Environmental Noise Assessment

99 Houghton General Plan Amendment EIR

Kern County, California

BAC Job # 2008-105

Prepared For:

McIntosh & Associates

c/o Ms. Stacy Luna
2001 Wheelan Court
Bakersfield, California 93309

Prepared By:

Bollard Acoustical Consultants, Inc.

Jason Mirise, Vice President

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BOLLARD
Acoustical Consultants

455 Main Street, Suite 3 ▸ Newcastle, CA 95658 ▸ Phone: (916) 663-0500 ▸ Fax: (916) 663-0501 ▸ BACNOISE.COM

ENVIRONMENTAL SETTING

Project Location and Description

The proposed 99 Houghton General Plan Amendment project (99 Houghton, LLC) is located on the east side of State Route 99 (SR 99), west of South Union Avenue, between Di Giorgio Road (north) and Houghton Road (south), in Kern County, California just south of the City of Bakersfield. The project is within the Metropolitan Bakersfield General Plan area. Please refer to the aerial graphic presented below.

The project proposes General Plan zoning changes for approximately 316 acres of undeveloped Agricultural land to Light Industrial/M-1 (132 acres) and Medium Industrial/M-2 (184 acres). Presently, there are no specific plans regarding the proposed project.

Acoustical Terminology

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that human hearing can detect. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, or Hertz (Hz). Human hearing is generally capable of detecting sound between 20 Hz and 20,000 Hz.

Our hearing is capable of processing these pressure variations (sound) over an extremely broad dynamic range. Therefore, the measurement of sound directly in terms of pressure would require a very large and awkward range of numbers. The logarithmic treatment of these numbers – converting measured sound pressure (Pa) into sound pressure level (decibels, dB) – was developed primarily to limit the range of numbers. The decibel scale allows for 5 orders of magnitude in sound pressure to be expressed within a range of 100 dB.

The perceived loudness of sound is dependent on 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 the A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way we perceive noise. For this reason, the A-weighted sound level has become a standard tool for environmental noise assessment. All noise levels reported below are A-weighted.

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 used to measure the ambient noise level is the average, or equivalent sound level (L_{eq}), which corresponds to a steady-state, A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The L_{eq} is the foundation for the day/night average level (L_{dn}).

The L_{dn} is based on the average noise level over a continuous 24-hour period, with a +10 dB weighting (penalty) applied to noise occurring during nighttime hours (10 p.m.-7 a.m.). The nighttime penalty is based on the assumption that people react to nighttime noise exposures as if they are twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

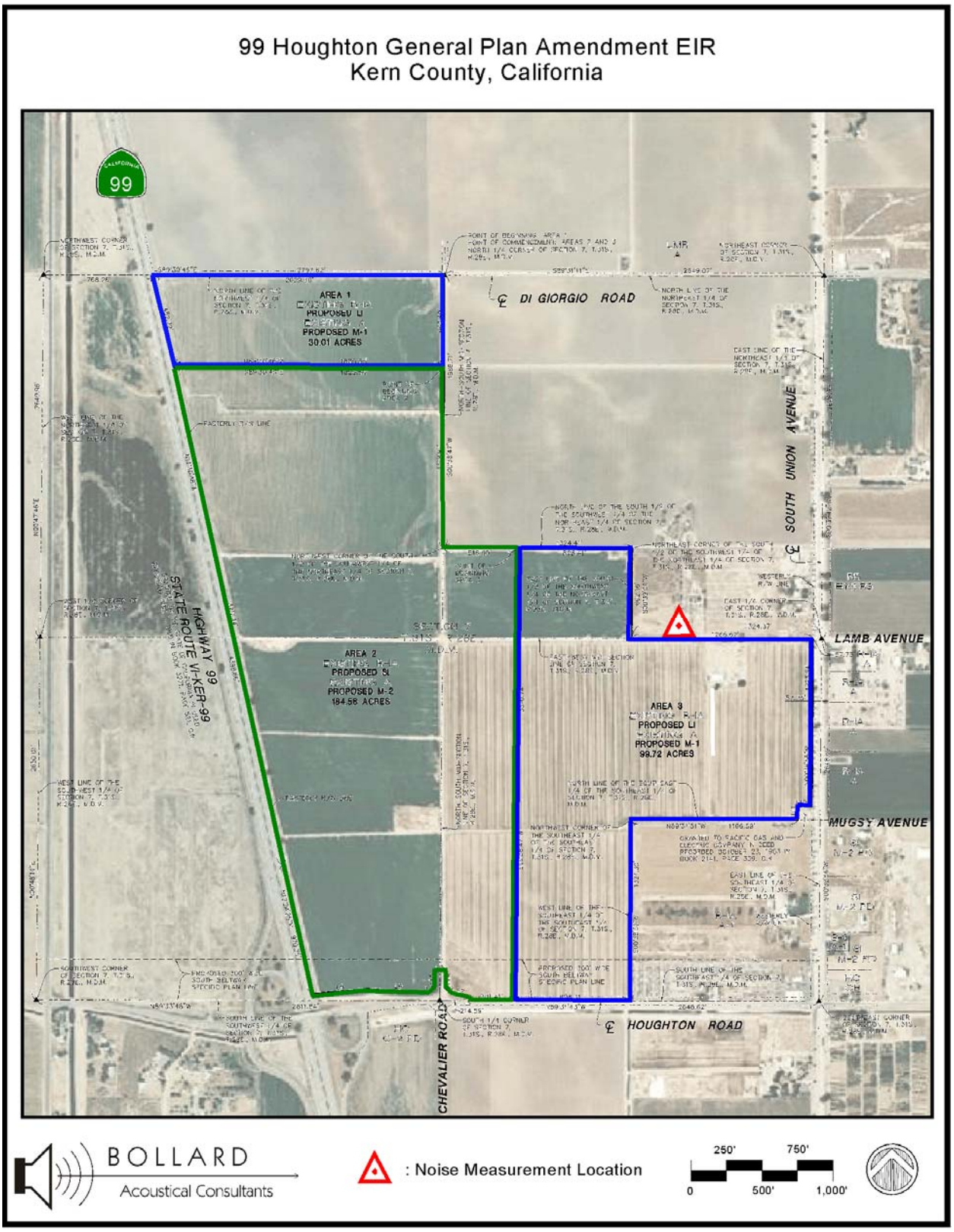
99 Houghton General Plan Amendment EIR
Kern County, California
99
AREA 1
PROPOSED LI
PROPOSED M-1
30.01 ACRES
AREA 2
PROPOSED SI
PROPOSED M-2
184.58 ACRES
AREA 3
PROPOSED LI
PROPOSED M-1
99.72 ACRES
DI GIORGIO ROAD
SOUTH UNION AVENUE
LAMB AVENUE
MUGGY AVENUE
HIGHWAY 99
STATE ROUTE VI-KER-99
CHEVALIER ROAD
HOUGHTON ROAD
BOLLARD
Acoustical Consultants
: Noise Measurement Location
250'
750'
0
500'
1,000'

Table 1 provides definitions of acoustical terminology relevant to this study.

Table 1

Acoustical Terminology

Acoustics	The science (or physics) of sound.
Ambient Noise	The distinctive acoustical characteristics of a given environment consisting of all noise sources audible at a given 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 noise.
A-Weighting	A frequency-response filter that conditions a given sound signal to approximate human response.
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 (10 p.m.-7 a.m.) weighted by a factor of 10 prior to averaging.
Decibel or dB	A Bel 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 Bel.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
L_{dn}	Day/Night Average Level. Similar to CNEL but with no evening weighting. The hours of 7-10 p.m. are considered daytime.
L_{eq}	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square (RMS) sound level measured over a given period of time.
L_n	The measured sound pressure level exceeded (n) percent of the time.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB at 1,000 Hz for persons with good hearing.
SEL	A single-number rating indicating the total energy of a discrete noise event compressed into a 1-second time duration.

Existing Land Uses in the Project Vicinity

The project site is currently zoned for Exclusive Agriculture uses. The project site is bordered to the north, south, and east by agricultural, commercial/light industrial, and rural residential uses; and to the west by SR 99. Please see the graphic presented above.

Known noise-sensitive land uses in the immediate project vicinity include existing single-family residences to the north/east and east of the project property. These uses may be affected by increased project-related traffic noise on local area roadways and on-site noise sources.

Existing Ambient Noise Environment

The existing ambient noise environment in the immediate project vicinity is defined primarily by SR 99 traffic, local traffic, and commercial/light industrial operations. To quantify the existing ambient noise environment in the project vicinity, a 24-hour ambient noise level measurement survey was completed at the closest residential property to the project site on December 18-19, 2008. Ambient noise levels were recorded in the front yard of the residence at 12063 South Union Avenue (future extension of Lamb Avenue), as shown in the graphic above.

A Larson-Davis Laboratories (LDL) Model 820 precision integrating sound level meter equipped with an LDL Model 2560 ½" microphone was used for the noise level measurement survey. The meter was calibrated before use with an LDL Model CAL200 acoustical calibrator to ensure measurement accuracy. The equipment used meets all pertinent specifications of the American National Standards Institute (ANSI) for Type 1 (precision) sound level meters (ANSI S1.4).

Existing ambient noise exposure at the closest residential uses to the project site was measured to be approximately 63 dB L_{dn}, with daytime (7 a.m.-10 p.m.) and nighttime (10 p.m.-7 a.m.) hourly-average noise exposure (Hourly L_{eq}) of approximately 51 dB and 58 dB, respectively. It is assumed that relatively high nighttime noise exposure was caused by heavy truck traffic in the area (5-7 a.m.). Currently, the ambient noise exposure at residential uses in the project area does not exceed the County's 65 dB L_{dn} exterior noise exposure criterion.

Existing Roadway Traffic Noise

The Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used to predict existing noise levels due to traffic in the project vicinity. The Model is based on 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 project site. The Model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. A day/night traffic distribution of 83%/17% was factored into the Model calculations to estimate 24-hour average noise exposure (L_{dn}). Other modeling assumptions included medium/heavy truck split of 2%/1% for most studied roadways (higher percentages for collector and arterial roadways); and traffic speeds of 35, 45, and 65 MPH for local, collector, and arterial (highway) roadways. Traffic volumes for existing conditions were obtained from McIntosh & Associates (January 2009).

Table 2 shows the existing traffic noise levels in terms of L_{dn} at a reference distance of 100 feet from the centerlines of existing project-area roadways. This is considered to be the "baseline" condition. The table also includes the distances to existing traffic noise contours.

Table 2

Existing Traffic Noise Levels and Contour Distances
99 Houghton, LLC – Kern County, California

Roadway	Segment	L_{dn} (dB) @ 100 Feet	Distance (feet) 70 dB L_{dn}	65 dB L_{dn}	60 dB L_{dn}
Panama Lane	West of South H Street	68	78	169	364
	South H Street to South Union Avenue	65	48	103	222
	South Union Avenue to Cottonwood Road	64	39	84	180
	East of Cottonwood Road	64	39	84	180
Hosking Avenue	West of South H Street	54	9	20	42
	South H Street to South Union Avenue	54	9	19	40
	South Union Avenue to Cottonwood Road	40	1	2	5
Taft Highway/SR 119/East Panama Road	West of Wible Road	63	35	75	163
	Wible Road to SR 99 SB Off Ramp	65	45	97	209
	SR 99 SB Off Ramp to South H Street	66	57	122	262
	South H Street to South Union Avenue	69	84	180	388
	South Union Avenue to Cottonwood Road	68	76	163	351
	East of Cottonwood Road	68	73	158	340
Curnow Road (East of SR 99)	West of South Union Avenue	45	2	5	10
	South Union Avenue to Cottonwood Road	40	1	2	5
DiGiorgio Road	Chevalier Road to South Union Avenue	n/a	n/a	n/a	n/a
	South Union Avenue to Cottonwood Road	33	0	1	2
	East of Cottonwood Road	47	3	6	13
Lamb Avenue	Chevalier Road to South Union Avenue	n/a	n/a	n/a	n/a
	East of South Union Avenue	n/a	n/a	n/a	n/a
Mugsy Avenue	West of South Union Avenue	n/a	n/a	n/a	n/a
	East of South Union Avenue	n/a	n/a	n/a	n/a
Houghton Road/Buena Vista Boulevard	West of Stine Road	60	23	49	106
	Stine Road to Wible Road	58	15	33	72
	Wible Road to South H Street	56	12	26	57
	South H Street to SR 99 SB On/Off Ramps/Costajo Street	58	16	36	77
	SR 99 SB On/Off Ramps to SR 99 NB On/Off Ramps	62	30	65	139
	SR 99 NB On/Off Ramps to Project Entrance #4	64	43	92	199
	Project Entrance #4 to Chevalier Road	64	43	92	199
	Chevalier Road to Project Entrance #3	64	43	92	199
	Project Entrance #3 to South Union Avenue	64	43	92	199
	South Union Avenue to Cottonwood Road	64	43	92	199
	Cottonwood Road to Adobe Road	65	43	94	202
	East of Adobe Road	65	43	94	202

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Existing Traffic Noise Levels and Contour Distances
99 Houghton, LLC – Kern County, California

Roadway	Segment	L_{dn} (dB) @ 100 Feet	Distance (feet) 70 dB L_{dn}	65 dB L_{dn}	60 dB L_{dn}
Shafter Road	Chevalier Road to South Union Avenue	n/a	n/a	n/a	n/a
	East of South Union Avenue	30	0	0	1
Kaiser Lane	Chevalier Road to South Union Avenue	n/a	n/a	n/a	n/a
Bear Mountain Boulevard/SR 223	West of Costajo Street	60	20	44	94
	Costajo Street to SR 99 NB On/Off Ramp	60	20	44	94
	SR 99 NB On/Off Ramp to South Union Avenue	69	89	193	415
	East of South Union Avenue	69	90	195	419
Stine Road	North of Houghton Road	45	2	5	10
	South of Houghton Road	45	2	5	10
Wible Road	North of Taft Highway/SR 119	54	8	18	38
	Taft Highway/SR 119 to Houghton Road	52	7	14	30
	South of Houghton Road	50	5	10	22
South H Street	North of Panama Lane	61	24	53	113
	Panama Lane to Hosking Avenue	62	30	64	138
	Hosking Avenue to Taft Highway/SR 119	57	14	30	64
	Taft Highway/SR 119 to SR 99 NB Off Ramp	53	8	17	37
	SR 99 NB Off Ramp to Curnow Road (East)	45	2	5	10
	Curnow Road (West) to Houghton Road	46	3	6	13
	South of Houghton Road	45	2	5	10
Chevalier Road	DiGiorgio Road to Lamb Avenue/Project Entrance #1	n/a	n/a	n/a	n/a
	Lamb Avenue to Houghton Road	n/a	n/a	n/a	n/a
	Houghton Road to Shafter Road	40	1	2	5
	Shafter Road to Kaiser Lane	40	1	2	5
South Union Avenue/SR 99 Business	North of Panama Lane	69	89	192	413
	Panama Lane to Hosking Avenue	67	62	134	290
	Hosking Avenue to Taft Highway/SR 119/East Panama Road	64	42	91	196
	Taft Highway/SR 119/East Panama Road to Curnow Road	60	23	49	106
	Curnow Road to DiGiorgio Road	60	20	44	94
	DiGiorgio Road to Lamb Avenue	59	19	42	90
	Lamb Avenue to Project Entrance #2	59	18	40	86
	Project Entrance #2 to Mugsy Avenue	52	6	13	27
	Mugsy Avenue to Houghton Road/Buena Vista Boulevard	52	6	13	27
	Houghton Road/Buena Vista Boulevard to Shafter Road	50	5	11	23

Table 2

Existing Traffic Noise Levels and Contour Distances
99 Houghton, LLC – Kern County, California

Roadway	Segment	L_{dn} (dB) @ 100 Feet	Distance (feet) 70 dB L_{dn}	65 dB L_{dn}	60 dB L_{dn}
	Shafter Road to Kaiser Lane	49	4	9	20
	Kaiser Lane to Bear Mountain Boulevard/SR 223	49	4	9	20
	South of Bear Mountain Boulevard/SR 223	47	3	7	15
Cottonwood Road	North of Panama Lane	53	7	16	34
	Panama Lane to Hosking Avenue	40	1	2	5
	Hosking Avenue to East Panama Road	40	1	2	5
	East Panama Road to Curnow Road	46	3	6	13
	Curnow Road to DiGiorgio Road	46	3	6	13
	DiGiorgio Road to Buena Vista Boulevard	36	1	1	3
Adobe Road	North of Buena Vista Boulevard	n/a	n/a	n/a	n/a
	South of Buena Vista Boulevard	40	1	2	5

Sources: FHWA-RD-77-108, McIntosh & Associates (January 2009), and Bollard Acoustical Consultants, Inc.

REGULATORY SETTING

In order to limit population exposure to physically and/or psychologically damaging noise levels, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. The Metropolitan Bakersfield General Plan Noise Element and CEQA provide regulations regarding noise exposure relevant to the proposed project. The following provides a general overview of the existing regulations established by the Metropolitan Bakersfield General Plan and CEQA.

Metropolitan Bakersfield General Plan Noise Element (December 11, 2007)

The Metropolitan Bakersfield General Plan has established land use compatibility criteria for various community land uses. For noise generated by transportation noise sources such as traffic, the Noise Element of the General Plan specifies that residential land uses are compatible with exterior noise levels of up to 60 dB L_{dn} without the need for noise mitigation. The 60 dB L_{dn} noise level is considered an acceptable noise environment for residential outdoor activities. The Plan may allow an exterior noise level of up to 65 dB L_{dn} provided that available exterior noise level reduction measures have been implemented and interior noise levels satisfy the Plan's standard.

An interior noise level criterion of 45 dB L_{dn} is specified in the Noise Element for residential land uses exposed to transportation noise sources. The intent of this interior noise standard is to provide a suitable environment for indoor communication and sleep.

In addition to the L_{dn} criteria discussed above, the Metropolitan Bakersfield General Plan establishes noise level performance criteria applied to non-transportation noise exposure at noise-sensitive uses. These standards are summarized in Table 3.

Table 3

Noise Level Performance Standards – Non-Transportation Noise Sources
Metropolitan Bakersfield General Plan (December 11, 2007)

Noise Level Descriptor	Daytime (7 a.m. – 10 p.m.)	Nighttime (10 p.m. – 7 a.m.)
L_{50}	55	50
L_{25}	60	55
L_{8}	65	60
L_{2}	70	65
L_{max}	75	70

Significance Criteria for Project-Related Noise Level Increases

The potential increase in traffic noise exposure due to the project is a factor in determining significance. Research into the human perception of changes in sound level indicates the following.

- A 3 dB change is barely perceptible,
- A 5 dB change is clearly perceptible, and
- A 10 dB change is perceived as being twice or half as loud.

A limitation of using a single noise level increase value to evaluate noise impacts is that it fails to account for pre-project noise conditions. Table 4 is based on recommendations made in August 1992 by the Federal Interagency Committee on Noise (FICON) to provide guidance in the assessment of changes in ambient noise levels resulting from aircraft operations. The recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been asserted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the L_{dn}. Specifically, they provide good correlation to transportation-related noise sources.

Table 4

Significance of Changes in Cumulative Noise Exposure

Noise Level Without Project (L_{dn})	Increase Required for Significant Impact
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Sources: Federal Interagency Committee on Noise (FICON) and Metropolitan Bakersfield General Plan (December 11, 2007).

An increase in the traffic noise levels becomes more significant as the ambient noise levels increase. For instance, a significant increase in traffic noise levels is expected to be 1.5 dB when the no-project traffic noise levels exceed 65 dB L_{dn}. However, a significant increase in traffic noise levels is expected to be 5 dB when the no-project traffic noise levels are less than 60 dB L_{dn}. In other words, as ambient noise levels increase, a smaller increase in noise resulting from the project is sufficient to cause significant annoyance.

Generally, a project may have a significant impact on the environment if it will substantially increase the ambient noise levels at adjoining areas or expose people to severe noise exposure. In practice, more specific professional standards have been developed, as discussed above. These standards state that a noise impact may be considered significant if it would generate noise that would conflict with local planning criteria.

Additionally, noise impacts associated with the proposed project would be considered significant if they would expose existing noise-sensitive land uses to traffic noise level increases consistent with Table 4.

NOISE IMPACTS ANALYSES

The identified, primary noise-producing elements associated with the project are increased traffic on the local roadway network, project-related traffic on new roadways resulting from the project, and industrial operations associated with the project.

Presently, there are no details regarding future project industrial uses on the project properties. Detailed analyses regarding noise sources associated with these uses may be necessary once specific project information is available.

Project-Related Traffic

To assess noise impacts due to project-related traffic increases on the local roadway network, traffic noise levels were predicted at a representative distance (100 feet from the roadway centerlines) for the 2020, 2020+Project, 2035, and 2035+Project scenarios. The traffic noise levels were predicted using the same modeling methodology used for the Existing scenario described in the Environmental Setting section above. Results of the project-related traffic noise analyses are summarized in Table 5.

Table 5

Predicted Traffic Noise Exposure Levels at 100 Feet from Roadway Centerlines
99 Houghton, LLC – Kern County, California

		L_{dn}, dB (Change, dB)	
Roadway	**Segment**	**2020+Project**	**2035+Project**
Panama Lane	West of South H Street	69 (0)	70 (0)
	South H Street to South Union Avenue	67 (0)	69 (0)
	South Union Avenue to Cottonwood Road	66 (0)	68 (0)
	East of Cottonwood Road	65 (0)	66 (-1)
Hosking Avenue	West of South H Street	58 (-2)	65 (0)
	South H Street to South Union Avenue	57 (-1)	61 (0)
	South Union Avenue to Cottonwood Road	46 (-2)	57 (0)
Taft Highway/SR 119/East Panama Road	West of Wible Road	67 (+1)	69 (0)
	Wible Road to SR 99 SB Off Ramp	68 (+1)	70 (+1)
	SR 99 SB Off Ramp to South H Street	69 (0)	72 (0)
	South H Street to South Union Avenue	70 (0)	71 (0)
	South Union Avenue to Cottonwood Road	70 (0)	70 (0)
	East of Cottonwood Road	69 (0)	70 (0)
Curnow Road (East of SR 99)	West of South Union Avenue	52 (+3)	55 (+1)
	South Union Avenue to Cottonwood Road	40 (0)	43 (0)
DiGiorgio Road	Chevalier Road to South Union Avenue	**47 (n/a)**	**47 (n/a)**
	South Union Avenue to Cottonwood Road	**47 (n/a)**	**48 (+8)**
	East of Cottonwood Road	49 (+4)	**48 (+5)**
Lamb Avenue	Chevalier Road to South Union Avenue	**59 (n/a)**	**59 (n/a)**
	East of South Union Avenue	43 (+3)	46 (+1)
Mugsy Avenue	West of South Union Avenue	58 (n/a)	58 (n/a)
	East of South Union Avenue	33 (n/a)	36 (n/a)
Houghton Road/Buena Vista Boulevard	West of Stine Road	60 (0)	59 (0)
	Stine Road to Wible Road	58 (0)	58 (0)
	Wible Road to South H Street	57 (0)	57 (0)
	South H Street to SR 99 SB On/Off Ramps/Costajo Street	60 (0)	61 (0)
	SR 99 SB On/Off Ramps to SR 99 NB On/Off Ramps	**68 (+5)**	**68 (+4)**
	SR 99 NB On/Off Ramps to Project Entrance #4	**70 (+5)**	**71 (+5)**
	Project Entrance #4 to Chevalier Road	**70 (+5)**	**71 (+5)**
	Chevalier Road to Project Entrance #3	**68 (+3)**	**68 (+2)**
	Project Entrance #3 to South Union Avenue	65 (0)	66 (0)
	South Union Avenue to Cottonwood Road	65 (0)	66 (0)
	Cottonwood Road to Adobe Road	65 (0)	66 (0)
	East of Adobe Road	65 (0)	66 (0)
Shafter Road	Chevalier Road to South Union Avenue	**40 (n/a)**	43 (+3)

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Predicted Traffic Noise Exposure Levels at 100 Feet from Roadway Centerlines
99 Houghton, LLC – Kern County, California

		L_{dn}, dB (Change, dB)	
Roadway	**Segment**	**2020+Project**	**2035+Project**
	East of South Union Avenue	36 (-4)	45 (0)
Kaiser Lane	Chevalier Road to South Union Avenue	**43 (n/a)**	**45 (+5)**
Bear Mountain Boulevard/SR 223	West of Costajo Street	61 (0)	63 (0)
	Costajo Street to SR 99 NB On/Off Ramp	63 (-1)	68 (0)
	SR 99 NB On/Off Ramp to South Union Avenue	70 (0)	71 (0)
	East of South Union Avenue	70 (0)	71 (0)
Stine Road	North of Houghton Road	47 (0)	49 (0)
	South of Houghton Road	48 (0)	50 (0)
Wible Road	North of Taft Highway/SR 119	55 (0)	55 (0)
	Taft Highway/SR 119 to Houghton Road	53 (0)	54 (0)
	South of Houghton Road	52 (0)	53 (0)
South H Street	North of Panama Lane	62 (0)	63 (0)
	Panama Lane to Hosking Avenue	64 (+1)	65 (0)
	Hosking Avenue to Taft Highway/SR 119	60 (0)	63 (0)
	Taft Highway/SR 119 to SR 99 NB Off Ramp	57 (0)	60 (0)
	SR 99 NB Off Ramp to Curnow Road (East)	49 (-2)	56 (0)
	Curnow Road (West) to Houghton Road	46 (0)	46 (+1)
	South of Houghton Road	47 (-1)	51 (0)
Chevalier Road	DiGiorgio Road to Lamb Avenue/Project Entrance #1	**46 (n/a)**	**46 (n/a)**
	Lamb Avenue to Houghton Road	**59 (n/a)**	**59 (n/a)**
	Houghton Road to Shafter Road	**48 (+8)**	**48 (+8)**
	Shafter Road to Kaiser Lane	**46 (+6)**	**46 (+6)**
South Union Avenue/SR 99 Business	North of Panama Lane	72 (+1)	73 (+1)
	Panama Lane to Hosking Avenue	**71 (+2)**	72 (0)
	Hosking Avenue to Taft Highway/SR 119/East Panama Road	**69 (+2)**	**71 (+2)**
	Taft Highway/SR 119/East Panama Road to Curnow Road	**69 (+5)**	**70 (+3)**
	Curnow Road to DiGiorgio Road	**69 (+7)**	**70 (+4)**
	DiGiorgio Road to Lamb Avenue	**69 (+7)**	**70 (+5)**
	Lamb Avenue to Project Entrance #2	**67 (+5)**	**68 (+3)**
	Project Entrance #2 to Mugsy Avenue	**60 (+5)**	61 (+3)
	Mugsy Avenue to Houghton Road/Buena Vista Boulevard	55 (0)	58 (0)
	Houghton Road/Buena Vista Boulevard to Shafter Road	55 (+1)	58 (0)
	Shafter Road to Kaiser Lane	54 (0)	58 (0)
	Kaiser Lane to Bear Mountain Boulevard/SR 223	53 (0)	58 (0)
	South of Bear Mountain Boulevard/SR 223	45 (-7)	55 (-1)

Table 5

Predicted Traffic Noise Exposure Levels at 100 Feet from Roadway Centerlines
99 Houghton, LLC – Kern County, California

		L_{dn}, dB (Change, dB)	
Roadway	**Segment**	**2020+Project**	**2035+Project**
Cottonwood Road	North of Panama Lane	58 (+1)	62 (+1)
	Panama Lane to Hosking Avenue	**54 (+5)**	58 (+2)
	Hosking Avenue to East Panama Road	**54 (+6)**	57 (+3)
	East Panama Road to Curnow Road	46 (0)	46 (0)
	Curnow Road to DiGiorgio Road	47 (+1)	47 (+1)
	DiGiorgio Road to Buena Vista Boulevard	40 (0)	46 (0)
Adobe Road	North of Buena Vista Boulevard	**40 (n/a)**	43 (0)
	South of Buena Vista Boulevard	47 (0)	55 (0)

Source: FHWA-RD-77-108, McIntosh & Associates, and Bollard Acoustical Consultants, Inc.

Notes: Values in **bold** represent significant project-related noise level increases. Values in **bold/underline** represent significant project-related noise impacts.

Based on the information presented in Table 5, significant project-related traffic noise exposure would be expected along parts of South Union Avenue, Cottonwood Road, Di Giorgio Road, Chevalier Road, Lamb Avenue, Adobe Road, Shafter Road, and Kaiser Lane in the project vicinity. This is considered in more detail below.

Chevalier Road between Houghton Road and Di Giorgio Road, Di Giorgio Road west of South Union Avenue, and Lamb Ave west of South Union Avenue would be constructed as part of the project. Future (2020 and 2035) traffic noise exposure at the closest existing homes on Lamb Avenue west of South Union Avenue would be approximately 59 dB L_{dn}. This level is below the existing measured ambient noise level of 63 dB L_{dn}, and would not be expected to add significantly to the overall noise environment in the area based on the established significance criteria. There are no current noise-sensitive uses near the future Chevalier Road and Di Giorgio Road on the project site.

On portions of Di Giorgio Road, Chevalier Road, Cottonwood Road, Shafter Road, Kaiser Lane, and Adobe Road, project-related traffic noise exposure increases from their respective roadways would generally be considered significant if not for the existing ambient noise exposure dominated by SR 99. In these cases, existing ambient noise exposure in the project area are assumed to be no less than 53 dB L_{dn} (conservatively 10 dB less than the measured ambient noise exposure near the east side of the project site), and future (2020 and 2035) project-related traffic noise exposures would not be expected to add significantly to the noise environments.

As shown in Table 5, future (2020 and 2025) project-related traffic noise exposure increases would be expected to exceed the applicable significance criterion (+1.5 dB) along sections of Houghton Road and South Union Avenue in the project vicinity. There are no noise sensitive land uses adjacent to Houghton Road between SR 99 and Project Entrance #3, and South Union Avenue between Lamb Avenue and Mugsy Avenue. Therefore, there are no project-related noise impacts along these roadway segments. Significant project-related traffic noise level increases are

assumed along South Union Avenue between Panama Lane and Lamb Avenue where residential uses currently exist.

Project Construction

During the construction phases of the project, noise from building equipment would be expected to add to the noise environment in the immediate project vicinity. Activities involved in construction would likely generate maximum noise levels, as indicated in Table 6, of 77-85 dB at a distance of 50 feet. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours (7 a.m.-6 p.m.). Still, existing residences near the project properties would likely be affected by this noise.

Noise would also be generated during the construction phases by increased truck traffic on local area roadways. A significant project-generated noise source would be truck traffic associated with the transport of heavy materials and equipment to and from the construction site.

Table 6

Construction Equipment Noise Levels at 50 Feet

Type of Equipment	L_{max}, dB	Hourly L_{eq}, dB/% Use
Backhoe	78	74/40%
Concrete Mixer Truck	79	75/40%
Dump Truck	77	73/40%
Front End Loader	79	75/40%
Pneumatic Tools	85	82/50%
Air Compressor	78	74/40%

Source: Roadway Construction Noise Model V 1.0, U.S. Department of Transportation

SPECIFIC IMPACTS AND MITIGATION STATEMENTS

Impact 1: Project-Related Traffic Noise (On-Site)

The project would require the construction of several roadways in the area. Future traffic noise exposure at the closest existing residential uses on Lamb Avenue west of South Union Avenue would be approximately 59 dB L_{dn}. This level does not exceed the measured ambient noise exposure (63 dB L_{dn}) which is dominated by SR 99 traffic, nor would it be expected to significantly increase the noise environment in the project vicinity. *This impact is less than significant.*

Mitigation 1

None required.

Impact 2: Project-Related Traffic Noise (Off-Site)

The project would generate increased traffic on local area roadways. As shown in Table 5, project-related traffic noise levels relative to no-project levels on parts of South Union Avenue may exceed the applicable significance criteria (Table 4). *This impact would be significant.*

Mitigation 2

The following construction may be considered to mitigate project-related traffic noise exposure increases at existing noise-sensitive receiver locations. The construction of property line noise barriers in this instance is not feasible if residences along impacted roadway segments front the roadway and require driveway access.

Evaluation of Rubberized Asphalt Noise Mitigation Measure Effectiveness:

One means of reducing overall traffic-related noise levels would be to install a rubberized asphalt pavement or open gap pavement. Studies conducted for the Sacramento County Department of Environmental Review and Assessment and Transportation Department to determine the noise reduction provided by rubberized asphalt have been completed in recent years. Those studies indicate that the use of rubberized asphalt on Sacramento County roadways appears to have resulted in an average traffic noise level reduction of approximately 4 dB over that provided by conventional asphalt.

The European Commission Green Paper, published in the June 1997 edition of Noise/News International, cites the following on Page 87:

"Low-noise porous road surfaces have been the subject of much research. These porous road surfaces reduce both the generation and propagation of noise by several mechanisms - which can be related to the open structure of the surface layer. Results have shown that the emission noise levels can be reduced from levels generated on equivalent non-porous road surfaces by between 3-5 dB on average; by optimizing the surface design, larger noise reductions are feasible. At present, the cost of porous asphalt surfacing is higher than conventional surfaces (for resurfacing, but for new roads, the cost is minimal), but may drop as contractors gain experience with porous surfaces."

The use of noise-reducing paving materials for the impacted areas appears to be a feasible means of achieving a 3-5 dB decrease in traffic noise and reducing the potential for adverse public reaction to future traffic noise levels on these roadways. *Following mitigation, this impact would be less than significant. If the installation of noise-reducing pavement is not a consideration, then this impact would be significant and unavoidable.*

Impact 3: Project-Related Noise (Industrial Uses)

Noise production due to future project industrial uses may significantly impact nearby existing residential uses on Lamb Avenue west of South Union Avenue. The project-related industrial uses are unknown at this time. *This impact would be potentially significant.*

Mitigation 3

Site-specific acoustical analyses should be completed for industrial uses that would neighbor existing or future residential uses. Mitigation measures required to satisfy the applicable noise exposure performance criteria (Table 3) would be established by these studies. Some industrial uses may not be compatible with the project area and may not be suitable for this project. *Following mitigation, this impact would be less than significant.*

Impact 4: Construction Noise

Activities associated with the project construction would result in elevated noise levels, with maximum noise levels as high as 85 at 50 feet as shown in Table 6. Although these levels would be audible at the nearest existing residences, they would be temporary in nature and would likely occur during normal daytime working hours. *Nonetheless, because construction activities would result in periods of elevated noise levels, this impact would be potentially significant.*

Mitigation 4

To mitigate construction noise impacts, activities should be limited to normal daytime hours (7 a.m.-6 p.m.), and all internal combustion engines should be fitted with factory specified mufflers. Staging areas for heavy construction equipment should be positioned well away from neighboring residential areas.

Implementation of the mitigation measures would reduce this impact to a less than significant level.

This concludes our Environmental Noise Assessment for the 99 Houghton General Plan Amendment EIR project in Kern County, California. Please contact me at (916) 663-0500 or jasonm@bacnoise.com if you have any questions or require additional information.