

Chapter 3 Existing and Future Traffic Conditions

This chapter describes existing (2004) and projected (2030) traffic conditions along the SR 169 corridor including expected increases in traffic volumes and vehicle delay. The chapter also describes how the expected increases will affect the operating condition and travel times at key intersections and various sections of the highway. Current safety conditions and recent SR 169 collision history are also presented in this chapter.

1 What are the overall SR 169 Corridor traffic and growth trends?

WSDOT is the agency charged by the legislature with developing and managing the transportation system. A significant part of that obligation is responding to demands on the state transportation infrastructure. Increases in traffic volumes are frequently the result of many new residential and commercial developments placed further and further from the established metropolitan job centers. WSDOT is not the permitting agency for this non-centralized growth. That responsibility usually falls to the local jurisdictions.

The SR 169 corridor has experienced increased residential development and population growth over the last several years. These increases along the corridor and in the surrounding areas have created additional travel demand on SR 169 and the area's local roadways. As new developments are constructed in yet untouched portions

**Exhibit 3.1
SR 169 Vicinity Map**



For a larger view of the SR 169 Corridor go to map in Exhibit 2.1, on page 2-2.

of Enumclaw, Black Diamond, and Maple Valley in accordance with recently updated comprehensive plans, the demand placed on the existing highway network will continue to increase.

2 What is the jobs/housing balance for the SR 169 corridor vicinity?

A jobs/housing balance is shown as a ratio of jobs per household. When an area studied registers a 1.00 it means the area has an equal number of jobs to housing units. When the ratio is over 1.00 it means the area is actually importing jobs from other nearby “home rich” or “bedroom communities”. The usual desired jobs/housing balance is reached at about 1.50 jobs per household.

The SR 169 corridor surrounding area has experienced considerable growth in the last 20 years (a 70% increase in households and a 117% increase in jobs).¹ See Exhibit 3.2 on page 3-4. The SR 169 corridor vicinity went from a 0.64 jobs

¹ Source: Puget Sound Regional Council (PSRC) Draft 2006 Sub-County Forecasts for Population and Employment (REVISED Version, Oct 2006). Source data was used for comparison purposes. Data is based on a Forecast Analysis Zone (FAZ). The PSRC prepares small area forecasts of households and employment, in order to meet the requirements of federal legislation and data needs for land use and transportation modeling. Nine (9) FAZs were compiled for the data used in these graphs. The nine FAZs are the closest FAZs in proximity to the SR 169 corridor. The FAZs are:

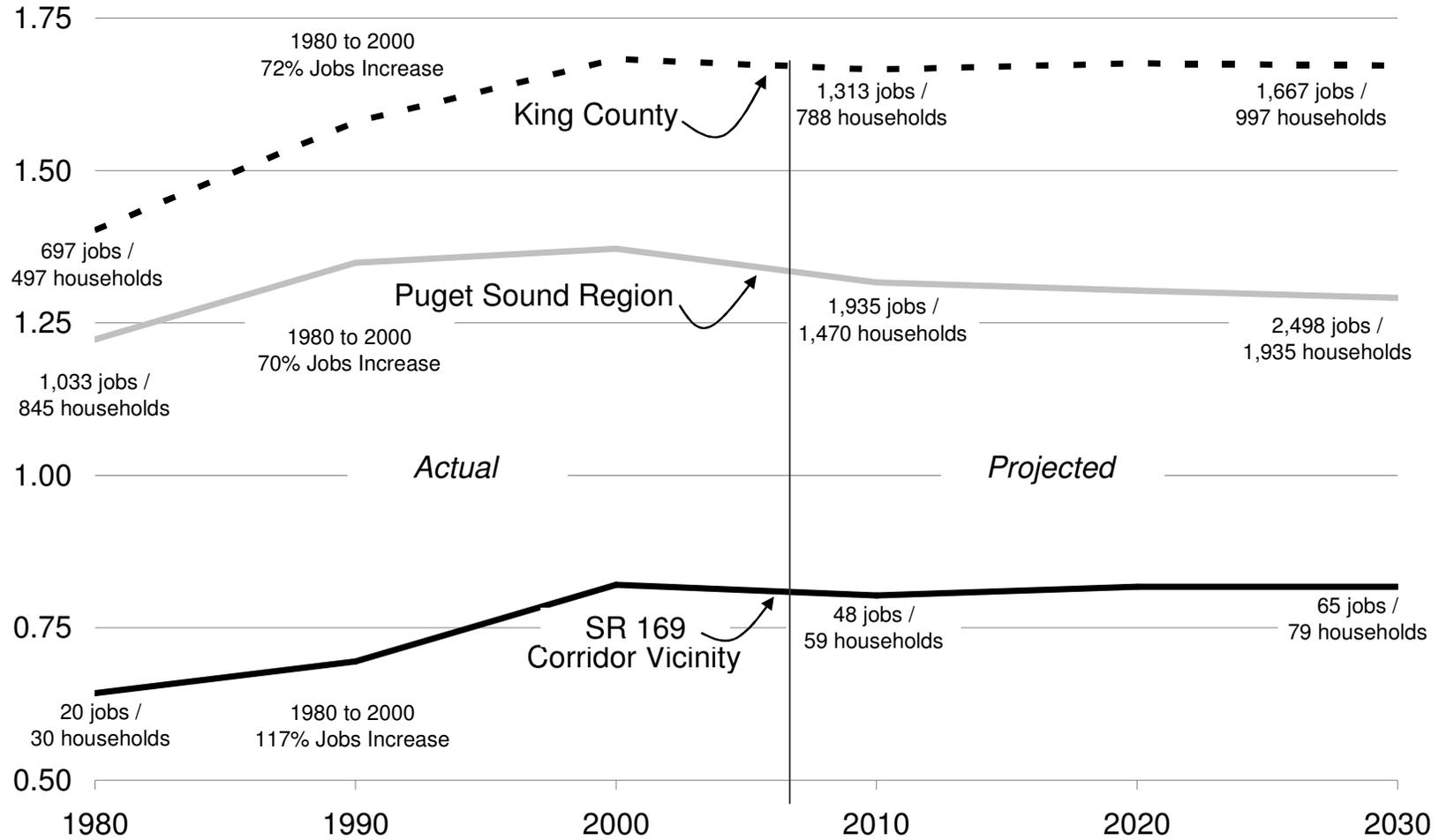
- FAZ 3200 – Enumclaw Plateau;
- FAZ 3310 – Black Diamond / Lake Sawyer;
- FAZ 3320 – Covington / Timberline;
- FAZ 3330 – Maple Valley / Hobart;
- FAZ 3413 – Lake Youngs;
- FAZ 3416 – Fairwood;
- FAZ 4110 – Renton Industrial;
- FAZ 4120 – Renton Highlands; and
- FAZ 4230 – Renton Plateau;

FAZs may have city names, however, they are made up of Census tracts, so they do not exactly follow city boundaries. FAX map may be found at <http://www.psrc.org/datapubs/data/geo/index.htm>.

Exhibit 3.2

JOBS per HOUSEHOLDS

1980 to 2030 (Jobs and Households totals are in thousands)



Source: Puget Sound Regional Council (PSRC) Draft 2006 Sub-County Forecasts for Population and Employment (REVISED Version, Oct 2006).

per household in 1980 to 0.82 jobs per household in 2000. Even with this significant 117% growth in jobs the data still displays a jobs/housing imbalance.

The jobs/housing data also shows that King County and the larger (four county) Puget Sound Region also experienced large growth in jobs from 1980 to 2000 (King County – 72% jobs increase; Puget Sound Region – 70% jobs increase).

The current data and the future estimates lead to the conclusion that the SR 169 Corridor will not continue to see significant rises in employment, but will continue to see a steady rise in homes, thus putting more pressure on SR 169 to deliver these suburban workers to their jobs elsewhere in Puget Sound.

3 Is there a daily SR 169 traffic pattern?

SR 169, like many highways on the outskirts of metropolitan Puget Sound, has a predominantly heavy traffic flow during the morning toward regional employment centers (northbound on SR 169). During the afternoon commute hours the traffic volumes then reverse and are heavy southbound toward the more residential areas. The heaviest of these morning and afternoon commute hours are referred to as the AM peak hour and PM peak hour, respectively.

Traffic Volumes

4 What are the current traffic volumes on SR 169?

The traffic volumes along SR 169 increase as one travels the corridor from south to north. Predictably the average daily traffic (ADT) volumes are higher within the city limits of Enumclaw, Black Diamond, Maple Valley and Renton than they are in the rural King County sections of the highway. Exhibit 3.3 on page 3-5, and the following bullet highlights, display the SR 169 ADT ranges for 2004 and the projected ADT ranges for 2030.

Exhibit 3.2
Average Daily Traffic Volumes
 (2004 – 2030)

Highway Segment	Milepost	Number of Lanes	2004 ADT Range	2030 ADT Range	Growth from 2004 – 2030
Enumclaw	0.00 to 1.67	2 lanes	8,300 – 9,900	11,400 – 16,000	37 – 62%
Rural / Agricultural	1.67 to 6.02	2 lanes	8,200 – 9,300	13,900 – 16,800	70 – 81%
Black Diamond	6.02 to 10.02	2 lanes	8,400 – 13,200	16,000 – 23,700	80 – 91%
Maple Valley	10.02 to 15.07	2 to 5 lanes	11,900 – 39,700	15,600 – 58,100	31 – 46%
Cedar River	15.07 to 19.22	2 lanes	19,000 – 19,400	25,300 – 25,600	32 – 33%
Renton	19.22 to 25.26	5 lanes	19,900 – 55,100	37,000 – 71,800	30 – 86%

The projected average daily traffic volumes for 2030 were developed using the current King County Travel Demand model (KC model). The KC model projects travel demand based on estimated growth in employment and population.

Adjustments were made to the KC model to incorporate employment growth, population projections, and current land use plans for the jurisdictions along SR 169. The 2004 data above reveals:

- Traffic volumes are relatively low on the southern most ten miles of the corridor (between Enumclaw and Maple Valley) indicating rural and low intensity urban land use designations in this general area.
- Traffic volumes spike significantly in the city of Maple Valley due to the permitting and construction of numerous residential developments in and around this small city.
- The ADT range in the Cedar River segment is very small indicating most drivers are passing through this segment.
- In the Renton segment, the ADT range is very wide indicating much more intensive land use as the highway approaches I-405.

5 What are the current heavy vehicle traffic volumes on SR 169?

The current heavy vehicle traffic volumes along SR 169 are highest in the middle of the corridor in Maple Valley. Vehicle classification counts for the entire day were collected during the fall of 2004 at a number of sites along the corridor. Heavy vehicles usually refer to the class of vehicles with more than four tires and include RV’s, delivery trucks, and semi-trucks. On a daily basis, the percentage of heavy vehicles range between 9 percent and 20 percent along the corridor.

Exhibit 3.4
Daily Heavy Vehicle Traffic Volumes
 (Fall 2004)

Highway Area	Percentage of Average Daily Traffic Volumes
Within Enumclaw	9 %
Enumclaw to Black Diamond	20 %
Maple Valley (SR 169 / SR 516 junction)	14 %
North of Maple Valley	10 %

6 What are the projected (2030) traffic volumes on SR 169?

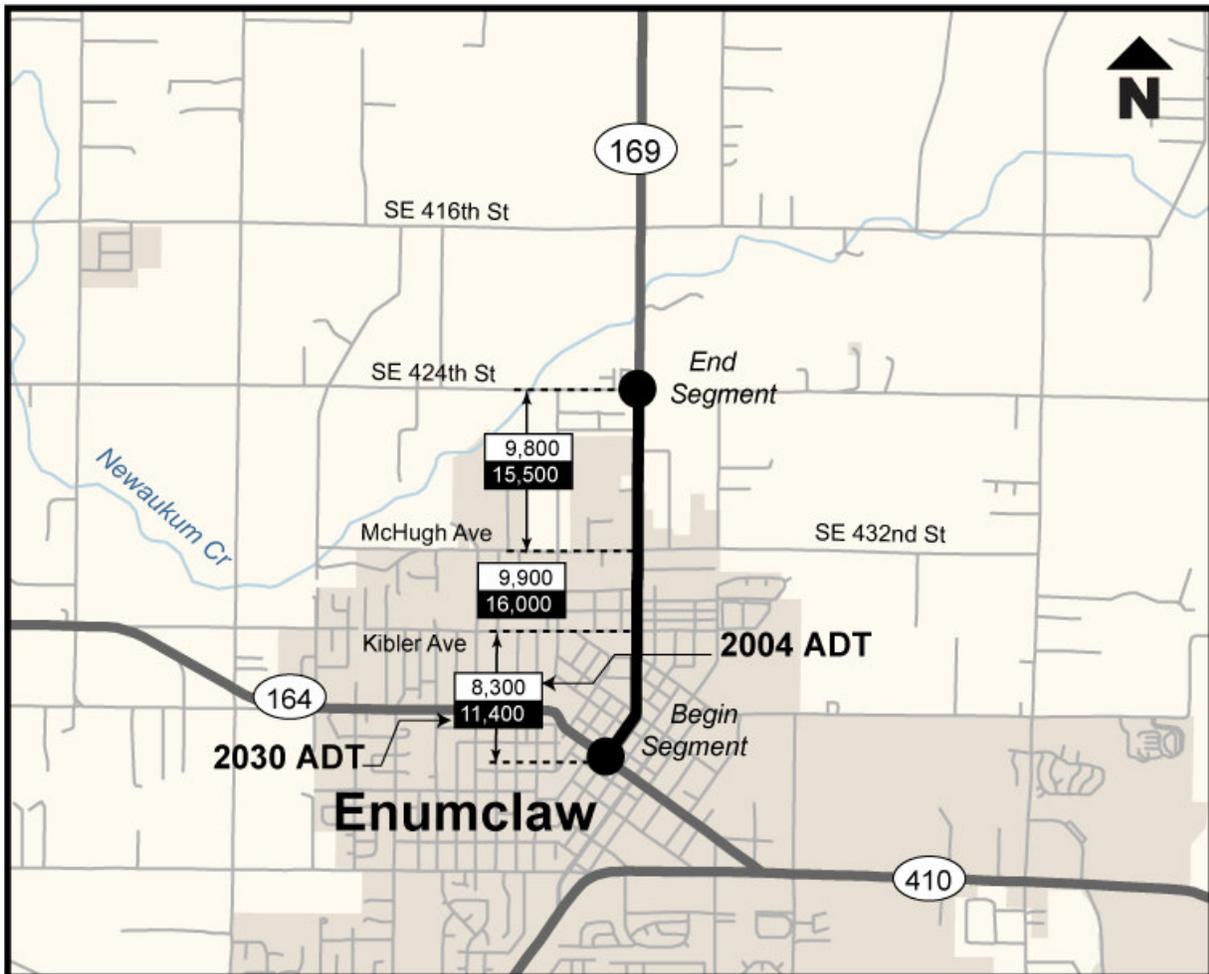
SR 169 average daily traffic volumes are predicted to significantly jump between 30 and 91 percent by the year 2030.² The largest percent growth is projected to occur in the Rural / Agricultural and Black Diamond segments. These two segments currently feature predominantly two-lane highway alignments. Although the percentage of growth is high, total projected 2030 traffic volumes are not expected to exceed the capacity of the existing highway.

² The year 2030 was chosen as the future year planning horizon for analysis in this Route Development Plan.

Year 2030 projections represent a version of the future year 2030 where no new additional capacity improvements would be built other than those that are already funded and slated to be implemented.

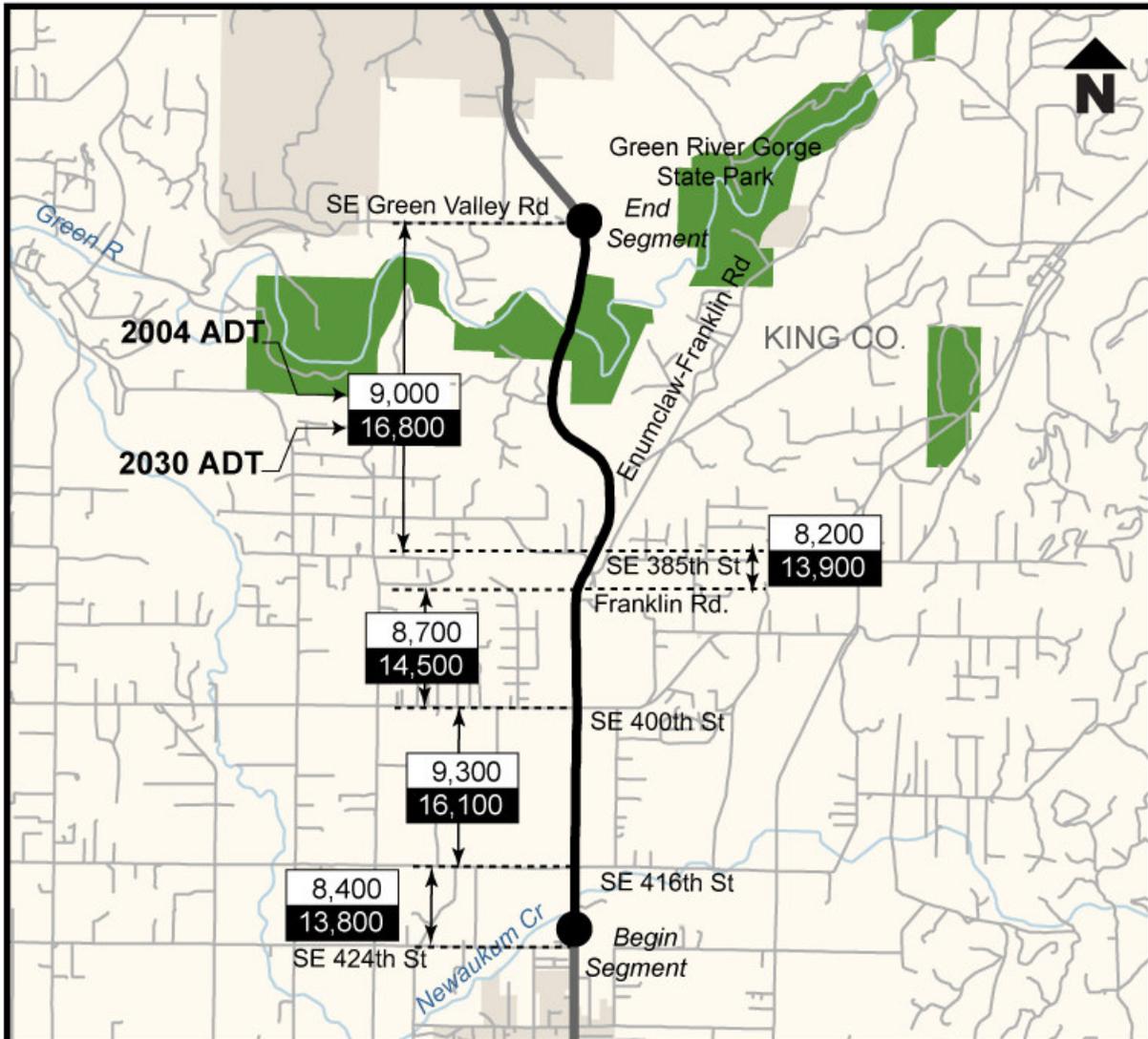
The highest projected 2030 ADTs are in sections of SR 169 that currently have five lanes and are near access points to high volume state highways (Renton – near the I-405 interchange and Maple Valley – at SE 231st near the SR 18 access ramps). A more detailed look at ADT volumes within each analyzed segment for 2004 and predicted 2030 is shown below in Exhibits 3.5 through 3.10.

**Exhibit 3.5
Enumclaw Segment - Existing and Future ADT Volumes**



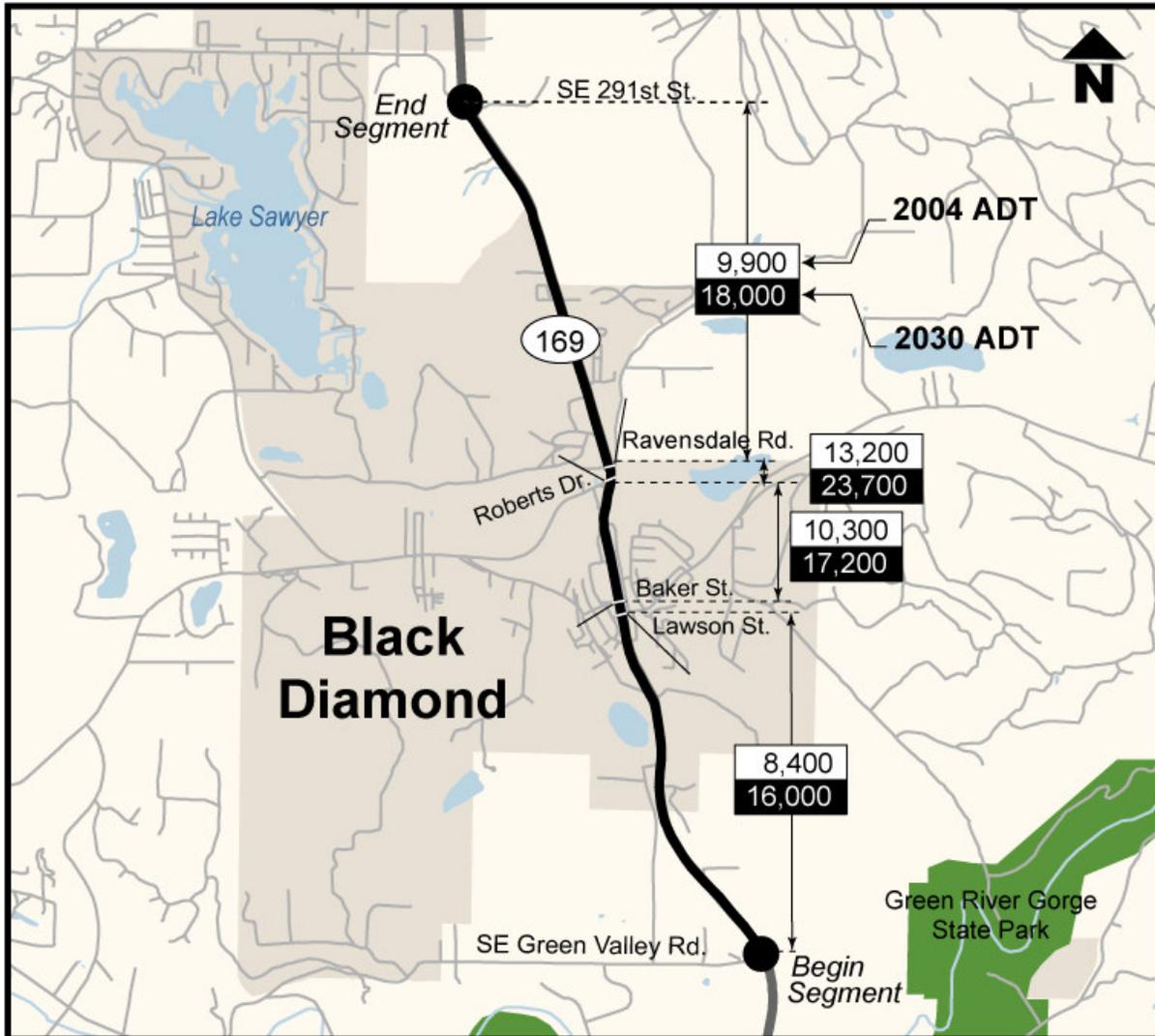
*Traffic Volumes shown represent Average Daily Traffic (ADT) for 2004 (existing) and 2030 (future) traffic conditions.

Exhibit 3.6
Rural / Agricultural Segment – Existing and Future ADT Volumes



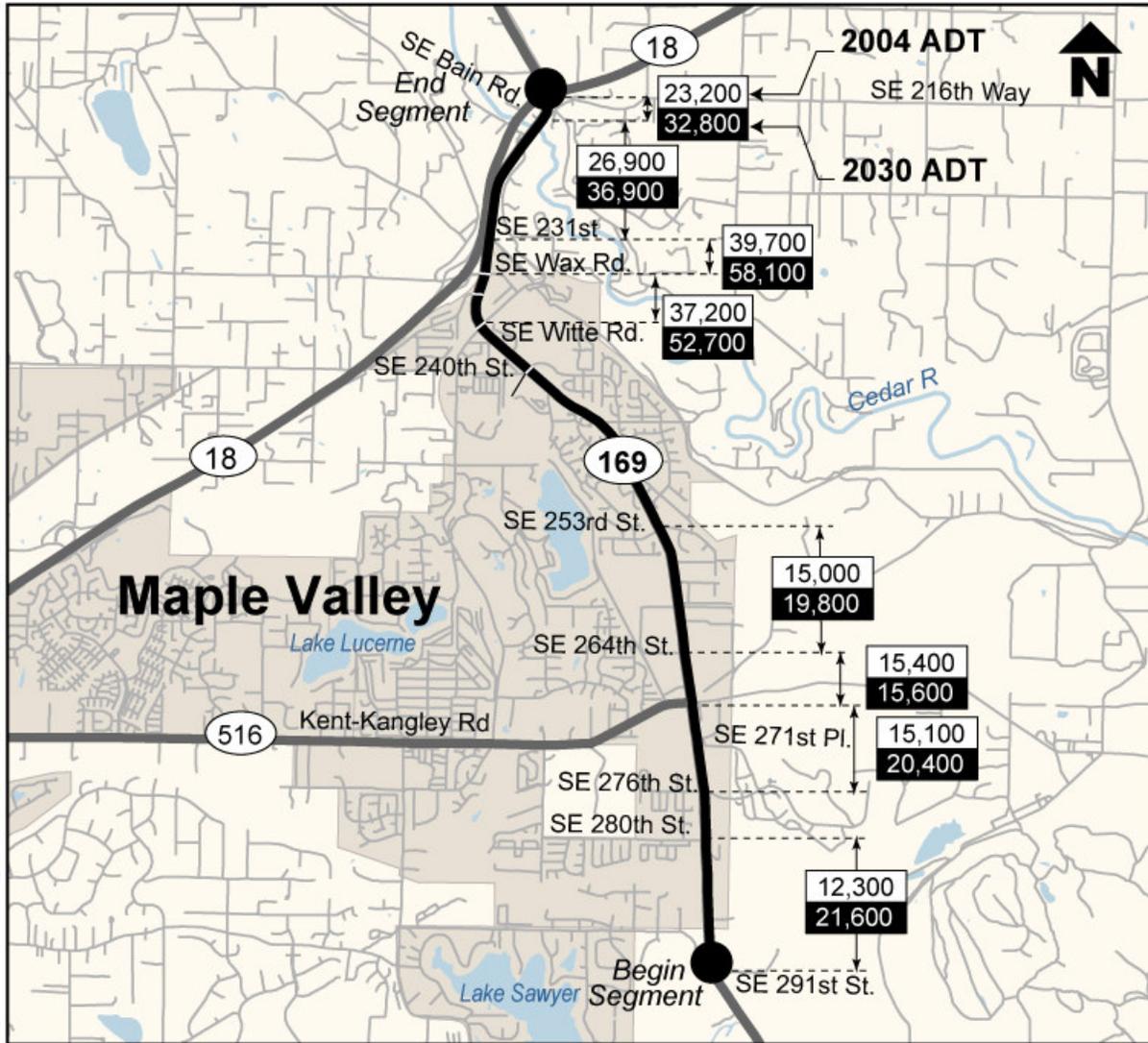
Traffic volumes shown represent Average Daily Traffic (ADT) for 2004 (existing) and 2030 (future) traffic conditions.

**Exhibit 3.7
Black Diamond Segment – Existing and Future ADT Volumes**



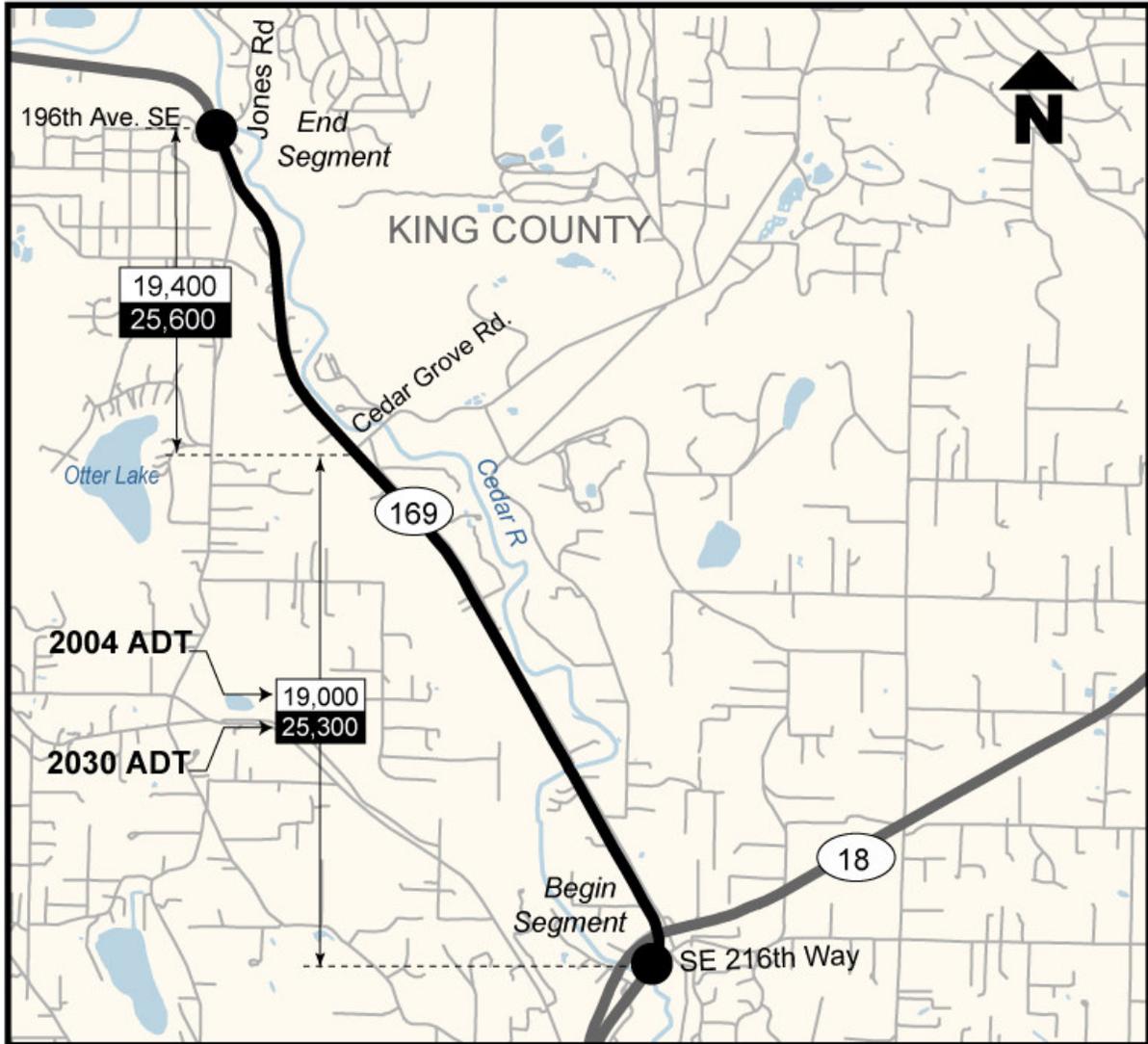
Traffic volumes shown represent Average Daily Traffic (ADT) for 2004 (existing) and 2030 (future) traffic conditions.

**Exhibit 3.8
Maple Valley Segment – Existing and Future ADT Volumes**



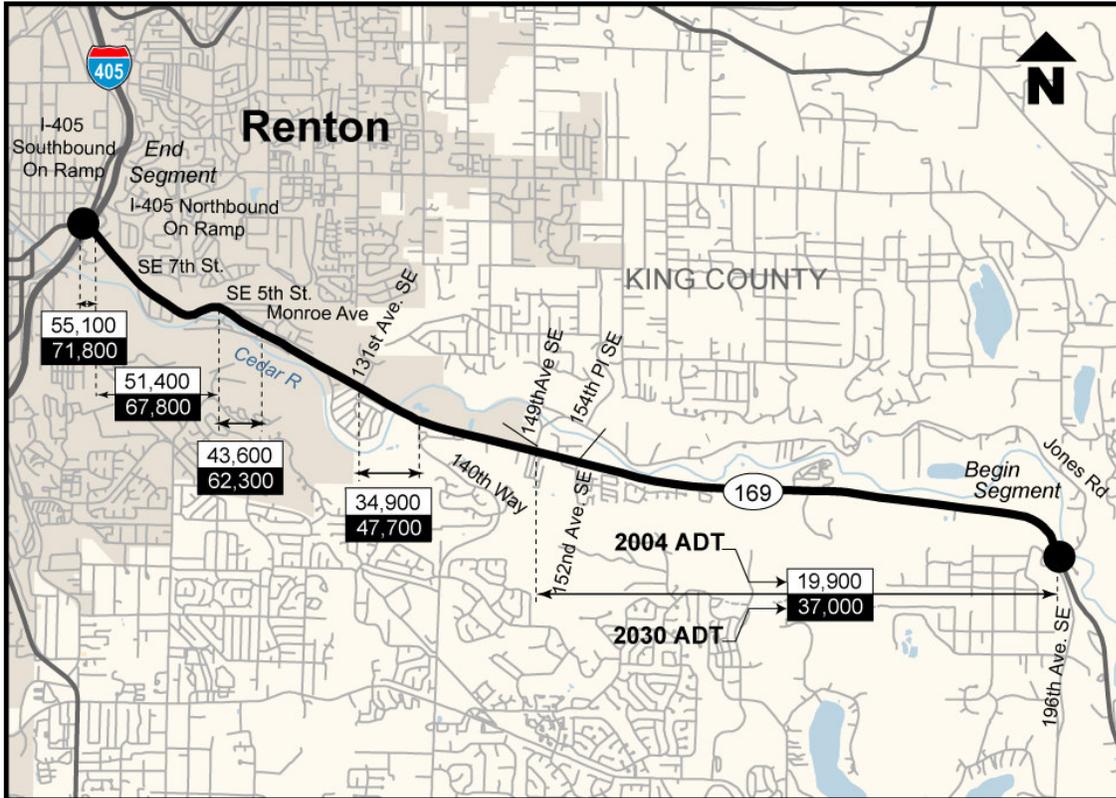
Traffic volumes shown represent Average Daily Traffic (ADT) for 2004 (existing) and 2030 (future) traffic conditions.

**Exhibit 3.9
Cedar River Segment – Existing and Future ADT Volumes**



Traffic volumes shown represent Average Daily Traffic (ADT) for 2004 (existing) and 2030 (future) traffic conditions.

**Exhibit 3.10
Renton Segment – Existing and Future ADT Volumes**



Traffic volumes shown represent Average Daily Traffic (ADT) for 2004 (existing) and 2030 (future) traffic conditions.

Intersection Level of Service

7 How is traffic operational analysis performed and what is LOS?

Traffic operational analysis uses six grades of level-of-service (LOS). Each grade is designated a letter in the range of A through F, with “LOS A” representing the best operating conditions and “LOS F” the worst. Each specific level of service definition varies with the type of transportation facility involved. In general, “LOS A” describes a free-flowing condition in which individual vehicles are not affected by the presence of other vehicles. At the other end of the spectrum, “LOS F” describes a breakdown in operations when traffic arriving at a point is greater than the facility’s capacity to

process the traffic flow; vehicles begin to back up and clog the system.

What was the LOS methodology?

Level of service (LOS) is analyzed for highway intersections and segments of highway. This section of the report discusses intersection LOS. Level of service of various highway sections is discussed later in this chapter.

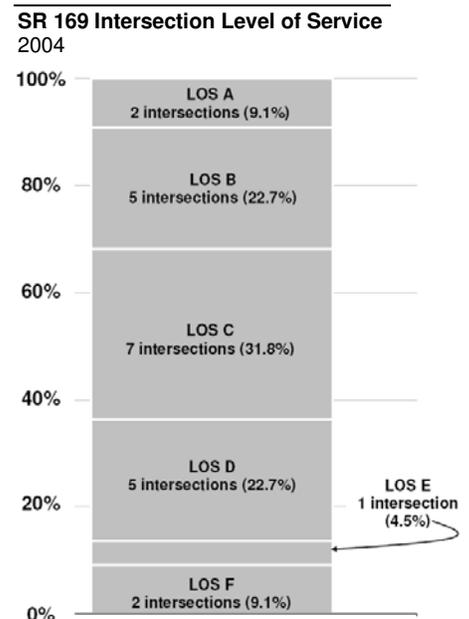
The analysis in this report yields a level of service for each intersection based on the calculated delay an average driver would experience at each intersection. The LOS methodology was based on procedures identified in the Highway Capacity Manual (2000), and the intersections were evaluated using Synchro 6.0 software. The statewide level of service standard for a Highway of Statewide Significance (HSS) in an urban area is LOS D³ (LOS at the SR 169 analyzed intersections is displayed in Exhibit 3.11 on page 3-15 below. The calculated delay of an average driver at those intersections is displayed in Exhibit 3.20 on page 3-27, later in this chapter.).

How do intersections affect delay?

During the AM and PM peak hours, there are certain areas along the corridor that begin to slow down, causing traffic back up and delay. Often it is not just the traffic on the corridor itself, but the vehicles entering the highway at intersections along the corridor that greatly contribute to this delay.

Intersection contributing factors to delay may be:

- Is the intersection signalized?
- How much traffic is going through or turning at the intersection?
- Does the intersection have channelization for a dedicated turn lane?
- What is the volume of traffic entering SR 169 from the intersecting street?



³ During the 2006 Legislative session the Washington State Legislature designated SR 169 as a Highway of Statewide Significance (HSS). The data gathered and analysis performed on SR 169 was done prior to this change in highway classification.

8 What is the current SR 169 intersection LOS?

Twenty-two intersections along SR 169 were analyzed to determine the operational efficiency of the corridor for both existing and future conditions. For comparison in this report, the PM peak hour was calculated, as it is the heavier of the peak hours. Exhibit 3.11 (on page 3-15) summarizes the existing and future LOS per intersection. Intersection LOSs that do not meet (or will not meet) the LOS D standard, are displayed in **bold text**.

The current PM peak hour level of service at most of the analyzed intersections is performing adequately. But a few critical intersections are performing inefficiently. The 2004 data in Exhibit 3.11 displays that 19 (86 percent) of the 22 analyzed intersections are operating at LOS D or better.

Three intersections in 2004 are operating below the LOS D standard. Each of these three intersections currently experiences high traffic volumes in its segment (See Exhibits 3.3 through 3.10 for each segment's current and projected traffic volumes). Improvements are currently funded at two of these remaining intersections:

- SR 169 / SR 516 (Kent-Kangley Rd.), and
- SR 169 / I-405 northbound off ramp.

The one remaining intersection without any funded improvements is the SR 169 / Black Diamond – Ravensdale Rd. intersection which is currently operating at LOS F.

Appendix F

Appendix F contains a summary of SR 169 intersection 2030 LOS information developed for this RDP.
