SH 48
Corridor Study

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Table of Contents

List of Tables

List of Figures

Appendix

Chapter 1

INTRODUCTION

SH 48 is 24.4 miles in length and is located almost wholly within Jefferson County. Beginning at I-15 at Roberts, it passes Menan, Lewisville, Rigby and Ririe, before ending at US 26 0.27 miles south of the Jefferson/Bonneville County Line. See Figure 1. Within the State Highway System, SH 48 is seen as an east-west connector between I-15, US 20, and US 26. To Jefferson County, SH 48 is the east-west "Main Street" of eastern Jefferson County – providing high speed, non-stop travel between the communities noted above, and farm to market functions between remaining agricultural areas and produce packing plants in Lewisville and Rigby. Although SH 48 lies within a mile grid pattern of county roadways, no other county roadway has been developed sufficiently to divert trips of more than a couple of miles long from SH 48.

Jefferson County is experiencing increasing residential development as growth in the eastern Idaho/US 20 corridor continues. This changing pattern of land use suggests that the transportation functions of SH 48 will need to change as well. The Rigby/Jefferson County Transportation Plan (2007) profiled Jefferson County demographics, developed a traffic forecast, and identified future improvement needs. ITD District 6 joined the countywide study, providing funding for completion of a separate SH 48 Corridor Plan. This study thus incorporates the findings of the countywide study as the context for determining the future needs of SH 48. This document provides ITD with additional details pertinent to a state highway corridor plan. However, the fundamental needs of the county system and SH 48 have been derived from the same planning framework.

Corridor Boundaries

The termini of SH 48 are clearly defined as I-15 to the west and US 26 to the east. Further, the influence area of SH 48 does not extend outward at either end. To the west the land is not productive and development is sparse. To the northeast lies the South Fork of the Snake River. Thus traffic pressures from areas beyond either terminus are unlikely.

Between the termini lie the agricultural and increasingly residential areas of Jefferson County. As noted above, the county road system has not been highly developed. Thus the influence of SH 48 extends one to two miles on either side of the road and encompasses a high percent of both the historic and current development within Jefferson County. The following section on the characteristics of Jefferson County (excerpted from the countywide study) is applicable to the SH 48 corridor.

FIGURE 1
SH 48 Corridor Study
STUDY AREA

Chapter 2 EXISTING CONDITIONS

Social-Economic Characteristics of Jefferson County

Table 1 presents a social-economic profile of Jefferson County extracted from US Census Data for the years 1990 and 2000. Updated population estimates for 2005 are shown along with the percent of growth from 2000 to 2005. The estimated 2005 population of Jefferson County is 21,580 – an increase of about 13 percent since 2000. During this period, Jefferson County ranked 7th in percent growth of all counties in Idaho. The estimated 2005 population of Rigby is 3,245; a growth of about 8 percent since 2000.

The growth trend in Jefferson County started in the 1990's with the amount of housing starts over the decade ending in 2000 increasing 60 percent over the decade ending in 1990. The 2000 Census reported 6,287 housing units in Jefferson County, of which 93 percent were occupied.

Employees residing in Jefferson County increased 26 percent from 1990 to 2000 period, to a total of about 8,300 persons. Agricultural and other land resource related employees dropped significantly. Office, retail, and service positions increased, reflecting the urbanization of the area and employment opportunities in Idaho Falls and Rexburg. Employment in wholesale and retail trade declined in Jefferson County. Employment in the construction industry increased 27 percent. A comparison of Jefferson County employees vs. employment within Jefferson County indicates a growing residential community that increasingly travels outside of the county for work and services.

The following paragraphs describe the existing conditions of SH 48 in terms of physical characteristics, safety experience, traffic volumes, and operational measures.

Physical Characteristics of SH 48

With the exception of two short segments in Roberts and Rigby, SH 48 is essentially a 2-lane rural highway with shoulders and open roadside drainage. See Figure 2. The travel lanes are 12 feet wide. Shoulder width varies from 2 to 6 feet. The nominal right of way width is 60 feet; however, this varies where more recent agreements with developers have expanded right of way on the developed side of the roadway. Historically the right of way is "prescriptive" with the property lines of adjacent properties meeting in the center of the right of way. This also changes as parcels are subdivided.

In rural areas, many sections of the SH 48 roadside include steep slopes; either to roadside drainage ditches or due to adjacent irrigation canals. Irrigation canals are frequently adjacent to the SH 48 right of way. In addition, the ITD Milepost Log lists 14 bridges crossing named canals.

For 0.4 miles in Roberts and 0.4 miles through Rigby, SH 48 is a 40 foot road with curbing on one or both sides.

TABLE 1

SH 48 Corridor Study

SOCIAL ECONOMIC PROFILE OF JEFFERSON COUNTY

Description	Jefferson County 1990	%	2000	%	Percent Change 1990 to 2000
Population	**16,543**		**19,155**		**16%**
Preschool < 5	1,652	10	1,711	9	4%
School Age 5 -19	5,663	34	5,899	31	4%
Adult 20 - 64	7,606	46	9,770	51	28%
Senior > 64	1,622	10	1,775	9	9%
Dwelling Units	**5,383**		**6,287**		**17%**
Occupied	4,871	90	5,901	84	21%
Vacant	482	9	386	16	-20%
Seasonal/Recreation	30	1	53	3	77%
Housing Built in Last 10 Years	901	17	1,438	23	60%
Residence Location Five Years Ago					
Same House	9,447	63	10,699	62	13%
Same County	2,290	15	2,721	16	19%
Outside County	3,162	21	3,803	22	20%
Employed Population	**6,582**		**8,289**		**26%**
Management/Professional	2,244	34	2,520	30	12%
Sales and Office	690	10	1,965	24	185%
Production/Transportation	582	9	1,379	17	137%
Service	907	14	1,093	13	21%
Construction	476	7	908	11	91%
Farming, Fishing Forestry	1,683	26	424	5	-75%
Employment - Selected Industries					
Education, Health and Social Services	1,507	23	1,600	19	6%
Construction/Manufacturing	1,256	19	1,600	19	27%
Wholesale/Retail Trade	1,436	22	1,400	17	-3%
Agriculture, Forestry, Fishing, Hunting	1,016	15	1,000	12	-2%

2005 Population Update

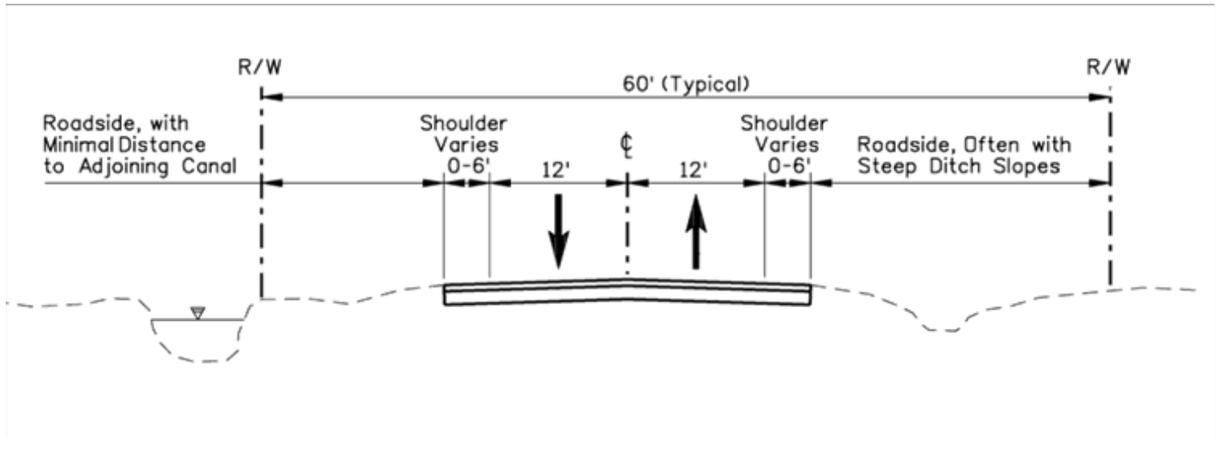
Location	2005 Pop.	Increase '00 to '05
Hamer	12	0.0%
Lewisville	497	6.4%
Menan	726	2.7%
Mud Lake	270	0.0%
Rigby	3,245	8.2%
Ririe (pt.)	507	-2.5%
Roberts	665	2.8%
Balance of Jefferson County	15,658	15.7%
Jefferson County Total	**21,580**	**12.7%**

FIGURE 2

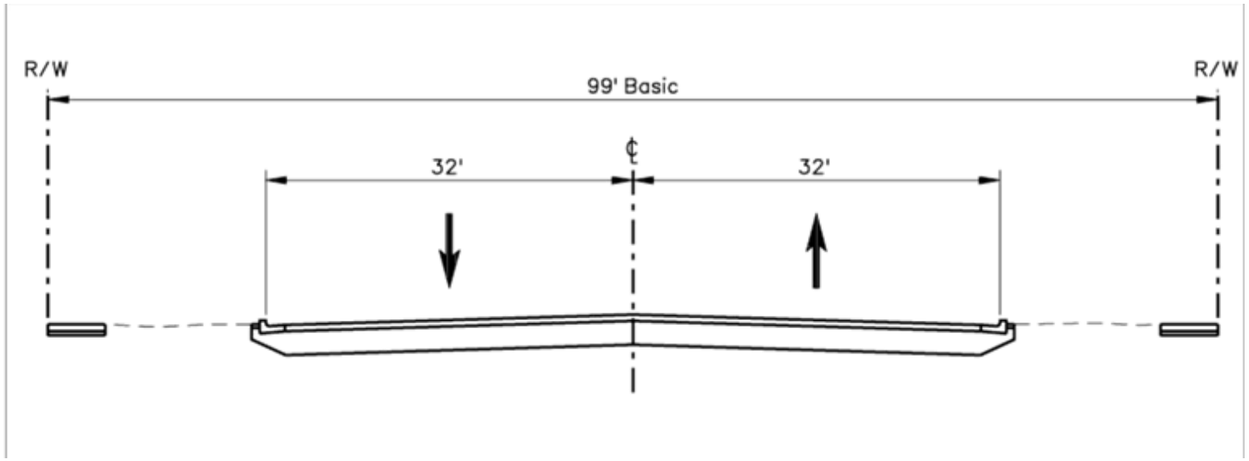
SH 48 Corridor Study

SH 48 Existing Roadway Sections

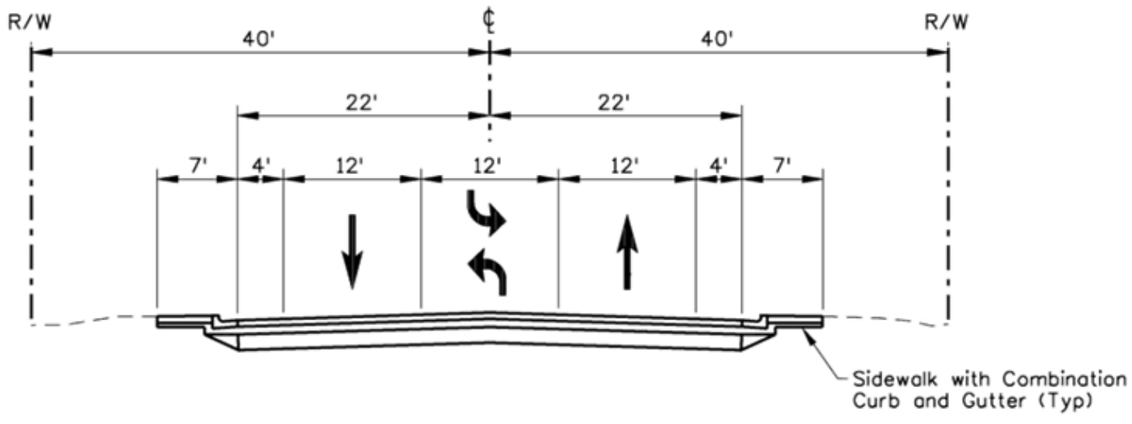
Existing Rural Roadway



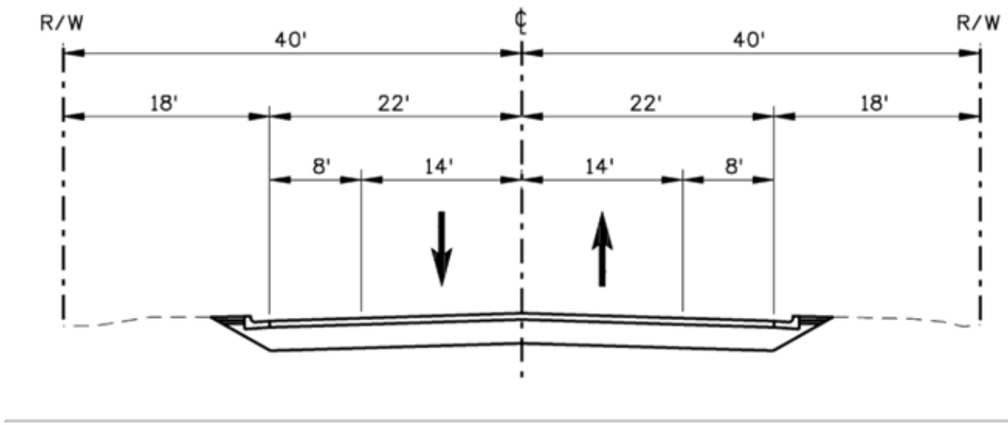
Existing Typical Section Through Rigby



Roadway Improvements Under Design by ITD 3800 East to 3rd West Street



Existing Typical Section Through Roberts



Although the horizontal alignment of SH 48 can be characterized as being "straight", the direction of the roadway changes from east-west to north- south nine times dividing the road into straight segments. After the first two corners (located in Roberts) each of the corners has been replaced by large radius curves – generally signed for 40 to 50 miles per hour as shown below.

Starting Milepost	Direction Change Roadway	Segment Length	Direction Forward	Approximate Radius	Warning Sign Speed
0.0	627 North	0.5	E-W		
0.5	Front St(2800 E)	0.2	N-S	Urban	n/a
0.7	650 North	6.2	E-W	Urban	n/a
6.9	3500 East	3.5	N-S	550ft	40 mph
10.4	300 North	9.9	E-W	600 ft	45 mph
20.3	4500 East	1.4	N-S	950 ft	None
21.7	150 North	0.9	E-W	1140 ft	50 mph
22.6	4600 East	1.4	N-S	1150 ft	None
24.0	County Line Rd	0.4	E-W	900 ft	50 mph

There are also mild alignment changes between mileposts 1 and 4 in the segment between Roberts and Menan.

Appendix A is a series of 17 exhibits with aerial photography showing the entire length of SH 48. Other information portrayed in Appendix A exhibits includes:

Milepost Locations
Accident Locations by severity
Generalized Sensitive Land Uses
Approximate Property Lines
City Limits
Other general land use information.

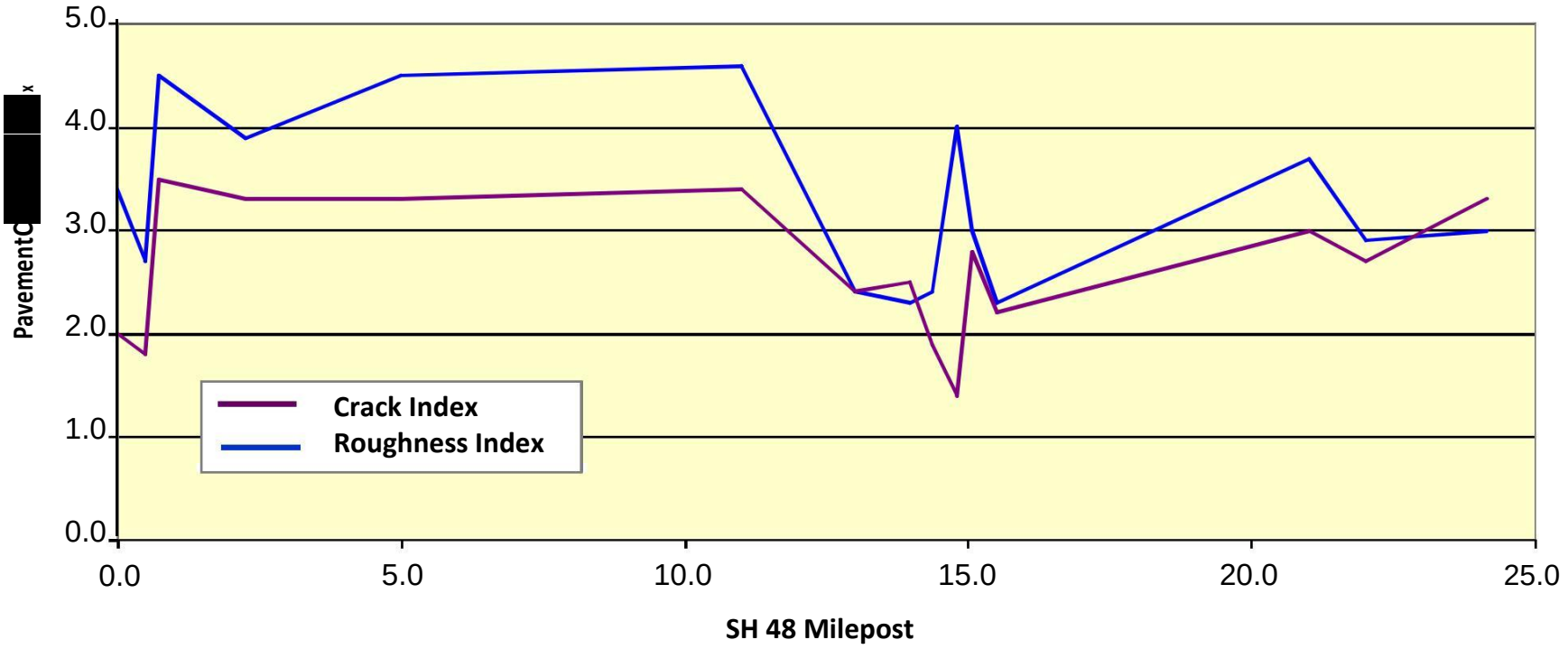
The vertical alignment of SH 48 is essentially flat throughout the length of the highway.

ITD routinely surveys the pavement condition of all state highways. Pavement condition indices for roughness and cracking are computed from the data collected. The index values range from 0.0 (poor condition) to 5.0 (excellent condition). Figure 3 graphs the roughness index and cracking index for SH 48 along its length.

FIGURE 3

SH 48 Corridor Study

Roughness and Cracking Pavement Conditions along SH 48



3Figure
7PagerCorrido48SH Study

The graph shows that pavement conditions are generally better west of Rigby than east of Rigby. The worst conditions occur within Roberts (0.5 miles) and in the vicinity of Rigby (2.5 miles between 3800 East and 4050 East).

	Weighted Average Index	
Segment	Roughness	Cracking
MP 0.0 to 13.0	3.3	4.3
MP 13.0 to 24.4	2.4	2.6

The western section of SH 48 is in generally good condition, particularly with respect to cracking. Recent improvements to the eastern section are expected to significantly improve these values when the road conditions are next measured.

Existing Traffic/Operations

Average daily traffic along SH 48 is shown in Figure 4. It ranges from 1,000 to 2,000 vehicles per day (vpd) at either end of the project. Between Menan and Rigby, volumes are between 2,000 and 3,600 vpd. Traffic volumes peak in the vicinity of Rigby, reaching 4,000 to 5,600 vpd. For comparison, traffic clow in US 20 is 16,000 vpd past Rigby. (Source: ITD Traffic Flow Map, District 6, 2005)

Outside of the Rigby area, the current traffic volumes are easily accommodated by the existing 2-lane roadway. Figure 4 also graphs Level of Service (LOS) calculated for both roadway and intersection conditions. LOS values range from A to F, representing increasing levels of delay due to increasing traffic on SH 48, or approaching SH 48 at an intersection. LOS A through C are considered acceptable, LOS D is marginal, and E and F are unacceptable. An *existing* LOS of D or worse indicates a clear need for improvement.

The graphs of roadway and intersection LOS indicated acceptable operation in all but the Rigby area. With a roadway LOS of E and an intersection LOS of E for existing traffic levels in the vicinity of Rigby indicate an immediate need for improvement.

Accident Experience

Accident data for the 10-year period including 1997 through 2006 was obtained from ITD. In the ten-year period covered there were 298 accidents along SH 48. These included four accidents resulting in fatalities, and 119 injury accidents.

Table 2 summarizes accidents on SH 48 by accident type, with accident types grouped according to a related roadside characteristics as follows:

- Roadside Related Accidents – occur when a vehicle leaves the paved road and hits a fixed object or encounters steep slopes that can lead to injuries or vehicle damage. Examples include overturning accidents or hitting a tree.
- Road Width Related Accidents - those accidents where additional lanes or shoulder width could reasonably be seen as allowing a driver to avoid accidents such as sideswipes, head-on collisions, or hitting a parked car.

TABLE 2

SH 48 Corridor Study

SUMMARY OF ACCIDENTS BY TYPE AND RELATED ROADWAY ELEMENT

Accident Type	Frequency 97 to 01	Frequency 01 to 06
Overturn	13	4
Embankment	9	4
Ditch	3	
Tree	2	1
Guardrail Face	1	
Bridge/Pier/Abutment		2
Utility Pole	4	5
Fence	3	3
Other Object Not Fixed	2	
Other Fixed Object	2	
Highway Traffic Signpost	2	2
Delineator Post	2	3
Other Pole	1	1
Total	44	25

Related Roadway Physical Characteristic	Percent 97 to 01	Percent 01 to 06
Roadside	**25**	**21**

Accident Type	Frequency 97 to 01	Frequency 01 to 06
Side Swipe Same	5	2
Side Swipe Opposite	2	2
Parked Car	4	
Backed Into	2	2
Pedacycle	1	1
Parked / Private Property	1	
Other Non-Collision	1	
Head On	1	
Fell/Pushed/Jumped	1	
Pedestrian		1
Total	18	8

Related Roadway Physical Characteristic	Percent 97 to 01	Percent 01 to 06
Road Width	**10**	**7**

Accident Type	Frequency 97 to 01	Frequency 01 to 06
Rear End	32	32
Angle Turning	18	11
Same Direction Turning	14	5
Rear-End Turning	5	5
Head-On Turning	3	4
Angle	25	19
Total	97	76

Related Roadway Physical Characteristic	Percent 97 to 01	Percent 01 to 06
Access	**55**	**63**

Accident Type	Frequency 97 to 01	Frequency 01 to 06
Domestic Animal	12	6
Wild Animal	4	3
Cargo Loss/Shift		1
Other		1
Total	16	11

	Percent 97 to 01	Percent 01 to 06
Other	**10**	**9**

- Access Related Accidents – so grouped because they involve vehicles entering, crossing, or turning off of the roadway. Rear-end, turning, and angle accidents are in this category.

The final group is "Other" and includes mostly collisions with animals. These accidents cannot be reasonably associated with physical characteristics of the roadway.

It is customary to look at accidents over a five year period; thus, the ten years of accidents were split into two groups: 1997 through 2001, and 2002 through 2006. The most noticeable fact is that the number of accidents actually went down during the latter period. This is counter intuitive, although much of the recent growth and traffic increase did not start until after a mild recession in 2002.

Of interest is the change of accident types as a percent of the total accidents over time. There is a clear pattern of an increase in access related incidences, an indicator as to what can be expected as Jefferson County continues to grow without changes in the characteristics of SH 48.

Figure 5 provides a graphical presentation of the location of accidents by type over the length of the SH 48. What is most apparent is the clustering of access related accidents in the vicinity of Rigby. This is of course logical, and along with low Levels of Service, supports the need for timely improvement in this area.

The second chart compares actual SH 48 accident rates with the statewide average accident rates for comparable roadways. West of Rigby the accident rate is at or below the statewide average, indicating that general improvement based on past accident experience is not warranted. Within and east of Rigby, the SH 48 rate is 70 percent higher than the expected rate – a further indication of need for improvement. For the remaining five miles along 300 North, the SH 48 rate is about equal to the expected rate. Appendix C presents details of the accident analyses performed for this study.

Summary of Public Concerns

Participants at a Public Meeting held in June, 2008 were invited to fill out a questionnaire, part of which asked them to indicate whether any of five characteristics of SH 48 were of concern. The responses, all of which were submitted by people living along SH 48, are summarized in Table 3. The categories included Entering Traffic, Narrow Roadway, Visibility, Traffic Speed, and Roadway Curves. The highest rated concern was Entering Traffic. The concern was not the effect of entering vehicles on traffic already traveling on SH 48. The concern was the difficulty of getting on SH 48 from side roads and driveways. This concern was sighted by 75 percent of the respondents, most of which were directed toward the segment from 4000 East to 4500 East.

FIGURE 4

SH 48 Corridor Study

EXISTING TRAFFIC AND LEVEL OF SERVICE

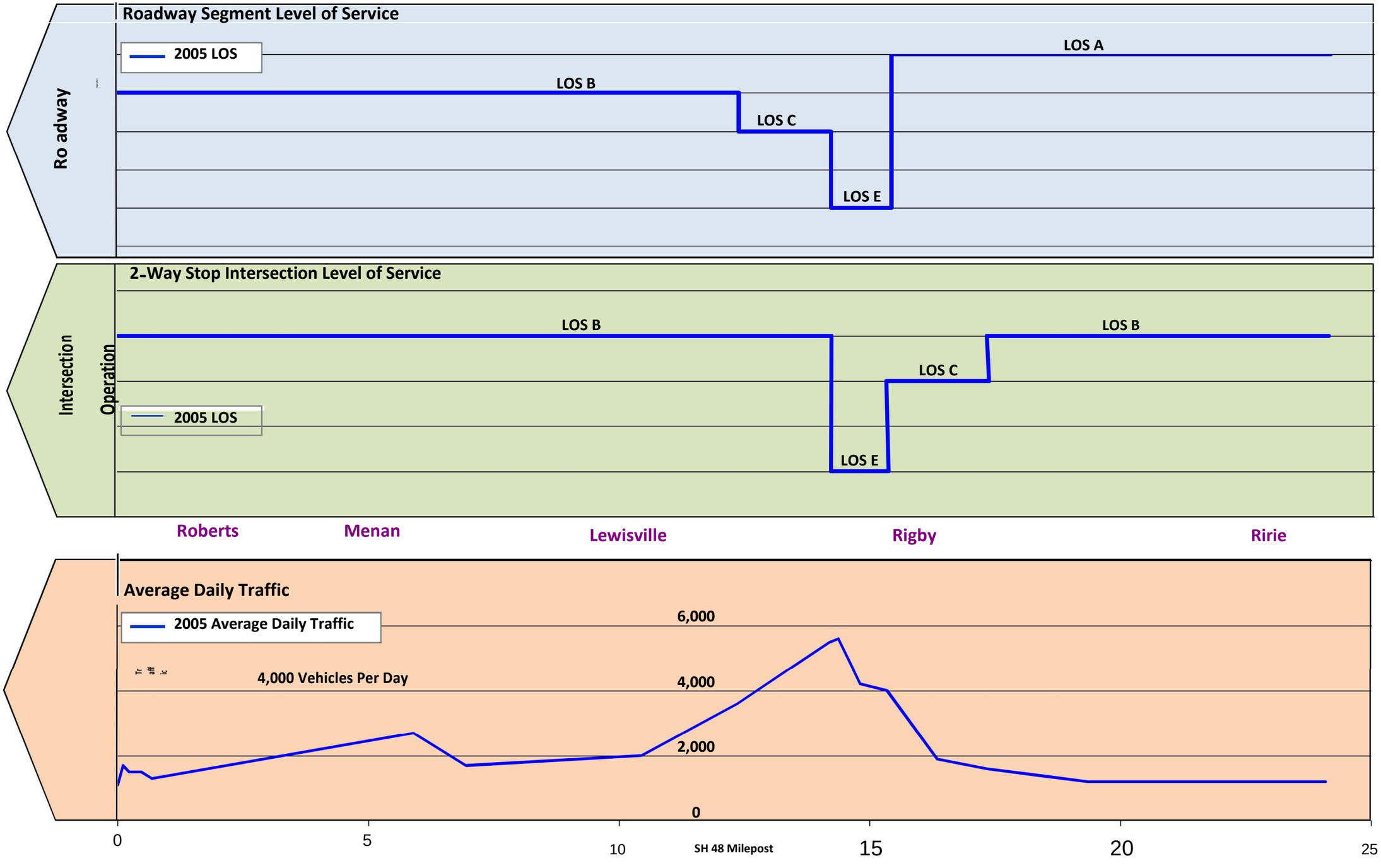


TABLE 3

SH 48 Corridor Study

SUMMARY OF PUBLIC CONCERNS WITH CHARACTERISTICS OF SH 48

Concern	Response			
	No Response	No	Yes	Where
Entering Traffic	3	1	12	Rigby to Ririe (2) 3700 E (1) 3800 E (1) Yellowstone Hwy 4000 E (5) 4100 E (4) 4200 E (1)
Narrow Roadway	5	2	9	Rigby to Ririe 3800 E to 4000 E 4000 E to 4300 E 4000 E 4100 E (2) 4100 E culverts needed
Visibility	8	2	6	Rigby to Ririe Crossroads with trees 4000 E 4500 E 250 N bridge 4600 W 50 N bridge
Traffic Speed	7	3	6	Rigby to Ririe Where posted 55mph 4000 E to 4500 E 4100 E
Roadway Curves	9	4	3	4500 E

(x) Indicates Number of Responses

Summary of Responses to questionnaire at June, 08 Public Meeting

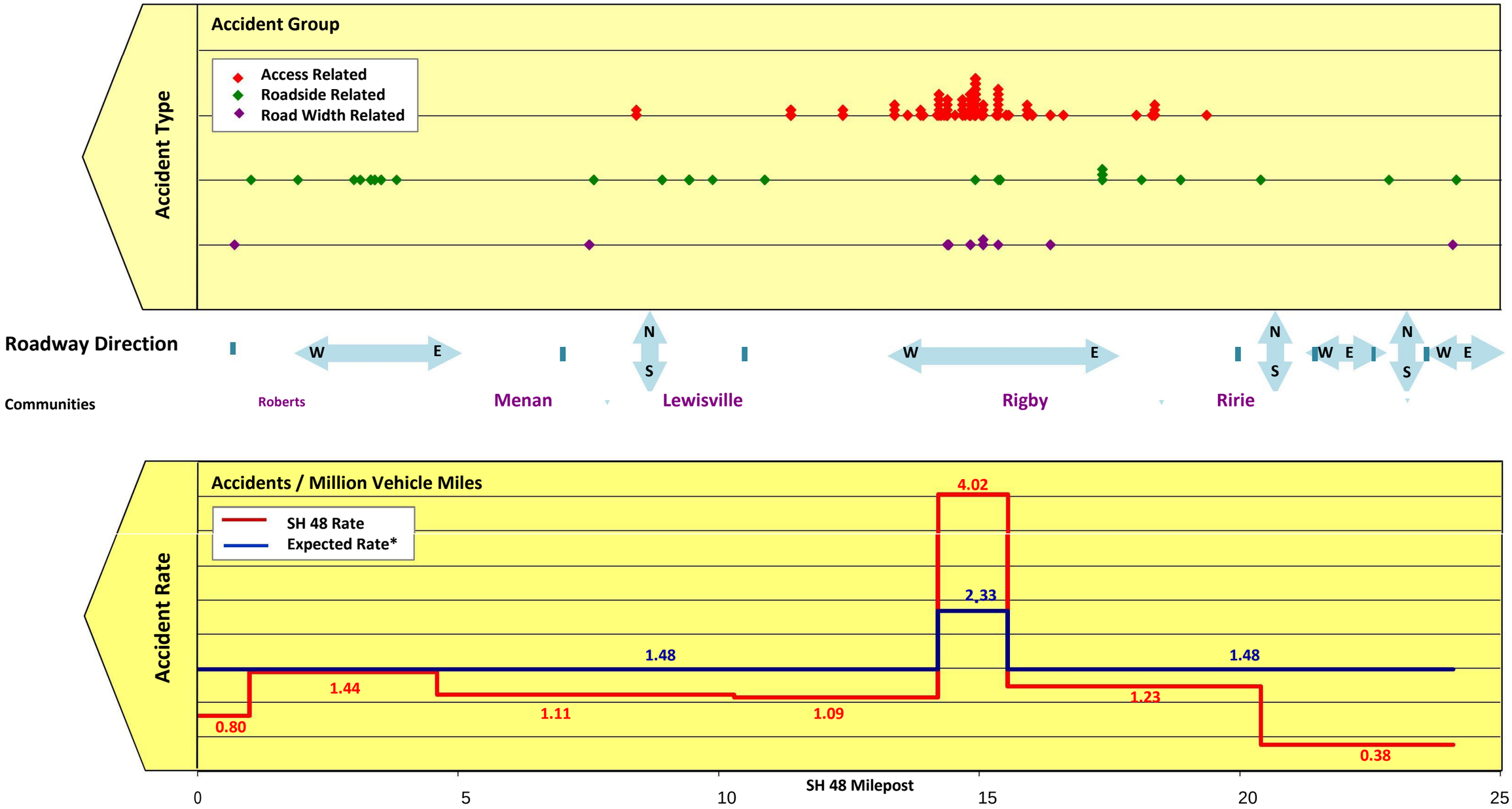
The second highest element of concern was Narrow Roadway. This was due primarily to lack of shoulders but is also indicative of the need for turn lanes so that left and right turning traffic can move out of the traffic stream. About 40 percent of the respondents sighted visibility (at crossroads) and high traffic speed as concerns. Few have any trouble negotiating the curves where SH 48 switches from E-W to N-S travel.

The above comments are consistent with a roadway that is nearing capacity as mainline and crossroad volumes increase. This suggests potential roadway widening and a change from the traditional 2-way stop control on the crossroads.

FIGURE 5

SH 48 Corridor Study

LOCATION OF ACCIDENTS BY TYPE / ACCIDENT RATE COMPARISON



* Based on statewide average rates by roadway type computed by ITD for use in safety analysis

Chapter 3

LAND USE AND TRAFFIC FORECAST

A 13 percent increase in population in Jefferson County between 2000 and 2005 clearly shows that Jefferson County is growing; and growth can be expected to continue. Northeastern Idaho is experiencing dramatic growth due to many factors including the scenic beauty of the Yellowstone Park / Teton Mountain complex, and the growth of BYU-Idaho. Most of the growth in Jefferson County is residential and can be most directly associated with the growth of Idaho Falls to the south and Rexburg to the north. Growth in the retail and service sectors in Jefferson County can be expected as population climbs.

As the number of people living in Jefferson County increases, there will be a corresponding houses or apartments; and more traffic to and from the new homes. Using "growth" to estimate future traffic on SH 48 involved the following:

- Estimating the number of new homes in to be built in Jefferson County by the forecast year of 2025 - (Forecast Growth),
- Applying a factor of 1 new trip in the peak hour per new home (known from studies published in Trip Generation, Institute of Traffic Engineers, 7th Edition), - Trip Generation),
- Assuming that most trips start at home and travel to work, school, or shopping locations, etc. and then return home. This allowed patterns of travel from homes to various activities to be developed. – (Trip Distribution), and
- Estimating the number of motorists that would likely use SH 48 to travel back and forth. – (Traffic Assignment)

The details of this process are described in Chapter 4 of the Rigby/Jefferson County Transportation Plan, excerpts of which are included in this document as Appendix B. The paragraphs below briefly summarize the resulting dwelling unit and traffic forecast.

Forecast Growth

An estimate of population growth prepared by the Jefferson County Economic Development Office was used as the basis for travel forecasts made in Jefferson County. The population growth forecast is shown in Figure 6. Figure 6 indicates a 20-year population increase from 20,900 in 2005 to 38,200 in 2025. This represents a growth of 83 percent over the 20-year period or a compound rate of 3.07 percent per year.

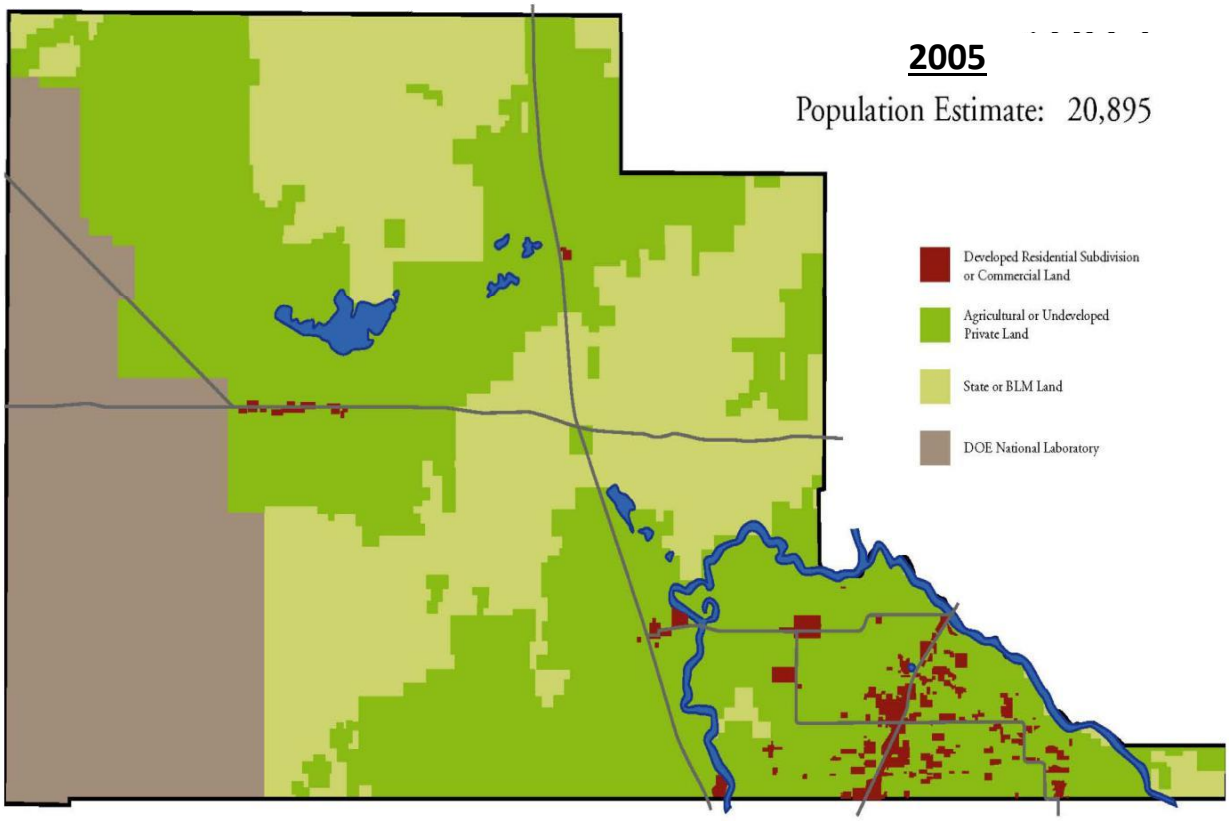
The increase in population was assumed to result in a corresponding increase in the number of homes in Jefferson County. The number of homes was estimated to increase from the existing (2005) total of 6,245 to a future (2025) total of 11,427. The location of additional homes was distributed to the various areas of Jefferson County according to the spatial distribution of development represented by the brown areas in Figure 6.

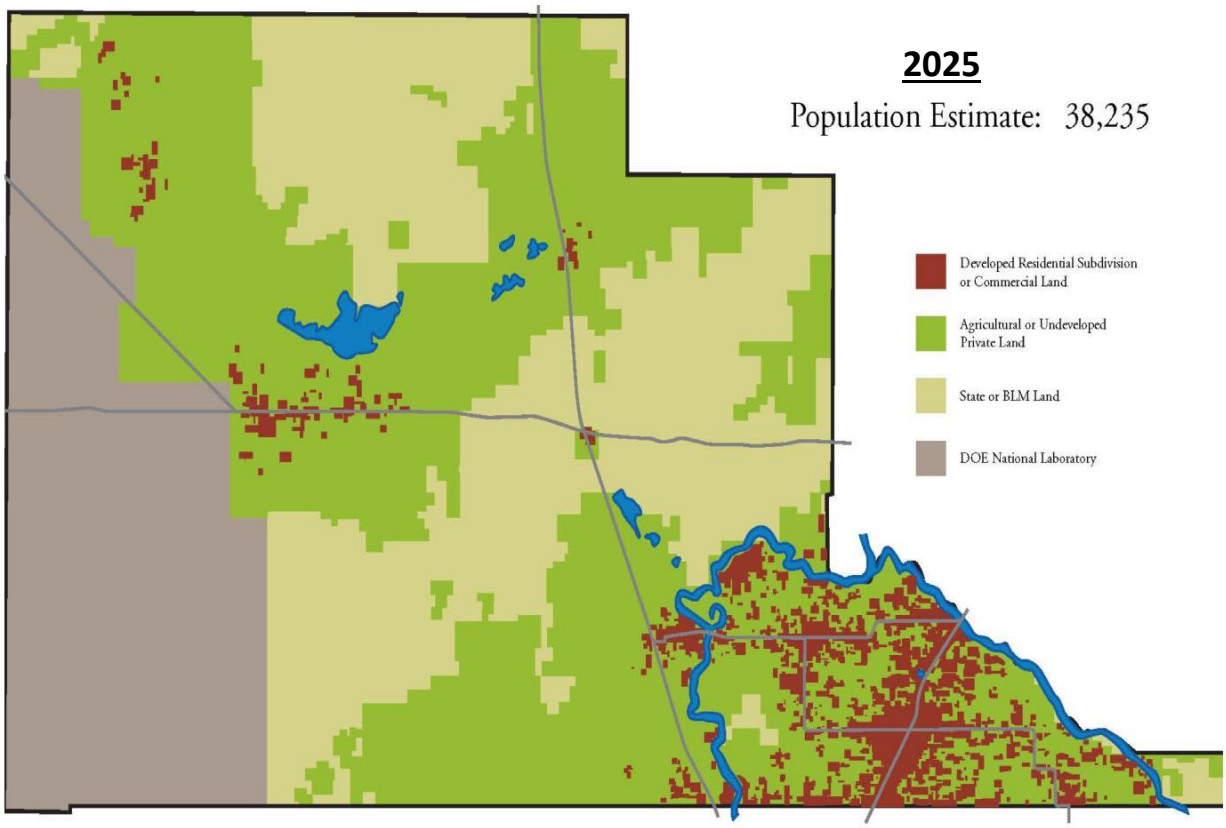
The 20-year increase in trips made during the busiest time of the day (the "peak hour") in Jefferson County was estimated to be 6,900 trips. As noted above, Appendix B explaines how the above number of total trips was estimated.

FIGURE 6

SH 48 Corridor Study

ESTIMATE OF POPULATOIN GROWTH 2005 - 2025





Source: Data developed by the Jefferson County Office of Economic Development; as presented in the Rigby / Jefferson County Transportation Plan.

Trip Distribution

In the trip distribution step, trips starting in any given area are assigned a destination area to form a complete movement. Data from a Jefferson County employers survey conducted for the Rigby/Jefferson County Transportation Plan were used to estimate the pattern of trips traveling from one area to the next. This included areas outside of Jefferson County. Figure 7 summarizes the estimated additional traffic flow between various areas of the county.

Traffic Assignment

Trips from one one area of Jefferson County to another can be routed along existing roadways necessary to complete the trip, thus providing an indication of the number of additional trips on roadways throughout the county. However, because of the choices available in a mile grid system and the size of the traffic zones, considerable judgment is required to identify the amount of traffic on any given roadway. A total of three separate estimates were made to arrive at the traffic forecast for SH 48 used in this study. The first two were made during the county-wide planning process. The third was made later as part of this corridor study. Descriptions follow:

1. The first estimate was made assuming that travel conditions remained essentially unchanged from existing conditions. This implied that travel on SH 48 would remain at posted speed limits and no stops would be required outside of the Rigby area. At the same time, travel on the county roads would remain inferior to that of SH 48, with relatively narrow roads and frequent stops. This estimate produced the highest traffic levels on SH 48.
2. The second estimate was made assuming improvements were made to county roads (described as the "County Circulation System" in the Transportation Plan), thus providing motorists with attractive alternatives to SH 48. This produced the lowest SH 48 forecast.
3. The third forecast used a different logical approach which examined each zone to zone movement and estimated a percent of that movement likely to travel via SH 48. This was done as part of this corridor study, some time after the above two estimates, and thus represents an independent estimate. The thought behind this estimate was that the attractiveness of SH 48 would be partially offset by location of development away from SH 48, improvements to county roads, and some increase in congestion on SH 48.

The third forecast resulted in forecast traffic levels on SH 48 generally between the above two forecasts and was deemed appropriate for use in this study.

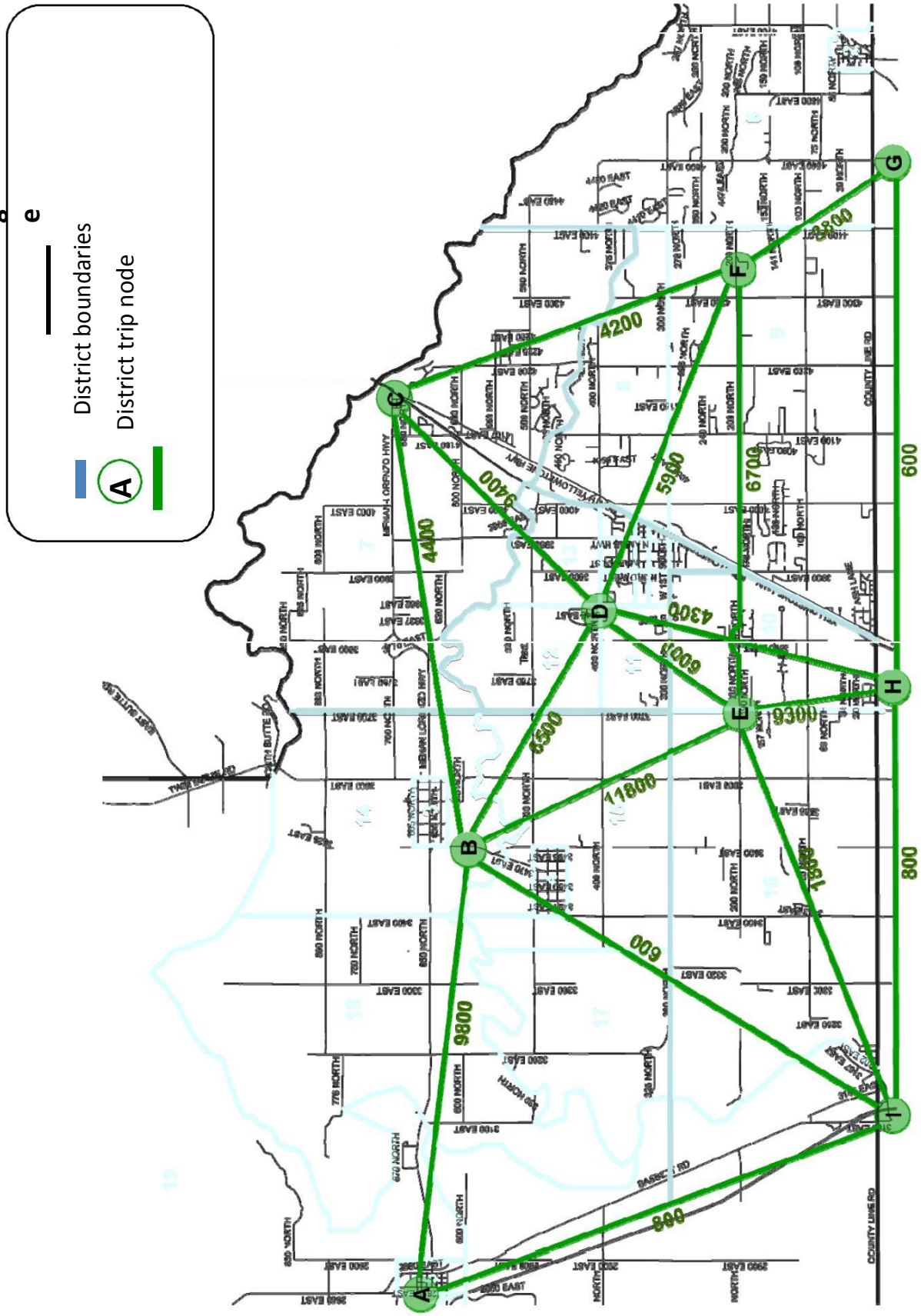
The forecast traffic on SH 48 is estimated to increase traffic between three and five times existing levels. Forecast averaged daily traffic volumes are as follows:

- Between Roberts and Menan – about 6,000 vehicles per day (vpd)
- Between Menan and 300 North – about 9,000 vpd
- 3400 East to 4100 East – about 16,000 vpd
- East of 4200 East – about 5,000 vpd.

FIGURE 7

SH 48 Corridor Study

FUTURE AREA TO AREA TRAFFIC ESTIMATES



Chapter 4 CORRIDOR NEEDS

The results of capacity analysis are expressed in terms of "Level of Service" (LOS) with values ranging from A through F, based on freedom of movement within the traffic stream and increasing delay due to traffic congestion. The implications of the levels of service are explained below:

- LOS A – Few cars, complete freedom of movement, able to maintain desired speed, minimal delay caused traffic control methods (stop signs or traffic signals).
- LOS B – Additional cars on the road, some additional effort needed to accommodate other vehicles, speeds maintained, minor delay at intersections.
- LOS C – Enough traffic to require drivers to be aware of other vehicles on the road. Travel speeds are not reduced, but the speed of travel is mostly dictated by actions of other drivers. Delays at intersections become noticeable, but "reasonable". LOS C is usually the standard of operation used to determine what improvements are necessary to serve future traffic.
- LOS D – Traffic movement may be "sluggish" and individuals motorists are totally controlled by the pace of vehicles in the traffic stream. Maintained speed may dip below posted speed limits and delays at intersections will be objectionable but not extreme. LOS D is often tolerated as a design standard in urban areas when further improvements would be too expensive.
- LOS E – Traffic moving, but slowly. Inability to maneuver and mounting delay becomes irritating. People seek less attractive but now faster alternate routes.
- LOS F – Essentially "failure". Traffic is "stop and go"; progress slow and frustrating.

In practice LOS A, B, and C are always acceptable. LOS D is considered tolerable where there are constraints to better improvements. LOS E and F are not acceptable and are considered justification for needed improvements.

Capacity analyses were performed to identify the effect of forecast traffic volumes on the operation of SH 48. Figure 8 compares existing and future Level of Service (LOS) for intersections and roadway segments for existing and future traffic conditions. For roadway operations, most of the existing 2-lane roadway will be substandard, with LOS dropping into the D and E range. The effect on the operation of existing intersections is more dramatic. LOS for intersection operations for the central 15 miles of SH 48 will decline to E and F under future traffic conditions. In essence, the existing stop control on the side roads (2-way stop control) will no longer be able to provide sufficient opportunitiy for side road traffic to move into or across the increased SH 48 traffic stream.

Operational analyses and comments made by the public tell us that in the vicinity of Rigby the effect of traffic levels of SH 48 and the crossroads has already reached unsuitable levels under conditions of 2-way stop control. These conditions will generally extend outward from Rigby as future development occurs, necessitating a progression of improvements along SH 48.

This study can look at the effects of 20 years of growth, and envision the state to which SH 48 should evolve. However, lacking funding to construct the necessary improvement ahead of the development, various improvements over the length of SH 48 will likely be initiated based on

observed traffic delays needs at specific locations – this in response to actual development location and size.

Faced with the lack of certainty as to the specific location of development, this chapter presents suggestions for the evolution of roadway and intersection improvements that can be applied as need develops. In Chapter 5 – Recommended Improvements, the various improvement levels described herein are combined with the 20 year forecast traffic volumes to describe a coherent set of recommendations for the full length of SH 48.

Access Capacity

Access capacity refers to the ability of vehicles to enter or cross the SH 48 traffic stream safely, and without undue delay. In a general sense, this includes vehicles entering and exiting SH 48 from all sources including mile grid roads, lesser public roads, private subdivision roads, and private driveways. The relative spacing, volume, and number of access points has an effect on roadway operations that will be discussed under Access Management in Chapter 5.

What follows is a suggested evolution for the improvement of intersections at mile grid and sub-mile grid public roadways. Figure 9 illustrates a logical progression of intersection improvement levels that could address capacity and safety issues. Note that, depending on existing and future traffic patterns, some "steps" may be skipped and physical constraints may dictate modifications to the general configurations discussed here.

FIGURE 8

SH 48 Corridor Study

EXISTING AND FUTURE LEVEL OF SERVICE COMPARISON

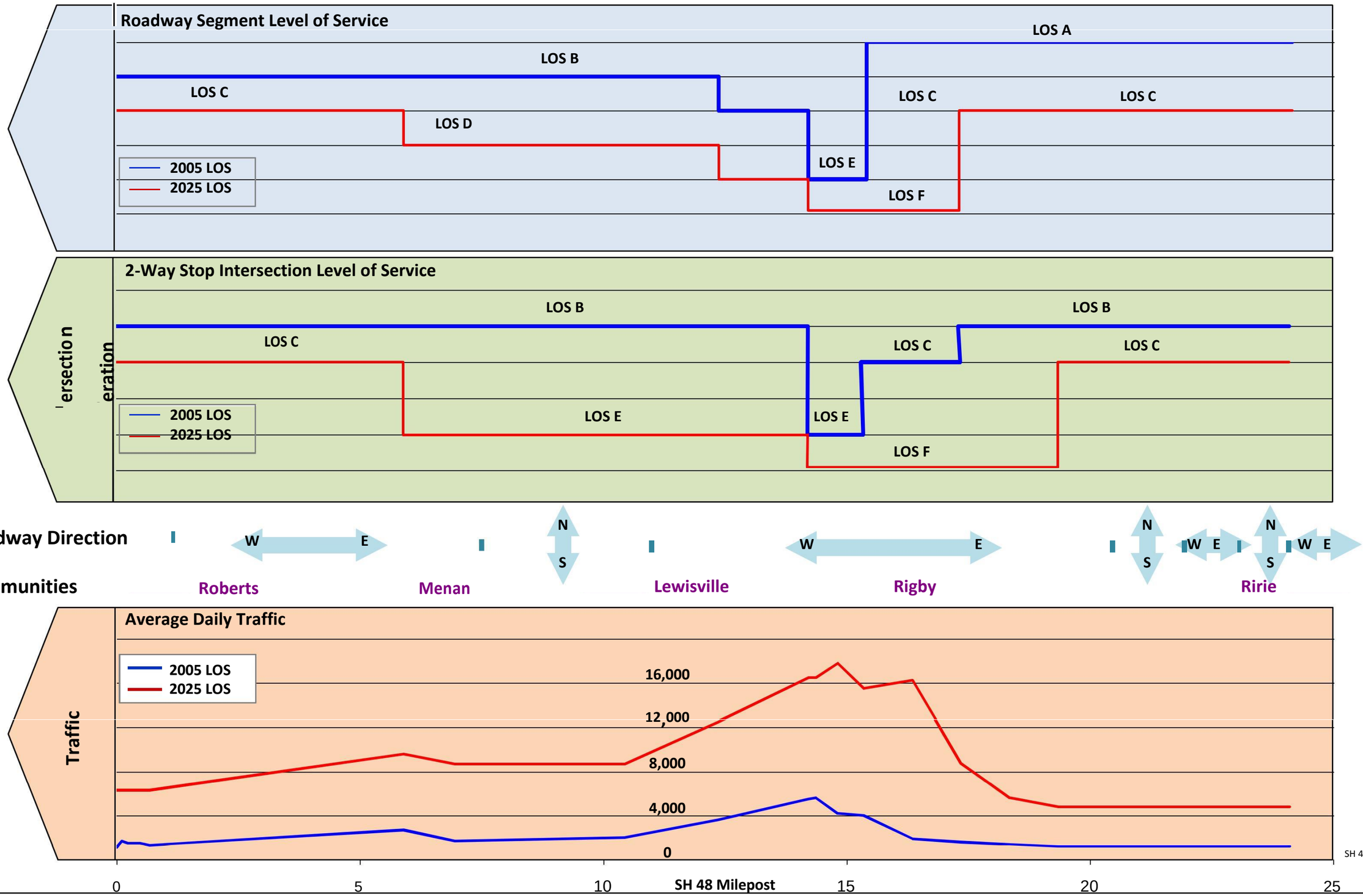


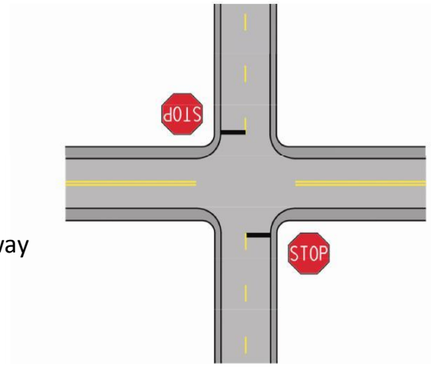
FIGURE 9

SH 48 Corridor Study

GENERAL IMPROVEMENT LEVELS - INTERSECTIONS

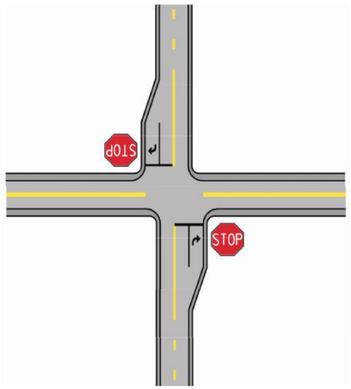
A. Most Existing Intersections

- Single lane approaches on all roadways
- Turning vehicles delay other vehicles
- Capacity range –
  - 6,000 vehicles per day – SH 48
  - 2,000 vehicles per day – crossroad/driveway

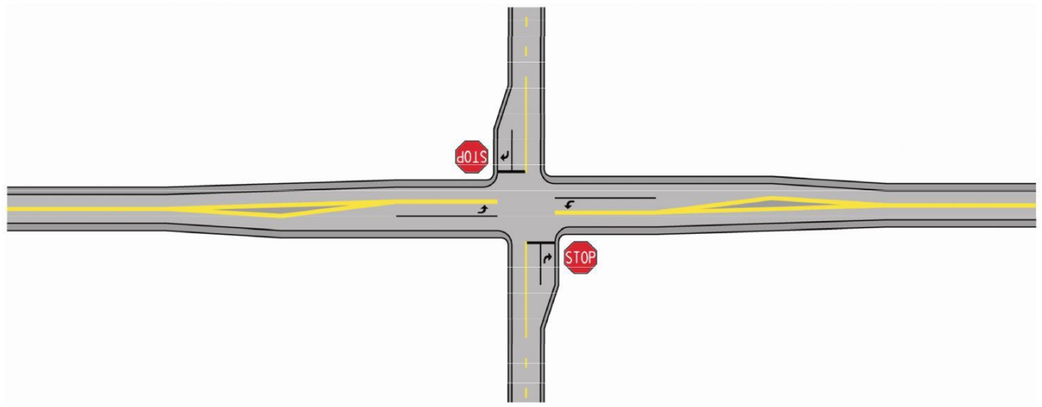


B. Minimal Improvement

- Addition of right turn lanes to crossroad approaches
- Relatively low cost
- Allows right turning vehicles to avoid longer delays from left turning and thru vehicles
- Capacity of critical left turning and thru movements unchanged; total delay at intersection decreased

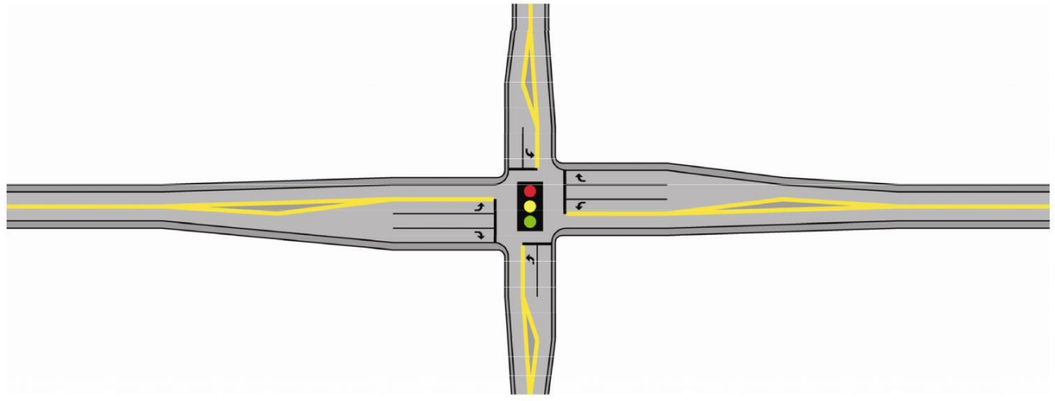


C. Major Improvement



- Right turn lanes as in “B”
- Addition of dedicated left turn Lanes to SH 48
- Increased cost due to taper lengths necessary to develop new lane
- Intersection capacity increased about 15 percent
- Increased safety for vehicles turning left from SH 48
- Significant decrease in delay for thru vehicles on SH 48

D. Beyond Two-Way Stop Control



- Fully developed urban intersection with signal control
- Higher traffic volumes creating need for further lane additions make intersections too complex for 2-way stop control
- 4-way stop control not an option – too much delay for traffic on SH 48
- Roundabouts may not be appropriate for SH 48 – intended to serve longer distance trips
- Signalization appropriate for mile grid roads and new public roads serving areas beyond frontage properties
- Access planning should produce local street systems tied to 1 mile signal spacing or minimum ½ mile spacing in highly developed areas

NOTE: The levels of intersection improvements are not meant to limit the possible improvements at any given intersection. Factors influencing improvements at specific intersections include:

–Turning patterns,

–Timing of traffic buildup on either SH 48 or the crossroad, and

–The timing of roadway improvements.

At most locations the starting point is an existing intersection where 2-lane, roadways cross. Two stop signs control traffic on the side road, allowing SH 48 traffic to travel without interruption. As long as traffic is low on either SH 48 or the crossroad, there is essentially no delay for SH 48 traffic. Crossroad traffic has little trouble finding gaps in SH 48 traffic to enter or cross the traffic stream. However, as the number of cars and trucks increase, intersection delay increases in one of three ways.

a) Increased crossroad traffic without significant increases in SH 48 traffic will cause delays to crossroad vehicles. An additional lane on the crossroad approaches can reduce crossroad delays but will not increase the fundamental capacity of the 2-way stop controlled intersection. This is illustrated as the Minimal Improvement in Figure 9.
b) A relatively balanced increase in traffic on both SH 48 and crossroad approaches can have two effects. Crossroad traffic experiences more delay due to higher volume and fewer acceptable gaps on SH 48. Traffic on SH 48 begins to experience delays because traffic turning from the crossroad can slow through traffic as entering vehicles accelerate from the turn. Also, more SH 48 traffic is likely to be turning at the crossroad, further slowing or even stopping through traffic. Delays to SH 48 traffic and safety issues caused by SH 48 traffic turning at a crossroad can be reduced by adding turn left turn lanes to the SH 48 approaches. This is illustrated as the Major Improvement in Figure 10. This can increase the capacity of the intersection up to 15 percent. However, as the combination of SH 48 and crossroad traffic approach 800 vehicles per hour, the useful limits (operation of the intersection without excessive delay) of 2-way stop control are reached. Driver expectations are not met, discomfort increased, and safety can become an issue as drivers accept smaller gaps to avoid excessive delays.
c) The third form of failure occurs when traffic on SH 48 increases to the point where traffic on the crossroad is essentially blocked from entering the traffic stream, causing undue delay. This type of failure is not based on crossroad traffic volumes and thus can affect all types of access points. This is likely to occur as SH 48 volumes reach about 800 vehicles per hour. Under this condition, the concept of a 2-lane rural highway breaks down. Additional lanes are likely needed on SH 48 as are other forms of traffic control at major intersections.

As suggested in points b and c above, there are limits beyond which two-way stop control is not able to serve the traffic demand. These limits are reached due to increasing travel demand; which, in turn, is the result of increasing development. As the character of the land use changes from rural to residential, the nature of roadways serving these areas must also change. The context of capacity and safety improvements changes from that of a rural, non-stop roadway to that of an urban arterial roadway with the need to stop through traffic periodically to allow safe crossroad access.

The next, least complicated, type of traffic control is to place stop signs on both the side road and SH 48. Although 4-way stop control would greatly benefit crossroad traffic, it would create excessive back-ups on SH 48. Thus, where traffic exceeds the capacity of two-way stop control, the next option is a traffic signal. The introduction of traffic signals creates a corresponding need for planning access. Signals should be spaced no closer than 0.5 miles and preferably 1.0 mile. A signalized intersection is a high capacity solution. As much as practical, future

development should be arranged such that new traffic is routed through the signalized intersections rather than using several lesser volume roads. This can be accomplished by means of an access management plan. This is discussed in more detail in Chapter 5.

The subject of intersection improvements has been discussed first because, as traffic increases, it is likely that problems will be observed first at intersections. Benefits can be obtained from improvements to individual intersections as need arises relatively independent of the roadway itself, or other intersections. The amount of funding necessary at any one time may be less than that needed for reconstruction of a section of roadway. Where feasible, intersection improvements should be planned to accommodate the ultimate configuration of the intersecting roadways. This is especially true where intersection improvements alone require relocation of irrigation canals or structures and/or realignment of the roadways.

Roadway Improvement Levels

Similar to intersections, the evolution of SH 48 from a completely rural highway to one serving increasingly residential land uses can be seen as a sequence of improvement levels. These roadway improvement levels are illustrated in Figure 10. With few exceptions, the existing roadway consists of two 12-foot lanes with minimal shoulders. The adjacent roadside is often too narrow to develop gentle side slopes that contribute to roadside safety. Adjacent irrigation canals add further complications.

A basic 2-lane roadway can be expected to handle traffic on the sections of SH 48 with the least increase in daily traffic; volumes generally less than 2,000 vehicles per day increasing to future levels of 5,000 to 6,000 vehicles per day. These conditions are expected to occur in the eastern and western five miles of SH 48. However, improvements to the existing 2-lane configuration of SH 48 are warranted for safe and efficient travel over the next 20 years. The types of improvements are illustrated in the "Improved 2-Lane Roadway" cross-section. This improvement level seeks to maximize 2-lane traffic flows as well as increase safety. The improvements include 6-foot and preferably 8-foot paved shoulders. Wider shoulders have several benefits. They:

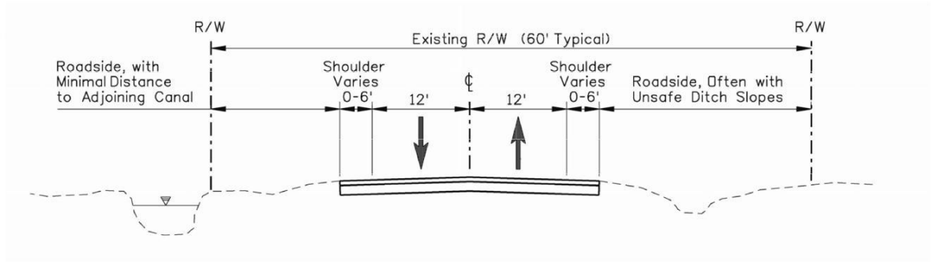
- Allow traffic to flow more easily with greater safe roadway width,
- Provide additional width to better handle farm equipment,
- Allow right turning traffic to move right onto the shoulders and facilitate passing by through traffic,
- Provide more safe space in which to maneuver to avoid a collision in the event of an erratic driver, and
- Provide a paved width on which bicyclists may more safely travel.

Beyond the shoulders, it is beneficial to create a safe, forgiving roadside to minimize the severity of accidents when vehicles leave the road. There are many places where the existing roadside includes steep slopes to drainage ditches and irrigation canals.

FIGURE 10
SH 48 Corridor Study
GENERAL IMPROVEMENT LEVELS - ROADWAY

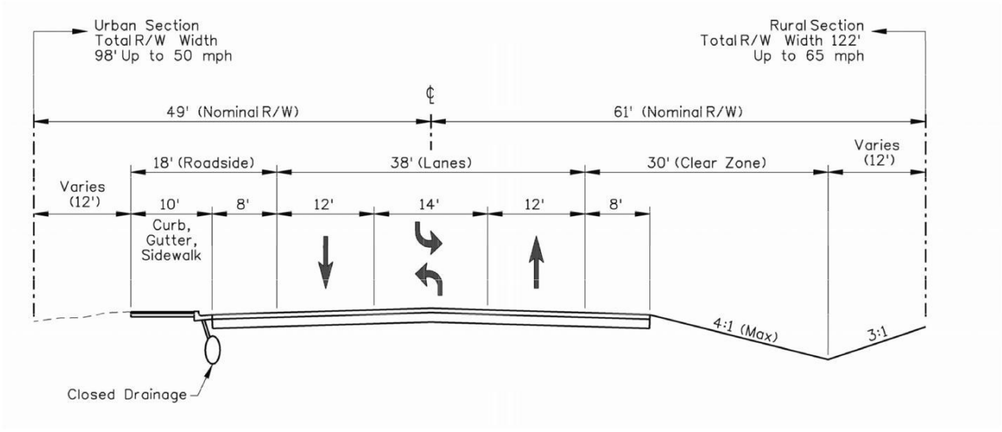
Existing Rural Roadway

- 2-lane roadway with poor shoulders
- Roadside often includes steep slopes to ditches and canal embankments
- Adjacent canals complicate roadside improvements
- Existing right-of-way not adequate for proper improvements unless additional right-of-way reserved by recent developments
- Capacity of roadway segments – 7,000 to 9,000 vehicles per day



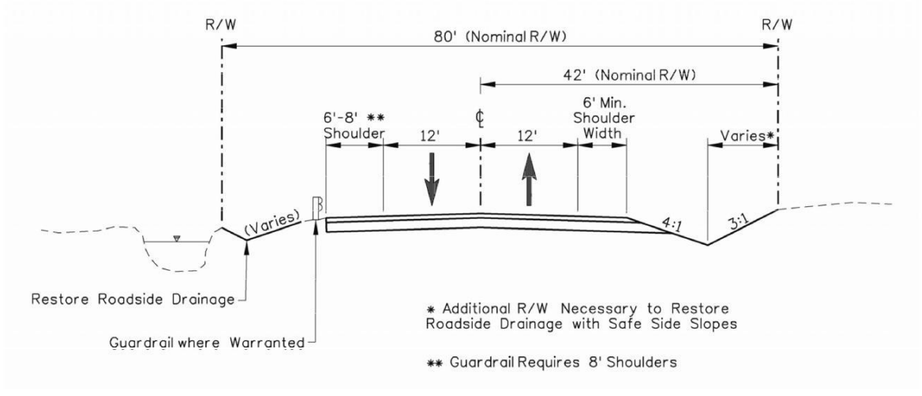
Capacity Improvement (With Safety Improvements)

- Continuous two-way-left-turn lane removes left-turning traffic from thru traffic
- 8-foot shoulders reduce effects of right-turning traffic on thru traffic
- Rural sections with roadside safety would require about 120 feet of right-of-way
- Using an urban curb & gutter section (with a closed drainage system) would reduce right-of-way needs



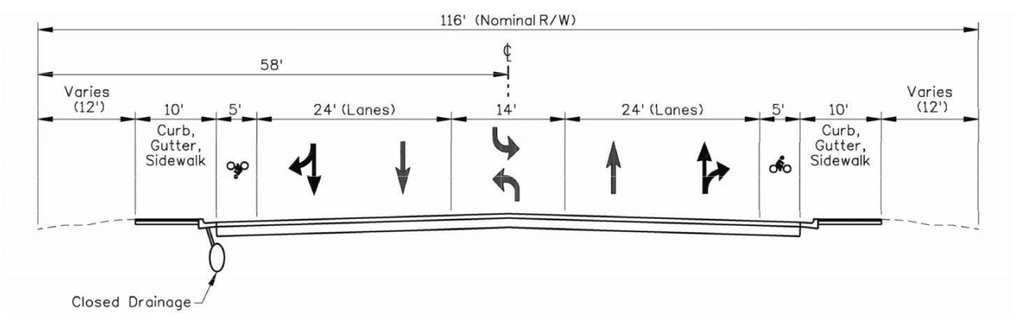
Improved 2-Lane Roadway (Safety Improvements)

- Roadway width increased to provide minimum 6 foot shoulders
- Roadside slopes reconstructed to provide safety clear zone
- Depending on terrain, 20 to 40 feet of additional right-of-way may be required
- Wider shoulders and guardrail employed where unable to obtain necessary right-of-way



Maximum Improvement – Five Lane Section

- Fully developed roadway for urban area associated with Rigby
- Curb & gutter and closed drainage appropriate for area
- Bicycle lanes included rather than shoulders
- Adjacent canals would either be relocated or enclosed



Adjacent irrigation canals present the potential of either running into a canal or hitting an embankment built up along the canal bank.

Because of the complications with the irrigation canals and the limited existing right of way (generally 60 feet), developing the above improvements will require additional right of way and a possible shift in the alignment of the highway. Thus, even this "minimal" improvement will be expensive.

The next improvement level shown in Figure 10 is labeled "Level 1 Capacity Improvement". This improvement level includes a 54-foot roadway surface that provides for 8-foot shoulders, 12-foot traffic lanes and a 14-foot median two-way-left-turn lane. Depending on the circumstances, the shoulder could be flanked by either curb, gutter and sidewalk (with a closed drainage system) or a safely graded roadside as discussed above. This would essentially require reconstruction of the roadway within a 100 to 120 foot right of way. This improvement, by design, provides for left turning traffic at numerous points along the roadway. It also assists left turning onto the highway as this maneuver can be made into the median lane meaning that traffic on SH 48 need only be clear in one direction at a time.

The three-lane road described above does represent a step toward urban roadway operations in that passing is not allowed on this type of roadway. However, under these operating conditions, capacity increases from 7,000 to 9,000 vehicles per day to about 13,000 vehicles per day without significant decreases in speed.

The final improvement level is the "Five Lane Section". The use of this type of roadway represents a full transition from rural highway to urban/suburban arterial. Where a five lane roadway is warranted, the SH 48 traffic volumes and crossroad volumes will be high enough that regularly spaced traffic signals must be assumed. The signals create gaps in the traffic flow that make access from other lesser roads and access points possible. Speed limits would be no higher than 55 mph with one- mile signal spacing; less where numerous access points exist. This section represents the ultimate build- out of SH 48. Although more lanes are provided, the nominal right of way required may be less than that of the three-lane roadway described above because of the assumed urban roadside conditions of curb, gutter and sidewalk. The capacity of the five-lane roadway would exceed any foreseen need on SH 48 – the exact value being contingent on crossroad traffic volumes and intersection designs.

Access Management

Access management refers to the body of policy and design decisions that seek to balance the ever present desire for access to an adjoining roadway with the goal of preserving the efficiency of travel on that roadway. Put simply, a greater number of access points (intersections or driveways) on a given segment of roadway will increase roadway congestion and increase accidents. With increasing traffic levels, and limited ability to create ever wider roadways, there is greater importance being placed on increasing the efficiency and safety of the roadways we have built or will build.

The fundamental purpose of access management is to minimize interference to traffic flow from vehicles turning onto and off of the primary roadway. The primary tools are to minimize the

number of access points and increase the spacing between points. Medians and other access designs are ways of limiting movements from certain access points. All of these efforts reduce the number of potential conflicts in a given roadway segment, thereby reducing the likelihood of congestion and accidents. Since the early 1990's a large body of research has emerged to substantiate the effectiveness of access management techniques. A sampling of this evidence is provided in Figure 11 which summarizes the benefits of selected access management strategies.

The appropriate number and spacing of access points along a roadway is, of course, dependent on the intended use of the roadway. Local streets directly serving home sites need little control. Access to mile grid roadways or state highways intended to move large volumes of traffic from one area to another should be managed. ITD has developed an access control policy for application on all roadways on their system. The policy specifies the maximum number of access points per mile and the minimum spacing between points. Another important parameter is limiting access within a minimum distance from intersections.

ITD access control level II is applicable to SH 48. Primary elements of this access management level are:

Minimum Intersection Spacing	1/8 to 1/4 mile
Minimum Approach Spacing	150 to 500 feet
Signal Spacing	1/4 to 1/2 mile

The lesser of the range of values shown above are intended for urban areas where existing patterns make effective access management difficult. The longer spacings noted above should be applied to all future development along SH 48.

Figure 12 illustrates various levels of access management and techniques that can achieve desirable access management results. The most fundamental step is to attempt to achieve minimum approach spacing. This by itself sets a limit on the potential number of access points (albeit an undesirably high one). Achieving this result can be difficult where existing individual lots do not have enough frontage to allow minimum spacing. If the lots are undeveloped, shared accesses at adjoining lot lines can be planned to achieve greater spacing.

The larger the platted development, the more successful access planning can be; as is illustrated by the second and third examples in Figure 12. Coordination with several developments located between primary grid roads can benefit both development accessibility and SH 48 access goals. Note also that the access planning for the various example parcels illustrate several reasonable trade-offs; as are sometimes necessary to bring all parties together. The third example shows how large parcels can be configured to avoid any access to SH 48 without sacrificing accessibility.

There is often a sense that, given the amount of existing development (within both traditional communities and new subdivisions) it may be too late to achieve meaningful results using planning techniques. An analysis of SH 48 frontage was performed to address this issue. The goal of the analysis was to determine the potential for limiting the total number of access points, given existing development along SH 48.

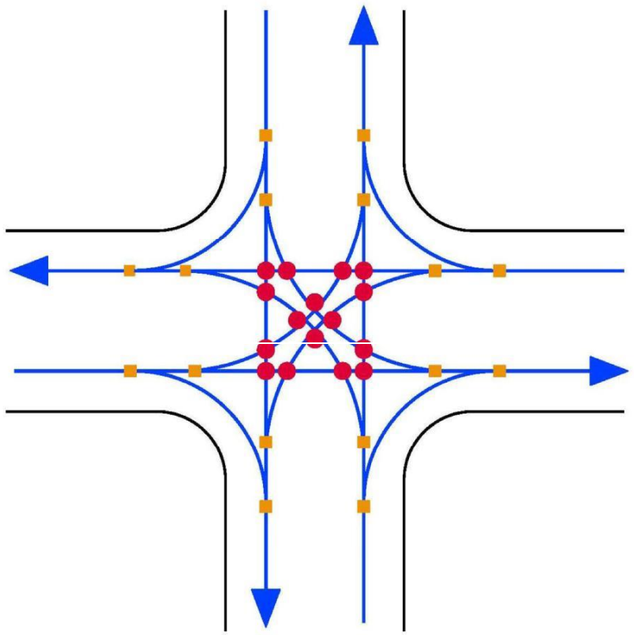
FIGURE 11

SH 48 Corridor Study

OPERATION BENEFITS OF ACCESS MANAGEMENT

Conflict Points

Theory: All access points create numerous potential conflict points. Minimizing the number of conflict points will improve safety and flow on the system.



- 16 Crossing
- 16 Diverge/Merge

Research Results

Crash Rates

Access Points per Mile	Crash Index
10	1.0 (base)
20	1.4
30	1.8

- Reducing the number of access points reduces the number of crashes.

Right Turn Slowing

Driveway Spacing	Percent of Following Vehicles Slowed
100 ft	64%
200 ft	40%
300 ft	29%

- More space between access points reduces the number of vehicles slowed by others turning:
  - Allows more efficient flow on the highway,
  - Reduces vehicle speed conflicts; thereby
  - Promoting safer, more efficient operation

Signal Spacing Vs Travel Time

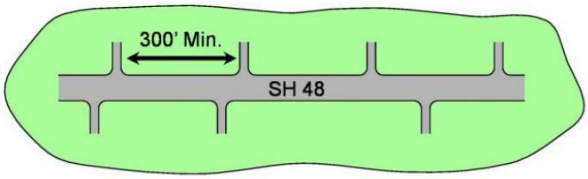
Signals per Mile	Spacing	Travel Time Increase
2	2640 ft	1 (base)
3	1760 ft	9%
4	1320 ft	16%
8	660 ft	39%

- Travel to and along SH 48 will exceed the capacity of 2-Way Stop control.
- Traffic signals will be needed in some areas.
- Signals can handle more traffic than Stop control.
- Good circulation paths away from SH 48:
  - `Allow larger areas to access a minimum number of signalized intersections.
  - Fewer signals result in less travel delay along SH 48.

FIGURE 12
SH 48 Corridor Study
EXAMPLE ACCESS MANAGEMENT LEVELS AND TECHNIQUES

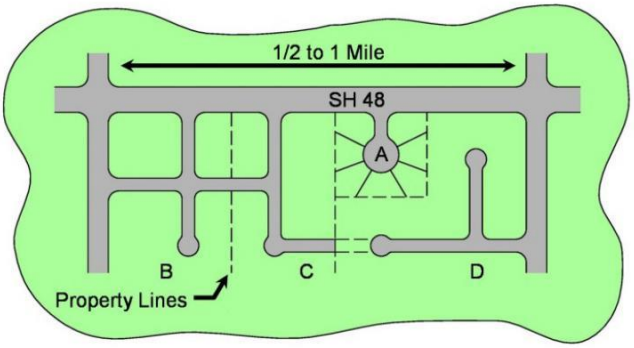
Traditional – Little Effort to Limit Number of Access Points

- Many individual driveways or small private roads access directly to the state highway
- Reduces safety and efficiency of arterial roadway
- Minimum 300' spacing where parcel size permits



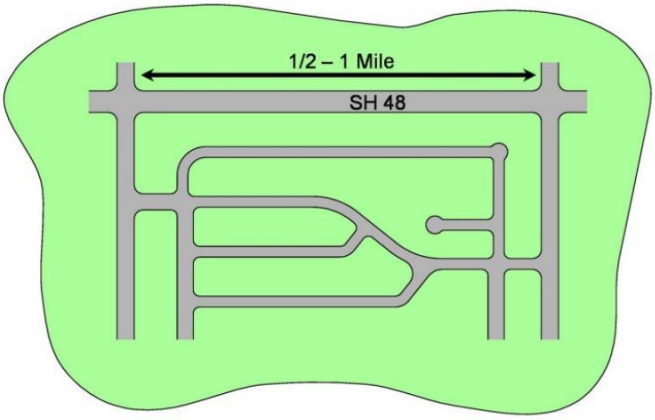
Coordination of Multiple Developments

- Parcel A – In Place – Serves 7 homesites from one access
- Parcel B – Allowed well spaced access from SH 48 provides access from crossroad provides for connection to adjacent development
- Parcel C – Allowed well spaced access from SH 48 provides access from crossroad provides for connection to adjacent development
- Parcel D – Access provided from crossroad only does not connect to adjacent parcels however, no access to SH 48 required
- Result – Acceptable number of access points on SH 48
- Parcels B and C enjoy multiple access opportunities allowing traffic "leveling" and better emergency response



Larger Parcels Provide Opportunity for Well Planned Access

- Single development with all access via side roads – no SH 48 access
- Reasonably direct connection between east and west crossroads provides good accessibility throughout development
- Longer, straight, grid type residential streets enhance accessibility but are not required



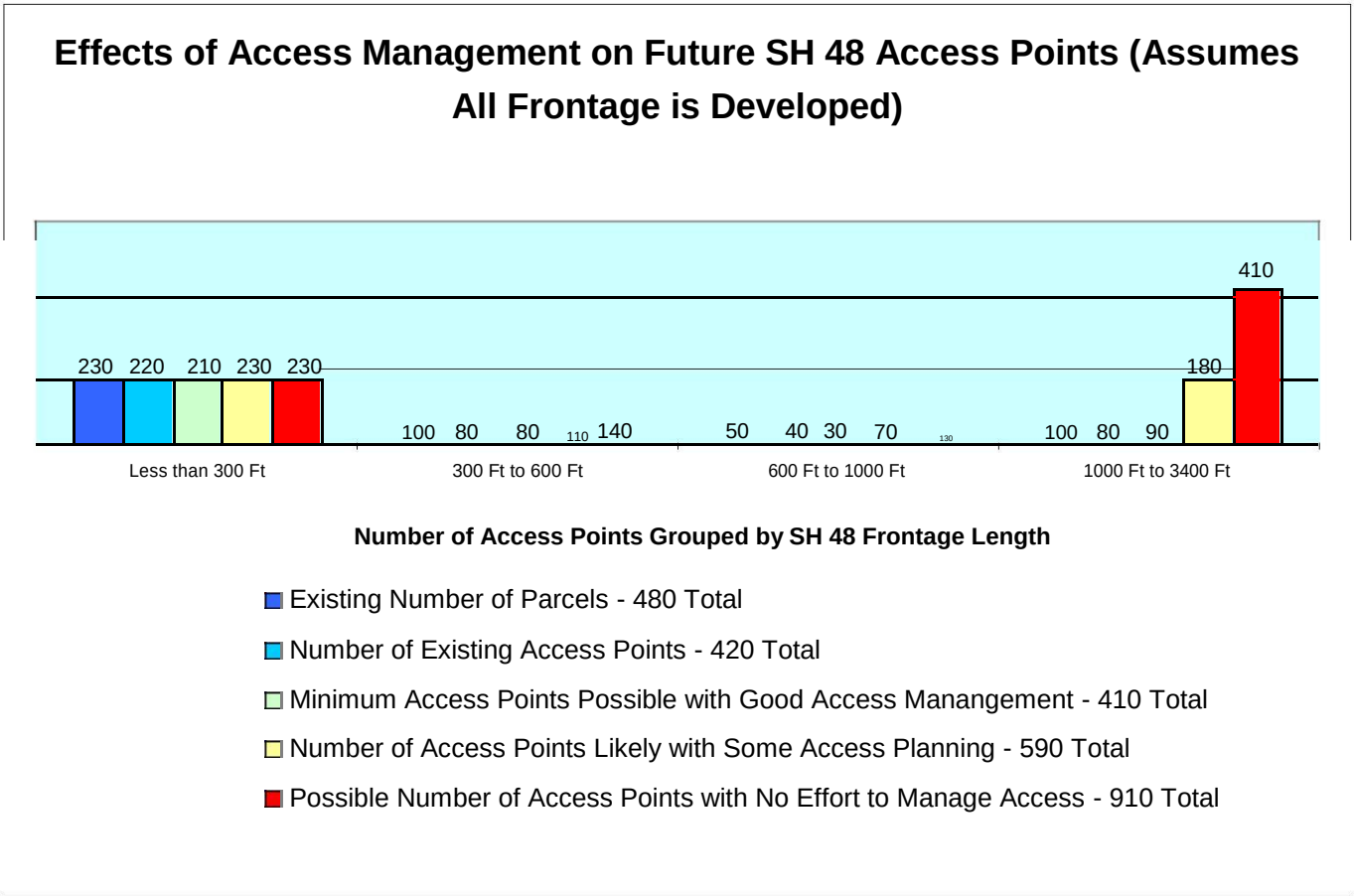
The following procedure was employed to accomplish this analysis:

- Aerial photography covering SH 48 was obtained. Parcel boundaries and the name of each parcel owner were overlaid on the aerial.
- It was assumed that all property with SH 48 frontage would be developed.
- Multiple adjacent parcels with the same ownership were treated as one parcel for the purposes of estimating future access points. (This assumes that a single owner of multiple parcels would be cooperative in developing an access plan for the combined needs of all parcels.)
- A minimum of one access point per parcel/owner was assumed regardless of minimum spacing criteria. The primary effect of this was to maintain access to existing homes where parcel frontage width would not conform to minimum spacing criteria.
- The number of existing access points and the frontage width were recorded for each parcel.
- For each parcel, three estimates were made of the potential future number of access points corresponding to three levels of access planning and management as follows:
    1) Possible (high) number of access points given little access planning beyond the limitation of a minimum 300 foot spacing between access points (less where existing parcel widths where smaller). This calculation was done mathematically based on the frontage measurement for each parcel.
    2) A probable number of access points resulting from "some access planning" allowing for some flexibility during the plat approval process for access beyond the minimum that could be envisioned. As an example, a parcel with ¼ mile frontage would ideally be developed with no more than one access point. In this level of access planning two access points were assumed.
    3) This level represented the minimum number of access points with good access management. Use of side road access and any other means were applied to minimize the number of access points along SH 48.

Note that the above efforts imply considerable judgment on the part of the analyst without the benefit of landowner participation. The intent of this effort was to determine the potential effectiveness of access planning, given the current state of development along SH 48; not to determine specific access parameters for all parcels. The individual judgments made for each parcel are not part of the findings of this study. Development of a full access management plan, with the full participation of property owners and local governments is one recommendation included in Chapter 5.

The results of the above analysis are presented in Figure 13.

FIGURE 13
SH 48 Corridor Study
POTENTIAL EFFECTS OF ACCESS PLANNING



Observation and Conclusions

- Existing developed parcels with 300 feet or less frontage are responsible for almost 50 percent of the existing access points. Little change can be accomplished without redevelopment.
- Longer SH 48 frontage presents a greater opportunity for efficient access development.
- With good access management, it is possible to develop all frontage along SH 48 with little increase in the total number of access points.

Notes:
- Access point counts exclude existing public roads.
- Access point counts exclude Roberts, Rigby, and Ririe.

Figure 13 displays the following information, grouped by the SH 48 frontage length:

- The number of existing parcels,
- The number of existing access points,
- The minimum number of access points possible with good access management,
- The number of access points likely with some access planning, and
- The number of access points possible with little effort to manage access.

There are a number of conclusions that can be drawn from the data presented:

- It is not too late! Good access planning can have a dramatic effect on the ultimate number of access points on SH 48.
- In the worst case scenario, the number of access points assuming full frontage development would be more than double the existing number of access points.
- Aggressive access management could potentially see full development with no increase in the total number of access points.
- The moderate access planning approach would limit access point increases to about 40 percent rather than the potential 125 percent with no planning.
- The larger the frontage length, the greater the flexibility to incorporate good access planning to minimize direct access needs.

To reiterate, the purpose of the above evaluation was to determine the potential results of access planning given the current level of SH 48 frontage development. The conclusion is that the potential for significant benefit exists.

Chapter 4 has addressed improvement needs and levels of improvements applicable to various segments of SH 48. In Chapter 5, recommendations as to the application of the above improvements will be made.

Chapter 5 RECOMMENDATIONS

Previous chapters have profiled the existing physical and operational characteristics of SH 48, expected development in Jefferson County and the resulting growth of traffic on SH 48, and various improvement levels appropriate to portions of SH 48. This information is combined in this chapter to support recommendations for improvements to SH 48 over the 20-year planning period. Recommendations are discussed for each of five logical segments:

1) Roberts to 3400 East (Lewisville Hwy) – 6 miles,
2) 3400 East to 300 North/3500 East (passing Menan and Lewisville) – 4 miles,
3) 3500 East to 3800 East – 3 miles,
4) 3800 East to 4200 East (Rigby vicinity) – 4 miles, and
5) 4200 East to Ririe / End of Project – 7 miles.

The discussion for each segment includes a description of the intersection and roadway improvement levels appropriate for conditions in that segment. This is followed by suggestions regarding the timing of improvements in the segment. Note that the needs are based on a 20-year forecast. However there are existing critical needs as well. Thus the timing of need can range from 0 to 20 years. Unless the need is imminent, the timing and location of specific intersection or roadway improvements cannot be reliably predicted because so much depends on individual decisions regarding the location and size of private developments. In lieu of specific improvement years, guidance is provided on operations and safety measures that could be used to trigger improvement needs. Site specific improvements that are based on public comment and engineering judgment complete the discussion for each segment. Following the segment discussions, several recommendations applicable throughout SH 48 are discussed.

Segment 1 - Roberts to 3400 East (Lewisville Highway) on 650 North

Figure 14 summarizes traffic conditions and suggested improvement levels for this six mile segment. Land use has remained predominantly rural in this western-most segment. No recommendations are made within the Roberts city limits. Although some development has taken place adjacent to SH 48, the overall density of development within one to two miles of SH 48 is expected to be less than in other areas. Future traffic is forecast to be 6,300 vehicles per day – a level that remains within the capabilities of a 2-lane roadway. The need for intersection improvements is likely, but 2-way stop traffic control should remain adequate. This judgment is valid as long as the combined crossroad approach volumes do not exceed about 250 vehicles per hour. Although this volume may not cause problems initially, the intersection will fail at the forecast SH 48 volume level.

Operations and safety in this segment would benefit by an improved roadside. Although this is the minimum roadway improvement, it is still costly. The current accident experience matches the statewide accident rate, with accidents related to roadside the most predominant type. While the need to improve roadside conditions is not immediate, accident rates in this segment should be monitored (using ITD's safety analysis procedures) to determine when roadside improvement is warranted.

There are no site specific improvements in this segment.

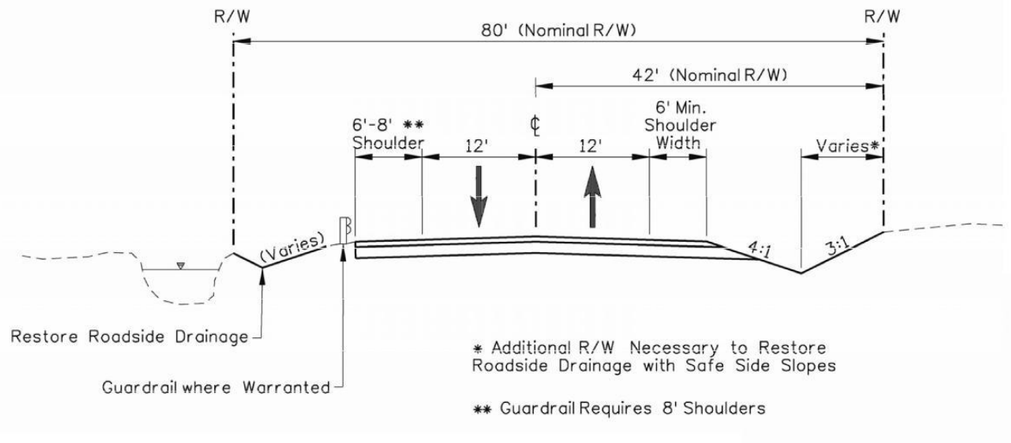
FIGURE 14
SH 48 Corridor Study
Suggested Improvements
Segment 1 – Roberts to Lewisville Hwy

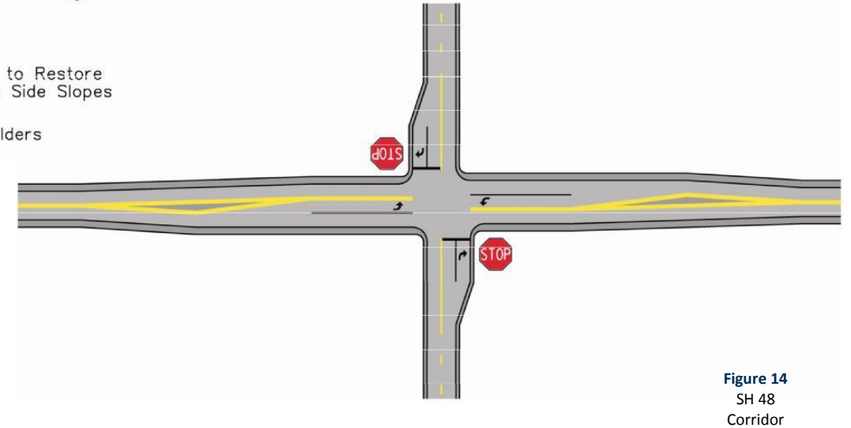
Roberts to Lewisville Hwy - 6 Miles

Traffic Conditions	Existing	Future
Average Daily Traffic	1,700	6,300
Roadway Level of Service	B	D
Intersection Level of Service	B	C

Suggested Improvements

Typical Roadway Configuration	Roadside Improvements or 3-Lane Roadway where Needed for Access
Typical Intersection Configuration	SH 48 / Left Turn Lanes Side Road / Right Turn Lanes Stop Controlled
Nominal ROW Width Required	80 Ft





Segment 2 - 3400 East (Lewisville Highway) to 300 North on 3500 East

This segment includes about a mile of east-west roadway approaching Menan. At 3500 East SH 48 turns south to a north-south alignment for three miles until reaching 300 North, where it again changes to an east-west heading. Within this distance, SH 48 skirts the perimeters of Menan and Lewisville. SH 48 passes through a 0.75 mile industrial area (predominantly a produce packing plant) located just north of Lewisville.

Figure 15 depicts this segment of SH 48. With forecast traffic volumes expected to reach 9,000 vehicles per day, traffic will exceed the useful capacity of a *rural* two-lane roadway. To explain further, the issue is not that a 2-lane roadway cannot physically carry that traffic. The problem is that very little crossroad traffic can enter or cross the SH 48 traffic stream and delays from traffic turning off of SH 48 cannot be absorbed. As a rural highway, the forecast volumes would warrant consideration of widening SH 48 to a four-lane divided highway (likely on new alignment) in order to maintain free flow, 2-way stop controlled rural highway operation/expectations.

The suggested roadway improvement in this segment is to develop a three-lane road with a two-way-left-turn lane occupying the center lane. For this to be effective, however, it is necessary that driver expectations and operating conditions become more urban in nature. This can be accomplished by means of a curbed roadside, a constrained speed limit, and at least one traffic signal. All of these measures will influence driver expectations; which, in turn, will change the effective capacity of the roadway. The following comments further discuss the suggested improvements for this segment:

- As residential development spreads west from Rigby, the need for services and convenience stores will move west as well. It is reasonable to believe that a location in the vicinity of Lewisville and Menan, with access to SH 48 would be more favorable to commercial development than other places along SH 48. (This segment of SH 48 is over four miles from central Rigby.) Thus the "urbanization" of this segment of SH 48 roadway and a reasonable development scenario are very much compatible.
- The term "constrained speed limit" is not focused on forcing artificially low speeds. Rather, it is meant to avoid speed limits of 55 mph or above that imply a free running roadway ahead. Even a reduction of the speed limit to 50 mph suggests a more constrained situation – the intended response. Given funding availability, it is likely that the speed limit in this segment could be lowered for other reasons prior to the roadway reconstruction.
- Unless another location for a traffic signal emerges from development patterns, it is suggested that the intersection at 500 North be favored for signalization. It is centrally located in this segment. In addition, 500 North is included in the Countywide Circulation System described in the Rigby/Jefferson County Transportation Plan. It has thus been identified as a roadway of higher importance and priority for County improvements.

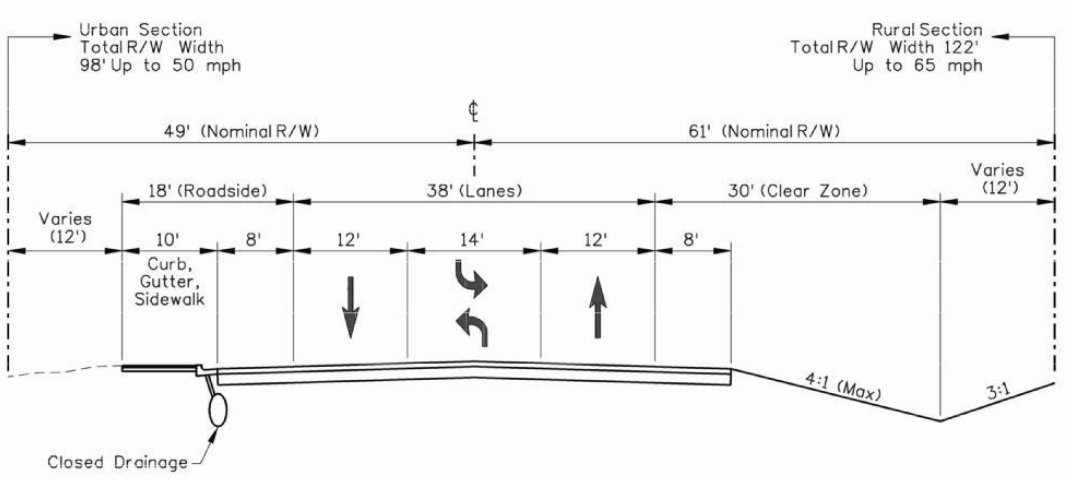
FIGURE 15
SH 48 Corridor Study
Suggested Improvements
Segment 2 – Lewisville Hwy to 300 North

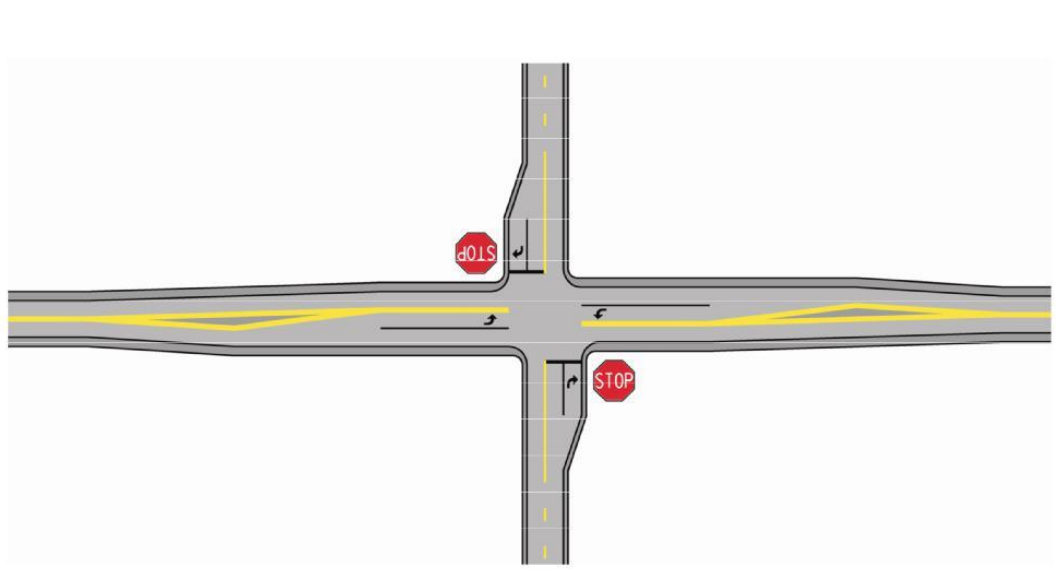
Lewisville Hwy to 300 North - 4 Miles

Traffic Conditions	Existing	Future
Average Daily Traffic	2,500	9,000
Roadway Level of Service	B	D
Intersection Level of Service	B	E

Suggested Improvements

Typical Roadway Configuration	3-Lane Roadway with Parking in Commercial Areas
Typical Intersection Configuration	SH 48 / Left Turn Lanes Side Road / Right Turn Lanes Stop Controlled Signal at 500 North
Nominal ROW Width Required	100-120 Ft





Unlike Segment 1, the traffic forecast indicates that roadway and intersection improvements will be necessary in Segment 2. The timing of need is uncertain as it is dictated by the pace of development west of Rigby. It is likely that the recommended widening will not be needed until the later years of the 20-year plan. The need for intersection improvements could come at any time.

One site-specific improvement is recommended for study in this segment. North American Foods, LLC operates a produce packing plant west of SH 48 about one half mile north of Lewisville. They employ approximately 350 persons. Both employees and trucks enter the packing plant via a driveway from SH 48. There are no turn lanes on SH 48 into the plant entrance. The routine entrance of employees and the more seasonal arrival of trucks bringing produce from the fields cause frequent delays for through traffic on SH 48. Several members of the public as well as a company representative have suggested there is a need for turn lanes at this access. It is recommended that sufficient traffic count data be assembled so as to document the need and benefit of improvements at this access. Assuming a need is identified; ITD, county, and company representatives should develop a plan for funding and implementation.

Segment 3 - 3500 East to 3800 East on 300 North

Figure 16 depicts this three mile segment of SH 48. While the adjacent land use remains predominantly agricultural, this segment could be considered as the western fringe of ongoing development. Three schools constructed within the last several years are located in this segment. The Midway Middle School and Jefferson Elementary School have been constructed in the northwest and northeast quadrants of the SH 48/3700 East intersection. The Rigby Senior High School occupies the south-east quadrant of the SH 48/3800 East intersection.

SH 48 has been widened to provide left turn lanes at both 3700 East and 3800 East. The accident rate of 1.07 accidents per million vehicle miles is about 30 percent less than the expected rate of 1.48 accidents per million vehicle miles. Traffic volumes are expected to increase from 3,500 to 12,500 vehicles per day over the 20-year planning period. Traffic will exceed the useful capacity of a two-lane roadway and very little crossroad traffic will be able enter or cross the SH 48 traffic stream without a system of signalized intersections.

The suggested roadway improvement in this segment is to develop a three-lane road with a two-way-left-turn lane occupying the center lane. A system of traffic signals placed at the mile road intersections will be necessary to provide opportunities for traffic from lesser approaches to enter the traffic stream. Right turn lanes should be provided under the following circumstances:

- At signalized intersections,
- At any other intersection where right turns exceed 100 vehicles per hour, and
- Along stretches where circumstances result in a series of closely spaced commercial or residential access points.

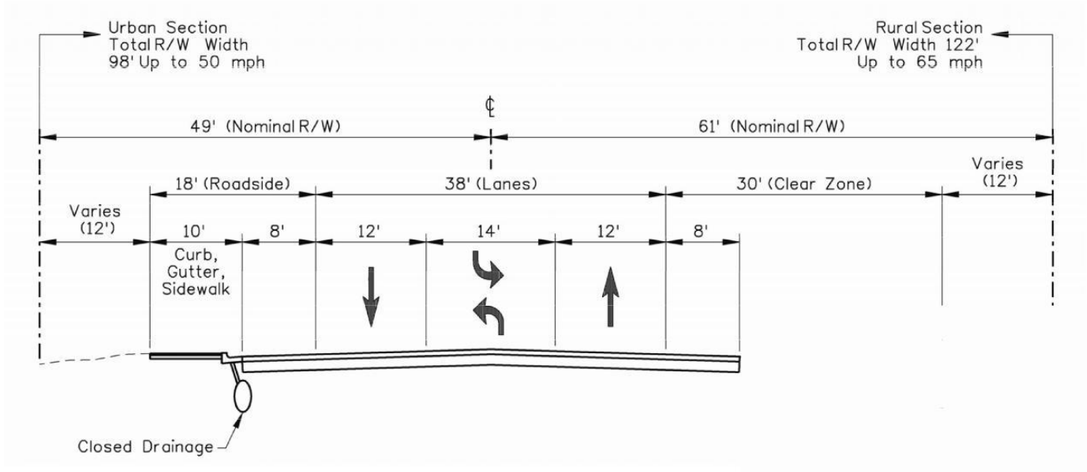
FIGURE 16
SH 48 Corridor Study
Suggested Improvements
Segment 3 – 3500 North to 3800 East

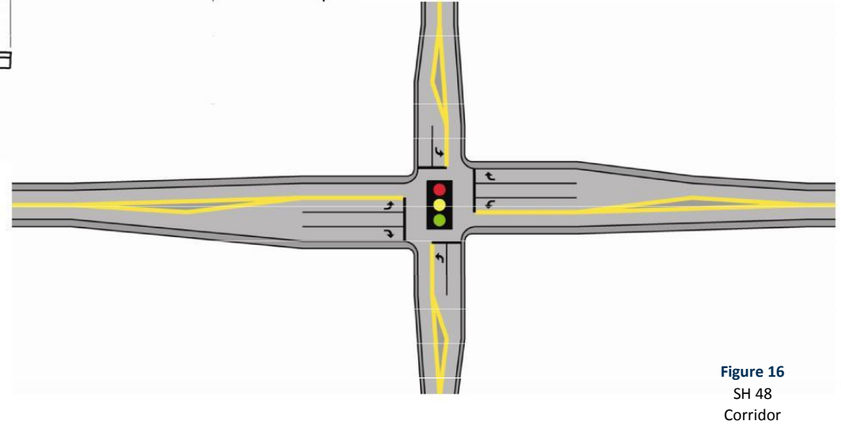
3500 East to 3800 East - 3 Miles

Traffic Conditions	Existing	Future
Average Daily Traffic	3,500	12,500
Roadway Level of Service	C	E
Intersection Level of Service	B	E

Suggested Improvements

Typical Roadway Configuration	3-Lane Roadway with Right Turn Lanes at Intersections
Typical Intersection Configuration	Signals at I Mile Spacing
Nominal ROW Width Required	100-130 Ft





As traffic levels and development increase, the operational context will change from rural to urban. This should be supported with a reduction in speed limit to 45 mph when conditions warrant.

The timing of need is uncertain as it is dictated by the pace of development west of Rigby. It is likely that the recommended widening will be needed within the first ten years of the planning period. The need for intersection improvements, including signalization, could come at any time.

No site specific improvements are included in this segment. (The need for signalization at the 3800 East intersection is discussed in the next segment.)

Segment 4 - 3800 East to 4200 East on 300 North

This four mile segment of SH 48 is currently the most urbanized and congested segment on SH 48. This segment passes through Rigby (first 2 miles) and then extends another 2 miles east of US 20 through the more rapidly growing eastern sections of the county. See Figure 17. There is one signalized intersection at Main Street / US 20 B. The speed limit drops from 55 mph to 35 mph before 3rd West (3900 East), increases to 45 mph beyond US 20, and resumes 55 mph one half mile east at the Rigby City Limits.

Under existing conditions, there are many complaints from the public about the difficulty of getting on and off SH 48 because of the high traffic in this segment – 6,000 vehicles per day. The safety analysis for the 1.4 mile section between Claremore Drive and the east City Limits shows an average of 4.02 accidents per million vehicle miles – or about 70 percent higher than that expected for similar roadways in Idaho. In addition, the number of accidents resulting in injuries was found to be almost 60 percent higher than expected (95% significance level).

Specific intersections noted for safety and delay issues include 3800 East (at the high school), 3rd West, Yellowstone Highway, 4000 East, and 4200 East.

ITD is currently designing a roadway widening improvement between 3800 East and 3rd West in Rigby (3900 East) that will include a three-lane roadway, curb and gutter and a joint use bicycle/pedestrian path. This is programmed to be constructed in 2009.

Traffic is expected to grow from the existing 6,000 vehicles per day to about 18,000 vehicles per day. Under these conditions anything short of a five-lane urban arterial with signalization at one half to one mile spacing should be considered as an interim project (relative to the 20-year planning period assumed for this study.) The planned widening between 3800 East and 3rd West, combined with the existing 40-foot street width in Rigby should support traffic operations west of US 20 for an interim 10 year period. However signalization of the intersections at 3800 East and 3rd West should be considered as near term projects. These signals, operated as a system with the existing signal at State Street, are needed to serve traffic at these higher volume intersections and create adequate gaps for traffic from lesser access points to more safely enter the SH 48 traffic stream.

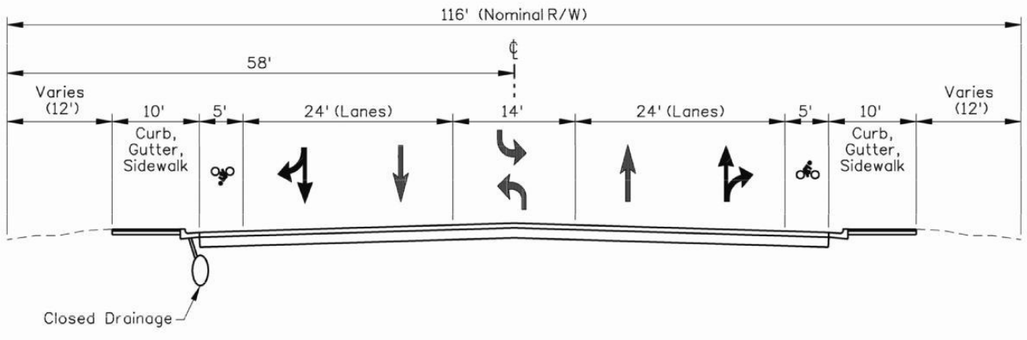
FIGURE 17
SH 48 Corridor Study
Suggested Improvements
Segment 4 – 3800 East to 4200 East

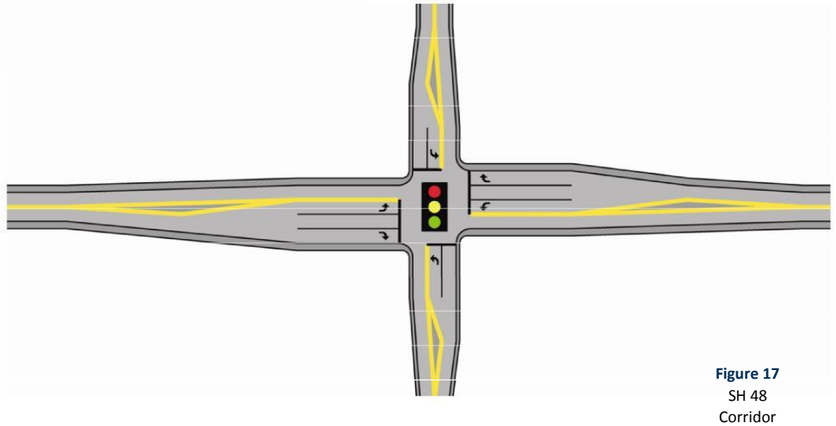
3800 East to 4200 East - 4 Miles

Traffic Conditions	Existing	Future
Average Daily Traffic	6,000	18,000
Roadway Level of Service	E-A	E
Intersection Level of Service	E-C	F

Suggested Improvements

Typical Roadway Configuration	5-Lane Roadway
Typical Intersection Configuration	Signals at I Mile Spacing
Nominal ROW Width Required	120 Ft





East of US 20, crossroad traffic is generally heavier than in the open sections of SH 48 west of Rigby. There are also many small parcels fronting directly on SH 48. The following recommendation, excerpted from the Rigby/Jefferson County Transportation Plan, effectively summarizes improvements necessary:

> Existing accident experience and traffic volumes indicate a need for improvement of SH 48 between Yellowstone Hwy and 4200 East. Improvements should include initial widening to a three-lane road with provisions for future widening to 5 lanes, and widening of all major crossroad approaches. This improvement, together with recommended signalization, will address growing needs at the SH 48/Yellowstone intersection. However, the needs of this intersection may require interim construction of turn lanes (westbound left and northbound right) to meet traffic demands until full length improvements to SH 48 can be accomplished. Installation of a second signal east of US 20 (in addition to the signal proposed at Yellowstone Hwy) to effectively control traffic operations through this urbanizing section of SH 48 should be considered.

Since the above recommendations were written, the Jefferson School District has selected a site for a new elementary school on 4100 East, just north of SH 48. This will further increase the needs for improvements in this section.

To summarize, the operation on SH 48 within this segment have essentially become urbanized. From 3800 East to about 4000 East, the roadway (with the planned improvement) supports this operation. However, signals are needed at several intersections to create gaps in traffic for lesser access points. In the eastern two miles (4000 to 4200 East) there are no planned improvements and the SH 48 roadway and intersections cannot meet the current demand. The need for at least interim improvements in this segment is essentially immediate. The need for intersection improvements at various locations has been identified and planning for roadway widening should start soon, given the minimum five to seven year period necessary for funding and project development. Finally, consistent with the urbanization of this segment, reductions in speed limits are suggested. On the west side, the start of the 35 mph speed zone should be moved west to 3800 East. On the east end of this segment the 45 mph speed limit should be moved east to 4200 East. Appropriate speed studies will be necessary before these changes can be made.

Segment 5 - 4200 East to Project Terminus (Ririe)

Figures 18a and 18b summarize traffic conditions and suggested improvement levels for this seven mile segment. Land use has remained predominantly rural in this is this eastern-most segment.

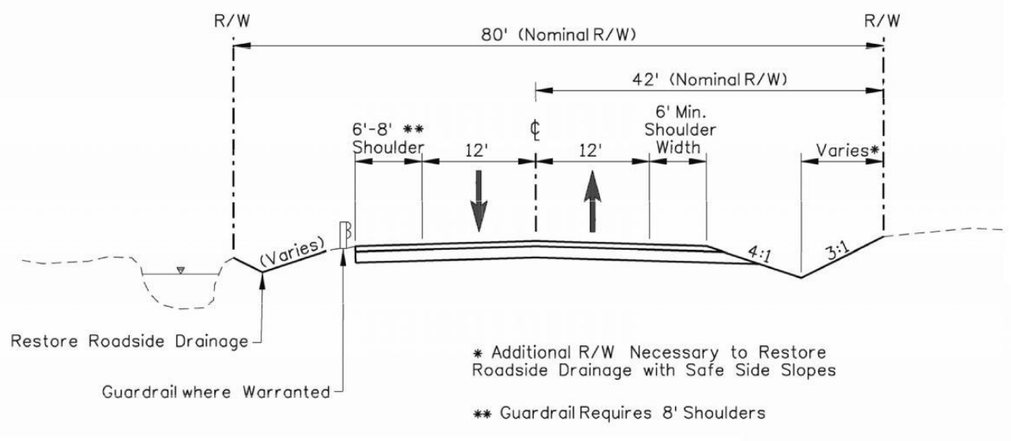
FIGURE 18a
SH 48 Corridor Study
Suggested Improvements
Segment 5 – 4200 East to Ririe

4200 East to Ririe - 7 Miles

Traffic Conditions	Existing	Future
Average Daily Traffic	1,500	5,000
Roadway Level of Service	A	C
Intersection Level of Service	B	C

Suggested Improvements

Typical Roadway Configuration	Roadside Improvements or 3-Lane Roadway where Needed for Access
Typical Intersection Configuration	SH 48 / Left Turn Lanes Side Road / Right Turn Lanes Stop Controlled
Nominal ROW Width Required	80 Ft



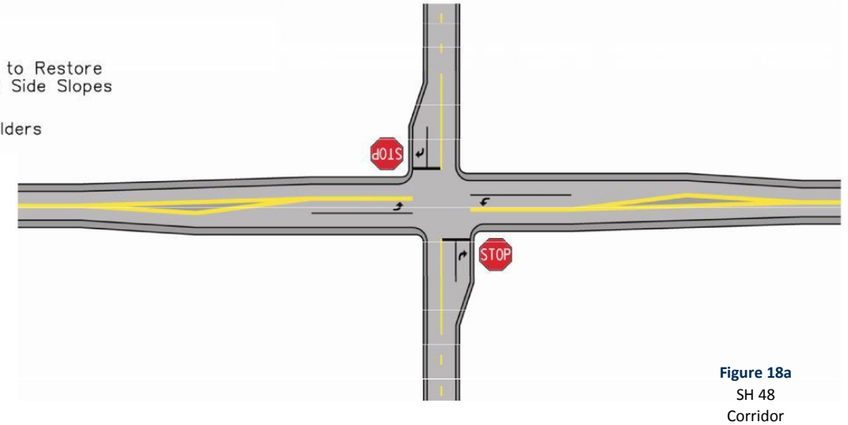


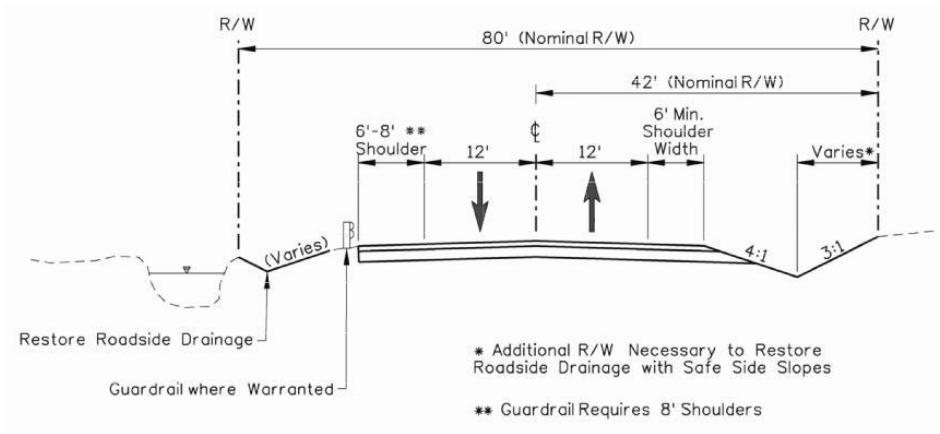
FIGURE 18b
SH 48 Corridor Study
Suggested Improvements
Segment 5—4200 East to Ririe

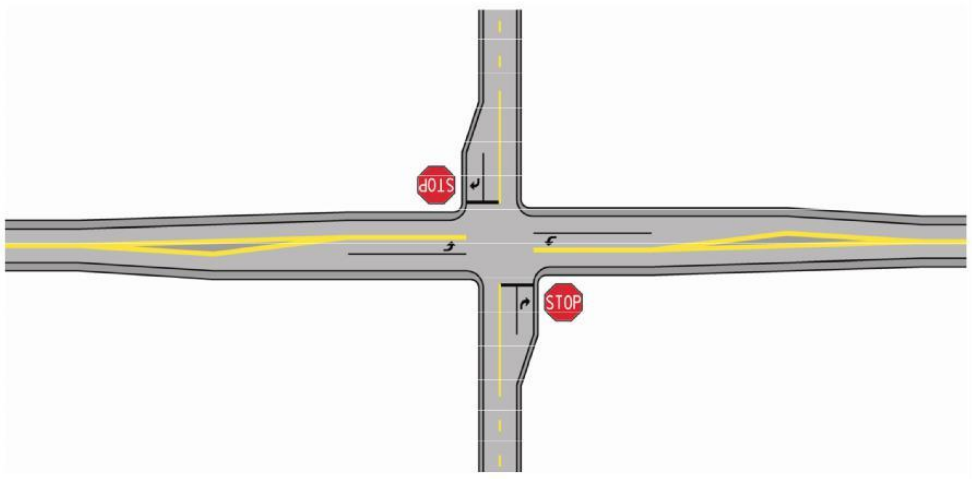
4200 East to Ririe - 7 Miles

Traffic Conditions	Existing	Future
Average Daily Traffic	1,500	5,000
Roadway Level of Service	A	C
Intersection Level of Service	B	C

Suggested Improvements

Typical Roadway Configuration	Roadside Improvements or 3-Lane Roadway where Needed for Access
Typical Intersection Configuration	SH 48 / Left Turn Lanes Side Road / Right Turn Lanes Stop Controlled
Nominal ROW Width Required	80 Ft





Traffic growth on SH 48 in this segment is expected to be lower than in the other segments – from 1,500 vehicles per day now to 5,000 vehicles per day in 2025. There are several reasons for the lower traffic expectations in this segment:

- In this segment SH 48 continues as an east-west roadway on 300 North for three miles (reaching 4500 East). After turning south at 4500 East, the alignment is predominantly north-south, traveling three miles south to County Line Road while advancing eastward only 1.5 miles to Ririe. Including the turn at 4500 East, there are four 90 degree bends in SH 48. Thus the function and directness of the road changes in this segment.
- The regional traffic flows between Idaho Falls / Rigby-Jefferson County / Rexburg are moving along a north-east/south-west axis formed by the relative locations of the communities. The Eastern Idaho Railroad, US 20 and the old Yellowstone Highway all follow this axis. Trips headed generally south (Idaho Falls) from this SH 48 service area are likely to head to US 20 via County Line Road or follow US 26 to Idaho Falls.
- Only traffic from the eastern "tip" of Jefferson County headed specifically to Rigby and areas further west would find SH 48 convenient.

The future traffic forecast of 5,000 vehicles per day remains within the capabilities of a 2-lane roadway. The need for intersection improvements is likely but 2-way stop traffic control should remain adequate. However, this judgment is valid as long as the combined crossroad approach volumes do not exceed about 300 vehicles per hour.

For the three miles ending at 4500 East the current accident experience is slightly higher than the statewide accident rate (1.58 vs. 1.48) with accidents related to either "roadside" or "access" about even. Operations and safety in this segment would benefit by an improved roadside. Although this is the minimum roadway improvement, it is still costly. While the need to improve roadside conditions is not immediate, accident rates in this segment should be monitored (using ITD's safety analysis procedures) to determine when improvements are warranted.

There is one site-specific issue that should be monitored. The Ririe Middle School is located south of County Line Road. The students from Ririe must cross SH 48 to reach the school grounds. At the current traffic levels of 1,200 vehicles per day this situation should not present an unmanageable safety hazard. However, as traffic increases, the traffic levels and number of school crossings should be monitored to determine the need for more advanced school crossing with warning markings, signing, and beacons.

Other Recommendations for SH 48

The following recommendations for improving SH 48 should be applied throughout the length of SH 48 where situations warrant.

Visibility at Intersections

There are two issues that should be addressed:

- The visibility of SH 48 intersections as it relates to the general awareness of drivers that they are approaching an intersection, and
- Sight distance for safe crossroad operations.

Because of the generally flat terrain, and the lack of changes to the roadway when passing mile grid intersections (such as widening for turn lanes), it is difficult to recognize the presence of a county road intersection in advance. This leaves drivers on SH 48 unaware of potential conflicts and the need to be attentive. It is assumed that "local" drivers learn to recognize where the intersections are (noting houses, trees, irrigation canal bridges, etc); however, as increased traffic raises the potential for collisions, greater visibility is necessary. Increased development brings more "non-local" traffic in the form of deliveries, service vehicles, tourists, and friends from elsewhere. This further increases the chances for conflict. Intersection and roadway improvements discussed earlier will change the appearance of SH 48 at intersections and thus provide drivers direct visual indications of an upcoming intersection. These improvements will take many years. Installation of large crossroad street signing at all mile grid intersections is recommended as a simple, low cost means of "marking" the locations of upcoming intersections.

The second issue is one of providing adequate sight distance at intersections where this is lacking. Advance sight distance allows crossroad vehicles and SH 48 vehicles to be aware of each other and thus both vehicles be involved in collision avoidance. There are intersections where sight distances are inadequate in one or more quadrants, often due to homes or surrounding vegetation historically located too close to the corner. In other cases canal berms are the limiting factor. ITD and Jefferson County are encouraged to work together to establish proper sight distance "triangles" where ever possible (likely where existing structures would not be affected). Specific intersections in need of improvement mentioned by the public (either verbally or through the public meeting questionnaire) include 3700 East, 3800 East 4,000 East, and 4200 East.

Access Management

Techniques, benefits, and need for access management have been discussed in Chapter 4 of this report. ITD has an obvious interest in limiting access along SH 48 to preserve the quality of flow along this state highway. This is true regardless of whether SH 48 is viewed in its present "rural" context or through the evolution to an "urban" context.

Achieving beneficial access management requires very close cooperation between ITD and local county and city officials. While ITD has the right to approve or disapprove access permits when land use changes, county and city governments are responsible for plat approvals that, when not properly studied, can "give life" to poor access decisions.

Fortunately, ITD, Rigby, and Jefferson County have a mutual interest in protecting the transportation utility of SH 48. The following statement is taken from the Rigby/Jefferson County Transportation Plan:

> "As traffic increases, it will be necessary to add some stop and signal control to SH 48. However, it is in County's interest to minimize the interruptions and maintain SH 48 as the primary cross county connection. To do this, it will be necessary for the future County roadway system to offer attractive alternatives to using SH 48. At the same time, the function of SH 48 must be protected by implementation of policies to control access along the highway. As SH 48 lies entirely within Jefferson County, this action is directly related to the interests of Jefferson County."

Experience has shown that achieving desirable levels of access management is virtually impossible after development has already occurred. As was documented in Chapter 4, starting good access management now can still have significant and long lasting positive effects on future SH 48 operations. However, even though development has not occurred, the benefits of access management will not be achieved without strong resolve on the part of ITD and county decision makers. Limiting access points to major adjacent roadways means that additional local roadways must be constructed to bring traffic to the nearest access point. This is not difficult to plan. However some will perceive this as a limitation on development potential. In other cases, an individual property may require interim access until the full off-grid circulation system is developed. It may be necessary fund various improvements ahead of actual development, overcoming development timing issues, to achieve the greater whole. In addition, the benefits of individual application of access control policy may not be apparent until further development takes place. Thus early implementation requires firm resolve and constant attention to the sum of the parts.

One way to accomplish this is to develop an *Access Management Plan* that would establish a framework for access throughout the length of SH 48 with input from adjacent landowners, county and city planners, and ITD. Rather than wait for the landowner to submit a plat and then judge the merits of the proposed access, the access parameters agreed to in formulating the plan could be built into the development layout. The plan should be as flexible as possible in identifying "access windows" so as not to unduly burden the property owners. While this planning process will involve discussions with individual land owners and is likely to be lengthily, the intention is to produce a coherent plan considering many affected properties; making the development process more predictable and guiding individual developments towards a more effective whole.

Inter-Agency Cooperation

Jefferson County, Rigby, other municipal governments, and ITD are each responsible for the development and maintenance of different parts of the roadways within Jefferson County. From the standpoint of performance, the roadway *system* in Jefferson County would be best developed without regard to jurisdictional issues. This can be difficult for a variety of reasons; with differences in funding opportunities often leading the way. Regardless of how various improvements are funded, it is the sum of the whole that is important. How well the surrounding county roadway system is developed will have a direct impact on the amount of

traffic/operational delays on SH 48. It is important that county, city and state governments understand their rolls and responsibilities in developing SH 48 and the Jefferson County transportation system. At present, these understandings do not formally exist. Each of the parties have an interest in the others activities. And the goals of one party can often be complimented by the actions of another. Access management on SH 48 is probably the best example. A memorandum of understanding between Jefferson County and ITD regarding each agency's contributions toward achieving the fundamental goals (such as preserving the functionality of SH 48) would serve everyone's interests.

The lack of inter-agency agreements between ITD and Jefferson County is far from unique. By taking these issues to heart and defining the roles and responsibilities of all agencies in the future development of the transportation system, Jefferson County, ITD and Rigby would set a leadership example within Idaho for similarly developing counties. The need for this undertaking will never be eliminated. Over time, however, the opportunities for benefits will be lost and the complexity of achieving such agreements will increase.

There is one additional agency to agency agreement specific to Jefferson County that should be considered. As this study has shown, it will be necessary to upgrade SH 48 as increased development occurs. In many cases additional right of way will be required. This is normal. However, the system of irrigation distribution canals that adjoins many, if not most, sections of SH 48 greatly complicates the matter of additional right of way. In any given mile segment:

- If the adjoining canal is not to be affected, that dictates that all widening be on the side opposite the canal. This may conflict with existing development or environmentally sensitive areas.
- The presence of a canal will complicate right of way contributions by developers adjoining the canal unless the canal can be relocated.
- Relatively "simple" intersection approach improvements on the grid system will be far more complex and expensive where the intersections are adjacent to not only canals, but also irrigation distribution structures and gates.

Given the potential effects of the irrigation canal system on the cost and complexity of roadway improvement projects, it is suggested that ITD initiate a planning process that provides an overall framework for modifications to the irrigation systems as improvements are made. The product would be memorandums of understanding between the ITD and the canal companies. These memorandums would become the basis for all future agreements necessary to achieve improvements to SH 48 that could affect the canals. The memorandum would set out policies and procedures to be followed in communicating with the canal companies; criteria governing the relocation or enclosure of canal faculties; procedures and standards for the corresponding changes in property, easements and other real estate issues; and design requirements for relocating canals and distribution structures when necessary. The idea is to establish the basic policies and procedures ahead of time for what will become a common issue as improvements to SH 48 are made. This will allow engineers and planners to better evaluate the merits of various improvement alternatives for any particular project and avoid "reinventing the wheel" any time a portion of the canal system may be affected. Changes to any of the general provisions would, of course, be made to suit the needs of any particular project.

In addition to the physical, technical, and ownership complications presented by the proximity of irrigation canals, there may also be cultural and historic perseveration issues. The State Historic Preservation Officer (SHPO) has determined that main canals, primary laterals, and associated drainage channels should be considered to have cultural or historic value. (Lesser level irrigation features need not be evaluated.) Section 106 of the 1966 National Historic Preservation Act (NHPA) applies to projects that include Federal Funding, a Federal Permit, or Federal Land. Recent experience has been that a typical canal crossing or a short relocation (relative to the entire length of the canal) has resulted in findings of No Adverse Effect. However these decisions are made on a case by case basis.

Given the near certain effects on irrigation channels from future roadway improvements, it is suggested that an advance study be conducted to determine what canals paralleling SH 48 would require Section 106 documentation if affected. Advance knowledge of this will be helpful in planning and programming future improvements

Public Support

The public was asked to give their opinion on the various improvement options discussed above at a Public Meeting held on June 19, 2008. The information in Table 4 below indicates that the public in attendance was very supportive of the suggested improvements. Intersection improvement was the highest rated improvement with an average ranking of 4.7 out of 5.0. The lowest rated recommendation was access management with a rating of 3.5. Lower ranked responses for access management and additional right of way (3.9) indicate a willingness of at least half of the respondents to accept the more burdensome consequences of improvements to SH 48.

TABLE 4

SH 48 Corridor Study

PUBLIC RANKING OF PROPOSED IMPROVEMENTS

	Summary Opinion		Distribution of Rankings					
			Oppose		Not Needed		Support	Average
Future Plan Element	Favorable	UnFavorable	1	2	3	4	5	Rating
Improved Intersections	14	1			1	2	12	4.73
Widened Shoulders	12	1			1	3	9	4.62
Added Lanes	11	3		1	2	1	10	4.43
Use of Traffic Signals	11	4	1	1	2	3	8	4.07
More Right-of Way	9	5	1	1	3	2	7	3.93
Access Management	7	7	2		5	3	4	3.50

Summary of Responses to questionnaire at June, 08 Public Meeting

Appendices included as separate document.