Report

Railroad Quiet Zone Study for Laredo, TX

prepared for

Laredo Urban Transportation Study (MPO)
and the City of Laredo

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September 28, 2006

Laredo Railroad Quiet Zone Study

Report

Prepared for:

The City of Laredo and
The Laredo Urban Transportation Study

Prepared by:

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Executive Summary
LAREDO RAILROAD QUIET ZONE STUDY

STUDY BACKGROUND AND PURPOSE

The railroad network in Laredo is part of an international network which extends into Mexico and serves the rail cargo needs of the area on both sides of the U.S./Mexico border. Freight rail service is provided by privately owned U.S. carriers: the Union Pacific Railroad (UP) and Texas-Mexican Railway (Tex-Mex). Together, these railway companies account for all rail traffic through Laredo and utilize the only international rail bridge between Laredo and Nuevo Laredo.

There are 84 at-grade crossings of UP and Tex-Mex lines in an area bordered by Loop 20 in the north and Loop 20 in the east. There are 46 crossings of the UP and 38 crossings of the Tex-Mex. As trains approach these crossings, they are required by law to sound their horns as a safety precaution to warn motorists on the traversing roadways. As most of these crossings are located either in or nearby residential areas, horn blowing results in noise impacts to residents near the crossings.

Because of concerns regarding sound levels near the railroad lines and associated complaints from residents regarding adverse impacts to their quality of life, the City of Laredo and the Laredo Urban Transportation Study (the Metropolitan Planning Organization or MPO for the area) desired with this study to evaluate the railroad crossings in the City in order to determine what measures might be appropriate to establish Quiet Zones. Quiet Zones are areas where locomotive engineers are permitted not to blow their train horns as they approach a grade crossing.

STUDY CONTEXT

The UP typically runs 20 through trains and up to 50 local moves on its tracks in Laredo each day. It operates both the Laredo Yard, a traditional switching yard west of downtown Laredo, and the Port Laredo intermodal (trailer/container on flatcar) terminal north of Loop 20. The Tex-Mex typically runs 10 through trains and 2 switch moves in Laredo each day. It operates Serrano Yard, a traditional switching yard east of Loop 20. Tex-Mex also owns the U.S. half of the international rail bridge, and provides UP trackage rights to run traffic between Laredo Yard and Nuevo Laredo.

The 84 study area at-grade crossings, including several private crossings, experience differing volumes of vehicular traffic, and most are protected by a variety of warning signs and devices. These range from fully protected (automatic gates with flashing lights) to simple crossbucks. Three private crossings have no protection.

Land uses along the corridor are a combination of industrial, commercial, and residential. The study team's initial analysis of Quiet Zone potential concentrates on the rail lines where they have adjoining residential use. Similar analysis could be extended to rail segments in commercial or industrial areas if the City of Laredo wishes to do so.

EXISTING CONDITIONS

The study team investigated traffic delays at the 84 crossings in the study area. Using 2003 Average Annual Daily Traffic data (AADT), their analysis found that the longest delays to motor vehicle traffic, the lowest service levels, and longest queuing lengths occurred at five crossings:

- Las Cruces Drive on the UP's Laredo Subdivision
- Guadalupe Street on the Tex-Mex
- Chihuahua Street East on the Tex-Mex
- Market Street East on the Tex-Mex
- Arkansas Street on the Tex-Mex

The Federal Railroad Administration (FRA) maintains records of accidents at grade crossings that involve trains and train operations. The study team reviewed accidents that occurred over the five years of 2000-04, including one accident in January 2005 (the most recent five-year period for which accidents have been recorded by the FRA). There were 25 recorded accidents during the review period. Accidents occurred at only nine of the 84 grade crossings in the study area. Eight of these reported accidents occurred at a single grade crossing – Mann Road on the UP Laredo Subdivision, the western line of the two parallel lines of the UP through the City.

FUTURE CONDITIONS

As noted in the *Laredo Metropolitan Transportation Plan 2005-2030*, the population of the MPO area is expected to rise 135 percent from 205,801 to 482,300 in 2035. Employment also is expected to rise 134 percent from 76,398 in 2003 to 178,629 in 2035. These trends in themselves would indicate the likelihood of more motor vehicle and pedestrian travel across at-grade crossings in Laredo.

Both UP and Tex-Mex anticipate that rail carloads will grow at 3 percent per year. The 3 percent per year increase in carloads does not equate automatically to a 3 percent increase in train volume. This is because through trains can absorb increases in growth by getting longer. However, at some point, with the continued growth year-over-year, there will be an increase in the number of trains as well. Neither UP nor Tex-Mex reported capital investments in Laredo which might increase traffic delays at study area crossings.

The results a traffic analysis for the years 2010 and 2015 were the same as for the 2003 analysis. That is, the longest delays to motor vehicle traffic, the lowest service levels, and longest queuing lengths occurred at the five crossings previously mentioned.

SUMMARY OF FINDINGS

The study team analyzed six separate potential Quiet Zones. Three of these are composed of crossings on the UP, two are composed of crossings on the Tex-Mex. One involves crossings of both the UP and Tex-Mex lines in the southwestern quadrant of Laredo. For each zone, the team identified a combination of safety improvements which would enable a zone to merit a designation by the FRA as a Quiet Zone. These improvements included some street closures and a crossing gate with flasher mechanism at crossings where none exists today. The total estimate cost for all improvements is $5.25 million. Quiet Zones can be implemented individually, allowing for a potential phasing of improvements.

NEXT STEPS

Refinements of the foregoing analysis may include additional street closures, combining Quiet Zones, or running the analysis with future year AADT and train volumes. With the refinements performed, there needs to be a review of findings by the FRA. Also, it is recommended that these findings be shared with the UP and the Tex-Mex for their input as well. Once these reviews have been obtained and discussed, the City of Laredo may proceed with the required formal steps to establish one or more Quiet Zones.

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Introduction
LAREDO RAILROAD QUIET ZONE STUDY

STUDY BACKGROUND AND PURPOSE

The railroad network in Laredo is part of an international network which extends into Mexico and serves the rail cargo needs of the area on both sides of the U.S./Mexico border. Freight rail service is provided by privately owned U.S. carriers: the Union Pacific Railroad (UP) and Texas-Mexican Railway (Tex-Mex). Together, these railway companies account for all rail traffic through Laredo and utilize the only international rail bridge between Laredo and Nuevo Laredo. The Tex-Mex owns the international rail bridge and has an agreement with UP that allows joint use of the bridge, the Tex-Mex mainline, and the storage tracks located at the north end of the bridge.

The Union Pacific rail line travels in a north-south direction through Laredo along Interstate Highway 35 (I-35) and Santa Maria Road. The UP mainline continues north to San Antonio and provides service throughout the United States. UP operates about 20 through trains and up to 50 one-way switch moves per day in the Laredo area. UP operates Port Laredo, an intermodal (trailer/container on flatcar) yard located north of the I-35 and Loop 20 interchange, as well as Laredo Yard, a traditional rail terminal west of downtown Laredo and north of the International Railroad Bridge.

The Texas-Mexican rail line begins with Mexico's rail line that crosses over the international bridge from Nuevo Laredo. The Tex-Mex line then travels eastward from the UP downtown terminal to the industrial parks along State Highway 359 (SH 359), and onward to serve the area east of Laredo to as far as Corpus Christi, Texas. Tex-Mex operates an average of 12 through and switch trains per day, and has a rail yard, Serrano Yard, located on SH 359. There are 84 at-grade crossings of UP and Tex-Mex lines in an area bordered by Loop 20 in the north and Loop 20 in the east. There are 46 crossings of the UP and 38 crossings of the Tex-Mex. As trains approach these crossings, they are required by law to sound their horns as a safety precaution to warn motorists on the traversing roadways. As most of these crossings are located either in or nearby residential areas, horn blowing results in noise impacts to residents near the crossings. During the most recent five year period, there have been 25 reported accidents at 9 of these crossings. Thus, due to both the central location of the railroad facilities in Laredo and the prominence of at-grade crossings, the issues of safety, noise, and traffic delay have often been at the forefront of public discourse.

Because of concerns regarding sound levels near the railroad lines and associated complaints from residents regarding adverse impacts to their quality of life, the City of Laredo and the Laredo Urban Transportation Study (the Metropolitan Planning Organization or MPO for the area) desired with this study to evaluate the railroad crossings in the City in order to determine what measures might be appropriate to establish Quiet Zones. Quiet Zones are areas where locomotive engineers are non required to blow their train horns as they approach at-grade crossing. To qualify as a Quiet Zone, specific safety requirements of the Federal Railroad Administration (FRA), the federal agency having oversight for safety on the national freight and passenger rail system, must be met.

The study sponsors felt that strategies where locomotive horns would not need to be used will further enhance the livability of the surrounding residential neighborhoods.

METHODOLOGY

The first step in the analysis was to document the study context. The study team obtained from the UP and Tex-Mex a description of railroad operations in Laredo. The details included existing volume of trains, typical train lengths, train speed, and anticipated growth in train carloads. The study team also visited each crossing, and confirmed the crossing characteristics and the type of warning protection in place. The team also noted land uses along the UP and Tex-Mex corridors. A description of the study corridor context appears in Chapter 1.

Chapter 2 documents existing conditions along the UP and Tex-Mex corridors. The study team looked at traffic delays due to train movements at all 84 crossings in the study area, and determined where the major delays are occurring. Similarly, the team also reviewed FRA records of accidents at grade crossings that involve trains and train operations, and determined where train-motor vehicle accidents are mostly occurring. The *Laredo Rail Noise Study*, performed by WSA and provided separately, assessed train horn impacts at 12 different locations in the study area.

Future conditions are the focus of Chapter 3. The study team predicted where the major traffic delays will be occurring in the future. The chapter also notes where the grade separation projects in the future are likely to be. Such projects will enhance safety as well as eliminate horn blowing.

Chapter 4 describes the two ways that a public authority having jurisdiction over traffic enforcement at grade crossings can designate a Quiet Zone. Other provisions for the FRA Quiet Zone regulations are also cited, including periodic updates to determine if the implemented safety improvements that enabled the establishment of Quiet Zones continue to meet federal requirements.

Finally, Chapter 5 describes the study team's analysis of potential Quiet Zones in Laredo. The study team analyzed six separate Quiet Zones. Three of these are composed of crossings on the UP, two are composed of crossings on the Tex-Mex. One involves crossings of both the UP and Tex-Mex lines in the southwestern quadrant of Laredo. The capital costs for the proposed safety improvements enabling the establishment of these potential Quiet Zones were identified, along with next steps leading toward implementation of the zones.

ORGANIZATIONS CONSULTED

The study team worked with representatives of the UP and Tex-Mex railroads to understand existing and likely future rail operations in Laredo. The team also obtained from the City of Laredo the traffic volumes on streets crossing UP and Tex-Mex lines in the study area.

Chapter 1
STUDY CONTEXT

The purpose of this chapter to describe typical railroad operations in Laredo, and to identify pertinent features of railroad/roadway grade crossings found along those railroad lines. The understanding of rail operations and the circumstances applicable to each grade crossing are essential to development of a plan to create one or more "quiet zones" within which trains will not be required to sound warning horns as they approach a crossing. This Memorandum reviews rail operations and grade crossing conditions, including warning devices, vehicular traffic volumes, and accident experience. Land uses along the rail corridors and motor vehicle and rail traffic generators in the study area are also discussed.

RAIL OPERATIONS IN LAREDO

There are two railroads serving Laredo. One is the Union Pacific Railroad (UP), which operates two north-south oriented lines in the western portion of the city. The other is the Texas Mexican Railway (Tex-Mex), which operates on an east-west route through the southern portion of the city. The UP and Tex-Mex rail lines appear in Figure 1-1 at the end of this chapter. The operations of both railroads and their impacts to at-grade crossings in Laredo are discussed by railroad below. The descriptions are based on information obtained from both railroads in August and September, 2005.

Union Pacific Railroad

UP is the largest railroad in the North America in terms of both route miles and traffic handled. UP operates on 33,000 route miles throughout the Midwestern and the Western states, and originating 7.7 million carloads in 2003. Traffic flows are both east-west, between the West Coast and Midwestern and Gulf regions, as well as north-south, between Mexico and the Midwest. For UP, Laredo is the primary gateway to the Mexican rail system.

UP operates two parallel rail lines in Laredo. One is the Laredo Subdivision and the other is the Rio Grande Subdivision. Subdivision is a railroad term which refers to specific sections of track. The two subdivisions run parallel through Laredo. The Laredo Subdivision's southern terminus is the UP Lower Yard/Import Yard (hereafter referred to as the UP Laredo Yard) north of the Rio Grande. The subdivision runs north to San Antonio. This track is used for shipments between Laredo, San Antonio and more northern points, and for international shipments between the U.S. and Mexico.

The Rio Grande Subdivision runs between the Laredo Yard and a point just north of Mann Street, where the line connects with the Laredo Subdivision. The subdivision is used for rail shipments to and from shippers located along the subdivision, and provides an alternate route for through trains to relieve congestion on the primary Laredo Subdivision.

The UP Laredo Yard is central to UP operations in Laredo. Trains departing north to San Antonio or south to Mexico, and vice versa, are either processed or pass through the yard. Railcars switched to or from shippers along the Rio Grande Subdivision are processed in the yard to and from UP's intercity ("through") trains. A UP train count for a typical day, along with other operating detail, appears in Table 1-1.

UP local trains, or switching moves, operate from Laredo Yard to local industries along both the Laredo and Rio Grande Subdivisions. Some operate as far as UP's Port Laredo intermodal container/trailer handing

facility 12 miles north of the UP Laredo Yard. Maximum speed on UP lines in the study area is 20 mph. However, trains typically operate between 10-15 mph.

Table 1-1: UP Laredo Operations Summary	
Southbound through trains arriving daily	8
Northbound through trains departing daily	12
One-way switch trains daily	Between 12 and 50
Trains per time of day	Evenly spread through day
Through train length	6,500'-7,000'
Switching train length	60'-1,000'
Max speeds	20 mph
Growth rate in carloads	3% per year
Train horn rules	G Code
Number of crossings in study area	46
Source: Interview with UP official	

A through train of 6,500 feet in length (about 108 cars) and operating at 15 miles per hour will take almost 5 minutes to pass through a grade crossing. A switch train of 1,000 feet in length (about 16 cars) and operating at 10 miles per hour will take over a minute to clear a grade crossing. With many streets crossing both of the two parallel UP routes, motorists could be delayed at two nearby locations.

As UP through and switch trains approach at-grade crossings, the engineers sound warning horns in accordance with the General Code of Operating Rules (also called the G Code). The specified horn signal is two longs, a short, and a long. The Rio Grande Subdivision has numerous at-grade crossings, many of which are located only a block apart. This results in considerable horn noise impacting residents and businesses in the general area along the rail line.

The crossings that are most often blocked by UP trains are near the UP Laredo Yard. It is not uncommon for Scott and Sanchez Streets to be blocked up to 50 times per day, whereas Gonzales Street, further to the north, may only be blocked half that number of times, according to UP. The higher numbers are a result of train moves related to processing cars in the UP Laredo Yard. During this processing, a locomotive may pull a string of cars northbound to a point just outside the yard and blocking some crossings, before reversing and pushing the cars back into the yard onto another track.

Texas Mexican Railway

The Tex-Mex is a regional railroad, operating over 549 route miles in south Texas. The railroad was purchased in 2004 by the larger Kansas City Southern Railway (KCS). The Tex-Mex, which retains its operating identity, has merged its operations with KCS so as to become part of the larger carrier's so-called NAFTA Railway including KCS, the Tex-Mex, and Transportacion Ferroviaria Mexicana (TFM). The NAFTA Railway offers shippers a single-carrier rail system stretching from Mexico City to the U.S. Midwest.

The Tex-Mex east-west mainline runs through south Laredo. Its western terminus is the international bridge crossing the Rio Grande (the Tex-Mex owns the U.S. portion of the bridge). The Tex-Mex has a small yard adjacent to and east of the UP Laredo Yard. The majority of trains on the Tex-Mex mainline are through trains. However, switch trains moving traffic to and from shippers in south Laredo run daily. A Tex-Mex train count on a typical day, along with other operating detail, appears in Table 1-2. Tex-Mex's primary Serrano Yard is located about nine miles east of downtown Laredo. Switch trains serve Laredo shippers from Serrano Yard.

Table 1-2: Tex-Mex Laredo Operations Summary	
Eastbound through trains arriving daily	5
Westbound through trains departing daily	5
One-way switch trains daily	2
Trains per time of day	Evenly spread through day
Through train length	6,500'-7,000'
Switching train length	60'-1,000'
Max speeds	10-20 mph
Growth rate in carloads	3% per year
Train horn rules	G Code
Number of crossings in study area	38
Source: Interview with KSC official	

Operating speeds through Laredo on the Tex-Mex are somewhat higher than on UP, and train volumes are smaller. Furthermore, the Tex-Mex Serrano Yard is outside the study area, so there are no switch operations that frequently block crossings. The cumulative blocking at crossings along the Tex-Mex line is less vis a vis UP. Like UP, the Tex-Mex adheres to the G Rule, and blows horns with the same pattern at crossings. The existence of numerous crossings at one-block intervals across the north side of the business district contributes to horn noise disruptions to residents and businesses along the route.

GRADE CROSSINGS IN LAREDO

The study area contains 84 grade crossings, including several private crossings. These crossings experience differing volumes of vehicular traffic, and most are protected by a variety of warning signs and devices. The crossings and type of warning device employed at each crossing are shown on Figures 1-2 and 1-3 at the end of this chapter.

Motor Vehicle Traffic at Grade Crossings

Vehicular usage at the grade crossings varies widely, from a low of 40 motor vehicles per day to a high of 24,000 cars per day. Fifteen crossings (18%) have an annual average daily traffic count (AADT) of more than 5,000 vehicles. Another 39 crossings (46%) are used by 1,000 to 5,000 daily vehicles, and 30 crossings (36%) have less than 1,000 vehicles per day. Traffic volumes[1] for the 84 crossings are shown in Table 1-3.

Table 1-3: Laredo Grade Crossings Ranked by AADT in 2003				
No.	Name	Lanes	AADT	Type of Warning
5	FM 1472 MINES RD	6	24,000	Bells, lights, and gates
75	MARKET ST E	2	17,300	Bells, lights, and gates
74	CHIHUAHUA ST E	2	17,000	Bells, lights, and gates
73	GUADALUPE ST	2	17,000	Bells, lights, and gates
84	ARKANSAS AV	2	16,550	Bells and lights*
2	LAS CRUCES DR	2	11,340	Bells, lights, and gates
65	IH 35 FRONTAGE RD (SAN DARIO AV)	3	11,000	Bells, lights, and gates
64	IH 35 FRONTAGE RD (SANTA URSULA AV)	3	11,000	Bells, lights, and gates
12	CHICAGO ST (UP Main)	2	10,030	Bells, lights, and gates

[1] Traffic volumes estimated by WSA, based on available recent traffic counts at or near the grade crossings.

Table 1-3: Laredo Grade Crossings Ranked by AADT in 2003				
No.	Name	Lanes	AADT	Type of Warning
27	CHICAGO ST (UP RGR)	2	10,030	Bells, lights, and gates
71	CORPUS CHRISTI ST	2	9,590	Bells, lights, and gates
83	MARKET ST	2	8,730	Bells, lights, and gates
63	SAN BERNARDO AV	2	8,620	Bells, lights, and gates
10	CALTON RD (UP Main)	2	7,790	Bells, lights, and gates
24	CALTON RD (UP RGR)	3	7,790	Bells and lights
58	SANTA MARIA AV	2	4,640	Bells, lights, and gates
6	INDUSTRIAL BL	2	4,440	Bells, lights, and gates
66	SAN EDUARDO AV	2	4,020	Bells, lights, and gates
42	PARK ST	2	3,830	Crossbucks
7	MANN RD (UP Main)	2	3,710	Bells, lights, and gates
17	MANN RD (UP RGR)	2	3,710	Crossbucks**
14	JEFFERSON ST (UP Main)	2	3,600	Bells, lights, and gates
38	JEFFERSON ST (UP RGR)	2	3,600	Bells, lights, and gates
60	CONVENT AV	2	3,200	Bells, lights, and gates
1	SAN LORENZO DR	2	2,870	Crossbucks
52	SANTA ISABEL AV AND WASHINGTON ST	2	2,760	Bells and lights
13	BALTIMORE ST (UP Main)	2	2,650	Bells, lights, and gates
33	BALTIMORE ST (UP RGR)	2	2,650	Bells, lights, and gates
45	SANTA ISABEL AV	2	2,620	Crossbucks, stop signs
46	SCOTT ST	2	2,510	Bells, lights, and gates
15	SANCHEZ ST (UP Main)	2	2,200	Bells, lights, and gates
43	SANCHEZ ST (UP RGR)	2	2,200	Crossbucks
72	MARCELLA AV	2	2,110	Bells and lights
67	SAN FRANCISCO AV	2	2,110	Bells, lights, and gates
81	MALINCHE AV	2	2,100	Crossbucks, stop signs
82	BARTLETT AV	2	2,000	Crossbucks, stop signs
56	MAIN AV	2	1,680	Bells, lights, and gates
3	TEJAS LOOP	2	1,680	Bells, lights, and gates
8	ISLAND AV (UP Main)	2	1,670	Bells, lights, and gates
20	ISLAND AV (UP RGR)	2	1,610	Crossbucks, stop signs**
11	MARKLEY LN (UP Main)	2	1,550	Bells, lights, and gates
26	MARKLEY LN (UP RGR)	2	1,550	Bells, lights, and gates
9	JUSTO PENN ST (UP Main)	2	1,480	Bells, lights, and gates
23	JUSTO PENN ST (UP RGR)	2	1,480	Crossbucks, stop signs
69	MONTERREY AV	2	1,480	Bells, lights, and gates
80	BUENA VISTA AV	2	1,440	Crossbucks
79	SEYMOUR AV	2	1,440	Crossbucks
77	HENDRICKS AV	2	1,390	Crossbucks
61	FLORES AV	2	1,360	Crossbucks
57	DAVIS AV	2	1,310	Bells, lights, and gates
62	SAN AGUSTIN AV	2	1,260	Bells and lights
55	SANTA CLOTILDE AV	2	1,180	Bells, lights, and gates
78	STONE AV	2	1,150	Crossbucks
54	SANTA RITA AV	2	1,030	Bells and lights
59	JUAREZ AV	2	950	Bells and lights

Table 1-3: Laredo Grade Crossings Ranked by AADT in 2003				
No.	Name	Lanes	AADT	Type of Warning
76	LOGAN AV	2	900	Crossbucks
70	SANDERS AV	2	680	Bells, lights, and gates
47	ZARAGOSA ST (Tex-Mex)	2	630	Crossbucks
16	ZARAGOZA ST (UP Main and RGR)	2	630	Crossbucks
35	MADISON ST	2	620	Crossbucks, stop signs
36	BLAIR ST	2	610	Crossbucks, stop signs
34	LAFAYETTE ST	2	570	Bells, lights, and gates
31	BOSTON ST	2	520	Crossbucks, stop signs
68	SAN JORGE AV	2	310	Bells, lights, and gates
39	SHEA ST	2	300	Crossbucks, stop signs
41	BRUNI ST	2	270	Crossbucks, stop signs
32	PIERCE ST	2	250	Crossbucks, stop signs
44	GARZA ST	2	230	Crossbucks, stop signs
30	PHILADELPHIA ST	2	230	Crossbucks
37	FRANKFORT ST	2	200	Crossbucks, stop signs
49	HIDALGO ST	2	200	Stop sign
18	PRIVATE EXXON NORTH (UP RGR)	2	200	Crossbucks, stop signs
19	PRIVATE EXXON SOUTH (UP RGR)	2	200	Crossbucks, stop signs
25	PRIVATE PEPSI	2	200	Crossbucks
51	UP LOT	2	200	Crossbucks, stop signs
29	UGARTE ST	2	150	Crossbucks
40	GONZALEZ ST	2	140	Crossbucks
53	VIDAURRI AV	2	130	Crossbucks
28	PACE ST	2	100	Crossbucks
4	PRIVATE GREAT LAKES CHEMICAL	2	100	Crossbucks, stop signs
22	PRIVATE SALES SOUTH	2	100	None
21	PRIVATE SCALES NORTH	2	100	None
50	PRIVATE UP POLICE	2	50	None
48	ITURBIDE ST	2	40	Crossbucks, stop signs
Source: Wilbur Smith Associates survey of crossings				
Notes: * *Automatic gates were being installed in May 2005* ** *Automatic gates and flashers were being installed in May 2005*				

Warning Devices at Grade Crossings

The type of warning system at Laredo grade crossings ranges from a simple crossbuck or crossbuck with stop sign, to a fully developed warning system with flashing lights, bells, and automatic gates. Some crossings have overhead flashing lights in addition to the more typical side of the road location. 37 crossings have bells, flashing lights, and automatic gates. Another 7 crossings have bells and lights but no gates. 36 crossings are protected only by stop signs and/or crossbucks, while 3 private crossings have no crossing protection. As might be expected, the crossings with higher levels of protection are generally those with higher traffic volumes. Three crossings were being improved when WSA performed the field reconnaissance survey in May 2005. These were Arkansas Avenue, Mann Road on the Rio Grande Subdivision, and Island Avenue on the Rio Grande Subdivision, as noted in Table 1-3.

Accidents at Grade Crossings

Records of accidents occurring at grade crossings are maintained by the Federal Railroad Administration (FRA) as part of its grade crossing database. (The FRA is the federal agency charged with safety oversight of railroads in the U.S.) During the most recent five year period, there were 25 reported accidents at 9 Laredo grade crossings. Eight accidents occurred at one grade crossing (Mann Road), while the others were spread through the community along both the UP and Tex-Mex tracks. Most involved only property damage to vehicles that stalled on the track or disregarded gates or warnings and attempted to cross in front of an approaching train. None involved fatalities. The relatively minor nature of most accidents is likely related to the low speed of trains operating in Laredo. A full discussion of grade crossing accidents is found in Chapter 2, together with a map showing the number and location of recent accidents.

Grade Crossing Layouts

Table 1-4 cites the smallest angle of the crossing street to the rail lines in the study area. All of crossing angles are in the 60 to 90-degree category used by the FRA (non-skewed crossing). However, the vast majority of rail line-to-crossing street angles are 90 degrees. That is, the most crossing streets run perpendicular to the rail lines.

Table 1-4: Crossing Layout and Adjacent Intersection Configuration

Xing No.	Cross Street Name	Smallest Crossing Angle	Adjacent Intersection within 400'	Adjacent Intersection Signalized
1	SAN LORENZO DR	60-90	No	N/A
2	LAS CRUCES DR	60-90	Yes	Yes
3	TEJAS LOOP	60-90	Yes	No
4	PRIVATE GREAT LAKES CHEMICAL	60-90	Yes	No
5	FM 1472 MINES RD	60-90	Yes	Yes
6	INDUSTRIAL BL	60-90	Yes	Yes
7	MANN RD	60-90	Yes	Yes
8	ISLAND AV	60-90	Yes	No
9	JUSTO PENN ST	60-90	Yes	No
10	CALTON RD	60-90	Yes	Yes
11	MARKLEY LN	60-90	No	N/A
12	CHICAGO ST	60-90	Yes	No
13	BALTIMORE ST	60-90	Yes	No
14	JEFFERSON ST	60-90	No	N/A
15	SANCHEZ ST	60-90	Yes	No
16	ZARAGOZA ST	60-90	Yes	No
17	MANN RD	60-90	Yes	Yes
18	PRIVATE EXXON NORTH	60-90	Yes	No
19	PRIVATE EXXON SOUTH	60-90	Yes	No
20	ISLAND AV	60-90	Yes	No
21	PRIVATE SCALES NORTH	60-90	Yes	No
22	PRIVATE SALES SOUTH	60-90	Yes	No
23	JUSTO PENN ST	60-90	Yes	No
24	CALTON RD	60-90	Yes	Yes
25	PRIVATE PEPSI	60-90	Yes	No
26	MARKLEY LN	60-90	No	N/A
27	CHICAGO ST	60-90	Yes	No

Table 1-4: Crossing Layout and Adjacent Intersection Configuration				
Xing No.	Cross Street Name	Smallest Crossing Angle	Adjacent Intersection within 400'	Adjacent Intersection Signalized
28	PACE ST	60-90	Yes	No
29	UGARTE ST	60-90	Yes	No
30	PHILADELPHIA ST	60-90	Yes	No
31	BOSTON ST	60-90	Yes	No
32	PIERCE ST	60-90	Yes	No
33	BALTIMORE ST	60-90	Yes	No
34	LAFAYETTE ST	60-90	Yes	No
35	MADISON ST	60-90	Yes	No
36	BLAIR ST	60-90	Yes	No
37	FRANKFORT ST	60-90	Yes	No
38	JEFFERSON ST	60-90	Yes	No
39	SHEA ST	60-90	Yes	No
40	GONZALEZ ST	60-90	Yes	No
41	BRUNI ST	60-90	Yes	No
42	PARK ST	60-90	Yes	No
43	SANCHEZ ST	60-90	Yes	No
44	GARZA ST	60-90	Yes	No
45	SANTA ISABEL AV	30-59	No	N/A
46	SCOTT ST	60-90	Yes	No
47	ZARAGOSA ST	60-90	Yes	No
48	ITURBIDE ST	60-90	Yes	No
49	HIDALGO ST	60-90	Yes	No
50	PRIVATE UP POLICE	60-90	Yes	No
51	UP LOT	60-90	Yes	No
52	SANTA ISABEL AV AND WASHINGTON ST	60-90	Yes	No
53	VIDAURRI AV	60-90	No	N/A
54	SANTA RITA AV	60-90	No	N/A
55	SANTA CLOTHIDE AV	60-90	No	N/A
56	MAIN AV	60-90	No	N/A
57	DAVIS AV	60-90	No	N/A
58	SANTA MARIA AV	60-90	Yes	No
59	JUAREZ AV	60-90	No	N/A
60	CONVENT AV	60-90	Yes	No
61	FLORES AV	60-90	Yes	No
62	SAN AGUSTIN AV	60-90	Yes	No
63	SAN BERNARDO AV	60-90	Yes	No
64	IH 35 FRONTAGE RD (SANTA URSULA AV)	60-90	Yes	No
65	IH 35 FRONTAGE RD (SAN DARIO AV)	60-90	Yes	No
66	SAN EDUARDO AV	60-90	Yes	No
67	SAN FRANCISCO AV	60-90	Yes	No
68	SAN JORGE AV	60-90	No	N/A
69	MONTERREY AV	60-90	No	N/A
70	SANDERS AV	60-90	No	N/A
71	CORPUS CHRISTI ST	60-90	Yes	Yes

Table 1-4: Crossing Layout and Adjacent Intersection Configuration				
Xing No.	Cross Street Name	Smallest Crossing Angle	Adjacent Intersection within 400'	Adjacent Intersection Signalized
72	MARCELLA AV	60-90	Yes	Yes
73	GUADALUPE ST	60-90	Yes	Yes
74	CHIHUAHUA ST E	60-90	Yes	Yes
75	MARKET ST E	60-90	No	N/A
76	LOGAN AV	60-90	No	N/A
77	HENDRICKS AV	60-90	Yes	No
78	STONE AV	60-90	No	N/A
79	SEYMOUR AV	60-90	Yes	No
80	BUENA VISTA AV	60-90	Yes	No
81	MALINCHE AV	60-90	Yes	No
82	BARTLETT AV	60-90	Yes	No
83	MARKET ST	60-90	No	N/A
84	ARKANSAS AV	60-90	Yes	No
Source: Wilbur Smith Associates survey of crossings				

Adjacent Intersection Configuration

Of the 84 crossings in the study area, 66 have an adjacent intersection within 400 feet of the crossing, as shown in Table 1-4. A rule of thumb in traffic planning is that a distance of 400 feet or more between a crossing and an adjacent intersection should be sufficient to prevent queuing of traffic extending from the crossing into the intersection. Where the distance is less the 400 feet and the adjacent intersection is signalized, some additional traffic studies might be merited in order to enhance safety at the intersection which could be affected by queue overspill.

Eleven of those adjacent intersections within 400 feet of the crossings are signalized, and 55 are not. Queuing of traffic between the crossing and the adjacent intersection may require some modification in signal cycles at the intersection to enhance safety. Queuing from a street intersection across a grade crossing needs to be evaluated where grade crossings are close to signalized intersections. In some cases, typically when the intersection is less than 200 feet away, the intersection signalization and the grade crossing safety gates should be interconnected to ensure that a grade crossing is cleared of traffic before a train arrives. Safety at those intersections without signalization might be enhanced with implementation of signalization.

Eighteen of the 84 crossings do not have adjacent intersections within 400 feet. As distances of more than 400 feet likely are long enough to obviate concerns of traffic queuing impacts at adjacent intersections, the signalization status of those more distant intersections was not considered in Table 1-4.

LAND USES ALONG LAREDO RAIL CORRIDORS

Land uses along the UP and Tex-Mex rail corridors in Laredo appear in Figure 1-4. In the northern portion of the study area, land uses along the Union Pacific rail corridor represent a mixture of commercial and industrial uses. These predominate north of Markley Lane. While train horn noise can be disturbing to employees in these uses, the noise is usually less noticeable because of higher ambient industrial noise levels, and generally higher traffic noise levels from trucking activities.

South of Markley Lane, scattered commercial and industrial uses adjoin the railroad but the predominant use within several blocks on each side of the rail lines is residential. Train horn noise becomes more noticeable in residential areas, particularly at night when ambient noise from traffic is low. East of the UP Rio Grande Runaround track, the area is almost entirely residential. Between the two UP lines uses are mixed. West of the UP main line there are pockets of residential separated by clusters of non residential uses. Residential uses adjacent to or within a block or two of the tracks are found southward along the UP, including areas on each side of the UP Laredo Yard.

Along the Tex-Mex, there are residential neighborhoods east and west of the joint UP / Tex-Mex corridor adjoining the UP and Tex-Mex yards. At Washington Street, the Tex-Mex route turns easterly, passing just north of Laredo's central business area. Residential use predominates north of the tracks, and residential uses bordering the central area are found south of the tracks. Further to the east, most of the Tex-Mex rail line passes through extensive residential neighborhoods.

The study team's initial analysis of Quiet Aone potential concentrates on the rail lines where they have adjoining residential use. Similar analysis could be extended to rail segments in commercial or industrial areas if the City of Laredo wishes to do so.

SPECIAL TRAFFIC GENERATORS

Table 1-5 lists special traffic generators located in areas either adjacent to or nearby the Union Pacific and Texas Mexican rail lines. Special generators would include commercial/retail facilities, civic-related facilities, educational facilities, etc. These generators are drawn from the Laredo *Metropolitan Transportation Plan* (2004).

Table 1-5: Special Traffic Generators near Rail Lines	
Laredo Civic Center	Special Events
Laredo Community College	Students: 7,352; Staff: 580
Laredo Intermodal Transit Center	Annual Bus System Transfers: 326,783
Martin High School	Students: 1,741; Staff 250
St. Augustine Jr./Sr. High School	Students: 629: Staff 58
Wal Mart Super Center	Employees: 523
Source: Laredo Metropolitan Transportation Plan 2005-2030	

RAILROAD TRAFFIC GENERATORS

UP has three generators of rail traffic in the Laredo area. These are:

- Laredo Yard south of Scott Street
- Shippers located along the Rio Grande Subdivision
- Port Laredo intermodal yard north of the study area

The Laredo Yard is where shipments to and from Mexico are processed: cars are assembled into blocks for various destinations. Each of UP's 20 daily through trains either arrives or departs from the Laredo Yard. All 12 to 50 one-way switch moves also begin and end in the Laredo Yard.

Shippers along the Rio Grande Subdivision account for a portion of UP's 12 to 50 daily one-way switch moves. The remaining trains are going to or from Port Laredo.

Tex-Mex also has three traffic generators in Laredo. These are:

- Its small yard adjacent to the UP's Laredo Yard
- Shippers located along its east-west main line in the study area
- Serrano Yard east of the study area

Serrano Yard is where shipments to and from Mexico are processed: cars are assembled into blocks for various destinations. Each of Tex-Mex's 10 daily through trains either arrives or departs from Serrano Yard. Both of Tex-Mex's two one-way switch moves also begin and end in Serrano Yard. The switch trains move traffic to/from the railroad's small yard near UP's Laredo Yard and to/from shippers along the main line in Laredo.

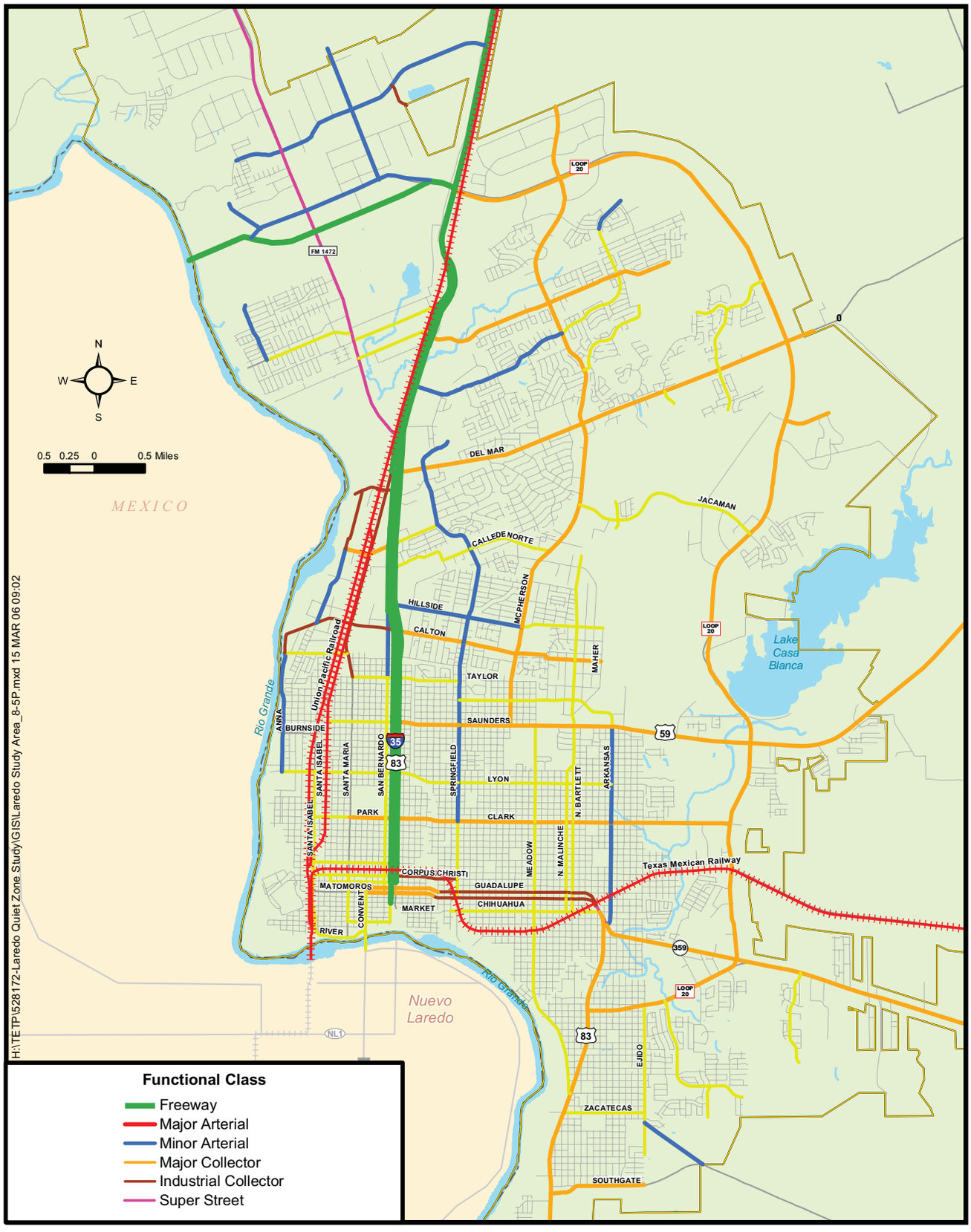

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Figure 1-1
LAREDO QUIET ZONE STUDY AREA
528170/PDF - 03/29/06

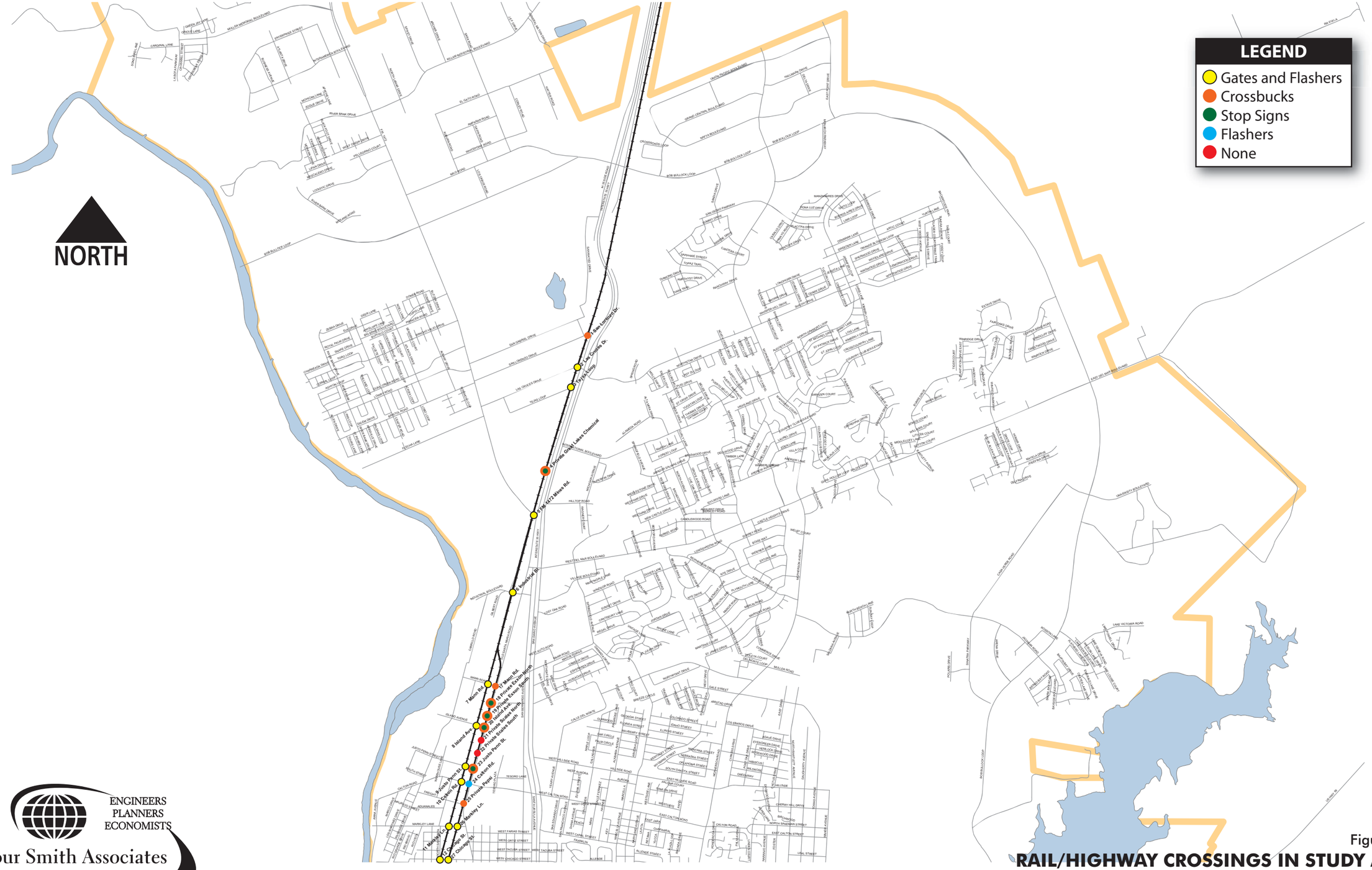

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Figure 1-2
RAIL/HIGHWAY CROSSINGS IN STUDY AREA
528170/BASE - 3/10/06

NORTH

LEGEND

- Gates and Flashers
- Crossbucks
- Stop Signs
- Flashers
- None

11 Markley Ln.
25 Markley Ln.
12 Chicago St.
27 Chicago St.
28 Pace St.
29 Ugarte St.
39 Philadelphia St.
31 Boston St.
32 Pierce St.
33 Baltimore St.
34 Lafayette St.
35 Madison St.
13 Baltimore St.
36 Blair St.
37 Frankfort St.
38 Jefferson St.
14 Jefferson St.
39 Shea St.
40 Gonzalez St.
41 Bruni St.
42 Park St.
43 Sanchez St.
44 Garza St.
15 Sanchez St.
45 Santa Isabel Ave.
46 Scott St.
53 Vidauri Ave.
64 Santa Rita Ave.
55 Santa Clotilde Ave.
56 Main Ave.
57 Davis Ave.
58 Santa Maria Ave.
59 Juarez Ave.
60 Convent Ave.
61 Flores Ave.
62 San Agustin Ave.
63 San Bernardo Ave.
64 IH 35 Frontage Rd. (Santa Ursula Ave.)
65 IH 35 Frontage Rd. (San Dario Ave.)
66 San Eduardo Ave.
67 San Francisco Ave.
68 San Jorge Ave.
69 Monterey Ave.
70 Sanders Ave.
71 Corpus Christi St.
72 Marcella Ave.
73 Guadalupe St.
74 Chihuahua St. E
75 Market St. E
76 Logan Ave.
77 Hendricks Ave.
78 Stone Ave.
79 Seymour Ave.
80 Buena Vista Ave.
81 Mallinche Ave.
82 Bartlett Ave.
83 Market St.
84 Arkansas Ave.
50 UP Police Near Farragut St.
51 UP Lot Near Houston St.
52 Santa Isabel Ave. & Washington St.
49 Hidalgo St.
48 Iturbide St.
47 Zaragoza St.

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Figure 1-3

RAIL/HIGHWAY CROSSINGS IN STUDY AREA

528170/BASE - 3/10/06

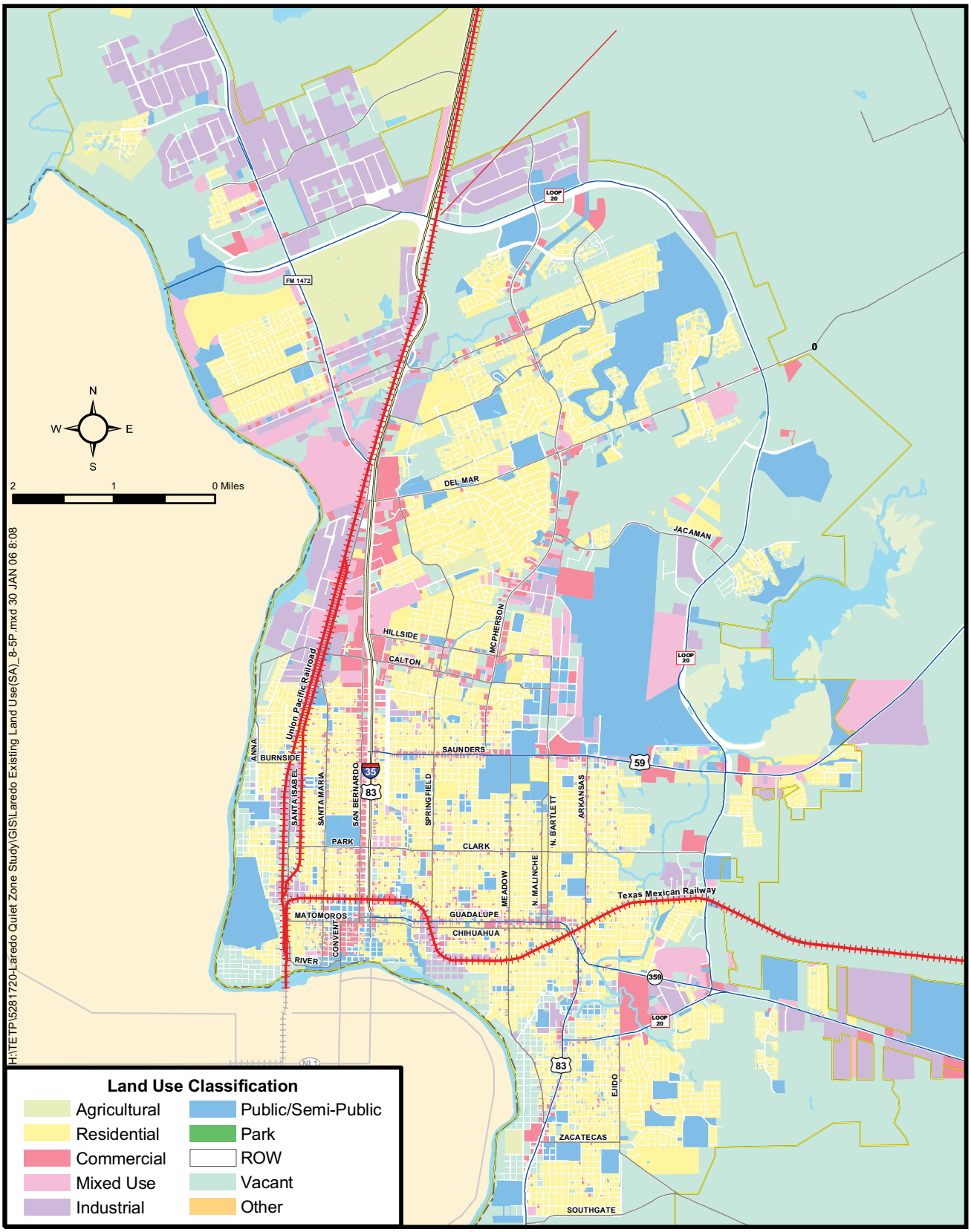

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Figure 1-4
LAREDO QUIET ZONE EXISTING LAND USE
528170/PDF - 03/29/06

Chapter 2
EXISTING CONDTIONS

The purpose of this chapter is to discuss existing conditions related train horn noise impacts, traffic delays at rail-highway crossings, and accidents at grade crossings in the study area.

TRAIN HORN IMPACTS ON LAREDO RESIDENTS

There are four segments of rail lines in the study area where locomotive engineers sound their horns in areas with fairly dense residential development. These areas are:

- Along the Union Pacific Railroad's Laredo and Rio Grande Subdivisions between Markley Lane to the north and Scott Street to the south.
- Along the southern most segment of the Laredo Subdivision between Scott Street and Zaragoza Street; and along the parallel Texas Mexican Railway line from Washington Street to Zaragoza Street.
- Along the Tex-Mex from Vidaurri Avenue to Marcella Avenue.
- Along the Tex-Mex from Logan Avenue to Arkansas Avenue.

The *Laredo Rail Noise Study* provided separately, assessed train horn impacts at 12 different locations in the study area. The study assumed Category 2 land uses for the calculations of all the impacts. Category 2 includes residences and buildings where people normally sleep, such as homes, hospitals and hotels, and thus where nighttime sensitivity to noise is assumed to be of utmost importance.

In that study, train horn impacts were measured relative to ambient noise levels (absent train horns) over a 24-hour period. Measurements ran from no impact, to impact, to severe impact. The higher the noise level is at a crossing with a train horn blown as compared to the noise level at the crossing absent the train horn, the greater or the more adverse is the impact. The study identified severe impacts at Chicago Street and Madison Street on the UP and at Main Avenue on the Tex-Mex. The study found impacts at most other locations. In other words, train horns over the length of the day have adverse impacts (in some cases severely adverse impacts) on several residential areas along side UP and Tex-Mex tracks in Laredo.

TRAFFIC DELAYS AT RAIL-HIGHWAY CROSSINGS

The study team evaluated delays experienced by motor vehicles due to train movements at all 84 crossings in the study area. The results are summarized in Tables 2-1 through 2-4 on the following pages.

The analysis methodology used to evaluate vehicular traffic delays and queuing at the study area crossings has been taken from the National Cooperative Highway Research Program (NCHRP) Report 288, *Evaluating Grade-Separated Rail and Highway Crossing Alternatives*, published by the Transportation Research Board, National Research Council, Washington D.C., in 1987. See Appendix A, Section IV, pages 34 through 36. Additional methodology information was obtained from the Transportation Research Record (TRR) 1754, Paper No. 01-3051, *Methodology for Evaluating Highway-Railway Grade Separations*, Washington D.C., 2001, pp. 77-80. A summary of the methodology as it has been applied to this study can be found in Appendix A of this report.

Table 2-1
Year 2003 – Average Daily Traffic and Estimated Level of Service (LOS)
at Railroad Crossings in the Study Area
Union Pacific Railroad

Study No.	FRA No.	Milepost	Cross-street Name	Average Daily Traffic	Estimated LOS at the crossing
1	446694P	406.03	SAN LORENZO DR	2,870	B
2	448359U	406.03	LAS CRUCES DR	11,340	D
3	448377S	406.04	TEJAS LOOP	1,680	A
4	446696D	407.00	PRIVATE GREAT LAKES CHEMICAL	100	A
5	446697K	407.40	FM 1472 MINES RD	24,000	B
6	446699Y	408.10	INDUSTRIAL BL	4,440	C
7	446700R	408.30	MANN RD	3,710	A
8	446704T	408.10	ISLAND AV	1,670	A
9	446707N	409.25	JUSTO PENN ST	1,480	A
10	446709C	409.30	CALTON RD	7,790	B
11	446760A	409.70	MARKLEY LN	1,550	A
12	446780L	409.90	CHICAGO ST	10,030	B
13	446788R	410.30	BALTIMORE ST	2,650	A
14	446796H	410.90	JEFFERSON ST	3,600	A
15	446802J	411.60	SANCHEZ ST	2,200	A
16	447866Y	412.80	ZARAGOZA ST	630	A
17	446701X	408.10	MANN RD	3,710	B
18	446702E	408.20	PRIVATE EXXON NORTH	200	A
19	446703L	408.25	PRIVATE EXXON SOUTH	200	A
20	446705A	408.80	ISLAND AV	1,610	A
21	Unknown	409.00	PRIVATE SCALES NORTH	100	A
22	Unknown	409.10	PRIVATE SALES SOUTH	100	A
23	446706G	409.30	JUSTO PENN ST	1,480	A
24	446708V	409.30	CALTON RD	7,790	A
25	848242R	409.50	PRIVATE PEPSI	200	A
26	446761G	409.70	MARKLEY LN	1,550	A
27	446781T	409.90	CHICAGO ST	10,030	B
28	446782A	409.95	PACE ST	100	A
29	446784N	410.00	UGARTE ST	150	A
30	446785V	410.10	PHILADELPHIA ST	230	A
31	446786C	410.20	BOSTON ST	520	A
32	446787J	410.30	PIERCE ST	250	A
33	446789X	410.40	BALTIMORE ST	2,650	A
34	446790S	410.50	LAFAYETTE ST	570	A
35	446791Y	410.60	MADISON ST	620	A
36	446792F	410.70	BLAIR ST	610	A
37	446793M	410.80	FRANKFORT ST	200	A
38	446795B	410.90	JEFFERSON ST	3,600	B
39	448448L	411.00	SHEA ST	300	A
40	446801C	411.05	GONZALEZ ST	140	A
41	446799D	411.10	BRUNI ST	270	A
42	446800V	411.15	PARK ST	3,830	B
43	446801C	411.20	SANCHEZ ST	2,200	A
44	446803R	411.25	GARZA ST	230	A
45	848264R	411.80	SANTA ISABEL AV	2,640	A
46	446805E	411.90	SCOTT ST	2,510	D

Source: Wilbur Smith Associates

Table 2-2
Year 2003 – Average Daily Traffic and Estimated Level of Service (LOS)
at Railroad Crossings in the Study Area
Texas-Mexican Railway

Study No.	FRA No.	Milepost	Cross-street Name	Average Daily Traffic	Estimated LOS at the crossing
47	793589T	0.30	ZARAGOSA ST	630	A
48	793543E	0.40	ITURBIDE ST	50	A
49	793540J	0.50	HIDALGO ST	200	A
50	Unknown	0.55	PRIVATE UP POLICE	50	A
51	Unknown	0.60	UP LOT	200	A
52	793547G	0.70	STA ISABEL AV AND WASHINGTON ST	2,760	B
53	793548N	0.80	VIDAURRI AV	130	A
54	793549V	0.90	SANTA RITA AV	1,030	A
55	793550P	0.96	SANTA CLOTHIDE AV	1,180	A
56	793551W	1.00	MAIN AV	1,680	A
57	793552D	1.08	DAVIS AV	1,310	A
58	793553K	1.10	SANTA MARIA AV	4,640	C
59	793554S	1.20	JUAREZ AV	950	A
60	793556F	1.30	CONVENT AV	3,200	B
61	793557M	1.40	FLORES AV	1,360	A
62	793558U	1.47	SAN AGUSTIN AV	1,260	A
63	793559B	1.50	SAN BERNARDO AV	8,620	C
64	793560V	1.55	IH 35 FRONTAGE RD (STA URSULA AV)	11,000	B
65	793561C	1.60	IH 35 FRONTAGE RD (SAN DARIO AV)	11,000	B
66	793562J	1.67	SAN EDUARDO AV	4,020	B
67	793563R	1.70	SAN FRANCISCO AV	2,110	A
68	793564X	1.80	SAN JORGE AV	310	A
69	793565E	2.00	MONTERREY AV	1,480	A
70	793566L	2.10	SANDERS AV	680	A
71	793567T	2.15	CORPUS CHRISTI ST	9,590	C
72	793568A	2.20	MARCELLA AV	2,110	A
73	793580G	2.30	GUADALUPE ST	17,000	D
74	793584J	2.36	CHIHUAHUA ST E	17,000	D
75	793582V	2.50	MARKET ST E	17,300	D
76	793586X	2.80	LOGAN AV	900	A
77	793588L	3.00	HENDRICKS AV	1,390	A
78	793591U	3.20	STONE AV	1,150	A
79	793593H	3.30	SEYMOUR AV	1,440	A
80	793594P	3.50	BUENA VISTA AV	1,440	A
81	793595W	3.70	MALINCHE AV	2,100	A
82	Unknown	3.75	BARTLETT AV	2,000	A
83	793596D	3.80	MARKET ST	8,730	C
84	793598S	4.20	ARKANSAS AV	16,550	D

Source: Wilbur Smith Associates

Table 2-3
Year 2003 - Estimated Delays and Queuing at Railroad Crossings in the Study Area
Union Pacific Railroad

Study No.	FRA No.	Milepost	Cross-street Name	Average Delay per Vehicle (seconds)	Average Queue Length (feet)
1	446694P	406.03	SAN LORENZO DR	12.5	20
2	448359U	406.03	LAS CRUCES DR	34.9	230
3	448377S	406.04	TEJAS LOOP	0.0	0
4	446696D	407.00	PRIVATE GREAT LAKES CHEMICAL	0.0	0
5	446697K	407.40	FM 1472 MINES RD	13.5	70
6	446699Y	408.10	INDUSTRIAL BL	16.2	45
7	446700R	408.30	MANN RD	0.0	0
8	446704T	408.10	ISLAND AV	0.0	0
9	446707N	409.25	JUSTO PENN ST	0.0	0
10	446709C	409.30	CALTON RD	9.2	40
11	446760A	409.70	MARKLEY LN	0.0	0
12	446780L	409.90	CHICAGO ST	7.2	40
13	446788R	410.30	BALTIMORE ST	0.0	0
14	446796H	410.90	JEFFERSON ST	0.0	0
15	446802J	411.60	SANCHEZ ST	0.0	0
16	447866Y	412.80	ZARAGOZA ST	0.0	0
17	446701X	408.10	MANN RD	9.7	20
18	446702E	408.20	PRIVATE EXXON NORTH	0.0	0
19	446703L	408.25	PRIVATE EXXON SOUTH	0.0	0
20	446705A	408.80	ISLAND AV	0.0	0
21	Unknown	409.00	PRIVATE SCALES NORTH	0.0	0
22	Unknown	409.10	PRIVATE SALES SOUTH	0.0	0
23	446706G	409.30	JUSTO PENN ST	0.0	0
24	446708V	409.30	CALTON RD	4.6	15
25	848242R	409.50	PRIVATE PEPSI	0.0	0
26	446761G	409.70	MARKLEY LN	0.0	0
27	446781T	409.90	CHICAGO ST	10.8	65
28	446782A	409.95	PACE ST	0.0	0
29	446784N	410.00	UGARTE ST	0.0	0
30	446785V	410.10	PHILADELPHIA ST	0.0	0
31	446786C	410.20	BOSTON ST	0.0	0
32	446787J	410.30	PIERCE ST	0.0	0
33	446789X	410.40	BALTIMORE ST	0.0	0
34	446790S	410.50	LAFAYETTE ST	0.0	0
35	446791Y	410.60	MADISON ST	0.0	0
36	446792F	410.70	BLAIR ST	0.0	0
37	446793M	410.80	FRANKFORT ST	0.0	0
38	446795B	410.90	JEFFERSON ST	10.0	20
39	448448L	411.00	SHEA ST	0.0	0
40	446801C	411.05	GONZALEZ ST	0.0	0
41	446799D	411.10	BRUNI ST	0.0	0
42	446800V	411.15	PARK ST	9.4	20
43	446801C	411.20	SANCHEZ ST	0.0	0
44	446803R	411.25	GARZA ST	0.0	0
45	848264R	411.80	SANTA ISABEL AV	0.0	0
46	446805E	411.90	SCOTT ST	28.7	40

Source: Wilbur Smith Associates

Table 2-4
Year 2003 - Estimated Delays and Queuing at Railroad Crossings in the Study Area
Texas-Mexican Railway

Study No.	FRA No.	Milepost	Cross-street Name	Average Delay per Vehicle (seconds)	Average Queue Length (feet)
47	793589T	0.30	ZARAGOSA ST	0.0	0
48	793543E	0.40	ITURBIDE ST	0.0	0
49	793540J	0.50	HIDALGO ST	0.0	0
50	Unknown	0.55	PRIVATE UP POLICE	0.0	0
51	Unknown	0.60	UP LOT	0.0	0
52	793547G	0.70	STA ISABEL AV AND WASHINGTON ST	13.0	20
53	793548N	0.80	VIDAURRI AV	0.0	0
54	793549V	0.90	SANTA RITA AV	0.0	0
55	793550P	0.96	SANTA CLOTHIDE AV	0.0	0
56	793551W	1.00	MAIN AV	0.0	0
57	793552D	1.08	DAVIS AV	0.0	0
58	793553K	1.10	SANTA MARIA AV	15.5	40
59	793554S	1.20	JUAREZ AV	0.0	0
60	793556F	1.30	CONVENT AV	11.3	20
61	793557M	1.40	FLORES AV	0.0	0
62	793558U	1.47	SAN AGUSTIN AV	0.0	0
63	793559B	1.50	SAN BERNARDO AV	20.9	105
64	793560V	1.55	IH 35 FRONTAGE RD (STA URSULA AV)	13.1	55
65	793561C	1.60	IH 35 FRONTAGE RD (SAN DARIO AV)	13.1	55
66	793562J	1.67	SAN EDUARDO AV	9.0	20
67	793563R	1.70	SAN FRANCISCO AV	0.0	0
68	793564X	1.80	SAN JORGE AV	0.0	0
69	793565E	2.00	MONTERREY AV	0.0	0
70	793566L	2.10	SANDERS AV	0.0	0
71	793567T	2.15	CORPUS CHRISTI ST	22.5	125
72	793568A	2.20	MARCELLA AV	0.0	0
73	793580G	2.30	GUADALUPE ST	33.9	335
74	793584J	2.36	CHIHUAHUA ST E	33.9	335
75	793582V	2.50	MARKET ST E	35.4	355
76	793586X	2.80	LOGAN AV	0.0	0
77	793588L	3.00	HENDRICKS AV	0.0	0
78	793591U	3.20	STONE AV	0.0	0
79	793593H	3.30	SEYMOUR AV	0.0	0
80	793594P	3.50	BUENA VISTA AV	0.0	0
81	793595W	3.70	MALINCHE AV	0.0	0
82	Unknown	3.75	BARTLETT AV	0.0	0
83	793596D	3.80	MARKET ST	20.6	105
84	793598S	4.20	ARKANSAS AV	32.6	315

Source: Wilbur Smith Associates

For this analysis, the team used the train movement data provided by the UP and Tex-Mex railroads (cited in Chapter 1) and average annual daily traffic (AADT) data provided by the City of Laredo. The AADT data was for 2003. The study team assumed that train data for that year was the same as that reported by UP and Tex-Mex for 2005. Making assumptions of the growth in train and vehicular traffic, the team was able to forecast delay and estimate levels of service (A-E) in 2010 and 2015.

As shown in Tables 2-1 through 2-4, the longest delays to motor vehicle traffic, the lowest service levels, and longest queuing lengths occurred at five crossings:

- Las Cruces Drive, Crossing #2, on the UP's Laredo Subdivision
- Guadalupe Street, Crossing #73, on the Tex-Mex
- Chihuahua Street East, Crossing #74 on the Tex-Mex
- Market Street East, Crossing #75, on the Tex-Mex
- Arkansas Street, Crossing #84, on the Tex-Mex

The locations of these crossings appear in Figures 1-2 and 1-3 of Chapter 1.

Traffic Delay Metrics

These five crossings had the highest average delay per day, at over 100 vehicle-hours. They had the highest average delay for each vehicle delayed, at over six minutes or more per vehicle. They had the highest average delay per vehicle, at over 30 seconds per vehicle. Lastly, these five crossings had the lowest level of service (LOS) calculated for all crossings in the study area, i.e. an LOS of D[1].

Queuing Metrics

Queuing refers to the lining up of cars away from a crossing when the crossing is occupied by a passing train. These five crossings have both the highest number of vehicles per hour per lane in the primary direction, at over 600 vehicles; and the longest average queue length per lane, at over 200 feet.

ACCIDENTS AT RAIL-HIGHWAY CROSSINGS

The Federal Railroad Administration (FRA) maintains records of accidents at grade crossings that involve trains and train operations. The study team reviewed accidents that occurred over the five years of 2000-04, including one accident in January 2005 (the most recent five-year period for which accidents have been recorded by the FRA). There were 25 recorded accidents during the review period. Accidents occurred at only nine of the grade crossings in the study area, with eight of these reported accidents at a single grade crossing. Accidents reported at these crossings are summarized below. The locations and number of

[1] LOS at crossings is calculated in seconds of delay for vehicles, per the following table:

LOS	Seconds of Delay
A	0
B	5
C	15
D	25
E	40
F	60

accidents are shown graphically on Figure 2-1 at the end of this chapter. Appendix B contains detail information about all the accidents recorded by FRA within the study area, since 1975.

Mann Road at UP Laredo Subdivision (Crossing #7)

Eight grade crossing accidents were reported for the Union Pacific mainline crossing at Mann Road. Nine involved truck-trailer vehicles, and one involved an automobile. Eight involved vehicles that did not stop at the crossing. One additional accident involved a vehicle that stopped and then proceeded into the crossing, and one involved a vehicle stalled on the crossing. In nine instances, the train hit the car attempting to cross the tracks, while in one instance the car hit the moving train already occupying the crossing. Vehicle speeds were reported between 0 and 25 miles per hour; train speeds were between 5 and 15 miles per hour. The accidents took place between 9:30 am and 8:35 pm. Property damage ranged from $500 to $50,000, with an average of $12,100 per accident. Personal injuries occurred in 3 of the accidents.

Mann Road is protected by crossing gates and flashing lights, including some cantilevered over the traffic lanes. The two-lane roadway carries 3,710 AADT. Maximum allowable train speed is 20 miles per hour.

Mann Road at UP Rio Grande Subdivision (Crossing #17)

Two accidents were reported for the Rio Grande bypass crossing of Mann Road. Both involved truck-trailer vehicles that did not stop at the crossing. In both cases the train hit the vehicle. Train speeds were 5 and 15 miles per hour, while vehicle speeds were 5 and 12 miles per hour. Both accidents occurred during afternoon hours, with total property damage of $27,800. There were no injuries reported.

Mann Road is a two-lane roadway with 3,710 AADT. The crossing is protected by crossbucks only, and has no gates or flashing lights. Maximum allowable train speed is 20 miles per hour.

San Lorenzo Drive at UP Laredo Subdivision (Crossing #1)

Three accidents were reported at the UP crossing of San Lorenzo Drive. All three accidents involved truck-trailer vehicles that did not stop at the crossing, and were hit by trains. Train speeds ranged from 5 to 15 miles per hour, with vehicle speeds of 4 to 25 miles per hour. The accidents all took place during mid-day hours. Property damage ranged from $500 to $35,000 and averaged $20,200 per accident. There were injuries to the vehicle driver in two of the accidents.

San Lorenzo Drive is a two-lane roadway protected only by crossbucks. The current AADT is 2,870. Maximum allowable train speed is 20 miles per hour.

FM 1472 Mines Road at UP Laredo Subdivision (Crossing #5)

Three accidents were reported at the UP crossing of FM 1472 Mines Road. Vehicles involved were a truck-trailer, auto, and pick-up truck. In each case, the vehicle was stopped or stalled on the crossing and was struck by the approaching train. Train speeds were 8 to 15 miles per hour. Accidents occurred in daylight hours. Property damage ranged from $0 to $20,000. There was one railroad employee injury resulting from one accident.

FM 1472 Mines Road is a major roadway carrying 24,000 AADT. The crossing is protected by automatic gates and flashing lights, including lights cantilevered overhead. There are three lanes of traffic in the eastbound direction, and two lanes westbound. Maximum allowable train speed is 20 miles per hour.

Sanchez Street at UP Laredo Subdivision (Crossing #15)

The Sanchez Street crossing accounted for three accidents involving autos or a van. One driver did not stop, while two others stopped on the crossing. Train speeds were 10-15 miles per hour. One highway user injury was reported, and property damage averaged $6,000 per incident.

Sanchez Street is protected with automatic gates and flashing lights. In addition to the main track, there are three parallel yard tracks at the crossing. Sanchez Street is a two-lane roadway with an AADT of 2,200. Maximum allowable train speed is 20 miles per hour.

Logan Avenue at Tex-Mex Mainline (Crossing #76)

Two accidents were recorded at the Logan Avenue crossing. Both involved trucks that were struck by trains. Both accidents occurred during daytime hours. Both trains and trucks were moving at low speeds. There were no injuries, and damage to property was only $7,000 in total.

Logan Avenue is a two-lane roadway protected by crossbucks only. The street carries 900 AADT. In addition to the main line track, there are two parallel freight tracks at the crossing. Maximum allowable train speed is 10-20 miles per hour.

Arkansas Avenue at Tex-Mex Mainline (Crossing #84)

Two accidents occurred at this grade crossing during the five study years. One involved a pick-up, while the second involved a truck-trailer. In each case, the vehicle failed to stop at the crossing and was struck by a slow moving train. One was in late afternoon, and the second was at 11:15 pm. Damage was reported at $5,500 total, and there were no personal injuries.

Arkansas Avenue is a two-lane roadway, with the crossing protected by flashing lights. The road carries 16,550 AADT at the crossing location. Maximum allowable train speed is 10-20 miles per hour.

Las Cruces Drive at UP Laredo Subdivision (Crossing #2)

The one accident reported at this crossing involved a truck-trailer that did not stop, and was hit by the train entering the crossing. Damage was reported at $8,000. The accident happened at 8:30 am and did not result in any personal injuries.

Las Cruces Drive is a two-lane roadway carrying 11,340 AADT. It is protected by automatic gates and flashing lights. Maximum allowable train speed is 20 miles per hour.

Buena Vista Avenue at Tex-Mex Mainline (Crossing #80)

One accident was reported at the Buena Vista Avenue grade crossing, resulting from an auto failing to stop and subsequently hitting rail equipment that already occupied the crossing. The incident occurred about 4:00 am, with no injuries and only $1,500 in reported damages.

Buena Vista Avenue has two lanes at the crossing, protected only by crossbucks. It carries 1,440 AADT. Maximum allowable train speed is 10-20 miles per hour.

General Analysis

Sixteen of the 25 accidents involved vehicles that failed to stop at the crossing, apparently unheeding any mechanical warning devices, railroad horns, or stop signs. The remainder involved vehicles that stopped and then proceeded, or were stopped or stalled by gates or other circumstances. Available accident reports do not

indicate why cars failed to heed train warning horns or other protective devices, or why some vehicles were stalled or stopped on the tracks. Seven accidents resulted in injuries to nine persons – either vehicle occupants or railroad employees. The severity of injuries is not indicated in the available data. All occurred where train speeds were mostly in the 5-15 mile per hour range.

Despite the existence of 84 grade crossings in the study area with frequent train movements, the relatively low highway traffic volumes and the low train speeds at most Laredo crossings has resulted in only five accidents per year in the most recent five-year period.

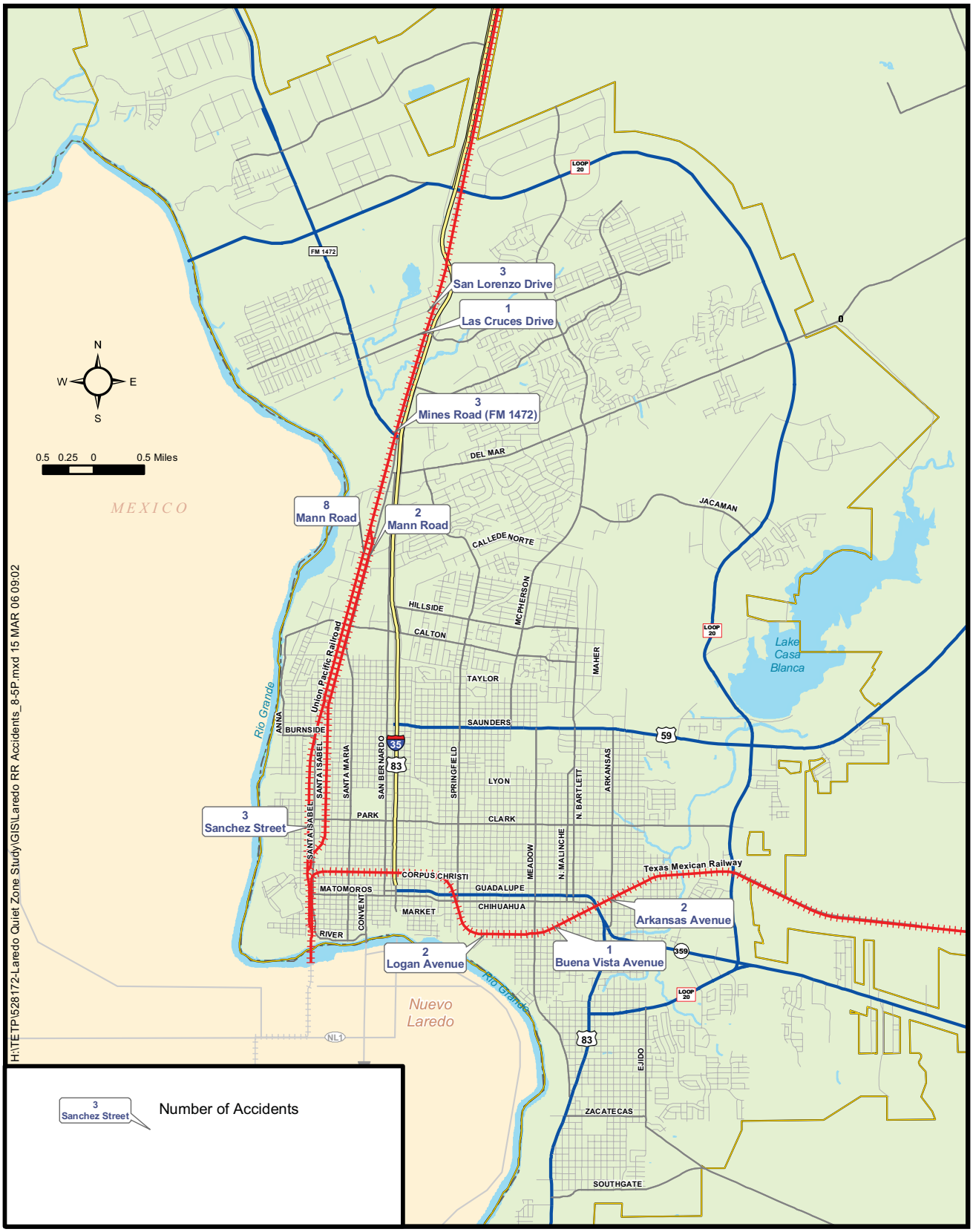
Accidents during the five-year analysis period were evenly spread across the years. There were six accidents reported in 2000, five accidents reported in each year 2001 through 2003, and four reported in 2004 (including one in January of 2005). During the previous five-year period (1995 through 1999) there were 22 reportable accidents. This rate of 4.7 crossing-related accidents per year over the past 10 years contrasts sharply with the 1990-1994 period, when there were 60 accidents (averaging 12 per year). The study team could not determine whether this reduction might be attributed to crossing protection improvements, changes in accident reporting requirements, or other causes.

The long-term grade crossing accident rates in the study area, based only on those accidents included in the FRA record database, are shown below in Table 2-5.

Table 2-5
Laredo Crossing Accidents

Period	Accidents	Annual Average
1975-1979	24	4.8
1980-1984	26	5.2
1985-1989	45	9.0
1990-1994	60	12.0
1995-1999	22	4.4
2000-2004	25	5.0

Source: FRA



ENGINEERS
PLANNERS
ECONOMISTS
Wilbur Smith Associates

Figure 2-1
ACCIDENTS AT CROSSINGS IN LAREDO 2000-2004
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Chapter 3
FUTURE CONDITIONS

The purpose of this chapter is to identify various future demographic and traffic conditions along the UP and Tex-Mex rail lines in the study area. It also includes a listing of the grade separation projects in the study area.

FUTURE DEMOGRAPHICS

As noted in the *Laredo Metropolitan Transportation Plan 2005-2030*, the population of the MPO area is expected to rise 135 percent from 205,801 to 482,300 in 2035. Employment also is expected to rise 134 percent from 76,398 in 2003 to 178,629 in 2035. These trends in themselves would indicate the likelihood of more motor vehicle and pedestrian travel across at-grade crossings in Laredo.

SPECIAL GENERATORS

Chapter 1 identified special traffic generators adjacent or near the rail lines (see Table 1-5). Special generators are major employers, institutions and post-secondary schools that have peak travel times other than typical rush hours. It is reasonable to assume that these will continue to be special generators in the future, thus contributing to motor vehicle and pedestrian traffic crossing rail lines.

FUTURE RAILROAD VOLUMES

During conversations in the summer of 2005, UP related that its carload business from, to and through Laredo should increase about 3 percent per year. Accordingly, increased delays at crossings can be expected.

The 3 percent per year increase in carloads does not equate automatically to a 3 percent increase in train volume. This is because through trains can absorb increases in growth by getting longer. However, at some point, with the continued growth year-over-year, there will be an increase in the number of trains as well. The traffic analysis in Tech Memo 2 assumes an increase in total UP trains of less than 1 percent a year.

UP did not report any major investments in the Laredo area which might increase delays to motor vehicle traffic in the study area.

Tex-Mex also related that it expects its carloads from, to and through Laredo will grow at about 3 percent per year. Accordingly, increased delays at crossings can be expected. The traffic analysis in Tech Memo 2 assumes an increase in total Tex-Mex trains of less than 1 percent a year. Tex-Mex did not report any major investment plans in the Laredo area which might increase delays to motor vehicle traffic in the study area.

FUTURE TRAFFIC CONDITIONS AT CROSSINGS

The study team applied the same traffic analysis methodology as it did for 2003 (as reported in Chapter 2 and Appendix A) to years 2010 and 2015, in order to determine likely traffic conditions at crossings in the study area. The team grew AADT at crossings at 1 percent a year, and grew train traffic at about the same rate. The results are shown in Tables 3-1 through 3-4 on the following pages.

Table 3-1
Years 2010 and 2015 – Average Daily Traffic and Estimated Level of Service (LOS)
at Railroad Crossings in the Study Area
Union Pacific Railroad

Study No.	Cross-street Name	Average Daily Traffic 2010	Average Daily Traffic 2015	Estimated LOS at the crossing 2010	Estimated LOS at the crossing 2015
1	SAN LORENZO DR	3,100	3,300	C	C
2	LAS CRUCES DR	12,200	12,800	D	E
3	TEJAS LOOP	1,800	1,900	B	B
4	PRIVATE GREAT LAKES CHEMICAL	100	100	B	B
5	FM 1472 MINES RD	25,700	27,000	C	C
6	INDUSTRIAL BL	4,800	5,000	C	C
7	MANN RD	4,000	4,200	B	B
8	ISLAND AV	1,800	1,900	A	A
9	JUSTO PENN ST	1,600	1,700	A	A
10	CALTON RD	8,400	8,800	B	B
11	MARKLEY LN	1,700	1,800	A	A
12	CHICAGO ST	10,800	11,400	B	B
13	BALTIMORE ST	2,800	2,900	A	A
14	JEFFERSON ST	3,900	4,100	A	B
15	SANCHEZ ST	2,400	2,500	B	B
16	ZARAGOZA ST	700	700	B	C
17	MANN RD	4,000	4,200	B	B
18	PRIVATE EXXON NORTH	200	200	A	A
19	PRIVATE EXXON SOUTH	200	200	A	A
20	ISLAND AV	1,700	1,800	A	A
21	PRIVATE SCALES NORTH	100	100	A	A
22	PRIVATE SALES SOUTH	100	100	A	A
23	JUSTO PENN ST	1,600	1,700	A	A
24	CALTON RD	8,400	8,800	B	B
25	PRIVATE PEPSI	200	200	A	A
26	MARKLEY LN	1,700	1,800	A	A
27	CHICAGO ST	10,800	11,400	B	B
28	PACE ST	100	100	A	A
29	UGARTE ST	200	200	A	A
30	PHILADELPHIA ST	200	200	A	A
31	BOSTON ST	600	600	A	A
32	PIERCE ST	300	300	A	A
33	BALTIMORE ST	2,800	2,900	B	B
34	LAFAYETTE ST	600	600	A	A
35	MADISON ST	700	700	A	A
36	BLAIR ST	700	700	A	A
37	FRANKFORT ST	200	200	A	A
38	JEFFERSON ST	3,900	4,100	B	B
39	SHEA ST	300	300	A	A
40	GONZALEZ ST	200	200	A	A
41	BRUNI ST	300	300	A	A
42	PARK ST	4,100	4,300	B	B
43	SANCHEZ ST	2,400	2,500	A	A
44	GARZA ST	200	200	A	A
45	SANTA ISABEL AV	2,800	2,900	B	B
46	SCOTT ST	2,700	2,800	D	D

Source: Wilbur Smith Associates

Table 3-2
Years 2010 and 2015 – Average Daily Traffic and Estimated Level of Service (LOS) at Railroad Crossings in the Study Area
Texas-Mexican Railway

Study No.	Cross-street Name	Average Daily Traffic 2010	Average Daily Traffic 2015	Estimated LOS at the crossing 2010	Estimated LOS at the crossing 2015
47	ZARAGOSA ST	700	700	B	B
48	ITURBIDE ST	100	100	B	B
49	HIDALGO ST	200	200	B	B
50	PRIVATE UP POLICE	100	100	B	B
51	UP LOT	200	200	B	B
52	STA ISABEL AV AND WASHINGTON ST	3,000	3,200	B	B
53	VIDAURRI AV	100	100	B	B
54	SANTA RITA AV	1,100	1,200	B	B
55	SANTA CLOTHIDE AV	1,300	1,400	B	B
56	MAIN AV	1,800	1,900	B	B
57	DAVIS AV	1,400	1,500	B	B
58	SANTA MARIA AV	5,000	5,300	B	C
59	JUAREZ AV	1,000	1,100	B	B
60	CONVENT AV	3,400	3,600	B	B
61	FLORES AV	1,500	1,600	B	B
62	SAN AGUSTIN AV	1,400	1,500	B	B
63	SAN BERNARDO AV	9,200	9,700	C	D
64	IH 35 FRONTAGE RD (STA URSULA AV)	11,800	12,400	C	C
65	IH 35 FRONTAGE RD (SAN DARIO AV)	11,800	12,400	C	C
66	SAN EDUARDO AV	4,300	4,500	B	C
67	SAN FRANCISCO AV	2,300	2,400	B	B
68	SAN JORGE AV	300	300	B	B
69	MONTERREY AV	1,600	1,700	B	B
70	SANDERS AV	700	700	B	B
71	CORPUS CHRISTI ST	10,300	10,800	C	D
72	MARCELLA AV	2,300	2,400	B	B
73	GUADALUPE ST	18,200	19,100	D	E
74	CHIHUAHUA ST E	18,200	19,100	D	E
75	MARKET ST E	18,500	19,400	D	E
76	LOGAN AV	1,000	1,100	B	B
77	HENDRICKS AV	1,500	1,600	B	B
78	STONE AV	1,200	1,300	B	B
79	SEYMOUR AV	1,500	1,600	B	B
80	BUENA VISTA AV	1,500	1,600	B	B
81	MALINCHE AV	2,300	2,400	B	B
82	BARTLETT AV	2,100	2,200	B	B
83	MARKET ST	9,400	9,900	C	D
84	ARKANSAS AV	17,700	18,600	D	E

Source: Wilbur Smith Associates

Table 3-3
Years 2010 and 2015 – Estimated Delays and Queuing at Railroad Crossings in the Study Area
Union Pacific Railroad

Study No.	Cross-street Name	Average Delay per Vehicle (seconds) 2010	Average Delay per Vehicle (seconds) 2015	Average Queue Length (feet) 2010	Average Queue Length (feet) 2015
1	SAN LORENZO DR	15.8	17.5	30	35
2	LAS CRUCES DR	39.0	44.9	275	335
3	TEJAS LOOP	11.8	13.4	15	15
4	PRIVATE GREAT LAKES CHEMICAL	7.6	8.0	0	0
5	FM 1472 MINES RD	15.1	17.1	85	100
6	INDUSTRIAL BL	20.0	22.2	55	65
7	MANN RD	5.2	5.8	10	15
8	ISLAND AV	3.6	4.0	5	5
9	JUSTO PENN ST	3.5	3.9	5	5
10	CALTON RD	8.5	9.8	40	50
11	MARKLEY LN	3.3	3.7	5	5
12	CHICAGO ST	10.2	12.0	65	80
13	BALTIMORE ST	4.1	4.9	5	10
14	JEFFERSON ST	5.0	6.0	10	15
15	SANCHEZ ST	8.2	9.4	10	15
16	ZARAGOZA ST	14.7	15.3	5	5
17	MANN RD	6.2	6.8	15	15
18	PRIVATE EXXON NORTH	2.3	2.4	0	0
19	PRIVATE EXXON SOUTH	2.3	2.4	0	0
20	ISLAND AV	4.0	4.4	5	5
21	PRIVATE SCALES NORTH	4.5	4.7	0	0
22	PRIVATE SALES SOUTH	4.5	4.7	0	0
23	JUSTO PENN ST	3.7	4.7	5	5
24	CALTON RD	5.9	6.6	20	20
25	PRIVATE PEPSI	2.3	2.4	0	0
26	MARKLEY LN	4.0	4.4	5	5
27	CHICAGO ST	12.0	13.8	75	90
28	PACE ST	4.5	4.7	0	0
29	UGARTE ST	2.3	2.4	0	0
30	PHILADELPHIA ST	2.3	2.4	0	0
31	BOSTON ST	3.5	3.7	0	0
32	PIERCE ST	3.2	3.3	0	0
33	BALTIMORE ST	5.2	5.6	10	10
34	LAFAYETTE ST	3.5	3.7	0	0
35	MADISON ST	3.0	3.1	0	0
36	BLAIR ST	3.0	3.1	0	0
37	FRANKFORT ST	2.3	2.4	0	0
38	JEFFERSON ST	5.9	6.5	15	15
39	SHEA ST	3.2	3.3	0	0
40	GONZALEZ ST	2.3	2.4	0	0
41	BRUNI ST	3.2	3.3	0	0
42	PARK ST	6.0	7.0	15	20
43	SANCHEZ ST	4.5	4.9	5	5
44	GARZA ST	2.3	2.4	0	0
45	SANTA ISABEL AV	5.2	5.6	10	10
46	SCOTT ST	27.6	30.5	45	50

Source: Wilbur Smith Associates

Table 3-4
Years 2010 and 2015 – Estimated Delays and Queuing at Railroad Crossings in the Study Area
Texas-Mexican Railway

Study No.	Cross-street Name	Average Delay per Vehicle (seconds) 2010	Average Delay per Vehicle (seconds) 2015	Average Queue Length (feet) 2010	Average Queue Length (feet) 2015
47	ZARAGOSA ST	6.6	6.9	5	5
48	ITURBIDE ST	6.5	6.8	0	0
49	HIDALGO ST	6.7	7.1	0	0
50	PRIVATE UP POLICE	6.5	6.8	0	0
51	UP LOT	6.7	7.1	0	0
52	STA ISABEL AV AND WASHINGTON ST	11.0	12.5	20	25
53	VIDAURRI AV	6.5	6.8	0	0
54	SANTA RITA AV	7.9	8.5	5	5
55	SANTA CLOTHIDE AV	7.6	9.1	5	5
56	MAIN AV	9.1	9.7	10	10
57	DAVIS AV	7.9	9.4	5	10
58	SANTA MARIA AV	14.6	16.8	45	50
59	JUAREZ AV	7.6	8.2	5	5
60	CONVENT AV	11.5	13.6	25	30
61	FLORES AV	8.2	9.7	5	10
62	SAN AGUSTIN AV	7.9	9.4	5	10
63	SAN BERNARDO AV	22.8	25.9	120	145
64	IH 35 FRONTAGE RD (STA URSULA AV)	15.2	17.4	70	85
65	IH 35 FRONTAGE RD (SAN DARIO AV)	15.2	17.4	70	85
66	SAN EDUARDO AV	13.3	15.3	35	40
67	SAN FRANCISCO AV	9.8	11.1	15	15
68	SAN JORGE AV	7.0	7.3	0	0
69	MONTERREY AV	8.5	9.1	10	10
70	SANDERS AV	6.6	6.9	5	5
71	CORPUS CHRISTI ST	24.6	28.2	150	180
72	MARCELLA AV	9.8	11.1	15	15
73	GUADALUPE ST	39.2	45.1	415	505
74	CHIHUAHUA ST E	39.2	45.1	415	505
75	MARKET ST E	40.0	45.9	430	520
76	LOGAN AV	7.6	8.2	5	5
77	HENDRICKS AV	8.2	9.7	5	10
78	STONE AV	7.3	8.8	5	5
79	SEYMOUR AV	8.2	9.7	5	10
80	BUENA VISTA AV	8.2	9.7	5	10
81	MALINCHE AV	9.8	11.1	15	15
82	BARTLETT AV	9.2	10.5	10	15
83	MARKET ST	22.8	26.4	125	150
84	ARKANSAS AV	38.5	44.3	395	485

Source: Wilbur Smith Associates

As shown in Tables 3-1 through 3-4, the results for the years 2010 and 2015 were the same as for the 2003 analysis. That is, the longest delays to motor vehicle traffic, the lowest service levels, and longest queuing lengths occurred at five crossings:

- Las Cruces Drive, Crossing #2, on the UP's Laredo Subdivision
- Guadalupe Street, Crossing #73, on the Tex-Mex
- Chihuahua Street East, Crossing #74 on the Tex-Mex
- Market Street East, Crossing #75, on the Tex-Mex
- Arkansas Street, Crossing #84, on the Tex-Mex

The locations of these crossings appear in Figures 1-2 and 1-3 in Chapter 1.

Traffic Delay Metrics for 2010 and 2015

These five crossings had the highest average delay per day, at between 132 and 247 vehicle-hours. They had the highest average delay for each vehicle delayed, at between 6.4 and 8.4 minutes or more per vehicle. They had the highest average delay per vehicle, at between 38.5 and 45.9 seconds per vehicle. Lastly, these five crossings had the lowest levels of service (LOS) calculated for all crossings in the study area, with LOS D and E.

Queuing Metrics for 2010 and 2015

Queuing refers to the lining up of cars away from a crossing when the crossing is occupied by a passing train. These five crossings have both the highest number of vehicles per hour per lane in the primary direction, at between 730 and 1,160 vehicles; and the longest average queue length per lane, at between 275 and 520 feet.

FUTURE GRADE SEPARATION PROJECTS

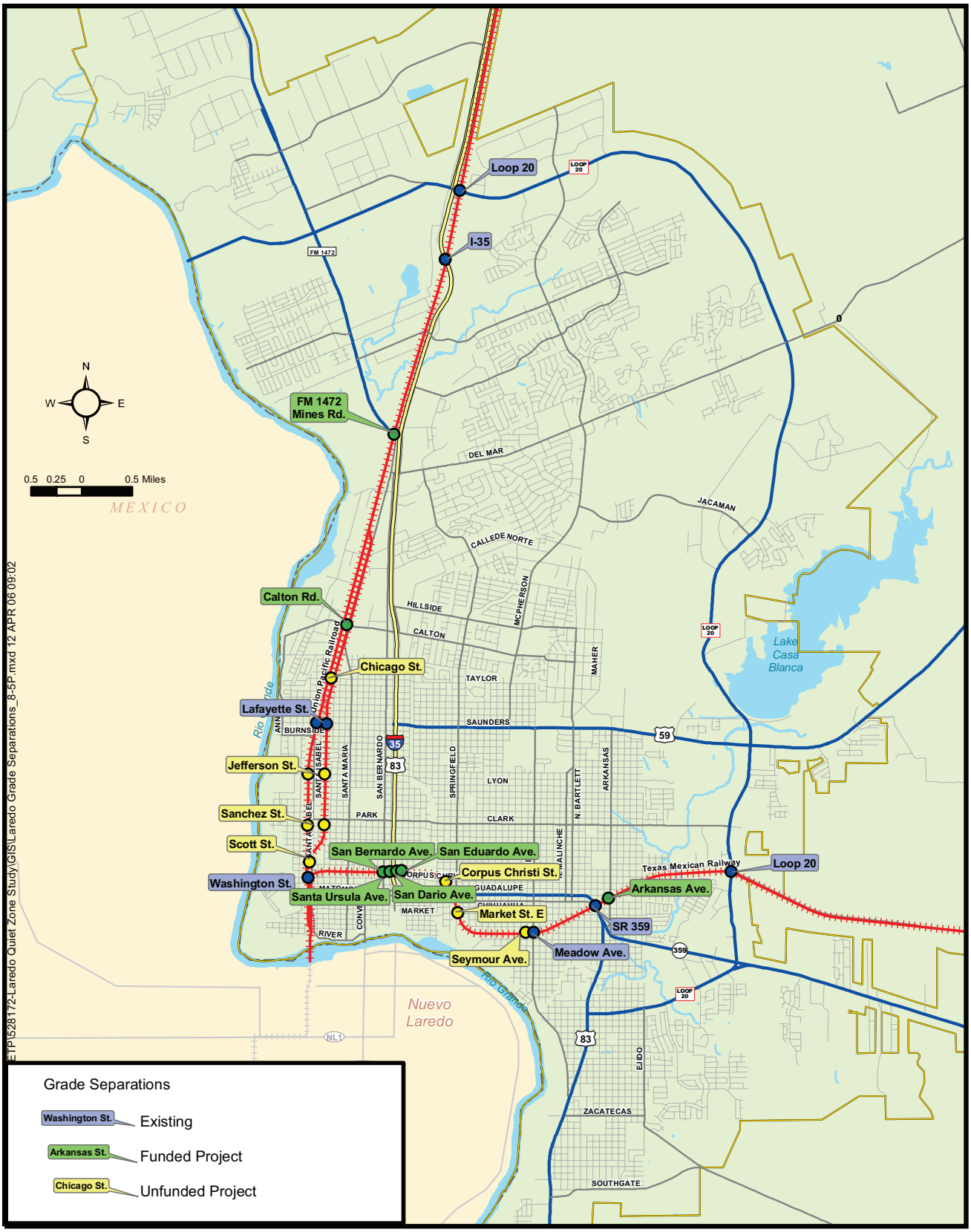
The *Laredo Metropolitan Transportation Plan* identifies various grade separation projects. These appear in Table 3-5 in the following page. The projects are identified by the number and name assigned to the existing crossings in this study. The railroad at the crossing appears in the table as well. The table also includes the sponsor of the proposed grade separation project. Five are sponsored by the State of Texas in the short term (to be implemented by 2014). Two other projects are sponsored by the Federal government for implementation also in the short term. Seven other projects are illustrative, meaning project that would be included in a long range plan (beyond 2015) if reasonable additional resources were available. In other words, they are considered unfunded.

Figure 3-1 shows the locations of these existing grade separations in the study area, as well as funded and unfunded grade separations projects.

Table 3-5
Proposed Grade Separations in the Study Area

Project Crossing	Crossing Name	Railroad	Sponsor
5	FM 1472 Mines Rd.	UP	State – Short Term
63	San Bernardo Ave.	Tex-Mex	State – Short Term
64	IH 35 Frontage Rd. (Sta. Ursula Ave.)	Tex-Mex	State – Short Term
65	IH 35 Frontage Rd. (San Dario Ave.)	Tex-Mex	State – Short Term
66	San Eduardo Ave.	Tex-Mex	State – Short Term
84	Arkansas Ave.	Tex-Mex	Federal – Short Term
10 & 24	Calton Rd.	UP	Federal – Short Term
12 & 27	Chicago St.	UP	Illustrative Projects
79	Seymour Ave.	UP	Illustrative Projects
15 & 43	Sanchez St.	UP	Illustrative Projects
75	Market St. E	UP	Illustrative Projects
14 & 38	Jefferson St.	Tex-Mex	Illustrative Projects
46	Scott St.	UP	Illustrative Projects
71	Corpus Christi St.	Tex-Mex	Illustrative Projects

Source: Laredo Metropolitan Transportation Plan



ENGINEERS
PLANNERS
ECONOMISTS
Wilbur Smith Associates

Figure 3-1
LAREDO GRADE SEPARATIONS
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Chapter 4
QUIET ZONE PROCESS

INTRODUCTION

In late 2003, the Federal Railroad Administration (FRA) published an interim rule requiring that locomotive horns be sounded approaching public highway-rail grade crossings. The rule contained an exception to permit designation of "quiet zones" where horns would not have to be used. The quiet zones could only be established where risk is sufficiently low or where approved safety measures compensate for the absence of a warning by the locomotive horn. After a review and comment period, FRA issued final rules for quiet zones in June, 2005.

A quiet zone must by definition include at least one-half mile along a railroad line, encompassing all the crossings within the zone. At a minimum, each grade crossing must be protected by flashing lights, bells, automatic gates, and advance warning signs placed along the roadway prior to the crossing. Different safety measures may apply to each crossing, but the quiet zone as a whole must not exceed a specific risk index or threshold. The risk index (a numerical rating between zero and one) is determined by FRA and may be revised annually.

QUIET ZONE ESTABLISHMENT

Quiet zones may be established by the public authority (city, county, or state) having jurisdiction over traffic enforcement by one of two alternative methods:

(1) Local Agency Designation

The local public authority may designate quiet zones when the safety measures at each grade crossing comply fully with one or more FRA "pre-approved" sets of measures (termed Supplemental Safety Measures or SSMs) that have been determined to provide sufficient risk reduction. The SSMs must be sufficient to reduce the quiet zone risk index below the Nationwide Significant Risk Threshold, or below the Risk Index With Horns. The approved safety measures include:

(a) Installation of four-quadrant gates with constant warning time devices and power out indicators. Gates must meet prescribed requirements to extend across the entire span of the roadway.

(b) Installation of two-quadrant gates with constant warning time devices and power out indicators, and with median dividers or similar roadway channelization to preclude vehicles crossing the center of the road to drive around lowered gates.

(c) Temporary or permanent closure of a grade crossing. Temporary closing allows closing during night hours so a locomotive horn does not need to be used, but requires use of the horn during daytime hours when the grade crossing is in use.

(2) FRA Review and Designation

At the request of the local public authority, the FRA may designate quiet zones having safety measures other than FRA's pre-approved measures. The local public authority must form a diagnostic team to evaluate each crossing and recommend actions sufficient to determine risk. In addition, the community must undertake periodic monitoring and reporting to ensure that risk levels remain acceptable. FRA provides an on-line

calculating program to aid in determining the reduction in risk levels that the safety measures provide. Safety measures may include combinations of the following:

(a) Four-Quadrant or two-quadrant gates that do not meet the strict SSM standards that apply to locally designated quiet zones.

(b) Additional non-engineering Alternative Safety Measures (ASMs) such as programmed enforcement, public education, and photo enforcement. Periodic monitoring and reporting is required.

(c) Additional engineering ASMs including any measures not specified. An example of an engineering ASM would be adjustment of crossing geometry or sight distances to reduce risk. Periodic monitoring and reporting is required.

For both methods of establishing a quiet zone, some common steps apply:

1. The local public authority must provide notice to the railroad, state agencies, law enforcement, private crossing owners, and to other interested parties describing the safety measures to be employed, and affording the public an opportunity to comment.

2. The local public authority and/or the railroad must provide updated information for FRA's grade crossing inventory.

Once the local public authority decides to establish a quiet zone (or alternatively the FRA approves a quiet zone), the public authority must notify the railroad and other agencies of the effective date, and must periodically reaffirm that all requirements are met. Should the agency ultimately determine that a quiet zone no longer serves its purpose or that it does not meet the basic requirements, it may terminate the quiet zone.

Any local public authority considering establishment of a quiet zone is encouraged to work informally with both the affected railroad company, and with the FRA, prior to initiating the formal steps necessary to designate a quiet zone.

OTHER PROVISIONS RELATED TO QUIET ZONES

Private Grade Crossings. Private grade crossings are not subject to FRA rules that horns be sounded, but they may be included along with nearby public crossings in a quiet zone. If a private crossing within a quiet zone permits access to the public, or provides access to active industrial or commercial sites, a diagnostic team must evaluate the crossing and any recommendations of the diagnostic team must be observed. Interested state agencies and the railroad involved should be included on the diagnostic team. Private crossings must also be marked by a crossbuck and stop sign, and be provided with advance warning signs.

Periodic Updates. For quiet zones with SSMs, the local public authority must affirm to FRA that the quiet zone continues to meet the applicable requirements on a 5 year review basis. For quiet zones with ASMs as approved by FRA, the authority must affirm the requirements on a 3 year basis.

FRA Reviews. FRA will periodically calculate the Quiet Zone Risk Index and compare it to the Nationwide Significant Risk Threshold. If the risk index for the zone exceeds the threshold, the local public authority will be notified to terminate the quiet zone, or to implement such additional measures as may be required to maintain a risk index below the threshold level in order to retain the quiet zone.

Acceptable Gate Standards for SSM Status. Four quadrant gates must span all highway approaches and exit lanes on both sides of the crossing in a manner to prevent the highway user from circumventing the gates by moving into the oncoming traffic lane to cross the tracks. Four quadrant gates with traffic channelization of at least 60 feet qualify for higher effectiveness ratings. Gaps between lowered gates must not exceed 2

feet, and gaps between a gate and a channelization device must not exceed one foot. Standard gates must be supplemented by medians or channelization that extends 100 feet from the gate arm, or at least 60 feet if there is an intersection within 100 feet of the gate.

Wayside Horns. Ground mounted wayside horns are an alternative to sounding of locomotive horns at grade crossings. This technology involves installation of horns at the crossing, generally directing the sound outward along the vehicular path rather than lengthwise along the railroad alignment. The horns sound automatically as a train approaches, so it is not necessary to sound the locomotive horn. While these horns do not create "quiet" circumstances, they are generally less objectionable because the horn sound is concentrated where it is needed most – to be heard by an approaching motorist. A crossing with wayside horns may be included with other crossings in a quiet zone, but the risk calculation for the zone is based on the other crossings and not the crossing with the wayside horn.

COMPLETE QUIET ZONE REGULATIONS

Quiet zone administrative procedures, minimum requirements, and reporting and record keeping requirements are detailed in the Code of Federal Regulations at 49 CFR Part 222. A local public authority considering establishment of a quiet zone should consult these provisions for a complete understanding of the process and related requirements.

Chapter 5
QUIET ZONE ANALYSIS

INTRODUCTION

The purpose of this analysis is to identify potential New Quiet Zones that may be established in the City of Laredo. A New Quiet Zone means a segment of a rail line encompassing one or more consecutive public highway-rail grade crossings at which routine sounding of locomotive horns is restricted pursuant to 49 CFR Part 222. A New Quiet Zone does not qualify as either a Pre-Rule Quiet Zone or an Intermediate Quiet Zone. As neither of the latter types of quiet zones exists in Laredo, any quiet zone established there would be a New Quiet Zone.

A quiet zone may be established if the Quiet Zone Risk Index (QZRI) is at, or below, the Nationwide Significant Risk Threshold (NSRT).

- The QZRI means a measure of risk to the motoring public of crossing a quiet zone, after adjustment to account for increased risk due to the lack of locomotive horn use at the crossings within a quiet zone.

- The NSRT means a measure of risk, calculated on a nationwide basis. The number reflects the average level of risk to the motoring public at public highway-rail grade crossings equipped with flashing lights and gates and at which locomotive horns are sounded.

The QZRI may be reduced by implementation of supplementary safety measures (SSMs), which include street closures, four-quadrant gates, and two-quadrant gates with 200-foot medians extending into the street from a crossing. The QZRI may also be reduced by implementing one or more alternative safety measures (ASMs) such as public education programs, photo enforcement, or engineering measures that reduce risks.

The following summary analysis focuses on six potential New Quiet Zones in the study area. The study area consists of Union Pacific Railroad (UP) track between Zaragoza Street on the south and Loop 20 on the north; and Texas Mexican Railway (Tex-Mex) track between Zaragoza Street on the west and Loop 20 on the east. Within each area, the study team employed a combination of SSMs – either crossing closures or warning device upgrades – to generate a QZRI which was below the NSRT.

METHODOLOGY

The study team first inventoried all of the 84 crossings in the study area. The team visited each crossing in May 2005, and captured detail on the crossing characteristics, e.g. warning devices, number of railroad tracks, number of roadway lanes, paving status, and pavement markings pertaining to crossings. The team photographed each crossing, both public and private. The team supplemented this detail with information on the number and speed of trains, obtained by interviews with UP and Tex-Mex officials in the summer of 2005. The team obtained motor vehicle traffic volumes at or near crossings from the City of Laredo[1]. The team relied on accident history provided through the Federal Railroad Administration (FRA) Highway-Rail Grade Crossing Accident/Incident Reports. The team then combined all of these data into its own Laredo Railroad Crossing Database, on which it relied to calculate the QZRI for each quiet zone. Figures 5-1 and 5-

[1] Some grade crossings did not have traffic counts at the crossing. In these cases, WSA estimated the traffic volumes from available counts at nearby locations.

2 at the end of the chapter show all the crossings in the study area, and identify the warning devices in place at each crossing as of May 2005. Table 5-1 below indicates the additional detail for each crossing, including the number of lanes, the Average Annual Daily Traffic (AADT) for 2003, the train speed and the daily number of trains. Each crossing was given a Project Crossing Number.

The goal of this inventory was to capture the detail required for running of the FRA's Quiet Zone Calculator. This calculator develops the QZRI by first assessing the risk at each crossing and then by averaging the cumulative risk over the number of crossings in a quiet zone. The calculator determines the risk at each crossing given 10 variables:

1. Type of warning device
2. Number of vehicles per day
3. Number of trains per day
4. Number of trains per daylight hours
5. Number of tracks
6. Paved roadway: yes or no
7. Maximum train speeds
8. Number of highway lanes
9. Number of years for accident analysis
10. Number of accidents during analysis years

The study team entered the first eight variables. The calculator provides the latter two variables from a link with other FRA data.

A review of land uses adjacent to the track allowed the study team to identify six areas where quiet zones might be appropriate. (Please see an illustration of land uses in Chapter 1.) Since the goal of a quiet zone is to reduce the impact of train horn noise on people living near crossings, the team looked for greater concentrations of residential land uses adjacent to UP and Tex-Mex tracks; the UP track includes both its western main track and its eastern Rio Grande Runaround (RGR) track. Ultimately, the team identified six areas to investigate as potential quiet zones. Each area is at least a half mile long, the minimum length for a quiet zone. The potential quiet zones are identified by letters A through F in Figure 5-3 at the end of this chapter.

To be analyzed in the quiet zone calculator, each crossing must have at least two-quadrant gates and flashing lights. The study team realized that many of the crossings, particularly along the UP tracks, did not have such a level of protection. Many had just crossbucks, or crossbucks with stop signs. Since upgrading all crossings would mean a considerable investment for the City of Laredo, the study team looked for streets that might be closed, thereby obviating the need for costly upgrades. Potential closures included those crossings with a comparatively low traffic volume (AADT), which could easily be diverted to nearby crossings. Table 5-2 identifies the potential crossings closures by quiet zone and where the crossing traffic would be diverted.

With the closures and diversions identified, the team was able to begin the calculations of QZRI for the six potential quiet zones.

Table 5-1: Daily Motor Vehicle Traffic and Trains at Crossings in Study Area

Project X'ing	FRA X'ing	Mi. Post No.	Railroad	Street	Lanes	AADT	MPH	Trains per Day		
								Locals	Through	Total
1	446694P	406.03	UP	SAN LORENZO DR	2	2,870	20	12	20	32
2	448359U	406.03	UP	LAS CRUCES DR	2	11,340	20	12	20	32
3	448377S	406.04	UP	TEJAS LOOP	2	1,680	20	12	20	32
4	446696D	407.00	UP	PRIVATE GREAT LAKES CHEMICAL	2	100	20	12	20	32
5	446697K	407.40	UP	FM 1472 MINES RD	6	24,000	20	12	20	32
6	446699Y	408.10	UP	INDUSTRIAL BL	2	4,440	20	12	20	32
7	446700R	408.30	UP	MANN RD	2	3,710	20	10	10	20
8	446704T	408.90	UP	ISLAND AV	2	1,670	20	10	10	20
9	446707N	409.25	UP	JUSTO PENN ST	2	1,480	20	10	10	20
10	446709C	409.30	UP	CALTON RD	2	7,790	20	10	10	20
11	446760A	409.70	UP	MARKLEY LN	2	1,550	20	10	10	20
12	446780L	409.90	UP	CHICAGO ST	2	10,030	20	10	10	20
13	446788R	410.30	UP	BALTIMORE ST	2	2,650	20	10	10	20
14	446796H	410.90	UP	JEFFERSON ST	2	3,600	20	10	10	20
15	446802J	411.60	UP	SANCHEZ ST	2	2,200	20	33	10	43
16	447866Y	412.80	UP	ZARAGOZA ST	2	630	20	24	23	47
17	446701X	408.10	RGR	MANN RD	2	3,710	20	14	10	24
18	446702E	408.20	RGR	PRIVATE EXXON NORTH	2	200	20	14	10	24
19	446703L	408.25	RGR	PRIVATE EXXON SOUTH	2	200	20	14	10	24
20	446705A	408.80	RGR	ISLAND AV	2	1,610	20	14	10	24
21	Unknown	409.00	RGR	PRIVATE SCALES NORTH	2	100	20	14	10	24
22	Unknown	409.10	RGR	PRIVATE SALES SOUTH	2	100	20	14	10	24
23	446706G	409.30	RGR	JUSTO PENN ST	2	1,480	20	14	10	24
24	446708V	409.31	RGR	CALTON RD	3	7,790	20	14	10	24
25	848242R	409.50	RGR	PRIVATE PEPSI	2	200	20	14	10	24
26	446761G	409.70	RGR	MARKLEY LN	2	1,550	20	14	10	24
27	446781T	409.90	RGR	CHICAGO ST	2	10,030	20	14	10	24
28	446782A	409.95	RGR	PACE ST	2	100	20	14	10	24
29	446784N	410.00	RGR	UGARTE ST	2	150	20	14	10	24
30	446785V	410.10	RGR	PHILADELPHIA ST	2	230	20	14	10	24
31	446786C	410.20	RGR	BOSTON ST	2	520	20	14	10	24
32	446787J	410.30	RGR	PIERCE ST	2	250	20	14	10	24
33	446789X	410.40	RGR	BALTIMORE ST	2	2,650	20	14	10	24
34	446790S	410.50	RGR	LAFAYETTE ST	2	570	20	14	10	24
35	446791Y	410.60	RGR	MADISON ST	2	620	20	14	10	24
36	446792F	410.70	RGR	BLAIR ST	2	610	20	14	10	24
37	446793M	410.80	RGR	FRANKFORT ST	2	200	20	14	10	24
38	446795B	410.90	RGR	JEFFERSON ST	2	3,600	20	14	10	24
39	448448L	411.00	RGR	SHEA ST	2	300	20	14	10	24
40	446801C	411.05	RGR	GONZALEZ ST	2	140	20	14	10	24
41	446799D	411.10	RGR	BRUNI ST	2	270	20	14	10	24
42	446800V	411.15	RGR	PARK ST	2	3,830	20	14	10	24
43	446801C	411.20	RGR	SANCHEZ ST	2	2,200	20	14	10	24
44	446803R	411.25	RGR	GARZA ST	2	230	20	14	10	24
45	848264R	411.80	RGR	SANTA ISABEL AV	2	2,640	20	14	10	24
46	446805E	411.90	UP/RGR	SCOTT ST	2	2,510	20	50	20	70
47	793589T	0.30	Tex-Mex	ZARAGOSA ST	2	630	10	2	10	12
48	793543E	0.40	Tex-Mex	ITURBIDE ST	2	40	10	2	10	12
49	793540J	0.50	Tex-Mex	HIDALGO ST	2	200	10	2	10	12
50	Unknown	0.55	Tex-Mex	PRIVATE UP POLICE	2	50	10	2	10	12
51	Unknown	0.60	Tex-Mex	UP LOT	2	200	10	2	10	12
52	793547G	0.70	Tex-Mex	SANTA ISABEL AV AND WASHINGTON ST	2	2,760	10	2	10	12
53	793548N	0.80	Tex-Mex	VIDAURRI AV	2	130	10	2	10	12
54	793549V	0.90	Tex-Mex	SANTA RITA AV	2	1,030	10	2	10	12
55	793550P	0.96	Tex-Mex	SANTA CLOTHIDE AV	2	1,180	10	2	10	12
56	793551W	1.00	Tex-Mex	MAIN AV	2	1,680	10	2	10	12
57	793552D	1.08	Tex-Mex	DAVIS AV	2	1,310	10	2	10	12
58	793553K	1.10	Tex-Mex	SANTA MARIA AV	2	4,640	10	2	10	12
59	793554S	1.20	Tex-Mex	JUAREZ AV	2	950	10	2	10	12
60	793556F	1.30	Tex-Mex	CONVENT AV	2	3,200	10	2	10	12
61	793557M	1.40	Tex-Mex	FLORES AV	2	1,360	10	2	10	12
62	793558U	1.47	Tex-Mex	SAN AGUSTIN AV	2	1,260	10	2	10	12
63	793559B	1.50	Tex-Mex	SAN BERNARDO AV	2	8,620	10	2	10	12
64	793560V	1.55	Tex-Mex	IH 35 FRONTAGE RD (SANTA URSULA AV)	3	11,000	10	2	10	12
65	793561C	1.60	Tex-Mex	IH 35 FRONTAGE RD (SAN DARIO AV)	3	11,000	10	2	10	12
66	793562J	1.67	Tex-Mex	SAN EDUARDO AV	2	4,020	10	2	10	12
67	793563R	1.70	Tex-Mex	SAN FRANCISCO AV	2	2,110	10	2	10	12
68	793564X	1.80	Tex-Mex	SAN JORGE AV	2	310	10	2	10	12
69	793565E	2.00	Tex-Mex	MONTERREY AV	2	1,480	10	2	10	12
70	793566L	2.10	Tex-Mex	SANDERS AV	2	680	10	2	10	12
71	793567T	2.15	Tex-Mex	CORPUS CHRISTI ST	2	9,590	10	2	10	12
72	793568A	2.20	Tex-Mex	MARCELLA AV	2	2,110	10	2	10	12
73	793580G	2.30	Tex-Mex	GUADALUPE ST	2	17,000	10	2	10	12
74	793584J	2.36	Tex-Mex	CHIHUAHUA ST E	2	17,000	10	2	10	12
75	793582V	2.50	Tex-Mex	MARKET ST E	2	17,300	10	2	10	12
76	793586X	2.80	Tex-Mex	LOGAN AV	2	900	10	2	10	12
77	793588L	3.00	Tex-Mex	HENDRICKS AV	2	1,390	10	2	10	12
78	793591U	3.20	Tex-Mex	STONE AV	2	1,150	10	2	10	12
79	793593H	3.30	Tex-Mex	SEYMOUR AV	2	1,440	10	2	10	12
80	793594P	3.50	Tex-Mex	BUENA VISTA AV	2	1,440	10	2	10	12
81	793595W	3.70	Tex-Mex	MALINCHE AV	2	2,100	10	2	10	12
82	Unknown	3.75	Tex-Mex	BARTLETT AV	2	2,000	10	2	10	12
83	793596D	3.80	Tex-Mex	MARKET ST	2	8,730	10	2	10	12
84	793598S	4.20	Tex-Mex	ARKANSAS AV	2	16,550	10	2	10	12

Table 5-2: Potential Crossing Closures and Diversions

Zone	Project X'ing	X'ing to Be Closed	Vehicular Traffic to Be Diverted to	Share
A	28	Pace	Chicago	100%
A	30	Philadelphia	Boston	100%
A	32	Pierce	Boston	50%
			Baltimore	50%
A	34	Lafayette	Baltimore	50%
			Madison	50%
B	37	Frankfort	Blair	50%
			Jefferson	50%
B	39	Shea	Jefferson	50%
			Gonzalez	50%
C	41	Bruni	Gonzalez	50%
			Sanchez	50%
C	42	Park	Gonzalez	50%
			Sanchez	50%
C	44	Garza	Sanchez	100%
D	50	Private UP Police	UP Parking Lot	100%
E	53	Vidaurri	Santa Rita	100%
E	55	Santa Clotilde	Santa Rita	50%
			Main	50%
E	57	Davis	Main	50%
			Santa Maria	50%
E	59	Juarez	Santa Maria	50%
			Convent	50%
E	61	Flores	Convent	50%
			San Bernardo	50%
E	62	San Agustin	Convent	50%
			San Bernardo	50%
E	68	San Jorge	San Francisco	100%
E	70	Sanders	Monterrey	50%
			Marcella	50%
F	78	Stone	Meadow	100%
F	79	Seymour	Meadow	100%

FINDINGS

Table 5-3 summarizes the calculation of QZRI for each of the six potential quiet zones. The table identifies the crossings in each zone, the AADT (including traffic diverted from closed crossings), the trains per day, and the warning device improvements required in order to ensure a QZRI below the current NSRT of 17,030.00 – a figure provided by FRA.

Table 5-3: Quiet Zone Risk Index of Quiet Zones in Study Area

Zone	Project X'ing	FRA X'ing	Street	AADT	RR	Trains/Day	Warning Device	Improvement	Risk
A	11	446760A	Markley Ln.	1,550	UP	20	Gates and Flashers		17,580.78
A	21	446761G	Markley Ln.	1,550	RGR	24	Gates and Flashers		18,900.71
A	12	446780L	Chicago St.	10,030	UP	20	Gates and Flashers		23,418.99
A	27	446781T	Chicago St.	10,130	RGR	24	Gates and Flashers		19,965.59
A	29	446784N	Ugarte St.	150	RGR	24	Crossbucks	Gates and Flashers	5,474.34
A	31	446786C	Boston St.	875	RGR	24	Crossbucks and Stop Signs	Gates and Flashers	10,512.69
A	13	446788R	Baltimore St.	2,650	UP	20	Gates and Flashers		11,920.10
A	33	446789X	Baltimore St.	3,060	RGR	24	Gates and Flashers		16,706.54
A	35	446791Y	Madison St.	905	RGR	24	Crossbucks and Stop Signs	Gates and Flashers	10,549.47
								QZRI	**14,382.95**
B	36	446792F	Blair St.	710	RGR	24	Crossbucks and Stop Signs	Gates and Flashers	9,730.53
B	14	446796H	Jefferson St.	3,600	UP	20	Gates and Flashers		17,850.87
B	38	446795B	Jefferson St.	3,850	RGR	24	Gates and Flashers		22,437.18
								QZRI	**16,672.86**
C	40	446801C	Gonzalez St.	2,340	RGR	24	Crossbucks	Gates and Flashers	15,127.93
C	15	446802J	Sanchez St.	2,200	UP	43	Gates and Flashers	Off-quad Gates and Flashers	18,169.05
C	43	446801C	Sanchez St.	4,485	RGR	24	Crossbucks	Gates and Flashers	13,809.16
C	45	848264R	Santa Isabel Av.	2,620	RGR	24	Crossbucks and Stop Sign	Gates and Flashers	14,706.66
C	46	446805E	Scott St.	2,510	UP/RGR	70	Gates and Flashers		22,364.84
								QZRI	**16,835.53**
D	16	447866Y	Zaragoza St.	630	UP/RGR	47	Crossbucks	Gates and Flashers	11,656.12
D	49	793540J	Hidalgo St.	200	Tex-Mex	12	Stop Signs	Gates and Flashers	4,227.77
D	51	Unknown	UP Lot (Houston St.)	250	Tex-Mex	12	Crossbucks and Stop Signs	Gates and Flashers	3,304.98
D	48	793543E	Iturbide St.	40		12	Crossbucks and Stop Signs	Gates and Flashers	1,252.48
D	52	793547G	Sta. Isabel/Washington St.	2,760	Tex-Mex	12	Flashers	Gates and Flashers	12,420.28
D	47	793589T	Zaragoza St.	630	Tex-Mex	12	Crossbucks	Gates and Flashers	4,476.83
								QZRI	**6,223.08**
E	54	793549V	Santa Rita Av.	1,750	Tex-Mex	12	Flashers	Gates and Flashers	9,938.91
E	56	793551W	Main Av.	2,925	Tex-Mex	12	Gates and Flashers		7,560.44
E	58	793553K	Santa Maria Av.	5,770	Tex-Mex	12	Gates and Flashers		15,090.97
E	60	793556F	Convent Av.	4,985	Tex-Mex	12	Gates and Flashers		15,275.92
E	63	793559B	San Bernardino Av.	9,930	Tex-Mex	12	Gates and Flashers		18,389.45
E	64	793560V	IH 35 Frontage/Sta. Ursula	11,000	Tex-Mex	12	Gates and Flashers		25,412.64
E	65	793561C	IH 35 Frontage/San Dario	11,000	Tex-Mex	12	Gates and Flashers		25,412.64
E	66	793562J	San Eduardo Av.	4,020	Tex-Mex	12	Gates and Flashers		13,344.75
E	67	793563R	San Francisco Av.	2,420	Tex-Mex	12	Gates and Flashers		7,160.19
E	69	793565E	Monterrey Av.	1,820	Tex-Mex	12	Gates and Flashers		6,228.28
E	71	793567T	Corpus Christi St.	9,590	Tex-Mex	12	Gates and Flashers		15,289.33
E	72	793568A	Marcella Av.	2,450	Tex-Mex	12	Flashers	Gates and Flashers	11,373.72
								QZRI	**14,206.44**
F	80	793594P	Buena Vista Av.	1,440	Tex-Mex	12	Crossbucks	Gates and Flashers	8,078.83
F	82	Unknown	Bartlett Av.	2,000	Tex-Mex	12	Crossbucks and Stop Signs	Gates and Flashers	9,122.94
F	81	793595W	Malinche Av.	2,100	Tex-Mex	12	Crossbucks and Stop Signs	Gates and Flashers	9,890.09
F	83	793596D	Market St.	8,730	Tex-Mex	12	Flashers	Gates and Flashers	25,124.07
F	84	793598S	Arkansas Av.	16,550	Tex-Mex	12	Flashers	Gates and Flashers	30,684.74
								QZRI	**16,580.13**

In all, improvements were identified for 21 crossings. In all but one case, these would require installation of two-quadrant gates with flashing lights. The exception was at Sanchez St., Project Crossing 15 in Zone C. Because of previous accidents there, the team determined that a four-quadrant gate SSM was needed to bring down the crossing's risk sufficiently to allow for a QZRI low enough to be below an NSRT of 17,030.00. The four-quad gate concept could be achieved by adding two-quad gates to the quadrants not having gates and flashers now.

There are four important caveats to note regarding the calculations above. First, the study team had to create surrogates – theoretical stand-ins for assessing risk and thereby QZRI for the respective zones – for four crossings. This is because the crossing number or crossing location was not in the FRA crossing database, or because the accident history for a particular crossing was not available on FRA's quiet zone calculator. The four crossings for which surrogates were created are below.

- Sanchez St., Project Crossing 43 in Zone C
- UP Lot (Houston St.), Project Crossing 51 in Zone D
- Buena Vista Av., Project Crossing 80 in Zone F
- Bartlett Av., Project Crossing 82 in Zone F

Second, the team ran three iterations of Zone E. Number 1, which included eight closures per the parameters discussed above, appears in Table 3. Number 2 assumed only the closures listed in the *Comprehensive Mobility Plan, Laredo Urban Transportation Study* (2001), which showed seven closures (six of which it shared with Number 1). Number 3 assumed all crossings in the zone remained open, requiring upgrades to at least two-quadrant gates and flashers at five crossings. Iteration Number 2 had a QZRI of 13,990.01, and Number 3 had a QZRI of 10,219.22. The lowest number was the apparent result of spreading the risk over more crossings. However, Number 3 would require the most warning device upgrades. Number 1 requires the least, as shown in the Table below.

Table 5-4: Zone E Quiet Zone Calculator Assumptions and Results

Iteration	Crossings	Closures	Upgrades	QZRI
Number 1	20	8	2	14,206.44
Number 2	20	7	3	13,990.01
Number 3	20	0	6	10.219.22

Third, the calculations utilized AADT for 2003 and train data for 2005. It is probable that volumes for both trains and motor vehicles will increase in future years, though car and truck traffic at some crossings are unlikely to change much, e.g. certain crossings on the RGR track providing access to industries nearby. As a result, QZRI are likely to rise as well.

Fourth, this analysis considers only the warning devices in place at the time of the inventory in May, 2005. Some improvements in crossing safety may have occurred since then.

COST OF IMPROVEMENTS

Clearly, the least expensive quiet zones to implement would be Zone B and E. Of the two, E represents the more significant opportunity, given the greater residential area along the zone. Table 5-5 shows an order of magnitude cost estimate for implementing the quiet zones. The required improvement at each street amounts to new two quadrant gates, each costing $250,000. In cases where only flashers exist, this analysis assumes that the existing flashers would be replaced by a new gate and flasher mechanism. Improvements for all six zones total an estimated $5.25 million. Quiet Zones can be implemented individually, allowing for a potential phasing of improvements.

The table cites AADT for those streets in each zone which would undergo an improvement with the implementation of a quiet zone. Arkansas Street, with AADT of 16,550, is both the most heavily traveled Street in Zone F; and it is the most heavily traveled street in the study area.

Table 5-5: Estimated Cost of Improvements			
Quiet Zone	AADT of Improved Crossings	Improvement	Estimated Cost
A	1,930	Add gates and flashers to 3 crossings	$750,000
B	710	Add gates and flashers to 1 crossing	$250,000
C	11,645	Add gates and flashers to 3 crossing and off-quadrant gates to one crossing	$1,000,000
D	4,510	Add gates and flashers to 5 crossings and gates to 1 crossing	$1,500,000
E	4,200	Add gates and flashers to 2 crossings	$500,000
F	30,820	Add gates and flashers to 3 crossings and gates to 2 crossings	$1,250,000

NEXT STEPS

Refinements of the foregoing analysis may include additional street closures, combining Quiet Zones, or running the analysis with future year AADT and train volumes. With the refinements performed, there needs to be an informal review of findings by the FRA. Also, it is recommended that these findings be shared with the UP and the Tex-Mex for their input as well. Once these reviews have been obtained and discussed, the City of Laredo may proceed with the required formal steps to establish one or more Quiet Zones.

The FRA Quiet Zone Calculator has records of all quiet zone scenarios run for this analysis. These are identified by the following designations. These scenarios may be reviewed by accessing the FRA Calculator using gstevens@wilbursmith.com as the user, and the password: "password".

- 1A
- 1B
- 1C
- 1D
- 1D (2)
- 1E
- 1F
- 2E
- 3E

Scenarios 1A, 1B, 1C, 1D (2), 1E, and 1F refer to those shown in Table 5-3. 2E is Zone E with the closures identified by the *Laredo Comprehensive Mobility Plan*. 3E is Zone E with no closures. 1D assumes the closure of Iturbide Street, with diversion of traffic to Zaragosa Street (25%) and Hidalgo Street (75%).

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Figure 5-1

RAIL/HIGHWAY CROSSINGS IN STUDY AREA

528170/BASE - 2/13/06

NORTH

LEGEND
- Gates and Flashers
- Crossbucks
- Stop Signs
- Flashers
- None

11 Markley Ln.
25 Markley Ln.
12 Chicago St.
27 Chicago St.
28 Pace St.
29 Ugarte St.
39 Philadelphia St.
31 Boston St.
32 Pierce St.
33 Baltimore St.
34 Lafayette St.
35 Madison St.
13 Baltimore St.
36 Blair St.
37 Frankfort St.
38 Jefferson St.
14 Jefferson St.
39 Shea St.
40 Gonzalez St.
41 Bruni St.
42 Park St.
43 Sanchez St.
44 Garza St.
15 Sanchez St.
45 Santa Isabel Ave.
46 Scott St.
53 Vidauri Ave.
64 Santa Rita Ave.
55 Santa Clotilde Ave.
56 Main Ave.
57 Davis Ave.
58 Santa Maria Ave.
59 Juarez Ave.
60 Convent Ave.
61 Flores Ave.
62 San Agustin Ave.
63 San Bernardo Ave.
64 IH 35 Frontage Rd. (Santa Ursula Ave.)
65 IH 35 Frontage Rd. (San Dario Ave.)
66 San Eduardo Ave.
67 San Francisco Ave.
68 San Jorge Ave.
69 Monterey Ave.
70 Sanders Ave.
71 Corpus Christi St.
72 Marcella Ave.
73 Guadalupe St.
74 Chihuahua St. E
75 Market St. E
76 Logan Ave.
77 Hendricks Ave.
78 Stone Ave.
79 Seymour Ave.
80 Buena Vista Ave.
81 Mallonne Ave.
82 Bartlett Ave.
83 Market St.
84 Arkansas Ave.
50 UP Police Near Farragut St.
51 UP Lot Near Houston St.
52 Santa Isabel Ave. & Washington St.
49 Hidalgo St.
48 Iturbide St.
47 Zaragoza St.

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Figure 5-2
RAIL/HIGHWAY CROSSINGS IN STUDY AREA
528170/BASE - 3/10/06

NORTH

A

B

C

D

E

F

11 Markley Ln.
12 Chicago St.
27 Chicago St.
28 Pace St.
29 Ugarte St.
30 Philadelphia St.
31 Boston St.
32 Pierce St.
33 Baltimore St.
34 Lafayette St.
35 Madison St.
13 Baltimore St.
36 Blair St.
37 Frankfort St.
38 Jefferson St.
14 Jefferson St.
39 Shea St.
40 Gonzalez St.
41 Bruni St.
42 Park St.
43 Sanchez St.
44 Garza St.
15 Sanchez St.
45 Santa Isabel Ave.
46 Scott St.
53 Vidaurri Ave.
54 Santa Rita Ave.
55 Santa Clotilde Ave.
56 Main Ave.
57 Davis Ave.
58 Santa Maria Ave.
59 Juarez Ave.
60 Convent Ave.
61 Flores Ave.
62 San Agustin Ave.
63 San Bernardo Ave.
64 N IH 35 Frontage Rd (Santa Ursula Ave.)
65 S IH 35 Frontage Rd. (San Dario Ave.)
66 San Eduardo Ave.
67 San Francisco Ave.
68 San Jorge Ave.
69 Monterey Ave.
70 Sanders Ave.
71 Corpus Christi St.
72 Marcella Ave.
73 Guadalupe St.
74 Chihuahua St. E
75 Market St. E
76 Logan Ave.
77 Hendricks Ave.
78 Stone Ave.
79 Seymour Ave.
80 Buena Vista Ave.
81 Malinche Ave.
82 Bartlett Ave.
83 Jarvis Ave. & Market St.
84 Arkansas Ave.
52 Santa Isabel Ave.
51 UP Lot Near Washington St.
50 UP Police Near Farragut St.
49 Hidalgo St.
48 Iturbide St.
47 Zaragoza St.
Zaragoza St.

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Figure 5-3

PROPOSED QUIET ZONES FOR ANALYSIS

528170/BASE - 3/10/06