WHATCOM COUNTY COUNCIL AGENDA BILL

NO. 2008-448

CLEARANCES	*Initial*	*Date*	*Date Received in Council Office*	*Agenda Date*	*Assigned to:*
Originator: Gary Davis	GD	10/8/08	RECEIVED OCT 14 2008 DEC. 2, 2008 WHATCOM COUNTY COUNCIL	12/9/2008	*Planning Committee; Introduction*
Division Head:				1/13/2009	Public Hearing
Dept. Head: David Stalheim		10-9-08		5/12/2009	Council
Prosecutor:		10-10-08			
Purchasing/Budget:	—	—			
Executive: Pete Kremen	PK	10-14-08			

TITLE OF DOCUMENT:

Ordinance Adopting Amendments to the Birch Bay Community Plan related to Transportation Facilities

ATTACHMENTS:

(1) Memorandum to County Council
(2) Proposed Ordinance

SEPA review required? ***(x) Yes*** ***( ) NO*** ***SEPA review completed?*** ***(x) Yes*** ***( ) NO***	***Should Clerk schedule a hearing?*** ***(x) Yes*** ***( ) NO*** ***Requested Date:***

SUMMARY STATEMENT OR LEGAL NOTICE LANGUAGE: ***(If this item is an ordinance or requires a public hearing, you must provide the language for use in the required public notice. Be specific and cite RCW or WCC as appropriate. Be clear in explaining the intent of the action.)***

Amend the Birch Bay Community Plan to amend Chapter 11 – Transportation, and Chapter 2 – Summary, and add Appendix A – Birch Bay Transportation Planning Study; related to transportation facilities.

COMMITTEE ACTION:	***COUNCIL ACTION:***
12/09/2008: Approved to forward to a public hearing. Must have concurrent review. Public hearing at first meeting in January. Approval in February	12/09/2008: Introduced 1/13/2009: Council forwarded to Concurrency 7-0 5/12/2009: Council Adopted 7-0 Ord. 2009-036

Related County Contract #:	***Related File Numbers:***	***Ordinance or Resolution Number:***
	CMP2007-00008	Ord. 2009-036

Please Note: Once adopted and signed, ordinances and resolutions are available for viewing and printing on the County's website at: www.co.whatcom.wa.us/council.

SPONSORED BY: Consent
PROPOSED BY: PDS
INTRODUCTION DATE: 12/9/2009

ORDINANCE # 2009-036

AMENDING BIRCH BAY COMMUNITY PLAN CHAPTER 11 - TRANSPORTATION, AND CHAPTER 2 – SUMMARY, AND ADDING APPENDIX A – BIRCH BAY TRANSPORTATION PLANNING STUDY, RELATED TO TRANSPORTATION FACILITIES

WHEREAS, The Washington State Legislature, through RCW 36.70A.080(2) states that a county comprehensive plan may include subarea plans that are consistent with the comprehensive plan; and

WHEREAS, Legal notice was published in the Bellingham Herald; and

WHEREAS, The Planning Commission held a public hearing on the proposal; and

WHEREAS, The Planning Commission has evaluated the proposed amendments.

WHEREAS, The County Council has considered the Planning Commission's recommendations.

The Council makes the following findings of fact and conclusions:

FINDINGS OF FACT

1. The Whatcom County Council adopted the Birch Bay Community Plan on September 28, 2004 (Ord. 2004-047).

2. RCW 36.70A.080(2) states that a county comprehensive plan may include subarea plans that are consistent with the comprehensive plan.

3. The Birch Bay UGA is a rapidly growing area and an updated plan for transportation facilities to serve future growth in the area is in the public interest.

4. Countywide Planning Policy A.4 states, "Citizen comments and viewpoints shall be incorporated into the decision-making process in development of draft plans and regulations. Consideration of citizen comments shall be evident in the decision making process."

5. County staff, in conjunction with the project consultant, held public open house meetings on June 12, 2007 and December 11, 2007, and made information on the planning process

available to the public via a web site, brochures, and a set of display boards that were posted at various locations.

6. County staff and the project consultant presented the draft Chapter 11 amendments at the July 23, 2008 meeting of the Birch Bay Steering Committee and invited public comment.

7. Countywide Planning Policy E.4 states, "The county shall assure that there are plans to provide appropriate levels of urban facilities and services within non-city Urban Growth Areas..."

8. A determination of non-significance (DNS) was issued under the State Environmental Policy Act (SEPA) on August 12, 2008.

9. Notice of the Planning Commission hearing for the subject amendment was published in the Bellingham Herald on August 3, 2008.

10. The Planning Commission held a public hearing relating to the subject amendment on August 14, 2008.

CONCLUSION

The proposed amendments are consistent with the goals and policies of the Whatcom County Comprehensive Plan and serve the public interest.

NOW, THEREFORE, BE IT ORDAINED by the Whatcom County Council that:

Section 1. Birch Bay Community Plan, Chapter 11 – Transportation; and Chapter 2 - Summary, are amended as shown on Exhibit A.

Section 2. Adjudication of invalidity of any of the sections, clauses, or provisions of this ordinance shall not affect or impair the validity of the ordinance as a whole or any part thereof other than the part so declared to be invalid.

ADOPTED this 12th day of May, 2009

WHATCOM COUNTY COUNCIL
WHATCOM COUNTY, WASHINGTON

ATTEST:

COUNTY COUNCIL WHATCOM COUNTY STATE OF WASHINGTON

Dana Brown-Davis, Council Clerk

Seth Fleetwood, Council Chair

APPROVED as to form:

Civil Deputy Prosecutor

(X) Approved ( ) Denied

Pete Kremen, Executive

Date: 5-14-09

EXHIBIT A

Birch Bay Community Plan

- **Amendments to Chapter 11 -- Transportation**
- **Amendments to Chapter 2 -- Summary**
- **Appendix A – Birch Bay Transportation Planning Study**

Chapter 11

TRANSPORTATION

Introduction

In 2007 Whatcom County and its consultant, Transpo Group, worked with Birch Bay residents to develop a transportation planning study of the Birch Bay area, including transportation facilities within the Community Plan boundary as well as facilities outside the boundary connecting Birch Bay with I-5 and Blaine. That study, which is attached to the Community Plan as Appendix A, proposes measures intended to ensure the transportation system effectively serves Birch Bay residents into the future. This chapter is based on the policies and projects proposed in the study as a result of public participation and thorough analysis of expected future travel demands.

Existing Transportation System

Roadway System and Traffic Controls

The transportation system in and around the Birch Bay area consists of various transportation facilities, including state highways, collector routes, local streets, transit services, and pedestrian and bicycle facilities. This inventory covers the street system, traffic controls, traffic volumes, traffic operations, traffic safety, transit service, and non-motorized facilities (see Figure 11-1).

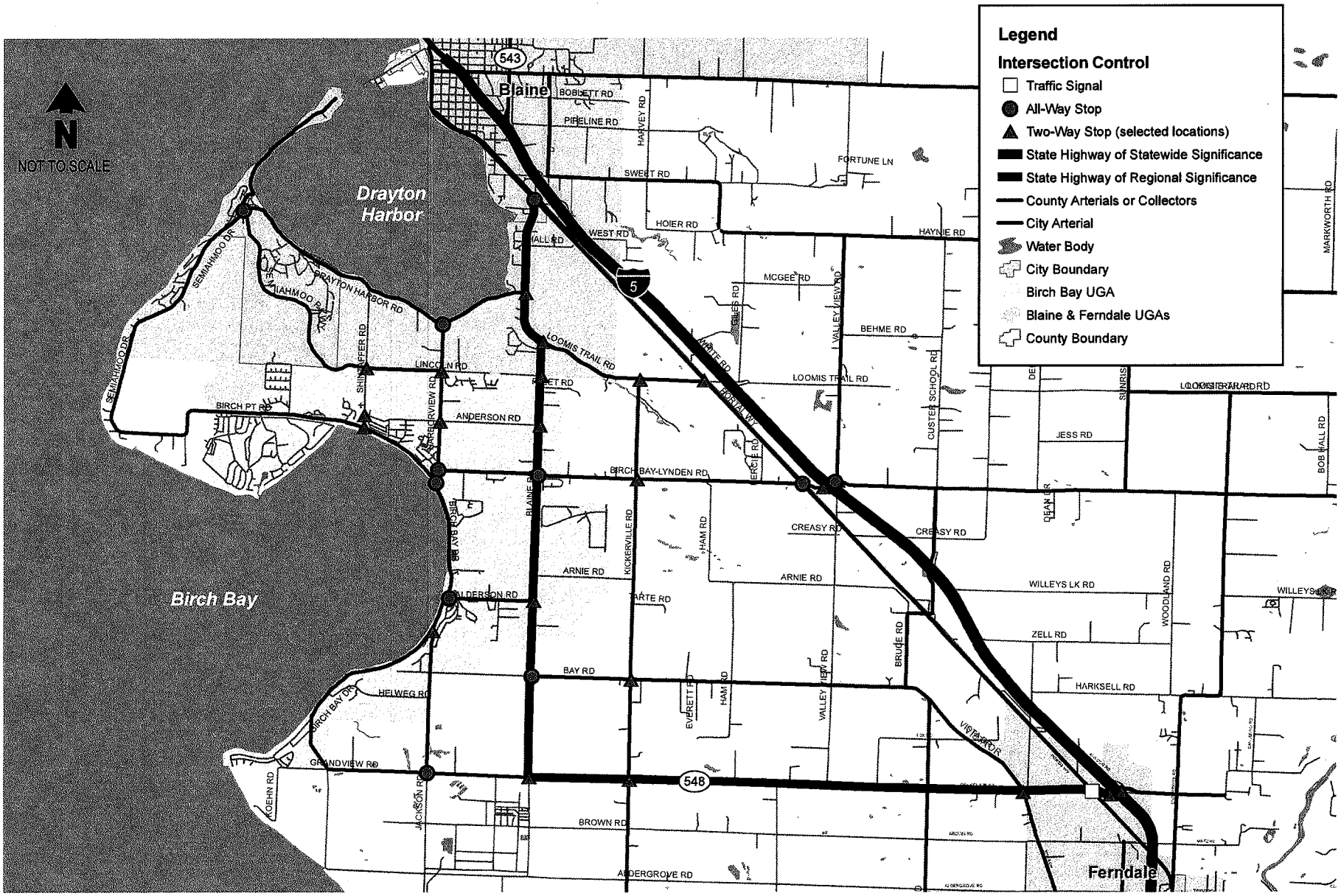

Figure 11-1
Existing Roadway System & Traffic Controls

Birch Bay Community Plan

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State Highways

Interstate 5 (I-5) is the north-south interstate freeway serving Washington State. It connects to Canada within the City of Blaine. I-5 is classified as a Highway of Statewide Significance (HSS), meaning that local concurrency programs will not be applied. Within the Birch Bay Subarea, I-5 runs diagonally from the northwest (in Blaine) to the southeast near the City of Ferndale. I-5 has four travel lanes within the study area and a posted speed limit of 70 mph. Interchanges within the study area are located at Grandview Road (SR 548) and Birch Bay-Lynden Road. An interchange also serves the Birch Bay Subarea at exit 274 in the south part of the City of Blaine.

SR 548 is a state Highway of Regional Significance (HRS) within the Birch Bay Subarea. It is comprised of two segments – Blaine Road and Grandview Road.

> **Blaine Road (SR 548)** serves major north-south travel flows between the City of Blaine and the industrial areas south of Grandview Road. At its north end it connects with Interstate 5 at an interchange in the south part of the City of Blaine (exit 274). It has two travel lanes and a posted speed limit of 45 mph. The roadway has several small hills due to the rolling terrain. Its lanes are relatively narrow and there is little or no shoulder area.
>
> **Grandview Road (SR 548)** serves as SR 548 east of Blaine Road. It is an east-west, two-lane roadway which connects the south part of the Birch Bay Urban Growth Area with an interchange with Interstate 5 and with an alternative route to Ferndale and Bellingham via Kickerville Road. The lanes are typically between 10 feet and 12 feet wide, and the posted speed limit is 50 mph.

County Arterial and Collector Roads

Whatcom County owns and maintains a variety of arterial and collector roads in the Birch Bay area. These roads generally function to provide access between communities, or to connect residential neighborhoods with community centers and facilities. These are two-lane roads, with posted speed limits ranging from 25 to 50 mph.

Local Access Roads

The remaining routes are local access roads. These streets serve local abutting land uses and neighborhood traffic. They generally have two travel lanes and 25-mph speed limits.

Traffic Volumes

Daily and PM peak hour traffic volumes were collected from a variety of sources including Whatcom County, Washington State Department of Transportation (WSDOT), and Whatcom Council of Governments (WCOG). These traffic volumes were supplemented with existing PM peak hour turning movement counts conducted for the plan update in 2006 and 2007. The existing PM peak hour volumes are shown in Figure 4.

Traffic Operations

Traffic operations for an intersection can be described alphabetically with a range of levels of service (LOS). LOS A indicates free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays.

Whatcom County's Comprehensive Plan establishes level of service standards for roadway segments for purposes of transportation concurrency evaluation (See Table 11-1). Under state law, the county cannot approve any development that would generate enough traffic to cause the level of service on county arterials and collectors to fall below the adopted standards.

Table 11-1 Whatcom County Level of Service Standards (Concurrency)

Arterial Location	Maximum V/C[1] ratio	Level of Service Standard
Outside Urban Growth Area	0.75	C
Urban Growth Areas not associated with cities (includes Birch Bay UGA)	0.80	C
Urban Growth Areas associated with cities	0.90	D

1. Volume-to-capacity

State highways have a separate standard that is set by WSDOT and the Regional Transportation Planning Organization. Highways of Statewide Significance (HSS) within urban areas, such as sections of I-5, have a LOS

threshold of LOS D. In rural areas, the HSS LOS is set at LOS C. The LOS for Highways of Regional Significance (HRS), such as Blaine Road (SR 548), is set at the LOS adopted by the local metropolitan planning organization (MPO). The MPO for Whatcom County is the Whatcom Council of Governments (WCOG). WCOG and Whatcom County both indicate that the LOS standard for HRS within urban areas is set at LOS D. Outside of urban areas, the HRS LOS standard is LOS C.

Whatcom County establishes similar levels of service for intersection operations, for purposes of traffic impact analyses beyond concurrency evaluations. The Birch Bay Transportation Planning Study uses levels of service based on intersection operations during weekday afternoon peak traffic conditions. The level of service is measured in terms of expected delay at the most congested motion at the intersection. Table 11-2 and Figure 11-3 summarize the existing weekday PM peak hour LOS at study intersections.

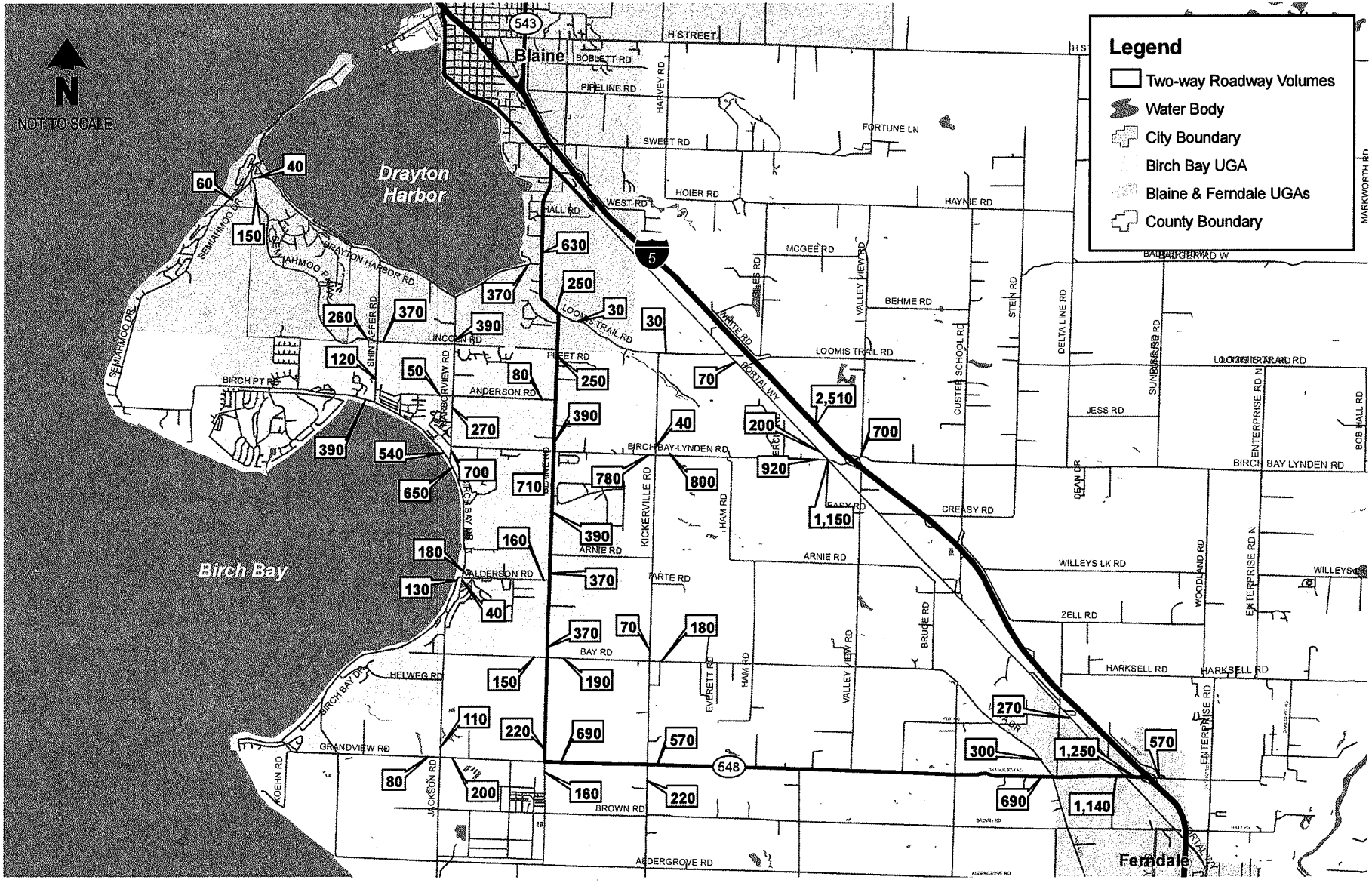

Figure 11-2

2007 PM Peak Hour Two-Way Traffic Volumes

Birch Bay Community Plan

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Table 11-2 2007 Weekday PM Peak Hour Intersection Level of Service

Intersection	Urban or Rural	Intersection Control[1]	2007		
			LOS[2]	Delay[3]	WM[4]
I-5 NB Ramps / Birch Bay-Lynden Road	Rural	AWSC	C	21.6	-
I-5 SB Ramps / Birch Bay-Lynden Road	Rural	TWSC	D	33.9	SB
I-5 NB Ramps / Grandview Road (SR 548)	Urban	TWSC	F	75.2	NB
I-5 SB Ramps / Grandview Road (SR 548)	Urban	TWSC	D	31.4	SB
Blaine Road (SR 548) / Drayton Harbor Road	Urban	TWSC	B	13.6	EB
Blaine Road (SR 548) / Loomis Trail Road	Urban	TWSC	A	8.6	WB
Blaine Road (SR 548) / Lincoln Road	Urban	TWSC	A	10.0	EB
Blaine Road (SR 548) / Anderson Road	Urban	TWSC	A	9.7	EB
Blaine Road (SR 548) / Birch Bay-Lynden Road	Urban	AWSC	C	19.7	-
Blaine Road (SR 548) / Alderson Road	Urban	TWSC	B	11.2	EB
Blaine Road (SR 548) / Bay Road	Rural	AWSC	A	8.3	-
Blaine Road (SR 548) / Grandview Road (SR 548)	Rural	TWSC	E	38.0	SB
Semiahmoo Parkway / Drayton Harbor Road	Urban	AWSC	A	7.6	-
Shintaffer Road / Semiahmoo Parkway (Lincoln Road)	Urban	TWSC	B	13.1	SB
Shintaffer Road / Anderson Road	Urban	TWSC	A	9.2	WB
Shintaffer Road / Birch Bay Drive	Urban	TWSC	B	10.2	SB
Harborview Road / Lincoln Road	Urban	TWSC	B	12.9	EBL
Harborview Road / Anderson Road	Urban	TWSC	B	11.3	EB
Harborview Road / Birch Bay-Lynden Road	Urban	AWSC	C	16.0	-
Harborview Road / Birch Bay Drive	Urban	AWSC	A	9.2	-
Birch Bay Drive / Alderson Road	Urban	AWSC	A	7.8	-
Birch Bay Drive / Jackson Road	Urban	TWSC	A	9.2	WBL
Jackson Road / Grandview Road	Rural	AWSC	A	7.6	-
Kickerville Road / Loomis Trail Road	Rural	TWSC	A	8.7	NB
Kickerville Road / Birch Bay-Lynden Road	Rural	TWSC	C	17.4	SB
Kickerville Road / Bay Road	Rural	TWSC	B	10.6	NB
Kickerville Road / Grandview Road (SR 548)	Rural	TWSC	C	23.4	NB
Portal Way / Loomis Trail Road	Rural	TWSC	A	8.4	EB

Portal Way / Birch Bay-Lynden Road	Rural	AWSC	E	35.4	-
Portal Way / Grandview Road (SR 548)	Urban	Signal	B	13.3	0.54
Vista Drive / Grandview Road (SR 548)	Urban	AWSC	C	19.1	-
Valley View Road / Birch Bay-Lynden Road	Rural	TWSC	B	11.7	SB

1. Signal = Traffic Signal; AWSC = All-Way Stop Control; TWSC = Two-Way Stop Control.
2. Level of service, based on 2000 Highway Capacity Manual methodology. Shaded cells indicate intersections exceeding Whatcom County LOS standard: LOS D in urban locations (within city limits or UGA) & LOS C in rural locations (non-UGA).
3. Average delay in seconds per vehicle.
4. Worst movement reported for unsignalized intersections.

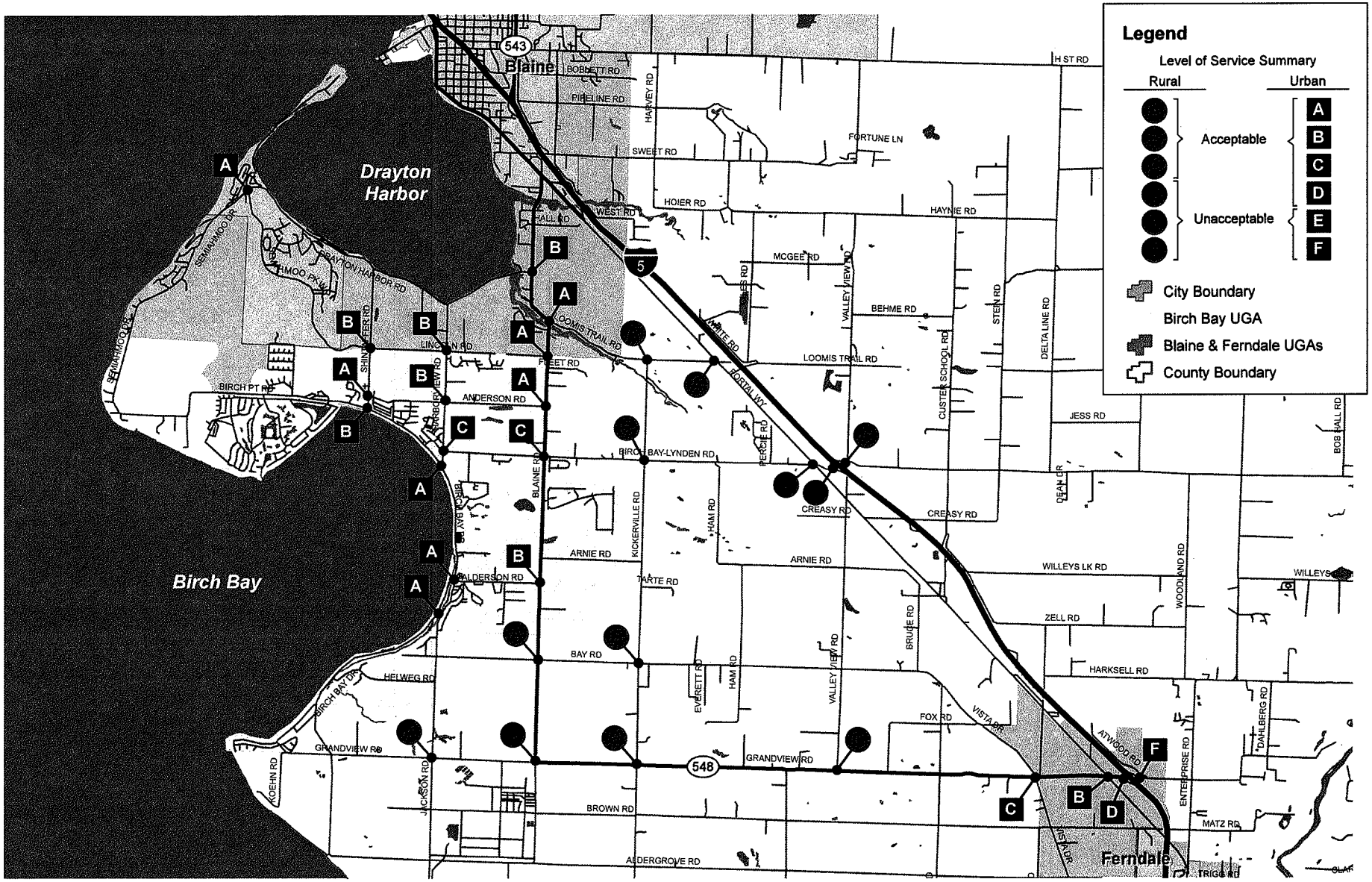

Figure 11-3

2007 Weekday PM Peak Hour Intersection Level of Service

Birch Bay Community Plan

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As shown in Table 11-2, all but four study intersections are currently operating at the respective LOS standard or better during the weekday PM peak hour. The exceptions are:

The location exceeding the urban LOS standard (LOS D):

- I-5 NB Ramps / Grandview Road (SR 548) – operating at LOS F

Locations exceeding the rural LOS standard (LOS C):

- I-5 SB Ramps / Birch Bay Lynden Road – operating at LOS D
- Blaine Road (SR 548) / Grandview Road (SR 548) – operating at LOS E
- Portal Way / Birch Bay-Lynden Road – operating at LOS E

Birch Bay-Lynden Road carries the highest traffic volumes in the area, contributing to the level of service deficiencies observed in existing conditions. The high traffic volumes during peak hours limit the gaps available for side street traffic to turn onto Birch Bay-Lynden Road.

Transit and Public Transportation

The public transportation agency in the Birch Bay area is Whatcom Transportation Authority (WTA). WTA offers several services for local residents and visitors to make trips throughout the county. Typical fixed route service is available in the Birch Bay area, although its frequencies do not necessarily provide for regular commuting.

The following types of transit service are available in Birch Bay:

- Fixed route service (Routes 55, 70X)
- Dial-a-Ride, or Flex service
- Paratransit

Fixed Route Service

WTA's fixed route service includes Route 70X, which is an express service between Birch Bay and Bellingham. The route has one stop in the Birch Bay area, at Birch Bay-Lynden Road and I-5 to serve Birch Bay Square. Route 70X makes four round trips per day on weekdays between 6:00 AM and approximately 7:00 PM. Saturday service for Route 70X is provided by Route 55, which is the other fixed route service.

Route 55 serves as a connector route between Blaine, Birch Bay, Ferndale, and the Bellis Fair mall in Bellingham. This route makes three round trips per day, in addition to making "flex" deviations along the route for previously requested stops by individual users. Route 55 runs between 8:40 AM and approximately 4:00 PM on weekdays, and between 8:40 AM and approximately 6:00 PM on Saturdays. See Figure 11-4 for a map of these routes.

Dial-a-Ride Service

WTA's Dial-a-Ride service is provided for users in the Birch Bay and Blaine areas. This service provides local service in the area, and also connects to Route 70X. According to the WTA Six-Year Strategic Service Plan, Dial-a-Ride service during the middle of the day will serve as Route 55, a local service route. When Route 70X is in the area, the Dial-a-Ride service will continue to provide connections to the fixed route service. The average monthly ridership in 2006 for the Dial-a-Ride service was 606 passengers.

Paratransit Service

WTA's paratransit service is provided for those users who are not able to use the traditional fixed route services. These users are typically people with disabilities or seniors. The federal Americans with Disabilities Act (ADA) provides standards for paratransit, which includes a policy that passenger capacity constraints are not allowed. WTA strives to meet the demand of all eligible individuals.

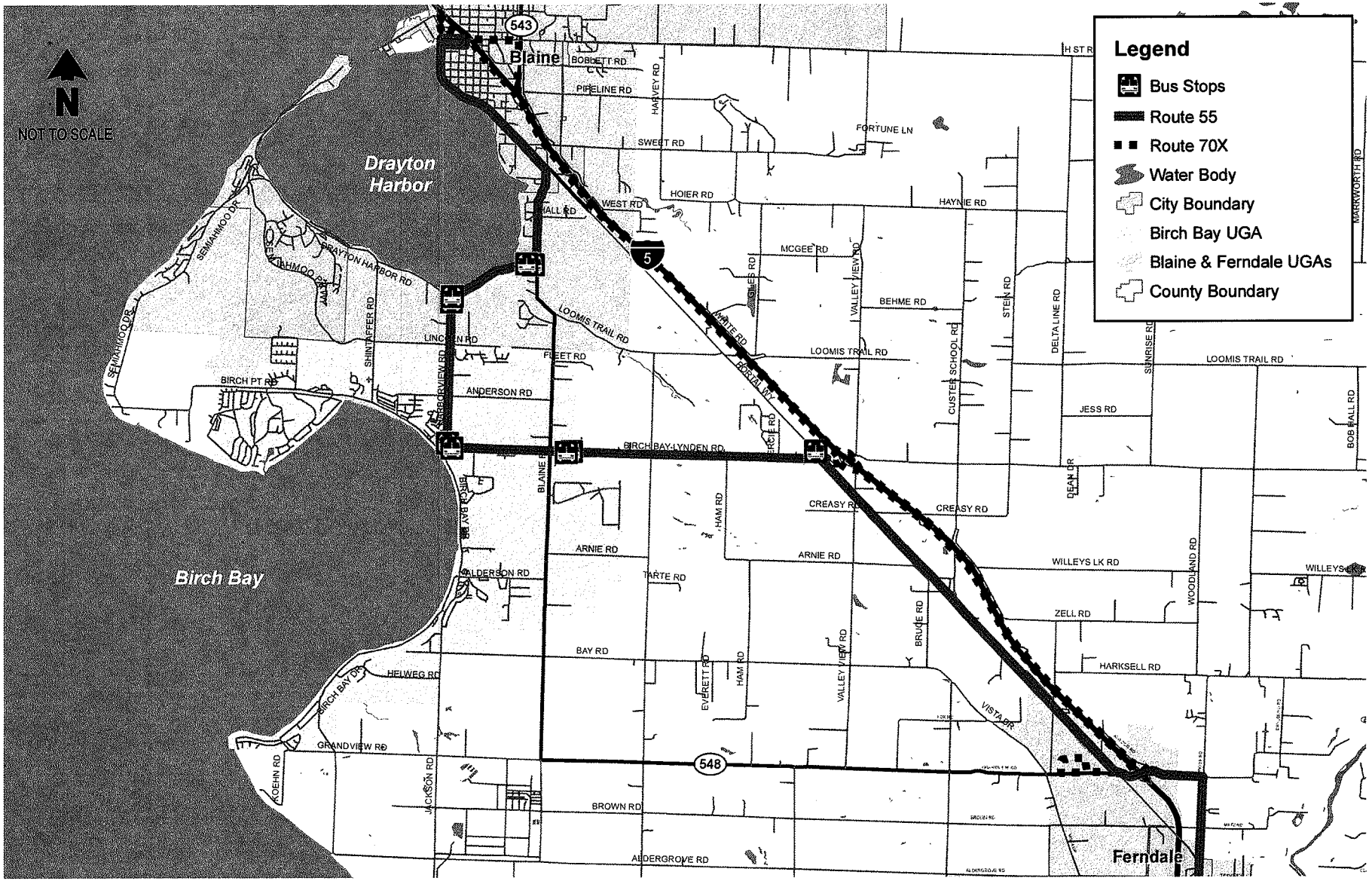

Figure 11-4
Fixed Transit Routes

Birch Bay Community Plan

M:\06\06229 Whatcom County Concurrency Management\GIS\Figures\BB_Community_Plan\FIG 11-4 Transit Routes.mxd

Pedestrian and Bicycle Systems

A well connected non-motorized transportation system encourages healthy recreational activities, reduces vehicle travel demand, and enhances safety within the community. The projects included in Table 11-3 include pedestrian and bicycle facilities as part of the identified roadway improvements. In many cases, the proposed improvements include the addition or enhancement of roadway shoulders to accommodate non-motorized transportation within Birch Bay. Included in these projects is the Birch Bay Drive Pedestrian Facility project.

The pedestrian system within Birch Bay is comprised of sidewalks, walkways, trails, and roadway shoulders. Within the UGAs, the County desires to have roadways improved to urban standards, which could include sidewalks or other types of pedestrian walkway facilities. Pedestrian facilities should be located along streets that provide access and connectivity to the commercial businesses, residential areas, parks, schools, public buildings, and transit stops within the Birch Bay UGA. Enhanced roadway shoulders outside the UGA will improve safety for pedestrian travel in those areas.

Within Birch Bay, the bicycle system is comprised of mostly roadways. Many of the roadways within the study area have deficient roadway shoulders or are without shoulders altogether. The major improvements for bicycle travel will be the addition or enhancement of roadway shoulders. An important component of the bicycle system is completion of the Coast Millennium Trail through Birch Bay, providing a bicycling link from the Canadian border to Bellingham and farther south. A portion of the trail has been completed south of Semiahmoo Parkway.

There are several proposed non-motorized facilities throughout the County, a few of which are in the Birch Bay study area. Proposed non-motorized facilities in the study area include:

- Bicycle lane along Semiahmoo Parkway
- Off-road trail that would connect to a bicycle lane along Birch Bay Drive
- Off-road trail to continue south of the Birch Bay Drive bicycle lane
- Bicycle lane along Birch Bay-Lynden Road
- Bicycle lane along Portal Way
- Portion of the Coast Millennium Trail that begins near Alderson Road and Birch Bay Drive and continues south toward Ferndale
- Bicycle lane along Birch Bay Drive

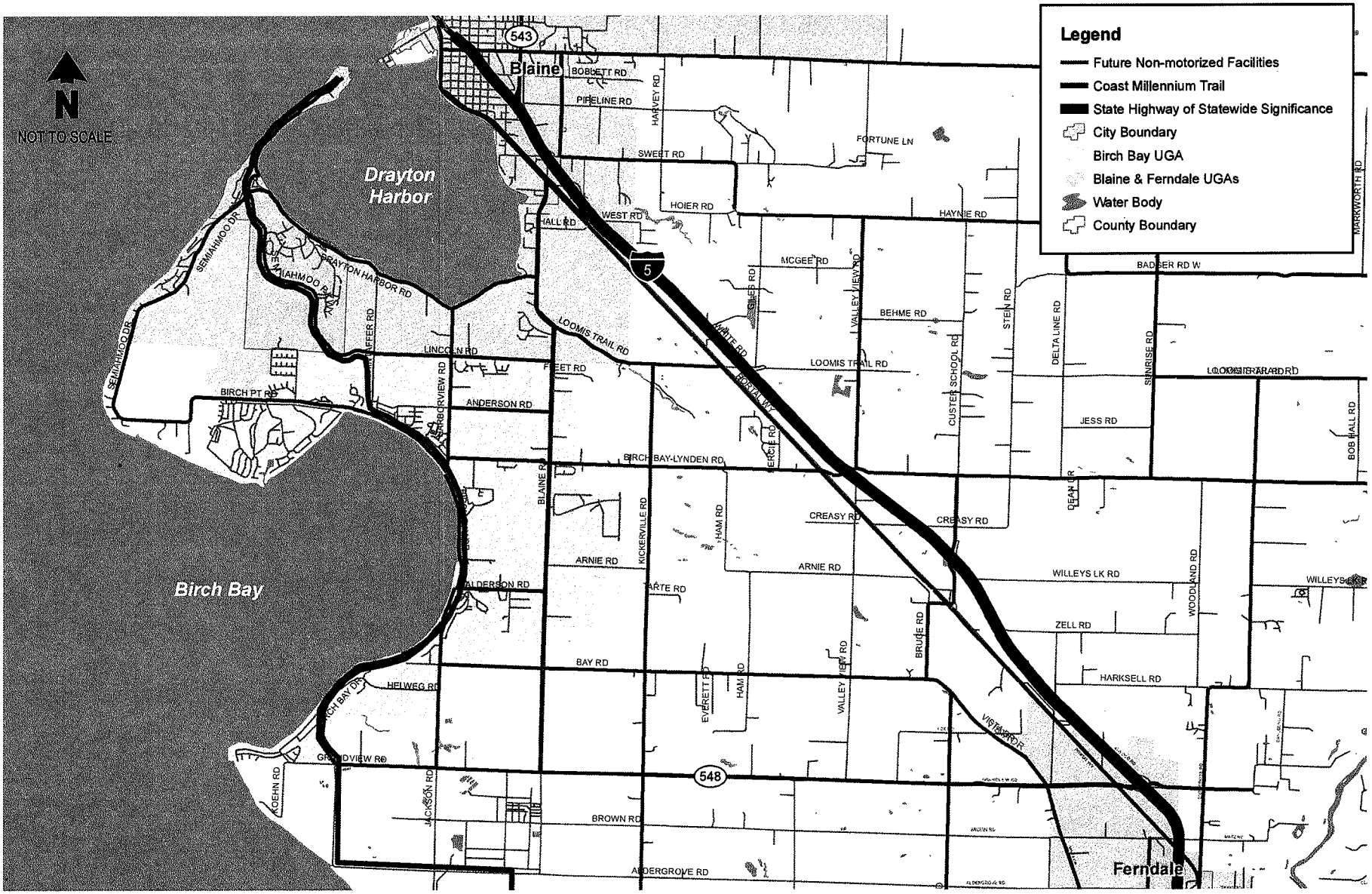

Figure 11-5
Birch Bay Study Area Non-motorized Transportation System Plan

Birch Bay Community Plan

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Travel Forecasts

The Birch Bay Transportation Planning Study used the Whatcom Council of Governments' regional travel demand model and the population and employment figures from this Community Plan to predict vehicular travel patterns in 2027. The study analyzed and compared alternatives with and without the capacity improvements proposed in the study.

The analysis indicated that the most critical areas for congestion in the future would be along Birch Bay-Lynden Road between I-5 interchange and Harborview Road and along Grandview Road (SR 548) between the I-5 interchange and Vista Drive. It was found that improving traffic operations at these locations consequently reduces the traffic using the I-5/south Blaine interchange (exit 274), thus resolving capacity issues along Blaine Road (SR 548) and Drayton Harbor Road that would be expected without these improvements.

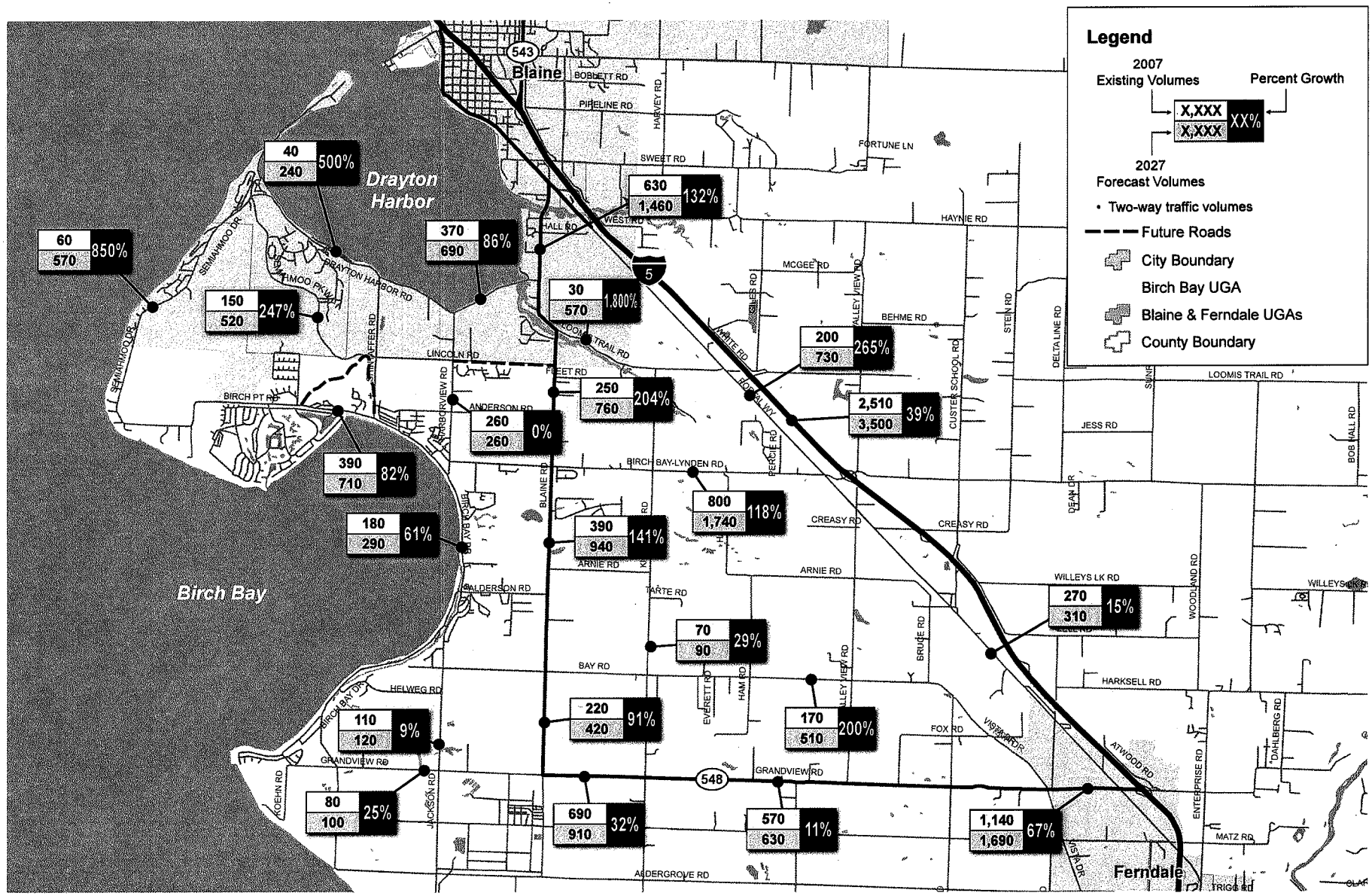

Figure 11-6

2007 and 2027 PM Peak Hour Traffic Volumes

Birch Bay Cummunity Plan

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Transportation Vision, Goals and Policies

Vision Statement

East-west traffic movement between Birch Bay and I-5, that has been a problem for years, has improved significantly. Birch Bay - Lynden Road and Grandview Road, have been widened by providing adequate shoulders and center left-turn lanes. Blaine Road also functions as a north-south collector/distributor road taking the traffic load off Birch Bay Drive, leaving it for local access traffic and for bicycles and pedestrians. A number of pay parking lots have appeared east of Birch Bay Drive, camouflaged and tucked away behind commercial facilities with their storefronts facing Birch Bay Drive. Bus service has improved considerably, enabling workers to travel to out-of-the-area job locations in Semiahmoo, Blaine, BP and Bellingham. Pedestrian and bicycle trails have become an integral part of all major road improvements. For example, along the trail, bicyclists can now travel, in their own right-of-way from the Canadian border to Bellingham and further south. Birch Bay Drive, which used to function as a north-south arterial road, now has resemblance to a beach-front promenade, integrating the people oriented development on the east side of the Drive with the water oriented activities on the west side

Goals and Policies

Public Participation

A. Encourage and solicit public participation in all transportation-related decisions to help ensure that planning and implementation have public support.

B. Provide programs and forums to help the public and stakeholders understand transportation issues, requirements, planning concepts, and funding programs.

1. Agency Coordination

A. Encourage interlocal agreements with Washington State Department of Transportation (WSDOT) and local agencies to coordinate development review programs and mitigation.

B. Coordinate with Washington State Department of Transportation (WSDOT) to improve interchange intersections and other key intersections.

C. Coordinate updates to the Birch Bay Community Plan's transportation chapter with the State Highway Systems Plan (Washington State Department of Transportation (WSDOT)), Whatcom Transportation Plan (Whatcom Council of Governments (WCOG)), City of Blaine, and the Whatcom Transit Authority (WTA).

2. Land Use, Development Review, and Standards

A. Review County land use policies and implementing regulations, standards, and incentives to insure they support, encourage, and maximize alternative transportation modes such as bicycling, walking, transit, and transportation demand programs.

B. Require development of circulation roads within the Birch Bay UGA commercial area.

C. For purposes of transportation concurrency evaluation, maintain a level of service (LOS) C or better (volume / capacity ratio of 0.80 or less) on road segments within the Birch Bay UGA and LOS C or better (0.75 or less) on road segments outside the UGA.

D. Convert roadways within the designated UGAs from rural standards to urban standards while being sensitive to the character of the area.

E. Roadway standards should include context sensitive design elements to be flexible with the character and topography of the area (separated pathways in lieu of sidewalks where appropriate).

3. Streets and Highways

A. Maintain a level of service (LOS) C or better for intersections outside the UGA and LOS D for state highway intersections and intersections within UGA boundaries.

B. Set a reduced year-round speed limit on Birch Bay Drive of 20 or 25 miles per hour.

C. Require urban street standards on roadways serving urban development within UGA boundaries.

D. Discourage commuter through traffic on Birch Bay Drive.

E. Provide safer and more efficient travel to Birch Bay-Lynden Road, City of Blaine, City of Ferndale, and I-5.

4. Pedestrians and Bicycles

A. Improve non-motorized connections to other local and regional destinations.

B. Provide streets and arterials that maximize pedestrian and bicycle use.

C. Whenever possible, separate vehicle traffic from pedestrian and bicycle modes.

D. Design and construct arterials and collector roadways to support safe use by pedestrians and bicyclists.

E. Ensure that new non-motorized facilities meet Americans with Disabilities Act (ADA) requirements.

5. Public Transportation and Transportation Demand Management

A. Commit to alternative transportation by working closely with WTA and major employers to establish park & ride lots and implement van pools and car pools.

B. Encourage enhanced service/frequency to the Birch Bay subarea

6. Environmental Considerations

A. Require road standards that reduce the amount of impervious surface and that treat stormwater on site with appropriate low impact development techniques while providing for safe and efficient operations of the transportation facilities

B. Encourage flexible road design standards that encourage native vegetation retention.

C. Encourage consistency with open space corridor plans (such as the Birch Bay Watershed Management Plan), shoreline master program, salmon recovery plans, and critical areas regulations to reduce impacts to fish and wildlife.

7. Program Financing and Implementation

A. Tie transportation funding priority to concurrency and facility adequacy.

B. Continue to partner with Washington State Department of Transportation (WSDOT), Whatcom Council of Governments (WCOG), and Whatcom

Transit Authority (WTA), and other local agencies to fund improvement projects and programs that serve the Birch Bay subarea.

Transportation Systems Plan

The transportation systems plan proposed in the Birch Bay Transportation Planning Study provides a long-range strategy for the Birch Bay UGA to address current and forecast transportation issues and needs. Transportation system improvements are required to accommodate the projected growth in population and employment within the Birch Bay UGA. The transportation systems plan is based upon analyses of the existing transportation system, forecasts of future travel demands, anticipated availability of funding resources, and the desire of the Birch Bay community to create an efficient transportation system that puts a priority on community livability. The Plan builds on the countywide policies and standards, while shaping transportation goals and vision for the Birch Bay subarea.

The transportation systems plan primarily focuses on streets and highway improvements because they serve most of the travel needs for the subarea. The streets and highways serve general traffic, freight, transit, ridesharing, pedestrians, and bicyclists. Therefore, the Plan also provides the framework for other travel modes in the community, including pedestrian, bicycle, and transit modes.

Transportation Improvement Projects

Based on an evaluation of existing and forecast traffic volumes, traffic operations, safety, and circulation needs, a recommended list of transportation improvement projects and programs were defined. The project list is organized into the following categories:

- Intersection Projects
- New Roadway and Major Widening or Reconstruction Projects
- Minor Widening and Reconstruction Projects
- State Route Projects
- Other Mode

Figure 11-7 and Table 11-3 identify each of the projects and shows where the projects are located. Table 11-3 also provides a brief description of each project including the project limits. The table identifies projects that are currently part of the County's Transportation Improvement Program (TIP). This highlights the projects that are currently identified for planning,

design, or construction. A project identification number is provided for each project that is referenced in Figure 11-7.

Planning level cost estimates are also included for each project. The cost estimates were prepared based on typical per unit costs, functional classification, and level of improvement. The cost estimates include allowances for right-of-way acquisition based on generalized needs to meet the County's adopted roadway standards. Estimated costs for several improvements on state routes were developed jointly with Washington State Department of Transportation (WSDOT).

A relative priority (high, medium, and low) was established for each project. The priority reflects the relative need for the projects to enhance the Birch Bay subarea transportation system and provides guidance in implementing the respective improvements.

State Route Projects. I-5 provides the primary regional connection to the Birch Bay subarea. To the north, I-5 connects the Birch Bay subarea to the U.S./Canada border. To the south, I-5 connects to Bellingham and the central Puget Sound region. SR 548 also provides for regional travel from the Birch Bay subarea to I-5 from the north and east. The Washington State Highways Systems Plan (HSP) is the element of Washington's Transportation Plan that addresses the states highway system. The 2007-2026 HSP does not identify specific improvements within the Birch Bay subarea. The HSP calls for a Interstate Master Plan that would identify improvements to optimize capacity and safety on the interstate highway system.

Table 11-3 Birch Bay Community Plan Transportation Improvement Projects and Programs

Project Group	Project ID	Project Name	Project Limits	Project Description	In Existing TIP? [1]	TIF Eligible?	Total Project Cost ($1,000s) Estimated [2]	Relative Priority	Project Justification				Comments
									Capacity	Safety	Road Standards & Preservation	Area Circulation	
INTERSECTIONS PROJECTS	I-1	Birch Bay- Lynden Road / Portal Way	Intersection	Construct intersection improvements to include turn lanes and install traffic signal when, warranted.	Yes	Yes	$3,000	High	X	X			In design, construction programmed for 2009.
	I-2	Birch Bay-Lynden Road / Kickerville Road	Intersection	Construct intersection improvements to include roundabout or install turn lanes and traffic signal, when warranted.	No	Yes	$3,000	Medium	X	X			Turn lanes could be constructed on Birch Bay-Lynden Road as part of R-1.
	I-3	Birch Bay-Lynden Road / Harborview Road	Intersection	Construct intersection improvements to include turn lanes and install traffic signal when warranted.	No	Yes	$3,000	High	X	X			
	I-4	Birch Bay Drive / Harborview Road	Intersection	Improve/ redesign the intersection with turn lanes, and install traffic signal when warranted.	No	Yes	$3,000	High	X	X			
NEW ROADWAYS AND MAJOR WIDENING OR RECONSTRUCTION PROJECTS	R-1	Birch Bay-Lynden Road Widening	Portal Way to UGA limit just east of Blaine Road	Widen to rural major collector standards including turn lanes at major access locations and paved shoulders for non-motorized trips.	No	Yes	$1,500	High	X	X	X		Also see project I-2.
	R-2	Birch Bay-Lynden Road Widening	UGA limit just east of Blaine Road to Harborview	Widen to urban principal arterial standards including turn lanes and non-motorized facilities.	No	Yes	$1,600	High	X	X	X		Also see projects I-3 and I-4.
	R-3	Birch Point Connector Road	Birch Point Road to Shintaffer Road	Construct new 2-lane connection at urban standards including non-motorized facilities and new intersection with Semiahmoo Drive.	No	No	$2,000	High	X			X	A section of the project is constructed by the developer.
	R-4	Lincoln Road Extension and Improvement	Shintaffer Road to Blaine Road (SR 548)	Reconstruct existing road and construct 2-lane urban arterial to Blaine Road with non-motorized enhancement including construction of roundabouts at intersections with Blaine Road and Harborview Road.	Yes	Yes	$9,000	High	X			X	In design, construction programmed for 2011.
	R-5	West Blaine UGA Connector Road	Birch Point Road to Semiahmoo Drive	Construct new 2-lane road to urban standards between Birch Point Road and Semiahmoo Drive to serve future urban development.	No	No	$4,800	Low				X	Blaine UGA. Would be constructed by development projects. Alignment would be defined as part of future development projects.
	R-6	Harborview Road	Birch Bay Drive to Birch Bay-Lynden Road	Improve roadway to urban principal arterial standards including non-motorized facilities.	No	Yes	$200	High		X	X		
	R-7	Harborview Road	Birch Bay-Lynden Road to Drayton Harbor Road	Improve roadway to major collector standards including non-motorized facilities.	No	Yes	$1,000	Low			X		
	R-8	Portal Way/Dakota Creek Bridge #500	Bridge	Bridge replacement or rehabilitate structure	Yes	Yes	$5,000	Medium		X	X		
	R-9	Commercial area circulation roads	West of Blaine Road (SR 548).	Local circulation urban road(s) as part of future development.	No	No	$6,000	Medium	X			X	To be built by development projects with potential future Birch Bay Town Center.

Project Group	Project ID	Project Name	Project Limits	Project Description	In Existing TIP? [1]	TIF Eligible?	Total Project Cost ($1,000s) Estimated [2]	Relative Priority	Project Justification				Comments
									Capacity	Safety	Road Standards & Preservation	Area Circulation	
MINOR WIDENING AND RECONSTRUCTION PROJECTS	M-1	Birch Bay Drive	Alderson Road to Shintaffer Road	Improve roadway to urban minor arterial standards including non-motorized facilities.	Yes	Yes	$5,000	High		X (urban)	X		
	M-2	Birch Bay Drive	Alderson Road to Point Whitehorn Road	Improve to urban minor arterial standards including non-motorized facilities.	No	Yes	$1,800	Medium		X (urban)	X		
	M-3	Grandview Road	Point Whitehorn Road to Blaine Road	Improve to rural collector road standards with paved shoulders for non-motorized travel.	Yes	No	$3,000	Low			X		
	M-4	Birch Bay-Lynden Road	I-5 to Guide Meridian Road	Improve to rural major collector standards including paved shoulders for non-motorized travel.	No	No	$5,000	Medium			X		Supports Birch Bay Subarea Transportation Plan with non-motorized connection to/from Lynden.
	M-5	Drayton Harbor Road	Harborview Road to Shintaffer Road	Reconstruct, repair road slope and pavement and upgrade roadway.	Yes	No	$1,800	Medium			X		Within Blaine Urban Growth Area. Environmental constraints will affect design standard.
	M-6	Drayton Harbor Road	Harborview Road to Blaine Road	Improve to rural collector standards with shoulders for non-motorized travel.	Yes	Yes	$1,800	Medium		X (urban)			Within Blaine Urban Growth Area.
	M-7	Portal Way	Grandview Road to Birch Bay- Lynden Road	Reconstruct to major collector standards including paved shoulders for non-motorized travel.	No	No	$3,000	Low			X		If pavement is low than Whatcom County usually has a major reconstruction.
	M-8	Portal Way	Birch Bay- Lynden Road to Loomis Trail Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	Yes	$1,200	Medium	X				
	M-9	Portal Way	Loomis Trail Road to Blaine city limit	Reconstruct to major collector standards including paved shoulders for non-motorized travel.	No	No	$1,800	Low			X		
	M-10	Birch Point Road	Semiahmoo Drive to Shintaffer Road	Reconstruct to urban minor arterial standards including non-motorized facilities	No	Yes	$3,000	Low		X (urban)	X		
	M-11	Kickerville Road	Loomis Trail Road to Bay Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	No	$2,400	Low			X		
	M-12	Kickerville Road	Bay Road to Grandview Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	No	$650	Low			X		
	M-13	Jackson Road	Birch Bay Drive to Grandview Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	Yes	$1,200	Low			X		
	M-14	Loomis Trail Road	Blaine Road to Portal Way	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	Yes	$1,200	High	X		X		
	M-15	Semiahmoo Drive	Blaine city limits to Birch Point Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	Yes	$2,000	Low			X		Within Blaine Urban Growth Area.
	M-16	Shintaffer Road	Lincoln Road to Birch Point Road	Reconstruct to urban collector standards including paved shoulders for non-motorized travel.	No	Yes	$600	Low			X		
	M-17	Vista Drive	Bay Road to Grandview Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	Yes	$1,500	Medium	X		X		
	M-18	Bay Road	Blaine Road to Vista Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	Yes	$2,600	Medium	X		X		
	M-19	Alderson Road	Birch Bay Drive to Blaine Road	Reconstruct to urban collector standards including paved shoulders for non-motorized travel.	No	Yes	$600	Medium		X (urban)	X		
	M-20	Anderson Road	Harborview Road to Blaine Road	Reconstruct to urban standards including paved shoulders for non-motorized travel.	No	No	$750	Low		X (urban)			
	M-21	Bay Road	Jackson Road to Blaine Road	Reconstruct to urban standards including paved shoulders for non-motorized travel.	No	No	$750	Low		X (urban)			
	M-22	Point Whitehorn Road	Birch Bay Drive to Grandview Road	Reconstruct to urban standards including paved shoulders for non-motorized travel.	No	No	$400	Low		X (urban)			

Project Group	Project ID	Project Name	Project Limits	Project Description	In Existing TIP? [1]	TIF Eligible?	Total Project Cost ($1,000s) Estimated [2]	Relative Priority	Project Justification				Comments
									Capacity	Safety	Road Standards & Preservation	Area Circulation	
STATE ROUTE PROJECTS	S-1	Blaine Road (SR 548)	Peace Portal Drive to Lincoln Road	Reconstruct and widen to add turn lanes and shoulders/non-motorized facilities at standards (WSDOT standards).	No	No	$6,000	High	X	X (urban)	X		Within Blaine Urban Growth Area.
	S-2	Blaine Road (SR 548)	Lincoln Road to Birch Bay-Lynden Road	Reconstruct and widen to add turn lanes and shoulders/non-motorized facilities at standards (WSDOT standards).	No	No	$5,000	High	X	X (urban)	X		Continuation of Project S-1.
	S-3	Blaine Road (SR 548)	Birch Bay-Lynden Road to Bay Road	Reconstruct and widen to add turn lanes and non-motorized facilities to meet standards (WSDOT standards).	No	No	$7,000	Medium	X	X (urban)	X		Continuation of Project S-2.
	S-4	Blaine Road (SR 548)	Bay Road to Grandview Road	Reconstruct to standards (WSDOT standards)	No	No	$4,000	Medium		X	X		Continuation of Project S-3. Culvert completed for $2.5M.
	S-5	Blaine Road (SR 548) / Drayton Harbor Road	Intersection	Improve/redesign the intersection with turn lanes and install traffic signal when warranted.	No	No	$2,000	High	X	X			Within Blaine Urban Growth Area. Overlay project programmed by WSDOT.
	S-6	Blaine Road (SR 548) / Loomis Trail Road	Intersection	Improve/redesign the intersection with turn lanes and install traffic signal when warranted.	No	No	$2,000	Medium	X	X			
	S-7	Blaine Road (SR 548) / Grandview Road	Intersection	Improve/ redesign the intersection , and install traffic signal with turn lanes when warranted or a roundabout facility	No	No	$2,000	High	X	X			Developer funded.
	S-8	Blaine Road (SR 548) / California Creek Bridge Replacement	Bridge	Bridge replacement or rehabilitate structure	No	No	$6,500	Medium			X		Within Blaine Urban Growth Area.
	S-9	Blaine Road (SR 548) / Dakota Creek Bridge Replacement	Bridge	Bridge replacement or rehabilitate structure	No	No	$13,000	Medium			X		Within City of Blaine (fully WSDOT funded).
	S-11	On and Off ramps of I-5 / Birch Bay-Lynden Road Interchange	Interchange ramps	Improve/ redesign the ramps intersection with turn lanes and install traffic signal when warranted	No	No	$3,400	High	X	X			
	S-12	I-5 / Birch Bay-Lynden Road Interchange	Interchange	Major reconstruction of interchange at Birch Bay-Lynden Road	No	No	N/A	Medium	X				
	S-13	I-5 / Grandview Rd Interchange	Interchange ramps	Improve/ redesign the ramps intersection with turn lanes and install traffic signal, when warranted	No	No	$3,500	Medium	X	X			
	S-14	I-5 / Grandview Road Interchange	Interchange	Reconstruction of interchange at Grandview Road	No	No	N/A	Medium	X				Potential long-term project to widen Grandview Road to add travel lanes to reduce queuing impacts.
	S-15	Birch Bay- Lynden Road / Blaine Road (SR 548)	Intersection	Construct intersection improvements to include roundabout or install turn lanes and traffic signal, when warranted.	Yes	No	$3,000	High	X	X			Potential Whatcom County funding.
	S-16	Grandview Road (SR 548) / Kickerville Road	Intersection	Construct intersection improvements to include roundabout or install turn lanes and traffic signal, when warranted.	No	No	$3,000	Medium	X	X			Potential Whatcom County funding.
	S-17	Grandview Road (SR 548) / Vista Drive	Intersection	Construct intersection improvements to include roundabout or install turn lanes and traffic signal, when warranted.	No	No	$3,000	High	X	X			
OTHER MODE	O-1	Park & Ride Facility	Birch Bay Town Center vicinity	Construct new park & ride lot (or 2 smaller lots) with defined parking stalls capacity to serve Birch Bay, Semiahmoo, and Blaine.	No	No	N/A	Medium	X			X	Whatcom Transit Authority lead. Carry out location and demand study prior to density becomes high. Could be along Harborview Birch Bay-Lynden corridor.
	O-2	Increase Transit Service	Countywide	Increase transit service between Birch Bay and Blaine, Ferndale, and Bellingham.	No	No	N/A	Medium	X			X	Whatcom Transit Authority lead.

Notes:

(1) Project is identified in County's current Transportation Improvement Program or is funded as part of State's Transportation Plan

(2) Represents planning level project cost estimates. Project costs will be refined during the project design phase.

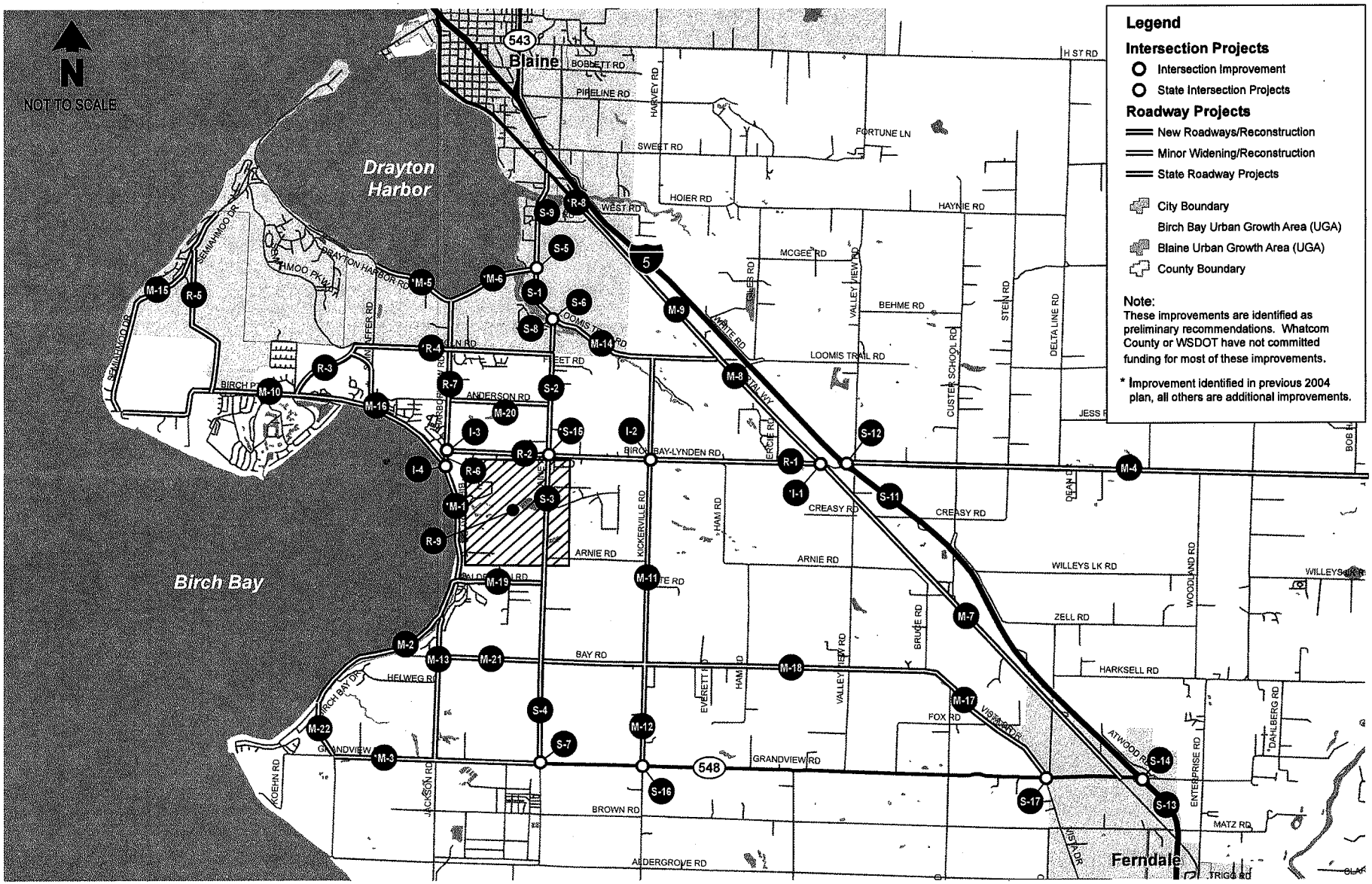

Figure 11-7

Birch Bay Study AreaTransportation Improvement Projects

Birch Bay Community Plan

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Improvements to the I-5/Birch Bay-Lynden Road interchange (projects S-11, S-12) are identified in the Plan as high and medium priorities respectively. Improvements to this interchange have been identified to meet near and long term needs. Project S-11 will improve operations in the near term by redesigning the ramp intersections with turn lanes and installing a traffic signal, when future traffic volumes warrant. Project S-12 will provide a complete reconstruction of the interchange.

Improvements to the I-5/Grandview interchange (projects S-13, S-14) are also identified for the near and long term needs. Similar to project S-11, project S-13 is a high priority and is identified to improve operations at the ramp intersections by adding turn lanes and installing a traffic signal when future traffic volumes warrant. Project S-14 is a medium priority and will provide a complete interchange reconstruction to meet long-range forecast needs.

Blaine Road (SR 548) – Improvements are identified for Blaine Road both north and south of Birch Bay-Lynden Road. North of Birch Bay-Lynden Road, the Plan calls for reconstructing Blaine Road, from I-5 to Birch Bay-Lynden Road (projects S-1, S-2). The improvement projects would add shoulders for n on-motorized travel. Intersection improvements are identified at Drayton Harbor Road and Loomis Trail Road (projects S-5, S-6). These improvements include adding turn lanes and traffic signals or roundabouts when future traffic volumes warrant. The Plan also identifies the replacement of two bridges in this corridor, the California Creek bridge and the Dakota Creek bridge (projects S-8, S-9).

South of Birch Bay-Lynden Road, the Plan identifies reconstructing Blaine Road from Birch Bay-Lynden Road to Grandview Road (projects S-3, S-4). The section of Blaine Road north of Bay Road is within the Urban Growth Area for Birch Bay and as such would be reconstructed to WSDOT's standards, adding shoulders for non-motorized travel. South of Bay Road, Blaine Road should be constructed per WSDOT's rural collector standards. Intersections improvements at Birch Bay-Lynden Road and Grandview Road are also identified in the Plan (projects S-15, S-7). A potential roundabout at the Blaine Road (SR 548)/Grandview Road (SR 548) intersection is currently being discussed by WSDOT as part of a developer funded improvement. Though the transportation planning study does not identify the intersection of Blaine Road and Alderson Road as falling below LOS standards within the study period, planned intensive land uses at that intersection may require intersection improvements as mitigation under SEPA at the time of development.

Grandview Road (SR 548) – Two intersection improvements, in addition to those identified at the I-5 interchange and at Blaine Road (SR 548), are identified in the Plan. Improvements to the intersections of Grandview Road (SR 548) at Kickerville Road and at Vista Drive include the installation of turn lanes and roundabout or traffic signal when future traffic volumes warrant. The improvement at Vista Drive/Grandview Road (SR 548) is a high priority because it serves traffic to/from the Birch Bay UGA to I-5 via Bay Road.

However, the HSP does identify I-5 from Grandview Road to the City of Blaine as a "solution that requires further analysis" as the existing capacity will not be sufficient for future traffic volumes.

Intersection Projects. Improvements to intersections along County maintained arterials serving the Birch Bay subarea are needed to resolve existing and future deficiencies, primarily along Birch Bay-Lynden Road. This roadway serves as the main east-west arterial, connecting the Birch Bay subarea to I-5 and the rest of the region. Intersection improvements along this corridor will improve safety and operations by adding turn lanes at key locations and installing traffic signals or roundabouts when future traffic volumes warrant. The Plan identifies three high priority intersection improvements at Birch Bay-Lynden Road at Portal Way, Birch Bay-Lynden Road at Harborview Road, and Birch Bay Drive at Harborview Road.

New Roadways and Major Widening or Reconstruction Projects. Several new roadways and major widening projects are identified in the Plan to address existing deficiencies and support future growth. This category of projects includes upgrading and major widening of roadways to County standards to provide turn lanes at major access locations. Improvements to non-motorized facilities, such as roadway shoulders, are also identified.

Birch Bay-Lynden Road Widening – Birch Bay-Lynden Road serves as the primary east-west arterial, connecting Birch Bay to I-5. In addition to the intersection improvements identified above, the Plan calls for widening the roadway to meet rural major collector standards from Portal Way to the UGA boundary just east of Blaine Road (SR 548) and to urban principal arterial standards west to Harborview Road. These projects would improve facilities for non-motorized travel by paving roadway shoulders and/or adding sidewalks or separated pathways. In addition, the project would include widening to accommodate turn lanes at major access locations. This will allow safer and easier access for left turning vehicles along Birch Bay-Lynden Road.

Lincoln Road Extension and Improvement – To complete an alternative east-west corridor north of Birch-Bay Lynden Road, an extension of Lincoln Road between Harborview Road and Blaine Road (SR 548) is planned. In addition to extending the roadway, the project will improve Lincoln Road from Shintaffer Road to Blaine Road (SR 548) to urban minor arterial standards, including construction of two roundabouts at Harborview Road and Blaine Road. The project also includes a separated pathway for non-motorized travel.

Birch Point Connector Road – A new connection between Birch Bay Drive and Lincoln Road is also a key new collector route serving the northern part of the Birch Bay UGA. When fully constructed, this new roadway will provide improved mobility and an alternative to Birch Bay Drive for east-west traffic to/from the residential growth anticipated in the Birch Bay and Blaine UGAs. The project includes realigning the segment of Shintaffer Road south of Lincoln Road, and constructing a new intersection at Lincoln Road. Part of the road would be funded and constructed by a developer. The remaining section will be a County project.

Harborview Road – Improvements are identified for Harborview Road from Birch Bay Drive to Drayton Harbor Road. The section of Harborview Road from Birch Bay Drive to Birch Bay-Lynden Road would be improved to reflect the existing and future demands of Birch Bay traffic traveling to I-5 via Birch Bay-Lynden Road. The section of Harborview Road from Birch Bay-Lynden Road to Drayton Harbor Road would be improved to urban collector standards. Both of these projects would include improved facilities for non-motorized travel.

Commercial Area Circulation Roads. In addition to specific improvements identified above, the Plan calls for construction of new circulation roads within the planned Birch Bay UGA commercial area between Birch Bay-Lynden Road and Alderson Road. These new roadways would provide improved access and circulations to future development anticipated for this area, as well as help maintain safety and operations of adjacent arterials, collectors, and state highways.

Minor Widening and Reconstruction Projects.

Improvements are also needed on other roadways serving the Birch Bay subarea. This category of projects includes minor widening of roadways to add shoulders and improve non-motorized facilities.

Birch Bay Drive – With its proximity to the waterfront, Birch Bay Drive serves as a primary non-motorized route within the Birch Bay UGA.

The Birch Bay Drive Pedestrian Facility, part of the Birch Bay Shoreline Enhancement Project, is designed and identified in the county's six-year Transportation Improvement Program. This project would improve the Birch Bay Drive roadway and provide separate facilities for pedestrians and bicyclists. The 2000 Birch Bay Economic Development Action Plan emphasized the need for improved pedestrian and bicycle facilities along Birch Bay Drive as part of the community's economic development strategy. A year round speed limit of 20 to 25 mph is recommended. Specific changes to speed limit should be considered with community input.

Loomis Trail Road – Loomis Trail Road serves as an east-west connector between Portal Way and Blaine Road, northeast of the Birch Bay UGA. The Plan identifies improvements to reconstruct Loomis Trail Road to rural major collector standards. The project includes paved shoulders for non-motorized users.

Maintenance and Operations Programs. A systematic program for maintaining the existing and future transportation infrastructure is critical to a safe and efficient transportation system. Elements of a maintenance and operations program for the Birch Bay subarea should include a systematic evaluation of pavement conditions on arterial and local roadways, signage, sight distance (such as vegetation blocking sight lines), and impacts of parking on safety and operations. Other elements should include regular monitoring and servicing of traffic control devices, such as traffic signals and flashing beacons.

In addition, the maintenance and operations program should include a periodic evaluation of speed limits on facilities based on functional classification, design, and current roadway conditions. The speed evaluation should consider elements such as geometric design, actual travel speeds, intersection control, traffic safety, and possible impacts on adjacent corridors or neighborhood streets.

Chapter 2

SUMMARY
BIRCH BAY COMMUNITY PLAN

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Transportation

Proposed Transportation Plan. The transportation systems plan proposed in the Birch Bay Transportation Planning Study provides a long-range strategy for the Birch Bay UGA to address current and forecast transportation issues and needs. Transportation system improvements are required to accommodate the projected growth in population and employment within the Birch Bay UGA. The transportation systems plan is based upon analyses of the existing transportation system, forecasts of future travel demands, anticipated availability of funding resources, and the desire of the Birch Bay community to create an efficient transportation system that puts a priority on community livability. The Plan builds on the countywide policies and standards, while shaping transportation goals and vision for the Birch Bay subarea.

The transportation systems plan primarily focuses on streets and highway improvements because they serve most of the travel needs for the subarea. The streets and highways serve general traffic, freight, transit, ridesharing, pedestrians, and bicyclists. Therefore, the Plan also provides the framework for other travel modes in the community, including pedestrian, bicycle, and transit modes.

Transportation Improvement Projects. Based on an evaluation of existing and forecast traffic volumes, traffic operations, safety, and circulation needs, a recommended list of transportation improvement projects and programs were defined. These projects are shown on Figure 11-7 and listed in Table 11-3.

State Route Projects. I-5 provides the primary regional connection to the Birch Bay subarea. To the north, I-5 connects the Birch Bay subarea to the U.S./Canada border. To the south, I-5 connects to Bellingham and the central Puget Sound region. SR 548 also provides for regional travel from the Birch Bay subarea to I-5 from the north and east. The Washington State Highways Systems Plan (HSP) is the element of Washington's Transportation Plan that addresses the states highway system. The 2007-2026 HSP does not identify specific improvements within the Birch Bay subarea. The HSP calls for an Interstate Master Plan that would identify improvements to optimize capacity and safety on the interstate highway system.

Improvements to the I-5/Birch Bay-Lynden Road interchange (projects S-11, S-12) are identified in the Plan as high and medium priorities respectively. Improvements to this interchange have been identified to meet near and long term needs. Project S-11 will improve operations in the near term by redesigning the ramp intersections with turn lanes and installing a traffic signal, when future traffic volumes warrant. Project S-12 will provide a complete reconstruction of the interchange.

Improvements to the I-5/Grandview interchange (projects S-13, S-14) are also identified for the near and long term needs. Similar to project S-11, project S-13 is a high priority and is identified to improve operations at the ramp intersections by adding turn lanes and installing a traffic signal when future traffic volumes warrant. Project S-14 is a medium priority and will provide a complete interchange reconstruction to meet long-range forecast needs.

Blaine Road (SR 548) – Improvements are identified for Blaine Road both north and south of Birch Bay-Lynden Road. North of Birch Bay-Lynden Road, the Plan calls for reconstructing Blaine Road, from I-5 to Birch Bay-Lynden Road (projects S-1, S-2). The improvement projects would add shoulders for non-motorized travel. Intersection improvements are identified at Drayton Harbor Road and Loomis Trail Road (projects S-5, S-6). These improvements include adding turn lanes and traffic signals or roundabouts when future traffic volumes warrant. The Plan also identifies the replacement of two bridges in this corridor, the California Creek bridge and the Dakota Creek bridge (projects S-8, S-9).

South of Birch Bay-Lynden Road, the Plan identifies reconstructing Blaine Road from Birch Bay-Lynden Road to Grandview Road (projects S-3, S-4). The section of Blaine Road north of Bay Road is within the Urban Growth Area for Birch Bay and as such would be reconstructed to WSDOT's standards, adding shoulders for non-motorized travel. South of Bay Road, Blaine Road should be constructed per WSDOT's rural collector standards. Intersections improvements at Birch Bay-Lynden Road and Grandview Road are also identified in the Plan (projects S-15, S-7). A potential roundabout at the Blaine Road (SR 548)/Grandview Road (SR 548) intersection is currently being discussed by WSDOT as part of a developer funded improvement. Though the transportation planning study does not identify the intersection of Blaine Road and Alderson Road as falling below LOS standards within the study period, planned intensive land uses at that intersection may require intersection improvements as mitigation under SEPA at the time of development.

Grandview Road (SR 548) – Two intersection improvements, in addition to those identified at the I-5 interchange and at Blaine Road (SR 548), are identified in the Plan. Improvements to the intersections of Grandview Road (SR 548) at Kickerville Road and at Vista Drive include the installation of turn lanes and roundabout or traffic signal when future traffic volumes warrant. The improvement at Vista Drive/Grandview Road (SR 548) is a high priority because it serves traffic to/from the Birch Bay UGA to I-5 via Bay Road.

However, the HSP does identify I-5 from Grandview Road to the City of Blaine as a "solution that requires further analysis" as the existing capacity will not be sufficient for future traffic volumes.

Intersection Projects. Improvements to intersections along County maintained arterials serving the Birch Bay subarea are needed to resolve existing and future deficiencies, primarily along Birch Bay-Lynden Road. This roadway serves as the main east-west arterial, connecting the Birch Bay subarea to I-5 and the rest of the region. Intersection improvements along this corridor will improve safety and operations by adding turn lanes at key locations and installing traffic signals or roundabouts when future traffic volumes warrant. The Plan identifies three high priority intersection improvements at Birch Bay-Lynden Road at Portal Way, Birch Bay-Lynden Road at Harborview Road, and Birch Bay Drive at Harborview Road.

New Roadways and Major Widening or Reconstruction Projects. Several new roadways and major widening projects are identified in the Plan to address existing deficiencies and support future growth. This category of projects includes upgrading and major widening of roadways to County standards to provide turn lanes at major access locations. Improvements to non-motorized facilities, such as roadway shoulders, are also identified.

Birch Bay-Lynden Road Widening – Birch Bay-Lynden Road serves as the primary east-west arterial, connecting Birch Bay to I-5. In addition to the intersection improvements identified above, the Plan calls for widening the roadway to meet rural major collector standards from Portal Way to the UGA boundary just east of Blaine Road (SR 548) and to urban principal arterial standards west to Harborview Road. These projects would improve facilities for non-motorized travel by paving roadway shoulders and/or adding sidewalks or separated pathways. In addition, the project would include widening to accommodate turn lanes at major access locations. This will allow safer and easier access for left turning vehicles along Birch Bay-Lynden Road.

Lincoln Road Extension and Improvement – To complete an alternative east-west corridor north of Birch-Bay Lynden Road, an extension of Lincoln Road between Harborview Road and Blaine Road (SR 548) is planned. In addition to extending the roadway, the project will improve Lincoln Road from Shintaffer Road to Blaine Road (SR 548) to urban minor arterial standards, including construction of two roundabouts at Harborview Road and Blaine Road. The project also includes a separated pathway for non-motorized travel.

Birch Point Connector Road – A new connection between Birch Bay Drive and Lincoln Road is also a key new collector route serving the northern part of the Birch Bay UGA. When fully constructed, this new roadway will provide improved mobility and an alternative to Birch Bay Drive for east-west traffic to/from the residential growth anticipated in the Birch Bay and Blaine UGAs. The project includes realigning the segment of Shintaffer Road south of Lincoln Road, and constructing a new intersection at

Lincoln Road. Part of the road would be funded and constructed by a developer. The remaining section will be a County project.

Harborview Road – Improvements are identified for Harborview Road from Birch Bay Drive to Drayton Harbor Road. The section of Harborview Road from Birch Bay Drive to Birch Bay-Lynden Road would be improved to reflect the existing and future demands of Birch Bay traffic traveling to I-5 via Birch Bay-Lynden Road. The section of Harborview Road from Birch Bay-Lynden Road to Drayton Harbor Road would be improved to urban collector standards. Both of these projects would include improved facilities for non-motorized travel.

Commercial Area Circulation Roads. In addition to specific improvements identified above, the Plan calls for construction of new circulation roads within the planned Birch Bay UGA commercial area between Birch Bay-Lynden Road and Alderson Road. These new roadways would provide improved access and circulations to future development anticipated for this area, as well as help maintain safety and operations of adjacent arterials, collectors, and state highways.

Minor Widening and Reconstruction Projects. Improvements are also needed on other roadways serving the Birch Bay subarea. This category of projects includes minor widening of roadways to add shoulders and improve non-motorized facilities.

Birch Bay Drive – With its proximity to the waterfront, Birch Bay Drive serves as a primary non-motorized route within the Birch Bay UGA. The Birch Bay Drive Pedestrian Facility, part of the Birch Bay Shoreline Enhancement Project, is designed and identified in the county's six-year Transportation Improvement Program. This project would improve the Birch Bay Drive roadway and provide separate facilities for pedestrians and bicyclists. The 2000 Birch Bay Economic Development Action Plan emphasized the need for improved pedestrian and bicycle facilities along Birch Bay Drive as part of the community's economic development strategy. A year round speed limit of 20 to 25 mph is recommended. Specific changes to speed limit should be considered with community input.

Loomis Trail Road – Loomis Trail Road serves as an east-west connector between Portal Way and Blaine Road, northeast of the Birch Bay UGA. The Plan identifies improvements to reconstruct Loomis Trail Road to rural major collector standards. The project includes paved shoulders for non-motorized users.

Maintenance and Operations Programs. A systematic program for maintaining the existing and future transportation infrastructure is critical to a safe and efficient transportation system. Elements of a maintenance and operations program for the Birch Bay subarea should include a systematic evaluation of pavement conditions on

arterial and local roadways, signage, sight distance (such as vegetation blocking sight lines), and impacts of parking on safety and operations. Other elements should include regular monitoring and servicing of traffic control devices, such as traffic signals and flashing beacons.

In addition, the maintenance and operations program should include a periodic evaluation of speed limits on facilities based on functional classification, design, and current roadway conditions. The speed evaluation should consider elements such as geometric design, actual travel speeds, intersection control, traffic safety, and possible impacts on adjacent corridors or neighborhood streets.

• • • • •

BIRCH BAY COMMUNITY PLAN – APPENDIX A

BIRCH BAY TRANSPORTATION PLANNING STUDY

Prepared for:

Whatcom County

January 2009

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Table of Contents

Table of Contents (Continued)

Figures

Tables

Introduction

The Birch Bay area of Whatcom County is located in the northwest corner of Washington State, approximately 21 miles from the county seat of Bellingham and approximately 6 miles south of the Canadian border. Birch Bay is not an incorporated city, and its Urban Growth Area (UGA) remains under the jurisdiction of Whatcom County. The Birch Bay UGA is directly adjacent to the City of Blaine and its UGA. The Birch Bay UGA is centered on Birch Bay, a half-moon shaped bay off of the northern Puget Sound. The UGA extends south toward Grandview Road and north to the Blaine city limits and the city's UGA along Lincoln Road. The easternmost edge of the Birch Bay UGA lies just west of Kickerville Road. Interstate 5 (I-5) runs about 2.5 miles west of the UGA boundary. Blaine Road, also known as SR 548, is a state highway that runs north-south through Birch Bay. The Birch Bay area is illustrated in Figure 1.

The 2000 U.S. Census reported that the population in the Birch Bay Census Designated Place (CDP) is 4,960 people, and the population of the City of Blaine was 3,770 people. Each of these population estimates was notably larger than was reported in the 1990 U.S. Census: when the Birch Bay area had 2,656 people and the City of Blaine had a population of 2,489. Between 1990 and 2000 the Birch Bay population grew by almost 90 percent and the City of Blaine grew by over 50 percent.

Another significant Birch Bay fact reported in the 2000 U.S. Census was that over 50 percent of the housing units were for seasonal, recreational, or occasional use.[1] This statistic is an indicator of a community in which there are more housing units than the population estimates would suggest are necessary.

Purpose

The Birch Bay Transportation Planning Study provides a link between Whatcom County's Comprehensive Plan, the Birch Bay Community Plan, and the transportation facilities and services needed to support growth over the next 20 years. The Transportation Planning Study focuses on safety, capacity, and operational improvements on state highways, arterials, and collectors serving the Birch Bay area. The Planning Study also identifies pedestrian, bicycle, and transit programs to help meet the overall transportation needs of the community.

The Transportation Planning Study is a key component to the Birch Bay Community Plan. It provides the County and the Birch Bay community with a guide for transportation system improvements to meet existing and future travel needs. It also integrates the community's priorities for transportation improvements with those of Whatcom County and the Washington State Department of Transportation (WSDOT).

[1] U.S. Census Bureau, Census 2000 Summary File 1, Matrices P1, P3, P4, P8, P9, P12, P13, P,17, P18, P19, P20, P23, P27, P28, P33, PCT5, PCT8, PCT11, PCT15, H1, H3, H4, H5, H11, and H12.

Planning Study Organization

The Transportation Planning Study was developed in a series of tasks to meet the requirements of the GMA. The Planning Study is organized as follows:

- Goals and Policies
- Existing Transportation System Inventory
- Travel Forecasts
- Transportation Systems Plan
- Financial Plan and Implementation Strategies

Study Area

The Study Area for the Transportation Planning Study includes the Birch Bay UGA, the Blaine UGA, portions of the City of Blaine, and adjacent unincorporated Whatcom County. This area comprises approximately 40 square miles. The Birch Bay UGA has been defined by Whatcom County, and the Blaine UGA has been defined by both the County and the City of Blaine. Figure 1 shows the study area for the 2008 Birch Bay Transportation Planning Study.

As noted above, the Study Area extends beyond the Birch Bay UGA boundary. This larger area accounts for the transportation system serving the Birch Bay UGA, extending to I-5 and to the City of Blaine and its UGA.

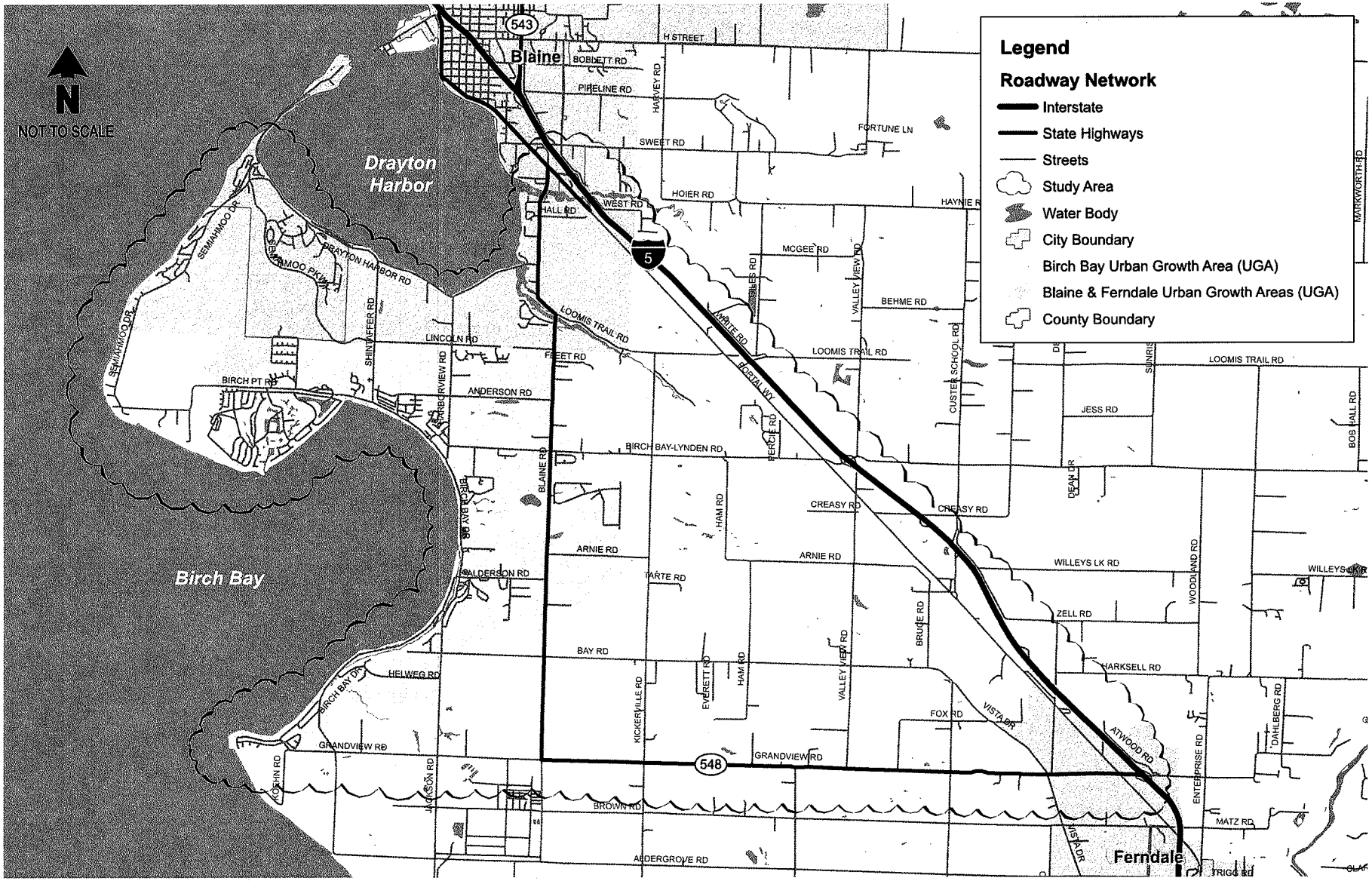

Figure 1
Study Area

Birch Bay Transportation Planning Study

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Public Participation Process

Public participation is a key element of the planning process. Whatcom County developed an outreach strategy to gather input from stakeholders, interested parties, neighboring agencies, and the public on the study. The strategy involved several components to obtain input from members of the community, both at key decision points and throughout the planning process. The goal of the outreach process was to develop a planning study that reflects the priorities of the community.

The public participation process used multiple methods for engaging the community including the following components:

- Open houses
- Project Web page
- Brochure
- Traveling display

Two open houses were held to inform the community about the Study effort, including the purpose of the Transportation Planning Study, and the reasons for updating the Community Plan. Figure 2 illustrates the linear progression of the planning study process.

The first open house, held in June 2007, provided an opportunity for the public to view the results of the existing conditions analysis, provide feedback on their transportation concerns, and learn more about the potential types of improvements that may be considered in Birch Bay. The comments received helped guide the County as it moved forward with developing a list of proposed transportation improvement projects to address these issues.

The second open house occurred in December 2007. Attendees were able to learn about the future condition of the transportation system in Birch Bay, given the expected changes in land use and population growth. Potential improvement projects that may be used to address transportation issues were also presented at this meeting. Appendix A provides summaries of the two open houses including comments received.

In addition to the two open house events, Whatcom County also hosted a project Web page about the Study, to provide up-to-date project information to a wide audience. The Web page included details about upcoming public events, team contact information, and the project timeline.

Whatcom County also developed and circulated a brochure and traveling display about the Study at locations throughout the Birch Bay and Blaine communities in order to reach those that were unable to attend an open house event, or who do not have internet access. The display and brochure provided information about the potential improvement projects that are being considered for the Birch Bay area, and ways to make a comment or get involved with the Study process.

As a result of these outreach efforts, five primary themes were identified, based on the following community feedback (public participation summaries found in Appendix A):

- East-west connections and access to Interstate-5 should be improved to support traffic circulation and provide for more reliable emergency vehicle access and evacuation routes.

- Speed limits on Birch Bay Drive should be maintained at 20-25 miles per hour year-round, not just during seasonal times.
- Existing roads should be widened to provide for adequate shoulders to improve safety for non-motorized users and allow for a safe place to pull off the road in an emergency without blocking traffic.
- A network of safe bicycle and pedestrian paths to encourage non-motorized travel throughout the Birch Bay community should be incorporated into the Study, along with road improvements.
- The public transportation network should be improved to serve a broader area and increased frequency is also desired.

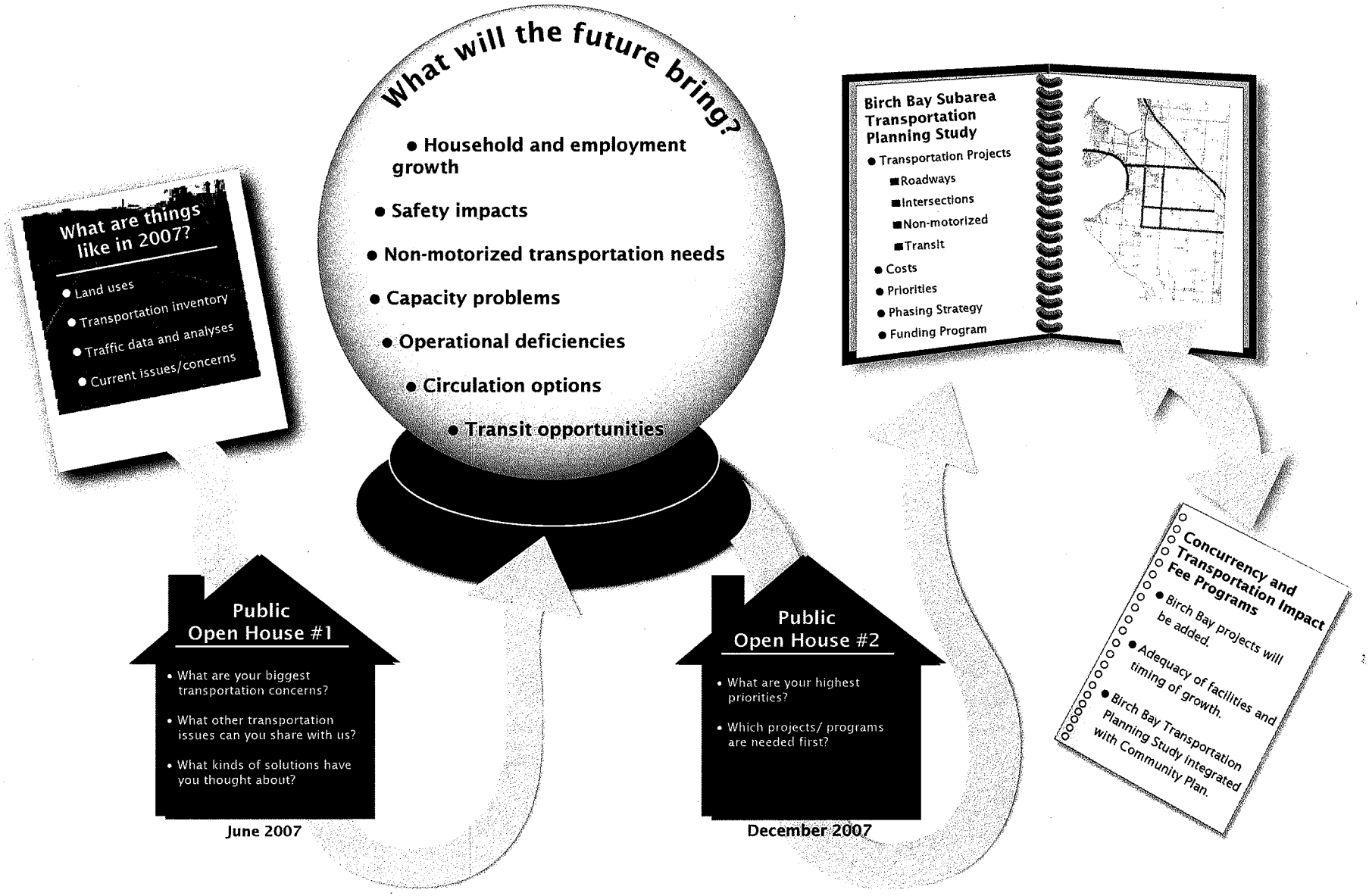

Figure 2
Plan Background and Process

Birch Bay Transportation Planning Study

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Existing Transportation System Inventory

The transportation system in and around the Birch Bay area consists of various transportation facilities, including state highways, collector routes, local streets, transit services, and pedestrian and bicycle facilities. Information on existing facilities was assembled from various sources. The inventory covers the street system, traffic controls, traffic volumes, traffic operations, traffic safety, transit service, and non-motorized facilities.

Roadway System and Traffic Controls

Street Inventory

The following summarizes the existing conditions of roadways serving Birch Bay and surrounding area as of March 2008.

State Highways

Interstate 5 (I-5) is the north-south interstate freeway serving Washington State. It connects to Canada within the City of Blaine. I-5 is classified as a Highway of Statewide Significance (HSS). Within Birch Bay, I-5 runs diagonally from the northwest (in Blaine) to the southeast near the City of Ferndale. I-5 has four travel lanes within the study area and a posted speed limit of 70 mph. Interchanges within the study area are located at Grandview Road (SR 548) and Birch Bay-Lynden Road. An interchange also serves the Birch Bay area at exit 274 in the south part of the City of Blaine.

SR 548 is a state Highway of Regional Significance (HRS) within the Birch Bay Area. It is comprised of two segments – Blaine Road and Grandview Road.

> **Blaine Road (SR 548)** serves major north-south travel flows between the City of Blaine and the industrial areas south of Grandview Road. At its north end it connects with Interstate 5 at an interchange in the south part of the City of Blaine (exit 274). It has two travel lanes and a posted speed limit of 45 mph. The roadway has several small hills due to the rolling terrain. Its lanes are relatively narrow and there is little or no shoulder area.
>
> **Grandview Road (SR 548)** serves as SR 548 east of Blaine Road. It is an east-west, two-lane roadway which connects the south part of the Birch Bay Urban Growth Area with an interchange with Interstate 5 and with an alternative route to Ferndale and Bellingham via Kickerville Road. The lanes are typically between 10 feet and 12 feet wide, and the posted speed limit is 50 mph. Grandview Road has wider shoulders as compared to other roadways in the study area.

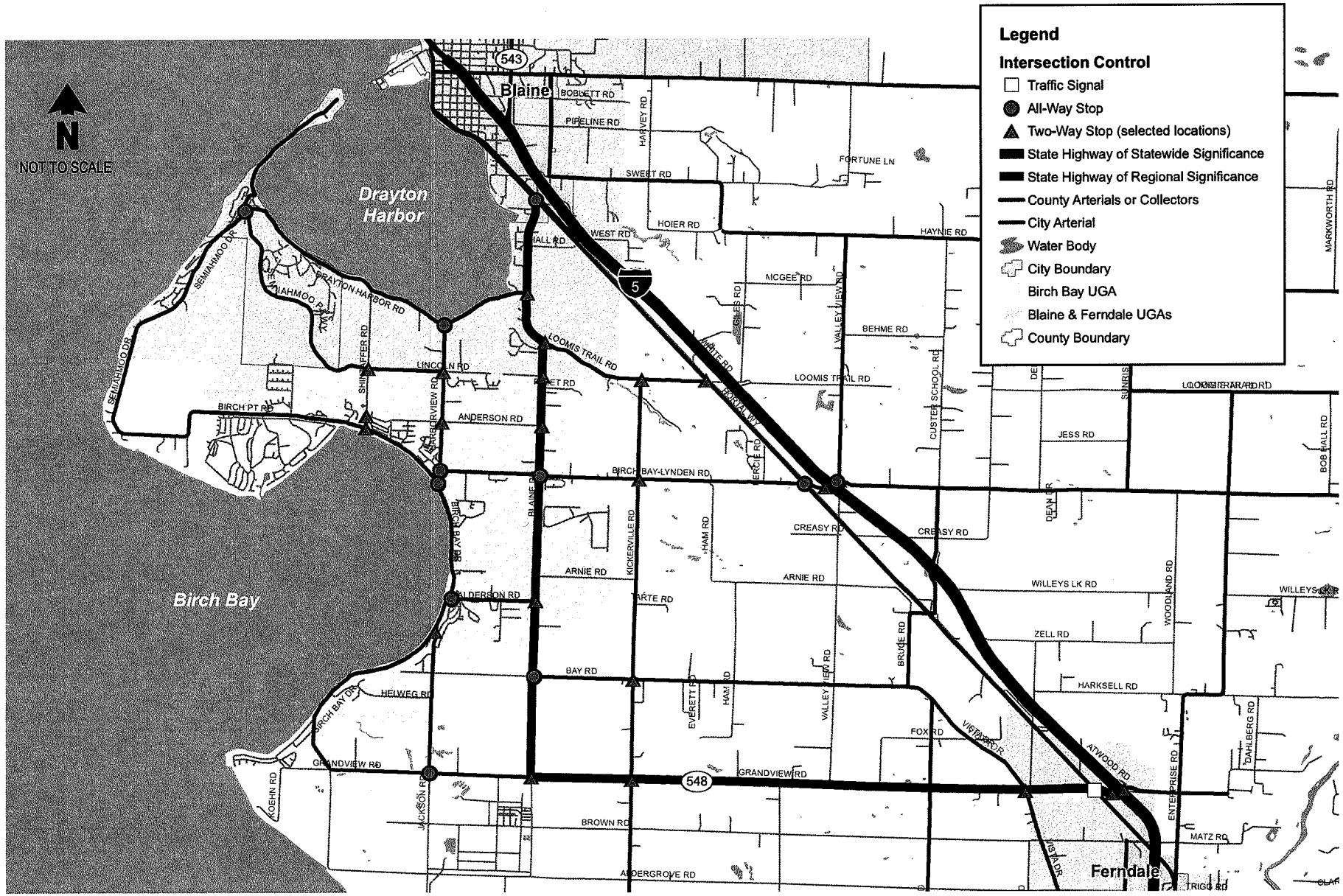

Figure 3
Existing Roadway System & Traffic Controls

Birch Bay Transportation Planning Study

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County Arterials and Collectors

Birch Bay-Lynden Road is the primary east-west road, connecting Birch Bay with I-5. It has two lanes between ten and thirteen feet wide. Generally the minor side streets are stop controlled. However, major streets (Harborview Road, Blaine Road, Portal Way, east I-5 ramps) are all-way stop controlled. Some sections of the roadway have paved shoulders, between three and seven feet in width. There are also nine foot wide gravel shoulders along some sections, while other portions of the roadway have little or no shoulders. The posted speed limit along this road is 50 mph between Blaine Road (SR 548) and I-5. To the west the road connects to Harborview Road and to the east to Guide Meridian Road (SR 539). West of Blaine Road the posted speed limit is 40 mph.

Birch Bay Drive is a two lane rural major collector that ties in to Point Whitehorn Road to the south and to Birch Point Road to the north. It provides connections to the Birch Bay Village and Semiahmoo areas. All-way stop signs control traffic flows at major street crossings. The roadway typically has ten foot lanes and four foot wide paved shoulders. The posted speed limit is 20 mph between May 5 and September 15 and 35 mph the remainder of the year. It provides access to developments and activities along the Birch Bay waterfront. Birch Bay Drive experiences significant pedestrian use due to its proximity to the waterfront and the adjacent commercial businesses. The 2000 Birch Bay Economic Development Action Plan emphasized the need for improved pedestrian and bicycle facilities along Birch Bay Drive as part of the community's economic development strategy.

Birch Point Road is a major collector that connects to Semiahmoo Drive to the west and Shintaffer Road to the east. It serves as an extension of Birch Bay Drive and provides connections to and from the Birch Bay Village development. The roadway has two travel lanes. Lane widths are typically 10 to 11 feet in width; a section of the road near Birch Bay Village has narrower travel lanes. Some portions of the roadway have gravel shoulders, ranging between three feet and eight feet wide, and the other portions have paved shoulders ranging between four and six feet wide. The posted speed limit is 30 mph and 45 mph.

Semiahmoo Drive links Birch Point Road to the south and Drayton Harbor Road and Semiahmoo Parkway to the north. It is a two lane collector with travel lanes typically 10 feet wide. The posted speed limit is 45 mph.

Lincoln Road is a two lane collector that connects to the west with Semiahmoo Parkway and to the east with Harborview Road. Lincoln Road has a missing segment between Harborview Road and Blaine Road. Travel lanes (combined with paved shoulders) along this road range between nine and seventeen feet in width. There is not striped delineation between the travel lanes and paved shoulders. The posted speed limit is 35 mph. Along most sections of the roadway there no shoulders, with a small section between the Blaine City Limits and Shintaffer Road having gravel shoulders. Lincoln Road forms the boundary between the Blaine and Birch Bay UGAs.

Shintaffer Road is classified as a major collector between Birch Bay Drive and Lincoln Road in the Birch Bay UGA; north of Lincoln Road, in the Blaine UGA, it is classified as a local street. It has two lanes of travel ranging between nine and thirteen feet in width. There are narrow gravel shoulders (1 to 2 feet wide) on both sides, about one to two feet wide. The posted speed limit on this roadway is 35 mph. It connects Drayton Harbor Road to the north with Birch Bay Drive to the south.

Harborview Road is a two lane major collector roadway with eleven foot lanes along the majority of the roadway and seventeen foot lanes (combined with paved shoulders) near Drayton Harbor Road. There is not striped delineation between the travel lanes and paved shoulders. Along sections of the roadway there are paved shoulders up to five feet in width. There are also gravel shoulders along other sections ranging between four and six feet wide, while other portions of the roadway have no shoulders. To the north it connects with Drayton Harbor Road and to the south it connects to Birch Bay Drive. The posted speed limit along this road is 40 mph.

Drayton Harbor Road is classified as a city arterial within the Blaine city limits, as a rural minor collector between the Blaine city limits and Harborview Road, and as a rural major collector from Harborview Road to Blaine Road (SR 548). It has two travel lanes between ten and eleven feet wide with primarily unpaved gravel shoulders ranging between three and six feet wide. The speed limit is 25 mph west of Harborview Road and 45 mph between Harborview Road and Blaine Road.

Grandview Road (west of Blaine Road (SR 548)) is a two lane roadway with ten to twelve foot wide travel lanes. There are gravel shoulders on both sides, ranging between three and eight feet in width. It connects to Point Whitehorn Road and local development west of Blaine Road, then to I-5 via SR 548 (Grandview Road). The posted speed limit along this road is 35 mph.

Point Whitehorn Road has two lanes of travel that are approximately ten feet in width. Three-foot wide gravel shoulders are on both sides of the roadway and the posted speed limit is 35 mph. This street connects Birch Bay Drive to the north with Grandview Road to the south.

Kickerville Road is a two lane roadway with travel lanes that vary between ten and eleven feet wide. Generally the road has five foot gravel shoulders on both sides. To the north it connects with Loomis Trail Road and to the south it connects to Bay Road. Kickerville Road continues on as a major collector to Rainbow Road. The posted speed limit along this road is 35 mph north of Grandview Road and 45 mph south of Grandview.

Bay Road is classified as a major collector between Kickerville Road and Blaine Road and a minor collector between Kickerville Road and Vista Drive. This roadway has two lanes of travel ranging between eight and eleven feet in width. Most of the shoulders are gravel and range from two feet to five feet in width. The section of road west of Jackson Road (which is currently classified as a local street) has three-foot wide paved shoulders. The posted speed limit on this roadway is 35 mph west of Blaine Road, 50 mph between Blaine Road and Valley View Road, and 45 mph east of Valley View. It connects Blaine Road (SR 548) to the west with Vista Drive and Bruce Road to the east.

Jackson Road is a collector that has two lanes of travel ranging between nine and fifteen feet in width. Some portions of the roadway have gravel shoulders, ranging between two and three feet in width, and the other portions have paved shoulders ranging between four and seven feet wide. The posted speed limit on this roadway is 40 mph north of Grandview Road and 35 mph south of Grandview. It connects Birch Bay Drive to the north with Grandview Road and Henry Road to the south.

Alderson Road is a two lane rural minor collector with eleven foot lanes and a posted speed limit of 35 mph. Along most sections of the roadway there are paved four-foot shoulders, with a small section near Birch Bay Drive having little to no shoulders. To the east it

connects with the Blaine Road (SR 548) and to the west it connects to Birch Bay Drive. It provides local east-west connectivity in the center part of the Birch Bay UGA.

Loomis Trail Road is a two-lane collector. It connects Blaine Road (SR 548) with Portal Way. It has 10 to 11 foot travel lanes and shoulders ranging in width from 0 to 6 feet. Its posted speed limit is 35 mph.

Vista Drive serves as an extension of Bay Road between Bruce Road and Grandview Road. It has limited gravel shoulders and a posted speed limit of 45 mph.

Other rural minor collectors in the study area include **Olson Road** and **Bruce Road/Custer School Road**.

Local Access Roads

The remaining routes are local access roads. These streets serve local abutting land uses and neighborhood traffic. They provide access between residential or business areas and the arterials. They generally have two travel lanes and 25-mph speed limits.

Traffic Volumes

Daily and PM peak hour traffic volumes were collected from a variety of sources including Whatcom County, Washington State Department of Transportation (WSDOT), and Whatcom Council of Governments (WCOG). These traffic volumes were supplemented with existing PM peak hour turning movement counts conducted for the study update in 2006 and 2007. The existing PM peak hour volumes are shown in Figure 4.

North-South Roadways

I-5 is a north-south roadway with high PM peak hour volumes, particularly in the Birch Bay Area. According to WSDOT, weekday PM peak hour volumes (in both directions) range from approximately 2,200 to 2,700 vehicles per hour (vph). Northbound traffic accounts for approximately 50 to 70 percent of the traffic on I-5 during the PM peak hour. Northbound volumes during the PM peak hour are approximately 1,400 vph.

Blaine Road (SR 548) is another north-south roadway with relatively significant PM peak hour volumes. A primary reason for the high volumes is that Blaine Road connects to I-5 and to the City of Blaine. The northern portion of Blaine Road between Birch Bay-Lynden Road and Drayton Harbor Road has a two-way PM peak hour traffic volume of 245 vph. North of Drayton Harbor Road the volumes increase to 635 vph showing the influence of travel from the Semiahmoo area of the City of Blaine. The southern portion of Blaine Road has a PM peak hour traffic volume of 230 vph. The Blaine Road corridor, within the study area, has a two-way PM peak hour traffic volume of 435 vph, 57 percent in the northbound direction and 43 percent southbound in the southbound direction.

Portal Way is a roadway that runs parallel to I-5. Portal Way's intersections with east-west arterials experience relatively high traffic volumes. For example, the intersection of Portal Way and Birch Bay-Lynden Road has an entering PM peak hour volume of 1,150 vph. Between Loomis Trail Road and Grandview Road, the Portal Way corridor has a two-way PM peak hour traffic volume of 200 vph, 65 percent traveling in the northbound and 35 percent traveling in the southbound direction.

Harborview Road runs north-south between Birch Bay Drive and Drayton Harbor Road. PM peak hour volumes range from 385 vph on the northern portion of the road to 700 vph south of Birch Bay-Lynden Road. Most of the vehicles on this southern section are southbound (58 percent) during the PM peak hour reflecting traffic accessing Birch Bay Drive. High traffic volumes in this location contribute to a decreased intersection level of service (LOS), as discussed below in the Traffic Operations section.

Birch Bay Drive is a north-south roadway that follows the edge of the Birch Bay waterfront. The highest traffic volumes on Birch Bay Drive are found just south of Harborview Drive, with 410 vph. Just north of Alderson Road, the two-way PM peak hour volumes decrease to less than 200 vph. South of Alderson Road the volumes decline to less than 50 vph during the PM peak hour.

Most other north-south roads in the study area have total two-way volumes of 150 vph or less.

East-West Roadways

Birch Bay-Lynden Road and Grandview Road (SR 548) provide access to and from the Birch Bay area from I-5. Therefore, they carry the highest traffic volumes (except for I-5) within the study area.

Birch Bay-Lynden Road between Harborview Road and I-5 has between 705 and 920 vph in the PM peak hour. In general, westbound traffic volumes represent approximately 60 percent of the total traffic during the PM peak hour.

Grandview Road connects the Birch Bay area to I-5 south of Birch Bay-Lynden Road. Between Blaine Road and I-5 the two-way volumes range from 690 to 1,250 vph. Westbound traffic in the corridor represents only 20 to 40 percent of the total PM peak hour traffic. West of Blaine Road, the volumes in the corridor are significantly lower, ranging from less than 100 vph to up to 200 vph. The notable directional split of PM peak hour traffic along Grandview Road is directly related to the proximity to the Cherry Point Refinery, located south of the roadway. The majority of this traffic is oriented eastbound towards I-5.

A third major east-west route is Bay Road. This roadway is classified as a major and minor rural collector. It carries between 145 and 175 vph between Blaine Road and Kickerville Road during the PM peak hour. Bay Road is an alternative connector to I-5. In general, westbound traffic volumes represents over 60 percent of the total traffic during the PM peak hour.

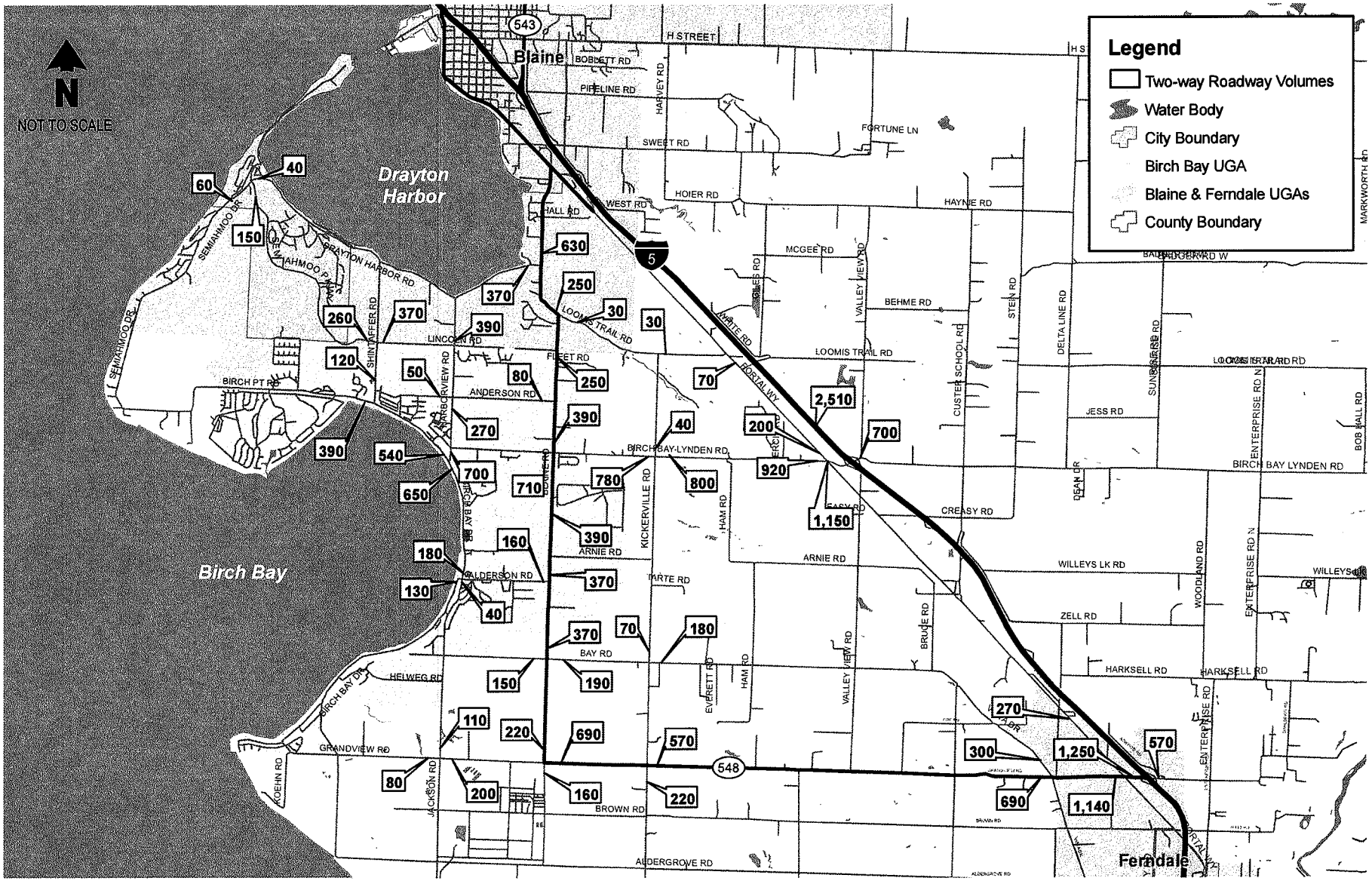

Figure 4

2007 PM Peak Hour Two-Way Traffic Volumes

Birch Bay Transportation Planning Study

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Traffic Operations

Traffic operations for an intersection can be described alphabetically with a range of levels of service (LOS). LOS A indicates free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays.

Whatcom County's Comprehensive Plan establishes the following level of service standards for roadway segments for purposes of transportation concurrency evaluation (see Table 1). Under state law, the county cannot approve any development that would generate enough traffic to cause the level of service on county arterials and collectors to fall below the adopted standards.

Table 1. Whatcom County Level of Service Standards (Concurrency)

Arterial Location	Maximum V/C[1] ratio	Level of Service Standard
Outside Urban Growth Area except Primary Routes	0.75	C
Inside County Urban Growth Area (Birch Bay UGA)	0.80	C
Inside City Urban Growth Area (Blaine UGA)	0.90	D

1. Volume-to-capacity

State highways have a separate standard that is set by WSDOT and the Regional Transportation Planning Organization (RTPO). Highways of Statewide Significance (HSS) within urban areas, such as sections of I-5, have a LOS threshold of LOS D. In rural areas, the HSS LOS is set at LOS C (per state law, HSS are not subject to local concurrency requirements). The LOS for Highways of Regional Significance (HRS), such as Blaine Road (SR 548), is set at the LOS adopted by the local metropolitan planning organization (MPO). The MPO/RTPO for Whatcom County is the Whatcom Council of Governments (WCOG).

Currently the LOS standard for HRS within urban areas is set at LOS D. Outside of urban areas, the HRS LOS standard is LOS C. WSDOT and WCOG plan to continue to discuss the LOS standards for state highways of regional significance and their application to local agency concurrency programs.

SEPA is typically used to review impacts within the immediate and nearby vicinity, such as vehicular access points, frontage right-of-way improvements and nearby intersections or roadways. SEPA uses the "significant adverse environmental impact" standard as the threshold for triggering mitigation. SEPA can be based on level of service standards different than concurrency. Evaluating traffic operations at intersections provides a nationally recognized and locally accepted method of measuring traffic flow and congestion.

Traffic operations analyses were conducted at the study area intersections to evaluate the current traffic characteristics of the existing roadway system. Individual intersection levels of service (LOS) were calculated at the study area intersections. The LOS analysis methodology was based on procedures identified in the *Highway Capacity Manual* (HCM 2000), and was evaluated using Synchro v.6.0. Level of Service (LOS) is measured in total vehicle delay on the worst movement for unsignalized intersections. Appendix B summarizes the HCM level of service definitions.

Table 2 summarizes the existing weekday PM peak hour LOS at study intersections. The detailed LOS worksheets are included in Appendix C.

Table 2. 2007 Weekday PM Peak Hour Intersection Level of Service

Intersection	Urban or Rural	Intersection Control[1]	2007 LOS[2]	2007 Delay[3]	2007 WM[4]
I-5 NB Ramps / Birch Bay-Lynden Road	Rural	AWSC	C	21.6	-
I-5 SB Ramps / Birch Bay-Lynden Road	Rural	TWSC	D	33.9	SB
I-5 NB Ramps / Grandview Road (SR 548)	Urban	TWSC	F	75.2	NB
I-5 SB Ramps / Grandview Road (SR 548)	Urban	TWSC	D	31.4	SB
Blaine Road (SR 548) / Drayton Harbor Road	Urban	TWSC	B	13.6	EB
Blaine Road (SR 548) / Loomis Trail Road	Urban	TWSC	A	8.6	WB
Blaine Road (SR 548) / Lincoln Road	Urban	TWSC	A	10.0	EB
Blaine Road (SR 548) / Anderson Road	Urban	TWSC	A	9.7	EB
Blaine Road (SR 548) / Birch Bay-Lynden Road	Urban	AWSC	C	19.7	-
Blaine Road (SR 548) / Alderson Road	Urban	TWSC	B	11.2	EB
Blaine Road (SR 548) / Bay Road	Rural	AWSC	A	8.3	-
Blaine Road (SR 548) / Grandview Road (SR 548)	Rural	TWSC	E	38.0	SB
Semiahmoo Parkway / Drayton Harbor Road	Urban	AWSC	A	7.6	-
Shintaffer Road / Semiahmoo Parkway (Lincoln Road)	Urban	TWSC	B	13.1	SB
Shintaffer Road / Anderson Road	Urban	TWSC	A	9.2	WB
Shintaffer Road / Birch Bay Drive	Urban	TWSC	B	10.2	SB
Harborview Road / Lincoln Road	Urban	TWSC	B	12.9	EBL
Harborview Road / Anderson Road	Urban	TWSC	B	11.3	EB
Harborview Road / Birch Bay-Lynden Road	Urban	AWSC	C	16.0	-
Harborview Road / Birch Bay Drive	Urban	AWSC	A	9.2	-
Birch Bay Drive / Alderson Road	Urban	AWSC	A	7.6	-
Birch Bay Drive / Jackson Road	Urban	TWSC	A	9.2	WBL
Jackson Road / Grandview Road	Rural	AWSC	A	7.6	-
Kickerville Road / Loomis Trail Road	Rural	TWSC	A	8.7	NB
Kickerville Road / Birch Bay-Lynden Road	Rural	TWSC	C	17.4	SB
Kickerville Road / Bay Road	Rural	TWSC	B	10.6	NB
Kickerville Road / Grandview Road (SR 548)	Rural	TWSC	C	23.4	NB
Portal Way / Loomis Trail Road	Rural	TWSC	A	8.4	EB
Portal Way / Birch Bay-Lynden Road	Rural	AWSC	E	35.4	-
Portal Way / Grandview Road (SR 548)	Urban	Signal	B	13.3	0.54
Vista Drive / Grandview Road (SR 548)	Urban	AWSC	C	19.1	-
Valley View Road / Birch Bay-Lynden Road	Rural	TWSC	B	11.7	SB

1. Signal = Traffic Signal; AWSC = All-Way Stop Control; TWSC = Two-Way Stop Control.
2. Level of service, based on 2000 Highway Capacity Manual methodology. Shaded cells indicate intersections exceeding Whatcom County LOS standard: LOS D in urban locations (within city limits or UGA) & LOS C in rural locations (non-UGA).
3. Average delay in seconds per vehicle.
4. Worst movement reported for unsignalized intersections.

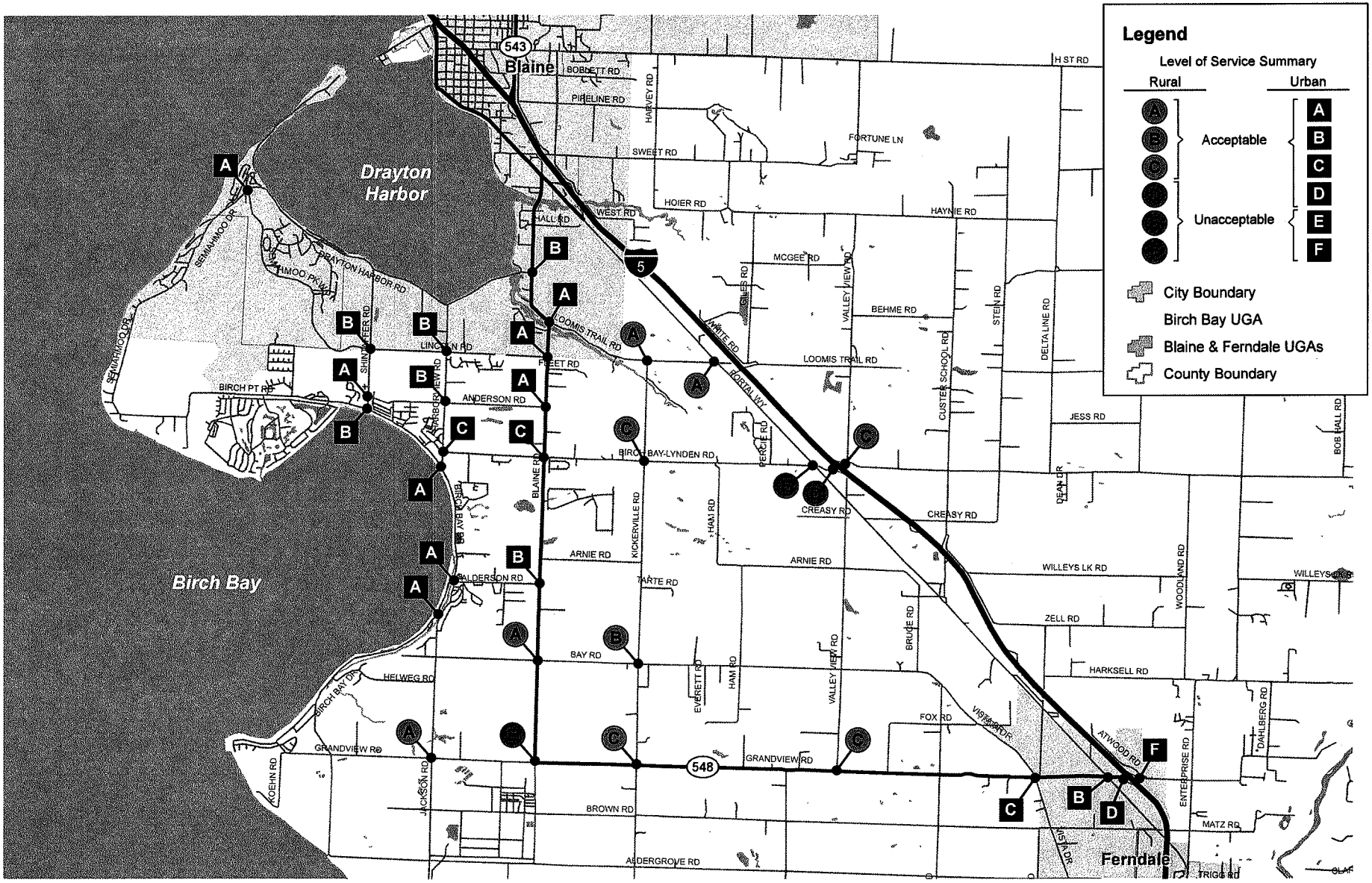

Figure 5

2007 Weekday PM Peak Hour Intersection Level of Service

Birch Bay Transportation Planning Study

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As shown in Table 2, all but four study intersections are currently operating at the respective LOS standard or better during the weekday PM peak hour. The exceptions are:

The location exceeding the urban LOS standard (LOS D):

- I-5 NB Ramps / Grandview Road (SR 548) – operating at LOS F

Locations exceeding the rural LOS standard (LOS C):

- I-5 SB Ramps / Birch Bay Lynden Road – operating at LOS D
- Blaine Road (SR 548) / Grandview Road (SR 548) – operating at LOS E
- Portal Way / Birch Bay-Lynden Road– operating at LOS E

Birch Bay-Lynden Road carries the highest traffic volumes in the area, contributing to the level of service deficiencies observed in existing conditions. The high traffic volumes during peak hours limit the gaps available for side street traffic to turn onto Birch Bay-Lynden Road.

Traffic Safety

Whatcom County provided traffic collision data for the roadways in the Birch Bay study area. This area has several notable traffic collision locations. Based on reported collision data between January 1, 2003, and December 31, 2005, there were a total of 213 collisions within the greater Birch Bay study area. Most of the collisions involved single vehicles running off the road or hitting fixed objects. There were three collisions involving bicycles and two involving pedestrians. There were three fatality collisions which resulted in four fatalities within the study area during this three year period. This section further describes the locations and types of collisions.

There were many types of collisions in the Birch Bay area; however single vehicle/fixed object collisions were the majority. Another common collision type is multi-vehicle/rear-end collisions. This type of collision was more than 10 percent of total collisions. Both of these collision types had contributing circumstances of "exceeding reasonable safe speed."

Over the three years of data collection, there were three traffic collisions that resulted in fatalities, approximately 1 percent of total collisions within the county. A collision in 2005 on Birch Bay Drive between Cottonwood Drive and Beachway Drive resulted in two fatalities. A collision in 2004 on Alderson Road, west of Blaine Road had one fatality, as did a collision on Kickerville Road, south of Arnie Road in 2005. Of the remaining 210 traffic collisions, there were 71 incidents that resulted in injuries and 139 collisions without injuries.

The Birch Bay area includes a segment of Grandview Road (SR 548) classified by WSDOT as a high accident location (HAL); this segment of approximately 1,500 feet is located near the Kickerville Road intersection. HALs are typically evaluated to identify if there are particular issues that can be improved to reduce collisions. Based on the data available for the 2008 Study update, no accidents were reported within this HAL segment between 2003 and 2005.

Roadway Segment Analysis

Within the January 2003 and December 2005 time period, the section of roadway with the highest number of traffic collisions was Birch Bay-Lynden Road between Blaine Road (SR 548) and Kickerville Road; this section had nine collisions. The next highest number of collisions was on Birch Bay-Lynden Road between Valley View Road and Custer School Road, with eight collisions. Three other roadway sections also had eight collisions: Birch Bay-Lynden Road from Kickerville Road to Pierce Road; Birch Bay-Lynden Road from Harborview Road to Blaine Road (SR 548); and on Bay Road between Blaine Road (SR 548) and Bruce Road. Birch Bay-Lynden Road has two intersections with a deficient level of service, which indicate high levels of peak hour traffic volumes (these intersections are at Portal Way and Harborview Road). Table 3 summarizes these roadway segments with collision locations.

There were three pedestrian-related collisions within the January 2003-to-December 2005 time period. There were no fatalities, but each collision involved a vehicle hitting a pedestrian. Two of these incidents were on Birch Bay Drive: one took place approximately 480 feet northeast of the intersection with Jackson Road, and one occurred approximately 680 feet northwest of the intersection with Harborview Road. The third pedestrian-related collision on a roadway in the Birch Bay area was on Birch Bay-Lynden Road, approximately 160 feet west of the intersection with Blaine Road (SR 548).

Table 3. Birch Bay Collision Locations: Roadways

Roadway	Limits	Primary Collision Type	Number of Collisions 2003 to 2005
Birch Bay-Lynden Road	Blaine Road (SR 548) to Kickerville Road	Fixed Object	9
Birch Bay-Lynden Road	Valley View Road to Custer School Road	Fixed Object	8
Birch Bay-Lynden Road	Kickerville Road to Percie Road	Fixed Object	8
Birch Bay-Lynden Road	Harborview Road to Blaine Road (SR 548)	Fixed Object	8
Bay Road	Blaine Road (SR 548) to Bruce Road	Entering Driveway	8

Source: Washington State Department of Transportation (WSDOT)

Intersection Analysis

The intersection in the Birch Bay area with the most traffic collisions between 2003 and 2005 is at Birch Bay-Lynden Road and Custer School Road, with seven collisions. This intersection is located just east of I-5. The majority of the accidents at this intersection involved traffic entering from the side street. The intersection with the next highest number of collisions is Birch Bay-Lynden Road and Portal Way with five collisions during three years. This intersection is located just west of I-5. It has relatively high traffic volumes, and operates at LOS E, indicating peak hour congestion and delays. Rear-end accidents were the primary type of collision. Table 4 lists these intersections. There were no pedestrian or bicycle related collisions at intersections in the Birch Bay area during the 2003 to 2005 time period.

Table 4. Birch Bay Collision Locations: Intersections

Intersection	Primary Collision Type	Number of Collisions 2003-2005
Birch Bay-Lynden Road / Custer School Road	Entering at Angle	7
Birch Bay-Lynden Road / Portal Way	Rear End	5

Source: Washington State Department of Transportation (WSDOT)

Transit and Public Transportation

The public transportation agency in the Birch Bay area is Whatcom Transportation Authority (WTA). WTA offers several services for local residents and visitors to make trips throughout the county. Typical fixed route service is available in the Birch Bay area, although its frequencies do not necessarily provide for regular commuting. WTA fills this gap with other services such as Rideshare or Dial-a-Ride. This section describes the existing transit service in Birch Bay, including transit routes, stops, ridership, and the County's ridesharing program.

The following types of transit service are available in Birch Bay:

- Fixed route service (Routes 55, 70X)
- Dial-a-Ride, or Flex service
- Paratransit
- Rideshare, including vanpools

Fixed Route Service

WTA's fixed route service includes Route 70X, which is an express service between Birch Bay and Bellingham. The route has two stops in the Birch Bay area (at Birch Bay-Lynden Road and I-5 to serve Birch Bay Square and Grandview Road and I-5 to serve the Grandview Industrial Park). Route 70X makes four round trips per day on weekdays between 6:00 AM and approximately 7:00 PM. Saturday service for Route 70X is provided by Route 55, which is the other fixed route service.

Route 55 serves as a connector route between Blaine, Birch Bay, Ferndale, and the Bellis Fair mall in Bellingham. This route makes three round trips per day, in addition to making "flex" deviations along the route for previously requested stops by individual users. Route 55 runs between 8:40 AM and approximately 4:00 PM on weekdays, and between 8:40 AM and approximately 6:00 PM on Saturdays. See Figure 6 for a map of these routes.

WTA tracks the ridership on these two fixed routes. Ridership on Route 55 is tracked at each bus stop and also by travel direction. Recent average monthly ridership data (March to June 2007) show that northbound ridership to Birch Bay includes 30 passengers boarding and 158 passengers alighting. Southbound ridership to Bellingham includes 183 passengers boarding and 23 passengers alighting. This pattern reflects the attractions of jobs and major commercial land uses in Bellingham.

The average monthly ridership on Route 70X includes 536 southbound passengers that are boarding, and no southbound passengers that are alighting (Southbound passengers who

board in Blaine do not typically alight in Birch Bay). For northbound passengers, there are 158 boarding and 480 alighting. The details of both routes' ridership are outlined in Table 5.

Table 5. Existing Transit Ridership for WTA Routes 55 and 70X

Route	2007 Average Monthly Ridership[1] On	Off
Route 55		
Northbound (to Birch Bay/Blaine)	30	158
Southbound (to Bellingham)	183	23
Total	213	181
Route 70X		
Northbound (to Blaine)	158	480
Southbound (to Bellingham)	536	0
Total	694	480

1. 2007 (March to June) WTA average monthly ridership

Dial-a-Ride Service

WTA's Dial-a-Ride service is provided for users in the Birch Bay and Blaine areas. This service provides local service in the area, and also connects to Route 70X. According to the WTA Six-Year Strategic Service Plan, Dial-a-Ride service during the middle of the day will serve as Route 55, a local service route. When Route 70X is in the area, the Dial-a-Ride service will continue to provide connections to the fixed route service. The average monthly ridership in 2006 for the Dial-a-Ride service was 606 passengers.

Paratransit Service

WTA's paratransit service is provided for those users who are not able to use the traditional fixed route services. These users are typically people with disabilities or seniors. The federal Americans with Disabilities Act (ADA) provides standards for paratransit, which includes a policy that passenger capacity constraints are not allowed. WTA strives to meet the demand of all eligible individuals.

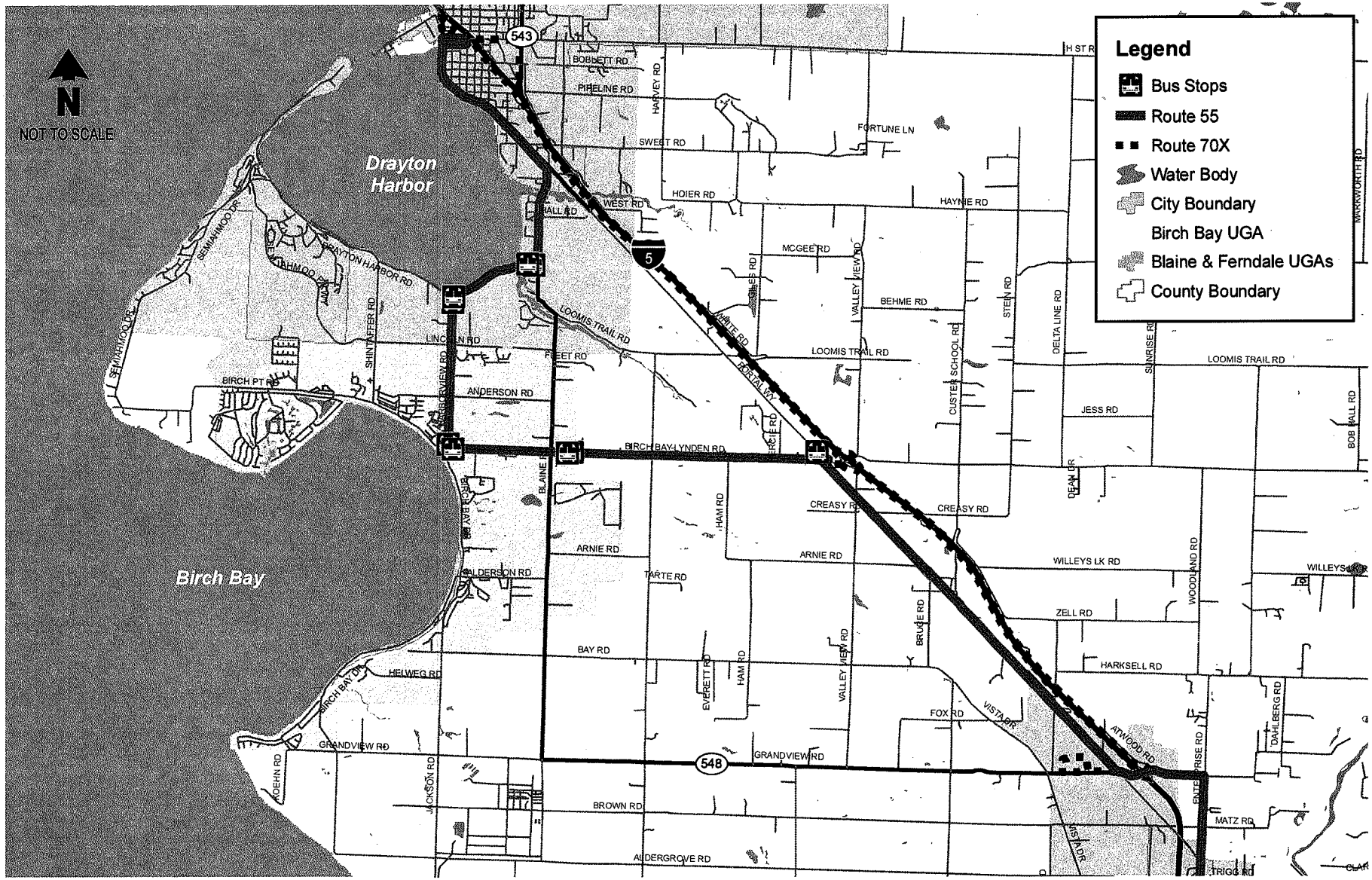

Figure 6
Fixed Transit Routes

Birch Bay Transportation Planning Study

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Rideshare Service

WTA's Rideshare program is intended for those users who are not served well by the fixed route service, or desire a more flexible commuting option. There are area employers in the general study area that must comply with the State's Commute Trip Reduction (CTR) program. WTA assists by providing employer outreach programs.

Non-motorized Facilities

Birch Bay's existing transportation system includes relatively limited facilities for pedestrians and bicyclists. In the areas where sidewalks or bicycle lanes are not available, pedestrians must use the roadway shoulders and bicyclists use the shoulders or ride in the main travel lanes. Figure 7 illustrates where paved and unpaved shoulders exist on all classes of streets within the Birch Bay Urban Growth Area (UGA).

According to Whatcom County road standards, newly constructed rural arterials and major collectors should have eight foot shoulders and a drainage ditch. Neighborhood collectors should have 6 foot shoulders and a drainage ditch. Local roads should have a four foot gravel shoulder and drainage ditch.

Table 6. Whatcom County Road Standards for Shoulder Width

Arterial Classification	Shoulder Width[1]
Rural Principal and Minor Arterials	8
Rural Major Collectors	8
Rural Minor Collectors	6
Neighborhood Collectors	6
Local Streets	4

1. Measured in feet.
Source: Whatcom County Road Standards (2004)

The most significant roadway that has substantial shoulders is Grandview Road (SR 548) between Blaine Road and I-5. This state highway has paved shoulders that are at least six feet wide on both sides of the street. Another major east-west roadway with paved shoulders is Birch Bay-Lynden Road between Harborview Road and Blaine Road (SR 548). Few north-south roadways include shoulders that are at least six feet wide. One that does is on Harborview Road between Anderson Road and Drayton Harbor Road. A large portion of Semiahmoo Drive also has six foot wide unpaved shoulders.

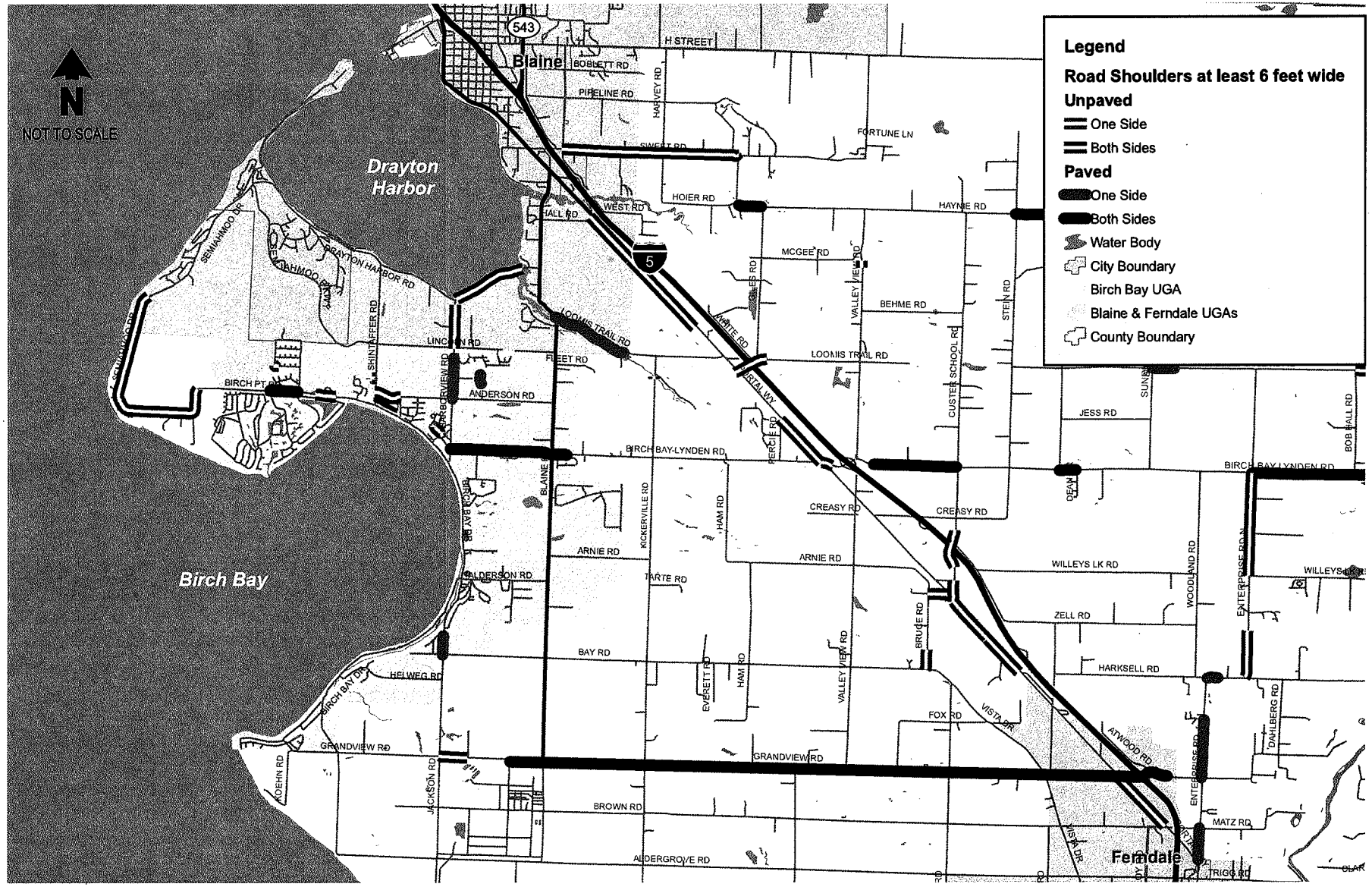

Figure 7
Available Roadway Shoulders

Birch Bay Transportation Planning Study

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Travel Forecasts & Alternatives Evaluation

Travel Demand Forecasting Model

A travel demand forecasting model was used to assist in defining future transportation needs. The Whatcom Council of Governments (WCOG) travel demand forecasting model was used as a basis for developing the Birch Bay area travel demand forecasting model. The WCOG model is hosted on an EMME/2 software platform and is calibrated to a 2005 base year. The model forecasts weekday PM peak hour traffic volumes based on the 2027 land use forecasts.

The WCOG travel demand forecasting model divides the Whatcom County into Transportation Analysis Zones (TAZs) which are relatively similar areas in terms of land use and travel characteristics. The TAZs contain the land use data from which the traffic using the transportation system is generated. The land use data is summarized for the Birch Bay area in Appendix B. The original WCOG model represented the Birch Bay area by 30 TAZs. These TAZs were further refined as part of this study into 116 TAZs to provide more detail in evaluating travel demands along specific corridors and intersections. The zones external to Birch Bay area were not changed.

The transportation network represents the local area road system within the model. The WCOG model, being a strategic planning model, includes all arterial and collector streets in addition to the state highways. In the Birch Bay area, collector roads and some local streets were included to more accurately represent travel patterns. Each roadway is divided into segments based on the location of key intersections and major driveways. Road segments are coded by functional classification, number of lanes, speed, and capacity.

Trip tables represent the travel among the traffic analysis zones and are estimated from the land uses. Trip generation equations are used to convert land use into travel demand. Trips are generated for different purposes including work, college, school, recreation, shopping, and others. Trip distribution is the other basic tool for developing trip tables. Trips are distributed using a gravity model that allocates zone-to-zone interchanges based on travel time and distances.

The model assignment results were compared to actual traffic counts and travel patterns to calibrate and validate the model to base year conditions. The calibration/validation process involves refining and reviewing the model to better represent existing conditions. The Birch Bay area model was calibrated for the PM peak hour (using recent counts) within generally accepted standards for transportation models and thus provides a basis for developing and evaluating future travel demands.

Existing and Forecast Land Use

Land use and socioeconomic data were used to develop traffic forecasts for the study area. The WCOG model provided the basis for developing the base year (2005) and forecast year (2027) land use. The land use data and forecasting methodology are documented in Appendix C. Table 7 summarizes the 2005 and 2027 total number of dwelling units and employees for the Birch Bay UGA and City of Blaine with UGA.

Table 7. Existing and Forecast Land Use

Land Use Type and Area	2005	2027	Percent Increase
Households[1]			
Birch Bay UGA	4,087	7,629	87%
City of Blaine with UGA	1,900	6,089	220%
Total	**5,987**	**13,718**	**129%**
Employment[2]			
Birch Bay UGA	593	1,100	86%
City of Blaine with UGA	2,876	4,888	70%
Total	**3,470**	**5,988**	**73%**

Source: Transpo Group 2007

1. Households measured in number of dwelling units.
2. Employment measured in number of employees.

Within the study area, the number of households is forecast to grow by approximately 7,700 dwelling units, an almost 130 percent increase from 2005 to 2027. The largest numbers of new dwelling units are expected to be built in the City of Blaine and its UGA. Approximately 4,200 new dwelling units are estimated to be constructed by 2027.

Existing and forecast employment within the study area are also summarized in Table 8. The total number of employees for the study area is forecasted to increase by 73 percent, from 3,470 to 5,988 employees. Most of the employment growth will occur in the City of Blaine and its UGA, approximately 2,000 new employees. The employment in the Birch Bay area is forecast to nearly double by 2027, an increase of over 500 new employees.

Baseline Transportation Improvements and Analysis

City, County, and state transportation improvements projects likely to be funded and built by 2027 were reviewed and included as appropriate in the future baseline model. The improvements were defined based on the City of Blaine and Whatcom County Transportation Improvement Program (TIP) and the WSDOT Highway Systems Plan. In the Birch Bay area the planned improvements included the Lincoln Road extension and widening between Shintaffer Road and Blaine Road (SR 548). A new connector road between Birch Point Road and Lincoln Road at Shintaffer Road also was assumed completed by 2027. Table 8 provides a description of the major baseline transportation improvements included in the model.

Table 8. 2027 Baseline Transportation Improvements

Roadway	Project Limits	Project Description
Lincoln Road	Shintaffer Road and Blaine Road (SR 548)	Widen between Shintaffer Road and Morningside Drive and construct the extension from Morningside Drive to Blaine Road (SR 548)
Birch Point Connector	Birch Point Road and Lincoln Road	Construct a road connection between Birch Point Road and Lincoln Road at Shintaffer Road

Traffic volume growth in the Birch Bay area between 2005 and 2027 was approximately 90 percent in the PM peak hour causing relatively high growth percentages along the study area corridors. Figure 8 illustrates the growth in traffic volumes between 2005 and 2027.

The increase in traffic volumes during the PM peak hour is a direct result of the increase in residential land uses particularly along Semiahmoo Drive thus causing more home-based-work trips which occur during the peak periods.

This large percent increase in traffic volumes is still well below the capacity for most of the roadways within the study area. Traffic volumes exceeded capacities along Birch Bay-Lynden Road and Grandview Road (SR 548). The large increase in traffic volumes (approximately 60 percent) is expected to degrade the traffic operations of I-5/Birch Bay-Lynden Road and the I-5/Grandview Road (SR 548) interchanges below county and regional level of service standards. Volumes exceeding capacity are also observed along Blaine Road (SR 548) and Drayton Harbor Road. These result from traffic shifting from the I-5/Birch Bay-Lynden Road interchange and the I-5/Grandview Road (SR 548) interchange to I-5/south Blaine interchange (exit 274). Much of this traffic is generated by the planned households along Semiahmoo Drive and within the Blaine UGA.

The analysis of the baseline scenario indicated that the most critical areas for congestion in the future would be along Birch Bay-Lynden Road between I-5 interchange and Harborview Road and along Grandview Road (SR 548) between the I-5 interchange and Vista Drive. It was found that improving traffic operations at these locations consequently reduces the traffic using the I-5/south Blaine interchange (exit 274), thus resolving capacity issues along Blaine Road (SR 548) and Drayton Harbor Road observed under the baseline scenario.

Alternatives Analysis

The evaluation of the baseline travel forecasts indicated a need for additional east-west capacity and circulation options within the Birch Bay area. Options to address these issues ranged from adding more capacity to Birch Bay-Lynden Road and Grandview Road to extending Lincoln Road. These alternative roadway improvements were evaluated using the County's travel demand model. Separate model scenarios were created for each alternative to evaluate the shifts in traffic due to the proposed roadway improvement project or group of projects. The alternative analysis used the 2027 baseline model as a starting point. The alternatives analysis included an evaluation of the scenarios listed in Table 9.

Table 9. 2027 Model Scenarios Evaluated

Scenario	Scenario Description
Birch Bay-Lynden Road Improvement Scenarios	• Add turn lanes at the intersections with the I-5 ramps. • Widen Birch Bay to five lanes between Harborview Road and Portal Way.
Grandview Road (SR 548) Improvement Scenarios	• Add turn lanes at the intersections with the I-5 ramps. • Widen Grandview Road (SR 548) to five lanes between Vista Drive and I-5.

Alternatives analysis was performed with capacity improvements assumed at the Birch Bay-Lynden Road and Grandview Road (SR 548). These improvements assume the addition of turn lanes at the I-5 interchange intersections with Birch Bay-Lynden Road and Grandview Road (SR 548). Capacity improvements were also evaluated along Birch Bay-Lynden Road between Portal Way and I-5 and for Grandview Road (SR 548) between Vista Drive and I-5. In addition, a two-way left turn (TWLT) lane was evaluated along Birch Bay-Lynden Road between Portal Way and Harborview Road. The purpose of the TWLT lane is to alleviate friction issues between through traffic and local traffic. Traffic volumes for the baseline scenario are illustrated in Figure 8.

The alternatives analyses illustrate the need for increased capacities along Birch Bay-Lynden Road and Grandview Road (SR 548) west of I-5. These corridors need to be widened to accommodate the traffic generated by the new residential developments during the peak periods. The transportation system recommendations are illustrated in more detail in the following section.

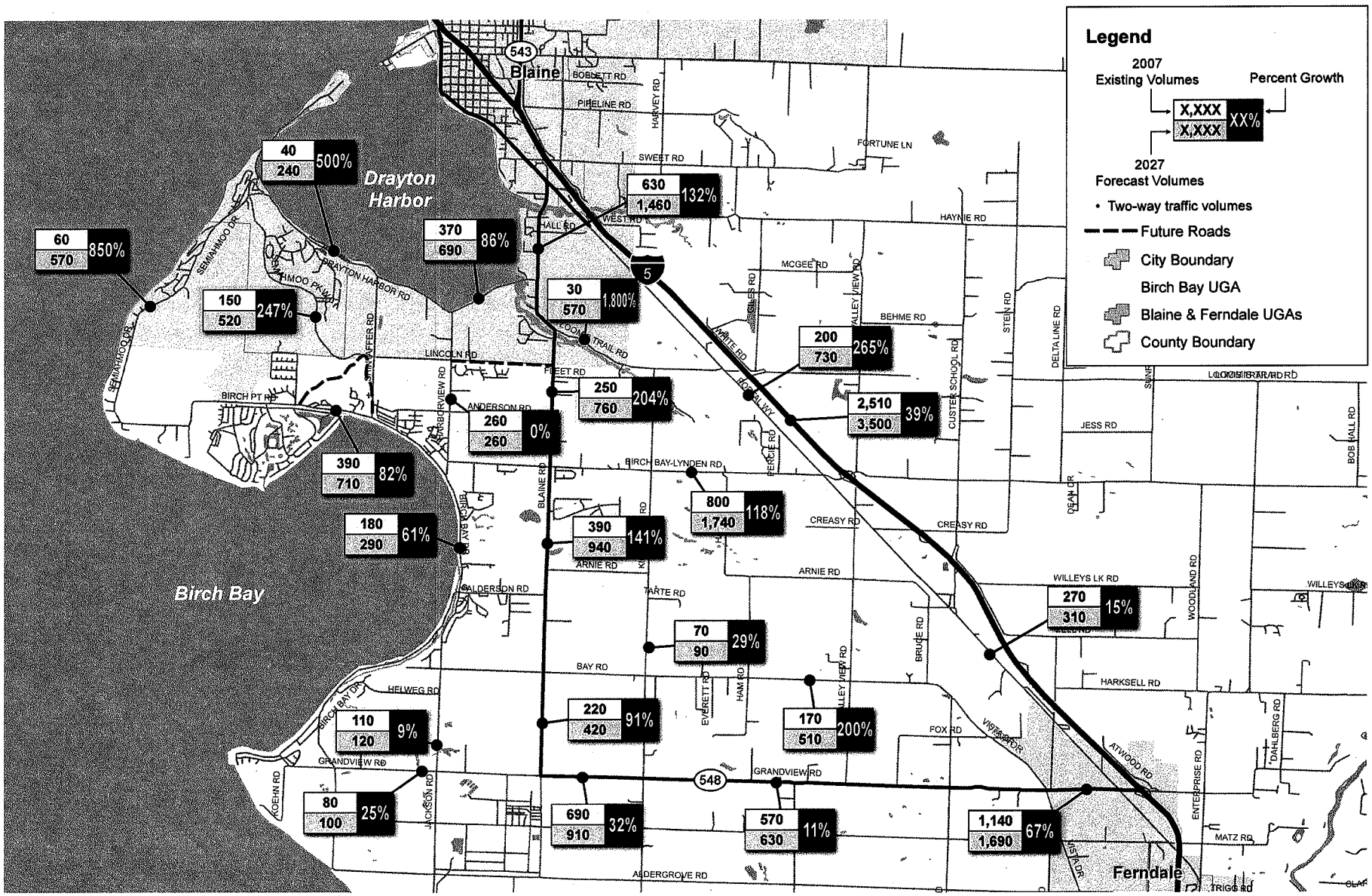

Figure 8

2007 and 2027 PM Peak Hour Traffic Volumes

Birch Bay Transportation Plannning Study

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Transportation System Improvement Recommendations

The transportation system improvement recommendations provide a long-range strategy for the Birch Bay UGA to address current and forecast transportation issues and needs. Transportation system improvements are required to accommodate the projected growth in population and employment within the Birch Bay UGA. The transportation system improvement recommendations are based upon analyses of the existing transportation system, forecasts of future travel demands, anticipated availability of funding resources, and the desire of the Birch Bay community to create an efficient transportation system that puts a priority on community livability. The Study builds on the countywide policies and standards, while shaping transportation goals and vision for the Birch Bay area.

The transportation systems plan primarily focuses on streets and highway improvements because they serve most of the travel needs for the area. The streets and highways serve general traffic, freight, transit, ridesharing, pedestrians, and bicyclists. Therefore, the Study also provides the framework for other travel modes in the community, including pedestrian, bicycle, and transit modes.

Streets and Highways

Streets and highways serving Birch Bay provide the basic transportation system for the Birch Bay UGA and surrounding areas. They also serve other travel modes including pedestrians, bicycles, and transit. The street and highway section identifies the functional roadway system and improvement projects and programs needed to maintain and expand the transportation system.

Roadway Functional Classification

Roadway functional classification provides a hierarchy of roadways. These classifications provide a guide for future development of the Birch Bay area's roadway system. Arterial roadways serve higher traffic volumes and may have limited access points while local roadways provide neighborhood circulation and local access. Collectors are a classification between arterial and local access roads, typically connecting residential neighborhoods with community centers and facilities.

Functional classifications for roadways in Whatcom County are based on the Federal Function Classification map, which was last updated in 2004. Because Birch Bay is not considered an urban area based on federal criteria, the arterials and collectors in the area are designated as rural rather than urban on the federal map. However, for purposes of determining appropriate road design standards, Whatcom County Public Works applies urban standards to collectors and arterials within the Birch Bay Urban Growth areas. This acknowledges and supports the need for urban-level improvements (curb, gutter, and sidewalk) within an area designated for urban densities.

In addition to the rural-urban designations, further changes in the functional classification of some roadways are needed to support future demand for local circulation and regional access to the Birch Bay area as the area transitions from rural to urban designations and densities.

Transportation Improvement Projects

Based on an evaluation of existing and forecast traffic volumes, traffic operations, safety, and circulation needs, a recommended list of transportation improvement projects and programs were defined. The project list is organized into the following categories:

- Intersection Projects
- New Roadway and Major Widening or Reconstruction Projects
- Minor Widening and Reconstruction Projects
- State Route Projects
- Other Mode

Figure 9 and Table 10 identify each of the projects and their locations. Table 10 also provides a brief description of each project including the project limits. The table identifies projects that are currently part of the County's Transportation Improvement Program (TIP). This highlights the projects that are currently identified for planning, design, or construction. A project identification number is provided for each project that is referenced in Figure 9.

Planning level cost estimates are also included for each project. The cost estimates were prepared based on typical per unit costs, functional classification, and level of improvement. The cost estimates include allowances for right-of-way acquisition based on generalized needs to meet the County's adopted roadway standards. Estimated costs for several improvements on state routes were developed jointly with Washington State Department of Transportation (WSDOT).

A relative priority (high, medium, and low) was established for each project. The priority reflects the relative need for the projects to enhance the Birch Bay area transportation system and provides guidance in implementing the respective improvements.

State Route Projects

I-5 provides the primary regional connection to the Birch Bay area. To the north, I-5 connects the Birch Bay area to the U.S./Canada border. To the south, I-5 connects to Bellingham and the central Puget Sound region. SR 548 also provides for regional travel from the Birch Bay area to I-5 from the north and east. The Washington State Highways Systems Plan (HSP) is the element of Washington's Transportation Plan that addresses the state highway system. The 2007-2026 HSP does not identify specific improvements within the study area. The HSP calls for an Interstate Master Plan that would identify improvements to optimize capacity and safety on the interstate highway system.

I-5 Interchanges – The Study identifies improvements to two interchanges serving the Birch Bay area. Improvements are needed to fix existing operational issues in the near term and to serve anticipated growth in the long term.

Table 10. Birch Bay Transportation Planning Study Projects and Programs

Project Group	Project ID	Project Name	Project Limits	Project Description	In Existing TIP? [1]	TIF Eligible?	Total Project Cost ($1,000s) Estimated [2]	Relative Priority	Project Justification				Comments
									Capacity	Safety	Road Standards & Preservation	Area Circulation	
INTERSECTIONS PROJECTS	I-1	Birch Bay- Lynden Road / Portal Way	Intersection	Construct intersection improvements to include turn lanes and install traffic signal when, warranted.	Yes	Yes	$3,000	High	X	X			In design, construction programmed for 2009.
	I-2	Birch Bay-Lynden Road / Kickerville Road	Intersection	Construct intersection improvements to include roundabout or install turn lanes and traffic signal, when warranted.	No	Yes	$3,000	Medium	X	X			Turn lanes could be constructed on Birch Bay-Lynden Road as part of R-1.
	I-3	Birch Bay-Lynden Road / Harborview Road	Intersection	Construct intersection improvements to include turn lanes and install traffic signal when warranted.	No	Yes	$3,000	High	X	X			
	I-4	Birch Bay Drive / Harborview Road	Intersection	Improve/ redesign the intersection with turn lanes, and install traffic signal when warranted.	No	Yes	$3,000	High	X	X			
NEW ROADWAYS AND MAJOR WIDENING OR RECONSTRUCTION PROJECTS	R-1	Birch Bay-Lynden Road Widening	Portal Way to UGA limit just east of Blaine Road	Widen to rural major collector standards including turn lanes at major access locations and paved shoulders for non-motorized trips.	No	Yes	$1,500	High	X	X	X		Also see project I-2.
	R-2	Birch Bay-Lynden Road Widening	UGA limit just east of Blaine Road to Harborview	Widen to urban principal arterial standards including turn lanes and non-motorized facilities.	No	Yes	$1,800	High	X	X	X		Also see projects I-3 and I-4.
	R-3	Birch Point Connector Road	Birch Point Road to Shintaffer Road	Construct new 2-lane connection at urban standards including non-motorized facilities and new intersection with Semiahmoo Drive.	No	No	$2,000	High	X			X	A section of the project is constructed by the developer.
	R-4	Lincoln Road Extension and Improvement	Shintaffer Road to Blaine Road (SR 548)	Reconstruct existing road and construct 2-lane urban arterial to Blaine Road with non-motorized enhancement including construction of roundabouts at intersections with Blaine Road and Harborview Road.	Yes	Yes	$9,000	High	X			X	In design, construction programmed for 2011.
	R-5	West Blaine UGA Connector Road	Birch Point Road to Semiahmoo Drive	Construct new 2-lane road to urban standards between Birch Point Road and Semiahmoo Drive to serve future urban development.	No	No	$4,800	Low				X	Blaine UGA. Would be constructed by development projects. Alignment would be defined as part of future development projects.
	R-6	Harborview Road	Birch Bay Drive to Birch Bay-Lynden Road	Improve roadway to urban principal arterial standards including non-motorized facilities.	No	Yes	$200	High		X	X		
	R-7	Harborview Road	Birch Bay-Lynden Road to Drayton Harbor Road	Improve roadway to major collector standards including non-motorized facilities.	No	Yes	$1,000	Low			X		
	R-8	Portal Way/Dakota Creek Bridge #500	Bridge	Bridge replacement or rehabilitate structure	Yes	Yes	$5,000	Medium		X	X		
	R-9	Commercial area circulation roads	West of Blaine Road (SR 548).	Local circulation urban road(s) as part of future development.	No	No	$6,000	Medium	X			X	To be built by development projects with potential future Birch Bay Town Center.

Project Group	Project ID	Project Name	Project Limits	Project Description	In Existing TIP? [1]	TIF Eligible?	Total Project Cost ($1,000s) Estimated [2]	Relative Priority	Project Justification				Comments
									Capacity	Safety	Road Standards & Preservation	Area Circulation	
MINOR WIDENING AND RECONSTRUCTION PROJECTS	M-1	Birch Bay Drive	Alderson Road to Shintaffer Road	Improve roadway to urban minor arterial standards including non-motorized facilities.	Yes	Yes	$5,000	High		X (urban)	X		
	M-2	Birch Bay Drive	Alderson Road to Point Whitehorn Road	Improve to urban minor arterial standards including non-motorized facilities.	No	Yes	$1,800	Medium		X (urban)	X		
	M-3	Grandview Road	Point Whitehorn Road to Blaine Road	Improve to rural collector road standards with paved shoulders for non-motorized travel.	Yes	No	$3,000	Low			X		
	M-4	Birch Bay-Lynden Road	I-5 to Guide Meridian Road	Improve to rural major collector standards including paved shoulders for non-motorized travel.	No	No	$5,000	Medium			X		Supports Birch Bay Subarea Transportation Plan with non-motorized connection to/from Lynden.
	M-5	Drayton Harbor Road	Harborview Road to Shintaffer Road	Reconstruct, repair road slope and pavement and upgrade roadway.	Yes	No	$1,800	Medium			X		Within Blaine Urban Growth Area. Environmental constraints will affect design standard.
	M-6	Drayton Harbor Road	Harborview Road to Blaine Road	Improve to rural collector standards with shoulders for non-motorized travel.	Yes	Yes	$1,800	Medium		X (urban)			Within Blaine Urban Growth Area.
	M-7	Portal Way	Grandview Road to Birch Bay- Lynden Road	Reconstruct to major collector standards including paved shoulders for non-motorized travel.	No	No	$3,000	Low			X		If pavement is low than Whatcom County usually has a major reconstruction.
	M-8	Portal Way	Birch Bay- Lynden Road to Loomis Trail Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	Yes	$1,200	Medium	X				
	M-9	Portal Way	Loomis Trail Road to Blaine city limit	Reconstruct to major collector standards including paved shoulders for non-motorized travel.	No	No	$1,800	Low			X		
	M-10	Birch Point Road	Semiahmoo Drive to Shintaffer Road	Reconstruct to urban minor arterial standards including non-motorized facilities	No	Yes	$3,000	Low		X (urban)	X		
	M-11	Kickerville Road	Loomis Trail Road to Bay Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	No	$2,400	Low			X		
	M-12	Kickerville Road	Bay Road to Grandview Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	No	$650	Low			X		
	M-13	Jackson Road	Birch Bay Drive to Grandview Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	Yes	$1,200	Low			X		
	M-14	Loomis Trail Road	Blaine Road to Portal Way	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	Yes	$1,200	High	X		X		
	M-15	Semiahmoo Drive	Blaine city limits to Birch Point Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	Yes	$2,000	Low			X		Within Blaine Urban Growth Area.
	M-16	Shintaffer Road	Lincoln Road to Birch Point Road	Reconstruct to urban collector standards including paved shoulders for non-motorized travel.	No	Yes	$600	Low			X		
	M-17	Vista Drive	Bay Road to Grandview Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	Yes	$1,500	Medium	X		X		
	M-18	Bay Road	Blaine Road to Vista Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	No	Yes	$2,600	Medium	X		X		
	M-19	Alderson Road	Birch Bay Drive to Blaine Road	Reconstruct to urban collector standards including paved shoulders for non-motorized travel.	No	Yes	$600	Medium		X (urban)	X		
	M-20	Anderson Road	Harborview Road to Blaine Road	Reconstruct to urban collector standards including paved shoulders for non-motorized travel.	No	No	$750	Low		X (urban)			
	M-21	Bay Road	Jackson Road to Blaine Road	Reconstruct to urban collector standards including paved shoulders for non-motorized travel.	No	No	$750	Low		X (urban)			
	M-22	Point Whitehorn Road	Birch Bay Drive to Grandview Road	Reconstruct to urban collector standards including paved shoulders for non-motorized travel.	No	No	$400	Low		X (urban)			

Project Group	Project ID	Project Name	Project Limits	Project Description	In Existing TIP? [1]	TIF Eligible?	Total Project Cost ($1,000s) Estimated [2]	Relative Priority	Project Justification				Comments
									Capacity	Safety	Road Standards & Preservation	Area Circulation	
STATE ROUTE PROJECTS	S-1	Blaine Road (SR 548)	Peace Portal Drive to Lincoln Road	Reconstruct and widen to add turn lanes and shoulders/non-motorized facilities at standards (WSDOT standards).	No	No	$6,000	High	X	X (urban)	X		Within Blaine Urban Growth Area.
	S-2	Blaine Road (SR 548)	Lincoln Road to Birch Bay-Lynden Road	Reconstruct and widen to add turn lanes and shoulders/non-motorized facilities at standards (WSDOT standards).	No	No	$5,000	High	X	X (urban)	X		Continuation of Project S-1.
	S-3	Blaine Road (SR 548)	Birch Bay-Lynden Road to Bay Road	Reconstruct and widen to add turn lanes and non-motorized facilities to meet standards (WSDOT standards).	No	No	$7,000	Medium	X	X (urban)	X		Continuation of Project S-2.
	S-4	Blaine Road (SR 548)	Bay Road to Grandview Road	Reconstruct to standards (WSDOT standards)	No	No	$4,000	Medium		X	X		Continuation of Project S-3. Culvert completed for $2.5M.
	S-5	Blaine Road (SR 548) / Drayton Harbor Road	Intersection	Improve/redesign the intersection with turn lanes and install traffic signal when warranted.	No	No	$2,000	High	X	X			Within Blaine Urban Growth Area. Overlay project programmed by WSDOT.
	S-6	Blaine Road (SR 548) / Loomis Trail Road	Intersection	Improve/redesign the intersection with turn lanes and install traffic signal when warranted.	No	No	$2,000	Medium	X	X			
	S-7	Blaine Road (SR 548) / Grandview Road	Intersection	Improve/ redesign the intersection , and install traffic signal with turn lanes when warranted or a roundabout facility	No	No	$2,000	High	X	X			Developer funded.
	S-8	Blaine Road (SR 548) / California Creek Bridge Replacement	Bridge	Bridge replacement or rehabilitate structure	No	No	$6,500	Medium			X		Within Blaine Urban Growth Area.
	S-9	Blaine Road (SR 548) / Dakota Creek Bridge Replacement	Bridge	Bridge replacement or rehabilitate structure	No	No	$13,000	Medium			X		Within City of Blaine (fully WSDOT funded).
	S-11	On and Off ramps of I-5 / Birch Bay-Lynden Road Interchange	Interchange ramps	Improve/ redesign the ramps intersection with turn lanes and install traffic signal when warranted	No	No	$3,400	High	X	X			
	S-12	I-5 / Birch Bay-Lynden Road Interchange	Interchange	Major reconstruction of interchange at Birch Bay-Lynden Road	No	No	N/A	Medium	X				
	S-13	I-5 / Grandview Rd Interchange	Interchange ramps	Improve/ redesign the ramps intersection with turn lanes and install traffic signal, when warranted	No	No	$3,500	Medium	X	X			
	S-14	I-5 / Grandview Road Interchange	Interchange	Reconstruction of interchange at Grandview Road	No	No	N/A	Medium	X				Potential long-term project to widen Grandview Road to add travel lanes to reduce queuing impacts.
	S-15	Birch Bay- Lynden Road / Blaine Road (SR 548)	Intersection	Construct intersection improvements to include roundabout or install turn lanes and traffic signal, when warranted.	Yes	No	$3,000	High	X	X			Potential Whatcom County funding.
	S-16	Grandview Road (SR 548) / Kickerville Road	Intersection	Construct intersection improvements to include roundabout or install turn lanes and traffic signal, when warranted.	No	No	$3,000	Medium	X	X			Potential Whatcom County funding.
	S-17	Grandview Road (SR 548) / Vista Drive	Intersection	Construct intersection improvements to include roundabout or install turn lanes and traffic signal, when warranted.	No	No	$3,000	High	X	X			
OTHER MODE	O-1	Park & Ride Facility	Birch Bay Town Center vicinity	Construct new park & ride lot (or 2 smaller lots) with defined parking stalls capacity to serve Birch Bay, Semiahmoo, and Blaine.	No	No	N/A	Medium	X			X	Whatcom Transit Authority lead. Carry out location and demand study prior to density becomes high. Could be along Harborview Birch Bay-Lynden corridor.
	O-2	Increase Transit Service	Countywide	Increase transit service between Birch Bay and Blaine, Ferndale, and Bellingham.	No	No	N/A	Medium	X			X	Whatcom Transit Authority lead.

Notes:

(1) Project is identified in County's current Transportation Improvement Program or is funded as part of State's Transportation Plan

(2) Represents planning level project cost estimates. Project costs will be refined during the project design phase.

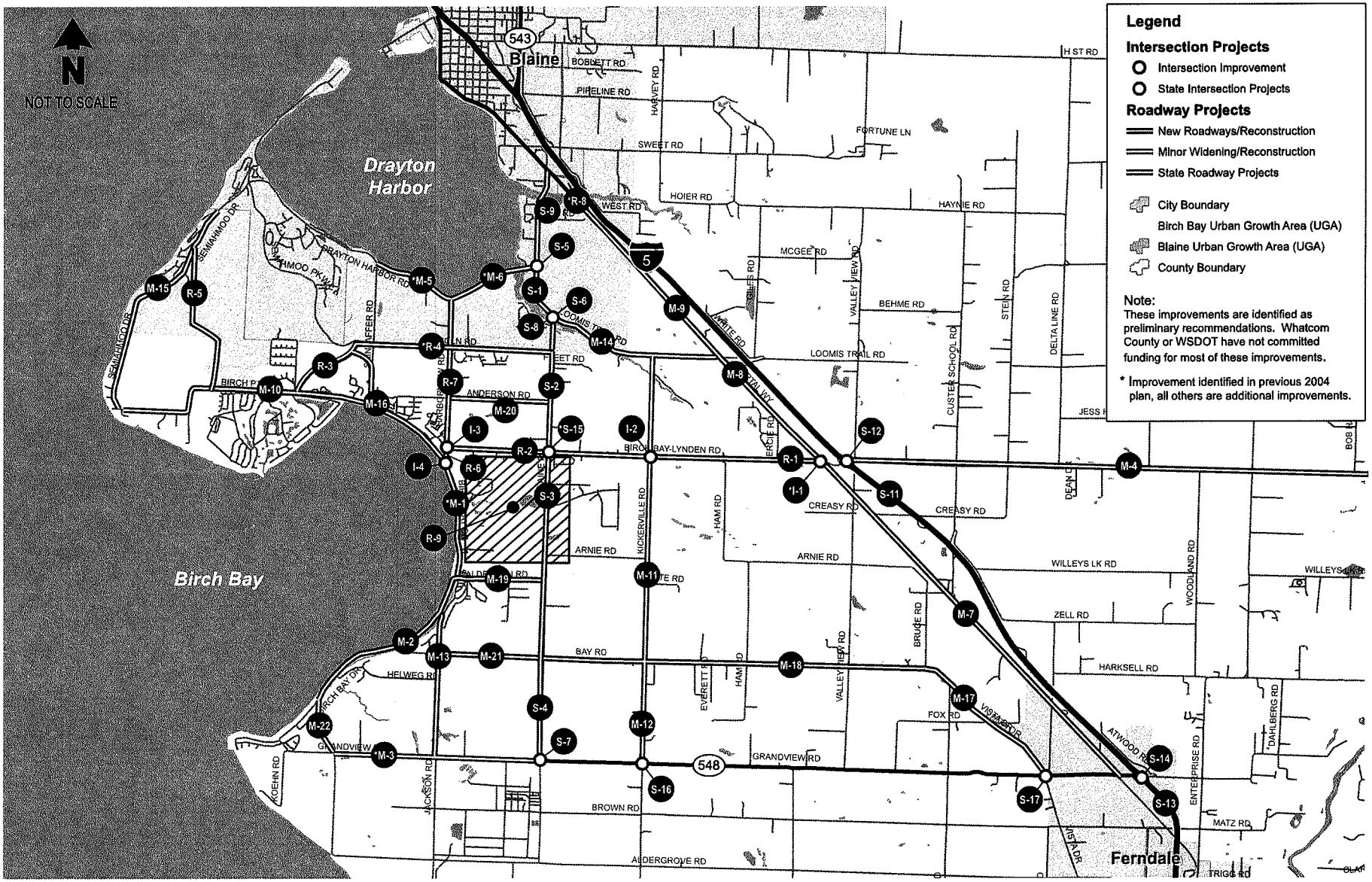

Figure 9

Birch Bay Study AreaTransportation Improvement Projects

Birch Bay Transportation Planning Study

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Improvements to the I-5/Birch Bay-Lynden Road interchange (projects S-11, S-12) are identified in the Study as high and medium priorities respectively. Improvements to this interchange have been identified to meet near and long term needs. Project S-11 will improve operations in the near term by redesigning the ramp intersections with turn lanes and installing a traffic signal, when future traffic volumes warrant. Project S-12 will provide a complete reconstruction of the interchange.

Improvements to the I-5/Grandview interchange (projects S-13, S-14) are also identified for the near and long term needs. Similar to project S-11, project S-13 is a high priority and is identified to improve operations at the ramp intersections by adding turn lanes and installing a traffic signal when future traffic volumes warrant. Project S-14 is a medium priority and will provide a complete interchange reconstruction to meet long-range forecast needs.

Blaine Road (SR 548) – Improvements are identified for Blaine Road both north and south of Birch Bay-Lynden Road. North of Birch Bay-Lynden Road, the Study calls for reconstructing Blaine Road, from I-5 to Birch Bay-Lynden Road (projects S-1, S-2). The improvement projects would add shoulders for non-motorized travel. Intersection improvements are identified at Drayton Harbor Road and Loomis Trail Road (projects S-5, S-6). These improvements include adding turn lanes and traffic signals or roundabouts when future traffic volumes warrant. The Study also identifies the replacement of two bridges in this corridor, the California Creek bridge and the Dakota Creek bridge (projects S-8, S-9).

South of Birch Bay-Lynden Road, the Study identifies reconstructing Blaine Road from Birch Bay-Lynden Road to Grandview Road (projects S-3, S-4). The section of Blaine Road north of Bay Road is within the Urban Growth Area for Birch Bay and as such would be reconstructed to WSDOT's standards, adding shoulders for non-motorized travel. South of Bay Road, Blaine Road should be constructed per WSDOT's rural collector standards. Intersections improvements at Birch Bay-Lynden Road and Grandview Road are also identified in the Study (projects S-15, S-7). A potential roundabout at the Blaine Road (SR 548)/Grandview Road (SR 548) intersection is currently being discussed by WSDOT as part of a developer funded improvement. Though the transportation planning study does not identify the intersection of Blaine Road and Alderson Road as falling below LOS standards within the study period, planned intensive land uses at the intersection may require intersection improvements as mitigation under SEPA at the time of development.

Grandview Road (SR 548) – Two intersection improvements, in addition to those identified at the I-5 interchange and at Blaine Road (SR 548), are identified in the Study. Improvements to the intersections of Grandview Road (SR 548) at Kickerville Road and at Vista Drive include the installation of turn lanes and roundabout or traffic signal when future traffic volumes warrant. The improvement at Vista Drive/Grandview Road (SR 548) is a high priority because it serves traffic to/from the Birch Bay UGA to I-5 via Bay Road.

However, the HSP does identify I-5 from Grandview Road to the City of Blaine as a "solution that requires further analysis" as the existing capacity will not be sufficient for future traffic volumes.

Intersection Projects

Improvements to intersections along County maintained arterials serving the Birch Bay area are needed to resolve existing and future deficiencies, primarily along Birch Bay-Lynden Road. This roadway serves as the main east-west arterial, connecting the Birch Bay area to I-

5 and the rest of the region. Intersection improvements along this corridor will improve safety and operations by adding turn lanes at key locations and installing traffic signals or roundabouts when future traffic volumes warrant. The Study identifies three high priority intersection improvements at Birch Bay-Lynden Road at Portal Way, Birch Bay-Lynden Road at Harborview Road, and Birch Bay Drive at Harborview Road.

New Roadways and Major Widening or Reconstruction Projects

Several new roadways and major widening projects are identified in the Study to address existing deficiencies and support future growth. This category of projects includes upgrading and major widening of roadways to County standards to provide turn lanes at major access locations. Improvements to non-motorized facilities, such as roadway shoulders, are also identified.

Birch Bay-Lynden Road Widening – Birch Bay-Lynden Road serves as the primary east-west arterial, connecting Birch Bay to I-5. In addition to the intersection improvements identified above, the Study calls for widening the roadway to meet rural major collector standards from Portal Way to the UGA boundary just east of Blaine Road (SR 548) and to urban principal arterial standards west to Harborview Road. These projects would improve facilities for non-motorized travel by paving roadway shoulders and/or adding sidewalks or separated pathways. In addition, the project would include widening to accommodate turn lanes at major access locations. This will allow safer and easier access for left turning vehicles along Birch Bay-Lynden Road.

Lincoln Road Extension and Improvement – To complete an alternative east-west corridor north of Birch-Bay Lynden Road, an extension of Lincoln Road between Harborview Road and Blaine Road (SR 548) is planned and funded for construction. In addition to extending the roadway, the project will improve Lincoln Road from Shintaffer Road to Blaine Road (SR 548) to urban minor arterial standards, including construction of two roundabouts at Harborview Road and Blaine Road. The project also includes a separated pathway for non-motorized travel.

Birch Point Connector Road – A new connection between Birch Bay Drive and Lincoln Road is also a key new collector route serving the northern part of the Birch Bay UGA. When fully constructed, this new roadway will provide improved mobility and an alternative to Birch Bay Drive for east-west traffic to/from the residential growth anticipated in the Birch Bay and Blaine UGAs. The project includes realigning the segment of Shintaffer Road south of Lincoln Road and constructing a new intersection at Lincoln Road. Part of the road is being funded and constructed by a developer. The remaining section will be a County project.

Harborview Road – Improvements are identified for Harborview Road from Birch Bay Drive to Drayton Harbor Road. The section of Harborview Road from Birch Bay Drive to Birch Bay-Lynden Road would be improved to reflect the existing and future demands of Birch Bay traffic traveling to I-5 via Birch Bay-Lynden Road. The section of Harborview Road from Birch Bay-Lynden Road to Drayton Harbor Road would be improved to urban collector standards. Both of these projects would include improve facilities for non-motorized travel.

Commercial Area Circulation Roads

In addition to specific improvements identified above, the Study calls for construction of new circulation roads within the planned Birch Bay UGA commercial area between Birch Bay-Lynden Road and Alderson Road. These new roadways would provide improved access and circulations to future development anticipated for this area, as well as help maintain safety and operations of adjacent arterials, collectors, and state highways.

Minor Widening and Reconstruction Projects

Improvements are also needed on other roadways serving the Birch Bay area. This category of projects includes minor widening of roadways to add shoulders and improve non-motorized facilities.

Birch Bay Drive – With its proximity to the waterfront, Birch Bay Drive serves as a primary non-motorized route within the Birch Bay UGA. The Birch Bay Drive Pedestrian Facility, part of the Birch Bay Shoreline Enhancement Project, is designed and identified in the County's six-year Transportation Improvement Program. This project would improve Birch Bay Drive roadway and provide separate facilities for pedestrians and bicyclists. The 2000 Birch Bay Economic Development Action Plan emphasized the need for improved pedestrian and bicycle facilities along Birch Bay Drive as part of the community's economic development strategy. A year round speed limit of 20 to 25 mph is recommended. Specific changes to speed limit should be considered with community input.

Loomis Trail Road – Loomis Trail Road serves as an east-west connector between Portal Way and Blaine Road, northeast of the Birch Bay UGA. The Study identifies improvements to reconstruct Loomis Trail Road to rural major collector standards. The project includes paved shoulders for non-motorized users.

Maintenance and Operations Programs

A systematic program for maintaining the existing and future transportation infrastructure is critical to a safe and efficient transportation system. Elements of a maintenance and operations program for the Birch Bay area should include a systematic evaluation of pavement conditions on arterial and local roadways, signage, sight distance (such as vegetation blocking sight lines), and impacts of parking on safety and operations. Other elements should include regular monitoring and servicing of traffic control devices, such as traffic signals and flashing beacons.

In addition, the maintenance and operations program should include a periodic evaluation of speed limits on facilities based on functional classification, design, and current roadway conditions. The speed evaluation should consider elements such as geometric design, actual travel speeds, intersection control, traffic safety, and possible impacts on adjacent corridors or neighborhood streets.

Public Transportation and Transportation Demand Management

Public transit and travel demand management (TDM) programs are important components in an integrated and comprehensive transportation system. These programs build on regional programs with refinements to reflect the specific needs of the Birch Bay area.

Public Transit

The Study identifies two transit related improvements. A new park & ride lot is identified for a location serving Birch Bay, Semiahmoo, and the City of Blaine. No specific site is identified for the park & ride, however potential locations along the Harborview, Birch Bay-Lynden Road, or Grandview Road corridors should be evaluated. A study is recommended to evaluate future transit demand and a potential future park & ride lot location.

In addition, the Study identifies increased fixed route transit service between Birch Bay and the destinations of Blaine, Ferndale, and Bellingham as a future need.

Transportation Demand Management Program

In addition to improving the transit system, reducing travel demand through transportation demand management (TDM) strategies can supplement other efforts in reducing peak hour congestion within the Birch Bay UGA. TDM programs consist of measures for reducing peak hour single occupancy vehicle travel that are primarily focused on larger employers. The Washington Commute Trip Reduction (CTR) Law (RCW 70.94.521) requires TDM performance targets for employers with over 100 employees. Currently there are no affected worksites within the Birch Bay area.

Whatcom County has a draft CTR plan that is scheduled for adoption in 2008. The study supports TDM strategies in the County's UGAs. These strategies focus on the integration of land use and transportation planning, as well as encouraging non-motorized travel.

Pedestrian and Bicycle Systems

A well connected non-motorized transportation system encourages healthy recreational activities, reduces vehicle travel demand, and enhances safety within the community. The projects included in Table 10 included pedestrian and bicycle facilities as part of the identified roadway improvements. In many cases, the proposed improvements include the addition or enhancement of roadway shoulders to accommodate non-motorized transportation within the Birch Bay. Included in these projects is the Birch Bay Drive Pedestrian Facility project.

The pedestrian system within the Birch Bay area is comprised of sidewalks, walkways, trails, and roadway shoulders. Within the UGAs, the County desires to have roadways improved to urban standards, which could include sidewalks or other types of pedestrian walkway facilities. Pedestrian facilities should be located along streets that provide access and connectivity to the commercial businesses, residential areas, parks, schools, public buildings, and transit stops within the Birch Bay UGA. Enhanced roadway shoulders outside the UGA will improve safety for pedestrian travel in those areas.

Within the Birch Bay area, the bicycle system is comprised of mostly roadways. Many of the roadways within the study area have deficient roadway shoulders or are without shoulders altogether. The major improvements for bicycle travel will be the addition or enhancement of roadway shoulders. An important component of the bicycle system is completion of the Coast Millennium Trail through Birch Bay, providing a bicycling link from the Canadian border to Bellingham and farther south. A portion of the trail has been completed south of Semiahmoo Parkway.

There are several proposed non-motorized facilities throughout the County, a few of which are in the Birch Bay area. Proposed non-motorized facilities in the study area include:

- Bicycle lane along Semiahmoo Parkway
- Off-road trail that would connect to a bicycle lane along Birch Bay Drive
- Off-road trail to continue south of the Birch Bay Drive bicycle lane
- Bicycle lane along Birch Bay-Lynden Road
- Bicycle lane along Portal Way
- Portion of the Coast Millennium Trail that begins near Alderson Road and Birch Bay Drive and continues south toward Ferndale
- Bicycle lane along Birch Bay Drive

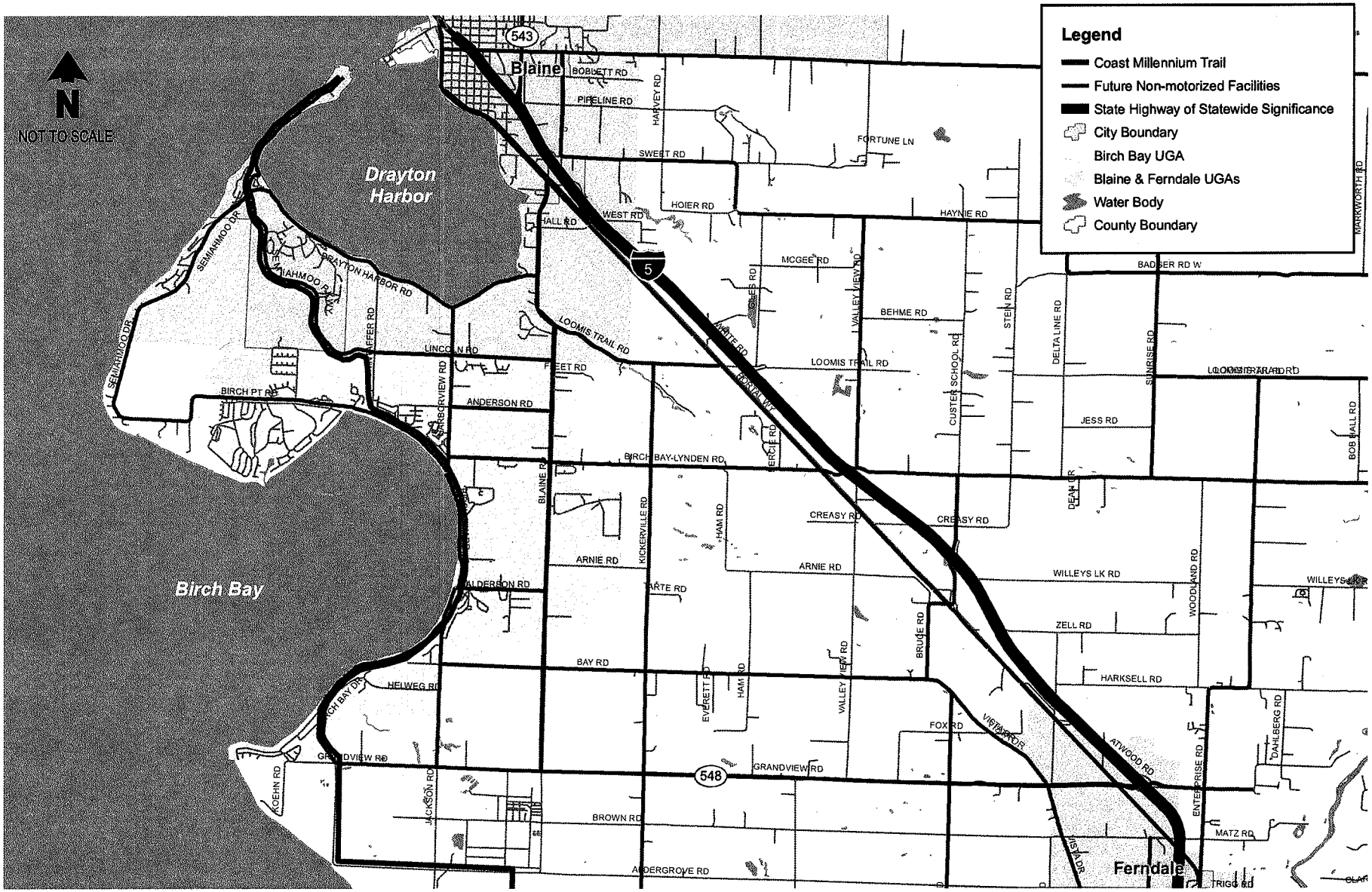

Figure 10
Birch Bay Study Area Non-motorized Transportation System Plan

Birch Bay Transportation Planning Study

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Project Cost Summary

Table 10 summarizes the list of improvement projects and programs. Planning level cost estimates are included for each project and program item. In addition to Whatcom County projects, the improvement program includes projects that are under the jurisdiction or lead of WSDOT. Table 11 provides a summary of the project cost estimates, by jurisdiction and improvement category.

Table 11. 20-Year Project Cost Summary

Improvement Category	Costs
Capital Improvements	
Birch Bay Area State Highway Improvements	$63,400,000
Birch Bay Area County Arterial Improvements	$85,350,000
Subtotal	*$148,750,000*
State Highway Improvement Cost per Year	**$3,170,000**
County Arterial Improvement Cost per Year	**$4,267,500**
County Programs	
Maintenance and operations (Overlays) Cost per Year[1]	$160,000
Maintenance and operations (Overlays) 20-Year Cost	$3,200,000
County Cost Subtotal	*$88,550,000*
County Cost per Year	**$4,427,500**
Total Project Cost	**$151,950,000**
Total Project Costs per Year	**$7,597,500**

1. Based on Birch Bay Incorporation Feasibility Study, March 2008

Over $150 million will be needed to fully fund the Birch Bay area's indentified needs through 2027. Over 95 percent of the County related costs will be needed in the form of capital improvements to upgrade the County arterial system serving the Birch Bay area. The Study also identifies over $3 million for maintenance and operations. An average of over $7.5 million per year would be required to fully fund the Birch Bay area's transportation needs by 2027.

Approximately 43 percent of the $148.75 million in capital transportation improvements is needed for improvements to state routes. Of the $63.4 million in state route improvements, approximately $7 million is needed for near term interchange improvements at I-5. The I-5 interchange improvements include signal and channelization improvements at the ramp intersections at Grandview Road and Birch Bay-Lynden Road. Long term needs at these locations call for the reconstruction of the interchanges themselves. The remaining $56.5 million in state highway improvements would be on along SR 548 with a significant portion of the costs associated with the Dakota Creek bridge replacement project, estimated at $13 million.

The highest cost for arterial improvements includes the Lincoln Road extension and improvement. This project accounts for over 10 percent of the non-state highway arterial improvements.

It is anticipated that existing funding sources will fall short of funding all of the improvement project needs identified in Table 10. Projects were prioritized to identify those projects that should be implemented first with the limited funding available. Table 12 summarizes the project costs by project type and relative priority.

The prioritization process considered the following:

- Project cost
- Project benefit
- Implementation complexity
- Project need

Table 12. Project Relative Priority

Project Type	High	Medium	Low	Total
Intersection	$9,000,000	$3,000,000	$0	**$12,000,000**
Major Road	$14,500,000	$11,000,000	$5,800,000	**$31,300,000**
Minor Road	$6,200,000	$16,300,000	$19,550,000	**$42,050,000**
State Route	$24,400,000	$39,000,000	$0	**$63,400,000**
Total	**$54,100,000**	**$69,300,000**	**$25,350,000**	**$148,750,000**

1. Table does not include projects for major reconstruction of I-5 interchanges at Birch Bay-Lynden Road and Grandview Road.
2. Table does not include transit service projects.

Of the projects categorized as high priority, approximately 45 percent are on state routes. This is consistent with the importance of state facilities to the Birch Bay area. Of the remaining high priorities, new roadways and major road widening/reconstruction projects make up the next largest share with approximately 27 percent or high priority projects. Intersection projects are the third largest share, approximately 17 percent, and minor widening/reconstruction projects are the smallest share of high priority projects at approximately 11 percent.

Although intersection projects are a relatively minor share of all high priority projects, they may provide the most value per dollar expended. Three of the four of intersection projects identified are categorized as a high priority.

ATTACHMENT A
PUBLIC PARTICIPATION SUMMARIES

June 2007 – Birch Bay Subarea Plan Update Open House Summary

Purpose and format

Whatcom County hosted an open house in Birch Bay at the Birch Bay Bible Community Church from 6:00 p.m. – 8:00 p.m. on June 12, 2007.

The purpose of the open house was to solicit comments from the public regarding their transportation concerns and potential improvement projects for the Birch Bay Urban Growth Area (UGA).

Attendees were able to learn about the results of a recent existing conditions analysis, areas where growth is anticipated, previously identified and anticipated transportation issues, and types of transportation improvements that may be proposed.

Display boards were placed at stations around the room to provide information to the attendees. Additionally, Whatcom County invited and provided a station for the Birch Bay Steering Committee. Attendees were asked to share their feedback, both written and verbal, on the information presented to them as well as suggest potential improvements to address specific issues.

A brief presentation was given at 6:45 pm to provide an overview of the purpose and need for the Birch Bay Subarea Plan update and the study objectives. The project team was available before and after the presentation to answer questions and talk with attendees about transportation issues in their community.

Summary of comments

Seventy-nine (79) people attended the open house. Thirty-one (31) people filled out a comment form and twenty-eight (28) comments were left on the flip charts. The consultants and staff also recorded comments from attendees.

There were four main themes that were noted from the comments:

- A large number of comments suggested that Lincoln Road between Harborview Road and Blaine Road should be connected. Many of these comments also recommended extending Lincoln Road to Portal Way, via Loomis Trail Road; an

additional interchange with I-5 could be constructed to improve regional connections.

- Many comments expressed the need for additional access to I-5 from Birch Bay, including an overpass for vehicles to cross the railroad tracks without having to wait for the train to pass. Emergency vehicles also need direct access to and from I-5 without having to wait at the train crossing. Commenters explained that it is difficult for drivers and emergency vehicles to access I-5 from Birch Bay due to the limited number of access routes, narrow roads, congestion and delays at the railroad crossing.

- Another frequently submitted comment was that vehicles drive at high rates of speed along Birch Bay Drive and that the speed limit should be maintained at 20-25 mph year round. Other people suggested a number of other improvements along Birch Bay Drive. Their suggestions included constructing bike and pedestrian paths, widening shoulders, and building seawalls or berms for erosion control. A significant number of comments also suggested the need to widen a number of roads within Birch Bay.

- A significant number of the comments suggested the need for bike and pedestrian improvements in the area. Other comments focused on the need for additional public transportation.

An attendee provided the project team with two suggestions via written letters for transportation improvements:

- Ditch restoration is needed throughout the Birch Bay community. The community provided results from a successful ditch restoration project in Sonoma County, California. Community members believe that this improvement would slow down run-off, eliminate standing pools of water, prevent children from playing in the ditches, eliminate soil bank erosion, discourage use of the ditches as dumping grounds for debris, prevent vehicles from going into the ditches, and reduce ditch maintenance.

- Construct a causeway across Drayton Harbor connecting Cherry Street to Shintaffer Road. The community believes that this improvement would improve the economic prosperity of downtown Blaine, eliminate the railroad crossing that can currently block access for fire and EMT units, cost less than the Lincoln extension, is in conjunction with the Drayton Harbor Road improvement, can redirect commuter traffic off of Birch Point Road from Birch Bay Village, Bay Ridge, Birch Bay View, and Semiahmoo, and provide an economic boost during the Olympics for Birch Bay and Blaine due to enhanced accessibility from both North and South I-5.

Additional comments by location

Additional comments from the open house are summarized below. They are organized by the location that they refer to *(the number in parentheses indicates the frequency of the question or comment).*

General Comments

- Display Board at public meeting illustrating six foot shoulders is incorrect. (2)
- Widen roads and shoulders. (2)
- City of Blaine, City of Ferndale, Birch Bay Steering Committee, and Whatcom County all need to work together rather than compete.
- Need to establish emergency evacuation route out of Birch Bay.
- The planners for the current construction between Birch Bay Village and I-5 have done a terrible job. Do not have this same agency in charge of future transportation improvements.
- The project team seems to be unaware that the Birch Bay community is a resort and retirement community primarily. And summer is the most populous time of year. Many of the year round residents are no longer employed.
- Infill prediction maps need to be modified to reconcile them with wetland maps.
- Plan for the future. Widen roads now that will need to be 4 lanes in 20-30 years.

Public and Non-Motorized Transportation

- Increase public transportation in Birch Bay. (4)
- Improve all existing shoulders in Birch Bay for pedestrians and bikers. (4)
- Add bike and pedestrian paths in Birch Bay.
- Add bike and pedestrian paths on at least one north/south and east/west route in Birch Bay.
- Add sidewalks and a trail network in Birch Bay near the beaches and businesses.
- Cherry point refinery would like WTA to provide service to their location. If WTA cannot accommodate, they may look into private service provider.

I-5 Access

- Additional I-5 access. Birch Bay-Lynden Road can't handle the current traffic volumes. (6)
- If additional access to I-5 from Birch Bay is constructed it needs to include an overpass at the railroad crossing that allow vehicles direct access to I-5. (5)
- Overpass at the railroad crossing that allows emergency vehicles to cross the railroad tracks without waiting for the train to pass. (4)
- Many of the residents in Birch Bay work at St. Joseph's Hospital in Bellingham and are on-call for emergency response. Birch Bay needs better access to I-5 in case of emergency. (3)
- Additional I-5 access, preferable at Loomis Trail. Birch Bay-Lynden Road can't handle the increase in traffic due to all the development taking place in the Birch Bay UGA.

- Complete the road that allows the Birch Bay Village access to I-5 without going on Birch Bay Drive.
- Finish construction on Birch Point Drive extension that will connect to Semiahmoo Parkway. This route is important to travel from Birch Bay Village to Cost Cutter in Blaine, and to access I-5.

Birch Bay Drive

- The speed limit should be decreased to 20-25 mph year round on Birch Bay Drive due to vehicles moving at high speeds. (8)
- Birch Bay Drive to SR 548 is too narrow. (2)
- Don't initiate any transportation improvement projects along Birch Bay Drive, including trails and berms. It would only encourage people to use the private beaches. (2)
- Add bike and pedestrian paths along Birch Bay Drive. (2)
- Birch Bay Drive can not be closed down to one lane during construction. Existing roads must remain open during construction.
- Widen Birch Bay Drive to four lanes.
- Do not eliminate access to Birch Bay Drive.
- Birch Bay Drive needs transportation improvements.
- The speed limit on Birch Bay Drive should either be limited to 10 mph or it should be widened.
- Bike paths are needed on roads within Birch Bay and between Birch Bay and Blaine.
- Construct a seawall along Birch Bay Drive.
- Construct six foot shoulders along Birch Bay Drive.
- The presentation did not address current and future construction on Birch Bay Drive. Many of us are from Birch Bay Village and are very concerned about this and want more information.

Birch Bay-Lynden Road

- Intersection of Birch Bay-Lynden Road and Portal Way is very congested. (3)
- Widen Birch Bay-Lynden Road between Harborview Road and I-5. (3)
- Intersection of Birch Bay-Lynden Road and Blaine Road is dangerous and congested.
- Birch Bay-Lynden Road is dangerous and congested.
- Intersection of Birch Bay-Lynden Road and Portal Way needs to have an overpass over the railroad crossing that allows provides direct access to I-5. Emergency vehicles need better access to/from Birch Bay.
- Delays at Portal Way and Birch Bay-Lynden Road due to railroad crossing. Whatcom County should work with BNSF to see if they can run their trains at off-peak traffic hours to accommodate commuters.
- Add a roundabout at the intersection of Harborview Road and Birch Bay-Lynden Road and at the intersection of Blaine Road and Birch Bay-Lynden Road.

- Transportation improvements at Peace Arch Outlet Stores will create congestion at the intersection of Portal Way and Birch Bay-Lynden Road. Additionally this intersection has a railroad crossing which also creates additional congestion.

Lincoln Road

- Continuation of Lincoln Road between Harborview Road and Blaine Road. (10)
- Extend Lincoln Road to Portal Way and add additional access to I-5. (5)
- Lincoln Road needs wide shoulders. Currently there are no shoulders and this roadway is unsafe. (3)
- Add bike and pedestrian paths along Lincoln Road. (2)
- SR 548 between Lincoln and Birch Bay-Lynden Road.
- Widen Lincoln Road.

Drayton Harbor Road

- Make improvements along Drayton Harbor Road in order to alleviate traffic volumes on Lincoln Road.
- Drayton Harbor Road needs to be improved.

Blaine Road

- Widen Blaine Road. (2)
- The section of Blaine Road between Drayton Harbor Road and Peace Portal Drive is too narrow. (2)
- Blaine Road has high levels of congestion and no shoulders.

Portal Way

- Roundabout at intersection of SR 548 and Portal Way.
- Congestion issues at the intersection of SR 548 and Portal Way. During the peak morning hours the queue backs up over one mile. A traffic signal needs to be installed at this intersection rather than a four way stop or a roundabout.

Anderson Road

- Six foot shoulders should be constructed on Anderson Road.
- Widen Anderson Road between Shintaffer Road and Blaine Road and add bike and pedestrian paths.

Harborview Road

- Six foot shoulders are needed on Harborview Road.
- Six foot shoulders on Harborview Road do not exist as your map indicates.

Birch Point Road

- The section of Birch Point Road between Selder Road and Birch Bay Drive experiences severe congestion and vehicles traveling at high rates of speed.
- Steep grade being constructed on Birch Point Road will be dangerous in winter when roads are icy.

- It needs to be determined what effect construction on Birch Point Road will have on existing flood conditions and lakes in Birch Bay Village.

Bay Point Road

- Close Bay Point Road to the public and allow access exclusively to land owners. Add beach parking and bike and pedestrian paths.

Jackson Road

- Jackson Road is too narrow. (2)

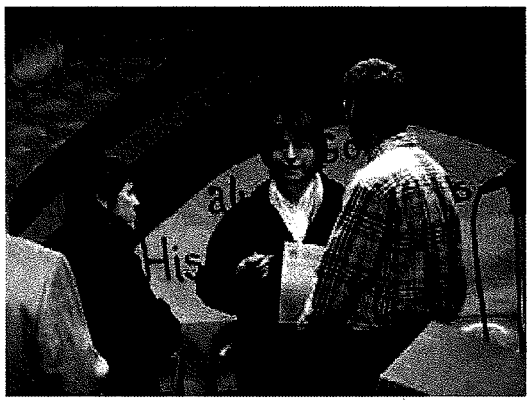
Other Locations

- Construct extension from Selder Road to Semiahmoo Parkway.
- Construct a causeway between Cherry Street in Blaine and Shintaffer Road in Birch Bay.
- New road needs to be built parallel to Birch Bay Drive between Birch Bay-Lynden Road and Alderson Road.
- Construct a roadway parallel to Blaine Road and Birch Bay Drive. Birch Bay is in need of an alternative way to drive around the bay.

December 2007 – Birch Bay Subarea Plan Update Open House Summary

Purpose and format

Whatcom County hosted an open house in Birch Bay at the Birch Bay Bible Community Church from 6:00 p.m. – 8:00 p.m. on December 11, 2007.



The purpose of the open house was to solicit feedback from the public on the list of proposed transportation improvement projects being considered for the Birch Bay Urban Growth Area (UGA).

Attendees were able to learn about the current condition of the transportation system in Birch Bay, areas where growth is anticipated, transportation issues that have already been identified by the community, and the potential improvement projects that may be used to address transportation issues.

Display boards were placed at stations around the room to provide information to the attendees. Attendees were asked to share their feedback, both written and verbal, on the information presented to them as well as provide feedback on the list of proposed improvement projects for the Birch Bay area.

A brief presentation was given at 6:45 pm to provide an overview of the existing and future traffic conditions in the Birch Bay area and to review the list of proposed improvement projects and funding strategies to address transportation issues in the community. The project team was available before and after the presentation to answer questions and talk with attendees.

Summary of comments

Forty-two (42) people attended the open house. Eight (8) people filled out a comment form and fifteen (15) comments were left on the flip charts that were displayed around the room. The project team also recorded comments from attendees.

There were two primary themes noted from the comments:

- The majority of the comments received focused on the need for a network of bike and pedestrian paths throughout the community.

- Many of the comments also suggested the need for improved public transportation to serve a larger area and run more frequently.

Two attendees provided the project team with suggestions via written letters regarding transportation issues in the area:

- The Blaine Municipal Airport is an important component of the community and should not be closed.

- 1) Priority should not be given to the widening of Grandview Road from Lincoln Road to Point Whitehorn Road. 2) Capital investment to make downtown Birch Bay a countywide and regional attractor through implementation of the Design Guidelines efforts of the Steering Committee in 2006 and early 2007.

Additional comments by theme

Additional comments from the open house are summarized below. They are organized by theme *(the number in parentheses indicates the frequency of the question or comment).*

General Comments

- Many roads in the Birch Bay and Blaine area have striping that is barely visible. Repaint the areas that have faded. *(2)*
- Road side ditches are dangerous and need to be improved. *(2)*
- Use Birch Bay tax dollars for improvements in Birch Bay.
- Implement moratorium on growth if roads and other transportation infrastructure can not be in place.
- Prioritize transportation improvements along bus routes.
- Access to and from Birch Bay is restricted if a train is stopped on the tracks.
- Improve the existing transportation infrastructure so that it can support larger commercial area.
- The UGA does not include critical surrounding areas that are related to the forecasted growth and transportation challenges.
- Need east/west road from Birch Bay Drive to Blaine Road about midway between Birch Bay-Lynden Road and Alderson Road.
- Need north/south road from Birch Bay-Lynden Drive to Alderson Road between Birch Bay Drive and Blaine Road.

Public and Non-Motorized Transportation

- Add bike and pedestrian paths in Birch Bay. *(8)*
- Increase public transportation in Birch Bay. *(3)*
- Improve shoulders in Birch Bay for pedestrians and bikers. *(2)*

Speed Limit

- The speed limit in Birch Bay Village should be lowered year round. *(2)*

- Radar speed signs would be a good investment for Birch Bay Drive.

Water Quality

- Preserve the water quality in the bay by treating storm water runoff. *(3)*

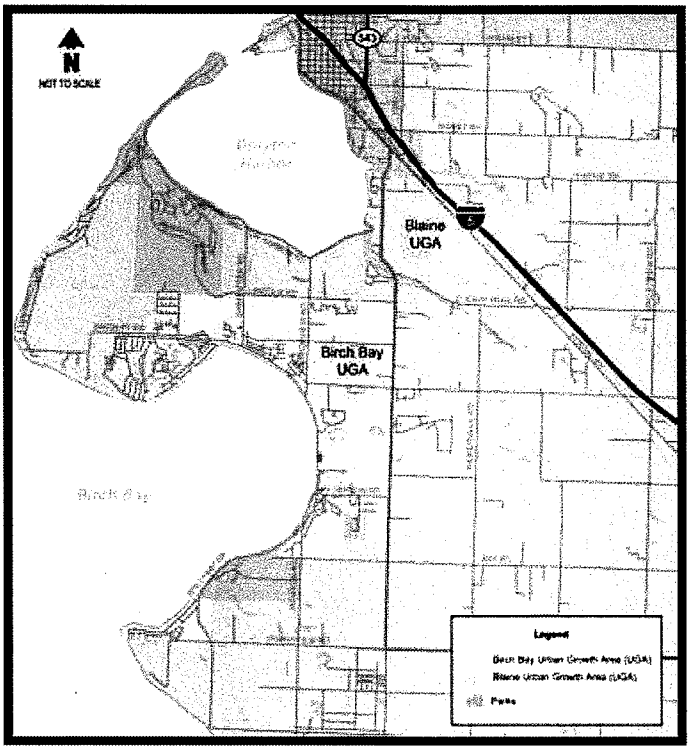
Birch Bay Subarea Transportation Plan Update

Planning the future transportation system in Birch Bay

- The Birch Bay Subarea Transportation Plan, originally adopted in September 2004, is being updated in 2008 to include a list of recommended transportation improvement projects and policies to improve safety and address the growth anticipated in the Birch Bay area over the next 20 years
- The County is identifying and evaluating roadway, non-motorized, and transit options and developing an updated plan that incorporates community priorities and addresses funding and implementation strategies
- Input from commuters, residents, recreational users and businesses is important to help identify and establish the community's priorities when addressing the transportation needs in the subarea
- The Birch Bay Subarea Transportation Plan update is being developed in parallel with the County's current efforts to develop a transportation concurrency management program and transportation impact fee program

For more information about these and other county planning efforts, visit the County Planning and Development Services Web site at:

http://www.co.whatcom.wa.us/pds/planning/index.jsp



Birch Bay Subarea Transportation Plan Update Study Area
UGA = Urban Growth Area

Birch Bay Subarea Transportation Plan Update Timeline

Spring 2007

- Looked at a snapshot of the transportation system in Birch Bay today
- Gathered data on existing land uses, safety problems, traffic circulation and congestion

June 2007

- Hosted a public open house to gather community concerns and identify local transportation issues

Summer/Fall 2007

- Looked at what the transportation system may look like in the future
- Gathered data on household and employment growth, potential safety impacts, and future traffic patterns
- Identified potential improvement projects to address these concerns, including non-motorized and transit opportunities

December 2007

- Hosted a second public open house to gather feedback on the potential improvement projects and the community's priorities

Winter 2008

- Continue to gather public feedback
- Finalize the list of potential improvement projects
- Consider project costs, priorities, implementation strategies and funding options
- Draft the Birch Bay Subarea Transportation Plan Update

Spring 2008

- Work with the Birch Bay community and the Whatcom County Council to review and revise the draft plan
- Finalize and adopt the updated Birch Bay Subarea Transportation Plan

For more information

Whatcom County Planning and Development Services Web site

http://www.co.whatcom.wa.us/pds/planning/index.jsp

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Birch Bay Subarea Transportation Plan Update

What are the challenges?

Whatcom County has identified issues that need to be addressed in the Birch Bay and Blaine Urban Growth Areas (UGA), based on population and economic growth projections, traffic and safety data, and feedback from the local community.

Residential growth

- Approximately 7,800 households are expected to be added in the Birch Bay UGA, City of Blaine, and the Blaine UGA by the year 2027.

Employment growth

- Approximately 2,500 employees are expected to be added in the Birch Bay UGA, City of Blaine, and the Blaine UGA by the year 2027.

Collisions and traffic delays

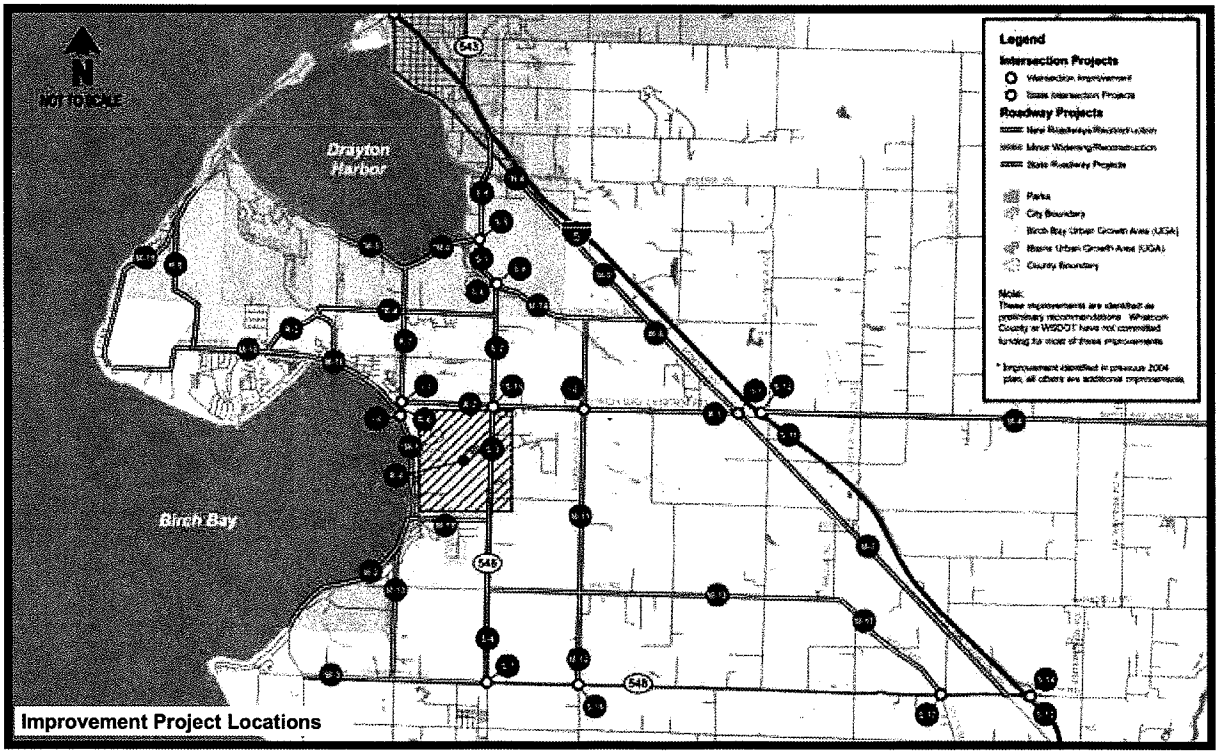
- Safety issues have been identified on parts of Birch Bay Drive, Birch Bay-Lynden Road, Bay Road, Portal Way and Grandview Road.

- Intersections that are currently congested within or near the Birch Bay UGA during afternoon peak hours traffic include the intersections of Birch Bay-Lynden Road with Harborview Road, Portal Way, Interstate-5 and Valley View Road, and the intersection of Birch Bay Drive and Harborview Road.

Preliminary Recommended Improvement Projects

Whatcom County has identified 43 potential improvement projects through the plan update process in addition to the 8 transportation projects that were already included in the original 2004 Birch Bay Subarea Transportation Plan.

These improvement projects will foster development of the future transportation network for the Birch Bay area, and support a balance of motorized and non-motorized transportation facilities as well as expanded transit service needs. The community's priorities will need to be established, as it will not be realistic for the county, neighboring cities or the Washington State Department of Transportation, who will be responsible for implementing these projects, to fully fund and construct all of these improvements in the short term.



Improvement Project Locations

Project Group	Project Group ID	Project Name	Project Description	Relative Priority	Total Project Cost ($1,000,000s) Estimated
INTERSECTIONS PROJECTS	I-1*	Birch Bay- Lynden Road / Portal Way	Construct intersection improvements to include turn lanes and install traffic signal when, warranted.	High	$3,000,000
	I-2	Birch Bay-Lynden Road / Kickerville Road	Construct intersection improvements to include roundabout or install turn lanes and traffic signal, when warranted.	Medium	$3,000,000
	I-3	Birch Bay-Lynden Road / Harborview Road	Construct intersection improvements to include turn lanes and install traffic signal when warranted.	High	$3,000,000
	I-4	Birch Bay Drive / Harborview Road	Improve/ redesign the intersection with turn lanes, and install traffic signal when warranted.	High	$3,000,000
NEW ROADWAYS AND MAJOR WIDENING OR RECONSTRUCTION PROJECTS	R-1	Birch Bay-Lynden Road Widening	Widen to rural major collector standards including turn lanes at major access locations and paved shoulders for non-motorized trips.	High	$1,500,000
	R-2	Birch Bay-Lynden Road Widening	Widen to urban principal arterial standards including turn lanes and non-motorized facilities.	High	$1,800,000
	R-3	Birch Point Connector Road	Construct new 2-lane connection at urban standards including non-motorized facilities and new intersection with Semiahmoo Drive.	High	$2,000,000
	R-4*	Lincoln Road Extension and Improvement	Reconstruct existing road and construct 2-lane urban arterial to Blaine Road with non-motorized enhancement including construction of roundabouts at intersections with Blaine Road and Harborview Road.	High	$9,000,000
	R-5	West Blaine UGA Connector Road	Construct new 2-lane road to urban standards between Birch Point Road and Semiahmoo Drive to serve future urban development.	Low	$4,800,000
	R-6	Harborview Road	Improve roadway to urban principal arterial standards including non-motorized facilities.	High	$200,000
	R-7	Harborview Road	Improve roadway to major collector standards including non-motorized facilities.	Low	$1,000,000
	R-8*	Portal Way/Dakota Creek Bridge #500	Bridge replacement or rehabilitate structure	Medium	$5,000,000
	R-9	Commercial area circulation roads	Local circulation urban road(s) as part of future development.	Medium	$6,000,000
MINOR WIDENING AND RECONSTRUCTION PROJECTS	M-1*	Birch Bay Drive	Improve roadway to urban minor arterial standards including non-motorized facilities.	High	$5,000,000
	M-2	Birch Bay Drive	Improve to urban minor arterial standards including non-motorized facilities.	Medium	$1,800,000
	M-3*	Grandview Road	Improve to rural collector road standards with paved shoulders for non-motorized travel.	Low	$3,000,000
	M-4	Birch Bay-Lynden Road	Improve to rural major collector standards including paved shoulders for non-motorized travel.	Medium	$5,000,000
	M-5*	Drayton Harbor Road	Reconstruct, repair road slope and pavement and upgrade roadway.	Medium	$1,800,000
	M-6*	Drayton Harbor Road	Improve to rural collector standards with shoulders for non-motorized travel.	Medium	$1,800,000
	M-7	Portal Way	Reconstruct to major collector standards including paved shoulders for non-motorized travel.	Low	$3,000,000
	M-8	Portal Way	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	Medium	$1,200,000
	M-9	Portal Way	Reconstruct to major collector standards including paved shoulders for non-motorized travel.	Low	$1,800,000
	M-10	Birch Point Road	Reconstruct to urban minor arterial standards including non-motorized facilities	Low	$3,000,000
	M-11	Kickerville Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	Low	$2,400,000
	M-12	Kickerville Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	Low	$650,000
	M-13	Jackson Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	Low	$1,200,000
	M-14	Loomis Trail Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	High	$1,200,000
	M-15	Semiahmoo Drive	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	Low	$2,000,000
	M-16	Shintaffer Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	Low	$600,000
	M-17	Vista Drive	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	Medium	$1,500,000
	M-18	Bay Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	Medium	$2,600,000
	M-19	Alderson Road	Reconstruct to rural collector standards including paved shoulders for non-motorized travel.	Medium	$600,000
STATE ROUTE PROJECTS	S-1	Blaine Road (SR 548)	Reconstruct and widen to add turn lanes and shoulders/non-motorized facilities at urban standards (WSDOT standards).	High	$6,000,000
	S-2	Blaine Road (SR 548)	Reconstruct and widen to add turn lanes and shoulders/non-motorized facilities at urban standards (WSDOT standards).	High	$5,000,000
	S-3	Blaine Road (SR 548)	Reconstruct and widen to add turn lanes and non-motorized facilities to meet urban standards (WSDOT standards).	Medium	$7,000,000
	S-4	Blaine Road (SR 548)	Reconstruct to rural collector standards (WSDOT standards), including replacement of culvert at Terrell Creek.	Medium	$4,000,000
	S-5	Blaine Road (SR 548) / Drayton Harbor Road	Improve/redesign the intersection with turn lanes and install traffic signal when warranted.	High	$2,000,000
	S-6	Blaine Road (SR 548) / Loomis Trail Road	Improve/redesign the intersection with turn lanes and install traffic signal when warranted.	Medium	$2,000,000
	S-7	Blaine Road (SR 548) / Grandview Road	Improve/ redesign the intersection , and install traffic signal with turn lanes when warranted or a roundabout facility	High	$2,000,000
	S-8	Blaine Road (SR 548) / California Creek Bridge Replacement	Bridge replacement or rehabilitate structure	Medium	$6,500,000
	S-9	Blaine Road (SR 548) / Dakota Creek Bridge Replacement	Bridge replacement or rehabilitate structure	Medium	$13,000,000
	S-10	I-5 / Blaine exit Interchange Reconstruction	Rebuild I-5 Exit 276 (Blaine Interchange)	High	$14,000,000
	S-11	On and Off ramps of I-5 / Birch Bay-Lynden Road Interchange	Improve/ redesign the ramps intersection with turn lanes and install traffic signal when warranted	High	$3,400,000
	S-12	I-5 / Birch Bay-Lynden Road Interchange	Major reconstruction of interchange at Birch Bay-Lynden Road	Medium	N/A
	S-13	I-5 / Grandview Rd Interchange	Improve/ redesign the ramps intersection with turn lanes and install traffic signal, when warranted	Medium	$3,500,000
	S-14	I-5 / Grandview Road Interchange	Reconstruction of interchange at Grandview Road	Medium	N/A
	S-15*	Birch Bay- Lynden Road / Blaine Road (SR 548)	Construct intersection improvements to include roundabout or install turn lanes and traffic signal, when warranted.	High	$3,000,000
	S-16	Grandview Road (SR 548) / Kickerville Road	Construct intersection improvements to include roundabout or install turn lanes and traffic signal, when warranted.	Medium	$3,000,000
	S-17	Grandview Road (SR 548) / Vista Drive	Construct intersection improvements to include roundabout or install turn lanes and traffic signal, when warranted.	High	$3,000,000
OTHER PROJECTS	O-1	Park & Ride Facility	Construct new park & ride lot (or 2 smaller lots) with defined parking stalls capacity to serve Beirch Bay, Semiahmoo, and Blaine.	Medium	N/A
	O-2	Increase Transit Service	Increase transit service between Birch Bay and Blaine, Ferndale, and Bellingham.	Medium	N/A

1 Represents planning level project cost estimates. Project costs will be refined during the project design phase.

Notes:
These improvements are identified as preliminary recommendations. Whatcom County or WSDOT have not committed funding for most of these improvements.

* Improvement identified in previous 2004 plan, all others are additional improvements.

Birch Bay Subarea Transportation Plan Update

What have we heard from the Birch Bay community?

Whatcom County held two public open houses in June and December of 2007 to gather feedback from the local community and identify other issues to be addressed by the subarea plan update. Recommendations from the community included the following comments:

- "We need more reliable access to and from I-5. Birch Bay-Lynden Road can not handle the current traffic volumes."
- "Emergency vehicles that service the Birch Bay area need direct access to and from I-5 without having to wait at the train crossing."
- "Consider connecting Lincoln Road between Harborview Road and Blaine Road to create additional east-west access for our community."
- "Please increase public transportation service in Birch Bay."
- "Key areas in our community need to be connected with bike paths. All roads should have improved shoulders to allow bike and pedestrian travel, and a safe place for drivers to pull of the road."
- "The speed limit should be decreased year round on Birch Bay Drive."

Funding strategies

The total cost to implement the proposed improvements is $160.85 million

Current available funding will not be able to cover all of the identified potential improvement projects. A funding strategy will be incorporated into the transportation plan update and will identify a number of potential funding sources which may include:

- local, county, city, state or federal funds
- impact fees or other developer improvements
- grants
- legislative appropriations

Concurrency Management and Impact Fee Program Development

Whatcom County is planning ahead for the growth expected to occur over the next twenty years. The County is committed to implementing policies and plans to keep your communities safe, move our economy forward, and maintain the quality of life unique to our community.

To better tie transportation improvements with new development, Whatcom County is developing two transportation programs – a Transportation Concurrency Management Program and a Transportation Impact Fee Program.

What is transportation concurrency?

- Counties are required by the Washington State Growth Management Act (GMA) to ensure that its transportation system can adequately support approved developments in a timely manner, or concurrent with development
- The County cannot approve a new development if the transportation system will not meet adopted service standards with the additional impact of that development, unless measures to accommodate that development are agreed upon and implemented along with the project
- The Transportation Concurrency Management Program will update the interim program adopted in December 2007
- The end result will be a program that aligns with the County's vision for a safe and efficient transportation system that will support the projected population and employment growth with the available funding resources

What are transportation impact fees?

- Transportation impact fees are a tool that can be used by Whatcom County under the GMA to help fund transportation improvements necessary to help offset the impacts of growth
- The fees are collected as a part of the approval process for a new development, and are used to help fund transportation improvements needed to serve new growth
- The amount charged is based on the additional demand on the transportation system that will be created by the new development and the cost of the improvements to meet that demand
- These fees cannot be used to resolve existing deficiencies or to fully fund the cost of needed transportation improvements
- Impact fees must be used in combination with other potential funding sources to pay for improvements

Birch Bay Subarea Transportation Plan Update Timeline

Spring 2007

- Looked at a snapshot of the transportation system in Birch Bay today
- Gathered data on existing land uses, safety problems, traffic circulation and congestion

June 2007

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- Identified potential improvement projects, including non-motorized and transit opportunities

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Winter 2008

- Continue to gather public feedback
- Finalize the list of potential improvement projects
- Consider project costs, priorities, implementation strategies and funding options
- Draft the Birch Bay Subarea Transportation Plan Update

Spring 2008

- Work with the Birch Bay community and the Whatcom County Council to review and revise the draft plan
- Finalize and adopt the updated Birch Bay Subarea Transportation Plan

For more information

Whatcom County Planning and Development Services Web site:
http://www.co.whatcom.wa.us/pds/planning/index.jsp

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Birch Bay
Subarea Transportation Plan Update

Planning the future transportation system in Birch Bay

- The Birch Bay Subarea Transportation Plan, originally adopted in September 2004, is being updated in 2008 to include a list of recommended transportation improvement projects and policies to improve safety and address the growth anticipated in the Birch Bay area over the next 20 years
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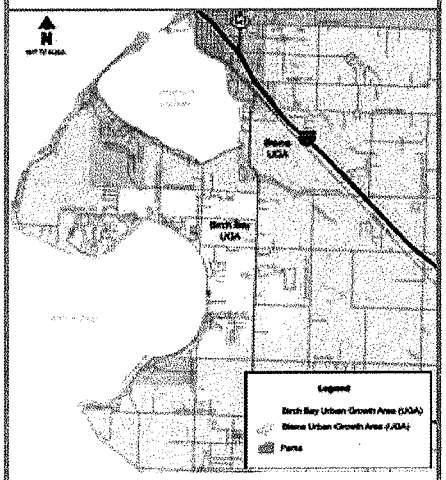
Birch Bay Subarea Transportation Plan Update Study Area



UGA = Urban Growth Area

For more information

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What are the challenges?

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For more detailed information about the preliminary recommended improvement projects shown on the map below, please contact John Everett at (360) 676-6907.

Residential growth

- Approximately 7,800 households are expected to be added in the Birch Bay UGA, City of Blaine, and the Blaine UGA by the year 2027.

Employment growth

- Approximately 2,500 employees are expected to be added in the Birch Bay UGA, City of Blaine, and the Blaine UGA by the year 2027.

Collisions and traffic delays

- Safety issues have been identified on parts of Birch Bay Drive, Birch Bay-Lynden Road, Bay Road, Portal Way and Grandview Road
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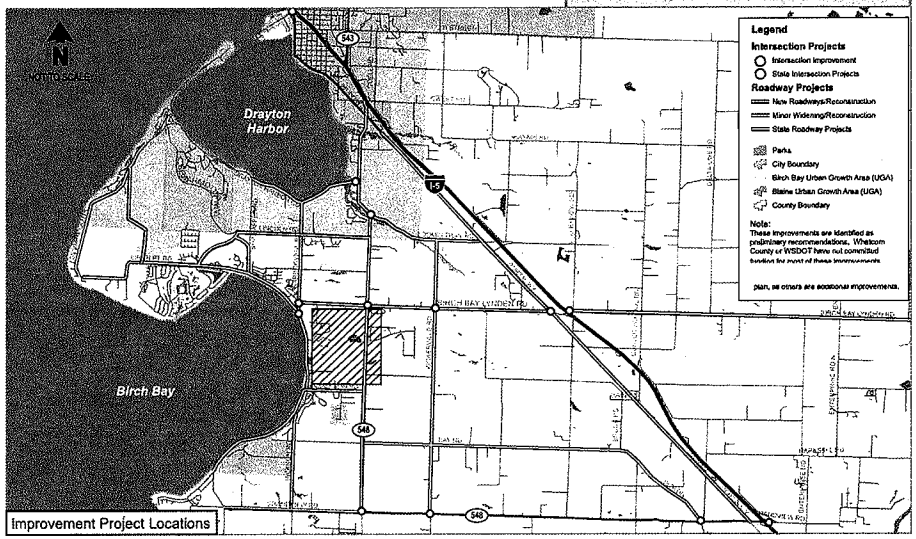

Improvement Project Locations

What have we heard from the Birch Bay community?

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ATTACHMENT B
LEVEL OF SERVICE DEFINITIONS

Highway Capacity Manual, 2000

Signalized intersection level of service (LOS) is defined in terms of the average total vehicle delay of all movements through an intersection. Vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time. Specifically, LOS criteria are stated in terms of average delay per vehicle during a specified time period (for example, the PM peak hour). Vehicle delay is a complex measure based on many variables, including signal phasing (i.e., progression of movements through the intersection), signal cycle length, and traffic volumes with respect to intersection capacity. Table 1 shows LOS criteria for signalized intersections, as described in the *Highway Capacity Manual* (Transportation Research Board, Special Report 209, 2000).

Table 1. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (sec/veh)	General Description (Signalized Intersections)
A	≤10	Free Flow
B	>10 - 20	Stable Flow (slight delays)
C	>20 - 35	Stable flow (acceptable delays)
D	>35 - 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 - 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

Unsignalized intersection LOS criteria can be further reduced into two intersection types: all-way stop-controlled and two-way stop-controlled. All-way, stop-controlled intersection LOS is expressed in terms of the average vehicle delay of all of the movements, much like that of a signalized intersection. Two-way, stop-controlled intersection LOS is defined in terms of the average vehicle delay of an individual movement(s). This is because the performance of a two-way, stop-controlled intersection is more closely reflected in terms of its individual movements, rather than its performance overall. For this reason, LOS for a two-way, stop-controlled intersection is defined in terms of its individual movements. With this in mind, total average vehicle delay (i.e., average delay of all movements) for a two-way, stop-controlled intersection should be viewed with discretion. Table 2 shows LOS criteria for unsignalized intersections (both all-way and two-way, stop-controlled).

Table 2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

ATTACHMENT C
FORECAST LAND USE METHODOLOGY TECHNICAL MEMORANDUM

The Transpo Group

MEMORANDUM

Date:	October 23, 2007	**TG:**	06229.00
To:	John Everett, Whatcom County		
From:	Patrick Lynch, AICP, The Transpo Group Carmen Bendixen, The Transpo Group		
Subject:	DRAFT Birch Bay Subarea Land Use Methodology		

This memorandum summarizes The Transpo Group's process for updating the existing and forecast land use in support of the travel demand modeling effort for the Birch Bay Subarea Transportation Plan. The land use data generates the transportation demands that are the foundation on which the Plan is based. The main objective of this process is to establish the existing baseline and future forecast that provides a reasonable basis to assess future land use and transportation system needs for the Birch Bay area.

The following outlines the general process for updating the land use for the Birch Bay area:

- Reviewed and refined the Transportation Analysis Zone structure for the Birch Bay area
- Updated existing land use data for the study area based on Whatcom Council of Governments (WCOG) 2005 land use data and a county-wide aerial photo.
- Updated forecast land use based on WCOG 2027 land use data and economic data provided by ECONorthwest.

The following exhibits and appendices are attached:

- Exhibit 1 – Original WCOG Model TAZs in Birch Bay Subarea
- Exhibit 2 – Refined Whatcom County Model TAZs in Birch Bay Subarea
- Exhibit 3 – Household Land Use in Birch Bay Subarea
- Exhibit 4 – Employment Land Use in Birch Bay Subarea
- Exhibit 5 – Blaine and Birch Bay Population and Employment Estimates
- Exhibit 6 – Birch Bay UGA and Blaine City and UGA Land Use Controls
- Appendix A – ECONorthwest Land Use Evaluation Memorandum
- Appendix B – Final 2005 and 2027 Land Use Tables

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Transportation Analysis Zone (TAZ) Structure

The TAZ structure from the WCOG model provided the starting point for the Birch Bay Subarea Transportation Plan travel forecasting model. From this structure, a refined TAZ structure was developed for the Birch Bay area to provide the added detail needed for preparing the Birch Bay Subarea Transportation Plan. The additional detail is needed for evaluating transportation system needs on collectors and at intersections serving the subarea. **Exhibits 1** and **2** illustrate the locations of the original TAZs and the new refined TAZs.

The Birch Bay Subarea model includes all TAZs within the Birch Bay Urban Growth Area (UGA), and TAZs covering the adjacent Blaine UGA. TAZs south and east of the Birch Bay UGA also were included to ensure primary travel corridors serving the Birch Bay Subarea were included in the analyses. This includes trip producers and attractors as far south as the Cherry Point Refinery and east of I-5.

A total of 30 original WCOG TAZs were the focus of the Birch Bay Subarea for the more detailed travel forecasting purposes of the Subarea Plan. For the size of this geographic area, the number and size of these TAZs in the Birch Bay Study area were not as sufficient as desired; therefore, the original TAZs had to be divided into smaller and more distinct zones.

The WCOG TAZs and land use allocations within the selected travel forecast model subarea boundary were entered into an Excel spreadsheet for allocation and analysis purposes. These TAZs were subdivided and the WCOG boundaries were refined to support the more detailed model. The refinement was based on the locations of the UGA boundaries, natural features, the roadway network, and zoning designations. The new set of subarea TAZs was renumbered. The original 30 TAZs were divided into 116 refined TAZs as shown on Exhibit 2. WCOG TAZs outside of this area were not modified as part of the planning process.

Existing (2005) Land Use

The existing land use data from the original WCOG TAZs were allocated to new TAZs. The allocation was made based on zoning designations and review of aerial photographs. Certain adjustments were made to the Birch Bay Subarea's land use allocation. Such changes are necessary in the typical process of refining larger TAZs into more refined geographical units. Besides the need to divide each original WCOG TAZ down to several smaller TAZs, the household and employment allocated to each larger TAZ also needed to be divided appropriately among the new smaller TAZs.

Households

The County's GIS aerial photo was used to assign existing households to the refined TAZs. The total number of residential structures within the study area based on the aerial photo did not directly match the WCOG household estimates for individual WCOG TAZs. Since a reasonably accurate assessment of the number of households

in the subarea is essential to producing a reliable calibration for the travel demand model, the original land use estimates were adjusted. **Exhibit 3** shows the summary of existing households for districts for the Birch Bay study area (the land use summary districts, which are aggregates of the smaller TAZs, are only used to illustrate the data).

Based on the count of existing development from the aerial photo, the Transpo team re-allocated land uses in certain TAZs. These TAZs were selected for adjustments based on the size of the discrepancy between the development shown in the aerial photo and the amount of land use allocated to each WCOG TAZ. For example, the aerial photo indicated approximately 10 households in TAZ 512, while the previous WCOT model had 283 households (based on WCOG's original land use allocation). These types of adjustments result from the more refined review of land use in individual TAZs which can be better addressed at a subarea planning level instead of at the Countywide level conducted by the WCOG.

During the model calibration process, it became clear that the types of households in the Birch Bay and Blaine UGAs do not follow the typical household trip generation pattern. The team's background knowledge of the region confirmed that the Birch Bay Subarea has a significant seasonal component. Using U.S. Census data, the ratio of occupied households to "unoccupied" households (i.e., seasonal or resort households) was calculated. The census reported that the percentage of "unoccupied" households for TAZs in the subarea model ranged from under 5 percent to over 80 percent The unoccupied households were then defined as a separate residential land use category in the model, with a reduced average trip generation rate. This additional refinement of the land use situation in the Birch Bay Subarea is intended to provide a more accurate tool for estimating existing and forecast travel demands.

The following summarizes the most significant findings and adjustments allocating existing household data within the Birch Bay and Blaine UGAs.

Birch Bay

- The revised Whatcom County model identified approximately 4,085 dwelling units within the equivalent WCOG TAZs representing the Birch Bay UGA. This is approximately 630 units less than the original WCOG model. The refinement was most noticeable in the northern part of the UGA with approximately 1,465 fewer dwelling units. Another significant difference was found in the southern portion of the UGA with approximately 950 more dwelling units. **Exhibit 6** compares existing households for the refined Whatcom County model and the original WCOG model.
- WCOG TAZ 168 provides an example of the adjustments made to the original land use allocation. This rectangular zone, which is partially located in the Birch Bay UGA and partially outside the UGA, originally had 1,130 households allocated to it for the 2005 WCOG model. The County's aerial photo revealed that current development in this TAZ contained only 55 to 70

structures or households and that these were primarily within the Birch Bay UGA. The remainder of the zone is largely undeveloped. After dividing the larger zone into seven smaller zones, the reduced household total was divided among the new refined zones. The seven new TAZs contain a total of 66 households; although this allocation is significantly smaller than the original allocation of 1,130 households, it is consistent with the existing development within this TAZ.

- Several other WCOG TAZs were also modified that had significant differences between what was allocated and what was observed based on the aerial photo. These zones are generally located within Subareas 3, 4, 6, 7, and 9 as illustrated in **Exhibit 3**.

City of Blaine and UGA

- The revised Whatcom County model identified approximately 1,900 dwelling units within the equivalent WCOG TAZs representing the City of Blaine and UGA. This is approximately 520 dwelling units lower than the original WCOG model. The refinement was most noticeable in the central part of the UGA along Drayton Harbor with a decrease of approximately 210 units. **Exhibit 6** compares existing households for the refined Whatcom County model and the original WCOG model for the Blaine UGA.
- For example, WCOG TAZ 235 is split between the Birch Bay UGA and the Blaine UGA. The original WCOG model household allocation was 543 households, but after reviewing the aerial photos, the refined Whatcom County model household allocation was reduced to 337.

Employment

Similar to the household allocation process described above, allocating the amount of employment also relied on the use of several tools. The aerial photo was useful in identifying where existing large scale commercial development is located, as well as major industrial uses. The countywide geographic information system (GIS) data, such as land parcels and zoning, provided detailed spatial information that also aided in determining where existing employment is. **Exhibit 4** shows the resulting existing employment allocation in the Birch Bay Subarea study area.

Birch Bay UGA

- Unlike the adjustment in the total number of households, the total existing employment in the Birch Bay UGA study area was not significantly modified from the WCOG totals. The employment was, however, reallocated to study area TAZs, as appropriate. A total of approximately 595 employees were included in the Birch Bay UGA and surrounding areas. There were some local area changes as described below. The aerial photo revealed some commercial activity located in the central area of the Birch Bay UGA, specifically in TAZs

556 and 554. These areas are zoned General Commercial. Approximately 75 employees were allocated to these two TAZs.

- The Cherry Point refinery is located south of the Birch Bay UGA. Employment at the refinery is significant as it relates to the traffic volumes and operations of the study area transportation network. Based on information provided by the refinery's representative, the existing (2005) full time employment is reported at 800 employees. Contractor employees can add between 400 and 1,200 more employees depending on work fluctuations. A typical work day at the site experiences approximately 1,100 employees. Approximately 2/3 of those employees (approximately 735 employees) are expected to leave the site in the PM peak period (between 4 pm and 7 pm). Based on these data, the refined Whatcom County model allocated 800 employees to the TAZ for model calibration purposes.

City of Blaine and UGA

- The refined Whatcom County model identified approximately 2,875 employees within the equivalent WCOG TAZs representing the City of Blaine and its UGA. This is approximately 200 employees fewer than the original WCOG model for those TAZs. The refinement was most noticeable in the central part of the UGA with a decrease of approximately 60 employees. These employees were reallocated to other nearby TAZs outside of the Blaine UGA. **Exhibit 6** compares existing employment for the refined Whatcom County model and the original WCOG model.
- Based on the aerial photo and existing land use zoning map, the existing employment allocation outside the City of Blaine but within the UGA was limited to only a few TAZs, consistent with the largely residential nature of the land use in those areas.
- Areas of the City of Blaine and surrounding UGA with more than 20 employees are generally located in the central part of UGA (subarea 3) and the far western part of the City limits (subarea 1) as illustrated in **Exhibit 4**.

Forecasted (2027) Land Use

Similar to the land use allocation for the 2005 base year, the land use forecasts from the WCOG model were reviewed to help support identification of transportation improvement projects for the Birch Bay Subarea Transportation Plan. Refining the land use forecasts within the subarea is needed to provide a more detailed assessment of transportation system needs.

The initial land use allocation based on the refined TAZ structure was reviewed by ECONorthwest, one of the subconsultants on the project team. ECONorthwest completed a regional population and economic forecast report for Whatcom County in 2002; the geographic boundaries of Blaine and Birch Bay in that study do **not** exactly match with the boundaries of the process described in this memorandum.

ECONorthwest provided input and recommendations based on their past work and analyses of growth in the in the Birch Bay and Blaine study area. See **Appendix A** for ECONorthwest's memo summarizing their analysis.

Exhibit 5 summarizes the land use for the two UGAs within the study area. The three population columns for 2002, 2007, and 2022 each have low, baseline, and high estimates. The three different estimates were calculated in ECONorthwest's 2002 population and economic forecasting report in order to accommodate different regional growth scenarios.

Households

After reviewing Transpo's preliminary land use allocation spreadsheets, ECONorthwest provided additional direction for estimating growth in households within the Birch Bay and Blaine UGAs, which were incorporated into the 2027 forecasts.

Birch Bay UGA

- ECONorthwest recommended using a 2.88% average annual growth rate to project Birch Bay's population change between 2005 and 2027, compared to the original WCOG model growth rate of 1.91%. The recommended 2.88% growth rate represents the "high growth" scenario from ECONorthwest's 2002 Whatcom County population forecast. This growth rate was applied to the lower number of existing households in the Birch Bay UGA, which was discussed above.
- The refined Whatcom County model started from a lower estimate of existing households; the growth rate is approximately 1% higher than the original WCOG model. This results in a difference in the forecast growth between 2005 and 2027 of approximately 1,115 more dwelling units in the Birch Bay UGA in the subarea model than the original WCOG model. Overall, the refined Whatcom County model forecasts approximately 485 more dwelling units than the original WCOG model for 2027 (an additional growth of 1,115 units less the 630 fewer existing dwelling units). **Exhibit 6** compares forecasted households for the refined Whatcom County model and the original WCOG model.
- As an example, WCOG TAZ 169 located in the Birch Bay UGA, originally had 13 households allocated in the existing land use allocation, but the aerial photo revealed hundreds of residential structures. The 2005 household allocation was revised to 787; considering this change, the original 2027 allocation also was revised. The 2027 WCOG household allocation was adjusted from 395 to 907 split among three smaller TAZs for the Birch Bay Subarea analysis.

City of Blaine and UGA

- ECONorthwest recommended applying an annual growth rate of 2.19% within the City of Blaine and its surrounding UGA. Again, this is consistent with the "high growth" scenario from ECONorthwest's 2002 Whatcom County population forecast. This rate is approximately 0.5% higher than the original 1.7% WCOG model annual growth rate for the same area. The combination of the lower number of existing housing units and the higher annual growth rate result in a 2027 forecast of 3,059 dwelling units for the subarea model. This is approximately 450 residential units less than the original WCOG 2027 forecasts.
- Based on updated information, 2,000 additional households were added in three separate TAZs in the Blaine UGA, near Semiahmoo. In addition, 1,030 more households were added in two separate TAZs in the City of Blaine near the Canadian border. The developments in which these households will be based have not yet been permitted. The 2027 horizon may be too short to realize the construction of all of these households. The additional potential growth was added to the results based on the above growth rates to ensure that transportation system needs could adequately be defined. A sensitivity analysis without some or all of the additional growth will be conducted to ascertain what additional transportation improvements are needed due to the added growth.
- The additional 3,030 dwelling units described above result in a forecast growth of approximately 4,190 household dwelling units, which results in an average annual growth rate of 5.44% for the City of Blaine and the surrounding UGA. This is approximately 2,600 more dwelling units in the refined Whatcom County model than is forecasted in the original WCOG model.
- The Semiahmoo area of Blaine within the Birch Bay Subarea also has a significant amount of household growth forecast by 2027. Based on information about pending development projects provided by Whatcom County, TAZs 563 through 568 are forecast to grow from 205 households in 2005 to 645 households by 2027.

Employment

The Transpo Team revised the previous land use allocations for TAZs within the Birch Bay and Blaine UGAs based on ECONorthwest's suggestions (see below). Based on the ECONorthwest review, the 2027 forecast employment levels for both the Birch Bay UGA and the Blaine UGA were reasonable. See **Exhibit 6** for the growth of the employment allocation in the Birch Bay Subarea.

Birch Bay UGA

- As discussed in the existing land use section, the revised Whatcom County model identified approximately 50 more employees for the Birch Bay UGA than did the original WCOG model. ECONorthwest recommended using a 2.85% average annual growth rate to project Birch Bay's employment change between 2005 and 2027, while the original WCOG model identified a growth rate of 2.15%. The recommended 2.85% growth rate represents the "baseline forecast" scenario from ECONorthwest's 2002 Whatcom County population forecast.
- The refined Whatcom County model started from a slightly higher existing employment estimate and the recommended annual growth rate is approximately 0.7% higher than the original WCOG model. This results in a difference in growth (2005 to 2027) of 230 more employees for the Birch Bay subarea in the refined Whatcom County model than the original WCOG model. **Exhibit 6** compares forecasted employment for the refined Whatcom County model and the original WCOG model.
- As discussed in the existing land use section, the Cherry Point Refinery is not within the Birch Bay UGA, but it is a major employer in the Birch Bay vicinity. Based on information provided by the refinery's representative, modest growth is anticipated by 2027. An additional 100 full time employees, for a total of 900 full time employees, was assumed by 2027 for use in the refined Whatcom County model.

City of Blaine and UGA

- Based on recent growth and ECONorthwest's employment forecast from the 2002 report, an average annual growth rate of 2.44% was recommended to forecast the City of Blaine and UGA employment from 2005 to 2027. This is consistent with the "baseline forecast" from the 2002 ECONorthwest report. This recommended growth rate is approximately 1% higher than the 1.4% annual growth rate based on the WCOG model.
- This results in approximately 690 more employees in the refined Whatcom County model than the original WCOG model. **Exhibit 6** compares forecasted employment for the refined Whatcom County model and the original WCOG model.

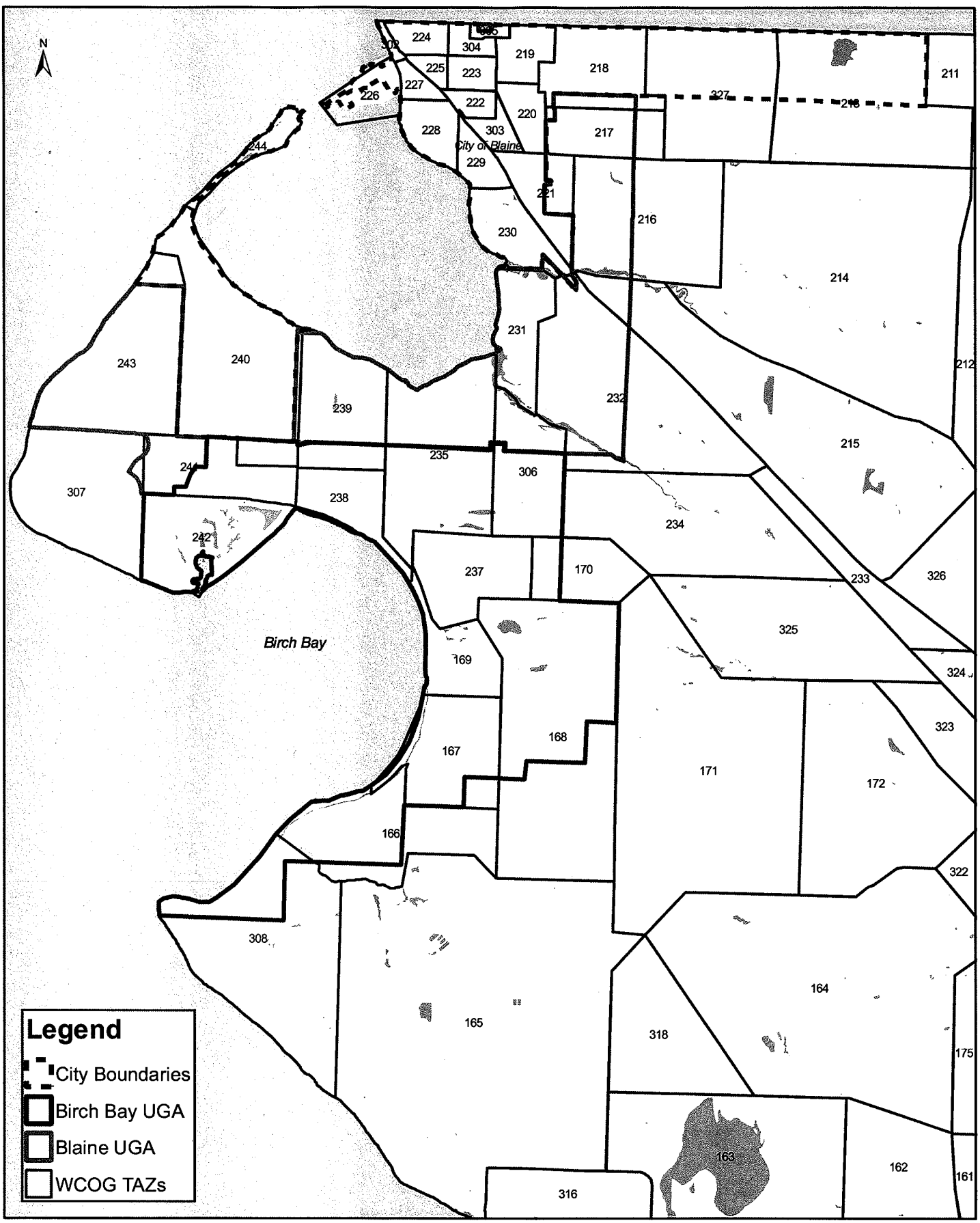

Exhibit 1
Original WCOG Model TAZs in Birch Bay Subarea

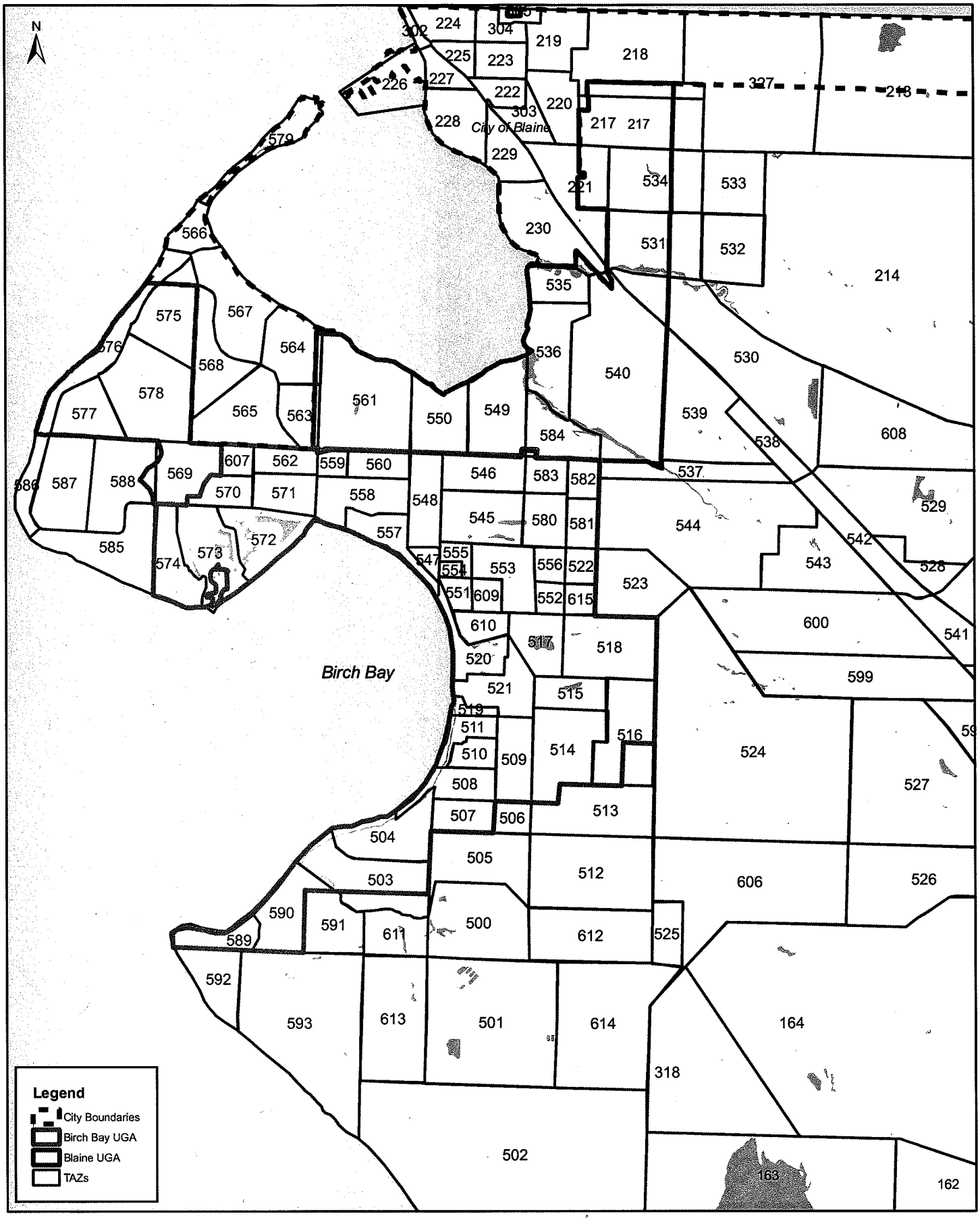

Exhibit 2
Refined Whatcom County Model TAZs in Birch Bay Subarea

Birch Bay Subarea Plan

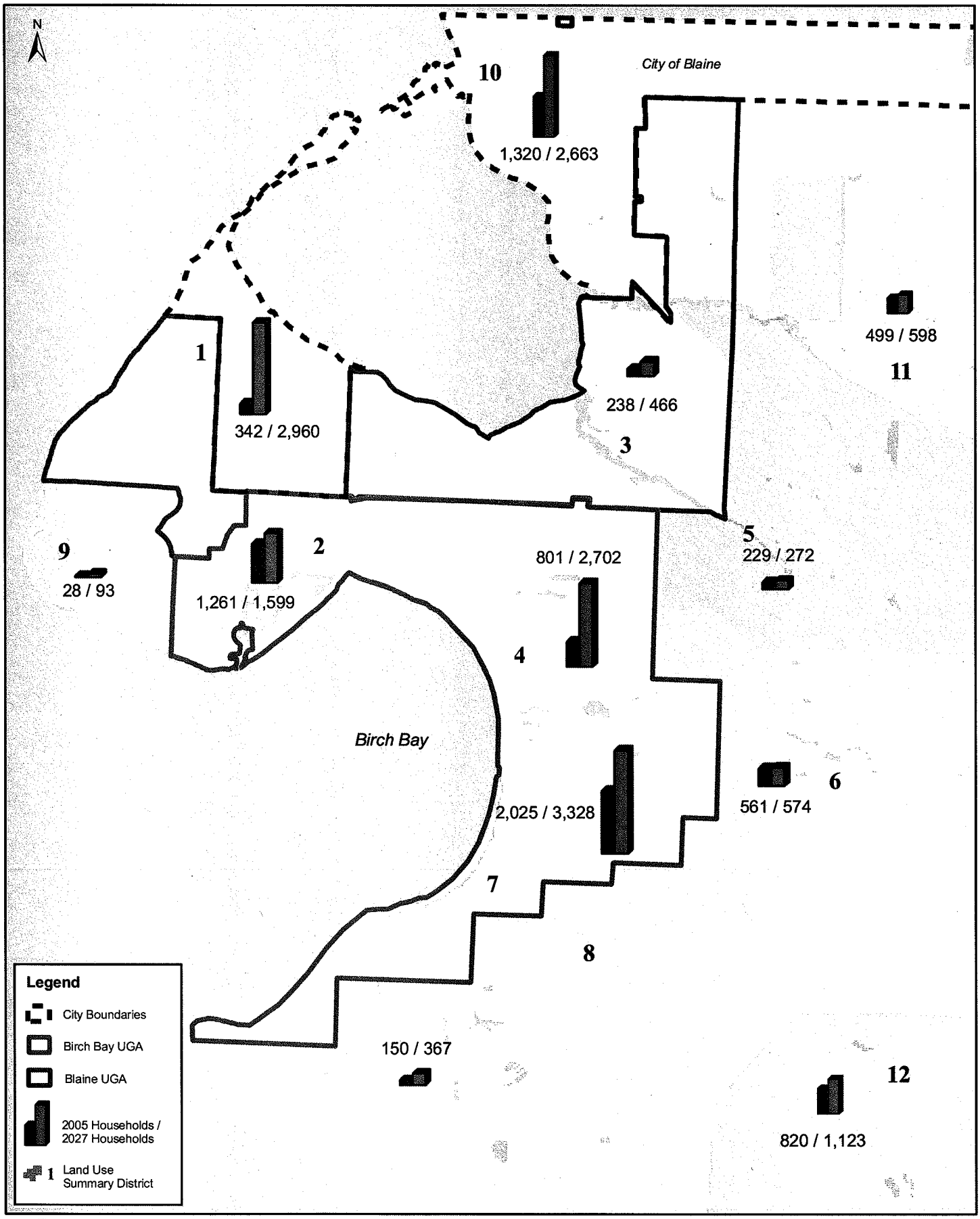

Exhibit 3
Household Land Use in Birch Bay Subarea

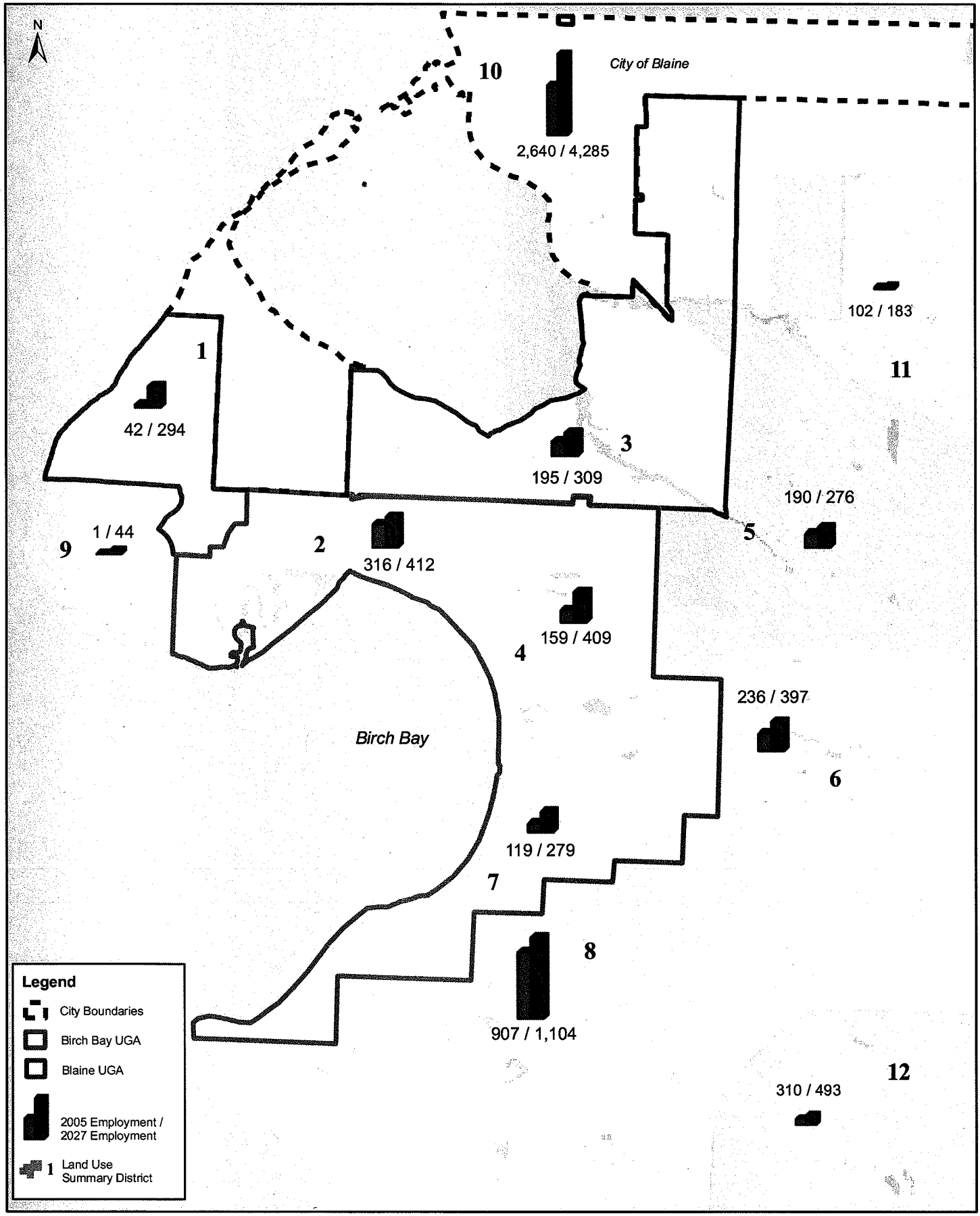

Exhibit 4
Employment Land Use in Birch Bay Subarea

Exhibit 5. Blaine & Birch Bay Population & Employment Estimates

Population: Household Population (number of people) & Total Households (dwelling units- WCOG Data)												
	Total Households		*Population*			*Population*			*Population*			*Total Households*	
	2005 WCOG[1]	2005 Refined TAZs[2]	2002[3]			2007[3]			2022[3]			2027 WCOG	2027 Refined TAZs[2]
			Low	Baseline	High	Low	Baseline	High	Low	Baseline	High		
Birch Bay UGA	4,716	4,087	4,605	4,721	4,815	4,941	5,265	6,004	5,764	6,912	9,619	7,145	7,629
Blaine w/UGA	2,419	1,900	4,886	4,959	5,011	5,136	5,328	5,738	5,775	6,440	7,942	3,507	6,089
TOTAL	**7,135**	**5,987**	**9,491**	**9,680**	**9,826**	**10,077**	**10,593**	**11,742**	**11,539**	**13,352**	**17,561**	**10,652**	**13,718**

Employment: Number of Employees[4]											
	2005 WCOG[1]	2005 Refined TAZs[2]	2001[5]	2007[5]			2022[5]			2027 WCOG	2027 Refined TAZs[2]
				Low	Baseline	High	Low	Baseline	High		
Birch Bay UGA	545	593	356	473	486	507	690	741	835	870	1,100
Blaine w/UGA	3,081	2,876	1,752	2,200	2,262	2,357	3,022	3,247	3,655	4,197	4,888
TOTAL	**3,626**	**3,470**	**2,108**	**2,673**	**2,748**	**2,864**	**3,712**	**3,988**	**4,490**	**5,067**	**5,988**

1. The Whatcom Council of Governments (WCOG) information is compiled from the transportation analysis zones (TAZs) included in the travel demand model. The TAZ boundaries do not completely match the UGA or City boundaries; therefore, the comparison between the WCOG estimates, the refined TAZ estimates, and the ECONorthwest estimates is for illustrative purposes only.
2. These calculations were made using the adjusted number of households and the number of employees in the refined TAZs within each respective UGA; therefore, these totals differ from the original WCOG estimates. The 2005 WCOG household estimates were adjusted according to aerial image observations of current conditions in the subarea. The 2027 estimates were adjusted according to upcoming residential and commercial projects in the subarea.
3. *Whatcom County Population and Economic Forecasts*, prepared for Whatcom County by ECONorthwest, May 2002. See Tables 3-3, 3-6, 3-8.
4. WCOG uses 12 employment categories: Educational; Financial, Insurance, and Real Estate; Service; Government; Manufacturing; Retail; Wholesale; Transportation, Communications, and Utilities; Construction; Agriculture; Other; and Mining. Whatcom County Population and Economic Forecasts consolidated these categories into 3 broad employment categories: Retail; Commercial (includes employment from Service and Finance, Insurance, and Real Estate); and industrial (includes employment from Manufacturing, Transportation and Utilities, and Wholesale).
5. *Whatcom County Population and Economic Forecasts*, Tables 3-13, 3-16, 3-19, 3-20, 3-23, 3-24, 3-27. The year 2001 was the existing employment estimate year when ECONorthwest completed *Whatcom County Population and Economic Forecasts.*

Exhibit 6: Birch Bay UGA and Blaine City/UGA Land Use Control Totals

	Housholds (HH)			Employment (EMP)		
Birch Bay UGA						
		Birch Bay Subarea Estimate	WCOG Original		Birch Bay Subarea Estimate	WCOG Original
	2005	4,085	4,716	2005	593	545
	2027	7,629	7,145	2027	1,100	870
		2.88%	**1.91%**		**2.85%**	**2.15%**
HH growth		**3,544**	**2,429**	**EMP growth**	**507**	**325**
Blaine City/UGA						
		Birch Bay Subarea Estimate	WCOG Original		Birch Bay Subarea Estimate	WCOG Original
	2005	1,899	2,419	2005	2,876	3,081
	2027	3,059	3,507	2027	4,888	4,197
		2.19%	**1.70%**		**2.44%**	**1.41%**
HH growth		**1,160**	**1,088**	**EMP growth**	**2,012**	**1,116**
HH growth + 3,030 du's		**4,190**				
Refined + 3,030 du's		**6,089**				
		5.44%				

Appendix A: ECONorthwest Land Use Evaluation Memorandum

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March 27, 2007

TO: **Jon Pascal**
FROM: **Beth Goodman and Anne Fifield**
SUBJECT: **EVALUATION OF THE TRANSPO GROUP'S ESTIMATE OF HOUSING AND EMPLOYMENT IN BIRCH BAY AND BLAINE**

The Transpo Group developed population and employment estimates for Birch Bay and Blaine for the period 2005 to 2027. These estimates were used to allocate population and employment to TAZs for transportation planning purposes.

The Transpo Group asked ECONorthwest to evaluate the forecasts based on recent development, growth trends, and the forecasts presented in the "Whatcom County Population and Economic Forecasts" prepared by ECONorthwest in 2002. ECO's evaluation of the population forecasts is that the population base and growth rate assumptions for the City of Blaine are reasonable but the population base and growth rate assumptions for Birch Bay are low. Our evaluation of the employment forecasts is that the employment base for both cities are reasonable. The growth rate assumptions for employment in Birch Bay are reasonable but the growth rate assumption for employment in Blaine are probably low.

The remainder of this memorandum presents our conclusions in more detail, including an explanation of the factors we considered and information supporting our conclusions. The memorandum is organized into the following sections:

- **Evaluation of population forecasts** presents ECO's evaluation of the population base and growth assumptions.
- **Evaluation of employment forecasts** presents ECO's evaluation of the employment base and growth assumptions
- **Appendix** presents additional data that ECO considered in the evaluations.

EVALUATION OF POPULATION FORECASTS

This section describes ECO's evaluation of the Transpo Group's estimates of the existing population base and the population forecasts. Rather than forecasting population, the Transpo Group developed forecasts for the number of households in Birch Bay and Blaine in 2027. They began with estimates of the number of households in the Birch Bay and Blaine UGAs in 2005 as the basis for their forecasts.

POPULATION BASE

The Transpo Group started with the Whatcom Council of Government's (WCOG) estimate of households in Blaine and Birch Bay in 2005 and refined the estimate, based on an analysis of current aerial photographs. Table 1 shows WCOG's estimate of households in 2005, the Transpo Group's refinement of the estimate of households in 2005, the Transpo Group's forecast for households in 2027, and change in population from 2005 to 2027. ECO has evaluated two items presented in Table 1: (1) the Transpo Group's estimate of housing in 2005 and (2) the Transpo Group's forecast for dwelling units in 2027.

Table 1. Estimate of households, Blaine and Birch Bay UGAs, 2005 and 2027

	2005	Transpo Group		Change 2005-2027		
	WCOG	2005	2027	Number	Percent	AAGR
Birch Bay UGA	5,103	3,734	8,426	4,692	126%	3.77%
Blaine w/UGA	2,235	2,035	3,351	1,317	65%	2.29%

Source: Transpo Group
Note: AAGR is average annual growth rate.

The Transpo Group estimated that Birch Bay and Blaine have fewer dwelling units than the WCOG estimate. ECO's evaluation is that the Transpo Group's estimates may be low, especially in Birch Bay.

Blaine

The Transpo Group estimated that the Blaine UGA has about 200 fewer dwelling units than the WCOG estimate. Based on 2000 Census data and building permit activity, this estimate may be low. In 2000, the Census estimated that the City of Blaine had 1,737 dwelling units. Between 2000 and 2005, the City reported issuing building permits for 277 single-family detached units and 142 multifamily dwellings. Based on these estimates, Blaine had about 2,160 dwellings in 2005, 125 more dwellings than the Transpo Group's estimates. It is possible that some of the building permits may not have resulted in construction of a dwelling unit, making the Transpo Group's estimate closer to the actual number of dwellings in Blaine in 2005.

Birch Bay

The Transpo Group estimated that Birch Bay had 1,369 fewer dwelling units than WCOG. ECO believes the Transpo Group's estimate of dwelling units is too low. The 2000 Census reported that the Birch Bay Census Designated Place (CDP) had 5,105 dwelling units, which is close to WCOG's estimate of dwelling units in 2005.[1]

Interviews with local real estate professionals in Birch Bay indicate that the area experienced significant residential development between 2002 and early 2006, consistent with regional housing trends. If is true, Birch Bay should have more dwelling units in 2005 than in 2000. Our

[1] ECO was unable to obtain an estimate of building permit activity in Birch Bay from Whatcom County when this memorandum was written.

conclusion is that either the Transpo Group's estimate of dwelling units in Birch Bay is low or the geography used to define Birch Bay is different between the Census and the current project.

POPULATION FORECAST

The Transpo Group asked ECO to evaluate their forecast of dwelling units in Blaine and Birch Bay in 2027 (shown in Table 1) based on recent growth trends and the population forecasts presented in the "Whatcom County Population and Economic Forecasts" report. This section discusses the evaluation.

The Transpo Group presented their forecast in terms of housing units, but ECO's 2002 forecast was for population. The first step in evaluating the Transpo Group's forecast of housing units in 2027 was to convert households into population.

Converting households to population has two assumptions and two points for uncertainty: household size and occupancy rate. Household sizes in Blaine and Birch Bay have remained relatively stable over the past ten years, suggesting that it is unlikely that they would vary substantially over the next twenty years.[2]

The stability of occupancy rates is less certain. The factors contributing to the purchase and ownership of second homes are complex and interconnected with trends in the economy at the local through international levels. For example, purchase of homes by Canadians, which is common in the area, varies based on the strength of the Canadian dollar relative to the U.S. dollar. Canadians purchased fewer homes in Birch Bay during the 1990's when the Canadian dollar was weak but have purchased more homes in Birch Bay during the last five years, when the Canadian dollar has been strong relative to the U.S. dollar. This complexity make it is unclear how occupancy rates will change in the planning period.

In 2000, Whatcom County's occupancy rate was about 87%. Blaine's occupancy rate (86%) was similar to the County's average. Birch Bay's occupancy rate (42%) was much lower than the County average. If Birch Bay's occupancy rate became more like the County average over the next twenty years, it could have a significant impact on the forecast of households and population.[3] In the absence of information about future occupancy rates in Birch Bay, ECO has assumed occupancy rates will be the same in the future as they were in the past.

Table 2 shows the results of the conversion of households to population. Based on the Transpo Group's forecast and the assumptions about household size and occupancy, in 2027 Birch Bay would have about 8,170 residents and Blaine would have about 7,160 residents.

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[2] Household sizes have been decreasing nationally over the past several decades, a trend that is likely to continue. However, household size in Birch Bay has remained stable between 1990 to 2000 and household size increased (from 2.34 persons per household) in Blaine during the 1990's.

[3] For example, if Birch Bay's occupancy rate increased to the County average (87%) and if Birch Bay had 8,426 dwellings in 2027, the population would be about 17,000 residents.

Table 2. Population estimate based on forecast of households, Birch Bay and Blaine, 2027

	2027 Est. DU	2000 HH size	Occupancy	Population Estimate
Birch Bay UGA	8,426	2.33	42%	8,246
Blaine w/UGA	3,351	2.48	86%	7,158

Source: Census, 2000; Transpo Group; calculations by ECONorthwest

The next step in the evaluation was to compare growth over the planning period. Table 3 shows a comparison of forecast population change in Birch Bay and Blaine between 2000 and 2027.[4] Over the twenty-seven year period, Birch Bay is forecast to grow by 3,211 residents at an average annual rate of 1.87%. Over the same period, Blaine is forecast to grow by 3,388 residents at an average annual rate of 2.40%.

Table 3. Population change, Birch Bay and Blaine, 2000-2027

	2000 Census	2027 Transpo	Change Number	Change Percent	Change AAGR
Birch Bay UGA	4,961	8,172	3,211	65%	1.87%
Blaine w/UGA	3,770	7,158	3,388	90%	2.40%

Source: Census, 2000; Transpo Group; calculations by ECONorthwest

Blaine

ECO's conclusion is that this forecast is probably reasonable for the Blaine UGA. This conclusion is based on historical population change and recent development activity in Blaine, shown in Table A-1 and A-2 in the Appendix. Between 2000 and 2006, population in the City of Blaine has grown at an average annual rate of 2.92% and has issued permits for 419 residential units. In a previous evaluation of population growth in Blaine, ECO concluded that the City is likely to grow between 3% and 4% annually between 2007 and 2012. The Transpo Group's forecast of growth fits with the "high growth" scenario from ECO's 2002 County population forecast, which projects that Blaine will grow at an average annual rate of 2.19% between 2007 to 2022.

Birch Bay

The evaluation of the forecast for Birch Bay is more difficult for three reasons: (1) recent development or population estimates are not available for Birch Bay, (2) there is uncertainty about whether Birch Bay will continue to have a low occupancy rate, and (3) there are significant differences between the estimates of the number of dwelling units in Birch Bay in 2005 from WCOG and the Transpo Group.

[4] ECO used the Census estimate of population from 2000 because there is no more recent estimate of population for Birch Bay.

ECO made the following assumptions about Birch Bay: (1) Birch Bay has grown at least as fast as Whatcom County since 2000 (1.67% AAGR)[5], (2) the occupancy rate will be the same in the future as it has been historically, and (3) the Transpo Group's estimate of dwelling units in Birch Bay in 2005 is accurate.

Based on these assumptions, the Transpo Group's forecast of population growth rate at 1.87% annually for the twenty-two year period is low. Historically, Birch Bay has grown much faster than the County. Between 1990 and 2000, Birch Bay grew at 7.1% annually, compared with the County's 2.7% annual growth rate. Interviews with real estate professionals indicate that the housing market in Birch Bay grew very quickly from 2002 to spring of 2006 and has since slowed but is still active. Based on this information, the best estimate for Birch Bay's growth is the "high growth" scenario from ECO's 2002 County population forecast, which projects that Birch Bay's population will grow at an average annual rate of 2.88% between 2007 to 2022.

In addition, the Transpo Group's forecast for dwelling units is lower than the estimate of the build-out capacity of Birch Bay by 2022 presented in the Birch Bay Community Plan. The Plan estimates that the build-out capacity of the proposed Birch Bay UGA is 3,450 additional housing units by 2022. County planning staff indicate that Birch Bay has grown faster than the expectations presented in the Community Plan. Based on the Transpo Group's estimate of housing in 2005 and forecast for housing, Birch Bay would have capacity for nearly 300 more dwelling units than is forecast for 2027.

In summary, ECO believes that the Transpo Group's base population for Birch Bay is low and the growth rate assumption is low.

EVALUATION OF EMPLOYMENT FORECAST

Change in employment for a city is generally measured using data from the Quarterly Census of Employment and Workforce (QCEW), confidential data about covered employment.[6] ECO did not have access to QCEW data for Blaine or Birch Bay for this project. The best source of information for recent employment figures available to ECO was covered employment for the entire County.

Between 2001 and 2005, employment in Whatcom County grew from 68,918 to 78,491 jobs, an increase of 9,573 jobs at an average annual rate of 3.31%. The forecasts of employment in the 2002 "Whatcom County Population and Economic Forecasts" report assume that employment in Blaine and Birch Bay will grow at a similar rate as the County. Based on that assumption, it is likely that employment has grown by about 3% annually since 2002.

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[5] It is likely that Birch Bay has grown much faster than the County. Between 1990 and 2000, Birch Bay grew at 7.1% annually, compared with the County's 2.7% annual growth rate.

[6] Covered employment includes only employees who are covered by unemployment insurance, such as sole proprietors. It is unclear whether the estimates of employment from WCOG and the Transpo Group in Table 4 are for covered or total employment. It is likely that these estimates are for covered employment because estimates of total employment are not available from the Bureau of Economic Analysis. Using an estimate of covered employment for transportation planning with an UGA is reasonable because most sole proprietors in Whatcom County are likely to be employed from their home and have comparatively little impact on transportation.

Table 4 shows the Transpo Group's estimate of employment in Blaine and Birch Bay in 2005 and 2027. Again, the Transpo Group's base estimate is lower than WCOG's estimates, by 60 employees in Birch Bay and is 126 employees in Blaine. ECO has no way to evaluate the accuracy of these estimates. It is worth noting that these estimates are higher than the estimates presented in the "Whatcom County Population and Economic Forecasts" report, which projected that Birch Bay had 356 covered employees and Blaine had 1,752 covered employees.

The Transpo Group projected that employment would grow by 436 jobs in Birch Bay between 2005 to 2027, at an average annual rate of 2.83%. In the Blaine UGA, they projected that employment would grow by 1,069 jobs over the twenty-two year period at an average annual rate of 1.44%.

Table 4. Estimate of employment, Blaine and Birch Bay UGAs, 2005 and 2027

	2005	Transpo Group		Change 2005-2027		
	WCOG	2005	2027	Number	Percent	AAGR
Birch Bay UGA	574	514	950	436	85%	2.83%
Blaine w/UGA	3,013	2,887	3,956	1,069	37%	1.44%

Source: Transpo Group

Blaine

Based on recent growth and ECO's employment forecast from the 2002 report, presented in Table A-6, our conclusion is that the Transpo Group's forecast for employment in Blaine is probably low. The Transpo Group forecast employment growth of 1.44% annually, which is lower than the "low growth" scenario presented in the 2002 report. We recommend using the baseline forecast for Blaine from the 2002 report, which assumes annual change of 2.44% over the 2007-2022 period.

Birch Bay

Based on recent growth and ECO's employment forecast from the 2002 report, presented in Table A-7, our conclusion is that the Transpo Group's forecast of employment for Birch Bay is reasonable. We recommend using the baseline forecast for Birch Bay from the 2002 report, which assumes annual change of 2.85% over the 2007-2022 period.

APPENDIX: ADDITIONAL DATA

This appendix presents data that was used in the evaluation of the Transpo Group's forecast for dwelling units and employment in Blaine and Birch Bay.

Table A-1. Historic population growth, Whatcom County, Blaine, Unincorporated Whatcom County, 1970 to 2006

Year	Whatcom Co.	Blaine	Unincorp.
1970	81,983	1,955	34,004
1980	106,701	2,363	48,622
1990	127,780	2,489	59,187
2000	166,826	3,770	74,231
2006	184,300	4,480	81,066
AAGR			
1970-2006	2.28%	2.33%	2.44%
1990-2006	2.32%	3.74%	1.99%
2000-2006	1.67%	2.92%	1.48%

Source: Office of Financial Management

Table A-2. Number and type of residential building permits approved, City of Blaine, 2000 to 2005

	2000	2001	2002	2003	2004	2005	Total
West Blaine							
Single-family dwellings	16	17	22	19	41	30	**145**
Multifamily dwellngs	0	0	0	0	14	16	**30**
Central Blaine							
Single-family dwellings	9	14	12	19	19	39	**112**
Multifamily dwellngs	18	6	10	13	28	33	**108**
East Blaine							
Single-family dwellings	0	2	0	1	13	4	**20**
Multifamily dwellngs	0	0	0	0	4	0	**4**
Total dwelling units	**43**	**39**	**44**	**52**	**119**	**122**	**419**

Source: City of Blaine

Table A-3. Population forecast scenarios, Whatcom County, 2002-2022

	Population		
Year	High Growth Scenario	Baseline Scenario	Low Growth Scenario
2002	174,501	173,471	171,066
2007	195,931	187,980	182,901
2012	217,426	202,848	194,248
2017	238,636	217,574	204,916
2022	261,084	231,928	215,850
Average Annual Growth Rates			
2002	-	-	-
2007	2.34%	1.62%	1.35%
2012	2.10%	1.53%	1.21%
2017	1.88%	1.41%	1.08%
2022	1.81%	1.29%	1.05%
Average Annual Net Changes			
2002	-	-	-
2007	4,286	2,902	2,367
2012	4,299	2,974	2,269
2017	4,242	2,945	2,134
2022	4,490	2,871	2,187

Source: Whatcom County Population and Economic Forecasts, ECONorthwest 2002

Table A-4. Population forecast scenarios, Blaine UGA, 2002-2022

	High growth scenario			Baseline			Low growth scenario		
Year	Pop.	Change	AAGR	Pop.	Change	AAGR	Pop.	Change	AAGR
2002	5,011	--	--	4,959	--	--	4,886	--	--
2007	5,738	727	2.75%	5,328	369	1.45%	5,136	250	1.00%
2012	6,465	727	2.41%	5,711	383	1.40%	5,364	228	0.87%
2017	7,171	706	2.09%	6,085	374	1.28%	5,565	201	0.74%
2022	7,942	771	2.06%	6,440	355	1.14%	5,775	210	0.74%

Source: Whatcom County Population and Economic Forecasts, ECONorthwest 2002

Table A-5. Population forecast scenarios, Birch Bay, 2002-2022

	High growth scenario			Baseline			Low growth scenario		
Year	Pop.	Change	AAGR	Pop.	Change	AAGR	Pop.	Change	AAGR
2002	4,815	--	--	4,721	--	--	4,605	--	--
2007	6,004	1,189	4.51%	5,265	544	2.21%	4,941	336	1.42%
2012	7,193	1,189	3.68%	5,835	570	2.08%	5,242	301	1.19%
2017	8,347	1,154	3.02%	6,391	556	1.84%	5,495	253	0.95%
2022	9,619	1,272	2.88%	6,912	521	1.58%	5,764	269	0.96%

Source: Whatcom County Population and Economic Forecasts, ECONorthwest 2002

Table A-6. Employment forecast scenarios, Blaine UGA, 2007-2022

	High growth scenario			Baseline			Low growth scenario		
Year	Pop.	Change	AAGR	Pop.	Change	AAGR	Pop.	Change	AAGR
2007	2,357	--	--	2,262	--	--	2,200	--	--
2012	2,765	408	3.25%	2,580	318	2.67%	2,470	270	2.34%
2017	3,190	425	2.90%	2,909	329	2.43%	2,740	269	2.09%
2022	3,655	465	2.76%	3,247	338	2.22%	3,022	282	1.98%

Source: Whatcom County Population and Economic Forecasts, ECONorthwest 2002

Table A-7. Employment forecast scenarios, Birch Bay, 2007-2022

	High growth scenario			Baseline			Low growth scenario		
Year	Pop.	Change	AAGR	Pop.	Change	AAGR	Pop.	Change	AAGR
2007	507	--	--	486	--	--	473	--	--
2012	608	102	3.73%	567	81	3.13%	543	71	2.82%
2017	716	108	3.31%	653	86	2.86%	615	71	2.49%
2022	835	119	3.12%	741	88	2.56%	690	75	2.34%

Source: Whatcom County Population and Economic Forecasts, ECONorthwest 2002

Appendix B: Final Land Use Tables

Key to Land Use Tables

Variable	Description	Units
TAZ	Transportation Analysis Zone	ID number
Total HH	Total Households	Households
Un-occ HH	Un-occupied Households	Households
Occ HH	Occupied Households	Households
Total EMP	Total Employment	Employees
EDU_EMP	Educational Employment	Employees
FIRE_EMP	Finance, Insurance and Real Estate Employment	Employees
SERV_EMP	Service Employment	Employees
GOV_EMP	Government Employment	Employees
MAN_EMP	Manufacturing Employment	Employees
RET_EMP	Retail Employment	Employees
WSL_EMP	Wholesale Employment	Employees
TCU_EMP	Transportation, Communications and Utility Employment	Employees
CON_EMP	Construction Employment	Employees
AG_EMP	Agriculture Employment	Employees
OTR_EMP	Other Employment	Employees
MIN_EMP	Mining Employment	Employees

2005 Land Use

TAZ	Total HH	Un-occ HH	Occ HH	Total EMP	EDU_EMP	FIRE_EMP	SERV_EMP	GOV_EMP	MAN_EMP	RET_EMP	WSL_EMP	TCU_EMP	CON_EMP	AG_EMP	OTR_EMP	MIN_EMP
213	59	4	55	53	0	0	3	0	0	0	0	0	50	0	0	0
217	95	5	90	7	0	0	0	0	7	0	0	0	0	0	0	0
218	88	4	84	5	0	0	3	0	0	0	0	2	0	0	0	0
219	40	3	37	152	0	0	0	35	0	0	0	68	0	0	49	0
220	5	0	5	246	0	10	78	0	7	20	48	59	0	0	24	0
221	5	0	5	15	0	0	0	15	0	0	0	0	0	0	0	0
222	16	1	15	166	162	0	0	4	0	0	0	0	0	0	0	0
223	187	14	173	30	0	1	17	0	6	3	0	3	0	0	0	0
224	90	10	80	247	0	2	184	4	0	5	0	50	2	0	0	0
225	75	8	67	22	0	0	5	0	0	13	0	4	0	0	0	0
226	1	0	1	127	0	0	17	4	11	11	69	15	0	0	0	0
227	25	3	22	658	13	66	172	202	28	59	38	31	5	0	22	22
228	297	35	262	69	0	8	43	0	4	8	0	0	2	0	4	0
229	114	13	101	18	0	0	11	0	1	3	0	0	0	0	3	0
230	65	8	57	146	0	0	6	0	0	10	6	0	0	0	124	0
302	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303	1	0	1	574	55	0	0	101	230	23	31	93	25	0	16	0
304	75	5	70	10	0	2	0	0	5	0	3	0	0	0	0	0
305	63	5	58	88	0	0	0	0	0	72	0	16	0	0	0	0
327	19	1	18	7	0	0	0	0	0	2	0	2	3	0	0	0
500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
501	0	0	0	800	0	0	0	0	800	0	0	0	0	0	0	0
502	0	0	0	10	0	0	0	0	5	0	5	0	0	0	0	0
503	2	1	1	16	0	0	16	0	0	0	0	0	0	0	0	0
504	375	169	206	16	0	0	16	0	0	0	0	0	0	0	0	0
505	2	1	1	4	0	0	4	0	0	0	0	0	0	0	0	0
506	7	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0
507	35	16	19	0	0	0	0	0	0	0	0	0	0	0	0	0
508	209	94	115	0	0	0	0	0	0	0	0	0	0	0	0	0
509	107	48	59	0	0	0	0	0	0	0	0	0	0	0	0	0
510	185	83	102	0	0	0	0	0	0	0	0	0	0	0	0	0
511	180	148	32	28	0	0	25	0	0	0	0	0	0	0	3	0
512	8	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0
513	5	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0
514	2	1	1	12	0	0	5	0	0	0	0	0	0	0	7	0
515	2	1	1	3	0	0	0	0	0	0	0	3	0	0	0	0
516	6	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
517	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
518	40	18	22	3	0	0	3	0	0	0	0	0	0	0	0	0
519	22	18	4	9	0	2	7	0	0	0	0	0	0	0	0	0
520	65	53	12	5	0	1	4	0	0	0	0	0	0	0	0	0
521	700	574	126	33	0	2	31	0	0	0	0	0	0	0	0	0
522	20	4	16	3	0	0	3	0	0	0	0	0	0	0	0	0
523	38	7	31	3	0	0	1	0	0	0	0	0	0	0	2	0
524	65	29	36	3	0	0	0	0	0	3	0	0	0	0	0	0
525	1	0	1	16	0	0	2	0	0	7	0	6	1	0	0	0
526	30	13	17	13	0	0	12	0	0	0	0	1	0	0	0	0
527	30	13	17	13	0	0	10	0	0	0	1	2	0	0	0	0
528	3	0	3	19	0	0	9	0	0	5	0	3	1	0	1	0
529	28	1	27	1	0	0	0	0	0	0	0	1	0	0	0	0
530	40	7	33	1	0	0	0	0	0	0	0	0	0	0	1	0
531	19	1	18	63	0	0	6	0	57	0	0	0	0	0	0	0
532	9	0	9	7	0	0	4	0	0	2	0	0	0	0	1	0
533	13	1	12	7	0	0	3	0	2	1	0	0	0	0	1	0
534	22	1	21	63	0	0	0	0	60	0	0	0	3	0	0	0
535	23	4	19	18	0	0	10	0	0	2	0	1	5	0	0	0
536	13	2	11	9	0	0	4	0	0	3	0	0	2	0	0	0
537	5	1	4	4	0	0	2	0	0	2	0	0	0	0	0	0
538	4	1	3	34	0	0	7	0	0	2	20	5	0	0	0	0
539	9	2	7	4	0	0	3	0	0	0	0	1	0	0	0	0
540	54	10	44	35	0	0	18	0	0	2	13	2	0	0	0	0
541	31	1	30	0	0	0	0	0	0	0	0	0	0	0	0	0
542	6	1	5	71	0	0	4	7	0	41	13	0	5	0	1	0
543	20	4	16	29	0	0	4	0	0	25	0	0	0	0	0	0
544	10	2	8	13	0	0	5	0	0	5	0	0	3	0	0	0
545	20	10	10	4	0	0	4	0	0	0	0	0	0	0	0	0
546	150	74	76	38	0	1	25	0	3	0	0	7	0	0	0	0
547	90	44	46	0	0	0	0	0	0	0	0	0	0	0	0	0
548	30	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0
549	15	7	8	0	0	0	0	0	0	0	0	0	0	0	0	0
550	32	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0
551	77	63	14	1	0	0	1	0	0	0	0	0	0	0	0	0
552	1	1	0	14	0	2	12	0	0	0	0	0	0	0	0	0
553	90	44	46	2	0	0	2	0	0	0	0	0	0	0	0	0
554	0	0	0	37	0	0	20	0	2	7	0	1	0	0	7	0
555	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
556	1	0	1	37	0	3	27	0	5	0	0	0	0	0	2	0
557	240	118	122	92	0	7	85	0	0	0	0	0	0	0	0	0
558	90	29	61	61	0	7	44	0	1	9	0	0	0	0	0	0
559	2	1	1	11	0	0	8	3	0	0	0	0	0	0	0	0
560	2	1	1	90	0	4	64	0	0	3	5	14	0	0	0	0
561	30	15	15	5	0	0	5	0	0	0	0	0	0	0	0	0
562	11	3	8	9	0	0	3	0	2	0	1	0	1	0	2	0
563	11	3	8	0	0	0	0	0	0	0	0	0	0	0	0	0
564	54	17	37	0	0	0	0	0	0	0	0	0	0	0	0	0
565	11	3	8	1	0	0	1	0	0	0	0	0	0	0	0	0
566	43	14	29	0	0	0	0	0	0	0	0	0	0	0	0	0
567	75	24	51	0	0	0	0	0	0	0	0	0	0	0	0	0
568	11	3	8	0	0	0	0	0	0	0	0	0	0	0	0	0
569	6	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
570	80	25	55	0	0	0	0	0	0	0	0	0	0	0	0	0
571	20	6	14	4	0	0	0	0	2	0	0	0	0	0	2	0
572	209	66	143	42	0	11	7	10	4	0	1	1	8	0	0	0
573	209	66	143	7	0	2	4	0	0	0	0	0	0	0	1	0
574	278	88	190	0	0	0	0	0	0	0	0	0	0	0	0	0
575	13	4	9	3	0	0	0	0	0	2	1	0	0	0	0	0

2005 Land Use

576	105	33	72	0	0	0	0	0	0	0	0	0	0	0	0	0
577	4	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0
578	9	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0
579	0	0	0	37	0	10	6	0	0	1	0	20	0	0	0	0
580	6	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
581	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
582	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
583	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
584	30	15	15	2	0	0	2	0	0	0	0	0	0	0	0	0
585	10	3	7	1	0	0	0	0	0	0	0	0	0	0	1	0
586	10	3	7	0	0	0	0	0	0	0	0	0	0	0	0	0
587	5	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0
588	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
589	150	14	136	0	0	0	0	0	0	0	0	0	0	0	0	0
590	50	5	45	2	0	0	2	0	0	0	0	0	0	0	0	0
591	10	1	9	0	0	0	0	0	0	0	0	0	0	0	0	0
592	14	1	13	0	0	0	0	0	0	0	0	0	0	0	0	0
593	6	1	5	19	0	0	0	0	0	0	0	19	0	0	0	0
594	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
595	45	2	43	10	0	0	1	0	1	0	0	4	0	0	4	0
596	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
597	35	2	33	7	0	0	7	0	0	0	0	0	0	0	0	0
598	12	1	11	26	0	0	16	0	0	0	0	6	4	0	0	0
599	10	4	6	28	0	0	13	0	0	15	0	0	0	0	0	0
600	18	8	10	28	0	0	11	0	0	15	0	2	0	0	0	0
601	5	0	5	6	0	0	0	0	0	0	0	0	6	0	0	0
602	41	2	39	47	35	0	11	0	0	0	0	1	0	0	0	0
603	5	0	5	53	0	0	10	0	31	0	0	0	12	0	0	0
604	16	1	15	6	0	0	6	0	0	0	0	0	0	0	0	0
605	204	10	194	6	6	0	0	0	0	0	0	0	0	0	0	0
606	67	30	37	3	0	0	0	0	0	3	0	0	0	0	0	0
607	120	38	82	0	0	0	0	0	0	0	0	0	0	0	0	0
608	82	4	78	0	0	0	0	0	0	0	0	0	0	0	0	0
609	77	63	14	1	0	0	0	1	0	0	0	0	0	0	0	0
610	77	63	14	1	0	0	1	0	0	0	0	0	0	0	0	0
611	0	0	0	19	0	0	0	0	18	0	1	0	0	0	0	0
612	0	0	0	6	0	0	0	0	6	0	0	0	0	0	0	0
613	0	0	0	20	0	0	0	0	10	0	10	0	0	0	0	0
614	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
615	50	9	41	15	0	0	9	0	3	0	0	3	0	0	0	0
Total	**6,955**	**2,555**	**4,400**	**4,806**	**271**	**141**	**1,184**	**386**	**1,311**	**384**	**266**	**446**	**138**	**0**	**278**	**22**

2027 Land Use

TAZ	Total HH	Un-occ HH	Occ HH	Total EMP	EDU_EMP	FIRE_EMP	SERV_EMP	GOV_EMP	MAN_EMP	RET_EMP	WSL_EMP	TCU_EMP	CON_EMP	AG_EMP	OTR_EMP	MIN_EMP
213	587	4	583	106	0	0	10	0	0	15	5	0	75	1	0	0
217	134	5	129	107	0	0	10	0	7	40	10	20	0	0	20	0
218	149	4	145	52	25	0	10	0	0	10	0	2	0	0	5	0
219	46	3	43	237	5	0	26	35	0	36	0	86	0	0	49	0
220	7	0	7	433	0	13	125	0	7	100	75	74	2	2	35	0
221	11	0	11	81	0	0	10	15	0	7	25	12	10	2	0	0
222	21	1	20	229	191	0	15	9	0	11	0	3	0	0	0	0
223	212	14	198	53	7	1	27	0	6	6	0	4	2	0	0	0
224	109	10	99	424	0	3	276	41	0	24	0	67	13	0	0	0
225	93	8	85	29	1	0	8	0	0	16	0	4	0	0	0	0
226	1	0	1	177	0	0	32	4	11	31	73	18	8	0	0	0
227	33	3	30	820	25	100	210	215	35	100	50	32	9	0	22	22
228	340	35	305	183	2	23	104	0	4	31	1	5	6	2	5	0
229	129	13	116	60	0	0	29	0	1	20	0	0	0	0	10	0
230	89	8	81	341	0	15	75	0	0	65	10	0	0	1	175	0
302	0	0	0	6	0	0	2	0	0	2	1	0	1	0	0	0
303	2	0	2	691	76	1	43	121	240	35	31	100	26	1	17	0
304	87	5	82	79	0	3	45	11	5	6	3	5	1	0	0	0
305	67	5	62	142	0	0	13	15	0	85	10	19	0	0	0	0
327	546	1	545	35	0	0	6	0	0	13	0	7	9	0	0	0
500	44	0	44	27	0	0	2	0	24	0	0	0	0	0	1	0
501	0	0	0	900	0	0	0	0	900	0	0	0	0	0	0	0
502	2	0	2	28	0	0	0	0	22	0	5	1	0	0	0	0
503	40	1	39	33	0	0	33	0	0	0	0	0	0	0	0	0
504	375	169	206	35	0	2	29	0	0	4	0	0	0	0	0	0
505	80	1	79	7	0	0	7	0	0	0	0	0	0	0	0	0
506	9	3	6	1	0	0	1	0	0	0	0	0	0	0	0	0
507	402	16	386	0	0	0	0	0	0	0	0	0	0	0	0	0
508	282	94	188	0	0	0	0	0	0	0	0	0	0	0	0	0
509	241	48	193	0	0	0	0	0	0	0	0	0	0	0	0	0
510	282	83	199	5	0	0	3	0	0	2	0	0	0	0	0	0
511	180	148	32	38	0	0	29	0	0	5	0	1	0	0	3	0
512	59	4	55	0	0	0	0	0	0	0	0	0	0	0	0	0
513	19	2	17	0	0	0	0	0	0	0	0	0	0	0	0	0
514	230	1	229	59	0	1	36	1	0	14	0	0	0	0	7	0
515	197	1	196	36	0	0	23	0	0	0	0	8	0	0	5	0
516	48	3	45	0	0	0	0	0	0	0	0	0	0	0	0	0
517	97	2	95	0	0	0	0	0	0	0	0	0	0	0	0	0
518	627	18	609	7	0	0	5	0	0	0	0	0	0	0	2	0
519	80	18	62	16	0	3	10	0	0	3	0	0	0	0	0	0
520	127	53	74	8	0	1	7	0	0	0	0	0	0	0	0	0
521	700	574	126	53	0	3	46	1	0	3	0	0	0	0	0	0
522	80	4	76	44	0	0	27	0	5	6	0	3	1	0	2	0
523	38	7	31	6	0	0	4	0	0	0	0	0	0	0	2	0
524	68	29	39	5	0	0	2	0	0	3	0	0	0	0	0	0
525	2	0	2	27	0	0	7	0	0	11	0	6	3	0	0	0
526	34	13	21	37	0	0	17	0	0	5	1	2	12	0	0	0
527	30	13	17	37	1	0	17	0	0	4	1	3	10	1	0	0
528	3	0	3	26	0	0	11	0	0	5	0	3	6	0	1	0
529	28	1	27	3	0	0	0	0	0	0	0	1	1	0	1	0
530	40	7	33	3	0	0	0	0	0	0	0	0	0	2	1	0
531	25	1	24	75	0	0	6	0	60	6	0	1	2	0	0	0
532	14	0	14	9	0	0	4	0	0	3	0	0	0	0	2	0
533	13	1	12	10	0	0	3	0	2	4	0	0	0	0	1	0
534	26	1	25	75	0	0	1	0	60	4	1	4	5	0	0	0
535	30	4	26	33	0	0	18	0	0	4	0	1	10	0	0	0
536	16	2	14	24	0	0	17	0	0	4	0	0	3	0	0	0
537	5	1	4	7	0	0	2	0	0	5	0	0	0	0	0	0
538	4	1	3	49	0	0	19	0	0	4	20	6	0	0	0	0
539	9	2	7	8	0	0	3	0	0	2	2	1	0	0	0	0
540	64	10	54	80	0	0	53	0	0	5	14	2	1	1	4	0
541	31	1	30	24	0	0	3	2	0	8	3	1	6	0	1	0
542	6	1	5	77	0	0	4	7	0	46	13	0	6	0	1	0
543	41	4	37	60	0	0	6	0	0	53	0	0	1	0	0	0
544	27	2	25	24	0	0	8	0	0	9	0	0	7	0	0	0
545	185	10	175	22	0	0	14	0	0	7	0	1	0	0	0	0
546	201	74	127	67	0	3	46	0	3	6	0	7	2	0	0	0
547	111	44	67	0	0	0	0	0	0	0	0	0	0	0	0	0
548	161	15	146	0	0	0	0	0	0	0	0	0	0	0	0	0
549	76	7	69	0	0	0	0	0	0	0	0	0	0	0	0	0
550	139	16	123	0	0	0	0	0	0	0	0	0	0	0	0	0
551	97	63	34	5	0	0	4	1	0	0	0	0	0	0	0	0
552	28	1	27	82	0	7	62	0	3	10	0	0	0	0	0	0
553	464	44	420	3	0	0	3	0	0	0	0	0	0	0	0	0
554	19	0	19	73	0	0	37	1	6	18	0	2	2	0	7	0
555	142	0	142	9	0	0	9	0	0	0	0	0	0	0	0	0
556	66	0	66	72	0	4	49	0	5	8	0	0	0	0	6	0
557	240	118	122	101	0	9	91	0	0	1	0	0	0	0	0	0
558	154	29	125	67	0	9	47	0	1	10	0	0	0	0	0	0
559	68	1	67	16	0	2	8	3	0	2	0	1	0	0	0	0
560	16	1	15	99	0	4	73	0	0	3	5	14	0	0	0	0
561	44	15	29	7	0	0	5	0	0	0	0	2	0	0	0	0
562	82	3	79	75	0	3	65	1	2	0	1	0	1	0	2	0
563	87	3	84	0	0	0	0	0	0	0	0	0	0	0	0	0
564	109	17	92	0	0	0	0	0	0	0	0	0	0	0	0	0
565	123	3	120	17	0	0	17	0	0	0	0	0	0	0	0	0
566	103	14	89	0	0	0	0	0	0	0	0	0	0	0	0	0
567	100	24	76	0	0	0	0	0	0	0	0	0	0	0	0	0
568	123	3	120	0	0	0	0	0	0	0	0	0	0	0	0	0
569	21	2	19	0	0	0	0	0	0	0	0	0	0	0	0	0
570	125	25	100	0	0	0	0	0	0	0	0	0	0	0	0	0
571	98	6	92	5	0	1	0	0	2	0	0	0	0	0	2	0
572	209	66	143	42	0	11	7	10	4	0	1	1	8	0	0	0
573	209	66	143	7	0	2	4	0	0	0	0	0	0	0	1	0
574	278	88	190	0	0	0	0	0	0	0	0	0	0	0	0	0
575	693	4	689	49	0	0	35	0	0	10	4	0	0	0	0	0

2027 Land Use

576	155	33	122	42	0	2	40	0	0	0	0	0	0	0	0	0
577	675	1	674	47	0	0	43	0	0	0	0	0	0	4	0	0
578	685	3	682	47	0	0	47	0	0	0	0	0	0	0	0	0
579	86	0	86	92	0	11	60	0	0	1	0	20	0	0	0	0
580	38	3	35	0	0	0	0	0	0	0	0	0	0	0	0	0
581	22	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0
582	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
583	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
584	46	15	31	15	0	0	10	0	0	2	0	1	2	0	0	0
585	33	3	30	44	0	1	40	0	0	0	0	0	2	0	1	0
586	10	3	7	0	0	0	0	0	0	0	0	0	0	0	0	0
587	31	2	29	0	0	0	0	0	0	0	0	0	0	0	0	0
588	19	1	18	0	0	0	0	0	0	0	0	0	0	0	0	0
589	150	14	136	0	0	0	0	0	0	0	0	0	0	0	0	0
590	121	5	116	4	0	0	2	0	0	0	0	2	0	0	0	0
591	10	1	9	0	0	0	0	0	0	0	0	0	0	0	0	0
592	14	1	13	0	0	0	0	0	0	0	0	0	0	0	0	0
593	6	1	5	32	0	0	8	0	0	0	5	19	0	0	0	0
594	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
595	45	2	43	45	1	0	7	0	1	7	0	6	18	1	4	0
596	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
597	35	2	33	15	1	0	7	0	0	5	0	0	2	0	0	0
598	12	1	11	49	0	0	24	0	0	0	0	8	16	1	0	0
599	13	4	9	34	0	0	15	0	0	16	0	0	3	0	0	0
600	25	8	17	36	0	0	15	0	0	16	0	2	3	0	0	0
601	5	0	5	7	0	0	0	0	0	0	0	0	7	0	0	0
602	41	2	39	57	37	0	15	0	0	2	0	1	2	0	0	0
603	5	0	5	66	0	0	10	0	31	0	0	0	25	0	0	0
604	16	1	15	7	0	0	7	0	0	0	0	0	0	0	0	0
605	204	10	194	9	6	0	3	0	0	0	0	0	0	0	0	0
606	86	30	56	6	0	0	2	0	0	3	0	1	0	0	0	0
607	120	38	82	0	0	0	0	0	0	0	0	0	0	0	0	0
608	82	4	78	0	0	0	0	0	0	0	0	0	0	0	0	0
609	77	63	14	1	0	0	0	1	0	0	0	0	0	0	0	0
610	77	63	14	1	0	0	1	0	0	0	0	0	0	0	0	0
611	2	0	2	19	0	0	0	0	18	0	1	0	0	0	0	0
612	0	0	0	6	0	0	0	0	6	0	0	0	0	0	0	0
613	0	0	0	20	0	0	0	0	10	0	10	0	0	0	0	0
614	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
615	78	9	69	15	0	0	9	0	3	0	0	3	0	0	0	0
Total	**15,024**	**2,555**	**12,469**	**7,815**	**378**	**238**	**2,480**	**494**	**1,484**	**1,002**	**381**	**593**	**329**	**19**	**395**	**22**