Environmental Noise Assessment

Teichert Shifler Mining Reclamation Project

Yolo County, California

BAC Job # 2018-202

Prepared For:

Teichert Aggregates

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Introduction

Teichert Aggregates ("Teichert") proposes to mine and reclaim the Shifler property ("Project Site") for the purpose of supplying Teichert's existing Woodland aggregate mining and processing facility ("Woodland Plant"), as discussed below. These activities are referred to as the Shifler Mining and Reclamation Project ("Project"). This report describes the noise environment in the immediate project vicinity and analyzes potential noise impacts generated by the proposed project. Figure 1 identifies the location of the Shifler property.

In addition to studying potential noise impacts associated with excavation of the Shifler property, this analysis also evaluates potential traffic impacts associated with shifting the production limits for the Teichert Esparto facility to the Teichert Woodland facility.

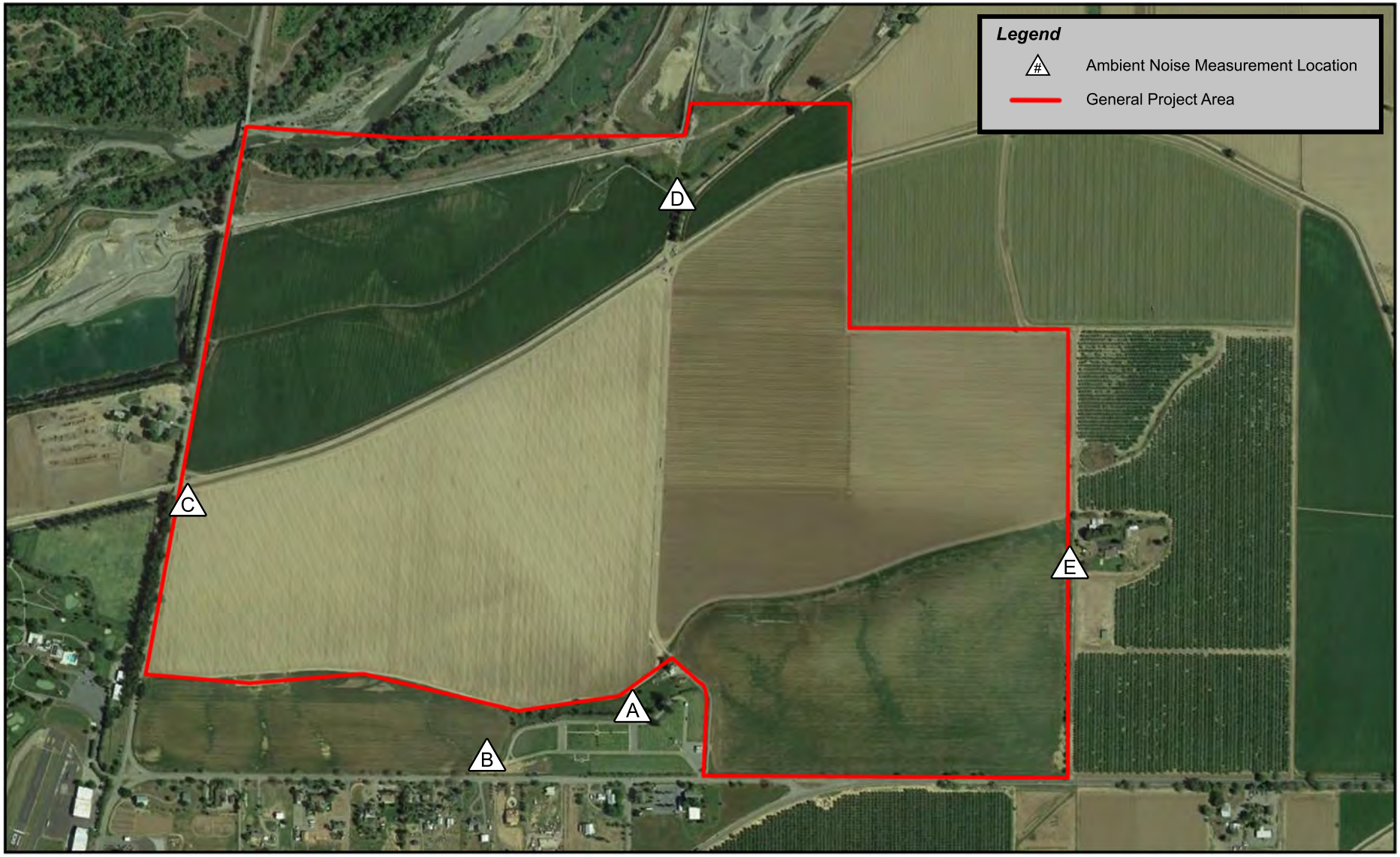
This report represents a revision to the Environmental Noise Analysis prepared for the Teichert Shifler Mining and Reclamation Project, prepared by Bollard Acoustical Consultants, Inc. (BAC Job# 2013-084, July 24th, 2015). This revision was requested by Teichert Aggregates due to a change in the project description which would allow Teichert to transfer the Esparto Plant's current annual permitted volume of 1 million tons sold to the Woodland Plant once mining is complete at Esparto or the Esparto surface mining permit expires, whichever occurs first. As a result of this change, aggregate sales at the Teichert Woodland plant could reach a maximum of 2.2 million tons per year versus the plant's currently permitted 1.2 million tons per year. This shift in volume would result in an increase in off-site heavy truck traffic on the local roadway network utilized by Teichert-generated trucks in the vicinity of the Woodland Plant. However, this increase in the Woodland Plant vicinity would result in a corresponding decrease in Teichert-generated heavy truck traffic on the local roadway network in the vicinity of the Esparto Plant. The proposed project may also require additional aggregate processing capacity at the Woodland Plant to accommodate a production of 2.2 million tons per year.

An increase in the processing capacity of the Woodland plant would reportedly not affect the levels of asphalt plant production at the Woodland plant site, which has historically occurred based on market demand, not plant capacity. Also, there is currently no asphalt production at the Esparto Plant despite the fact that it is allowed under the Esparto Plant Permit. So, under the proposed application, no asphalt production would shift from the Esparto Plant to the Woodland Plant.

Figure 1

Project Area and Noise Monitoring Locations

Teichert Shifler Mining and Reclamation Project - Yolo County, California



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Scale (feet)

0 500 1000

Objectives of This Analysis

The objectives of this analysis are as follows:

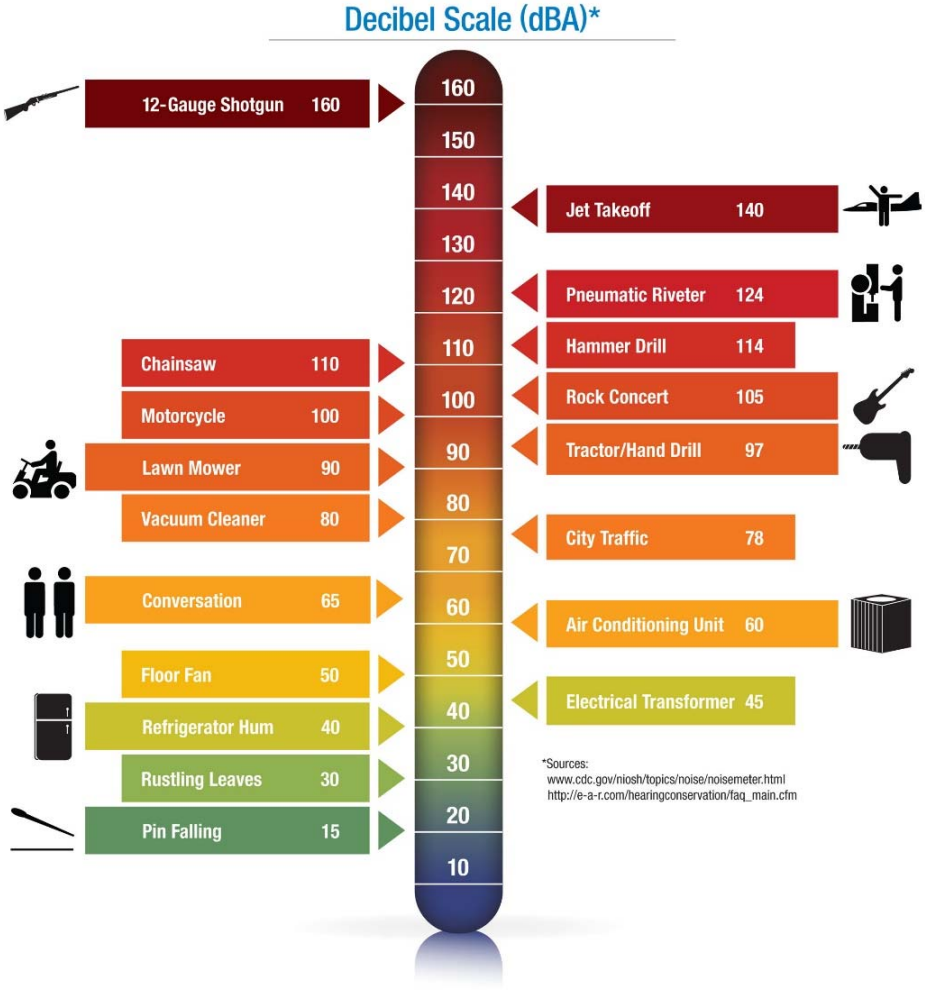
- To provide background information pertaining to the effects of noise.
- To identify existing sensitive land uses in the immediate project vicinity of both the Woodland Plant and the Shifler Mining Site.
- To quantify existing ambient noise levels at those nearest noise-sensitive land uses.
- To clearly set out applicable thresholds of significance by using the California Environmental Quality Act (CEQA) Guidelines in concert with Yolo County noise standards
- To predict project-related noise levels at the nearest noise-sensitive areas, and to compare those levels against the applicable thresholds of significance.
- To recommend mitigation, as necessary, to ensure compliance with Yolo County noise standards and the CEQA Guidelines.
- To summarize the results of this analysis into a report for eventual use in the development of the project environmental documents.

Noise Fundamentals and Terminology

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and hence are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, called Hertz (Hz).

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in levels (dB) correspond closely to human perception of relative loudness. Figure 2 illustrates common noise sources associated with a range of decibel levels.

Figure 2
Noise Levels Associated with Common Noise Sources



The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighing network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels in decibels.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (Leq) over a given time period (usually one hour). The Leq is the foundation of the Day-Night Average Level noise descriptor, Ldn, and shows very good correlation with community response to noise.

The Day-night Average Level (Ldn) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because Ldn represents a 24-hour average, it tends to disguise short-term variations in the noise environment. Ldn-based noise standards are commonly used to assess noise impacts associated with traffic, railroad and aircraft noise sources.

The Yolo County noise standards, which are discussed in detail later in this section, are expressed in terms of both hourly average (Leq) and day/night average (Ldn) descriptor as well as in terms of hourly performance standards. In addition to applying the County's noise standards to this Project, the California Environmental Quality Act (CEQA) requires that noise impacts be assessed relative to ambient noise levels that are present without the project. As a result, ambient noise surveys were conducted, and comparisons of Project to No-Project noise levels were used to assess noise impacts (in addition to comparison to Yolo County noise standards). Specifically, single-event maximum (Lmax) noise levels and hourly average (Leq) noise levels, both with and without the project, were compared so that the assessment of noise impacts was not based solely on an assessment of project-generated noise in terms of 24-hour averages (Ldn), but also on short-term fluctuations in the ambient noise environment.

It should be noted that audibility is not a test of significance according to CEQA. If this were the case, any project which added any audible amount of noise to the environment would be considered significant according to CEQA. Because every physical process creates noise, whether by the addition of a single vehicle on a roadway, or by a tractor in an agricultural field, the use of audibility alone as significance criteria would be unworkable. CEQA requires a substantial increase in noise levels before noise impacts are identified, not simply an audible change. The discussion of what constitutes a substantial change in noise environments, both existing and cumulative, is provided in the Regulatory Setting section of this report.

Project Description

Project Location and Setting – Shifler Mine Site

The approximately 319 acre Project Site is located three miles west of the City of Woodland, in unincorporated Yolo County (See Figure 1). The Project Site is generally bounded by County Road 94B to the west, Cache Creek to the north, and County Road 22 to the south.

The Project Site is currently in agricultural use. Moore Canal, a water conveyance structure owned and operated by the Yolo County Flood Control and Water Conservation District (YCFCWCD), bisects the Project Site from west to east. An existing electric conveyor previously used to transport mined aggregate from Teichert's Storz site to its Woodland Plant lies along the northern boundary of the Project Site but is not currently in use. Surrounding land uses include Teichert's Woodland Plant site to the northeast; agricultural land to the east; the Monument Hill Memorial Park cemetery and rural residential uses to the south; the Yolo Fliers Club golf course, the Watts-Woodland Airport, and Wild Wings residential subdivision and golf course to the southwest; Teichert's existing Storz mining site to the west, and the Cache Creek Nature Preserve to the northwest.

Mining Area, Depth, Anticipated Reserves

Teichert proposes to mine approximately 277 ± acres of the 319.3-acre Project Site. All of the proposed mining area would be off-channel and set back more than 200-feet from Cache Creek. Depth of mining will vary depending on the location, quality, and quantity of aggregate reserves present. It is anticipated that the mining will occur up to a maximum depth of 5 feet below MSL elevation, approximately 110 feet below existing ground surface, near the northeastern corner of the mining area with an estimated average depth of 60-70 feet below existing ground surface. As discussed below, Teichert is seeking a thirty-year permit that would allow for maximum aggregate sales of up to 2.2 million tons in a given year.

Setbacks

Mining activities on the Project Site will comply with the following setbacks, as shown in Figure 3:

- 200 feet from existing channel bank of Cache Creek.
- 50 feet from the County Road 94B right-of-way on west side of property (with visual screening proposed along the right-of-way).
- 50 feet from the property line and over 400 feet from the County Road 22 right-of-way on the south side of the property (with visual screening proposed along the right-of-way).
- 50 foot setback from Woodland Plant site to the north;

Conveyor and Processing

Aggregate mined at the Project Site will be transported to the existing Teichert Woodland processing plant to the north by electric conveyor.

Truck Traffic

Aggregate trucks going to and from the Woodland Plant currently access the site from its entrance on County Road 20. Trucks are required to use designated haul routes of County Road 20, County Road 96, and State Route 16 to and from Interstates 5 and 505. Local deliveries are allowed to use roads other than State Route 16, County Road 20, or County Road 96. No change to these designated haul routes is proposed as part of the Project.

Reclamation Plan

Teichert proposes to reclaim the approximately 277-acre mining area portion of the Project Site to agriculture and habitat uses. A portion of the mining area will be reclaimed to agricultural use. The remainder of the mining area would be reclaimed to a pond with riparian woodland along the fringes/shoreline. Slopes would be reclaimed to grassland. The amount of each habitat type could vary depending on actual mining depths and groundwater elevations.

Mining Permit Life

The duration of mining activities at the Project Site will vary depending on market demand and the quality and quantity of aggregate present onsite. The Project Site is proposed to be mined after completion of mining at the Schwarzgruber site that currently supplies the Woodland Plant. Mining of the Schwarzgruber site could be completed in as soon as two years, depending on market demand. Thus, mining of the Project Site would commence in 2020 at the earliest. Mining of the aggregate reserves on the Project Site could take 20 years or longer, depending on market demand. OCMP Policy 2.4-3 limits surface mining permits to a maximum of 30 years, with the

potential to extend the permit life by a maximum of 20 years with subsequent approvals. Accordingly, Teichert is requesting a permit duration of 30 years from the commencement of mining on the project site. Thus, if mining commenced in 2020, the permit would run until 2050. Reclamation activities could continue for an additional two years after the expiration of the surface mining permit.

Hours of Operation

Teichert's existing operations at the Woodland Plant and the associated Schwarzgruber mining site are governed by Condition 38 of the Schwarzgruber surface mining permit, which provides:

> The hours of operation for the mining site are 6:00 am to 6:00 pm Monday through Saturday. Occasional 24-hour operations to fulfill contract requirements are allowed within the regulations established in Section 10-4.421 of the mining ordinance. The hours of operation for the Teichert-Woodland plant are 6:00 am to 6:00 pm Monday through Friday. For the months of August, September, and October, hours may be extended to 10:00 pm (Monday through Friday) and 6:00 am to 6:00 pm Saturday and/or Sunday subject to compliance with Section 10-4.421 of the Mining Ordinance.

No changes are proposed to these existing hours of operation for the Shifler mining site or Woodland Plant.

Mining Characteristics

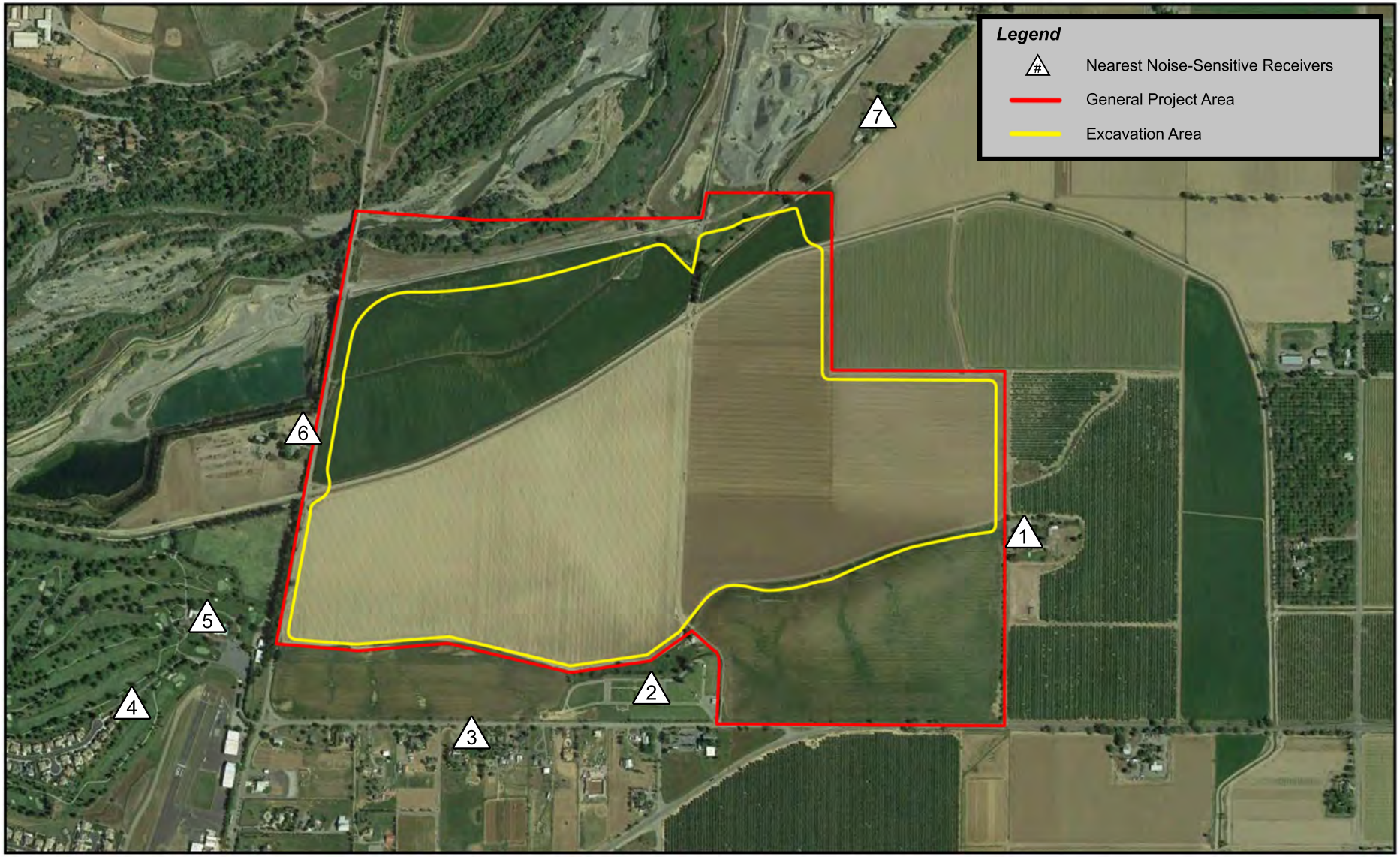
The first step of mining is the removal of overburden, i.e., the soil that overlays the sand and gravel proposed to be mined. Removal of overburden will be accomplished using scrapers, motor graders and bulldozers. Overburden will be progressively removed ahead of mining and stockpiled in setback areas and internal storage locations until retrieved for reclamation. The top layers of topsoil will be placed in temporary berms and/or stockpiles and seeded with naturalized annual grasses and forbs. As required by Section 10-4.433 of the Yolo County Off-Channel Surface Mining Ordinance, berms or stockpiles shall not exceed 40 feet in height with slopes no steeper than 2:1 horizontal to vertical. Berms and/or stockpiles could be located along the perimeter of mining areas, including within mining setbacks, to allow mining to occur without the need to relocate berms and/or stockpiles before reclamation occurs.

Aggregate above the groundwater will be harvested by scrapers and dozers. Aggregate mined below the water table will be extracted by a combination of equipment such as excavators and draglines. Water trucks will be used to control dust. This mining process will be the same as currently employed by Teichert at other sites supplying the Woodland Plant.

Figure 3

Mining Area and Nearest Noise-Sensitive Receivers

Teichert Shifler Mining and Reclamation Project - Yolo County, California



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Scale (feet)
0 500 1000

Environmental Setting

Sensitive Receptors in Project Vicinity

Noise sensitive receptors in the immediate vicinity of the Shifler mine site consist primarily of individual rural residences to the north, east and west, the Monument Hill Memorial Park and clustered rural residences to the south, the Yolo Flyers Club Golf Course and more concentrated residential development to the southwest. The nearest noise-sensitive receptors to the Shifler mining site are identified on Figure 3. Some of the receptors shown on Figure 3 represent individual receptors (i.e. R1, R2, & R7), whereas others represent groups of receptors (i.e. R3, R4, R5, R6).

Existing sensitive receptors in the vicinity of the Teichert Woodland plant, which is due north of the proposed Shifler mining site, consist primarily of rural residences along County Roads 20, 96, 94B, and 95.

Existing Ambient Noise Environment

2014 Ambient Noise Survey

The existing ambient noise environment in the immediate vicinity of the Shifler site is defined primarily by local and distant traffic, local agricultural operations, small aircraft operations associated with the Watts-Woodland Airport, and by existing activity at the Teichert Woodland facility.

To quantify the existing ambient noise environment at the nearest potentially affected residences to the project site, continuous noise level measurements were conducted at the location identified on Figure 1 between May 29-31, 2014. The monitoring survey represents 72 consecutive hours of ambient noise level data times five sites. Weather conditions present during the monitoring program were typical for the season, consisting of warm temperatures, variable clouds, wind, and relative humidity.

Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used for the noise level measurement survey. The meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4). The numerical summaries of the ambient noise level measurements are provided in Table 1. The graphical results of the noise monitoring program are provided in Appendix B.

Table 1
Statistical Summary of Ambient Noise Measurement Results
Teichert Shifler Nearest Residences – May 29-31, 2014

		Daytime (7 a.m. - 10 p.m.)		Nighttime (10 p.m. to 7 a.m.)		
Site	**Date**	**Average (L_{eq})**	**Maximum (L_{max})**	**Average (L_{eq})**	**Maximum (L_{max})**	Ldn
A	May 29	54	84	58	79	69
	May 30	56	90	49	88	61
	May 31	50	79	45	66	55
B	May 29	65	87	59	86	70
	May 30	66	89	57	86	69
	May 31	65	87	57	86	69
C	May 29	59	87	53	79	63
	May 30	61	93	51	81	65
	May 31	57	90	52	80	62
D	May 29	55	102	55	75	67
	May 30	47	76	42	71	51
	May 31	44	76	43	69	51
E	May 29	50	82	59	78	68
	May 30	50	80	47	79	55
	May 31	46	79	46	77	54

Source: Bollard Acoustical Consultants, Inc.
The noise measurement location is identified on Figure 1.
Noise level data shown are averages for the period.

The Table 1 data indicate that measured ambient noise levels were considerably higher at Sites A (cemetery), D (near northern project boundary), and Site E (eastern site boundary), on May 29 than on May 30 or 31. This increase in ambient noise levels on May 29 was observed by BAC staff to be partially due to agricultural harvesting operations occurring on the Shifler site on the morning of May 29th.

The Table 1 data indicate that the lowest measured ambient noise conditions occurred at Sites D & E, which are close to the northern and eastern site boundaries, respectively. Unlike Sites A-C, Sites D & E are set back a considerable distance from the nearest roadways.

2018 Ambient Noise Survey

To supplement the 2014 ambient noise survey, additional ambient noise level measurements were conducted by BAC staff on December 11, 2018. The short-term ambient noise level measurements were conducted at 18 locations, including eight (8) locations on the Teichert Woodland Plant Site and ten (10) locations representing the nearest existing sensitive receptors to both the Woodland plant site and the Shifler mining site. The 2018 ambient noise measurement sites are shown on Figure 4. The results of the additional ambient noise surveys are provided in Table 2.

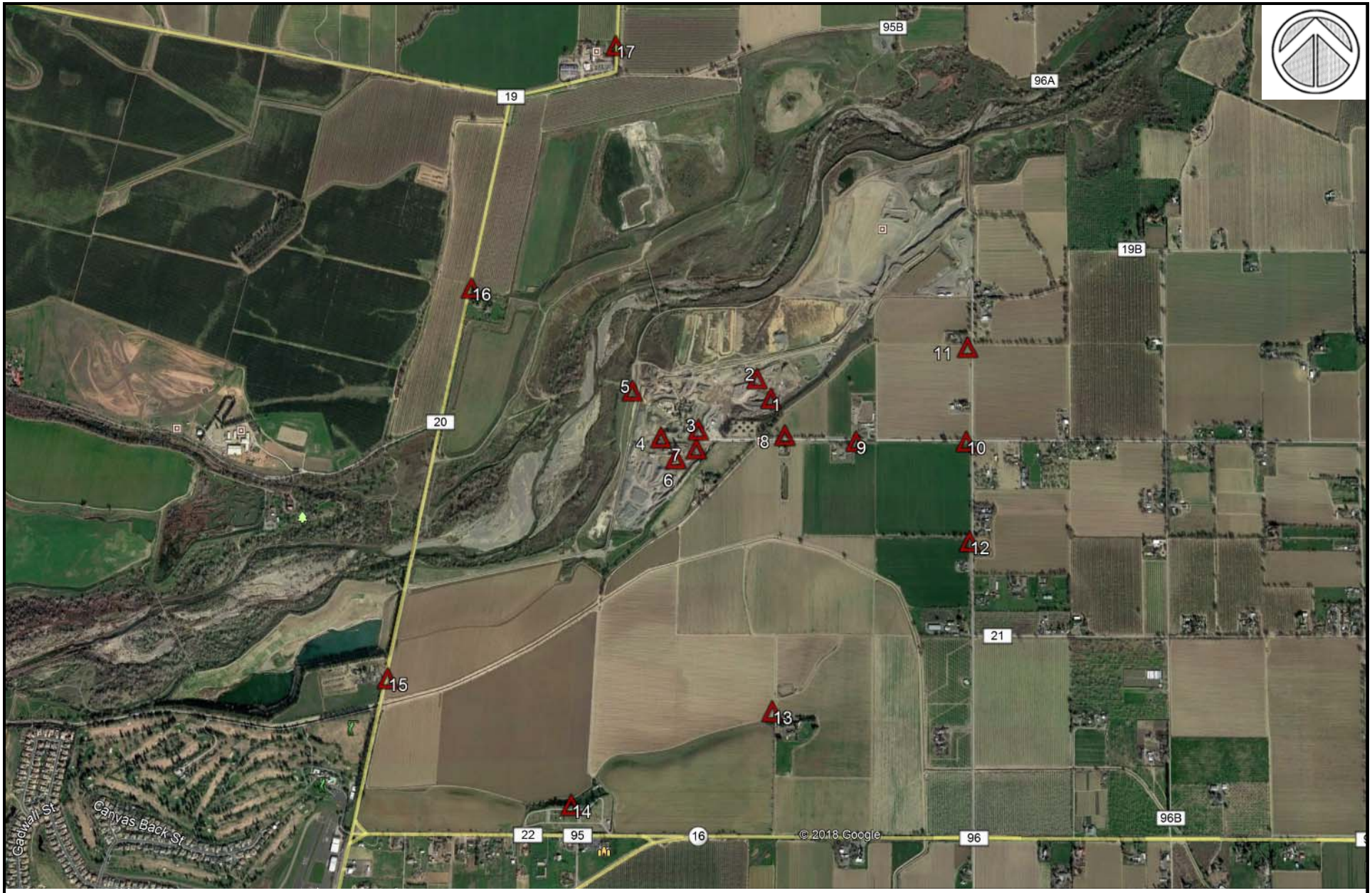

Figure 4
Noise Measurement Sites
Teichert Woodland Plant Vicinity
December 11, 2018

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Table 2
Statistical Summary of Ambient Noise Measurement Results
Teichert Woodland Plant Area – December 11, 2018

Site	Description	Average (L_{eq}, dBA)	Maximum (L_{max}, dBA)	Noise Source / Notes
1	300 feet south of Recycle Plant	70	72	Dozers, excavator, breaker, recycle plant
2	250 feet west of Recycle Plant	70	71	Dozers, excavator, breaker, recycle plant
3	300 feet east of Rock Plant	69	70	Main rock plant dominant – crushers/screens
4	400 feet southwest of Rock Plant	68	74	Main rock plant dominant – crushers/screens
5	600 feet northwest of Rock Plant	60	62	Rock plant dominant
6	90 feet from Asphalt Plant – w/o burner	72	72	Asphalt plant bag house – burner not operating
6	90 feet from Asphalt Plant – w burner	81	83	Entire asphalt plant
7	150 feet from Asphalt Plant – partial shielding	73	75	Asphalt plant dominant but partially shielded
8	Nearest Residence to plant site on Co. Rd. 20	52	56	Recycle conveyors dominant – main rock plant barely audible
9	Next nearest residence to plant site on Co. Rd. 20.	45	55	Distant background traffic – Teichert operations barely audible.
10	Corner of Co. Rd. 20 & 96	67	83	Local traffic only – Teichert operations inaudible
11	Residence 1,300 ft. north of Co. Rd. 20 on Co. Rd. 96	41	50	Local traffic only – Teichert operations inaudible
12	1,400 ft. south of Co. Rd. 20 on Co. Rd. 96	41	50	Local traffic only – Teichert operations inaudible
13	Residence adjacent to southeast corner of Shifler Site	44	49	Teichert plant audible in distance
14	Monument Hill Memorial Park	42	44	Local traffic – Teichert plant barely audible
15	Residence on west side of Co. Rd. 94 B adjacent to Shifler mine site	39	43	Background traffic – Teichert plant inaudible
16	Residence on Co. Rd. 94B 3,300 ft. west of Rock Plant	69	83	Background traffic – Teichert plant inaudible
17	Residence on Co. Rd. 95 5,000 ft. north of Rock Plant	62	74	Background traffic – Teichert plant inaudible

Source: Bollard Acoustical Consultants, Inc.
The noise measurement locations are identified on Figure 1.
Noise level data shown are averages for the period.

Existing/Baseline Traffic Noise Environment

Two different baseline traffic conditions are evaluated in this assessment for the Teichert Woodland Plant operations. The first was developed using the average annual production over the ten-year period between 2004 and 2014. This scenario is referred to in this document as "Baseline 1". The second baseline condition is based on the maximum trip generation associated with the currently permitted 1.2 million tons per year from the Woodland Plant. This scenario is referred to in this document as "Baseline 2".

To describe traffic noise levels for baseline traffic conditions, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions.

Existing traffic on the local roadways in the project vicinity is categorized for noise purposes into automobiles, medium duty trucks (2 axles), and heavy duty trucks (3+ axles). Heavy truck traffic volumes in the immediate project vicinity essentially consist of agricultural, commercial, and aggregate industry trucks. For this assessment of existing traffic noise levels on local roadways, the average daily Teichert truck trip generation over the past 10 years was utilized. The FHWA model input data and results for the two baseline scenarios are provided in Appendices C & D, respectively.

Tables 3 & 4 show the predicted traffic noise levels in terms of the Day/Night Average Level descriptor (L_{dn}) at a standard distance of 50 feet from the centerlines of the existing project-area roadways for the two baseline conditions. The 50 foot distance was selected for analysis as this distance generally represents the closest residences to the centerlines of the roadways which will primarily be used by Teichert truck traffic. The extent by which existing land uses located along the project area roadways are affected by baseline traffic noise depends on their respective proximity to the roadways and their individual sensitivity to noise.

Table 3
Baseline #1 Traffic Noise Levels and Distances to Traffic Noise Contours
Teichert Shifler Project Vicinity Roadways – Yolo County, California

Roadway	Segment	L_{dn}[1]	Distance to Ldn Contour (ft) 70	65	60
County Road 20	Woodland entrance – CR 96	63	23	40	71
County Road 20	CR 96 – CR 98	66	32	57	101
County Road 98	I-5 – CR 20	68	40	72	128
County Road 96	CR 20 – SR 16	63	23	41	73
SR 16	West of I-505	71	57	101	179
SR 16	I-505 – CR 94B	72	61	109	193
SR 16	CR 94B – CR 96	72	65	116	206

1. L_{dn} is computed at a standardized distance of 50 feet from the roadway centerline.
Source: FHWA-RD-77-108 with inputs prepared by Fehr & Peers

Table 4
Baseline #2 Traffic Noise Levels and Distances to Traffic Noise Contours
Teichert Shifler Project Vicinity Roadways – Yolo County, California

Roadway	Segment	L_{dn}[1]	Distance to Ldn Contour (ft) 70	65	60
County Road 20	Woodland entrance – CR 96	65	29	51	90
County Road 20	CR 96 – CR 98	67	36	64	113
County Road 98	I-5 – CR 20	69	44	78	139
County Road 96	CR 20 – SR 16	64	25	45	80
SR 16	West of I-505	71	57	101	179
SR 16	I-505 – CR 94B	72	62	110	196
SR 16	CR 94B – CR 96	72	66	117	209

1. L_{dn} is computed at a standardized distance of 50 feet from the roadway centerline.
Source: FHWA-RD-77-108 with inputs prepared by Fehr & Peers

Regulatory Setting

California Environmental Quality Act (CEQA) Guidelines

Criteria for determining the significance of noise impacts were developed based on information contained in the California Environmental Quality Act Guidelines (State CEQA Guidelines). According to those guidelines, a project may have a significant effect on the environment if it will satisfy the following conditions:

1. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or in other applicable local, state or federal standards.
2. Generation of excessive groundborne vibration or groundborne noise levels.
3. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, where people residing or working in the project area would be exposed to excessive noise levels.

Applicable Local Noise Standards

Yolo County Health and Safety Element Standards

The Yolo County General Plan Health and Safety Element contains land use compatibility guidelines with respect to noise. Specifically, Health and Safety Element Figure HS-7 (Noise Compatibility Guidelines), indicates that 60 dB Ldn is considered an acceptable exterior noise environment for residential land uses. That figure also establishes an exterior ambient noise environment of 75 dB Ldn as being acceptable for industrial and agricultural land uses. Health and Safety Element Action HS-A63 requires that proposed projects be reviewed for compatibility with surrounding land uses in accordance with the aforementioned land use compatibility guidelines.

Yolo County Off-Channel Surface Mining Ordinance

The Yolo County Off-Channel Surface Mining Ordinance provides considerably more specificity with respect to the noise compatibility of surface mining projects than the County Health and Safety Element. As a result, the Off-Channel Surface Mining Ordinance standards described below are used to assess the potential for noise impacts associated with the project relative to adopted County standards. The following specific sections of the Ordinance apply to this project:

> **Sec. 10-4.421. Noise: General standard.**
> From 6:00 a.m. to 6:00 p.m., noise levels shall not exceed an average noise level equivalent (Leq) of eighty (80) decibels (dBA) measured at the property boundaries of the site. However, noise levels shall not exceed an average noise level equivalent (Leq) of sixty (60) decibels (dBA) for any nearby off-site residences or other noise-sensitive land uses.
>
> From 6:00 p.m. to 6:00 a.m., noise levels shall not exceed an average noise level equivalent (Leq) of sixty-five (65) decibels (dBA) measured at the property boundaries of the site. At no time shall noise levels exceed a community noise equivalent (CNEL) of sixty (60) decibels (dBA) for any existing residence or other noise-sensitive land use. An existing residence shall be considered the property line of any residentially zoned area or, in the case of agricultural land, any occupied offsite residential structures. Achieving the noise

standards may involve setbacks, the use of quieter equipment adjacent to residences, the construction of landscaped berms between mining activities and residences, or other appropriate measures. (§ 1, Ord. 1190, eff. September 5, 1996)

Sec. 10-4.423. Noise: Traffic.

Operators shall provide acoustical analysis for future truck and traffic noise associated with the individual operations along County roadways identified as experiencing significant impacts due to increased traffic noise. The study shall identify noise levels at adjacent noise-sensitive receptors and ways to control the noise to the "normally acceptable" goal of a CNEL of sixty (60) dBA and reduce the increase over existing conditions to five (5) dBA or less. Typical measures that can be employed include the construction of noise barriers (wood or masonry), earthen berms, or rerouting of truck traffic. (§ 1, Ord. 1190, eff. September 5, 1996).

Determination of a Significant Noise Increase

As noted above in Section 10-4.423 of the Yolo County Off-Channel Surface Mining Ordinance, an increase in traffic noise resulting from a project in excess of 5 dB is considered significant. This threshold is applied to changes in ambient noise levels resulting from project-related off-site traffic as well as on-site excavation operations.

According to the publication *Architectural Acoustics* (M. David Egan, J. Ross Publishing, 2007, p21), a 3 dB increase in noise levels for similar sources is considered "just barely perceptible", and a 6 dB increase represents a "clearly noticeable" increase in noise levels. In addition, a 10 dB increase is required before the sound is subjectively considered to be twice as loud.

Noise Generation of the Project

Excavation Noise at Shifler Site

As noted previously, removal of the limited overburden will be accomplished using scrapers, motor graders and bulldozers. Following removal of overburden, aggregate materials will primarily be mined using scrapers until the water table is reached. The scrapers would dump directly over a grate which feeds the conveyor system used to transport material to the Teichert Woodland Plant. At the depths at which groundwater is reached, an excavator or dragline will be used to extract the aggregate resource. The excavator will fill haul trucks which will dump directly over a grate which feeds the conveyor system used to transport material to the Teichert Woodland Plant. Water trucks will be used to control dust. This mining process will be the same as currently employed by Teichert at other sites supplying the Woodland Plant, as well as Teichert's Esparto operations.

To quantify the noise generation of proposed excavation activities at the Shifler property, Bollard Acoustical Consultants (BAC) utilized reference noise level data collected by BAC at various Teichert excavation areas in recent years, including the Teichert Esparto Operations. The reference noise levels utilized to quantify the noise generation of operations at the Shifler site are provided in Table 5. It should be noted that the hourly average noise emissions of the excavation activities are dependent on the duration of the hour the noise sources are present. For example, scrapers and haul trucks transferring aggregates between the excavation area and conveyors

would only be in the immediate vicinity of a property line near an existing noise-sensitive receptor for a relatively small percentage of the hour.

Table 5
Reference Noise Levels for Excavation Equipment and Operations
Teichert Shifler Project – Yolo County, California

Equipment / Operation	Lmax @ 100 feet	Leq @ 100 feet	Distance to 60 dB Leq Contour (ft)
Conveyors	60/70[1]	57	71
Self-Elevating Scrapers	90	75	560
Excavator	80	70	320
Haul Trucks	80	70	350

Source: BAC reference noise level data collected at various Teichert operations.
1. Following conveyor startup, noise generated by conveyor belts is fairly steady-state (not time varying). As a result, there is little difference between the maximum and average noise levels generated by conveyors while in operation (60 dBA vs 57 dBA). However, maximum noise levels generated by conveyor alarms are typically 10 dB higher so as to be audible over background noise. However, the duration of the conveyor alarms is very limited and doesn't affect the average noise generation of the conveyor system. The 70 dBA maximum shown in Table 5 is due to the conveyor start-up alarms.

Aerial imagery was used to scale the distances from the nearest proposed excavation activities at the Teichert Shifler project site to the seven (7) representative noise-sensitive receptor locations closest to the project site. A sound level decay rate of 6 dB per doubling of distance was used to project noise from the project site to the nearest sensitive receptors. An additional offset of -1.5 dB per doubling of distance between the noise source and receptor was applied to account for atmospheric absorption and excess ground attenuation. Furthermore, a -5 dB offset was applied to noise generated by excavator/haul truck operations as that equipment would not be utilized until the dry-pit mining with scrapers is completed and the excavation operations are recessed into the pit area.

Table 6 shows the distances between the nearest excavation locations on the project site and project-area receptors. Table 6 also shows the predicted noise levels associated with proposed excavation activities at those sensitive receptor locations.

Table 6
Projected Average Noise Levels at Nearest Sensitive Receptors for On-Site Operations
Teichert Shifler Project – Yolo County, California

Receptor	Distance	Scraper	Excavator / Haul Truck	Conveyor
1	300	65	53	42
2	300	60	48	37
3	600	59	47	36
4	1500	49	37	26
5	500	60	48	37
6	300	65	53	42
7	1000	54	42	31

Source: Bollard Acoustical Consultants, Inc. (BAC)

It should be noted that the noise levels predicted for scraper operations assume worst-case operations at existing ground elevation. As the depth of excavation increases, shielding of scraper operations by the intervening pit walls will result in considerably lower noise levels at the nearest receptors than indicated in Table 6.

It is also worthy of note that conveyor start-up alarms generate brief periods of elevated maximum noise levels estimated to be approximately 10 dB higher than the average noise levels shown in Table 6. The range of maximum noise levels associated with conveyor startup alarms would range from approximately 36 to 52 dBA Lmax at the nearest sensitive receptors. This range of levels is both well below applicable noise standards and well below existing maximum noise level exposure at these receptors.

The Table 6 data indicate that, with the exception of Receptors 1 and 6, project noise generation is predicted to be satisfactory relative to the Yolo County Surface Mining Ordinance standard of 60 dB L_{eq}. Because initial overburden removal operations using self-elevating scrapers could cause average noise levels at the residences represented by Receptors 1 and 6 to exceed the County's applicable 60 dB L_{eq} noise standard and result in a substantial increase in ambient noise levels at Receptor 1 (See Figure 3), ***this impact is considered significant***. The following specific mitigation measures would reduce initial excavation noise generation to a state of compliance with the Yolo County 60 dB L_{eq} exterior noise level standard at the nearest residences:

1. Initial scraper operations occurring within 560 feet of an existing residence should be limited to 15 minutes per hour to reduce hourly noise exposure to 60 dB L_{eq} or less at those receptor locations.

   AND

2. An earth berm or other form of noise barrier should be erected along 300 feet of the eastern and western site boundaries nearest to receptors 1 and 6. The barrier should be a minimum of eight (8) feet in height relative to existing ground elevation.

Teichert Woodland Processing Plant Noise

This project does not propose any changes to the Woodland Plant. However, once excavation and processing operations have ceased at the Esparto site, the Esparto plant equipment would be relocated to the Woodland Site to replace the older Woodland Plant equipment. In addition, 1 additional crusher and 2 additional screens would likely be required to accommodate the increase in plant capacity from 1.2 million tons per year to 2.2 million tons per year.

Noise level measurements conducted at the Woodland Plant site in December 2018 and at the Esparto Plant site in August if 2019 indicate that the aggregate processing plant noise generation is very similar. With the additional crusher and 2 additional screens, the noise generation of the processing plant equipment is predicted to be approximately 1-2 dB higher than the existing noise generation of the Esparto aggregate processing equipment. However, the area identified for the location of the Esparto processing plant equipment once relocated to the Woodland Plant site is generally farther away from the nearest residences than the existing Woodland plant equipment. The net effect of the slight increase in plant noise generation resulting from the additional crusher and screen and the increased distance to the nearest residences is predicted to be negligible.

As a result, ***this impact is considered less than significant***. It should be noted that no changes to asphalt plant production levels are proposed as part of this project, and that asphalt production would continue to occur according to market demand, as it has historically.

Although the changes in processing plant equipment and location at the Woodland plant required to provide the increase in capacity from 1.2 to 2.2 million tons per year are not expected to result in a significant change in plant noise generation at the nearest residences to the woodland plant. In the event the increased facility output does result in increased noise levels in the immediate vicinity of the Teichert Woodland plant, or extended hours of operation, the following specific mitigation measures could be employed to reduce processing plant noise emissions to levels at or below the current levels quantified in Table 2:

1. A noise survey should be conducted following the installation of any new equipment which will be required to increase processing capacity of the Woodland Plant. In the event that the survey results indicate the additional equipment has resulted in a substantial increase in processing plant noise emissions (in excess of 5 dB), the following noise mitigation options should be implemented as appropriate to reduce the overall increase in plant noise levels to less than 5 dB at the nearest residences:

    - Erect localized noise barriers adjacent to ground level equipment determined to be responsible for substantial increases in ambient noise levels.

    - Suspend acoustic curtains adjacent to elevated equipment determined to be responsible for substantial increases in ambient noise levels.

- Line new conveyor transfer points and hoppers with heavy urethane linings.
- Utilize urethane screens in new screen decks.
- Utilize broad-band backup beepers for any new mobile equipment rather than the traditional tonal back-up beepers.
- Ensure that all internal combustion engines which may be required to drive new equipment is equipped with appropriate mufflers.

Project-Generated Traffic Noise

Currently, the Teichert Woodland and Esparto facilities are permitted to sell 1.2 and 1.0 million tons of aggregate products per year, respectively, for a combined annual tonnage of 2.2 million per year. This project proposes to shift the 1 million ton annual allotment from the Esparto facility to the Woodland facility upon completion of excavation operations at the Esparto facility. This analysis evaluates changes in traffic noise levels along the roadway network utilized by project traffic assuming a future Woodland Plant output of 2.2 million tons per year.

To predict changes in traffic noise levels resulting from the increase in Woodland Plant output to 2.2 million tons per year, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. Tables 7 & 8 show the predicted traffic noise levels in terms of the Day/Night Average Level descriptor (L_{dn}) at a standard distance of 50 feet from the centerlines of the existing project-area roadways for the two baseline scenarios described previously. The FHWA model input data and results for existing baseline conditions are provided in Appendix C.

This analysis recognizes that not all of the residences located adjacent to the project area roadways are 50 feet from the roadway centerline. Most residences are located farther from the centerline of the project roadways. The 50 foot distance was selected for analysis because it generally represents the distance between the nearest residences and centerlines of the roadways which would typically be used by project traffic. It should be noted, however, that changes in traffic noise levels resulting from a project are not distance-dependent. Specifically, if a residence located 50 feet from the roadway would experience a 3 dB increase from the project, a residence located 100 or even 200 feet from the roadway would also experience a 3 dB increase resulting from the project. Although the actual traffic noise levels decrease with increasing distance from the roadway, the *change* in noise levels would remain the same. As a result, the use of a normalized 50 foot distance for computing the change in noise levels resulting from the project is both conservative and acceptable, as the calculated changes shown in Tables 7 - 9 would apply to all residences in the vicinity of project roadways, regardless of the distance between those residences and the roadway centerlines.

As stated previously, Section Sec. 10-4.423 (Noise: Traffic) of the Yolo County Off-Channel Surface Mining Ordinance, operators shall provide acoustical analysis for future truck and traffic noise associated with the individual operations along County roadways identified as experiencing significant impacts due to increased traffic noise.

Such an analysis was prepared and this study has determined that existing (pre-project) traffic noise levels currently exceed 60 dB Ldn at some sensitive receptors due to a combination of existing aggregate truck traffic (and other truck traffic), and usage of the project area roadways by the general public. Because existing traffic levels currently exceed the "normally acceptable" goal of 60 dB Ldn without the project, this impact assessment necessarily focuses on minimizing project-generated traffic noise level increases to 5 dB or less, in accordance with the County Off-Channel Surface Mining Ordinance.

Table 7
Traffic Noise Levels (L_{dn} @ 50 feet) and Changes Relative to Baseline 1[1] Conditions
Teichert Woodland Plant Vicinity Roadways – Yolo County, California

Roadway	Segment	Baseline No-Project	Baseline + Project	Change	Impact?[2]
County Rd 20	Woodland entrance – CR 96	63.1	67.7	4.6	No
County Rd 20	CR 96 – CR 98	66.1	68.7	2.6	No
County Rd 98	I-5 – CR 20	68.2	70.1	1.9	No
County Rd 96	CR 20 – SR 16	63.3	65.3	2.0	No
SR 16	West of I-505	71.1	71.1	0.1	No
SR 16	I-505 – CR 94B	71.7	72.1	0.4	No
SR 16	CR 94B – CR 96	72.3	72.7	0.4	No

Source: FHWA-RD-77-108 with inputs provided by Fehr & Peers Associates
1. Baseline 1 is defined as existing plus ten-year average Woodland Plant aggregate production.
2. Pursuant to the Yolo County Off-Channel Mining Ordinance a 5 dB increase in project-generated traffic noise is considered significant. Where the project-related increase would not exceed 5 dB the impact is considered less than significant.

Table 8
Traffic Noise Levels (L_{dn} @ 50 feet) and Changes Relative to Baseline 2[1] Conditions
Teichert Woodland Plant Vicinity Roadways – Yolo County, California

Roadway	Segment	Baseline No-Project	Baseline + Project	Change	Impact?[2]
County Rd 20	Woodland entrance – CR 96	65.1	67.7	2.5	No
County Rd 20	CR 96 – CR 98	67.1	68.7	1.6	No
County Rd 98	I-5 – CR 20	68.9	70.1	1.2	No
County Rd 96	CR 20 – SR 16	64.0	65.3	1.2	No
SR 16	West of I-505	71.1	71.1	0.0	No
SR 16	I-505 – CR 94B	71.9	72.1	0.3	No
SR 16	CR 94B – CR 96	72.4	72.7	0.2	No

Source: FHWA-RD-77-108 with inputs provided by Fehr & Peers Associates
1. Baseline 2 is defined as existing plus currently permitted aggregate production of 1.2 million tons per year.
2. Pursuant to the Yolo County Off-Channel Mining Ordinance a 5 dB increase in project-generated traffic noise is considered significant. Where the project-related increase would not exceed 5 dB the impact is considered less than significant.

The Table 7 & 8 data indicate that the predicted traffic noise level increases resulting from the project would be below the 5 dB threshold of significance criteria applied by the Yolo County Off-Channel Surface Mining Ordinance to this project for both baseline scenarios. As a result, ***the project-related traffic noise increase relative to existing baseline conditions is considered less-than-significant***.

Table 9 provides the FHWA results for future (cumulative) conditions. Cumulative no project conditions consist of future traffic volume increases on the local roadway network which will occur over time with the growth in the region plus currently permitted Teichert Woodland plant production of 1.2 million tons per year. The FHWA model input data and results for cumulative conditions are provided in Appendix D.

Table 9
Traffic Noise Levels (L_{dn} @ 50 feet) and Changes Relative to Cumulative Conditions
Teichert Woodland Plant Vicinity Roadways – Yolo County, California

Roadway	Segment	Cumulative No-Project	Cumulative + Project	Change	Impact?[1]
County Rd 20	Woodland entrance – CR 96	65.4	69.6	4.2	No
County Rd 20	CR 96 – CR 98	67.7	70.3	2.7	No
County Rd 98	I-5 – CR 20	69.0	71.3	2.2	No
County Rd 96	CR 20 – SR 16	64.9	67.0	2.0	No
SR 16	West of I-505	73.1	73.2	0.1	No
SR 16	I-505 – CR 94B	73.2	73.6	0.4	No
SR 16	CR 94B – CR 96	72.9	73.3	0.5	No

Source: FHWA-RD-77-108 with inputs provided by Fehr & Peers Associates
1. Pursuant to the Yolo County Off-Channel Mining Ordinance a 5 dB increase in project-generated traffic noise is considered significant. Where the project-related increase would not exceed 5 dB the impact is considered less than significant.

The Table 9 data indicate that the predicted traffic noise level increases resulting from the project would be below the 5 dB threshold of significance criteria applied by the Yolo County Off-Channel Surface Mining Ordinance to this project relative to future (cumulative) conditions. As a result, ***the project-related traffic noise increase relative to cumulative conditions is considered less-than-significant***.

Conclusions and Recommendations

This analysis concludes the following:

A. Noise generated by initial overburden removal and excavation operations at the proposed Shifler Project site is predicted to exceed the applicable Yolo County Noise Level standards and significantly exceed existing ambient noise levels at the nearest existing residences to the project site. This impact is considered to be short-term and limited to locations where scraper operations would occur within 560 feet of an existing residence. This impact is limited to residences represented by Receptors 1 and 6 on Figure 3.

   Once the excavation equipment has recessed deep enough into the excavation area so as to no longer be visible at receptors 1 or 6, or once the scrapers are no longer operating within 560 feet of an existing residence, the identified exceedances would no longer occur.

B. The project is not expected to result in substantive changes in noise generation at the Teichert Woodland Plant.

C. No significant increases in off-site traffic noise levels is predicted to result from allowing the total 2.2 million annual tons of aggregate materials permitted between the Woodland and Esparto Plants to be shifted to the Woodland Plant (i.e. project-related traffic noise increases are predicted to be below the OCSM Ordinance criteria of 5 dB).

To mitigate the potential noise impact identified in Conclusion “A” above, the following specific recommendations should be implemented:

1. Initial scraper operations occurring within 300 feet of the project site border near Receptors 1 or 6 should be limited to 15 minutes per hour to reduce hourly noise exposure to 60 dB L_{eq} or less at those receptor locations.

   AND

2. An earth berm or other form of noise barrier should be erected along 300 feet of the eastern and western site boundaries nearest to receptors 1 and 6. The barrier should be a minimum of eight (8) feet in height relative to existing ground elevation.

To further reduce the potential for annoyance associated with proposed excavation activities at the Shifler Site, consideration of the following measures is recommended:

3. Excavation activities occurring within 560 feet of an existing residence should be limited to the hours of 6 am to 10 pm until such time as the excavation equipment has recessed in the pit a sufficient depth to no longer be visible from those nearest residences.

4. Although exceedance of the County's noise standards are not identified at the Monument Hill Cemetery, and although the majority of the cemetery is shielded from view of the Shifler site by intervening topography, ongoing communication between Teichert and Monument Hill representatives is encouraged to identify feasible methods for minimizing potential noise intrusion during services.

Although appreciable changes in Woodland Plant noise emissions are not anticipated to occur as a result of this project, the following recommendations could be implemented should the assumptions surrounding this conclusion change in the future:

5. A noise survey could be conducted following the installation of any new significant noise-generating equipment at the Woodland Plant which was not contemplated in this analysis. In the event that the survey results indicate the additional equipment has resulted in a substantial increase in processing plant noise emissions (in excess of 5 dB), the following noise mitigation options should be implemented as appropriate to reduce the overall increase in plant noise levels to less than 5 dB at the nearest residences:

    - Erect localized noise barriers adjacent to ground level equipment determined to be responsible for substantial increases in ambient noise levels.

    - Suspend acoustic curtains adjacent to elevated equipment determined to be responsible for substantial increases in ambient noise levels.

    - Line new conveyor transfer points and hoppers with heavy urethane linings.

    - Utilize urethane screens in new screen decks.

    - Utilize broad-band backup beepers for any new mobile equipment rather than the traditional tonal back-up beepers.

    - Ensure that all internal combustion engines which may be required to drive new equipment is equipped with appropriate mufflers.

This concludes BAC's analysis of potential noise impacts associated with the proposed Teichert Shifler mining project and increase in Woodland Plant output to 2.2 million tons per year. Please contact BAC at (916) 663-0500 with any questions or comments on this analysis.

Appendix A

Acoustical Terminology

Acoustics The science of sound.

Ambient Noise The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.

Attenuation The reduction of an acoustic signal.

A-Weighting A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.

Decibel or dB Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.

CNEL Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.

Frequency The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.

Ldn Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.

Leq Equivalent or energy-averaged sound level.

Lmax The highest root-mean-square (RMS) sound level measured over a given period of time.

Loudness A subjective term for the sensation of the magnitude of sound.

Masking The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.

Noise Unwanted sound.

Peak Noise The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the Maximum level, which is the highest RMS level.

RT_{60} The time it takes reverberant sound to decay by 60 dB once the source has been removed.

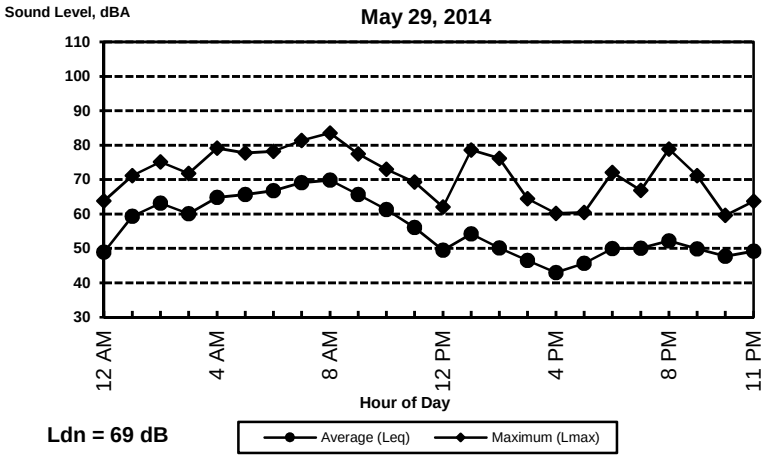
Sabin The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.

SEL A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy of the event into a 1-s time period.

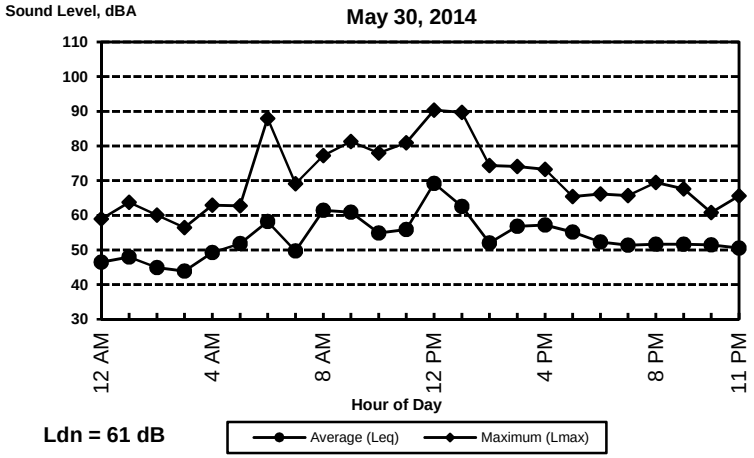
Threshold of Hearing The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.

Threshold of Pain Approximately 120 dB above the threshold of hearing.

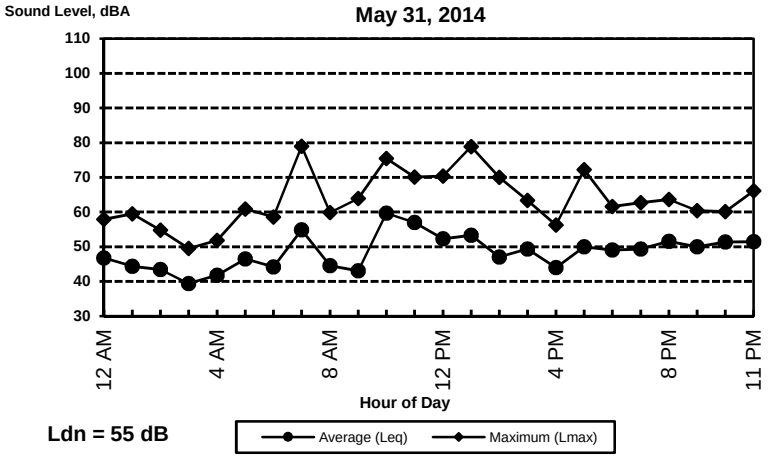
Appendix B-1
Teichert Shifler Mining and Reclamation Project in Woodland
Site A: Central Cemetery Area



Ldn = 69 dB



Ldn = 61 dB



Ldn = 55 dB

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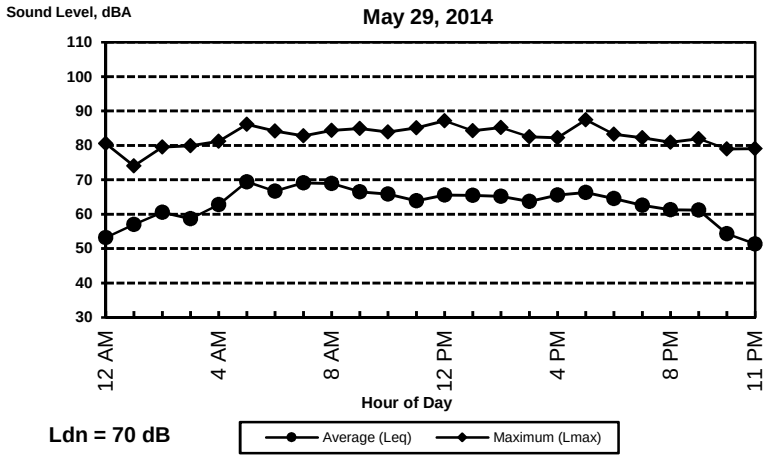
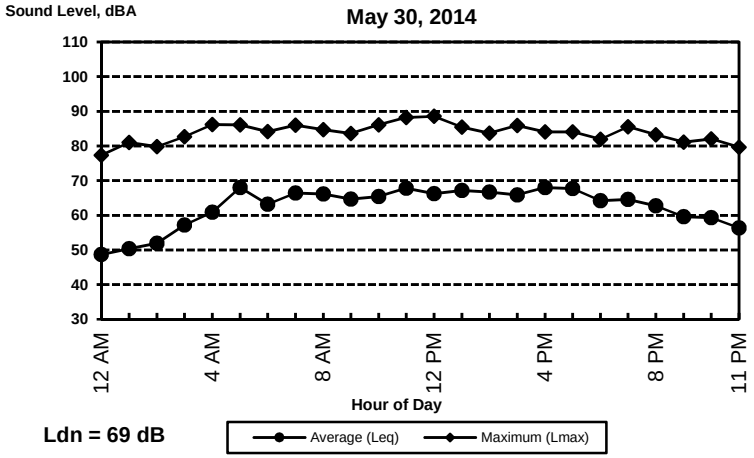
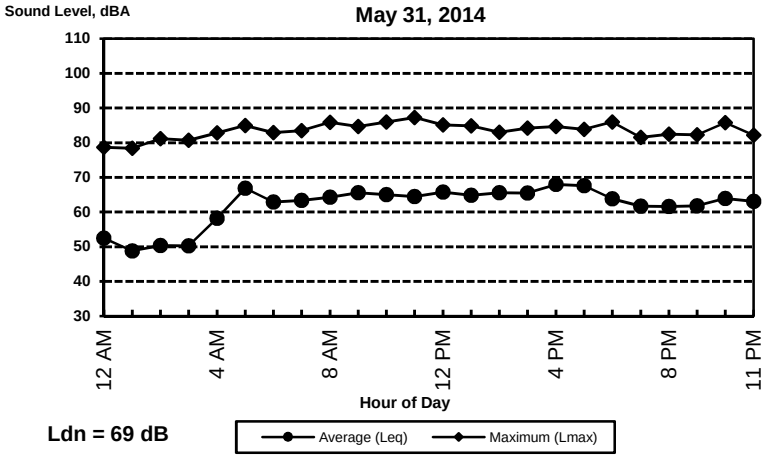
Appendix B-2
Teichert Shifler Mining and Reclamation Project in Woodland
Site B: Southern Cemetery



Ldn = 70 dB



Ldn = 69 dB



Ldn = 69 dB

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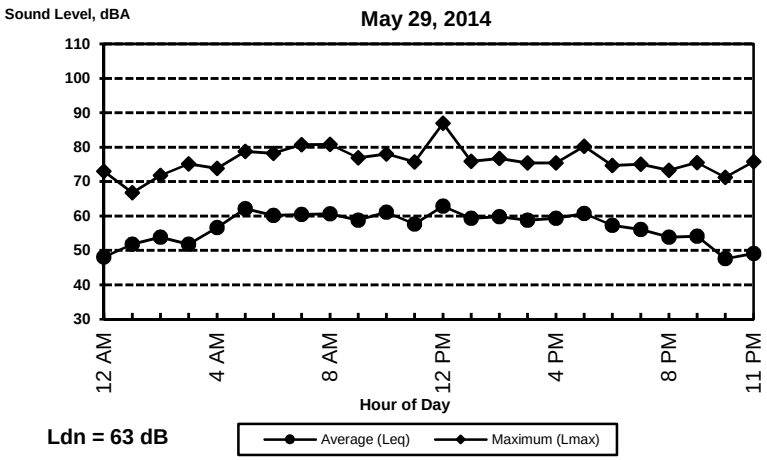
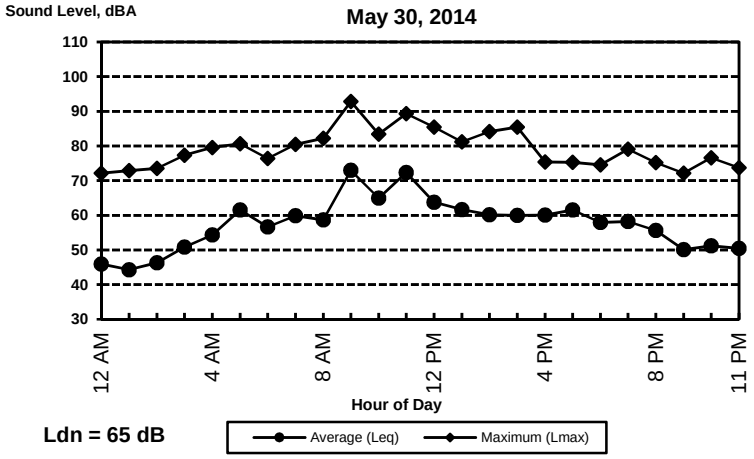
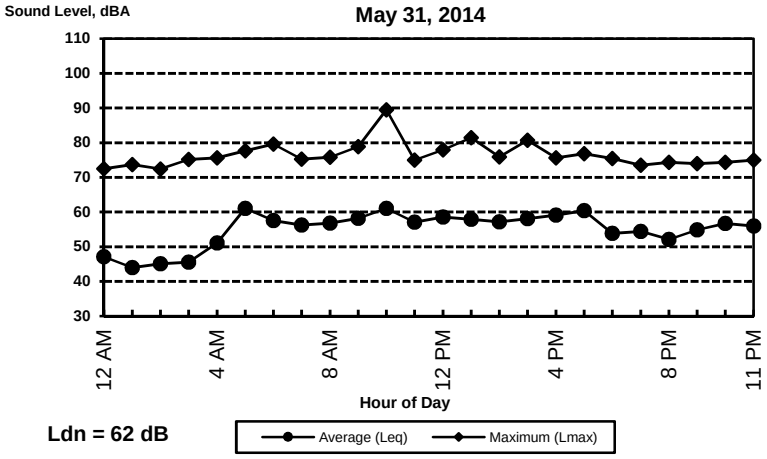
Appendix B-3
Teichert Shifler Mining and Reclamation Project in Woodland
Site C: Western Site Boundary



Ldn = 63 dB



Ldn = 65 dB



Ldn = 62 dB

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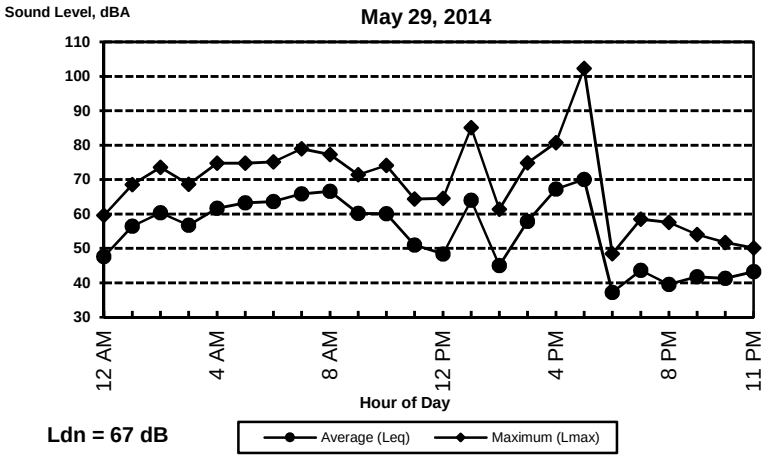
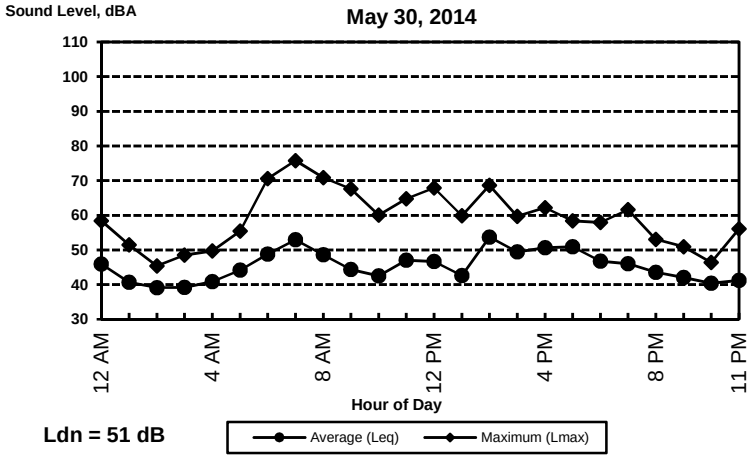
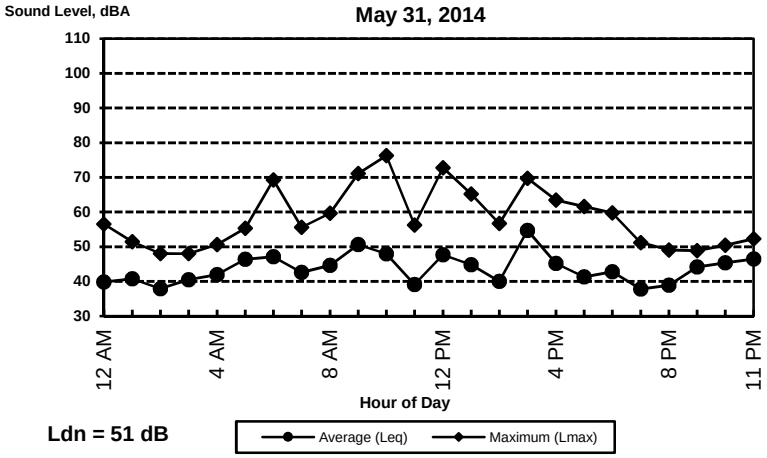
Appendix B-4
Teichert Shifler Mining and Reclamation Project in Woodland
Site D: Northern Site Boundary



Ldn = 67 dB



Ldn = 51 dB



Ldn = 51 dB

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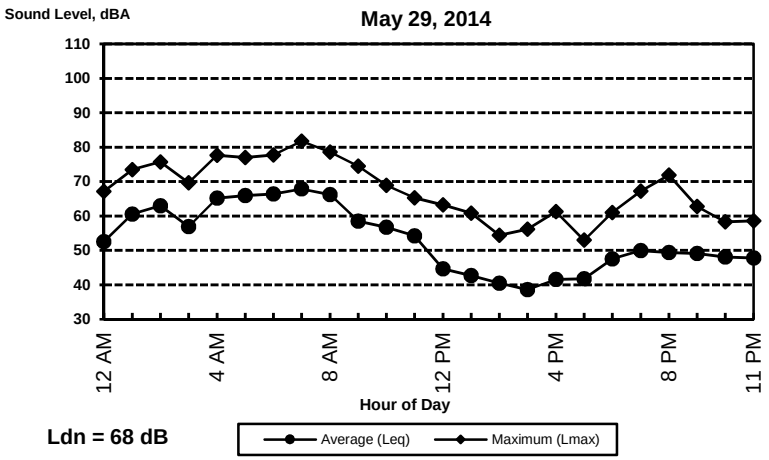
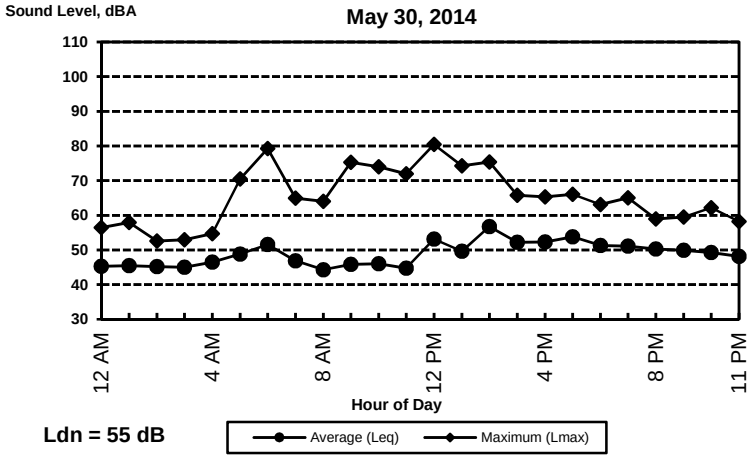
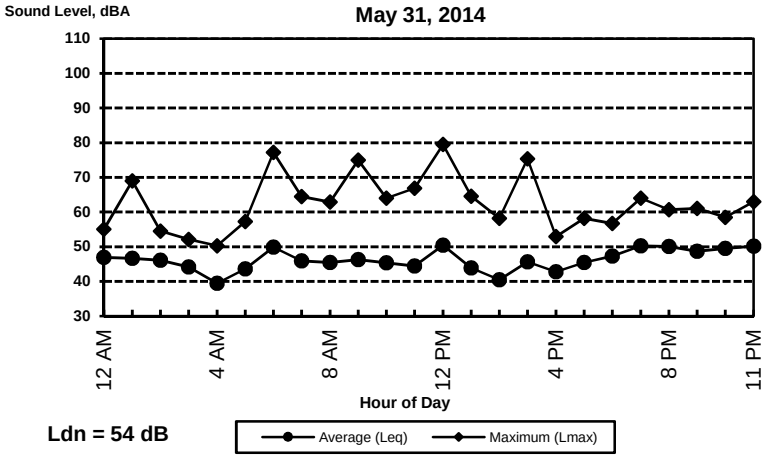
Appendix B-5
Teichert Shifler Mining and Reclamation Project in Woodland
Site E: Eastern Site Boundary



Ldn = 68 dB



Ldn = 55 dB



Ldn = 54 dB

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Appendix C-1
FHWA Highway Traffic Noise Prediction Model Inputs
Teichert Shifler Project
Scenario: Existing without Teichert Truck Trips

#	Roadway	Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	County Road 20	Woodland entrance to CR 96	142	80	20	2	2	55	100
2	County Road 20	CR 96 to CR 98	2,134	80	20	2	2	55	50
3	County Road 98	I-5 to CR 20	4,159	80	20	2	2	55	50
4	County Road 96	CR 20 to SR 16	1,342	80	20	2	2	55	50
5	SR 16	West of I-505	7,500	80	20	3	7	55	50
6	SR 16	I-505 to CR 94B	8,377	80	20	3	7	55	50
7	SR 16	CR 94B to CR 96	9,588	80	20	3	7	55	50

Appendix C-2
FHWA Highway Traffic Noise Prediction Model Inputs
Teichert Shifler Project
Scenario: Baseline 1 Teichert Trucks

#	Roadway	Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	County Road 20	Woodland entrance to CR 96	226	80	20	0	100	40	100
2	County Road 20	CR 96 to CR 98	161	80	20	0	100	50	50
3	County Road 98	I-5 to CR 20	161	80	20	0	100	55	50
4	County Road 96	CR 20 to SR 16	66	80	20	0	100	45	50
5	SR 16	West of I-505	9	80	20	0	100	55	50
6	SR 16	I-505 to CR 94B	66	80	20	0	100	55	50
7	SR 16	CR 94B to CR 96	66	80	20	0	100	55	50

Appendix C-3
FHWA Highway Traffic Noise Prediction Model Inputs
Teichert Shifler Project
Scenario: Baseline 2 Teichert Trucks

#	Roadway	Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	County Road 20	Woodland entrance to CR 96	376	80	20	0	100	40	100
2	County Road 20	CR 96 to CR 98	267	80	20	0	100	50	50
3	County Road 98	I-5 to CR 20	267	80	20	0	100	55	50
4	County Road 96	CR 20 to SR 16	109	80	20	0	100	45	50
5	SR 16	West of I-505	15	80	20	0	100	55	50
6	SR 16	I-505 to CR 94B	109	80	20	0	100	55	50
7	SR 16	CR 94B to CR 96	109	80	20	0	100	55	50

Appendix D-1
FHWA Highway Traffic Noise Prediction Model Inputs
Teichert Shifler Project
Scenario - Cumulative No Teichert Trucks

#	Roadway	Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	County Road 20	Woodland entrance to CR 96	350	80	20	2	2	55	100
2	County Road 20	CR 96 to CR 98	2,750	80	20	2	2	55	50
3	County Road 98	I-5 to CR 20	4,425	80	20	2	2	55	50
4	County Road 96	CR 20 to SR 16	1,850	80	20	2	2	55	50
5	SR 16	West of I-505	12,075	80	20	3	7	55	50
6	SR 16	I-505 to CR 94B	11,650	80	20	3	7	55	50
7	SR 16	CR 94B to CR 96	10,750	80	20	3	7	55	50

Appendix D-2
FHWA Highway Traffic Noise Prediction Model Inputs
Teichert Shifler Project
Scenario: Teichert Trucks @ 2.2 MTPY

#	Roadway	Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	County Road 20	Woodland entrance to CR 96	690	80	20	0	100	40	100
2	County Road 20	CR 96 to CR 98	490	80	20	0	100	50	50
3	County Road 98	I-5 to CR 20	490	80	20	0	100	55	50
4	County Road 96	CR 20 to SR 16	200	80	20	0	100	45	50
5	SR 16	West of I-505	28	80	20	0	100	55	50
6	SR 16	I-505 to CR 94B	200	80	20	0	100	55	50
7	SR 16	CR 94B to CR 96	200	80	20	0	100	55	50

Appendix E

Teichert Shifler - On-Site Equipment Noise

Reference Levels, Distances, and Calculations

Reference Level (dB Leq at 100 feet)		
Scraper	Excavator/Truck	Conveyor
75	**70**	**57**

Receiver	Distance (feet)	Atmospheric Attenuation	Topographic Attenuation			Noise Level (dB Leq)		
			Scrapers	Excavators	Conveyor	Scrapers	Excavator/Truck	Conveyor
1	300	0.5	0	5	5	65	55	42
2	300	0.5	5	10	10	60	50	37
3	600	0.9	0	5	5	59	49	36
4	1500	2.3	0	5	5	49	39	26
5	500	0.8	0	5	5	60	50	37
6	300	0.5	0	5	5	65	55	42
7	1000	1.5	0	5	5	54	44	31

Receiver	**Total Equipment Noise Level (dB Leq)**
1	**65**
2	**60**
3	**59**
4	**50**
5	**61**
6	**65**
7	**54**