CITY OF SHORELINE

TRANSPORTATION MASTER PLAN

ADOPTED BY RESOLUTION NO. 234 ON JULY 11, 2005

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CITY OF SHORELINE

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Chapter 1. Introduction

The City of Shoreline's Draft Transportation Master Plan (TMP) is the long-range blueprint for travel and mobility, describing a vision for transportation that supports the City's adopted land use plan. The TMP will provide guidance for public and private sector decisions on local and regional transportation investments, including short, mid-, and long-range transportation *and* related land-use activities. In this way, the City can assess the relative importance of the projects and schedule their planning, engineering, and construction as growth takes place and the need for the facilities and improvements is warranted. It also establishes a prioritization of the projects to be included in future Capital Improvement Plans. The TMP covers all forms of personal travel - walking, bicycling, bus and automobile.

The TMP reflects policy direction from the City Council, Planning Commission, public comments, and technical analysis of existing conditions and external requirements (such as federal and state mandates). The TMP focuses on satisfying travel demand by making efficient use of the existing infrastructure and by providing the facilities and services to encourage walking, cycling and transit as priority modes.

How Does the TMP Affect Daily Life in Shoreline?

The TMP describes a vision for Shoreline's transportation future, identifies policies to help achieve that vision and contains the transportation funding program for implementation. These policies affect choices for travel by car, bus, bicycle and on foot. By identifying transportation priorities and the funding to support them, the TMP is able to recommend what projects are built and what programs are pursued.

State and Regional Policy Context

The City's Comprehensive Plan must meet a number of state and regional requirements. Key requirements include compliance with the State Growth Management Act, certification of the transportation-related provisions in local comprehensive plans, and King County's Countywide Planning Policies.

Washington State Growth Management Act

In 1990, Washington adopted the Growth Management Act (GMA) to mandate local comprehensive planning in heavily populated and high growth areas of the state. The GMA establishes broad goals, such as managing urban growth, protecting agricultural lands, reducing sprawl, and encouraging multi-modal transportation systems. The overall goals of the GMA encourage affected jurisdictions, including Shoreline, to keep pace with land development and make public road and transit improvements to help meet the expected transportation demand.

Puget Sound Regional Council: Vision 2020 and Destination 2030

Vision 2020, the growth, economic and transportation strategy for the four-county central Puget Sound region includes the multi-county planning policies required under the Growth Management Act. These policies are used to review and certify the transportation-related

provisions in local comprehensive plans. Destination 2030, adopted in May 2001, is the detailed transportation component of Vision 2020. Destination 2030 emphasizes four areas of transportation policy: (1) optimize and maintain existing facilities and services, (2) manage travel demand, (3) link transportation with land use, and (4) offer greater mobility options. Destination 2030 includes an investment strategy to guide decisions on transportation projects and programming.

King County Countywide Planning Policies

As one of the jurisdictions in King County, the state GMA requires that Shoreline's Transportation Element must be consistent with the King County Countywide Planning Policies. In general, the Countywide Planning Policies direct local jurisdictions to provide a balanced transportation system using all modes of transportation as efficiently as possible. It directs state, regional, county and city governments to coordinate effectively when planning transportation improvements.

City of Shoreline Transportation Goals & Policies

The recommended system improvements in the Transportation Master Plan will implement the City of Shoreline's transportation goals and policies in the Transportation Element of the City's Comprehensive Plan. Those policies provide direction for prioritizing projects and programs and identifying the City's strategic interests in regional investments, adjacent transportation facilities, and funding alternatives. The goals and policies for the 2005 Transportation Element update are listed in **Appendix 1-1** and reprinted as sidebars throughout the relevant chapters of the TMP.

Planning Process

The City of Shoreline initiated the update of its Comprehensive Plan concurrent with development of long-range "Master Plans" for Transportation, Parks and Recreation, and Surface Water Management. The City was also in the process of updating its shoreline policies. The City's general policy direction for updating the Transportation Element of the Comprehensive Plan and creating the Transportation Master Plan called for the following areas of emphasis:

- Build on the existing comprehensive plan and assume the adopted land use vision is unchanged
- Create safe and friendly streets, emphasizing safety, convenience, attractiveness and environmental enhancement ("green streets")
- Be aggressive in developing capital systems that can serve more than one function: for example, coordinate storm- and surface water improvements with transportation projects, and use the transportation system to support the parks system.
- Provide safe linkages to schools
- Develop walk-able communities where residents can walk to the library, park, school, or nearby grocery store, cross streets safely and enjoy the experience

Open Houses

Early in the planning process, the City held two public meetings (in September 2003) to introduce the project to the public. At the open houses, the City asked for public input on the transportation, parks, recreation and open space, shoreline, and storm water conditions

to be addressed in the master plans. Transportation proved to be a very popular topic, and many residents expressed interest in a "green streets" program (see community design element of the comprehensive plan). The City also used its web site, a newsletter and press releases to the media to convey information about the planning processes.

Planning Commission Transportation Work Group

The Planning Commission retained oversight of the initial development of the various work products, dividing into topical work groups for each discipline. The transportation work group held a series of meetings that were open to the public, in which they advised staff and the consultant team in developing policies for the initial update of the transportation element of the comprehensive plan. Each member of the transportation work group identified areas of the City needing transportation improvements and identified policy issues for consideration.

The transportation work group adopted a set of guiding principles (see **Appendix 1-1**) to serve as a framework for developing transportation policies (see **Appendix 1-2**) and highlighted the following priorities:

- Put a major emphasis on alternatives to driving alone… especially pedestrian systems.
- Fix missing links – don't build "sidewalks to nowhere"
- Coordinate with parks and surface water master planning efforts

The transportation work group reviewed the street classification system recommended in this plan. They also reviewed preliminary lists of proposed transportation improvements, with particular attention to pedestrian project evaluation criteria.

Staff Workshops

A team of senior City staff representing the planning, parks, public works and finance departments reviewed and approved materials for presentation to the planning commission work groups. The staff discussed a number of issues, including

- "SeaStreets" in the City of Seattle as an example of integrated surface water and transportation needs. SeaStreets have no curbs and integrate meandering edge treatments and other landscaping elements.
- Street classifications
- The need to emphasize east-west ped/bike connections
- Recognizing the Interurban Trail as the spine of the City's bike/pathway network
- How to develop a sense of place around "Greenstreets"
- Potential connections to the regional transportation system

The team identified and reviewed recommended project improvements for consideration in the Capital Facilities Element of the Comprehensive Plan. This project list will be forwarded to the Planning Commission for consideration along with recommendations on the Comprehensive Plan amendments and Master Plans. Both the Planning Commission and City Council will conduct public hearings prior to taking action on the plans.

TMP Review and Adoption

The review and adoption process for the TMP, as well as the Comprehensive Plan and other Master plans, included

- Public open house and presentation of the Draft Comprehensive Plan and Master Plans
- Planning Commission Public Hearings and Plan Reviews
- Planning Commission Recommended Draft Comprehensive Plan and Master Plans
- City Council Public Hearings and Plan Reviews
- City Council Adoption of Comprehensive Plan and Master Plans

Chapter 2. Inventory of the Existing Transportation System

Roadway Network

Shoreline is greatly impacted by state highways. SR 99 and I-5, both of which are designated as "highways of statewide significance," run the entire length of Shoreline and carry well over 200,000 vehicles per day.

Shoreline is also bordered by three state highways; SR 104 (NE 205th Street), SR 523 (NE 145th Street), and SR 522 (Bothell Way NE). Even though these three corridors are not currently inside the corporate limits of the City, Shoreline citizens and businesses rely on them for a majority of their travels. Generally, the sidewalk systems along these streets are in disrepair, illumination is lacking, and the lanes are narrow and do not include provisions to improve transit operations.

I-5 has three full interchanges with direct impact on Shoreline: NE145th Street, NE 175th Street, and NE 205th Street. The location of each of these interchanges has direct and significant impact on these streets, essentially making them Shoreline's most heavily traveled east-west corridors. When I-5 is congested, parallel arterials in Shoreline often receive spillover through traffic: 15th Avenue NE, 5th Avenue NE, 1st Avenue NE, and Meridian Avenue N are the streets that tend to pick up the overflow traffic.

Aurora Corridor Project

The Aurora Corridor Project is to support the City of Shoreline's transportation policies in the adopted Comprehensive Plan. This project will redevelop the three miles of Aurora Avenue N (SR 99) that run through Shoreline. The goal of the plan is to improve pedestrian and vehicle safety, pedestrian and disabled access, vehicular capacity, traffic flow, transit speed and reliability, nighttime visibility and safety, storm water quality, economic investment potential and streetscape amenities, and satisfy access management RCW (Revised Code of Washington).

For funding and design purposes, the plan is divided into two sections: N 145th to 165th Streets and N 165th to 205th Streets. The City has completed both a State Environmental Policy Act (SEPA) EIS and a National Environmental Policy Act (NEPA) environmental assessment review for Aurora N 145th to 165th Streets. The current funded project is N 145th to 165th Streets and construction is scheduled to begin in 2005. The cost estimate for preliminary engineering, right-of-way and construction for the first mile (N 145th to 165th) is $25 Million, with 87% of the funding coming from federal, state and county grants and 13% from money set aside by the City for the project.

The original design concept was developed during the Aurora Corridor Multi-Modal Pre-Design Study, a public process involving over 60 public meetings, open houses and

briefings at City Council meetings. Based on the analysis in the final EIS, the City Council approved Alternative A – Modified on December 9, 2002 that includes the following features:

- 7-foot sidewalks
- 4-foot amenity zone for bus shelters, street and pedestrian lights, landscaping and pedestrian amenities such as benches and trash cans
- Two through lanes and a Business Access/Transit (BAT) lane in each direction next to the curb
- Continuous street lighting and pedestrian-level lighting at intersections
- Underground utilities
- Narrower sidewalks at three locations to avoid impacts to buildings (will be widened with redevelopment of parcels)
- Landscaping
- Stormwater facilities and water quality treatment that meets or exceeds city, county and state requirements
- Raised medians with left/U-turns at intersections (breaks for pedestrian crossings)
- New traffic signals/pedestrian crossings at 152nd and 165th
- Bus zone enhancements

Street Classifications

Federal and State guidelines require that streets be classified based on function. Generally, streets are classified as either arterials or local streets. Local jurisdictions can also use the designations to guide the nature of improvements allowed and/or desired on certain roadways, such as sidewalks or street calming devices. The City of Shoreline's 1998 Comprehensive Plan used the following designations, which are illustrated in **Figure 2-1**. (Note: the TMP recommends modification to these designations as shown in Chapter 6.)

Arterials – The primary function of arterials is to provide a high degree of vehicular mobility by limiting property access. The vehicles on arterials are predominantly for through traffic. Arterials are generally connected with interstate freeways or limited access expressways. Sidewalks are required by the City's development code. Arterials are further classified into three classes: Principal Arterials, Minor Arterials and Collector Arterials.

Principal Arterials have higher levels of local land access controls and regional significance as major vehicular travel routes that connect between cities within a metropolitan area.

Minor Arterials are generally designed to provide a high degree of intra-community connections and are less significant from a perspective of a regional mobility.

Collector Arterials assemble traffic from the interior of an area/community and deliver it to the closest Minor or Principal Arterials. Collector Arterials provide for both mobility and access to property are designed to fulfill both functions.

Local Streets – All other streets are generally designated as local streets.

Local Streets provide local access to residential areas. Buses are not allowed except for short distances, and with new development or redevelopment sidewalks are typically required by the City's development code, although with some design flexibility.

Figure 2-1. Existing Street Classification

Source: Shoreline Comprehensive Plan, adopted on November 23, 1998.

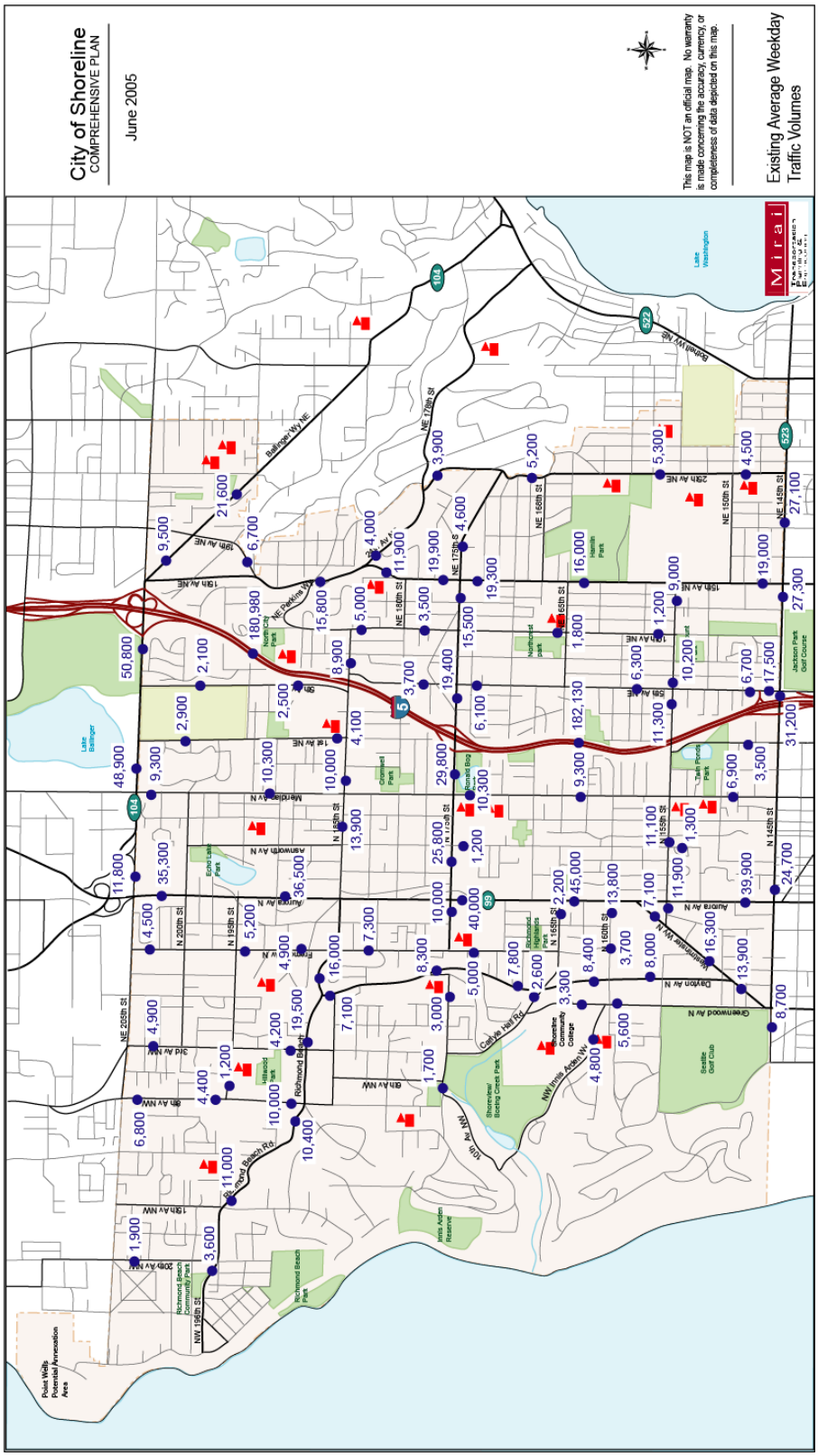
Existing Traffic

The pattern of daily traffic volumes reflects the street classifications. The highest volumes of traffic are observed on state highways, which are principal arterials. SR 99 (Aurora Avenue N) had the highest overall average daily traffic for any facility in Shoreline except I-5. Over a two-year period (2000-2002), traffic volumes range from 35,300 in the north to 45,000 in the vicinity of N 160th Street. However, SR 104 (N 205th Street) near the I-5 interchange had daily traffic volumes around 50,000. Traffic along SR 523 (NE 145th Street) had volumes ranging from 24,000 to 31,000. Other principal arterials that had significant traffic but are not state routes include: 15th Avenue NE, Meridian Avenue N, NW Richmond Beach Road, N 185th Street, N 175th Street, N 155th Street and Westminster Way N. **Figure 2-2** summarizes the existing Average weekday traffic volumes for Shoreline.

Access Control Classification System

For all Washington State highways, Washington State Department of Transportation (WSDOT) controls all access to these facilities in order to preserve the safety and efficiency of these highways. Under current access management standards, access is distinguished as being either a limited access highway or a managed access highway. I-5 is the only limited access highway in Shoreline. The remaining state routes in Shoreline are managed access. Aurora Avenue within the City of Shoreline is a class 4 managed access highway. WSDOT has sole authority to reclassify route designations.

Figure 2-2. Existing Average Weekday Traffic Volumes (2000-2002)



Local and Regional Public Transit

Public transit is an integral part of Shoreline's commitment to address neighborhood quality of life issues. Shoreline citizens view public transit as a way to address issues of traffic congestion, transportation options, pollution, and a sense of community. Unlike central cities in the Puget Sound region, Shoreline does not have a concentrated base of employment or major population centers. The majority of the destinations for journey-to-work trips for Shoreline residents are located in urban centers such as Downtown Seattle and the University of Washington. However, access to community facilities and institutions are important to the people of Shoreline. The library, city hall, community center and many parks and schools are scattered throughout the City. The one major destination point within the City is Shoreline Community College, a major commuter college.

Transit Agencies

The City of Shoreline is served by three transit agencies: Metro Transit, Community Transit, and Sound Transit. Metro Transit provides transit service primarily in King County. Just to the north of Shoreline, Community Transit services most of Snohomish Country and adjacent areas. Both Metro and Community Transit provide park-and-ride lots, vanpools, paratransit, Dial-A Ride Transportation (DART), and local and commuter express bus service throughout their primary service areas and to neighboring major centers. However, due to their service jurisdictions, transit users along the Aurora Avenue Corridor who cross the county line need to make a transfer.

Sound Transit is the regional transit agency for the Puget Sound region and provides express bus service from Shoreline to Seattle, Lynnwood, and Everett. Sound Transit provides limited services in Shoreline. Two express buses stop at I-5/NE145th freeway station, which serves the North Jackson Park-and-Ride lot located within the City. Sound Transit's Sounder commuter rail between Seattle and Everett operates along Shoreline's coast but currently does not have any stations within the City limits.

Facilities

Bus stops are located along most principal, minor and collector arterials and next to park-and-ride lots. Almost all are accessible. The Aurora Village Transit Center is a major transfer point for both Metro Transit and Community Transit. The transit center accommodates a park-and-ride lot, and 12 bus bays that allow for local, inter-community and regional bus connections. Transit riders who cross the county line along Aurora Avenue need to transfer at this location. Community Transit provides connections to the Edmonds-Kingston ferry and the Sounder Edmonds station. The freeway station at N 145th Street provides connections between the North Jackson Park-and-Ride, Metro's express buses, and Sound Transit service. Five Metro Transit lines and two Sound Transit routes serve the freeway station.

Passenger amenities are provided at major passenger activity areas, including Aurora Village Transit Center, Shoreline Park-and-Ride, Shoreline Community College, and the N 145th Avenue freeway station. Amenities at these locations include shelters, benches and route-specific schedule information. However, only 47 out of the 288 Shoreline stops have shelters. Most shelter locations are oriented towards AM peak bus route operations.

A King County Metro survey of bus stops in Shoreline conducted in the spring of 2003 indicated that the most heavily utilized stops were located at the Aurora Village Transit Center, Shoreline Community College, along Aurora Avenue N, and a couple of stops along N 175th Street and 15th Avenue N. The stops with the largest number of boardings and

disembarkations occurred at the Aurora Village Transit Center. Outside of the Transit Center, Shoreline Community College had the next highest number of boardings and disembarkations, followed by the Shoreline Park-and-Ride.

In addition to their transit service, Metro Transit has eight designated park-and-ride lots located throughout the City; three are permanent facilities, and five are parking lots leased from local churches. The Shoreline Park-and-Ride located on Aurora Avenue N has the largest capacity with 400 parking spaces. The smallest park-and-ride lot is located at Shoreline United Methodist Church with 20 spaces. A study conducted by Metro Transit in the spring of 2003 indicated that all of the permanent park-and-ride lots have a utilization rate ranging from 68% to 74%. The leased lot at Aurora Church of Nazarene had the highest utilization rate with 97%. The remaining five lots have excess capacity. See **Table 2-1** for a complete listing.

Table 2-1. Shoreline Park-and-Ride Facilities

Name	Location	Capacity	2003 Utilization
Aurora Church of Nazarene	1900 N 175th ST	67	97%
Shoreline United Methodist Church	NE 145th ST & 25th Avenue NE	20	75%
Shoreline	18821 Aurora Avenue N	400	74%
Aurora Village Transit Center	1524 N 200th ST	200	74%
North Jackson Park	14711 5th Avenue NE	68	68%
Korean Zion Presbyterian Church	17920 Meridian Avenue N	25	52%
Prince of Peace Lutheran Church	14514 20th Avenue NE	40	40%
Bethel Lutheran Church	NE 175th ST & 10th Avenue N	85	27%

NOTE: Italicized are leased parking lots.

Transit priority treatments are provided at several locations along the I-5 and Aurora Avenue N corridors. In addition to the high occupancy vehicle lanes on I-5, ramp metering and queue by-pass lanes for transit and carpools have been constructed at the interchanges with N 145th Street, N 175th Street, and N 205th Street/Lake Ballinger Way. Business access/transit (BAT) lanes have been constructed in the northbound shoulder of Aurora Avenue N.

Service

As of January 2004, 28 bus routes operate in the City of Shoreline as well as four routes that skirt its southeastern border along Lake City Way. Fifteen out of the 28 routes operate only during peak periods. The remaining routes are offered throughout the day, seven days a week. Overall, Metro Transit provides the majority of the service, with 20 fixed routes operating in the Shoreline area. Using Metro Transit's classification system, current transit services can be aggregated into the following categories:

Community: These routes provide local access within the City. Currently, there are no bus routes that exclusively serve the City of Shoreline. However, as part of their overall service, several routes connect Shoreline neighborhoods together including: 330, 331, 346, 347, 348, and 358.

Inter-community: These routes connect communities within a subarea of the county and neighboring areas such as Mountlake Terrace, Lake City, Lake Forest Park, Kenmore and Northgate. Routes include: 330, 331, 345, 346, 347, 348, and 355.

Regional: These connect Shoreline to urban centers outside of the subarea or county including: Downtown Seattle, University District, Bellevue, Renton, Lynnwood and Everett. Routes include Metro 5, 77, 242, 243, 301, 303, 304, 308, 316, 342, 355, 358, 373, 416; Community Transit 100, 101, 118, 416, 630; and Sound Transit 510 and 511.

Custom: Custom bus routes operate at specific times to specific destinations such as an employment area or school. Metro operates route 949 to the Boeing Everett plant and route 995 to Lakeside School.

In addition to fixed route service, Metro Transit provides primary paratransit service for Shoreline to King County under its ACCESS Transportation program. Community Transit also provides DART to destinations in Shoreline from Snohomish County. A regional coalition of transit agencies, including Community and Sound Transit, provide regional connections for special needs riders. **Table 2-2** illustrates that most Shoreline bus routes are regional service to Downtown Seattle, and are provided during peak periods. However, the majority of inter-community services to neighboring areas have all day service.

Table 2-3 provides an overview of service availability for each of the 28 bus routes serving Shoreline. Most lines service regional north-south corridors running at 30-minute headways. Recently, Metro added route 348, which provides east-west connections through the City. Evening headways are either 30 or 60 minutes. Saturday service runs on 30-minute headways, while buses on Sunday run at 60-minute intervals. Routes that have an end point in Shoreline tend to terminate at Shoreline Community College or at the Aurora Village Transit Center. Most of the regional and one of the inter-community bus routes operate only during peak periods. The remaining routes offer a mix of inter-community and regional bus service throughout most of the day during the weekday.

Table 2-2. Transit Service Classification

Service Type	Route	Provider	Major Destinations
Regional	5	Metro Transit	Shoreline CC, Greenwood, Woodland Park Zoo, Fremont, Downtown Seattle
Regional	*77*	*Metro Transit*	*North City, Jackson Park, Maple Leaf, Downtown Seattle*
Regional	*100*	*Community Transit*	*Aurora Village TC, Edmonds CC, Everett Station*
Regional	101	Community Transit	Aurora Village TC, Edmonds CC, Mariner P&R
Regional	118	Community Transit	Aurora Village, Alderwood Mall, Ash Way P&R
Regional	*242*	*Metro Transit*	*North City, Northgate TC, Green Lake P&R, Montlake, Safeco, Overlake*
Regional	*243*	*Metro Transit*	*Jackson Park, Lake City, Ravenna, University Village, Montlake, Evergreen Point, Bellevue, Wilburton P&R*
Regional	*301*	*Metro Transit*	*Aurora Village TC, Firdale Village, Richmond Highlands, Shoreline P&R, I-5 Freeway Stations, Downtown Seattle (Tunnel)*
Regional	*303*	*Metro Transit*	*Shoreline P&R, Aurora Village TC, Richmond Highlands, Jackson Park, Northgate TC, Downtown Seattle, First Hill*
Regional	*304*	*Metro Transit*	*Richmond Beach, NE 145th ST Freeway Station, Downtown Seattle*
Regional	*308*	*Metro Transit*	*Horizon View, Lake Forest Park, Lake City, Jackson Park, Downtown Seattle*
Regional	*316*	*Metro Transit*	*Meridian Park, N Seattle CC, E Green Lake, Downtown Seattle*
Regional	*342*	*Metro Transit*	*Shoreline P&R, Aurora Village TC, Lake Forest Park, Kenmore P&R, I-405 Freeway Stations, Bellevue TC, Newport Hills, Kennydale, Renton Boeing, Renton TC*
Regional	*355*	*Metro Transit*	*Shoreline CC, Greenwood, University District, Downtown Seattle*
Regional	358	Metro Transit	Aurora Village TC, Shoreline P&R, Aurora Avenue N, W Green Lake, Downtown Seattle
Regional	*373*	*Metro Transit*	*Aurora Village TC, Shoreline P&R, Richmond Heights, Jackson Park, Maple Leaf, University District, UW Campus*
Regional	*416*	*Community Transit*	*Edmonds Ferry, Aurora Village TC, Downtown Seattle*
Regional	510	Sound Transit	Downtown Seattle, Lynnwood, Everett
Regional	511	Sound Transit	Ash Way P&R, Lynnwood, Downtown Seattle
Regional	630	Community Transit	Edmonds CC TC, Edmonds Ferry, Aurora Village, Lynnwood TC
Inter-community	*330*	*Metro Transit*	*Shoreline CC, Fircrest, Lake City*
Inter-community	331	Metro Transit	Shoreline CC, Richmond Highlands, Aurora Village TC, Ballinger Terrace, Lake Forest Park, Kenmore P&R
Inter-community	345	Metro Transit	Shoreline CC, Northwest Hospital, N Seattle CC, Northgate TC
Inter-community	346	Metro Transit	Aurora Village TC, Richmond Highlands, Haller Lake, Northwest Hospital, Northgate TC
Inter-community	347	Metro Transit	Mountlake Terrace P&R, Ballinger Terrace, Shoreline Library, Jackson Park, Northgate TC
Inter-community	348	Metro Transit	Richmond Beach, North City, Shoreline Community Center & Library, Jackson Park, Northgate TC
Custom	*949*	*Metro Transit*	*NE 145th & I-5 Station, Everett Boeing Plant*
Custom	*995*	*Metro Transit*	*Evergreen School, Lakeside School*

NOTE: *Italicized* routes only operate during peak periods.

Table 2-3. Transit Service Headways by Time Period

Route	Provider	Peak		Midday	Early Evening	Late Evening	Sat.	Sunday
		Peak dir	Both dir					
77	*Metro Transit*	*15*	-	-	-	-	-	-
100	*Community Transit*	*20*	-	-	-	-	-	-
242	*Metro Transit*	*30*	-	-	-	-	-	-
243	*Metro Transit*	*30*	-	-	-	-	-	-
303	*Metro Transit*	*25*	-	-	-	-	-	-
304	*Metro Transit*	*25*	-	-	-	-	-	-
308	*Metro Transit*	*30*	-	-	-	-	-	-
316	*Metro Transit*	*25*	-	-	-	-	-	-
342	*Metro Transit*	*30*	-	-	-	-	-	-
355	*Metro Transit*	*15*	-	-	-	-	-	-
373	*Metro Transit*	*30*	-	-	-	-	-	-
416	*Community Transit*	*20*	-	-	-	-	-	-
949	*Metro Transit*	*180*	-	-	-	-	-	-
995	*Metro Transit*	*180*						
301	*Metro Transit*	*15*	*30*	-	-	-	-	-
330	*Metro Transit*	-	*30*	-	-	-	-	-
510	Sound Transit	30	-	60	30	60	60	60
511	Sound Transit	30	-	30	30	60	60	60
118	Community Transit	-	30	30	60	-	60/30/60	60
630	Community Transit	-	30	30	60	-	60	60
5	Metro Transit	-	30	30	30	30	30	30
101	Community Transit	15	20	15	15	30	30	30
331	Metro Transit	-	30	30	30	60	30/60	60
345	Metro Transit	-	30	30	30	60	60/30/60	60
346	Metro Transit	-	30	30	60	60	60/30/60	60
347	Metro Transit	-	30	30	60	60	60/30/60	60
348	Metro Transit	-	30	30	60	60	60/30/60	60
358	Metro Transit	8	15	15	30	30	30/15/30	30

NOTE: *Italicized* routes only service during peak periods.

Table 2-4 provides an overview of weekday service destinations to and from the City of Shoreline. Almost 7 out of 10 buses that service Shoreline have a regional connection (68.9%). Roughly one-third of all bus service is destined to and from Downtown Seattle (32.7%). This equates to roughly half of all regional transit service (47.4%). Metro Transit routes 5 and 358, which provide all-day service, contribute over two-thirds of all Downtown bus service. The remaining seven routes only provide peak period service.

The next largest percentage of transit service (30.7%) makes connections to inter-community destinations. Locations include neighboring Mountlake Terrace, Lake City, Lake Forest Park, Kenmore and Northgate. With the exception of Metro Transit route 330, all-day bus service is evenly distributed among the remaining five servicing routes. The third largest percentage of overall transit service (23.0%) is regional destinations to points north: Edmonds, Lynnwood and Everett. Half of the transit service is provided by Community Transit route 101, which makes connections to the Edmonds / Kingston ferry and Sound Transit's Sounder commuter rail station.

Outside of the custom bus services, connections to the University District and points east of Lake Washington comprise the smallest percentage of overall service (4.3%). Nearly 9% of all bus service had connecting service between both Downtown Seattle and points north of Shoreline. Sound Transit routes 510 and 511 provide over 84% of this service.

Figure 2-3 maps out the all-day transit service and their destinations. This figure illustrates how much of this service provides connections to inter-community destination and provides connections throughout most of Shoreline. Connections to points north are only provided at the freeway station of Aurora Village transit center in the peak period. **Figure 2-4** illustrates how the majority of the service provides connections to Downtown Seattle. These routes are available throughout the City. Transit routes to the University District or points to the north, south or east are only available at select areas of Shoreline. Many of these connections can be made at the Aurora Village Transit Center.

Table 2-4. Weekday Transit Service by Destination

Service Type	Destination	Route	Provider	# of Buses	% of Total Service	% of Service Type	% of Destination
Regional	Downtown Seattle (SOUTH)	5	Metro Transit	81	7.5%	10.8%	22.9%
		77	*Metro Transit*	*9*	*0.8%*	*1.2%*	*2.5%*
		301	*Metro Transit*	*41*	*3.8%*	*5.5%*	*11.6%*
		303	*Metro Transit*	*14*	*1.3%*	*1.9%*	*4.0%*
		304	*Metro Transit*	*10*	*0.9%*	*1.3%*	*2.8%*
		308	*Metro Transit*	*8*	*0.7%*	*1.1%*	*2.2%*
		316	*Metro Transit*	*14*	*1.3%*	*1.9%*	*4.0%*
		355	*Metro Transit*	*20*	*1.8%*	*2.7%*	*5.6%*
		358	Metro Transit	157	14.5%	21.0%	44.4%
		TOTAL		354	32.7%	47.4%	100%
	Downtown Seattle – Edmonds / Lynnwood / Everett (N-S)	*416*	*Community Transit*	*15*	*1.4%*	*2.0%*	*15.5%*
		510	Sound Transit	35	3.2%	4.7%	36.1%
		511	Sound Transit	47	4.3%	6.3%	48.5%
		TOTAL		97	8.9%	13.0%	100%
	Edmonds / Lynnwood / Everett (NORTH)	*100*	*Community Transit*	*19*	*1.8%*	*2.5%*	*7.6%*
		101	Community Transit	127	11.7%	17.0%	51.0%
		118	Community Transit	45	4.2%	6.0%	18.1%
		630	Community Transit	58	5.4%	7.8%	23.3%
		TOTAL		249	23.0%	33.3%	100%
	University District / Bellevue / Renton (SOUTH-EAST)	*242*	*Metro Transit*	*15*	*1.4%*	*2.0%*	*31.9%*
		243	*Metro Transit*	*6*	*0.6%*	*0.8%*	*12.8%*
		342	*Metro Transit*	*11*	*1.0%*	*1.5%*	*23.4%*
		373	*Metro Transit*	*15*	*1.4%*	*2.0%*	*31.9%*
		TOTAL		47	4.3%	6.3%	100%
	TOTAL			747	68.9%	100%	-
Inter-community	Mountlake Terrace / Lake City / Lake Forest Park / Kenmore / Northgate	*330*	*Metro Transit*	*22*	*2.0%*	*6.6%*	*6.6%*
		331	Metro Transit	61	5.6%	18.3%	18.3%
		345	Metro Transit	61	5.6%	18.3%	18.3%
		346	Metro Transit	64	5.9%	19.2%	19.2%
		347	Metro Transit	62	5.7%	18.6%	18.6%
		348	Metro Transit	63	5.8%	18.9%	18.9%
		TOTAL		333	30.7%	100%	100%
	TOTAL			333	30.7%	100%	-
Community	Shoreline	-	-	-	-		-
Custom	*Everett Boeing Plant*	*949*	*Metro Transit*	*2*	*0.2%*	*50%*	*100%*
	Lakeside School	*995*	*Metro Transit*	*2*	*0.2%*	*50%*	*100%*
	TOTAL			4	0.4%	100%	-
TOTAL				1084	100%	-	-

NOTE: *Italicized* routes only service during peak periods.

Figure 2-3. All Day Transit Service Routes

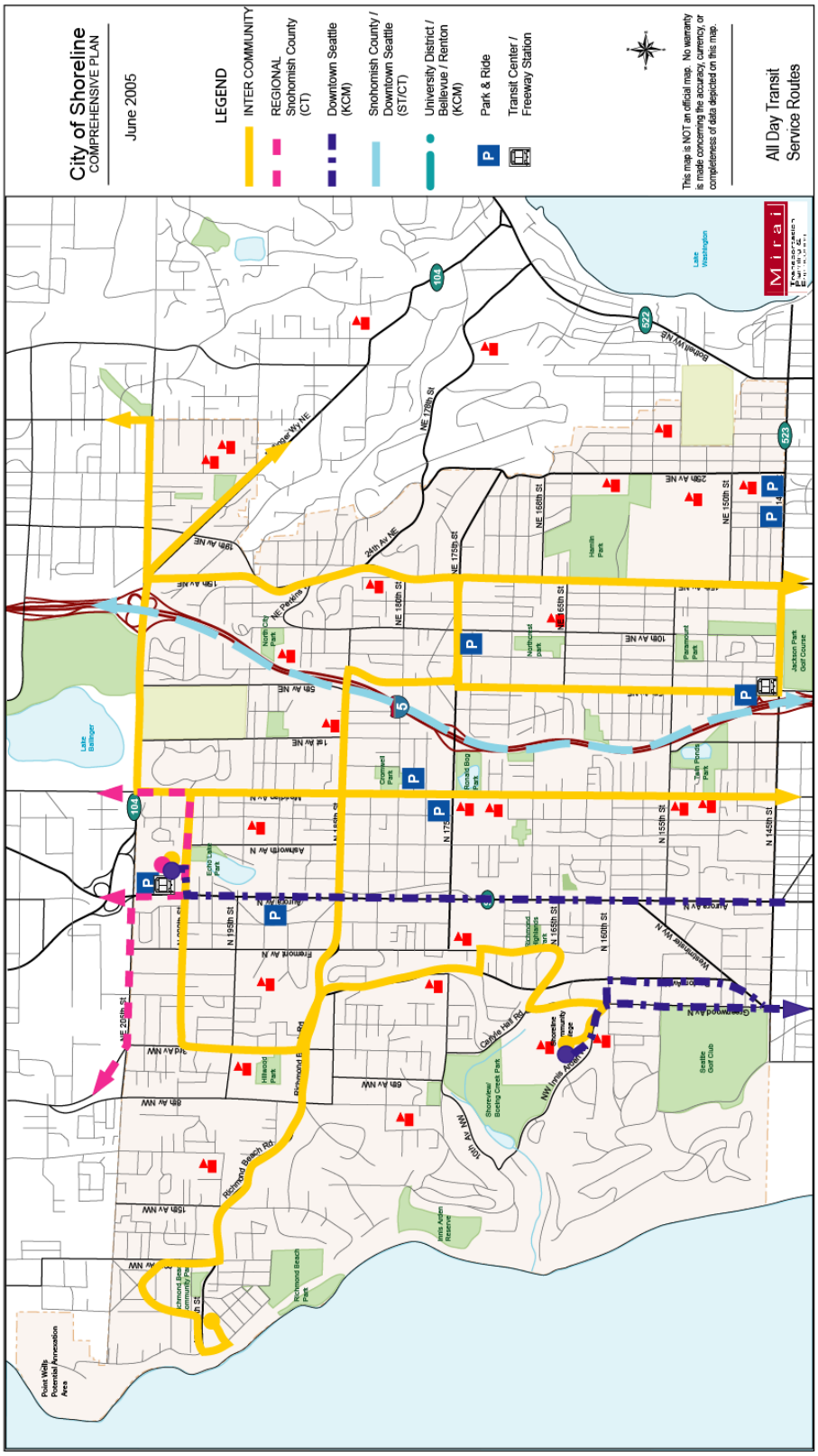
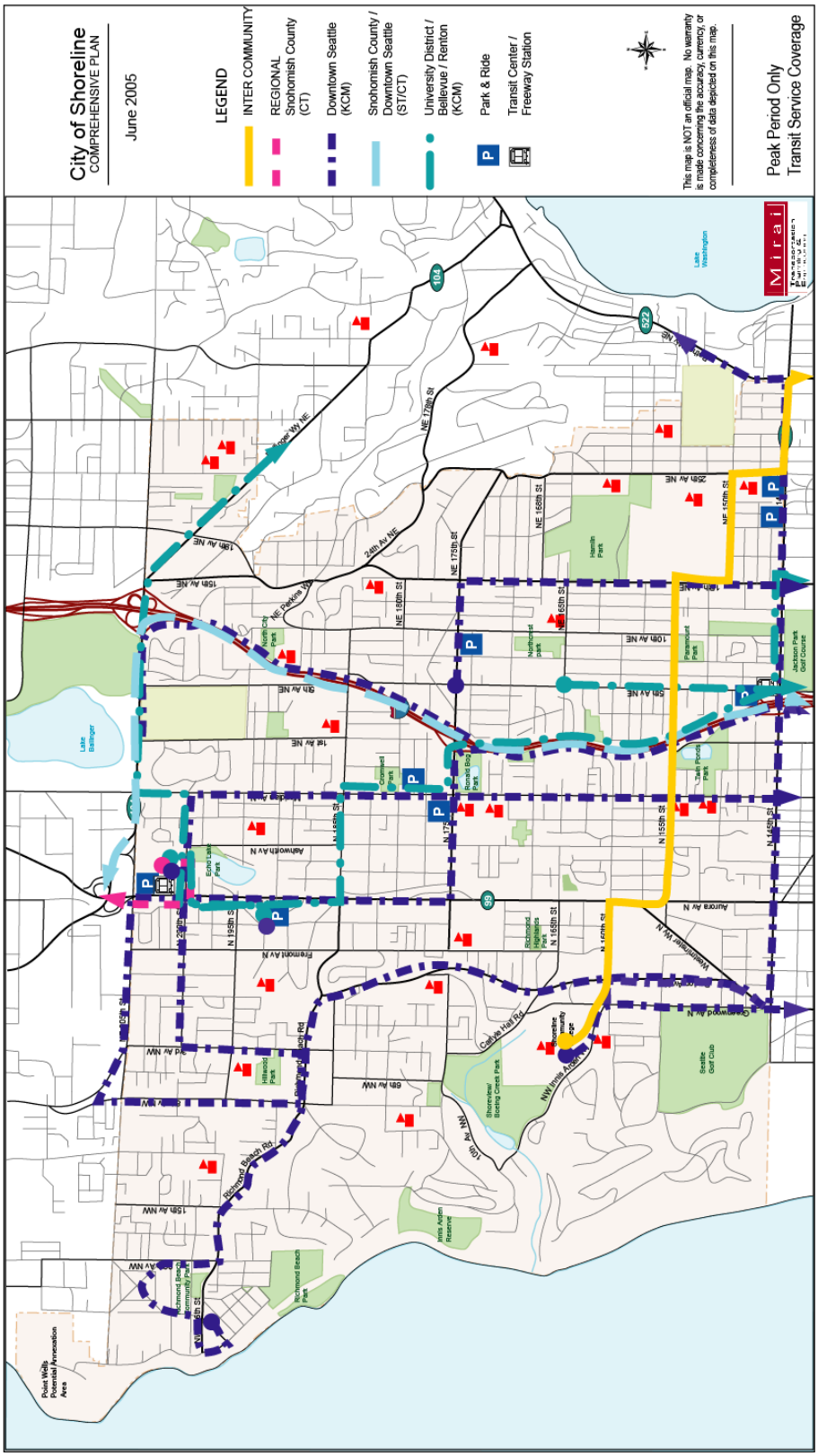


Figure 2-4. Peak Period Only Transit Service Coverage



Pedestrian and Bicycle Systems

The community has repeatedly identified sidewalks as important. Residents want to use sidewalks and trails to go to work, catch a bus, walk to school, go shopping or do recreation activities. In addition, many residents of the City's 85-90 group homes have limited mobility and need the safety and access provided by sidewalks. However, only about one-third of Shoreline's arterial streets and even fewer local streets have sidewalks. **Figure 2-5** illustrates existing sidewalks.

The City of Shoreline's terrain lends itself fairly well to bicyclists traveling north-south. However, the ridges and ravines pose greater challenges for east-west travel by bike especially around North City, Richmond Beach, Innis Arden, Briarcrest and Shoreline Community College. Bicyclists in Shoreline must generally ride in traffic due to the lack of wide shoulders or exclusive bike lanes. The City provides bike lanes on N 155th Street between Midvale Avenue N and 5th Avenue N and recently created lanes on N 185th Street when that roadway was modified from four to three lanes between Stone Avenue N and 1st Avenue N. At the end of 2003, a similar lane modification project was completed for 15th Avenue NE between NE 150th Street and NE 175th Street where bicycle lanes were added. The lanes on 155th end rather abruptly at 5th Avenue N to accommodate on-street parking for Paramount Park users. Bicyclists can cross under I-5 on NE 155th and over I-5 on the N 195th pedestrian overpass (dismounting is suggested due to the narrow walkway). Street maintenance also improves the bicycle environment for riders using roadway shoulders. **Figure 2-6** illustrates existing bike facilities.

Upon completion, the Interurban Trail will be one of the most important pathway projects for pedestrians and bicyclists in Shoreline.

Interurban Trail

The City of Shoreline completed construction on the first segment of the Interurban Trail in February 2004. For design, construction and funding purposes, Shoreline has divided its portion of the Interurban Trail into five sections:

- South Section: N. 145th to 155th Streets;
- South Central: N. 160th to 175th Streets;
- North Central: N. 175th to 192nd Streets;
- North: N. 192nd to 205th Streets; and
- Bridges: N. 155th to 160th Streets.

The trail section between N. 155th and 160th Streets includes two pedestrian bridges. The City Council approved the "Loop Ramp Option" in Fall 2003 that provides a bridge over N. 155th Street, just west of Aurora Avenue N. and a bridge across Aurora Avenue N. at about N. 158th Street. The only section that is not funded is N. 175th to 192nd Streets. When completed, the Interurban Trail will be a three-mile non-motorized transportation system mostly developed along the former Interurban Rail Line. Owned by Seattle City Light and used as an electrical power transmission corridor, the 100-foot-wide former rail corridor runs from Seattle to Everett, roughly parallel to Aurora Avenue.

Shoreline and Seattle have agreed on the benefits of adding a trail to the transmission right-of-way corridor. The City of Shoreline is working with a regional committee of public agencies that are developing sections of the Interurban Trail through their jurisdictions. Snohomish County has completed about 80 percent of its Interurban corridor from Everett to

just north of the King-Snohomish County line. Seattle is in the planning and design stages on its section between N. 108th and 129th Streets.

The Interurban Trail's close proximity to Aurora Avenue N and the economic core of Shoreline will provide access to nearby shopping, services and employment, plus access to transit centers at Aurora Village and the Shoreline Park-and-Ride. The trail project, when completed, will also include rest stops, trailhead, interpretive historical and natural features, and directional signs.

Accident Analysis

WSDOT provided six years of reported accident data, 1998 – 2003, for assessing accident locations for all state highway facilities in the City of Shoreline. The City of Shoreline provided data for reported accidents on the remaining streets. Note that data from August to December 2003 was incomplete. In addition, accidents for which no police report was filed are not included in this analysis, so minor accidents and non-injury accidents are probably under-represented by this data. **Table 2-5** summarizes the six-year accident data for the Shoreline intersections with the highest rates of reported accidents. **Table 2-6** summarizes mid-block accidents.

Table 2-5. Intersection Accident Analysis (1998-2003)

Location		Total	Entering	Accident
Street	Cross Street	Accidents*	Volume**	Rate***
15th Avenue NE	NE 155th St	28	6,315	0.89
	NE 175th St	30	8,821	0.68
3rd Avenue NW	Richmond Beach Rd NW	38	7,158	1.06
5th Avenue NE	NE 175th St	27	5,835	0.93
Aurora Avenue N****	N 145th St	30	15,974	0.38
	N 152nd St	35	N/A	N/A
	N 155th St	43	15,862	0.54
	N 160th St	43	14,740	0.58
	N 175th St	38	17,049	0.45
	N 185th St	27	15,967	0.34
	N 205th St	32	15,624	0.41

* Total number of accidents from 1/1/98 to 12/31/03, provided by the City of Shoreline. **Accident data from 8/1/03 to 12/31/03 is incomplete.**
** In thousands
*** Number of accidents per million vehicles per year
**** Based on intersection analysis and not shown accidents based on corridor analysis

Figure 2-5. Existing Sidewalks

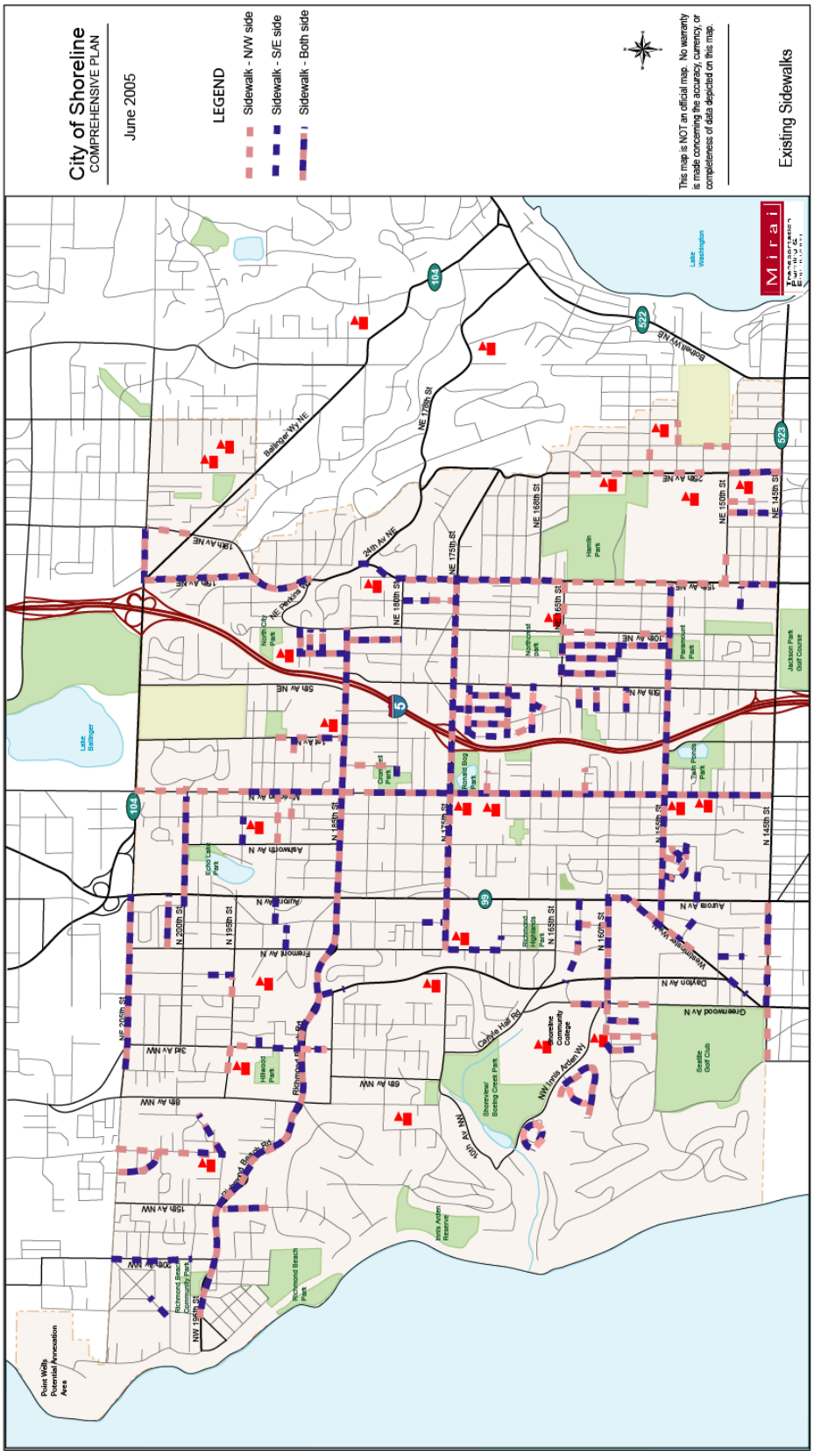
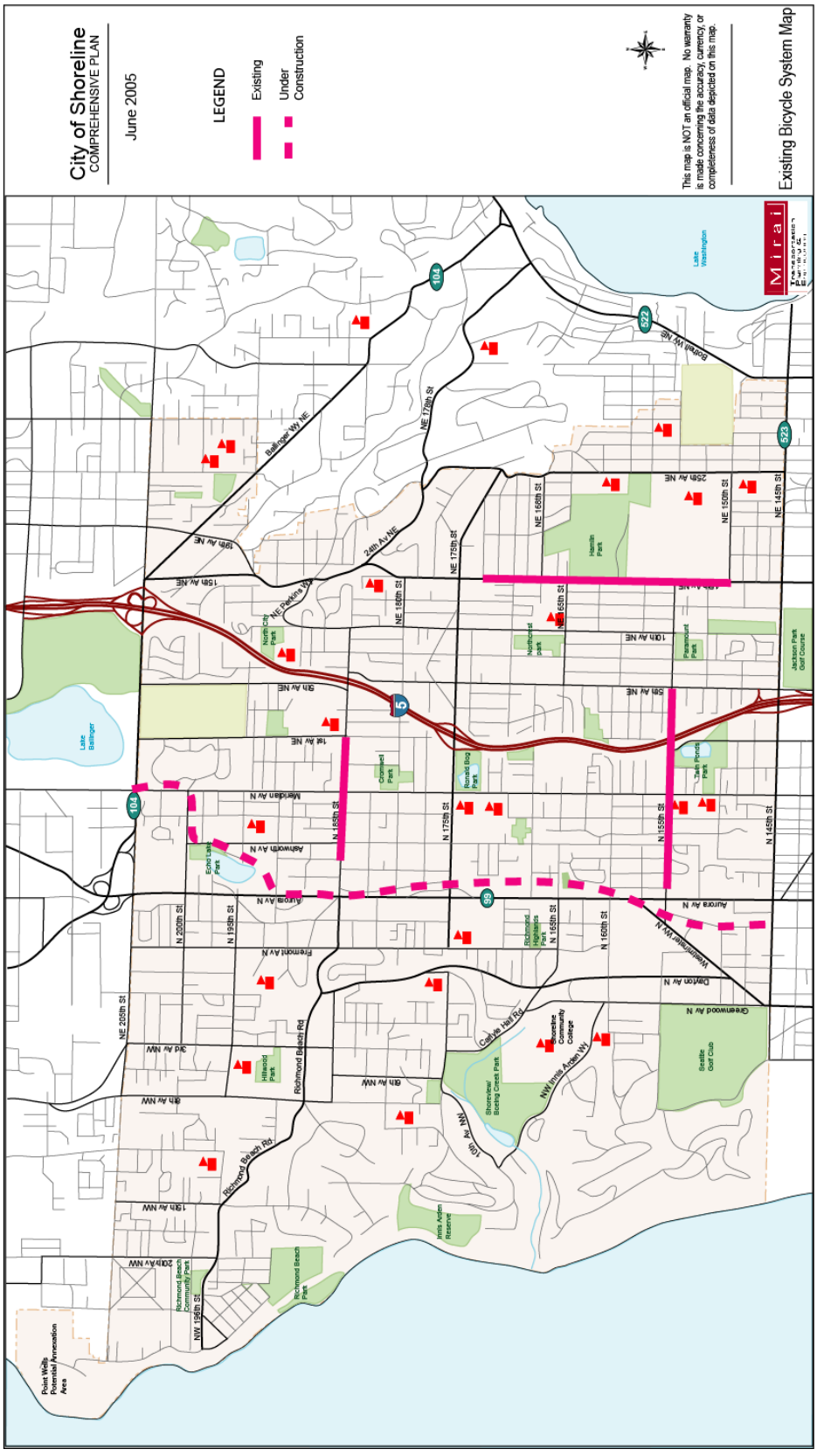


Figure 2-6. Existing Bicycle System Map



The majority of the accidents at intersections for the City of Shoreline occurred along Aurora Avenue N. For the six-year period, the intersection at N 155th Street and Aurora Avenue N and at N 160th Street and Aurora Avenue N both had the highest number of observed accidents (43). The next two highest accident locations at intersections were also on Aurora Avenue: N 152nd Street and N 175th Street. This stretch of Aurora is highly commercialized and has several through lanes in each direction. Left-turn lanes and pockets are provided at all intersections, including the cross streets.

When these numbers are normalized by volume, the accident rate is relatively low along Aurora Avenue N. At N 160th Street and Aurora Avenue N, the rate is only 0.58 accidents per million vehicles per mile. At N 155th Street, the accident rate drops to 0.54. For the intersections with the most total accidents, the highest accident rate was observed at NE 175th Street and 5th Avenue N with 1.06. This intersection is in a primarily low-density residential area and is situated at the top of a hill. **Figures 2-7** and **2-8** map out these locations.

For mid-block locations, Aurora Avenue N was the site of the majority of accidents. The highest number was observed between N 152nd and N 155th Street on Aurora Avenue N where 91 accidents occurred. The next highest number of accidents for a mid-block location occurred between N 170th and N 175th Street where 66 accidents were reported. These locations are highly commercialized with several driveways connecting to Aurora Avenue N. The roadway has 2 lanes in each direction and a center two-way left-turn lane.

The block between N 152nd and N 155th Street remained a problem spot. It had the second highest accident rate of 1.44 accidents per million vehicles per year. However, the highest mid-block accident rate was found along N 205th Street between Aurora Avenue N and Meridian Avenue N. This five-lane roadway is heavily commercialized with the Aurora Village shopping center to the south and a center two-way left-turn lane. **Figures 2-9** and **2-10** map out these locations.

Aurora's intersection analysis shows low accident rates. However, as a corridor, the accident rates are considered very high. Left turn accidents are the most common type of accidents. The Aurora Corridor Project will address this issue.

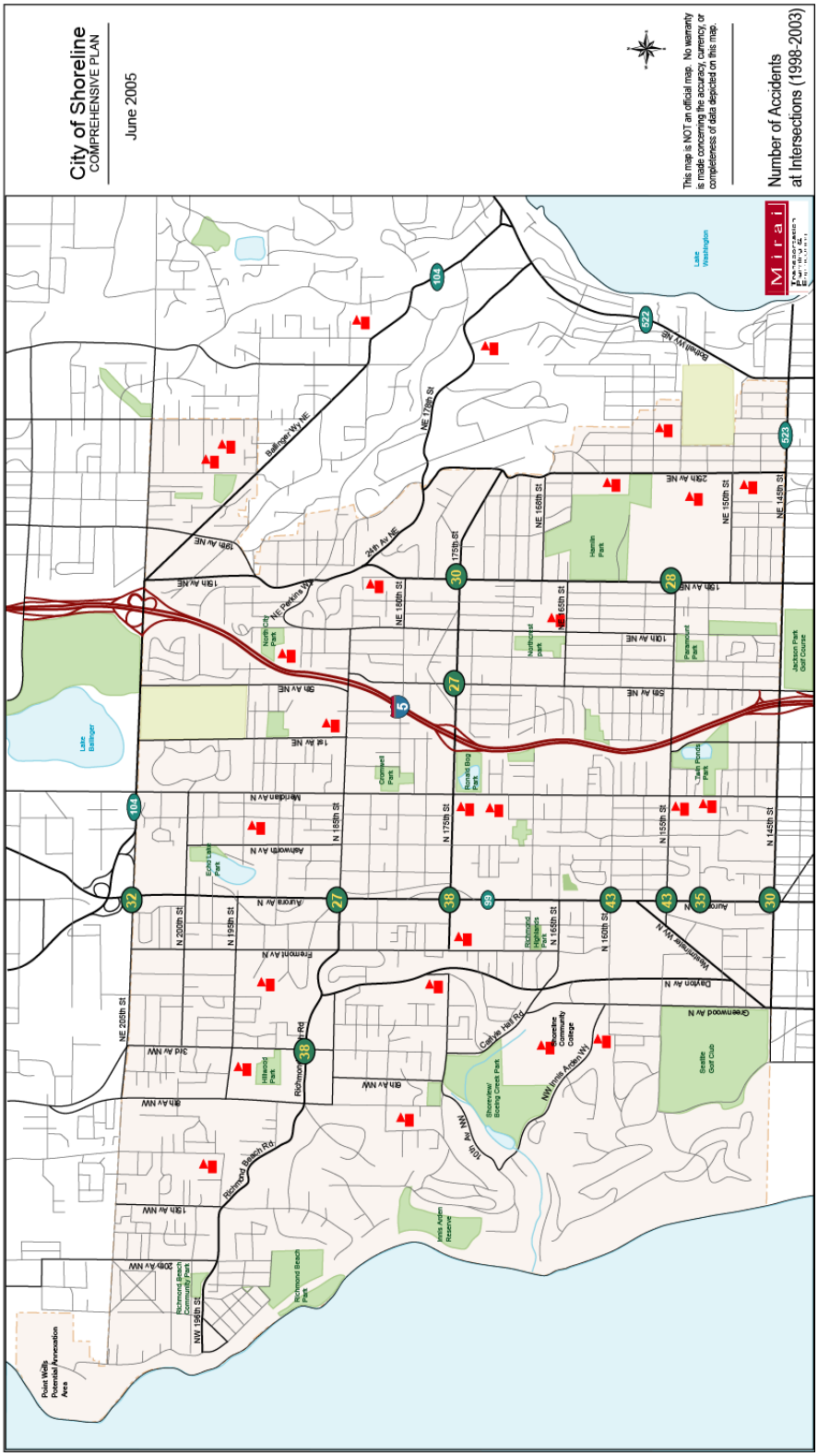
Table 2-6. Mid-block Accident Analysis (1998-2003)

Location			Total Accidents*	Daily Traffic	Accident Rate**
Street	Cross Street 1	Cross Street 2			
15th Avenue NE	Forest Park Dr NE	Ballinger Way NE	7	9,500	0.48
	NE 145th St	NE 146th St	7	19,000	0.24
	NE 146th St	NE 147th St	8	19,000	0.27
	NE 148th St	NE 150th St	6	18,500	0.21
	NE 150th St	NE 151st St	6	18,000	0.22
	NE 169th St	NE 170th St	5	17,650	0.18
	NE 172nd St	NE 175th St	12	19,300	0.40
	NE 175th St	NE 177th St	5	19,900	0.16
	NE 180th St	NE 184th St	5	6,000	0.54
19th Avenue NE	Ballinger Way NE	NE 205th St	9	8,430	0.69
25th Avenue NE	NE 153rd St	NE 155th St	7	4,900	0.93
5th Avenue NE	NE 145th St	NE 148th St	12	14,500	0.45
	NE 153rd St	NE 155th St	5	6,400	0.51
Aurora Avenue N	N 145th St	N 149th St	40	39,900	0.65
	N 149th St	N 152nd St	30	40,485	0.48
	N 152nd St	N 155th St	91	41,070	1.44
	N 155th St	N 160th St	57	42,243	0.88
	N 160th St	N 163rd St	31	44,414	0.45
	N 163rd St	N 165th St	8	45,000	0.12
	N 165th St	N 167th St	33	44,000	0.49
	N 167th St	N 170th St	38	43,000	0.57
	N 170th St	N 175th St	66	40,000	1.07
	N 175th St	N 180th St	30	38,833	0.50
	N 180th St	N 182nd St	10	37,677	0.17
	N 182nd St	N 183rd St	15	37,000	0.26
	N 183rd St	N 185th St	40	37,000	0.70
	N 185th St	N 192nd St	35	36,500	0.62
	N 192nd St	N 195th St	26	35,900	0.47
	N 195th St	N 198th St	22	35,900	0.40
	N 198th St	N 199th St	11	35,600	0.20
	N 199th St	N 200th St	31	35,450	0.57
	N 201st St	N 205th St	44	35,300	0.81
Ballinger Way NE	15th Avenue NE	19th Avenue NE	23	36,200	0.41
Fremont Avenue N	N 175th St	N 178th St	5	5,700	0.57
Greenwood Avenue N	N 145th St	N 148th St	5	5,600	0.58
Meridian Avenue N	N 172nd St	N 175th St	6	10,300	0.38
	N 180th St	N 183rd St	5	10,300	0.32
N 145th St	Whitman Avenue N	Aurora Avenue N	5	18,000	0.18
N 152nd St	Aurora Avenue N	Stone Ln N	12	N/A	N/A
N 155th St	Aurora Avenue N	Midvale Avenue N	15	11,500	0.85
N 160th St	Linden Avenue N	Aurora Avenue N	17	13,800	0.80
N 175th St	Aurora Avenue N	Midvale Avenue N	5	25,800	0.13
	Densmore Avenue N	Wallingford Avenue N	5	27,800	0.12
	Meridian Avenue N	Corliss Avenue N	14	29,800	0.31
	Midvale Avenue N	Ashworth Avenue N	12	25,800	0.30
	Wallingford Avenue N	Meridian Avenue N	10	27,800	0.23
N 185th St	Aurora Avenue N	Midvale Avenue N	12	14,500	0.54
	Linden Avenue N	Aurora Avenue N	7	14,750	0.31
	Meridian Avenue N	Corliss Avenue N	5	10,000	0.32
N 200th St	Aurora Avenue N	Ashworth Avenue N	14	7,500	1.21
N 205th St	Aurora Avenue N	Meridian Avenue N	47	11,800	2.59
	Fremont Avenue N	Whitman Avenue N	6	8,675	0.45
	Whitman Avenue N	Aurora Avenue N	7	8,675	0.52
NE 175th St	12th Avenue NE	15th Avenue NE	14	15,500	0.59
NE 185th St	3rd Avenue NE	5th Avenue NE	6	9,450	0.41
NW Innis Arden Way	6th Avenue NW	Greenwood Avenue N	5	4,800	0.68
NW Richmond Beach Rd	15th Avenue NW	12th Avenue NW	14	11,000	0.83
	8th Avenue NW	3rd Avenue NW	27	15,000	1.17

*Total number of accidents from 1/1/98 to 12/31/03, **8/1/03 to 12/31/03 is incomplete, due to WSDOT's limted accident data processing capabilities.**

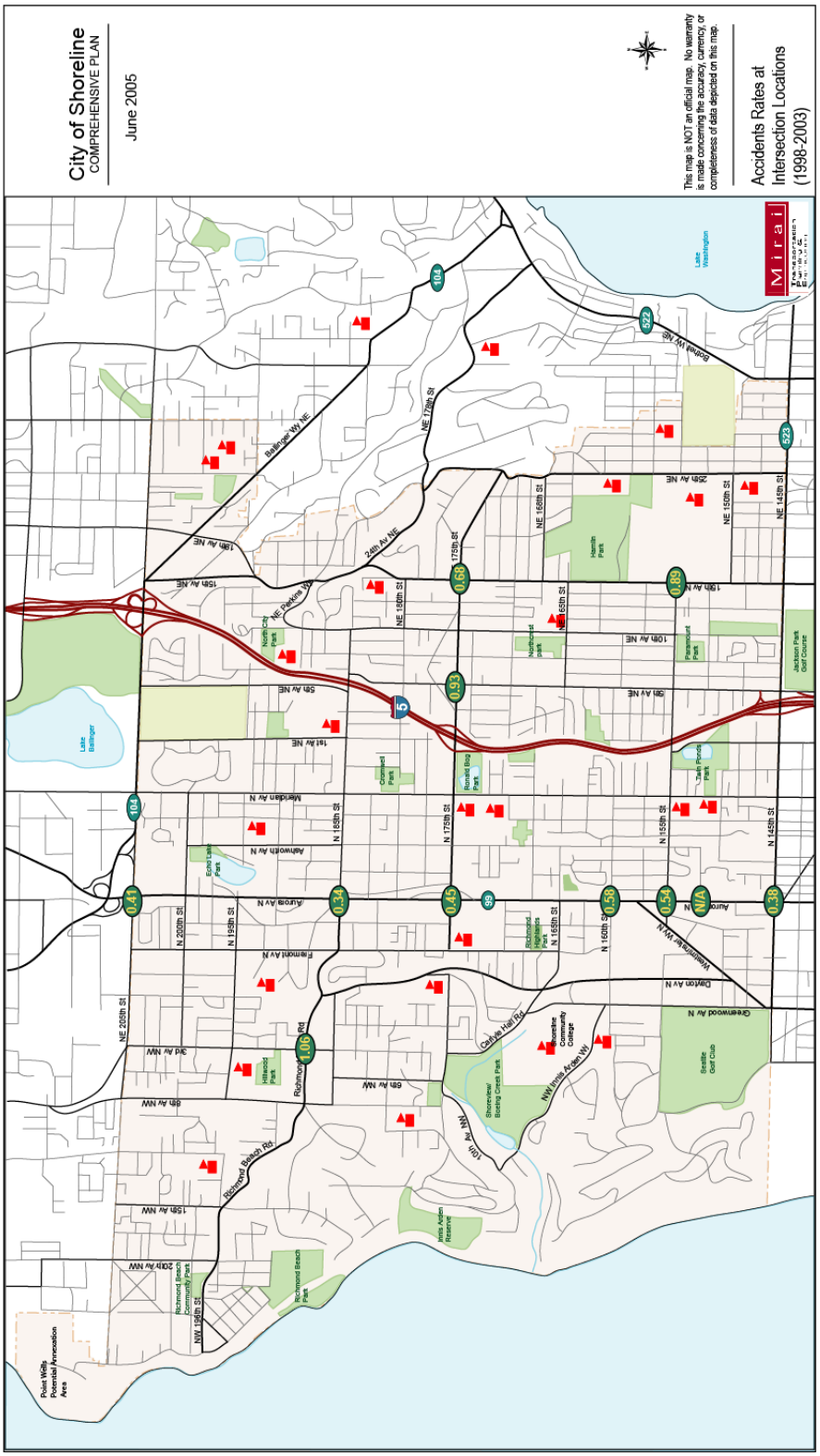
** Number of accidents per million vehicles per year.

Figure 2-7. Number of Accidents at Intersections (1998-2003)



Total number of accidents from 1/1/98 to 12/31/03, provided by the City of Shoreline. **Accident data from 8/1/03 to 12/31/03 is incomplete.**

Figure 2-8. Accident Rates at Intersection Locations (1998-2003)



Total number of accidents from 1/1/98 to 12/31/03, provided by the City of Shoreline. **Accident data from 8/1/03 to 12/31/03 is incomplete.**

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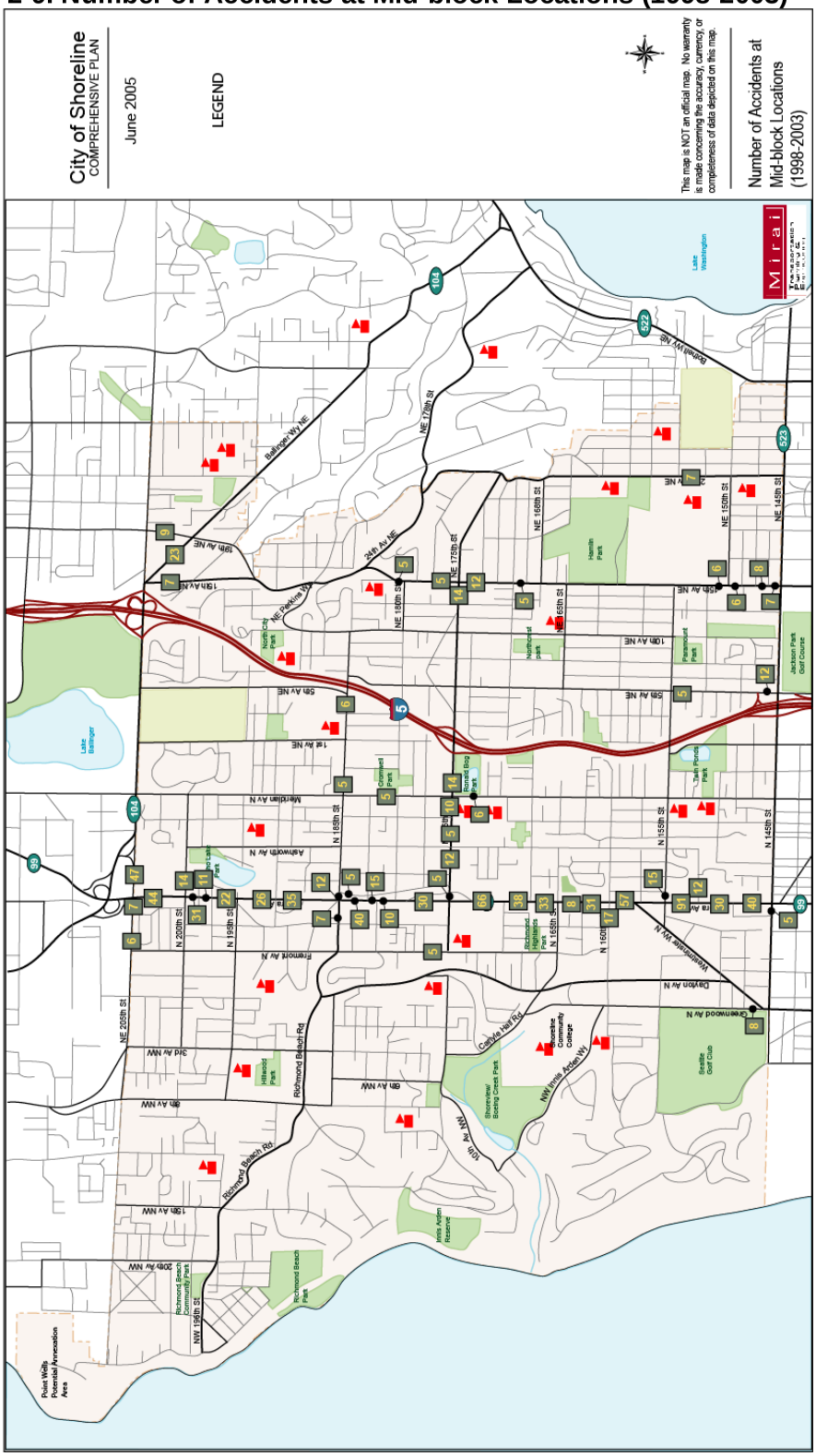
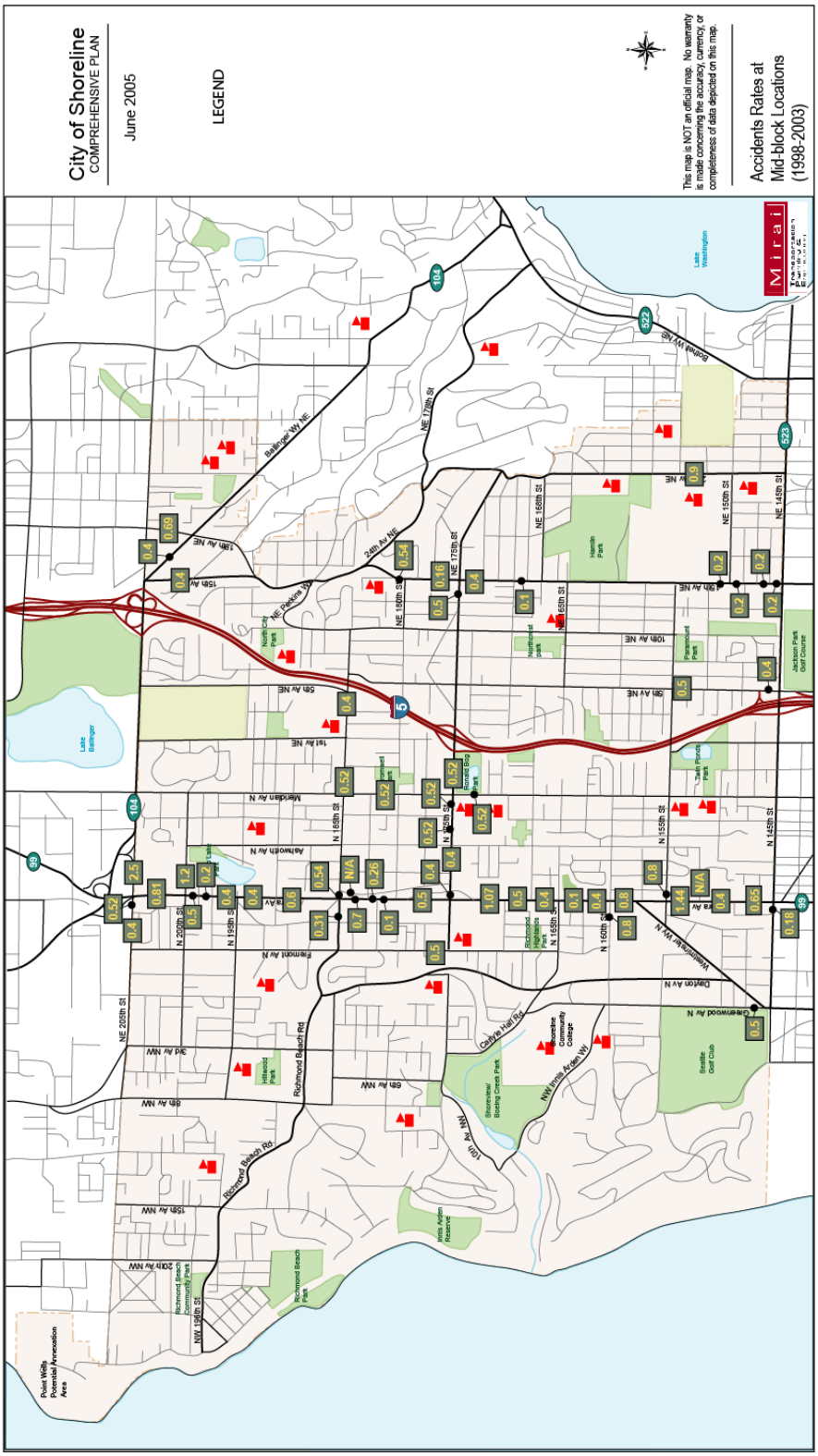
Figure 2-9. Number of Accidents at Mid-block Locations (1998-2003)



* Total number of accidents from 1/1/98 to 12/31/03, provided by the City of Shoreline. **Accident data from 8/1/03 to 12/31/03 is incomplete.**

Figure 2-10. Accident Rates at Mid-block Locations (1998-2003)



* Total number of accidents from 1/1/98 to 12/31/03, provided by the City of Shoreline. **Accident data from 8/1/03 to 12/31/03 is incomplete**.

Pedestrian-Bicycle Accident Data

This same set of six-year accident data, 1998 – 2003, recorded pedestrian and bicycle related accidents. From this data, only the location and number of incidents was provided. Accident locations are mapped out in **Figure 2-11**. Note that data from August to December 2003 was incomplete.

A total of 129 accidents were reported. However, no location had more than two vehicle incidents involving a pedestrian or bicyclist. These accidents occurred at 106 unique locations. Sixty of them were at intersections and the remaining 46 occurred at mid-block locations. Most of the accidents occurred along arterials. Aurora Avenue N had the highest number of accidents (31). Other corridors with a concentrated number of accidents included: N/NE 155th Street (12), N/NE 175th Street (10), 15th Avenue NE (8) and N/NE 185th Street (7). Almost all of the accidents that occurred in residential areas were within a half-mile radius to a school or park.

Shoreline's Neighborhood Traffic Safety Program

The City of Shoreline created its Neighborhood Traffic Safety Program (NTSP) to respond to residents' concerns about speeding, cut-through traffic, accidents and pedestrian safety on residential (non-arterial) streets. The City developed this program with the help of citizens, school district officials, fire and police department representatives and technical experts.

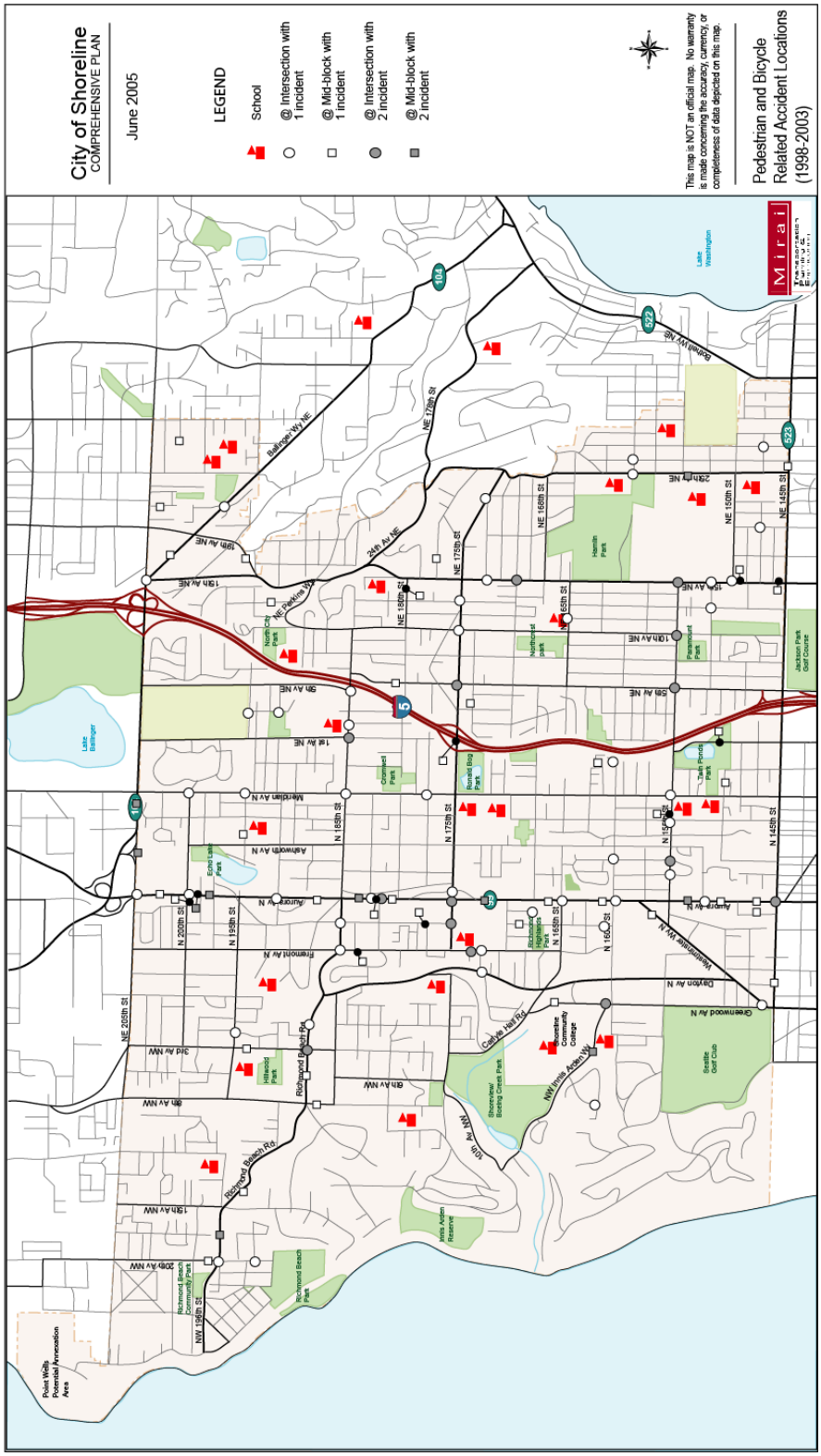
The NTSP consists of a two-phase approach that incorporates the "Three E's." The first phase uses "Education" and traffic "Enforcement" to encourage behavior changes that lead to safer streets. The second phase uses "Engineering" solutions such as traffic circles, speed bumps and narrowed lanes for traffic calming.

Transportation Demand Management

Transportation demand management (TDM) seeks to balance the expense of additional roadway capacity projects by reducing the peak period demand for vehicle space. TDM employs a number of techniques to influence travel mode choice, the time of day that a trip is taken, and even whether or not a trip is made.

The City of Shoreline also has six sites required to comply with the state's Commute Trip Reduction (CTR) Law. This law sets goals for single occupant commute trip reduction at worksites that employ over 100 regular full time employees. As the City continues to grow and new businesses locate here, additional sites may be subject to the CTR law. The City, large employers, Sound Transit, Metro Community Transit need to work together to provide good transit service to these sites.

Figure 2-11. Pedestrian and Bicycle Related Accident Locations (1998-2003)



⋆ Total number of accidents from 1/1/98 to 12/31/03, provided by the City of Shoreline. **Accident data from 8/1/03 to 12/31/03 is incomplete.**

Chapter 3. Forecasts

Understanding the future nature and volume of traffic in the City makes it possible to recommend appropriate transportation facility improvements for the City of Shoreline. This information builds upon an understanding of existing traffic volumes and flow patterns, as presented in Chapter 2. Mirai Associates developed a 2022 Shoreline travel demand forecast model to analyze future traffic volumes for the TMP. This model is based upon Puget Sound Regional Council's four-county regional transportation model. The City will be able to update this model as needed when land use forecasts and other input data are revised.

Demographic data sets, including household and employment forecasts associated with a system of transportation analysis zones (TAZs), form the basis for travel demand forecasting. Within the City of Shoreline, the planning department prepared household and employment forecasts. For the region outside the City, the model used PSRC's regional household and employment forecasts for 2020, with some adjustments.

Shoreline Zone Structure

The Shoreline transportation model can be described as a focused and refined regional transportation model. Within the construct of the regional model, Shoreline consists of approximately fourteen regional transportation analysis zones. To develop the Shoreline model, the regional transportation analysis zone structure was replaced with 117 Shoreline Analysis Zones (SAZs). With the inclusion of the Shoreline zone structure, the total number of Transportation Analysis Zones in the Shoreline model was expanded to 953 from 850 TAZs in the PSRC model. **Figure 3-1** compares the Shoreline SAZs to the PSRC's TAZs

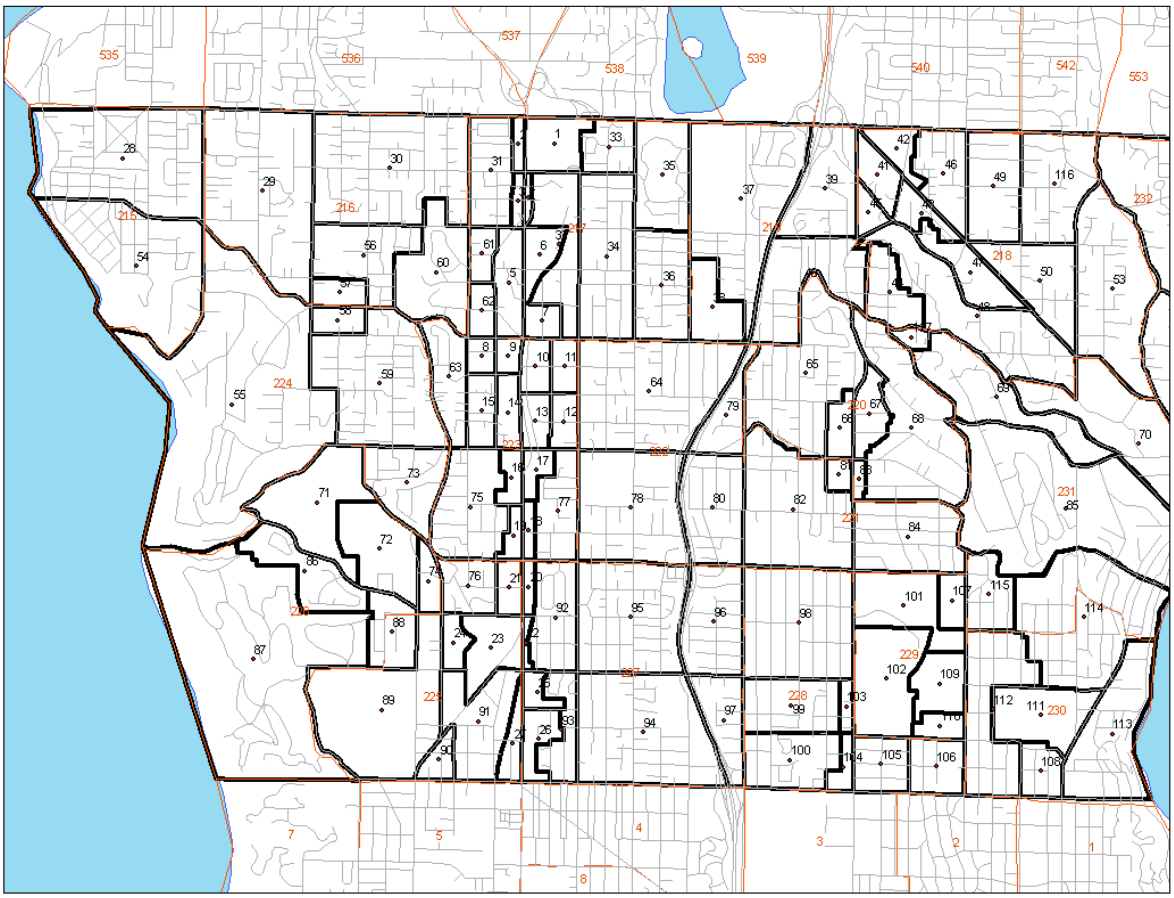
Current Year Land Use Data Refinement

The base year estimates of housing and employment are key inputs to the development of the Shoreline transportation demand forecasting model.

Shoreline's planning staff estimated the existing (base year 2002) housing units. The City used the King County Assessor's data from the City of Shoreline and the US Census Bureau's Summary Files 1 and 3 (SF1, SF3).

The City also provided the existing employment data. Existing employment was estimated using the 2001 data from the Washington State Employment Security Department. The employment data is referred to as "covered" data and typically accounts for 80 percent of the total employment in a region. The Puget Sound Regional Council, in accordance with agreements among the Washington State Employment Security Department, PSRC and the City of Shoreline, processed the initial employment dataset. The database consists of point level data for each employer in the study area. Each record has the employment sector data (two digit SIC code) and the estimate of employees in March of 2001. The final zonal estimates of "covered" employment are then factored to develop total employment in a zone. **Appendix 3-1** provides additional detail about this data.

Figure 3-1. Map Showing Shoreline's SAZs and PSRC's TAZs



Note: The black (bold) lines indicate the boundaries of Shoreline models SAZs and the red (pale) lines define the PSRC model's TAZs. The Shoreline model's SAZs extend into the City of Lake Forest Park in the east of the City of Shoreline.

The point level data was aggregated to the Shoreline SAZ system and summarized to develop estimates of five groups of employment sectors. The employment sectors include Retail, FIRES (Finance, Insurance, Real Estate and Services), Government and Education, Manufacturing and WTCU (Wholesale, Transportation, Communication and Utilities).

The transportation modeling process assigns different trip generation rates based on land use categories and factors such as household size, the number of workers in a household and employment types.

Year 2022 Land Use Forecasts

The City selected the year 2022 as the planning horizon for developing the Transportation Master Plan. The City's planning department provided the 2022 housing and employment forecasts, using the growth estimates developed by King County. The City relied on the

growth potential reported in the Buildable Lands Report published by King County on September 6, 2002.

To assist in the transportation analysis, the 2022 housing and employment data was aggregated into the Shoreline's 117 SAZs. The housing and employment forecasts for the remaining zones outside the City of Shoreline were obtained by interpolating the PSRC's 2020 and 2030 household and employment data, which was released in January of 2003.

Table 3-1 shows 2001 households and employment data and 2022 households and employment forecasts for the City, which were used to develop the Shoreline travel forecasting model. **Appendix 3-1** shows the existing and 2022 land use data at the SAZ level.

The traffic forecasts developed for 2022 with the Shoreline model assume that the households in the City will grow by 2,300 and employment will increase by about 2,200 workers within the City. It is projected that households will grow by 8.7 percent and employment will grow by 12.7 percent. **Table 3-1** below shows these projections.

Table 3-1. 2001 and 2022 Households and Employment for the City of Shoreline

	2001	2022	Difference (2022 - 2001)
Households			
Single Family	18,885	19,685	800 (4.2%)
Multifamily	7,163	8,671	1,508 (21.1%)
Total Households	26,048	28,356	2,308 (8.7%)
Employment			
Retail	5,188	6,294	1,106 (21.3%)
Office	7,134	8,191	1,069 (15%)
Other	5,216	5,288	72 (1.4%)
Total Employment	17,538	19,773	2,235 (12.7%)

2022 Traffic Volumes (PM Peak Hour)

In order to calculate intersection levels of service for the future planning year, the forecast volumes from the Shoreline model were "post-processed". This means that the model volumes were adjusted with the existing traffic counts and checked for consistency through the traffic corridors within the City. After completing the post-processing work, the 2022 PM peak hour traffic volumes were input to Synchro software to calculate levels of service.

Figure 3-2 shows the 2002 PM peak hour traffic volumes by direction and 2022 volumes forecasted with the Shoreline model on the major arterials in the City. **Appendices 3-2 and 3-3** show existing and 2022 traffic volumes at all the intersections where levels of service were calculated.

Impacts To State Owned Transportation Facilities

State law requires that the City's transportation element include an assessment of impacts to state owned transportation facilities. The Shoreline model developed for the TMP includes the state owned facilities throughout the Puget Sound area, including those located within the City of Shoreline. The model developed 2022 traffic forecast volumes base on the households and employment growth projected by the City for the areas within the City and the land use growth projected by the Puget Sound Regional Council.

The City of Shoreline includes three state owned facilities: SR 99 (Aurora Avenue North) from 145th Street to 205th Street, Interstate-5 and a short segment of SR 104 (Ballinger Way NE) at the northeast corner of the City. Shoreline also borders SR 522 (Bothell Way NE) at the southeast corner of the City and SR 523 (N/NE 145th Street from SR 522 to Aurora Avenue N) on the southern edge of the City.

I-5

The sections of I-5 within the City of Shoreline carry about 170,000 to 190,000 vehicles per day. During the AM peak hour, the southbound I-5 lanes carry over 6,000 vehicles per hour on the general purpose lanes, which operate at capacity with poor levels of service. Likewise, during the PM peak hour, the northbound I-5 lanes carry close to 7,000 vehicles per hour, which indicates severe traffic congestion. There is little room for traffic volumes to increase in the peak direction of I-5 during AM and PM peak period.

There are no current plans to expand I-5 in the Shoreline area, so traffic growth will be accommodated for the most part by the Shoreline's arterial streets. Regional growth and the resulting demand for more travel in the future will actually reduce access to I-5 from Shoreline. It is projected that traffic volumes on the City's arterial streets along I-5 will increase because of the increased pass through traffic. It is recommended that the City and State Department of Transportation work together to manage the current and forecasted congestion problems on I-5.

Aurora Avenue N (SR 99)

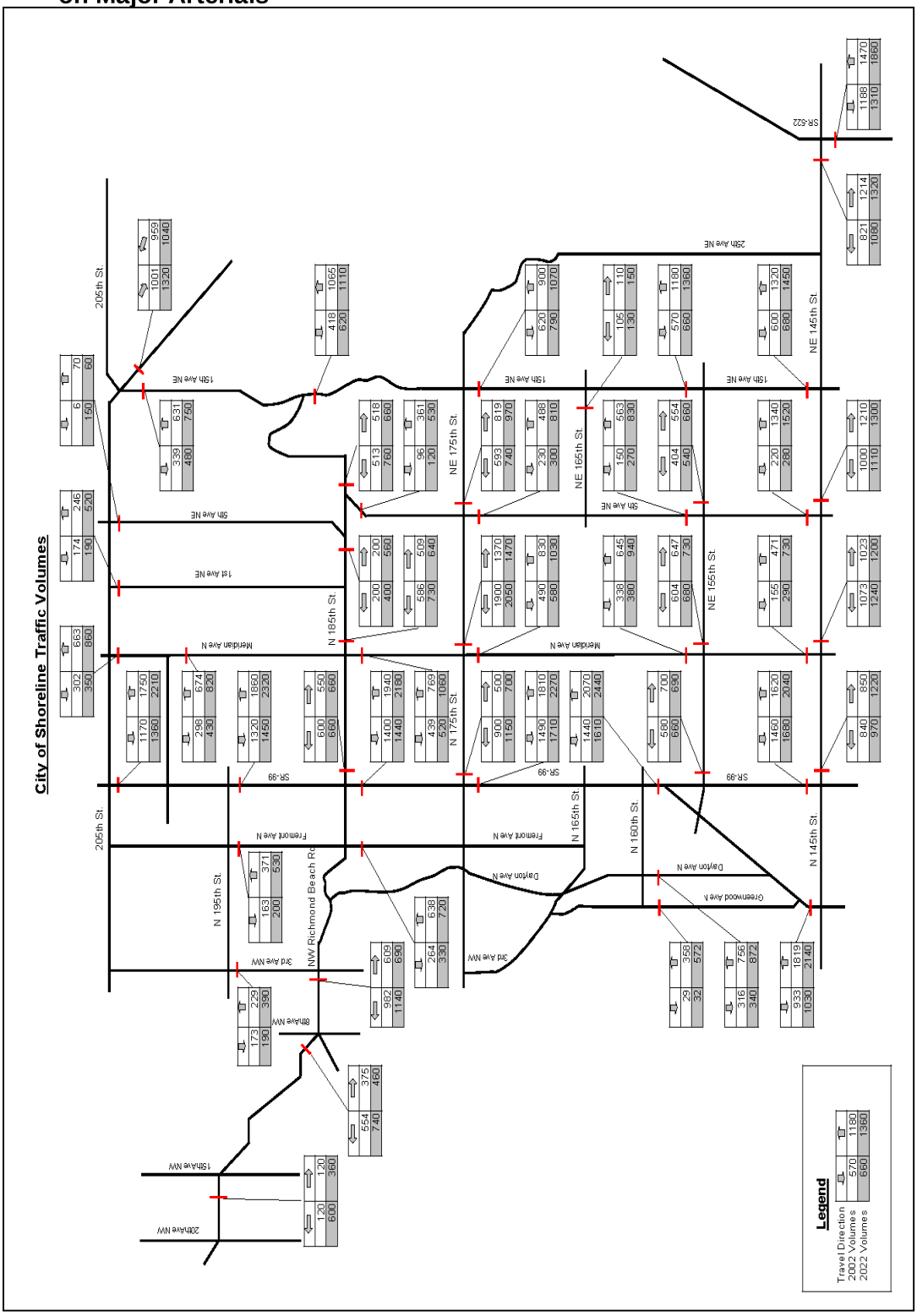
As shown in **Figure 3-2** above, it is forecasted that the traffic volumes on Aurora Avenue N throughout the City will increase. During the PM peak hour, the volume of the increase will be about 200 to 400 vehicles per hour. The 2002 and 2022 levels of service for the intersections on Aurora Avenue N are discussed in Chapter 4, and LOS sheets are provided in **Appendix 4-1**.

Although the projected employment growth along Aurora Avenue will add a relatively small amount of traffic to the future volumes on Aurora Avenue, the majority of the increased traffic on this facility will be the result of regional growth and shifts of traffic from I-5.

Ballinger Way NE (SR 104)

Only three-quarters of a mile of SR 104 is located within the City of Shoreline. The City section of SR 104 has 5 lanes. The forecasted traffic growth during the PM peak hour is slight, about 100 vehicles per hour in each direction. The through traffic on Ballinger Way NE will operate at good levels of service. However, the approaching traffic from the side streets to Ballinger Way will experience increased delays. The recommended improvements in the TMP include improvements to reduce delays at Ballinger Way and 19th Avenue NE.

Figure 3-2. 2002 Existing PM Peak Hour and 2022 Forecast PM Peak Hour Volumes on Major Arterials



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Chapter 4. Level of Service

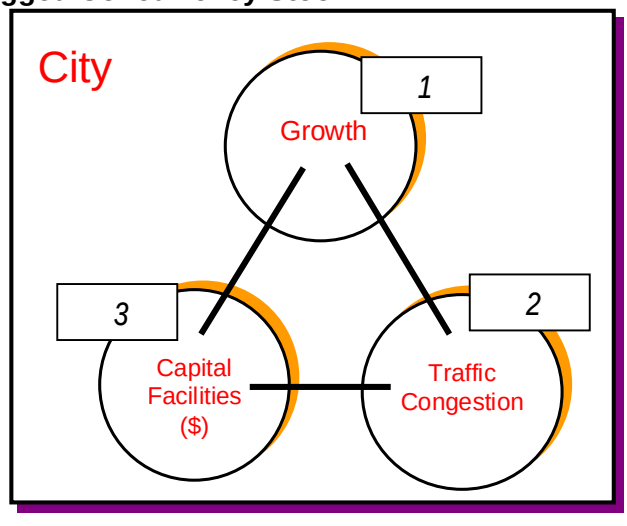
Transportation and Growth Management

The State Growth Management Act (GMA) requires each local jurisdiction to identify facility and service needs based on level of service standards for all arterials and transit routes. Level of service standards are used to judge the performance of the transportation system. The GMA further requires that a City's comprehensive plan transportation element include specific actions and requirements for bringing into compliance any facilities or services that are below an established level of service standard. It also requires that system expansion needs be identified for at least ten years, based on the traffic forecasts for the adopted land use plan and level of service standards.

If probable funding falls short of meeting identified needs, the jurisdiction is given two options: 1) to raise additional funding, and/or 2) to reassess the land use assumptions. Under the GMA it is also possible to lower the LOS standards. The relationship between LOS standards, funding needs to accommodate increased travel, and land use assumptions is referred to as "concurrency". The concept of concurrency is illustrated **Figure 4-1**. The three "legs" of the concurrency stool represent the following planning components:

1: Growth
2: Traffic congestion (measured with the level of service standards)
3: Resources needed to fund new capital facilities

Figure 4-1. Three-Legged Concurrency Stool



Concurrency is balanced when growth is matched with needed facilities. If any of the features is unbalanced, one of the following three actions must be taken:

1. Reduce growth by denying or delaying land use permit applications, or
2. Increase funding for new facilities, or
3. Change the level of service standard.

Level of Service Standards for Roads

The GMA allows each local jurisdiction to choose a Level of Service (LOS) method and standards. Level of Service is a qualitative measure used to denote intersection operating conditions. It generally describes levels of traffic congestion at signalized and unsignalized intersections in an urban area. The level of service standard is one of the cornerstones of Shoreline's Transportation Element. Two of the most important criteria to be applied for selecting a LOS methodology are 1) whether it is easy to administer and 2) whether it is technically/legally proven. The City of Shoreline in the past used a relatively simple but technically unreliable method to calculate level of service. This method is referred to as a critical movement volume-to-capacity ratio method. The Transportation Research Board explained the method in Transportation Research Circular Number 212 in 1980 but it was not adopted as a tool to calculate level of service. The most recent Highway Capacity Manual 2000 (HCM 2000) defines level of service with seconds of delays at an intersection in urban areas. For addressing transportation concurrency and level of service for the City of Shoreline, the consultant used the Transportation Research Board's HCM 2000 method. Using this delay method, LOS was calculated for the PM peak hour with the 2022 volumes from the Shoreline traffic model and LOS was calculated using Synchro software.

Level of service is represented on a scale ranging from A at the highest level to F at the lowest level. As shown in **Table 4-1**, level of service is based on the average delay time per vehicle entering the intersection as defined in the Highway Capacity Manual 2000. It also provides qualitative descriptions of each level of service (LOS) rating. Intersection delay is the travel time in seconds experienced by a driver traveling through the intersection, compared with a free flow condition.

LOS A and B represent minimal delays, and LOS C represents generally acceptable delays. LOS D represents an increasing amount of delay and an increasing number of vehicles stopped at the intersection. An intersection with LOS E is approaching capacity and is processing the maximum number of vehicles possible through the intersection. LOS F means that the intersection is operating with excessive delays, meaning that it has a high level of traffic congestion. Vehicles approaching an intersection with LOS F may have to wait for more than one signal cycle to get through the intersection.

Level of Service for Highways of Statewide Significance

The GMA requires WSDOT to identify transportation facilities and services of statewide significance. Local jurisdictions are required to include these in their inventories of essential facilities, along with level-of-service standards, needs and impacts, but cities and counties may not deny development based upon their performance (i.e., they are excluded from local concurrency requirements). The City of Shoreline currently has three state highways of statewide significance passing through or adjacent to the City: SR 99 (Aurora Avenue), I-5, and NE 205th Street between SR 99 and I-5. (NE 205th is outside Shoreline's city limits.)

Table 4-1. Level of Service Definition (Delay Method)

LOS	Average Signalized Intersection Delay Per Vehicle (seconds)	Average Unsignalized Intersection Delay Per Vehicle (seconds)	Descriptions of Level of Service Operations
A	<10	<10	Highest driver comfort. Little delay. Free flow.
B	<10 and>20	<10 and >15	High degree of driver comfort. Little delay.
C	<20 and >35	<15 and>25	Some delays. Acceptable level of driver comfort. Efficient traffic operation.
D	<35 and>55	<25 and >35	Long cycle length. Some driver frustration. Efficient traffic operation.
E	<55 and >80	<35 and >50	Approaching capacity. Notable delays. High level of driver frustration.
F	>80	>50	Flow breaks down. Excessive delays.

Source: 2000 Highway Capacity Manual

Level of Service for Regionally Significant State Highways

The Puget Sound Regional Council (PSRC) has designated two state highways in or adjacent to Shoreline that are not of "statewide significance" as "regionally significant": NE 145th Street and Ballinger Way. (Note: NE 145th Street is mostly under King County and City of Seattle jurisdiction, and outside the City of Shoreline.) The PSRC, its member cities and counties, and WSDOT worked together to adopt level of service standards for regionally significant highways. The proposed standard that applies to the City of Shoreline (Tier 1) is LOS "E/mitigated," meaning that congestion should be mitigated (through alternative means of travel such as transit) when PM peak hour LOS falls below LOS E.

Level of Service Methodology for Roadways and Intersections

The City of Shoreline's 1997 Comprehensive Plan used a volume-to capacity ratio (V/C) methodology for calculating levels of service. This technique is based on the "Critical Movement Summation" concept developed by traffic engineers in the 1970s to calculate intersection capacity. In essence, LOS with this method is based on a calculated critical intersection volume and compares that volume against a benchmark intersection capacity that is stratified by level of service. Since that time, transportation researchers have found that the critical volume-to-capacity ratio is only one of several factors that affect the level of service. The quality of signal progression, the cycle length, the green ratio, the roadway grade, pedestrian crossings, availability of on-street parking and the lane width will influence the level of service.

At this time, transportation experts find that the Highway Capacity Manual (HCM) 2000 method produces the most useful information by which to effectively understand levels of traffic congestion in an urban street network. The HCM 2000 methodology can calculate level of service for each approach leg of an intersection, whereas the V/C method cannot. For these reasons, this study used the HCM 2000 delay method to calculate intersection levels of service for signalized and unsignalized intersections throughout Shoreline.

The LOS table in **Appendix 4-1** provides the existing (2002) averaged delay and level of service for each intersection legs at each signalized intersection as well as the volume-to-capacity ratio at the same intersection. The table also shows the 1996 volume-to-capacity rations, which can be compared against the 2001/2002 volume-to-capacity ratios. **Appendix 4-1** also shows the existing (2002) levels of service for selected unsignalized intersections. **Appendix 4-2** provides more detail on this methodology.

Adopted and Recommended Level of Service Standards

The City of Shoreline's existing Transportation Element defines level of service standards as follows in Policy T3:

> *Maintain Level of Service "D" by area-wide averaging in Zone 1,2, and 3, and LOS "E" in Zones 4 and 5, and develop a funding plan to improve Level of Service. Improvements to transit service or other modes should be considered in developing a concurrency management system as a potential mitigation to increasing intersection capacity.*
>
> *Zone 1 is the area west of the Aurora Avenue Corridor*
> *Zone 2 is the Aurora Avenue Corridor*
> *Zone 3 is the area between the Aurora Avenue Corridor and I-5*
> *Zone 4 is the area between I-5 and the east City limits*
> *Zone 5 is the Annexation Area A*

This approach can be characterized as an "area-wide intersection averaging" method. The advantages of this method can be listed as follows:

- One or two congested intersections are unlikely to cause a concurrency problem.
- It helps the City approach traffic congestion from a broad perspective.
- There will be tendency to find solutions that will benefit the transportation system.

At the same time, some disadvantages can be identified:

- This method does not provide precise information about where traffic congestion problems are occurring within the City.
- Related to development applications, it will be harder to identify specific traffic mitigation and to require actions to mitigate traffic impacts from the developments.
- It is difficult to explain congestion problems to the public.

Consultant Recommended LOS Standard

Mirai Associates believes that the disadvantages of the City's current LOS method and standards outweigh the advantages. The problem with the current LOS approach of the area-wide intersection averaging method is that the public as well as the policy makers may not gain a clear understanding of the implications of averaged LOS findings. As the result, it would be difficult to establish effective policies to address the issue of transportation concurrency in the City. Mirai Associates therefore recommends that the City adopt LOS E to best balance levels of congestion, the cost of added capacity and the need to minimize diversion of traffic onto neighborhood streets.

Transportation Policy T3 state's the recommended LOS method and standard:

> *Adopt LOS E at the signalized intersections on the arterials within the City as the level of service standards for evaluating planning level concurrency and reviewing traffic impacts of developments, excluding the Highways of Statewide Significance (Aurora Avenue N and Ballinger Way NE). The level of service shall be calculated with the delay method described in the Transportation Research Board's Highway Capacity Manual 2000 or its updated versions.*

Future Study

The City will, in the future, develop a multi-modal LOS measure to emphasize person trips, rather than simply vehicle trips, as directed in Transportation Policy Tw:

> *The City of Shoreline shall pursue the development of a multi-modal measure for Level of Service that takes into account not only vehicular travel and delay, but transit service and other modes of travel.*

Existing Level of Service (2002)

Mirai calculated existing PM peak hour levels of service for all arterial intersections, including state facilities and selected unsignalized intersections. The results are shown in **Appendix 4-1**. One intersection within the City is currently operating at LOS F: N 175th Street and Meridian Avenue.

One intersection on an arterial adjacent to the City is operating at LOS F: N 145th Street and I-5 Northbound Ramp/5th Avenue NE location. (145th Street belongs to King County.)

Four intersections within the City are operating at LOS E:

- N 185th Street and Meridian Avenue
- N 185th Street and Aurora Avenue
- N 175th Street and Aurora Avenue
- N 155th Street and Aurora Avenue

As pointed out above, Aurora Avenue N is designated as a Highway of Statewide Significance by the state and is therefore excluded from this concurrency analysis.

The following intersections, adjacent to and located outside the City, operate at LOS E:

- N 145th Street and Greenwood Avenue
- N 145th Street and 15th Avenue NE
- N 145th Street and Bothell Way NE
- N 205th Street and Meridian Avenue North

Several other intersections that operate at LOS D or better also have at least one approach (i.e. one "leg") at LOS E or F:

- N 155th Street and Meridian Avenue – Eastbound approach at LOS F
- Perkins Way and 15th Avenue NE: Eastbound approach at LOS F
- 24th Avenue NE and 155th Avenue NE: Westbound approach at LOS E
- N 155th Street and 15th Avenue NE: Eastbound approach at LOS E
- N 205th Street and Aurora Avenue: Northbound & Eastbound approaches at LOS E
- N 200th Street and Aurora Avenue: Northbound & Eastbound approaches at LOS E
- Ballinger Road NE and 19th Avenue NE: Northbound and Southbound at LOS F
- N 205th Street and 15th Avenue NE: Northbound at LOS E
- N 205th Street and 19th Avenue NE: Eastbound at LOS F

Two unsignalized intersections operate at LOS E or F at one approach:

- 15th Avenue NE and NE 150th Street: Westbound at LOS F
- 5th Avenue NE and NE 185th Street: Northbound at LOS F

Future No Action Level of Service (2022)

Tables in **Appendix 4-1** show the future (2022) levels of service for the signalized intersections on all arterials, and selected unsignalized intersections, if no transportation improvements are made beyond what is currently funded in the City's capital improvement plan. Most of the LOS E intersections listed above degrade to LOS F.

In addition to one intersection (N 175th Street and Meridian Avenue North), which is operating at LOS F, five other intersections will operate at LOS F within the City. They are

- N 205th Street and Aurora Avenue N
- N 175th Street and Aurora Avenue N
- N 155th Street and Aurora Avenue N
- N 185th Street and Meridian Avenue N
- Perkins Way and 15th Avenue NE

As noted above, Aurora Avenue N within the City of Shoreline is designated as the Highway of Statewide Significance, and it is excluded for a concurrency evaluation under the GMA.

For the adjacent arterials, in addition to the intersection of N 145th Street and I-5 Northbound ramps/5th Avenue, which is operating LOS F, two additional intersections will operate at LOS F:

- N 145th Street and Bothell Way
- N 205th Street and Meridian Avenue N

Five additional intersections will operate at LOS E within the City:

- N 155th Street and Meridian Avenue
- N 175th Street and 15th Avenue NE
- N 185th Street and Aurora Avenue N
- N 200th Street and Aurora Avenue N
- Ballinger Road NE and 19th Avenue NE

In addition to the two unsignalized intersections at LOS F in 2002, the following two additional unsignalized intersections will operate at LOS F at one approach in 2022:

- 10th Avenue NE and NE 185th Street
- 5th Avenue NE and NE 165th Street

Future Level of Service with Improvements (2022)

If the City retains the LOS standard in Transportation Policy T3, the following improvement projects will meet and/or reduce risks of not meeting that standard. A revised standard may result in a different set of project recommendations. (Note: the No Action analysis assumes that the Aurora Avenue corridor improvement project adopted in the 2002 Shoreline Capital Improvement Program will be completed by 2022. While several intersections in the corridor will operate at LOS F with the project, no additional improvements in the corridor are recommended.)

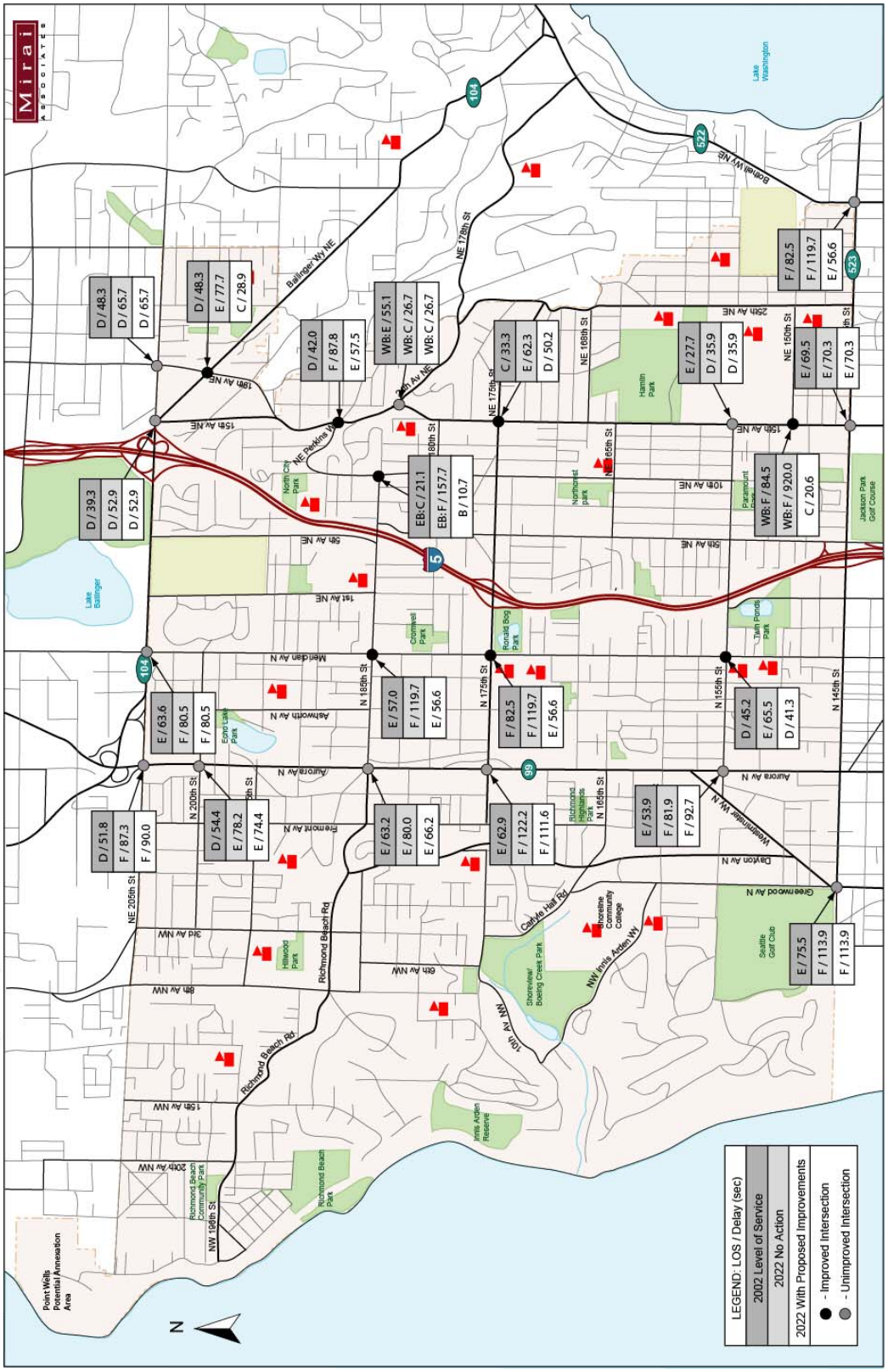
- N 175th Street and Meridian Avenue N: provide a westbound right turn lane and add a northbound through lane
- N 185th Street and Meridian Avenue N: provide an additional northbound through lane
- Perkins Way NE and 15th Avenue NE: provide westbound and eastbound left turn lanes
- N 155th Street and Meridian Avenue N: provide an additional northbound through lane
- NE 175th Street and 15th Avenue NE: provide a eastbound right turn lane, an additional northbound through lane and separate a westbound left turn lane from the existing through lane
- Ballinger Way NE and 19th Avenue NE: provide northbound and southbound left turn lanes on 19th Avenue

To reduce delays at unsignalized intersections, two new signals should be installed at the following locations:

- NE 150th Street and 15th Avenue NE (This project is listed in the 2004 - 2009 CIP.)
- NE 185th Street and 5th Avenue NE

The 2022 levels of service with the recommended improvements are shown in **Appendix 4-1**. The recommended improvements will bring the congested intersections to operate at LOS E or better in 2022 except several of the intersections on Aurora Avenue N within the City of Shoreline. **Figure 4-2** shows LOS and delay for signalized intersections for 2002, 2022 no action and 2022 with improvements.

Figure 4-2. Level of Service and Delay for Signalized Intersections: 2002, 2022 No Action and 2022 with Proposed Improvements



Level of Service for Transit

Recommended LOS Standard

The level of service (LOS) for transit is based upon a number of factors. LOS needs to account for both the availability and the quality of transit service. Measures of availability look at the frequency of the service, hours of service, accessibility, and service coverage. When looking at the quality of service, issues of reliability, safety and travel times are of concern. However, due to the availability of certain measures, the recommended LOS standard for the City of Shoreline focuses upon measures of availability. In addition, grading will be dependent upon the type of service: community, inter-community and regional. **Tables 4-2, 4-3** and **4-4** summarize the recommended LOS standards for each service.

Table 4-2. Recommended Level of Service Definition: Community Service

LOS	Guideline					
	Peak Headways	Vehicle/Hr	Off Peak Headways	Vehicle/Hr	Daily Hours of Service	Description of LOS
A	< 10 min	> 6	< 20 min	> 3	19 - 24	Passengers do not need schedules.
B	10 – 14 min	5 - 6	20 - 40 min	1 – 3	17 - 18	Frequent service, passengers consult schedules.
C	15 – 20 min	3 - 4	20 - 40 min	1 - 3	14 - 16	Maximum desirable time to wait if bus missed.
D	21 – 30 min	2	40 - 60 min	1	12 - 13	Service unattractive to choice riders.
E	31 – 60 min	1	> 60 min	< 1	4 - 11	Service available during hour.
F	> 60 min	< 1	> 60 min	< 1	0 - 3	Service unattractive to all riders.

Table 4-3. Recommended Level of Service Definition: Inter-Community Service

LOS	Guideline					
	Peak Headways	Vehicle/Hr	Off Peak Headways	Vehicle/Hr	Daily Hours of Service	Description of LOS
A	< 20 min	> 3	< 30 min	> 2	19 - 24	Passengers do not need schedules.
B	20 – 30 min	2 - 3	30 - 45 min	1 - 2	17 - 18	Frequent service, passengers consult schedules.
C	31 – 45 min	1 – 2	45 - 60 min	1	14 - 16	Maximum desirable time to wait if bus missed.
D	46 – 60 min	1	> 60 min	< 1	12 - 13	Service unattractive to choice riders.
E	> 60 min	<1	> 60 min	< 1	4 - 11	Service available during hour.
F	> 60 min	< 1	None	0	0 - 3	Service unattractive to all riders.

Table 4-4. Recommended Level of Service Definition: Regional Service

LOS	Guideline					
	Peak Headways	Vehicle/Hr	Off Peak Headways	Vehicle/Hr	Daily Hours of Service	Description of LOS
A	< 20 min	> 3	< 30 min	> 2	19 - 24	Passengers do not need schedules.
B	20 – 30 min	2 - 3	30 - 45 min	1 - 2	17 - 18	Frequent service, passengers consult schedules.
C	31 – 45 min	1 – 2	45 - 60 min	1	14 - 16	Maximum desirable time to wait if bus missed.
D	46 – 60 min	1	> 60 min	< 1	12 - 13	Service unattractive to choice riders.
E	> 60 min	<1	> 60 min	< 1	4 - 11	Service available during hour.
F	> 60 min	< 1	None	0	0 - 3	Service unattractive to all riders.

Table 4-5. Level of Service for Existing Transit Service

Route	Provider	Peak		Midday	Early Evening	Late Evening	Saturday	Sunday	LOS
		Peak dir	Both dir						
*77**	*Metro Transit*	15	-	-	-	-	-	-	A
*100**	*Community Transit*	20	-	-	-	-	-	-	A
*242**	*Metro Transit*	30	-	-	-	-	-	-	B
*243**	*Metro Transit*	30	-	-	-	-	-	-	B
*303**	*Metro Transit*	25	-	-	-	-	-	-	B
*304**	*Metro Transit*	25	-	-	-	-	-	-	B
*308**	*Metro Transit*	30	-	-	-	-	-	-	B
*316**	*Metro Transit*	25	-	-	-	-	-	-	B
*342**	*Metro Transit*	30	-	-	-	-	-	-	B
*355**	*Metro Transit*	15	-	-	-	-	-	-	A
*373**	*Metro Transit*	30	-	-	-	-	-	-	B
*416**	*Community Transit*	20	-	-	-	-	-	-	B
*301**	*Metro Transit*	-	15/30	-	-	-	-	-	B
330*	Metro Transit	-	30	-	-	-	-	-	B
510	*Sound Transit*	30	-	60	30	60	60	60	B
511	*Sound Transit*	30	-	30	30	60	60	60	B
118	*Community Transit*	-	30	30	60	-	60/30/60	60	B
630	*Community Transit*	-	30	30	60	-	60	60	B
5	*Metro Transit*	-	30	30	30	30	30	30	B
101	*Community Transit*	-	20/15	15	15	30	30	30	A
331	Metro Transit	-	30	30	30	60	30/60	60	B
345	Metro Transit	-	30	30	30	60	60/30/60	60	B
346	Metro Transit	-	30	30	60	60	60/30/60	60	B
347	Metro Transit	-	30	30	60	60	60/30/60	60	B
348	Metro Transit	-	30	30	60	60	60/30/60	60	B
358	*Metro Transit*	-	8/15	15	30	30	30/15/30	30	A

NOTE: *Italicized* routes provide regional transit service. * Peak hour service only.

Table 4-5 summarizes the transit LOS for each transit route servicing Shoreline. For the size and population density of Shoreline, a community oriented transit service is not feasible due to costs and probable low ridership. However, most inter-community transit service for the City of Shoreline operates at LOS B, which is acceptable given Shoreline 's demographics. Regional service currently operates at LOS B for the routes serviced by Sound Transit and Community Transit. However, Metro Transit route 358 along Aurora Avenue N is a LOS A. On less traveled corridors, most peak hour service was operating at a LOS B.

The average interval between transit stops in urban areas should be within ¼ mile of each other. As a general rule, ¼ mile is accepted as a comfortable walking distance for pedestrians. This spacing is greatly dependent upon the availability of public right of way, pedestrian crossings, safety and topography. **Figure 4-2** maps out the coverage area around each bus stop in Shoreline regardless of the type of transit service. The orange ring represents a radius of 1/8 mile and the tan ring represents a radius of ¼ mile away from the transit stop. Most of Shoreline's residents are within a quarter mile from a transit stop. Connections to transit stops through the sidewalk infrastructure is limited.

Bicyclists can catch a bus at any transit stop. All buses are equipped with bicycle racks and can carry up to two bikes at any time. For those who are not within close proximity of a bus stop, one of the eight Park-and-ride lots are within a five-mile distance from any point in Shoreline. The blue "P" on the map represents a Park-and-ride.

The majority of the bus stops in the City are handicapped accessible. However, there are several that are not due to limited right-of-way and/or topography. Shelters are provided at most locations where there are a high number of boardings. King County Metro provides and maintains all bus stops in the City of Shoreline.

Figure 4-3 represents the transit coverage for weekday and weekend service. Areas with a deficiency in transit service are similar to areas that are not within easy access to a transit stop. Areas that are noticeably outside of all day transit service are Briarcrest, the eastern edge of North City, Innis Arden, the Highlands, and parts of Richmond Beach.

Figure 4-3. Existing Transit Stop Coverage Areas

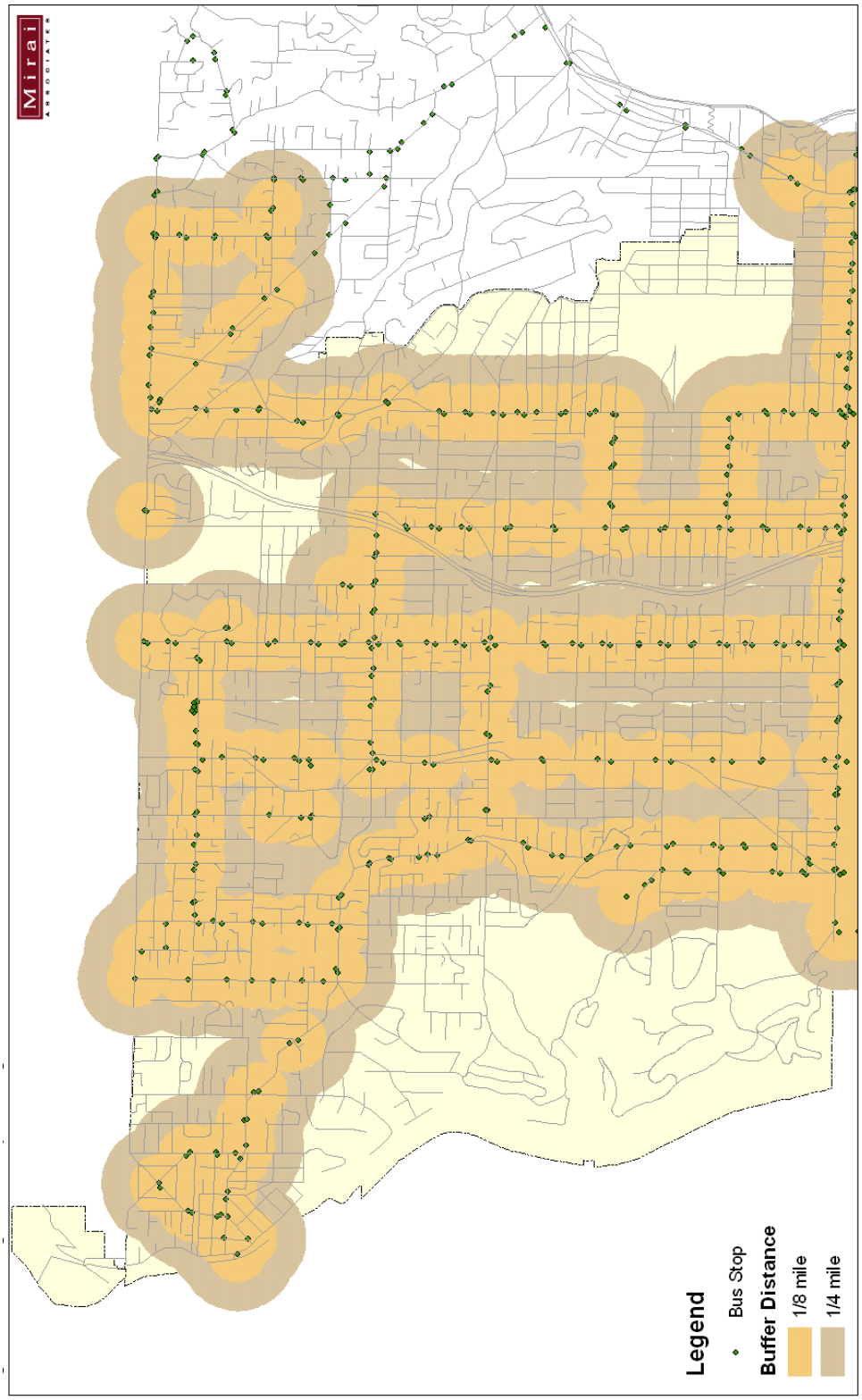
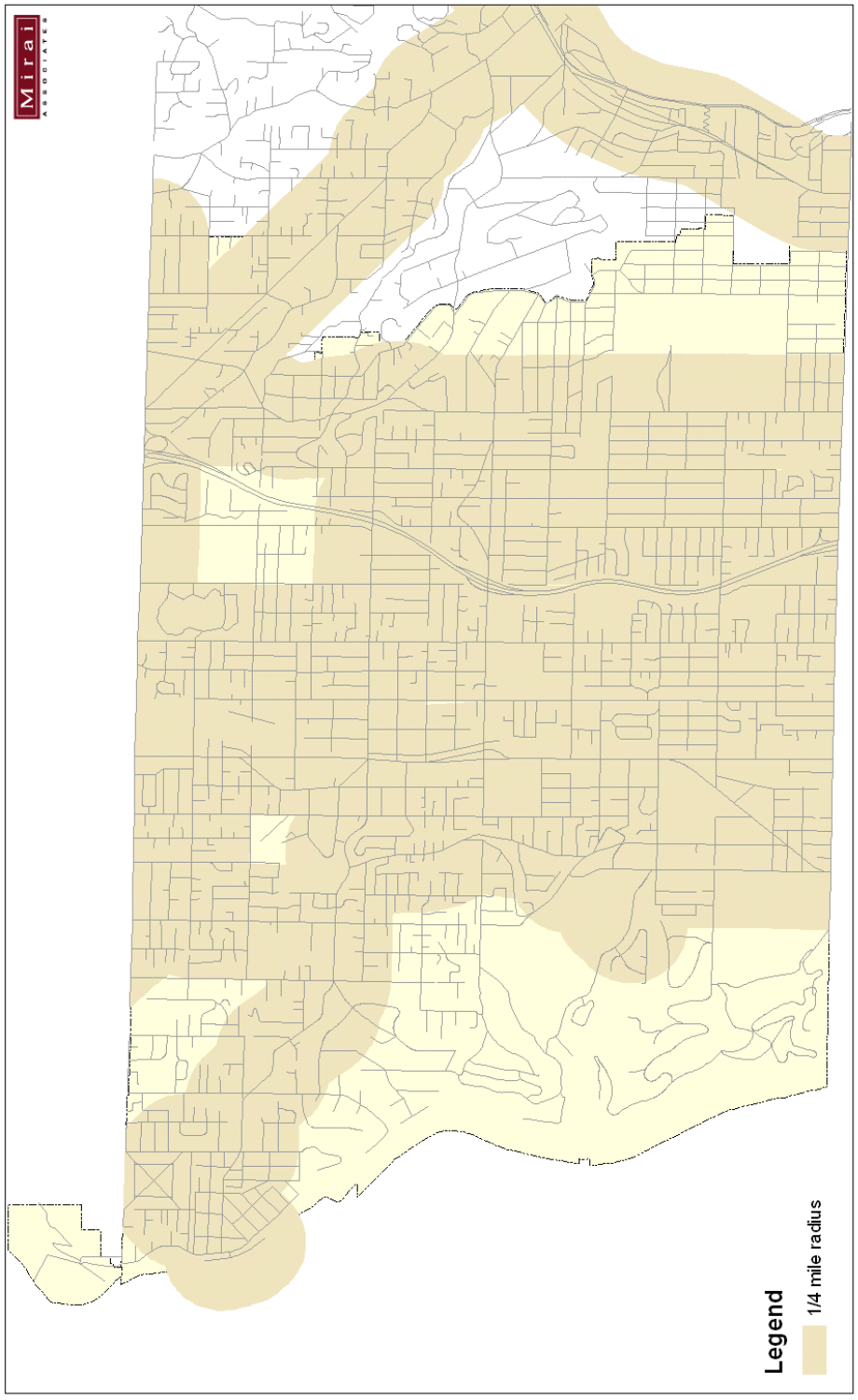


Figure 4-4. Existing All Day Transit Service Coverage Area



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Chapter 5. Project Evaluation

Pedestrian Project Evaluation

The project team identified potential sidewalk projects from a number of sources, including working sessions with City staff and a subcommittee of the Planning Commission, field evaluation of local conditions, supporting documents for the 1998 Comprehensive Plan, and the City's 2003 Bond Advisory Committee project list that identified roadways within a given radius of schools as candidates for sidewalks.[1]

The evaluation process combined quantitative project scoring and qualitative policy-linked reviews. The project team first developed a quantitative evaluation methodology to begin identifying the highest priority pedestrian projects for the City. City staff, the consultant team and a working committee of the Planning Commission also identified high priority projects to ensure system continuity and to respond to emerging needs.

The project team used the weighted evaluation criteria shown in **Table 5-1** for a two-step process. The criteria are based on the pedestrian policies in the City's transportation element of the comprehensive plan. Projects scoring within the top 20 percent of all rated projects made the initial "cut". To reflect the City and residents' policy priorities, that list was then expanded to include projects that provide school access along an arterial and those identified as high priority projects by the Bond Advisory Committee. **Appendix 5-1** shows the initial project scores.

Bicycle Project Evaluation

The City identified a number of bicycle improvements as part of the 1998 Comprehensive Plan. Most of these improvements remain uncompleted due to limited funding and higher priority needs elsewhere in the City. The projects from the 1998 Comprehensive Plan were ranked according to the criteria shown in **Table 5-2**, below. **Appendix 5-2** shows the bicycle project scores.

Since the City is making a major investment in the Interurban Trail, improvements that connect to the trail are given the greatest weight. School and park connections remain important to the community and are also given substantial weight. Several of these projects overlap with high priority pedestrian projects. The final scope of these projects should be revisited prior to project design, to ensure consistency with "green streets" policies and to balance right of way requirements with safety considerations.

[1] Recommendations identified by the Bond Advisory Committee when considering a potential ballot measure for capital improvements.

Table 5-1. Pedestrian Project Evaluation Criteria

Criteria	1st Screen	2nd Screen
School Access. Will sidewalk be within 10 blocks of a school?	60 points	Yes
Located on an Arterial. Will sidewalk be located on an arterial?	30 – 40 points	Yes
Connects to a Park. Will sidewalk connect to a Park?	40 points	
Connects to Existing Sidewalk. Will sidewalk connect to an existing sidewalk?	30 – 40 points	
Completes Shoreline Loop. Will sidewalk help complete a "loop" around the City?	35 points	
Connects to Bus Line. Will sidewalk provide access to a bus line?	30 points	
Links 3 Major Destinations. Will sidewalk connect homes to neighborhood businesses, schools and other recreation facilities?	20 points	
Bond Advisory Committee Priority #1 and #2. Was the sidewalk a highest priority of the Bond Advisory Committee?		Yes

Table 5-2. Bicycle Project Evaluation Criteria

Criteria	Points
Connects to Interurban Trail	100
Links to School	75
Links to Park	50
Connects to the Shoreline Loop	25
Connects to the Lake to Sound Trail	25
Access to Express Transit	25
Potential access to Burke-Gilman Trail	25

Roadway and Intersection Project Evaluation

The City manages its roadway system to provide safe streets, provide multi-modal transportation options, and to protect neighborhoods. The roadway project prioritization criteria shown in **Table 5-3** recognize these objectives. Other key priorities drawn from the City's transportation policies include supporting the City's level of service standards, and ensuring mobility for freight transportation. Projects scoring in the top 50th percentile were identified as the highest priority; those scoring between the 25th and 49th percentile were second priority, and those below the 25th percentile were third priority. The project scores are shown in **Appendix 5-3**.

Table 5-3. Roadway and Intersection Project Evaluation Criteria

Criteria	Points
Safety	25 - 100
Support level of service standards	50-75
Support/protect neighborhoods	50-75
Freight benefit	25
Multiple functions	75

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Chapter 6. Recommended Improvements: Safe and Friendly Streets

Transportation remains a high priority for most Shoreline citizens, particularly as it relates to neighborhood quality of life. Citizens want streets to be attractive, welcoming and safe for pedestrians and bicyclists as well as drivers.

The City inherited a substantial street grid system from King County, however many of the streets lack sidewalks, curbs and gutters. Citizens consistently cite the lack of sidewalks as a pressing transportation issue. Safety remains the City's most important responsibility, and citizens support safety as their first priority. Citizens are also very concerned about preventing and managing neighborhood cut through traffic. The City does not control the county or regional transit systems, but planned regional investments in transit may increase ridership opportunities for Shoreline citizens, if properly designed.

This chapter of the TMP sets forth a series of recommendations to support the transportation policies of the City's Comprehensive Plan. (These policies are included as sidebars in this document.) These recommendations call for increased funding for safety programs and also set forth an overlay of street design standards for "Green Streets" as identified in the Community Design Element of the Comprehensive Plan. Lists of pedestrian, bicycle and roadway projects are included, drawn from the project lists in **Appendices 5-1, 5-2 and 5-3** and reflecting the evaluation criteria described in Chapter 5.

Appendix 6-1 shows the "financially constrained" project recommendation -- all the projects recommended for funding over the next 20 years. The projects have been prioritized by mode – but not across mode, i.e. roadway projects were not evaluated against pedestrian projects.

Goal T I: ***Provide safe and friendly streets for Shoreline citizens.***

T1: *Make safety the first priority of citywide transportation planning and traffic management. Place a higher priority on pedestrian, bicycle, and automobile safety over vehicle capacity improvements at intersections.*

T2: *Use engineering, enforcement, and educational tools to improve traffic safety on City roadways.*

T3: *Monitor traffic accidents, citizen input/complaints, traffic violations, and traffic growth to identify and prioritize locations for safety improvements.*

T4: *Develop a detailed traffic and pedestrian safety plan for arterials, collector arterials and high potential hazard locations.*

T5: *Develop a safe roadway system as a high priority. Examples of methods to improve safety include: center turn lanes, median islands, turn prohibitions, signals, illumination, access management, and other traffic engineering techniques.*

T6: *Evaluate and field test installation of devices that increase safety of pedestrian crossings such as flags, in-pavement lights, pedestrian signals, and raised, colored and/or textured crosswalks.*

T7: *Designate "Green Streets" on select arterials and neighborhood collectors that connect schools, parks, neighborhood centers and other key destinations, for which the design guidelines in Table 6-2 shall apply. Compile design standards for each "Green Street" type.*

T8: *Develop a comprehensive detailed street lighting and outdoor master lighting plan to guide ongoing public and private street lighting efforts.*

T9: *Minimize curb cuts (driveways) on arterial streets by combining driveways through the development review process and in implementing capital projects.*

Appendix 6-2 cross-references the evaluated projects, i.e. it shows where potential pedestrian, bicycle and/or roadway projects overlap. The TMP project list is intended to serve as a guide when selecting projects for grant applications and for funding within the City's 6-year Capital Investment Plan.

Enhanced Safety Programs

Safety Management Program

Traffic safety is the City's top transportation priority. Unsafe driving practices put children and adults at risk while traveling in vehicles, bicycling or walking along the roadways. The vast majority of crashes are caused by driver error. Changing driver behavior, through education and enforcement, is an important element in addressing traffic safety issues. At the same time, the City's design and management of its roadway and sidewalk systems can reduce the number and severity of collisions.

Safety programs draw experts from multiple professions, including land use planning and development, civil and mechanical engineering, law and law enforcement, public policy, medicine and public health. The first director of the National Highway Traffic Safety Administration, William Haddon, M.D., created the matrix shown in **Table 6-1** illustrating how human factors, vehicle/equipment, road engineering and social/economic related behaviors could reduce risk to motorists, bicyclists and pedestrians. [1]

Table 6-1. Risk Reduction Using the Haddon Matrix

	Human Factors	**Vehicle/Equipment (objectives)**	**Road Engineering (objectives)**	**Social/Economic (objectives)**
Pre-Crash (how to avoid collisions)	Driver Training	Laser Beam Headlights (improve night vision)	Traffic Signals and Signs (eliminate traffic conflicts)	Sidewalks (promote safe walking)
Crash (reduce injury during impact)	Mandatory Child Safety Seat Use	Safety Restraints (reduce injury)	Guardrails (avoid collisions with fixed, off road objects)	Speed Limits (reduce severity of crash)
Post-Crash (increase chance of survival)	EMS	High Impact Gas Tanks (reduce chance of fire)	Cell phones and 911 (quick trauma treatment)	Lawsuits (mitigate financial and personal loss)

This table shows that a range of actions can help prevent collisions:

- Driver training
- Improved headlight technology
- Traffic signals and signs
- Provision and design of sidewalks

The table also lists an additional array of actions can help reduce the severity of injury and increase chances of survival from collisions.

[1] Planning for Traffic Safety in 2004 and Beyond. Prepared by Paul J. Ossenbruggen, Ph.D., The Far View Distance Learning Program, College of Engineering and Physical Sciences, University of New Hampshire, March 2004.

Safety Recommendations: The City of Shoreline should continue to combine civil engineering, safety education and police enforcement tools to improve traffic safety on City roadways. The Transportation Master Plan recommends creating and funding a safety management program to provide additional resources to the transportation department. As one of the first steps for this program, the City should develop quantifiable performance-based goals and an evaluation process to prioritize emerging safety needs.

The City's public works department is in the process of creating a traffic accident database but has been hampered by the lack of data from the state of Washington and a lack of dedicated resources. Once the database is established, the department should work in cooperation with the police department to identify high accident locations, prioritize emerging needs and fund improvements from the safety management funds.

The City should also keep current on how socio-economic trends affect safety needs. For example, most existing schools were designed when the majority of children walked, bicycled, or rode school buses. Today, parents dropping off and picking up children in cars can overwhelm available facilities and overflow into adjacent streets, creating safety concerns.

The City should consider including the following elements when developing a safety management program:

- Continue to work with the Shoreline School District to review safe walk routes and reduce hazards at high volume child drop-off sites
- Partner with automobile dealerships and/or WSDOT to provide safety education, which may include
    - child car seat installation
    - seat belt effectiveness

- Encourage the use of alternative transportation for trips to community facilities
- Provide bicycle safety programs through youth organizations (e.g. Scouts, YMCA)

Street Lighting

Effective pedestrian lighting is one urban element that will help people feel safe and comfortable enough to get out of their cars and walk in their neighborhoods, to transit stops, to stores, etc. In addition, good lighting design can minimize light pollution, enhance the urban environment, deter undesirable activities, increase safety, and minimize glare, power consumption, cost, visual impacts (day and night), and unwanted light spill-over onto private property. Restricting lighting of some public spaces is also important in creating places for uses where light pollution would be intrusive.

Lighting that is well designed and properly maintained will improve the appearance of public spaces, encourage people to interact, and contribute to a positive sense of safety and security. However, lighting by itself does not make a public place safer, and poor lighting is not the main contributing factor in nighttime crime in public spaces. The lack of people socializing and using the public space contributes to an environment that may actually encourage crime, regardless of the level of lighting. In places where lighting may provide a false sense of confidence or safety, a "no lighting" policy may be appropriate to completely discourage the use of an area after dark. If there is no natural surveillance or interaction of people, there is no level of lighting that will prevent crime.

In addition to lighting pedestrian areas, street lighting should provide uniform lighting along the full width of the public travel way. In places where pedestrian activity is important and encouraged, street lighting should properly illuminate sidewalks and street-crossing areas, and provide uniform lighting on the City roads. Street lighting projects should combine with other urban design elements to create a welcoming pedestrian environment.

Street Lighting Recommendations: The City of Shoreline should adopt and fund a street lighting plan that includes the following considerations:

- streetlight pole height standards;
- criteria for lamp fixture choice;
- lamp technology;
- color rendering and light spectrum criteria;
- light level standards
- reduction of light pollution to enhance star gazing; and
- nighttime safety criteria.

Due to evolving lighting technologies and lamp fixtures, the City should review this streetlight lighting plan on a regular basis.

Curb Ramps Program & Pedestrian Program

The City's curb ramp program includes the design and construction of curb ramps and bus pads. The ramps and bus pads are constructed to meet the standards of the Americans with Disabilities Act. The program can also fund wheelchair detection loops and audible pedestrian signals. Project locations are determined from an inventory compiled and maintained by the public works department, with a goal of installing 20 curb ramps per year. The City also has created a pedestrian improvement program to evaluate pedestrian safety needs and seek grant funding to implement improvements.

Curb Ramps & Pedestrian Program Recommendations: The City should continue funding these programs, with additional emphasis emerging needs for pedestrian safety and ADA compliance projects. The curb ramp program can be phased out over time as project objectives are met.

Neighborhood Traffic Safety Program

Over the past two decades, a significant number of programs, tools, and physical devices have been developed throughout the country to reduce the negative impacts of cut-through traffic. Many of these have been implemented in the Puget Sound area. Solutions to the impacts range from education and enforcement to capital construction projects. The capital solutions include: traffic circles, speed humps, narrowing, chicanes, textured pavement, closures, partial closures, traffic diverters, and more. Generally speaking, the more frequent a "traffic calming" device is used, the better the results in slowing or discouraging traffic. Also, different devices are successful in different situations.

Most of the traffic growth anticipated over the next twenty years will originate or be destined outside of the City of Shoreline. Shoreline will seek ways to ensure continued mobility through and within its boundaries, but will not do so at the expense of its neighborhoods. The City has instituted a successful Neighborhood Traffic Safety Program (NTSP) whereby citizens can work with their neighbors and the City to reduce traffic impacts on their neighborhood streets.

Goal T VI: Protect the livability and safety of residential neighborhoods from the adverse impacts of the automobile.

T45: *Work with neighborhood residents to reduce speeds and cut-through traffic on non-arterial streets with education, enforcement, traffic calming, signing, or other techniques. Design new residential streets to discourage cut-through traffic while maintaining the connectivity of the transportation system.*

T46: *Streamline the Neighborhood Traffic Safety Program process and improve opportunities for public input.*

T47: *Monitor traffic growth on collector arterials and neighborhood collectors and take measures to keep volumes within reasonable limits.*

Neighborhood Traffic Safety Program Recommendations: The City should dedicate a staff person to the NTSP, while streamlining the program to make it more responsive. At the same time, the City should continue working to manage traffic impacts from the state highway system on city arterials.

"Green Streets"

The Community Design Element directs the City to develop a program to implement "Green Street" improvements that prioritizes connections to schools, parks, neighborhood centers and other key destinations. The public works department is charged with developing "Green Street" transportation standards to overlay existing street design standards. The "Green Street" standards will provide guidelines for an enhanced streetscape, including street trees, landscaping, lighting, pathways, crosswalks, bicycle facilities, decorative paving, signs, seasonal displays, and public art. The "Green Street" standards proposed in **Table 6-2** vary with the underlying street classification.

Recommendation: Adopt the recommended transportation "Green Street" standards in **Table 6-2** for arterials and neighborhood collectors. Conduct a planning study with the storm and surface water utility to identify an initial "Green Street" corridor.

Table 6-2. Design Guidelines for Transportation "Green Streets"

	Arterial "Green Street"	Neighborhood Collector "Green Street"
Vehicle Travel Lanes	2, 3 or 5	2
Vehicle Speed	Moderate	Slow
Turn/Median	Mix of medians and turn lanes that provide pedestrian refuge	None
On-Street Parking	Allowed	Usually
Landscaping	Street trees, landscaped medians and buffers between roadway and sidewalk	Street trees and buffers between roadway and sidewalk or mixed use path
Public Art	Included	Not included
Transit Amenities	High quality service supported with amenities at major stops and station areas	Buses/transit stops not generally allowed
Pedestrian Amenities	Sidewalk with buffering, special lighting and special crossing amenities tied to major transit stops	Sidewalk or mixed use path, with buffering, lighting and special crossing amenities
Bikeways	Striped or shared	Shared roadway or mixed use path
Drainage	Consider street edge alternatives that reduce storm water runoff from streets.	Consider street edge alternatives that reduce storm water runoff from streets.
Note: Application of "Green Street" design elements and guidelines shall depend upon the unique characteristics of the design project, available right of way, and the character and intensity of planned land use.		

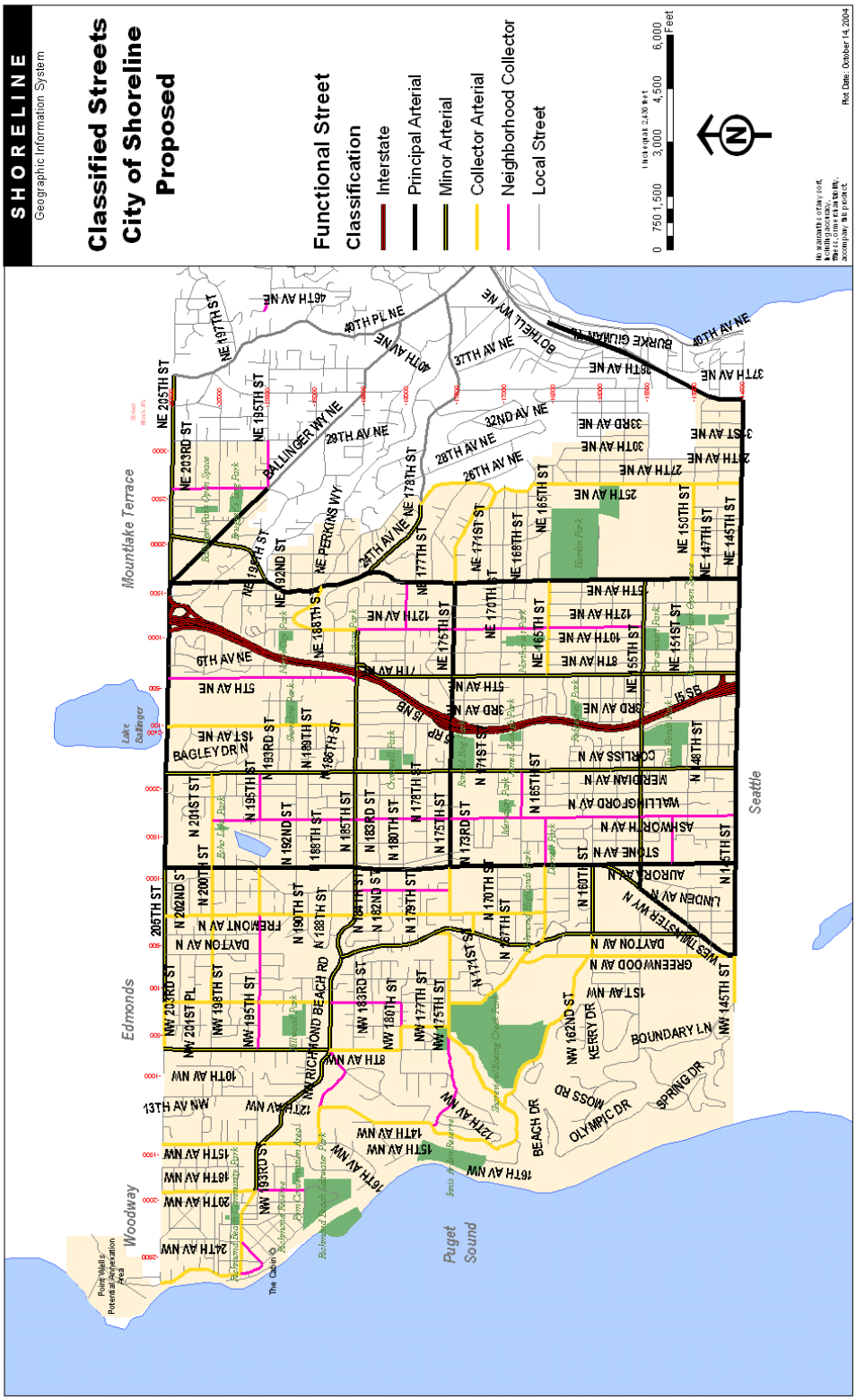
Street Classification Recommendations

The TMP recommends modifications to Shoreline's Functional Street Classification in the Transportation Element of the 1998 Comprehensive Plan. **Appendix 6-3** provides detailed information about the recommended street classifications. **Table 6-3** provides a general description of the classification system, and **Figure 6-1** shows the recommended new street classification map.

Table 6-3: General Description of Classified Streets

	Arterial			Local Street	
	Principal Arterial	**Minor Arterial**	**Collector Arterial**	**Neighborhood Collector**	**Local Street**
Function	- To connect cities and urban centers with minimum delay - To channel traffic to Interstate system - To accommodate long and through trips	- To connect activity centers within the City - To channel traffic to Principal Arterials/Interstate - Accommodate some long trips	- To serve community centers and businesses - To channel traffic from Neighborhood Access streets to Minor or Principal Arterials - Accommodate medium	- To serve residential areas - To channel traffic from local streets to Collector Arterials - Accommodate short trips such as shopping trips	- To provide local accesses - To serve residential areas
Land Access	- Limited local access – refer to the "Access Management Plan"	- Limited local access to abutting properties	- Local access with some control	- Local access with minimum restrictions	- Local access with minimum restrictions
Speed Limits	30 - 45 mph	30 – 40 mph	30 – 35 mph	25 – 30 mph	25 mph
Daily Volumes (vpd)	- More than 15,000 vpd	- 8,000 – 25,000 vpd	- 3,000 – 9,000 vpd	- less than 4,000 vpd	- less than 4,000 vpd
Number of Lanes	- Three or more lanes	- Three or more lanes	- Two or more lanes	- One or Two lanes	- One or Two lanes
Lane striping	- Travel lanes delineated with stripes	- Travel lanes delineated with stripes	- Travel lanes delineated with stripes	- No travel lane striping	- No travel lane striping
Median	- Landscaped medians or two-way center left turn lanes	- Landscaped medians or two-way center left turn lanes	- Landscaped medians allowed	- Medians are not needed unless provided as traffic calming devices	- Medians may be provided as traffic calming devices
Transit	- Buses/transit stops allowed	- Buses/transit stops allowed	- Buses/transit stops allowed	- Buses/transit stops not generally allowed except for short segments	- Buses/transit stops not allowed
Bicycle Facilities	- Bike lanes or shared lanes desired	- Bike lanes or shared lanes desired	- Bike lanes or shared lanes desired	- Shared lanes can be provided	- Bike facilities not specifically provided; may include signed bike routes
Pedestrian Facilities*	- Sidewalks on both sides - Landscaped/amenity strips	- Sidewalks on both sides - Landscaped/amenity strips	- Sidewalks on both sides - Landscaped/amenity strips	- Sidewalks on both sides - Landscaped/amenity strips	- Safe pedestrian access through the use of sidewalks, trails, or other means.

Figure 6-1: Recommended Street Classifications



Roadway Improvement Projects

Construction of the City of Shoreline's Aurora Corridor Project will address a number of congestion and safety issues within the City. Most of the city's remaining roadways function relatively well and do not experience high accident rates. Several will require additional turn lanes and/or through lanes at key intersections to prevent excessive congestion. Additional recommended roadway improvements were identified while evaluating the City's existing conditions and future traffic volumes.

Table 6-4 lists the recommended roadway improvements, and **Figure 6-2** illustrates the locations on a map. Several of these improvements should be funded through the new Safety Management Program. In addition, a number of planning studies have been recommended to better define project needs, including development of a multi-modal level of service standard, and a major subarea study of the Meridian Avenue North and North 175th corridors. A revised level of service standard may result in a different set of project recommendations.

All of the evaluated roadway and intersection improvements are listed in **Appendix 5-3**.

Goal T II: Work with transportation providers to develop a safe, efficient and effective multimodal transportation system to address overall mobility and accessibility. Maximize the people carrying capacity of the surface transportation system.

T10: Implement the transportation master plan that integrates green streets, bicycle routes, curb ramps, major sidewalk routes, street classification, bus routes and transit access, street lighting and roadside storm drainage improvements. Promote adequate capacity on the roadways and intersections to provide access to homes and businesses.

T11: Coordinate transportation infrastructure design and placement to serve multiple public functions when possible, i.e. integrate storm water management, parks development and transportation facility design.

T12: Implement a coordinated signal system that is efficient and which is flexible depending on the demand or time of day, and responsive to all types of users.

T13: Adopt LOS E at the signalized intersections on the arterials within the City as the level of service standards for evaluating planning level concurrency and reviewing traffic impacts of developments, excluding the Highways of Statewide Significance (Aurora Avenue N and Ballinger Way NE). The level of service shall be calculated with the delay method described in the Transportation Research Board's Highway Capacity Manual 2000 or its updated versions.

T14: The City of Shoreline shall pursue the development of a multi-modal measure for Level of Service that takes into account not only vehicular travel and delay, but transit service and other modes of travel.

T15: Assure that vehicular and non-motorized transportation systems are appropriately sized and designed to serve the surrounding land uses and to minimize the negative impacts of growth.

T16: Design transportation improvements to support the city's land use goals and fit the character of the areas through which they pass.

T17: Utilize the Arterial Classification Map as a guide in balancing street function with land uses. Minimize through traffic on local streets.

T18: Develop a regular maintenance schedule for all components of the transportation infrastructure. Develop maintenance schedules based on safety/imminent danger, and on preservation of resources.

T19: Inventory and inspect the transportation infrastructure.

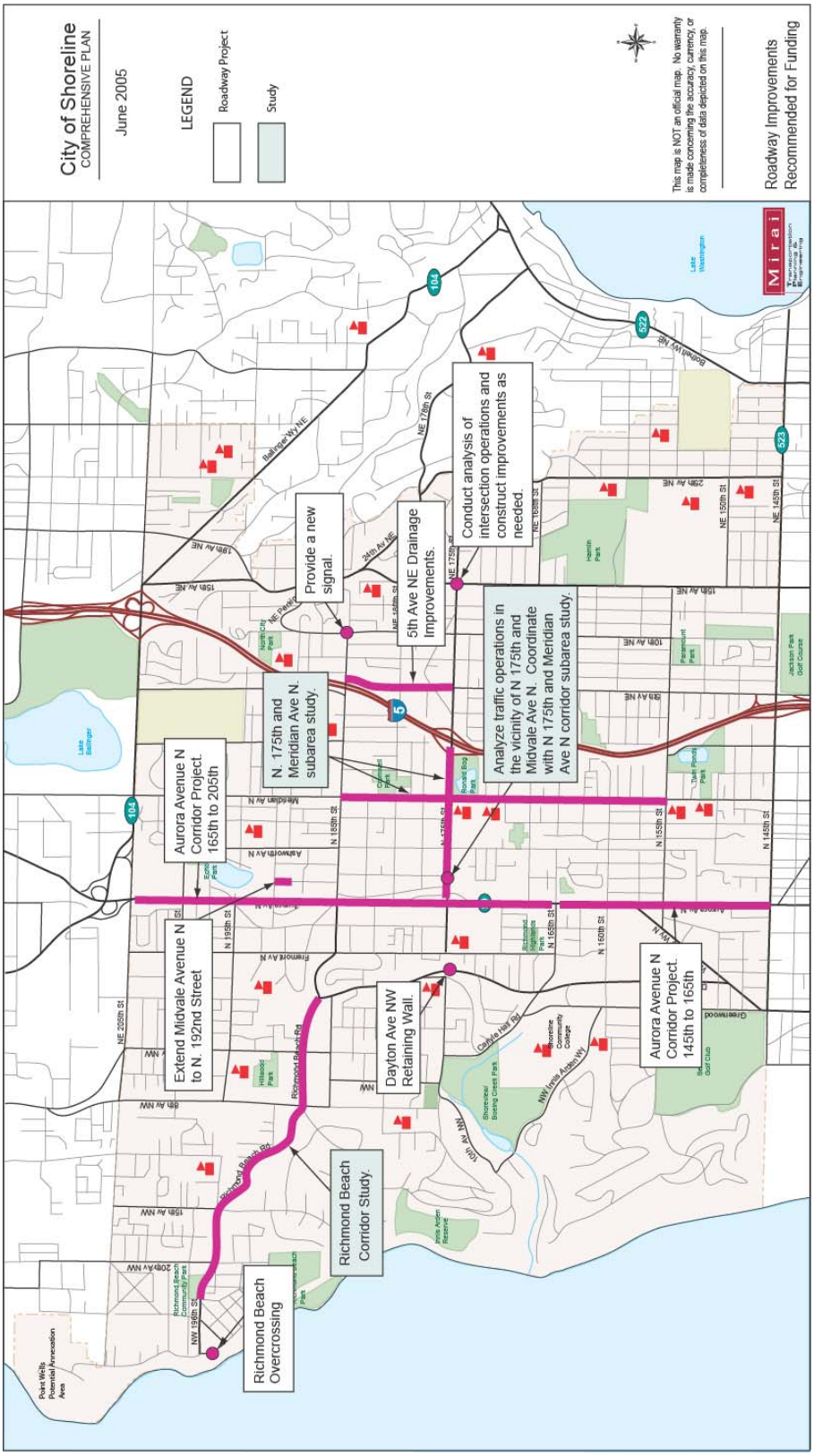
T20: Establish a pavement management system.

T21: Upgrade our signal system so that it is responsive, fully interconnected, and moves people efficiently and safely.

Table 6-4. Roadway Projects Recommended for Funding

Roadway Projects Recommended for Funding				
Location	**Improvement**	**Function/Benefit**	**Comment**	**Cost in 2004$ (thousands)**
All	Annual Road Surface Maintenance Program	Maintain existing system		$13,000
Richmond Beach Drive and NW 196th Street	Richmond Beach Over-crossing	Improve Neighborhood Access and Safety		$1,868
N/A	Transportation Improvements CIP Project Formulation	Planning		$800
All	Roads Capital Engineering			$3,884
All	Neighborhood Traffic Safety Program	Improve Neighborhood Access and Safety		$3,220
Aurora Ave N: 145th to 165th	Aurora Corridor Project	Safety and Operations		$15,993
Aurora Ave N: 165th to 205th	Aurora Corridor Project	Safety and Operations		$52,277
North City/15th Ave NE	North City Business District/15th Avenue NE Improvements	Safety and Operations		$3,699
Dayton Ave N @ 175th	Retaining Wall	Safety		$388
5th Ave NE	Street Drainage Improvements	Operations		$166
Multiple (see Capital Facilities Plan)	Safety Management Program.	Document, prioritize and fund emerging safety needs.	Candidate projects include street lighting plan, signal at NE 185th St/10th Ave NE	$1,000
North 175th Street and Meridian Ave N	Corridors Subarea Project	Meet LOS standard	Placeholder pending study outcome	$2,060
Midvale Ave N: N 190th to N 192nd	Extend Midvale Ave N to N 192nd Street		Developer Funded Improvement	$0
NE 175th Street and 15th Ave NE	Intersection analysis and improvements	Meet LOS standard		$1,290
Multiple (see Capital Facilities Plan)	Planning Studies	Improve Neighborhood Access and Safety	Recommended studies include Richmond Beach Road, N. 175th & Meridian Corridor Study,Multimodal LOS Study, Ballinger Way/I-5 Undercrossing, Transit Plan and "Green Street" Corridor Selection	$535

Figure 6-2. Roadway Improvements Recommended for Funding



Transit Improvements

The City-wide Citizen Survey conducted by the City in 2004 indicates that a majority (64%) of its citizens are either very satisfied or somewhat satisfied with the availability of public transportation. In response to a question of what aspect of transportation that should receive the most emphasis over the next two years, the availability of public transportation was ranked fourth with 28% of the respondents who selected it as one of their top two choices.

According to the 2000 census data, 10.2% of Shoreline residents used transit as their primary mode to work while 12.8% carpooled and 2.1% either walked or biked to work. By 2020, it has been estimated that over 2,300 new housing units will be constructed and over 2,200 jobs will be created. Accommodating this anticipated growth while minimizing the impact of additional traffic is a high priority for the city of Shoreline. The transit strategy in this plan aims to:

- Increase existing transit use by providing full-service, accessible transit, with high-frequency peak period service and extended off-peak service on weekdays and weekends, and improved facilities.
- Tailor service levels and route structures to reflect the different needs of areas within the City by providing a mix of flexible and fixed routes, community bus routes, inter-community and commuter transit service.

Goal T III: Support increased transit coverage and service that connects local and regional destinations to improve mobility options for all Shoreline residents.

T22: *Develop a detailed transit plan in coordination with transit providers to identify level of service targets, facilities and implementation measures to increase Shoreline residents' and students' transit ridership.*

T23: *Work with transit service providers to provide safe, lighted, and weather protected passenger waiting areas at stops with high ridership, transfer points, park and ride, and park and pool lots.*

T24: *Work with all transit providers to support "seamless" service into Shoreline across the county lines and through to major destinations.*

T25: *Work with Sound Transit to study the development of a low impact commuter rail stop in the Richmond Beach/Point Wells area. The Richmond Beach residents shall be involved in the decision making process as far as location, design, and access to the service.*

Currently, transit service in the city of Shoreline is fair to very good. However, the coverage of the service does not meet the needs of all residents. The recent addition of Metro Route 348 has improved east-west connections making connections with Richmond Beach to major destination points of Shoreline Center, the library and Hamlin Park. Metro Transit's most recent review of their bus routes indicates that most bus routes are generally well utilized. However, Routes 330 and 346 had lower than average ridership.

Changes in demand and recent changes in service as well as citywide goals necessitate a reevaluation of the current transit service. Any improvements needed in service coverage will need coordination with the various transit authorities that serve Shoreline. Each agency has its own service standards that will influence which changes can be made to Shoreline's transit services.

The City should work with WSDOT, transit agencies and counties to reconstruct the Aurora Avenue North Bridge over SR 104 to add business access and transit (BAT) lanes to connect Shoreline's BAT lanes with those in Edmonds.

Transit Recommendations:

- Increase bus service efficiency along underserved, non-serviced corridors or overextended bus routes.
    - Improve the quality of all day cross-town service in the southern portion of the city, e.g. the NE 155th Street corridor
    - Reconfigure, increase, and/or add dedicated bus service to serve the Briarcrest and eastern portions of North City.
- Improve inter-county service between King and Snohomish County
    - Provide "one-seat" rides along Aurora Avenue N. without the need for a transfer at the Aurora Village Transit Center.
    - Improve access to Sound Transit routes running on I-5.
- Improve accessibility to bus stops and transit facilities that enhance surrounding neighborhoods.
    - Add sidewalks and bicycle lanes
    - Provide safe pedestrian crossings on the major and collector arterials with approximately a quarter mile spacing to support transit and business access.
    - Add shelters at locations that meet the criterion of a minimum of 25 boardings in King County.
        - West side of Aurora Avenue N at the far side of N 200th Street;
        - North side of the Shoreline Community College entrance at the main campus entrance;
        - East side of the Shoreline Park & Ride roadway at the near side of N 192nd Street;
        - West side of Aurora Avenue N at the far mid block at N 175th Street;
        - West side of Aurora Avenue N at the far midblock at N 155th Street;
        - West side of Aurora Avenue N at the far side of N 152nd Street;
        - East side of Aurora Avenue N at the near side of N 185th Street;
        - West side of Aurora Avenue N at the far side of N 170th Street;
        - West side of N 5th Avenue at the near side of NE 163rd Street;
        - East side of Aurora Avenue N at the far side of N 155th Street;
        - West side of 15th Avenue NE at NE 177th Street;
        - South side of N 175th Street at Densmore Avenue N;
        - East side of Aurora Avenue at the far side of N 160th Street
    - Identify and improve lighting and visibility of bus stops.
        - Reference accident and crime statistics for incidents at or near transit stop locations.
    - Provide safe pedestrian crossings through the installation of curb "bulb outs" and pedestrian tablets.
- Consider the impact of proposed high-capacity transit corridors.
    - Identify preferred high-capacity corridors
        - Extensions of the Seattle Monorail Project's Green Line;
        - Sound Transit's Phase Two expansion;
        - Bus rapid transit opportunities, e.g. Metro Transit route 358 along Aurora Avenue N.
    - Consider impacts to existing transit service and conditions.
        - Improve pedestrian accessibility and facilities along proposed corridors;
        - Identify potential inter-modal transfer locations;
        - Coordinate Park and Ride locations and possible expansion.

Pedestrian Improvements

Shoreline's citizens continue to emphasize the importance of sidewalks for safety, enhanced mobility, convenience, and recreation. Pedestrian advocate Dan Burden summarizes the value of pedestrian mobility in building communities:

"Every trip begins and ends with walking. Walking remains the cheapest form of transport for all people, and the construction of a walkable community provides the most affordable transportation system any community can plan, design, construct and maintain. Walkable communities … lead to more social interaction, physical fitness and diminished crime and other social problems."

*- **Walkable Communities Inc**., 320 S. Main St, High Springs, FL*

The City of Shoreline has great potential to be a "walkable community," with many activities and resources within walking distance of neighborhoods. The City's roadway grid system provides multiple east/west and north/south connections, and the City offers a number of public spaces, including parks, shopping centers and community centers. The challenge for Shoreline is knowing where to start: where to best spend limited resources to best serve the community.

Candidate Project Improvements

Candidate projects were identified from several sources. The City's 1998 Comprehensive Plan identified many of the City's arterials as potential "urban standards" projects; that is, they needed to be upgraded from rural-type roads to a higher standard that would include curbs, gutters and sidewalks. These projects were located on most of the City's main roadways. In 2003, the City's Bond Advisory Committee also identified roadways within a given radius of schools as candidates for sidewalks, and the City worked with the Shoreline School District to update service area walk route maps.[2] In addition, the City's Parks Department has a "walking map," developed with the assistance of high school students, which provided valuable information about potential destinations in walking distance of neighborhoods.

Goal T IV: Provide a pedestrian system that is safe, connects to destinations, accesses transit, and is accessible by all.

T26: *Provide adequate, predictable, and dedicated funding to construct pedestrian projects.*

T27: *Place high priority on sidewalk projects that abut or provide connections to schools, parks, transit, shopping, or large places of employment.*

T28: *Reinforce neighborhood character and abutting land uses when developing and designing the pedestrian system.*

T29: *Provide sidewalks on arterial streets and neighborhood collectors.*

T30: *Develop flexible sidewalk standards to fit a range of locations, needs and costs.*

T31: *Work with the School District to determine and construct high priority safe school walk routes. The City should partner with the School District to achieve these goals.*

T32: *Coordinate sidewalk design and construction with adjacent jurisdictions where sidewalks cross the City boundaries.*

T33: *Provide pedestrian signalization at signalized intersections, and install midblock crossings if safety warrants can be met. Consider over- and under-crossings where feasible and convenient for users. Use audio and visual pedestrian aids where useful.*

T34: *Implement the City's curb ramp program to install wheelchair ramps at all curbed intersections.*

T35: *Require all commercial, multi-family and residential short-plat and long-plat developments to provide for sidewalks or separated all weather trails, or payment in lieu of sidewalks.*

T36: *Develop an off-street trail system that serves a recreational and transportation function. Preserve rights-of-way for future non-motorized trail connections, and utilize utility easements for trails when feasible.*

[2] Recommendations identified by the Bond Advisory Committee when considering a potential ballot measure for capital improvements.

These candidate projects were considered in relation to existing and proposed framework for the pedestrian system, which includes

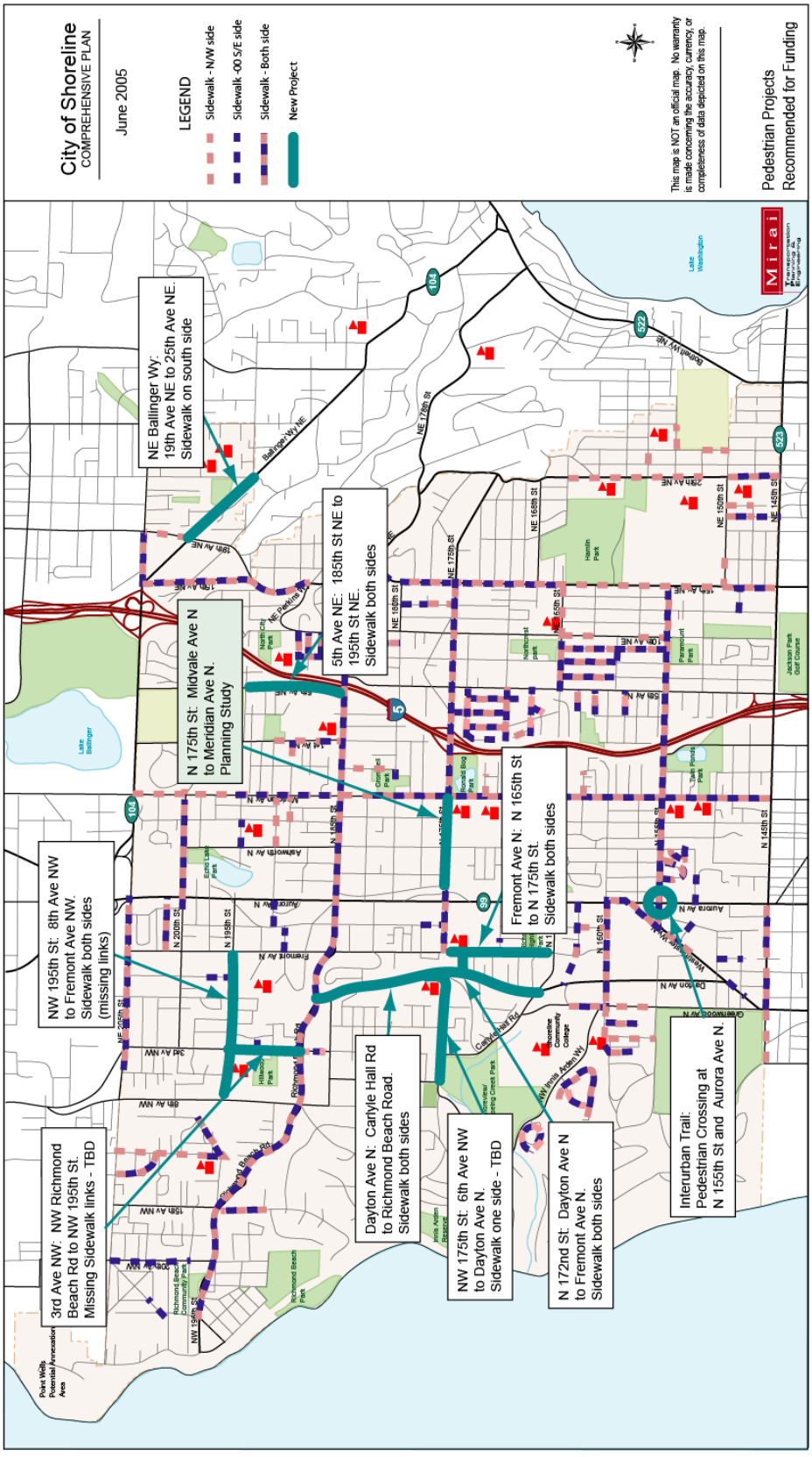
- the location of existing sidewalks,
- existing bus routes,
- the Interurban Trail, and
- a proposed continuous pedestrian/bicycle "Shoreline Loop" within the city limits that will connect neighborhoods with schools, local businesses, community institutions and other parts of the city.

Each of these potential projects was evaluated within a prioritization matrix to establish the highest priority needs (see chapter 5). The top priority projects connect to the existing and proposed sidewalk framework, provide school and/or park access along arterials, link neighborhood destinations and connect to transit service. Those recommended for funding are described below in **Table 6-5**. When adopting the City's Comprehensive Plan in June 2005, the Council added an additional $5 million to the Pedestrian Program. For a listing of all the evaluated pedestrian projects, please see **Appendix 5-2**. **Figure 6-3**, the pedestrian system proposed project map, identifies projects recommended for funding in relation to the existing sidewalk system.

Table 6-5. Pedestrian Projects Recommended for Funding

Pedestrian Projects Recommended for Funding			
Project	**Location**	**Side of the Street**	**Cost in 2004$ (thousands)**
Interurban Trail Pedestrian Crossing	Citywide		$2,917
Curb Ramp, Gutter and Sidewalk Program	Citywide		$2,740
Traffic Small Works	Citywide		$1,800
Pedestrian Program (see Capital Facilities Plan)	Citywide		$18,850
	Candidate Projects:		
	NW 175th St: 6th Ave NW to Dayton Ave N	One Side TBD	$1,289
	N 175th: Midvale to Meridian (Coordinate with N 175th planning study)	Both	$2,779
	N 172nd St: Dayton Ave N to Fremont Ave N	Both	$357
	Dayton Ave N: Carlyle Hall Rd to Richmond Beach Rd	Both	$1,558
	3rd Ave NW: NW Richmond Beach Rd to NW 195th St	One Side TBD	$818
	NE Ballinger Way: 19th Ave NE to 25th Ave NE	South Side	$714
	Fremont Ave N: N 165th St to N 175th St	Both Sides	$1,720
	5th Ave NE: NE 185th to NE 195th St	Both Sides	$1,720
	NW 195th: 8th Ave NW to Fremont Ave NW	Both Sides (missing links)	$2,180

Figure 6-3 Pedestrian Projects Recommended for Funding



Bicycle Improvements

Shoreline is generally well suited for bicycle travel. The topography is relatively flat between Dayton Avenue and Lake Forest Park. Bicycles can legally use all streets in Shoreline (except I-5). The Interurban Trail (currently under construction) and its future segments, will serve as the north-south spine for bicyclists. East/west bicycle lanes are currently provided on N/NE 155th Street (Hwy 99 to 15th NE) and N/NE 185th Street (Stone Avenue North to 1st NE). Other bike facilities include recreational off-street trails in Hamlin Park and Innis Arden Reserve.

Bicycle System Scheme

Shoreline recognizes the importance of bicycling as a mode that addresses the city's transportation and recreational needs. At the city level, bicycle routes in the network connect neighborhoods to schools, city institutions, community businesses and recreational and commuter destinations including transit linkages. At a larger scale, these bike routes provide connections that link to the regional network.

Figure 6-4 identifies the corridors for regional and city bike routes. The Lake to Sound Trail (blue) provides east-west connections through the city and provides connections to Richmond Beach Saltwater Park and the Burke-Gilman Trail.

Currently under construction, the Interurban Trail provides north-south connections to neighboring Seattle and Mountlake Terrace. The Shoreline Loop is a circulator route providing connections from surrounding neighborhoods to many of the city parks, schools, and businesses as well as regional bike routes. The Cross-Town Connector provides for linkages from the center of the city to the rest of Shoreline.

Lake to Sound Trail (east-west link)

An east-west connection through the city of Shoreline would link North City with Richmond Beach. It would also provide an important connection between the Puget Sound and the Burke-Gilman Trail along Lake Washington. Along the corridor, many businesses and institutions are located including the Shoreline community center, the post office, and the police station. As **Figure 6-4** shows, one potential route from west to east would start at Richmond Beach Saltwater Park, go north on 20th Avenue NW, and then go east on NW 195th Street to Richmond Beach Road. It would then use the existing bike lanes on 185th Street. Northwest 195th Street / Richmond Beach Road has the potential to be restriped to three lanes, which can include bike lanes (see recommended

Goal T V ***Develop a bicycle system that is connective and safe and encourages bicycling as a viable alternative method of transportation***

T37: *Reinforce neighborhood character and abutting land uses when developing and designing the bicycle system.*

T38: *Work with the bicycle community to develop bicycle routes connecting schools, recreational and commuter destinations, including transit linkages. Aggressively pursue construction of the Interurban Trail as the spine of the City's bicycle system.*

T39: *Work with neighboring jurisdictions and other agencies to ensure that Shoreline's bicycle routes/corridors and designs are compatible and connect with one another.*

T40: *Work with Lake Forest Park to develop a bicycle linkage to the Burke-Gilman trail.*

T41: *Work with the School District to determine and encourage safe bike routes to schools. The City should partner with the School District to achieve these goals.*

T42: *Accommodate bicycles in future roadway or intersection improvement projects.*

T43: *Require new commercial developments to provide convenient bicycle parking facilities for employees and visitors/customers. Encourage merchants to install bike parking facilities.*

T44: *Reduce barriers to bicycle travel and reduce bicycle safety problems.*

planning study). Twentieth Avenue NW is a low-traffic residential street with minimal shoulders.

At 10th Avenue NE, several possible connections to the Burke-Gilman Trail through Lake Forest Park have been identified. One route follows NE Perkins Way to 15th Avenue NE, where bicyclists can cross at the signalized intersection. At 15th Avenue NE, a sidewalk is provided on the east side of the street. From 15th Avenue NE, the route takes 24th Avenue NE / NE 178th Street. At the intersection of NE 178th Street, NE 180th Street and Brookside Boulevard NE in Lake Forest Park, one route takes NE 178th Street to Ballinger Way NE where bicyclists can cross at the signalized intersection at Bothell Way NE. The other connection takes bicyclists down Brookside Boulevard NE to a signalized intersection at NE 170th Street and Bothell Way NE where the Burke-Gilman Trail meets. The route has very limited right-of-way for bike lanes and the terrain is quite steep in certain sections. A combination use of bike lanes, sidewalks and mixed traffic applications are needed.

Interurban Trail (north-south link)

Shoreline is pressing ahead with the construction of the Interurban Trail. Using the former Interurban Light Rail Line right-of-way, this off road facility offers bicyclists and pedestrians a safe, separated trail along the Aurora Avenue N corridor. In addition to the many business nearby, it connects to the Shoreline Park-and-Ride and Aurora Village Transit Center from the neighboring residential communities, When completed, this 3.25 mile trail will connect to Seattle and Snohomish County.

Shoreline Loop (circulator route)

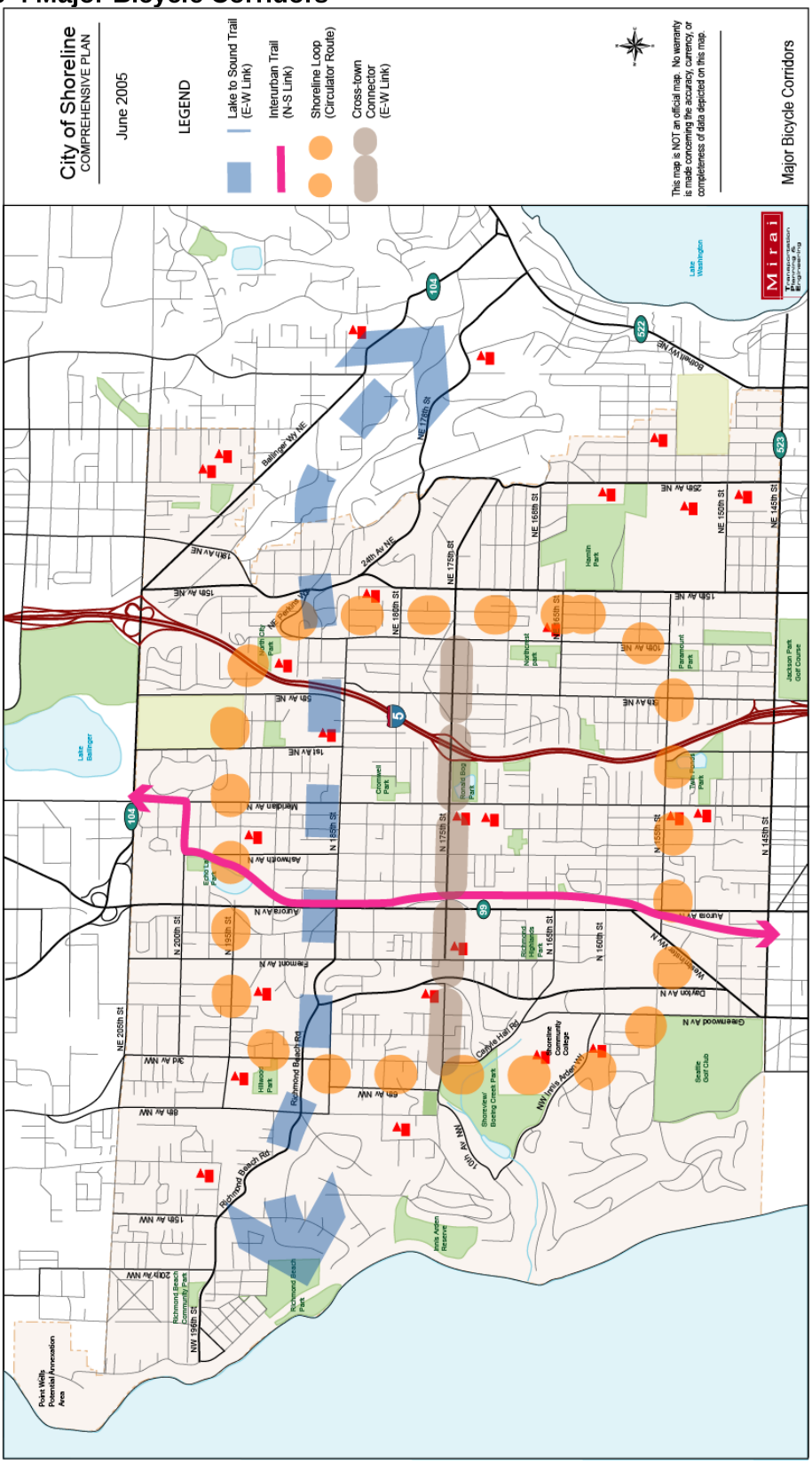
Construction of a continuous pedestrian/bicycle loop within the city limits can focus missing links between neighborhoods with schools, local businesses, community institutions and other parts of the city. It can provide a clear and safe route for bicycle enthusiasts, walkers and school kids to get around Shoreline. **Figure 6-4** shows one such potential “grand loop”, using the existing bike lanes on 155th Street and 15th Avenue NE as interim system anchors. Additional major improvements will be needed on the western and northern parts of the loop. Areas include the hilly Innis Arden/Shoreline Community college vicinity and along N 200th Street and 8th Avenue NW.

Currently, there is a pedestrian crossing over I-5 at NE 195th Street. For the future loop trail, the accommodation of both pedestrians and bicyclists may bicyclists to walk their bikes over the bridge or widening of the crossing. Also, similar considerations need to be made for the planned pedestrian bridge to be constructed over Aurora Avenue N between N 155th Street and N 158th Street. Additional spurs linking to neighboring communities, parks and schools should be considered.

Cross-town Connector (east-west link)

I-5 presents a major obstacle for east-west connections in the city. Additional connections are desirable for residents, particularly between 175th Street and 155th Street. Currently, bicyclist can cross I-5 in the north at either the 195th Street pedestrian bridge or the185th Street overpass and at the155th Street underpass in the south. 175th Street provides a major vehicular link in the center of Shoreline but the limited right-of-way does not allow for simple bike improvements.

Figure 6-4 Major Bicycle Corridors



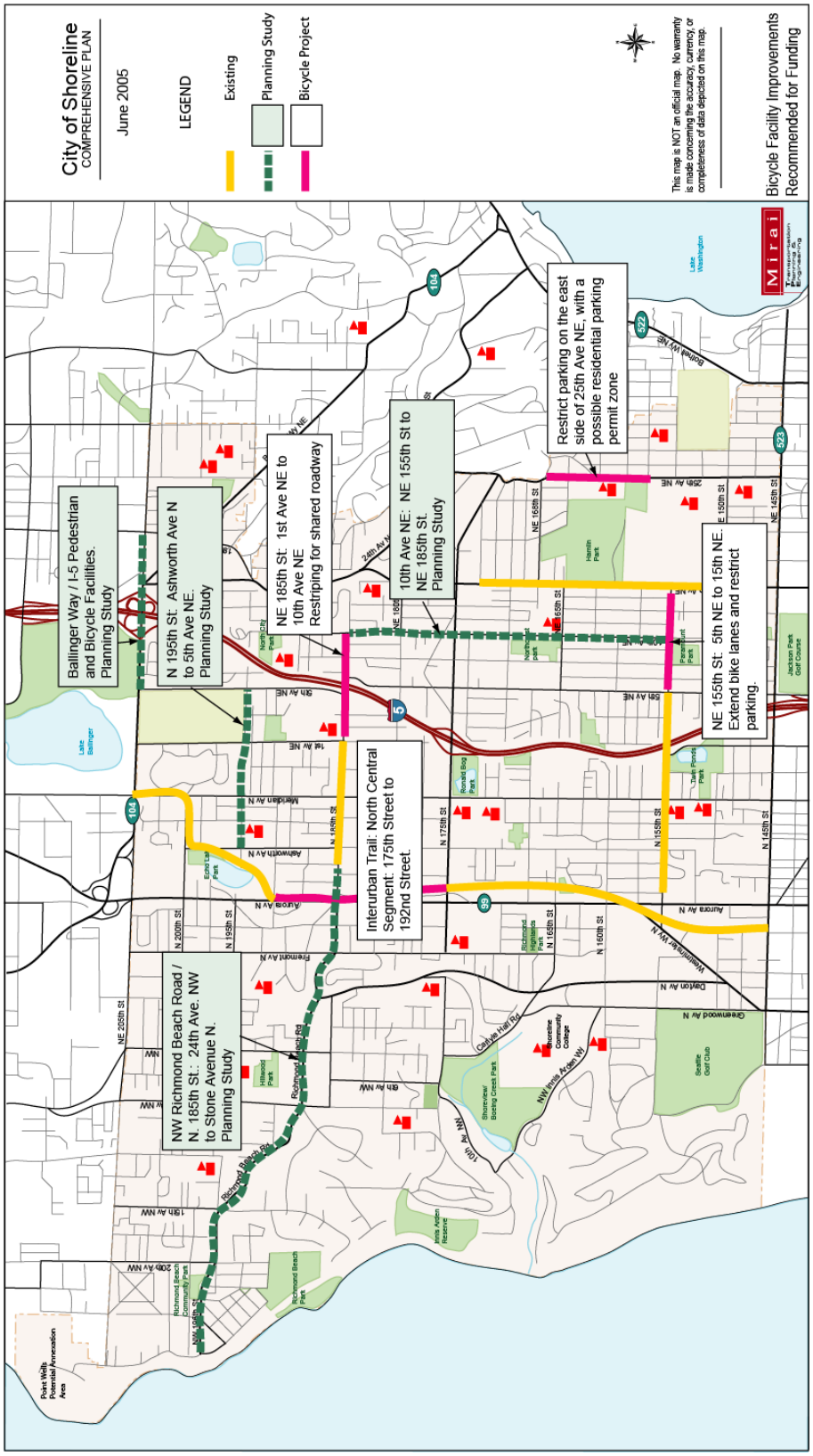
Creating a new overpass crossing at either 167th Street or 165th Street will require substantial grade work on the west side of I-5. There have also been discussions about providing additional east-west connections for vehicles and a potential new auto bridge, which can include a bike lane and convert the connecting streets to "green streets." Another possible crossing is the Metro underpass for the maintenance garage near 163rd Street. This would be a bicycle and pedestrian link only. Traffic volumes at this underpass are relatively low due to the vehicle-restricted interchange. However, this crossing makes routing for the cross-town connector more difficult due to the lack of street connectivity to the west of I-5. Additional study is needed for an additional east-west link at these locations.

Each of these potential projects was evaluated within a prioritization matrix to establish the highest priority needs (see chapter 5). Bicycle improvement projects recommended for funding are listed in **Table 6-6** and mapped on **Figure 6-5. Appendix 5-3** lists all evaluated bicycle improvements.

Table 6-6: Bicycle Projects Recommended for Funding

Bicycle Projects Recommended for Funding			
Project	**Location**	**Improvement**	**Cost in 2004$ (thousands)**
Interurban Trail North Central Segment	North Central Segment: 175th – 192nd Street	Mixed use trail	$1,971
Bicycle Program	Citywide		$150
	Candidate Projects		
	NE 185th Street: 5th Ave NE to 10th Ave NE	Restriping, shared roadway, both sides	$120,000
	Restrict parking on the east side of 25th Ave NE in the vicinity of Shorecrest High and Kellogg Middle Schools, with a possible residential parking permit zone for neighborhood residents.	East	Not estimated
	NE 155th St: 5th NE to 15th NE. Extend bike lanes and restrict parking	South	$22,000
Planning Studies	Multiple Locations (see Capital Facilities Plan)		Funded through "project studies" in Roadway Projects
	Candidate Projects		
	10th Avenue NE: NE 155th Street to NE 185th Street	10' off-road asphalt trail, one side	Candidate for initial "Green Street" project. Study funded through "project studies"
	N 195th Street: Ashworth Avenue N to 5th Avenue NE	10' off-road asphalt trail, one side	Candidate for initial "Green Street" project. Study funded through "project studies"
	NW Richmond Beach Road / N 185th Street: 24th Ave NW to Stone Avenue N	Restriping, shared roadway, both sides	Study funded through "project studies" project placeholder in roadway projects.
	Ballinger Way/I-5 Pedestrian and Bicycle Facilities	Improved pedestrian and bicycle access under I-5 at Ballinger Way/N 205th	Study funded through "project studies"

Figure 6-5 Bicycle Facility Improvement Recommendation for Funding



Transportation Demand Management (TDM)

TDM promotes more efficient use of the existing transportation systems by influencing the time, route or mode selected for a given trip. TDM strategies increase travel choices, offering the opportunity to choose how, when and, if travel will be by car or in some other way, with the aim of balancing demand with the transportation system. Options include:

- Modal strategies such as vanpools and telecommuting;
- Incentives such as bus passes;
- Specialized services such as shuttles; and
- Design improvements such as bike lockers and preferential parking for ridesharing.

With limited resources to build new capacity and continued employment growth, Transportation Demand Management (TDM) strategies are cost-effective, complementary, and efficient alternatives to additional investment in transportation facilities.

Goal T VII: Encourage alternative modes of transportation to reduce the number of automobiles on the road.

T48: *Work with major employers, developers, schools, and conference facilities to provide incentives to employees, tenants, students, and visitors to utilize alternatives other than the single occupant vehicle.*

T49: *Support educational programs for children and residents that communicate transportation costs, safety, and travel choices.*

T50: *Support state and federal tax policies that promote transit and ridesharing.*

T51: *Develop parking system management and regulations to support alternatives to the single occupant vehicle*

T52: *Analyze alternatives by which employers and/or developers not subject to the Commute Trip Reduction Act can encourage their employees and tenants to pursue alternative transportation choices.*

T53: *Work with Shoreline Community College and King County Metro to reduce employee and student use of single occupant vehicles and promote transit and carpooling.*

TDM Recommendations: The City of Shoreline should emphasize the following elements in supporting TDM programs in the city and region:

- Provide tools and resources for employers and property owners to develop economical and effective choices for customers' and employees' access and mobility.

- Emphasize Incentives for developers and commuters. For employers and developers, incentives involve receiving a return for conducting TDM, such as preferential treatment in the development review process or bonuses in the development process. Incentives for travelers and commuters, on the other hand, can include subsidies, transit passes, and financial incentives.

- Encourage the development of organizations that coordinate transportation needs through public-private partnerships. A key TDM strategy supports the formation of organizing structures such as Transportation Management Associations (TMAs). These organizations allow local business, property owners, and residents to partner with the city to coordinate and implement comprehensive transportation services and infrastructure within a localized area.

Freight and Mobility System

Trucks delivering wholesale and retail goods, business supplies and building materials throughout the City are impacted by and themselves impact traffic congestion. The City must ensure that trucks have the ability to move to and through Shoreline. On the other hand, the City needs to ensure that residential streets are not unnecessarily impacted by cut-through truck traffic. The November 2000 North City Sub-Area Plan designates a number of business access routes to provide safer freight movements off of the main 15th Avenue NE roadway. Development of a business access road for businesses along Highway 99 would provide extra access for freight deliveries while moving trucks off of the heavily used Highway 99 corridor. **Figure 6-6** shows the City's truck routes.

Goal T VIII: Develop a transportation system that enhances the delivery and transport of goods and services

T54: *Incorporate new strategies, as they are developed, into Shoreline's TDM programs that promote or provide alternatives to driving alone.*

T55: *Ensure that service and delivery trucks, and other freight transportation can move with minimal delay on appropriate streets and rail systems in our city as shown on the truck route map.*

T56: *Minimize the disruption of arterial traffic flow by developing time-limited loading zones in commercial areas and regulating areas that don't have loading zones. Develop a plan for business access streets to provide freight loading zones on less-heavily traveled roadways.*

T57: *Discourage truck traffic through residential neighborhoods during typical sleeping hours.*

T58: *Work with developers/ property owners along the Aurora Avenue North corridor and in North City to plan business access streets as a part of redevelopment.*

Freight Mobility Recommendation: Develop time-limited loading zones in commercial areas. Require business access plans as properties along Highway 99 redevelop.

Regional Coordination

The City of Shoreline's greatest increase in projected travel over the next 25 years is in the area of regional travel. New employment and shopping opportunities will increase the need for travelers to be able to get to, into and through Shoreline to reach their destinations. If Shoreline's businesses are to be successful and thrive, the City and region must provide a broad range of multimodal improvements to address congestion and mobility needs.

Shoreline's transportation system is affected by a dynamic and complex governance structure. Federal, state, regional and local governmental entities make funding, policy, and project decisions that affect Shoreline. These include the Washington State Department of Transportation, the Puget Sound Regional Council, Sound Transit, King County (including Metro Transit), Snohomish County, Community Transit, and the neighboring cities of Seattle, Lake Forest Park, Edmonds and Woodway. The City of Shoreline can play an important role in facilitating regional action to provide and fund convenient travel choices. It is possible that the King County Monorail organization may extend the Seattle Monorail Green Line into Shoreline. If this happens, the City should actively work together to enhance the public transportation system with new transit technology in the City.

Regional Coordination Recommendation: Shoreline will benefit from a more active role in representing the City's interests and the Comprehensive Plan goals and policies in this context. Given the multiplicity of forums, the City should focus its efforts on agencies that can provide funding or services to the City. This should be a three-step effort:

Regional Coordination Recommendation (continued):

Step 1: Identify priorities

- Identify those improvements involving other agencies that are most important to the City (especially transit and pedestrian improvements along Highway 99, the Interurban Trail, NE 145th, NE 205th and Interstate 5).

Step 2: Identify opportunities

- Become familiar with federal, state, regional and county budget and appropriations processes
- Participate in regional and county planning processes that will affect the City's strategic interests

Step 3. Form strategic alliances

- Identify and approach potential partners (adjacent jurisdictions or like-minded agencies)
- Develop federal and state legislative agendas and meet with US and state representatives (elected officials and staff) who can help fund key projects (esp. Highway 99 and the Interurban Trail)
- Develop regional legislative agenda and meet with area representatives elected officials and staff) to the PSRC, Sound Transit, the Regional Transportation Investment District, and King County Council
- Develop partnerships with the local business community to advocate at the federal, state and regional level for common interests.

Goal T X: ***Coordinate the implementation and development of Shoreline's transportation system with our neighbors and regional partners***

T65: *Advocate the City's strategic interest in high capacity transit, local and express bus service and other transit technologies. Work with local and regional agencies to obtain a fair share of transit service and facilities.*

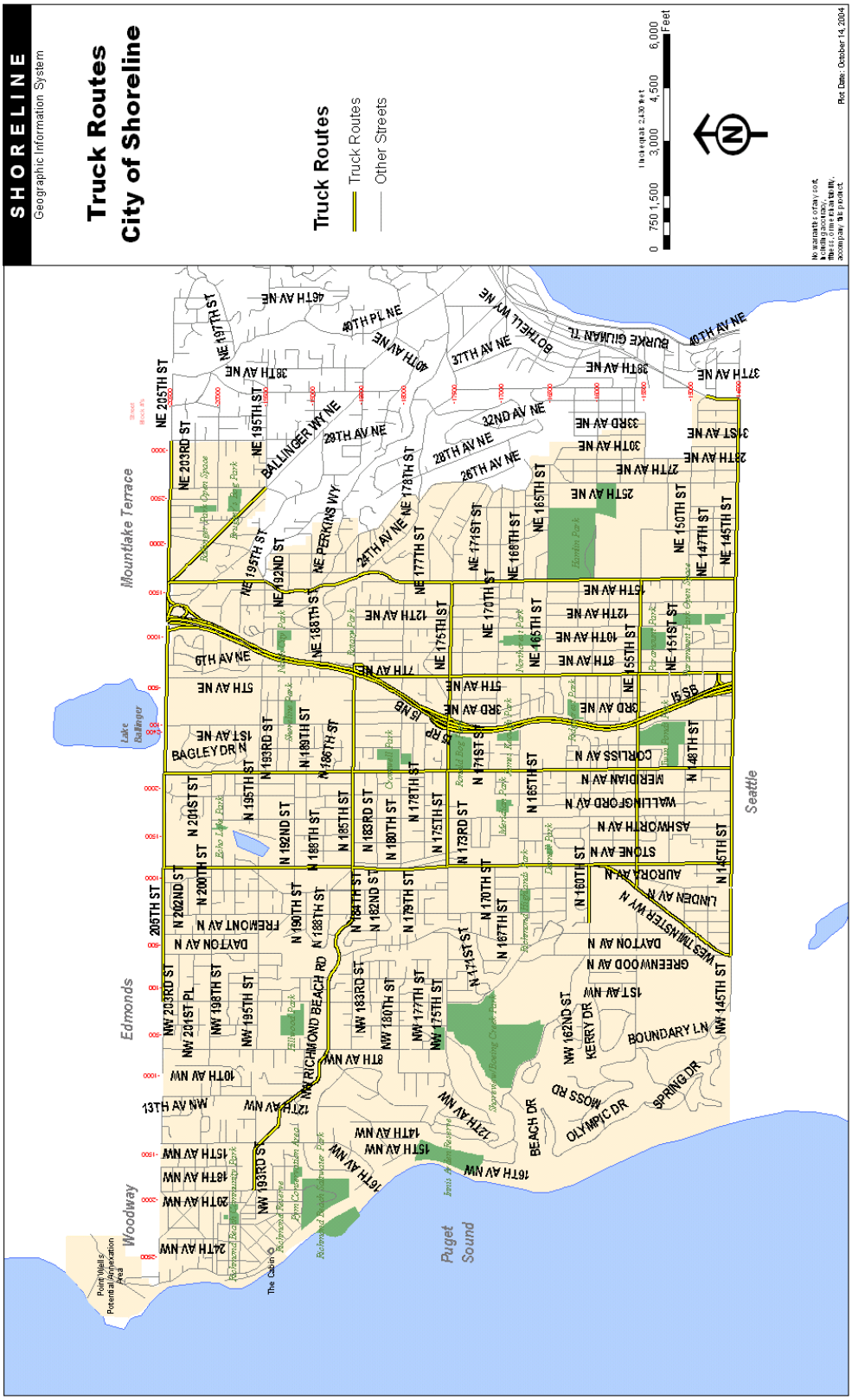
T66: *Develop short, medium- and long-range priorities and implementation strategies for improvements to the state highway system within and adjacent to the City of Shoreline. Advocate for added access to and connections to I-5 through the City of Shoreline.*

T67: *Develop interlocal agreements with neighboring jurisdictions for development impact mitigation, for coordination of joint projects, and management of pass through traffic. Consider annexing the sections of NE 145th and NE 205th Streets that are adjacent to the City. Ensure ongoing maintenance of these roadways for vehicle and pedestrian use. Work with adjacent jurisdictions and stakeholders to jointly study the 145th, 205th and Bothell Way NE corridors to develop level of service standards as part of a plan and funding strategy for future improvements.*

T68: *Work with neighboring jurisdictions to reduce air quality impacts and manage storm water runoff from the transportation system.*

T69: *Pursue methods of reducing the impact on Richmond Beach Drive at the King/Snohomish County line (e.g. closing) if the Point Wells property is not annexed by the City of Shoreline. Consider the extension of 205th only as potential mitigation for future development of Point Wells.*

Figure 6-6. Truck Route Map



Chapter 7: Financial Analysis

Financial Analysis

Transportation Revenue

The City of Shoreline funds transportation capital projects from its fuel tax, real estate excise tax, general fund and grant revenue from the state and federal governments. **Figure 7-1** on the next page shows the proportionate share of each funding source over the next 20 years, based on the funding allocation in the 2004 - 2009 Capital Improvement Program. The large grant share reflects major federal grants for the Aurora Corridor project and the Interurban Trail project.

Transportation Expenditures

The majority of Shoreline's transportation capital budget is spent on system safety and operations projects (53%), with the balance allocated to pedestrian and non-motorized projects (34%) and system preservation (13%). **Figure 7-2** on the next page shows these allocations. In 2003, the City 's funding for its annual road surface maintenance program was reduced due to the repeal of the local vehicle license fee. This funding was restored in the 2005-2011 Capital Improvement Program. The TMP supports maintaining full funding of this program to minimize pavement life cycle costs through routine maintenance.

Goal T IX: Secure reliable and fair funding to ensure continuous maintenance and improvement of the transportation system.

T59: *Aggressively seek grant opportunities to implement the adopted Transportation Element to ensure that Shoreline receives its fair share of regional and federal funding. Pursue grant opportunities for joint project needs with adjacent jurisdictions.*

T60: *Analyze and if feasible implement a City-wide development impact fee program which will include transportation system improvements, and where feasible, use SEPA to provide traffic mitigation for system-wide impacts.*

T61: *Support efforts at the state and federal level to increase funding for the transportation system.*

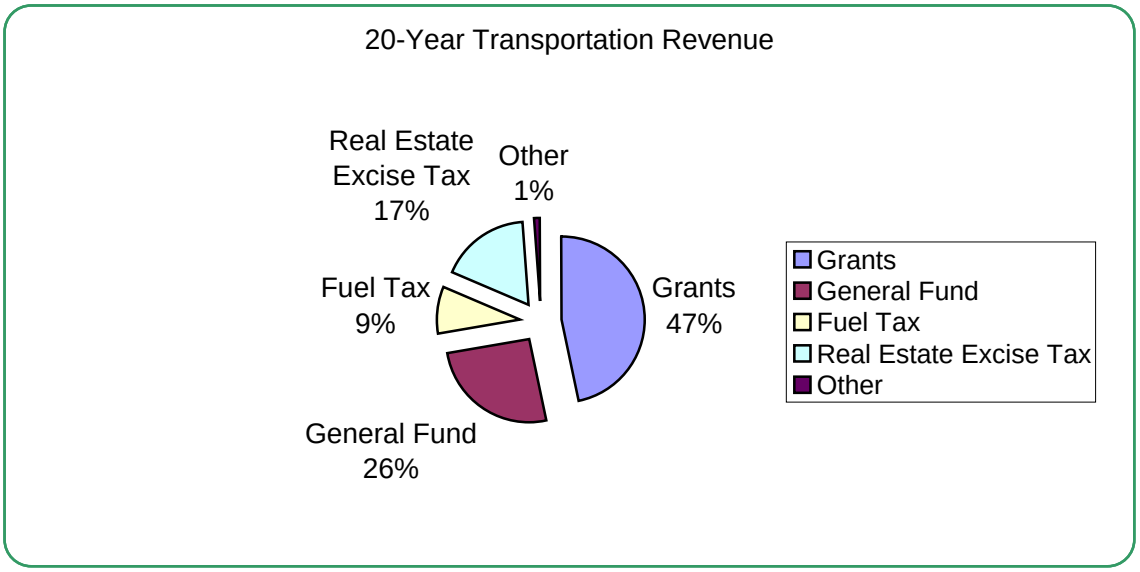
T62: *Allocate resources in the City's Transportation Improvement Program and Capital Improvement Program according to the project prioritization matrices.*

T63: *Balance project costs against reasonably expected revenue sources for the Transportation Master Plan (TMP). The TMP shall be updated bi-annually to reflect changes in revenue availability and revisions to the project list.*

T64: *Pursue one of the following actions in the event that the City is unable to fund the transportation capital improvements needed to maintain adopted transportation level of service standards:*

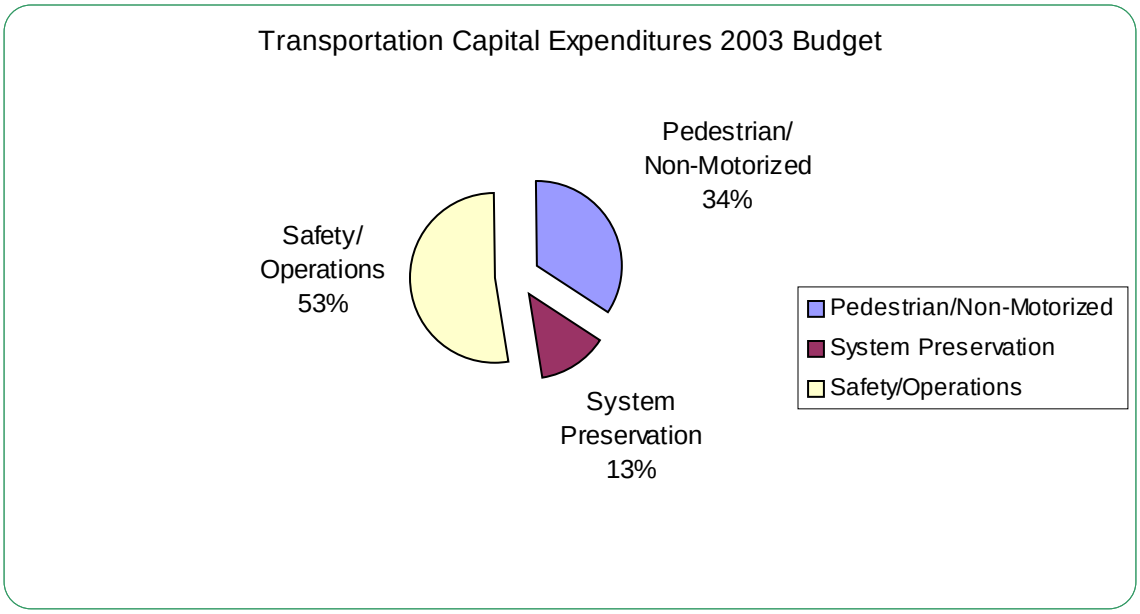
- *Phase development which is consistent with the Land Use Plan until such time that adequate resources can be identified to provide adequate transportation improvements;*
- *Reassess the Land Use policies and regulations to reduce the travel demand placed on the system to the degree necessary to meet adopted transportation service standards;*
- *Reassess the City's adopted transportation level of service standards to reflect levels that can be maintained, based on known financial resources.*

Figure 7-1. 20-Year Transportation Revenue



Source: City of Shoreline 2004 – 2009 CIP

Figure 7-2. 2003 Transportation Capital Expenditures



Source: City of Shoreline 2004 – 2009 CIP

Financial Forecast

Based upon current funding sources and awarded grants, the funds expected to be available in the next 20 years for transportation capital projects total $131.6 million in 2004 dollars.

Revenues Available for Transportation Capital Facilities	
	2004$
Existing Reserves	$9,518,426
CIP Revenue Forecast 2005-2010 (converted to 2004$)	$78,759,243
Local Revenue Forecast 2011-2024	$27,795,250
SWU Components	$8,033,000
Assumed New Grants	$7,503,000
Total Estimated Revenue 2005-2024	$131,608,919

Available Revenue Sources

Federal Funding

The federal funding picture for the 2004 Transportation Equity Act: A Legacy for Users (TEA-LU) has not yet been determined. Some Congressional observers envision a greater emphasis on roadway funding than in the previous Transportation Equity Act for the 21st Century (TEA-21), passed in 1998. At present, funding programs in TEA -21 emphasize multimodal improvements such as the Surface Transportation Program, which gives regions greater independence to invest in alternate modes of travel, including capital transit projects, such as High Occupancy Vehicle (HOV), Light Rail Transit (LRT), and park-and-ride facilities.

National Highway System (NHS, includes SR 99 through Shoreline)

- roadway construction,
- operational and maintenance improvements,
- start-up for traffic management and control,
- infrastructure-based intelligent transportation system capital improvements,
- fringe and corridor parking,
- carpool and vanpool projects,
- bicycle and pedestrian projects,
- wetlands and natural habitat mitigation.
- transit projects, if they benefit the NHS facility
- publicly-owned intracity and intercity bus terminals

Surface Transportation Program (STP)

- Regional allocations and Statewide competition
- operational and capacity improvements to roadways
- programming of transit capital projects,
- intracity and intercity bus terminals,
- carpool projects,
- fringe and corridor parking,
- capital and operating costs for traffic monitoring, management or control
- transportation enhancements,
- transportation planning, and
- transportation control measures for air quality

Congestion Mitigation/Air Quality (CMAQ)

- Apportioned by population and weighted by the severity of air pollution
- Funds cannot be used for new highway capacity
- construction of high occupancy vehicle lanes are allowed
- transit is eligible

Bridge Replacement and Rehabilitation Program

- replacement and rehabilitation of deficient highway bridges
- seismic retrofit bridges on any public road.

High Priority (Demonstration) Projects

- projects designated for funding by Congress

State Funding

In 2005, the Legislature passed ESSB 6103, an $8 billion dollar investment in transportation over the next 16 years. The revenues include a 9.5 cents gas tax increase phased in over the next four years (3 cents the first year, 3 cents the second year, 2 cents the third year, and 1.5 cents the fourth year), a weight fee on vehicles under 8,000 pounds (up to 4,000 lbs - $10, 4,000 to 6,000 lbs - $20, 6,000 to 8,000 lbs - $30) and various fee increases for vehicle and driver licensing requests.

Two years earlier, the 2003 Legislature adopted a five-cent per gallon gas tax that is predicted to raise approximately $4.178 billion dollars over a ten-year period. The revenue package also included a .3% vehicle transfer fee and a 15% vehicle gross weight fee. In previous years, the Legislature recognized the need for an integrated transportation system as an essential element in the movement of goods, people and service. Consequently, local governments were provided a share of the revenue packages.

The Motor Vehicle Fuel Tax and Motor Vehicle Excise Tax (MVET) continue to serve as the two major state revenue sources for highway maintenance and arterial construction funds. Some of the programs funded by these revenue sources are described below:

Motor Fuel Tax

- 2.46 cents per gallon
- distributed to cities on per capita basis

Transportation Improvement Account

- projects to improve the mobility of people and goods in urbanized areas
- encourages projects which are coordinated among government agencies and provide for public/private participation
- requires a minimum 20% local match

Urban Arterial Trust Account (UATA)

- reduce congestion
- strengthen the structural ability to carry traffic loads
- address roadway width deficiencies
- provide improvements to reduce accident rates
- implement traffic management to maximize mobility of people and goods
- requires a minimum 20% local match

Public Works Trust Fund

- low interest loans
- funded by state utility taxes

Local Funding

The revenue sources described in this section are programs approved by the State Legislature which authorize jurisdictions to impose fees at the local level for specific transportation infrastructure categories with voter approval. Most of these programs have not been instituted in this region, but could be imposed in the future.

Regional Transportation Investment District

- Covers King, Pierce, and Snohomish Counties
- May seek voter approval for
    - Sales Tax of 0.1% to 0.5%,
        - includes High Capacity Transportation (HCT) taxes*
    - Vehicle License Fee of $1 to $100,
    - Motor Vehicle Excise Tax (MVET) of 0.1% to 0.3%,
    - Local Option Gas Tax 0 to 2.8¢ per gallon,
    - Tolls on specific roads or bridges

- May not use revenue for operations, maintenance, and preservation projects or programs

Local Option Vehicle License Fee (share to cities)

- imposed at county level
- public transportation
- high capacity transportation
- transportation planning and design
- other transportation related activities

Local Option Fuel Tax

- imposed by the county
- up to 10% of the statewide motor vehicle fuel tax
- for highway purposes including
    - construction and maintenance of city streets, county and state roads
    - related activities.

Transportation Impact Fees

- address the impact of development activity on transportation facilities

Commercial Parking Tax

- county or city may impose
- may be based on gross proceeds or number of stalls, or on the customer
- subject to exclusive referendum procedure
- general transportation purposes.

Funding Plan

The recommended project list is constrained within available revenue sources, with conservative estimates as to available grant revenue. Full funding of the additional investments evaluated in the TMP within twenty years would require significant additional revenue.

Appendix 1-1

Transportation Element Goals and Policies

Transportation Element
Goals & Policies

Introduction

The Transportation Element will guide the development and funding of a transportation network that provides mobility for residents and employees within the City of Shoreline in a way that preserves citizens' quality of life. The City's transportation system will be designed around safe and friendly streets that can accommodate pedestrians and bicycles as well as automobiles and buses. Because of Shoreline's location between the City of Seattle and Snohomish County, the City should also pursue a strategic plan to coordinate transportation improvements with neighboring jurisdictions and transit providers. The Transportation Element establishes policies on how to prioritize the City's transportation system improvements and how to identify the City's strategic interests in regional investments, adjacent transportation facilities and funding alternatives.

Transportation Goals

Goal T I: Provide safe and friendly streets for Shoreline citizens.

Goal T II: Work with transportation providers to develop a safe, efficient and effective multimodal transportation system to address overall mobility and accessibility. Maximize the people carrying capacity of the surface transportation system.

Goal T III: Support increased transit coverage and service that connects local and regional destinations to improve mobility options for all Shoreline residents.

Goal T IV: Provide a pedestrian system that is safe, connects to destinations, accesses transit, and is accessible by all.

Goal T V: Develop a bicycle system that is connective and safe and encourages bicycling as a viable alternative method of transportation

Goal T VI: Protect the livability and safety of residential neighborhoods from the adverse impacts of the automobile.

Goal T VII: Encourage alternative modes of transportation to reduce the number of automobiles on the road.

Goal T VIII: Develop a transportation system that enhances the delivery and transport of goods and services

Goal T IX: Secure reliable and fair funding to ensures continuous maintenance and improvement of the transportation system.

Goal T X: Coordinate the implementation and development of Shoreline's transportation system with our neighbors and regional partners.

Goal TXI: Maintain the transportation infrastructure so that it is safe and functional.

Transportation Policies

Safe and Friendly Streets

T1: Make safety the first priority of citywide transportation planning and traffic management. Place a higher priority on pedestrian, bicycle, and automobile safety over vehicle capacity improvements at intersections.

T2: Use engineering, enforcement, and educational tools to improve traffic safety on City roadways.

T3: Monitor traffic accidents, citizen input/complaints, traffic violations, and traffic growth to identify and prioritize locations for safety improvements.

T4: Develop a detailed traffic and pedestrian safety plan for arterials, collector arterials and high potential hazard locations.

T5: Develop a safe roadway system as a high priority. Examples of methods to improve safety include:

- center left turn lanes,
- median islands,
- turn prohibitions,
- signals, illumination,
- access management, and
- other traffic engineering techniques.

T6: Evaluate and field test installation of devices that increase safety of pedestrian crossings such as flags, in-pavement lights, pedestrian signals, and raised, colored and/or textured crosswalks.

T7: Designate "Green Streets" on select arterials and neighborhood collectors that connect schools, parks, neighborhood centers and other key destinations. Compile design standards for each "Green Street" type.

T8: Develop a comprehensive detailed street lighting and outdoor master lighting plan to guide ongoing public and private street lighting efforts.

T9: Minimize curb cuts (driveways) on arterial streets by combining driveways through the development review process and in implementing capital projects.

Multi-Modal Transportation System

T10: Implement the Transportation Master Plan that integrates "Green Streets", bicycle routes, curb ramps, major sidewalk routes, street classification, bus routes and

transit access, street lighting and roadside storm drainage improvements. Promote adequate capacity on the roadways and intersections to provide access to homes and businesses.

T11: Coordinate transportation infrastructure design and placement to serve multiple public functions when possible, i.e. integrate storm water management, parks development and transportation facility design.

T12: Implement a coordinated signal system that is efficient and which is flexible depending on the demand or time of day, and responsive to all types of users.

T13: Adopt LOS E at the signalized intersections on the arterials within the City as the level of service standard for evaluating planning level concurrency and reviewing traffic impacts of developments, excluding the Highways of Statewide Significance (Aurora Avenue N and Ballinger Way NE). The level of service shall be calculated with the delay method described in the Transportation Research Board's Highway Capacity Manual 2000 or its updated versions.

T14: The City of Shoreline shall pursue the development of a multi-modal measure for Level of Service that takes into account not only vehicular travel and delay, but transit service and other modes of travel.

T15: Assure that vehicular and non-motorized transportation systems are appropriately sized and designed to serve the surrounding land uses and to minimize the negative impacts of growth.

T16: Design transportation improvements to support the city's land use goals and fit the character of the areas through which they pass.

T17: Utilize the Arterial Classification Map as a guide in balancing street function with land uses. Minimize through traffic on local streets.

T18: Develop a regular maintenance schedule for all components of the transportation infrastructure. Develop maintenance schedules based on safety/imminent danger, and on preservation of resources.

T19: Inventory and inspect the transportation infrastructure.

T20: Establish a pavement management system.

T21: Upgrade our signal system so that it is responsive, fully interconnected, and moves people efficiently and safely.

Local and Regional Public Transit

T22: Develop a detailed transit plan in coordination with transit providers to identify level of service targets, facilities and implementation measures to increase Shoreline residents' and students' transit ridership.

T23: Work with transit service providers to provide safe, lighted, and weather protected passenger waiting areas at stops with high ridership, transfer points, Park and Ride, and park and pool lots.

T24: Work with all transit providers to support "seamless" service into Shoreline across the county lines and through to major destinations.

T25: Work with Sound Transit to study the development of a low impact commuter rail stop in the Richmond Beach/Point Wells area. The Richmond Beach residents shall be involved in the decision making process as far as location, design, and access to the service.

Pedestrian System

T26: Provide adequate, predictable, and dedicated funding to construct pedestrian projects.

T27: Place high priority on sidewalk projects that abut or provide connections to schools, parks, transit, shopping, or large places of employment.

T28: Reinforce neighborhood character and abutting land uses when developing and designing the pedestrian system.

T29: Provide sidewalks on arterial streets and neighborhood collectors.

T30: Develop flexible sidewalk standards to fit a range of locations, needs and costs.

T31: Work with the School District to determine and construct high priority safe school walk routes. The City should partner with the School District to achieve these goals.

T32: Coordinate sidewalk design and construction with adjacent jurisdictions where sidewalks cross the City boundaries.

T33: Provide pedestrian signalization at signalized intersections, and install midblock crossings if safety warrants can be met. Consider over- and under-crossings where feasible and convenient for users. Use audio and visual pedestrian aids where useful.

T34: Implement the City's curb ramp program to install wheelchair ramps at all curbed intersections.

T35: Require all commercial, multi-family and residential short-plat and long-plat developments to provide for sidewalks or separated all weather trails, or payment in lieu of sidewalks.

T36: Develop an off-street trail system that serves a recreational and transportation function. Preserve rights-of-way for future non-motorized trail connections, and utilize utility easements for trails when feasible.

Bicycle System

T37: Reinforce neighborhood character and abutting land uses when developing and designing the bicycle system.

T38: Work with the bicycle community to develop bicycle routes connecting schools, recreational and commuter destinations, including transit linkages. Aggressively pursue construction of the Interurban Trail as the spine of the City's bicycle system.

T39: Work with neighboring jurisdictions and other agencies to ensure that Shoreline's bicycle routes/corridors and designs are compatible and connect with one another.

T40: Work with Lake Forest Park to develop a bicycle linkage to the Burke-Gilman trail.

T41: Work with the School District to determine and encourage safe bike routes to schools. The City should partner with the School District to achieve these goals.

T42: Accommodate bicycles in future roadway or intersection improvement projects.

T43: Require new commercial developments to provide convenient bicycle parking facilities for employees and visitors/customers. Encourage merchants to install bike parking facilities.

T44: Reduce barriers to bicycle travel and reduce bicycle safety problems.

Neighborhood Protection

T45: Work with neighborhood residents to reduce speeds and cut-through traffic on non-arterial streets with education, enforcement, traffic calming, signing, or other techniques. Design new residential streets to discourage cut-through traffic while maintaining the connectivity of the transportation system.

T46: Streamline the Neighborhood Traffic Safety Program process and improve opportunities for public input.

T47: Monitor traffic growth on collector arterials and neighborhood collectors and take measures to keep volumes within reasonable limits.

Transportation Demand Management

T48: Work with major employers, developers, schools, and conference facilities to provide incentives to employees, tenants, students, and visitors to utilize alternatives other than the single occupant vehicle.

T49: Support educational programs for children and residents that communicate transportation costs, safety, and travel choices.

T50: Support state and federal tax policies that promote transit and ridesharing.

T51: Develop parking system management and regulations to support alternatives to the single occupant vehicle

T52: Analyze alternatives by which employers and/or developers not subject to the Commute Trip Reduction Act can encourage their employees and tenants to pursue alternative transportation choices.

T53: Work with Shoreline Community College and King County Metro to reduce employee and student use of single occupant vehicles and promote transit and carpooling.

Freight Mobility System

T54: Incorporate new strategies, as they are developed, into Shoreline's TDM programs that promote or provide alternatives to driving alone.

T55: Ensure that service and delivery trucks, and other freight transportation can move with minimal delay on appropriate streets and rail systems in our city as shown on the truck route map.

T56: Minimize the disruption of arterial traffic flow by developing time-limited loading zones in commercial areas and regulating areas that don't have loading zones. Develop a plan for business access streets to provide freight loading zones on less-heavily traveled roadways.

T57: Discourage truck traffic through residential neighborhoods during typical sleeping hours.

T58: Work with developers/property owners along the Aurora Avenue North corridor and in North City to plan business access streets as a part of redevelopment.

Funding

T59: Aggressively seek grant opportunities to implement the adopted Transportation Element to ensure that Shoreline receives its fair share of regional and federal funding. Pursue grant opportunities for joint project needs with adjacent jurisdictions.

T60: Analyze and if feasible implement a City-wide development impact fee program which will include transportation system improvements, and where feasible, use SEPA to provide traffic mitigation for system-wide impacts.

T61: Support efforts at the state and federal level to increase funding for the transportation system.

T62: Allocate resources in the City's Transportation Improvement Program and Capital Improvement Program according to the project prioritization matrices.

T63: Balance project costs against reasonably expected revenue sources for the Transportation Master Plan (TMP). The TMP shall be updated bi-annually to reflect changes in revenue availability and revisions to the project list.

T64: Pursue one of the following actions in the event that the City is unable to fund the transportation capital improvements needed to maintain adopted transportation level of service standards:

- Phase development which is consistent with the Land Use Plan until such time that adequate resources can be identified to provide adequate transportation improvements;
- Reassess the Land Use policies and regulations to reduce the travel demand placed on the system to the degree necessary to meet adopted transportation service standards; or
- Reassess the City's adopted transportation level of service standards to reflect levels that can be maintained, based on known financial resources.

Regional Coordination

T65: Advocate the City's strategic interest in high capacity transit, local and express bus service and other transit technologies. Work with local and regional agencies to obtain a fair share of transit service and facilities.

T66: Develop short-, medium- and long-range priorities and implementation strategies for improvements to the state highway system within and adjacent to the City of Shoreline. Advocate for added access to and connections onto I-5 through the City of Shoreline.

T67: Develop interlocal agreements with neighboring jurisdictions for development impact mitigation, for coordination of joint projects, and management of pass-through traffic. Consider annexing the sections of NE 145th and NE 205th Streets that are adjacent to the City. Work with adjacent jurisdictions and stakeholders to jointly study the 145th, 205th and Bothell Way NE corridors to develop level of service standards as part of a plan and funding strategy for future improvements.

T68: Work with neighboring jurisdictions to reduce air quality impacts and manage storm water runoff from the transportation system.

T69: Pursue methods of reducing the impact on Richmond Beach Drive at the King/Snohomish County line (e.g. closing) if the Point Wells property is not annexed by the City of Shoreline. Consider the extension of 205th only as potential mitigation for future development of Point Wells.

Appendix 1-2

Guiding Principles

Shoreline Transportation Master Plan

Study Goals, Objectives and Guiding Principles

Prepared by Mirai Associates (September 28, 2003)

The purpose of this paper is to assist the City of Shoreline Planning Commission's transportation work group (TWG) in establishing goals and guiding principles for the Shoreline Transportation Master Plan. Preliminary staff and TWG discussions have identified the issues listed below as a starting point for discussion.

Study Goals and Objectives

As defined in the Council-adopted scope of work, *this study will update the Transportation Element of the city's comprehensive plan and develop "a multimodal Transportation Master Plan, which will serve as the basis for identifying transportation improvement projects and programs for the next 20 years."*

The study process will accomplish the following objectives as the means by which to achieve the study goals:

1. Update the city's transportation element policies to reflect current citywide planning objectives and meet State Growth Management Act requirements.

    a. Understand the future needs of the city's transportation system
    b. Link transportation facility needs to future land use growth
    c. Coordinate transportation investments with Parks and Storm and Surface Water programs

2. Assist the city in creating a multimodal transportation network that serves and enhances Shoreline's livability and quality of life.

    a. Listen to comments made by citizens of Shoreline and address them when formulating recommendations
    b. Emphasize creative approaches to attract transit investments and use
    c. Develop a transportation network that supports "walkable communities". A walkable community will link playspaces, provide communication spaces and buffers between pedestrians and automobiles.

3. Identify a strategic implementation plan that prioritizes transportation investments, leverages city investments across departments (i.e. parks, utilities) and with other agencies (i.e. WSDOT, King County Metro, Sound Transit and adjacent cities) and identifies potential funding opportunities.

4. Review the city's ability to finance transportation improvements. If the cost of the transportation facility needs is greater than the city's financial ability, review additional financing sources and/or lower level of service standards.

Guiding Principles

A. Inter-Agency Coordination

In addition to the City of Shoreline, transportation services are provided by the State, King County and other transportation agencies such as Sound Transit. It is important that city's transportation polices address its relationship with those agencies and clarify city's desires as to how the services should be provided to the city.

- **Interstate 5**

  It is important to find the relationship between the levels of traffic congestion on the city's arterials and traffic congestion on I-5. Depending on the outcome of the analysis, the city should formulate strong policies toward I-5 capacity improvements. This study should examine several mainline and access capacity improvement options using the city's travel forecast model being developed for this study.

- **Shoreline Community College**

  Shoreline Community College (SCC) is one of the significant activity centers in Shoreline. Coordination between the Shoreline Community College master planning and City's transportation master planning is essential.

- **Transit Service: King County Metro/Community Transit**

  As the "end of the line" for both King County Metro and Community Transit bus service, the City of Shoreline needs to be aggressive in lobbying for service enhancements, including cross-county routes. King County Metro recently implemented a new service concept for North King County, which the City should monitor. This study will also look at ways for the City and transit agencies to improve access to transit and to enhance its effectiveness in regional and sub-regional forums such as the Puget Sound Regional Council, SeaShore and King County's Regional Transit Committee.

- **Transit Service: Sound Transit**

  The City needs to identify its interests relative to Phase II planning for Sound Transit. These may include one or more light rail stations and/or a commuter rail station. Potential light rail stations along I-5 include 145th, 175th or 185th. The light rail alignment beyond Northgate has not been finalized and could continue along I-5 or conceivably move to the SR 99 corridor. Previous consideration of commuter rail station location choices for the Shoreline/Richmond Beach area has been limited to the Point Wells and Metro Pump station sites, however a preferred location has not been selected at this time. It is unclear whether the City wishes to address the commuter rail station issue at this time.

- **Border Streets: SR 523: NE 145th Street and SR 104: Ballinger Way/NE 205th Street**

  The city does not own the rights of way for these streets, but these corridors have a significant impact on transportation circulation within the City. While the implementation of improvements in this corridor must be done by the neighboring jurisdictions (Edmonds/WSDOT, King County, Seattle) this study should identify the City of Shoreline's strategic interests in both corridors.

- **SR 522**

  The city owns a short section of SR 522 north of NE 145th Street. This study will include this section of roadway, with particular attention to the intersection of NE Bothell Way and NE 145th Street.

- **SR 99: Aurora Avenue N**

  In light of the City's adopted plan for Aurora Avenue, this study will not identify any additional major transportation facility improvements in the Aurora Avenue corridor. WSDOT has designated Aurora Avenue through the city as a part of Highways of Statewide Significance and a part of the National Highway System in the State of Washington. Given those state and national route designation, this study will assume that the state will not turn back the jurisdiction of Aurora Avenue N to the city.

- **King County Solid Waste**

  King County is developing a First NE Transfer Station Master Plan. According to the published schedule, the Master Plan, along with environmental evaluations, to be completed in mid-2003. Is there a need to coordinate this planning activity with the transportation plan development?

B. Land Use Issues

- **Fircrest Redevelopment**

  The consultant will need to work with City staff to clarify how the potential redevelopment of the Fircrest site could affect the transportation system.

- **Greenstreets**

  Parks, Planning and Transportation should discuss how the City's Greenstreets policy (T10) could be defined and implemented. Greenstreets are designated in the Community Design Element of the Comprehensive Plan and called for in Transportation Element policy T10.

C. Shoreline Street Classifications

Development of hierarchy of streets is important for providing efficient vehicle circulation, and at the same time, protecting neighborhoods from through traffic. The city's investments (including street markings and signage) on transportation facilities should be more closely tied to street classification while coordinated with storm and surface water and parks priorities.

D. Miscellaneous Street Configuration Issues

- Three vs. Four-lane Arterials: The city may wish to develop a policy as to when it will consider constructing three-lane arterials and when it will construct four-lane arterials.

- Ashworth Avenue future use/configuration. The city may wish to reclassify Ashworth Avenue north as a neighborhood collector instead of a local street. Within the city's street classification plan, neighborhood collectors are non-arterials providing a collector function within a residential area. We also will evaluate the intersection configuration at NE 175th Street and Ashworth Way N.

- Business Access Streets. The city may wish to consider a policy and/or regulations encouraging back street access to businesses located on 15th NE and Aurora Avenue

- Roundabouts. Shoreline staff have suggested in the intersections of 8th NW/Richmond Beach Road and Innis Arden and Greenwood as good candidates for roundabouts.

E. Pedestrian/Bike System and Investments

The City's Bond Advisory Committee has identified locations within a 1,000-foot radius of elementary schools as high priority candidates for sidewalks. The city also has a policy identifying other high priority sidewalk locations and has identified future pedestrian facilities in the Transportation Element. Consideration should be given to including missing links and I-5 pedestrian crossings at 167th and/or 180th as potential priorities. The study will review the future bicycle system map in the existing Transportation Element. The adequacy of the Shoreline/Lake Forest Park bike route linkage at Perkins Way may warrant review. The study will review and potentially revise the "project priority matrix" in light of new project evaluation criteria.

F. Level of Service/Concurrency

The level of service standard should be regarded as one of the cornerstones for the development of Shoreline's Transportation Plan. It is very important to discuss all issues related to setting or updating the level of service standard and calculation methodology. Two of the most important criteria to be applied for selecting a LOS methodology are 1) whether it is easy to administer and 2) whether it is technically/legally proven.

Mirai Associates recommends that the City employ the intersection delay method, calculated with the Highway Capacity Manual 2000, for the development of the transportation plan. LOS should be calculated for the PM peak hour using Synchro software, after which a decision should be made as to whether levels of service at the intersections within a zone or a corridor should be averaged for purposes of concurrency.

G. Program Set-Asides

It is almost impossible to evaluate transportation facility and service needs across all transportation modes and activities with one set of evaluation criteria. It is often difficult to prioritize arterial improvement projects aimed at reducing traffic congestion against projects designed to protect residential neighborhoods from through traffic. To provide an equal playing field, some jurisdictions establish program set-asides in their CIP. The following is a list of possible programs that can have a dedicated funding allocation in the city's CIP.

- Neighborhood Traffic Control
- Neighborhood Enhancement
- Traffic Safety
- Non-Motorized

The City may wish to establish a policy to set aside fixed percent of the total transportation expenditure on specific programs.

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H. Funding Assumptions

It is likely that cost of the transportation facility improvement needs in the city will exceed its existing funding sources.

The Bond Advisory Committee is preparing to finance sidewalk improvements in the vicinity of the schools through the bonds. If approved, this bond financing would make improvements to city's pedestrian system. However, it would not be sufficient to address all of the transportation needs. The study could consider some or all of the following potential funding sources:

- Impact Fees
- LIDs
- Transportation District
- Street Utility
- Franchise fee for right of way
- Grant Opportunities

Appendix 3-1
Land Use Data at SAZ Level

	City of Shoreline Households and Employment for 2022 and 2022															
	2001								2022							
TAZ	Households	Tot Emp	Retail	FIRES	Gov	EDUC	WCTU	Manu	Households	Tot Emp	Retail	FIRES	GOV	EDUC	WCTU	Manu
1	20	940	786	154	0	0	0	0	20	1210	1012	198	0	0	0	0
2	20	63	47	16	0	0	0	0	20	160	119	41	0	0	0	0
3	68	36	20	16	0	0	0	0	68	82	46	36	0	0	0	0
4	52	47	5	36	0	0	0	6	52	69	8	55	0	0	0	6
5	92	184	14	164	0	0	0	6	108	197	15	176	0	0	0	6
6	136	114	13	21	0	0	17	63	136	114	13	21	0	0	17	63
7	40	217	118	51	0	0	0	48	46	246	138	60	0	0	0	48
8	52	55	0	55	0	0	0	0	53	55	0	55	0	0	0	0
9	0	335	307	27	0	0	1	0	0	335	307	27	0	0	1	0
10	156	214	104	85	0	4	0	21	168	221	108	88	0	4	0	21
11	64	1	0	1	0	0	0	0	82	1	0	1	0	0	0	0
12	88	168	10	158	0	0	0	0	98	168	10	158	0	0	0	0
13	48	384	65	137	15	161	0	6	49	391	67	142	15	161	0	6
14	128	253	101	62	0	90	0	0	131	253	101	62	0	90	0	0
15	108	52	0	39	0	13	0	0	113	52	0	39	0	13	0	0
16	4	361	237	32	0	0	7	85	4	457	312	43	0	0	12	90
17	64	60	17	26	0	0	11	6	64	129	39	68	0	0	11	11
18	24	238	217	21	0	0	0	0	24	259	236	23	0	0	0	0
19	28	76	1	69	6	0	0	0	28	223	3	214	6	0	0	0
20	20	40	8	32	0	0	0	0	20	109	22	87	0	0	0	0
21	128	38	27	11	0	0	0	0	140	83	59	24	0	0	0	0
22	8	60	53	7	0	0	0	0	8	78	69	9	0	0	0	0
23	4	1152	821	126	74	0	0	131	4	1226	865	136	74	0	0	151
24	0	34	6	28	0	0	0	0	0	34	6	28	0	0	0	0
25	64	281	251	30	0	0	0	0	64	281	251	30	0	0	0	0
26	160	464	75	376	0	0	0	13	160	464	75	376	0	0	0	13
27	44	222	92	106	0	0	20	4	64	278	118	136	0	0	20	4
28	736	138	6	105	0	5	1	21	792	154	7	120	0	5	1	21
29	664	157	13	49	2	80	2	11	740	157	13	49	2	80	2	11
30	756	76	0	70	0	0	5	1	791	76	0	70	0	0	5	1
31	268	109	0	40	0	0	0	69	275	109	0	40	0	0	0	69
32	424	151	0	151	0	0	0	0	483	151	0	151	0	0	0	0
33	104	2	0	2	0	0	0	0	110	2	0	2	0	0	0	0
34	400	97	0	20	1	64	0	12	405	97	0	20	1	64	0	12
35	432	188	0	185	0	0	0	3	432	188	0	185	0	0	0	3
36	316	30	6	9	0	0	0	15	322	30	6	9	0	0	0	15
37	320	111	7	65	38	0	0	1	332	111	7	65	38	0	0	1
38	52	231	0	28	0	203	0	0	54	231	0	28	0	203	0	0
39	264	24	0	24	0	0	0	0	298	36	0	36	0	0	0	0
40	276	78	0	16	0	61	1	0	333	78	0	16	0	61	1	0
41	104	326	81	202	19	0	5	19	119	470	102	300	19	0	10	39
42	128	453	226	210	0	15	0	2	128	486	243	226	0	15	0	2
43	128	7	1	6	0	0	0	0	153	40	6	34	0	0	0	0
44	112	9	0	9	0	0	0	0	118	9	0	9	0	0	0	0
45	100	2	0	2	0	0	0	0	112	2	0	2	0	0	0	0

	City of Shoreline Households and Employment for 2022 and 2022															
	2001								2022							
TAZ	Households	Tot Emp	Retail	FIRES	Gov	EDUC	WCTU	Manu	Households	Tot Emp	Retail	FIRES	GOV	EDUC	WCTU	Manu
46	316	46	0	24	0	22	0	0	332	46	0	24	0	22	0	0
47	256	0	0	0	0	0	0	0	256	0	0	0	0	0	0	0
48	256	83	9	22	51	0	1	0	256	83	9	22	51	0	1	0
49	244	12	0	11	0	0	0	1	287	12	0	11	0	0	0	1
50	528	161	27	35	0	99	0	0	528	161	27	35	0	99	0	0
51	648	48	1	46	0	0	0	1	648	48	1	46	0	0	0	1
52	972	422	31	158	0	231	0	2	972	422	31	158	0	231	0	2
53	372	43	7	30	0	1	2	3	372	43	7	30	0	1	2	3
54	464	238	20	86	0	0	131	1	477	239	20	86	0	0	132	1
55	676	57	3	49	0	4	0	1	720	57	3	49	0	4	0	1
56	280	26	0	26	0	0	0	0	295	26	0	26	0	0	0	0
57	80	185	129	56	0	0	0	0	80	239	167	72	0	0	0	0
58	280	88	40	43	5	0	0	0	280	88	40	43	5	0	0	0
59	572	124	1	55	0	61	1	6	597	124	1	55	0	61	1	6
60	360	925	5	887	0	0	0	33	366	925	5	887	0	0	0	33
61	64	69	0	0	0	69	0	0	68	69	0	0	0	69	0	0
62	84	124	0	16	0	102	0	6	100	124	0	16	0	102	0	6
63	160	21	0	18	0	3	0	0	181	21	0	18	0	3	0	0
64	608	24	2	20	0	0	1	1	642	24	2	20	0	0	1	1
65	592	65	3	57	0	0	1	4	611	71	3	63	0	0	1	4
66	52	505	116	151	197	0	13	28	471	843	263	336	197	0	13	34
67	344	164	104	50	0	0	10	0	659	430	279	136	0	0	15	0
68	724	38	2	27	0	0	1	8	797	38	2	27	0	0	1	8
69	48	12	0	12	0	0	0	0	48	12	0	12	0	0	0	0
70	424	780	453	205	0	78	32	12	424	780	453	205	0	78	32	12
71	12	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0
72	12	19	15	4	0	0	0	0	15	19	15	4	0	0	0	0
73	220	15	2	13	0	0	0	0	232	15	2	13	0	0	0	0
74	40	39	21	2	0	0	10	6	50	39	21	2	0	0	10	6
75	252	6	0	4	0	0	0	2	254	6	0	4	0	0	0	2
76	252	21	0	20	0	0	0	1	268	21	0	20	0	0	0	1
77	232	23	0	23	0	0	0	0	240	23	0	23	0	0	0	0
78	268	93	0	26	0	67	0	0	272	93	0	26	0	67	0	0
79	108	4	0	2	0	0	0	2	118	4	0	2	0	0	0	2
80	324	787	0	12	0	772	0	3	344	787	0	12	0	772	0	3
81	40	247	8	235	0	0	4	0	208	379	12	363	0	0	4	0
82	480	36	7	27	0	0	0	2	484	36	7	27	0	0	0	2
83	32	320	94	4	0	221	0	1	154	417	187	8	0	221	0	1
84	304	51	0	50	1	0	0	0	304	55	0	54	1	0	0	0
85	588	62	13	44	0	0	2	3	588	62	13	44	0	0	2	3
86	56	4	0	0	0	0	2	2	56	4	0	0	0	0	2	2
87	100	168	0	43	0	125	0	0	178	168	0	43	0	125	0	0
88	112	3	0	1	0	0	0	2	119	3	0	1	0	0	0	2
89	180	147	12	93	0	42	0	0	199	148	12	94	0	42	0	0
90	132	378	0	378	0	0	0	0	140	384	0	384	0	0	0	0

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	2001								2022							
TAZ	Households	Tot Emp	Retail	FIRES	Gov	EDUC	WCTU	Manu	Households	Tot Emp	Retail	FIRES	GOV	EDUC	WCTU	Manu
91	228	95	0	15	0	80	0	0	239	95	0	15	0	80	0	0
92	236	12	0	12	0	0	0	0	239	12	0	12	0	0	0	0
93	208	34	0	23	0	6	0	5	216	34	0	23	0	6	0	5
94	512	108	11	17	0	67	7	6	529	108	11	17	0	67	7	6
95	500	49	0	48	0	0	0	1	506	49	0	48	0	0	0	1
96	272	85	0	85	0	0	0	0	274	85	0	85	0	0	0	0
97	116	66	0	0	0	66	0	0	126	66	0	0	0	66	0	0
98	608	28	7	21	0	0	0	0	617	34	9	26	0	0	0	0
99	248	37	15	21	0	0	0	1	257	37	15	21	0	0	0	1
100	228	22	15	4	0	0	3	0	242	22	15	4	0	0	3	0
101	4	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
102	0	54	0	54	0	0	0	0	0	54	0	54	0	0	0	0
103	60	180	0	6	94	80	0	0	63	180	0	6	94	80	0	0
104	60	252	29	212	0	0	11	0	72	252	29	212	0	0	11	0
105	276	204	143	34	0	0	27	0	293	204	143	34	0	0	27	0
106	84	0	0	0	0	0	0	0	96	0	0	0	0	0	0	0
107	0	5	0	0	5	0	0	0	0	5	0	0	5	0	0	0
108	200	31	22	9	0	0	0	0	249	31	22	9	0	0	0	0
109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	44	0	0	0	0	0	0	0
111	156	10	0	10	0	0	0	0	156	10	0	10	0	0	0	0
112	372	156	0	147	0	7	0	2	373	156	0	147	0	7	0	2
113	708	396	86	268	0	0	0	42	708	396	86	268	0	0	0	42
114	364	8	0	4	0	0	0	4	364	8	0	4	0	0	0	4
115	148	745	0	0	744	0	0	1	153	745	0	0	744	0	0	1
116	64	0	0	0	0	0	0	0	64	0	0	0	0	0	0	0
117	44	0	0	0	0	0	0	0	48	0	0	0	0	0	0	0
Total	**26048**	**17538**	**5188**	**7134**	**1252**	**2899**	**329**	**736**	**28356**	**19773**	**6294**	**8191**	**1252**	**2899**	**345**	**792**
Growth									**2308**	**2235**						

Appendix 3-2

2002 PM Peak Hour Intersection Traffic Volumes

Appendix 3-2 2002 PM Peak Hour Intersection Traffic Volumes

2002 PM															NB		SB		EB		WB		Total	
INTID	Location	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
3	NE 145th St. & SR-522 (Bothell Way)	126	1340	4	59	980	548	984	50	180		28	147	296	1470	2620	1587	1188	1214	113	471	821	4742	4742
7	NE 145th St. & 25th Ave. NE	4	4	4	97	7	44	72	1015	3		3	909	124	12	200	148	13	1090	1116	1036	957	2286	2286
10	NE 145th St. & 15th Ave. NE	150	930	100	150	360	90	250	900	150		90	750	140	1180	1320	600	600	1300	1150	980	990	4060	4060
12	NE 180th St. & 15th Ave. NE	125	1060	20	10	460	50	70	11	95					1205	1130	520	555	176	41	0	175	1901	1901
13	NE 150th St. & 15th Ave. NE		1185	78	86	458						29		126	1263	1311	544	487	0	164	155	0	1962	1962
15	NE 145th St. & 5th Ave. NE	240	670	530	20	70	130	470	660	90		20	780	200	1440	1340	220	180	1220	1210	1000	1150	3880	3880
19	NE 185th Street & 5th Ave. NE	235		126					392	81		15	498		361	0	0	96	473	518	513	733	1347	1347
20	NE 145th St. & 20th Ave. NE	8	57	49	23	39	4	6	992	20		28	937	18	114	81	66	87	1018	1064	983	949	2181	2181
22	N 145th St. & SB I-5 on ramp								860	330			1220		0	0	0	330	1190	860	1220	1220	2410	2410
24	N 145th St. & Greenwood Ave. N	8	1287	321	144	636	153	361	203	6		261	181	171	1616	1819	933	903	570	668	613	342	3732	3732
26	Greenwood Ave. N & NW Innis Arden Way	142	257			75	6	9		127					399	266	81	202	136	0	0	148	616	616
27	Greenwood Ave. N & Westminster Way N	430	1390			760	50			170					1820	1390	810	930	170	0	0	480	2800	2800
29	N 145th St. & SR-99 (Aurora Ave. N)	60	1200	250	200	1100	160	150	400	60		160	410	270	1510	1620	1460	1320	610	850	840	630	4420	4420
32	Dayton Ave. N & Westminster Way N						263	614	776				547		0	614	263	0	1390	776	547	810	2200	2200
34	N 160th St. & Greenwood Ave. N	6	328	24	99	10	1	2	14			19	13	70	358	400	110	29	16	137	102	20	586	586
35	N 160th St. & SR-99 (Aurora Ave. N)	250	1800	20	40	1250	170	240	70	180		10	30	20	2070	2060	1460	1440	490	130	60	450	4080	4080
36	N 160th St. & Dayton Ave. N	14	631	111	47	264	17	12	217	14		38	186	78	756	721	328	316	243	375	302	217	1629	1629
39	N 155th St. & Westminster Way N	56		673					241	39		152	186		729	0	0	191	280	914	338	242	1347	1347
40	N 155th St. & SR-99 (Aurora Ave. N)	150	1300	250	140	1000	10	440	310	140		150	200	230	1700	1970	1150	1290	890	700	580	360	4320	4320

Appendix 3-2 2002 PM Peak Hour Intersection Traffic Volumes

2002 PM															NB		SB		EB		WB		Total	
INTID	Location	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
40	N 155th St. & SR-99 (Aurora Ave. N)	150	1300	250	140	1000	10	440	310	140		150	200	230	1700	1970	1150	1290	890	700	580	360	4320	4320
41	N 155th St. & 15th Ave. NE	310	800	12	20	430	120	320	20	250		20	70	60	1122	1180	570	700	590	52	150	500	2432	2432
42	N 155th St. & 5th Ave. NE	154	363	86	29	75	46	152	439	43		39	317	48	603	563	150	157	634	554	404	517	1791	1791
46	N 145th St. & Meridian Ave. N	50	327	32	51	83	21	28	940	5		50	907	116	409	471	155	138	973	1023	1073	978	2610	2610
47	N 155th St. & Meridian Ave. N	78	362	46	70	152	116	149	531	66		28	442	134	486	645	338	246	746	647	604	636	2174	2174
50	NE 205th St & SR-99 (Aurora Ave. N)	80	1500	170	260	950	170	240	290	70		150	280	390	1750	2130	1380	1170	600	720	820	530	4550	4550
51	NE 205th St & Meridian Ave. N	193	267	203	72	130	73	99	1536	53		119	1825	189	663	555	275	302	1688	1811	2133	2091	4759	4759
64	N 155th St. & Wallingford Ave N	12	6	21	4	2	15	19	741	17		6	553	8	39	33	21	25	777	766	567	580	1404	1404
67	N 165th St. & Aurora Ave. N	70	2030	20	20	1420	20	10		60		5		20	2120	2060	1460	1485	70	40	25	90	3675	3675
69	NE 185th Street & Dayton Ave. N	404		111					580	211		97	652		515	0	0	308	791	691	749	1056	2055	2055
74	15th Ave. NW & Richmond Beach Road Connector (East)	72		45					298			47	484		117	0	0	47	298	343	531	556	946	946
76	15th Ave. NW & Richmond Beach Road Connector (North)			117		31						47			117	0	31	78	0	117	47	0	195	195
77	15th Ave. NW & Richmond Beach Road Connector (West)				20		20	20	100				100		0	20	40	0	120	120	100	120	260	260
87	NE 185th Street & Aurora Ave. N	160	1710	70	100	1160	70	210	380	90		150	330	120	1940	2040	1330	1400	680	550	600	560	4550	4550
88	NE 185th Street & Meridian Ave. N	188	508	73	102	253	50	84	334	96		90	383	113	769	705	405	439	514	509	586	621	2274	2274
90	NE 185th Street & Fremont Ave. N	253	333	52	66	156	44	53	510	96		12	486	40	638	426	266	264	659	628	538	783	2101	2101

Appendix 3-2 2002 PM Peak Hour Intersection Traffic Volumes

2002 PM															NB		SB		EB		WB		Total	
INTID	Location	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
93	N 175th St. & 15th Ave. NE	330	520	50	70	340	150	320	200	210		70	130	70	900	910	560	620	730	320	270	610	2460	2460
94	N 175th St. & 5th Ave. NE	232	174	82	14	85	22	78	723	80		65	507	21	488	273	121	230	881	819	593	761	2083	2083
95	N 175th St. & SR-99 (Aurora Ave. N)	80	1670	60	200	1050	40	50	240	60		380	360	160	1810	1880	1290	1490	350	500	900	480	4350	4350
96	N 175th St. & Meridian Ave. N	110	500	220	200	180	50	90	950	110		200	1250	450	830	1040	430	490	1150	1370	1900	1410	4310	4310
97	N 175th St. & Fremont Ave. N		367	241	91	137						218		286	608	653	228	355	0	332	504	0	1340	1340
104	Richmond Beach Road & 15th Ave. NW								298	31			484		0	0	0	31	329	298	484	484	813	813
107	NE 185th Street & 20th Ave. NW	5	5	10	5	10	10	20	60	50		5	100	25	20	50	25	65	130	75	130	115	305	305
114	15th Ave. NW & Richmond Beach Road Connector (South)		20				50	30							20	50	50	0	30	0	0	50	100	100
124	SR-104 (NE 205th St) & 1st Ave. NE	85		161					1776	41		133	1926		246	0	0	174	1817	1937	2059	2011	4122	4122
125	N 200th St. & SR-99 (Aurora Ave. N)	20	1620	220	120	1070	50	40	120	30		220	160	100	1860	1760	1240	1320	190	460	480	230	3770	3770
127	N 200th St. & Meridian Ave. N	188	461	25	12	160	85	140	11	126		12	25	10	674	611	257	298	277	48	47	298	1255	1255
132	NE 205th St & Business Drvwy	347	14	188	36	22	55	43	634	32		275	575	18	549	75	113	329	709	858	868	977	2239	2239
135	NE 205th St & WB Edmonds Way								1645					2055	0	2055	0	0	1645	1645	2055	0	3700	3700
141	N 200th St. & Business Drvwy	10	10	10	100	10	300	150	450	100		20	500	100	30	260	410	130	700	560	620	810	1760	1760
143	Edmonds Way & SB Ramp to 205th St									672	61		1294		0	0	0	672	672	0	1294	1294	1966	1966
145	NE 205th St & SB Ramp to 205th St						61		973				761		0	0	61	0	973	973	761	822	1795	1795
146	NE 205th St & Nile Temple Golf Course Entrance			70				30	2330	5		1	1840	100	70	130	0	6	2365	2400	1941	1840	4376	4376

Appendix 3-2 2002 PM Peak Hour Intersection Traffic Volumes

2002 PM															NB		SB		EB		WB		Total	
INTID	Location	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
148	NE 185th Street & 5th Ave. NE				100		100	100	100				100	100	0	200	200	0	200	200	200	200	600	600
150	Ballinger Way NE & 15th Ave. NE	332	216	83	27	76	427	518	891	201		62	883	14	631	748	530	339	1610	1001	959	1642	3730	3730
151	NE 196th St. & 15th Ave. NE		585	465	24	299						169		21	1050	606	323	468	0	489	190	0	1563	1563
164	NE 185th Street & 1st Ave. NE	10	24	25	57	6	87	95	402	14		14	527	118	59	237	150	34	511	484	659	624	1379	1379
212	NE 185th Street & 3rd Ave. NW	21	56	28	109	51	100	60	525	24		24	861	264	105	380	260	99	609	662	1149	982	2123	2123
216	N 175th St. & Midvale Avenue N	120	50	20	59	10	85	62	795	150		20	1021	143	190	255	154	180	1007	874	1184	1226	2535	2535
219	19th Ave. NE & Ballinger Way NE	77	354	39	91	118	47	167	779	70		42	844	104	470	625	256	230	1016	909	990	968	2732	2732
220	15th Ave. NE & 56th Ave. W	26	312	221	24	155	121	223	437	37		47	258	37	559	572	300	239	697	682	342	405	1898	1898
221	NE 196th St. & Forest Park Drive NE	68	12	17	9	360	131	4	20	3		26	161	19	97	35	500	389	27	46	206	360	830	830
238	NE Perkins Way & 15th Ave. NE	24	967	74	42	367	27	135	51	12		39	61	26	1065	1128	436	418	198	167	126	112	1825	1825
241	15th Ave. NE & 24th Ave. NE		1029	117	49	411						106		65	1146	1094	460	517	0	166	171	0	1777	1777
245	NE 185th Street & 10th Ave. NE	180	70	10	15	40	162	310	10	130		10	5	10	260	390	217	180	450	35	25	347	952	952
252	NE 177th St. & 15th Ave. NE		910	40	30	510						50		30	950	940	540	560	0	70	80	0	1570	1570
259	NE 160th St. & 15th Ave. NE		1293	9	6	487						6		15	1302	1308	493	493	0	15	21	0	1816	1816
260	NE 175th St. & 25th Ave. NE	20	146			88	72	118		18					166	264	160	106	136	0	0	92	462	462
269	NE 165th St. & 15th Ave. NE	40	1160	10	10	490	60	60	10	40		5	5	5	1210	1225	560	535	110	30	15	105	1895	1895
270	NE 165th St. & 5th Ave. NE	30	474	38	25	126	9	9	3	12		34	6	31	542	514	160	172	24	66	71	45	797	797
273	NE 205th St)& SB I-5 on ramp								1511			28	1449	271	0	271	0	28	1511	1511	1748	1449	3259	3259

Appendix 3-2 2002 PM Peak Hour Intersection Traffic Volumes

2002 PM															NB		SB		EB		WB		Total	
INTID	Location	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
274	SB I-5 on ramps from 205th St					200				300					0	0	200	500	300	0	0	0	500	500
275	NE 205th St & SB I-5 on ramp								1511	475			1449		0	0	0	475	1986	1511	1449	1449	3435	3435
285	Ballinger Way NE & SB I-5 off ramp				495				1511				1449		0	0	495	0	1511	2006	1449	1449	3455	3455
292	NE 205th St & SB I-5 off ramp						895		1511				1449		0	0	895	0	1511	1511	1449	2344	3855	3855
293	SB I-5 off ramps to 205th St					300	300								0	0	600	300	0	0	0	300	600	600
294	NE 205th St & NB I-5 off ramp						600		600				900		0	0	600	0	600	600	900	1500	2100	2100
295	N 195th St. & Fremont Ave. N	85	282	4	6	117	28	38	32	41		5	64	24	371	344	151	163	111	42	93	177	726	726
296	Ballinger Way NE & NB I-5 off ramp				400		50		600				900		0	0	450	0	600	1000	900	950	1950	1950
297	NB I-5 off ramp to 205th St					400	600								0	0	1000	400	0	0	0	600	1000	1000
303	N 195th St. & 3rd Ave. NW	17	212		9	140	39	20	37	14		19	80	34	229	266	188	173	71	46	133	136	621	621
309	NE 205th St & NB I-5 on ramp								800	200			1500		0	0	0	200	1000	800	1500	1500	2500	2500
324	NE 205th St & NB I-5 on ramp			400					1000				900	100	400	100	0	0	1000	1400	1000	900	2400	2400
325	N 175th St. & NB I-5 on ramp	760		300				470	580				550	270	1060	740	0	0	1050	880	820	1310	2930	2930
330	N 175th St. & SB I-5 off ramp				80	5	580		970	400		200	1320		0	0	665	605	1370	1050	1520	1900	3555	3555
333	N 145th St. & SB I-5 off ramp				360		310		860			340	810		0	0	670	340	860	1220	1150	1120	2680	2680
337	5th Ave. NE & NB I-5 off ramp		370			110		1070							370	1440	110	110	1070	0	0	0	1550	1550
338	NB I-5 off ramp to 5th Ave NE		20	1070											1090	20	0	0	0	1070	0	0	1090	1090
350	SB I-5 on ramp from NE 145th St.					340				330					0	0	340	670	330	0	0	0	670	670

Appendix 3-2 2002 PM Peak Hour Intersection Traffic Volumes

2002 PM															NB		SB		EB		WB		Total	
INTID	Location	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
352	NB I-5 on ramp & NB I-5 off ramp			200										200	200	200	0	0	0	200	200	0	400	400
359	N 175th St. & 10th Ave. NE	30	113	36	98	76	27	62	623	39		7	544	107	179	282	201	122	724	757	658	601	1762	1762
362	N 192nd St. & SR-99 (Aurora Ave. N)	10	1600	30	20	1100	20	30	20	20		20	20	40	1640	1670	1140	1140	70	70	80	50	2930	2930
365	NE 185th Street & Linden Ave. N	83	88	65	77	58	68	66	572	56		32	530	29	236	183	203	146	694	714	591	681	1724	1724
371	N 145th St. & 1st Ave. NE	74	286	223	69	45	4	4	901	46		115	1071	32	583	322	118	206	951	1193	1218	1149	2870	2870
375	WB Edmonds Way & WB 205th St												761	1294	0	1294	0	0	0	0	2055	761	2055	2055
377	EB Edmonds Way & WB 205th St					672							761		0	0	672	672	0	0	761	761	1433	1433
378	NE 205th St & EB Edmonds Way				672				973						0	0	672	0	973	1645	0	0	1645	1645

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Appendix 3-3

2022 PM Peak Hour Intersection Traffic Volumes

Appendix 3-3 2022 PM Peak Hour Intersection Traffic Volumes

2022 PM															NB		SB		EB		WB		Total	
INTID	Location	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
3	NE 145th St. & SR-522 (Bothell Way)	250	1600	10	60	1060	630	1000	100	220		30	200	320	1860	2920	1750	1310	1320	170	550	1080	5480	5480
7	NE 145th St. & 25th Ave. NE	20	10	10	130	10	50	80	1090	30		20	950	190	40	280	190	60	1200	1230	1160	1020	2590	2590
10	NE 145th St. & 15th Ave. NE	210	1050	110	160	410	110	260	970	180		110	800	140	1370	1450	680	700	1410	1240	1050	1120	4510	4510
12	NE 180th St. & 15th Ave. NE	130	1100	20	10	650	60	80	20	100					1250	1180	720	750	200	50	0	190	2170	2170
13	NE 150th St. & 15th Ave. NE		1320	90	100	630						50		160	1410	1480	730	680	0	190	210	0	2350	2350
15	NE 145th St. & 5th Ave. NE	300	750	550	40	90	150	510	710	150		20	830	260	1600	1520	280	260	1370	1300	1110	1280	4360	4360
19	NE 185th Street & 5th Ave. NE	320		210					450	90		30	730		530	0	0	120	540	660	760	1050	1830	1830
20	NE 145th St. & 20th Ave. NE	30	80	70	30	40	10	30	1090	40		30	980	40	180	150	80	110	1160	1190	1050	1020	2470	2470
22	N 145th St. & SB I-5 on ramp								970	380			1290		0	0	0	380	1350	970	1290	1290	2640	2640
24	N 145th St. & Greenwood Ave. N	20	1480	400	180	690	160	480	280	20		310	220	180	1900	2140	1030	1020	780	860	710	400	4420	4420
26	Greenwood Ave. N & NW Innis Arden Way	280	452			80	12	132							732	584	92	80	132	0	0	292	956	956
27	Greenwood Ave. N & Westminster Way N	600	1510			820	70			200					2110	1510	890	1020	200	0	0	670	3200	3200
28	Aurora Square & SR-99 (Aurora Ave. N)		2440			1460	150			150					2440	2440	1610	1610	150	0	0	150	4200	4200
29	N 145th St. & SR-99 (Aurora Ave. N)	100	1550	370	200	1270	210	190	650	80		200	470	300	2020	2040	1680	1550	920	1220	970	780	5590	5590
32	Dayton Ave. N & Westminster Way N						290	700	790				610		0	700	290	0	1490	790	610	900	2390	2390
34	N 160th St. & Greenwood Ave. N	12	520	40	100	12	4	12	20			20	20	120	572	652	116	32	32	160	160	36	880	880
35	N 160th St. & SR-99 (Aurora Ave. N)	230	2170	40	50	1390	170	260	80	200		20	60	40	2440	2470	1610	1610	540	170	120	460	4710	4710
36	N 160th St. & Dayton Ave. N	20	732	120	72	280	20	20	220	20		40	240	152	872	904	372	340	260	412	432	280	1936	1936
39	N 155th St. & Westminster Way N	70	40	680	50	400	90	10	260	50		270	260	70	790	120	540	720	320	990	600	420	2250	2250

Appendix 3-3 2022 PM Peak Hour Intersection Traffic Volumes

2022 PM															NB		SB		EB		WB		Total	
INTID	Location	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
40	N 155th St. & SR-99 (Aurora Ave. N)	180	1760	90	200	1240	220	410	400	150		200	240	220	2030	2390	1660	1590	960	690	660	640	5310	5310
41	N 155th St. & 15th Ave. NE	370	950	20	20	500	140	340	20	280		20	80	70	1340	1360	660	800	640	60	170	590	2810	2810
42	N 155th St. & 5th Ave. NE	170	560	130	30	140	100	200	500	60		50	420	70	860	830	270	250	760	660	540	690	2430	2430
46	N 145th St. & Meridian Ave. N	50	550	70	120	140	30	60	1010	10		60	1060	120	670	730	290	210	1080	1200	1240	1140	3280	3280
47	N 155th St. & Meridian Ave. N	80	620	70	90	160	130	180	570	110		60	480	140	770	940	380	330	860	730	680	690	2690	2690
50	NE 205th St & SR-99 (Aurora Ave. N)	90	1900	220	370	1100	180	340	390	90		170	350	430	2210	2670	1650	1360	820	980	950	620	5630	5630
51	NE 205th S) & Meridian Ave. N	260	380	220	120	140	110	150	1720	80		130	2050	220	860	750	370	350	1950	2060	2400	2420	5580	5580
64	N 155th St. & Wallingford Ave N	40	20	40	10	10	20	20	800	20		20	640	20	100	60	40	50	840	850	680	700	1660	1660
67	N 165th St. & SR-99 (Aurora Ave. N)	130	2350	30	30	1600	30	20		60		10		20	2510	2390	1660	1670	80	60	30	160	4280	4280
69	NE 185th Street & Dayton Ave. N	450		150					600	220		120	840		600	0	0	340	820	750	960	1290	2380	2380
74	15th Ave. NW & Richmond Beach Road Connector (East)	80		60					350			70	600		140	0	0	70	350	410	670	680	1160	1160
76	15th Ave. NW & Richmond Beach Road Connector (North)			140		50						70			140	0	50	120	0	140	70	0	260	260
77	15th Ave. NW & Richmond Beach Road Connector (West)				80		30	40	320				570		0	40	110	0	360	400	570	600	1040	1040
87	NE 185th Street & Aurora Ave. N	100	1970	110	110	1260	110	220	440	110		70	310	280	2180	2470	1480	1440	770	660	660	520	5090	5090
88	NE 185th Street & Meridian Ave. N	230	730	100	120	300	70	100	420	110		110	490	130	1060	960	490	520	630	640	730	790	2910	2910
90	NE 185th Street & Fremont Ave. N	290	360	70	80	190	90	70	600	120		20	610	70	720	500	360	330	790	750	700	990	2570	2570

Appendix 3-3 2022 PM Peak Hour Intersection Traffic Volumes

2022 PM															NB		SB		EB		WB		Total	
INTID	Location	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
93	N 175th St. & 15th Ave. NE	340	650	80	70	430	210	330	250	240		120	180	90	1070	1070	710	790	820	400	390	730	2990	2990
94	N 175th St. & 5th Ave. NE	300	400	110	20	100	50	140	840	100		100	610	30	810	570	170	300	1080	970	740	960	2800	2800
95	N 175th St. & SR-99 (Aurora Ave. N)	90	2100	80	220	1200	40	60	400	90		420	520	210	2270	2370	1460	1710	550	700	1150	650	5430	5430
96	N 175th St. & Meridian Ave. N	140	630	260	210	210	60	100	1000	120		250	1320	480	1030	1210	480	580	1220	1470	2050	1520	4780	4780
97	N 175th St. & Fremont Ave. N	1	530	290	150	190	10	1	10	1		260	10	350	821	881	350	451	12	450	620	21	1803	1803
104	Richmond Beach Road & 15th Ave. NW								350	50			570	110	0	110	0	50	400	350	680	570	1080	1080
107	NE 185th Street & 20th Ave. NW	10	30	70	160	20	20	20	140	20		110	210	230	110	280	200	150	180	370	550	240	1040	1040
114	15th Ave. NW & Richmond Beach Road Connector (South)		110				110	40							110	150	110	0	40	0	0	110	260	260
121	N 152nd St. & SR-99 (Aurora Ave. N)		2010	30	10	1580						50		30	2040	2040	1590	1630	0	40	80	0	3710	3710
124	SR-104 (NE 205th St) & 1st Ave. NE	220		300					2010	50		140	1952		520	0	0	190	2060	2310	2092	2172	4672	4672
125	N 200th St. & SR-99 (Aurora Ave. N)	30	2000	270	130	1170	50	70	160	40		270	180	150	2300	2220	1350	1480	270	560	600	260	4520	4520
127	N 200th St. & Meridian Ave. N	200	590	30	20	210	100	240	20	180		40	30	10	820	840	330	430	440	70	80	330	1670	1670
128	N 182nd St. & SR-99 (Aurora Ave. N)	100	2150			1400	40	100		60					2250	2250	1440	1460	160	0	0	140	3850	3850
131	N 195th St. & SR-99 (Aurora Ave. N)	50	2250	20	30	1400	50	30	10	20		30	60	20	2320	2300	1480	1450	60	60	110	160	3970	3970
132	NE 205th St & Business Drvwy	370	20	330	30	30	60	60	850	70		290	620	20	720	100	120	390	980	1210	930	1050	2750	2750
135	NE 205th St & WB Edmonds Way								1950					2420	0	2420	0	0	1950	1950	2420	0	4370	4370
141	N 200th St. & Business Drvwy	10	10	10	100	10	280	120	310	50		20	300	100	30	230	390	80	480	420	420	590	1320	1320

Appendix 3-3 2022 PM Peak Hour Intersection Traffic Volumes

2022 PM															NB		SB		EB		WB		Total	
INTID	Location	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
143	Edmonds Way & I-5 SB Ramp to 205th St								750	110			1600		0	0	0	110	860	750	1600	1600	2460	2460
145	NE 205th St & SB Ramp to 205th St						110		1200				820		0	0	110	0	1200	1200	820	930	2130	2130
146	NE 205th St & Nile Temple Golf Course Entrance			60				1	2310	120		30	2230	5	60	6	0	150	2431	2370	2265	2230	4756	4756
148	NE 185th Street & 5th Ave. NE				80		70	30	530				330	400	0	430	150	0	560	610	730	400	1440	1440
150	Ballinger Way NE & 15th Ave. NE	380	270	100	40	100	450	680	1180	290		90	920	30	750	980	590	480	2150	1320	1040	1750	4530	4530
151	NE 196th St. & 15th Ave. NE		650	590	30	370						270		30	1240	680	400	640	0	620	300	0	1940	1940
164	NE 185th Street & 1st Ave. NE	10	30	30	60	10	90	150	470	30		30	650	150	70	330	160	70	650	560	830	750	1710	1710
212	NE 185th Street & 3rd Ave. NW	40	100	50	140	60	110	70	590	30		30	990	270	190	440	310	120	690	780	1290	1140	2480	2480
216	N 175th St. & Midvale Avenue N	1	1	10	80	1	100	70	880	10		1	1160	180	12	251	181	12	960	970	1341	1261	2494	2494
219	19th Ave. NE & Ballinger Way NE	90	400	50	100	200	80	200	940	90		50	860	110	540	710	380	340	1230	1090	1020	1030	3170	3170
220	15th Ave. NE & 56th Ave. W	40	420	240	32	250	170	320	600	60		80	350	70	700	810	452	390	980	872	500	560	2632	2632
221	NE 196th St. & Forest Park Drive NE	80	20	40	10	30	10	20	400	140		30	220	30	140	70	50	200	560	450	280	310	1030	1030
238	NE Perkins Way & 15th Ave. NE	30	1000	80	50	550	30	240	80	30		40	70	30	1110	1270	630	620	350	210	140	130	2230	2230
241	15th Ave. NE & 24th Ave. NE		1050	130	70	560						120		70	1180	1120	630	680	0	200	190	0	2000	2000
245	NE 185th Street & 10th Ave. NE	380	150	20	10	60	230	380	20	280		5	15	10	550	540	300	345	680	50	30	625	1560	1560
252	NE 177th St. & 15th Ave. NE		1040	50	50	580						70		70	1090	1110	630	650	0	100	140	0	1860	1860

Appendix 3-3 2022 PM Peak Hour Intersection Traffic Volumes

2022 PM															NB		SB		EB		WB		Total	
INTID	Location	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
259	NE 160th St. & 15th Ave. NE		1290	10	10	730						10		20	1300	1310	740	740	0	20	30	0	2070	2070
260	NE 175th St. & 25th Ave. NE	50	230			130	80	150		40					280	380	210	170	190	0	0	130	680	680
269	NE 165th St. & 15th Ave. NE	50	1200	10	10	700	70	80	20	50		10	10	10	1260	1290	780	760	150	40	30	130	2220	2220
270	NE 165th St. & 5th Ave. NE	30	720	50	30	230	10	10	10	20		40	10	40	800	770	270	290	40	90	90	50	1200	1200
273	NE 205th St & SB I-5 on ramp								2060			50	1380	320	0	320	0	50	2060	2060	1750	1380	3810	3810
274	SB I-5 on ramps from 205th St					50				530					0	0	50	580	530	0	0	0	580	580
275	NE 205th St & SB I-5 on ramp								1600	530			2280		0	0	0	530	2130	1600	2280	2280	4410	4410
285	Ballinger Way NE & SB I-5 off ramp				460				1600				1380		0	0	460	0	1600	2060	1380	1380	3440	3440
292	SR-104 (NE 205th St) & SB I-5 off ramp						900		1600				1380		0	0	900	0	1600	1600	1380	2280	3880	3880
293	SB I-5 off ramps to 205th St					460	900								0	0	1360	460	0	0	0	900	1360	1360
294	NE 205th St & NB I-5 off ramp						400		1490				1350		0	0	400	0	1490	1490	1350	1750	3240	3240
295	N 195th St. & Fremont Ave. N	130	390	10	10	130	30	40	40	50		20	100	40	530	470	170	200	130	60	160	260	990	990
296	Ballinger Way NE & NB I-5 off ramp				250				1490				1350		0	0	250	0	1490	1740	1350	1350	3090	3090
297	NB I-5 off ramp to 205th St					250	400								0	0	650	250	0	0	0	400	650	650
303	N 195th St. & 3rd Ave. NW	20	360	10	10	150	40	20	40	20		20	110	70	390	450	200	190	80	60	200	170	870	870
309	NE 205th St & NB I-5 on ramp								1490	570			1750		0	0	0	570	2060	1490	1750	1750	3810	3810
324	NE 205th St & NB I-5 on ramp			410					1740				1350	400	410	400	0	0	1740	2150	1750	1350	3900	3900

Appendix 3-3 2022 PM Peak Hour Intersection Traffic Volumes

2022 PM															NB		SB		EB		WB		Total	
INTID	Location	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
325	N 175th St. & NB I-5 on ramp	880		400				520	680				700	300	1280	820	0	0	1200	1080	1000	1580	3480	3480
330	N 175th St. & SB I-5 off ramp				180		750		1020	450		230	1350		0	0	930	680	1470	1200	1580	2100	3980	3980
333	N 145th St. & SB I-5 off ramp				400		380		970			370	910		0	0	780	370	970	1370	1280	1290	3030	3030
337	5th Ave. NE & NB I-5 off ramp		470			260		1130							470	1600	260	260	1130	0	0	0	1860	1860
338	NB I-5 off ramp to 5th Ave NE		50	1130											1180	50	0	0	0	1130	0	0	1180	1180
350	SB I-5 on ramp from NE 145th St.					370				380					0	0	370	750	380	0	0	0	750	750
351	NB I-5 on ramp & 5th Ave. NE	720	800			260	30	30		20					1520	830	290	280	50	0	0	750	1860	1860
352	NB I-5 on ramp & NB I-5 off ramp			50										750	50	750	0	0	0	50	750	0	800	800
359	N 175th St. & 10th Ave. NE	80	250	70	100	80	30	120	730	60		10	630	170	400	540	210	150	910	900	810	740	2330	2330
362	N 192nd St. & Aurora Ave. N	30	2230	60	30	1400	20	40	20	20		30	30	50	2320	2320	1450	1450	80	110	110	80	3960	3960
365	NE 185th Street & Linden Ave. N	120	200	100	80	60	70	90	610	60		40	560	30	420	320	210	160	760	790	630	750	2020	2020
371	N 145th St. & 1st Ave. NE	90	310	250	70	50	10	20	1030	60		120	1140	40	650	370	130	230	1110	1350	1300	1240	3190	3190
375	WB Edmonds Way & WB 205th St												820	1600	0	1600	0	0	0	0	2420	820	2420	2420
377	EB Edmonds Way & WB 205th St					750							820		0	0	750	750	0	0	820	820	1570	1570
378	NE 205th St & EB Edmonds Way				750				1200						0	0	750	0	1200	1950	0	0	1950	1950

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Appendix 4-1

Level of Service

Appendix 4-1. 1996 Capacity Analysis (Volume to Capacity Ratio) and 2002 Signalized Intersection Level of Service

			2002 Intersection LOS Summary (City of Shoreline)														1996 Capacity Analysis	
			Intersection LOS			Intersection Approach LOS												
						NB		SB		EB		WB		Other Leg				
Zone	No.	Intersection	LOS	Delay	V/C	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay		LOS	V/C
4	1	N 205th St & Aurora Ave	D	51.8	1.06	E	67.1	C	34.0	E	61.3	D	41.9				F	1.09
4	2	N 205th St & Aurora Village Entr	C	29.3	0.82	D	48.9	B	15.3	C	24.7	C	22.5				A	0.4
4	3	N 205th St & SR 104 Ramp	B	13.0	0.55			C	20.3	A	8.0							
2	4	N 205th St & Meridian Ave	E	63.6	0.93	E	69.1	E	55.3	D	44.6	E	78.0				F	1.1
2	5	N 205th St & 1st Ave NE	B	17.3	0.87	B	14.9			C	23.4	B	12.3				E	0.95
5	6	N 205th St & SB I-5 Ramp	C	23.7	0.67			C	26.2	C	23.7	C	22.9				D	0.83
5	7	N 205th St & 15th Ave NE	D	39.3	0.92	E	59.7	B	15.3	C	34.3	D	47.6				C	0.78
5	8	N 205th St & 19th Ave NE	D	48.3	0.79	B	15.2	B	11.9	F	99.1	C	30.9				C	0.72
4	9	N 200th St & Aurora Ave	D	54.4	0.98	E	68.0	C	25.0	E	62.5	E	74.2				E	0.94
2	11	N 200th St & Meridian Ave	A	7.5	0.45	A	5.7	A	4.1	B	13.6	B	16.0				B	0.63
5	12	Ballinger Rd NE & 19th Ave NE	D	48.3	0.95	F	115.2	F	85.0	C	23.8	C	32.2				D	0.84
5	13	N 196th St & 15th Ave NE	A	8.6	0.53	A	6.1	A	6.5	-	-	C	26.3				C	0.72
5	14	Ballinger Rd NE & 25th Ave NE	C	28.0	0.74	D	44.5	C	25.4	C	23.5	D	46.7	C	27.3		B	0.68
4	15	N 192nd St & Aurora Ave	A	4.9	0.65	A	1.8	A	4.5	D	48.5	D	44.7				A	0.6
1	16	Richmond Beach Road & 8th Ave NW	C	29.8	0.72	D	35.4	C	31.9	C	29.4	C	26.6	C	33.4		A	0.55
1	17	Richmond Beach Road & 3rd Ave NW	B	11.2	0.54	B	14.9	B	13.3	A	9.8	B	11.1				A	0.51
1	18	Richmond Beach Road & Dayton Ave N	C	25.3	0.55	E	65.9	-	-	B	11.8	B	11.6				B	0.67
4	19	Richmond Beach Road & Fremont	C	26.5	0.67	D	36.6	C	25.2	C	20.3	C	23.0				A	0.55

Appendix 4-1. 1996 Capacity Analysis (Volume to Capacity Ratio) and 2002 Signalized Intersection Level of Service

			2002 Intersection LOS Summary (City of Shoreline)													1996 Capacity Analysis	
			Intersection LOS			Intersection Approach LOS											
						NB		SB		EB		WB		Other Leg			
Zone	No.	Intersection	LOS	Delay	V/C	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	V/C
4	20	Richmond Beach Road & Linden	C	20.3	0.55	B	19.0	B	16.2	C	21.9	C	20.2			A	0.33
4	21	N 185th St & Aurora Ave	E	63.2	1.08	E	65.6	C	28.1	F	140.3	D	40.7			E	0.99
3	22	Perkins Way & 15th Ave NE	D	42.0	1.09	D	40.3	B	18.2	F	96.8	D	51.7			A	0.37
3	23	24th Ave & 15th Ave NE	B	10.4	0.75	A	7.7	A	0.7	-	-	E	55.1			A	0.51
3	24	N 180th St & 15th Ave NE	A	9.3	0.80	A	7.5	A	3.9	D	37.6	-	-			A	0.39
3	25	N 177th St & 15th Ave NE	A	5.6	0.65	A	5.0	A	1.8	-	-	D	37.8			A	0.36
4	26	N 175th St & Fremont	A	9.7	0.66	A	9.3	B	10.6	A	0.0	A	9.7			A	0.44
4	27	N 175th St & Aurora Ave	E	62.9	0.96	E	78.9	C	26.8	E	59.5	F	83.5			F	1.03
2	28	N 175th St & Meridian Ave	F	82.5	1.20	F	85.5	E	85.5	D	48.9	F	104.2			E	0.9
2	29	N 175th St & I-5 SB Ramp	C	21.7	0.97			C	23.1	C	24.2	B	18.8			E	0.9
3	30	N 175th St & I-5 NB Ramp	B	18.7	0.85	C	24.1			A	5.8	C	28.2			B	0.68
3	31	N 175th St & 5th Ave NE	C	33.4	0.58	D	45.1	D	50.5	C	28.5	C	27.5			A	0.6
3	32	N 175th St & 10th Ave NE	B	14.8	0.47	C	21.8	C	23.9	B	13.3	B	11.8			A	0.41
3	33	N 175th St & 15th Ave NE	C	33.3	0.82	C	28.4	C	25.0	D	40.1	D	48.4			D	0.85
4	34	N 160th St & Dayton Ave N	B	10.2	0.64	A	8.9	A	7.7	B	14.1	B	12.9			C	0.71
4	35	N 160th St & Aurora Ave	C	29.4	0.85	C	32.0	C	20.2	D	45.2	C	32.0			D	0.83
3	36	N 160th St & 15th Ave NE	A	3.1	0.83	A	3.5	A	1.0	-	-	C	28.9			A	0.39
4	37	N 155th St /Westminster Way	B	12.0	0.62	A	4.0	B	18.2	C	21.0	B	13.2			A	0.4
4	38	N 155th St & Aurora Ave	E	53.9	0.95	D	54.1	D	38.0	E	75.5	E	58.9			F	1.04
2	39	N 155th St & Meridian Ave	D	45.2	1.18	B	17.2	B	13.8	F	85.6	D	35.3			C	0.7
3	40	N 155th St & 5th Ave NE	B	16.1	0.61	B	18.5	B	11.4	B	16.0	B	14.3			A	0.58
3	41	N 155th St & 15th Ave NE	C	27.7	0.89	B	15.6	B	11.9	E	66.7	C	24.1			A	0.57

Appendix 4-1 1996 Capacity Analysis (Volume to Capacity Ratio) and 2002 Signalized Intersection Level of Service

Zone	No.	Intersection	2002 Intersection LOS Summary (City of Shoreline)													1996 Capacity Analysis	
			Intersection LOS			Intersection Approach LOS											
						NB		SB		EB		WB		Other Leg			
			LOS	Delay	V/C	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	V/C
1	42	Westminster Way/Dayton Ave N	A	9.4	0.63	A	8.2	A	10.0			B	12.3			A	0.3
1	43	N 145th St & Greenwood Ave	E	75.5	1.05	F	112.8	D	36.1	E	69.1	D	42.6			E	0.96
4	44	N 145th St & Aurora Ave	C	29.8	0.89	C	27.1	C	23.4	D	46.8	C	33.2			E	0.95
2	45	N 145th St & Meridian Ave	B	18.7	0.75	B	19.6	B	16.0	B	17.6	B	19.6			B	0.61
2	46	N 145th St & 1st Ave NE	D	41.8	1.03	F	161.8	E	65.6	A	6.4	A	9.7			C	0.74
2	47	N 145th St & I-5 SB Ramp	D	35.8	0.75			C	30.8	D	54.1	C	25.1			D	0.86
3	48	N 145th St & I-5 NB Ramp/5th Ave NE	F	111.5	1.10	F	118.5	C	34.9	E	72.0	F	166.6			F	1.09
3	49	N 145th St & 15th Ave NE	E	69.5	0.92	E	78.3	E	55.6	E	74.4	E	61.1			E	0.91
3	50	N 145th St & 20th Ave NE	A	7.9	0.47	A	9.7	B	14.4	A	9.3	A	5.8			A	0.52
3	51	N 145th St & 25th Ave NE	A	4.1	0.61	B	15.5	B	16.7	A	1.8	A	4.5			A	0.48
3	52	N 145th St & Bothell Way	E	68.8	1.11	E	79.6	D	38.7	F	88.1	F	86.5			E	0.92
2	53	N 185th St & 1st Ave NE	A	6.3	0.56	B	12.5	B	10.4	A	5.2	A	5.7			A	0.47
2	55	N 185th St & Meridian Ave	E	57.0	1.10	E	68.7	C	21.1	D	51.4	E	71.3			A	0.55
3	304	NE 165th St & 15th Ave NE	B	16.4	0.85	C	20.2	A	2.8	D	41.3	D	41.7				

Appendix 4-1 Existing (2002) Level of Service for Selected Unsignalized Intersections

Node No. In Synchro	Intersection		2002 Level of Service and Approach Delay (in Seconds)							
	NB/SB	EB/WB	EB		WB		NB		SB	
13	15th Ave. NE	NE 150th St.			F	84.5				
19	5th Ave. NE	NE 185th Street					F	73.6		
27	Greenwood Ave. N	Westminster Way N					C	16.9	B	14.4
34	Greenwood Ave. N	N 160th St.	A	8.5	A	7.6	B	11.2	A	8.8
74	15th Ave. NW East	Richmond Beach Rd.	A	9.0	B	11.2	B	10.0		
76	15th Ave. NW	Richmond Beach Rd. South			A	8.9				
77	15th Ave. NW West	Richmond Beach Rd.							A	9.4
107	20th Ave. NW	Richmond Beach Rd.	A	6.8	A	7.3	A	7.5	A	7.5
114	15th Ave. NW	Richmond Beach Rd. North	A	8.7						
146	5th Ave. NE	NE 205th St.					E	46.7		
148	5th Ave. NE	N 185th St.							B	13.6
221	19th Ave. NE	NE 196th St.	A	9.1	A	9.7	A	9.1	C	16.7
245	10th Ave. NE	NE 185th St.	C	21.1	A	8.6	B	13.9	A	9.6
260	25th Ave. NE	NE 175th St.	B	11.8						
270	5th Ave. NE	NE 165th St. NE	A	8.7	A	8.9	C	17.6	A	9.3
295	Fremont Ave. N	N 195th St.	A	9.3	A	9.0	B	13.0	A	9.3
303	3rd Ave. NW	N 195th St.		8.7	A	9.0	A	10.0	A	9.3

Appendix 4-1. 2022 Signalized Intersection Level of Service Under No Action Condition

Zone	No.	Intersection	2022 Intersection LOS Summary											
			Intersection LOS		Intersection Approach LOS									
					NB		SB		EB		WB		Other Leg	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
4	1	N 205th St & Aurora Ave	F	87.3	F	110.6	E	77.3	E	58.4	E	75.3		
4	2	N 205th St & Aurora Village Entr	D	36.5	C	24.3	B	13.0	D	48.3	D	36.6		
4	3	N 205th St & SR 104 Ramp	C	28.6			C	25.8	A	8.9				
2	4	N 205th St & Meridian Ave	F	80.5	F	93.7	E	73.8	D	51.6	F	100.3		
2	5	N 205th St & 1st Ave NE	C	28.6	C	33.4			D	42.0	B	14.2		
5	6	N 205th St & SB I-5 Ramp	B	12.3			B	17.6	B	12.3	B	10.4		
5	7	N 205th St & 15th Ave NE	D	52.9	E	76.0	C	22.5	D	54.4	D	50.4		
5	8	N 205th St & 19th Ave NE	D	65.7	D	53.2	C	23.2	F	81.4	F	91.4		
4	9	N 200th St & Aurora Ave	E	78.2	F	110.4	B	19.6	E	61.7	F	94.4		
2	11	N 200th St & Meridian Ave	B	10.4	A	9.3	A	6.6	B	14.1	B	16.0		
5	12	Ballinger Rd NE & 19th Ave NE	E	77.7	F	96.7	F	85.3	E	59.2	F	96.9		
5	13	N 196th St & 15th Ave NE	B	10.5	A	6.4	A	8.5			C	32.1		
5	14	Ballinger Rd NE & 25th Ave NE	D	45.2	E	56.7	D	38.8	D	41.8	D	47.0	C	21.2
4	15	N 192nd St & Aurora Ave	A	8.3	A	7.2	A	4.2	D	48.3	E	55.5		
1	16	Richmond Beach Road & 8th Ave NW	D	46.8	E	73.3	C	32.6	C	31.4	D	47.1	C	33.7
1	17	Richmond Beach Road & 3rd Ave NW	B	12.7	B	16.9	B	15.7	B	10.8	B	12.5		
1	18	Richmond Beach Road & Dayton Ave N	B	13.1	B	17.2			B	11.4	B	11.9		
4	19	Richmond Beach Road & Fremont	D	39.7	E	74.3	C	34.4	C	22.8	C	26.1		

Appendix 4-1 2022 Signalized Intersection Level of Service Under No Action Condition

Zone	No.	Intersection	2022 Intersection LOS Summary											
			Intersection LOS		Intersection Approach LOS									
					NB		SB		EB		WB		Other Leg	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
4	20	Richmond Beach Road & Linden	C	27.4	C	24.4	B	19.7	C	22.3	D	38.1		
4	21	N 185th St & Aurora Ave	E	80.0	F	131.5	C	32.0	D	42.6	E	61.0		
3	22	Perkins Way & 15th Ave NE	F	87.8	F	109.0	C	33.8	F	123.3	E	74.4		
3	23	24th Ave & 15th Ave NE	A	9.6	A	9.5	A	4.7			C	26.7		
3	24	N 180th St & 15th Ave NE	B	10.3	A	7.1	A	7.2	D	40.9				
3	25	N 177th St & 15th Ave NE	A	7.5	A	6.8	A	1.9			D	38.7		
4	26	N 175th St & Fremont	C	23.2	B	10.5	E	61.5	B	19.8	B	18.6		
4	27	N 175th St & Aurora Ave	F	122.2	F	195.5	D	45.7	E	60.8	F	104.1		
2	28	N 175th St & Meridian Ave	F	119.7	F	119.0	E	76.2	E	75.2	F	156.7		
2	29	N 175th St & I-5 SB Ramp	C	30.3			E	67.4	C	26.5	B	12.0		
3	30	N 175th St & I-5 NB Ramp	C	32.5	D	37.4			A	7.1	E	56.6		
3	31	N 175th St & 5th Ave NE	D	48.4	D	46.0	E	63.7	D	47.8	D	48.4		
3	32	N 175th St & 10th Ave NE	B	12.1	B	19.3	B	13.4	B	12.6	A	7.7		
3	33	N 175th St & 15th Ave NE	E	62.3	E	70.2	D	38.4	D	51.9	F	106.1		
4	34	N 160th St & Dayton Ave N	B	12.2	B	11.7	A	8.3	B	14.1	B	15.3		
4	35	N 160th St & Aurora Ave	C	27.5	C	30.7	A	8.6	E	67.1	D	38.9		
3	36	N 160th St & 15th Ave NE	A	3.8	A	3.7	A	2.9			C	28.0		
4	37	N 155th St /Westminster Way	C	20.5	A	4.5	B	18.3	C	21.1	D	43.1		
4	38	N 155th St & Aurora Ave	F	81.9	F	145.7	C	30.9	D	47.8	E	63.1		
2	39	N 155th St & Meridian Ave	E	65.5	E	71.7	C	28.6	E	69.1	E	74.6		
3	40	N 155th St & 5th Ave NE	C	24.0	C	28.7	B	12.8	C	27.1	B	17.5		
3	41	N 155th St & 15th Ave NE	D	35.9	D	35.9	B	19.1	E	57.3	C	21.4		

Appendix 4-1. 2022 Signalized Intersection Level of Service Under No Action Condition

Zone	No.	Intersection	2002 Intersection LOS Summary (City of Shoreline)											
			Intersection LOS		Intersection Approach LOS									
					NB		SB		EB		WB		Other Leg	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	42	Westminster Way/Dayton Ave N	A	8.1	A	5.3	A	6.7			B	15.7		
1	43	N 145th St & Greenwood Ave	F	113.9	F	146.7	D	46.7	F	149.7	F	84.1		
4	44	N 145th St & Aurora Ave	E	59.9	E	61.1	D	40.6	F	90.3	E	62.2		
2	45	N 145th St & Meridian Ave	D	51.9	E	55.5	D	53.3	D	43.0	E	57.4		
2	46	N 145th St & 1st Ave NE	E	66.5	F	118.3	C	21.4	B	12.5	F	91.1		
2	47	N 145th St & I-5 SB Ramp	C	33.9			D	38.6	E	55.4	B	14.8		
3	48	N 145th St & I-5 NB Ramp/5th Ave NE	F	145.0	F	144.3	D	50.4	F	97.3	F	228.9		
3	49	N 145th St & 15th Ave NE	E	70.3	E	75.9	E	67.2	E	62.4	E	75.5		
3	50	N 145th St & 20th Ave NE	A	9.7	A	10.0	B	11.4	A	9.9	A	9.3		
3	51	N 145th St & 25th Ave NE	A	8.3	B	14.8	B	18.7	A	8.9	A	5.8		
3	52	N 145th St & Bothell Way	F	105.3	F	133.9	E	71.6	F	111.2	F	101.6		
2	53	N 185th St & 1st Ave NE	A	7.3	B	15.9	B	13.8	A	7.4	A	5.3		
2	55	N 185th St & Meridian Ave	F	119.7	F	119.0	E	76.2	E	75.2	F	156.7		
3	304	NE 165th St & 15th Ave NE	C	24.4	C	34.1	A	4.4	D	44.1	D	40.0		

Appendix 4-1. 2022 Level of Service for Selected Unsignalized Intersections Under No Action Condition

Node No. In Synchro	Intersection		2022 Level of Service and Approach Delay (in Seconds)							
	NB/SB	EB/WB	EB		WB		NB		SB	
13	15th Ave. NE	NE 150th St.			F	920.0				
19	5th Ave. NE	NE 185th Street					F	405.0		
27	Greenwood Ave. N	Westminster Way N					E	41.6	C	16.5
34	Greenwood Ave. N	N 160th St.	A	9.6	A	9.1	C	24.0	A	9.7
74	15th Ave. NW East	Richmond Beach Rd.	B	10.9			B	14.7	B	10.1
76	15th Ave. NW	Richmond Beach Rd. South			A	9.1				
77	15th Ave. NW West	Richmond Beach Rd.			C	22.2				
107	20th Ave. NW	Richmond Beach Rd.	A	9.5	C	16.9	B	10.4	B	12.8
114	15th Ave. NW	Richmond Beach Rd. North	A	9.3						
146	5th Ave. NE	NE 205th St.					E	47.7		
148	5th Ave. NE	N 185th St.							E	36.4
221	19th Ave. NE	NE 196th St.	D	26.9	C	15.7	B	10.1	B	11.4
245	10th Ave. NE	NE 185th Sr.	F	157.7	B	10.0	D	29.1	B	14.0
260	25th Ave. NE	NE 175th St.	C	16.1						
270	5th Ave. NE	NE 165th St. NE	A	9.8	A	10.0	F	95.6	B	12.1
295	Fremont Ave. N	N 195th St.	B	10.9	B	11.4	D	27.9	B	10.8
303	3rd Ave. NW	N 195th St.	A	9.7	B	11.2	C	15.3	B	10.6

Appendix 4-1. 2022 Signalized Intersection Level of Service with Recommended Improvements

			2022 Intersection LOS Summary											
			Intersection LOS		Intersection Approach LOS									
					NB		SB		EB		WB		Other Leg	
Zone	No.	Intersection	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
4	1	N 205th St & Aurora Ave	F	90.0	F	103.1	D	47.6	F	132.4	F	96.9		
4	2	N 205th St & Aurora Village Entr	D	36.5	C	24.3	B	13.0	D	48.3	D	36.6		
4	3	N 205th St & SR 104 Ramp	C	28.6			C	25.8	A	8.9				
2	4	N 205th St & Meridian Ave	F	80.5	F	93.7	E	73.8	D	51.6	F	100.3		
2	5	N 205th St & 1st Ave NE	C	28.6	C	33.4			D	42.0	B	14.2		
5	6	N 205th St & SB I-5 Ramp	B	12.3			B	17.6	B	12.3	B	10.4		
5	7	N 205th St & 15th Ave NE	D	52.9	E	76.0	C	22.5	D	54.4	D	50.4		
5	8	N 205th St & 19th Ave NE	D	65.7	D	53.2	C	23.2	F	81.4	F	91.4		
4	9	N 200th St & Aurora Ave	E	74.4	F	93.2	C	32.1	E	74.6	F	97.4		
2	11	N 200th St & Meridian Ave	B	10.4	A	9.3	A	6.6	B	14.1	B	16.0		
5	12	**Ballinger Rd NE & 19th Ave NE**	**C**	**28.9**	**D**	**47.7**	**C**	**33.5**	**C**	**22.8**	**C**	**24.6**		
5	13	N 196th St & 15th Ave NE	B	10.5	A	6.4	A	8.5			C	32.1		
5	14	Ballinger Rd NE & 25th Ave NE	D	45.2	E	56.7	D	38.8	D	41.8	D	47.0	C	21.2
4	15	N 192nd St & Aurora Ave	A	6.4	A	4.1	A	4.1	D	48.9	D	54.3		
1	16	Richmond Beach Road & 8th Ave NW	D	46.8	E	73.3	C	32.6	C	31.4	D	47.1	C	33.7
1	17	Richmond Beach Road & 3rd Ave NW	B	12.7	B	16.9	B	15.7	B	10.8	B	12.5		
1	18	Richmond Beach Road & Dayton Ave N	B	13.1	B	17.2			B	11.4	B	11.9		
4	19	Richmond Beach Road & Fremont	D	39.7	E	74.3	C	34.4	C	22.8	C	26.1		

Appendix 4-1. 2022 Signalized Intersection Level of Service with Recommended Improvements

Zone	No.	Intersection	2022 Intersection LOS Summary											
			Intersection LOS		Intersection Approach LOS									
					NB		SB		EB		WB		Other Leg	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
4	20	Richmond Beach Road & Linden	C	27.4	C	24.4	B	19.7	C	22.3	D	38.1		
4	21	N 185th St & Aurora Ave	E	66.2	E	79.9	C	30.6	E	64.2	F	103.1		
3	22	**Perkins Way & 15th Ave NE**	**E**	**57.5**	**E**	**63.7**	**C**	**25.9**	**F**	**89.7**	**E**	**69.2**		
3	23	24th Ave & 15th Ave NE	A	9.6	A	9.5	A	4.7			C	26.7		
3	24	N 180th St & 15th Ave NE	B	10.3	A	7.1	A	7.2	D	40.9				
3	25	N 177th St & 15th Ave NE	A	7.5	A	6.8	A	1.9			D	38.7		
4	26	N 175th St & Fremont	C	23.2	B	10.5	E	61.5	B	19.8	B	18.6		
4	27	N 175th St & Aurora Ave	F	111.6	F	172.7F	D	36.6	E	74.0	F	104.1		
2	28	**N 175th St & Meridian Ave**	**E**	**56.6**	**D**	**39.1**	**E**	**77.7**	**E**	**78.8**	**D**	**47.3**		
2	29	N 175th St & I-5 SB Ramp	C	30.3			E	67.4	C	26.5	B	12.0		
3	30	N 175th St & I-5 NB Ramp	C	32.5	D	37.4			A	7.1	E	56.6		
3	31	N 175th St & 5th Ave NE	D	48.4	D	46.0	E	63.7	D	47.8	D	48.4		
3	32	N 175th St & 10th Ave NE	B	12.1	B	19.3	B	13.4	B	12.6	A	7.7		
3	33	**N 175th St & 15th Ave NE**	**D**	**50.2**	**D**	**54.8**	**D**	**52.6**	**D**	**46.1**	**D**	**41.9**		
4	34	N 160th St & Dayton Ave N	B	12.2	B	11.7	A	8.3	B	14.1	B	15.3		
4	35	N 160th St & Aurora Ave	D	40.5	D	47.4	C	20.8	E	69.5	C	34.4		
3	36	N 160th St & 15th Ave NE	A	3.8	A	3.7	A	2.9			C	28.0		
4	37	N 155th St /Westminster Way	C	20.5	A	4.5	B	18.3	C	21.1	D	43.1		
4	38	N 155th St & Aurora Ave	F	92.7	F	119.3	F	81.7	D	49.3	F	101.5		
2	39	**N 155th St & Meridian Ave**	**D**	**41.3**	**B**	**17.2**	**E**	**66.8**	**D**	**50.7**	**D**	**42.4**		
3	40	N 155th St & 5th Ave NE	C	24.0	C	28.7	B	12.8	C	27.1	B	17.5		
3	41	N 155th St & 15th Ave NE	D	35.9	D	35.9	B	19.1	E	57.3	C	21.4		

Appendix 4-1. 2022 Signalized Intersection Level of Service with Recommended Improvements

Zone	No.	Intersection	2002 Intersection LOS Summary (City of Shoreline)											
			Intersection LOS		Intersection Approach LOS									
					NB		SB		EB		WB		Other Leg	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	42	Westminster Way/Dayton Ave N	A	8.1	A	5.3	A	6.7			B	15.7		
1	43	N 145th St & Greenwood Ave	F	113.9	F	146.7	D	46.7	F	149.7	F	84.1		
4	44	N 145th St & Aurora Ave	E	58.2	D	36.3	E	56.1	F	102.7	E	58.0		
2	45	N 145th St & Meridian Ave	D	51.9	E	55.5	D	53.3	D	43.0	E	57.4		
2	46	N 145th St & 1st Ave NE	E	66.5	F	118.3	C	21.4	B	12.5	F	91.1		
2	47	N 145th St & I-5 SB Ramp	C	33.9			D	38.6	E	55.4	B	14.8		
3	48	N 145th St & I-5 NB Ramp/5th Ave NE	F	145.0	F	144.3	D	50.4	F	97.3	F	228.9		
3	49	N 145th St & 15th Ave NE	E	70.3	E	75.9	E	67.2	E	62.4	E	75.5		
3	50	N 145th St & 20th Ave NE	A	9.7	A	10.0	B	11.4	A	9.9	A	9.3		
3	51	N 145th St & 25th Ave NE	A	8.3	B	14.8	B	18.7	A	8.9	A	5.8		
3	52	N 145th St & Bothell Way	F	105.3	F	133.9	E	71.6	F	111.2	F	101.6		
2	53	N 185th St & 1st Ave NE	A	7.3	B	15.9	B	13.8	A	7.4	A	5.3		
2	55	**N 185th St & Meridian Ave**	**E**	**55.3**	**D**	**44.8**	**D**	**36.6**	**E**	**55.6**	**F**	**82.9**		
3	304	NE 165th St & 15th Ave NE	C	24.4	C	34.1	A	4.4	D	44.1	D	40.0		

Appendix 4-2

Level of Service Standards and Methodology

Memorandum

Date: September 10, 2003

To: Jill Marilley, Shoreline City Engineer

From: Tom Noguchi, Mirai Associates

Subject: Level of Service Standards and Methodologies

The purpose of this memo is to outline issues related to establishing a level of service (LOS) standard and a LOS calculation method that will set a level of traffic congestion allowed in the City.

The level of service standard should be regarded as one of the cornerstones for the development of Shoreline's Transportation Plan. It is very important at this time to discuss all issues related to setting or updating the level of service standard and calculation methodology. It is not be possible to set the level of service standards without deciding about the LOS methodology and calculating existing and projected LOS using that methodology. Therefore, this memo focuses on issues of the LOS methodology.

Growth Management Act

The 1990 Growth Management Act (GMA) requires each local jurisdiction to identify facility and service needs based on level of service standards for all arterials and transit routes Level of service standards are used to judge the performance of the transportation system. The GMA further requires that a transportation element include specific actions and requirements for bringing into compliance any facilities or services that are below an established level of service standard. It also requires that system expansion needs must be identified for at least ten years, based on the traffic forecasts for the adopted land use plan and level of service standards. For the needs, a financing plan must be developed. If probable funding falls short of meeting identified needs, the jurisdiction is given two options: 1) to raise additional funding, and/or 2) to reassess the land use assumptions. Under the GMA it is also possible to lower the LOS standards. The relationship between LOS standards, funding needs to accommodate increased travel, and land use assumptions is referred to as "concurrency".

The concept of concurrency can be illustrated with a three-legged stool (**Figure 1**). Each leg is characterized as follows:

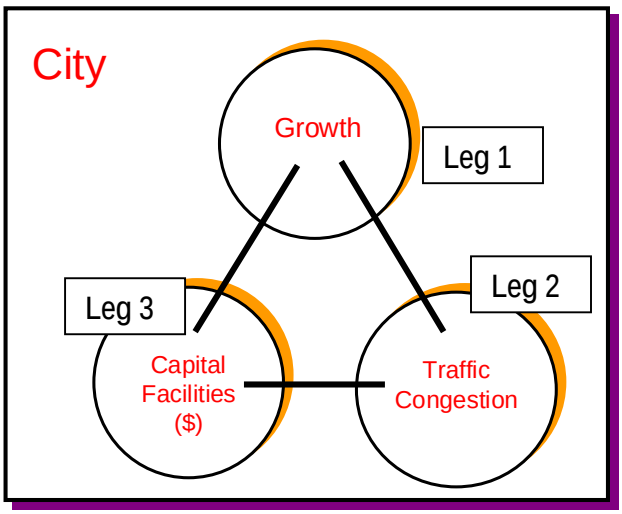
Leg 1- Growth
Leg 2- Traffic congestion (measured with the level of service standards)
Leg 3- Resources needed to fund new capital facilities

The stool must be balanced. If it is standing upright, then growth is occurring concurrent with needed facilities. If the three-legged stool is slanted or tipped, then actions must be

taken to keep growth balanced correctly with available funding and standards. To stabilize the stool, the City must take one of the following three options:

1. Reduce growth by denying or delaying land use permit applications
2. Increase funding for new facilities
3. Change the level of service standard

Figure 1. Concept of a Three-Legged Stool



Existing Comprehensive Plan LOS Standards for Roads

The level of service standard, which the City adopted in the existing Transportation Element, employs a zonal LOS average method. Under this method, an average area-wide LOS is computed based on the LOS calculation for each intersection within a zone. A LOS standard is set for each area and not to each intersection within the zone.

The City has been divided into the following five geographical zones:

- Zone 1 includes all of the signalized intersections west of Aurora.
- Zone 2 has all of the signalized intersections between Aurora and I-5.
- Zone 3 covers the area east of I-5.
- Zone 4 covers the signalized intersections in the Aurora corridor.
- Zone 5 is defined with the future annexation area A.

The City adopted the following level of service standard for each zone:

- Zone 1 - LOS **D**
- Zone 2 - LOS **D**
- Zone 3 - LOS **D**
- Zone 4 - LOS **E**
- Zone 5 - LOS **E**

The level of service at individual signalized intersections is calculated based on a critical lane analysis technique, explained in the Transportation Research Circular 212 - Interim Materials on Highway Capacity (1980). The "planning" technique was selected for use in concurrency testing. The Circular 212 methodology provides a volume-to-capacity (V/C) ratio, as well as the LOS ratings for each individual intersection.[1] For example, LOS E equates to the intersection operating at 90 - 99.9% of capacity while a LOS D is 80 - 89.9% of capacity.

The City has determined that several intersections are exempt from capacity mitigation. The reasons given for these exemptions are that the improvement has its own negative impacts such as high cost, or an impact on adjacent properties, or it may be unfeasible or it is not cost effective due to topography, grade, or other factors. (The existing Transportation Element does not list those exempted intersections.)

The Issue

Should the City continue to use the adopted level of service standards and/or LOS calculation methods?

One way to answer this question is to review methodology options available to the City.

LOS Methodology Options for Roads

The GMA allows each local jurisdiction to choose a LOS method and standards. **Table 1** shows the different LOS methodology options. Generally, one can define a method by selecting an option from each column in **Table 1**. For example, the LOS could be measured in terms of delay for averaged PM peak two hours and applied to signalized intersections to calculate level of service.

Table 1. LOS Methodology Options

LOS Measuring Method	LOS Measuring Period	LOS Applied Location
Volume to capacity ratio Delay Average travel time/travel speed	PM peak one hour AM peak one hour Noon peak one hour Week end peak one hour Averaged PM peak two hours Averaged PM peak three hours	Signalized intersections Arterial intersections (including unsignalized intersections) Corridor average Area average of intersections Screenlines Arterial segments

[1] Please note that a few editions to the Highway Capacity Manual have been made since 1980. The volume-to-capacity ratio method to calculate levels of service was not included in subsequent versions of the Highway Capacity Manual because it was found that levels of service measured in terms of vehicle delays do not correlate well with volume-to-capacity ratios. In short, a volume-to-capacity ratio was determined not to be an effective level of service measurement method.

Discussion

The following brief discussions summarize the advantages and disadvantages of each LOS methodology.

LOS Measuring Method

Volume to capacity ratio

Advantages:

- V/C ratio calculation is simple
- Does not require a large set of data

Disadvantages:

- HCM 2000 does not support capacity as level of service (LOS should be measured in terms of driver frustration – delay.)
- Difficult to measure traffic congestion accurately (V/C ratios do not directly correspond to levels of traffic congestion.)
- Capacity is hard to define
- Ignores traffic operation and other parameters that influence traffic flows

Delay

Advantages:

- HCM 2000 employs delay as the concept to define level of service
- Non-technical people can understand the concept
- Several computer programs are readily available

Disadvantages:

- Detailed traffic operational data are needed
- Harder to forecast future traffic operational conditions

Average travel time/travel speed (corridor segments)

Advantages:

- Most effectively simulates drivers' travel experience
- Measures the performance of a transportation system most effectively
- Can use the HCM 2000 corridor LOS method

Disadvantages:

- Extensive data gathering is needed
- Harder to make forecasts for travel time changes (Models are generally designed to forecast future volumes.)
- Would need extensive resources

LOS Measuring Period

Most jurisdictions apply LOS with traffic volumes taken during the PM peak one hour. Some use averaged one hour volume, averaged from two hours time period.

LOS Applied Locations

Signalized intersections only

Advantages:

- Traffic data are readily available
- Easier to address LOS problems with signal operations

Disadvantages:

- Does not evaluate LOS at unsignalized intersections
- Difficult to identify future signal needs
- Harder to require development to mitigate impacts

Arterial intersections including unsignalized intersections

Advantages:

- Address LOS on all arterial intersections
- Signal needs and operations at all intersections on arterials can be evaluated

Disadvantages:

- Traffic data are not readily available at unsignalized intersections
- A solution at an unsignalized intersections may be expensive or undesirable to implement from a traffic operation point of view

Area-wide intersection average

Advantages:

- One or two congested intersections are unlikely to cause a concurrency problem
- Can approach traffic issues from a broader perspective
- Tendency to find solutions that would benefit the system

Disadvantages:

- Locations of congestion problems are not apparent
- Harder to require actions to mitigate impacts from developments
- Difficult to explain congestion problems to public

Arterial corridors segments

This approach is directly tied to the average travel time/travel speed method. The advantages and disadvantages are discussed above.

Screenlines

Advantages:

- Fewer locations to calculate LOS
- Not likely to cause a concurrency problem

Disadvantages:

- Ignores potential congestions problems
- Harder to require development mitigations
- Difficult to develop a transportation plan
- Difficult to explain congestion problems to public

Level of Service Standards for Roads

Mirai has been building a Synchro/SimTraffic network for all arterials in Shoreline. As soon as we receive existing traffic count data from the City, we will be able to calculate intersection delays and V/C ratios. We are not be able to discuss the issue of LOS standards for roads until we can analyze the existing and future level of service conditions.

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Appendix 5-1
Pedestrian Evaluation Chart

Location	Improvement	Estimated Cost	Initial Priority	Completes Grand Loop	Links over 3 major destinations	Project is on arterial	School Walk Route	Completes missing link or to existing sidewalk (CE)	Connects to Transit	Connects to Park	Score	BAC Priority #1 OR #2
Meridian Ave N: N 175th St to N 172nd St	East	0.276	1		20	40	60	40	30	40	230	
NE Ballinger Way: 19th Ave NE to 25th Ave NE	South	0.714	1		20	40	60	30	30	40	220	
3rd Ave NW: NW Richmond Beach Rd to NW 195th St	Both	1.298	1		20	30	60	40	30	40	220	
N 175th St: Midvale (formerly from Ashworth) Ave N to Meridian Ave N	North	0.747	1			40	60	40	30	40	210	
Fremont Ave N: N 165th St to N 175th St	Both	1.72	1		20	30	60	30	30	40	210	
5th Ave NE: NE 185th St to NE 195th St	Both	1.72	1		20	30	60	30	30	40	210	
N 172nd St: Dayton Ave N to Fremont Ave N	Both	0.357	1		20	30	60	30	30	40	210	
NW 195th: 8th Ave NW to Fremont Ave NW	Both (missing links)	2.18	1			30	60	40	30	40	200	
Ashworth: N 185th to N 192nd	Both	1.071	1			30	60	40	30	40	200	
15th Ave NE: NE Perkins Way to NE 180th St	West	0.812	1		20	40	60	40	30		190	
15th Ave NE: NE 165th St to NE 150th St	East	1.298	1		20	40	60	40	30		190	
NE 25th: 195th to 205th	Both	1.753	1			30	60	30	30	40	190	
NE 165th: 15th NE to 25th NE	Both	1.753	1			30	60	30	30	40	190	
NE 180th: NE 10th to NE 15th	Both	0.844	2	35		30	60	30	30		185	
Dayton Ave N: Carlyle Hall Rd to St Luke's School (see bike project 103)	Both	1.558	1		20	40	60	30	30		180	Y
NW Innis Arden Way: NW 167th St to Greenwood Ave N	Both	3.181	2		20	30	60		30	40	180	Y
3rd Ave NW: NW 195th St to NW 205th St	Both	1.72	2		20	30	60		30	40	180	Y

Location	Improvement	Estimated Cost	Initial Priority	Completes Grand Loop	Links over 3 major destinations	Project is on arterial	School Walk Route	Completes missing link or to existing sidewalk (CE)	Connects to Transit	Connects to Park	Score	BAC Priority #1 OR #2
Fremont Ave N: N 175th St to N 205th St (formerly 40b,c,d)	Both	5.129	2		**20**	**30**	**60**	**40**	**30**		**180**	Y
NE 150th St: 15th Ave NE to 25th Ave NE (see bike project 104)	Both	1.753	2		**20**	**30**	**60**	**40**	**30**		**180**	Y
8th Ave NW: NW 205th St to NW Richmond Beach Board (formerly 33a,b) (see bike project 101)	Both	2.987	2			**40**	**60**		**30**	**40**	**170**	Y
24th Ave NE: 15th Ave NE to 25th Ave NE	Both	1.656	2			**40**	**60**	**30**		**40**	**170**	Y
NE 165th : NE 6th to NE 5th	Both	0.195	3			**30**	**60**	**40**		**40**	**170**	
10th Ave NE: NE158th to NE 162nd	Both	0.584	3			**30**	**60**	**40**		**40**	**170**	
10th Ave NE: NE 165th to NE 185th	Both	3.473	2			**30**	**60**	**40**		**40**	**170**	Y
N 195th: Wallingford Ave N to 1st NE	Both	1.298	1			**30**	**60**	**40**		**40**	**170**	Y
1st NE: N 193rd to N 195th	Both	0.519	3			**30**	**60**	**40**		**40**	**170**	
Ashworth: N 195th to N 200th	Both	0.876	2			**30**	**60**	**40**		**40**	**170**	Y
6th Ave NW: NW 180th St to NW 175th St	Both	0.876	2	**35**		**30**	**60**			**40**	**165**	Y
Dayton Ave N: St Luke's School to Richmond Beach Rd (see bike project 103 and Roundabout)	Both	2.045	2			**40**	**60**	**30**	**30**		**160**	Y
NW 180th St: 8th Ave NW to 6th Ave NW	Both	0.422	2	**35**		**30**	**60**	**30**			**155**	Y
NE Perkins Way: 10th Ave NE to 15th Ave NE	Both	1.234	2			**30**	**60**	**30**	**30**		**150**	Y
N 165th St: Dayton Ave N to Aurora Ave North	Both	1.558	3		**20**	**30**	**60**		**30**		**140**	
25th Ave NE: NE 150th St to NE 145th St	Both	0.844	2			**30**	**60**	**40**			**130**	Y
10th Ave NE: NE 185th St to NE 195th St (formerly NE 190th St) (see bike project 106)	Both	1.668	2			**30**	**60**			**40**	**130**	Y

Location	Improvement	Estimated Cost	Initial Priority	Completes Grand Loop	Links over 3 major destinations	Project is on arterial	School Walk Route	Completes missing link or to existing sidewalk (CE)	Connects to Transit	Connects to Park	Score	BAC Priority #1 OR #2
8th Ave NW: NW 185th St to NW 180th St	Both	0.649	2	**35**		**30**	**60**				**125**	Y
25th Ave NE: NE 168th St to NE 165th St (see bike project 109)	West	0.26	2			**30**	**60**	**30**			**120**	Y
NW 175th St: 6th Ave NW to Dayton Ave N	Both	2.045	2			**30**	**60**				**90**	Y
25th Ave NE: NE 175th St to NE 168th St (see bike project 109)	Both	0.844	3			**30**	**60**				**90**	
25th Ave NE: NE 165th St to NE 150th St (formerly 18b,19) (see bike project 109)	East	1.282	2			**30**	**60**				**90**	Y
Carlyle Hall Rd NW: NW 175th to Dayton Ave N		2.013	3			**30**			**30**	**30**	**90**	
Ashworth: N 167th to N 175th	Both	1.298	3				**60**	**30**	**30**	**40**	**160**	
5th Ave NE: NE 175th St to NE 185th St	Both	1.818	3			**40**		**40**	**30**		**110**	
NE 175th/171st: 15th NE to 25th NE	Both	1.948	3		**20**	**30**		**30**	**30**		**110**	
Greenwood Ave N: N 160th to Carlyle Hall Road N	Both	1.234	3			**30**	**60**	**30**	**30**		**150**	
Ashworth: 145th N to 155th N	Both	1.72	2				**60**	**30**	**30**		**120**	Y (partial)
10th Ave NE: NE 162nd to NE 165th	East	0.292	2				**60**				**60**	Y

Appendix 5-2
Bicycle Evaluation Chart

Appendix 5-2. Project Evaluation Chart - Bicycle Improvements

Location	Improvement	Project: Est. Cost (2004 in $000)	Connection to: Interurban Trail 100	Shoreline Loop 50	Lake to Sound Trail 25	Burke-Gilman Trail 25	School 75	Park 50	Express Transit 50	TOTAL
8th Avenue NW: NW 205th St to NW Richmond Beach Rd	5' bike lanes	$1,464		50	25				50	125
NW 200th Street: 8th Ave NW to Aurora Ave N	asphalt trails on both sides	$2,279		50					50	100
NE Perkins Way: 10th Ave NE to 15th Ave NE	shared roadway	$605		50	25					75
24th Avenue NE: 15th Ave NE to city limits	shared roadway	$811			25	25				50
15th Avenue NE: NE Perkins Way to 24th Ave NE	sidewalk	$0			25	25				50
20th Avenue NW: NW 195th St and NW 190th St	off-road asphalt trail	$522			25			50	50	125
NW 196th Street: 20th Ave NW to 24th Ave NW	5' bike lanes built as part of roadway project	$130			25			50	50	125
NW Richmond Beach Road/NW 195th St: 20th Ave NW to Dayton Ave N	5' bike lanes built as part of roadway project	$280		50	25				50	125
NE 185th Street: 5th Ave NE to 10th Ave NE	restripe for bike lanes	$120		50	25					75
NE 155th Street: 5th Ave NE to 15th Ave NE	add signs, share roadway	$220		50				50	50	150
Dayton Avenue N: NW Richmond Beach Road to Westminster Way N/N 150th St	shared roadway	$3,214		50			75		50	175
Dayton Ave N: NW Richmond Beach Rd to N 150th St	Construct new 5-foot wide paved bicycle lanes in each direction, in addition to the sidewalks proposed in projects 39a through 39d	$1,728		50			75		50	175
NE 150th Street: 15th Ave NE to 25th Ave NE	shared roadway	$843		50			75		50	175
NE 150th St: 15th Ave NE to 25th Ave NE	Stripe existing roadway to provide 5-foot bicycle lanes in each direction, in addition to the sidewalks proposed in project 55	$509		50			75		50	175
NW Richmond Beach Road/N 185th Street: Dayton Ave N to Stone Ave N	shared roadway	$280	100	50					50	200
N 160th Street: Dayton Ave N to Aurora Ave N/Interurban Trail	design study for connection to Interurban Trail	not estimated	100	50					50	200
N 155th Street: Aurora Ave N/Interurban Trail to Midvale Ave N	design study for connection to Interurban Trail	not estimated	100	50					50	200
N 200th Street: Aurora Ave N to Ashworth Ave N	asphalt trails on both sides	$603	100	50					50	200
8th Avenue NW/NW 180th Street/6th Avenue NW: NW Richmond Beach Rd to NW 175th St	5' bike lanes	$1,808		50			75	50	50	225
NW 175th Street: 6th Ave NW to Dayton Ave N	5' bike lanes	$1,243		50			75	50		175
25th Avenue NE: NE 145th St to NE 170th St	shared roadway	$2,148		50			75	50	50	225
10th Avenue NE: NE 155th St to NE 195th St	mixed trail	$4,080		50	25	25	75	50	50	275
N 195th Street: Ashworth Ave N to 10th Ave NE	10' mixed trail	$2,030	100	50			75		50	275

Appendix 5-3
Roadway Evaluation Chart

Appendix 5-3. Project Evaluation Chart - Roadway Improvements

Criteria		Estimated Cost ($000)	Safety	Support/ protect neighborhood	Freight Benefit	Multiple Functions	LOS	Total Score	Priority
Weight			25 - 100	50 - 75	20	75	50 - 75		
Project Location	Description of Project								
Aurora Ave N: from N 145th St to N 205th St	Complete BAT lanes, sidewalks and signals according to the adopted concept	$80,073	100	50	20	75	50	295	1
15th Ave NE/NE 150th St	Install new signal	$22	100	75	0	0	50	225	1
NW Richmond Beach Road: from 22nd Place West to Dayton Avenue N	Restripe to 3 lanes and wide shoulder	$40	100	75	0	50	0	225	1
N 175th St: from Midvale Ave N to Wallingford Ave N	Widen to include a center turn lane; analyze traffic operations; provide sidewalks on both sides	$1,400	50	75	20	50	0	195	1
Meridian Ave N/N 175th St	Construct WB right turn lane and add NB through lane	$940	75	0	10	0	75	160	1
Dayton Ave N/St Luke Pl N	Construct roundabout	$750	100	50	0	0	0	150	1
Innis Arden Way/N 160th St/ Greenwood Ave N	Construct roundabout	$750	100	50	0	0	0	150	1
NE 175th St/15th Ave NE	Provide EB right turn lane and additional NB through lane, and separate a WB left turn lane from the existing through lane	$1,290	50	0	20	0	75	145	2
Meridian Ave N/N 185th St	Provide additional NB through lane	$590	25	0	20	0	75	120	2
Meridian Ave N/N 155th St	Provide additional NB through lane	$590	25	0	20	0	75	120	2
Perkins Way/15th Ave NE	Provide WB and EB left turn lanes	$710	25	0	0	25	50	100	2
19th Ave NE/NE Ballinger Way	Provide NB and SB left turn lanes on 19th Ave NE	$710	25	0	0	0	75	100	2
Dayton Ave N/Richmond Beach Rd	Reconfigure intersection; remove islands, rebuild signal	$400	50	50				100	2
Dayton Ave N/Westminster Way	Reconfigure per draft plan	$450	50	50				100	2
Carlyle Hall Rd/NW 165th St	Improve geometry to create acceptable angle intersections with the approaches to Dayton Avenue at Carlyle and N 165th	$750	50	50	0	0	0	100	2
N 175th St/Stone Ave N	Analyze traffic operations	$50	25	0	0	50	0	75	3
Ballinger Way/15th NE	Northbound dual left turn lanes and dual through lanes. Widen south leg of 15th NE	$400	25				50	75	3
N 195th St: from Meridian Ave N to 5th Ave NE	Construct new 2-lane Collector Arterial	$5,110	0	0	0	75	0	75	3
NE 185th St/10th Ave NE	Install new signal	$220	0	0	10	0	50	60	3
NE 165th St: from 15th Ave NE to 25th Ave NE	Construct new 2-lane Collector Arterial	$5,110	0	0	10	50	0	60	3
NE 155th St: from 15th NE to 25th NE	Construct new Neighborhood Collector	not estimated						0	n/a

Appendix 6-1

Project Recommendations

APPENDIX 6-1. TMP PROJECT RECOMMENDATIONS

PROJECTS	Project Costs 2004 - 2009	City Revenue 2004 - 2009	Grants 2004 - 2009	Project Costs 2010 - 2024	Comments
PEDESTRIAN/ NONMOTORIZED PROJECTS					
interurban Trail	$1,740	$631	$1,109		
interurban trail ped crossing	$3,484	$517	$2,967		
interurban trail north central segment	$2,430	$486	$1,944		
curb ramps program	$300	$300	$300		
pedestrian program	$600	$300	$300	**$840**	
NW 175th St: 6th Ave NW to Dayton Ave N (one side of street)				**$1,289**	setback for future bike lanes; assume 20% grant funding
Dayton Ave N: Carlyle Hall Rd to N 175th				**$1,558**	
N 172nd St: Dayton Ave N to Fremont Ave N				**$357**	
3rd Ave NW: NW Richmond Beach Rd to NW 195th St (one side)				**$818**	
N 175th and Midvale Ave N Corridors Subarea Project Placeholder				**$2,779**	Coordinate with planning study; assume 50% grant funding
NE 185th Street: 5th Ave NE to 10th Ave NE: Restriping, shared roadway, both sides				**$120**	see roadway restriping placeholder
25th NE: NE 145th to NE 168th parking restrictions				N/A	
NE 155th St: 5th NE to 15th NE complete bike lanes and restrict parking				**$22**	

ATTACHMENT 6-1. TMP PROJECT RECOMMENDATIONS - Continued

PROJECTS	Project Costs 2004 - 2009	City Revenue 2004 - 2009	Grants 2004 - 2009	Project Costs 2010 - 2024	Comments
SYSTEM PRESERVATION PROJECTS					
annual road surface maintenance program	$3,200	$3,200		**$9,800**	full funding restored
advanced transportation right of way acquisition	$80	$80		$280	
annual sidewalk repair program	$300	$300		$700	
richmond beach overcrossing 167OX	$2,153	$344	$1,809		
SAFETY/OPERATIONS PROJECTS					
transportation improvements CIP project formulation	$240	$240		$560	
N 185th and Aurora intersection - preliminary study	$40	$40			
neighborhood traffic safety program	$966	$966		$2,254	
aurora 145 - 165	$20,283	$1,454	$18,829		
aurora 165 - 205	$59,790	$10,554	$49,236		
NCBD/15th Ave improvements	$3,465	$3,281	$184		
North 160th Street@greenwood ave north pre design study	$50	$50			
dayton avenue north@175th street retaining wall	$310	$310			
5th avenue NE street drainage improvements	$166	$116	$50		
TMP	$109	$109			

APPENDIX 6-1. TMP PROJECT RECOMMENDATIONS - Continued

PROJECTS	Project Costs 2004 - 2009	City Revenue 2004 - 2009	Grants 2004 - 2009	Project Costs 2010 - 2024	Comments
Safety Management Program (candidate projects may include)				**$1,000**	assume $200K grant funds
street lighting standards and financing plan (50K)					
NE 185th St/10th Ave NE: install new signal ($220K)					
Meridian Ave N/N 175th Street Corridors Subarea Project Placeholder				**$2,060**	Coordinate with subarea and LOS studies. 25% grant candidate (concurrency elements)
Midvale Ave N: N 190th to N 192nd				**N/A**	Developer funded
NE 175th St/15th Ave NE: Intersection analysis and improvements				**$1,290**	concurrency; assume 50% grant funding

APPENDIX 6-1. TMP PROJECT RECOMMENDATIONS - Continued

PROJECTS	Project Costs 2004 - 2009	City Revenue 2004 - 2009	Grants 2004 - 2009	Project Costs 2010 - 2024	Comments
PLANNING STUDIES (candidate studies are listed below)					
N 175th and Meridian Ave N Corridor Subarea Study				$185	See project funding placeholders above
Multimodal Level of Service Study				$50	
Richmond Beach Road: Aurora to Puget Sound				$100	
Ballinger Way under I-5 ped bike connections				$50	
Transit Plan				$100	
Green Street initial corridor selection and predesign				$50	50% match with storm drainage
CIP REVENUE 2004-2009	$99,706	$23,278			
LOCAL REVENUE 2010 - 2024	$23,842				
ASSUMED NEW GRANTS 2010 - 2024	$2,503				
LOCAL REVENUE FORECAST 2004 - 2024	$47,120	$47,120			
TOTAL REVENUE	$126,051				
CIP PROJECTS 2004-2009	$99,706				
PROGRAM FUNDING 2010-2024	$15,434				
PLANNING STUDIES	$535				
NEW PROJECTS 2010-2024	$10,293				
TOTAL PROJECTS	$125,968				

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Appendix 6-2
New Project Cross Reference

Appendix 6-2. Evaluated Projects Cross-Reference (sorted by street name)

Project No.	Location/Segment	Improvement	Side of the Street	2004 Total Project Cost ($M)	Adjacent project	see sidewalk project	see roadway project	see bike project
17	25th Ave NE: NE 175th St to NE 168th St	sidewalk	Both	0.844	**18a**			**b15**
18a	25th Ave NE: NE 168th St to NE 165th St	sidewalk	West	0.260	**17, 18b**			**b15**
18b	25th Ave NE: NE 165th St to NE 150th St	sidewalk	East	1.282	**18a, 20**			**b15**
20	25th Ave NE: NE 150th St to NE 145th St	sidewalk	Both	0.844	**18b**			**b15**
b15	25th Avenue NE: NE 145th St to NE 170th St	3' widened curb lane, both sides	Both	2.148		**17a, b, 20**		
b1	20th Avenue NW: NW 195th St to NW 190th St	10' off-road asphalt trail, one side	one side	0.522	**b3**			
49	24th Ave NE: 15th Ave NE to 25th Ave NE	sidewalk	Both	1.656	**47**			**b19**
b19	24th Avenue NE: 15th Ave NE to city limits	3' widened curb lane, both sides	Both	0.811	**b20**	**49**		
36a	3rd Ave NW: NW 195th St to NW 205th St	sidewalk	Both	1.720	**36b**			
36b	3rd Ave NW: NW Richmond Beach Rd to NW 195th St	sidewalk	Both	1.298	**36a**			
new	10th Ave NE: NE158th to NE 162nd	sidewalk	Both	0.584	**new**			**b16**
new	10th Ave NE: NE 175th to NE 185th	sidewalk	Both	1.753	**51, new**		**x**	**b16**
51	10th Ave NE: NE 185th St to NE 195th St	sidewalk	Both	1.688	**new**			**b16**
new	10th Ave NE: NE 165th to NE 175th	sidewalk	Both	1.720	**new**			**b16**
new	10th Ave NE: NE 162nd to NE 165th	sidewalk	East	0.292	**new**			**b16**
b16	10th Avenue NE: NE 155th St to NE 195th St	10' off-road asphalt trail, one side	one side	4.080		**51, new**	**x**	
35b	6th Ave NW: NW 180th St to NW 175th St	sidewalk	Both	0.876	**11b, new**			**b6**
b11	NW 200th Street: 8th Ave NW to Aurora Ave N	5' asphalt trails, both sides	Both	2.279				
b3	NW Richmond Beach Road/NW 195th St: 20th Ave NW to Dayton Ave N	Restriping for 5' bike lanes, both sides, built as part of roadway project	Both	0.062	**b4**		**x**	
b4	NW Richmond Beach Road/N 185th Street: Dayton Ave N to Stone Ave N	Restriping, shared roadway, both sides	Both	0.028	**b3**			
b7	NW 175th Street: 6th Ave NW to Dayton Ave N	5' bike lanes, both sides	Both	1.243	**b6**	**11b**	**x**	
11b	NW 175th St: 6th Ave NW to Dayton Ave N (to St. Luke Place?)	sidewalk	Both	2.045	**35b**			**b7**
b2	NW 196th Street: 20th Ave NW to 24th Ave NW	Restriping for 5' bike lanes, both sides, built as part of roadway project	Both	0.013	**b3**		**x**	
new	NW 195th: 8th Ave NW to Palatine Ave NW	sidewalk	Both	1.526	**new**			
new	NW 195th: Palatine Ave N to Fremont Ave N	sidewalk	North	0.471	**new**			
new	NW 195th: Greenwood to Dayton	sidewalk	South	0.179	**new**			
new	NW 180th St: 8th Ave NW to 6th Ave NW	sidewalk	Both	0.422	**36b**			**b6**

Appendix 6-2. Evaluated Projects Cross-Reference (sorted by street name)

Project No.	Location/Segment	Improvement	Side of the Street	2004 Total Project Cost ($M)	Adjacent project	see sidewalk project	see roadway project	see bike project
23	NW Innis Arden Way: NW 167th St to Greenwood Ave N	sidewalk	Both	3.181	**new**		**x**	
new	NE 25th: 195th to 205th	sidewalk	Both	1.753	**8**			
52	NE Perkins Way: 10th Ave NE to 15th Ave NE	sidewalk	Both	1.234	**47, 51, new**		**x**	**b18**
b18	NE Perkins Way: 10th Ave NE to 15th Ave NE	3' widened curb lane, both sides	Both	0.605	**b20, b16**	**52**	**x**	
new	NE 165th : NE 6th to NE 5th	sidewalk	Both	0.195				
new	NE 165th: 15th NE to 25th NE	sidewalk	Both	1.753	**new**		**x**	
new	NE 165th: 10th Ave NE to 15th Ave NE	sidewalk	South	0.438	**new**			
16	NE 175th/171st: 15th NE to 25th NE	sidewalk	Both	1.948	**17**			
new	N 195th: Wallingford Ave N to 1st NE	sidewalk	Both	1.298	**new**			
b13	NE 155th Street: 5th Ave NE to 15th Ave NE	Restriping and signage, shared roadway, both sides	Both	0.022				
55	NE 150th St: 15th Ave NE to 25th Ave NE	sidewalk	Both	1.753				**b14**
b14	NE 150th Street: 15th Ave NE to 25th Ave NE	3' widened curb lane, both sides	Both	0.843		**b55**		
new	NE 185th: 10th Ave NE to 8th Ave NE	sidewalk	Both	0.876				**b17**
b17	NE 185th Street: 5th Ave NE to 10th Ave NE	Restriping, shared roadway, both sides	Both	0.012	**new**	**new**		
new	NE 180th: NE 10th to NE 15th	sidewalk	Both	0.844	**47**			
b12	N 200th Street: Aurora Ave N to Ashworth Ave N	5' asphalt trails, both sides	Both	0.603				
22	N 165th St: Dayton Ave N to Aurora Ave North	sidewalk	Both	1.558	**39c**		**x**	**b8**
new	N 165th/I-5 Overpass Design Study			0.050				
b9	N 160th Street: Dayton Ave N to Aurora Ave N	Design study for connection to Interurban Trail		0.000	**b10**		**X**	
new	N 172nd St: Dayton Ave N to Fremont Ave N	sidewalk	Both	0.357	**39c**			
new	N 175th: Midvale to Meridian	sidewalk	Both	0.747			**x**	
new	N 195th: Ashworth to Wallingford	sidewalk	North	0.227				**b21**
b21	N 195th Street: Ashworth Ave N to 10th Ave NE	10' off-road asphalt trail, one side	one side	2.030		**new**	**X**	
b10	N 155th Street: Aurora Ave N to Midvale Ave N	Design study for connection to Interurban Trail		0.000	**b9**			
8	NE Ballinger Way: 19th Ave NE to 25th Ave NE	sidewalk	South	0.714	**new**		**x**	
44	Meridian Ave N: N 175th St to N 172nd St	sidewalk	East	0.276	**new**			
new	Greenwood Ave N: N 160th to Carlyle Hall Road N	sidewalk	Both	1.234	**23**			
40a	Fremont Ave N: N 165th St to N 175th St	sidewalk	Both	1.720	**new**			
new	Fremont Ave N: N 175th St to N 205th St (formerly 40b,c,d)	sidewalk	Both	5.129	**40a**			

Appendix 6-2. Evaluated Projects Cross-Reference (sorted by street name)

Project No.	Location/Segment	Improvement	Side of the Street	2004 Total Project Cost ($M)	Adjacent project	see sidewalk project	see roadway project	see bike project
new	1st NE: N 192nd to N 195th	sidewalk	Both	0.519	**b21, new**			
46	5th Ave NE: NE 175th St to NE 185th St	sidewalk	Both	1.818	**45a**			
45a	5th Ave NE: NE 185th St to NE 195th St	sidewalk	Both	1.720	**46**			
47	15th Ave NE: NE Perkins Way to NE 180th St	sidewalk	West	0.812	**52**			
48	15th Ave NE: NE 165th St to NE 150th St	sidewalk	East	1.298				
b20	15th Avenue NE: NE Perkins Way to 24th Ave NE	No improvements, share sidewalk	Both	0.000	**49**			**b18,b19**
33a	8th Ave NW: NW 205th St to NW Richmond Beach Road	sidewalk	Both	2.987	**new**			**b5**
new	8th Ave NW: Richmond Beach Rd to NW 180th	sidewalk	East	0.649	**33a**			
b5	8th Avenue NW: NW 205th St to NW Richmond Beach Rd	3' widened curb lane, both sides	Both	1.464		**33a**		
b6	8th Avenue NW/NW 180th Street/6th Avenue NW: NW Richmond Beach Rd to NW 175th St	5' bike lanes, both sides	Both	1.808	**b7**	**X**		**11b, 35b**
39c	Dayton Ave N: Carlyle Hall Rd to St Luke's School	sidewalk	Both	1.558	**39d, new**			**b8**
39d	Dayton Ave N: St Luke's School (N 175th St) to Richmond Beach Rd	sidewalk	Both	2.045	**39c, new**		**x**	**b8**
new	Dayton Ave: N 172nd to N 175th	sidewalk	Both	0.454	**39c, d**		**x**	**b8**
b8	Dayton Avenue N: NW Richmond Beach Road to Westminster Way N/N 149th St	3' widened curb lane, both sides	Both	3.214		**39c, d, new**	**X**	**b8**
21	Carlyle Hall Rd NW: NW 175th to Dayton Ave N	sidewalk	Both	2.013	**11b, 39c**			
new	Ashworth: N 167th to N 175th	sidewalk	Both	1.298	**new (175th)**			
new	Ashworth: N 185th to N 192nd	sidewalk	Both	1.071	**new (Ashworth)**			
new	Ashworth: N 195th to N 200th	sidewalk	Both	0.876	**b21, new (Ashworth, N. 195th)**			
new	Ashworth: 145th N to 155th N	sidewalk	Both	1.720				
new	Ashworth: N 195th to N 192nd	sidewalk	West	0.325	**new (Ashworth)**			

Appendix 6-3

Planning Commission Transportation Work Group Street Classification Recommendations

Appendix 6.3 Recommended Changes in Street Classification

Roadway	Recommended Change
All State Routes: **SR 522:** Bothell Way NE **SR 523:** 145th Street N/NE from Lake City Way NE to Greenwood Avenue **SR 99:** Aurora Avenue N from 145th Street N to N 205th Street **SR 104:** Ballinger Way NE/NE 205th from east city limit to Edmonds Way	Reclassify as "Principal Arterial" under City of Shoreline classification system.
NE 205th from Ballinger Way NE to east city limits	Change from "outside Shoreline" to Minor Arterial
FORMERLY MINOR ARTERIALS	
10TH Avenue NE/NE Perkins Street from NE 185th Street to 15th Avenue NE	Change to Collector Arterial
205th from 3rd NW to 8th NW	To Collector Arterial (previously "outside Shoreline)
FORMERLY COLLECTOR ARTERIALS	
5TH Avenue NE from NE 185th to NE 205th Street	Change to Neighborhood Collector
Richmond Beach Drive between NW 196th and NW 195th	Change to Neighborhood Collector.
NW 195th from Richmond Beach Drive to NW 196th	Change to Neighborhood Collector
20th Avenue NW from NW 195th to RB Saltwater Park	Change to Neighborhood Collector
FORMERLY RESIDENTIAL STREETS	
Fremont Avenue N from N 175th Street to N 165th Street	Change to Collector Arterial
Greenwood Avenue N from Innis Arden Way to Carlyle Hall Road	Change to Collector Arterial
NE 165th Street from 5th Avenue NE to 15th Avenue NE (in the future extend to 25th NE)	Change to Collector Arterial
N 172nd Street from Fremont Avenue N to Dayton Avenue N	Change to Collector Arterial
N 165th Street from Dayton Avenue N to Aurora Avenue N	Change to Collector Arterial
N 167th Street from Ashworth Avenue N to Meridian Avenue N	Change to Neighborhood Collector
Linden Avenue N from N 175th Street to N 185th Street	Change to Neighborhood Collector
3RD Avenue NW from Richmond Beach Road to N 180th Street	Change to Neighborhood Collector
N 165th Street from Aurora Avenue N to Ashworth Avenue N	Change to Neighborhood Collector
N 195th Street from Aurora Avenue N to Fremont Avenue N	Change to Collector Arterial
N 195th Street from Fremont Avenue N to 8th Avenue NW	Change to Neighborhood Collector

Table 2. Continued. (Recommended Changes in Street Classification)

FORMERLY RESIDENTIAL STREET	
1st Avenue NE from NE 185th Street to NE 205th Street	Change to Collector Arterial
10th Avenue NE from NE 155th Street to NE 185th Street	Change to Neighborhood Collector (175th to 185th to be Collector Arterial)
NE 180th Street from 10th Avenue to 15th Avenue NE	Change to Collector Arterial.
Ashworth Avenue N from NE 145th Street to N 200th Street	Change to Neighborhood Collector
NW 175th Street from 6th Avenue NW to 14th Avenue NW	Change to Neighborhood Collector
NW 188th Street to Innis Arden Road/Richmond Beach Road	Change to Neighborhood Collector
25th NE from NE 205th to Ballinger Way	Change to Collector Arterial
NE 195th Street from Ballinger Way to 30th NE	Change to Neighborhood Collector
NW Innis Arden Road from NW 188th Street to 8th Avenue NW	Change to Neighborhood Collector
N 152nd Street from Aurora Avenue N to Ashworth Avenue N	Change to Neighborhood Collector.
N 192nd from Aurora to Ashworth	Neighborhood Collector
FUTURE COLLEFTOR ARTERIAL	
N 195th Street from Meridian Ave N to 5th Avenue NE	Develop this street as a Collector Arterial
NE 165th Street from 15th Avenue NE to 25th Avenue NE	Develop this street as a Collector Arterial
FUTURE NEIGHBORHOOD COLLECTOR	
Extension of NE 155th Street from 15th Avenue NE to 25th Avenue NE as redevelopment in the are occurs	Develop internal streets as Neighborhood Collectors

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Appendix 7-1

Construction Cost Estimates Methodology

Preliminary Construction Cost Estimates

Costs estimates associated with the recommended improvements reflect planning-level assumptions and therefore represent order-of-magnitude rather than absolute costs. Planning level cost estimates are built upon standard unit costs of rights of way and construction materials and do not reflect actual site conditions such as unstable or contaminated soils, unexpected utility needs or exceptional right of way requirements. These conditions generally become apparent upon identification of final alignments and completion of 10% - 30% of project design. Planning level cost estimates include contingencies for these unknowns and are useful starting points for comparing order of magnitude costs between projects and analyzing potential overall capital program costs. Cost estimating methodologies for Shoreline's Transportation Master Plan include the following assumptions:

Pedestrian: The Sidewalk, C&I, and L&I improvements include 6' wide walk, 4' wide planter strip with landscaping and irrigation, and curb & gutter. There is a 50% markup applied for construction contingency, design and construction administration.

Stormwater costs are the same as for Bike projects, and include conveyance, water quality treatment and detention. This cost could be shared with Bike Projects if both are built on same street section.

The Right of Way costs assume 5' of acquisition per side of street at $1.089 million per acre. Roadway widening is not assumed with pedestrian projects.

Bicycle: Costs are divided into into 3 parts: Pavement, Stormwater and Right of Way. The Pavement and Stormwater costs are in 2004 dollars and include a 50% markup to account for construction contingency, design engineering, construction management and administration. The Right of Way costs are based on $25 per square foot or $1.089 million per acre. It has been assumed that new Right of Way is required for every new square foot of Bike improvement.

It is noted that the conveyance portion of the stormwater costs could be shared between Bike and Ped projects for the same section of street. This could reduce the 3' and 5' both-sides project costs by $0.317 million per mile based on a conveyance cost of $60 per linear foot. The TMP cost estimates do not reflect this potential stormwater cost savings.

Roadway: Project assumptions include widening costs at $6.21 million per mile. New roadway costs $10 million per mile. Typical signals are estimated at approximately $250,000.