	13.8	13.8
Effective Green, g (s)	61.6		2.6	68.2	13.8	13.8
Actuated g/C Ratio	0.68		0.03	0.76	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)	1256		52	1425	274	245
v/s Ratio Prot	c0.65		0.02	c0.62	c0.11	
v/s Ratio Perm						0.01
v/c Ratio	0.95		0.62	0.81	0.71	0.04
Uniform Delay, d1	12.7		43.2	6.9	36.2	32.5
Progression Factor	0.86		0.91	0.89	1.00	1.00
Incremental Delay, d2	12.2		14.0	3.6	8.4	0.1
Delay (s)	23.1		53.3	9.8	44.6	32.5
Level of Service	C		D	A	D	C
Approach Delay (s)	23.1			10.9	41.7	
Approach LOS	C			B	D	

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

7: Main St. & Walgreens

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	930	80	240	865	150	235	15	140	140	20	30
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	5.0	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	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	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	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.86		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3524		1787	1881	1564	1805	1617		1797	1730	
Flt Permitted	0.16	1.00		0.16	1.00	1.00	0.72	1.00		0.57	1.00	
Satd. Flow (perm)	296	3524		297	1881	1564	1374	1617		1072	1730	
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)	26	969	83	250	901	156	245	16	146	146	21	31
RTOR Reduction (vph)	0	6	0	0	0	63	0	112	0	0	24	0
Lane Group Flow (vph)	26	1046	0	250	901	93	245	50	0	146	28	0
Confl. Peds. (#/hr)	1		6	6		1			5	5		
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	45.7	43.3		60.0	52.6	52.6	20.0	20.0		20.0	20.0	
Effective Green, g (s)	47.7	44.3		61.0	53.6	52.6	21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.53	0.49		0.68	0.60	0.58	0.23	0.23		0.23	0.23	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	213	1735		412	1120	914	321	377		250	404	
v/s Ratio Prot	0.00	0.30		c0.09	c0.48			0.03			0.02	
v/s Ratio Perm	0.06			0.33		0.06	c0.18			0.14		
v/c Ratio	0.12	0.60		0.61	0.80	0.10	0.76	0.13		0.58	0.07	
Uniform Delay, d1	13.2	16.5		9.9	14.1	8.3	32.2	27.3		30.6	26.9	
Progression Factor	1.12	0.88		0.83	0.99	1.31	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.7		1.5	3.8	0.1	10.3	0.2		3.5	0.1	
Delay (s)	14.9	15.3		9.7	17.8	11.0	42.5	27.5		34.1	27.0	
Level of Service	B	B		A	B	B	D	C		C	C	
Approach Delay (s)		15.3			15.4			36.5			32.2	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

8: Main St. & Labounty Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	890	235	400	755	230	395	75	565	235	65	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	4.0		3.0	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	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	
Frt	1.00	0.97		1.00	0.96		1.00	1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1787	3453		1787	3449		1769	1863	1583		1724	
Flt Permitted	0.21	1.00		0.12	1.00		0.56	1.00	1.00		0.77	
Satd. Flow (perm)	387	3453		235	3449		1050	1863	1583		1375	
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)	92	967	255	435	821	250	429	82	614	255	71	114
RTOR Reduction (vph)	0	26	0	0	31	0	0	0	8	0	14	0
Lane Group Flow (vph)	92	1196	0	435	1040	0	429	82	606	0	426	0
Confl. Peds. (#/hr)			1	1			2					2
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Turn Type	pm+pt			pm+pt			pm+pt		pm+ov	Perm		
Protected Phases	5	2		1	6		3	8	1		4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	31.2	28.0		47.0	39.8		33.0	33.0	48.0		23.0	
Effective Green, g (s)	33.2	29.0		48.0	40.8		34.0	34.0	48.0		24.0	
Actuated g/C Ratio	0.37	0.32		0.53	0.45		0.38	0.38	0.53		0.27	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	4.0		5.0	
Vehicle Extension (s)	3.0	4.0		3.0	4.0		3.0	0.2	3.0		3.0	
Lane Grp Cap (vph)	208	1113		401	1564		453	704	844		367	
v/s Ratio Prot	0.02	0.35		c0.19	0.30		c0.07	0.04	0.12			
v/s Ratio Perm	0.14			c0.39			0.28		0.26		c0.31	
v/c Ratio	0.44	1.07		1.08	0.66		0.95	0.12	0.72		1.16	
Uniform Delay, d1	19.2	30.5		26.2	19.3		33.1	18.2	15.9		33.0	
Progression Factor	0.90	0.75		0.83	0.70		1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.3	47.5		61.2	1.5		29.0	0.0	2.9		98.5	
Delay (s)	18.5	70.3		82.9	15.0		62.1	18.3	18.8		131.5	
Level of Service	B	E		F	B		E	B	B		F	
Approach Delay (s)		66.7			34.6			35.3			131.5	
Approach LOS		E			C			D			F	

Intersection Summary			
HCM Average Control Delay	54.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
9: Main St. & I-5 SB Ramps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1135	645	230	1155	0	0	0	0	780	5	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	5.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95					0.95	0.95	
Frt		1.00	0.85	1.00	1.00					1.00	0.89	
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.99	
Satd. Flow (prot)		3574	1599	1787	3574					1649	1530	
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.99	
Satd. Flow (perm)		3574	1599	1787	3574					1649	1530	
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)	0	1220	694	247	1242	0	0	0	0	839	5	430
RTOR Reduction (vph)	0	0	389	0	0	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	1220	305	247	1242	0	0	0	0	663	584	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	4%	4%	4%
Turn Type			Perm	Prot						Split		
Protected Phases		2		1	6					4	4	
Permitted Phases			2									
Actuated Green, G (s)		29.2	29.2	12.3	46.0					34.0	34.0	
Effective Green, g (s)		30.2	29.2	12.8	47.0					35.0	35.0	
Actuated g/C Ratio		0.34	0.32	0.14	0.52					0.39	0.39	
Clearance Time (s)		5.0	5.0	4.5	5.0					5.0	5.0	
Vehicle Extension (s)		4.0	4.0	2.5	4.0					3.5	3.5	
Lane Grp Cap (vph)		1199	519	254	1866					641	595	
v/s Ratio Prot		c0.34		c0.14	0.35					c0.40	0.38	
v/s Ratio Perm			0.19									
v/c Ratio		1.02	0.59	0.97	0.67					1.03	0.98	
Uniform Delay, d1		29.9	25.4	38.4	15.7					27.5	27.2	
Progression Factor		0.86	1.46	1.04	0.59					1.00	1.00	
Incremental Delay, d2		21.1	2.0	30.5	0.8					44.7	31.9	
Delay (s)		46.9	39.0	70.3	10.1					72.2	59.1	
Level of Service		D	D	E	B					E	E	
Approach Delay (s)		44.0			20.1			0.0			65.9	
Approach LOS		D			C			A			E	

Intersection Summary			
HCM Average Control Delay	42.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Main St. & I-5 NB Ramps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	465	1055	395	55	790	415	130	370	70	185	50	470
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	
Frt	1.00	0.96		1.00	0.95		1.00	0.98		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	3428		1770	3356		1805	1855		1770	1610	
Flt Permitted	0.95	1.00		0.95	1.00		0.19	1.00		0.28	1.00	
Satd. Flow (perm)	3467	3428		1770	3356		358	1855		517	1610	
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)	484	1099	411	57	823	432	135	385	73	193	52	490
RTOR Reduction (vph)	0	42	0	0	75	0	0	7	0	0	160	0
Lane Group Flow (vph)	484	1468	0	57	1180	0	135	451	0	193	382	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	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)	12.3	38.9		4.1	30.7		33.5	33.5		33.5	33.5	
Effective Green, g (s)	12.8	39.4		4.6	31.2		34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.14	0.44		0.05	0.35		0.38	0.38		0.38	0.38	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.5	4.0		2.5	4.0		2.5	2.5		3.5	3.5	
Lane Grp Cap (vph)	493	1501		90	1163		135	701		195	608	
v/s Ratio Prot	c0.14	c0.43		0.03	0.35			0.24			0.24	
v/s Ratio Perm							c0.38			0.37		
v/c Ratio	0.98	0.98		0.63	1.01		1.00	0.64		0.99	0.63	
Uniform Delay, d1	38.5	24.9		41.9	29.4		28.0	23.0		27.8	22.8	
Progression Factor	0.88	0.73		0.80	1.41		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.5	3.5		3.5	17.6		77.5	1.8		60.9	2.1	
Delay (s)	42.3	21.8		36.8	59.2		105.5	24.8		88.8	25.0	
Level of Service	D	C		D	E		F	C		F	C	
Approach Delay (s)		26.8			58.2			43.2			41.7	
Approach LOS		C			E			D			D	

Intersection Summary			
HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	120.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	410	900	915	70	70	345
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
Frpb, ped/bikes	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
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)	1752	1845	1881	1563	1641	1468
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1752	1845	1881	1563	1641	1468
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	432	947	963	74	74	363
RTOR Reduction (vph)	0	0	0	15	0	323
Lane Group Flow (vph)	432	947	963	59	74	40
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	3%	3%	1%	1%	10%	10%
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	26.0	72.0	42.0	42.0	10.0	10.0
Effective Green, g (s)	26.0	72.0	42.0	42.0	10.0	10.0
Actuated g/C Ratio	0.29	0.80	0.47	0.47	0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	506	1476	878	729	182	163
v/s Ratio Prot	c0.25	0.51	c0.51		c0.05	
v/s Ratio Perm				0.04		0.03
v/c Ratio	0.85	0.64	1.10	0.08	0.41	0.25
Uniform Delay, d1	30.2	3.7	24.0	13.3	37.2	36.6
Progression Factor	1.36	0.51	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.8	60.3	0.2	1.5	0.8
Delay (s)	46.2	2.6	84.3	13.5	38.7	37.4
Level of Service	D	A	F	B	D	D
Approach Delay (s)		16.3	79.3		37.6	
Approach LOS		B	E		D	

Intersection Summary			
HCM Average Control Delay	42.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	690	35	10	615	0	20	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			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)	5	750	38	11	668	0	22	0	22	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)												
pX, platoon unblocked												
vC, conflicting volume	668			788			1470	1470	769	1492	1489	668
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	668			788			1470	1470	769	1492	1489	668
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 %	99			99			79	100	95	100	100	100
cM capacity (veh/h)	926			836			105	126	404	96	123	461

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	793	679	43	0
Volume Left	5	11	22	0
Volume Right	38	0	22	0
cSH	926	836	167	1700
Volume to Capacity	0.01	0.01	0.26	0.00
Queue Length 95th (ft)	0	1	25	0
Control Delay (s)	0.2	0.3	34.1	0.0
Lane LOS	A	A	D	A
Approach Delay (s)	0.2	0.3	34.1	0.0
Approach LOS			D	A

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	520	85	30	460	25	100	195	45	25	105	60
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.98			0.96	
Flt Protected		0.99			1.00			0.99			0.99	
Satd. Flow (prot)		1839			1863			1834			1789	
Flt Permitted		0.89			0.94			0.85			0.94	
Satd. Flow (perm)		1641			1762			1589			1694	
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)	92	565	92	33	500	27	109	212	49	27	114	65
RTOR Reduction (vph)	0	9	0	0	3	0	0	9	0	0	28	0
Lane Group Flow (vph)	0	740	0	0	557	0	0	361	0	0	178	0
Confl. Peds. (#/hr)									1	1		
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.8			27.8			15.6			15.6	
Effective Green, g (s)		27.8			27.8			15.6			15.6	
Actuated g/C Ratio		0.54			0.54			0.30			0.30	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		888			953			482			514	
v/s Ratio Prot												
v/s Ratio Perm		c0.45			0.32			c0.23			0.11	
v/c Ratio		0.83			0.58			0.75			0.35	
Uniform Delay, d1		9.9			7.9			16.1			13.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		6.8			0.9			6.3			0.4	
Delay (s)		16.6			8.8			22.4			14.3	
Level of Service		B			A			C			B	
Approach Delay (s)		16.6			8.8			22.4			14.3	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	51.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	515	5	5	450	5	5	45	5	5	10	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			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)	27	560	5	5	489	5	5	49	5	5	11	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	495			565			1152	1122	562	1149	1122	492
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495			565			1152	1122	562	1149	1122	492
tC, single (s)	4.1			4.1			7.2	6.6	6.3	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	97			99			96	75	99	96	94	95
cM capacity (veh/h)	1064			992			152	196	519	130	190	555

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	592	500	60	43
Volume Left	27	5	5	5
Volume Right	5	5	5	27
cSH	1064	992	202	294
Volume to Capacity	0.03	0.01	0.30	0.15
Queue Length 95th (ft)	2	0	30	13
Control Delay (s)	0.7	0.2	30.1	19.3
Lane LOS	A	A	D	C
Approach Delay (s)	0.7	0.2	30.1	19.3
Approach LOS			D	C

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

15: W Axton Rd & Guide Meridian Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	150	155	15	110	10	195	1455	25	30	995	190
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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1687	1776	1509	1736	1803		1736	3471	1553	1719	3438	1538
Flt Permitted	0.40	1.00	1.00	0.66	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	711	1776	1509	1200	1803		1736	3471	1553	1719	3438	1538
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)	284	158	163	16	116	11	205	1532	26	32	1047	200
RTOR Reduction (vph)	0	0	119	0	3	0	0	0	11	0	0	113
Lane Group Flow (vph)	284	158	44	16	124	0	205	1532	15	32	1047	87
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	4%	4%	4%	5%	5%	5%
Turn Type	pm+pt		Perm	pm+pt			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	37.3	31.8	31.8	16.5	15.0		17.0	65.3	65.3	2.3	50.6	50.6
Effective Green, g (s)	37.3	31.8	31.8	16.5	15.0		17.0	65.3	65.3	2.3	50.6	50.6
Actuated g/C Ratio	0.32	0.27	0.27	0.14	0.13		0.15	0.56	0.56	0.02	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	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	3.0	3.0	3.0
Lane Grp Cap (vph)	380	483	410	176	231		252	1939	868	34	1488	666
v/s Ratio Prot	c0.12	0.09		0.00	0.07		c0.12	c0.44		0.02	0.30	
v/s Ratio Perm	c0.12		0.03	0.01					0.01			0.06
v/c Ratio	0.75	0.33	0.11	0.09	0.54		0.81	0.79	0.02	0.94	0.70	0.13
Uniform Delay, d1	32.9	34.0	31.9	43.5	47.7		48.4	20.4	11.5	57.2	27.0	19.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.8	0.4	0.1	0.2	2.4		17.9	3.4	0.0	129.7	1.5	0.1
Delay (s)	40.7	34.4	32.0	43.7	50.1		66.3	23.8	11.5	187.0	28.6	20.0
Level of Service	D	C	C	D	D		E	C	B	F	C	C
Approach Delay (s)		36.7			49.4			28.5			31.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	31.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	116.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

16: Smith Rd & Labounty Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	170	20	90	150	355	20	85	145	300	95	5
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.92			0.92			1.00	
Flt Protected		1.00			0.99			1.00			0.96	
Satd. Flow (prot)		1799			1700			1662			1810	
Flt Permitted		0.99			0.92			0.96			0.63	
Satd. Flow (perm)		1778			1575			1598			1186	
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)	5	177	21	94	156	370	21	89	151	312	99	5
RTOR Reduction (vph)	0	7	0	0	93	0	0	82	0	0	1	0
Lane Group Flow (vph)	0	196	0	0	527	0	0	179	0	0	415	0
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	5%	5%	5%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.0			21.0			22.3			22.3	
Effective Green, g (s)		21.0			21.0			22.3			22.3	
Actuated g/C Ratio		0.41			0.41			0.43			0.43	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		728			645			695			516	
v/s Ratio Prot												
v/s Ratio Perm		0.11			c0.33			0.11			c0.35	
v/c Ratio		0.27			0.82			0.26			0.81	
Uniform Delay, d1		10.1			13.4			9.2			12.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			7.9			0.2			8.9	
Delay (s)		10.3			21.4			9.4			21.5	
Level of Service		B			C			A			C	
Approach Delay (s)		10.3			21.4			9.4			21.5	
Approach LOS		B			C			A			C	

Intersection Summary			
HCM Average Control Delay	17.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	108.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

17: Smith Rd & Barrett Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	410	115	35	370	270	165	365	80	285	245	55
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	1.00			1.00	1.00		1.00			1.00	
Frt	1.00	0.97			1.00	0.85		0.98			0.99	
Flt Protected	0.95	1.00			1.00	1.00		0.99			0.98	
Satd. Flow (prot)	1787	1819			1855	1583		1841			1795	
Flt Permitted	0.30	1.00			0.61	1.00		0.74			0.55	
Satd. Flow (perm)	561	1819			1134	1583		1387			1005	
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)	89	432	121	37	389	284	174	384	84	300	258	58
RTOR Reduction (vph)	0	17	0	0	0	189	0	9	0	0	6	0
Lane Group Flow (vph)	89	536	0	0	426	95	0	633	0	0	610	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	20.0	20.0			20.0	20.0		32.0			32.0	
Effective Green, g (s)	20.0	20.0			20.0	20.0		32.0			32.0	
Actuated g/C Ratio	0.33	0.33			0.33	0.33		0.53			0.53	
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	187	606			378	528		740			536	
v/s Ratio Prot		0.29										
v/s Ratio Perm	0.16				c0.38	0.06		0.46			c0.61	
v/c Ratio	0.48	0.89			1.13	0.18		0.86			1.14	
Uniform Delay, d1	15.8	18.9			20.0	14.2		12.0			14.0	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	1.9	14.4			85.4	0.2		9.5			82.8	
Delay (s)	17.8	33.4			105.4	14.3		21.6			96.8	
Level of Service	B	C			F	B		C			F	
Approach Delay (s)		31.2			69.0			21.6			96.8	
Approach LOS		C			E			C			F	

Intersection Summary			
HCM Average Control Delay	54.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	99.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

18: Smith Rd & Northwest Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	565	100	200	495	45	80	245	235	25	135	45
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	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	
Frt		0.98			0.99			1.00	0.85		0.97	
Flt Protected		0.99			0.99			0.99	1.00		0.99	
Satd. Flow (prot)		1814			1819			1858	1599		1809	
Flt Permitted		0.85			0.66			0.82	1.00		0.76	
Satd. Flow (perm)		1544			1214			1543	1599		1380	
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)	96	601	106	213	527	48	85	261	250	27	144	48
RTOR Reduction (vph)	0	9	0	0	4	0	0	0	192	0	17	0
Lane Group Flow (vph)	0	794	0	0	784	0	0	346	58	0	202	0
Confl. Peds. (#/hr)	3		5	5		3	2					2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		38.0			38.0			14.0	14.0		14.0	
Effective Green, g (s)		38.0			38.0			14.0	14.0		14.0	
Actuated g/C Ratio		0.63			0.63			0.23	0.23		0.23	
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)		978			769			360	373		322	
v/s Ratio Prot												
v/s Ratio Perm		0.51			c0.65			c0.22	0.04		0.15	
v/c Ratio		0.81			1.02			0.96	0.16		0.63	
Uniform Delay, d1		8.3			11.0			22.7	18.3		20.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		5.2			37.4			37.1	0.2		3.8	
Delay (s)		13.5			48.4			59.8	18.5		24.5	
Level of Service		B			D			E	B		C	
Approach Delay (s)		13.5			48.4			42.5			24.5	
Approach LOS		B			D			D			C	

Intersection Summary			
HCM Average Control Delay	33.1	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
19: Smith Rd & Aldrich Rd

Ferndale - Planned Action EIS
2034 Mid Volumes - Mitigated (LOS D)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	825	5	25	685	10	5	25	60	5	10	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			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)	11	897	5	27	745	11	5	27	65	5	11	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	755			902			1731	1731	899	1802	1728	750
vC1, stage 1 conf vol							921	921		804	804	
vC2, stage 2 conf vol							810	810		997	924	
vCu, unblocked vol	755			902			1731	1731	899	1802	1728	750
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			98	90	81	97	96	99
cM capacity (veh/h)	851			741			236	261	340	169	253	415

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	11	902	27	755	98	22
Volume Left	11	0	27	0	5	5
Volume Right	0	5	0	11	65	5
cSH	851	1700	741	1700	307	246
Volume to Capacity	0.01	0.53	0.04	0.44	0.32	0.09
Queue Length 95th (ft)	1	0	3	0	33	7
Control Delay (s)	9.3	0.0	10.0	0.0	22.1	21.0
Lane LOS	A		B		C	C
Approach Delay (s)	0.1		0.3		22.1	21.0
Approach LOS					C	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
20: Smith Rd & Guide Meridian Rd

Ferndale - Planned Action EIS
2034 Mid Volumes - Mitigated (LOS D)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	460	240	170	250	100	330	1325	325	165	845	155
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	0.95		1.00	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.95		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3357		1770	3387		3433	3539	1583	3400	3505	1568
Flt Permitted	0.44	1.00		0.26	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	814	3357		478	3387		3433	3539	1583	3400	3505	1568
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)	231	495	258	183	269	108	355	1425	349	177	909	167
RTOR Reduction (vph)	0	97	0	0	62	0	0	0	128	0	0	107
Lane Group Flow (vph)	231	656	0	183	315	0	355	1425	221	177	909	60
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Turn Type	pm+pt			pm+pt			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	19.6	15.6		19.6	15.6		9.0	30.0	30.0	4.0	25.0	25.0
Effective Green, g (s)	19.6	15.6		19.6	15.6		9.0	30.0	30.0	4.0	25.0	25.0
Actuated g/C Ratio	0.28	0.22		0.28	0.22		0.13	0.43	0.43	0.06	0.36	0.36
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	284	752		209	759		444	1525	682	195	1259	563
v/s Ratio Prot	0.05	0.20		c0.05	0.09		c0.10	c0.40		0.05	0.26	
v/s Ratio Perm	0.18			c0.20					0.14			0.04
v/c Ratio	0.81	0.87		0.88	0.41		0.80	0.93	0.32	0.91	0.72	0.11
Uniform Delay, d1	22.5	26.0		23.8	23.1		29.4	18.9	13.1	32.6	19.3	14.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.1	10.9		30.9	0.4		9.7	12.0	1.3	39.2	2.1	0.1
Delay (s)	38.6	36.9		54.8	23.5		39.1	30.8	14.4	71.8	21.4	14.9
Level of Service	D	D		D	C		D	C	B	E	C	B
Approach Delay (s)		37.3			33.7			29.5			27.6	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	31.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	69.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

21: Slater Road & Rural Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	570	55	405	440	85	105	15	500	175	15	20
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1736	1803		1719	1810	1538	1687	1776	1509	1703	1640	
Flt Permitted	0.49	1.00		0.11	1.00	1.00	0.73	1.00	1.00	0.75	1.00	
Satd. Flow (perm)	904	1803		204	1810	1538	1302	1776	1509	1339	1640	
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)	16	606	59	431	468	90	112	16	532	186	16	21
RTOR Reduction (vph)	0	4	0	0	0	33	0	0	210	0	15	0
Lane Group Flow (vph)	16	661	0	431	468	57	112	16	322	186	22	0
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	7%	7%	7%	6%	6%	6%
Turn Type	pm+pt			pm+pt		Perm	Perm		Perm	Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	31.6	30.5		46.6	40.5	40.5	19.4	19.4	19.4	19.4	19.4	
Effective Green, g (s)	33.6	31.5		47.6	41.5	41.5	20.4	20.4	20.4	20.4	20.4	
Actuated g/C Ratio	0.44	0.41		0.63	0.55	0.55	0.27	0.27	0.27	0.27	0.27	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	2.5		3.0	2.5	2.5	3.6	3.6	3.6	3.6	3.6	
Lane Grp Cap (vph)	423	747		369	988	840	349	477	405	359	440	
v/s Ratio Prot	0.00	0.37		c0.19	0.26			0.01			0.01	
v/s Ratio Perm	0.02			c0.55		0.04	0.09		c0.21	0.14		
v/c Ratio	0.04	0.88		1.17	0.47	0.07	0.32	0.03	0.80	0.52	0.05	
Uniform Delay, d1	11.9	20.6		21.8	10.6	8.1	22.3	20.5	25.9	23.6	20.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	12.1		101.0	0.3	0.0	0.7	0.0	10.7	1.5	0.1	
Delay (s)	12.0	32.6		122.8	10.8	8.2	22.9	20.6	36.5	25.1	20.7	
Level of Service	B	C		F	B	A	C	C	D	C	C	
Approach Delay (s)		32.2			59.4			33.8			24.4	
Approach LOS		C			E			C			C	

Intersection Summary			
HCM Average Control Delay	42.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

22: Slater Road & I-5 SB Ramps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	655	555	300	745	0	0	0	0	115	0	165
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	1.00	1.00	1.00						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		1845	1568	1736	1827						1736	1553
Flt Permitted		1.00	1.00	0.16	1.00						0.95	1.00
Satd. Flow (perm)		1845	1568	297	1827						1736	1553
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)	0	682	578	312	776	0	0	0	0	120	0	172
RTOR Reduction (vph)	0	0	192	0	0	0	0	0	0	0	0	144
Lane Group Flow (vph)	0	682	386	312	776	0	0	0	0	0	120	28
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	0%	0%	0%	4%	4%	4%
Turn Type			Perm	pm+pt						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4	8						6		6
Actuated Green, G (s)		29.1	29.1	43.6	43.6						10.0	10.0
Effective Green, g (s)		29.1	29.1	43.6	43.6						10.0	10.0
Actuated g/C Ratio		0.47	0.47	0.71	0.71						0.16	0.16
Clearance Time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		872	741	455	1293						282	252
v/s Ratio Prot		c0.37		c0.12	0.42							
v/s Ratio Perm			0.25	0.37							0.07	0.02
v/c Ratio		0.78	0.52	0.69	0.60						0.43	0.11
Uniform Delay, d1		13.6	11.4	9.3	4.6						23.2	22.0
Progression Factor		1.00	1.00	1.00	1.00						1.00	1.00
Incremental Delay, d2		4.6	0.7	4.3	0.8						1.0	0.2
Delay (s)		18.2	12.0	13.5	5.4						24.3	22.2
Level of Service		B	B	B	A						C	C
Approach Delay (s)		15.4			7.7			0.0			23.0	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	61.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Slater Road & I-5 NB Ramps

Ferndale - Planned Action EIS
2034 Mid Volumes - Mitigated (LOS D)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	580	0	0	740	255	310	0	430	0	0	0
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	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)	1770	1863			1881	1599		1787	1599			
Flt Permitted	0.11	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	197	1863			1881	1599		1787	1599			
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)	202	617	0	0	787	271	330	0	457	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	48	0	0	227	0	0	0
Lane Group Flow (vph)	202	617	0	0	787	223	0	330	230	0	0	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	pm+pt					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases	4					8	2		2			
Actuated Green, G (s)	45.1	45.1			33.9	33.9		17.9	17.9			
Effective Green, g (s)	45.1	45.1			33.9	33.9		17.9	17.9			
Actuated g/C Ratio	0.64	0.64			0.48	0.48		0.25	0.25			
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	285	1183			898	763		451	403			
v/s Ratio Prot	c0.07	0.33			c0.42							
v/s Ratio Perm	0.38					0.14		0.18	0.14			
v/c Ratio	0.71	0.52			0.88	0.29		0.73	0.57			
Uniform Delay, d1	13.5	7.1			16.7	11.3		24.3	23.2			
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	7.8	0.4			9.6	0.2		6.0	2.0			
Delay (s)	21.3	7.5			26.3	11.5		30.4	25.2			
Level of Service	C	A			C	B		C	C			
Approach Delay (s)		10.9			22.5			27.3			0.0	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	71.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Slater Road & Pacific Highway

Ferndale - Planned Action EIS
2034 Mid Volumes - Mitigated (LOS D)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	440	510	70	10	540	135	165	60	30	120	25	290
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	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.95		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	1829		1787	1825		1787	1786		1770	1605	
Flt Permitted	0.95	1.00		0.95	1.00		0.32	1.00		0.69	1.00	
Satd. Flow (perm)	3433	1829		1787	1825		605	1786		1292	1605	
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)	478	554	76	11	587	147	179	65	33	130	27	315
RTOR Reduction (vph)	0	5	0	0	10	0	0	24	0	0	226	0
Lane Group Flow (vph)	478	625	0	11	724	0	179	74	0	130	116	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	12.0	45.5		0.8	34.3		23.0	23.0		23.0	23.0	
Effective Green, g (s)	12.0	45.5		0.8	34.3		23.0	23.0		23.0	23.0	
Actuated g/C Ratio	0.15	0.56		0.01	0.42		0.28	0.28		0.28	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	507	1024		18	770		171	505		366	454	
v/s Ratio Prot	c0.14	0.34		0.01	c0.40			0.04			0.07	
v/s Ratio Perm							c0.30			0.10		
v/c Ratio	0.94	0.61		0.61	0.94		1.05	0.15		0.36	0.26	
Uniform Delay, d1	34.3	12.0		40.1	22.5		29.1	21.8		23.2	22.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.2	1.1		48.7	19.0		81.7	0.1		0.6	0.3	
Delay (s)	60.5	13.1		88.8	41.5		110.9	21.9		23.8	22.8	
Level of Service	E	B		F	D		F	C		C	C	
Approach Delay (s)		33.5			42.2			79.4			23.1	
Approach LOS		C			D			E			C	

Intersection Summary			
HCM Average Control Delay	39.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	81.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: Slater Road & Northwest Dr

Ferndale - Planned Action EIS
2034 Mid Volumes - Mitigated (LOS D)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	0	355	0	0	0	420	410	0	0	325	210
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	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.94	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1687	1509				1752	1845			1703	
Flt Permitted		0.76	1.00				0.95	1.00			1.00	
Satd. Flow (perm)		1345	1509				1752	1845			1703	
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)	283	0	386	0	0	0	457	446	0	0	353	228
RTOR Reduction (vph)	0	0	291	0	0	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	283	95	0	0	0	457	446	0	0	552	0
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	3%	3%	3%	5%	5%	5%
Turn Type	Perm		Perm	Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		19.4	19.4				21.0	51.1			26.1	
Effective Green, g (s)		19.4	19.4				21.0	51.1			26.1	
Actuated g/C Ratio		0.25	0.25				0.27	0.65			0.33	
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)		332	373				469	1201			566	
v/s Ratio Prot							c0.26	0.24			c0.32	
v/s Ratio Perm		c0.21	0.06									
v/c Ratio		0.85	0.26				0.97	0.37			0.98	
Uniform Delay, d1		28.2	23.7				28.5	6.3			25.9	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		18.6	0.4				34.7	0.2			31.4	
Delay (s)		46.8	24.1				63.2	6.5			57.3	
Level of Service		D	C				E	A			E	
Approach Delay (s)		33.7			0.0			35.2			57.3	
Approach LOS		C			A			D			E	

Intersection Summary			
HCM Average Control Delay	40.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	78.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Labounty Drive & Nordic Way

Ferndale - Planned Action EIS
2034 Mid Volumes - Mitigated (LOS D)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	230	415	130	410	35	440	15	110	15	15	55
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	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	
Flpb, ped/bikes		1.00	1.00		1.00			1.00	1.00		1.00	
Frt		1.00	0.85		0.99			1.00	0.85		0.91	
Flt Protected		1.00	1.00		0.99			0.95	1.00		0.99	
Satd. Flow (prot)		1855	1583		1843			1760	1568		1718	
Flt Permitted		0.94	1.00		0.85			0.67	1.00		0.91	
Satd. Flow (perm)		1752	1583		1593			1230	1568		1584	
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)	22	250	451	141	446	38	478	16	120	16	16	60
RTOR Reduction (vph)	0	0	254	0	4	0	0	0	69	0	34	0
Lane Group Flow (vph)	0	272	197	0	621	0	0	494	51	0	58	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		25.2	25.2		25.2			24.6	24.6		24.6	
Effective Green, g (s)		25.2	25.2		25.2			24.6	24.6		24.6	
Actuated g/C Ratio		0.44	0.44		0.44			0.43	0.43		0.43	
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		764	690		695			523	667		674	
v/s Ratio Prot												
v/s Ratio Perm		0.16	0.12		c0.39			c0.40	0.03		0.04	
v/c Ratio		0.36	0.28		0.89			0.94	0.08		0.09	
Uniform Delay, d1		10.9	10.5		15.1			15.9	9.9		9.9	
Progression Factor		1.00	1.00		1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.3	0.2		13.9			26.0	0.0		0.1	
Delay (s)		11.2	10.7		29.0			41.9	9.9		9.9	
Level of Service		B	B		C			D	A		A	
Approach Delay (s)		10.9			29.0			35.7			9.9	
Approach LOS		B			C			D			A	

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	57.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

106: Main St & SE Connector

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	625	275	135	500	365	170
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		1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1786		1770	1863	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	1786		1770	1863	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	679	299	147	543	397	185
RTOR Reduction (vph)	20	0	0	0	0	141
Lane Group Flow (vph)	958	0	147	543	397	44
Turn Type			Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	42.0		7.0	53.0	19.0	19.0
Effective Green, g (s)	42.0		7.0	53.0	19.0	19.0
Actuated g/C Ratio	0.52		0.09	0.66	0.24	0.24
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)	938		155	1234	420	376
v/s Ratio Prot	c0.54		c0.08	0.29	c0.22	
v/s Ratio Perm						0.03
v/c Ratio	1.02		0.95	0.44	0.95	0.12
Uniform Delay, d1	19.0		36.3	6.4	30.0	23.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	34.9		56.3	0.3	30.1	0.1
Delay (s)	53.9		92.6	6.7	60.1	24.1
Level of Service	D		F	A	E	C
Approach Delay (s)	53.9			25.0	48.6	
Approach LOS	D			C	D	

Intersection Summary			
HCM Average Control Delay	43.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

107: SE Connector & Barrett Rd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	295	90	330	395	65	295
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	321	98	359	429	71	321
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1035	573			788	
vC1, stage 1 conf vol	573					
vC2, stage 2 conf vol	462					
vCu, unblocked vol	1035	573			788	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	29	81			92	
cM capacity (veh/h)	449	519			831	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	321	98	788	71	321
Volume Left	321	0	0	71	0
Volume Right	0	98	429	0	0
cSH	449	519	1700	831	1700
Volume to Capacity	0.71	0.19	0.46	0.08	0.19
Queue Length 95th (ft)	139	17	0	7	0
Control Delay (s)	30.7	13.5	0.0	9.7	0.0
Lane LOS	D	B		A	
Approach Delay (s)	26.7		0.0	1.8	
Approach LOS	D				

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

Appendix B
Final EIS – Supplemental Transportation Analyses

Traffic Operations Analyses

LOS D – Traffic Signal Queues

Lane Group	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
Storage Length (ft)	300		0	200		0	0		0	300		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		429			620			300			526	
Travel Time (s)		11.7			16.9			8.2			14.3	
Lane Group Flow (vph)	21	452	0	11	649	0	0	122	0	128	112	0
v/c Ratio	0.04	0.33		0.02	0.48			0.54		0.66	0.35	
Control Delay	4.8	5.5		1.1	2.7			39.8		51.4	19.6	
Queue Delay	0.0	0.0		0.0	0.5			0.0		0.0	0.0	
Total Delay	4.8	5.5		1.1	3.1			39.8		51.4	19.6	
Queue Length 50th (ft)	3	71		0	11			59		70	27	
Queue Length 95th (ft)	12	151		m1	109			104		118	68	
Internal Link Dist (ft)		349			540			220			446	
Turn Bay Length (ft)	300			200						300		
Base Capacity (vph)	501	1352		663	1361			383		337	510	
Starvation Cap Reductn	0	0		0	314			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.04	0.33		0.02	0.62			0.32		0.38	0.22	

Intersection Summary	
Area Type:	Other

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	185	160	5	225	105	170	50	20	75	95	25
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	16	197	170	5	239	112	181	53	21	80	101	27

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	383	356	255	207
Volume Left (vph)	16	5	181	80
Volume Right (vph)	170	112	21	27
Hadj (s)	-0.24	-0.17	0.11	0.00
Departure Headway (s)	6.1	6.2	6.9	6.9
Degree Utilization, x	0.65	0.61	0.49	0.40
Capacity (veh/h)	555	535	457	446
Control Delay (s)	19.5	18.5	16.2	14.4
Approach Delay (s)	19.5	18.5	16.2	14.4
Approach LOS	C	C	C	B

Intersection Summary			
Delay	17.6		
HCM Level of Service	C		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	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
Storage Length (ft)	200		0	120		0	75		0	75		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		620			343			331			306	
Travel Time (s)		16.9			9.4			9.0			8.3	
Lane Group Flow (vph)	10	541	0	67	794	0	21	145	0	242	114	0
v/c Ratio	0.04	0.45		0.14	0.69		0.07	0.31		0.82	0.25	
Control Delay	7.7	8.4		4.3	5.7		23.4	21.4		53.6	23.3	
Queue Delay	0.0	0.0		0.0	2.6		0.0	0.1		2.2	0.0	
Total Delay	7.7	8.4		4.3	8.3		23.4	21.6		55.9	23.3	
Queue Length 50th (ft)	1	96		5	54		9	50		127	45	
Queue Length 95th (ft)	m6	203		m6	m100		25	94		#207	83	
Internal Link Dist (ft)		540			263			251			226	
Turn Bay Length (ft)	200			120			75			75		
Base Capacity (vph)	282	1198		464	1143		383	565		362	571	
Starvation Cap Reductn	0	0		0	227		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	66		44	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.45		0.14	0.87		0.05	0.29		0.76	0.20	

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	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
Storage Length (ft)	120		0	120		0	75		0	75		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		343			363			326			325	
Travel Time (s)		9.4			9.9			8.9			8.9	
Lane Group Flow (vph)	11	763	0	63	1190	0	11	89	0	253	48	0
v/c Ratio	0.13	0.59		0.18	0.97		0.04	0.23		0.92	0.12	
Control Delay	9.1	9.9		3.7	22.8		28.8	17.5		75.2	24.6	
Queue Delay	0.0	0.4		0.0	5.3		0.0	0.0		0.0	0.0	
Total Delay	9.1	10.3		3.7	28.1		28.8	17.5		75.2	24.6	
Queue Length 50th (ft)	2	217		6	86		5	19		141	17	
Queue Length 95th (ft)	m5	309		m6	#919		19	59		#283	46	
Internal Link Dist (ft)		263			283			246			245	
Turn Bay Length (ft)	120			120			75			75		
Base Capacity (vph)	85	1291		356	1233		291	401		279	396	
Starvation Cap Reductn	0	163		0	2		0	0		0	0	
Spillback Cap Reductn	0	19		0	38		0	1		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.68		0.18	1.00		0.04	0.22		0.91	0.12	

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	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
Storage Length (ft)	120		0	120		0	0		75	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		363			955			322			192	
Travel Time (s)		9.9			26.0			8.8			5.2	
Lane Group Flow (vph)	16	1074	0	160	1191	0	0	37	176	0	43	0
v/c Ratio	0.07	0.72		0.55	0.80			0.29	0.60		0.26	
Control Delay	1.7	4.9		9.6	8.4			42.4	17.4		25.9	
Queue Delay	0.0	0.2		0.0	0.2			0.0	0.0		0.0	
Total Delay	1.7	5.2		9.6	8.6			42.4	17.4		25.9	
Queue Length 50th (ft)	1	61		11	104			20	10		12	
Queue Length 95th (ft)	m1	m256		m52	#375			47	65		40	
Internal Link Dist (ft)		283			875			242			112	
Turn Bay Length (ft)	120			120					75			
Base Capacity (vph)	214	1487		290	1496			218	390		275	
Starvation Cap Reductn	0	67		0	9			0	0		0	
Spillback Cap Reductn	0	0		0	28			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.07	0.76		0.55	0.81			0.17	0.45		0.16	

Intersection Summary

Area Type: Other

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	120		75	0
Storage Lanes		0	1		1	1
Taper Length (ft)		25	25		25	25
Right Turn on Red		Yes				Yes
Link Speed (mph)	25			25	25	
Link Distance (ft)	955			314	322	
Travel Time (s)	26.0			8.6	8.8	
Lane Group Flow (vph)	1195	0	32	1158	195	63
v/c Ratio	0.92		0.33	0.81	0.71	0.21
Control Delay	23.0		44.4	11.4	50.4	10.6
Queue Delay	0.0		0.0	0.1	0.0	0.0
Total Delay	23.0		44.4	11.5	50.4	10.6
Queue Length 50th (ft)	~534		18	244	105	0
Queue Length 95th (ft)	#953		m26	415	174	34
Internal Link Dist (ft)	875			234	242	
Turn Bay Length (ft)			120		75	
Base Capacity (vph)	1294		97	1424	318	336
Starvation Cap Reductn	0		0	14	0	0
Spillback Cap Reductn	0		0	9	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.92		0.33	0.82	0.61	0.19

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	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
Storage Length (ft)	200		0	200		0	200		0	120		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		298			884			374			218	
Travel Time (s)		8.1			24.1			10.2			5.9	
Lane Group Flow (vph)	26	1052	0	250	901	156	245	162	0	146	52	0
v/c Ratio	0.09	0.60		0.61	0.76	0.15	0.76	0.33		0.58	0.12	
Control Delay	8.0	16.7		10.8	18.9	3.2	47.6	7.8		39.6	14.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.0	16.7		10.8	18.9	3.2	47.6	7.8		39.6	14.0	
Queue Length 50th (ft)	6	126		43	339	8	128	7		73	9	
Queue Length 95th (ft)	m7	m207		m83	m#655	m28	205	53		130	36	
Internal Link Dist (ft)		218			804			294			138	
Turn Bay Length (ft)	200			200			200			120		
Base Capacity (vph)	285	1740		466	1183	1024	382	555		298	503	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.09	0.60		0.54	0.76	0.15	0.64	0.29		0.49	0.10	

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	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
Storage Length (ft)	200		200	200		0	0		0	0		75
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		884			937			190			252	
Travel Time (s)		24.1			25.6			5.2			6.9	
Lane Group Flow (vph)	92	1222	0	435	1071	0	429	82	614	0	440	0
v/c Ratio	0.40	1.07		1.08	0.66		0.92	0.12	0.65		1.16	
Control Delay	14.9	70.7		80.7	14.3		53.5	18.9	16.1		127.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	14.9	70.7		80.7	14.3		53.5	18.9	16.1		127.9	
Queue Length 50th (ft)	11	~402		~212	258		193	30	208		~292	
Queue Length 95th (ft)	m22	#531		m#354	m91		#391	60	327		#477	
Internal Link Dist (ft)		804			857			110			172	
Turn Bay Length (ft)	200			200								
Base Capacity (vph)	229	1139		404	1625		464	704	940		380	
Starvation Cap Reductn	0	0		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.40	1.07		1.08	0.66		0.92	0.12	0.65		1.16	

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

9: Main St. & I-5 SB Ramps

Lane Group	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
Storage Length (ft)	0		200	120		0	0		0	0		120
Storage Lanes	0		1	1		0	0		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		937			759			361			289	
Travel Time (s)		25.6			20.7			8.2			6.6	
Lane Group Flow (vph)	0	1220	694	247	1242	0	0	0	0	663	611	0
v/c Ratio		1.02	0.76	0.97	0.67					1.03	0.98	
Control Delay		48.4	10.4	73.4	10.3					73.8	58.8	
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	
Total Delay		48.4	10.4	73.4	10.3					73.8	58.8	
Queue Length 50th (ft)		~381	108	131	146					~430	334	
Queue Length 95th (ft)		m#376	m119	m#181	m218					#650	#577	
Internal Link Dist (ft)		857			679			281			209	
Turn Bay Length (ft)			200	120								
Base Capacity (vph)		1199	908	254	1866					641	623	
Starvation Cap Reductn		0	0	0	0					0	0	
Spillback Cap Reductn		0	0	0	0					0	0	
Storage Cap Reductn		0	0	0	0					0	0	
Reduced v/c Ratio		1.02	0.76	0.97	0.67					1.03	0.98	

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

10: Main St. & I-5 NB Ramps

Lane Group	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
Storage Length (ft)	300		0	100		0	120		0	120		0
Storage Lanes	2		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		759			373			282			266	
Travel Time (s)		20.7			10.2			6.4			6.0	
Lane Group Flow (vph)	484	1510	0	57	1255	0	135	458	0	193	542	0
v/c Ratio	0.98	0.96		0.52	1.01		1.00	0.65		0.99	0.71	
Control Delay	44.7	21.1		38.5	54.6		110.7	27.6		93.8	17.8	
Queue Delay	0.0	0.0		0.0	35.8		0.0	0.0		0.0	0.0	
Total Delay	44.7	21.1		38.5	90.4		110.7	27.6		93.8	17.8	
Queue Length 50th (ft)	130	~424		35	~321		~76	205		107	133	
Queue Length 95th (ft)	m127	m405		m36	m312		#194	311		#247	259	
Internal Link Dist (ft)		679			293			202			186	
Turn Bay Length (ft)	300			100			120			120		
Base Capacity (vph)	493	1577		110	1238		135	708		195	768	
Starvation Cap Reductn	0	0		0	106		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.98	0.96		0.52	1.11		1.00	0.65		0.99	0.71	

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0			100	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25			25	25	25
Right Turn on Red				Yes		Yes
Link Speed (mph)		25	25		25	
Link Distance (ft)		373	521		382	
Travel Time (s)		10.2	14.2		10.4	
Lane Group Flow (vph)	432	947	963	74	74	363
v/c Ratio	0.85	0.64	1.10	0.10	0.41	0.75
Control Delay	49.3	3.2	85.8	9.4	42.6	14.4
Queue Delay	0.0	0.8	19.2	0.0	0.0	15.7
Total Delay	49.3	4.0	105.0	9.4	42.6	30.1
Queue Length 50th (ft)	238	59	~626	14	40	0
Queue Length 95th (ft)	m#306	m94	#858	37	76	80
Internal Link Dist (ft)		293	441		302	
Turn Bay Length (ft)				100		
Base Capacity (vph)	507	1477	878	745	292	559
Starvation Cap Reductn	0	249	0	0	0	0
Spillback Cap Reductn	0	0	35	0	0	181
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.77	1.14	0.10	0.25	0.96

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	690	35	10	615	0	20	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			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)	5	750	38	11	668	0	22	0	22	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)												
pX, platoon unblocked												
vC, conflicting volume	668			788			1470	1470	769	1492	1489	668
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	668			788			1470	1470	769	1492	1489	668
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 %	99			99			79	100	95	100	100	100
cM capacity (veh/h)	926			836			105	126	404	96	123	461

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	793	679	43	0
Volume Left	5	11	22	0
Volume Right	38	0	22	0
cSH	926	836	167	1700
Volume to Capacity	0.01	0.01	0.26	0.00
Queue Length 95th (ft)	0	1	25	0
Control Delay (s)	0.2	0.3	34.1	0.0
Lane LOS	A	A	D	A
Approach Delay (s)	0.2	0.3	34.1	0.0
Approach LOS			D	A

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	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
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			50			35			35	
Link Distance (ft)		3990			5242			5377			1732	
Travel Time (s)		68.0			71.5			104.7			33.7	
Lane Group Flow (vph)	0	749	0	0	560	0	0	370	0	0	206	0
v/c Ratio		0.84			0.59			0.76			0.38	
Control Delay		21.1			11.2			29.7			15.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		21.1			11.2			29.7			15.4	
Queue Length 50th (ft)		186			113			111			44	
Queue Length 95th (ft)		#402			191			#240			96	
Internal Link Dist (ft)		3910			5162			5297			1652	
Turn Bay Length (ft)												
Base Capacity (vph)		1135			1215			590			645	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.66			0.46			0.63			0.32	

Intersection Summary	
Area Type:	Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	515	5	5	450	5	5	45	5	5	10	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			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)	27	560	5	5	489	5	5	49	5	5	11	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	495			565			1152	1122	562	1149	1122	492
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495			565			1152	1122	562	1149	1122	492
tC, single (s)	4.1			4.1			7.2	6.6	6.3	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	97			99			96	75	99	96	94	95
cM capacity (veh/h)	1064			992			152	196	519	130	190	555

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	592	500	60	43
Volume Left	27	5	5	5
Volume Right	5	5	5	27
cSH	1064	992	202	294
Volume to Capacity	0.03	0.01	0.30	0.15
Queue Length 95th (ft)	2	0	30	13
Control Delay (s)	0.7	0.2	30.1	19.3
Lane LOS	A	A	D	C
Approach Delay (s)	0.7	0.2	30.1	19.3
Approach LOS			D	C

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	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
Storage Length (ft)	400		140	200		0	375		375	225		325
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			50			50	
Link Distance (ft)		7862			2160			5362			1864	
Travel Time (s)		107.2			29.5			73.1			25.4	
Lane Group Flow (vph)	284	158	163	16	127	0	205	1532	26	32	1047	200
v/c Ratio	0.75	0.32	0.30	0.08	0.63		0.78	0.76	0.03	0.52	0.70	0.26
Control Delay	46.5	35.5	6.9	30.3	61.5		67.4	22.4	4.8	85.3	30.3	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	35.5	6.9	30.3	61.5		67.4	22.4	4.8	85.3	30.3	4.0
Queue Length 50th (ft)	178	90	0	8	91		149	464	0	24	338	0
Queue Length 95th (ft)	#272	163	53	25	156		#252	595	14	#75	441	45
Internal Link Dist (ft)		7782			2080			5282			1784	
Turn Bay Length (ft)	400		140	200			375		375	225		325
Base Capacity (vph)	385	516	554	195	260		309	2011	911	61	1511	788
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.31	0.29	0.08	0.49		0.66	0.76	0.03	0.52	0.69	0.25

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	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
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		356			1439			278			423	
Travel Time (s)		6.9			28.0			7.6			11.5	
Lane Group Flow (vph)	0	203	0	0	620	0	0	261	0	0	416	0
v/c Ratio		0.28			0.85			0.34			0.81	
Control Delay		11.3			23.9			6.5			29.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.3			23.9			6.5			29.8	
Queue Length 50th (ft)		42			138			23			119	
Queue Length 95th (ft)		80			#321			65			#276	
Internal Link Dist (ft)		276			1359			198			343	
Turn Bay Length (ft)												
Base Capacity (vph)		949			909			916			629	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.21			0.68			0.28			0.66	

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
17: Smith Rd & Barrett Road

Ferndale - Planned Action EIS
2034 Mid Volumes - Mitigated (LOS D)

Lane Group	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
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1439			852			268			394	
Travel Time (s)		28.0			16.6			7.3			10.7	
Lane Group Flow (vph)	89	553	0	0	426	284	0	642	0	0	616	0
v/c Ratio	0.48	0.89			1.13	0.40		0.86			1.13	
Control Delay	26.1	37.9			109.9	4.1		26.4			100.3	
Queue Delay	0.0	0.0			0.0	0.0		0.0			0.0	
Total Delay	26.1	37.9			109.9	4.1		26.4			100.3	
Queue Length 50th (ft)	25	178			~185	0		176			~268	
Queue Length 95th (ft)	#67	#352			#336	44		#385			#448	
Internal Link Dist (ft)		1359			772			188			314	
Turn Bay Length (ft)												
Base Capacity (vph)	187	623			378	717		748			543	
Starvation Cap Reductn	0	0			0	0		0			0	
Spillback Cap Reductn	0	0			0	0		0			0	
Storage Cap Reductn	0	0			0	0		0			0	
Reduced v/c Ratio	0.48	0.89			1.13	0.40		0.86			1.13	

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
18: Smith Rd & Northwest Dr

Ferndale - Planned Action EIS
2034 Mid Volumes - Mitigated (LOS D)

Lane Group	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
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			45			35	
Link Distance (ft)		4352			5247			6852			5377	
Travel Time (s)		84.8			102.2			103.8			104.7	
Lane Group Flow (vph)	0	803	0	0	788	0	0	346	250	0	219	0
v/c Ratio		0.81			1.02			0.96	0.44		0.65	
Control Delay		17.2			52.1			65.9	6.0		29.4	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		17.2			52.1			65.9	6.0		29.4	
Queue Length 50th (ft)		179			~262			124	0		64	
Queue Length 95th (ft)		#430			#507			#269	48		#148	
Internal Link Dist (ft)		4272			5167			6772			5297	
Turn Bay Length (ft)												
Base Capacity (vph)		986			774			360	565		339	
Starvation Cap Reductn		0			0			0	0		0	
Spillback Cap Reductn		0			0			0	0		0	
Storage Cap Reductn		0			0			0	0		0	
Reduced v/c Ratio		0.81			1.02			0.96	0.44		0.65	

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

19: Smith Rd & Aldrich Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	825	5	25	685	10	5	25	60	5	10	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			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)	11	897	5	27	745	11	5	27	65	5	11	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	755			902			1731	1731	899	1802	1728	750
vC1, stage 1 conf vol							921	921		804	804	
vC2, stage 2 conf vol							810	810		997	924	
vCu, unblocked vol	755			902			1731	1731	899	1802	1728	750
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			98	90	81	97	96	99
cM capacity (veh/h)	851			741			236	261	340	169	253	415

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	11	902	27	755	98	22
Volume Left	11	0	27	0	5	5
Volume Right	0	5	0	11	65	5
cSH	851	1700	741	1700	307	246
Volume to Capacity	0.01	0.53	0.04	0.44	0.32	0.09
Queue Length 95th (ft)	1	0	3	0	33	7
Control Delay (s)	9.3	0.0	10.0	0.0	22.1	21.0
Lane LOS	A		B		C	C
Approach Delay (s)	0.1		0.3		22.1	21.0
Approach LOS					C	C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

20: Smith Rd & Guide Meridian Rd

Lane Group	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
Storage Length (ft)	175		115	275		275	400		400	350		350
Storage Lanes	1		0	1		0	2		1	2		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			50			50	
Link Distance (ft)		7852			1710			2267			5362	
Travel Time (s)		153.0			33.3			30.9			73.1	
Lane Group Flow (vph)	231	753	0	183	377	0	355	1425	349	177	909	167
v/c Ratio	0.81	0.89		0.88	0.46		0.80	0.93	0.43	0.91	0.72	0.25
Control Delay	45.2	36.1		61.5	20.2		45.2	32.4	6.9	80.8	23.4	4.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.2	36.1		61.5	20.2		45.2	32.4	6.9	80.8	23.4	4.0
Queue Length 50th (ft)	74	138		57	57		77	296	32	40	174	0
Queue Length 95th (ft)	#173	#236		#155	95		#141	#446	87	#96	241	35
Internal Link Dist (ft)		7772			1630			2187			5282	
Turn Bay Length (ft)	175			275			400		400	350		350
Base Capacity (vph)	284	868		208	840		444	1526	810	195	1259	670
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.87		0.88	0.45		0.80	0.93	0.43	0.91	0.72	0.25

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

21: Slater Road & Rural Avenue

Lane Group	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
Storage Length (ft)	100		0	100		100	100		100	200		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		728			1176			825			774	
Travel Time (s)		14.2			22.9			18.8			17.6	
Lane Group Flow (vph)	16	665	0	431	468	90	112	16	532	186	37	0
v/c Ratio	0.03	0.97		1.14	0.45	0.10	0.30	0.03	0.84	0.49	0.08	
Control Delay	8.9	53.4		113.1	13.5	5.0	21.4	17.0	23.2	25.2	10.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	8.9	53.4		113.1	13.5	5.0	21.4	17.0	23.2	25.2	10.7	
Queue Length 50th (ft)	3	287		~192	104	3	38	5	100	68	5	
Queue Length 95th (ft)	12	#583		#413	286	33	76	17	226	122	24	
Internal Link Dist (ft)		648			1096			745			694	
Turn Bay Length (ft)	100			100		100	100		100	200		
Base Capacity (vph)	513	688		378	1043	917	530	723	785	545	680	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.03	0.97		1.14	0.45	0.10	0.21	0.02	0.68	0.34	0.05	

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

22: Slater Road & I-5 SB Ramps

Lane Group	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
Storage Length (ft)	0		100	150		0	0		0	0		50
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1176			689			507			533	
Travel Time (s)		22.9			13.4			11.5			12.1	
Lane Group Flow (vph)	0	682	578	312	776	0	0	0	0	0	120	172
v/c Ratio		0.79	0.63	0.69	0.60						0.43	0.44
Control Delay		22.5	8.0	17.1	7.3						31.6	9.0
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		22.5	8.0	17.1	7.3						31.6	9.0
Queue Length 50th (ft)		199	46	36	112						42	0
Queue Length 95th (ft)		391	153	#142	246						99	49
Internal Link Dist (ft)		1096			609			427			453	
Turn Bay Length (ft)			100	150								50
Base Capacity (vph)		1193	1142	528	1574						502	572
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.57	0.51	0.59	0.49						0.24	0.30

Intersection Summary

Area Type: Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	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
Storage Length (ft)	100		0	0		50	0		175	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		689			633			455			623	
Travel Time (s)		13.4			12.3			10.3			14.2	
Lane Group Flow (vph)	202	617	0	0	787	271	0	330	457	0	0	0
v/c Ratio	0.71	0.52			0.88	0.34		0.73	0.73			
Control Delay	27.4	9.6			30.9	9.1		36.1	16.4			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	27.4	9.6			30.9	9.1		36.1	16.4			
Queue Length 50th (ft)	37	142			312	47		146	62			
Queue Length 95th (ft)	#146	235			#558	99		235	169			
Internal Link Dist (ft)		609			553			375			543	
Turn Bay Length (ft)	100					50			175			
Base Capacity (vph)	284	1346			1060	941		568	715			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.71	0.46			0.74	0.29		0.58	0.64			

Intersection Summary

Area Type: Other

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	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
Storage Length (ft)	150		0	50		0	0		0	0		100
Storage Lanes	2		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		633			3915			410			337	
Travel Time (s)		12.3			76.3			9.3			7.7	
Lane Group Flow (vph)	478	630	0	11	734	0	179	98	0	130	342	0
v/c Ratio	0.90	0.59		0.12	1.00		1.01	0.18		0.34	0.49	
Control Delay	56.3	14.3		39.4	58.3		100.3	15.1		24.3	6.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	56.3	14.3		39.4	58.3		100.3	15.1		24.3	6.3	
Queue Length 50th (ft)	123	176		5	~371		86	23		49	9	
Queue Length 95th (ft)	#211	352		21	#603		#211	57		95	67	
Internal Link Dist (ft)		553			3835			330			257	
Turn Bay Length (ft)	150			50								
Base Capacity (vph)	529	1071		92	737		194	595		415	729	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.90	0.59		0.12	1.00		0.92	0.16		0.31	0.47	

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

25: Slater Road & Northwest Dr

Lane Group	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
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		3915			261			1769			6852	
Travel Time (s)		76.3			5.1			26.8			103.8	
Lane Group Flow (vph)	0	283	386	0	0	0	457	446	0	0	581	0
v/c Ratio		0.85	0.58				0.97	0.37			0.98	
Control Delay		53.1	6.8				66.9	7.7			58.8	
Queue Delay		0.0	0.0				0.0	0.0			0.0	
Total Delay		53.1	6.8				66.9	7.7			58.8	
Queue Length 50th (ft)		132	0				228	94			270	
Queue Length 95th (ft)		#259	65				#416	146			#486	
Internal Link Dist (ft)		3835			181			1689			6772	
Turn Bay Length (ft)												
Base Capacity (vph)		360	687				470	1201			594	
Starvation Cap Reductn		0	0				0	0			0	
Spillback Cap Reductn		0	0				0	0			0	
Storage Cap Reductn		0	0				0	0			0	
Reduced v/c Ratio		0.79	0.56				0.97	0.37			0.98	

Intersection Summary	
Area Type:	Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

26: Labounty Drive & Nordic Way

Lane Group	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
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		592			520			696			211	
Travel Time (s)		16.1			14.2			19.0			5.8	
Lane Group Flow (vph)	0	272	451	0	625	0	0	494	120	0	92	0
v/c Ratio		0.36	0.48		0.90			0.94	0.16		0.13	
Control Delay		12.5	3.2		33.8			48.1	3.3		5.8	
Queue Delay		0.0	0.0		0.0			0.0	0.0		0.0	
Total Delay		12.5	3.2		33.8			48.1	3.3		5.8	
Queue Length 50th (ft)		60	0		190			166	0		7	
Queue Length 95th (ft)		108	43		#383			#345	25		29	
Internal Link Dist (ft)		512			440			616			131	
Turn Bay Length (ft)												
Base Capacity (vph)		822	982		751			535	749		722	
Starvation Cap Reductn		0	0		0			0	0		0	
Spillback Cap Reductn		0	0		0			0	0		0	
Storage Cap Reductn		0	0		0			0	0		0	
Reduced v/c Ratio		0.33	0.46		0.83			0.92	0.16		0.13	

Intersection Summary	
Area Type:	Other

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	720			684	528	
Travel Time (s)	16.4			15.5	12.0	
Lane Group Flow (vph)	978	0	147	543	397	185
v/c Ratio	1.02		0.95	0.44	0.95	0.36
Control Delay	55.0		100.1	7.8	64.6	6.4
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	55.0		100.1	7.8	64.6	6.4
Queue Length 50th (ft)	~482		75	112	196	0
Queue Length 95th (ft)	#748		#185	171	#364	48
Internal Link Dist (ft)	640			604	448	
Turn Bay Length (ft)						
Base Capacity (vph)	958		155	1234	420	517
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	1.02		0.95	0.44	0.95	0.36

Intersection Summary

Area Type: Other

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	295	90	330	395	65	295
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	321	98	359	429	71	321
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1035	573			788	
vC1, stage 1 conf vol	573					
vC2, stage 2 conf vol	462					
vCu, unblocked vol	1035	573			788	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	29	81			92	
cM capacity (veh/h)	449	519			831	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	321	98	788	71	321
Volume Left	321	0	0	71	0
Volume Right	0	98	429	0	0
cSH	449	519	1700	831	1700
Volume to Capacity	0.71	0.19	0.46	0.08	0.19
Queue Length 95th (ft)	139	17	0	7	0
Control Delay (s)	30.7	13.5	0.0	9.7	0.0
Lane LOS	D	B		A	
Approach Delay (s)	26.7		0.0	1.8	
Approach LOS	D				

Intersection Summary

Average Delay	7.4		
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

Appendix C—Greenhouse Gas Calculation Worksheets

Project Emissions Summary

Project Name

	Stationary Combustion	Electricity Use	Transportation	Non-Combustion Emissions	Total
Emissions Summary (MTCO2e)	907.7362702	2232.649529	12,391	0	15531.76762

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Project Emissions Summary

Project Name

	Stationary Combustion	Electricity Use	Transportation	Non-Combustion Emissions	Total
Emissions Summary (MTCO2e)	3078.37397	9007.477616	58,328	0	70413.66224

Project Emissions Summary

Project Name

	Stationary Combustion	Electricity Use	Transportation	Non-Combustion Emissions	Total
Emissions Summary (MTCO2e)	4183.632833	12412.67247	81,072	0	97668.41827