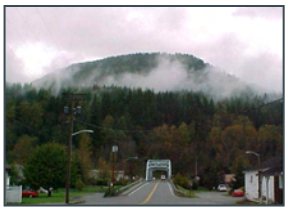


This chapter describes the present conditions along the US 2 corridor, including how changes in adjacent communities have impacted traffic. The study area extends from the City of Snohomish on the west to the Town of Skykomish on the east; a distance of approximately 47 miles.

Chapter 2: Existing Conditions

US Highway 2 represents one of only two year-round highways across the Cascade Mountains in the State of Washington and serves many different functions. For example, the highway serves as both a major freight route and as the “front door” and “main street” to many communities in the corridor. US 2 is also a scenic highway with substantial tourism traffic which adjoining communities rely on for economic sustenance, and it is an alternate route for I-90 when that highway is closed as a result of avalanche control or rock slides.

Chapter 1 included a brief history of the corridor. This chapter provides a description of the current setting – both man made and natural. A more detailed description can be found in Technical Memorandum No. 2, Existing Conditions Report.

1 What is the extent of the study area?

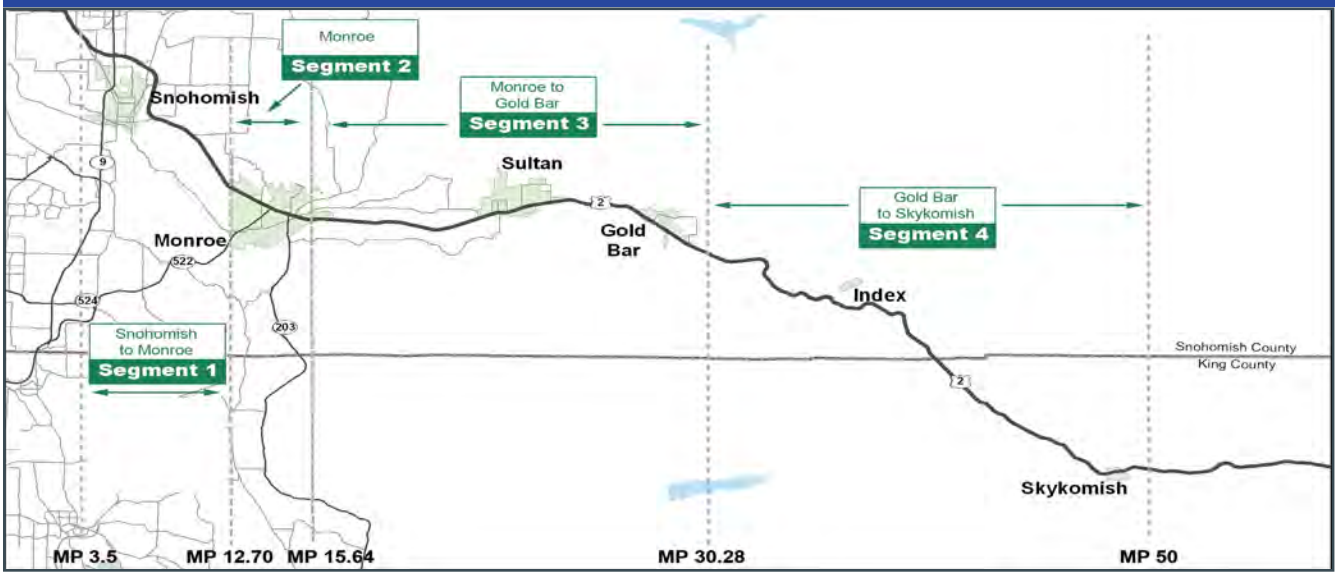
In the state of Washington, US 2 extends a total of 323 miles, from Everett on its west end to Newport and the Idaho border on its east end. The area under study extends from Everett to Skykomish, a distance of approximately 47 miles, running primarily through Snohomish County, with a small section running through King County. Due to the length and diversity of the study area, WSDOT divided it into four segments according to similarities within each segment as described below.

- **Segment 1** (Snohomish to West Monroe, MP 3.50 – MP

12.70): This relatively flat segment of US 2 begins in Snohomish at Bickford Road and continues through undeveloped land, wetlands and farmlands to the west city limits of Monroe.

- **Segment 2** (City of Monroe, MP 12.70 – MP 15.64): Segment 2 is lined by urban development with multiple traffic signals at city intersections. These traffic signals, while permitting ingress traffic from side streets, impede flow along US 2. SR 522 and SR 203, major commuting routes to the Seattle urban area, intersect US 2 within this segment.
- **Segment 3** (East of Monroe to East of Gold Bar, MP 15.64 to MP 30.28): This segment is less developed and lined by forests in many locations. It serves as the main access route for the cities of Sultan and Gold Bar. Homes and businesses along this segment are often built directly adjacent to US 2.
- **Segment 4** (East of Gold Bar to Old Cascade Highway, past the eastern town limits of Skykomish MP 30.28 – MP 50.00): The final segment of the study area climbs into the Cascades. Area communities (Index, Baring, and Skykomish) are not directly adjacent to the corridor. Segment 4 is primarily rural and characterized by sharp curves and reduced sight distance.

Exhibit 2-1. **US 2 Study Area**



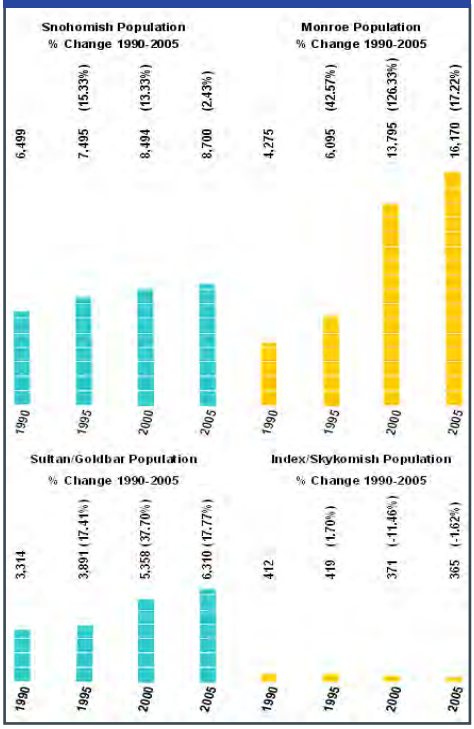
Source: WSDOT

2 How is the area along US 2 changing?

Population

As the Central Puget Sound has grown and become increasingly attractive to both existing residents and individuals relocating to the area, the demand for and cost of housing has increased. One result of this change has been an increasing demand for housing farther and farther from the central employment areas – such as Seattle and Bellevue. Because of the availability of land, services and access to commuter routes (in this case US 2, SR 522, SR 203 and SR 9), the population along three of the four study area segments has also increased, particularly between 1990 and 1995, and 1995 and 2000 (Exhibit 2-2). Of the four segments, Segment 2 (the Monroe area), has experienced the greatest growth – increasing 278% between 1990 and 2005. Of the 11,895 increase in Monroe's population between 1990 and 2005, only 2,120 were a result of annexation. Growth has largely been the result of migration into the area.

Exhibit 2-2. **Population Growth Along US 2, 1990 - 2005 (% change per five years)**



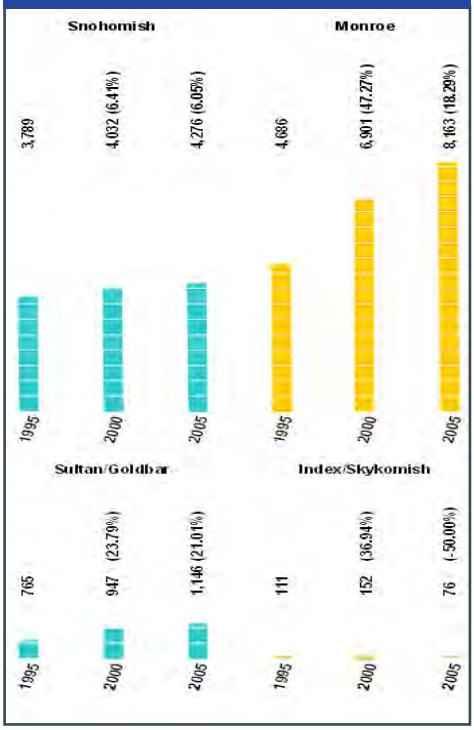
Source: LOCHNER

Employment

As people have moved and created greater population densities, employers, particularly retail employers, have followed. Between 1995 and 2005[1], employment growth followed population growth (Exhibit 2-3). The most dramatic growth, as one would expect, occurred in Segment 2 (Monroe). Only Segment 4 experienced a downward shift in employment.

Much of the employment growth in the communities adjacent US 2 has been retail employment, and when possible developers of retail centers have sought locations near transportation facilities. This growth has necessarily impacted US 2, and is a trend which has continued through the present. Snohomish, Monroe and Sultan are each considering or have underway new retail shopping facilities, each of which will access and impact US 2.

Exhibit 2-3. **Employment Growth Along US 2, 1995 - 2005 (% change per five years)**



Source: LOCHNER

[1]Employment data at place of work was not readily available for 1990.

3 What are the characteristics of the US 2 roadway?

The roadway characteristics of US 2 vary throughout the corridor and are summarized below.

- **Segment 1:** US 2 within this segment is primarily a two-lane highway with no median separation and limited sections of three- and four-lanes. Shoulder widths range from six to eight feet and WSDOT owns a right-of-way ranging from 150 – 500 feet (in total width).

  There are two interchanges (SR 9 & Campbell Road) already in place in Segment 1; as well as relatively few access points. Sidewalks are not available and although Segment 1 carries substantial daily traffic (in excess of 30,000 vehicles daily based on traffic counts completed in 2006 by Snohomish County), it has the look and feel of a rural highway.

- **Segment 2:** US 2 varies from a two-, three- and four-lane roadway within this segment. This segment contains a number of left-turn pockets as well as two-way turn lanes. In the summer of 2006, WSDOT installed c-curb channelization improvements through much of this segment in order to reduce left-turn collisions. Shoulder widths range from 0 – 12 feet and WSDOT-owned right-of-way is approximately 150 feet in total width.

  There is one interchange in this segment (SR 522) and six of the nine signalized intersections (Exhibit 2-5) in the corridor are within Segment 2. Sidewalks are intermittent and the current design of this very urban segment through Monroe is not conducive to pedestrian traffic.

- **Segment 3:** Throughout this segment, US 2 is essentially a two-lane highway without a median. For the City of Sultan, Town of Gold Bar and unincorporated Startup, US 2 serves much like Main Street, with a number of left-turn pockets and two-

Exhibit 2-4. **Kelsey Street, Monroe**

Source: LOCHNER

Exhibit 2-5. **US 2 Signalized Intersections**

Segment	Milepost	Location
2	12.95	East Rosevelt Road/163rd Avenue SE
2	13.97	179th Avenue
2	14.37	SR 522
2	14.57	Kelsey Street
2	14.92	SR 203-Lewis Street/ Chain Lake Road
2	15.22	Main Street/Old Owen Road
3	21.57	Old Owen Road/ Fern Bluff Road
3	22.37	5th Street
3	23.14	Sultan Basin Road

Source: WSDOT

way turn lanes. Shoulder widths range from 0 – 10 feet and WSDOT-owned right-of-way varies from approximately 67 to 150 feet in total width.

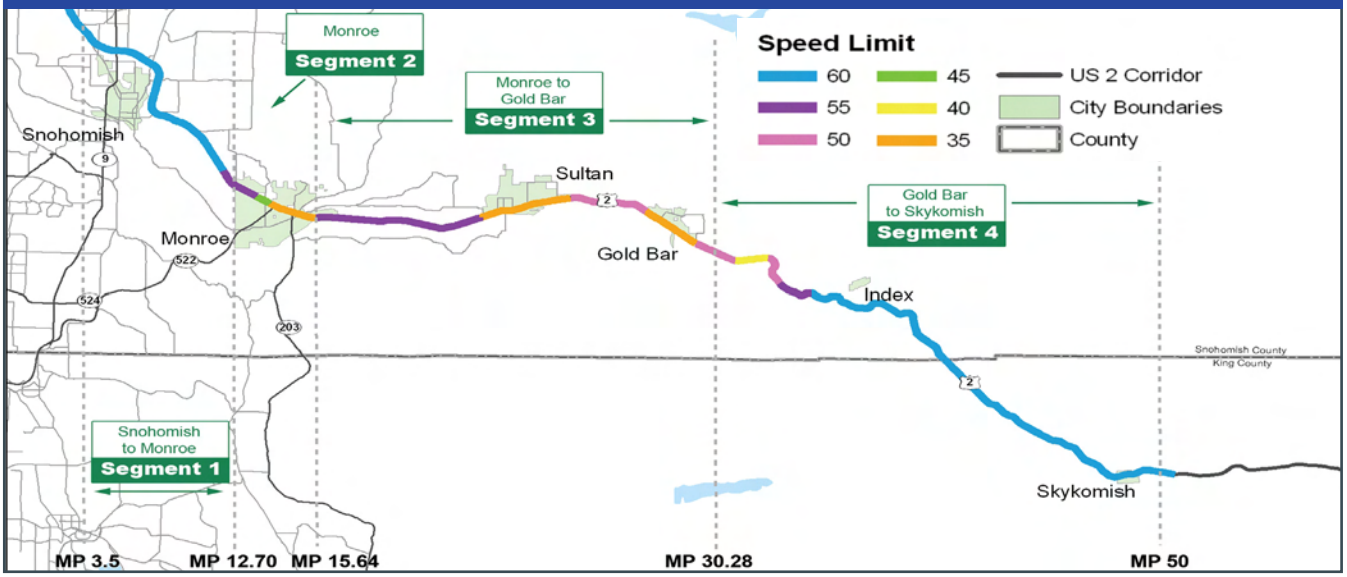
In recent years, the City of Sultan has installed three traffic signals at the following intersections: – at Old Owen Road/Fern Bluff Road, at 5th Street and most recently at Sultan Basin Road. Sidewalks are very limited within Segment 3 and pedestrian traffic fairly prevalent within the incorporated places as people walk to and from transit stops and businesses.

- **Segment 4:** US 2 is a rural two-lane highway throughout this segment, containing sharp curves and narrow shoulders. This stretch contains a number of left-turn pockets and a two-way turn lanes in the Skykomish vicinity. Shoulder widths range from 0 – 8 feet, with most being very narrow. WSDOT-owned right-of-way varies from approximately 70 to 200 feet in total width. There are no sidewalks, pedestrian paths, signalized intersections, nor interchanges in Segment 4.

Speed Limits

Speed limits along the corridor also vary with location, with speeds being higher in rural areas and lower in urban areas. The following exhibit shows speed limits throughout the study area.

Exhibit 2-6. **US 2 Study Area Speed Limits**



Source: WSDOT

Bicycles Routes

"Historically, WSDOT has identified 20 state routes as bicycle touring routes, including US 2."[2] While that is no longer the case, WSDOT continues to support and promote the construction of bicycle facilities on both new and reconstruction projects.

In part because of the scenic quality of the US 2 Corridor and its function as a cross-Cascades Highway, bicyclists use US 2 in Segments 2, 3 and 4.

Less bicycle traffic is seen along Segment 1, however, Snohomish County is working to extend the Centennial Trail from Snohomish to Monroe. The trail will run north of and parallel to the railroad right of way, extending to the Old Snohomish/Monroe Highway and ultimately to Fryelands Boulevard in Monroe.

In Sultan, a trail has been proposed on the north side of US 2. The Town of Skykomish secured grant funding to improve signage along the Old Cascade Highway that would encourage bicycle traffic along that route and into the community. Finally, in LEFT BY THE SIDE OF THE ROAD[3], the Cascade Bicycle Club recommends designation of US 2, from Monroe eastwards, as a Regional Bicycle Route.

Bridges and Intercrossing Structures

There are 40 bridges (Exhibit 2-8) and other similar structures (overpasses, sloughs, etc.) within the 47-mile corridor. A number of these were built in the early to mid-20th century and are nearing their lifespan (75 years). The average bridge age in the US 2 study area is 54 years, the majority of which are within Segment 4.

The number, design standard, and age of structures along US 2 represent a challenge for plan implementation. Additionally, residents of Sultan, Gold Bar, and Index expressed concern that an earthquake or other disaster could damage structures, making it impossible for them to escape to safety.

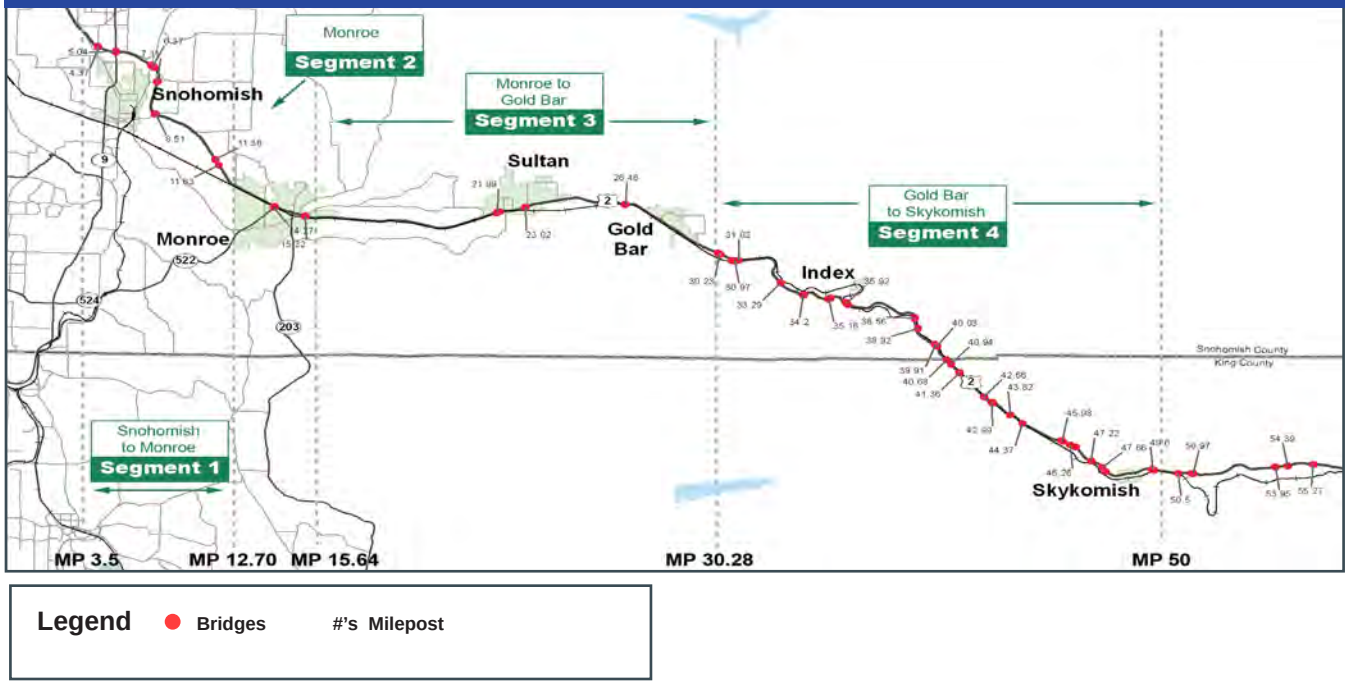
Exhibit 2-7. **Sultan River Bridge**

Source: LOCHNER

[2] Interview with Paula Reeves, WSDOT, February 28, 2007.

[3] LEFT BY THE SIDE OF THE ROAD, Puget Sound Regional Bicycle Network Study: Assessment and Recommendations, 2005, Cascade Bicycle Club.

Exhibit 2-8. **US 2 Study Area Bridges**



Source: WSDOT

Annual Average Daily Traffic

Concern over increasing congestion and declining safety were the reasons for initiating the US 2 Route Development Plan. To understand what is behind these concerns requires an understanding of the different roles US 2 plays through the study area.

- It serves as a primary weekday commuter route;
- Through Monroe in particular, but for Sultan and Gold Bar as well, it is the main access route for local shopping facilities;
- It is one of two year-round cross-Cascade Mountain highways;
- It is a Highway of Statewide Significance;
- Most of US 2 in Snohomish County is categorized as a T-2 Freight Route (carries between 4 million and 10 million tons of freight per year), with the greatest volumes of freight being natural resource based;
- It is a Scenic Highway and major tourist route, particularly

Annual Average Daily Traffic –

This is the total volume (both directions) of traffic on a roadway segment for one year, divided by 365 (the number of days in a year). Actual AADT is collected from permanent, continuous counters, while estimated AADT is based on actual data with adjustments for seasonal and other factors.

Source: WSDOT

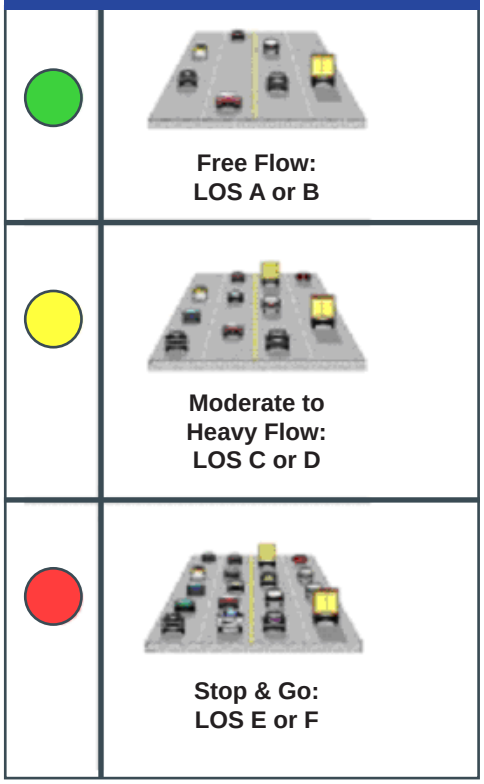
on weekends; and

- When I-90 is closed due to an avalanche, major collision, rock slide or other event, it becomes the route of preference for east-west movement between the Central Puget Sound and the rest of the State.

Because of the nature of travel along US 2, there is a dramatic difference between weekday and weekend travel (Exhibit 2-9). Within Segments 1 and 2, US 2 serves as a business access and commuter route during the week and during the weekend serves the dual purpose of a business access corridor and a through segment for tourist traffic. While weekday volumes on Segments 1,2, and 3 continue to increase, weekday traffic on Segment 4 has been stable to slightly declining for the last 15 years.

Conversely, weekend traffic represents an increasingly significant challenge for travelers and local residents alike along Segments 3 and 4. As can be seen in the next section, only two of the eleven intersections analyzed in this project fail on a typical weekday PM peak. However, all eleven intersections fail (level-of-service F) on a typical weekend peak, particularly the Sunday PM peak. Worsening traffic east of Monroe on the weekends, particularly the Sunday PM peak, has now exceeded roadway capacity. As a result, the City of Sultan has installed traffic signals in three locations (see above) in order to create gaps in the flow and allow local traffic from side streets to access and exit US 2.

Exhibit 2-9. **LOS Classification**



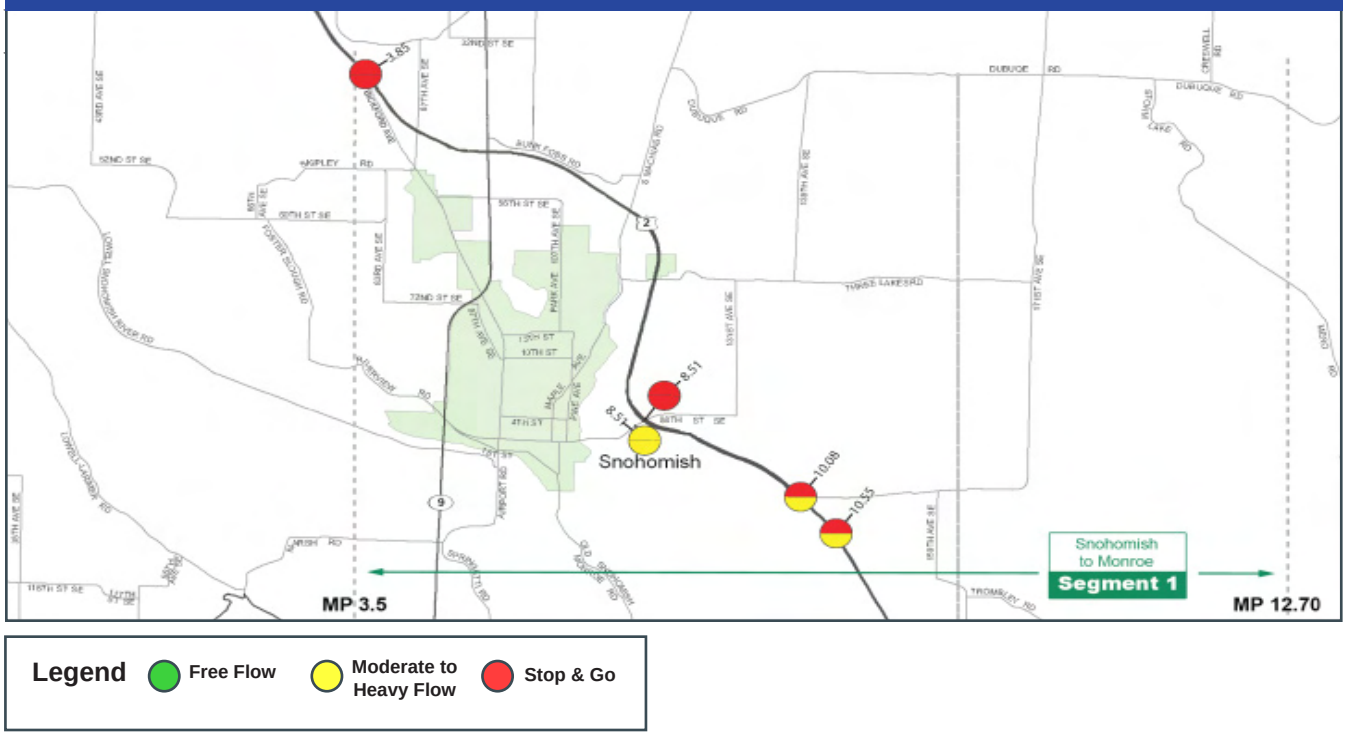
Source: LOCHNER

Level of Service (LOS)

To better understand mobility issues along the US 2 corridor, WSDOT calculated the PM peak-hour LOS at 23[4] intersections, for both the weekday and weekend (5 in Segment 1, 7 in Segment 2, 9 in Segment 3 and 2 in Segment 4). LOS indicates the ease at which vehicles can travel a roadway section or pass through an intersection (Figure 2-9). In general, level-of-service for intersections uses time of delay to assess the quality of an intersection's mobility. Analogous to the traffic volumes discussed above, intersection LOS values worsen throughout

[4] Originally 24 intersections were to be analyzed but turning movement counts were not available for the intersection of US 2 and Old Cascade Highway. As a result, it was not included in the final report.

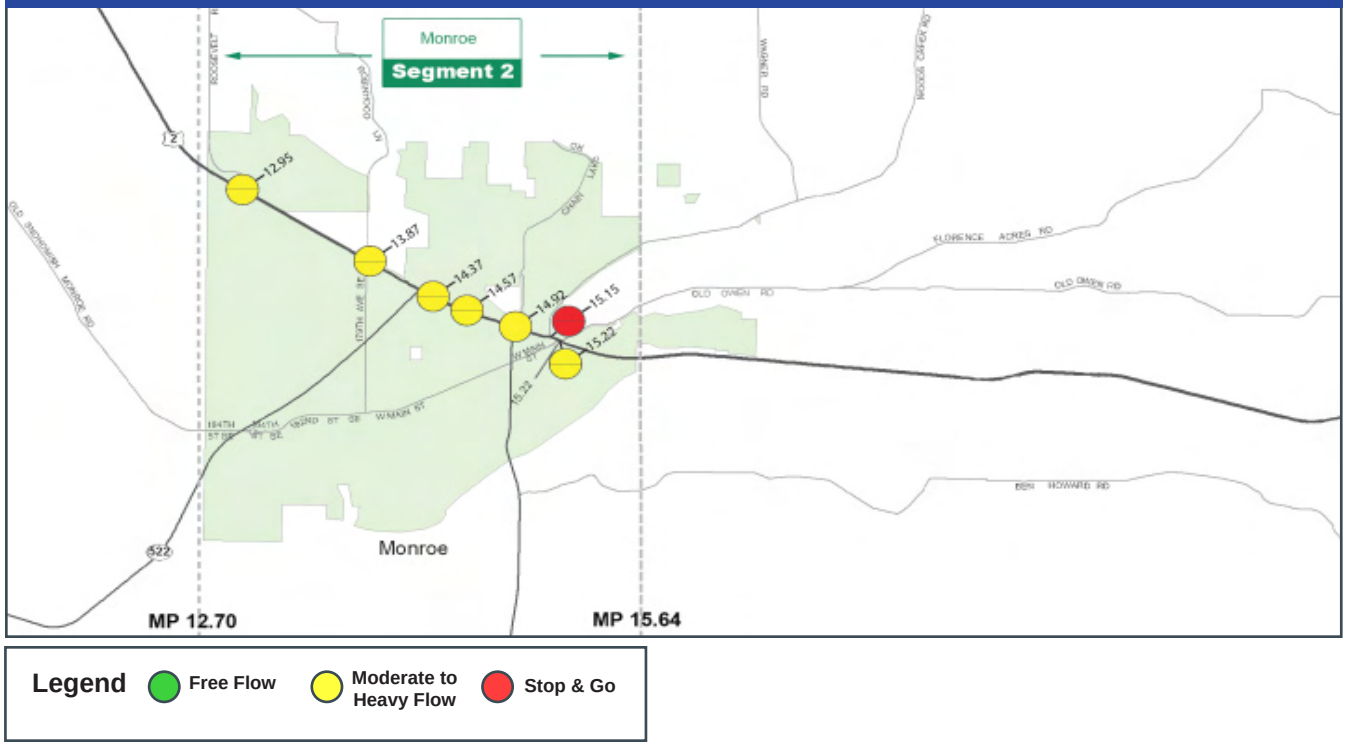
Exhibit 2-10. **Segment 1 Intersection LOS (2006)**



Note: Top halves of circles indicate weekday LOS, bottom halves indicate weekend LOS. (Based on Exhibit 2-9.)

Source: LOCHNER

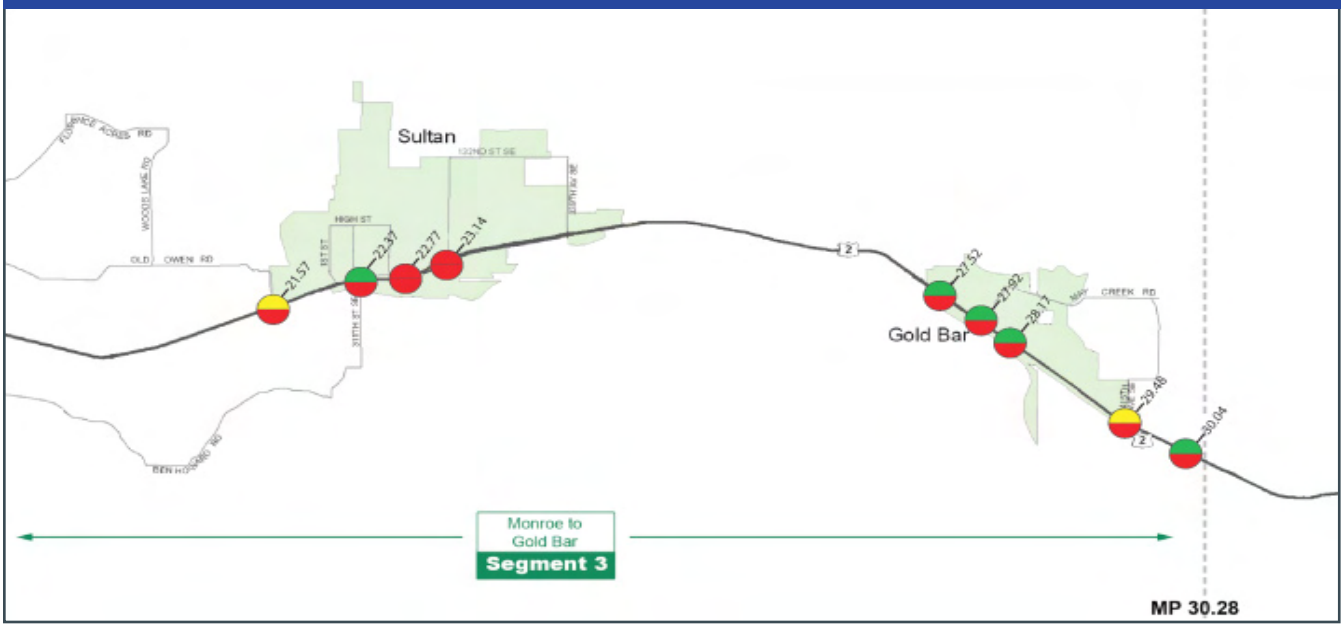
Exhibit 2-11. **Segment 2 Intersection LOS (2006)**



Note: Top halves of circles indicate weekday LOS, bottom halves indicate weekend LOS. (Based on Exhibit 2-9.)

Source: LOCHNER

Exhibit 2-12. **Segment 3 Intersection LOS (2006)**

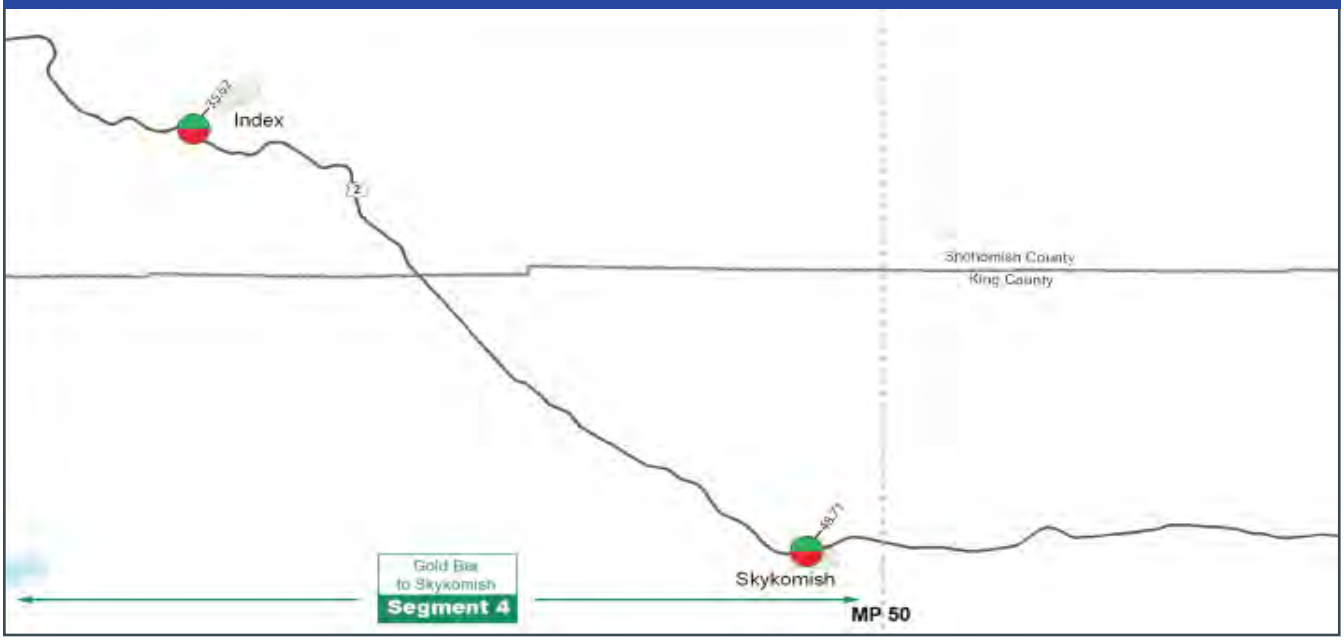


Legend Free Flow | Moderate to Heavy Flow | Stop & Go

Note: Top halves of circles indicate weekday LOS, bottom halves indicate weekend LOS. (Based on Exhibit 2-9.)

Source: LOCHNER

Exhibit 2-13. **Segment 4 Intersection LOS (2006)**



Legend Free Flow | Moderate to Heavy Flow | Stop & Go

Note: Top halves of circles indicate weekday LOS, bottom halves indicate weekend LOS. (Based on Exhibit 2-9.)

Source: LOCHNER

Transit

Increasingly, transportation planners look to reduce congestion by encouraging alternative modes of travel, particularly transit. Community Transit is the public transit provider for the communities within the study area, as far east as Gold Bar (Index and Skykomish do not have public transit stops).

System wide, Community Transit experienced a nearly 10% increase in boardings between 2005 and 2006. Routes 270, 275 and 424 serve the US 2 corridor (Exhibit 2-15) and all experienced positive growth for this same period (7%, 20% and 16% respectively). Routes 271 and 277 also serve the US 2 communities, but actually experienced a decline in boardings (3% and 23% respectively). For more information on Public Transit, please see Technical Memorandum No. 2, Existing Conditions Report.

Transit riders along the US 2 corridor, while reducing the number of single occupant vehicles and overall congestion, unfortunately are caught in the same intersection delays as all other users. Without queue jumps for buses or HOV lanes, transit trips may take as long as single occupant vehicle trips – potentially longer with the added transit stops.

There are four park and ride facilities in the study area. Of these, the park and ride lots in Monroe, Sultan and Gold Bar have direct access to US 2. The remaining park and ride lot is located in Snohomish at the junction of Bickford Avenue and SR 9, approximately one mile south of the US 2/SR 9 Interchange. Exhibit 2-16 summarizes the park and ride lots within the study area.

Finally, the BNSF Railway Company's Steven's Pass main line route parallels US 2 for most of the study area. Most of this length consists of a single track, with passing sidings located at approximately ten-mile intervals. The BNSF tracks are used by both freight and Amtrak passenger rail service, with a combined average of 23 trains per day using the facility. Amtrak maintains a passenger depot in the cities of Everett (west of the study area) and Wenatchee (east of the study area), with no at-grade railway crossings of US 2 throughout the entire 47-mile corridor.

Exhibit 2-14. **US 2 Bus Routes**

Route	Origin-Destination	Daily Boardings
270	Everett Stn-US 2 & 1st Street (Gold Bar)	510
271	Everett Stn-US 2 & 1st Street (Gold Bar)	104
275	Everett Stn-US 2 & Kelsey Street (Monroe)	361
277	Gold Bar P&R-Boeing Gate 68 S2	103
424	Snohomish P&R-4th Street/S Jackson Street (Seattle)	200

Source: Community Transit

Exhibit 2-15. **US 2 Park & Ride Locations**

Park & Ride Lot	Location	No. of Stalls	Utilization Rate
Gold Bar	US 2 & 2nd Street	28	32%
Monroe	17433 US 2	102	63%
Snohomish	SR 9 & Bickford Avenue	104	42%
Sultan	US 2, just east of Sultan	104	16%
Average		75	38%

Source: Community Transit

4 What are the safety issues in the project area?

General characteristics of traffic collisions

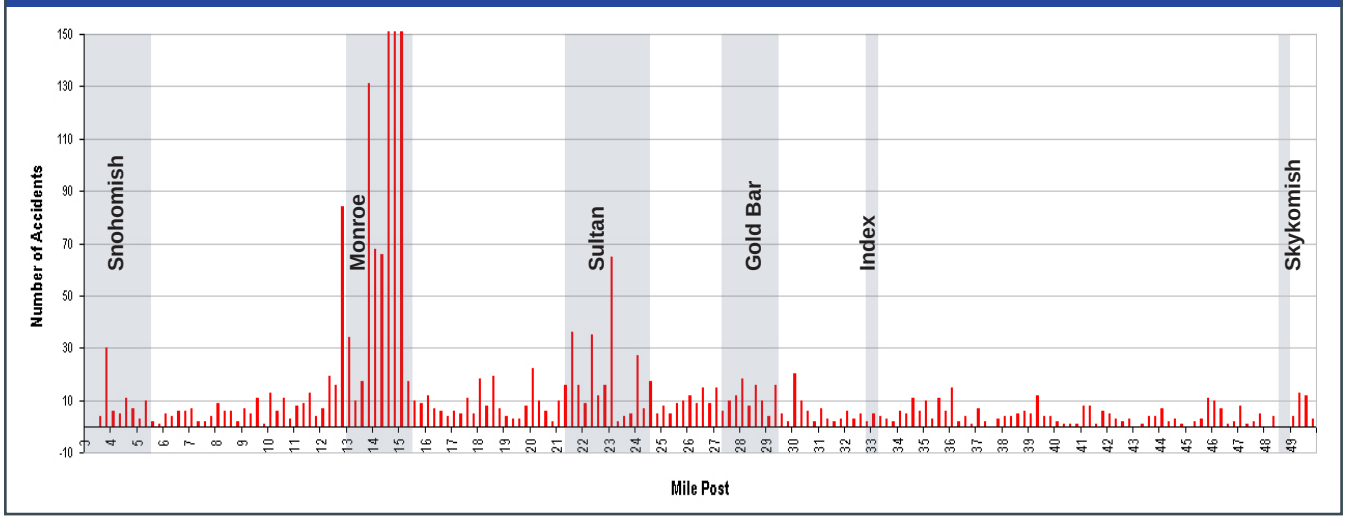
One of the overarching concerns leading to the RDP was the number of traffic collisions along the project corridor. Within the 47-mile stretch lie sharp curves, narrow shoulders and bridges, skewed intersections, as well as other geometrical deficiencies. The combination of relatively high traffic volumes, multiple commercial driveways abutting the roadway and long two-lane sections with limited passing opportunities, generates delays, irritable drivers and safety hazards. Traffic collisions between the seven-year period from January 1999 to February 2006 were analyzed as part of this project; both collision frequency and type varied by location.

Collision locations

From January of 1999 to February of 2006, a total of 2,358 collisions occurred on US 2 between Bickford Avenue on the west end of the RDP study area and Old Cascade Highway on the east end (Exhibit 2-17). During this period, the preponderance of collisions occurred in Segment 2; 1,050 or almost half of the total.

Approximately 74% of all collisions occurring in this time period were within Segment 2 and Segment 3. The actual

Exhibit 2-16. **Collision Distribution by Milepost**

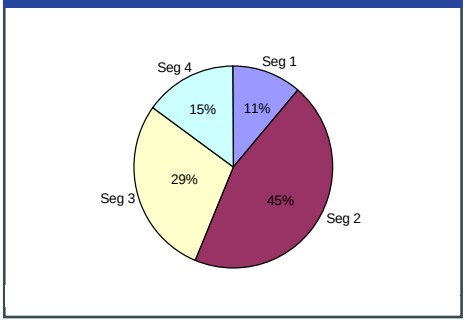


Source: WSDOT

percentage of collisions in each segment is shown in Exhibit 2-17.

Although Sultan is a smaller city than Snohomish, US 2 does not bypass Sultan as it does Snohomish, requiring through traffic to traverse stoplights and commercial driveways. The fact that Segment 1 and 4 produced fewer collisions can be attributed to their rural character, fewer driveways abutting the corridor and reduced interruptions to the traffic mainstream, and in the case of Segment 4 significantly lower traffic volumes.

Exhibit 2-17. **Segment Collision Percentages**



Source: WSDOT

HALs and HACs[5]

The state of Washington conducts three types of safety deficiency analyses every two years: high accident locations (HALs), high accident corridors (HACs) and pedestrian accident locations (PALs). This study discusses the first two. Segment 1 includes four HALs and one HAC; Segment 2

HALs and HACs –

HAL analysis utilizes two years of historical collision data. To qualify as a HAL, the segment must be at least one-tenth of a mile long and have a collision rate that is above the statewide average. HAC analysis utilizes five years of historical data. To qualify as a HAC, the segment must be at least one mile long and have a collision rate that is above the statewide average.

Source: WSDOT

5 Federal Law 23 United States Code Section 409 governs use of the data contained above. Under this law data maintained for purposes of evaluating potential highway safety enhancements: "...Shall not be subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data." If anyone attempts to use this data in an action for damages against WSDOT, the State of Washington, or any other jurisdiction involved in the locations mentioned in the data, these entities expressly reserve the right, under Section 409, to object to the use of the data, including any opinions drawn from the data.

Exhibit 2-18. **HALs along US 2 (2006)**

Segment	MP Section	Vicinity
1	4.80 - 5.06	EB Off-Ramp to SR 9
1	5.01 - 5.28	WB Off-Ramp to SR 9
2	13.78 - 13.97	179th Avenue SE
2	14.04 - 14.22	Cascade View Drive
2	14.27 - 14.37	WB On-Ramp from SR 522
2	14.30 - 15.00	West of SR 522 to Shopping Center east of SR 522
2	15.08 - 15.30	West of Woods Creek Road/Ann Street to east of Old Owen Road

Source: WSDOT

Exhibit 2-19. **HACs along US 2 (2006)**

Segment	MP Section	Vicinity
1	9.02 - 10.06	Campbell Road to 100th Street SE
3	16.49 - 18.48	West of Sofie Road to east of 245th Avenue SE
3	19.49 - 20.98	West of Fern Bluff Road to west of weigh station
3	24.49 - 26.48	West of Sultan Startup Road to west of Wallace River Bridge
3	27.49 - 28.48	Gold Bar western city limits to east of 9th Street
3	28.99 - 29.98	West of Picklefarm Road/Gunn Road to west of Reiter Road
3-4	29.99 - 30.98	Reiter Road to Railroad Crossing
4	32.02 - 35.51	West of Chain-up shoulder to east of S Fork Skykomish River
4	37.05 - 40.01	Entrance of Mt. Baker National Forest to Barclay Creek

Source: WSDOT

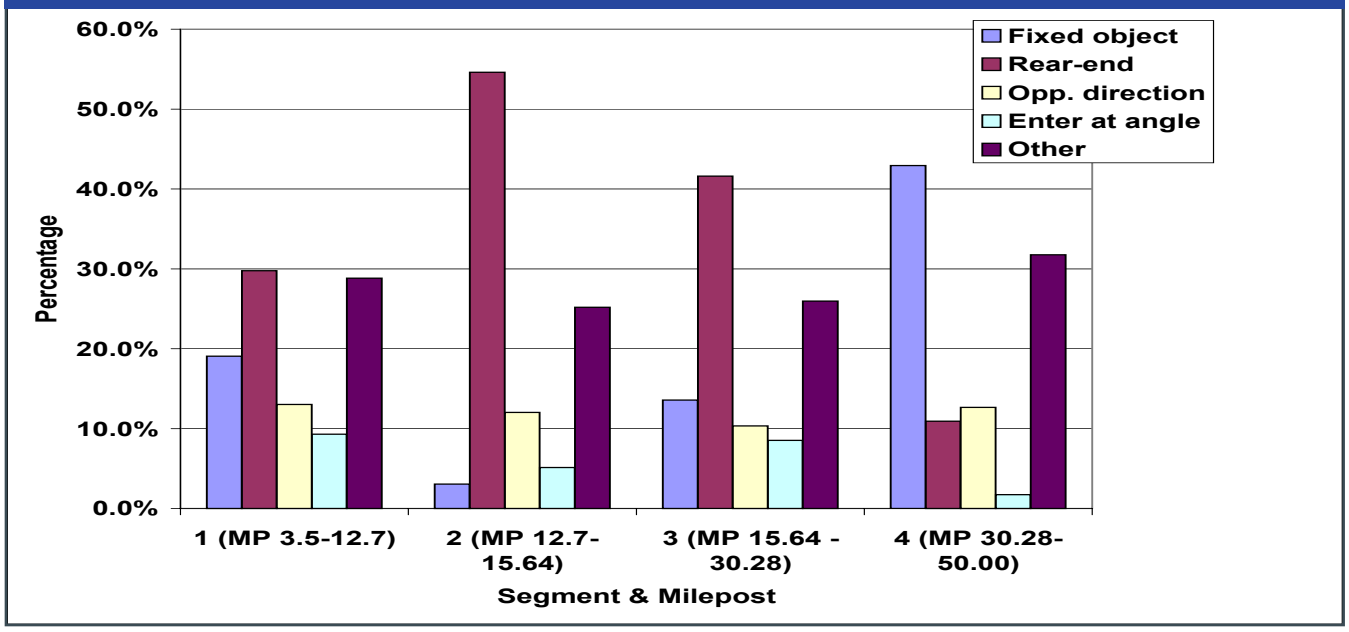
includes five HALs, Segment 3 includes five HACs and shares one HAC with the three in Segment 4 (Exhibits 2-18 and 2-19).

What this tells us is that US 2, within this study area, contains both highway segments and locations where collisions exceed the statewide average.

Collision types

WSDOT grouped collisions according to type for each segment in order to determine which segments (roadway geometry) are conducive to which collision types. Categories used were: rear-end collisions, opposite direction collisions, fixed object collisions, entering the stream at an angle collisions, and an encompassing 'other' category which includes vehicle overturns, sideswipes, as well as pedestrian and bicycle collisions. Collision types by segment are shown in Exhibit 2-20.

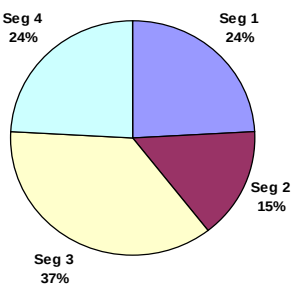
Exhibit 2-20. **Collision Types by Segment**



Source: WSDOT

In Segments 2 and 3, rear-end collisions account for 55 percent and 42 percent of all collisions, respectively; an incidence that is more common where signalized intersections are present (as is the case in both Segments 2 and 3). Fixed objects account for the highest percent of collisions along Segment 4 (43 percent). The extreme curves, narrow shoulders, limited sight distance and susceptibility to adverse weather conditions all can be seen to contribute significantly to this number. 'Other' types of collisions are relatively higher in Segments 1 and 4, at 29 percent and 32 percent, respectively. Collisions in which drivers had been drinking account for approximately nine percent, five percent, 11 percent, and eight percent, in Segments 1, 2, 3, and 4, respectively.

Exhibit 2-21. **Segment Fatality Percentages**



Source: WSDOT

Pedestrian/Bicycle Collisions

Of the 2,852 collisions occurring between January 1999 and October 2006, a total of 31 were between pedestrians or bicyclists and vehicles. Among these, 26 (84%) occurred in Segments 2 and 3, where pedestrian, bicycle and vehicular traffic are all heavier than the other segments of the study area.

Fatalities

From January 1999 to June 2006, a total of 33 fatalities occurred within the study area; one-third of those were the result of head on collisions. During this period, there were eight fatalities in Segment 1, five in Segment 2, 12 in Segment 3, and eight in Segment 4.