Chapter 4 Identification of Concerns

4.1 Introduction

This chapter identifies areas of the transportation system that do not meet typical industry standards of traffic engineering and transportation planning and also the expectations and/or perceptions of the community. Ideally, it is desirable to first identify issues and concerns before mitigation strategies can be developed. The identification of "concerns" results from intensive data analysis, field observation, and community input. These techniques have been used to assess the collected data and identify possible existing and future "concerns" with the existing transportation system. This approach is a necessary step and forms the basis for developing mitigation strategies. These strategies (i.e. project recommendations and policy suggestions) become the follow-up steps to plan for correction of the identified concerns. Identified concerns may fall into one or more of the following categories:

- Intersection levels of service;
- Safety (i.e. crash analyses);
- Access management ; and
- Community concerns.

4.2 Intersection Levels of Service

Section 2.3 of this Transportation Plan discussed the standards and methodologies used in the traffic engineering profession relative to intersection "levels of service." In order to calculate the LOS, traffic volumes on 16 intersections in and around Polson were counted during the summer and fall of 2010. These intersections included five signalized intersections and 11 unsignalized intersections in the Polson area. Each intersection was counted between 7:00 a.m. to 9:00 a.m. and between 4:00 p.m. and 6:00 p.m., to ensure that the intersection's peak volumes were represented. Based upon this data, the operational characteristics of each intersection were observed.

An intersection within city limits (urban) is determined to be functioning adequately if operating at LOS C or better, at all times. An intersection outside the city limits (rural) is considered to be functioning adequately if operating at LOS B or better, at all times. The LOS study in the Polson area shows that one signalized and one unsignalized intersection is currently functioning below acceptable levels of service under existing traffic conditions. These two intersections indicate potential opportunities for closer examination and further intersection improvement measures to mitigate operational conditions. These two intersections are shown in Table 4-1.

Table 4.1 Existing Intersections Failing Level of Service

Intersection	AM Peak	PM Peak
US 93 (2nd Avenue East) & 1st Street East *(Urban)*	C	**D**
US 93 & Caffrey Road *(Rural)*	**C**	**C**

In addition to operational characteristics identified through the Level of Service analysis described in Chapter 2 and summarized above, field reviews were performed at each of the sixteen (16) intersections. Observations were made and recorded and are presented on the following pages.

4.2.1 Signalized Intersections Field Observations

US 93 & South Shore Road (MT 35)

- Westbound vehicles on South Shore Road (MT 35) were observed turning northbound onto US 93 (i.e. right turn) and suddenly breaking and/or near collisions with vehicles. This is due to the short merging distance available as merging occurs from two lanes to one lane on the north approach of the intersection.
- Long vehicle queues on the westbound approach of South Shore Road.

US 93 (3rd Avenue East) & 4th Avenue East

- Long vehicle queues on both eastbound and westbound approaches of US 93.
- High pedestrian activity across the southbound leg of the intersection (residential area).
- Several vehicles observed on 4th Avenue East running yellow and/or red lights.

US 93 (2nd Avenue East) & 1st Street East

- Northbound traffic on 1st Street East experienced long queues which blocked street parking.
- Northbound vehicles on 1st Street East used an “unofficial” right turn lane due to a wide road and no restrictions.
- Businesses have conflicting approaches with close proximity to the intersection and cause delay and sudden breaking because of turning maneuvers. A tire shop is located in the southwest corner of the intersection, and a bank is located in the southeast corner of the intersection. Both businesses experience frequent traffic.

US 93 (2nd Avenue East) & Main Street

- The northbound leg of Main Street was under construction during the time data were collected.

- Moderate pedestrian activity was observed in the area of the intersection.
- On-street parking in proximity to the intersection created some sight obstruction issues.
- The location of the gas station in the southwest corner of the intersection caused conflicting traffic movements and congestion.

South Shore Road (MT 35) & Heritage Lane

- Vehicles were observed running yellow and red phases of the signal cycle, primarily on the Heritage Lane leg of the intersection.
- Vehicle queues up to seven vehicles were observed on Heritage Lane.
- Heavy truck traffic and recreational vehicle traffic were also observed at this location.

4.2.2 Unsignalized Intersections Field Observations

US 93 & Rocky Point Road

- The hill located on the west side of the intersection causes a sight obstruction for vehicles waiting to turn off Rocky Point Road, which is a skewed approach.
- Observed westbound vehicles on US 93 creating an "unofficial" right turn lane onto Rocky Point Road. The road is wider at this location, but not paved for an official right turn. Several vehicles were observed running the stop sign on Rocky Point Road to enter the US 93 traffic stream.

US 93 & Irvine Flats Road

- High recreational vehicle traffic was observed because of the RV campground located near the intersection.
- High amounts of bicycle traffic (in the afternoon) were observed through the business center parking lot on the north side of the intersection.
- High vehicle traffic was observed in and out of the business center parking lot.

US 93 & Caffrey Road

- Up to four4 cars in queue were observed for the northbound left turn from US 93 to Caffrey Road.

4th Avenue East & 1st Street East

- Heavy pedestrian activity, which may be due in part to the location of the County Courthouse and the Tribal Health Center, was observed near the intersection. With parking spaces in close proximity to the intersection, pedestrian sight distance appeared to be an issue.

- Diagonal street parking caused some sight distance obstructions for vehicles backing out of parking spaces.
- Two to five vehicles were observed in queues at the intersection.

4th Avenue East & 2nd Street East

- Diagonal parking spaces caused some sight obstructions for vehicles entering the intersection. Parking spaces are for the courthouse, school, and residential properties.
- Vehicles were observed running the 4-way stop control.
- Several near misses and rear end collisions were observed here.

7th Avenue & Main Street

- On-street parking close to the intersection caused some sight obstructions.
- Eastbound and westbound traffic on 7th Street had several vehicles backed up (6 to 8 cars) that extended nearly an entire city block (may be due to the construction taking place on Main Street at the time).
- Business owner near the intersection expressed the need for a light at the intersection.

7th Avenue West & 2nd Street West

- Heavy school traffic and pedestrian movements observed to and from school.
- Vehicles northbound on 2nd Street West were observed encroaching into the intersection for visibility because of street parking that caused a sight obstruction.

7th Avenue East & 7th Street East

- There was no "on-street" parking, although some vehicles were parked on sidewalks.
- Heavy pedestrian activity observed. Pedestrian pathways are located on the south side of the intersection.
- Vehicles observed backed up primarily due to bus stops in the residential area.

Skyline Drive & Caffrey Road

- High volumes of truck traffic observed to and from the northbound approach on Skyline Drive and to and from the eastbound approach on Caffrey Road (possibly due to construction in the area).

Kerr Dam Road (S 352) & Grenier Lane

- Sight obstruction observed due to the hill and curve at the south end of Kerr Dam Road. There is also a bus stop at this location which experiences frequent stops.
- Heavy pedestrian movements observed to and from the school and the residential development(s). Also several people used the trail along the east side of Kerr Dam Road.

Kerr Dam Road (S 352) & Back Road

- Heavy haul truck traffic to the landfill observed.
- Very little automobile traffic observed here.

4.3 Corridor Volumes, Capacity, and Levels of Service

Roadway capacity is of critical importance when studying the growth of a community. As traffic volume increases, the vehicle flow deteriorates. When traffic volumes approach and exceed the available capacity, the roadway begins to "fail." The capacity of a roadway is a function of a number of factors including intersection function, land use adjacent to the roadway, access and intersection spacing, roadway alignment and grade, speed, turning movements, vehicle fleet mix, adequate roadway design, land use controls, roadway network management, and good planning and maintenance. Proper use of all of these tools will increase the number of vehicles that a specific lane segment may carry. However, the number of lanes is the primary factor in evaluating roadway capacity because any lane configuration has an upper volume limit regardless of how carefully it has been designed.

The size of a roadway is based upon its anticipated traffic demand. It is desirable to size the arterial network to comfortably accommodate the traffic demand that is anticipated to occur 20 years from the time the roadway is constructed. The selection of a 20-year design period represents a desire to receive the most benefit from an individual construction project's service life within reasonable planning limits. The design, bidding, mobilization, and repair to affected adjacent properties can consume a significant portion of an individual project's budget. Frequent projects to make minor adjustments to a roadway can therefore be prohibitively expensive. Because roadway capacity generally is provided in large increments, a long term horizon is necessary; and the collector and local roadway networks are often sized to meet the local needs of the adjacent properties.

There are two measurements of a roadway's capacity, Average Daily Traffic (ADT) and Peak Hour. ADT measures the average number of vehicles a given roadway carries over a 24-hour period. Because traffic does not usually flow continuously at the maximum rate, ADT is not a statement of maximum capacity. Peak Hour measures the number of vehicles that a roadway can physically accommodate during the busiest hour of the day. It is therefore more of a maximum flow rate measurement than ADT. When the Peak Hour is exceeded, the traveling public will often perceive the roadway as "broken" even though the roadway's ADT is within the expected volume. Therefore, it is important to consider both elements during design of corridors and intersections.

The size of the roadway and the required right-of-way is a function of a land use that will occur along the roadway corridor. These uses will dictate the vehicular traffic characteristics, travel by pedestrians and bicyclists, and need for on-street parking. The right-of-way required should always be based upon the ultimate facility size. The actual amount of traffic that can be handled by a roadway is dependent upon the presence of parking, number of driveways and intersections, intersection traffic control, and roadway alignment. Data presented in Table 4.2 indicate the approximate volumes that can be accommodated by a particular roadway in “Vehicles per Day” (VPD). As indicated in Table 4.2, the actual traffic that a roadway can handle will vary on the basis of a variety of elements that include: roadway grade; alignment; pavement condition; number of intersections and driveways; the amount of turning movements; and the vehicle fleet mix. Roadway capacities can be increased under “ideal management conditions” (Column 2 in Table 4.2) that take into account such factors as limiting direct access points to a facility, adequate roadway geometrics, and improvements to sight distance. By implementing these control features, vehicles can be expected to operate under an improved Level of Service and potentially safer operating conditions.

Table 4.2 Approximate Volumes for Planning of Future Roadway Improvements

Road Segment	Historical Management Volumes	Ideal Management Volumes
Two Lane Road	Up to 12,000 VPD	Up to 15,000 VPD
Three Lane Road	Up to 18,000 VPD	Up to 22,500 VPD
Four Lane Road	Up to 24,000 VPD	Up to 30,000 VPD
Five Lane Road	Up to 35,000 VPD	Up to 43,750 VPD

Table 4.2 shows capacity levels which are appropriate for planning purposes in developing areas within the study area. In newly developing areas, there are opportunities to achieve additional lane capacity improvements. The careful, appropriate, and consistent use of the capacity guidelines listed above can provide for long-term cost savings and can help maintain infrastructure at a scale comfortable to the community.

Two important factors to consider in achieving additional capacity are peak hour demand and access control. Traffic volumes shown in Table 4.2 are 24-hour averages; however, traffic is not smoothly distributed during the day. The Major Street Network shows significant peaks of demand, especially the work “rush” hour and summer travel. These limited times create the greatest periods of stress on the transportation system. By concentrating large volumes in a brief period of time, a roadway’s short-term capacity may be exceeded and a roadway user’s perception of congestion is strongly influenced. The use of pedestrian and bicycle programs as discussed in Chapter 5 and TDM measures can help to smooth out the peaks and thereby extend the adequate service life of a specific roadway configuration. The Transportation Plan strongly recommends the pursuit of such measures as low-cost means of meeting a portion of expected transportation demand.

Each time a roadway is intersected by a driveway or another roadway, it raises the potential for conflicts among transportation users. The resulting conflicts can substantially reduce the roadway's ability to carry traffic as conflicts substantially reduce the roadway's ability to carry traffic if conflicts occur frequently. This basic principle is the design basis for the interstate highway system, which carefully restricts access to designated entrance and exit points. Arterial roadways are intended to serve the longest trip distances in an area and the highest traffic volume corridors. Access control is therefore very important on the higher-volume elements of a given community's transportation system. Collector roadways, and especially local roadways, do provide higher levels of immediate property access required for transportation users to enter and exit the roadway network. In order to achieve volumes in excess of those shown in Column 3 of Table 4.2, access controls should be put in place by the appropriate governing body. It is strongly recommended that access control standards appropriate to each classification of roadway be incorporated into local regulatory documents in place for the CSKT, the City of Polson, and for Lake County.

4.4 Projected Intersection Level of Service

Section 4.2 summarized the intersection operational concerns under existing traffic conditions. It is important to determine what the Level of Service for each intersection would be like in 20 years if no improvements occur on the transportation system. By calculating the "projected level of service" out to the planning year (2030), a baseline is created to compare improvements. To calculate level of service for intersections during the planning year (2030), the *TransCAD* modeling software was used to identify the percent change in volumes for individual intersection legs between the year 2010 and 2030. The resulting percent changes were then manually applied to the known intersection counts to arrive at theoretical year 2030 intersection turning movement counts. These "year 2030" intersection counts were then entered into the highway capacity software to determine intersection level of service. Note that the intersection turning movement counts completed along the existing US 93 were generally made during the month of August, 2010 to capture the peak hour tourism phenomena. Tables 4.3 and 4.4 show the year 2030 level of service, for both the urban and rural intersections, without the inclusion of an alternate route (studied under the *US 93 Polson Corridor Study*) or any improvements to the existing US 93.

Table 4.3 Projected (2030) Urban Intersection LOS

Intersection	AM Peak Hour					PM Peak Hour				
	EB	WB	NB	SB	INT	EB	WB	NB	SB	INT
US 93 & South Shore Road (MT 35)*	-	D	A	C	**B**	-	C	B	C	**C**
US 93 (3rd Avenue East) & 4th Avenue East*	A	A	F	D	**C**	A	A	F	D	**F**
US 93 (2nd Avenue East) & 1st Street East*	C	C	C	B	**C**	D	D	D	C	**D**
US 93 (2nd Avenue East) & Main Street*	A	A	D	D	**A**	A	A	F	F	**F**
South Shore Road (MT 35) & Heritage Lane*	A	A	E	-	**A**	A	A	F	-	**D**

Intersection	AM Peak Hour					PM Peak Hour				
	EB	WB	NB	SB	INT	EB	WB	NB	SB	INT
US 93 & Rocky Point Road	A	-	-	B	**B**	A	-	-	B	**B**
US 93 & Irvine Flats Road	A	A	B	-	**B**	A	A	B	-	**B**
4th Avenue East & 1st Street East	A	A	B	A	**B**	A	A	B	B	**B**
4th Avenue East & 2nd Street East	A	A	A	A	**A**	A	A	A	A	**A**
7th Avenue & Main Street	B	A	A	-	**A**	B	A	A	-	**A**
7th Avenue West & 2nd Street West	A	A	B	E	**C**	A	A	C	D	**C**
7th Avenue East & 7th Street East	A	A	A	A	**A**	A	A	A	A	**A**

** Note: These intersections are signalized intersections*
(Abbreviations used are as follows: EB = eastbound; WB = westbound; NB = northbound; SB = southbound; INT = intersections as a whole; N/A = not applicable).

Table 4.4 Projected (2030) Rural Intersection LOS

Intersection	AM Peak Hour					PM Peak Hour				
	EB	WB	NB	SB	INT	EB	WB	NB	SB	INT
US 93 & Caffrey Road	B	D	A	A	**C**	C	D	A	A	**C**
Skyline Drive & Caffrey Road	-	A	A	A	**A**	-	A	A	A	**A**
Kerr Dam Road (S 354) & Grenier Lane	-	A	A	A	**A**	-	B	A	A	**B**
Kerr Dam Road (S 354) & Back Road	A	-	A	A	**A**	A	-	A	A	**A**

(Abbreviations used are as follows: EB = eastbound; WB = westbound; NB = northbound; SB = southbound; INT = intersections as a whole; N/A = not applicable).

Tables 4.3 and 4.4 show that multiple intersections would not meet a desirable LOS of B or better (for rural areas) or C or better (for urban areas). For urban intersections, four intersections would not meet the LOS C or better criteria. These intersections are as follows:

- US 93 & 4th Avenue East;
- US 93 & 1st Street East ;
- US 93 & Main Street ; and
- MT 35 & Heritage Lane .

The only rural intersection that would not meet LOS B or better would be US 93 and Caffrey Road.