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 SAZ's to the PSRC's TAZs

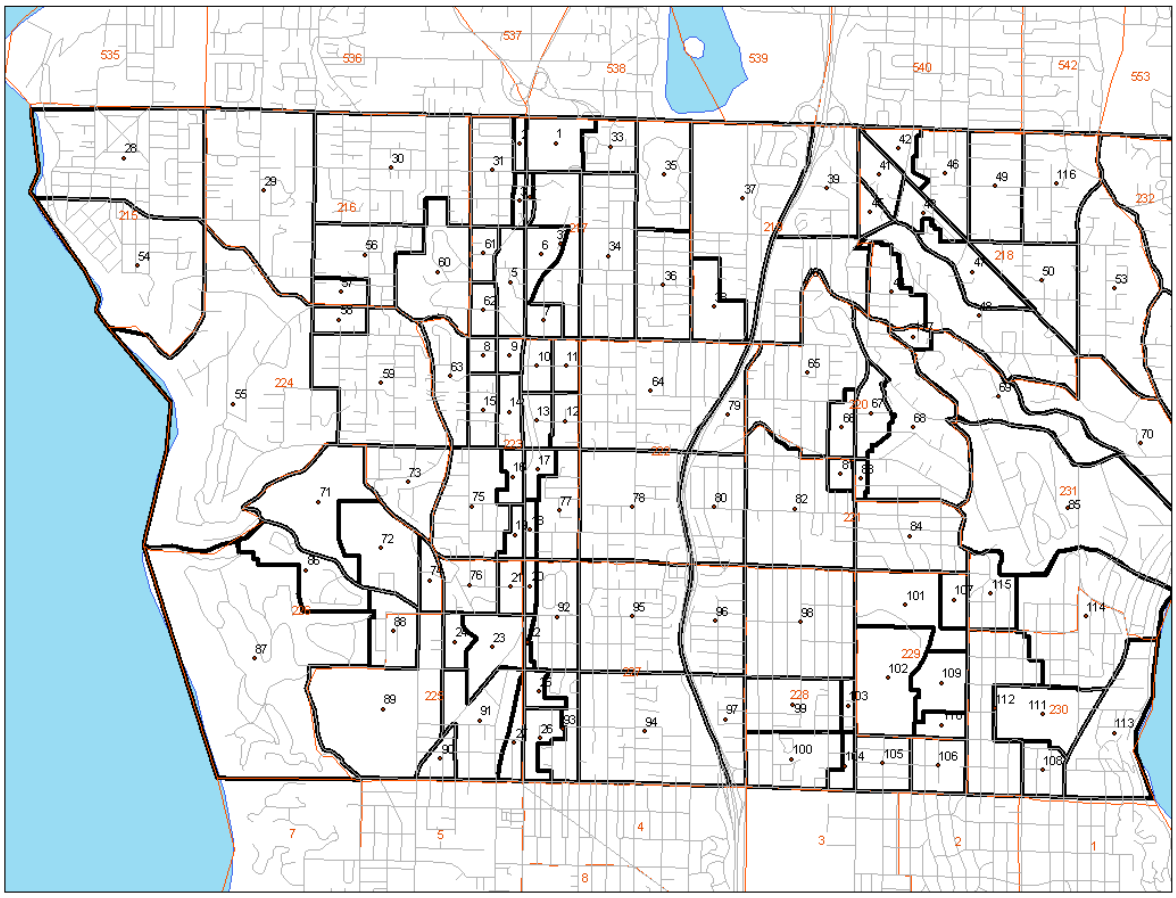
Current Year Land Use Data Refinement

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)

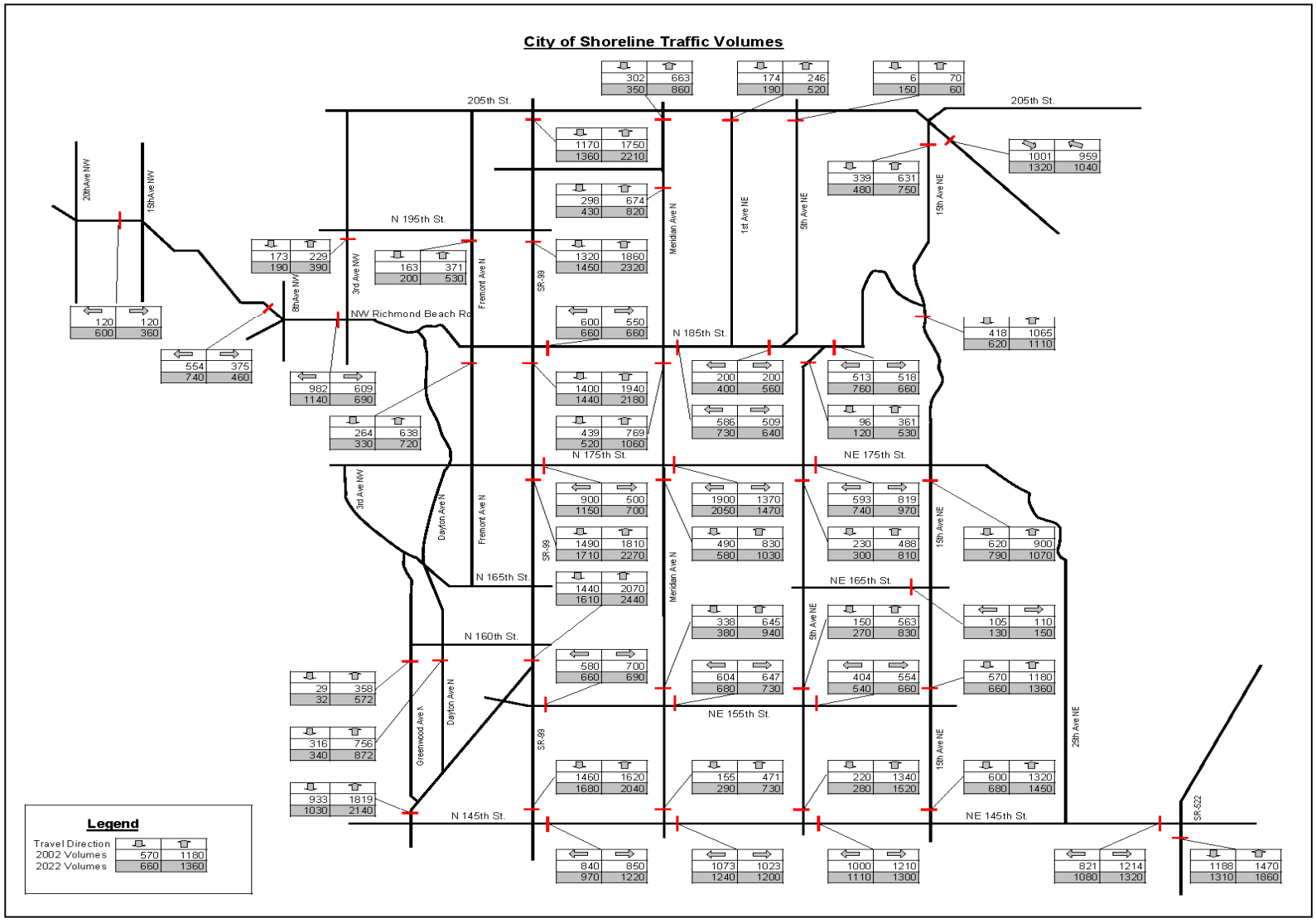
As shown in **Figure 3-2** above, it is forecasted that the traffic volumes on Aurora Avenue N throughout the City will increase. During the PM peak hour, the volume of the increase will be about 200 to 400 vehicles per hour. The 2002 and 2022 levels of service for the intersections on Aurora Avenue 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 those streets (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



(available in 11" x 17" format)