U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East
Tier 1 Draft Environmental Impact Statement

Traffic Noise Technical Memorandum

June 2016

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1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 50 Tier 1 EIS) was initiated by the project's lead agencies, the Colorado Department of Transportation (CDOT) and the Federal Highway Administration (FHWA). The purpose of the U.S. 50 Tier 1 EIS is to provide, within the framework of the National Environmental Policy Act of 1969 (NEPA), a corridor location decision for U.S. Highway 50 (U.S. 50) from Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line that CDOT and the communities can use to plan and program future improvements, preserve right of way, pursue funding opportunities, and allow for resource planning efforts.

The U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (Figure 1-1) is the area in which U.S. 50 Tier 1 EIS alternatives were assessed. This area traverses nine municipalities and four counties in the Lower Arkansas Valley of Colorado. The nine municipalities include (from west to east) the city of Pueblo, town of Fowler, town of Manzanola, city of Rocky Ford, town of Swink, city of La Junta, city of Las Animas, town of Granada, and town of Holly. The four counties that fall within this project area are Pueblo, Otero, Bent, and Prowers counties.

The project area does not include the city of Lamar. A separate Environmental Assessment (EA), the *U.S. 287 at Lamar Reliever Route Environmental Assessment*, includes both U.S. 50 and U.S. Highway 287 (U.S. 287) in its project area, since they share the same alignment. The Finding of No Significant Impact (FONSI) for the project was signed November 10, 2014. The EA/FONSI identified a proposed action that bypasses the city of Lamar to the east. The proposed action of the *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 287 near County Road (CR) C-C and extends nine miles to State Highway (SH) 196. Therefore, alternatives at Lamar are not considered in this U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definition

Noise is generally defined as unwanted or undesirable sound affecting noise sensitive receptors, and, ultimately, people. More specifically, traffic noise is generated by vehicles passing by and includes noise from tires on the pavement, engines, and exhaust. Factors that influence traffic noise include such things as the number of vehicles on the road, the types of vehicles (e.g., cars, trucks, or motorcycles), traffic speed, and the distance between the roadway and the person hearing the noise. Due to the physical properties of noise, it has a highly localized effect. Since sound energy dissipates with distance, people closer to its source experience higher levels of noise than those successively farther away.

Noise typically affects humans in three different ways: noise intensity or level, noise frequency, and noise variation with time. Noise intensity is determined by how sound pressure fluctuates, and it is expressed in decibels (dB). The range of noise normally encountered can be expressed by values between 0 and 120 dB on the dB scale. A 3-dB change in sound level generally represents a barely noticeable change in noise level, whereas a 10-dB change would be perceived as a doubling of loudness. The frequency of noise is related to the tone or pitch of the sound and is expressed in terms of cycles per second, or Hertz. The human ear can detect a wide range of frequencies from approximately 20 Hertz to 17,000 Hertz. Because human sensitivity to sound varies from person to person, the A-weighting system is commonly used when measuring noise to provide a value that represents human response. Noise levels measured using this system are called “A-weighted” levels, and are expressed as dBA.

Because noise fluctuates during the course of a day, it is common practice to condense all of this information into a single number, known as an equivalent sound level (Leq). Leq represents a steady sound level over a specified time period (typically 60 minutes).

3. Applicable Laws, Regulations, and Guidance

In addition to adhering to NEPA and its regulations (23 Code of Federal Regulations [CFR] 771), the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500–1508), and the Moving Ahead for Progress in the 21st Century Act of 2012 (MAP-21), the following laws, regulations, and guidance were followed during this analysis of noise. They are described in more detail below.

- Procedures for Abatement of Highway Traffic Noise and Construction Noise
- FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance
- CDOT Noise Analysis and Abatement Guidelines

3.1. Procedures for Abatement of Highway Traffic Noise and Construction Noise

As part of the Federal-Aid Highway Act of 1970, 23 CFR 772 (Procedures for Abatement of Highway Traffic Noise and Construction Noise) was established to provide procedures for noise studies and noise abatement criteria to help protect public health and welfare. The last amendment for this regulation was published on July 13, 2010.

3.2. FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance

The purpose of this document is to provide guidance for the analysis and abatement of highway traffic noise. It establishes baseline guidelines for individual state Department of Transportation (DOT) agencies to further address noise analysis and abatement specific to their state. The last version of this document was published in December 2011.

3.3. CDOT Noise Analysis and Abatement Guidelines

These guidelines establish noise abatement criteria, or noise level standards, above which noise-reducing actions should be considered, specifically for the State of Colorado. The most recent version was published on February 8, 2013.

4. Methodology

The U.S. 50 Corridor East project is a Tier 1 EIS. "Tiering" for this process means that the work involved will be conducted in two phases, or tiers, as follows:

- Tier 1—A broad-based (i.e., corridor level) NEPA analysis and data collection effort. The goal of Tier 1 is to determine a general corridor location (not a roadway footprint). Data sources will include existing quantitative data, qualitative information, or both. Mitigation strategies (not necessarily specific mitigation activities) and corridor-wide mitigation opportunities will be identified. Additionally, the U.S. 50 Tier 1 EIS will identify sections of independent utility (SIUs) and provide strategies for access management and corridor preservation.
- Tier 2—A detailed (i.e., project level) NEPA analysis and data collection effort. The goal of Tier 2 studies will be to determine an alignment location for each SIU identified in Tier 1. Data sources will include project-level data, including field data collection when appropriate. Tier 2 studies will provide project-specific impacts, mitigation, and permitting for each proposed project.

Resource methodology overviews were developed to identify and document which resource evaluation activities would be completed during the Tier 1 EIS, and which would be completed during Tier 2 studies. These overviews are intended to be guidelines to ensure that the Tier 1 EIS remains a broad-based analysis, while clarifying (to the public and resource agencies) when particular data and decisions would be addressed in the tiered process.

These overviews were approved by FHWA and CDOT in 2005, and they were agreed upon by the resource agencies during the project's scoping process between February and April of 2006.

Each overview summarizes the following information for the given resource:

- Relevant data or information sources—the types of corridor-level data that will be collected and the sources of those data
- Data collection and analysis methodology—how the data collection and analysis will be completed
- Project area—defined as one to four miles wide surrounding the existing U.S. 50 facility beginning at Pueblo, Colorado, at Interstate 25 (I-25) and extending to the Colorado-Kansas state line (resources will be reviewed within this band, and it is the same for all resources)
- Effects—the type(s) of effect(s) to be identified
- Mitigation options—how mitigation will be addressed
- Deliverables—how the activities above will be documented
- Regulatory guidance/requirements—a list of applicable laws, regulations, agreements, and guidance that will be followed during the review of the resources

These overviews were used by the project's resource specialists as guidelines to ensure that their activities were relevant to the Tier 1 decision (i.e., corridor location). As the resource specialists conducted their work, data sources or analysis factors were added or removed. The final actions of the resource specialists are described below. The resource methodology overview for traffic noise has been attached to this technical memorandum as Appendix A for reference only. Additionally, abbreviations and acronyms used in this report are listed in Appendix B.

4.1. Relevant Data or Information Sources

The following data and information were collected to identify noise sensitive receptors within the project area. Examples of noise sensitive receptors found in the project area include parks and recreation areas, residences, hotels and motels, schools, libraries, and hospitals. More information about what defines a noise sensitive receptor is located in Section 4.2. The following list identifies categories of noise sensitive receptors and the data and information sources used to identify them within the project area.

- Parklands and recreational areas—These facilities were identified during a field review primarily intended to identify potential Section 4(f) resources for the U.S. 50 Tier 1 EIS project. Parklands and recreational areas in Pueblo also were identified with the help of the City of Pueblo's website.
- Schools—Public elementary and secondary schools (i.e., K–12) were identified using the U.S. Department of Education's National Center for Education Statistics database.
- Libraries—Public libraries were identified using the PublicLibraries.com website.
- Hospitals—Hospitals were identified using information from the Colorado Department of Public Health and Environment, which licenses such facilities in Colorado.
- Aerial photography—Aerial photography was used to identify all other noise sensitive receptors.

Additionally, traffic data from CDOT was used to identify current (2011) traffic volumes on U.S. 50 and forecasted volumes for the year 2040.

4.2. Data Collection and Analysis Methodology

This traffic noise analysis was completed by identifying noise sensitive receptors within a study area defined as 1,000 feet wide and within 300 feet on either side of the Build Alternatives, centered on the Build Alternatives (creating a 1,600-foot-wide study area). Long-established state and federal noise guidelines prescribe how to determine whether a nearby property (i.e., noise receptor) is adversely affected by traffic noise. If traffic noise is expected to approach or exceed those guidelines (see Table 4-1), projects are required to mitigate for noise impacts above the respective Noise Abatement Criteria (NAC) dBA level for each receptor.

Table 4-1. CDOT Noise Abatement Criteria

Activity Category	Activity Leq(h)*	Evaluation Location	Activity Description
NAC A	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
NAC B	66	Exterior	Residential
NAC C	66	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
NAC D	51	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
NAC E	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
NAC F	NA	NA	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, ship yards, utilities (water resources, water treatment, electrical), and warehousing.
NAC G	NA	NA	Undeveloped lands that are not permitted for development.

** Hourly A-weighted sound level in dBA, reflecting a 1-dBA approach value below 23CFR772 values*

Noise sensitive receptors are categorized by the type of land use activities associated with the receptor (Table 4-1). Some categories are much more sensitive to the effects of traffic noise than others. For example, an outdoor amphitheater would be more affected by traffic noise than areas used occasionally by business customers, such as outdoor waiting areas at restaurants. This is because the purpose of the amphitheater is to hear the performances occurring there.

For the purposes of this U.S. 50 Tier 1 EIS, all noise sensitive receptors that were located, in whole or in part, within the 1,600-foot noise study area were recorded. Existing noise conditions were not collected, nor were any models developed to determine the potential impacts on the various receivers. Existing noise data and noise modeling will be conducted during Tier 2 studies and will be based on identified Tier 2 alignments.

4.3. Project Area

The project area for the U.S. 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to the Colorado-Kansas state line (as shown in Figure 1-1). The project area encompasses the study area limits, which is where the Tier 1 corridor alternatives considered by this project would be located. The study area is 1,000 feet wide centered on the corridor alternatives, beginning on or near the existing U.S. 50 at I-25 in Pueblo, Colorado, and extending to just east of Holly, Colorado, in the vicinity of the Colorado-Kansas state line. The limits of the project were approved by the lead agencies and other project stakeholders during the U.S. 50 Tier 1 EIS's scoping activities.

5. Existing Conditions

Currently, U.S. 50 is the primary east-west route into, out of, and through the 10 communities along U.S. 50 from I-25 to the vicinity of the Colorado-Kansas state line. These communities include Pueblo, Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Lamar, Granada, and Holly. (It should be noted that Lamar is not included in the U.S. 50 project area because it is being considered in the *U.S. 287 at Lamar Reliever Route Environmental Assessment*; therefore, it has been omitted from this analysis.) Thus, traffic on U.S. 50 currently has a noise effect on these communities. The following section describes traffic conditions on U.S. 50 today (using a date of 2011) and in the future (using a date of 2040) and identifies the noise sensitive receptors used for this analysis.

5.1. U.S. 50 Traffic Volumes

The average annual daily traffic (AADT) volume for a given roadway is the number of vehicles that drive the roadway during an average day. Figure 5-1 shows these traffic volumes for U.S. 50 between Pueblo and the Colorado-Kansas state line. Traffic volumes on U.S. 50 currently decline from a maximum of roughly 13,500 vehicles per day (vpd) within Pueblo city limits to a minimum of about 1,700 vpd east of Holly. The average traffic volume on U.S. 50 is approximately 5,500 vpd. By the year 2040, traffic volumes are expected to increase to 19,000 vpd in Pueblo and 2,500 vpd by Holly (Swenka 2014).

In comparison, the amount of traffic carried on I-25 through Pueblo was, on average, approximately 47,846 (Swenka 2014). In other words, traffic volumes on U.S. 50 are roughly 11 percent of the volumes on I-25 through Pueblo. Thus, traffic noise levels on U.S. 50 are relatively low.

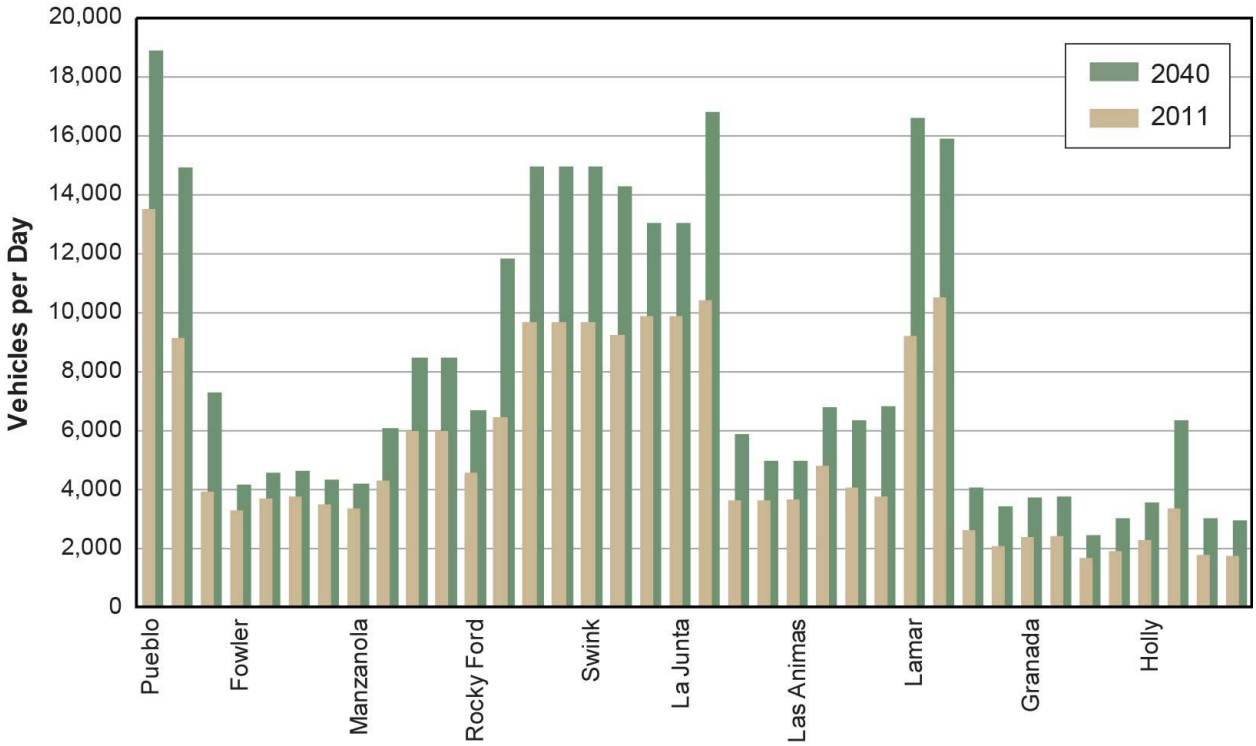

Figure 5-1. Average Annual Daily Traffic for 2011 and 2040

5.2. Ambient Noise Levels

In January 2014, highway traffic noise levels were collected along U.S. 50 in the project area to provide quantitative context to the corridor noise environment. The site selections were based on highway segment AADT volumes serving regional population centers. Additional traffic noise data collection conducted in 2011 for the *U.S. 287 at Lamar Reliever Route Environmental Assessment* also has been used to supplement this document (Hankard 2003, CH2M Hill 2012).

5.2.1. Measurement Locations

Noise measurements were taken at five locations along the U.S. 50 corridor (see Figure 5-2):

- Milepost 334 located just east of Avondale (2014)
- Milepost 365.5 located between Manzanola and Rocky Ford (2014)
- Milepost 384 located between La Junta and Las Animas at Otero CR 33 (2014)
- Milepost 433.5 at the corner of the U.S. 50 and U.S. 287 intersection (2002)
- Milepost 437.5 on U.S. 50 (2002)

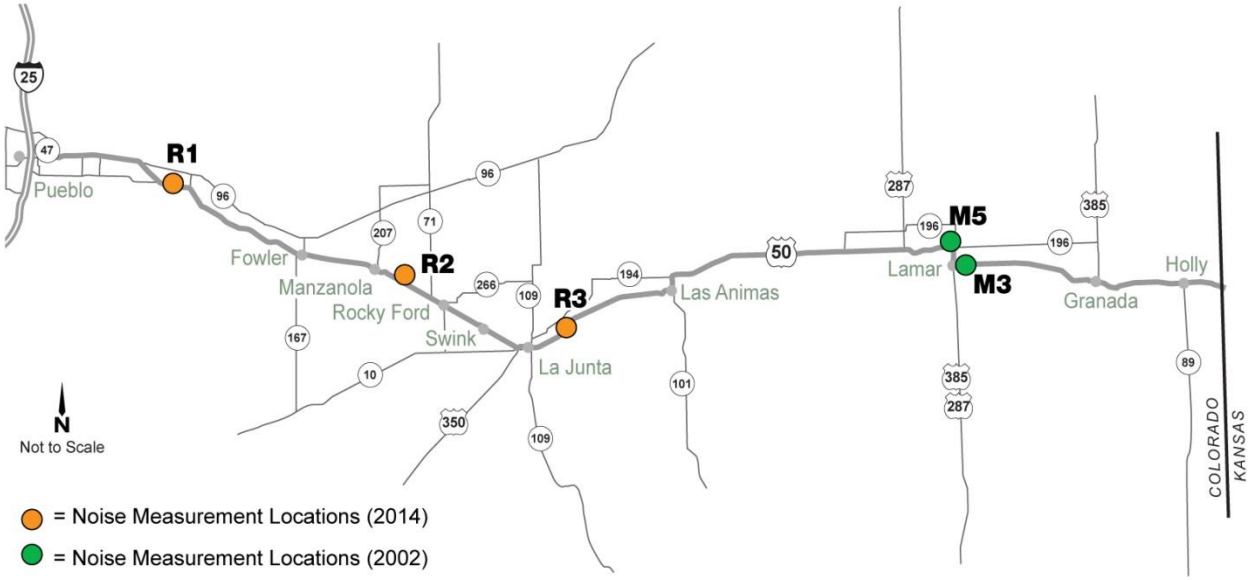

Figure 5-2. Noise Measurement Locations

5.2.2. Measurement Conditions for 2014 Data

All traffic noise measurements were recorded as average hourly equivalent Leq decibels using an A-weighted filter and fast control settings. Prior to each measurement, the Class II Quest 2900 Sound Meter was calibrated using a CE-10 Calibrator.

Stronger-than-desirable wind conditions have factored into the data collection. The Eastern Plains are characterized by pervasive and often gusty westerly wind. Several attempts to measure noise levels along the corridor were aborted due to complications caused by wind conditions and, in one case, extreme cold affecting sound meter operation.

Wind speeds at each site were estimated; no anemometer was deployed. MesoWest Weather real-time reporting from Pueblo and Lamar stations were utilized to estimate wind and gusting speeds, temperatures, and humidity in the morning ahead of field data collection. On-site temperatures were taken from local AccuWeather.com reporting.

5.2.3. Noise Results

The following tables summarize the noise levels, data collection parameters, and traffic volumes recorded at each site. The R2 noise level may be slightly skewed due to a very close diesel truck pass-by on the access road during the measurement.

Table 5-1. Noise Measurement Data

Site	Location/ Description	Date & Start Time	Reading Duration (minutes)	Leq (dBA)	Wind Speed (mph)	Temp (°F)	Relative Humidity (%)
R1	Milepost 334 50 feet south of EOP 2 lanes striped at grade	1/30/2014 9:08 AM	10	64.2	0–5	40	30–40
R2	Milepost 365.5 30 feet south of EOP 4 lanes striped at grade	1/30/2014 10:01 AM	10	66.2	5–10	44	30–40
R3	Milepost 384 35 feet south of EOP 4 lanes with 15-foot grass median, rolling terrain	1/30/2014 10:50 AM	13	58.5	10+	45	30–40
M3[1]	Milepost 437.5 U.S. 50 EB & WB east of the city of Lamar	12/6/2002 9:15 AM	60	60.1	—[2]	—[2]	—[2]
M5[1]	Milepost 433.5 Near the corner of the U.S. 50 and U.S. 287 intersection	12/6/2002 11:15 AM	60	50.4	—[2]	—[2]	—[2]

[1]*Source: Hankard 2003*
[2]*Data not provided in the Noise Analysis Report for the* U.S. 287 at Lamar Reliever Route EA.

Table 5-2. Traffic Volumes during 2014 Measurements

Site	Hourly Traffic Volume (vehicles/hour)								Posted Speed (mph)
	Light		Medium		Heavy		Total		
	EB	WB	EB	WB	EB	WB	EB	WB	
R1	66	222	0	0	24	6	90	228	65
R2	90	108	12	0	18	12	120	120	65
R3	56	69	5	5	9	5	70	79	65

Table 5-3. Traffic Volumes during 2002 Measurements

Site	Hourly Traffic Volume (vehicles/hour)			Speed
	Autos	Medium Trucks	Heavy Trucks	
M3	347	11	23	34
M5	41	1	10	56

Source: Hankard 2003

5.3. Noise sensitive receptors

A total of 1,720 noise sensitive receptors were identified using aerial photography and GIS files within the aforementioned traffic noise study area. Of the 1,720 noise sensitive receptors, 93.4 percent (1,607 noise sensitive receptors) were NAC B, 3.5 percent (60 noise sensitive receptors) were NAC C, and 3.1 percent (53 noise sensitive receptors) were NAC E. In addition, 1,007 noise sensitive receptors (58.5 percent) were identified in the Pueblo area, as this is the most populated section of the study area, and the majority (80 percent) of noise sensitive receptors in the study area are located within the communities rather than in between towns.

There were no NAC A or D noise sensitive receptors identified in the study area. Any NAC F and G noise sensitive receptors that were identified were not counted for this analysis as they do not have a designated NAC Leq(h) criterion. Because of this, they are not considered for any noise abatement measures (i.e., noise walls) that may be applicable based on the results of any future noise analysis done for any Tier 2 studies.

The NAC C noise sensitive receptors include park areas, rest stops, churches, day care centers, schools, and several Colorado Parks and Wildlife recreation trails that cross through the project area. A receptor was placed at each location, and, for recreation areas (parks, sports fields, etc.), a receptor was placed for each individual amenity feature within the recreation area. For example, if a park contained a playground, tennis courts, basketball courts, and open recreation space, a total of four noise sensitive receptors would be placed within the park area to represent each individual function that is available.

CDOT's Noise Abatement Guidelines (2013) do not specify how many noise sensitive receptors should be placed along a trail to represent it appropriately in the noise analysis (i.e., one receptor every 1,000 feet). However, the guidelines do say that usage, stopping sites, rest areas, etc., should be taken into account when deciding on the number of representative receivers. As field visits were not required for this Tier 1 analysis to quantify the usage of the trails in the study area, for the purposes of this analysis, one receptor was placed every time a recreation trail crossed the 1,600-foot study area corridor.

6. Effects

This analysis identified potential noise sensitive receptors within the 1,600-foot-wide traffic noise analysis area, which includes the areas within the Build Alternatives and within 300 feet of it on either side (north and south). An extra 300 feet was added on each side because noise from U.S. 50 traffic is heard on land adjacent to the highway. The extra 600 feet ensures that all potential noise sensitive receptors that could be affected are counted if a new highway segment is built on the edge of the Build Alternatives. The following sections summarize potential effects from U.S. 50 traffic noise by the No-Build Alternative and Build Alternatives.

6.1. No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller scale improvements may be undertaken, such as passing lanes and other minor safety improvements.

Land adjacent to U.S. 50 today would continue to experience traffic noise from the highway. Traffic volumes are expected to increase by approximately 52 percent on U.S. 50 in the Lower Arkansas Valley between 2011 and 2040 (Swenka 2014). In general, traffic would need to double to result in a perceptible noise increase. Therefore, the No-Build Alternative would result in only a slight increase in noise due to expected increases in traffic on U.S. 50 in the future, and this change would likely be imperceptible to the human ear.

6.2. Build Alternatives

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 50 from I-25 in Pueblo, Colorado, to approximately one mile east of Holly, Colorado. There are a total of 30 Build Alternatives. In Pueblo, three Build Alternatives are proposed that either improve U.S. 50 on its existing alignment and/or reroute it to the north to utilize SH 47. East of Pueblo, the remaining 27 Build Alternatives are divided into nine between-town alternatives and 18 around-town alternatives. The nine between-town alternatives improve U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 50 from its current through-town route at Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. Figure 6-1 provides an overview of the Build Alternatives as proposed.

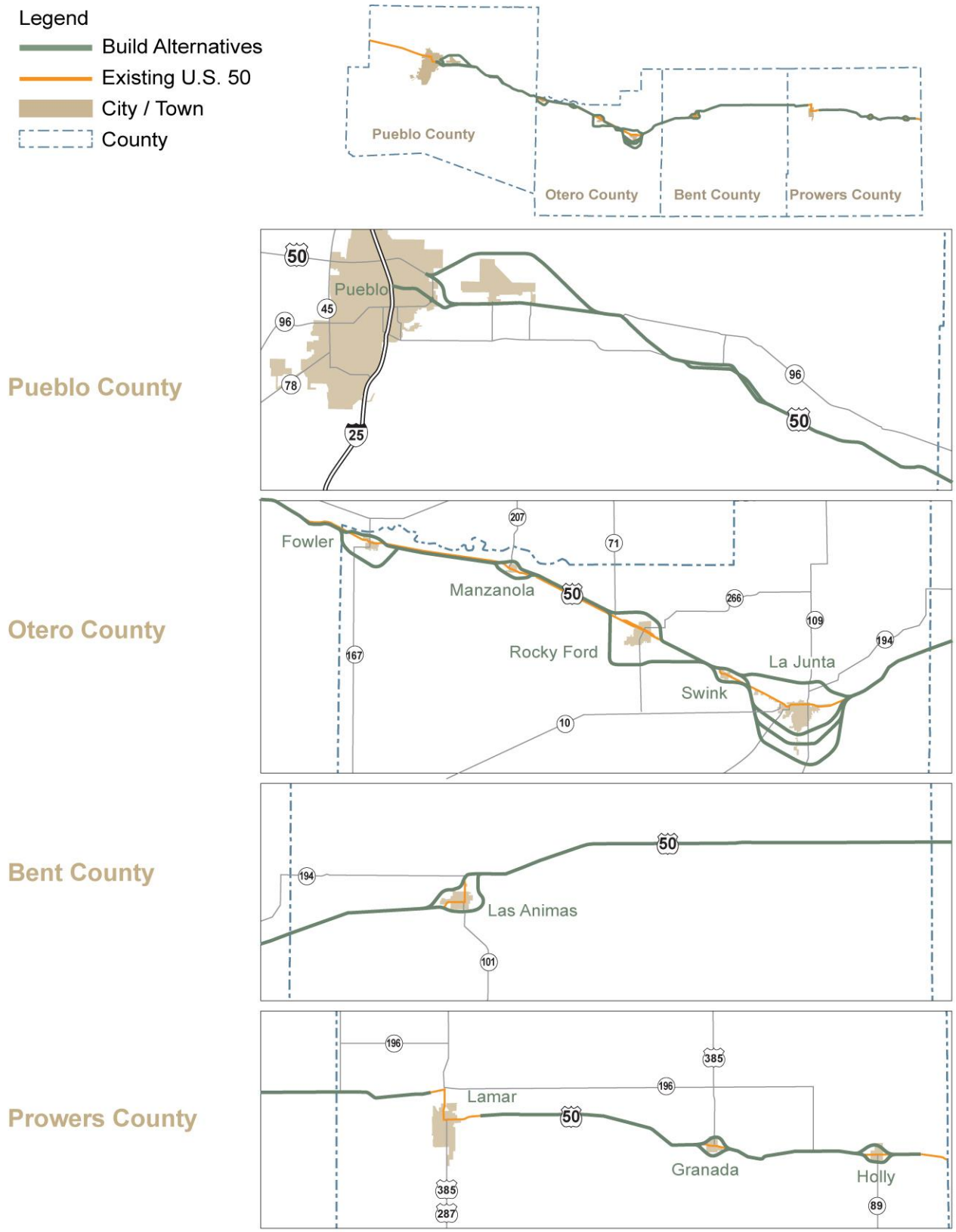

Figure 6-1. Build Alternatives Overview

The Build Alternatives have the potential to affect between 480 and 1,524 noise sensitive receptors. The number of these newly affected noise sensitive receptors will vary depending upon which alternatives are chosen. Table 6-1 provides more information about how these noise sensitive receptors could be affected by the Build Alternatives.

Table 6-1. Potential Traffic Noise Effects on Identified Noise Sensitive Receptors by the Build Alternatives

Location	Number of Noise Sensitive Receptors	Potential Traffic Noise Effects by the Build Alternatives
Between communities	266–309	Slight noise increase—Traffic on U.S. 50 is expected to increase in the future, resulting in a small increase in traffic noise. Based on traffic predictions (CDOT 2013), this change is likely to be imperceptible to the human ear. However, there remains potential for future levels of traffic noise to result in noise impacts.
Around communities	214–1,215	Noticeable noise increase—These noise sensitive receptors would experience new traffic noise when U.S. 50 is rerouted into their respective areas. However, these traffic noise levels would not be significantly different than noise levels experienced today along U.S. 50 between communities. Traffic noise would be noticeable to those noise sensitive receptors currently located far away from the highway or other busy roads, since there is little to no traffic in these areas currently.

Traffic noise effects resulting from the Build Alternatives are discussed in more detail below by the type of location—between communities or around communities.

Between Communities—The Build Alternatives between communities generally would maintain U.S. 50 on or near its current location between towns. In these locations, between 266 and 309 noise sensitive receptors have the potential to be affected by traffic noise, depending on which route is selected in Section 2: Fort Reynolds. These noise sensitive receptors already are affected by traffic noise on U.S. 50, and they will experience increased noise levels as traffic increases on U.S. 50 in the future. Since the average traffic volume on U.S. 50 between communities is expected to increase 52 percent between 2011 and 2040 (Swenka 2014), this will increase traffic noise slightly, but the increase over existing traffic noise levels would likely be imperceptible as traffic generally has to double to have a noticeable change. However, there remains potential for future levels of traffic noise to result in noise impacts.

Around Communities—The Build Alternatives around eight communities would provide an alternate route for U.S. 50 through-traffic around Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. In these locations, between 214 and 1,215 noise sensitive receptors would be potentially affected, depending on which alternatives are chosen in these areas. These noise sensitive receptors include the Cottonwood Links Golf Course (in Fowler), two school recreational facilities (one in Swink and one in Granada), and the Best Western Bent's Fort Inn (just north of Las Animas). The Build Alternatives would result in increased noise levels for these noise sensitive receptors due to the presence of a highway and its resulting traffic that does not currently exist there today. In most cases, the noise sensitive receptors are currently located far from U.S. 50 and many are far from other roadways. Because of this, traffic noise would be noticeable for these noise sensitive receptors; however, these traffic noise levels would not be substantially different than noise levels that are experienced today along U.S. 50 between communities.

6.2.1. Build Alternatives Effects by Location

The noise sensitive receptors that have the potential to be affected by the Build Alternatives are summarized in Table 6-2 by location. Locations are listed from west to east and include the number of receptors by NAC Category that have the potential to be impacted.

Table 6-2. Summary of Potentially Affected Noise Sensitive Receptors by Location

Section[a]	Build Alternatives (if more than one)	Number of Receptors per NAC Category[b]		
		B	C	E
Section 1: Pueblo	Alternative 1: Pueblo Airport North	74	0	1
	Alternative 2: Pueblo Existing Alignment	876	11	45
	Alternative 3: Pueblo SH 47 Connection	180	1	16
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	115	1	0
	Alternative 2: Fort Reynolds Realignment	72	1	0
Section 3: Fowler	Alternative 1: Fowler North	11	3	0
	Alternative 2: Fowler South	18	0	0
Section 4: Fowler to Manzanola	—	20	1	0
Section 5: Manzanola	Alternative 1: Manzanola North	35	4	0
	Alternative 2: Manzanola South	21	0	0
Section 6: Manzanola to Rocky Ford	—	22	2	0
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	59	3	1
	Alternative 2: Rocky Ford South	26	1	0
Section 8: Rocky Ford to Swink	—	8	0	0
Section 9: Swink	Alternative 1: Swink North	34	1	1
	Alternative 2: Swink South	10	6	0
Section 10: La Junta	Alternative 1: La Junta North	13	6	0
	Alternative 2: La Junta South	43	5	0
	Alternative 3: La Junta South	31	3	0
	Alternative 4: La Junta South	13	2	0
Section 11: La Junta to Las Animas	—	15	8	0
Section 12: Las Animas	Alternative 1: Las Animas North	29	4	2
	Alternative 2: Las Animas South	40	2	1
Section 13: Las Animas to Lamar[c]	—	76	5	1
Section 14: Lamar to Granada[c]	—	16	1	0
Section 15: Granada	Alternative 1: Granada North	14	1	0
	Alternative 2: Granada South	7	1	0
Section 16: Granada to Holly	—	9	2	0
Section 17: Holly	Alternative 1: Holly North	17	3	1
	Alternative 2: Holly South	2	1	0
Section 18: Holly Transition	—	5	2	0

[a] The study area for each section location is 1,600 feet wide, except for the existing alignment area in Section 1, Alternative 2, where the alternative follows the existing alignment and the corresponding portion of Alternative 3 that follows the existing alignment. In these locations, the study area is 750 feet in width.
[b] Each receptor was counted as it occurred in each respective section. Due to the fact that some sections share common study areas, the receptors listed here may be counted twice if they occur in more than one section study area.
[c] The Build Alternatives do not include alternatives in Lamar.

7. Mitigation Strategies

Since the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify which specific noise receptors would be affected by the Build Alternatives. However, specific noise conditions would be modeled during Tier 2 studies and mitigation would be considered based on the results of that analysis.

8. Avoidance Activities

Some traffic noise effects were avoided during the U.S. 50 Tier 1 EIS alternatives development process. Most of the noise receptors along U.S. 50 are located within the communities. The U.S. 50 Tier 1 EIS considered alternatives that would improve U.S. 50 on its existing alignment through these communities. However, these through-town alternatives were eliminated from further consideration during the alternatives development process. This resulted in the avoidance of traffic noise effects on some noise receptors within communities. This analysis did not calculate the specific number of receptors that were avoided. However, since most of the development is located within the communities, the number of receptors affected by increased traffic noise would have been dramatically higher if the through-town alternatives had not been eliminated.

9. References

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Appendices

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Appendix A. Resource Methodology Overview for Traffic Noise

This resource methodology overview is attached to this technical memorandum for reference only. The lead agencies for the U.S. 50 Tier 1 EIS (CDOT and FHWA) drafted resource methodology overviews to identify and document which resource evaluation activities would be completed during the Tier 1 EIS, and which would be completed during Tier 2 studies. These overviews were intended to be guidelines to ensure that the Tier 1 EIS remained a broad-based analysis, while clarifying (to the public and resource agencies) when particular data and decisions would be addressed in the tiered process. These overviews were approved by the lead agencies, and they were agreed upon by the resource agencies during the project's scoping process. They were subsequently used by the project's resource specialists as guidelines to ensure that their activities were relevant to the Tier 1 (i.e., corridor location) decision.

Table A-1. Resource Methodology Overview for Traffic Noise

Methodology Overview	Traffic Noise	
	Tier 1	**Tier 2**
Relevant Data/ Information Sources	• Aerial photography • Land use data • Existing and proposed traffic counts	• Existing and proposed traffic counts • Existing and proposed vehicle speed • Preliminary design • Land use data • Existing noise levels
Collection and/or Analysis Methodology	Aerial review of sensitive receptors adjacent to corridor alternatives (1,000 feet wide, plus 300 feet on either side of the Build Alternatives)	• Field review of sensitive receptors • Follow standard CDOT Noise Analysis and Abatement guidelines
Project Area	One to four miles wide surrounding the existing U.S. 50 facility beginning at I-25 in Pueblo to the Colorado-Kansas state line	Tier 2 specific sections of independent utility corridor boundaries
Impacts	Identification of sensitive receptors within the boundaries of the Build Alternatives and within 300 feet of the corridor edge	Follow standard CDOT Noise Analysis and Abatement guidelines
Mitigation Options	None expected	Follow standard CDOT Noise Analysis and Abatement guidelines
Deliverables	Traffic Noise Technical Memorandum	Traffic Noise Analysis Report
Regulatory Guidance/ Requirements	• Procedures for Abatement of Highway Traffic Noise and Construction (23 CFR 772) • Noise Analysis and Abatement Guidelines (CDOT 2013) • Highway Traffic Noise Analysis and Abatement Policy Guidance (FHWA)	

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Appendix B. Abbreviations and Acronyms

AADT	Annual Average Daily Traffic
CDOT	Colorado Department of Transportation
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CR	County Road
dB	Decibel
dBA	A-weighted decibel
DOT	Department of Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
I-25	Interstate 25
Leq	Equivalent sound level
MAP-21	Moving Ahead for Progress in the 21st Century Act of 2012
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act of 1969
SH	State Highway
SIU	Section of independent utility
U.S. 287	U.S. Highway 287
U.S. 50	U.S. Highway 50
U.S. 50 Tier 1 EIS	U.S. 50 Tier 1 Environmental Impact Statement
vpd	vehicles per day

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