

NOISE AND VIBRATION IMPACT ANALYSIS

CENTRAL PLAZA

CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, CALIFORNIA

The logo for LSA, consisting of the letters 'L', 'S', and 'A' in a bold, blue, sans-serif font.

October 2016

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CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, CALIFORNIA

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LIST OF ABBREVIATIONS AND ACRONYMS

μ PA	micropascals
ACEC	American Council of Engineering Companies
ADT	average daily traffic
Caltrans	California Department of Transportation
City	City of Lake Elsinore
CNEL	Community Noise Equivalent Level
County	County of Riverside
dB	decibels
dBA	A-weighted decibels
EPA	United States Environmental Protection Agency
FHWA	Federal Highway Administration
ft	feet
FTA	Federal Transit Administration
ft-lb/blow	foot-pounds per blow
HP	horsepower
HVAC	heating, ventilation, and air-conditioning
I-15	Interstate 15
in/sec	inches per second
kVA	kilovolt-amperes
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous noise level
μ in/sec	microinches per second
PPV	peak particle velocity
RCNM	Roadway Construction Noise Model
RMS	root-mean-square
sf	square feet
State	State of California
VdB	vibration velocity decibels
VMS	variable-message sign

INTRODUCTION

This noise impact analysis has been prepared to evaluate the potential noise impacts and mitigation measures associated with the Central Plaza Project (project) in the City of Lake Elsinore (City), California. This report is intended to satisfy the City's requirement for a project-specific final noise impact analysis by examining the short-term and long-term impacts on and adjacent to the project site and by evaluating the effectiveness of mitigation measures incorporated as part of the project design.

PROJECT DESCRIPTION

Based on the most recent site plan provided, the proposed project consists of 53,469 square feet (sf) of retail uses and 12,334 sf of restaurant uses south of Central Avenue and east of Collier Avenue. Interstate 15 (I-15) is located to the east/northeast of the project site, with its southbound on-ramp located next to the project site.

The project location and conceptual site plan are detailed on Figures 1 and 2, respectively.

EXISTING LAND USES AND GENERAL PLAN DESIGNATION

Existing on-site and adjacent uses are summarized below.

Location	Existing Use
On-site	Undeveloped, with an existing vacant residence along Central Avenue
North	Central Avenue; Commercial
South	Undeveloped
East	I-15; Commercial
West	Collier Road; Industrial

METHODOLOGY RELATED TO NOISE AND VIBRATION IMPACT ASSESSMENT

This evaluation of noise and vibration impacts associated with the proposed project includes the following:

- Determine the short-term construction noise and vibration impacts on off-site sensitive land uses.
- Determine the long-term traffic and stationary source noise and vibration impacts on off-site noise-sensitive uses.
- Determine the long-term traffic noise and vibration impacts on on-site uses.
- Determine the required mitigation measures to reduce short-term and long-term noise and vibration impacts.

This noise and vibration impact analysis utilizes the City's noise standards, including the City's Noise Element of the General Plan and Municipal Code noise control ordinance, and the State's Model



FIGURE 1

LSA



0 400 800
FEET

SOURCE: Bing Aerial, 2015; Riverside County, 2015.

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Central Plaza
Lake Elsinore, California
Regional and Project Location

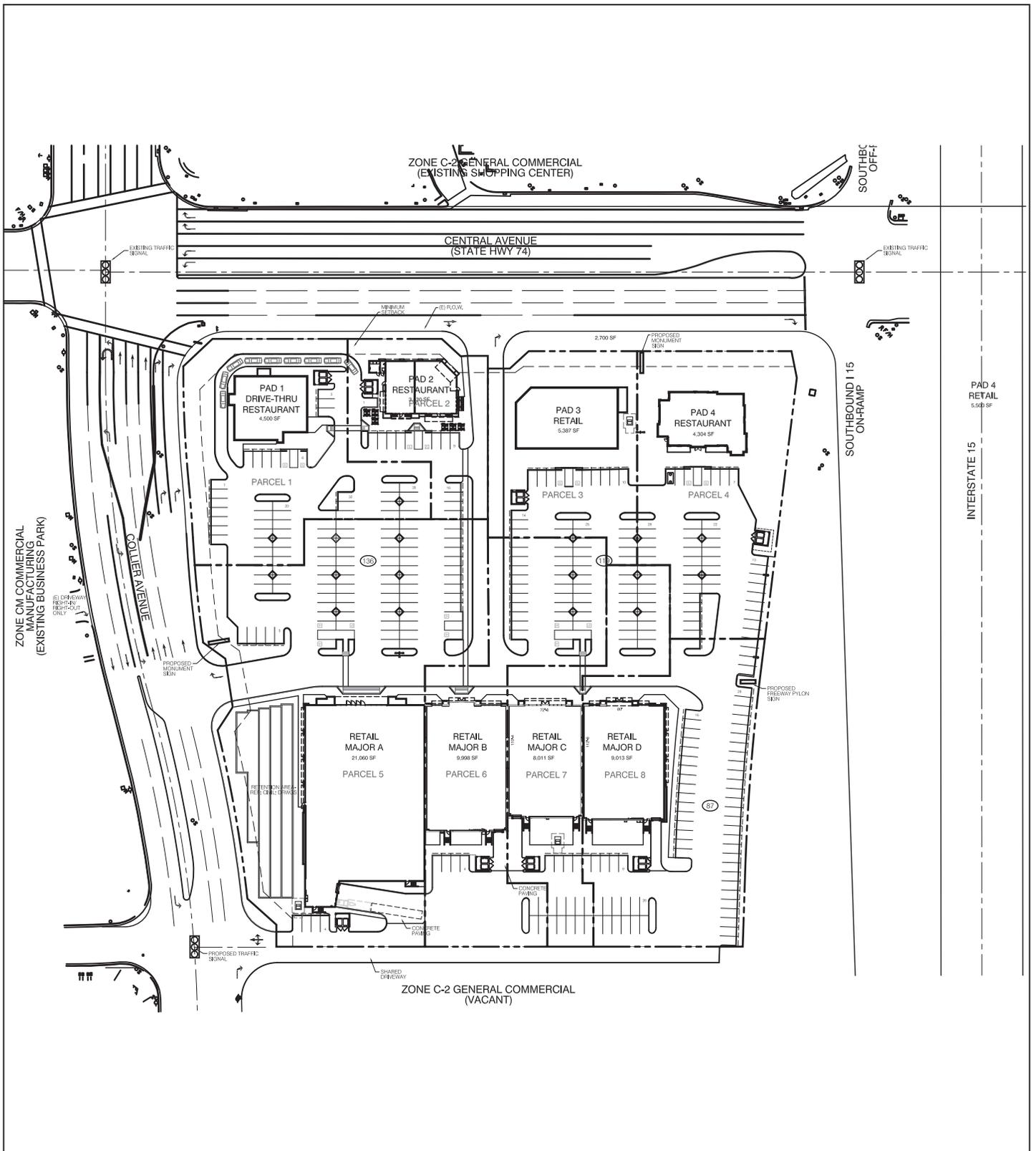
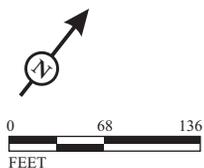


FIGURE 2



Central Plaza
 Lake Elsinore, California
 Conceptual Site Plan



SOURCE: GK Pierce Architects, 2017

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Community Noise Control Ordinance (State of California 1977) as thresholds against which potential noise impacts are evaluated. For vibration impact analysis, since the City has not adopted any vibration standards, the criteria recommended by the Federal Transit Administration (FTA) and the California Department of Transportation (Caltrans) were used in this study for both potential structural damages and human annoyance impact analysis.

CHARACTERISTICS OF SOUND

Sound is increasing in the environment and can affect quality of life. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations (or cycles per second) of a wave, resulting in the tone's range from high to low. Loudness is the strength of a sound and describes a noisy or quiet environment; it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

MEASUREMENT OF SOUND

Sound intensity is measured through the A-weighted scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units, such as inches or pounds, decibels (dB) are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 dB are 10 times more intense than 1 dB, 20 dB are 100 times more intense, and 30 dB are 1,000 times more intense. Thirty decibels (30 dB) represent 1,000 times as much acoustic energy as 1 dB. The decibel scale increases as the square of the change, representing the sound-pressure energy. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the loudness of the sound. Ambient sounds generally range from 30 A-weighted decibels (dBA) (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single-point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source, such as highway traffic or railroad operations, the sound decreases 3 dB for each doubling of distance in a hard site environment. Line source noise, which is noise in a

relatively flat environment with absorptive vegetation, decreases 4.5 dB for each doubling of distance.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California (State) are the L_{eq} and Community Noise Equivalent Level (CNEL) or the day-night average noise level (L_{dn}) based on dBA. CNEL is the time-varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during the evening hours. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours.

Other noise rating scales of importance, when assessing the annoyance factor, include the maximum instantaneous noise level (L_{max}), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions and addresses the annoying aspects of intermittent noise.

Another noise scale often used together with the L_{max} in noise ordinances for enforcement purposes is noise standards in terms of percentile noise levels. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half of the time the noise level exceeds this level, and half of the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first is audible impacts, which refers to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater since this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1 dB and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise level of less than 1 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

PHYSIOLOGICAL EFFECTS OF NOISE

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions and thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear.

This is called the threshold of pain. A sound level of 160–165 dBA will potentially result in dizziness or loss of equilibrium.

The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less developed areas.

Table A lists definitions of acoustical terms. Table B shows common sound levels and their noise sources, and Table C shows land use compatibility for exterior community noise, which is shown on Figure N-1 in the City’s Noise Element of the General Plan, as recommended by the California Department of Health, Office of Noise Control.

Table A: Definitions of Acoustical Terms

Term	Definition
Decibel, dB	A unit of noise level that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time; the number of times that the quantity repeats itself in one second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L ₀₂ , L ₀₈ , L ₅₀ , L ₉₀	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period.
Equivalent Continuous Noise Level, L _{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dB to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dB to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L _{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dB to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L _{max} , L _{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter during a designated time interval using fast-time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time; usually a composite of sound from many sources from many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, tonal or informational content, and the prevailing ambient noise level.

Source: *Handbook of Acoustical Measurements and Noise Control*, Third Edition (Harris 1991).

Table B: Common Sound Levels and Their Noise Sources

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Evaluations
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle a Few Feet Away	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	—
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	—
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	—
Near Freeway Auto Traffic	70	Moderately Loud	Reference Level
Average Office	60	Quiet	½ as loud
Suburban Street	55	Quiet	—
Light Traffic; Soft Radio Music in Apartment	50	Quiet	¼ as loud
Large Transformer	45	Quiet	—
Average Residence without Stereo Playing	40	Faint	⅛ as loud
Soft Whisper	30	Faint	—
Rustling Leaves	20	Very Faint	—
Human Breathing	10	Very Faint	Threshold of Hearing
—	0	Very Faint	—

Source: Compiled by LSA Associates, Inc. (2016).

Table C: Land Use Compatibility for Exterior Community Noise

Land Use Category	Noise Range (L _{dn} or CNEL), dB			
	I	II	III	IV
Passively used open spaces	50	50–55	55–70	70+
Auditoriums, concert halls, amphitheaters	45–50	50–65	65–70	70+
Residential—low-density single-family, duplex, mobile homes	50–55	55–70	70–75	75+
Residential—multifamily	50–60	60–70	70–75	75+
Transient lodging—motels, hotels	50–60	60–70	70–80	80+
Schools, libraries, churches, hospitals, nursing homes	50–60	60–70	70–80	80+
Actively used open spaces—playgrounds, neighborhood parks	50–67	—	67–73	73+
Golf courses, riding stables, water recreation, cemeteries	50–70	—	70–80	80+
Office buildings, business commercial and professional	50–67	67–75	75+	—
Industrial, manufacturing, utilities, agriculture	50–70	70–75	75+	—

Source: California Department of Health, Office of Noise Control (1976).

Noise Range I—Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Noise Range II—Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air-conditioning, will normally suffice.

Noise Range III—Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Noise Range IV—Clearly Unacceptable: New construction or development should generally not be undertaken.

CNEL = Community Noise Equivalent Level

dB = decibels

L_{dn} = day/night noise level

FUNDAMENTALS OF GROUND-BORNE VIBRATION

Vibration refers to ground-borne noise and perceptible motion. Ground-borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernable; however, without the effects associated with the shaking of a building, there is less adverse reaction. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by the occupants as motion of building surfaces, rattling of items on shelves or hanging on walls, or as a low-frequency rumbling noise. The rumbling noise is caused by the vibrating walls, floors, and ceilings radiating sound waves. Building damage is not a factor for normal projects, with the occasional exception of blasting and pile driving during construction. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by up to 10 dB. This is an order of magnitude below the damage threshold for normal buildings.

Vibration

Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by occupants as the motion of building surfaces, the rattling of items on shelves or wall hangings, or a low-frequency rumbling noise. The rumble noise is caused by the vibrating walls, floors, and ceilings radiating sound waves. Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). Of these two, RMS is best for characterizing human response to building vibration, and PPV is used to characterize potential for damage.

SETTING

Existing Sensitive Land Uses in the Project Area

Sensitive receptors include residences, schools, hospitals, and similar uses sensitive to noise. Existing properties adjacent to the project site include residences to the southeast and south. These sensitive land uses may be potentially affected by the noise generated during construction and operation of the proposed project. Other land uses in the project vicinity include industrial and commercial uses to the north and west and vacant land to the south of the project site that are not considered to be noise sensitive.

Overview of the Existing Noise Environment

The primary existing noise sources in the project area are transportation facilities. Traffic on Crane Street, Central Avenue, other local streets, and I-15 are the dominant sources contributing to the ambient noise levels in the project vicinity. Noise from motor vehicles is generated by engine vibrations, the interaction between the tires and the road, and the exhaust system.

Existing Traffic Noise

Guidelines provided in the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) were used to evaluate traffic-related noise conditions along Crane Street, Central Avenue, I-15, and other roadways in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resulting noise levels are weighted and summed over 24-hour periods to determine the CNEL values. Table D lists the existing traffic noise levels along surface streets in the project vicinity. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between traffic and the location where the noise contours are drawn.

As shown in Table D, the 70, 65, and 60 dBA CNEL impact zones are confined within the roadway right-of-way along Collier Avenue east of North Spring Street, Riverside Drive north of Collier Drive, Strickland Avenue east of Riverside Drive, and Cambern Avenue east of Central Avenue in the project vicinity. As also shown in Table D, the 70 dBA CNEL impact zone is confined to within 50 ft of the roadway centerline for six other roadway segments in the project vicinity. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix A.

Thresholds of Significance

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas or conflict with the adopted environmental plans and goals of the community in which it is located. The applicable noise standards governing the project site are the City's Noise Element of the General Plan and the Municipal Code.

City of Lake Elsinore Noise Standards

Noise Element of the General Plan. The Public Safety & Welfare Element of the City of Lake Elsinore General Plan (2011) contains noise standards in its Sub-Chapter 3.7 for interior and exterior sensitive spaces. These standards address the noise impacts from adjacent roadways and airports. The City specifies outdoor and indoor noise limits for residential, commercial, and institutional land uses. The noise standard identified in the General Plan for exterior living areas is 60 dBA CNEL for residential uses, including single-family, duplex, multifamily, and mobile homes. The interior noise standard is 45 dBA CNEL, which is consistent with the standard in the State of California Interior and Exterior Noise Standards, as shown in Table N-3 of the City's Noise Element of the General Plan.

Commercial Uses. The City's Noise Element establishes that for commercial uses, noise levels from exterior sources shall be mitigated so as not to exceed an interior CNEL level of 50 dBA with windows closed.

Table D: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
Central Avenue south of Collier Avenue	10,600	117	246	527	72.8
Central Avenue between Collier Avenue and Dexter Avenue	36,200	259	555	1,194	78.1
Central Avenue between Dexter Avenue and Cambern Avenue	37,800	267	571	1,229	78.3
Central Avenue between Cambern Avenue and Rosetta Canyon Drive	36,900	262	562	1,210	78.2
Central Avenue north of Rosetta Canyon Drive	30,700	233	498	1,070	77.4
Collier Avenue east of North Spring Street	100	< 50	< 50	< 50	48.9
Collier Avenue between North Spring Street and Chaney Street	6,200	< 50	74	158	66.8
Collier Avenue between Chaney Street and Crane Street	12,400	54	117	251	69.8
Collier Avenue between Crane Street and Central Avenue	12,800	56	119	256	69.9
Collier Avenue between Central Avenue and Riverside Drive	25,800	89	190	409	72.4
Collier Avenue west of Riverside Drive	6,900	< 50	80	170	66.7
Riverside Drive north of Collier Drive	1,100	< 50	< 50	< 50	58.2
Riverside Drive between Collier Drive and Gunnerson Street/Strickland Avenue	24,400	87	183	394	71.7
Riverside Drive south of Strickland Avenue	22,800	83	175	376	71.4
Gunnerson Street west of Riverside Drive	1,700	< 50	< 50	67	61.2
Strickland Avenue east of Riverside Drive	200	< 50	< 50	< 50	51.9
North Spring Street south of Collier Avenue	6,200	< 50	74	158	66.8
Dexter Avenue west of Central Avenue	15,000	64	133	285	69.6
Dexter Avenue east of Central Avenue	10,300	< 50	104	222	67.9
Cambren Avenue west of Central Avenue	9,700	< 50	99	213	68.7
Cambren Avenue east of Central Avenue	200	< 50	< 50	< 50	51.9
Rosetta Canyon Drive east of Central Avenue	4,600	< 50	60	130	65.5
I-15 north of Central Avenue	61,400	507	1,090	2,347	82.2
I-15 south of Central Avenue	70,100	554	1,191	2,564	82.7

Source: Compiled by LSA Associates, Inc. (2016).

Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.

ADT = average daily traffic

CNEL = Community Noise Equivalent Level

dBA = A-weighted decibels

ft = feet

Municipal Code Construction Noise Control. The City’s Municipal Code, Noise Control (Chapter 17.176), states that: “(1) operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of 7:00 p.m. and 7:00 a.m., or at any time on weekends and holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work or public service utilities or by variance issued by the City; and 2) Where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum noise levels at affected properties will not exceed those listed in the following schedule” (provided below as Table E):

Table E: Construction Noise Thresholds

Affected Property Types	Maximum Noise Levels (dBA)					
	Type I Areas (Single-Family Residential)		Type II Areas (Multifamily Residential)		Type III Areas (Semi-Residential/ Commercial)	
	Mobile Equipment (<10 days) ¹	Stationary Equipment (≥10 days) ²	Mobile Equipment (<10 days) ¹	Stationary Equipment (≥10 days) ²	Mobile Equipment (<10 days) ¹	Stationary Equipment (≥10 days) ²
Residential Properties (7:00 PM-7:00 AM)						
Daily, except Sundays and Legal Holidays	75	60	80	65	85	70
Daily, but All Day on Sundays and Legal Holidays	60	50	65	55	70	60
Business Properties (all hours)						
Daily, including Sundays and Legal Holidays	85	75	85	75	85	75

Source: Compiled by LSA Associates, Inc. (2016).

¹ Nonscheduled, intermittent, short-term operation.

² Repetitively scheduled and relatively long-term operations.

dBA = A-weighted decibels

Municipal Code Operational Noise Control Ordinance. The City’s Municipal Code, Chapter 17.176, also establishes exterior noise limits for various land uses during different time periods in different noise zone classifications from noise associated with stationary sources in the community. For single-family residential uses in suburban areas, the Noise Control Ordinance identified a reference noise level of 40 dBA during nighttime hours from 10:00 p.m. to 7:00 a.m. and 50 dBA during daytime hours from 7:00 a.m. to 10:00 p.m. These reference noise levels are increased by 5 dBA for multiple dwelling residences. For general commercial uses, the nighttime noise limits are 20 dBA higher than those for single-family residences, and the daytime noise limits are 15 dBA higher than those for single-family residences. These reference noise levels are not to be exceeded for more than 30 minutes in any hour, and should be adjusted upwards for events lasting less than 30 minutes in an hour. These noise level limits are called the percentile exceedance noise levels (L_N) that are used by local jurisdictions to regulate noise associated with stationary sources that normally occurs less than 24 hours during a day.

For interior noise-sensitive spaces, the noise limits are a reference noise level of 35 dBA during nighttime hours from 10:00 p.m. to 7:00 a.m., and 45 dBA during daytime hours from 7:00 a.m. to 10:00 p.m. These reference noise levels are not to be exceeded for more than 5 minutes in any hour, and should be adjusted upwards for events lasting less than 5 minutes in an hour.

Vibration

The FTA in its *Transit Noise and Vibration Impact Assessment* (2006) included ground-borne vibration and noise impact criteria guidance, as shown in Table F. Depending on the category of the nearest buildings adjacent to the project site, the potential vibration damage criteria vary.

Table F: Ground-Borne Vibration and Noise Impact Criteria

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 µin/sec)			Ground-Borne Noise Impact Levels (dB re 20 µPA)		
	Frequent Events ¹	Occasional Events ²	Infrequent Events ³	Frequent Events ¹	Occasional Events ²	Infrequent Events ³
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB ⁴	65 VdB ⁴	65 VdB ⁴	— ⁵	— ⁵	— ⁵
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Source: *Transit Noise and Vibration Impact Assessment*, Table 8-1 (FTA 2006).

¹ “Frequent Events” is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

² “Occasional Events” is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

³ “Infrequent Events” is defined as fewer than 70 vibration events of the same kind per day. This category includes most commuter rail branch lines.

⁴ This criterion limit is based on levels that are acceptable for most moderately sensitive equipment (e.g., optical microscopes). Vibration-sensitive manufacturing or research requires detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

⁵ Vibration-sensitive equipment is generally not sensitive to ground-borne noise.

µin/sec = microinches per second

dBA = A-weighted decibels

µPA = micropascals

HVAC = heating, ventilation, and air-conditioning

dB = decibels

VdB = vibration velocity decibels

The criteria presented in Table F account for variations in project type as well as the frequency of events, which differ widely among transit projects. Although the criteria examine ground-borne vibration from rail rapid transit systems, they also provide useful guidelines for human response to exposure to vibration in general. Table G lists the vibration damage criteria for various structural categories.

Table F (criteria in terms of VdB) and Table G (criteria in terms of VDB and inches per second [in/sec] in PPV) are used to evaluate the effects of vibration on human response and structural damage. For example, for a building constructed with reinforced concrete with no plaster, the FTA guidelines demonstrate that a vibration level of up to 102 VdB (0.5 in/sec PPV) is considered safe and would not result in any vibration damage (FTA 2006).

Table G: Vibration Damage Criteria

Building Category	PPV (in/sec)	Approximate Lv ¹ (VdB)
Reinforced concrete, steel, or timber (no plaster)	0.5	102
Engineered concrete and masonry (no plaster)	0.3	98
Non-engineered timber and masonry buildings	0.2	94
Buildings extremely susceptible to vibration damage	0.12	90

Source: *Transit Noise and Vibration Impact Assessment*, Table 12-3 (FTA 2006).

¹ RMS VdB re 1 µin/sec.

in/sec = inches per second

Lv = 20 log₁₀ (V/V_{ref}) is the vibration velocity in decibels

µin/sec = microinches per second

PPV = peak particle velocity

RMS = root-mean-square

VdB = vibration velocity decibels

PROJECT IMPACTS

Construction Noise Impact

Short-term noise impacts would be associated with the demolition, excavation, grading, and erection of buildings on site during construction of the proposed project. Project construction would be phased, and the timing of the phases would not overlap. Short-term, construction-related noise levels would be higher than existing ambient noise levels in the project area, but would no longer occur once construction of the project is completed.

Two types of short-term noise impacts could occur during construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site would incrementally increase noise levels on roadways in the project area. There will be a relatively high single-event noise exposure potential at a maximum level of 87 dBA L_{max} with trucks passing at 50 ft from sensitive receptors along roadway segments leading to the project site. When compared to the existing traffic volumes on streets in the project vicinity, the projected construction traffic will be minimal, and its associated long-term noise level change will not be perceptible. Therefore, short-term, construction-related worker commutes and equipment transport noise impacts would not be substantial.

The second type of short-term noise impact is related to noise generated during demolition, excavation, grading, and construction on the project site. Construction is performed in discrete steps, each of which has its own mix of equipment and noise characteristics; therefore, the noise levels vary as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by construction phases. Table H lists typical construction noise levels (L_{max}) included in the FHWA *Highway Construction Noise Handbook* (2006), based on a distance of 50 ft between the equipment and a noise receptor.

Typical maximum noise levels from construction activity or the active construction area range up to 90 dBA L_{max} at 50 ft during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because earthmoving equipment is the noisiest construction equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, draglines, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment (e.g., earthmovers, bulldozers, water trucks, and pickup trucks) may

Table H: RCNM Default Noise Emission Reference Levels and Usage Factors

Equipment Description	Impact Device?	Acoustical Usage Factor	Spec. 721.560 L _{max} at 50 ft (dBA, slow)	Actual Measured L _{max} at 50 ft (dBA, slow)	Number of Actual Data Samples (Count)
All other Equipment > 5 HP	No	50	85	N/A	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	N/A	0
Blasting	Yes	N/A	94	N/A	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	N/A	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (< 25 kVA, VMS Signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	N/A	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydraulic Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	N/A	0
Impact Derive	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarifier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/Chipping Gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (single nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Sheers (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trench Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	N/A	0
Tractor	No	40	84	N/A	0
Vacuum Excavator (Vac-Truck)	No	40	85	85	149

Table H: RCNM Default Noise Emission Reference Levels and Usage Factors

Equipment Description	Impact Device?	Acoustical Usage Factor	Spec. 721.560 L _{max} at 50 ft (dBA, slow)	Actual Measured L _{max} at 50 ft (dBA, slow)	Number of Actual Data Samples (Count)
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder/Torch	No	40	73	74	5

Source: *Highway Construction Noise Handbook*, Table 9.1 (FHWA 2006).

dBa = A-weighted decibels

FHWA = Federal Highway Administration

ft = feet

ft-lb/blow = foot-pounds per blow

HP = horsepower

kVA = kilovolt-amperes

L_{max} = maximum instantaneous noise level

N/A = Not Applicable

RCNM = Roadway Construction Noise Model

VMS = variable-message sign

involve 1 or 2 minutes of full power operation followed by 3 or 4 minutes at lower power settings. The following discussion addresses potential construction activity and equipment used on the project site and the noise levels associated with them.

Construction of the proposed project is expected to require the use of earthmovers, bulldozers, water trucks, and pickup trucks on site. Based on Table H, the maximum noise level generated by each earthmover on the proposed project site is assumed to be 84 dBA L_{max} at 50 ft from the scraper. Each bulldozer would also generate 82 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks and pickup trucks is approximately 74 dBA L_{max} at 50 ft from these vehicles. Each doubling of a sound source with equal strength increases the noise level by 3 dBA. Several pieces of earthmovers and bulldozers are expected to be used on site. Two scrapers operating near each other would result in a combined noise level of 87 dBA L_{max} (i.e., 84 dBA + 84 dBA = 87 dBA) at 50 ft. Two bulldozers operating near each other would result in a combined noise level of 85 dBA L_{max} (i.e., 82 dBA + 82 dBA = 85 dBA) at 50 ft; however, four bulldozers operating near each other would generate a combined noise level of 88 dBA (82 dBA + 82 dBA + 82 dBA + 82 dBA = 88 dBA). When these machines are simultaneously working in close proximity to each other, their respective noise levels would be added together and would result in a worst-case combined noise level of 90 dBA L_{max} (i.e., 88 dBA + 87 dBA = 90 dBA) at a distance of 50 ft from the active construction area. Residential properties that are located 800 ft to the southeast and 1,200 ft to the south of the project site would receive a noise reduction of 24 to 28 dBA, respectively, compared to the noise level measured at 50 ft from the on-site construction areas and may be subject to short-term, intermittent noise reaching 62 to 66 dBA L_{max}, respectively, from on-site construction activities. This range of noise levels are comparable to or lower than ambient noise levels in these neighborhoods. Based on Table D, existing traffic noise levels from I-15, Central Avenue, and Collier Road dominated the ambient noise in the project area. The entire project site is exposed to traffic noise from I-15 exceeding 65 dBA CNEL and, therefore, exceeding 65 dBA L_{max}. Similarly, more than half of the project site is exposed to traffic noise from Central Avenue exceeding 65 dBA CNEL and 65 dBA L_{max}. In addition, intervening buildings and structures between the project site and these nearest noise-sensitive receivers would also provide noise attenuation for the on-site construction noise. Therefore,

construction noise would not be substantially higher than current ambient noise levels in these residential neighborhoods.

The nearest commercial uses are approximately 200 ft northwest of the project construction area, which would provide 12 dBA or more noise attenuation from on-site construction activity. This distance attenuation would reduce the maximum construction noise from 90 dBA L_{max} to 78 dBA L_{max} or lower. In addition, traffic on I-15 and Central Avenue is closer to these commercial uses and would result in similar or higher maximum noise levels at the commercial uses. Similarly, the nearest industrial uses to the project site are approximately 200 ft southwest of the project construction area. Traffic noise from I-15 and Collier Road would provide a masking effect to the majority of on-site construction activity.

The City's Municipal Code sets noise associated with construction activity at business properties such as commercial uses at 85 dBA from mobile sources and 75 dBA from stationary sources. No construction activity on the project site would result in these noise limits to be exceeded at adjacent commercial and/or industrial uses. Therefore, as long as project construction complies with the construction hours specified in the City's Municipal Code, in combination with other equipment-related standard condition measures described subsequently in this report, project construction will not result in any significant noise impacts.

Construction Vibration. Vibration refers to ground-borne noise and perceptible motion. Ground-borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernable.

The operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on nearby structures varies depending on soil type, ground strata, and construction characteristics of the receptor buildings. The results from vibration can range from no perceptible effects at the lowest vibration levels to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels.

Construction-related ground-borne vibration rarely reaches levels that would damage structures. Caltrans and the FTA have published standard vibration velocities for construction equipment operations. Table I lists the vibration source amplitudes for construction equipment.

The closest buildings/structures in the project vicinity are the industrial structures located approximately 200 ft from the project construction area. None of the construction equipment (e.g., bulldozers, trucks, jackhammers) or activity expected on site would result in a vibration level greater than 0.12 in/sec PPV at these nearest industrial structures; therefore, no significant construction vibration impacts would occur, and no mitigation is required.

Traffic Noise Impact

The FHWA Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions along roadways in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resulting noise

Table I: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV (in/sec) at 25 feet
Pile Driver (Impact), Typical	0.644
Large Bulldozer	0.089
Caisson Drilling	0.089
Loaded Trucks	0.076
Jackhammer	0.035
Small Bulldozer	0.003

Source: *Transit Noise and Vibration Impact Assessment*, Table 12-2 (FTA 2006).

Caltrans = California Department of Transportation in/sec = inches per second

FTA = Federal Transit Administration PPV = peak particle velocity

levels are weighted and summed over 24-hour periods to determine the CNEL values. Tables J and K list the existing (2015) and opening year (2017) noise levels, respectively, in the project vicinity with and without the proposed project. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between the traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix A.

Off-Site Traffic Noise Impacts. Traffic noise levels would continue to be similar to those under the existing conditions along most roadway segments in the project vicinity. Under the existing plus project scenario, traffic-related noise levels would increase up to 0.7 dBA along most project area roadways (Table J), except along Cambern Avenue east of Central Avenue, where the project-related traffic noise level increase would be 4 dBA and is more than the 3 dBA threshold normally perceptible by the human ear in an outdoor environment. However, because the 70, 65, and 60 dBA CNEL impact zones on Cambern Avenue would continue to be confined within the roadway right-of-way, no significant traffic noise impact would occur on adjacent off-site noise-sensitive land uses.

Under the opening year (2017) with project (Table K) scenario, traffic noise level increases along all the roadway segments analyzed would have project-related increases of 0.7 dBA or less, which is not perceptible to the human ear in an outdoor environment over a period of time, and is less than the 3 dBA increase threshold for the human ear. Therefore, no mitigation measures are required.

On-Site Traffic Noise Impacts. The project site is directly adjacent to Collier Avenue and Central Avenue. The opening year (2017) with project noise levels (Table K) represent the highest traffic noise expected to result under the cumulative condition. Under the opening year (2017) without and with project conditions along Central Avenue and Collier Avenue, the 70, 65, and 60 dBA CNEL contours would extend to outside the roadway centerline. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix A.

The proposed on-site commercial structures are located along Central Avenue and Collier Avenue, as well as I-15. Based on Table K, the 70 dBA CNEL noise contour is projected to extend to 328, 109, and 604 ft from the roadway centerline of Central Avenue, Collier Avenue, and I-15, respectively.

Table J: Existing (2015) Traffic Noise Levels Without and With Project

Roadway Segment	Existing (2015) Without Project (Baseline)					Existing (2015) With Project						
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Change in ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase over Baseline CNEL (dBA) 50 ft from Centerline of Outermost Lane
Central Avenue south of Collier Avenue	10,600	117	246	527	72.8	10,600	0	117	246	527	72.8	0.0
Central Avenue between Collier Avenue and Dexter Avenue	36,200	259	555	1,194	78.1	40,000	3,800	277	593	1,276	78.5	0.4
Central Avenue between Dexter Avenue and Cambern Avenue	37,800	267	571	1,229	78.3	39,300	1,500	273	586	1,262	78.5	0.2
Central Avenue between Cambern Avenue and Rosetta Canyon Drive	36,900	262	562	1,210	78.2	38,100	1,200	268	574	1,236	78.3	0.1
Central Avenue north of Rosetta Canyon Drive	30,700	233	498	1,070	77.4	31,600	900	237	507	1,091	77.5	0.1
Collier Avenue east of North Spring Street	100	< 50	< 50	< 50	48.9	100	0	< 50	< 50	< 50	48.9	0.0
Collier Avenue between North Spring Street and Chaney Street	6,200	< 50	74	158	66.8	6,500	300	< 50	76	163	67.0	0.2
Collier Avenue between Chaney Street and Crane Street	12,400	54	117	251	69.8	13,300	900	57	122	263	70.1	0.3
Collier Avenue between Crane Street and Central Avenue	12,800	56	119	256	69.9	14,800	2,000	61	131	282	70.6	0.7
Collier Avenue between Central Avenue and Riverside Drive	25,800	89	190	409	72.4	27,400	1,600	92	198	425	72.7	0.3
Collier Avenue west of Riverside Drive	6,900	< 50	80	170	66.7	7,200	300	< 50	82	175	66.9	0.2
Riverside Drive north of Collier Drive	1,100	< 50	< 50	< 50	58.2	1,100	0	< 50	< 50	< 50	58.2	0.0
Riverside Drive between Collier Drive and Gunnerson Street/Strickland Avenue	24,400	87	183	394	71.7	25,600	1,200	89	189	406	71.9	0.2
Riverside Drive south of Strickland Avenue	22,800	83	175	376	71.4	23,700	900	85	180	386	71.5	0.1
Gunnerson Street west of Riverside Drive	1,700	< 50	< 50	67	61.2	2,000	300	< 50	< 50	75	61.9	0.7
Strickland Avenue east of Riverside Drive	200	< 50	< 50	< 50	51.9	200	0	< 50	< 50	< 50	51.9	0.0
North Spring Street south of Collier Avenue	6,200	< 50	74	158	66.8	6,500	300	< 50	76	163	67.0	0.2
Dexter Avenue west of Central Avenue	15,000	64	133	285	69.6	15,300	300	65	135	289	69.6	0.0
Dexter Avenue east of Central Avenue	10,300	< 50	104	222	67.9	10,300	0	< 50	104	222	67.9	0.0
Cambren Avenue west of Central Avenue	9,700	< 50	99	213	68.7	9,700	0	< 50	99	213	68.7	0.0
Cambren Avenue east of Central Avenue	200	< 50	< 50	< 50	51.9	500	300	< 50	< 50	< 50	55.9	4.0
Rosetta Canyon Drive east of Central Avenue	4,600	< 50	60	130	65.5	4,900	300	< 50	63	135	65.8	0.3
I-15 north of Central Avenue	61,400	507	1,090	2,347	82.2	61,900	500	510	1,096	2,360	82.2	0.0
I-15 south of Central Avenue	70,100	554	1,191	2,564	82.7	70,600	500	556	1,196	2,576	82.8	0.1

Source: Compiled by LSA Associates, Inc. (2016).

Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.

ADT = average daily traffic

CNEL = Community Noise Equivalent Level

dBA = A-weighted decibels

ft = feet

Table K: Opening Year (2017) Traffic Noise Levels Without and With Project

Roadway Segment	Opening Year (2017) Without Project					Opening Year (2017) With Project						
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Change in ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase over Baseline CNEL (dBA) 50 ft from Centerline of Outermost Lane
Central Avenue south of Collier Avenue	11,300	122	257	550	73.1	11,300	0	122	257	550	73.1	0.0
Central Avenue between Collier Avenue and Dexter Avenue	47,900	312	669	1,439	79.3	51,700	3,800	328	704	1,514	79.7	0.4
Central Avenue between Dexter Avenue and Cambern Avenue	49,700	319	685	1,475	79.5	51,200	1,500	326	699	1,505	79.6	0.1
Central Avenue between Cambern Avenue and Rosetta Canyon Drive	45,400	301	645	1,389	79.1	46,600	1,200	306	657	1,413	79.2	0.1
Central Avenue north of Rosetta Canyon Drive	37,600	266	569	1,225	78.3	38,500	900	270	578	1,244	78.4	0.1
Collier Avenue east of North Spring Street	100	< 50	< 50	< 50	48.9	100	0	< 50	< 50	< 50	48.9	0.0
Collier Avenue between North Spring Street and Chaney Street	8,000	< 50	87	187	67.9	8,300	300	< 50	89	192	68.1	0.2
Collier Avenue between Chaney Street and Crane Street	16,300	65	140	301	71.0	17,200	900	67	145	312	71.2	0.2
Collier Avenue between Crane Street and Central Avenue	16,700	66	142	306	71.1	18,700	2,000	71	153	330	71.6	0.5
Collier Avenue between Central Avenue and Riverside Drive	33,800	106	227	489	73.6	35,400	1,600	109	234	504	73.8	0.2
Collier Avenue west of Riverside Drive	8,000	< 50	88	188	67.3	8,300	300	< 50	90	192	67.5	0.2
Riverside Drive north of Collier Drive	1,200	< 50	< 50	56	58.6	1,200	0	< 50	< 50	56	58.6	0.0
Riverside Drive between Collier Drive and Gunnerson Street/Strickland Avenue	32,300	104	221	474	72.9	33,500	1,200	106	226	486	73.0	0.1
Riverside Drive south of Strickland Avenue	30,700	100	214	459	72.7	31,600	900	102	218	468	72.8	0.1
Gunnerson Street west of Riverside Drive	1,800	< 50	< 50	70	61.4	2,100	300	< 50	< 50	77	62.1	0.7
Strickland Avenue east of Riverside Drive	200	< 50	< 50	< 50	51.9	200	0	< 50	< 50	< 50	51.9	0.0
North Spring Street south of Collier Avenue	8,000	< 50	87	187	67.9	8,300	300	< 50	89	192	68.1	0.2
Dexter Avenue west of Central Avenue	16,300	67	141	301	69.9	16,600	300	68	142	305	70.0	0.1
Dexter Avenue east of Central Avenue	20,600	78	164	352	70.9	20,600	0	78	164	352	70.9	0.0
Cambren Avenue west of Central Avenue	10,400	< 50	104	223	69.0	10,400	0	< 50	104	223	69.0	0.0
Cambren Avenue east of Central Avenue	6,300	< 50	74	160	66.9	6,600	300	< 50	77	165	67.1	0.2
Rosetta Canyon Drive east of Central Avenue	5,700	< 50	70	150	66.4	6,000	300	< 50	72	155	66.7	0.3
I-15 north of Central Avenue	69,400	550	1,183	2,547	82.7	69,900	500	553	1,188	2,559	82.7	0.0
I-15 south of Central Avenue	79,400	601	1,294	2,786	83.3	79,900	500	604	1,299	2,797	83.3	0.0

Source: Compiled by LSA Associates, Inc. (2016).

Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.

ADT = average daily traffic

CNEL = Community Noise Equivalent Level

dBA = A-weighted decibels

ft = feet

Proposed on-site commercial buildings that are closest to I-15 (at distances ranging from 200 to 300 ft from the freeway centerline) would be exposed to traffic noise reaching 77 dBA CNEL.

The project site is located approximately 80 ft from the centerlines of Central Avenue and Collier Avenue, and would be exposed to traffic noise from reaching 79 and 72 dBA CNEL, respectively, without considering any building shielding effect. Since no outdoor active use areas would be impacted by the traffic noise, no sound walls are required for the proposed on-site uses. However, the City has established an interior noise standard of 50 dBA CNEL under the “with windows closed scenario” for commercial uses. Based on the typical sound level reductions of buildings identified in *Protective Noise Levels, Condensed Version of EPA Levels Document* (EPA 1978), standard building construction in Southern California would provide 24 dBA or more (the national average is 25 dBA) in noise reduction from exterior to interior with windows and doors closed. With windows and doors open, the exterior-to-interior noise reduction drops to 12 dBA or more (the national average is 15 dBA).

Under the windows closed scenario, proposed on-site commercial buildings would be exposed to traffic noise from I-15, Central Avenue, and Collier Road reaching 53, 55, and 48 dBA CNEL, respectively. Because the proposed on-site commercial buildings that are closest to I-15 and Central Avenue would have their interior noise level potential exceeding the City’s 50 dBA CNEL interior noise standard for commercial uses, building façade upgrades (e.g., window upgrades) would be required to meet the interior noise standard. The Sound Transmission Class (STC) rating for windows associated with commercial buildings along and directly exposed to traffic on Central Avenue is estimated to need to be STC-33 or higher to reduce the interior noise level at the commercial buildings to meet the 50 dBA CNEL interior noise standard. Similarly, windows associated with commercial buildings along and directly exposed to traffic on I-15 would need to be STC-31 or higher to meet the 50 dBA CNEL interior noise standard for commercial uses. Mechanical ventilation systems (e.g., air conditioning) are also required for these commercial buildings to ensure that windows can remain closed for the interior space.

Long-Term Operational Vibration Impacts

Operation of the proposed project would not involve any vibration sources to which people would be exposed or that would generate excessive ground-borne vibration or ground-borne noise. Vehicles with rubber tires on roadway segments surrounding the project site would not generate any significant ground-borne vibration that would exceed the 65 VdB perception threshold. No significant ground-borne vibration impacts would occur; therefore, no mitigation is required.

Based on Figure 10-1, Generalized Ground Surface Vibration Curves, included in the *Transit Noise and Vibration Impact Assessment* (FTA 2006), as stated in Table F, the vibration threshold for Category 2 (building where people sleep) is 72 VdB for frequent events and 80 VdB for infrequent events. The level of off-site vibration resulting from project operation would not exceed these vibration thresholds at the nearest residences, which are 800 ft and 1,200 ft away; therefore, no impacts would occur and no mitigation is warranted.

Long-Term Stationary Noise Impacts

The proposed project would potentially result in stationary source noise impacts from loading/unloading activities and parking lot activities at adjacent receivers.

Impacts to Off-Site Receivers. Delivery trucks and parking lot activities associated with on-site uses would potentially affect adjacent land uses. Based on past measurements at similar projects, the operation of delivery trucks (e.g., UPS, Federal Express, or company trucks) typically generates a maximum noise level of 75 dBA L_{max} at 50 ft. Typical delivery operations would occur once or twice per day within on-site parking areas for the restaurants and in the loading areas of the commercial/retail uses. The project site is surrounded by vacant land to the south/southwest (zoned C-2 General Commercial), I-15 to the east with commercial/restaurant uses on the other side of the I-15, Collier Avenue to the west with industrial uses on the other side of the road, and Central Avenue to the north with commercial/retail uses farther north.

When compared to the noise level measured at 50 ft from the noise source (i.e., delivery trucks), the 800 ft distance to the nearest residences to the southeast would provide a noise reduction of 24 dBA, and the 1,200 ft distance to the next nearest residences to the south would provide a noise reduction of 28 dBA. The loading/unloading noise associated with the on-site uses is projected to be 51 dBA L_{max} or 47 dBA L_{max} , respectively, at the nearest off-site residential property lines to the southeast and to the south of the project site. Additionally, intervening structures between the project site and these off-site receivers would provide shielding effect that would further reduce noise associated with the loading/unloading activity on the project site.

Although the City has not established any exterior noise standards in its Municipal Code for stationary sources, this range of noise levels would not exceed the typical exterior noise standards from stationary sources recommended by the State of California Department of Health Model Community Noise Control Ordinance (1977) that limit the maximum noise level to 75 dBA L_{max} . Because loading/unloading on the project site would occur only one or two times daily for each of the on-site uses and each time would only last a few minutes, noise associated with these activities—when averaged over a 24-hour period and weighted for evening and nighttime quieter ambient noise levels—would not contribute significantly to the CNEL level in the project area. Because the projected maximum noise levels from the on-site loading/unloading activity would be reduced to 51 dBA L_{max} or lower at the nearest off-site residences, even if these maximum noise levels occurred continuously for 24 hours (which means the hourly average noise level would be 51 dBA L_{eq} for 24 hours), the resulting 24-hour weighted noise level (adding 5 dBA to noise occurring from 7 p.m. to 10 p.m. and adding 10 dBA to the noise occurring from 10 p.m. to 7 a.m.) would be 57 dBA and 61 dBA CNEL during these time periods. The CNEL level associated with these loading/unloading activities would still not exceed the City's 65 dBA CNEL exterior noise standard for residential uses to the southeast and to the south of the project site.

Parking Lot Activity. Representative parking activities (e.g., employees conversing or doors slamming) on the project site would generate approximately 60 to 70 dBA L_{max} at 50 ft. This level of noise is lower than that of the truck delivery and loading/unloading activities and is intermittent in nature. All of the on-site parking areas are provided on level surfaces. Parking areas on the surface level are more than 800 ft (24 dBA reduction compared to the level measured at 50 ft) from the

nearest off-site outdoor living areas, as discussed above. Noise from the on-site parking areas would be reduced to 46 dBA L_{max} or lower at the nearest off-site outdoor living areas to the southeast of the project site and therefore is not anticipated to be a significant issue. Because parking lot activity would occur intermittently throughout the day, and each time would last less than 1 minute, noise associated with these parking lot activities, when averaged over a 24-hour period and weighted for evening and nighttime quieter ambient noise levels, would not contribute significantly to the CNEL level in the project area. The CNEL levels associated with these parking lot activities would not exceed the City's 65 dBA CNEL exterior noise standard for off-site noise-sensitive uses; therefore, no mitigation is required.

STANDARD CONDITIONS

Construction Impacts

Construction will be limited to the hours between 7:00 a.m. and 7:00 p.m. on weekdays in accordance with the City's Municipal Code.

The following standard condition measures can be implemented to reduce potential construction noise impacts on nearby sensitive receptors:

- During all site excavation and grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest to the project site during all project construction.

MITIGATION MEASURES

Traffic Noise Impacts

The following mitigation measures shall be implemented for the proposed project:

- On-site buildings directly exposed to I-15 and Central Avenue traffic noise are recommended to be provided with a mechanical ventilation system such as air conditioning so that windows can remain closed for prolonged periods of time.
- On-site buildings along Central Avenue (Pads 1 through 4) are required to have windows with ratings of STC-33 or higher to meet the 50 dBA CNEL interior noise standard for commercial uses.
- On-site buildings along I-15 (Major D and Pad 4) are required to have windows with ratings of STC-31 or higher. Because buildings on Pad 4 would have windows rated STC-33 or higher, as identified above, the project would already meet this requirement.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

With implementation of the identified mitigation measures, potential short-term and long-term noise impacts would be reduced to a less than significant level.

REFERENCES

- State of California, Department of Health, Office of Noise Control. 1976. Land Use Compatibility for Exterior Community Noise.
- . 1977. Model Community Noise Control Ordinance.
- City of Lake Elsinore. Municipal Code. Website: <http://www.lake-elsinore.org/city-government/municipal-code>, accessed August 2016.
- . December 13, 2011. Public Safety & Welfare Element of the General Plan. Website: <http://www.lake-elsinore.org/home/showdocument?id=7299>, accessed August 2016.
- Federal Highway Administration (FHWA). August 2006. Highway Construction Noise Handbook, FHWA-HEP-06-015, DOT-VNTSC-FHWA-06-02, NTIS No. PB2006-109012. Website: http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook, accessed August 2016.
- . 1977. Highway Traffic Noise Prediction Model, FHWA RD 77 108. Website: http://www.fhwa.dot.gov/environment/noise/traffic_noise_model, accessed August 2016.
- Federal Transit Administration (FTA), Office of Planning and Environment. May 2006. *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06. Website: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf, accessed August 2016.
- Harris, Cyril M. (ed.). 1991. *Handbook of Acoustical Measurements and Noise Control*, Third Edition.
- United States Environmental Protection Agency (EPA). 1978. *Protective Noise Levels, Condensed Version of EPA Levels Document*, EPA-550/9-79-100. Website: <http://nepis.epa.gov/Exe/ZyPDF.cgi/20012HG5.PDF?Dockey=20012HG5.PDF>, accessed August 2016.

APPENDIX A

FHWA TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Central Avenue south of Collier Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10600 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.77

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
117.4	246.3	527.4	1134.5

TABLE Existing-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016

ROADWAY SEGMENT: Central Avenue between Collier Avenue and Dexter Avenue

NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 36200 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 78.11

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
259.1	555.1	1194.3	2571.9

TABLE Existing-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Central Avenue between Dexter Avenue and Cambern Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 37800 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 78.29

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
266.6	571.3	1229.2	2647.2

TABLE Existing-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016

ROADWAY SEGMENT: Central Avenue between Cambern Avenue and Rosetta Canyon Drive

NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 36900 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 78.19

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
262.4	562.2	1209.7	2605.0

TABLE Existing-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Central Avenue north of Rosetta Canyon Drive
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 30700 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 77.39

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
232.5	497.5	1070.1	2304.4

TABLE Existing-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue east of North Spring Street
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 100 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Existing-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between North Spring Street and Chaney Street
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6200 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.80

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	73.6	158.1	340.4

TABLE Existing-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between Chaney Street and Crane Street
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12400 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.81

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
54.4	116.6	250.8	540.1

TABLE Existing-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between Crane Street and Central Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12800 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	----	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.95

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
55.5	119.1	256.2	551.7

TABLE Existing-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between Central Avenue and Riverside Drive
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 25800 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.41

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
88.8	190.0	408.6	879.7

TABLE Existing-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue west of Riverside Drive
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6900 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.68

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	79.6	170.0	365.4

TABLE Existing-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Riverside Drive north of Collier Drive
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1100 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.21

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	108.9

TABLE Existing-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Riverside Drive between Collier Drive and Gunnerson
Street/Strickland Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 24400 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
86.6	183.4	393.6	847.2

TABLE Existing-14
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Riverside Drive south of Strickland Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 22800 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.38

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
83.0	175.4	376.3	809.8

TABLE Existing-15
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Gunnerson Street west of Riverside Drive
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1700 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.18

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	67.0	143.8

TABLE Existing-16
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Strickland Avenue east of Riverside Drive
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 200 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.88

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Existing-17
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: North Spring Street south of Collier Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6200 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.80

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	73.6	158.1	340.4

TABLE Existing-18
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Dexter Avenue west of Central Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 15000 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.56

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
63.9	133.2	284.9	612.7

TABLE Existing-19
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Dexter Avenue east of Central Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10300 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.93

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	104.3	222.1	477.1

TABLE Existing-20
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Cambern Avenue west of Central Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9700 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.74

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	99.0	213.0	458.7

TABLE Existing-21
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Cambern Avenue east of Central Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 200 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.88

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Existing-22
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Rosetta Canyon Drive east of Central Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4600 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.50

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	60.4	129.6	279.0

TABLE Existing-23
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: I-15 north of Central Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 61400 SPEED (MPH): 65 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 82.17

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
507.1	1090.1	2347.1	5055.1

TABLE Existing-24
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: I-15 south of Central Avenue
NOTES: Central Plaza - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 70100 SPEED (MPH): 65 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 82.75

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
553.7	1190.7	2563.8	5522.0

TABLE Existing with Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Central Avenue south of Collier Avenue
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10600 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.77

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
117.4	246.3	527.4	1134.5

TABLE Existing with Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016

ROADWAY SEGMENT: Central Avenue between Collier Avenue and Dexter Avenue

NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 40000 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 78.54

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
276.7	593.2	1276.4	2748.9

TABLE Existing with Project-03
 FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016

ROADWAY SEGMENT: Central Avenue between Dexter Avenue and Cambern Avenue

NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39300 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 78.46

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
273.5	586.3	1261.5	2716.7

TABLE Existing with Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016

ROADWAY SEGMENT: Central Avenue between Cambern Avenue and Rosetta Canyon Drive

NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 38100 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 78.33

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
267.9	574.3	1235.7	2661.1

TABLE Existing with Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Central Avenue north of Rosetta Canyon Drive
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 31600 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 77.52

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
236.9	507.2	1090.9	2349.2

TABLE Existing with Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue east of North Spring Street
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 100 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Existing with Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016

ROADWAY SEGMENT: Collier Avenue between North Spring Street and Chaney Street

NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6500 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.00

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	75.9	163.2	351.3

TABLE Existing with Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016

ROADWAY SEGMENT: Collier Avenue between Chaney Street and Crane Street

NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13300 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.11

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
56.9	122.1	262.8	566.0

TABLE Existing with Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between Crane Street and Central Avenue
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14800 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.58

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
61.1	131.1	282.2	607.8

TABLE Existing with Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between Central Avenue and Riverside Drive
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 27400 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
92.4	197.7	425.3	915.7

TABLE Existing with Project-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue west of Riverside Drive
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7200 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	81.9	174.9	375.9

TABLE Existing with Project-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Riverside Drive north of Collier Drive
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1100 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.21

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	108.9

TABLE Existing with Project-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Riverside Drive between Collier Drive and Gunnerson Street/Strickland Avenue
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 25600 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.88

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
89.3	189.4	406.4	874.7

TABLE Existing with Project-14
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Riverside Drive south of Strickland Avenue
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 23700 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.55

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
85.0	180.0	386.1	830.9

TABLE Existing with Project-15
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Gunnerson Street west of Riverside Drive
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2000 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.88

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	74.6	160.2

TABLE Existing with Project-16
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Strickland Avenue east of Riverside Drive
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 200 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.88

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE Existing with Project-17
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: North Spring Street south of Collier Avenue
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6500 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.00

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	75.9	163.2	351.3

TABLE Existing with Project-18
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Dexter Avenue west of Central Avenue
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 15300 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
64.6	134.9	288.6	620.8

TABLE Existing with Project-19
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Dexter Avenue east of Central Avenue
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10300 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.93

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	104.3	222.1	477.1

TABLE Existing with Project-20
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Cambern Avenue west of Central Avenue
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9700 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.74

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	99.0	213.0	458.7

TABLE Existing with Project-21
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Cambern Avenue east of Central Avenue
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 500 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.86

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	63.8

TABLE Existing with Project-22
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016

ROADWAY SEGMENT: Rosetta Canyon Drive east of Central Avenue

NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4900 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.78

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	63.0	135.2	291.0

TABLE Existing with Project-23
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: I-15 north of Central Avenue
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 61900 SPEED (MPH): 65 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES			
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 82.21

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
509.8	1096.0	2359.8	5082.5

TABLE Existing with Project-24
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: I-15 south of Central Avenue
NOTES: Central Plaza - Existing with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 70600 SPEED (MPH): 65 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 82.78

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
556.3	1196.3	2576.0	5548.2

TABLE 2017 Cumulative w/o Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Central Avenue south of Collier Avenue
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11300 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.05

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
122.2	256.8	550.2	1183.8

TABLE 2017 Cumulative w/o Project-02
 FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
 ROADWAY SEGMENT: Central Avenue between Collier Avenue and Dexter Avenue
 NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 47900 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 79.32

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
311.6	668.7	1439.3	3099.8

TABLE 2017 Cumulative w/o Project-03
 FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
 ROADWAY SEGMENT: Central Avenue between Dexter Avenue and Cambern Avenue
 NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 49700 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 79.48

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
319.3	685.4	1475.1	3177.0

TABLE 2017 Cumulative w/o Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016

ROADWAY SEGMENT: Central Avenue between Cambern Avenue and Rosetta Canyon Drive

NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 45400 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 79.09

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
300.8	645.3	1388.8	2991.0

TABLE 2017 Cumulative w/o Project-05
 FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
 ROADWAY SEGMENT: Central Avenue north of Rosetta Canyon Drive
 NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 37600 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 78.27

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
265.6	569.3	1224.9	2637.8

TABLE 2017 Cumulative w/o Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue east of North Spring Street
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 100 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE 2017 Cumulative w/o Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between North Spring Street and Chaney Street
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8000 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.90

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	87.1	187.4	403.4

TABLE 2017 Cumulative w/o Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between Chaney Street and Crane Street
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16300 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.00

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
65.1	139.8	301.0	648.1

TABLE 2017 Cumulative w/o Project-09
 FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
 ROADWAY SEGMENT: Collier Avenue between Crane Street and Central Avenue
 NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16700 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
66.2	142.1	305.9	658.7

TABLE 2017 Cumulative w/o Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between Central Avenue and Riverside Drive
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 33800 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.58

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
106.1	227.3	489.1	1053.3

TABLE 2017 Cumulative w/o Project-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue west of Riverside Drive
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8000 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.32

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	87.7	187.5	403.3

TABLE 2017 Cumulative w/o Project-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Riverside Drive north of Collier Drive
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1200 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.59

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	55.8	115.2

TABLE 2017 Cumulative w/o Project-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Riverside Drive between Collier Drive and Gunnerson Street/Strickland Avenue
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 32300 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.89

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
103.8	220.8	474.4	1021.3

TABLE 2017 Cumulative w/o Project-14
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Riverside Drive south of Strickland Avenue
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 30700 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
100.4	213.5	458.6	987.3

TABLE 2017 Cumulative w/o Project-15
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Gunnerson Street west of Riverside Drive
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1800 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	----	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.43

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	69.5	149.4

TABLE 2017 Cumulative w/o Project-16
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Strickland Avenue east of Riverside Drive
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 200 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	----	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.88

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE 2017 Cumulative w/o Project-17
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: North Spring Street south of Collier Avenue
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8000 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.90

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	87.1	187.4	403.4

TABLE 2017 Cumulative w/o Project-18
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Dexter Avenue west of Central Avenue
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16300 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.92

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
67.2	140.7	301.0	647.5

TABLE 2017 Cumulative w/o Project-19
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Dexter Avenue east of Central Avenue
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20600 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.94

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
77.8	164.1	351.7	756.8

TABLE 2017 Cumulative w/o Project-20
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Cambern Avenue west of Central Avenue
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10400 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.04

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	103.7	223.1	480.5

TABLE 2017 Cumulative w/o Project-21
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Cambern Avenue east of Central Avenue
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6300 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	74.4	159.8	344.0

TABLE 2017 Cumulative w/o Project-22
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Rosetta Canyon Drive east of Central Avenue
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5700 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.43

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	69.6	149.5	321.8

TABLE 2017 Cumulative w/o Project-23
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: I-15 north of Central Avenue
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 69400 SPEED (MPH): 65 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 82.70

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
550.0	1182.7	2546.7	5485.2

TABLE 2017 Cumulative w/o Project-24
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: I-15 south of Central Avenue
NOTES: Central Plaza - 2017 Cumulative w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 79400 SPEED (MPH): 65 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 83.29

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
601.4	1293.7	2785.8	6000.1

TABLE 2017 Cumulative with Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Central Avenue south of Collier Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11300 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.05

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
122.2	256.8	550.2	1183.8

TABLE 2017 Cumulative with Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Central Avenue between Collier Avenue and Dexter Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 51700 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 79.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
327.7	703.6	1514.4	3261.6

TABLE 2017 Cumulative with Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Central Avenue between Dexter Avenue and Cambern Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 51200 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 79.61

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
325.6	699.1	1504.7	3240.5

TABLE 2017 Cumulative with Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016

ROADWAY SEGMENT: Central Avenue between Cambern Avenue and Rosetta Canyon Drive

NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 46600 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 79.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
306.0	656.6	1413.2	3043.4

TABLE 2017 Cumulative with Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Central Avenue north of Rosetta Canyon Drive
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 38500 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 78.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
269.8	578.3	1244.4	2679.7

TABLE 2017 Cumulative with Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue east of North Spring Street
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 100 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE 2017 Cumulative with Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between North Spring Street and Chaney Street
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8300 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	89.3	192.0	413.4

TABLE 2017 Cumulative with Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between Chaney Street and Crane Street
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17200 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.23

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
67.5	144.9	311.9	671.8

TABLE 2017 Cumulative with Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between Crane Street and Central Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18700 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.59

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
71.3	153.2	329.8	710.3

TABLE 2017 Cumulative with Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue between Central Avenue and Riverside Drive
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 35400 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.78

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
109.3	234.4	504.4	1086.2

TABLE 2017 Cumulative with Project-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Collier Avenue west of Riverside Drive
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8300 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES			
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.48

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	89.8	192.2	413.3

TABLE 2017 Cumulative with Project-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Riverside Drive north of Collier Drive
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1200 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.59

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	55.8	115.2

TABLE 2017 Cumulative with Project-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Riverside Drive between Collier Drive and Gunnerson
Street/Strickland Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 33500 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.05

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
106.2	226.2	486.1	1046.5

TABLE 2017 Cumulative with Project-14
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Riverside Drive south of Strickland Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 31600 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.80

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
102.3	217.6	467.6	1006.5

TABLE 2017 Cumulative with Project-15
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Gunnerson Street west of Riverside Drive
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2100 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	77.0	165.5

TABLE 2017 Cumulative with Project-16
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Strickland Avenue east of Riverside Drive
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 200 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.88

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	0.0	0.0	0.0

TABLE 2017 Cumulative with Project-17
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: North Spring Street south of Collier Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8300 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	89.3	192.0	413.4

TABLE 2017 Cumulative with Project-18
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Dexter Avenue west of Central Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16600 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.00

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
68.0	142.4	304.7	655.4

TABLE 2017 Cumulative with Project-19
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Dexter Avenue east of Central Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20600 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.94

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
77.8	164.1	351.7	756.8

TABLE 2017 Cumulative with Project-20
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Cambern Avenue west of Central Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10400 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.04

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	103.7	223.1	480.5

TABLE 2017 Cumulative with Project-21
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Cambern Avenue east of Central Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6600 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.07

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	76.7	164.8	354.9

TABLE 2017 Cumulative with Project-22
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: Rosetta Canyon Drive east of Central Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6000 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	73.60	13.60	10.22
M-TRUCKS	0.90	0.04	0.90
H-TRUCKS	0.35	0.04	0.35

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
0.0	72.0	154.7	333.0

TABLE 2017 Cumulative with Project-23
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: I-15 north of Central Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 69900 SPEED (MPH): 65 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 82.73

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
552.6	1188.4	2558.9	5511.5

TABLE 2017 Cumulative with Project-24
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/18/2016
ROADWAY SEGMENT: I-15 south of Central Avenue
NOTES: Central Plaza - 2017 Cumulative with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 79900 SPEED (MPH): 65 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
	---	-----	-----
AUTOS	69.50	12.90	9.60
M-TRUCKS	1.44	0.06	1.50
H-TRUCKS	2.40	0.10	2.50

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 83.32

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
-----	-----	-----	-----
604.0	1299.1	2797.4	6025.3