Appendix C-3
Noise and Vibration Report

NOISE AND VIBRATION TECHNICAL REPORT

Prepared in support of a
Supplemental Draft Environmental Impact Statement
for the
Southwest Gulf Railroad Company Proposed Construction of a Rail Line in Medina County, TX

Prepared for:
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NOISE and VIBRATIONTECHNICAL REPORT
Prepared in Support of a

Supplemental Draft Environmental Impact Statement

Regarding the

Southwest Gulf Railroad Company Proposed Construction of a Rail Line in Medina County, TX

1.0 INTRODUCTION

This technical report presents the assessment by the Surface Transportation Board's (Board) Section of Environmental Analysis (SEA) of the potential noise and vibration that could result from Southwest Gulf Railroad Company's (SGR's) proposed construction and operation of a rail line in Medina County, Texas. This evaluation includes a description of the existing acoustical environment within the project area, a prediction of the levels of sound and vibration resulting from construction and operation of each of the seven rail line alternatives and the No-Action Alternative, and a comparison of the various project alternative noise/vibration emission levels with laws, ordinances, regulations, and standards to determine their potential to produce adverse environmental effects. The potential for the rail project to create any combined or cumulative adverse effects with other existing or reasonably foreseeable sources of noise and/or vibration is also discussed. Additionally, the report evaluates possible mitigation measures designed for reducing any potential adverse effects.

Because the measurement and description of sound and vibration requires the use of units and quantities that may be unfamiliar to most readers, Appendix A contains a discussion of noise science. A review of the noise science discussion will assist the reader in evaluating the noise and vibration issues presented in this report.

2.0 PROJECT STUDY AREA

The study area, located in Medina County, Texas, is bounded on the north and northwest corner by the proposed quarry area; on the west by County Roads 351 and 455, and Farm to Market Road 2676; to the east by County Road 366; and has a southerly boundary of U.S. Highway 90 (Hwy 90). This area encompasses all potential railroad alignments under consideration, including the quarry area loading track, the four rail routes studied in the Draft Environmental Impact Statement (Draft EIS), the three Eastern Alternatives, the tie-in to the Union Pacific Railroad Company (UP) Del Rio subdivision tracks adjacent to Hwy 90 in Dunlay, Texas, and the No-Action Alternative. The area is predominately rural agricultural with large parcels and scattered residential use ancillary to farms and ranches. The nearest airport is a small general aviation airport located westerly of the study area in Hondo, Texas. No designated flight patterns cross the study area.

3.0 FEDERAL, STATE, AND FOCAL LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

3.1 Federal Noise/Vibration Regulations

A number of Federal guidelines exist to assess ground transportation noise and vibration impacts. These include:

- National Environmental Policy Act (42 United States Code [USC] 4321, et seq.)
- Noise Control Act of 1972 (42 USC 4901)

- Federal Transit Administration (FTA) Guidelines (DOT-T-95-16, April 1995)
- Federal Railroad Administration (FRA) Guidelines (Report No. 293630-1, December,1998)
- Occupational Health and Safety Administration (OSHA) Occupational Noise Exposure; Hearing Conservation Amendment (29 CFR 1910.95)
- United States Environmental Protection Agency (EPA) Railroad Noise Emission Standards (40 CFR Part 201)
- FRA Railroad Noise Emission Compliance Regulations (49 CFR Part 210)
- FRA Final Rule on the Use of Locomotive Horns at Highway-Rail Grade Crossings (49 CFR Parts 222 and 229)
- Surface Transportation Board's Environmental Rules (49 CFR 1105.7 (e)(6))

3.2 Local Noise/Vibration Regulations

SGR's rail line would be located in Medina County, Texas. The state of Texas and Medina County have no general noise ordinances, planning guidelines, or restrictions regarding noise from railroad operations or construction activities. However, pursuant to state law (Texas Administrative Code, Title 43, Part 1, Chapter 7, Subchapter D, Rule §7.31 (c)(9)), all railroads operating within the state must comply with Federal regulations regarding the sounding of locomotive horns near at-grade crossings of railroads and public highways. These Federal regulations are codified at 49 CFR, Parts 222 and 229. The final revision to these regulations, adopted in 2005, requires that locomotive horns be sounded to provide for safety at public highway-rail grade crossings except in quiet zones. The new regulations require that two long, one short, and one long blast of the horn be sounded when the locomotive is approaching a public highway-rail grade crossing, and the sounding of the horn be repeated or prolonged until the locomotive or train occupies the crossing. This pattern may be varied as necessary where crossings are spaced closely together. The locomotive horn must sound at least 15 seconds, but no more than 20 seconds, before the locomotive enters the crossing. For trains traveling in excess of 45 mph, the horn must be sounded for no more than one-quarter mile (1,320 feet) in advance of the nearest public highway-rail grade crossing, even if the advance warning provided by the locomotive horn will be less than 15 seconds in duration. Train horn noise was considered in the model used to predict the noise impacts of the project.

4.0 FIELD SURVEY METHODS AND PROCEDURES

SEA conducted an extensive field survey in order to objectively describe and quantify the existing acoustical environment in the area of the proposed project.[1] SEA conducted the survey from

[1] URS Corporation (URS) is working as SEA's independent third party contractor in this case, and has assisted in the preparation of the appropriate environmental documentation under SEA's supervision, direction, and control. In effect, URS has served as an extension of SEA's staff throughout the environmental review process. See 49 CFR 1105.4(j); Policy Statement on Use of Third-Party Contracting in Preparation of Environmental Documentation, 66 Federal Register 16,975; and 40 CFR

April 6 through 11, 2006, thus including weekday and weekend periods. The following discussion describes the selection of the noise measurement sites, and the methods and instrumentation used. The survey results are presented in Section 1.5.1.

4.1 Selection of Measurement Sites

SEA conducted 32 noise measurements at the locations shown on Figure 1. Representative noise measurement sites were selected for each alternative rail alignment. SEA based the selection on obtaining a representative geographical distribution of measurement locations that were close to noise-sensitive receivers with a potential exposure to the proposed project, and accessibility constraints. Measurements were conducted only at those representative sites that were either accessible to the public (i.e., no closed or locked gate, no posted Private or No Trespassing signs, or Private Road designations) or where permission was granted by the owner. Potential measurement sites and sensitive receptor locations were obtained from project design layouts, aerial photographs, and field observations by the study team. Site selection was primarily based on proximity to the alternative alignments and accessibility.

4.2 Field Measurement Procedures

Attended daytime (7:00 am to 10:00 pm) and nighttime (10:00 pm to 7:00 am) short-term measurements as well as automated long-term noise measurements were conducted using methods consistent with American National Standard Institute (ANSI) S12.9-1992/Part 2 and S12.9-1993/Part 3: Standards for Quantities and Procedures for Description and Measurement of Environmental Sound. The following two subsections describe the instrumentation as well as set-up and measurement procedures.

4.2.1 Instrumentation and Set-up

SEA conducted 19 attended daytime (ST) and 7 attended nighttime (NT) short-term sound level measurements at various outdoor locations along all seven alternative rail line alignments. The instrument used for these measurements was a Brüel & Kjær 2231 Type 1 (Precision grade) Sound Level Meter (SLM). SEA conducted six unattended outdoor long-term (LT) sound level measurements for the purpose of determining the fluctuations in noise levels along the alternative alignments throughout a typical 24-hour period. The instruments used for these measurements were Type 1 (Precision grade) Larson Davis 820 Community Noise Analyzers (CNA).

1506(c). Thus, all references to work conducted by SEA in this document include work conducted by URS.

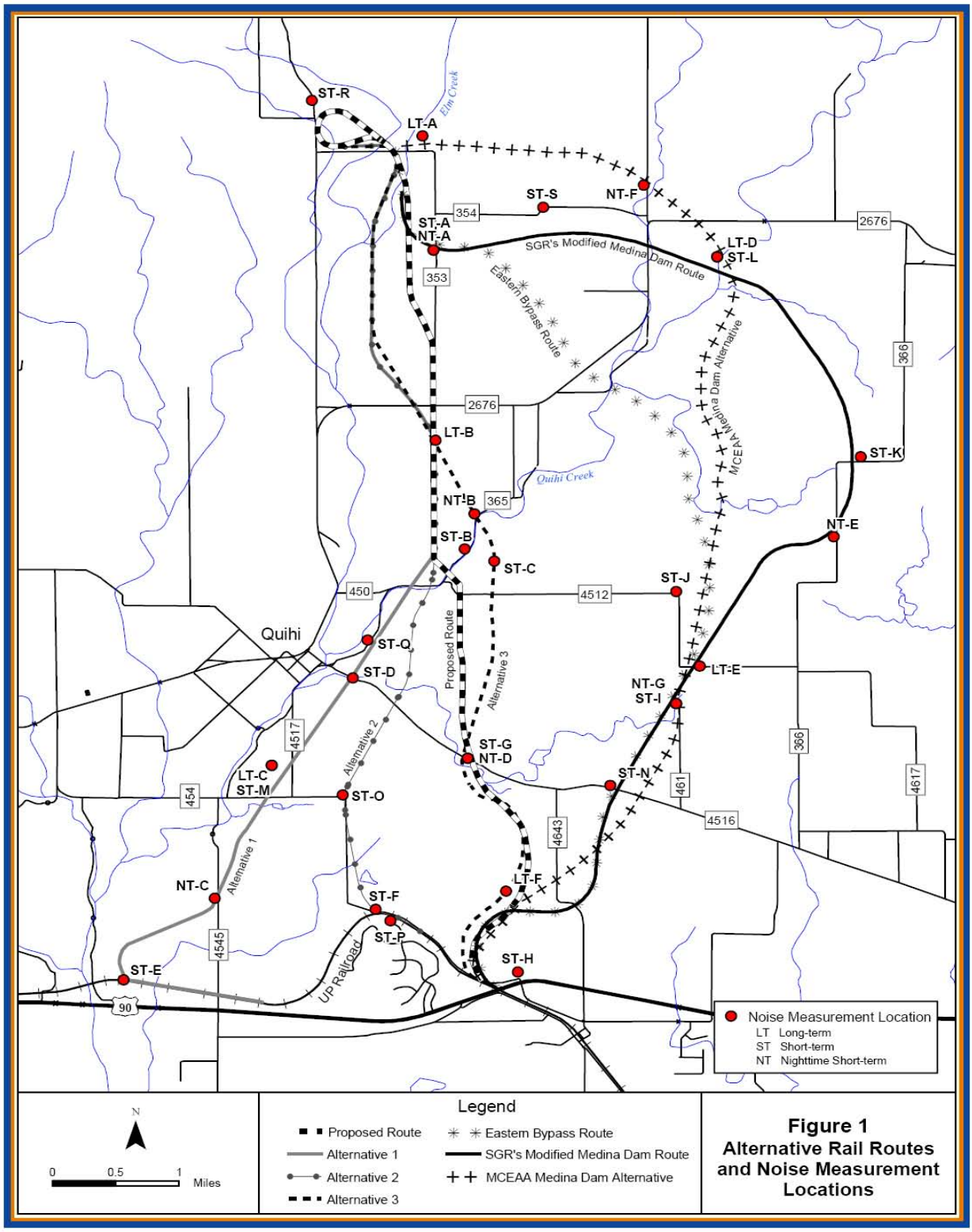

Figure 1. Alternative Rail Routes and Noise Measurement Locations

SEA set the SLM and CNA to the "Slow" time response mode that provides a one second averaging time for processing the incoming acoustic signal. The SLM and CNA were also set to apply the "A" weighting filter network that most closely approximates the hearing characteristics of the human ear. These settings are consistent with professional practice and relevant laws, ordinances, regulations, and standards (LORS) applicable to the measurement of environmental noise. To ensure accuracy, SEA field checked the laboratory calibration of the SLM/CNA before and after each measurement period using an acoustical calibrator. The accuracy of the acoustical calibrator is maintained through a program established by the manufacturer, and is traceable to the National Institute of Standards and Technology (NIST). The sound measurement instruments meet the requirements of the ANSI specification S1.4 and the International Electrotechnical Commission Publications 804 and 651.

For the short-term measurements, the SLM was mounted on a tripod. For the long-term measurement, the CNA was locked in a small steel weather enclosure with the microphone and windscreen protruding at least four inches from the top of the enclosure. The enclosure was attached to either a tree or fence post at the measurement site. During measurements the SLM and CNA were placed more than 10 feet from the nearest large acoustically reflective surface (e.g., wall). In all cases, the microphone height was five feet above the ground and the microphone was equipped with a windscreen.

SEA used additional equipment to collect meteorological information simultaneously with each short- term and at the beginning of each long-term measurement. Appendix B contains a listing of the pertinent measurement instrumentation and copies of the relevant calibration certificates.

4.2.2 Measurement Procedures

SEA measured the existing exterior[2] noise levels from Wednesday, April 6 through Tuesday, April 11, 2006. The daytime (ST) and nighttime (NT) short-term noise measurements were 5 to 10 minutes in duration at each of the 26 locations. Due to the consistency of the ambient noise level at each location, SEA typically conducted only one measurement at each site. In most cases, the long-term (LT) measurement durations were greater than 24 hours.

For all measurements, field personnel completed a Field Measurement Data Sheet (FMDS) (see Appendix C). For each short-term measurement, the FMDS lists the site location and description, weather conditions, calibration parameters, noise level data and sound sources. Documentary photographs were taken of each location (see Appendix D). The long-term measurement FMDS lists the same information as the short-term FMDS except for the noise level data that was subsequently downloaded to a computer (see Appendix C). For a long-term measurement, the sound sources and weather conditions listed on the FMDS are typically the sources and conditions during the site installation period.

[2] Consistent with Board precedent and industry standards, measurements of the difference in sound level (noise reduction) between the outside of a residence (exterior) compared to the level inside of the residence (interior) were not conducted as part of this study.

Field personnel obtained meteorological data in a distributed manner as opposed to setting up a single central measurement station. Using the handheld instruments described in Appendix B, field personnel made subjective observations plus objective measurements of weather conditions. Air temperature, relative humidity, wind speed and direction, and cloud cover were recorded on a FMDS for each location during the measurement period.

5.0 EXISTING NOISE ENVIRONMENT

5.1 Field Noise Survey and Measurement Results

The results of the survey are provided below for each potential rail line alignment. Each route is discussed individually, although all routes begin at the quarry and various routes may overlap at certain portions of the alignments and at the potential tie-in points to the UP rail line near Hwy 90. The Annual Average Daily Traffic on Hwy 90 in the study area is 12,900 vehicles per day. In general, the levels of existing environmental noise measured within the study area are consistent with the type and intensity of the adjacent and nearby land use. Existing sound levels are lower in the northerly portions of the study area in the environs of the proposed quarry and sound levels are elevated in the southerly portion of the study area closer to Hwy 90 and the UP rail line. Sound levels are slightly higher in proximity to traveled area roadways and lower near infrequently traveled roads. Sound levels are similar and predominately low to moderate in the large areas of agricultural use with scattered residences located away from the busier roads, Hwy 90, and the UP tracks. Most of the existing noise environment consists of extended periods of relative quiet, punctuated with brief occurrences of noisy events such as a truck, tractor, aircraft flyover, or a freight train. Natural sounds such as steady and gusting wind also temporarily elevate the ambient noise level. The existing noise environment is compatible with all present land use including residential.

The seven potential rail alignments and all noise measurement locations are shown on Figure 1. The Field Measurement Data Sheets, found in Appendix C, provide the precise locations of the measurement instruments.

5.1.1 No-Action Alternative

Refer to Section 4.12 of the Draft EIS for SEA's discussion of truck transport noise. In general, under the No-Action Alternative the method for transport of limestone from the quarry would involve the movement of approximately 1,700 loaded and empty heavy trucks trips using County Roads (CR). The trucks would use CR 353, Farm-to-Market (FM) road 2676, and CR 4516 between the quarry and Hwy 90. According to the Draft EIS the existing noise level along the truck transport route is 52 dBA L_{dn}. A summary of truck transport noise impacts is provided in Section 9.1.1 of this report.

5.1.2 Proposed Route

SGR's Proposed Route begins in the north portion of the study area at the quarry and extends southerly approximately seven miles to the UP rail line just north of Hwy 90. The route primarily traverses a rural area comprising relatively flat farmland, pastureland, undisturbed areas, and widely scattered residences. The quarry area is predominantly undisturbed with six nearby residences. There is a group of residences at the intersection of CR 353 and CR 354 easterly of the Proposed Route. Two

additional residences were visible approximately 2.5 miles southerly of the quarry. The remainder of the alignment passes through and is adjacent to farmland, pastureland, and undisturbed areas.

During the one week survey period, SEA conducted 10 sound level measurements along or adjacent to the Proposed Route. A daytime short-term (ST-R) and one long-term (LT-A) measurement were conducted near the quarry area. ST-R was along CR 252 adjacent to a residence and LT-A was within a field westerly of the residence located at 1180 CR 353. A daytime short-term (ST-A) and one nighttime short-term (NT-A) measurement were conducted just south of the quarry area along CR 353, southerly of CR 354. Southerly of the quarry, toward the midpoint of the route, two measurements were conducted. The long-term measurement (LT-B) was in an agricultural field within 1,000 to 3,000 feet of three residences. The short-term daytime measurement (ST-B) was conducted at the end of a residential driveway along CR 365. Further south, one daytime and one nighttime short-term measurement (NT-D and ST-G) were conducted along CR 4516. In the southern portion of the Proposed Route just north of the UP tie-in, one long-term and one daytime short-term measurement were conducted. The long-term measurement (LT-F) was conducted adjacent to CR 4613 surrounded by undisturbed land. The short-term measurement (ST-H) was conducted 100 feet in front of the residence, (404 feet northerly of the center line of Hwy 90). This residence is located approximately 1200 feet from the existing UP rail line.

Tables 1 and 2 summarize the results and details of the measurements, which correspond to the measurement locations depicted on Figure 1. The ST measurement summary tables do not contain 24-hour sound data, thus the L_{dn} is not listed. The maximum one-second sound level occurring during a multi-hour period is not meaningful so it is not presented; the L_{10} provides the trend for the louder sound levels during the measured period. Appendix C contains the Field Measurement Data Sheets, which show the precise locations of the measurement instruments.

Table 1. Short-Term Sound Level Measurement Results for the Proposed Route

Site No	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Date	Start Time	Duration (minutes)		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
ST-A	Along CR 353; 1,000' south of CR 354; 21' from the centerline of CR 353; 6' 9" from fence line N 29° 26' 35.6" W 099° 00' 37.7"	4/6/06	1845	5	Distant birds; slight buzzing of flies	26.0	42.3	18.5	20.4	24.4	27.4
			1855	5	Distant birds; slight buzzing of flies; distant barking dogs	25.0	36.4	21.3	22.4	23.9	26.9
ST-B	At the end of the driveway for residence located at 736 CR 365 N 29° 24' 23.4" W 099° 00' 22.9"	4/7/06	1305	10	Rustling leaves; birds; cow movements; gusty winds; few insects	42.9	57.5	25.6	29.4	35.4	43.9
ST-G	Along CR 4516; N 29° 22' 50.8" W 099° 00' 21.5"	4/10/06	1230	10	Rustling leaves; birds; 2 aircraft overhead	52.4	75.7	32.0	37.4	43.9	50.9
ST-H	Residence near intersection of CR 454 & Hwy 90; 100' south of residence; 404' north of Hwy 90 centerline; N 29° 21' 16.3" W 099° 59' 57.9"	4/11/06	1150	10	Traffic; train with 3 engines and 46 cars	61.7	73.5	48.7	53.9	57.9	65.4
ST-R	Along CR 252 outside residence located north of intersection of CRs 252 & 351; N 29° 27' 41.8" W 099° 01' 35.1"	4/11/06	1322	10	Rustling leaves; birds; distant backup alarm for road construction equipment; distant road construction	35.1	44.6	25.4	28.4	33.4	38.4
NT-A	Along CR 353; 1,000' south of CR 354; 21' from the centerline of CR 353; 6' 9" from fence line N 29° 26' 35.6" W 099° 00' 37.7"	4/9/06	2350	10	Distant barking dogs; distant hwy (slight); distant gun shot	29.8	44.7	22.9	24.4	26.4	31.4
NT-D	Along CR 4516; N 29° 22' 50.8" W 099° 00' 21.5"	4/9/06	2320	10	Rustling leaves; distant barking dogs; birds; 3 distant trains with whistle sequences; distant helicopter	34.4	57.3	27.9	28.9	30.9	35.9

Table 2. Long-Term Sound Level Measurement Results for the Proposed Route

Site No	Measurement Location	Measurement Period			Measurement Results, dBA					
		Date	Duration (hours: minutes: sec)	Start Time	L_{eq}	L_{dn}	L_{min}	L_{90}	L_{50}	L_{10}
LT-A	In field of residence at 1180 CR 353; N 29° 27' 26.0" W 099° 00' 42.9"	4/6/2006	23:49:00	1818	38.5	40.4	20.6	23.9	29.5	39.9
LT-B	Agricultural field south of CR 353 & 356; 2 residences along CR 356 to the NE and within sight of CNA ; N 29° 25' 11.5" W 099° 00' 36.7"	4/6/2006	33:34:26	2000	55.9	56.5	26.2	36.6	44.8	55.8
LT-F	Adjacent to CR 4613 surrounded by undisturbed land; N 29° 21' 52.0" W 099° 00' 03.4"	4/9/2006	27:48:53	1524	44.7	50.3	32.6	34.4	38.3	45.8

5.1.3 Alternative 1

Alternative 1 also begins at the quarry in the north portion of the study area and connects with the UP line just north of Hwy 90, three miles west of the Proposed Route's tie-in. The route primarily traverses a rural area composed of relatively flat farmland, pastureland, undisturbed areas, and widely scattered residences. The quarry area is predominantly undisturbed with six nearby residences. There is a group of residences at the intersection of CR 353 and CR 354 easterly of the Proposed Route. Two additional residences were visible approximately 2.5 miles southerly of the quarry. Alternative 1 would pass through a group of approximately eight residences as it crosses CR 4516 and an additional four residences before connecting with the UP line near a Recreational Vehicle (RV) park located just north of Hwy 90 and east of CR 455.

During the one week survey period, twelve sound level measurements were conducted adjacent to and in the vicinity of Alternative 1. One daytime short-term measurement (ST-R) was conducted in the quarry area along CR 252 adjacent to a residence; a long-term measurement (LT-A) was conducted within a field adjacent to the residence located at 1180 CR 353. A daytime short-term (ST-A) and a nighttime short-term (NT-A) measurement were conducted just south of the quarry area along CR 353 south of CR 354. Further to the south, toward the midpoint of the route, two measurements were conducted. The long-term measurement (LT-B) was in an agricultural field within 1,000 to 3,000 feet of three residences. The daytime short-term measurement (ST-B) was conducted at the end of a residential driveway along CR 365. Two daytime short-term measurements were conducted south of CR 450: ST-D was conducted along CR 4516 southeast of the residence located at 4311 CR 4516 and variously within 200 to 1,000 feet of ten residences; and ST-Q was conducted along CR 365 north of the 4516 intersection, within 500 to 1,000 feet of those same ten residences. A daytime short-term measurement (ST-M) and a long-term measurement (LT-C) were conducted in open pastureland located at 915 CR 454 within 750 and 1,000 feet of two residences. One nighttime short-term measurement (NT-C) was conducted along CR 4545 where Alternative 1 would cross the county road. A daytime short-term measurement (ST-E) was conducted on the south side of the UP train tracks easterly of the RV park located just north of Hwy 90 and east of CR 455.

Tables 3 and 4 summarize the results and details of the measurements, which correspond to the measurement locations depicted on Figure 1. Appendix C contains the Field Measurement Data Sheets, which show the precise locations of the measurement instruments.

Table 3. Short-Term Sound Level Measurement Results for Alternative 1

Site No	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Date	Start Time	Duration (minutes)		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
ST-A	Along CR 353; 1,000' south of CR 354; 21' from the centerline of CR 353; 6' 9" from fence line N 29° 26' 35.6" W 099° 00' 37.7"	4/6/06	1845	5	Distant birds; slight buzzing of flies	26.0	42.3	18.5	20.4	24.4	27.4
			1855	5	Distant birds; slight buzzing of flies; distant barking dogs	25.0	36.4	21.3	22.4	23.9	26.9
ST-B	At the end of the driveway for residence located at 736 CR 365 N 29° 24' 23.4" W 099° 00' 22.9"	4/7/06	1305	10	Rustling leaves; birds; cow movements; gusty winds; few insects	42.9	57.5	25.6	29.4	35.4	43.9
ST-D	Along CR 4516 southeast of the residence at 4311 CR 4516; N 29° 23' 26.4" W 099° 01' 15.8"	4/7/06	1211	10	Distant aircraft (small prop), rustling leaves, birds, distant large truck, distant cow, distant radio	42.2	57.3	28	31.4	39.4	44.9
			1225	5	Distant aircraft (small prop), rustling leaves, birds, low insect noise, distant jet	37.6	51.3	30.4	32.4	34.9	39.9
ST-E	South of the UP train tracks; east of the RV park; 44' south of the center line of the tracks; 14' north of the fence line; N 29° 21' 12.8" W 099° 03' 03.9"	4/7/06	1640	10	Distant Hwy 90 traffic; distant aircraft (small prop); rustling leaves	46.2	53.5	40.1	43.4	45.4	48.4
ST-M	Open pastureland located at 915 CR 454 within sight of the residence; N 29° 22' 47.7" W 099° 01' 54.0"	4/8/06	1238	10	Rustling leaves; birds; distant ATV; distant tractor	38.1	53.2	29.3	32.9	36.4	40.9
ST-Q	Along CR 365 north of the 4516 intersection within sight of a residence; N 29° 23' 43.0" W 099° 01' 08.7"	4/10/06	1500	10	Distant aircraft; rustling leaves; birds	45.0	57.7	29.9	33.9	39.9	48.9
ST-R	Along CR 252 outside residence located north of intersection of CRs 252 and 351; N 29° 27' 41.8" W 099° 01' 35.1"	4/11/06	1322	10	Rustling leaves; birds; distant backup alarm for road construction equipment; distant road construction	35.1	44.6	25.4	28.4	33.4	38.4
NT-A	Along CR 353; 1,000' south of CR 354; 21' from the centerline of CR 353; 6 ' 9" from fence line N 29° 26' 35.6" W 099° 00' 37.7"	4/9/06	2350	10	Distant barking dogs; distant fwy (slight); distant gun shot	29.8	44.7	22.9	24.4	26.4	31.4

Table 3. Short-Term Sound Level Measurement Results for Alternative 1 (Continued)

Site No	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Date	Start Time	Duration (minutes)							
						L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
NT-C	Along CR 4545 where Alternative 1 would cross the roadway; N 29° 21' 48.8" W 099° 02' 20.9"	4/8/06	1150	15	Distant aircraft; distant barking dogs; distant traffic; distant owl; distant coyote	35.9	47.9	25.0	28.4	33.4	39.9

Table 4. Long-Term Sound Level Measurement Results for Alternative 1

Site No	Measurement Location	Measurement Period			Measurement Results, dBA					
		Date	Duration (hours: minutes)	Start Time						
					L_{eq}	L_{dn}	L_{min}	L_{90}	L_{50}	L_{10}
LT-A	In field of residence at 1180 CR 353; N 29° 27' 26.0" W 099° 00' 42.9"	4/6/2006	23:49	1818	38.5	40.4	20.6	23.9	29.5	39.9
LT-B	Agricultural field south of CR 353 & 356; 2 residences along CR 356 to the NE and within sight of meter; N 29° 25' 11.5" W 099° 00' 36.7"	4/6/2006	33:34:00	2000	55.9	56.5	26.2	36.6	44.8	55.8
LT-C	Open pastureland located at 915 CR 454 within sight of the residence; N 29° 22' 47.7" W 099° 01' 54.0"	4/8/2006	1237	24:55:00	47.3	49.3	32.6	33.2	36.8	46.8

5.1.4 Alternative 2

Alternative 2 also begins at the quarry in the north portion of the study area and connects with the UP line just north of Hwy 90, at a point 0.3 miles northwest of the Proposed Route's tie-in. This route primarily traverses a rural area comprising relatively flat farmland, pastureland, undisturbed areas, and widely scattered residences. The quarry area is predominantly undisturbed with six nearby residences. There is a group of residences at the intersection of CR 353 and CR 354 easterly of Alternative 2. Two additional residences were visible approximately 2.5 miles southerly of the quarry. Alternative 2 would pass through a group of approximately four residences as it crosses CR 4516 and connects with the current UP line just east of the Creekwood Subdivision that has approximately 69 residences.

During the one week survey period, nine sound level measurements were conducted along or adjacent to Alternative 2. One daytime short-term and a long-term measurement were conducted in the quarry area along CR 252. One location was adjacent to a residence (ST-R) and the other within a field adjacent to the residence located at 1180 CR 353 (LT-A). A daytime short-term (ST-A) and a nighttime short-term (NT-A) measurement were conducted just south of the quarry area along CR 353 south of CR 354. Further to the south, toward the midpoint of the route, two measurements were conducted. The long-term measurement (LT-B) was in an agricultural field within 1,000 to 3,000 feet of three residences. The daytime short-term measurement (ST-B) was conducted at the end of a residential driveway along CR 365. Additionally, one daytime short-term measurement (ST-O) was conducted at the bend in CR 454 east of CR 4517, and a daytime short-term measurement (ST-F) was conducted along CR 454, adjacent to the Creekwood Subdivision. A daytime short-term measurement (ST-P) was also conducted within the Creekwood Subdivision at the end of a cul-de-sac within a hundred feet of a residence and the UP train tracks.

Tables 5 and 6 summarize the results and details of the measurements, which correspond to the measurement locations depicted on Figure 1. Appendix C contains the Field Measurement Data Sheets, which show the precise locations of the measurement instruments.

Table 5. Short-Term Sound Level Measurement Results for Alternative 2

Site No	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Date	Start Time	Duration (minutes)		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
ST-A	Along CR 353; 1,000' south of CR 354; 21' from the centerline of CR 353; 6' 9" from fence line N 29° 26' 35.6" W 099° 00' 37.7"	4/6/06	1845	5	Distant birds; slight buzzing of flies	26.0	42.3	18.5	20.4	24.4	27.4
			1855	5	Distant birds; slight buzzing of flies; distant barking dogs	25.0	36.4	21.3	22.4	23.9	26.9
ST-B	At the end of the driveway for residence located at 736 CR 365 N 29° 24' 23.4" W 099° 00' 22.9"	4/7/06	1305	10	Rustling leaves; birds; cow movements; gusty winds; few insects	42.9	57.5	25.6	29.4	35.4	43.9
ST-F	Along CR 454; 1' from fence line; 15' to centerline of road; N 29° 21' 44.0" W 099° 01' 05.0"	4/7/06	1400	10	Rustling leaves; birds; westbound train with 2 locomotives @ approx. 45 mph with whistle sequences	47.8	68.7	24.1	28.4	35.4	42.9
			1412	10	Rustling leaves; birds; distant aircraft	37.0	46.2	25.6	29.4	35.9	39.9
ST-O	At bend in CR 454 east of CR 4517; 23' from east/west fence line; 16' from north/south fence line; N 29° 22' 34.7" W 099° 01' 20.5"	4/10/06	1300	10	Distant aircraft; rustling leaves; birds	37.6	48.2	28.0	30.9	34.9	41.4
ST-P	Within Creekwood Subdivision; at end of cul-de-sac within a few hundred ft of residence and train track; N 29° 21' 38.9" W 099° 00' 58.0"	4/10/06	1335	15	Rustling leaves; nearby barking dogs; birds; distant Hwy 90 traffic; cell phone; eastbound freight train with 2 locomotives, 83 cars @ approx 15-20 mph with whistle sequences	59.9	77.4	32.5	36.4	44.9	58.4
ST-R	Along CR 252 outside residence located north of intersection of CRs 252 & 351; N 29° 27' 41.8" W 099° 01' 35.1"	4/11/06	1322	10	Rustling leaves; birds; distant backup alarm for road construction equipment; distant road construction	35.1	44.6	25.4	28.4	33.4	38.4
NT-A	Along CR 353; 1,000' south of CR 354; 21' from the centerline of CR 353; 6' 9" from fence line N 29° 26' 35.6" W 099° 00' 37.7"	4/9/06	2350	10	Distant barking dogs; distant freeway (slight); distant gun shot	29.8	44.7	22.9	24.4	26.4	31.4

Table 6. Long-Term Sound Level Measurement Results for Alternative 2

Site No	Measurement Location	Measurement Period			Measurement Results, dBA					
		Date	Duration (hours: minutes)	Start Time	L_{eq}	L_{dn}	L_{min}	L_{90}	L_{50}	L_{10}
LT-A	In field of residence at 1180 CR 353; N 29° 27' 26.0" W 099° 00' 42.9"	4/6/2006	23:49	1818	38.5	40.4	20.6	23.9	29.5	39.9
LT-B	Agricultural field south of CR 353 & 356; 2 residences along CR 356 to the NE and within sight of meter; N 29° 25' 11.5" W 099° 00' 36.7"	4/6/2006	33:34:00	2000	55.9	56.5	26.2	36.6	44.8	55.8

5.1.5 Alternative 3

Alternative 3 begins in the north at the quarry and connects with the UP line just north of Hwy 90 at the same location as the Proposed Route tie-in. The route primarily traverses a rural area comprising relatively flat farmland, pastureland, undisturbed areas, and widely scattered residences. The quarry area is predominantly undisturbed with six nearby residences. There is a group of residences at the intersection of CR 353 and CR 354 easterly of Alternative 3. Two additional residences were visible approximately 2.5 miles southerly of the quarry. With the exception of passing within 1,000 feet of one additional residence located approximately 3,000 feet north of CR 4512, the remainder of the alignment passes through and is adjacent to farmland and pastureland with widely scattered residences and undisturbed areas.

During the one week survey period, 12 sound level measurements were conducted along or adjacent to Alternative 3. A daytime short-term (ST-R) and one long-term (LT-A) measurement were conducted near the quarry area. ST-R was along CR 252 adjacent to a residence and LT-A was within a field westerly of the residence located at 1180 CR 353. A daytime short-term (ST-A) and one nighttime short-term (NT-A) measurement were conducted just south of the quarry area along CR 353, southerly of CR 354. Further south of the quarry, toward the midpoint of the route, two measurements were conducted. The long-term measurement (LT-B) was in an agricultural field within 1,000 to 3,000 feet of three residences. The short-term daytime measurement was conducted at the end of a residential driveway along CR 365. Another nighttime short-term (NT-B) measurement was conducted along CR 365, north of CR 450 and the stream crossing, with a residence approximately 1,000 feet to the east. The daytime short-term measurement (ST-C) was conducted approximately 1,500 feet north of CR 450 and 2,000 feet east of CR 365 within undisturbed land and approximately 1,500 feet from the nearest residence to the north. Further south, one daytime (ST-G) and one nighttime short-term (NT-D) measurement were conducted along CR 4516. In the southern portion of Alternative 3 just north of the UP tie-in, one long-term and one daytime short-term measurement were conducted. The long-term measurement (LT-F) was conducted adjacent to CR 4613 surrounded by undisturbed land. The short-term measurement (ST-H) was conducted 100 feet from a residence and 404 feet from the center line of Hwy 90.

Tables 7 and 8 summarize the results and details of the measurements, which correspond to the measurement locations depicted on Figure 1. Appendix C contains the Field Measurement Data Sheets, which show the precise locations of the measurement instruments.

Table 7. Short-Term Sound Level Measurement Results for Alternative 3

Site No	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Date	Start Time	Duration (minutes)		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
ST-A	Along CR 353; 1,000' south of CR 354; 21' from the centerline of CR 353; 6' 9" from fence line N 29° 26' 35.6" W 099° 00' 37.7"	4/6/06	1845	5	Distant birds; slight buzzing of flies	26.0	42.3	18.5	20.4	24.4	27.4
			1855	5	Distant birds; slight buzzing of flies; distant barking dogs	25.0	36.4	21.3	22.4	23.9	26.9
ST-B	At the end of the driveway for residence located at 736 CR 365 N 29° 24' 23.4" W 099° 00' 22.9"	4/7/06	1305	10	Rustling leaves; birds; cow movements; gusty winds; few insects	42.9	57.5	25.6	29.4	35.4	43.9
ST-C	Approximately 1,500' north of CR 450 and 2,000' east of CR 365; N 29° 24' 18.0" W 099° 00' 09"	4/7/06	1335	3	Birds	36.4	56.5	25.9	27.4	31.4	36.9
ST-G	Along CR 4516; N 29° 22' 50.8" W 099° 00' 21.5"	4/10/06	1230	10	Rustling leaves; birds; 2 aircraft overhead	52.4	75.7	32.0	37.4	43.9	50.9
ST-H	Residence near intersection of CR 454 & Hwy 90; 100' south of residence; 404' north of Hwy 90 centerline; N 29° 21' 16.3" W 099° 59' 57.9"	4/11/06	1150	10	Traffic; train with 3 engines and 46 cars	61.7	73.5	48.7	53.9	57.9	65.4
ST-R	Along CR 252 outside residence located north of intersection of CRs 252 & 351; N 29° 27' 41.8" W 099° 01' 35.1"	4/11/06	1322	10	Rustling leaves; birds; distant backup alarm for road construction equipment; distant road construction	35.1	44.6	25.4	28.4	33.4	38.4
NT-A	Along CR 353; 1,000' south of CR 354; 21' from the centerline of CR 353; 6' 9" from fence line N 29° 26' 35.6" W 099° 00' 37.7"	4/9/06	2350	10	Distant barking dogs; distant highway(slight); distant gun shot	29.8	44.7	22.9	24.4	26.4	31.4
NT-B	Along CR 365; north of CR 450; just north of stream crossing; N 29° 24' 38.9" W 099° 00' 18.4"	4/10/06	2250	10	Faint distant train, low but audible; rustling leaves	39.0	54.0	28.8	30.9	36.4	42.4
NT-D	Along CR 4516; N 29° 22' 50.8" W 099° 00' 21.5"	4/9/06	2320	10	Rustling leaves; distant barking dogs; birds; 3 distant trains with whistle sequences; distant helicopter	34.4	57.3	27.9	28.9	30.9	35.9

Table 8. Long-Term Sound Level Measurement Results for Alternative 3

Site No	Measurement Location	Measurement Period			Measurement Results, dBA					
		Date	Duration (hours: minutes)	Start Time						
					L_{eq}	L_{dn}	L_{min}	L_{90}	L_{50}	L_{10}
LT-A	In field of residence at 1180 CR 353; N 29° 27' 26.0" W 099° 00' 42.9"	4/6/2006	23:49	1818	38.5	40.4	20.6	23.9	29.5	39.9
LT-B	Agricultural field south of CR 353 & 356; 2 residences along CR 356 to the NE and within sight of meter; N 29° 25' 11.5" W 099° 00' 36.7"	4/6/2006	33:34:00	2000	55.9	56.5	26.2	36.6	44.8	55.8
LT-F	Adjacent to CR4613 surrounded by undisturbed land; N 29° 21' 52.0" W 099° 00' 03.4"	4/9/2006	27:48:00	1524	44.7	50.3	32.6	34.4	38.3	45.8

5.1.6 Eastern Bypass Route

The Eastern Bypass Route begins in the north portion of the study area at the quarry and extends southerly approximately nine miles to the UP railroad tracks tie-in approximately at the same location as the Proposed Route just north of Hwy 90. The route primarily traverses a rural area of relatively flat farmland, pastureland, undisturbed areas, and widely scattered residences. The quarry area is predominantly undisturbed with six nearby residences. There is a group of residences at the intersection of CR 353 and CR 354 easterly of the Eastern Bypass Route. There is a residence along the route immediately northwest of Farm-to-Market Road 2676. South of this residence, the approximate mid-point of the route passes through and is adjacent to farmland, pastureland, and undisturbed areas until passing through a group of approximately 12 residences along CR 4516. The remainder of the alignment passes through undisturbed land.

During the one week survey period, 11 sound level measurements were conducted along or adjacent to the Eastern Bypass Route. In the area of the quarry, a daytime short-term measurement (ST-R) was conducted along CR 252 adjacent to a residence and a long-term measurement (LT-A) was conducted within a field westerly of the residence located at 1180 CR 353. A daytime short-term (ST-A) and one nighttime short-term (NT-A) measurement were also conducted just south of the quarry area along CR 353, southerly of CR 354. Due to a lack of access to properties between CR 354 and CR 4512, no sound level measurements were conducted along this portion of the alignment. While a sound level measurement would have been possible where the route passes Farm-to-Market Road 2676, this road carries a good deal of traffic and, thus a measurement at that location would not be representative of the general surrounding area's noise environment. A daytime short-term measurement (ST-J) was conducted at the bend in CR 4512 west of CR 366. A long-term measurement (LT-E) was conducted along CR 4512 west of CR 366. A daytime short-term measurement (ST-I) and a nighttime short-term measurement (NT-G) were conducted at the end of CR 461. This location is within the Weiblen farmland approximately 1,500 feet from the residence. Another daytime short-term measurement (ST-N) was conducted along CR 4516 between CR 461 and CR 4643 within an agricultural field. This location is variously within 500 to 3,000 feet of 11 residences along CR 4516. A long-term measurement (LT-F) was conducted adjacent to CR 4613 surrounded by undisturbed land. Near the tie-in to the UP rail line, a short-term measurement (ST-H) was conducted within 100 feet of a residence and 404 feet from the center line of Hwy 90.

Tables 9 and 10 summarize the results and details of the measurements, which correspond to the measurement locations depicted on Figure 1. Appendix C contains the Field Measurement Data Sheets, which show the precise locations of the measurement instruments.

Table 9. Short-Term Sound Level Measurement Results for the Eastern Bypass Route

Site No	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Date	Start Time	Duration (minutes)		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
ST-A	Along CR 353; 1,000' south of CR 354; 21' from the centerline of CR 353; 6' 9" from fence line N 29° 26' 35.6" W 099° 00' 37.7"	4/6/06	1845	5	Distant birds; slight buzzing of flies	26.0	42.3	18.5	20.4	24.4	27.4
			1855	5	Distant birds; slight buzzing of flies; distant barking dogs	25.0	36.4	21.3	22.4	23.9	26.9
ST-H	Residence near intersection of CR 454 & Hwy 90; 100' south of residence; 404' north of Hwy 90 centerline; N 29° 21' 16.3" W 099° 59' 57.9"	4/11/06	1150	10	Traffic; train with 3 engines and 46 cars	61.7	73.5	48.7	53.9	57.9	65.4
ST-I	At the end of CR 461 at the bend in the road within Weiblen farm; within sight of residence; N 29° 23' 14.9" W 098° 58' 43.1"	4/9/06	1434	10	Rustling leaves; birds; distant tractor; distant power tools	36.0	49.8	29.0	30.9	33.4	38.9
ST-J	At bend in CR 4512; west of CR 366; 6' from east/west fence line; 15' from north/south fence line; N 29° 24' 4.6" W 098° 58' 43.0"	4/9/06	1110	10	Rustling leaves; distant aircraft; birds; distant farm equipment; distant insects; distant gun shots	33.6	46.3	27.9	29.9	32.4	35.9
ST-N	Along CR 4516 between CRs 461 and 4643; within the agricultural field; 51' to center line of road; 86' to gate post on opposite side of road; N 29° 22' 38.8" W 098° 59' 14.1"	4/10/06	1200	15	Rustling leaves; distant aircraft; birds; distant tractor; car passing on road	45.4	66.8	32.1	35.4	39.4	44.9
ST-R	Along CR 252 outside residence located north of intersection of CRs 252 & 351; N 29° 27' 41.8" W 099° 01' 35.1"	4/11/06	1322	10	Rustling leaves; birds; distant backup alarm for road construction equipment; distant road construction	35.1	44.6	25.4	28.4	33.4	38.4
NT-A	Along CR 353; 1,000' south of CR 354; 21' from the centerline of CR 353; 6' 9" from fence line N 29° 26' 35.6" W 099° 00' 37.7"	4/9/06	2350	10	Distant barking dogs; distant freeway (slight); distant gun shot	29.8	44.7	22.9	24.4	26.4	31.4

Table 9. Short-Term Sound Level Measurement Results for the Eastern Bypass Route (Continued)

Site No	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Date	Start Time	Duration (minutes)							
						L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
NT-G	At the end of CR 461 at the bend in the road within Weiblen farm; within sight of residence; N 29° 23' 14.9" W 098° 58' 43.1"	4/11/06	1204	5	Rustling leaves; wind (10-12 mph)	47.9	55.2	40.1	43.9	46.9	50.4

Table 10. Long-Term Sound Level Measurement Results for the Eastern Bypass Route

Site No	Measurement Location	Measurement Period			Measurement Results, dBA					
		Date	Duration (hours: minutes)	Start Time						
					L_{eq}	L_{dn}	L_{min}	L_{90}	L_{50}	L_{10}
LT-A	In field of residence at 1180 CR 353; N 29° 27' 26.0" W 099° 00' 42.9"	4/6/2006	23:49	1818	38.5	40.4	20.6	23.9	29.5	39.9
LT-E	Along CR 4512 west of CR 366 N 29° 23' 31.6" W 098° 58' 31.9"	4/8/2006	24:24:00	1335	44.2	50.7	27.3	35	41.5	47
LT-F	Adjacent to CR 4613 surrounded by undisturbed land; N 29° 21' 52.0" W 099° 00' 03.4"	4/9/2006	27:48:00	1524	44.7	50.3	32.6	34.4	38.3	45.8

5.1.7 SGR's Modified Medina Dam Route

SGR's Modified Medina Dam Route begins in the north portion of the study area at the quarry and connects with the UP rail line at the same location as the Proposed Route tie-in. However, between those two points the Modified Medina Dam Route bows further to the east. This route primarily traverses a rural area composed of relatively flat farmland, pastureland, undisturbed areas, and widely scattered residences. The quarry area is predominantly undisturbed with six nearby residences. There is a group of residences at the intersection of CR 353 and 354 north of SGR's Modified Medina Dam Route. This alignment also passes within 1,000 feet of a residence along Farm-to-Market Road 2676. Southeast of this point, the alignment runs through farmland, pastureland, and undisturbed land until passing two residences within 1,000 feet of Private Road (PR) 3660. The alignment passes two additional residences further south on CR 366 and passes through farmland again until coming near another group of approximately 11 residences along CR 4516. The alignment then passes within 1,000 feet of two residences along CR 4643 and finally traverses through farmland, pastureland, and undisturbed land until reaching the tie-in with the UP line.

During the one week survey period, 15 sound level measurements were conducted along or adjacent to SGR's Modified Medina Dam Route. A daytime short-term (ST-R) and one long-term (LT-A) measurement were conducted near the quarry area. ST-R was along CR 252 adjacent to a residence and LT-A was within a field westerly of the residence located at 1180 CR 353. A daytime short-term (ST-A) and one nighttime short-term (NT-A) measurement were also conducted just south of the quarry area along CR 353, southerly of CR 354. One daytime short-term (ST-S) measurement was conducted along CR 354 within 1,000 feet of two residences. One daytime short-term measurement (ST-L) and one long-term measurement (LT-D) were conducted along a private road in an agricultural field belonging to the resident located at 6744 FM 2676. Daytime short-term measurement (ST-K) was conducted along a portion of CR 366 that runs east to west south of PR 3660 within 1,968 feet from a residence to the southwest. A nighttime short-term measurement (NT-E) was conducted along CR 366 approximately 1,500 feet westerly of ST-K, and within 1,000 feet of two residences. Further south, a long-term measurement (LT-E) was conducted along CR 4512 approximately 4,000 feet westerly of CR 366. A daytime short-term measurement (ST-I) and a nighttime short-term measurement (NT-G) were conducted at the end of CR 461. This location is within the Weiblen farmland approximately 1,500 feet from the residence. Another daytime short-term measurement (ST-N) was conducted within an agricultural field adjacent to CR 4516, between CR 461 and CR 4643. This measurement location is variously within 500 to 3,000 feet of 11 residences along CR 4516. A long-term measurement (LT-F) was conducted adjacent to CR 4613 surrounded by undisturbed land. Near the tie-in to the UP rail line, a short-term measurement (ST-H) was conducted within 100 feet of a residence and 404 feet from the center line of Hwy 90.

Tables 11 and 12 summarize the results and details of the measurements, which correspond to the measurement locations depicted on Figure 1. Appendix C contains the Field Measurement Data Sheets, which show the precise locations of the measurement instruments.

Table 11. Short-Term Sound Level Measurement Results for SGR's Modified Medina Dam Route

Site No	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Date	Start Time	Duration (minutes)		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
ST-A	Along CR 353; 1,000' south of CR 354; 21' from the centerline of CR 353; 6' 9" from fence line N 29° 26' 35.6" W 099° 00' 37.7"	4/6/06	1845	5	Distant birds; slight buzzing of flies	26.0	42.3	18.5	20.4	24.4	27.4
			1855	5	Distant birds; slight buzzing of flies; distant barking dogs	25.0	36.4	21.3	22.4	23.9	26.9
ST-H	Residence near intersection of CR 454 & Hwy 90; 100' south of residence; 404' north of Hwy 90 centerline; N 29° 21' 16.3" W 099° 59' 57.9"	4/11/06	1150	10	Traffic; train with 3 engines and 46 cars	61.7	73.5	48.7	53.9	57.9	65.4
ST-I	At the end of CR 461 at the bend in the road within Weiblen farm; within 1,500' of residence; N 29° 23' 14.9" W 098° 58' 43.1"	4/9/06	1434	10	Rustling leaves; birds; distant tractor; distant power tools	36.0	49.8	29.0	30.9	33.4	38.9
ST-K	Along portion of CR 366 that runs east/west south of Private Road (PR) 3660; N 29° 25' 04.0" W 098° 57' 15.8"	4/8/06	1355	15	Rustling leaves; distant birds; distant farm machinery (clearly audible); one distant farm truck; wind (dominant)	41.4	54.9	25.9	30.9	37.9	44.9
ST-L	Along a private road in an agricultural field belonging to the resident located at 6744 FM 2676: N 29° 26' 32.6" W 098° 58' 23.6"	4/7/06	1900	10	Rustling leaves; wind (13-16 mph; gusts 17-20 mph)	48.0	57.9	37.3	41.4	46.4	51.4
ST-N	Along CR 4516 between CRs 461 and 4643; within the agricultural field; 51' to center line of road; 86' to gate post on opposite side of road; N 29° 22' 38.8" W 098° 59' 14.1"	4/10/06	1200	15	Rustling leaves; distant aircraft; birds; distant tractor; car passing on road	45.4	66.8	32.1	35.4	39.4	44.9
ST-R	Along CR 252 outside residence located north of intersection of CRs 252 & 351; N 29° 27' 41.8" W 099° 01' 35.1"	4/11/06	1322	10	Rustling leaves; birds; distant backup alarm for road construction equipment; distant road construction	35.1	44.6	25.4	28.4	33.4	38.4
ST-S	Along CR 354 within 1,000' of two residences; N 29° 27' 53.8" W 098° 59' 48.1"	4/11/06	1550	10	Birds; distant aircraft; distant tractor; distant truck	33.4	49.2	26.3	28.4	30.4	35.4

Table 11. Short-Term Sound Level Measurement Results for SGR's Modified Medina Dam Route (Continued)

Site No	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Date	Start Time	Duration (minutes)		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
NT-A	Along CR 353; 1,000' south of CR 354; 21' from the centerline of CR 353; 6' 9" from fence line N 29° 26' 35.6" W 099° 00' 37.7"	4/9/06	2350	10	Distant barking dogs; distant fwy (slight); distant gun shot	29.8	44.7	22.9	24.4	26.4	31.4
NT-E	Along CR 366 within 1,000' of two residences; N 29° 24' 28.8" W 098° 57' 28.7"	4/9/06	2239	10	Rustling leaves; distant trucks; distant gun shots; one faint cricket	34.5	45.8	27.4	29.4	32.9	37.9
			2250	5		35.3	47.9	29.6	31.4	34.4	37.9
NT-G	At the end of CR 461 at the bend in the road within Weiblen farm; within 1,500' of residence; N 29° 23' 14.9" W 098° 58' 43.1"	4/11/06	1204	5	Wind noise	47.9	55.2	40.1	43.9	46.9	50.4

Table 12. Long-Term Sound Level Measurement Results for SGR's Modified Medina Dam Route

Site No	Measurement Location	Measurement Period			Measurement Results, dBA					
		Date	Duration (hours: minutes)	Start Time	L_{eq}	L_{dn}	L_{min}	L_{90}	L_{50}	L_{10}
LT-A	In field of residence at 1180 CR 353; N 29° 27' 26.0" W 099° 00' 42.9"	4/6/2006	23:49	1818	38.5	40.4	20.6	23.9	29.5	39.9
LT-D	Along a private road in an agricultural field belonging to the resident located at 6744 FM 2676; N 29° 26' 32.6" W 098° 58' 23.6"	4/7/2006	39:41:00	1900	64.6	63.8	18.4	23.8	40.6	55.8
LT-E	Along CR 4512 west of CR 366; N 29° 23' 31.6" W 098° 58' 31.9"	4/8/2006	24:24:00	1335	44.2	50.7	27.3	35	41.5	47
LT-F	Adjacent to CR 4613 surrounded by undisturbed land; N 29° 21' 52.0" W 099° 00' 03.4"	4/9/2006	27:48:00	1524	44.7	50.3	32.6	34.4	38.3	45.8

5.1.8 The MCEAA Medina Dam Alternative

The MCEAA Medina Dam Alternative begins in the north at the quarry and connects with the UP line approximately at the same location as the Proposed Route. It is located in a rural area of relatively flat undisturbed land, farmland, and pastureland. The quarry area is predominantly undisturbed with six nearby residences. This alignment continues easterly from the quarry passing through undisturbed land until crossing CR 265 where the alignment is within 1,000 feet of a residence. This route then passes between two residences and within 1,000 to 2,500 feet of two additional residences along FM 2676. South of FM 2676, the alignment crosses farmland, pastureland, and undisturbed land until it comes within 1,000 feet of a residence along CR 461. In addition, the MCEAA Medina Dam Alternative passes through a grouping of 12 residences between CR 4516 and CR 4643, continues southerly passing through farmland, pastureland and undisturbed land until finally reaching the tie-in with the UP line just north of Hwy 90 and 1.5 miles west of CR 4643.

During the one week survey period, twelve sound level measurements were conducted along or adjacent to the MCEAA Medina Dam Alternative. One daytime short-term measurement (ST-R) was conducted in the quarry area along CR 252 adjacent to a residence; a long-term measurement (LT-A) was conducted within a field adjacent to the residence located at 1180 CR 353. One nighttime short-term (NT-F) measurement was conducted along CR 265 within 1,000 feet of a residence. One daytime short-term measurement (ST-L) and one long-term measurement (LT-D) were conducted along a private road in an agricultural field belonging to the resident located at 6744 FM 2676. Due to a lack of access to properties between FM 2676 and CR 4512, no sound level measurements were conducted along this portion of the alignment. A daytime short-term measurement (ST-J) was conducted at the bend in CR 4512, west of CR 366. Further south, a long-term measurement (LT-E) was conducted along CR 4512 approximately 4,000 feet westerly of CR 366. Daytime and nighttime short-term measurements (ST-I and NT-G) were conducted at the end of CR 461 within Weiblen farmland approximately 1,500 feet from the residence. Another daytime short-term (ST-N) measurement was conducted within an agricultural field adjacent to CR 4516, between CR 461 and CR 4643. This measurement location was variously within 500 to 3,000 feet of eleven residences along CR 4516. A long-term measurement (LT-F) was conducted adjacent to CR 4613 surrounded by undisturbed land. A short-term measurement (ST-H) was conducted within 100 feet of a residence and 404 feet from the center line of Hwy 90.

Tables 13 and 14 summarize the results and details of the measurements, which correspond to the measurement locations depicted on Figure 1. Appendix C contains the Field Measurement Data Sheets, which show the precise locations of the measurement instruments.

Table 13. Short-Term Sound Level Measurement Results for the MCEAA Medina Dam Alternative

Site No	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Date	Start Time	Duration (minutes)							
						L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
ST-H	Residence near intersection of CR 454 & Hwy 90; 100' south of residence; 404' north of Hwy 90 centerline; N 29° 21' 16.3" W 099° 59' 57.9"	4/11/06	1150	10	Traffic; train with 3 engines and 46 cars	61.7	73.5	48.7	53.9	57.9	65.4
ST-I	At the end of CR 461 at the bend in the road within Weiblen farm; within sight of residence; N 29° 23' 14.9" W 098° 58' 43.1"	4/9/06	1434	10	Rustling leaves; birds; distant tractor; distant power tools	36.0	49.8	29.0	30.9	33.4	38.9
ST-J	At bend in CR 4512; west of CR 366; 6' from east/west fence line; 15' from north/south fence line; N 29° 24' 4.6" W 098° 58' 43.0"	4/9/06	1110	10	Rustling leaves; distant aircraft; birds; distant farm equipment; distant insects; distant gun shots	33.6	46.3	27.9	29.9	32.4	35.9
ST-L	Along a private road in an agricultural field belonging to the resident located at 6744 FM 2676: N 29° 26' 32.6" W 098° 58' 23.6"	4/7/06	1900	10	Rustling leaves; wind (13-16 mph; gusts 17-20 mph)	48.0	57.9	37.3	41.4	46.4	51.4
ST-N	Along CR 4516 between CRs 461 and 4643; within the agricultural field; 51' to center line of road; 86' to gate post on opposite side of road; N 29° 22' 38.8" W 098° 59' 14.1"	4/10/06	1200	15	Rustling leaves; distant aircraft; birds; distant tractor; car passing on road	45.4	66.8	32.1	35.4	39.4	44.9
ST-R	Along CR 252 outside residence located north of intersection of CRs 252 & 351; N 29° 27' 41.8" W 099° 01' 35.1"	4/11/06	1322	10	Rustling leaves; birds; distant backup alarm for road construction equipment; distant road construction	35.1	44.6	25.4	28.4	33.4	38.4
NT-F	Along CR 265 within 1,000' of a residence; N 29° 27' 04.3" W 098° 58' 58.4"	4/10/06	2325	10	Rustling leaves; distant traffic; crickets; distant car; distant cow	41.6	52.7	30.1	32.9	38.9	45.9
NT-G	At the end of CR 461 at the bend in the road within Weiblen farm; within sight of residence; N 29° 23' 14.9" W 098° 58' 43.1"	4/11/06	0004	5	Wind noise	47.9	55.2	40.1	43.9	46.9	50.4

Table 14. Long-Term Sound Level Measurement Results for the MCEAA Medina Dam Alternative

Site No	Measurement Location	Measurement Period			Measurement Results, dBA					
		Date	Duration (hours: minutes)	Start Time						
					L_{eq}	L_{dn}	L_{min}	L_{90}	L_{50}	L_{10}
LT-A	In field of residence at 1180 CR 353; N 29° 27' 26.0" W 099° 00' 42.9"	4/6/2006	23:49	1818	38.5	40.4	20.6	23.9	29.5	39.9
LT-D	Along a private road in an agricultural field belonging to the resident located at 6744 FM 2676; N 29° 26' 32.6" W 098° 58' 23.6"	4/7/2006	39:41:00	1900	64.6	63.8	18.4	23.8	40.6	55.8
LT-E	Along CR 4512 west of CR 366; N 29° 23' 31.6" W 098° 58' 31.9"	4/8/2006	24:24:00	1335	44.2	50.7	27.3	35	41.5	47
LT-F	Adjacent to CR 4613 surrounded by undisturbed land; N 29° 21' 52.0" W 099° 00' 03.4"	4/9/2006	27:48:00	1524	44.7	50.3	32.6	34.4	38.3	45.8

6.0 EXISTING VIBRATION ENVIRONMENT

The existing vibration environment was not measured but was characterized by the field team through critical observation of perceptible ground vibration. Ground vibration was not perceived by any team members during the study. This included freight train locomotives operating approximately 115 feet away from ST-F. SEA concludes, based on the FTA Manual's threshold of vibration perception that the general existing vibration environment in the study area is below 65 velocity decibel level (VdB).

7.0 ENVIRONMENTAL CONSEQUENCES

SEA selected the methodologies used in this report to model railroad noise and vibration and to assess its environmental effects based upon what SEA believes are the most appropriate models, methods and standards for characterizing the potential future noise and vibration emissions and potential impacts from the project's construction and operation. SEA used an identical evaluation process to evaluate the potential environmental noise and/or vibration effects from the No-Action Alternative and each of the seven rail routes under consideration.

8.0 RAILROAD NOISE AND VIBRATION PREDICTION/IMPACT ASSESSMENT METHODOLOGY

8.1 Railroad Noise Prediction/Impact Assessment Methodology

The methodology selected for modeling heavy rail noise was Assessment of Noise Environments Around Railroad Operations. This document (Report WCR 73-5) was developed by Wyle Laboratories for a consortium of regional and national freight rail operators to model noise from freight rail line and classification yard operations. Agencies and consultants have also used the calculations and guidance provided in WCR 73-5 for many years to predict noise arising from heavy freight rail operations. This model includes noise from locomotives, rail cars, and wheel/rail interactions. Locomotives are modeled at throttle setting 8. Adjustments to the model are made where appropriate to account for train horn noise expected in the vicinity of railroad and public road at-grade crossings. SEA modeled train horns using a reference Sound Exposure Level (SEL) of 109 dBA, representing average train horn sound levels consistent with measurement data published by the Board (Surface Transportation Board 2000), train horn noise measurements from previous URS studies, and other sources.[3] The Board's noise impact criterion was used for assessing the potential for SGR's construction and operation to cause adverse environmental noise effects. The Board examines noise impacts to sensitive noise receptors when noise levels exceed 65 A-weighted decibels (dBA) Ldn (Day-Night Average Sound Level) and would increase by at least 3 dBA

[3] Short citations: Bayport Loop; Conrail; Powder River Basin; West Hayden Island; Santa Ana 2nd Track; (full citations in "References).

Ldn.[4] Thus, the No-Action Alternative, the Proposed Route and all alternative rail alignments were evaluated on the same basis to determine if they would result in the following conditions:

- An increase of 3 dBA L_{dn} or more in community noise exposure; and
- An increase to a noise level of 65 dBA L_{dn} or greater.

8.2 Railroad Vibration Prediction/Impact Assessment Methodology

The methodology selected for modeling freight rail vibration and performing impact analysis is contained in the Transit Noise and Vibration Impact Assessment Final Report (FTA Manual), DOT-T-95-16 developed for the U.S. Department of Transportation, FTA, April 1995.[5] Briefly, this method establishes a vibration criterion level based on the number of daily vibration events (i.e., railroad train pass-bys). For an infrequent number of daily events (<70), the impact criterion is a VdB of 80 for Category 2 land uses defined in the FTA Manual as "residences and buildings where people normally sleep." This impact criterion is applicable here. SEA assessed the potential for train operations to cause vibration impacts to water wells in the project area by evaluating data in published scientific papers and government agency reports and guidelines.[6]

8.3 Construction Noise/Vibration Prediction/Impact Assessment Methodology

Construction noise was predicted using data primarily developed by the EPA (EPA, 1971), verified more recently by measurement of typical heavy construction equipment in operation[7] and data provided in the previously cited FTA Manual. The FTA Manual and additional references were also used for conventional and specialized construction vibration assessment. The criteria for determination of adverse effects is a synthesis of recommendations, guidelines and criteria used by several agencies to evaluate noise and vibration levels resulting from construction of linear infrastructure projects. For example, the FRA/FTA methodology guideline offers that a daytime one-hour noise L_{eq} of 90 dBA is an

[4] Generally, SEA does not perform a detailed noise assessment for proposals that would result in less than eight trains per day (see 49 CFR 1105.7(e)(6)). However, as explained in the Draft Environmental Impact Statement, due to the public interest in this project, SEA has conducted a detailed analysis of potential noise impacts.

[5] A functionally equivalent version of the FTA methodology (FTA) was more recently adopted by the Federal Railroad Administration (FRA, 1998) with a focus on high speed rail systems. FTA is more relevant to the SGR project than FRA because FTA contains information regarding noise and vibration from low-speed heavy rail freight trains.

[6] Federal Transit Administration. 1995. Guidelines; Greene, et. al. 2002. Comparison of Pile-Driver Noise and Vibration from Various Pile-Driving Methods and Pile Types; Jones & Stokes. 2004. Transportation- and construction-induced vibration guidance manual.

[7] Heavy Equipment Noise Measurements conducted as part of Environmental Impact Report #604 for the Frank R. Bowerman Landfill Implementation. January 2006.

upper limit beyond which "there may be adverse community reaction."[8] Alternatively, a daytime eight-hour L_{eq} should not exceed 80 dBA to avoid adverse effects.

SEA evaluated potential construction vibration damage to residences, to cultural resources including the most sensitive category of extremely fragile historic structures and ruins, and to local water wells. FRA and FTA analysis guidelines also call for investigation of the potential for vibration-induced damage to fragile or extremely fragile buildings (FTA 1995; FRA 1998). Conventional construction vibration levels are not generally adverse to modern buildings and reasonably sound structures that may be 50 or more years old unless they are very close to the construction activity. SGR's proposed rail line construction could require special construction techniques, such as pile driving. Pile driving activity may occur in limited locations where bridge construction would be necessary to cross streams and washes. SEA calculated the expected ground vibration from a large pile driver and compared the results with published criteria that are more conservative than those used by the FTA and FRA. SEA discusses construction vibration impacts in Section 9.2.

Table 15. Ground-Borne Vibration and Ground-Borne Noise Impact Criteria

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 micro inch/sec)		Ground-Borne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent[1] Events	Infrequent[2] Events	Frequent[1] Events	Infrequent[2] Events
Category 1: Buildings where low ambient vibration is essential for interior operations.	65 VdB[3]	65 VdB[3]	[4]	[4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	80 VdB	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	83 VdB	40 dBA	48 dBA

Notes:

1. "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.
2. "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.
3. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.
4. Vibration-sensitive equipment is not sensitive to ground-borne noise.

Source: FTA 1995

8.4 Construction Vibration Impact on Water Wells

SEA analyzed the potential for construction vibration damage to water wells that might be located very close to project routes. The potential for construction vibration impact on water wells was assessed

[8] Federal Transit Administration Noise and Vibration Impact Assessment Manual. 1995. Chapter 12, Noise and Vibration During Construction, Pages 12-6 and 12-7, Criteria discussion of detailed assessment.

by evaluation of data in published scientific papers and government agency reports and guidelines.[9] SEA discusses construction vibration impacts in Section 9.2.

9.0 Impact Results

In general, the construction and operation of any of the seven rail alignments could produce adverse noise effects at some locations. However, with only one exception, no significant adverse vibration effects are expected to result from any project alternatives.[10] Section 9.1 addresses the results of the evaluation of project-related noise impacts, and Section 9.2 addresses the results of the evaluation of project-related vibration impacts. Figures 2a and 2b show the noise contours for the alternative routes and houses in the project vicinity. SEA identified houses in the project area through field observations during the noise survey and a review of aerial photographs, focusing on the areas near the alternative rail alignments. SEA notes that Figures 2a and 2b may not depict all of the houses in the project area and that the multiple houses in the Creekwood Subdivision are not shown individually.

[9] Greene, R. 2002. Comparison of Pile-driver Noise and Vibration from Various Pile-driving Methods and Pile Types; and, Jones & Stokes. 2004. Transportation- and construction-induced vibration guidance manual.

[10] The exception to this broad finding is in Alternative 1 where railroad tracks would intersect with one residence and pass very close to another. This is a direct artifact of the spacing between the route and the house. Efficient transmission of ground vibration was assumed for the analysis.

Figure 2a. FD 34284 Alternative Rail Routes and Residences Within 65 DNL Contour

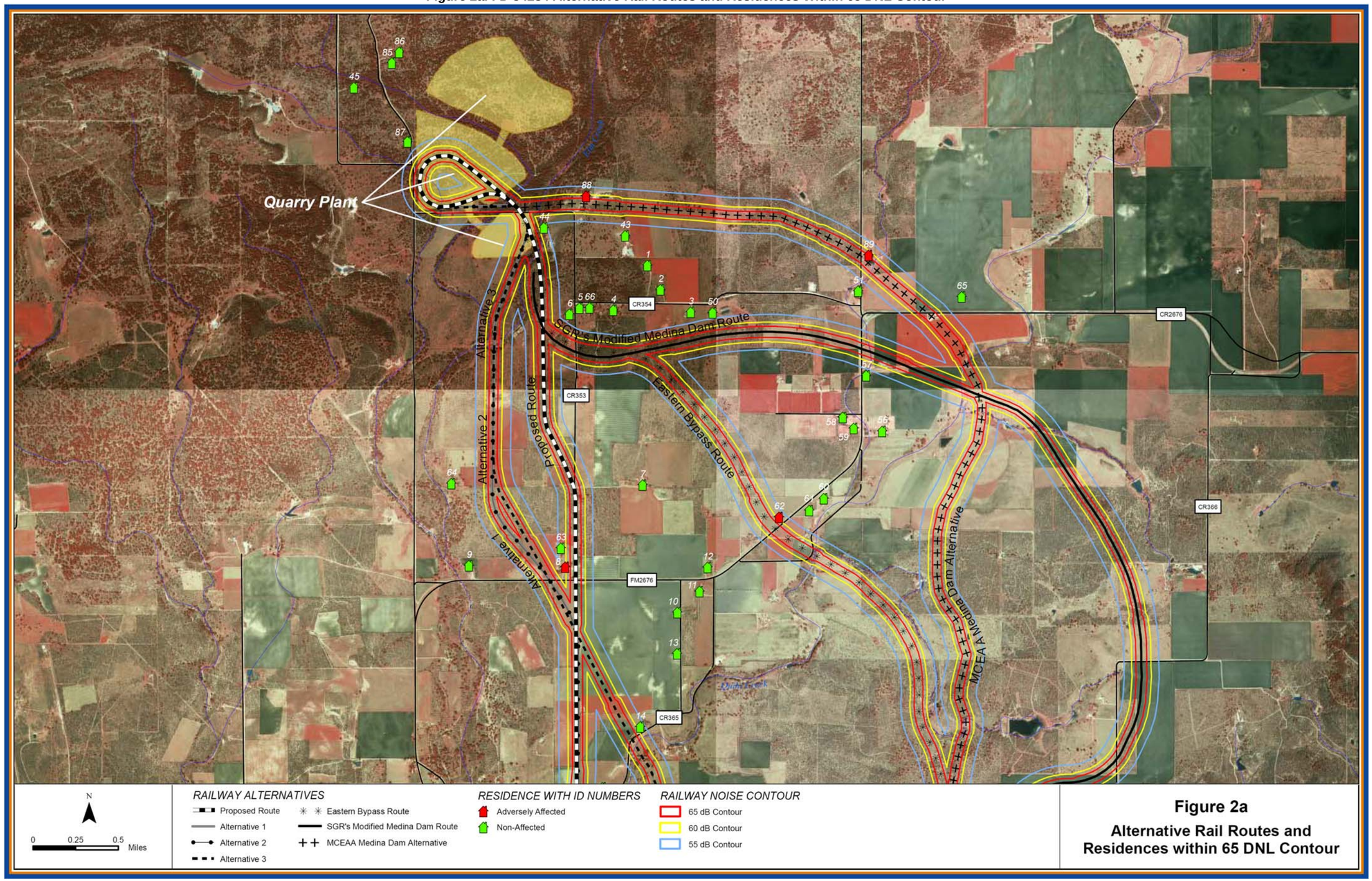

Figure 2b FD 34284. Alternative Rail Routes and Residences Within 65 DNL Contour

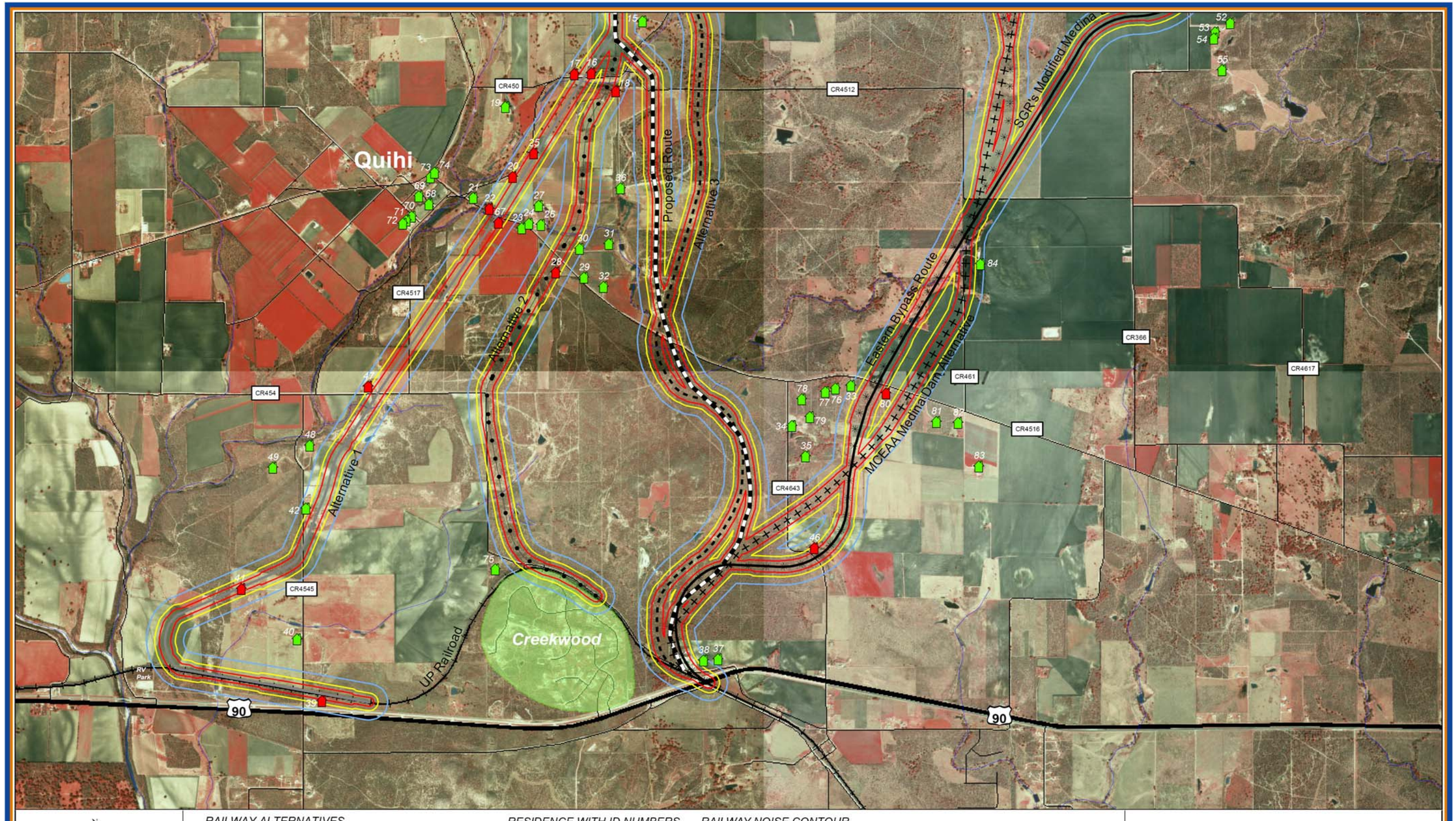

Figure 2b

Alternative Rail Routes and Residences within 65 DNL Contour

9.1 Noise

9.1.1 Operational Noise Impacts

The overall results of the operations noise impact analysis are discussed below and shown in Tables 15 and 16. The detailed results for each route follow.

SEA assessed the potential noise effects from future train operations by studying whether predicted noise levels for the several rail routes under consideration would exceed 65 dBA Ldn and would experience a 3 dBA or greater increase. When compared as two groupings, the Eastern Corridor Alternatives (Eastern Bypass Route, the MCEAA Medina Dam Alternative, and SGR's Modified Medina Dam Route) and the Central Corridor Alternatives (Proposed Route, Alternative 1, Alternative 2, and Alternative 3) would have approximately equivalent noise effects. While various factors would affect the ultimate project noise level at any given location as discussed in the noise science material found in Appendix A, it bears comment here that the most important variable factor is the relative distance between the proposed railroad track centerline and the noise-sensitive use.[11] The seven rail alignments are based on preliminary data and are somewhat schematic as presented on the available project alternative maps. SGR has indicated that if a route is approved, the alignment would be refined by final engineering (see Appendix B of this SDEIS, #E1-1664, page 5 and #E1-1439, page 6). Thus, for uniformity of analysis, the modeled distance between a sensitive use and the nearest proposed railroad tracks is derived from the map, notwithstanding that a route may pass directly through a sensitive use.[12]

Under all alternative rail alignments, multiple tracks would be located close to the loading track at the northern terminus of the line within the quarry area. This area is intended for rail cars to wait to be picked up by the locomotives. The rail line would terminate in the plant site, allowing 1,000 feet of buffer zone from the beginning point of the quarry. The nearest houses to the loading track area are approximately 1,200 and 1,500 feet away. Noise would occur during the loading process. However, sound levels from loading would be expected to be consistent with those generated by quarry operation and would not result in off-site effects. If the loading track is in the shape of a loop (the loading track would either be a loop or a series of parallel tracks), the curve radius of the loop track would likely be sufficient to preclude wheel squeal noise from occurring.[13] Additionally, the typically higher wheel-rail noise associated with a fixed-point as opposed to a movable point track crossover (also called a frog)[14] that would be located at the neck of the loop would not likely cause adverse noise effects due to distance from the nearest sensitive receptor.

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[11] Due to the typically large parcels in the study area, SEA considered a noise sensitive receptor to be the residential structure plus a 200 feet radius buffer zone as an area of frequent human use.

[12] See Section 3.10 of the SDEIS for SEA's discussion of proposed mitigation for this issue.

[13] Wheel squeal from curved track segments can usually be avoided by designing all turn radii to be greater than 1000 feet, or 10 times the railcar truck wheelbase, whichever is less.

[14] A track crossover or "frog" is used to merge two tracks into one and vice versa.

Table 16 shows how many residences near each rail alignment would experience a 3 dBA L_{dn} increase. Table 17 shows how many residences near each rail alignment would experience a 3 dBA L_{dn} increase **and** an increase to an L_{dn} of 65 or greater from SGR's proposed rail operations. Note that all residences where the project causes an increase in noise to 65 dBA L_{dn} will also experience a 3 dBA increase in L_{dn} compared to existing levels. A discussion of noise impacts from operations over each alternative follows.

Table 16. 3 dBA L_{dn} Increase

Route	Number of Houses
Proposed	20
Alternative 1	32
Alternative 2	27
Alternative 3	15
Eastern Bypass	18
MCEAA Medina Dam	17
SGR Modified Medina Dam	20

Table 17. Increase to 65 dBA L_{dn} or greater and 3 dBA L_{dn} Increase

Route	Number of Houses
Proposed	1
Alternative 1	9
Alternative 2	2
Alternative 3	0
Eastern Bypass	2
MCEAA Medina Dam	2
SGR Modified Medina Dam	2

No-Action Alternative

Noise from transporting all quarried material by heavy truck within the project area was discussed in Section 4.12 of the Draft EIS. SEA used the noise level data from the Draft EIS to compare truck transport noise impacts to all of the rail alternatives. In general, the method for transport of quarried material would involve the movement of approximately 1,700 loaded and empty heavy trucks using CRs between the quarry and Hwy 90 using CR 353, FM 2676, and CR 4516. Thirty noise-sensitive receptors (defined as the residential structure plus a 200 feet radius buffer zone as an area of frequent human use) would experience increases of 3 dBA or more L_{dn} and increase to a 65 dBA L_{dn} noise level within the study area. Refer to Section 4.12 of the Draft EIS for additional discussion of the No-Action Alternative.

Proposed Route

Twenty houses along the Proposed Route would experience an increase of 3 dBA L_{dn} or greater. However, only one of those receptors at the corner of FM 2676 and CR 353 (ID Number 8 on Figure 2)

would have an L_{dn} greater than 65 dBA and be adversely affected, according to the Board's criteria (see Table 18).

Table 18. Proposed Route – Adverse Impacts

ID #	Distance from Track (ft)	Nearest LT Monitors	Existing Noise Level L_{dn}	Predicted Noise Level L_{dn}	Increase Over Existing	Adversely Affected? (65 dB L_{dn})
1	3137	LT-A	40	45	5	No
2	3482	LT-A	40	44	4	No
4	1997	LT-A	40	47	7	No
5	964	LT-A	40	52	12	No
6	644	LT-A	40	55	15	No
8	1076	LT-B	57	66	9	Yes
15	603	LT-C	49	55	6	No
16	1000	LT-C	49	52	3	No
31	1165	LT-C	49	52	3	No
36	801	LT-C	49	53	4	No
38	439	N/A		57		No
43	2607	LT-A	40	46	6	No
44	267	LT-A	40	60	20	No
45	3016	LT-A	40	45	5	No
63	245	LT-B	57	61	4	No
66	1268	LT-A	40	50	10	No
85	3008	LT-A	40	45	5	No
86	3220	LT-A	40	45	5	No
87	661	LT-A	40	54	14	No
88	1816	LT-A	40	48	8	No

Alternative 1

Thirty two houses along this alternative would experience an increase of 3 dBA L_{dn} or greater. However, only nine receptors along this route would have an L_{dn} greater than 65 dBA and be adversely affected. Their ID numbers are listed on Table 19 and can be found on Figures 2a and 2b.

Table 19. Alternative 1 – Adverse Impacts

ID #	Distance from Track (ft)	Nearest LT Monitor	Existing Noise Level L_{dn}	Predicted Noise Level L_{dn}	Increase Over Existing (L_{dn})	Adversely Affected? (≥65 L_{dn})
4	3115	LT-A	40	45	5	No
5	2125	LT-A	40	47	7	No
6	1904	LT-A	40	48	8	No
8	442	LT-B	57	57	0	No

Table 19. Alternative 1 – Adverse Impacts (Continued)

ID #	Distance from Track (ft)	Nearest LT Monitor	Existing Noise Level L_{dn}	Predicted Noise Level L_{dn}	Increase Over Existing (L_{dn})	Adversely Affected? (≥65 L_{dn})
15	580	LT-C	49	55	6	No
16	0*	LT-C	49	102	53	Yes
17	91	LT-C	49	68	19	Yes
18	806	LT-C	49	53	4	No
19	1291	LT-C	49	52	3	No
20	32	LT-C	49	75	26	Yes
21	682	LT-C	49	54	5	No
22	117	LT-C	49	66	17	Yes
23	597	LT-C	49	55	6	No
24	698	LT-C	49	54	5	No
25	0*	LT-C	49	102	53	Yes
26	1027	LT-C	49	52	3	No
27	673	LT-C	49	54	5	No
39	3	N/A		93		Yes
41	0*	LT-C	49	102	53	Yes
42	161	LT-C	49	64	15	No
43	2838	LT-A	40	45	5	No
44	326	LT-A	40	59	19	No
45	3038	LT-A	40	45	5	No
47	133	LT-C	49	65	16	Yes
48	656	LT-C	49	54	5	No
63	693	LT-B	57	54	-3	No
64	1050	LT-A	40	51	11	No
67	0*	LT-C	49	102	53	Yes
85	3029	LT-A	40	45	5	No
86	3242	LT-A	40	45	5	No
87	683	LT-A	40	54	14	No
88	1821	LT-A	40	48	8	No

* Passes within the 200 foot buffer distance

Alternative 2

Twenty seven receptors would experience an increase of 3 dBA L_{dn} or greater. However, only two receptors along this route would have an L_{dn} greater than 65 dBA and be adversely affected. Their ID numbers are listed in Table 20 below and can be found on Figures 2a and 2b.

Table 20. Alternative 2 – Adverse Impacts

ID #	Distance from Track (ft)	Nearest LT Monitor	Existing Noise Level L_{dn}	Predicted Noise Level L_{dn}	Increase Over Existing (L_{dn})	Adversely Affected? (≥65 L_{dn})
4	3111	LT-A	40	45	5	No
5	2119	LT-A	40	47	7	No
6	1895	LT-A	40	48	8	No
8	457	LT-B	57	57	0	No
15	568	LT-C	49	55	6	No
16	366	LT-C	49	58	9	No
17	833	LT-C	49	53	4	No
18	86	LT-C	49	68	19	Yes
23	1127	LT-C	49	52	3	No
24	1016	LT-C	49	52	3	No
25	1251	LT-C	49	52	3	No
26	688	LT-C	49	54	5	No
27	980	LT-C	49	52	3	No
28	0*	LT-C	49	102	53	Yes
29	764	LT-C	49	53	4	No
30	236	LT-C	49	61	12	No
31	922	LT-C	49	52	3	No
36	937	LT-C	49	52	3	No
43	2832	LT-A	40	45	5	No
44	322	LT-A	40	59	19	No
45	3032	LT-A	40	45	5	No
63	690	LT-B	57	54	-3	No
75	671	LT-F	50	54	4	No
85	3025	LT-A	40	45	5	No
86	3244	LT-A	40	45	5	No
87	688	LT-A	40	54	14	No
88	1820	LT-A	40	48	8	No

- Passes within the 200 foot buffer distance

Alternative 3

Fifteen receptors would experience an increase of 3 dBA L_{dn} or greater. However, no receptors along this route would have an L_{dn} greater than 65 dBA (see Table 21). Thus, no receptors would be adversely affected.

Table 21. Alternative 3 – Adverse Impacts

ID #	Distance from Track (ft)	Nearest LT Monitor	Existing Noise Level L_{dn}	Predicted Noise Level L_{dn}	Increase Over Existing (L_{dn})	Adversely Affected? (≥65 L_{dn})
4	3112	LT-A	40	45	5	No
5	2122	LT-A	40	47	7	No
6	1901	LT-A	40	48	8	No
8	445	LT-B	47	57	10	No
14	278	LT-C	49	62	13	No
37	705	N/A		54		No
38	350	N/A		58		No
43	2838	LT-A	40	45	5	No
44	328	LT-A	40	59	19	No
45	3032	LT-A	40	45	5	No
63	609	LT-B	57	55	-2	No
85	3024	LT-A	40	45	5	No
86	3242	LT-A	40	45	5	No
87	678	LT-A	40	54	14	No
88	1817	LT-A	40	48	8	No

The Eastern Bypass Route

Eighteen receptors would experience an increase of 3 dBA L_{dn} or greater and be adversely affected. However, only two receptors would have sound levels above 65 dBA L_{dn}. These receptors are identified in Table 22 below and can be found on Figures 2a and 2b.

Table 22. The Eastern Bypass Route – Adverse Impacts

ID #	Distance from Track (ft)	Nearest LT Monitor	Existing Noise Level L_{dn}	Predicted Noise Level L_{dn}	Increase Over Existing (L_{dn})	Adversely Affected? (≥65 L_{dn})
1	2601	LT-A	40	46	6	No
2	1967	LT-A	40	48	8	No
4	1116	LT-A	40	51	11	No
5	952	LT-A	40	52	12	No
6	612	LT-A	40	55	15	No
33	350	LT-E	51	58	7	No
37	549	N/A		55		No
38	262	N/A		60		No
43	2787	LT-A	40	45	5	No
44	399	LT-A	40	56	16	No
46	34	LT-F	50	75	25	Yes
50	2162	LT-A	40	47	7	No
62	166	LT-B	57	65	8	Yes
66	1099	LT-A	40	51	11	No

Table 22. The Eastern Bypass Route – Adverse Impacts (Continued)

ID #	Distance from Track (ft)	Nearest LT Monitor	Existing Noise Level L_{dn}	Predicted Noise Level L_{dn}	Increase Over Existing (L_{dn})	Adversely Affected? (≥65 L_{dn})
76	708	LT-E	51	54	3	No
77	946	LT-E	51	52	1	No
80	252	LT-E	51	61	10	No
88	1788	LT-A	40	48	8	No

The MCEAA Medina Dam Alternative

Seventeen receptors would experience an increase of 3 dBA L_{dn} or greater and be adversely affected. However, only two receptors would have sound levels above 65 dBA L_{dn}. These receptors are identified in Table 23 below and can be found on Figure 2a.

Table 23. The MCEAA Medina Dam Alternative – Adverse Impacts

ID #	Distance from Track (ft)	Nearest LT Monitor	Existing Noise Level L_{dn}	Predicted Noise Level L_{dn}	Increase Over Existing (L_{dn})	Adversely Affected? (≥65 L_{dn})
1	1542	LT-A	40	49	9	No
2	2264	LT-A	40	47	7	No
4	2997	LT-A	40	45	5	No
5	3002	LT-A	40	45	5	No
6	3196	LT-A	40	45	5	No
38	517	N/A		56		No
43	687	LT-A	40	54	14	No
44	469	LT-A	40	57	17	No
46	941	LT-F	45	52	7	No
50	2844	LT-A	40	45	5	No
51	642	LT-A	40	55	15	No
56	2539	LT-A	40	46	6	No
65	911	LT-A	40	52	12	No
80	387	LT-E	51	58	7	No
84	415	LT-E	51	57	6	No
88	50	LT-A	40	72	32	Yes
89	0*	LT-A	40	102	62	Yes

Passes within the 200 foot buffer distance

SGR's Modified Medina Dam Route

Twenty receptors would experience an increase of 3 dBA L_{dn} or greater and be adversely affected. However, only two receptors would have sound levels above 65 dBA L_{dn}. These receptors are identified in Table 24 below and can be found on Figure 2b.

Table 24. SGR's Modified Medina Dam Route – Adverse Impacts

ID #	Distance from Track (ft)	Nearest LT Monitor	Existing Noise Level L_{dn}	Predicted Noise Level L_{dn}	Increase Over Existing (L_{dn})	Adversely Affected? (≥65 L_{dn})
1	2372	LT-A	40	46	6	No
2	1547	LT-A	40	49	9	No
3	675	LT-A	40	54	14	No
4	1221	LT-A	40	50	10	No
5	1085	LT-A	40	51	11	No
6	724	LT-A	40	54	14	No
33	496	LT-E	51	56	5	No
35	1166	LT-E	51	51	0	No
37	557	N/A		55		No
38	270	N/A		60		No
43	2881	LT-A	40	45	5	No
44	1260	LT-A	40	50	10	No
46	59	LT-F	50	71	21	Yes
50	528	LT-A	40	56	16	No
51	1466	LT-A	40	49	9	No
65	2427	LT-A	40	46	6	No
66	1235	LT-A	40	50	10	No
80	118	LT-E	51	66	15	Yes
88	2705	LT-A	40	46	6	No
89	2622	LT-A	40	46	6	No

9.1.2 Conventional Construction Noise Impacts

Noise and vibration related to construction would result from operation of heavy equipment needed to construct track bed, install track, and construct loading track and tie-in track facilities for the project. The magnitude of the noise increases would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, site geometry (including shielding from intervening terrain or other structures), and the distance between the construction noise source and noise-sensitive areas.

Neither the FRA or FTA Manual specifies standardized construction noise impact criteria, but both do provide reasonable guidelines to be used in the absence of, or in conjunction with, local ordinances and noise impact criteria (FRA, 1998; FTA, 1995).[15] Table 24 lists these guidelines, which prescribe different levels for daytime and nighttime construction. Daytime is defined as 7:00 a.m. to 10:00 p.m. and nighttime is defined as 10:00 p.m. to 7:00 a.m.

[15] The two manuals are consistent/identical with respect to the environmental impact assessment of a railroad project's operational and construction noise/vibration.

Table 25. Prescriptive Federal Railroad Administration Construction Noise Impact Guidelines

Receptor Category	One-Hour L_{eq} (dBA)	
	Day	Night
Residential	90	80
Commercial	100	100
Industrial	100	100

Source: FRA, 1998 (FTA guidelines are identical [1995]).

Noise from construction activity is generated by the broad array of powered noise-producing mechanical equipment used in the construction process. This equipment ranges from hand-held pneumatic tools to scrapers, bulldozers, dump trucks, and tie- and rail-handling equipment. The exact complement of noise-producing equipment that would be in use during any particular period of construction has not yet been determined for the project. Construction activities could be in progress at more than one part of the project site at a given time.

As previously discussed, the noise levels from construction activity during various phases of a typical construction project was the subject of an extensive study commissioned by the EPA.[16] The use of these conventional construction noise levels provides an accurate prediction of a project's potential construction noise emissions. The EPA study provides noise levels associated with various construction activities where all pertinent equipment is present and operating, at a reference distance of 50 feet, as shown in Table 25. Because technology improvements since the EPA study was published have resulted in quieter vehicles and equipment, this analysis of the SGR project used the average noise levels shown in the table for the loudest construction phases. Using this recently verified assumption (referenced in footnote 5), the average overall noise level expected to be generated from a construction site would be 89 dBA L_{eq} at a distance of 50 feet during the noisiest phases of construction. The actual minute-by-minute magnitude of construction noise emission typically varies over time because construction activity is intermittent, and the power demands on construction equipment (and the resulting noise output) are cyclical.[17]

[16] EPA (1971), Noise from Construction Equipment and Operations, Building Equipment and Home Appliances.

[17] From Chptr. 18.5, Beranek, L.L. and I.L. Ver, eds. 1992. Noise and Vibration Control Engineering.

Table 26. Typical Noise Levels from Construction Activities for Public Works Projects

Construction Activity	Average Sound Level* at 50 feet (dBA L_{eq})	Standard Deviation decibels (dB)
Ground Clearing	84	7
Excavation	89	6
Foundations	78	3
Erection	87	6
Finishing	89	7

* Sound level with all pertinent equipment operating.
Source: EPA, 1971.

Noise generated by construction equipment (or by any point source) decreases at a rate of approximately 6 decibels for every doubling of distance away from the source due to the reduction of acoustic energy per unit area resulting from the geometric spreading of the sound wave as it leaves the source and travels outward. Thus, if a particular construction activity generated average noise levels of 89 dBA at 50 feet, the L_{eq} would be 83 dBA at 100 feet, 77 dBA at 200 feet, 71 dBA at 400 feet, and so on. Intervening structures that block the line of sight between the source and receptor, such as constructed earthen berms, hills, or other manmade or natural landforms, would further decrease the resultant noise level by a minimum of 5 dBA. The effects of molecular air absorption and anomalous excess attenuation would additionally reduce the noise level from construction activities at more distant locations at the rates of 0.7 dBA and 1.0 dBA per 1,000 feet, respectively.

Based on the closest estimated distances from the proposed railroad tracks to noise-sensitive uses, the project construction noise levels on an hourly basis could range from 89 dBA L_{eq} within 50 feet, down to inaudibility at great distances. These noise levels would be temporary and would decrease as the project construction activity would progress along a selected route and would not cause adverse noise impacts (except to the few locations that are shown to be very close to project construction based on the schematic route alignments discussed previously).

9.1.3 Special Construction Noise Impacts

Special construction techniques such as pile driving may be required in a few specific locations for bridge construction depending on the selected route. Noise from pile-driving activity is different in character from typical construction noises and, thus, SEA analyzed its potential noise impacts separately. Also, because the primary source of noise from pile drivers is somewhat elevated, it does not typically benefit from attenuation due to intervening low-height landforms and structures. The noise attenuation from other factors such as geometric divergence and air absorption with distance still applies to noise from pile driving.

The typical L_{eq} produced during pile driving (hammering the pile) ranges from 82 to 100 dBA at 50 feet. The noise level value of 100 dBA L_{eq} for pile driver noise compared to conventional construction noise levels of 89 dBA L_{eq} would cause a higher degree of temporary disruption if there are noise-

sensitive activities in the immediate vicinity of the pile driving activity and may result in localized adverse effects within 500 feet of a residential use.

Allowing for point-source divergence and excess attenuation, the average sound levels that might occur at various larger distances from the pile site during pile driving activity were calculated. The resulting L_{eq} sound levels are presented in Table 26.

Table 27. Calculated Sound Levels From Special Construction

Distance from Construction Area	Calculated Sound Level L_{eq} (dBA)
800 feet	73
1,600 feet	69
2,100 feet	65
2,600 feet	63
3,500 feet	59

The analysis indicates that pile driving noise, although remaining clearly audible at substantial distances from the construction site, would comply with the eight hour daytime construction noise decibel limits recommended by FRA/FTA either as an individual source or in combination with other construction noise at a distance of approximately 300 feet from the pile. Thus, no widespread noise impacts from special construction activity would occur if this activity is located sufficiently far from sensitive use and conducted during daylight hours.

9.2 Vibration

9.2.1 Operational Vibration Impacts

Measurements of soil vibration transmission characteristics are not usually conducted during a General Vibration Assessment unless critical locations/structures are identified. SEA used conservative assumptions in its calculation of potential vibration impacts..

As determined during the field noise survey, Vibration Category 2 uses (residential) would be the primary receptors potentially affected by railroad vibration from SGR's proposed project.[18] As a first step in the analysis of potential impact, SEA used the FTA's "Screening Distance" assessment method and found that the screening distance for Category 2 receptors near a heavy rail project is 200 feet.[19] In other words, no adverse effects would be expected if residences are more than 200 feet from the tracks. However, because a few residences would be closer than 200 feet, SEA performed a General Vibration Assessment for the project. Future project-related vibration levels were modeled for various distances from the potential routes.

[18] Cultural resources such as historic structures comprise an additional category of potentially affected receptors. Potential impacts to these structures are discussed in Section 9.2.2.

[19] This FTA method identifies the maximum likely impact zone from project operations and allows for an evaluation to determine if all sensitive receptors are outside this zone.

To determine vibration impacts, the FTA (and, identically the FRA) guidance requires a determination of the number of daily vibration events; the type or category of land use receptors (Category 2 for this project); the distance from the receptor building footprint and building foundation type; sources of vibration; the train speed, wheel condition, and track condition; and soil characteristics.

For the operational vibration analysis, SEA classified the number of daily events as infrequent because of the low level of proposed train operation (i.e., four trains per day – two loaded and two empty). The source levels were derived from Figure 10-1 of the FTA manual because it includes slow speed, heavy rail trains. The distance between the source (i.e., rail centerline) and the receptor was measured using scaled aerial photographs showing the proposed project alignments. The condition of the train wheels was assumed to be good. Soil propagation characteristics for vibration-sensitive land uses near the alignments were assumed to be efficient.[20] The typical structure type was assumed to be of wood frame construction,[21] based upon general conditions observed in the field. For a conservative analysis, water wells were assumed to be unlined with no casing.

With the exception of two locations along Alternative 1, (identified on Figure 2b as house number 41 and house number 25) that might be subject to annoying but not damaging levels of train vibration, no residences would experience adverse vibration impacts. Water wells located 12 or more feet away from railroad tracks or immediately adjacent to roads carrying No-Action Alternative truck traffic would not be adversely affected by vibration impacts. In a recent report issued by the California Department of Transportation (Caltrans) regarding transportation and construction vibration its author highlights that "Water wells and buried pipelines can survive rather high-vibration intensities because they are constrained by the soil and bedding materials surrounding them."[22] Table 22 from that report is reproduced in Appendix A.

9.2.2 Construction Vibration Impacts

SEA performed a vibration analysis of conventional and pile driving construction vibration. Conventional, non pile driving construction vibration levels are relatively low and are generally limited to the immediate location of the construction equipment. For non pile driving activity, no adverse vibration impact would occur from construction of the project. This includes annoyance and potential building damage.

Any damage to above or below grade structures is highly dependent on the type of structure and the distance to the pile. Extremely fragile structures (ancient buildings and ruins for example) would require more of a buffer distance to preclude damage. FRA and FTA indicate that damage to a building is possible (but not necessarily probable) if ground vibration levels exceed the following criteria:

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[20] "Efficient" is the most conservative ground propagation characteristic.

[21] Wood Frame Construction is the most susceptible to ground borne vibration and the most conservative propagation characteristic.

[22] Jones & Stokes. 2004. Transportation- and construction-induced vibration guidance manual.

- 0.20 inches per second (in/sec) peak particle velocity (PPV) (approximately 100 VdB) for Fragile buildings,
- 0.12 in/sec PPV (approximately 95 VdB) for Extremely Fragile buildings.

SEA used the more stringent vibration criteria presented in Table 28 (Table 19 from Jones and Stokes 2004) to analyze the effects of pile driving[18] in order to evaluate potential damage to residences, cultural resources including the most sensitive category of extremely fragile historic structures and ruins, and local water wells. Perception of ground vibration from pile driving may extend up to 200 feet from the pile being driven and would likely result in annoyance. Note that this 200-feet zone is for perception and annoyance only.[23] From Table 28 the more conservative continuous criteria of 0.08 inch per second was used to determine a distance to avoid damage to fragile and extremely fragile historic buildings; for historic and some old buildings 0.25 inch per second was utilized. For newer residential structures a value of 0.5 inches per second was used. For unlined water wells, one-half of the criterion value was selected from Table 22 of Jones and Stokes 2004 (i.e., 2.72 inches per second).

Table 28. Vibration Damage Thresholds[24]

Table 19. Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

As a vibration source, SEA selected an 80,000 pounds force impact pile driver operating in competent soils that include most sands, sandy clays, silty clays, gravel, silts, and weathered rock. Minimum distances to avoid damage from pile driving were calculated using the following equation:

[23] The level at which people in buildings would likely be annoyed is 94 VdB per California Department of Transportation (Hendricks, R.) October, 1998.

[24] Table 19 from Jones & Stokes. 2004. *Transportation- and construction-induced vibration guidance manual*.

$$PPV_{Impact\ Pile\ Driver} = PPV_{Ref}\,(25/D)^{n}\ x\ (E_{equip}/E_{Ref})^{0.5} \quad (in/sec)$$

Where:

PPV_{Ref} = 0.65 in/sec for a reference pile driver at 25 ft.
D = distance from pile driver to the receiver in ft.
n = 1.1 is a value related to the vibration attenuation rate through ground
E_{Ref} = 36,000 ft-lb (rated energy of reference pile driver)
E_{equip} = rated energy of impact pile driver in ft-lbs.

Note that a value of 1.3 for h provides a more conservative analysis consistent with efficient propagation of ground vibration and it was used for calculating the vibration levels expected at sensitive receptors.

Pile driving should not be conducted within 60 feet of newer structures including houses, and no closer than 12 feet of uncased water wells. In order to avoid impacts to water wells, nearby wells would need to be identified and mitigation incorporated prior to construction of a selected alternative.

SEA reviewed previous analyses of the potential effects of nearby pile driving on surface or buried reinforced concrete pipe (RCP) or similar reinforced concrete structures. The most relevant study indicated that pile driving could be conducted more than 8 to 10 feet from the structure(s) without causing damage.[25]

Based on the vibration damage thresholds presented in Table 28 above, SEA determined that historic structures located more than 300 feet from any of the rail alignments would not be adversely impacted by construction or operation of the project. Using the same thresholds to avoid damage, SEA calculated that pile driving would be permissible if no closer than 180 feet of fragile and extremely fragile historic buildings, ruins, and ancient monuments; no closer than 150 feet of historic and all older residential structures. These minimum distances along with recommended minimum distances from other vibration sources (each including a slight additional buffer to account for field conditions) are provided in Table 29. Please note that some structures identified in SEA's cultural resources study may be within 25 feet of a No-Action Alternative truck route. Chapter 5 of the SDEIS presents more information regarding the potential project effects on cultural resources.

[25] URS Corporation. 2001. Report 51-00641385.10. Analysis of Potential Damage Risk to Buried Concrete Pipe (RCP) and Manhole Structure Due to Construction-Related Vibration.

Table 29. Recommended Minimum Distances from Vibration Source to Sensitive Receptor (feet)

Pile Driver	
Fragile / Extremely Fragile	180
Historic	150
Conventional Construction	
Fragile / Extremely Fragile	60
Historic	50
Railroad Operations	
Fragile / Extremely Fragile	25
Historic	20
Heavy Truck Operations	
Fragile / Extremely Fragile	30
Historic	25

Although historic, older, and newer residences would not be damaged by project construction, pile driving within 200 feet of an occupied residential structure could cause substantial annoyance.

10.0 POTENTIAL MITIGATION MEASURES

Sections 1.10.1 and 1.10.2 address noise and vibration mitigation measures, respectively.

10.1 Noise Mitigation Measures

As discussed in Section 1.9, construction and operation of the proposed rail line under any of the alternatives being studied in this environmental review process could cause some adverse noise impacts to sensitive receptors. In order to reduce these adverse impacts, SEA recommends that the mitigation listed below be imposed on any decision granting construction and operation authority:

1. Southwest Gulf Railroad Company (SGR) shall equip all noise-producing project construction equipment and vehicles using internal combustion engines with mufflers, air-inlet silencers, and other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. SGR shall equip mobile or fixed package equipment (e.g., arc-welders, air compressors) with shrouds and noise control features that are readily available for that type of equipment.

2. Southwest Gulf Railroad Company shall comply with all applicable local, state, or Federal regulations that control the noise output produced by mobile or fixed noise-producing equipment during rail construction activities.

3. Southwest Gulf Railroad Company shall use electrically-powered equipment instead of pneumatic or internal combustion powered equipment during rail construction activities, where such equipment is available to perform the same function.

4. Southwest Gulf Railroad Company shall minimize noise by locating material stockpiles, mobile equipment staging areas, parking areas, and maintenance areas as far as practicable from noise sensitive receptors.

5. Southwest Gulf Railroad Company shall establish and enforce a 10 mile per hour construction site and 25 miles per hour private construction access road speed limits during the rail construction period.

6. Southwest Gulf Railroad Company shall not engage in rail construction activities between 7:00 p.m. and 7:00 a.m. Monday through Saturday or at any time on Sunday or on Federal holidays. Exceptions may be made for emergency situations.

7. Southwest Gulf Railroad Company shall use noise-producing signals, including horns, whistles, alarms, and bells for safety warning purposes only.

8. Southwest Gulf Railroad Company shall ensure that no project-related fixed, mobile, or portable public address or music system is audible at any adjacent noise sensitive receptor, except for emergency purposes.

9. To minimize wheel squeal, if a loop track is used, Southwest Gulf Railroad Company shall design a loop track with a radius greater than 1000 feet or 10 times the wheelbase of the largest car used on the tracks.

10. Southwest Gulf Railroad Company shall provide a track lubrication system for a loop track to mitigate wheel squeal noise if such noise occurs.

11. Southwest Gulf Railroad Company shall provide a movable point crossover (a crossover designed with a spring loaded piece to eliminate the noise producing gap) to mitigate excess noise from a crossover at the neck of a loop track (where the curved track reconnects with the tangent (straight) track).

10.2 Vibration Mitigation Measures

10.2.1 Operational Vibration

Other than impacts to two residences along Alternative 1, the rail alternatives would not generate operational vibration impacts, thus no mitigation measures are recommended or necessary for any other rail alternatives. In most cases it is not practicable to mitigate vibration impacts from heavy freight rail trains. Construction activities and operations under the No-Action Alternative could create vibration impacts to cultural resources. Refer to Chapter 5 of the SDEIS for more information regarding impacts to cultural resources.

10.2.2 Construction Vibration

Because no vibration impacts are predicted during conventional construction phases of the project, no mitigation measures are recommended or necessary for conventional construction. Pile driving could cause impacts to water wells or cultural resources. This impact could be mitigated by conducting a pre-construction survey to locate nearby wells and monitoring the vibration levels at these wells to ensure that the PPV limit of 2.72 inches per second in any axis is not exceeded during construction and monitoring the vibration levels at cultural resources sites that are within the impact zone (as discussed in Chapter 5 of the SDEIS).

11.0 INDIRECT AND CUMULATIVE EFFECTS

The project is not expected to create any adverse indirect noise or vibration effects. All noise and vibration from existing activities was part of the direct impact assessment of this project. An evaluation of potential cumulative noise and vibration effects requires the consideration of existing or reasonably foreseeable future projects resulting from Federal or non-Federal action, including private actions whose independent noise or vibration effects could combine with less than substantial project effects to create an additional adverse effect. The only reasonably foreseeable project that might result in noise or vibration of any noteworthy magnitude would be the proposed quarry located in the vicinity of the project's loading track in the northeasterly corner of the study area. The two primary noise sources associated with the quarry would be (1) sub-grade blasting activities to fracture the rock formations (see Appendix B-1 of the SDEIS, #EI-2095) and (2) the excavation, transport, and loading of rock onto the project trains. The blasting activity is expected to occur not more than once per day. The below grade explosion is designed to fracture rock into large pieces for excavation. The production of fly-rock and dust is purposefully minimized by placing the explosive charges 50 feet below ground level and using a series of short (a few milli-seconds) delays between charge holes. This blasting procedure results in a sound of approximately one second duration at off-site areas. This sound (subjectively a "thump" because of its predominately low frequency content) would be very audible (but not harmful) in the northerly and perhaps audible in the central portion of the study area. With no shielding the sound could briefly approach a maximum 95 dBA at the nearest residence approximately 1,200 feet distant, and it would be gone within a second.[26] There would not be substantial acoustic energy in this brief blasting noise event and its effect on the overall sound levels combined with any of the project alternatives would be minimal. The second group of noise sources would be very similar to conventional construction noise as discussed in Section 9.1.2. The distances to the limits of quarrying activity, plus the shielding provided by landforms would act to appreciably reduce blast and mine operations noise at the nearest sensitive receptors. Thus, quarry noise would not materially contribute to noise from the No-Action or rail alternatives and no adverse cumulative noise effects are expected.

Damaging or perceptible quarry-activity-related ground vibration, including blasting vibration, would not propagate outside the quarry boundary, thus no cumulative adverse vibration effects are expected to occur.

[26] URS Greiner Woodward-Clyde. Blast Noise Measurements at Dry Creek Rock Plant.

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APPENDIX A

INTRODUCTION TO RAIL NOISE, CONSTRUCTION NOISE AND CONSTRUCTION VIBRATION

INTRODUCTION TO RAIL NOISE, CONSTRUCTION NOISE, AND CONSTRUCTION VIBRATION

A-1 - Glossary of Noise and Vibration Terms

Ambient Noise Level	The prevailing or energy-average noise level in an area comprised of all sounds from near and far. Usually described by the L_{eq} or an hourly L_{eq}-based sound descriptor such as L_{dn}.
Abatement	The reduction of noise or vibration or avoidance or elimination of an impact by taking purposeful action, such as constructing a barrier, or selecting a quieter source, or modifying a process, etc.
Attenuation	Reduction or decrease in sound or vibration energy.
Baseline	A reference characteristic or time to which project changes may be compared.
Continuously welded rail	Track where individual rail sections have been welded together and ground smooth to eliminate the joints.
Curved track	Track sections where the inner rail and the outer rail are of different lengths to accommodate a turn in the route. Differing track radii may be used depending on the required tightness of the curve.
Decibel	A unit of measurement on a logarithmic scale that describes the magnitude of a particular quantity of sound pressure with respect to a standard reference pressure value of 20 micropascals. The perceived loudness of a sound corresponds to its absolute magnitude compared to the reference sound or to the magnitude of other sounds. Decibels may also be used to describe other ratio-based quantities such as Sound Power Level, Sound Intensity Level, or various vibration levels (see VdB).
Decibels, A-weighted	(dBA). Refers to overall decibels of a sound where the strength of its individual frequencies have been modified by applying the A scale filter such that the magnitudes of lower and very high frequencies are discounted. A dBA value represents an overall sound level that corresponds well with human hearing response to the typical intensity of common environmental sounds.
Descriptor	Sound descriptor, also a metric. A term or acronym defining a method or formula used to describe or define sound or noise. May be a simple quantity such as the maximum sound level (L_{max}) or energy average sound level (L_{eq}), or PPV or VdB to describe vibration. It may be a more complex quantity that contains time-of-day penalties, such as the L_{dn} or DNL. Only a few of the many descriptors common to acoustics are used in this environmental analysis.

DNL	See L_{dn}.
Frequency	The number of times per second that the sine wave of sound repeats itself, or that the sine wave of a vibrating object repeats itself. Frequency is expressed in cycles per second and is abbreviated as Hertz (Hz). The frequency corresponds to the perceived pitch of a sound (e.g., high or low).
Hourly Noise Level	HNL, see $L_{eq}(h)$.
Insertion Loss	IL. A measure, expressed in decibels, of the acoustical effectiveness of any sound barrier to reduce/abate the sound pressure level experienced at a Receiver location. The IL value is subtracted from the unabated sound level that would occur at the Receiver location to determine the final, abated sound level.
Jointed rail	Track that has been formed by butting and clamping individual rail segments together end-to-end.
L_{eq}	Energy-equivalent sound level. The equivalent continuous non-varying sound level calculated to occur during a stated period, that contains the same acoustical energy as a time-varying sound occurring (or predicted to occur) during a period with the same duration. The L_{eq} is computed by summing the noise energy during the stated period using mathematical integration.
$L_{eq}(h)$	Energy-equivalent noise level for a one-hour period. Sometimes referred to as Hourly Noise Level. Other periods may be specified. Shorter periods may accurately represent longer periods when measuring a relatively constant level noise.
L_{dn}	Day-Night Average Sound Level. An annual measure of cumulative noise exposure in a community that applies a penalty during nighttime hours (10:00 pm to 7:00 am) to account for increased sensitivity to noise at night. The time weighting is applied by adding 10 dBA to the measured level of all sound that occurs during the nighttime period.
Line Source	See Source.
L_n	The "statistical" sound level equaled or exceeded "n" percent of the time during a measurement. For example, L_{10} is the sound level equaled or exceeded 10 percent of the time, or for 6 minutes during a one-hour period. The L_{50} would represent the sound level exceeded for 30 minutes during a 60-minute period.
Model	Noise or vibration model. A set of source characteristics, mathematical formulae, and a calculation method that predicts the generation, propagation, and resultant levels of sound or vibration at the source and at various receivers located a specified distance away from the source. A model may be implemented by hand calculations or by sophisticated computer programs. The computerized

	models are typically used where the source and/or the propagation path and/or the receiver locations are complex. The model may be two or three dimensional.
Noise	Unwanted sound. Based on subjective human individual or group assessment of a given sound's interference, annoyance, loudness, inappropriateness, etc.
Maximum Level	L_{max}. The highest magnitude of the sound or vibration energy occurring during a measurement or predicted to occur.
Minimum Level	L_{min}. The lowest magnitude of the sound or vibration energy occurring during a measurement or predicted to occur.
Point Source	See Source.
PPV	Peak particle velocity. A measure of vibration strength typically used to determine potential for damage to structures.
Propagation	Motion of the sound or vibration energy away from the source in the form of a wave through an elastic medium such as air or earth.
Receiver, Receptor	A location that might be adversely affected by noise. Receivers refer to both modeling locations and measurement locations that are selected because of their sensitivity to noise/vibration and/or because they are representative of other sensitive uses. With respect to noise, the Receiver may include outdoor areas of frequent human use associated with a residence in addition to the house itself. In this SDEIS, the Receiver includes an outdoor activity area extending 200 feet from the center of the residence. For vibration analysis, the house itself is the sensitive location.
SEL	Sound Exposure Level. A one-second duration, equivalent sound level calculated from an L_{eq} for the actual duration of an individual acoustic event or an average L_{eq} of two or more similar events to represent a typical acoustical event. For example, all of the sound energy from a train pass-by lasting two minutes squeezed into one second, as if the sound had occurred all at once, yields the SEL for the train pass-by event. Similarly, the L_{eq} measured from a train horn sequence lasting 20 seconds, when compressed into a one-second period is the SEL of the train horn sequence. SEL is expressed in dBA units the same as the L_{eq} and other sound descriptors. However, SEL values may only be compared to other SEL values SEL are not directly comparable to instantaneous sound level, or L_{eq}, or L_{dn}.
Sensitive Use	A type of land use that is susceptible to disturbance or annoyance from external noise and/or vibration sources. These locations are typically associated with residential use where people sleep, communicate, and engage in intellectual or recreational activities that require peace and quiet. It may also include public

spaces such as places of worship, schools, libraries, and hospitals and where very sensitive instrumentation and laboratory equipment is used.

Source — Sound Source. Typically a vehicle, machine, or other device or a larger facility such as a factory, busy highway, airport or rail line that generates relatively high levels of sound that is considered noise by nearby Receivers. Acoustic sources are classified as point or line sources based on their geometry. A point source is generally a single noise producing device such as a truck a lawnmower, an air conditioner, or even a factory if one is far away from it. Sound travels away from this type of source as the ripples on a pond move away from a stone tossed into the pond. A line source consists of a string of many point sources such as the collection of cars, trucks, buses, and motorcycles traveling on a busy highway, or a single long source such as a buzzing electrical transmission line. Because the sound comes from many places along the line at the same time, sound travels away from this type of source like a cylinder or tube similar to a very wide ocean wave breaking onshore all at once. Some sources represent both point and line source characteristics. For example, a freight train locomotive and the train horn are point sources, while the long line of rail cars is a line source.

Tangent track — Track that goes generally in a straight line without curves.

VdB — Velocity decibel. A measure of vibration strength compared to a reference value of 1 micro-inch per second. More recently developed to characterize human reaction to vibration, but is used to describe effects on buildings in some cases. The threshold of human perception is about 65 to 70 VdB, which is very much lower than the threshold of slight effects on buildings of 95 to 100 VdB.

Additional sound descriptors and terms may be found in publications of the American National Standards Institute (e.g., ANSI S1.1-1994 and ANSI S12.9-1988, Reaffirmed September 1998). An extensive Glossary of Acoustic terms prepared by the Institute of Noise Control Engineering of the United States may be found at http://users.aol.com/inceusa/glossary.html.

APPENDIX A-2 NOISE SCIENCE: AN INTRODUCTION TO RAIL NOISE, CONSTRUCTION NOISE, AND CONSTRUCTION VIBRATION

In three primary sections, this appendix provides general information regarding the fundamentals of rail noise and construction noise and vibration. Appendix A-4 presents the references for this appendix.

A-2.1 Fundamentals of Rail Noise

Noise is the common term used to describe unwanted sound. The terms 'noise' and 'sound' are used interchangeably in this discussion.

A-2.1.1 A-Weighted Sound Level

The unit of sound pressure level measurement is the decibel (dB). It is a unit describing the amplitude of sound pressure compared to a reference pressure. The most common descriptor of sound and noise associated with community noise measurements is the A-weighted sound pressure level, which is abbreviated as dBA. It is defined as the sound pressure level in decibels as measured on a sound meter using the A-weighting filter network. The A-weighting frequency filter de-emphasizes the very low and very high frequency components of sound (low and high pitched sounds) in a manner similar to the frequency response of human hearing. Environmental sound descriptors (metrics) that are based on A-weighted sound levels correlate well with people's group reactions to sound and environmental noise. All sound levels in this environmental analysis are A-weighted. The A-weighted sound pressure levels of typical sources of noise are shown in Table A-1. Commonly encountered sound levels range from slightly above the threshold of hearing and very quiet (around 20 dBA) to very loud sounds at 130 dBA. Note that the dBA values in the table are short-term sound levels and are not directly comparable to Day Night Average Sound Level (DNL or L_{dn}) or Sound Exposure Level (SEL). See Figure A-2 for typical L_{dn} values.

Table A-1 Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (at a Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness (Relative to a Reference Loudness of 70 Decibels*)
Military Jet Take-off with After-burner (50 ft) Civil Defense Siren (100 ft)	140 130	Aircraft Carrier Flight Deck	
Commercial Jet Take-off (200 ft)	120		Threshold of Pain *32 times as loud
Pile Driver (maximum level, 50 ft)	110	Rock Music Concert	*16 times as loud
Ambulance Siren (100 ft) Pile driver (average level, 50 ft) Newspaper Press (5 ft) Power Lawn Mower (3 ft)	100		Very Loud *8 times as loud
Motorcycle (25 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck, 40 mph (50 ft)	90	Boiler Room Printing Press Plant	*4 times as loud
Bulldozer, Grader, Loader, Concrete mixer, Tie cutter/inserter, (50 ft)	85		
Garbage Disposal (3 ft)	80	High Urban Ambient Sound	*2 times as loud
Passenger Car, 65 mph (25 ft) Vacuum Cleaner (10 ft)	70		Moderately Loud *70 decibels (Reference Loudness)
Normal Conversation (5 ft) Air Conditioning Unit (100 ft)	60	Data Processing Center Department Store	*1/2 as loud
Light Traffic (100 ft)	50	Private Business Office	*1/4 as loud
Bird Calls (distant)	40	Lower Limit of Urban Ambient Sound	Quiet *1/8 as loud
Soft Whisper (5 ft)	30	Quiet Bedroom	
	20	Recording Studio	Very Quiet
	10		
	0		Threshold of Hearing

Source: Compiled by URS Corporation from various published sources and widely-used references such as The Handbook of Acoustical Measurements and Noise Control, Third Edition, edited by C.M. Harris, 1991; and Noise and Vibration Control, Second Edition, edited by L.L. Beranek, 1988 Institute of Noise Control Engineering.

A-2.1.2 Sound Level Reduction with Distance

Sound generated by a point source decreases at a rate of approximately 6 decibels for every doubling of distance it travels away from the source. This is due to the reduction of acoustic energy per unit area resulting from the geometric spreading of the sound wave as it leaves the source and travels outward. Picture the ripples in a pond becoming smaller and smaller as they move away from the point where a tossed stone entered the water. Thus, if a particular construction activity generated average noise levels of 89 dBA at 50 feet from the source, the L_{eq} would be 83 dBA at 100 feet, 77 dBA at 200 feet, 71 dBA at 400 feet, and so on. Intervening structures that block the line of sight between the source and receptor, such as constructed earthen berms, hills, or other manmade or natural landforms, would further decrease the resultant noise level by a minimum of 5 dBA. The effects of molecular air absorption and anomalous excess attenuation would additionally reduce the noise level as experienced at more distant locations at the rates of 0.7 dBA and 1.0 dBA per 1,000 feet, respectively. Sound waves moving away from a line source do not diminish as rapidly, and their sound level decreases at a rate of 3 to 4½ dBA for every doubling of distance away from the source plus the additional reduction due to molecular air absorption and anomalous excess attenuation just like point sources.

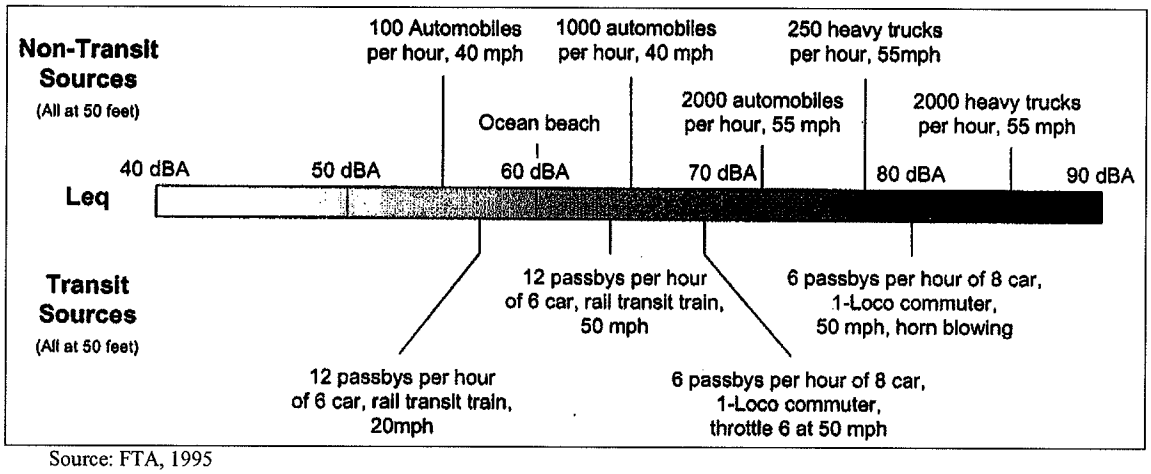
A-2.1.3 Equivalent Sound Level, Day-Night Average Sound Level, Sound Exposure Level

The A-weighted sound level of rail noise and other long-term noise-producing activities within and around a community vary with time. Certain noise descriptors are preferred for use in describing community noise environments. These descriptors are based upon noise energy and are called the Equivalent Noise Level (L_{eq}), and the Day-Night Average Sound Level (DNL or L_{dn}). L_{eq} is defined as the continuous steady-state noise level that would have the same total acoustical energy as the real fluctuating noise measured during the same period. Although L_{eq} can be measured or computed for any period, it is typically specified for one hour ($L_{eq}(h)$) or 24 hours ($L_{eq}(24h)$). DNL is the same as a 24-hour L_{eq} except that noise occurring during the nighttime hours (10:00 pm – 7:00 am) is weighted or penalized by 10 dBA. The nighttime penalty accounts for the increased annoyance of noise during typical sleeping hours. DNL accounts for the tempo (operational frequency), acoustic magnitude, duration and time of day of transit-related noise events. Sound Exposure Level (SEL) is an acoustical event L_{eq} compressed into a one second period irrespective of the actual event duration. It is more fully described in Appendix 4-1 Glossary. The SEL value allows one to directly compare the overall sound energy of two similar or different acoustic events, and/or events of different durations. For example, the sound energy from a work train with few cars, a fast passenger train, and a slow freight train may be compared on the basis of their SEL values. SEL also allows predictions to be made (modeling) of the L_{eq} and/or L_{dn} of future noise source activity that accounts for the expected number of events, when they will occur (day or night periods or both), and their relative sound levels.

Both L_{eq} and DNL descriptors are approved by various regulatory agencies for noise-related land use planning. The unit for each of these descriptors is dBA. The most recent methodology recommended for assessing rail noise effects (FRA, 1998) uses L_{dn} as the noise descriptor of choice. This is consistent with the guidelines adopted in 1995 by the Federal Transit Administration (DOT-T-95-16). Figures A-1 and A-2 show typical L_{eq} and L_{dn}, respectively, for transit (rail) and non-transit (non-rail) sources. Comparing the automobile traffic noise levels, 1,000 autos per hour at 40 mph generate approximately 65

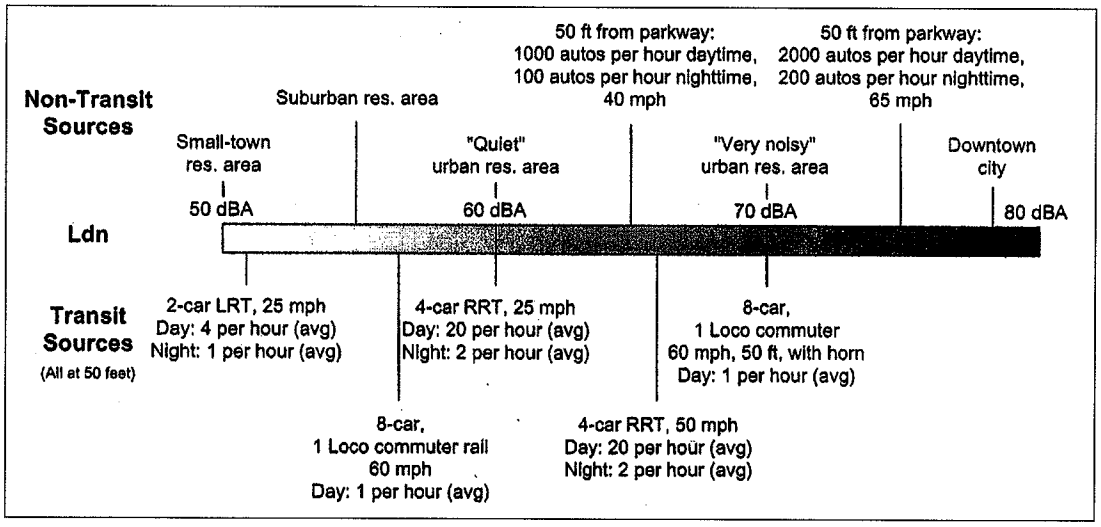
dBA L_{eq} (Figure A-2). Assuming this constant rate for the daytime period, but only 100 autos per hour during the nighttime, the L_{dn} would be 65 dBA.

Figure A-1. Typical Hourly L_{eq}



Source: FTA, 1995

Figure A-2 Typical DNL Values



Source: FTA, 1995

A-2.1.4 Insertion Loss

The insertion loss (abbreviated IL) is a measure of the effectiveness of a sound barrier. It is the noise level reduction at a specific Receiver due to construction of a noise barrier between the noise source (such as traffic and trains) and the Receiver. Generally, it is the net effect of the noise barrier attenuation and the loss of ground effects.

A-2.1.5 Perception of Sound

A change in environmental noise and/or vibration conditions often results from providing new or expanded transportation services. Generally, in the United States the main source of environmental noise affecting the population today is surface transportation noise, more specifically from vehicles traveling

local streets and roads, and state and interstate highways. A more limited population is exposed to noise from railroad and aviation noise sources with a very small number of persons affected by noise from marine transportation. Community noise may also be associated with transit stations, Park-and-Ride lots, and rail vehicle maintenance facilities.

Evaluating differences between an existing and total predicted future noise environment assesses the potential responses of persons to changes in their noise environment. The following relationships of perception and response to quantifiable increases in long-term sound level are used as a basis for assessing potential effects of rail noise:

- Except in a carefully controlled laboratory condition, a change of 1 dBA is very difficult to perceive;
- In the outside environment, a 3 dBA change is considered perceptible;
- An increase of 5 dBA is considered readily perceptible and would generally result in a change in community response to its noise environment; and
- A 10 dBA increase is perceived as a doubling in loudness and would likely result in a widespread community response.

A-2.1.6 Rail Noise Source Characteristics

Rail noise is dependent on many factors:

- Train length, consist (number and type of locomotives and rail cars) and on speed for the rail cars and somewhat on speed for the locomotive (locomotive noise is more dependent on the power requirements reflected by the throttle "notch" setting);
- Track condition and gradient;
- Distance from the track to the receiver;
- Intervening ground surface characteristics (whether acoustically reflective or absorptive (i.e., pavement or vegetation);
- Meteorological factors such as wind and temperature gradients; and
- Shielding due to structures, soundwalls, earthen berms, hills, and the edge of a roadway, or a depressed section (cut).

The noise from a train pass-by is a combination of contributions from locomotive engines and from railcars, with the majority of the noise exposure from the engines. Engines produce higher noise levels than cars, but the duration of the car-related noise is usually longer. The noise emitted by the engine is nearly independent of speed, but is highly dependent on the grade of the track. The mean A-weighted noise output of an engine increases when traveling uphill, and decreases rapidly when descending. Downgrade noise output tends to level off as the grade reaches approximately -2.5 percent, due to increased noise from the cooling fans of the dynamic braking system.

Railcar noise is independent of grade, but increases by approximately 6 dBA for each doubling of speed. Track and wheel condition have the greatest effect on car noise; jointed track (as opposed to continuously welded track) and the presence of switching frogs[1] can produce noise levels up to 8 dBA

[1] Where one track merges into or separates from another track.

higher than smooth track in good condition. In addition, wheel flats (caused by dragging of the car along the track when brakes are inappropriately applied) can add up to 15 dBA to the railcar noise emission.

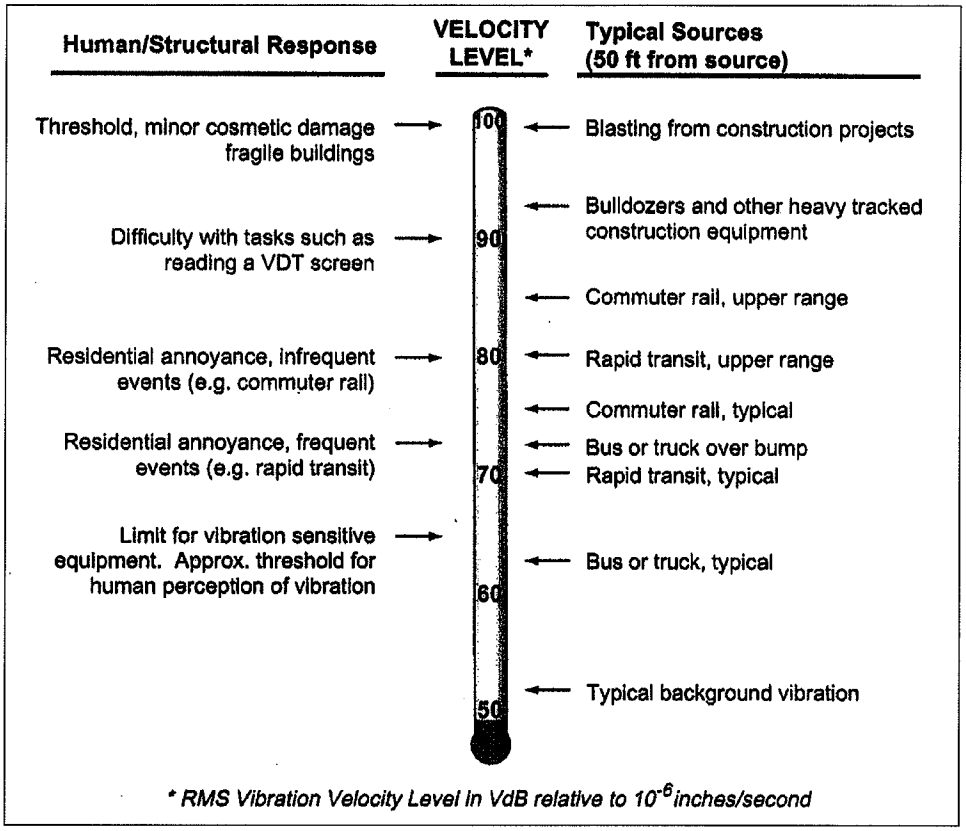
Another difference between engines and railcars is the location of their noise sources. The noisiest components on most locomotives are the cooling fans and radiators on the engine compartment (plus horns), while the wheel-rail interaction typically generates the greatest noise from railcars. The location of the noise source affects the noise reduction provided by a barrier because both the height and proximity of the source and receiver with respect to the barrier's location and height are important in determining the effectiveness of the barrier. The shape and surface of the barrier will also affect the attenuation provided. For example, an absorptive earthen berm or soundwall may provide 2 to 5 dBA greater IL compared to a reflective thin "screen" barrier of the same height and location.

Appendix A-3 Vibration

Ground-borne vibration is a small, rapidly fluctuating motion transmitted through the ground. The strength of ground-borne vibration diminishes (or "attenuates") fairly rapidly over distance. Some soil types transmit vibration quite efficiently; other types (primarily "sandy" soils) do not. There are several basic measurement units commonly used to describe the intensity of ground vibration. The descriptors used by FTA are peak particle velocity, abbreviated PPV, in units of inches per second and the velocity decibel, abbreviated VdB. The velocity parameter (instead of acceleration or displacement) best correlates with human perception of vibration. Thus, the response of humans to vibration is described in this section in terms of the root-mean square velocity level in VdB units relative to one micro-inch per second. As a point of reference, the average person can just barely perceive vibration velocity levels below 70 VdB (typically in the vertical direction). Potential damage to structures is often characterized in terms of PPV. The PPV descriptor is also used in this report and in the references used for analysis of potential vibration damage.

A comparison of common ground-borne vibration levels is shown on Figure A-3. Typical background vibration levels are between 50 and 60 VdB, whereas the levels for minor cosmetic damage to fragile buildings or blasting are generally 100 VdB.

Figure A-3. Typical Levels of Ground-Borne Vibration



Source: FRA, 1998

Typical vibration generated by construction equipment is provided in Table A-2. The peak particle velocity (PPV) and corresponding VdB are shown at a reference distance of 25 feet from the equipment.

Table A-2 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft (in/sec)	L_V at 25 ft (VdB)*
Pile driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile driver (vibratory)	Upper range	0.734	105
	Typical	0.17	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	In soil	0.008	66
	In rock	0.017	75
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

* RMS velocity in decibels (VdB) re 1 micro-inch/second
Source: FRA, 1998

Vibration propagates according to the following expression, based on point sources with normal propagation conditions:

$$PPV_{equip} = PPV_{ref}\left(\frac{25}{D}\right)^{1.5}$$

Where:

PPV_{equip} = the peak particle velocity in in/sec of the equipment adjusted for distance.

PPV_{ref} = the reference vibration level in in/sec at 25 feet from Table A-2.

A soils coefficient of 1.3 is more conservative and is used for soils exhibiting more efficient transmission of ground vibration. It was used in this SDEIS analysis.

The following Table A-3 is reproduced from Jones & Stokes. 2004.

Table A-3 Effect of Blasting Vibration on Materials and Structures

Table 22. Effect of Blasting Vibration on Materials and Structures

PPV (in/sec)	Application	Effect	Reference
600	Explosives inside concrete	Mass blowout of concrete	Tart et al. 1980
375	Explosives inside concrete	Radial cracks develop in concrete	Tart et al. 1980
200	Explosives inside concrete	Spalling of loose/weathered concrete skin	Tart et al. 1980
>100	Rock	Complete breakup of rock masses	Bauer and Calder 1978
100	Explosives inside concrete	Spalling of fresh grout	Tart et al. 1980
100	Explosives near concrete	No damage	Oriard and Coulson 1980
50–150	Explosive near buried pipe	No damage	Oriard 1994
25–100	Rock	Tensile and some radial cracking	Bauer and Calder 1978
40	Mechanical equipment	Shafts misaligned	Bauer and Calder 1977
25	Explosive near buried pipe	No damage	Siskind and Stagg 1993
25	Rock	Damage can occur in rock masses	Oriard 1970
10–25	Rock	Minor tensile slabbing	Bauer and Calder 1978
24	Rock	Rock fracturing	Langefors et al. 1948
15	Cased drill holes	Horizontal offset	Bauer and Calder 1977
>12	Rock	Rock falls in underground tunnels	Langefors et al. 1948
12	Rock	Rock falls in unlined tunnels	E. I. du Pont de Nemours & Co. 1977
<10	Rock	No fracturing of intact rock	Bauer and Calder 1978
9.1	Residential structure	Serious cracking	Langefors et al. 1948
8.0	Concrete blocks	Cracking in blocks	Bauer and Calder 1977
8.0	Plaster	Major cracking	Northwood et al. 1963
7.6	Plaster	50% probability of major damage	E. I. du Pont de Nemours & Co. 1977
7.0–8.0	Cased water wells	No adverse effect on well	Rose et al. 1991
>7.0	Residential structure	Major damage possible	Nichols et al. 1971
4.0–7.0	Residential structure	Minor damage possible	Nichols et al. 1971
<6.9	Residential structure	No damage observed	Wiss and Nichols 1974
6.3	Residential structure	Plaster and masonry walls crack	Langefors et al. 1948
5.44	Water wells	No change in well performance	Robertson et al. 1980
5.4	Plaster	50% probability of minor damage	E. I. du Pont de Nemours & Co. 1977
4.5	Plaster	Minor cracking	Northwood et al. 1963
4.3	Residential structure	Fine cracks in plaster	Langefors et al. 1948
>4.0	Residential structure	Probable damage	Edwards and Northwood 1960
2.0–4.0	Residential structure	Plaster cracking (cosmetic)	Nichols et al. 1971
2.0–4.0	Residential structure	Caution range	Edwards and Northwood 1960
2.8–3.3	Plaster	Threshold of damage (from close-in blasts)	E. I. du Pont de Nemours & Co. 1977
3.0	Plaster	Threshold of cosmetic cracking	Northwood et al. 1963
1.2–3.0	Residential structure	Equates to daily environmental changes	Stagg et al. 1980
2.8	Residential structure	No damage	Langefors et al. 1948
2.0	Residential structure	Plaster can start to crack	Bauer and Calder 1977
2.0	Plaster	Safe level of vibration	E. I. du Pont de Nemours & Co. 1977
<2.0	Residential structure	No damage	Nichols et al. 1971
<2.0	Residential structure	No damage	Edwards and Northwood 1960
0.9	Residential structure	Equivalent to nail driving	Stagg et al. 1980
0.5	Mercury switch	Trips switch	Bauer and Calder 1977
0.5	Residential structure	Equivalent to door slam	Stagg et al. 1980
0.1–0.5	Residential structure	Equates to normal daily family activity	Stagg et al. 1980
0.3	Residential structure	Equivalent to jumping on floor	Stagg et al. 1980
0.03	Residential structure	Equivalent to walking on floor	Stagg et al. 1980

Appendix A-4 References

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FRA. December 1998. High-Speed Ground Transportation Noise and Vibration Impact Assessment, Final Draft. Washington, DC.

FTA. April 1995. Transit Noise and Vibration Impact Assessment. DOT-T-95-16. (Prepared under contract by Harris, Miller, Miller and Hanson. Burlington, MA.) Washington, DC.

Jones & Stokes. 2004. Transportation- and construction-induced vibration guidance manual. June. (J&S 02-039.) Sacramento, CA. Prepared for California Department of Transportation, Noise, Vibration, and Hazardous Waste Management Office, Sacramento, CA.

United States Department of Labor, Occupational Safety and Health Administration, Office of Information. 1980. Noise Control. Washington, DC.

APPENDIX B

LIST OF FIELD INSTRUMENTATION AND CALIBRATION RECORDS

LIST OF FIELD INSTRUMENTATION

Sound Level Meter (for short-term noise measurements)

- Brüel & Kjær Type 2231 Precision (Type 1) Integrating Sound Level Meter, Serial Number 1413404

Community Noise Analyzers (for long-term noise measurements)

- Larson Davis Model 820 Type 1 Integrating Sound Level Meter, Serial Number 1470
- Larson Davis Model 820 Type 1 Integrating Sound Level Meter, Serial Number 1528
- Larson Davis Model 820 Type 1 Integrating Sound Level Meter, Serial Number 1597

Acoustical Calibrators

- Brüel & Kjær Type 4231 Acoustical Calibrator, Serial Number 1850301
- Larson Davis Model CAL-200 Acoustical Calibrator, Serial Number 2794

Meteorology Instrumentation

- Mannix Model CMM 880 Digital Hygrometer/Thermometer, Serial Number 8821784
- Sims Model DIC Digital Anemometer, Serial Number 95022

Other Equipment

- Surveyor tape measures, tripod, windscreens.
- Laser Rangefinder. Nikon Model Laser 800.
- Reference master clock. Oregon Scientific radio controlled (atomic reference, Boulder, CO) digital clock. Model RM806, SN 09A99.
- GPS. Garmin Model GPSmap76, Am WASS enhanced satellite receiver, Serial Number 80420663
- Two-Way Radios. Motorola FRS-250

CERTIFICATE OF CALIBRATION
14024-1
FOR BRÜEL & KJAER INTEGRATING SOUND LEVEL METER

Model **2231**

Serial No. **1413404**
ID No. **N/A**
P.O.# **Letter**

Customer: **URS Corporation**
Santa Ana, CA 92705

was tested and met factory specifications
according to the Referenced Test Procedure

on **14 MAR 2006** **BY** **HAROLD LYNCH**
Service Manager

As received condition: Within Specification.
Re-calibration due **14 MAR 2008**

Certified References*

Mfg.	Type	Serial No.	Date Due
B&K	2636	1601487	23 FEB 2007
HP	34401	MY41031678	29 JUL 2006
HP	3458A	2823A17713	01 AUG 2006
B&K	4226	1774068	07 MAR 2007
B&K	4231	1770857	21 JUL 2006

Performed in Compliance with ANSI, NCSL Z-540-1 (which also covers MIL STD 45662A) and ISO 17025, ISO 9001:2000 Certification NQA No. 11252
*References are traceable to NIST (National Institute of Standards and Technology).

Note: For calibration data see enclosed pages.
The data represent both "as found" and "as left."

Reference Test Procedure: **ACCT Procedure 2231 Ver. 1.1**

Brüel & Kjær Factory Service Instructions: **2231** Rev. Apr. 1985

Temperature	Relative Humidity	Barometric Pressure
23°C	38 %	992.09 hPa

Note: This calibration report shall not be reproduced, except in full, without written consent by Odin Metrology, Inc.

Signed: Harold Lynch

ODIN METROLOGY, INC.

CALIBRATION OF BRÜEL & KJÆR INSTRUMENTS
3533 OLD CONEJO ROAD; SUITE 125 THOUSAND OAKS CA 91320
PHONE: (805) 375-0830 FAX: (805) 375-0405

Certificate of Calibration and Conformance

Certificate Number 2006-75817

Instrument Model 820, Serial Number 1470, was calibrated on 06JAN2006. The instrument meets factory specifications per Procedure D0001.8160, ANSI S1.4 1983, IEC 651-Type 1 1979, and IEC 804-Type 1 1985.

New Instrument
Date Calibrated: 06JAN2006
Calibration due: 06MAR2007

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	2900 / 2209	0666 / 0123	12 Months	01DEC2006	2005-74664

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 24 ° Centigrade Relative Humidity: 24 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Corporate Headquarters. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

Signed: Keith Driskill
Technician: Keith Driskill

Larson Davis A PCB GROUP CO.

Larson Davis, Inc. is an ISO 9001:2000 Registered Company

1681 West 820 North • Provo, UT 84601 U.S.A. • 801.375.0177 • Fax: 801.375.0182 • www.larsondavis.com

Certificate of Calibration and Conformance

Certificate Number 2006-78701

Instrument Model 820, Serial Number 1528, was calibrated on 04APR2006. The instrument meets factory specifications per Procedure D0001.8160, ANSI S1.4 1983, IEC 651-Type 1 1979, and IEC 804-Type 1 1985.

Instrument found to be in calibration as received: YES
Date Calibrated: 04APR2006
Calibration due: 04APR2007

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL DUE	TRACEABILITY NO
Larson Davis	2900 / 2209	0656 / 0123	12 Months	01DEC2006	2005-74684

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 25 ° Centigrade

Relative Humidity: 28 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Corporate Headquarters. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data same as shipped data.

Signed: Keith Driskill

Technician: Keith Driskill

Larson Davis A PCB GROUP CO.

Larson Davis, Inc. is an ISO 9001-2000 Registered Company

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Certificate of Calibration and Conformance

Certificate Number 2006-78188

Instrument Model 820, Serial Number 1597, was calibrated on 21MAR2006. The instrument meets factory specifications per Procedure D0001.8160, ANSI S1.4 1983, IEC 651-Type 1 1979, and IEC 804-Type 1 1985.

New Instrument
Date Calibrated: 21MAR2006
Calibration due: 21MAY2007

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL DUE	TRACEABILITY NO
Larson Davis	LDSigGn/2209	0689 / 0103	12 Months	05DEC2006	2005-74821

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 27 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Corporate Headquarters. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

Signed:

Technician: Ron Harris

Larson Davis A PCB GROUP CO.

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CERTIFICATE OF CALIBRATION
FOR BRÜEL & KJÆR

Sound Level Calibrator Type 4231

The Sound Pressure Level has been measured by comparison with Standard Reference Pistonphone.

Type 4220 serial No. **1048473** and
Type 4220 serial No. **1048795**

Calibrated by: **TS** (BRÜEL & KJÆR)
Date of calibration: **17 AUG 2005**
Re-calibration due : **17 AUG 2006**

The calibrator type **4231**

Serial number **1850301**
ID number N/A

has been found to be **within** the specifications listed below.
Sound Pressure Level produced in the coupler terminated by a loading volume of 1.333 cm^3:
94.0 dB ± 0.2 dB
Level step: SPL increase of: **20 dB ± 0.1 dB**
Frequency: **1000 Hz ± 0.1 %**
Distortion: **< 1%**

For: **URS Corporation**
Santa Ana, CA 92705

CONDITION OF TEST

Ambient Pressure:	**997.18**	hPa
Temperature	**23°**	C
Relative Humidity	**39**	%
Date of Calibration	**13 MAR 2006**	
Re-calibration due on	**13 MAR 2007**	

Calibration procedure: Brüel & Kjær 4231, Rev. 15 DEC 2004

Certificate: **14024-3** PO #:**Letter**

PERFORMANCE AS RECEIVED:

Frequency	**999.8**	Hz
SPL	**94.01**	dB
SPL + 20 Db	**114.00**	dB
Distortion (at 94 dB)	**<0.3**	%
Battery voltage	**1.42**	Volt

Was frequency and SPL adjusted for improvement? **No!**
Was battery replaced with new alkaline type? **Yes!**

UNCERTAINTY OF MEASUREMENT:
A: Estimated Uncertainty of comparison: +/-0.05 dB
B: Estimated Uncertainty of Ref. 4220: +/-0.06 dB
C: Total Uncertainty : 0.08 dB (calculated as the Square root of the summed squares of a and b)
D: Expanded Uncertainty with C.F: 2 (for 95% Confidence Level): 0.16 dB

FINAL PERFORMANCE:

Frequency	**999.8**	Hz
SPL	**94.01**	dB
SPL + 20 dB	**114.00**	dB
Distortion (at 94 dB)	**<0.3**	%

Note: This calibrator was **within** Mfg. Specifications as received.

ODIN METROLOGY, INC.
CALIBRATION OF BRÜEL & KJÆR INSTRUMENTS
3533 OLD CONEJO ROAD, SUITE # 125
THOUSAND OAKS, CA 91320
PHONE: (805) 375-0830 FAX: (805) 375-0405

Performed on a test system which operates in compliance with ANSI/ NCSL Z540-1(also covering MIL STD 45662A), ISO 17025, and ISO 9001:2000 Certification NQA No. 11252. Reference standards pistonphones calibrated traceable to NIST with, NIST test no.**822/270212-04, D1209**

Calibration performed by:
Harold Lynch, Service Manager

Certificate of Calibration and Conformance

Certificate Number 2005-74013

Instrument Model CAL200, Serial Number 2794, was calibrated on 11NOV2005. The instrument meets factory specifications per Procedure D0001.8190.

Instrument found to be in calibration as received: YES
Date Calibrated: 11NOV2005
Calibration due: 11NOV2006

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL DUE	TRACEABILITY NO
Schaevitz	P3061-15PSIA	4987	12 Months	01MAR2006	278474
Larson Davis	2559	2506	12 Months	29MAR2006	13118-1
Larson Davis	2900	0661	12 Months	06APR2006	2005-67617
Hewlett Packard	34401A	US36033460	16 Months	27MAY2006	277736
Hewlett Packard	34401A	3146A10352	12 Months	24JUN2006	281920
Larson Davis	MTS1000/2201	0111	12 Months	08SEP2006	2005-0808-1
Larson Davis	PRM915	0112	12 Months	14SEP2006	2005-72135
Larson Davis	PRM902	0460	12 Months	14SEP2006	2005-72134

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Environmental test conditions as shown on calibration report.

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Corporate Headquarters. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"As Received" data is the same as shipped data.

Signed: Scott Montgomery

Technician: Scott Montgomery

Larson Davis A PCB GROUP CO.

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APPENDIX C

FIELD NOISE MEASUREMENT DATA

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: NT-A OBSERVER(s): Rob Greene Grant Limberg Jane Kim
START DATE & TIME: 4/9/06 11:48p END DATE & TIME: 4/9/06 12:10a
ADDRESS:
N 29° 26' 35.16" W 099° 00' 37.7" (Same as ST-A)

Weather

TEMP: 67 °F HUMIDITY: 58 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 3-4 MPH DIR: N NE E SE S SW W NW STEADY GUSTY 5-6mph
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 93.8 dBA SPL POST-TEST 93.9 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start / End							
1	2350 / 2400	L_{eq} 29.8	L_{max} 44.7	L_{min} 22.9	L_{90} 24.4	L_{50} 26.4	L_{10} 31.4	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: dirt
COUNT DURATION: ____-MINUTE

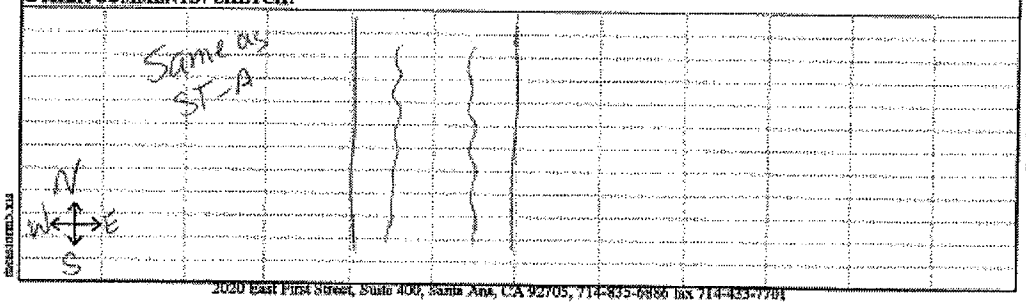
	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: distant Fwy (slight), distant gun shot

Description / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: N
OTHER COMMENTS / SKETCH:



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FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: NT-B OBSERVER(S): Rob Greene, Janice King, Grant Limberg
START DATE & TIME: 4/10/06 10:40 END DATE & TIME: 4/10/06
ADDRESS:
N29° 24' 38.9"
W099° 00' 18.4" Elev 875

Weather

TEMP: 72 °F HUMIDITY: 45 % R.H. WIND: CALM LIGHT [MODERATE] [VARIABLE]
WINDSPEED: 3-5 MPH DIR: N NE [E] SE S SW W NW STEADY [GUSTY] 7 mph
SKY: OVRCST [PARTLY CLOUDY] CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: [1] 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 93.8 dBA SPL POST-TEST 93.7 dBA SPL WINDSCREEN X
SETTINGS: [A-WEIGHTED] [SLOW] FAST FRONTAL [RANDOM] [ANSI] OTHER:

Rec #	Start / End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
1	2250 / 2300	39.0	54.0	28.8	30.9	36.4	42.4	
/ /	/ /							
/ /	/ /							
/ /	/ /							

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL [AMBIENT] OTHER:
ROADWAY TYPE: dirt
COUNT DURATION: ____-MINUTE

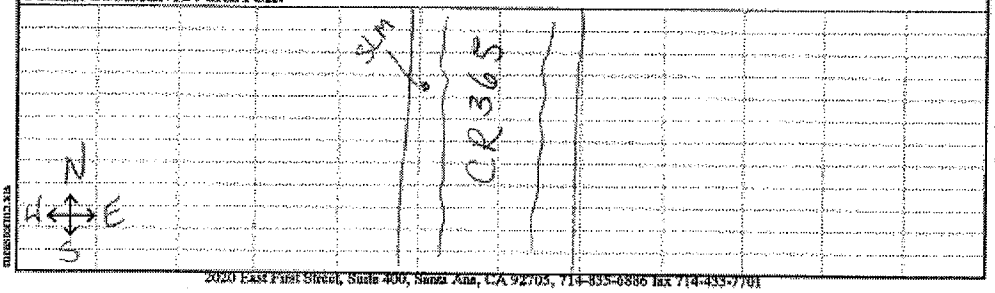
	#1 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / [RUSTLING LEAVES] / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: distant train (very faint) low but audible

Description / Sketch

TERRAIN: HARD [SOFT] MIXED [FLAT] OTHER:
PHOTOS: ICD
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: NT-C OBSERVER(S): Rob Greene, Janice King, Grant Limberg
START DATE & TIME: 4/8/06 11:40p END DATE & TIME: 4/8/06
ADDRESS:
N 29° 21' 48.8"
W 099° 02' 20.9" Elev. 846'

Weather

TEMP: 103 °F HUMIDITY: 35 % R.H. WIND: CALM / LIGHT MODERATE VARIABLE
WINDSPEED: 0 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY / CLEAR / SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 / 2 SERIAL #: 1413604
CALIBRATOR: B&K 4231 SERIAL #: 1850361
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 93.9 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED / SLOW FAST FRONTAL / RANDOM ANSI / OTHER:

Rec #	Start / End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
1	1150 / 1205	35.9	47.9	25.0	28.4	33.4	39.9	
	/ /							
	/ /							
	/ /							

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC / AIRCRAFT RAIL INDUSTRIAL / AMBIENT / OTHER:
ROADWAY TYPE: dirt (Interstate 90) Source

COUNT DURATION: ____-MINUTE

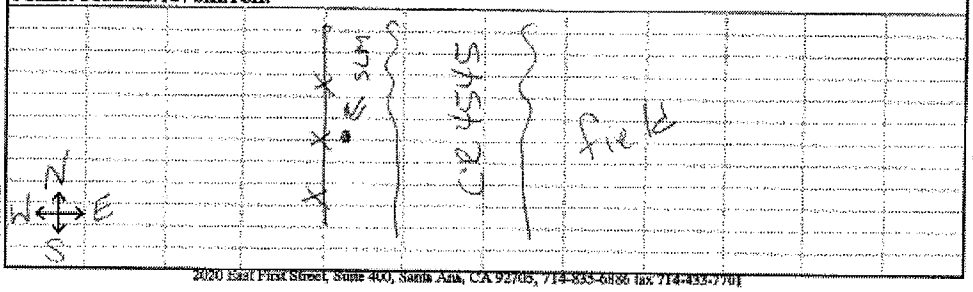
	#1 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	____ / ____	____ / ____	____ / ____	____ / ____
MED. TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
HVY TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
BUSES:	____ / ____	____ / ____	____ / ____	____ / ____
MOTORCYCLES:	____ / ____	____ / ____	____ / ____	____ / ____

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: Owl, Coyote

Description / Sketch

TERRAIN: HARD / SOFT MIXED / FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



MEASURES.XLS

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FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: NT-D OBSERVER(s): Rob Greene, Janice King, Grant Limbury
START DATE & TIME: 4/9/06 11:16p END DATE & TIME: 4/9/06
ADDRESS:
N 39° 22' 59.8"
W 84° 00' 21.5" Elev 891

Weather

TEMP: 67 °F HUMIDITY: 51 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 1-3 MPH DIR: N NE E SE S SW W NW STEADY GUSTY 8 mph
SKY: OVRCST PARTLY CLOUDY CLEAR / SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 / 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 93.8 dBA SPL POST-TEST 93.9 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL / RANDOM / ANSI / OTHER:

Rec #	Start / End							
/	2318 / 30sec	Train	L_{eq} 44.0	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
/	2320 /		L_{eq} 34.4	L_{max} 57.3	L_{min} 27.9	L_{90} 28.9	L_{50} 30.9	L_{10} 35.9
/	/ /		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
/	/ /		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: dirt paved
COUNT DURATION: ____-MINUTE

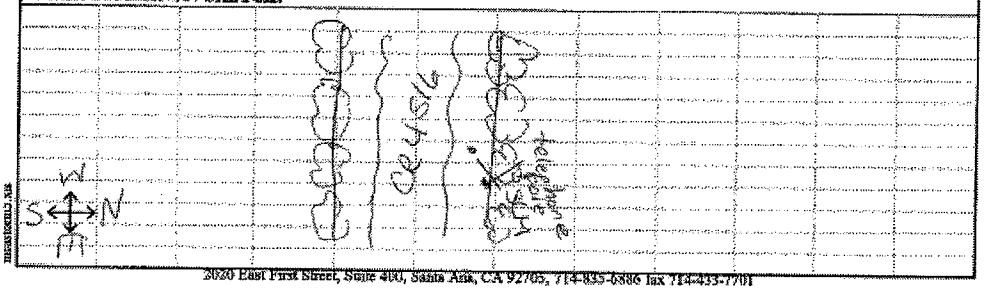
	#1 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS / distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS / tv / horn
OTHER: distant helicopter, 3 distant train whistle sequences

Description / Sketch

TERRAIN: HARD SOFT MIXED / FLAT OTHER:
PHOTOS: 10
OTHER COMMENTS / SKETCH:



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FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: LT-6 OBSERVER(S): Rob Greene, Grant Limberg, Jamie King
START DATE & TIME: 4/4/06 10:34p END DATE & TIME: 4/9/06
ADDRESS:
N 29° 24' 28.8"
W 098° 57' 28.7" Elev 1014

Weather

TEMP: 67 °F HUMIDITY: 46 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 7-8 MPH DIR: N NE E SE S SW W NW STEADY GUSTY 6-7.10
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: 2231 TYPE: 1 2 SERIAL #: 14 3404
CALIBRATOR: 4231 SERIAL #: 1850381
CALIBRATION CHECK: PRE-TEST 93.8 dBA SPL POST-TEST 93.9 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start / End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
1	2239 / 2249	34.5	45.8	27.4	29.4	32.9	37.9	
2	2250 / 2255	35.3	47.9	29.6	31.4	34.4	37.4	
/	/							
/	/							

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: dirt
COUNT DURATION: ____-MINUTE

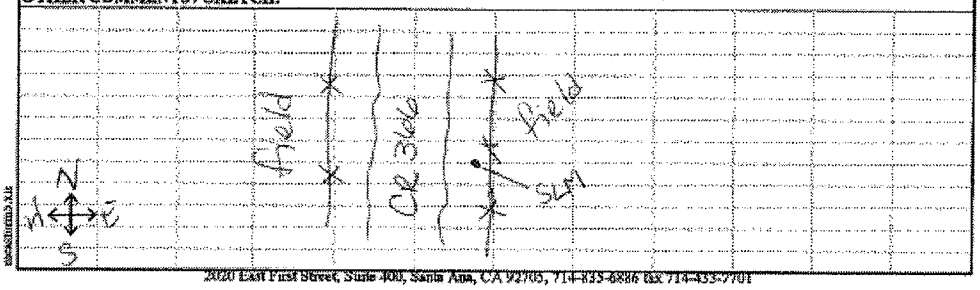
	SPEED (mph) NB / EB / SB / WB	NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	____ / ____	____ / ____	____ / ____	____ / ____
MED. TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
HVY TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
BUSES:	____ / ____	____ / ____	____ / ____	____ / ____
MOTORCYCLES:	____ / ____	____ / ____	____ / ____	____ / ____

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: distant trucks, gun shots (distant), one cricket (faint) (1) (2)

Description / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: 1 (2)
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: NT - F OBSERVER(s): Rob Greene, Grant Limberg, Janice King
START DATE & TIME: 4/10/06 11:15a END DATE & TIME: 4/10/06
ADDRESS:
N 29° 27' 04.3"
W098° 58' 58.4" Elev 911'

Weather

TEMP: 69 °F HUMIDITY: 50 % R.H. WIND: CALM LIGHT /MODERATE/ VARIABLE
WINDSPEED: 4-9 MPH DIR: N NE E /SE/ S SW W NW STEADY /GUSTY/ 12 mph
SKY: OVRCST /PARTLY CLOUDY/ CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: /1/ 2 SERIAL #:
CALIBRATOR: B&K 4231 SERIAL #:
CALIBRATION CHECK: PRE-TEST 93.8 dBA SPL POST-TEST 93.7 dBA SPL WINDSCREEN X
SETTINGS /A-WEIGHTED/ SLOW FAST FRONTAL /RANDOM/ /ANSI/ OTHER:

Rec #	Start	End								
1	2325	2335	L_{eq} 41.6	L_{max} 52.7	L_{min} 30.1	L_{90} 32.9	L_{50} 38.9	L_{10} 46.9		
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL /AMBIENT/ OTHER:
ROADWAY TYPE: dirt
COUNT DURATION: ____-MINUTE

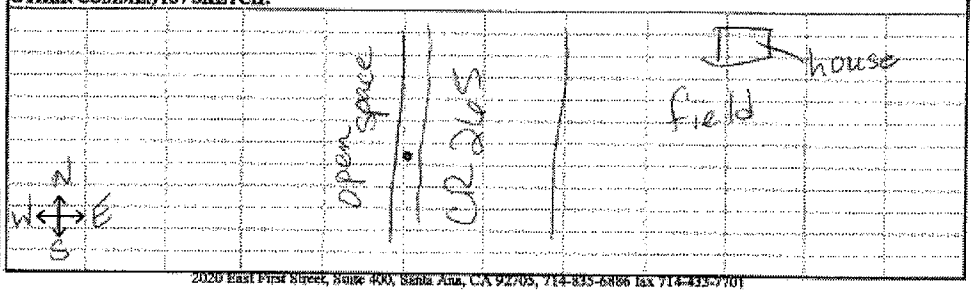
	#1 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	____ / ____	____ / ____	____ / ____	____ / ____
MED. TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
HVY TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
BUSES:	____ / ____	____ / ____	____ / ____	____ / ____
MOTORCYCLES:	____ / ____	____ / ____	____ / ____	____ / ____

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead /RUSTLING LEAVES/ distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING /distant TRAFFIC/ distant LANDSCAPING / distant TRAINS
OTHER: Crickets, distant car, distant cow

Description / Sketch

TERRAIN: HARD /SOFT/ MIXED /FLAT/ OTHER:
PHOTOS: 1 (2)
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: NT-9 OBSERVER(S): Rob Greene, Janice King, Grant Limberg
START DATE & TIME: 4/11/06 12:00pm END DATE & TIME: 4/12/06
ADDRESS:
N29° 23' 14.9" (same as ST-I)
W098° 58' 48.1" Elev 976

Weather

TEMP: 67 °F HUMIDITY: 56 % R.H. WIND: CALM LIGHT /MODERATE/ VARIABLE
WINDSPEED: 10-12 MPH DIR: N NE E /SE/ S SW W NW /STEADY/ GUSTY
SKY: OVRCST /PARTLY CLOUDY/ CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: /1/ 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 93.8 dBA SPL POST-TEST 93.7 dBA SPL WINDSCREEN X
SETTINGS /A-WEIGHTED/ /SLOW/ FAST FRONTAL /RANDOM/ /ANSI/ OTHER:

Rec #	Start	End								
1	1204	1209	L_{eq} 47.9	L_{max} 55.2	L_{min} 40.1	L_{90} 43.9	L_{50} 46.9	L_{10} 50.4		
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		

COMMENTS: All wind noise

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL /AMBIENT/ OTHER:
ROADWAY TYPE:
COUNT DURATION: ____-MINUTE

	SPEED (mph) NB / EB / SB / WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	____ / ____ / ____ / ____	____ / ____ / ____ / ____	____ / ____
MED. TRUCKS:	____ / ____ / ____ / ____	____ / ____ / ____ / ____	____ / ____
HVY TRUCKS:	____ / ____ / ____ / ____	____ / ____ / ____ / ____	____ / ____
BUSES:	____ / ____ / ____ / ____	____ / ____ / ____ / ____	____ / ____
MOTORCYCLES:	____ / ____ / ____ / ____	____ / ____ / ____ / ____	____ / ____

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead /RUSTLING LEAVES/ / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

Description / Sketch

TERRAIN: HARD /SOFT/ MIXED /FLAT/ OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:

(Same as ST-I)

2020 East First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-A OBSERVER(s): Rob Greene, Janice King, Grant Limberg
START DATE & TIME: 4/6/06 1845 END DATE & TIME:
ADDRESS:
N 29° 26' 35.6" W 099° 00' 37.7" Elev. 916
6'9" from fence to meter
21' from center line of road

Weather

TEMP: 90.4 °F HUMIDITY: 33.9 % R.H. WIND: CALM / LIGHT / MODERATE VARIABLE
WINDSPEED: 2 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: OVRCST / PARTLY CLOUDY / CLEAR / SUNNY / FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: 2231 TYPE: 1 / 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1830301
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 93.9 dBA SPL WINDSCREEN Y
SETTINGS: A-WEIGHTED / SLOW FAST FRONTAL / RANDOM / ANSI / OTHER:

Rec #	Start	End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
1	1845	1850	26.0	42.3	18.5	20.4	24.4	27.4	
2	1855	1900	25.0	36.4	21.3	22.4	23.9	26.9	

COMMENTS: Light aircraft overflight after 2nd measurement. Not measured.

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL / AMBIENT OTHER:
ROADWAY TYPE: Unimproved County Farm Road
COUNT DURATION: -MINUTE

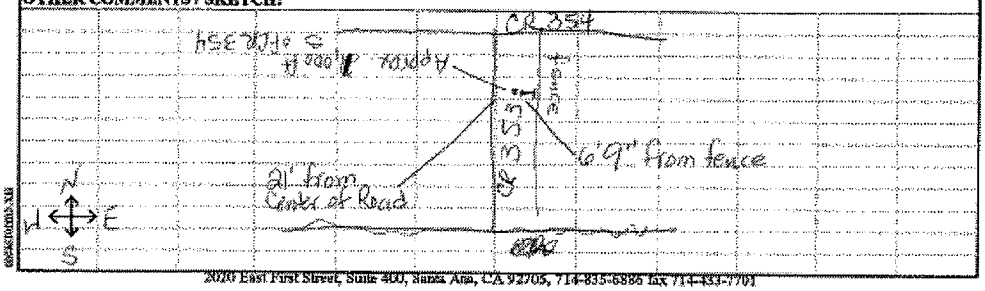
	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/ / /	/ / /	/ / /
MED. TRUCKS:	/ / /	/ / /	/ / /
HVY TRUCKS:	/ / /	/ / /	/ / /
BUSES:	/ / /	/ / /	/ / /
MOTORCYCLES:	/ / /	/ / /	/ / /

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS (2nd measurement / distant)
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: Very slight flies buzzing / Not one car went by

Description / Sketch

TERRAIN: HARD / SOFT / MIXED FLAT OTHER:
PHOTOS: 2
OTHER COMMENTS / SKETCH:



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FIELD NOISE MEASUREMENT DATA

URS

Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: STB OBSERVER(s): GV, RG, JK
START DATE & TIME: 4/7/06 1330 END DATE & TIME: 4/7/06 1330
ADDRESS: N 29 24' 23.4"
W 99 00' 22.9"
736 CR 365

Weather

TEMP: 93 °F HUMIDITY: 8 %RH WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 5-9 MPH DIR: N NE E SE S SW W NW STEADY GUSTY — NL
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: 2231 TYPE: (1) 2 SERIAL #: 1413404
CALIBRATOR: 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start / End							
1	1305 / 1315	L_{eq} 42.9	L_{max} 57.5	L_{min} 25.6	L_{90} 29.4	L_{50} 35.4	L_{10} 43.9	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE:
COUNT DURATION: ____-MINUTE

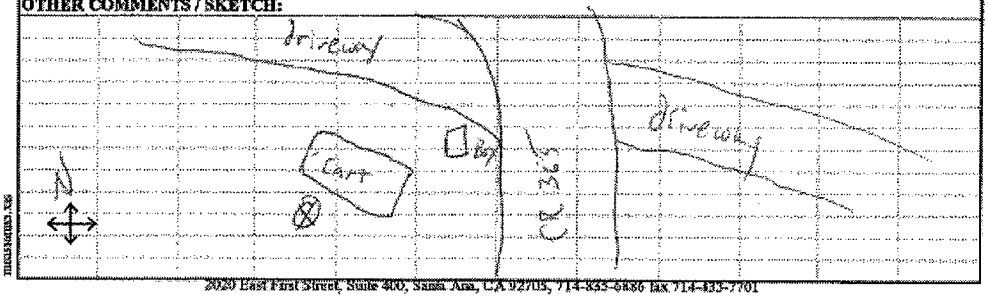
	SPEED (mph) NB / EB / SB / WB		#2 COUNT: NB / EB / SB / WB		SPEED (mph) NB EB / SB WB	
AUTOS:	____ / ____	____ / ____	____ / ____		____ / ____	
MED. TRUCKS:	____ / ____	____ / ____	____ / ____		____ / ____	
HVY TRUCKS:	____ / ____	____ / ____	____ / ____		____ / ____	
BUSES:	____ / ____	____ / ____	____ / ____		____ / ____	
MOTORCYCLES:	____ / ____	____ / ____	____ / ____		____ / ____	

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead RUSTLING LEAVES / distant BARKING DOGS BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: Cows lowing, cow-like things, dusty winds, insects - Hwy far

Description / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



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ST-B

SURFACE TRANSPORTATION BOARD
WASHINGTON, DC 20423

RIGHT OF ENTRY FOR NOISE STUDY

Permission is hereby granted to the Surface Transportation Board's Section of Environmental Analysis (SEA) and its contractor (URS Corporation), including employees of SEA and URS, to enter the:

☐ front yard ☐ side yard ☐ backyard ☐ open areas

of my property located at 736 CR 365 to temporarily install, operate, and remove noise monitoring equipment for the purposes of measuring existing ambient sound levels on or about my property. I understand that these noise measurements are part of SEA's environmental study of Southwest Gulf Railroad Company's proposal to construct and operate a rail line in Medina County, Texas.

This Right of Entry shall be valid only from April 6, 2006 through April 16, 2006.

Date of authorization: 4/7/06

Signature of authorizing person: Tried to Contact No one home
Resident

Additional Restrictions and/or Special Instructions for Entry (please print):

Resident Contact Information (please print):

Name(s): ~~Oefinger~~ Med Texlands (owner)

Telephone Number(s):

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-C OBSERVER(s): Rob Greene, Janice King, Grant Lindberg
START DATE & TIME: 4/7/06 END DATE & TIME:
ADDRESS:
N 29° 24' 18"
W 099° 00' 09"

Weather

TEMP: ____ °F HUMIDITY: ____ % R.H. WIND: CALM /LIGHT/ MODERATE VARIABLE
WINDSPEED: 1-3 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY /CLEAR/ SUNNY FOG RAIN Other: ____

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1850361
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER: ____

Rec #	Start / End							
1	1335 / 1338	L_{eq} 36.4	L_{max} 56.5	L_{min} 25.9	L_{90} 27.4	L_{50} 31.4	L_{10} 36.9	
___	___ / ___	L_{eq} ___	L_{max} ___	L_{min} ___	L_{90} ___	L_{50} ___	L_{10} ___	
___	___ / ___	L_{eq} ___	L_{max} ___	L_{min} ___	L_{90} ___	L_{50} ___	L_{10} ___	
___	___ / ___	L_{eq} ___	L_{max} ___	L_{min} ___	L_{90} ___	L_{50} ___	L_{10} ___	

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL /AMBIENT/ OTHER: ____
ROADWAY TYPE: Dirt

COUNT DURATION: ____-MINUTE

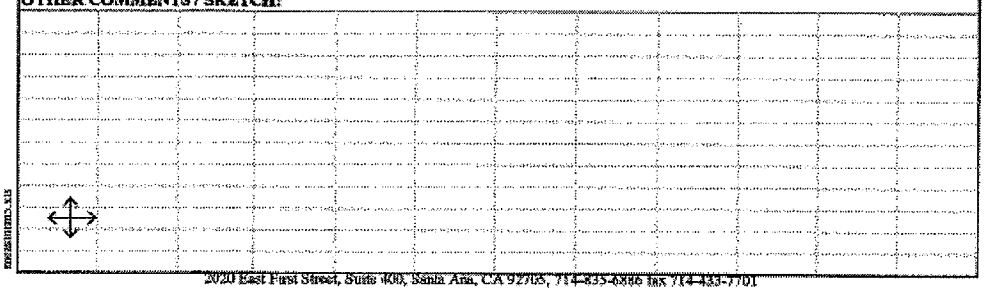
	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	___ / ___	___ / ___	___ / ___	___ / ___
MED. TRUCKS:	___ / ___	___ / ___	___ / ___	___ / ___
HVY TRUCKS:	___ / ___	___ / ___	___ / ___	___ / ___
BUSES:	___ / ___	___ / ___	___ / ___	___ / ___
MOTORCYCLES:	___ / ___	___ / ___	___ / ___	___ / ___

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS /BIRDS/
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: ____

Description / Sketch

TERRAIN: HARD /SOFT/ MIXED /FLAT/ OTHER: ____
PHOTOS:
OTHER COMMENTS / SKETCH:



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FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-D OBSERVER(s): Rob Greene, Janice King, Grant Limberg
START DATE & TIME: 4/7/06 12:00p END DATE & TIME: 4/7/06 12:33p
ADDRESS: SE of 4511 CR 4516
N 29° 23' 26.4"
W 099° 01' 15.8" Elev. 830

Weather

TEMP: 90.1 °F HUMIDITY: 38.0 % R.H. WIND: CALM [LIGHT] MODERATE [VARIABLE]
WINDSPEED: 3-6 MPH DIR: [N] NE E SE S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY [CLEAR] [SUNNY] FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: 2231 TYPE: [1] 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X
SETTINGS: [A-WEIGHTED] [SLOW] FAST FRONTAL [RANDOM] [ANSI] OTHER:

Rec #	Start / End								
1	1210 / 1221	L_{eq} 42.2	L_{max} 57.3	L_{min} 38.0	L_{90} 31.4	L_{50} 39.4	L_{10} 44.9		
2	1225 / 1230	L_{eq} 37.6	L_{max} 51.3	L_{min} 30.4	L_{90} 32.4	L_{50} 34.9	L_{10} 39.9		
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL [AMBIENT] OTHER:
ROADWAY TYPE:
COUNT DURATION: ____-MINUTE

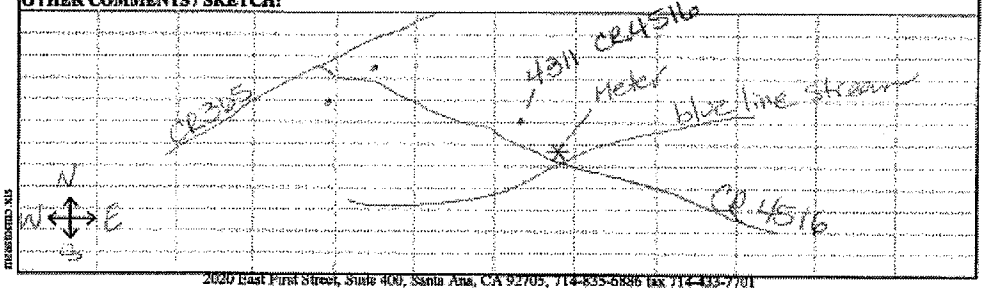
	#1 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	____ / ____	____ / ____	____ / ____	____ / ____
MED. TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
HVY TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
BUSES:	____ / ____	____ / ____	____ / ____	____ / ____
MOTORCYCLES:	____ / ____	____ / ____	____ / ____	____ / ____

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: / distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: ① distant radio ② aircraft overhead (small prop) ③ distant cow, distant large truck ④ insects (loc) ⑤ distant jet

Descriptions / Sketch

TERRAIN: HARD SOFT [MIXED] FLAT OTHER:
PHOTOS: 1 grant's camera
OTHER COMMENTS / SKETCH:



TEMPLATE.XLS

2020 East First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-E OBSERVER(S): Rob Greene, Janice King, Grant Limberg
START DATE & TIME: 4/7/06 4:30p END DATE & TIME: 4/7/06
ADDRESS:
N 29° 21' 12.8" 1866' from fiber optic line
W 099° 08' 03.9" Elev 823

TEMP: 97.8 °F HUMIDITY: 5.6 % R.H. WIND: CALM / LIGHT / MODERATE / VARIABLE
WINDSPEED: 5-8 MPH DIR: N NE E SE S SW W NW STEADY / GUSTY / 13mph
SKY: OVRCST PARTLY CLOUDY / CLEAR / SUNNY FOG RAIN Other:

Weather

INSTRUMENT: 2231 TYPE: 1 / 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1502301
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED / SLOW FAST FRONTAL / RANDOM / ANSI / OTHER:

Rec #	Start	End							
1	1646	1650	L_{eq} 46.2	L_{max} 83.5	L_{min} 40.1	L_{90} 43.4	L_{50} 45.4	L_{10} 48.4	
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	

COMMENTS:

Acoustic Measurements

PRIMARY SOURCE: / TRAFFIC / AIRCRAFT RAIL INDUSTRIAL / AMBIENT / OTHER:
ROADWAY TYPE: 4 lane divided

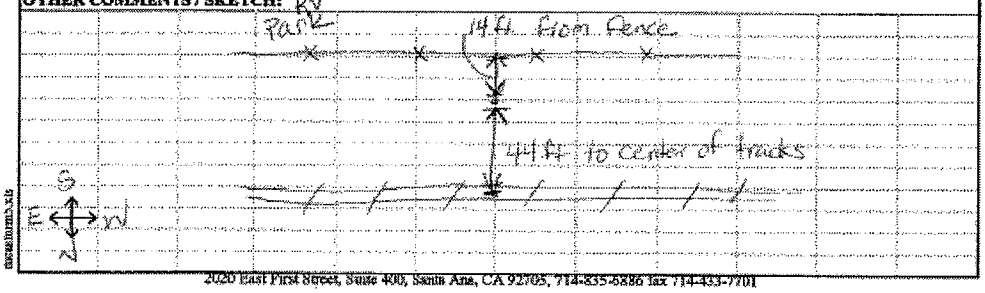
COUNT DURATION: ____-MINUTE	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	____ / ____	____ / ____	____ / ____	____ / ____
MED. TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
HVY TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
BUSES:	____ / ____	____ / ____	____ / ____	____ / ____
MOTORCYCLES:	____ / ____	____ / ____	____ / ____	____ / ____

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: / distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: distant US-90 traffic, propeller aircraft overhead

Source Info and Traffic Counts

TERRAIN: HARD / SOFT / MIXED / FLAT OTHER:
PHOTOS: 2
OTHER COMMENTS / SKETCH: RJ



Description / Sketch

2020 East First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-F OBSERVER(s): Rob Greene, Janice King, Grant Lamberty
START DATE & TIME: 4/7/06 1:50p END DATE & TIME: 4/7/06
ADDRESS:
N 29° 21' 44.0"
W 99° 01' 05.0"

Weather

TEMP: 95.3 °F HUMIDITY: 6.5 % R.H. WIND: CALM / LIGHT / MODERATE / VARIABLE /
WINDSPEED: 1-5 MPH DIR: N NE E SE S SW W NW STEADY / GUSTY / 14mph
SKY: OVRCST PARTLY CLOUDY / CLEAR / SUNNY / FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 / 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1855030
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED / SLOW FAST FRONTAL / RANDOM / ANSI / OTHER:

Rec #	Start	End								
1	1400	1410	L_{eq} 47.8	L_{max} 68.7	L_{min} 24.1	L_{90} 28.4	L_{50} 35.4	L_{10} 42.9		
2	1412	1422	L_{eq} 39.0	L_{max} 46.2	L_{min} 26.6	L_{90} 29.4	L_{50} 35.9	L_{10} 39.9		
/	/		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
/	/		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT / RAIL / INDUSTRIAL / AMBIENT / OTHER:
ROADWAY TYPE: dirt one lane - no traffic

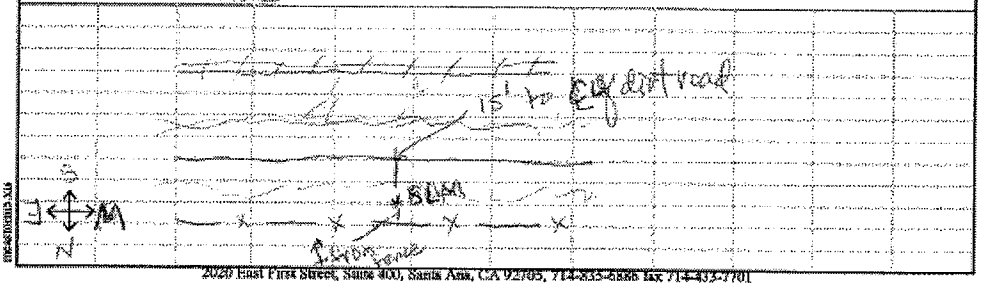
COUNT DURATION: -MINUTE	#1 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS (1) (2)
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS horns (1)
OTHER: Westbound 2 locomotives 45 mph (1) distant aircraft (2)

Description / Sketch

TERRAIN: HARD / SOFT / MIXED FLAT OTHER:
PHOTOS: 2
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-9 OBSERVER(S): Rob Greene, Janice King, Grant Limberg
START DATE & TIME: 4/10/06 12:25p END DATE & TIME: 4/10/06
ADDRESS:
N 29° 22' 50.8"
W 099° 00' 21.5" Elev 891

TEMP: 79 °F HUMIDITY: 31 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 5-7 MPH DIR: N NE E SE S SW W NW STEADY GUSTY 12mph
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Weather

INSTRUMENT: B&K 2231 TYPE: 1 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start	End								
1	1230	1240	L_{eq} 52.4	L_{max} 75.7	L_{min} 32.0	L_{90} 37.4	L_{50} 43.9	L_{10} 50.9		
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		

COMMENTS:

Acoustic Measurements

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: paved
COUNT DURATION: ____-MINUTE

	#1 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	1 / /	/	/	/
MED. TRUCKS:	/ /	/	/	/
HVY TRUCKS:	/ /	/	/	/
BUSES:	/ /	/	/	/
MOTORCYCLES:	/ /	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead RUSTLING LEAVES distant BARKING DOGS BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: 2 airplanes

Source Info and Traffic Counts

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: /
OTHER COMMENTS / SKETCH:

See map of NT-D

Description / Sketch

2020 East First Street, Suite 400, Santa Ana, CA 92705, 714-933-6986 fax 714-433-7701

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-H OBSERVER(s): Rob Greene, Janice King, Grant Linberg
START DATE & TIME: 4/11/06 11:40a END DATE & TIME: 4/11/06
ADDRESS:
N 29° 21' 16.3"
W 098° 54' 57.9" Elev 979

Weather

TEMP: 71 °F HUMIDITY: 65 % R.H. WIND: CALM / LIGHT / MODERATE / VARIABLE
WINDSPEED: 3-5 MPH DIR: N NE E / SE / S SW W NW STEADY / GUSTY
SKY: OVRCST / PARTLY CLOUDY / CLEAR / SUNNY / FOG / RAIN / Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 / 2 SERIAL #:
CALIBRATOR: B&K 4231 SERIAL #:
CALIBRATION CHECK: PRE-TEST 93.8 dBA SPL POST-TEST 93.9 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED / SLOW / FAST / FRONTAL / RANDOM / ANSI / OTHER:

Rec #	Start / End							
1	1150 / 1200	L_{eq} 61.7	L_{max} 73.5	L_{min} 48.7	L_{90} 53.9	L_{50} 57.9	L_{10} 65.4	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC / AIRCRAFT / RAIL / INDUSTRIAL / AMBIENT / OTHER:
ROADWAY TYPE: US90
COUNT DURATION: ____-MINUTE

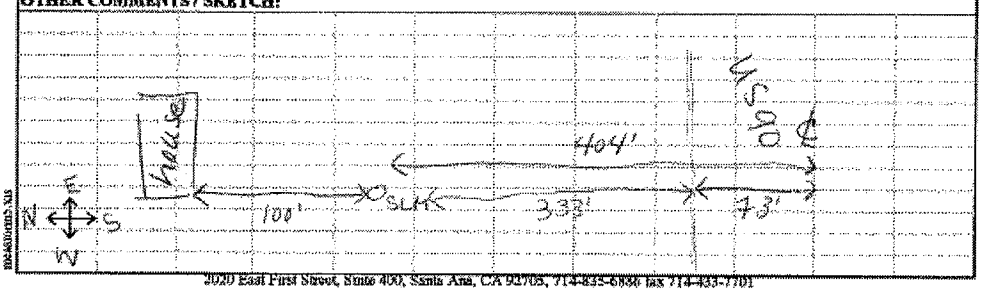
	NB (EB) / SB (WB)	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	✓ / ✓	/	/	/
MED. TRUCKS:	✓ / ✓	/	/	/
HVY TRUCKS:	✓ / ✓	/	/	/
BUSES:	0 / 0	/	/	/
MOTORCYCLES:	0 / 0	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: Train 3 engines 46 Cars

Description / Sketch

TERRAIN: HARD / SOFT / MIXED / FLAT / OTHER:
PHOTOS: 1 (J)
OTHER COMMENTS / SKETCH:



ST-H

SURFACE TRANSPORTATION BOARD
WASHINGTON, DC 20423

RIGHT OF ENTRY FOR NOISE STUDY

Permission is hereby granted to the Surface Transportation Board's Section of Environmental Analysis (SEA) and its contractor (URS Corporation), including employees of SEA and URS, to enter the:

☒ front yard ☐ side yard ☐ backyard ☐ open areas

of my property located at 2490 CR 454 Hondo TX to temporarily install, operate, and remove noise monitoring equipment for the purposes of measuring existing ambient sound levels on or about my property. I understand that these noise measurements are part of SEA's environmental study of Southwest Gulf Railroad Company's proposal to construct and operate a rail line in Medina County, Texas.

This Right of Entry shall be valid only from April 6, 2006 through April 16, 2006.

Date of authorization: 4-11-06

Signature of authorizing person: [signature] Resident

Additional Restrictions and/or Special Instructions for Entry (please print):

Resident Contact Information (please print):

Name(s): Consuelo Gonzales JR

Telephone Number(s): (210) 912-5117

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: STI OBSERVER(s): Grant Limberg & Janice Kim
START DATE & TIME: 4/9/06 2:15p END DATE & TIME: 4/9/06
ADDRESS:
N29° 23' 14.9"
W098° 58' 43.1" Elev. 976

Weather

TEMP: 89 °F HUMIDITY: 22 % R.H. WIND: CALM [LIGHT] MODERATE [VARIABLE]
WINDSPEED: 3 MPH DIR: N NE E SE S [SW] W NW STEADY [GUSTY] 10 mph
SKY: OVRCST PARTLY CLOUDY [CLEAR] [SUNNY] FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: 824K2231 TYPE: [1] / 2 SERIAL #: 1413464
CALIBRATOR: 824L4231 SERIAL #: 1550301
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST _____ dBA SPL WINDSCREEN X
SETTINGS: [A-WEIGHTED] / [SLOW] FAST FRONTAL [RANDOM] / [ANSI] OTHER:

Rec #	Start / End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
1	1439 / 1444	36.0	49.8	29.0	30.9	33.4	38.9	
___	___ / ___	___	___	___	___	___	___	___
___	___ / ___	___	___	___	___	___	___	___
___	___ / ___	___	___	___	___	___	___	___

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL [AMBIENT] OTHER:
ROADWAY TYPE: dirt
COUNT DURATION: _____-MINUTE

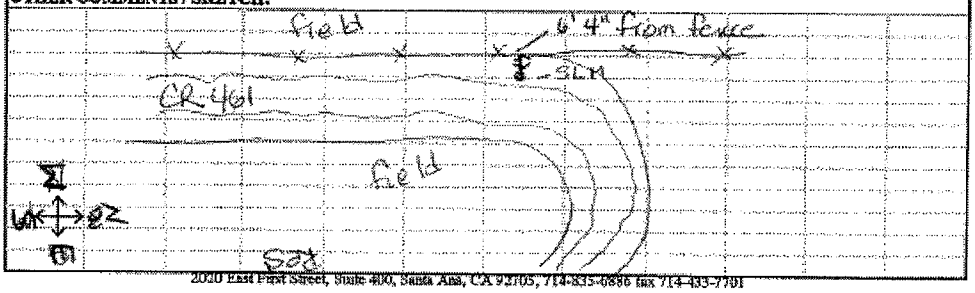
	#1 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	___ / ___	___ / ___	___ / ___	___ / ___
MED. TRUCKS:	___ / ___	___ / ___	___ / ___	___ / ___
HVY TRUCKS:	___ / ___	___ / ___	___ / ___	___ / ___
BUSES:	___ / ___	___ / ___	___ / ___	___ / ___
MOTORCYCLES:	___ / ___	___ / ___	___ / ___	___ / ___

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / [RUSTLING LEAVES] / distant BARKING DOGS / [BIRDS]
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: distant tractor, distant power tools

Description / Sketch

TERRAIN: HARD [SOFT] MIXED FLAT OTHER:
PHOTOS: 1 @ 3
OTHER COMMENTS / SKETCH:



ST-1

SURFACE TRANSPORTATION BOARD
WASHINGTON, DC 20423

RIGHT OF ENTRY FOR NOISE STUDY

Permission is hereby granted to the Surface Transportation Board's Section of Environmental Analysis (SEA) and its contractor (URS Corporation), including employees of SEA and URS, to enter the:

☐ front yard ☐ side yard ☐ backyard ☑ open areas

of my property located at N29° 33' 49" W98° 38' 43.1" to temporarily install, operate, and remove noise monitoring equipment for the purposes of measuring existing ambient sound levels on or about my property. I understand that these noise measurements are part of SEA's environmental study of Southwest Gulf Railroad Company's proposal to construct and operate a rail line in Medina County, Texas.

This Right of Entry shall be valid only from April 6, 2006 through April 16, 2006.

Date of authorization: 4/9/06

Signature of authorizing person: Harold Weikel
Resident

Additional Restrictions and/or Special Instructions for Entry (please print):

Resident Contact Information (please print):

Name(s): Harold Weikel

Telephone Number(s): 210-827-7128

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-J OBSERVER(S): Rob Greene, Grant Limberg, Janice King
START DATE & TIME: 4/9/06 1100a END DATE & TIME:
LOCATION: N29° 24' 4.6" W98° 58' 43.0" Elev 990'

Weather

TEMP: 77 °F HUMIDITY: 35 % R.H. WIND: CALM [LIGHT] MODERATE VARIABLE
WINDSPEED: 1-2 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY [CLEAR] [SUNNY] FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: [1] 2 SERIAL #:
CALIBRATOR: B&K 4231 SERIAL #:
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST dBA SPL WINDSCREEN X
SETTINGS: [A-WEIGHTED] [SLOW] FAST FRONTAL [RANDOM] [ANSI] OTHER:

Rec #	Start	End								
	1110	1120	L_{eq} 33.6	L_{max} 46.3	L_{min} 27.9	L_{90} 29.9	L_{50} 32.4	L_{10} 35.9		
			L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
			L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
			L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL [AMBIENT] OTHER:
ROADWAY TYPE: dirt
COUNT DURATION: -MINUTE

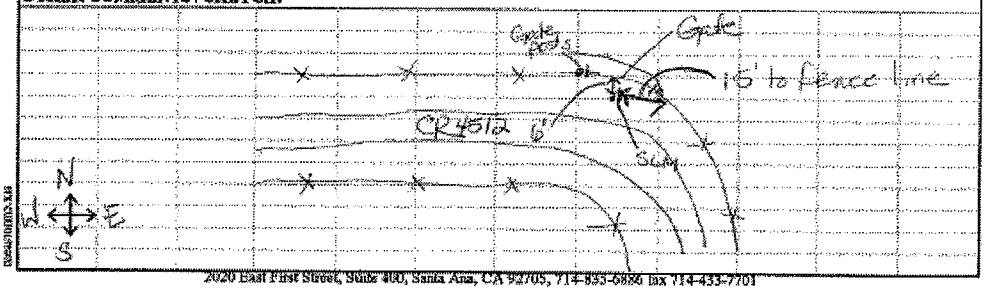
	#1 COUNT: NB / EB	SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB	SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/		/	/		/
MED. TRUCKS:	/		/	/		/
HVY TRUCKS:	/		/	/		/
BUSES:	/		/	/		/
MOTORCYCLES:	/		/	/		/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: [distant AIRCRAFT overhead] / [RUSTLING LEAVES] / distant BARKING DOGS / [BIRDS]
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: distant farm equipment, distant insect, distant bang, distant gun shots

Description / Sketch

TERRAIN: HARD [SOFT] MIXED FLAT OTHER:
PHOTOS: Y
OTHER COMMENTS / SKETCH:



2020 East First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-K OBSERVER(s): Rob Greene Janice King Grant Lunberry
START DATE & TIME: 4/4/06 1550p END DATE & TIME: 4/5/06 0215
SITE LAT/LONG: N29° 25' 04.0" W098° 57' 15.3" Elevation 1009

Weather

TEMP: 76 °F HUMIDITY: 23 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 4-7 MPH DIR: N NE E SE S SW W NW STEADY GUSTY 10 mph 15, 17
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST ____ dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start / End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
1	1356 / 1410	41.4	54.9	25.9	30.9	37.9	44.9	
	/							
	/							
	/							

COMMENTS: One farm truck (distant).

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: dirt
COUNT DURATION: ____ -MINUTE

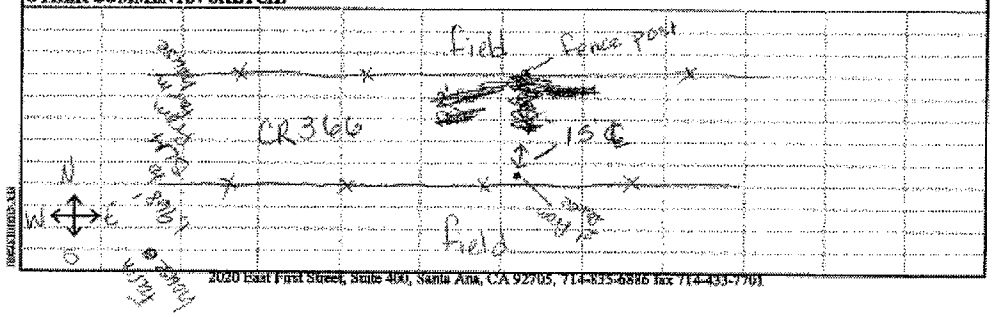
	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	____ / ____	____ / ____	____ / ____
MED. TRUCKS:	____ / ____	____ / ____	____ / ____
HVY TRUCKS:	____ / ____	____ / ____	____ / ____
BUSES:	____ / ____	____ / ____	____ / ____
MOTORCYCLES:	____ / ____	____ / ____	____ / ____

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / distant BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: distant farm machinery (clearly audible), Wind noise dominant

Description / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: 1
OTHER COMMENTS / SKETCH:



2020 East First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-6 OBSERVER(S): Rob Greene, Jamie King, Grant Limberg
START DATE & TIME: 4/7/06 6:50p END DATE & TIME: 4/8/06
ADDRESS:
N 29° 26' 32.6"
W 098° 58' 23.6" Elev 893

Weather

TEMP: 92.2 °F HUMIDITY: 60 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 13-16 MPH DIR: N NE E SE S SW W NW STEADY GUSTY / 17mph 30
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN ___
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start	End							
1	11900	11910	L_{eq} 48.0	L_{max} 57.9	L_{min} 37.3	L_{90} 41.4	L_{50} 46.4	L_{10} 51.4	
___	___	___	L_{eq} ___	L_{max} ___	L_{min} ___	L_{90} ___	L_{50} ___	L_{10} ___	
___	___	___	L_{eq} ___	L_{max} ___	L_{min} ___	L_{90} ___	L_{50} ___	L_{10} ___	
___	___	___	L_{eq} ___	L_{max} ___	L_{min} ___	L_{90} ___	L_{50} ___	L_{10} ___	

COMMENTS: Same permission as LT-D

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: dirt
COUNT DURATION: ___-MINUTE

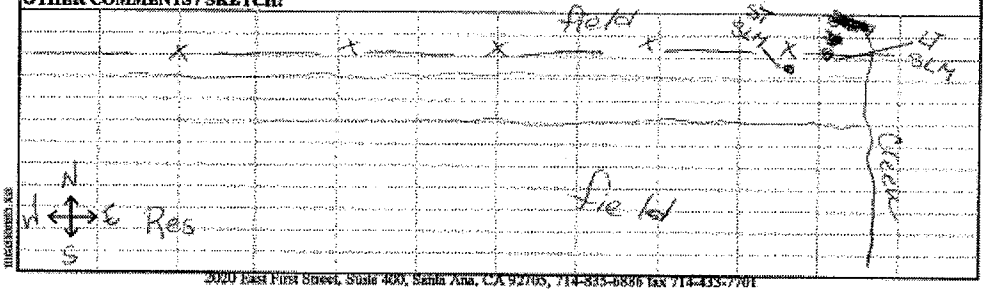
	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	___ / ___ / ___ / ___	___ / ___ / ___ / ___	___ / ___ / ___ / ___
MED. TRUCKS:	___ / ___ / ___ / ___	___ / ___ / ___ / ___	___ / ___ / ___ / ___
HVY TRUCKS:	___ / ___ / ___ / ___	___ / ___ / ___ / ___	___ / ___ / ___ / ___
BUSES:	___ / ___ / ___ / ___	___ / ___ / ___ / ___	___ / ___ / ___ / ___
MOTORCYCLES:	___ / ___ / ___ / ___	___ / ___ / ___ / ___	___ / ___ / ___ / ___

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

Description / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: 1
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-M OBSERVER(S): Rob Greene, Janice King, Grant Limberg
START DATE & TIME: 4/5/06 12:20 END DATE & TIME: 4/8/06
ADDRESS: 915 CR454
N29° 22' 47.7"
W099° 01' 54.0" Elev 825

Weather

TEMP: 720 °F HUMIDITY: 27.5 % R.H. WIND: CALM LIGHT /MODERATE/ VARIABLE
WINDSPEED: 5-6 MPH DIR: N NE E SE S SW W NW STEADY /GUSTY/ 10-11 mph
SKY: OVRCST PARTLY CLOUDY /CLEAR/ SUNNY/ FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 SERIAL #: 141404
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST dBA SPL WINDSCREEN X
SETTINGS /A-WEIGHTED/ /SLOW FAST FRONTAL /RANDOM/ /ANSI/ OTHER:

Rec #	Start / End							
1	1238 /	L_{eq} 38.1	L_{max} 53.2	L_{min} 29.3	L_{90} 30.9	L_{50} 36.4	L_{10} 40.9	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	

COMMENTS: Same location as LT-C

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC /AIRCRAFT/ RAIL INDUSTRIAL /AMBIENT/ OTHER:
ROADWAY TYPE:
COUNT DURATION: -MINUTE

	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/
MED. TRUCKS:	/	/	/
HVY TRUCKS:	/	/	/
BUSES:	/	/	/
MOTORCYCLES:	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant /AIRCRAFT/ overhead /RUSTLING LEAVES/ distant BARKING DOGS /BIRDS/
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: distant ATV, birds closeby, distant tractor

Description / Sketch

TERRAIN: HARD /SOFT/ MIXED /FLAT/ OTHER:
PHOTOS: 1
OTHER COMMENTS / SKETCH:

See map for LT-C

2020 East First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-N OBSERVER(s): Rob Greene, Grant Linkberg, James King
START DATE & TIME: 4/10/06 11:55a END DATE & TIME: 4/10/06
ADDRESS: N29° 22' 38.8" W098° 59' 14.1" Elevation 989.6'

Weather

TEMP: 76 °F HUMIDITY: 35 % R.H. WIND: CALM LIGHT [MODERATE] [VARIABLE]
WINDSPEED: 4-6 MPH DIR: N NE E [SE] S SW W NW STEADY [GUSTY] 15 mph
SKY: OVRCST [PARTLY CLOUDY] CLEAR [SUNNY] FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: [1] 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X
SETTINGS: [A-WEIGHTED] [SLOW] FAST FRONTAL [RANDOM] [ANSI] OTHER:

Rec #	Start	End							
	1200	1215	L_{eq} 45.4	L_{max} 66.8	L_{min} 32.1	L_{90} 35.4	L_{50} 39.4	L_{10} 44.9	
			L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
			L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
			L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL [AMBIENT] OTHER:
ROADWAY TYPE: paved
COUNT DURATION: ____-MINUTE

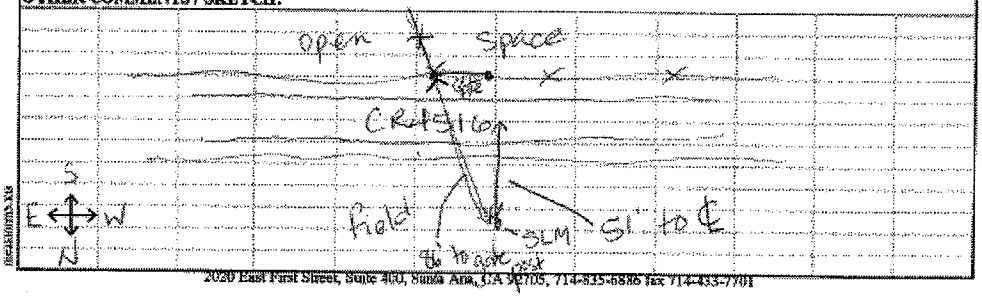
	#1 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	2 /	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / [RUSTLING LEAVES] / distant BARKING DOGS / [BIRDS] / distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: distant tractor, Cars passed on road

Description / Sketch

TERRAIN: HARD SOFT [MIXED] [FLAT] OTHER:
PHOTOS: 2 (a)
OTHER COMMENTS / SKETCH:



2020 East First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-0 OBSERVER(S): Rob Greene, Grant Limberg, Janice King
START DATE & TIME: 4/10/06 12:50p END DATE & TIME: 4/10/06
ADDRESS:
N 29° 22' 34.7"
W 099° 01' 20.5" Elev 880

Weather

TEMP: 85 °F HUMIDITY: 27 % R.H. WIND: CALM / LIGHT / MODERATE / VARIABLE
WINDSPEED: 0-8 MPH DIR: N NE E / SE S SW W NW STEADY GUSTY
SKY: OVRCST / PARTLY CLOUDY / CLEAR / SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 / 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED / SLOW FAST FRONTAL / RANDOM / ANSI OTHER:

Rec #	Start	End								
1	1300		L_{eq} 37.6	L_{max} 48.2	L_{min} 28.0	L_{90} 30.9	L_{50} 34.9	L_{10} 41.4		
			L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
			L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
			L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL / AMBIENT / OTHER:
ROADWAY TYPE: dirt

COUNT DURATION: ____-MINUTE

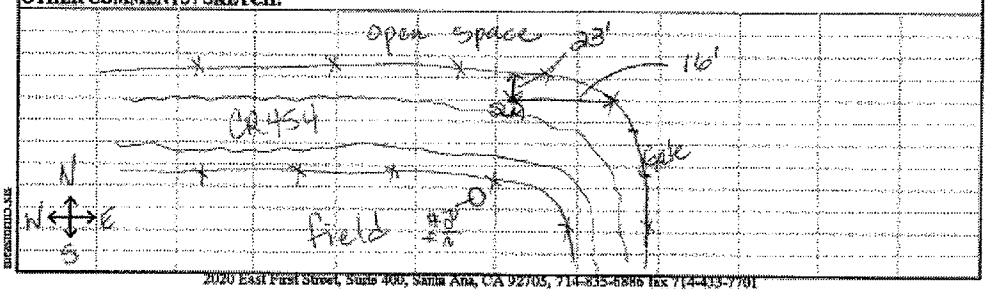
	#1 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	____ / ____	____ / ____	____ / ____	____ / ____
MED. TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
HVY TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
BUSES:	____ / ____	____ / ____	____ / ____	____ / ____
MOTORCYCLES:	____ / ____	____ / ____	____ / ____	____ / ____

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

Description / Sketch

TERRAIN: HARD / SOFT / MIXED / FLAT / OTHER:
PHOTOS: 160
OTHER COMMENTS / SKETCH:



BRANSFIELD.XLS

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-P OBSERVER(s): Rob Greene, Janice King, Grant Limberg
START DATE & TIME: 4/10/06 1:30p END DATE & TIME: 4/10/06
ADDRESS:
N29° 21' 38.9"
W098° 00' 56.0" Elev 914'

Weather

TEMP: 85 °F HUMIDITY: 25 % R.H. WIND: CALM LIGHT /MODERATE/ VARIABLE
WINDSPEED: 3-6 MPH DIR: N NE /E/ SE S SW W NW STEADY /GUSTY/ 10mph
SKY: OVRCST /PARTLY CLOUDY/ CLEAR /SUNNY/ FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: /1/ 2 SERIAL #: 1413409
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X
SETTINGS: /A-WEIGHTED/ /SLOW/ FAST FRONTAL /RANDOM/ /ANSI/ OTHER:

Rec #	Start / End							
1 /	1035 / 1050 :	L_{eq} 59.9	L_{max} 77.4	L_{min} 32.5	L_{90} 36.4	L_{50} 44.9	L_{10} 58.4	
/	/ :	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/ :	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/ :	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT /RAIL/ INDUSTRIAL /AMBIENT/ OTHER:
ROADWAY TYPE: paved
COUNT DURATION: ____-MINUTE

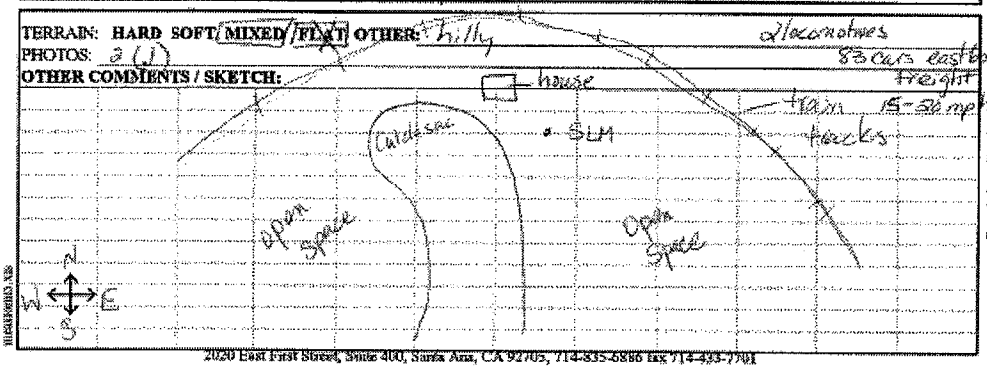
	#1 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	____ / ____	____ / ____	____ / ____	____ / ____
MED. TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
HVY TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
BUSES:	____ / ____	____ / ____	____ / ____	____ / ____
MOTORCYCLES:	____ / ____	____ / ____	____ / ____	____ / ____

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead /RUSTLING LEAVES/ distant /BARKING DOGS/ /BIRDS/ close by
distant CHILDREN PLAYING /distant TRAFFIC/ distant LANDSCAPING / distant TRAINS
OTHER: US90 in distance, Cell phone, train horn, whistle blows, train locomotive

Description / Sketch

TERRAIN: HARD SOFT /MIXED/ /FLAT/ OTHER: hilly
PHOTOS: 2 (1)
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

URS

Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-Q OBSERVER(S): Rob Greene, Grant Limbarg, Janice King

START DATE & TIME: 4/10/06 2:50p END DATE & TIME:

ADDRESS: N 29° 23' 43.6" W099° 01' 08.7" Elev 837'

Weather

TEMP: 88 °F HUMIDITY: 23 % R.H. WIND: CALM LIGHT MODERATE VARIABLE

WINDSPEED: 6 9 MPH DIR: N NE E SE S SW W NW STEADY GUSTY 14 mph

SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 / 2 SERIAL #:

CALIBRATOR: B&K 4231 93.9 SERIAL #:

CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST dBA SPL WINDSCREEN X

SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start	End								
1	1500	1510	L_{eq} 45.0	L_{max} 57.7	L_{min} 29.9	L_{90} 33.9	L_{50} 39.9	L_{10} 48.9		
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}		

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:

ROADWAY TYPE: dirt

COUNT DURATION: ___-MINUTE	NB / EB	SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB	SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	___ /	___	___ / ___	___ /	___	___ / ___
MED. TRUCKS:	___ /	___	___ / ___	___ /	___	___ / ___
HVY TRUCKS:	___ /	___	___ / ___	___ /	___	___ / ___
BUSES:	___ /	___	___ / ___	___ /	___	___ / ___
MOTORCYCLES:	___ /	___	___ / ___	___ /	___	___ / ___

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS

distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS

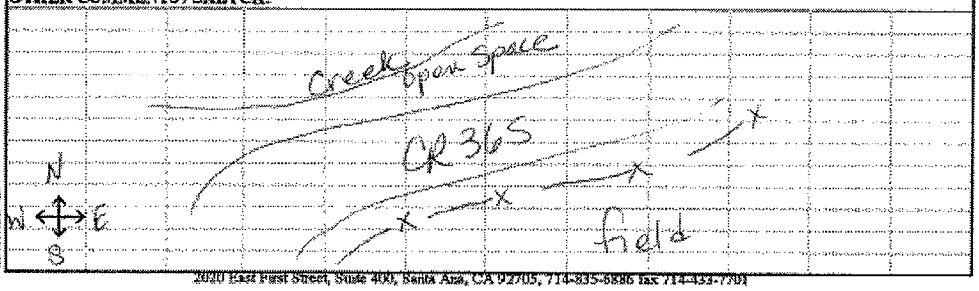
OTHER:

Description / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:

PHOTOS: 1 (N)

OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-R 1.20p OBSERVER(s): Rob Greene, Janice King, Grant Limberg
START DATE & TIME: 4/18/06 ~~2:45p~~ END DATE & TIME: 4/18/06
ADDRESS:
N29° 27' 41.8" W099° 01' 35.1" Elev 949

Weather

TEMP: ~~85~~ 77 °F HUMIDITY: ~~25~~ 50 % R.H. WIND: CALM / LIGHT / MODERATE / VARIABLE
WINDSPEED: 4-6 MPH DIR: N NE E SE ~~S~~ SW W NW / STEADY / GUSTY
SKY / OVRCST / PARTLY CLOUDY / CLEAR / SUNNY / FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1852801
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 93.9 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED / SLOW / FAST FRONTAL / RANDOM / ANSI OTHER:

Rec #	Start / End							
1	1322 / 1332	L_{eq} 35.1	L_{max} 44.6	L_{min} 25.4	L_{10} 28.4	L_{50} 33.4	L_{90} 38.4	
/	/	L_{eq}	L_{max}	L_{min}	L_{10}	L_{50}	L_{90}	
/	/	L_{eq}	L_{max}	L_{min}	L_{10}	L_{50}	L_{90}	
/	/	L_{eq}	L_{max}	L_{min}	L_{10}	L_{50}	L_{90}	

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL / AMBIENT / OTHER:
ROADWAY TYPE: dirt
COUNT DURATION: ____-MINUTE

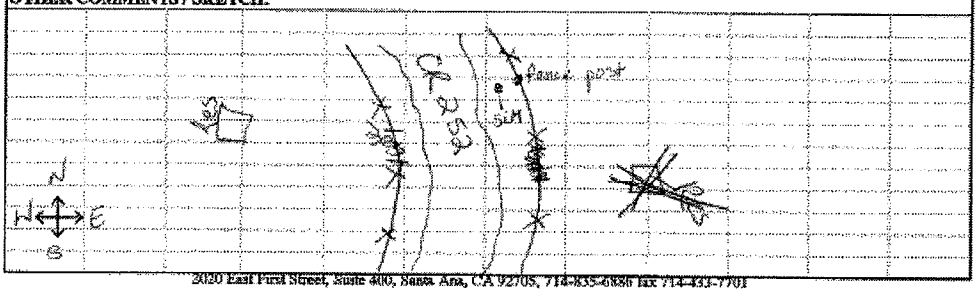
	COUNT: NB / EB / SB / WB	SPEED (mph) NB / EB / SB / WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	____ / ____	____ / ____	____ / ____	____ / ____
MED. TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
HVY TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
BUSES:	____ / ____	____ / ____	____ / ____	____ / ____
MOTORCYCLES:	____ / ____	____ / ____	____ / ____	____ / ____

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: distant backup alarm, distant construction/road)

Description / Sketch

TERRAIN: HARD / SOFT / MIXED / FLAT OTHER:
PHOTOS: 1 (↓)
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: ST-S OBSERVER(s): Rob Greene, Grant Lonberg, Jamie Kong
START DATE & TIME: 4/11/06 3:45p END DATE & TIME: 4/11/06 4:05p
ADDRESS:
N 29° 27' 53.3"
W 098° 59' 48.1" Elev 922

Weather

TEMP: 89 °F HUMIDITY: 37 % R.H. WIND: CALM / LIGHT MODERATE VARIABLE
WINDSPEED: MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 / 2 SERIAL #:
CALIBRATOR: B&K 4231 SERIAL #:
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 93.9 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED / SLOW FAST FRONTAL RANDOM / ANSI / OTHER:

Rec #	Start / End							
1	1550 / 1600	L_{eq} 33.4	L_{max} 49.2	L_{min} 26.3	L_{90} 28.4	L_{50} 30.4	L_{10} 35.4	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: dirt

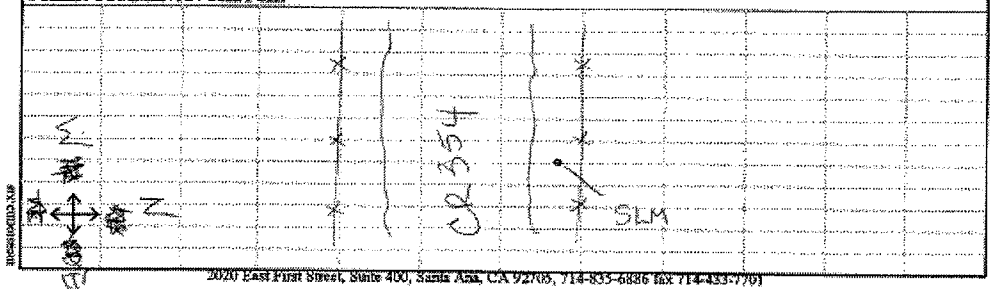
COUNT DURATION: ___-MINUTE	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	___ / ___	___ / ___	___ / ___	___ / ___
MED. TRUCKS:	___ / ___	___ / ___	___ / ___	___ / ___
HVY TRUCKS:	___ / ___	___ / ___	___ / ___	___ / ___
BUSES:	___ / ___	___ / ___	___ / ___	___ / ___
MOTORCYCLES:	___ / ___	___ / ___	___ / ___	___ / ___

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: distant tractor, distant truck

Description / Sketch

TERRAIN: HARD SOFT / MIXED FLAT / OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



2020 East First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7707

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: LT-A OBSERVER(S): Rob Greene, Janice King, Grant Limberg
DATE & TIME: 4/6/06 6:06p DATE & TIME: 4/7/06 6:20p
1180 CR 353
N29° 27' 26.0"
W099° 00' 42.9" Elev 922' ±

TEMP: 87.6 °F HUMIDITY: 41.5 % R.H. WIND: (CALM) LIGHT MODERATE VARIABLE
WINDSPEED: MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY (CLEAR) (SUNNY) FOG RAIN Other:

Weather

INSTRUMENT: LD820 TYPE: (1) 2 SERIAL #: 1597
CALIBRATOR: Cal 200 SERIAL #: 2794
CALIBRATION CHECK: PRE-TEST 93.8 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X
SETTINGS: (A) WEIGHTED (SLOW) FAST FRONTAL (RANDOM) (ANSI) OTHER:

Acoustic Measurements

Rec #	Start / End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
1	1818 / 1807	38.5	76.5	30.6	33.9	29.5	39.9	
/	/							
/	/							
/	/							

COMMENTS:
Meter affixed to tree

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL (AMBIENT) OTHER:
ROADWAY TYPE:

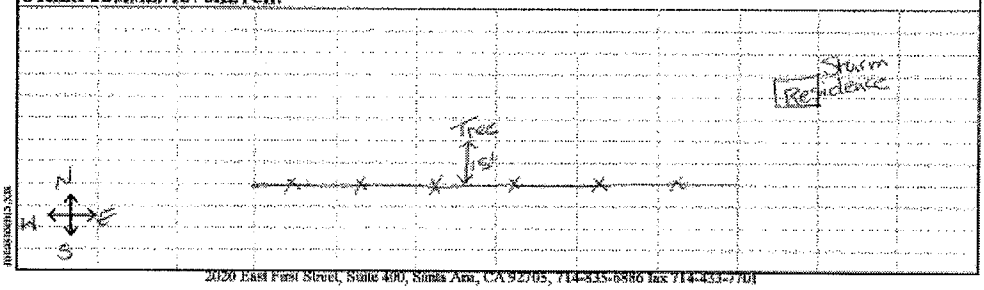
COUNT DURATION: ____-MINUTE	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / (distant BIRDS)
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

TERRAIN: HARD (SOFT) MIXED (FLAT) OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:

Description / Sketch



LT - H

SURFACE TRANSPORTATION BOARD
WASHINGTON, DC 20423

RIGHT OF ENTRY FOR NOISE STUDY

Permission is hereby granted to the Surface Transportation Board's Section of Environmental Analysis (SEA) and its contractor (URS Corporation), including employees of SEA and URS, to enter the:

☐ front yard ☐ side yard ☐ backyard ☒ open areas

of my property located at 1180 CR 353 to temporarily install, operate, and remove noise monitoring equipment for the purposes of measuring existing ambient sound levels on or about my property. I understand that these noise measurements are part of SEA's environmental study of Southwest Gulf Railroad Company's proposal to construct and operate a rail line in Medina County, Texas.

This Right of Entry shall be valid only from April 6, 2006 through April 8, 2006.

Date of authorization: 4-6-06

Signature of authorizing person: Marie Sturm
Resident

Additional Restrictions and/or Special Instructions for Entry (please print):

Resident Contact Information (please print):

Name(s): Marie Sturm

Telephone Number(s): 830 426 2142

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: LT-B OBSERVER(S): Rob Greene, Janice King, Grant Limbers
START DATE & TIME: 4/6/06 1900 END DATE & TIME: 4/8/06 12:30
ADDRESS: The Daily Place
Field South of CR 358 intersection N 29° 25' 11.5" W 099° 00' 36.7"
Elevation 854.0

Weather

TEMP: 84.2 °F HUMIDITY: 28.7 % R.H. WIND: CALM [LIGHT] MODERATE VARIABLE
WINDSPEED: 3 MPH DIR: N NE [E] [SE] S SW W NW [STEADY] GUSTY
SKY: OVRCST [PARTLY CLOUDY] CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: LD820 TYPE: [1] 2 SERIAL #: 1470
CALIBRATOR: CAL 200 SERIAL #: 2794
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X
SETTINGS: [A-WEIGHTED] [SLOW] FAST FRONTAL [RANDOM] ANSI OTHER:

Rec #	Start / End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
1	1900 / 2535	55.9	97.6	36.2	36.6	44.8	55.8	
/	/							
/	/							
/	/							

33 hrs 34 min 26.3 sec

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL [AMBIENT] OTHER:
ROADWAY TYPE:
COUNT DURATION: ____-MINUTE

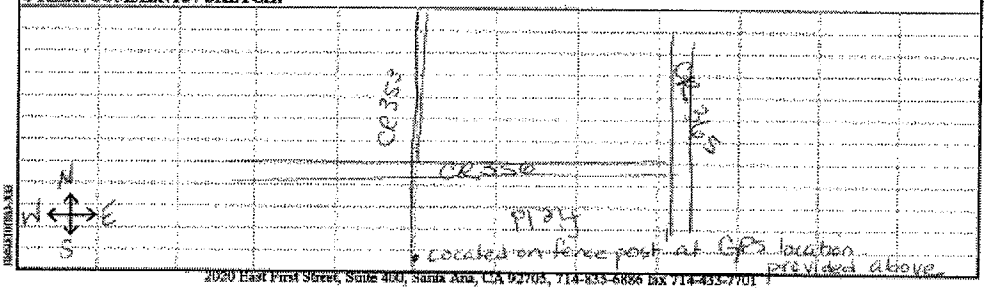
	SPEED (mph) NB / EB / SB / WB	NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	____ / ____	____ / ____	____ / ____	____ / ____
MED. TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
HVY TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
BUSES:	____ / ____	____ / ____	____ / ____	____ / ____
MOTORCYCLES:	____ / ____	____ / ____	____ / ____	____ / ____

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / [BIRDS]
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

Description / Sketch

TERRAIN: HARD [SOFT] MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



LT - B

SURFACE TRANSPORTATION BOARD
WASHINGTON, DC 20423

RIGHT OF ENTRY FOR NOISE STUDY

Permission is hereby granted to the Surface Transportation Board's Section of Environmental Analysis (SEA) and its contractor (URS Corporation), including employees of SEA and URS, to enter the:

☐ front yard ☐ side yard ☐ backyard ☒ open areas

of my property located at 1kc Daily Place to temporarily install, operate, and remove noise monitoring equipment for the purposes of measuring existing ambient sound levels on or about my property. I understand that these noise measurements are part of SEA's environmental study of Southwest Gulf Railroad Company's proposal to construct and operate a rail line in Medina County, Texas.

This Right of Entry shall be valid only from April 6, 2006 through April 16, 2006.

Date of authorization: 4/6/06

Signature of authorizing person: [signature]
Resident

Additional Restrictions and/or Special Instructions for Entry (please print):

Resident Contact Information (please print):

Name(s): Andrea S. Dee

Telephone Number(s): 210 415 5920 (Dea S. Dee)

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: LT-C OBSERVER(s): Rob Greene, Janice King, Grant Limberg
START DATE & TIME: 4/7/06 11:30a END DATE & TIME:
ADDRESS: 915 CR 454
N 29° 22' 47.7"
W 099° 01' 54.0" Elev 825

Weather

TEMP: 87.4 °F HUMIDITY: 85 % R.H. WIND: CALM / LIGHT / MODERATE / VARIABLE
WINDSPEED: 5-7 MPH DIR: N / NE / E / SE / S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY / CLEAR / SUNNY / FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: LD820 TYPE: 1 / 2 SERIAL #: 1528
CALIBRATOR: Cal200 SERIAL #: 27964
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST 93.6 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED / SLOW FAST FRONTAL / RANDOM / ANSI OTHER:

	Rec #	Start / End								
4/6/06	1	1140 /	24hrs 22min 51.5sec.	L_{eq} 32.4	L_{max} 64.7	L_{min} 11.7	L_{90} 13.9	L_{50} 20.9	L_{10} 35.1	
4/7/06	2	1237 / 24hrs		L_{eq} 47.3	L_{max} 86.0	L_{min} 32.6	L_{90} 33.2	L_{50} 36.8	L_{10} 46.8	
	/	/ 5:1 mid		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
	/	/ 5:30		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	

COMMENTS: Suspect data will restart 4/8/06

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL / AMBIENT / OTHER:
ROADWAY TYPE:
COUNT DURATION: -MINUTE

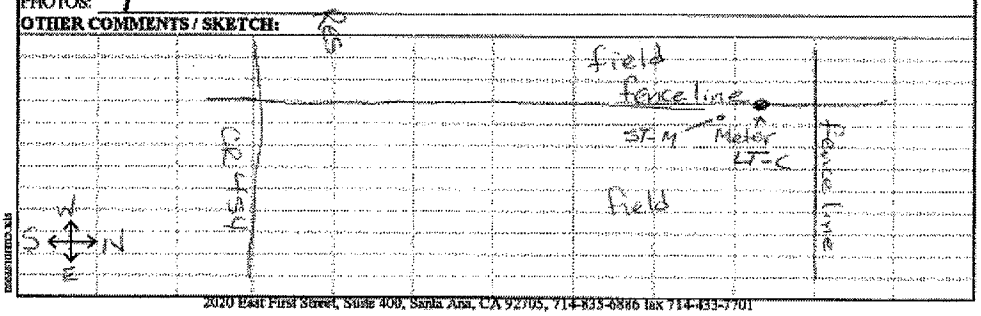
	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

Description / Sketch

TERRAIN: HARD / SOFT / MIXED FLAT OTHER:
PHOTOS: 1
OTHER COMMENTS / SKETCH:



LT-C

SURFACE TRANSPORTATION BOARD
WASHINGTON, DC 20423

RIGHT OF ENTRY FOR NOISE STUDY

Permission is hereby granted to the Surface Transportation Board's Section of Environmental Analysis (SEA) and its contractor (URS Corporation), including employees of SEA and URS, to enter the:

☐ front yard ☐ side yard ☐ backyard ☒ open areas

of my property located at 915 CR-454 to temporarily install, operate, and remove noise monitoring equipment for the purposes of measuring existing ambient sound levels on or about my property. I understand that these noise measurements are part of SEA's environmental study of Southwest Gulf Railroad Company's proposal to construct and operate a rail line in Medina County, Texas.

This Right of Entry shall be valid only from April 6, 2006 through April 16, 2006.

Date of authorization: 4-7-06

Signature of authorizing person: Joyce McKay
Resident

Additional Restrictions and/or Special Instructions for Entry (please print):

Resident Contact Information (please print):

Name(s): Joyce McKay

Telephone Number(s): 830-741-8976

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: LT-D OBSERVER(s): Rob Greene, Janice King, Grant Limberg
START DATE & TIME: 4/7/06 6:50p END DATE & TIME: 4/7/06
ADDRESS:
N29° 26' 32.6"
W098° 58' 23.6" Elev 893

Weather

TEMP: 92.0° F HUMIDITY: 5.0 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 13-16 MPH DIR: N NE E SE S SW W NW STEADY GUSTY 17-20mph
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: LD820 TYPE: 1 2 SERIAL #: 1597
CALIBRATOR: Cal200 SERIAL #: 2794
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST _____ dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start / End	39 hrs 41 mins 20 sec						
1	1900 /	L_{eq} 64.6,	L_{max} 101.2,	L_{min} 18.4,	L_{90} 23.8,	L_{50} 40.6,	L_{10} 55.8,	
___	___ / ___	L_{eq} ___,	L_{max} ___,	L_{min} ___,	L_{90} ___,	L_{50} ___,	L_{10} ___,	
___	___ / ___	L_{eq} ___,	L_{max} ___,	L_{min} ___,	L_{90} ___,	L_{50} ___,	L_{10} ___,	
___	___ / ___	L_{eq} ___,	L_{max} ___,	L_{min} ___,	L_{90} ___,	L_{50} ___,	L_{10} ___,	

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: dirt
COUNT DURATION: ____-MINUTE

	SPEED (mph) NB / EB / SB / WB	NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	___ / ___	___ / ___	___ / ___	___ / ___
MED. TRUCKS:	___ / ___	___ / ___	___ / ___	___ / ___
HVY TRUCKS:	___ / ___	___ / ___	___ / ___	___ / ___
BUSES:	___ / ___	___ / ___	___ / ___	___ / ___
MOTORCYCLES:	___ / ___	___ / ___	___ / ___	___ / ___

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

Descriptive / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: 1
OTHER COMMENTS / SKETCH:
Same as ST-L

2020 East First Street, Suite #400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

LT-D
ST-L

SURFACE TRANSPORTATION BOARD
WASHINGTON, DC 20423

RIGHT OF ENTRY FOR NOISE STUDY

Permission is hereby granted to the Surface Transportation Board's Section of Environmental Analysis (SEA) and its contractor (URS Corporation), including employees of SEA and URS, to enter the:

☐ front yard ☐ side yard ☐ backyard ☑ open areas

of my property located at 6744 FM 2676 to temporarily install, operate, and remove noise monitoring equipment for the purposes of measuring existing ambient sound levels on or about my property. I understand that these noise measurements are part of SEA's environmental study of Southwest Gulf Railroad Company's proposal to construct and operate a rail line in Medina County, Texas.

This Right of Entry shall be valid only from April 6, 2006 through April 16, 2006.

Date of authorization: 4-7-05

Signature of authorizing person: Bonnie McGill
Resident

Additional Restrictions and/or Special Instructions for Entry (please print):

Resident Contact Information (please print):

Name(s): Bonnie McGill

Telephone Number(s): 830-741-8612

FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: LT-E OBSERVER(S): Rob Greene, Janice King, Grant Lindsey
START DATE & TIME: 4/5/06 11:55 END DATE & TIME:
ADDRESS:
N 39° 23' 31.6"
W 98° 58' 31.9" Elev. 981 ft

Weather

TEMP: 74 °F HUMIDITY: 24 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 5-6 MPH DIR: N NE E SE S SW W NW STEADY GUSTY 10-15 mph
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: LD820 TYPE: 1 SERIAL #: 1470
CALIBRATOR: Cal200 SERIAL #: 3794
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST 93.9 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start / End	24hr 2dmin 14sec						
1	1335 /	L_{eq} 44.2	L_{max} 76.8	L_{min} 27.3	L_{90} 35.0	L_{50} 41.5	L_{10} 47.0	
	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: dirt

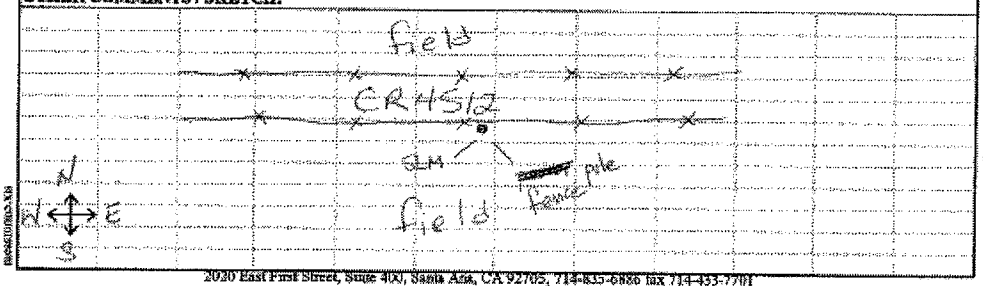
COUNT DURATION: ____-MINUTE		SPEED (mph)	#2 COUNT:	SPEED (mph)
	NB / EB / SB / WB	NB EB / SB WB	NB / EB / SB / WB	NB EB / SB WB
AUTOS:	____ / ____	____ / ____	____ / ____	____ / ____
MED. TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
HVY TRUCKS:	____ / ____	____ / ____	____ / ____	____ / ____
BUSES:	____ / ____	____ / ____	____ / ____	____ / ____
MOTORCYCLES:	____ / ____	____ / ____	____ / ____	____ / ____

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / distant BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: wind in the power lines causing vibration & noise (slight), distant tractor

Description / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: 1
OTHER COMMENTS / SKETCH:



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FIELD NOISE MEASUREMENT DATA

URS Project: STB Medina Co Texas Rail Job # 40818908.06

SITE IDENTIFICATION: LT-F OBSERVER(s): Grant Limberg & Janice King
START DATE & TIME: 4/9/08 3:20p END DATE & TIME:
ADDRESS:
N29° 21' 58.0"
W099° 00' 03.4" Elev 916

Weather

TEMP: 89 °F HUMIDITY: 49 % R.H. WIND: CALM [LIGHT] MODERATE [VARIABLE]
WINDSPEED: 2-5 MPH DIR: N NE [E] SE S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: LD820 TYPE: [1] 2 SERIAL #: ~~1538~~ 1470
CALIBRATOR: Cal 2-06 SERIAL #: 2794
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST 93.5 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start	End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
1	1524	~	44.7	80.7	32.6	34.4	38.3	45.8	

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE: dirt

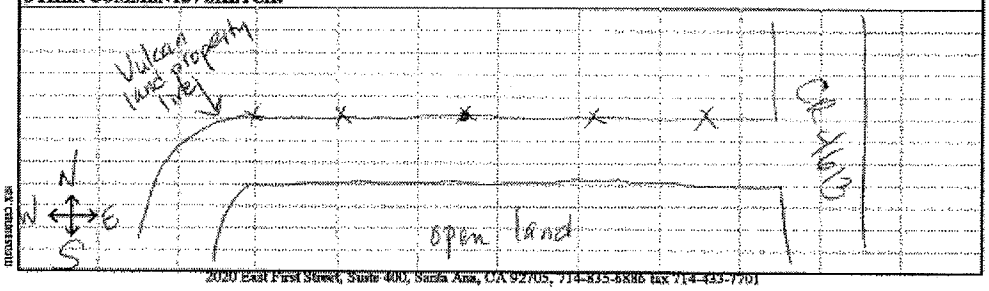
COUNT DURATION: ____-MINUTE	NB / EB	SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB	SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:						
MED. TRUCKS:						
HVY TRUCKS:						
BUSES:						
MOTORCYCLES:						

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / [RUSTLING LEAVES] / distant BARKING DOGS / [BIRDS]
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: Flies, Highway but very faint

Description / Sketch

TERRAIN: HARD [SOFT] MIXED [FLAT] OTHER:
PHOTOS: 1(J)
OTHER COMMENTS / SKETCH:

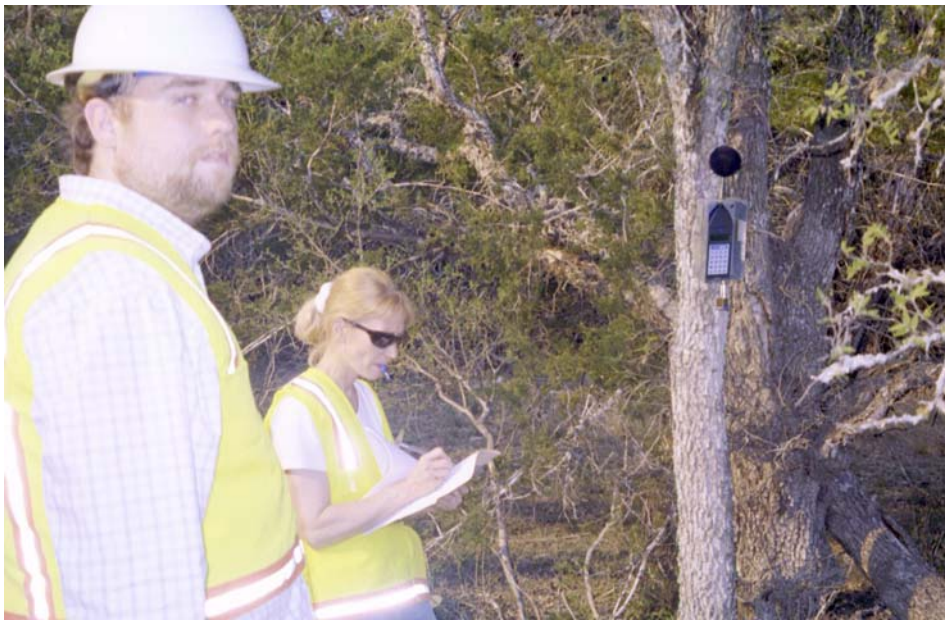


SLT Checklist.xls

APPENDIX D

PHOTOGRAPHIC LOG

Color photos can be viewed on the CD provided.

	LT-A
	LT-B

	LT-C/ST-M
	LT-D/ST-L

	LT-E
	LT-F

	ST-A
No photo available	ST-B

No photo available	ST-C
	ST-D

	ST-E
	ST-F

	ST-G
	ST-H

	ST-I/NT-F
	ST-J

	ST-K
	ST-N

	ST-O
	ST-P

	ST-Q
	ST-R

	ST-S
No Photo Available	NT-A

	NT-B
	NT-C

	NT-E
	NT-F