

# GORDON BRICKEN & ASSOCIATES

ACOUSTICAL and ENERGY ENGINEERS

January 17, 2012

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Prepared by:

Gordon Bricken  
President

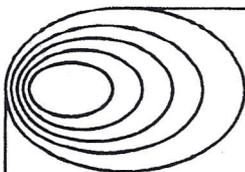
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# GORDON BRICKEN & ASSOCIATES

## ACOUSTICAL and ENERGY ENGINEERS

### S U M M A R Y

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This analysis has been completed to determine the noise exposure and the necessary mitigation measures for the proposed project located on Bundy Canyon Road and Orange Avenue in the City of Wildomar.

A detailed list of recommendations and requirements is given in the following summary. Details are discussed in the body of the report.

#### A. NOISE IMPACTS

The initial development on Parcels 1 and 2 will not exceed the allowed noise limits of the City. Future developments on Parcels 3 through 7 may or may not exceed the allowed limits depending on the density of development and the types of uses. Mitigation measures are feasible to produce compliance with the City's regulations on Parcels 3 through 7.

#### B. PROPOSED MITIGATION PARCELS 1 AND 2

The following list of conditions should be attached to the approval for Parcels 1 and 2 because compliance depends on adherence to the assumptions of the analysis:

1. Select air conditioning units with a rating of SR = 8.0, or less. Alternatively, if higher ratings are to be used, submit the roof mechanical plans to the acoustical engineer for a determination of compliance.
2. Refrigeration equipment should not exceed 68 dBA at 10 feet as installed.

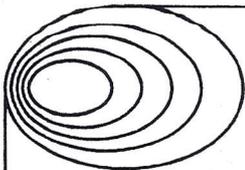
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3. Buildings may have up to five combinations of air conditioning and refrigeration units.
4. Mechanical equipment should be roof mounted.
5. Erect building parapets around buildings.
6. Trash compactors will be located so that a building shields the equipment from residential areas.
7. Parcels 1 and 2 should be revisited for acoustical compliance when final development plans are available.

C. PROPOSED MITIGATION REMAINDER PARCELS

No specific mitigation can be provided for Parcels 3 through 7. However, mitigation measures that would produce compliance are feasible for any of a variety of possible development options. Parcels 3, 4, 5, 6 and 7 should be the subject of an acoustical study when development plans are available.



# GORDON BRICKEN & ASSOCIATES

## ACOUSTICAL and ENERGY ENGINEERS

### 1.0 INTRODUCTION

This report presents the results of a noise impact and design study of the proposed Bundy Canyon project located on Bundy Canyon Road in the City of Wildomar. The site is at the southeast corner of Bundy Canyon Road and Orange Avenue. The north boundary is Bundy Canyon Road. The west boundary is Orange Avenue. The south boundary of the entire parcel is a point about 850 feet south of the center line of Bundy Canyon Road. That boundary is about 115 feet north of Canyon Drive. The east boundary is the I-15 on ramp. Included in this report is a discussion of the expected community noise environment and the recommendations for control of noise.

A vicinity map showing the general location of the shopping center is presented on Exhibit 1 -- Site Location Map. The site plan is shown on Exhibit 2. Exhibit 3 is an aerial view of the site.

The proposed site consists of seven parcels at the present time. The northern two parcels are proposed to be developed in the near term. Parcel 1 contains a building which will likely be a convenience store with gas service islands. The building nearest the freeway on-ramp is to be a fast food store which is on Parcel 2. It will have a drive-thru pickup lane. There are no existing buildings on the site at the present time. This analysis is primarily concerned with the impact on the residential land uses that are located to the south and west of the site. Some general observations will be made regarding the undeveloped portion of the parcel map. However, specific comments will require further analysis.

The following Exhibits detail the present uses around the site:

Exhibit 4 -- The upper view is looking southeast across the site from the intersection of Orange Avenue and Bundy Canyon Drive. The lower photo is the view looking north along Orange Avenue from the intersection of Orange Avenue and Canyon Drive.

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Exhibit 5 -- The upper photo is the view along Canyon Drive. The lower view is the freeway on-ramp along the east side of the project.

Exhibit 6 -- The photo is a view looking northeast across the site from the intersection of Orange Avenue and Canyon Drive.

An ARCO station is across Bundy Canyon Drive to the north.

2.0 APPLICABLE NOISE CRITERIA

The City of Wildomar is brand new having previously been subject to the regulations of the County of Riverside. It is presumed that the County noise regulations will be continued until such time as the City chooses to change them. The two applicable regulations, are:

1. The Land Use Code, and
2. The Noise Ordinance.

The land use code chart is depicted on Exhibit 7. Residential uses are usually acceptable as long as the exterior levels do not exceed 65 dBA CNEL. Commercial uses are acceptable provided the exterior noise levels do not exceed 70 dBA CNEL. The CNEL measure is a type of 24 hour average sound level. An explanation of the CNEL term is contained in Appendix 1.

Generally, the Land Use standard is applied to the site development which, in this case, would be commercial. However, land use criteria could be used to examine the impact the project has on the off-site land uses. The land use criteria requires that the proposed use not produce noise emissions exceeding 65 dBA CNEL on residential uses, which is the primary focus of the analysis.

The County Noise Ordinance, as adopted by the City, also governs the proposed site. However, the terms are based on the conditions that occur each hour in any 10 minute period. The terms of the Ordinance are given in Table 1.

TABLE 1

RESIDENTIAL NOISE LIMITS (1)

EXTERIOR	65 dbA Leq in any 10 minute period
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(1) Leq is the abbreviation for the average noise level.

### 3.0 EXISTING NOISE LEVELS

Measurements were conducted at two locations. One location was at 50 feet from the center line of Orange Avenue. The other location was 80 feet from the center line of Bundy Canyon Drive. The measurement charts are shown on Exhibits 8 and 9.

The average noise levels are given in Table 2.

TABLE 2  
MEASURED NOISE LEVELS

<u>POSITION</u>	<u>DESCRIPTION</u>	<u>AVERAGE LEVEL (Leq)</u>
#1	50' from center line of Orange Ave.	58
#2	80' from center line of Bundy Canyon Drive	55

Ten minute traffic counts were taken during the measurement period. The results of those counts are listed in Table 3.

TABLE 3  
OBSERVED TRAFFIC COUNTS<sup>(1)</sup>

	<u>AUTOS</u>	<u>MEDIUM TRUCKS</u>	<u>HEAVY TRUCKS</u>	<u>TOTAL</u>
<u>TEN MINUTES</u>				
Orange	46	0	0	46
Bundy Canyon	125	0	1	126
<u>HOURLY EQUIVALENT</u>				
Orange	276	0	0	276
Bundy Canyon	750	0	6	756
<u>PERCENTAGE</u>				
Orange	100.0	0.0	0.0	100.0
Bundy Canyon	99.2	0.0	0.8	100.0

(1) Estimated average speeds were 35 miles per hour.

The primary function of the measurements is to calibrate the Noise Model (FHWA RD-77-108) used to compute the CNEL data.

The model relies on the acoustical metric of the Average Noise Level (Leq). By taking the traffic count during the measurement, calculating the Leq value for that sample, and comparing it to the measured sample, it is possible to calibrate the CNEL model for any factors which are present and not adequately identified in the prediction equations.

The computer print-outs are contained in Appendix 2. The calculated and measured levels are compared in Table 4.

TABLE 4

COMPARISON OF CALCULATED AND MEASURED  
AVERAGE NOISE LEVELS FOR STREETS

	<u>ORANGE</u>	<u>BUNDY CANYON</u>
Calculated	59	62
Measured	58	62
DIFFERENCE	- 1	0

The calculated and measured values are within reasonable tolerance. Therefore, no corrections need be applied to the CNEL calculations. The 10 minute Leq values in Table 3 may be taken to be the existing 10 minute Leq ambient. There was no measurement for Canyon Drive but the levels can be taken to be similar to Orange Avenue.

4.0 FUTURE TRAFFIC NOISE LEVELS

The County of Riverside has a traffic model for predicting future traffic noise levels based on volume forecasts by the County Road Department. The Road Department volume model data is contained in Appendix 3. The County's Circulation Element defines Bundy Canyon Drive as an Arterial. There is no designation for Orange Avenue meaning it is, at most, a collector. Canyon Drive is a local street and the 24 hour level of 5,000 cars has been assigned. The County's Health Department provides a daily distribution model for use in calculating CNEL values. The models are given in Tables 5 and 6 on the following page.

TABLE 5

TRAFFIC INPUT DATA -- COLLECTOR/LOCAL

	<u>% DAY</u>	<u>% EVENING</u>	<u>% NIGHT</u>
Autos	73.60	13.60	10.22
Medium Trucks	0.90	0.04	0.90
Heavy Trucks	0.35	0.04	0.35
Volume =	12,000 for Orange Avenue 5,000 for Canyon Drive		
Speed =	40 MPH		

TABLE 6

TRAFFIC INPUT DATA -- ARTERIAL

	<u>% DAY</u>	<u>% EVENING</u>	<u>% NIGHT</u>
Autos	69.50	12.90	9.60
Medium Trucks	1.44	0.06	1.50
Heavy Trucks	2.40	0.10	2.50
Volume =	24,000 ADT for Bundy Canyon		
Speed =	40 Mph		

The calculations are contained in Appendix 4. The results are given in Table 7.

TABLE 7

FUTURE NOISE LEVELS AT 50 FEET  
FROM THE CENTER LINE

<u>ROADWAY</u>	<u>LEQ</u>	<u>CNEL</u>
Bundy Canyon Drive	70	76
Orange Avenue	64	68
Canyon Drive	61	64

The Orange Avenue and Canyon Drive values are the most relevant since residential uses exists along the streets.

## 5.0 REFERENCE NOISE LEVELS

### 5.1 NOISE SOURCES

There are four sources of noise as follows:

1. Fast food operations
2. Parking
3. Moving trucks
4. Mechanical equipment

### 5.2 FAST FOOD OPERATIONS

The Leq metric noise level requires knowing the time of day and the period of time in which the source operates. The typical fast food store will open at 6:00 A.M. and close at 1:00 A.M. Some operate 24 hours, but the assumption here is that this will not occur. There are basically three types of noise sources, the cars in the parking lot, the rooftop equipment and the speaker board.

The speaker board levels are taken from measurements at typical fast food locations. The average level from a sample of a typical sequence of events at a speaker board as measured at 10 feet is 62 dBA. If this level were to occur 19 hours, the effective CNEL level would be 66 dBA CNEL.

The parking lot contains a series of individual events which occur at different levels for different durations. These are given in Tables 8 and 9 on the following page.

TABLE 8

CNEL PARKING LOT SOUND LEVELS AT 10 FEET<sup>(1)</sup>

<u>SOURCE</u>	<u>REF. LEVEL</u>	<u>TIME PER CAR</u>	<u>TIME PER HOUR</u>	<u>HOURS PER DAY</u>	<u>ADJUST</u>	<u>CNEL</u>
Start Car	71	3	45	19	- 9	58
Door Slam	66	4	60	19	- 7	55
Radio	70	20	900	19	- 4	66
Verbal	55	20	900	19	- 4	51
Alarm arming	83	2	30	19	- 10	65
TOTAL						71

- (1) a. All calculations are based on cars/hour/space in 5 spaces.  
 b. Project operates 24 hours per day.  
 c. Time/car and time/hour in seconds.  
 d. Reference level rated at ten feet.  
 e. Hours assumed from 6:00 A.M. to 1:00 A.M.

TABLE 9

LEQ 10 MINUTE PARKING LEVELS AT 10 FEET<sup>(1)</sup>

<u>SOURCE</u>	<u>REF. LEVEL</u>	<u>TIME PER CAR</u>	<u>10 MIN TIME</u>	<u>LEQ</u>
Start Car	71	3	15	55
Door Slam	66	4	20	51
Radio	70	20	100	55
Verbal	55	20	100	40
Alarm arming	83	2	10	65
TOTAL				66

- (1) a. All calculations are based on cars/hour/space in 5 spaces.  
 b. Time interval 10 minutes.  
 c. Time/car in seconds.  
 d. Reference level rated at ten feet.  
 e. Hours assumed from 6:00 A.M. to 1:00 A.M.

The rooftop equipment noise ratings have not been specified. For calculation purposes, the air conditioning units were rated at 8.0 Bels with a 6 dBA increase for installation. This is equivalent to 68 dBA at ten feet per unit. The refrigeration equipment is also assumed at 68 dBA at ten feet. All units are assumed to run 19 hours a day.

The fast food store will be equipped usually with three air conditioning units and two refrigeration

units for a total of five units. The composite level will be 75 dBA Leq at 10 feet and 79 dBA CNEL.

### 5.3 CONVENIENCE STORE

The issues with the convenience store are the same as for the fast food operations with the exception of the speaker board. All the levels listed in Tables 8 and 9 will still apply. However, the mechanical equipment may vary from the fast food operations

The convenience store also has a gas filling island. The operation should service up to 60 cars an hour, or typically ten per any ten minute period. This would mean that the CNEL and Leq levels would be double the values in Tables 8 and 9, or three (3) dBA higher. The CNEL value would be 74 dBA CNEL at 10 feet and the 10 minute average level would be 69 dBA at 10 feet.

### 5.4 GENERAL PARKING

Tables 8 and 9 were based on five cars at one interval. The parking calculations was intended to apply to that which was related directly to the two stores. Also, there are additional parking spaces on the property which might be described as general parking. The plan shows 24 spaces around the convenience store and 64 spaces around the fast food store. The convenience store spaces will turn over fairly quickly. It was assumed that the 24 spaces would change every 10 minutes. The aggregate CNEL level in any 24 hour period would be three (3) times that listed in Table 8, or 76 dBA CNEL at 10 feet. The aggregate 10 minute average level would also be three times that in Table 9, or 71 dBA Leq. Note three times is equivalent to five (5) dBA.

The fast food general parking is going to turn over about once per hour, or the equivalent of 16 percent turn over on average per space every 10 minute period. The CNEL value for 64 spaces would be 10 dBA higher than listed in Table 8, or 81 dBA CNEL at 10 feet. The average noise level in any ten minute period would be four dBA higher than the level listed in Table 9, or 70 dBA Leq.

## 5.5 SUMMARY

All the recurring levels by category are given in Table 10.

TABLE 10

### REFERENCE LEVEL SUMMARY

<u>CATEGORY</u>	<u>LEQ LEVEL</u>	<u>CNEL LEVEL</u>
Speaker Board	62 @ 10'	66 @ 10'
Fast Food Parking	66 @ 10'	71 @ 10'
Convenience Parking	57 @ 10'	71 @ 10'
Convenience Gas	69 @ 10'	74 @ 10'
Fast Food Mechanical	75 @ 10'	79 @ 10'
Convenience Mechanical	75 @ 10'	79 @ 10'
Fast Food General Parking	71 @ 10'	69 @ 10'
Convenience General Parking	71 @ 10'	76 @ 10'

## 6.0 DESIGN NOISE LEVELS NORTH PARCEL

### 6.1 GENERAL OBSERVATIONS

The north parcel is the one with the development shown on the site plan on Exhibit 2. The values in Table 10 represent conditions that would apply if all the sources were aggregated in one location. In practice, this is not the case. However, from a noise perspective, the nearest sensitive locations are at distances that the source distance to these receivers is so similar that they can be treated as if they were aggregated in one location. The values will be based on that model. Only north, west and south directions are considered. The east direction is the freeway.

### 6.2 NORTH SIDE

All sources will be aggregated as if the center is at the center of the buildings. The fast food distance is 170 feet. The convenience store is 270 feet. The levels are given in Table 11 on the following page.

TABLE 11NORTH SIDE LEVEL SUMMARY<sup>(1)</sup>

<u>CATEGORY</u>	<u>LEQ LEVEL</u>	<u>CNEL LEVEL</u>
Speaker board	37	41
Fast Food Parking	41	46
Convenience Parking	29	42
Convenience Gas	40	45
Fast Food Mechanical	50	54
Convenience Mechanical	46	50
Fast Food General Parking	46	44
Convenience General Parking	42	47
TOTAL	56	58

- (1) a. Fast food store distance is 170 feet.  
Convenience Store is 270 feet.
- b. Distance corrections based on six (6) dB per doubling of distance. Actual levels may be lower due to ground absorption losses.

6.3 WEST SIDE

All sources will be aggregated as if the center is at the center of the buildings. The fast food distance is 390 feet. The convenience store is 170 feet. The levels are given in Table 12.

TABLE 12WEST SIDE LEVEL SUMMARY<sup>(1)</sup>

<u>CATEGORY</u>	<u>LEQ LEVEL</u>	<u>CNEL LEVEL</u>
Speaker Board	30	34
Fast Food Parking	34	39
Convenience Parking	32	46
Convenience Gas	44	44
Fast Food Mechanical	43	47
Convenience Mechanical	50	54
Fast Food General Parking	46	44
Convenience General Parking	39	44
TOTAL	53	57

- (1) a. Fast Food Store is 390 feet.  
Convenience store is 170 feet.
- b. Distance corrections based on six (6) dB per doubling of distance. Actual levels may be lower due to ground absorption losses.

The existing noise levels at the houses across Orange Avenue are 58 dBA Leq (10 minutes) and 62 dBA CNEL. These levels are higher than would be produced by the project at 53 dBA Leq (10 minutes) and 57 dBA CNEL. Future noise levels from Orange Avenue will be even higher. It may be concluded that the existing and future traffic levels on Orange Avenue will exceed the noise levels from the project.

6.4 SOUTH SIDE

All sources will be aggregated as if the center is at the center of the buildings. The fast food distance is 741 feet. The convenience store is 650 feet. The levels are given in Table 13.

TABLE 13

SOUTH SIDE LEVEL SUMMARY<sup>(1)</sup>

<u>CATEGORY</u>	<u>LEQ LEVEL</u>	<u>CNEL LEVEL</u>
Speaker Board	25	29
Fast Food Parking	29	34
Convenience Parking	21	35
Convenience Gas	33	38
Fast Food Mechanical	38	42
Convenience Mechanical	34	43
Fast Food General Parking	34	32
Convenience General Parking	35	40
TOTAL	44	48

- (1) a. Fast food Store is 741 feet.  
Convenience store is 650 feet.
- b. Distance corrections based on six (6) dB per doubling of distance. Actual levels may be lower due to ground absorption losses.
- c. The values are those at Canyon Drive.

The traffic levels on Canyon Drive would be expected to exceed the project's development levels on Parcels 1 and 2.

## 7.0 DESIGN LEVELS PARCEL 7

### 7.1 GENERAL OBSERVATIONS

The remainder of the site shows no development plan at the present time, although there is an outline of a possible building and parking lot on Parcel 7. It will be assumed for discussion purposes that something like that outline will occur on that parcel.

### 7.2 MECHANICAL

The Parcel 7 development, should it occur as shown, will have the same features as the convenience store with as many as 48 parking spaces. The store will be assumed to be a multi-tenant space with five units. Each unit would have a single separate mechanical system. The reference level is 68 dbA Leq at 10 feet. This will be 75 dbA Leq and 79 dbA CNEL assuming 24 hour operation.

### 7.3 PARKING

The general parking is assumed to turn over about once per hour, or the equivalent of 16 percent turn over, on average per space every 10 minute period. The CNEL value for 48 spaces would be nine (9) dbA higher than listed in Table 10, or 80 dbA at 10 feet. The average noise level in any ten minute period would be four dbA higher than the level listed in Table 10, or 69 dbA Leq.

### 7.4 SOUTH SIDE

The nearest residential use to the south is an estimated 150 feet from the south parcel property line. The levels are given in Table 14 on the following page.

TABLE 14

PARCEL 7 SOUTH SIDE LEVEL SUMMARY<sup>(1)</sup>

<u>CATEGORY</u>	<u>LEQ LEVEL</u>	<u>CNEL LEVEL</u>
Mechanical	51	55
General Parking	45	56
TOTAL	52	59

- (1) a. Store is 150 feet.  
 b. Distance corrections based on six (6) dB per doubling of distance. The actual levels may be lower due to ground absorption losses.

The levels at Canyon Drive of 52 dBA Leq (10 minutes) and 59 dBA CNEL are lower than the existing and estimated levels from the street traffic.

7.5 WEST SIDE

The west side across Orange Avenue has the values in Table 15.

TABLE 15

PARCEL 7 WEST SIDE LEVEL SUMMARY<sup>(1)</sup>

<u>CATEGORY</u>	<u>LEQ LEVEL</u>	<u>CNEL LEVEL</u>
Mechanical	50	54
General Parking	46	56
TOTAL	51	58

- (1) a. Store is 170 feet.  
 b. Distance corrections based on six (6) dB per doubling of distance. Actual levels may be lower due to ground absorption losses.

The levels of 51 dBA Leq (10 minutes) and 58 dBA CNEL are lower than the existing and future street noise levels.

8.0 OTHER PARCELS

Parcels 3, 4, 5 and 6 show no development or even hints of development as is shown on Parcel 7. Future development could be any of a number of concepts, including big box stores and markets which are considerably different in noise generation than the concepts proposed on Parcels 1, 2 and the

outline on Parcel 7. Therefore, the project should be conditioned to require additional noise studies when the vacant parcels are developed with a specific development plan.

## 9.0 SUMMARY OF RESULTS

Table 16 is a summary of the off-site noise results.

TABLE 16

### SUMMARY OF OFF-SITE NOISE LEVELS<sup>(1)</sup>

<u>PARCELS</u>	<u>SIDE</u>	<u>LEQ</u>	<u>CNEL</u>
1 and 2	North	56	58
	West	53	57
	South	44	48
7	South	52	59
	West	51	58

(1) The Leq listed is the 10 minute value.

The requirement is that the composite levels not exceed 65 dBA Leq for any 10 minutes, or 65 dBA CNEL. Inspection of Table 16 indicates that the criteria are not exceeded. The project will comply with the City's requirements for the design measures employed in the study.

However, certain assumptions have been made that should be spelled out in the event actual designs vary from the assumptions. They are as follows:

1. Select air conditioning units with a rating of SR = 8.0, or less. Alternately, if higher ratings are to be used, submit the roof mechanical plans to the acoustical engineer for a determination of compliance.
2. Refrigeration equipment should not exceed 68 dBA at 10 feet as installed.
3. Buildings may have up to five combinations of air conditioning and refrigeration units.
4. Mechanical equipment should be roof mounted.
5. Erect building parapets around buildings.
6. Trash compactors will be located so that a building shields the equipment from residential areas.

7. Parcels 1 and 2 should be revisited for acoustical compliance when final development plans are available.
8. Parcels 3, 4, 5, 6 and 7 should be the subject of an acoustical study when development plans are available.