3.13 NOISE

3.13.1 Introduction

The area potentially affected by the Proposed Action and alternatives extends 498 miles along the LOMR between St. Louis, Missouri, and Rulo, Nebraska. Proposed changes in commercial dredging activity on the LOMR could change the level of noise generated by this activity and related onshore activities. Sources of noise include operation of tug boats, engines, and processing equipment associated with dredging, and operation of onshore terminal facilities (use of front-end loaders, cranes, conveyors, and other processing equipment, and delivery trucks).

This section describes the existing noise conditions in areas affected by commercial dredging of sand and gravel in the LOMR. The information presented is intended to provide a general overview of noise conditions in the Project area and the land uses that would be affected by the Project. It also establishes the context within which the potential impacts of the Proposed Action and alternatives will be evaluated.

This section begins with definitions of noise terminology. The regulatory setting discusses applicable noise regulations and policies in the Project area. A discussion of existing noise-sensitive land uses in the Project area is followed by a discussion of the existing ambient noise levels in the Project area and noise levels generated by existing dredging and processing facilities.

3.13.2 Noise Terminology

Noise is commonly defined as unwanted sound (mechanical energy transmitted by pressure waves through a medium such as air) that annoys or disturbs people and may cause adverse psychological or physiological effects on human health. Because noise is an environmental issue that can interfere with human activities, evaluation of noise is necessary when considering the environmental impacts of a proposed project.

Sound pressure level using the decibel (dB) scale is most commonly used to characterize the loudness of sound. Because the human ear is not equally sensitive to all sound frequencies, noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called A-weighting. A-weighted decibels are written as dBA. Table 3.13-1 summarizes typical A-weighted sound levels for common noise sources.

Table 3.13-1 Typical A-Weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	—110—	Rock band
Jet flyover at 1,000 feet		
	—100—	
Gas lawnmower at 3 feet		
	—90—	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	—80—	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower at 100 feet	—70—	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	—60—	
		Large business office
Quiet urban daytime	—50—	Dishwasher in next room
Quiet urban nighttime	—40—	Theater, large conference room (background)
Quiet suburban nighttime		
	—30—	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	—20—	
		Broadcast/recording studio
	—10—	
	—0—	

Notes:

dBA = A-weighted decibel.
mph = Miles per hour.

Source: Caltrans 1998.

Because sound levels often vary over time, the equivalent sound level (L_{eq}) is used to represent the average sound energy over a given period of time. Noise impacts from a temporary mobile noise source such as a dredge operation are typically evaluated against a 1-hour L_{eq} noise standard. Noise impacts from a permanent stationary facility such as a sand plant are typically evaluated against a 24-hour weighted average such as the day-night level (L_{dn}). L_{dn} is the energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m. to account for increased sensitivity to noise during those hours.

In general, human sound perception is such that a change in sound level of 1 dB cannot typically be perceived by the human ear, a change of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level. A doubling of sound energy results in a 3-dB increase in sound level. An example of this is a roadway where the volume of traffic

doubles. Although this is a substantial increase in traffic volume, the increase in noise would be only 3 dB (i.e., just noticeable).

When evaluating noise from equipment operations, the noise level produced by the equipment is typically characterized in terms of a measured sound level at a specific distance, typically 50 feet. This "source" information can be determined from measurements or from standard reference data. With the source sound level, the sound level at various distances—including the sound level at specific receiver locations—can be predicted. The rate at which sound attenuates over distance depends on several factors, described below.

For a point source such as a stationary compressor or construction equipment, sound attenuates based on distance at a rate of 6 dB per doubling of distance. For example, if a point sound source produces a sound level of 85 dBA at 50 feet, the sound level at 100 feet would be 79 dBA and the sound level at 200 feet would be 73 dBA. For a line source such as free-flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance (Caltrans 1998).

Atmospheric conditions such as wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface such as grass attenuates at a greater rate than sound that travels over a hard surface such as pavement or water. The increased attenuation is typically in the range of 1–2 dB per doubling of distance. This increases the attenuation rate for point sources to 7–8 dB per doubling of distance and the attenuation rate for line sources to 4–6 dB per doubling of distance. Barriers such as buildings and topography that block the line of sight between a source and receiver also increase the attenuation of sound over distance. Typically, a barrier that blocks the line of sight between a noise source and a receiver will reduce sound by at least 5 dB.

3.13.3 Regulatory Setting

3.13.3.1 Federal

Noise Control Act of 1972

The federal Noise Control Act of 1972 (PL 92-574) established a requirement that all federal agencies administer their programs to promote an environment free of noise that would jeopardize public health or welfare. The USEPA was given the responsibility for:

- Providing information to the public regarding identifiable effects of noise on public health and welfare;
- Publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety;
- Coordinating federal research and activities related to noise control; and
- Establishing federal noise emission standards for selected products distributed in interstate commerce.

U.S. Army Corps of Engineers

Chapter 14, Operational Noise, of U.S. Army Regulation 200-1 "Environmental Protection and Enhancement" (U.S. Army 2007) provides guidance for evaluating noise associated with Army operations. This regulation provides noise criteria for military operations. Accordingly, these criteria are not directly applicable to the Proposed Action. Section 4-14a(10) does, however, state: "Transportation and industrial noise will be assessed on a case by case basis using appropriate noise metrics, including U.S. Department of Transportation guidelines."

In 2004, the USEPA (Region 2), in coordination with the USACE Kansas City District, published a document entitled *Hudson River PCBs Superfund Site Quality of Life Performance Standards* (USEPA 2004). This document provides specific guidance on noise standards for dredging activities, processing facility operations, and material transfer operations associated with PCB cleanup operations on the Hudson River. Table 3.13-2 summarizes the noise standards recommended in the USEPA 2004 document for residential uses.

3.13.3.2 State

Missouri, Kansas, and Nebraska do not have specific noise standards that relate to dredging and material processing activities. Each state is required to adopt highway noise and abatement policies for implementing federal-aid highway projects in each state. However, these policy documents do not relate to dredging and material processing activities.

3.13.3.3 Local

The Proposed Action lies within the jurisdiction of various counties and cities along the LOMR in the states of Missouri and Kansas. Some counties and cities have established policies and codes concerning the generation and control of noise that could adversely affect citizens and noise-sensitive

land uses. Appendix C provides a discussion of the counties and cities with applicable noise ordinances designed to protect its citizens from adverse noise.

Table 3.13-2 Noise Standards for Residential Uses[a]

Short-Term Impacts[b]: Facility Construction and Dredging

Mitigation recommended	Daytime: 75 dBA (maximum hourly average)
Mitigation required	Nighttime: 65 dBA (maximum hourly average)
	Daytime: 80 dBA (maximum hourly average)

Long-Term Impacts[c]: Processing Facility and Transfer Operations

	65 L_{dn}

Notes:

Daytime: 7:00 a.m. to 10:00 p.m. Nighttime: 10:00 p.m. to 7:00 a.m.

dBA = A-weighted decibel.
L_{dn} = Day-night level.

[a] Specific guidance on noise standards for dredging activities, processing facility operations, and material transfer operations associated with PCB cleanup operations on the Hudson River.

[b] Short-term is defined as activities that would occur during a 3- to 6-month period.

[c] Long-term is defined as activities that would occur during the 6-year life of the Hudson River project.

Source: USEPA 2004.

3.13.4 Noise-Sensitive Land Uses

Noise-sensitive land uses are generally considered to be places where people have an expectation of reasonable quiet, such as residences, health care facilities, and educational facilities. Other land uses such as parks, where quiet can be an important part of how the area is used, also can be considered sensitive to noise.

Numerous small towns and several cities are located near the river in the Project area; however, most of the land along the river is undeveloped agricultural land with scattered rural residences. The focus of the noise impact analysis is on residential uses where recurrent exposure to noise from dredging activity cannot be avoided by residents. For the purposes of this assessment, schools and health care facilities are treated as residential uses. Although parks, wildlife refuges, conservation areas, and day-use picnic areas exist in the Project area, these areas are not considered as sensitive as residential areas because use areas exposed to noise can temporarily be avoided if necessary during dredging activities. Table 3.13-3 lists cities and towns located along the river in the Project area by river segment. The county and state where each city or town is located is identified, along with the

approximate distance from the edge of the river to the nearest residential use. These distances range from 110 to 5,000 feet.

3.13.5 Noise Levels in the Project Area

3.13.5.1 Existing Ambient Noise Levels

Ambient noise levels depend to a great extent on the amount of development in an area. In a developed urban area, ambient noise levels are governed primarily by traffic on roadways and highways. Other forms of transportation including aircraft and trains are intermittent sources of noise in areas near airports and train tracks. The ambient noise levels in a rural agricultural area are governed primarily by farming activities and traffic on local roadways. In areas with no development-induced noise from sources such as farming or highway traffic, the primary sound is from natural sources such as wind and birds. Existing dredging operations and related processing facilities are sources of noise where those operations are located.

Population density and ambient noise levels tend to be closely correlated. Areas that are not urbanized are relatively quiet; while more urbanized areas are subjected to higher noise levels from roadway traffic, industrial activities, and other human activities. Table 3.13-3 summarizes typical ambient noise levels for various general location types.

Table 3.13-3 identifies location types in the Project area for each segment, and the typical ambient noise levels are based on those in Table 3.13-4.

3.13.5.2 Existing Dredging and Terminal Facility Noise

Each operator has provided information on existing dredging and terminal facility operations, including the number and size of engines used on each dredge and tugboat. Noise from dredging and tugboat operations has been estimated from these data using methods recommended by Hoover & Keith (2000). Tables 3.13-5 and 3.13-6 summarize the noise levels generated by each dredge or tug boat. Dredging would typically occur within a few miles upstream of a company's sand plant; dredging typically occurs no more than 7–10 miles upstream of the sand plant. Temporary mobile noise sources such as this are typically evaluated using a short-term average noise level. Accordingly, noise levels are reported in terms of L_{eq}. Tables 3.13-5 and 3.13-6 report the distance to the 75-dBA-L_{eq} and 65-dBA-L_{eq} noise contours. Residences located within the 65-dBA-L_{eq} contour potentially are exposed to noise impacts.

Table 3.13-3 Existing Ambient Noise Levels at Noise-Sensitive Land Uses in the Project Area (dB)

Segment	Company, Facility Name, River Mile	City/Town	State	County	Distance to Edge of River from Residences (feet)	Population	General Location Type	Ambient Noise Level (dB)[a]
		Rulo	Nebraska	Richardson	125	226	Small town	50
RM 489								
St. Joseph		White Cloud	Kansas	Doniphan	250	239	Small town	50
		Nodaway	Missouri	Andrew	2,600	6,000	Small town	50
		Elwood	Kansas	Doniphan	2,300	1,145	Quiet suburban residential	50
	Holliday Sand & Gravel Company, St. Joseph Plant, RM 447.8	St. Joseph	Missouri	Buchanan	175	72,651	Quiet suburban residential	50
		Palermo	Kansas	Doniphan	500	Unknown (unincorporated county area)	Small town	50
		Atchison	Kansas	Atchison	230	10,154	Quite suburban residential	50
		Leavenworth	Kansas	Leavenworth	300	35,420	Quiet suburban residential	50
		Lansing	Kansas	Leavenworth	4,700	10,705	Quiet suburban residential	50
		Weston	Missouri	Platte	4,500	1,631	Small town	50
		Weston Bend State Park	Missouri	Platte	100	NA	Quiet suburban residential	50
		Farley	Missouri	Platte	5,000	226	Small town	50

Table 3.13-3 Existing Ambient Noise Levels at Noise-Sensitive Land Uses in the Project Area (dB)

Segment	Company, Facility Name, River Mile	City/Town	State	County	Distance to Edge of River from Residences (feet)	Population	General Location Type	Ambient Noise Level (dB)[a]
RM 391								
Kansas City	The Master's Dredging Company, Waldron Site[b], RM 385	Waldron	Missouri	Platte	2,800	Unknown (unincorporated county area)	Small town	50
		Parkville	Missouri	Platte	1,700	4,059	Quiet suburban residential	50
		Riverside	Missouri	Platte	2,000	2,979	Quiet suburban residential	50
	Holliday Sand & Gravel Company, Randolph Plant, RM 360	Randolph	Missouri	Clay	1,200	47	Rural	40–50
		Kansas City	Kansas	Wyandotte	1,800	146,867	Quiet suburban residential	50
		Kansas City	Missouri	Jackson	1,800	447,306	Normal suburban residential	50
RM 357								
Waverly		River Bend	Missouri	Clay	630	10	Rural	40–50
		Missouri City	Missouri	Clay	130	295	Small town	50
		Sibley	Missouri	Jackson	720	347	Small town	50
		Napoleon	Missouri	Lafayette	125	208	Small town	50
		Wellington	Missouri	Lafayette	2,400	784	Small town	50
	Capital Sand Company, Lexington Plant, RM 317.5	Lexington	Missouri	Lafayette	1,100	4,453	Quiet suburban residential	50
	Capital Sand Company, Carrollton Plant, RM 287	Waverly	Missouri	Lafayette	190	806	Small town	50
		Miami	Missouri	Saline	140	160	Small town	50

Table 3.13-3 Existing Ambient Noise Levels at Noise-Sensitive Land Uses in the Project Area (dB)

Segment	Company, Facility Name, River Mile	City/Town	State	County	Distance to Edge of River from Residences (feet)	Population	General Location Type	Ambient Noise Level (dB)[a]
RM 250								
Jefferson City	Capital Sand Company, Glasgow Plant, RM 226.2	Glasgow	Missouri	Chariton, Howard	110	1,263	Small town	50
		Arrow Rock	Missouri	Saline	760	79	Small town	50
	Capital Sand Company, Boonville Plant, RM 196.2	Boonville	Missouri	Cooper	140	8,202	Quiet suburban residential	50
	Capital Sand Company, Rocheport Plant, RM 186.5	Rocheport	Missouri	Boone	270	208	Small town	50
		Huntsdale	Missouri	Boone	1,600	31	Rural	40–50
		Lupus	Missouri	Moniteau	250	29	Small town	50
		Sandy Hook	Missouri	Moniteau	200	Unknown (unincorporated county area)	Small town	50
		Marion	Missouri	Cole	500	Unknown (unincorporated county area)	Small town	50
	Hermann Sand & Gravel, Jefferson City Plant, RM 146.5			Callaway				
	Capital Sand Company, Jefferson City Plant, RM 143.5			Callaway				
		Jefferson City	Missouri	Cole	220	39,274	Quiet suburban residential	50
		Osage City	Missouri	Cole	1,150	Unknown (unincorporated county area)	Small town	50

Table 3.13-3 Existing Ambient Noise Levels at Noise-Sensitive Land Uses in the Project Area (dB)

Segment	Company, Facility Name, River Mile	City/Town	State	County	Distance to Edge of River from Residences (feet)	Population	General Location Type	Ambient Noise Level (dB)[a]
RM 130								
St. Charles		Chamois	Missouri	Osage	780	456	Small town	50
		Gasconade	Missouri	Gasconade	120	267	Small town	50
		Hermann	Missouri	Gasconade	140	2,674	Small town	50
		New Haven	Missouri	Franklin	200	1,867	Small town	50
	Edward N. Rau Contractor Company, Washington Site[b], RM 68			Franklin				
	Capital Sand Company, Washington Plant, RM 66	Washington	Missouri	Franklin	430	13,243	Quiet suburban residential	50
		Bernie E. Hillerman Park	Missouri	Franklin	1,000	NA	Quiet suburban residential	50
		Wildwood	Missouri	St. Charles	3,000	32,884	Normal suburban residential	55
	Limited Leasing Company, Bridgeton Plant, RM 44			St. Louis				
		Weldon Springs	Missouri	St. Charles	>5,000	527	Normal suburban residential	55
		Chesterfield	Missouri	St. Louis	>5,000	46,802	Normal suburban residential	55
	J.T.R., St. Charles Plant, RM 31.5			St. Charles				
		Maryland Heights	Missouri	St. Louis	>5,000	26,339	Normal suburban residential	55

Table 3.13-3 Existing Ambient Noise Levels at Noise-Sensitive Land Uses in the Project Area (dB)

Segment	Company, Facility Name, River Mile	City/Town	State	County	Distance to Edge of River from Residences (feet)	Population	General Location Type	Ambient Noise Level (dB)[a]
RM 130 (continued)								
St. Charles (continued)	Limited Leasing Company, Chesterfield Plant, RM 28							
		St. Charles	Missouri	St. Charles	450	63,009	Normal suburban residential	55
		Bridgeton	Missouri	St. Louis	>5,000	15,555	Normal suburban residential	55
		Hazelwood	Missouri	St. Louis	2,700	25,523	Normal suburban residential	55
	J.T.R., Riverview Plant, RM 16.5	Florissant	Missouri	St. Louis	1,000	51,387	Normal suburban residential	55
	Limited Leasing Company, Fort Belle Plant, RM 8	Spanish Lake	Missouri	St. Louis	300	21,337	Normal suburban residential	55

Notes:

dB = Decibel.

RM = River mile.

[a] Refer to Table 3.13-4 for typical ambient noise levels associated with location types.

[b] Not currently an operating facility but a proposed site under the Proposed Action and alternatives. Shown here for general reference.

Table 3.13-4 Typical Ambient Noise Levels by General Location Type

Location Type	dBA-L_{dn}
Rural	40–50
Small town or quiet suburban residential	50
Normal suburban residential	55
Urban residential	60
Noisy urban residential	65
Very noisy urban residential	70
Downtown, major metropolis	75–80
Adjoining freeway or near a major airport	80–90

Notes:

dBA = A-weighted decibel.
L_{dn} = Day-night level.

Source: Hoover and Keith 2000.

Existing terminal facilities in the Project area use front-end loaders, cranes, conveyors, and other processing equipment. Based on information provided by the MDNR (Zeaman pers. comm.), it was assumed that each plant has a crane, four loaders, and one dozer. Noise generated by this equipment has been estimated using noise source levels developed by the Federal Highway Administration (FHWA) (2006). Simultaneous operation of this equipment would result in a noise level of 83 dBA-L_{eq} at 50 feet from the source. Existing noise from other equipment at these facilities has been estimated using data from a plant with screens, crushers, conveyor belts, cyclones, sand classifiers, and screws (Bauer and Spencer 2008). This facility produces a reference sound level of approximately 89 dBA at 50 feet. The combined sound level of all of the equipment is 90 dBA-L_{eq} at 50 feet. Assuming continuous operation between 7:00 a.m. and 7:00 p.m., this level of noise corresponds to 87 L_{dn} at 50 feet.

For this assessment, it was assumed that all facilities with annual production of 250,000 tons or less produce a sound level of 87 L_{dn} at 50 feet. For larger facilities, the source noise level is scaled up based on the amount of production in excess of 250,000 tons/yr. As discussed in Section 3.13.2, a doubling of sound energy corresponds to a 3-dB increase in noise. Therefore, a doubling of delivered product volume is assumed to result in a 3-dB increase in facility noise. The change in noise level associated with larger or smaller changes in product volume also can be calculated directly. For example, a 10-percent increase in product volume would result in a 0.4-dB increase in noise.

Table 3.13-5 Tug Boat Noise Levels

Company	Tug Name	Engine(s)	Engine Horsepower	Sound Level at 50 Feet (dBA-L_{eq})[a]	Company Activity	Distance to 75-dBA-L_{eq} Contour (feet)[b]	Distance to 65-dBA-L_{eq} Contour (feet)[b]
J.T.R	Barbara Sue	2 – GM 8V-71	470	89	9.5 hours per day, (Monday–Friday)	251	792
	Shelby J	2 – 12V-71	680	91		315	998
	William Powell	2 – Cummins KTA19	1,200	93		397	1,256
Limited Leasing Company	Atlas	3 – Luggar L6140	1,500	96	10 hours per day, (Monday–Friday)	561	1,774
	Janet	2 – Detroit 8V71	460	89		251	792
	Joanne	2 – Detroit 8V71	460	89		251	792
	Leona	2 – Detroit 12V71	660	91		315	998
	Patricia	2 – Detroit 12V71	660	91		315	998
	Piasa	2 – Detroit 12V71	660	91		315	998
Capital Sand Company	Marge [a]	2 – Caterpillar 3412	600	90	10 hours per day, (Monday–Friday)	281	889
	Allison Marie	3 – Caterpillar 3412	600	92		354	1,119
	Tarkio	2 – Caterpillar 3412	600	90		281	889
Hermann Sand & Gravel	Kathryn	2 – Cummins N-14	880	92	12 hours per day, (Monday–Friday)	354	1,119
	Mel Sue	2 – NH 220 Cummins	400	89		251	792
Holliday Sand & Gravel Company	Chouteau	2 – Caterpillar C12	680	91	12 hours per day, (4–6 days per week)	315	998
	Sibley	2 – Caterpillar 3406	950	92		354	1,119
	Dakota	2 – Caterpillar 3412C	1,040	93		397	1,256
	Fairfax	2 – Caterpillar 3412C	1,300	94		446	1,409
	Edward Perry	2 – Caterpillar 3406	730	91		315	998

Notes:

dBA = A-weighted decibel.

L_{eq} = Equivalent sound level.

[a] Based on reciprocating engine horsepower (Hoover & Keith 2000).

[b] Based on point source attenuation of 6 dB per doubling of distance.

Table 3.13-6 Dredger Operation Noise Levels

Company	Dredge Name	Engines(s)	Engine Horsepower	Sound Level at 50 Feet (dBA-L_{eq})[a]	Company Activity	Distance to 75-dBA-L_{eq} Contour (feet)[b]	Distance to 65-dBA-L_{eq} Contour (feet)[b]
J.T.R.	Queenfish	Cummins 1710	425	86	10.5 hours per day, (Monday–Friday)	177	561
	Mark V	Caterpillar 3408	455	86		177	561
	JTR	Caterpillar 3408	455	86		177	561
Limited Leasing Company	St Charles	Caterpillar 3406	365	85	10 hours per day, (Monday–Friday)	158	500
	Traveler	Caterpillar 3406	365	85		158	500
	Chesterfield	Caterpillar 3406	365	85		158	500
Capital Sand Company	Kathy Lee	Caterpillar 3512	1,150	90	10 hours per day, (Monday–Friday)	281	889
	Sandy K	Caterpillar C18	450	86		177	561
	Rae Marie	Caterpillar 3412	450	86		177	561
		Caterpillar 3412	600	87		199	629
		Caterpillar 3406	450	86		177	561
Hermann Sand & Gravel	Arl-501	Cummins	335	85	12 hours per day, (Monday–Friday)	158	500
Holliday Sand & Gravel Company	Randolph	EMD 16-645-E6	1,200	90	12 hours per day, (Monday–Friday)	281	889
	Riverside	EMD 12-645E2	900	89		251	792
	St. Joseph	John Deere 6125AFM	400	86		177	561
The Master's Dredging Company	Penny	Caterpillar D 398 TA	825	89	10 hours per day, (Monday–Friday)	251	792
	Oklahoma	Caterpillar 3516 TA	2,450	93		397	1,256

Notes:

dBA = A-weighted decibel.

L_{eq} = Equivalent sound level.

[a] Based on reciprocating engine horsepower (Hoover & Keith 2000).

[b] Based on point source attenuation of 6 dB per doubling of distance.

For a permanent stationary facility such as a sand plant, noise levels typically are evaluated using L_{dn}. An adverse effect is considered to occur at residences where the noise levels exceed 65 L_{dn}. This threshold has been used by the USACE for similar dredging projects (USEPA 2004). The distance to the 65-L_{dn} contour is 630 feet based on point-source attenuation of 6 dB per doubling of distance.

Table 3.13-7 shows the distance between each existing plant and the nearest residence. Currently, residences are located within 630 feet of primary plant operations for two facilities (Glasgow, St. Charles and Alton). Table 3.13-7 also provides an estimate of existing haul truck noise levels based on the annual production capacity of each facility and daily average delivery estimates. The results in Table 3.13-7 indicate that existing haul truck noise from deliveries does not exceed 65 L_{dn} within 50 feet of the roadway at any of the existing facilities. Based on the assumptions stated in Table 3.13-7, deliveries would need to exceed 760 per day before truck noise would exceed 65 L_{dn} within 50 feet of the roadway and potentially result in a noise impact at residences along the roadway.

Table 3.13-7 Summary of Facility Processing and Haul Truck Noise

Facility Name (Company)	River Mile	Segment	Annual Tons Delivered	Facility Reference Noise Level (L_{eq} at 50 feet)[a]	Distance to Processing Noise 65-L_{dn} Contour (feet)	Distance to Nearest Residence (feet)	65 L_{dn} Exceeded at Nearest Residence?	Estimated Tons per Day[c]	Estimated Truck Deliveries Per Day[d]	Trips Per Day	Haul Truck Noise Level (L_{dn} at 50 feet)[e]
St. Joseph (Holliday)	447.8	St. Joseph	326, 928	88	720	850	No	1,514	76	151	56
Waldron (Masters)[b]	385	Kansas City	NA	NA	NA	3,300	NA	NA	NA	NA	NA
Riverside (Holliday)	372	Kansas City	1,450,773	95	1,516	2,900	No	6,717	336	672	62
Randolph (Holliday)	360	Kansas City	1,516529	94	1,551	3,800	No	7,023	351	702	63
Lexington (Capital)	317.5	Waverly	346,202	88	741	2,700	No	1,603	80	160	57
Carrollton (Capital)	287	Waverly	22,918	87	629	4,000	No	106	5	11	48
Glasgow (Capital)	226.2	Jefferson City	136,273	87	629	600	Yes	631	32	63	53
Boonville (Capital)	196.2	Jefferson City	11,338	87	629	1,900	No	52	3	5	47
Rocheport (Capital)	186.5	Jefferson City	272,709	87	657	1,350	No	1,263	63	126	56
Jefferson City (Hermann)	146.5	Jefferson City	64,861	87	629	5,200	No	300	15	30	51
Jefferson City (Capital)	143.5	Jefferson City	1,093,679	93	1,317	1,900	No	5,063	253	506	61
Hermann (Hermann)	97	St. Charles	61,097	87	629	1,900	No	283	14	28	51
Washington (Rau)[b]	68	St. Charles	NA	NA	NA	250	NA	NA	NA	NA	NA
Washington (Capital)	66	St. Charles	136,463	87	629	1,700	No	632	32	63	53
Bridgeton (Limited)	44	St. Charles	288,607	88	676	2,800	No	1,336	67	134	56
St. Charles (J.T.R.)	31.5	St. Charles	402,245	89	798	600	Yes	1,862	93	186	57
Chesterfield (Limited)	28	St. Charles	535,985	90	922	2,400	No	2,481	124	248	58

Table 3.13-7 Summary of Facility Processing and Haul Truck Noise

Facility Name (Company)	River Mile	Segment	Annual Tons Delivered	Facility Reference Noise Level (L_{eq} at 50 feet)[a]	Distance to Processing Noise 65-L_{dn} Contour (feet)	Distance to Nearest Residence (feet)	65 L_{dn} Exceeded at Nearest Residence?	Estimated Tons per Day[c]	Estimated Truck Deliveries Per Day[d]	Trips Per Day	Haul Truck Noise Level (L_{dn} at 50 feet)[e]
Riverview (J.T.R.)	16.5	St. Charles	60,011	87	629	2,300	No	278	14	28	51
Fort Belle (Limited)	8	St. Charles	82,459	87	629	850	No	382	19	38	51
Alton (Limted)	On Mississippi	On Mississippi	82,459	87	629	220	Yes	382	19	38	51

Notes:

L_{dn} = Day-night level.

L_{eq} = Equivalent sound level.

[a] Based on processing source level of 90 dBA-L_{eq} at 50 feet and continuous operation between 7:00 a.m and 7:00 p.m. (87 L_{dn} at 50 feet) for facilities producing 250,000 tons/year or less. Source level scaled up for larger facilities.

[b] New proposed facility.

[c] Assumes 216 delivery days per year (10 months of operation per year, 5 days a week.)

[d] Assumes average truck capacity of 20 tons

[e] Calculated using Federal Highway Administration Traffic Noise Model Version 2.1, assuming average truck speed of 45 miles per hour (mph) on local road near plant:

- Two truck trips (out and in from facility) per delivery.
- Daily truck trips equally distributed over 8-hour work day during daytime hours.
- Average truck speed of 45 mph on local road near plant.

3.13.6 References

3.13.6.1 Printed Literature

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3.13.6.2 Personal Communication

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