



**Noise Analysis for the  
Dogwood Road at Villa Avenue Project  
El Centro, California**

**Annexation (17-02)  
General Plan Amendment (17-02)  
Change of Zone (17-02)**

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A handwritten signature in black ink, appearing to read "William A. Maddux". The signature is fluid and cursive, with a large, sweeping flourish at the end.

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## Acronyms and Abbreviations

|              |  |
|--------------|--|
| AASHTO       | American Association of State Highway and Transportation Officials |
| ADT          | average daily traffic  |
| ALUC         | County Airport Land Use Commission                                 |
| CalGreen     | California Green Building Standards Code                           |
| Caltrans     | California Department of Transportation                            |
| CEQA         | California Environmental Quality Act                               |
| City         | City of El Centro  |
| CNEL         | community noise equivalent level                                   |
| County       | Imperial County  |
| dB           | decibel  |
| dB(A)        | A-weighted decibel   |
| FAR          | floor area ratio   |
| FHWA         | Federal Highway Administration                                     |
| FTA          | Federal Transit Authority  |
| HVAC         | heating, ventilation, and air conditioning                         |
| kW           | kilowatt   |
| $L_{eq}$     | equivalent noise level   |
| $L_{eq(8h)}$ | 8-hour equivalent noise level                                      |
| LLG          | Linscott, Law & Greenspan, Engineers                               |
| LOS          | Level of Service   |
| $L_{pw}$     | sound power  |
| PPV          | peak particle velocity   |
| PV           | photovoltaic   |

## Executive Summary

The Dogwood Road at Villa Avenue Project (project) consists of the annexation of the 330-acre site located at the southeast corner of Dogwood Road and Villa Avenue from Imperial County (County) to the City of El Centro (City). The project also includes a General Plan Amendment to designate the site as General Industrial and a Pre-zone to zone the site as General Manufacturing. No specific development is proposed at this time. This study assesses three phases: development of one, two, or three million square feet of manufacturing warehouse uses as well as various off-site transportation improvements in the vicinity of the project site. This report evaluates potential noise impacts associated with the development of the project site.

This report discusses potential noise impacts from the construction and operation of the project. The potential for noise impacts to adjacent receivers from construction or operation of future uses on the project site was assessed based on noise level limits from the City's Noise Abatement and Control Ordinance. Project compatibility with the existing and future noise environment was assessed based on the City General Plan Land Use Compatibility Standards.

## Construction Noise

The proposed project would allow for future construction on the project site as well as the construction of off-site roadway improvements. This future construction would generate construction noise. Section 17.1-8 of the City's Noise Abatement and Control Ordinance establishes an 8-hour equivalent noise level ( $L_{eq(8h)}$ ) limit of 75 A-weighted decibels (dB[A]) as measured at the property line of a residential use. Section IV.C.3 of the County's General Plan Noise Element establishes the same noise level limit at sensitive receptors.

As future construction details are not currently known, standard construction activities and equipment were assumed in this analysis. Construction activities that involve the use of common construction equipment such as bulldozers, graders, and loaders typically generate noise levels of 82 dB(A)  $L_{eq(8h)}$  at 50 feet from the center of construction activity. A construction noise analysis was conducted that considers the project construction would be phased and the nearest residential uses are located to the north of the site along Villa Lane and to the south of the site at the Palm Villa Mobile Home Park. Based on this analysis, construction noise levels would reach 59 dB(A)  $L_{eq(8h)}$  at the residential property line of properties to the north of Villa Avenue and construction noise levels would reach 58 dB(A)  $L_{eq(8h)}$  at the property line of Palm Villa Mobile Home Park. Thus, construction activities associated with development of the project site would comply with standards from the City Noise Abatement and Control Ordinance Section 17.1-8. Impacts would be less than significant.

The project would include improving Villa Avenue to a 2-lane Arterial between Dogwood Road and Cooley Road, paving Cooley Road from Aten Road to the project site, and improving Dogwood Road to include a second southbound lane from Villa Avenue to Commercial Avenue. Noise levels at the residences north of Villa Avenue would reach up to

71 dB(A)  $L_{eq(8h)}$  and noise levels at the southeast corner of Cooley Road and Cruickshank Road would reach up to 67 dB(A)  $L_{eq(8h)}$ . Construction noise levels would be less than noise standards for residential uses. Impacts would be less than significant.

## Traffic Noise

### Land Use Compatibility

Project compatibility with traffic noise was assessed based on the maximum traffic noise levels that could be generated by vehicles on adjacent roadways. The City's Land Use Compatibility Standards for general manufacturing uses is 70 community noise equivalent level (CNEL). Vehicle traffic on nearby roadways would result in noise levels up to 75 CNEL along the perimeter of the project site. Portions of the project site that would be exposed to noise levels that exceed 70 CNEL would include the westernmost 21 feet of the project site and the northernmost 20 feet of the project site. Mitigation Measure NOI-1 would require that all exterior use areas be set back or shielded from major roadways to prevent noise compatibility conflicts. With incorporation of Mitigation Measure NOI-1, future development of the project site would not include development of uses that conflict with the City Land Use Compatibility Standards. Impacts associated with traffic noise compatibility would be reduced to less than significant.

### Traffic Noise Increases

Project-generated traffic would increase volumes on local roadways and thereby increase traffic noise levels. This analysis was based on California Department of Transportation's (Caltrans) Protocol, which recommended 12 dB criterion for identifying substantial traffic noise increases. Substantial traffic noise increases would occur along the segment of Villa Avenue between Dogwood Road to Cooley Road and along the segment of Cooley Road between Aten Road to the project site. The land use designation and zoning for parcels adjacent to these segments is agricultural; agricultural uses are noise producers and are not noise-sensitive. Nonetheless, residences along Villa Avenue function as residential uses with no associated agricultural use. Traffic noise level increases would result in noise levels that exceed residential compatibility standards. Thus, mitigation measure NOI-2 would require that project access driveways be situated to direct project traffic away from residential uses along Villa Avenue. Although a substantial traffic noise increases would occur, no noise-sensitive use would be impacted. With incorporation of mitigation measure NOI-2, impacts associated with traffic noise increases would be reduced to less than significant.

## Railroad Noise

Railway activity on the segment of railway that runs immediately adjacent to the southern project site boundary is anticipated to be infrequent, with no railway activity on most days. Railway activity would not substantially contribute to the ambient noise environment and the increase in CNEL would be less than measurable. Railway noise would not be anticipated to result in noise levels that exceed the City Land Use Compatibility Standards.

## Aircraft Noise

The project site is not located within the 60 CNEL noise contour for the Imperial County Airport or any other public or private airport. Thus, the project would not expose any future land uses to noise levels from aircraft operations that would exceed the County Airport Land Use Commission or City noise compatibility standards.

## On-Site Generated Noise

The proposed project site zoning designation, General Manufacturing, accommodates a wide variety of uses associated with manufacturing, processing, fabrication, assembly of goods and materials, and other industrial uses; therefore, noise sources would vary widely. Common noise sources of concern for industrial uses include, but are not limited to, heating, ventilation, and air conditioning (HVAC) equipment, air handlers, cooling towers, boilers, generators, loading bay activities, and truck traffic. Specific noise sources that would also be likely to be associated with the proposed project would include railway operations associated with the rail line located along the southern project site boundary. At this time no specific development is proposed, and the specific location and type of noise sources are unknown. City policies are in place to control noise and reduce noise conflicts between various land uses. Enforcement of the Noise Abatement and Control Ordinance of the Municipal Code would limit noise conflicts. Given that no specific noise source is proposed and that enforcement of the Municipal Code Section 17.1 limits noise generation, impacts would be less than significant at the program level.

## Vibration

During construction, use of standard construction equipment associated with project site development and off-site roadway improvements would generate groundborne vibration. The project is not anticipated to include any substantial sources of groundborne vibration such as explosive blasting. Due to the size of the project site, widths of surrounding public right-of-ways construction activities would have substantial buffering from adjacent structures. Therefore, construction activities associated with project site development are not anticipated to result in vibration substantial enough to adversely affect nearby structures. Due to building setbacks and as standard roadway construction does not generally result in substantial vibration, construction activities associated with off-site roadway improvements would be less than significant.

No specific development is proposed at this time; however vibration sources may be constructed. These vibration sources would vary widely depending on the type of equipment future business would require. City policies in Municipal Code Section 29-156 are in place to control vibration and reduce noise conflict between various land uses. Given that no specific vibration source is proposed and that enforcement of the Municipal Code Section 29-156 limits groundborne vibration, impacts would be less than significant at the program level.

# 1.0 Introduction

## 1.1 Project Description

The project consists of the annexation of the 330-acre site located at the southeast corner of Dogwood Road at Villa Avenue from Imperial County (County) to the City of El Centro (City), a General Plan Amendment to designate the site as General Industrial, and a Pre-zone to zone the site as General Manufacturing. Figure 1 shows the regional location of the proposed project. Figure 2 shows an aerial photograph of the project vicinity.

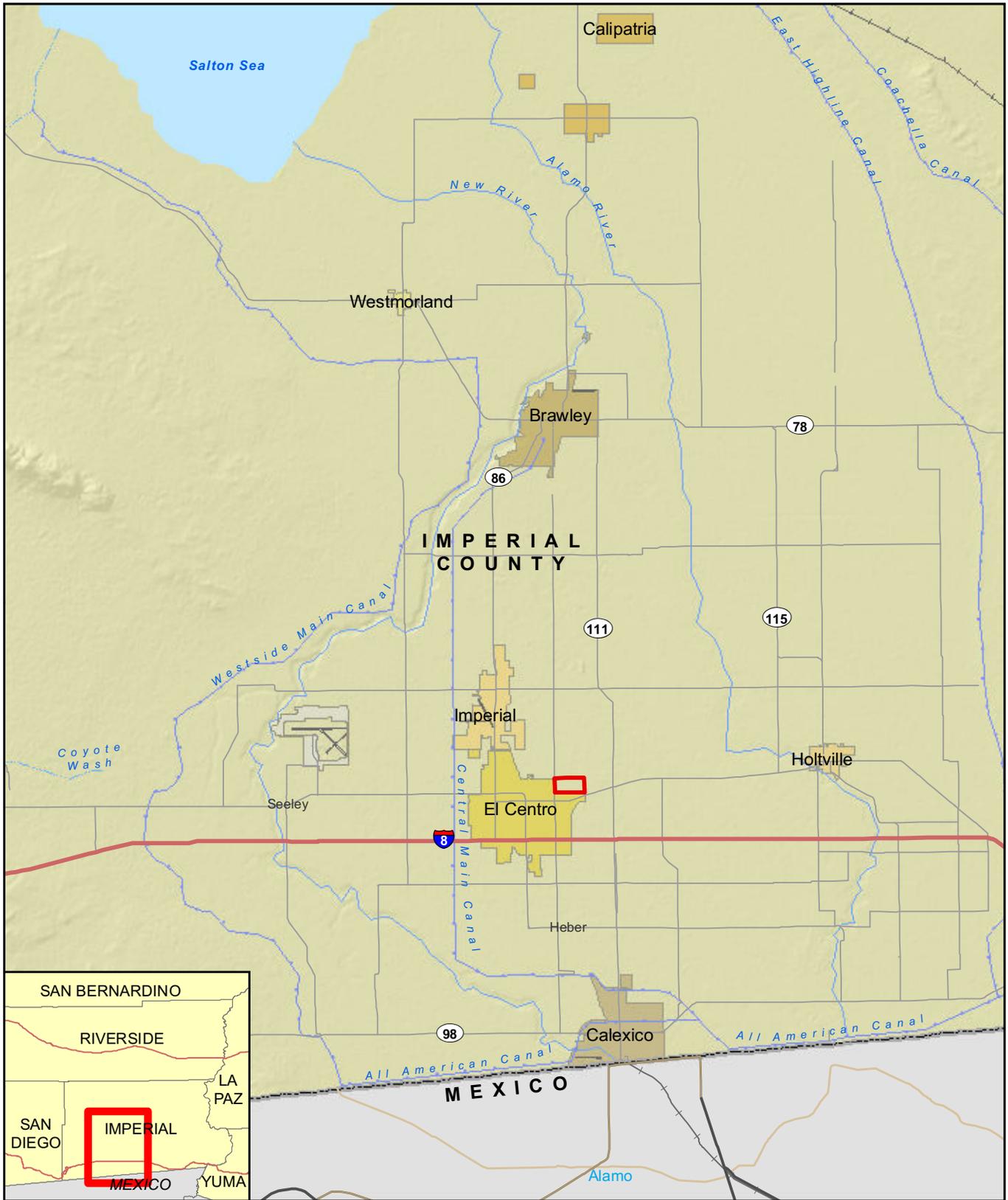
General Manufacturing zoning accommodates a maximum floor area ratio of 0.45:1 and an average floor area ratio of 0.35:1. Theoretical maximum buildout of the project site could include up to five million square feet of manufacturing warehouse or a similar use; however, building square footage would be limited to three million square feet via a Development Agreement that would be recorded against the parcels. Due to the size of the development, it is assumed the project would be phased. This study assesses three phases: development of one, two, or three million square feet of manufacturing warehouse uses. Also, considering the size of the development, the earliest year in which development totaling three million square feet would be reached is 2025.

The City strives to encourage land uses that are compatible, sustainable, and beneficial to the community. Consistent with this objective and current standard practices, the City has included the following conditions in the Development Agreement for future development of the project site:

- Provide subsidized transit passes to all employees.
- Provide a shuttle from heavier populated areas to the project site.
- Provide preferred parking spaces for employees who carpool.
- Allow annual monitoring of the Transportation Demand Management program by City staff.
- Stagger work shift times to avoid the hours of 7:00 to 8:00 a.m. and 4:00 to 6:00 p.m. in terms of start and end times.

### 1.1.1 Road Improvements

To support the allowed future development, the project includes frontage improvements to Dogwood Road, Villa Avenue, and Cooley Road. In addition, traffic mitigation improvements would be required (Linscott, Law & Greenspan [LLG] 2018). These improvements would be phased with the proposed development.



Project Boundary

FIGURE 1  
Regional Location



 Project Boundary

FIGURE 2

Project Location on Aerial Photograph

Phase 1 of the project (one million square feet) would include the following road improvements:

- Improve the intersection of Dogwood Road and Villa Avenue by installing a traffic signal and by adding: a southbound dedicated left-turn lane, northbound dedicated left-turn and right-turn lanes, westbound dedicated left-turn and right-turn lanes, and an eastbound dedicated left-turn lane (six additional lanes);
- Improve the intersection of Dogwood Road and East Commercial Street by installing a traffic signal; and
- Improve Villa Avenue to a 2-lane Arterial between Dogwood Road and Cooley Road (76-foot right-of-way for 1.0 linear mile).

Phase 2 of the project would include the following additional road improvements:

- Improve the Evan Hewes Highway and State Route 111 intersection by installing a traffic signal or by installing a raised median; and
- Improve Cooley Road to a paved, 2-lane road between the project site and Aten Road (30-foot right-of-way for 1.5 linear miles).

Phase 3 of the project would include the following additional road improvements:

- Improve the Dogwood Road and Villa Avenue intersection by adding: a second northbound dedicated right-turn lane (one additional lane);
- Improve Dogwood Road between Villa Avenue and Commercial Street to include a second southbound lane (additional 12 feet of right-of-way for 0.6 linear mile);
- Improve Villa Avenue between Dogwood Road and the project site to include a second eastbound dedicated left-turn lane and an eastbound dedicated right-turn lane (additional 12 feet of right-of-way for 1.0 linear mile); and
- Improve the Evan Hewes Highway and State Route 111 intersection by adding: a second dedicated northbound turn lane and an eastbound right-turn lane (two additional lanes).

## 1.2 Fundamentals of Noise

Sound levels are described in units called the decibel (dB). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease.

In technical terms, sound levels are described as either a “sound power level” or a “sound pressure level,” which while commonly confused are two distinct characteristics of sound. Both share the same unit of measure, the dB. However, sound power, expressed as  $L_{pw}$ , is the energy converted into sound by the source. As sound energy travels through the air, it creates a sound wave that exerts pressure on receivers such as an ear drum or microphone, the sound pressure level. Sound measurement instruments only measure sound pressure, and limits used in standards are generally sound pressure levels.

Noise is as a sound that is loud or unpleasant sound that causes disturbance. The human ear is not equally sensitive to all frequencies within the sound spectrum. To accommodate this phenomenon, the A-scale, which approximates the frequency response of the average young ear when listening to most ordinary everyday sounds, was devised. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Therefore, the “A-weighted” noise scale is used for measurements and standards involving the human perception of noise. Noise levels using A-weighted measurements are designated with the notation dB(A). Human perception of noise has no simple correlation with acoustical energy. The California Department of Transportations’ (Caltrans) studies indicate that changes in noise levels are generally perceived by the average human ear as follows: 3 dB(A) is barely perceptible, 5 dB(A) is readily perceptible, and 10 dB(A) is perceived as a doubling or halving of noise (Caltrans 2013a).

### **1.2.1 Descriptors**

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important. In addition, most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors has been developed. The noise descriptors used for this study are the equivalent noise level ( $L_{eq}$ ) and the community noise equivalent level (CNEL). The  $L_{eq}$  is the equivalent steady-state noise level in a stated period of time that is calculated by averaging the acoustic energy over a time period; when no period is specified, a 1-hour period is assumed. The CNEL is a 24-hour equivalent sound level. The CNEL calculation applies an additional 5 A-weighted decibels dB(A) penalty to noise occurring during evening hours, between 7:00 p.m. and 10:00 p.m., and a 10 dB(A) penalty is added to noise occurring during the night, between 10:00 p.m. and 7:00 a.m. These increases for certain times are intended to account for the added sensitivity of humans to noise during the evening and night.

### **1.2.2 Propagation**

Sound from a small, localized source (approximating a “point” source) radiates uniformly outward as it travels away from the source in a spherical pattern, known as geometric spreading. The sound level decreases or drops off at a rate of 6 dB(A) for each doubling of the distance.

Traffic noise is not a single, stationary point source of sound. The movement of vehicles makes the source of the sound appear to emanate from a line (line source) rather than a

point when viewed over some time interval. The drop off rate for a line source is 3 dB(A) for each doubling of distance.

The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site (such as parking lots or smooth bodies of water) receives no additional ground attenuation, and the changes in noise levels with distance (drop-off rate) are simply the geometric spreading from the source, which equates to 6 dB(A) per doubling distance. A soft site (such as soft dirt, grass, or scattered bushes and trees) provides an additional ground attenuation value of 1.5 dB(A) per doubling of distance. Thus, a point source over a soft site would drop off at 7.5 dB(A) per doubling of distance.

## **2.0 Applicable Standards**

The project includes annexation of the project site from the County to the City. Thus, in addition to applicable State standards, City standards and policies would be applicable to the project site. County noise standards would no longer apply to the project site; however, a parallel discussion of all standards and guidelines promulgated by the State, City, and County are included for reference.

Noise standards from the County Airport Land Use Commission (ALUC) apply to all land uses within an airport's sphere of influence regardless of municipal boundaries.

### **2.1 State of California Standards**

#### **2.1.1 California Code of Regulations**

Noise exposure in non-residential structures are regulated by 2016 California Building Code, Chapter 12 – Interior Environment, Section 1207 – Sound Transmission and 2016 California Green Building Standards, Chapter 5 – Nonresidential Mandatory Measures, Division 5.5 – Environmental Quality, Section 5.507 – Environmental Comfort, Subsection 5.507.4 – Acoustical Control.

Pursuant to these standards, all nonresidential building construction shall employ building assemblies and components that achieve a composite sound transmission class rating of at least 50 or shall otherwise demonstrate that exterior noise shall not result in interior noise environment where noise levels exceed 50 dB(A)  $L_{eq}$  in occupied areas during any hour of operation (24 California Code of Regulations Part 6, 5.506.7.4.2).

### **2.2 City of El Centro Standards**

#### **2.2.1 City Land Use Compatibility Standards**

The City General Plan Noise Element policies and plans are designed to protect the existing and planned land uses identified in the Land Use Element from excessive noise. Potential noise sources are identified in the Noise Element, and programs are established

to avoid or mitigate noise impacts from planned development. At the same time, the Land Use Element contains policies to ensure that environmental conditions, including noise, are considered in all land use decisions. Preventing the intrusion of incompatible land uses in order to create a healthy environment is a central goal of the Land Use Element. The City Land Use Compatibility Standards for assessing impacts of the existing noise environment on proposed uses are shown in Table 1. The City Land Use Compatibility Standards for assessing noise impacts from proposed development to existing uses are shown in Table 2.

| <b>Table 1</b>   |                                   |         |
|--|-----------------------------------|---------|
| <b>City of El Centro Compatibility Noise Standards</b>   |                                   |         |
| Zones  | One-Hour Average Sound Level (dB) |         |
|  | Outdoor                           | Indoor* |
| Rural and Single-Family Residential Zones  | 60                                | 45      |
| Multi-family Residential Zones   | 65                                | 45      |
| Schools, libraries, churches, hospitals, nursing homes, and parks and recreation areas   | 70                                | 45      |
| SOURCE: City of El Centro General Plan Noise Element Table N-2.  |                                   |         |
| *In the event that outdoor acceptable noise exposure levels cannot be mitigated by various attenuation measures, indoor noise levels shall not exceed 45 dB(A) CNEL. |                                   |         |

Apart from the Single-Family Residential (R1) zoning district located west of Dogwood Avenue between East State Street and Hamilton Avenue, there are no other rural, single-family, or multi-family zoning districts in the vicinity of the project site or in the vicinity of roads used by project-generated traffic (See Section 3.1). Single-Family land use compatibility conflicts would arise if noise levels exceed 60 CNEL at exterior uses in this zoning district.

The New Destiny International Christian Center is located at the southwest corner of Evan Hewes Highway and Cooley Road. There are no other schools, libraries, churches, hospitals, nursing homes, and parks and recreation areas in the vicinity of the project site or in the vicinity of roads used by project-generated traffic. Land use compatibility conflicts would arise if noise levels exceed 70 CNEL at this church.

Future development of the site is anticipated to include a manufacturing warehouse or other General Manufacturing use. These future uses on the project site would be most similar to the Industrial Manufacturing land use category from Table 2. Thus, exterior use areas associated with the future development of the project site are normally acceptable if ambient noise levels are 70 CNEL or less, conditionally unacceptable if ambient noise levels are 80 CNEL or less, and normally unacceptable if ambient noise levels are above 80 CNEL.

| Table 2<br>City of El Centro Noise/Land Use Compatibility Matrix |   |    |    |    |    |    |    |  |
|--|---|----|----|----|----|----|----|--|
| Land Use   | Community Noise Exposure<br>(L <sub>dn</sub> or CNEL)   |    |    |    |    |    |    |  |
|  | 50  | 55 | 60 | 65 | 70 | 75 | 80 |  |
| Residential  |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
| Transient Lodging – Motel, Hotel                                 |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
| Schools, Libraries, Churches, Hospitals,<br>Nursing Homes        |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
| Auditoriums, Concert Halls, Amphitheaters                        |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
| Sports Arena, Outdoor Spectator Sports                           |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
| Playgrounds, Parks   |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
| Golf Course, Riding Stables, Water<br>Recreation, Cemeteries     |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
| Office Buildings, Business Commercial, and<br>Professional       |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
| Industrial Manufacturing, Utilities,<br>Agriculture              |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
|  |   |    |    |    |    |    |    |  |
|  | <b>Zone A – Normally Acceptable:</b> Specified land use is satisfactory, based upon the assumption that any buildings involved meet conventional Title 24 construction standards. No special noise insulation requirements.                                 |    |    |    |    |    |    |  |
|  | <b>Zone B – Conditionally Acceptable:</b> New Construction or development shall be undertaken only after a detailed noise analysis is made and noise reduction measures are identified and included in the design.  |    |    |    |    |    |    |  |
|  | <b>Zone C – Normally Unacceptable:</b> New construction or development is discouraged. If new construction is proposed, a detailed analysis is required, noise reduction measures must be identified, and noise insulation features included in the design. |    |    |    |    |    |    |  |
|  | <b>Zone D – Clearly Unacceptable:</b> New construction or development clearly should not be undertaken.   |    |    |    |    |    |    |  |
| SOURCE: City of El Centro General Plan Noise Element Table N-3.  |   |    |    |    |    |    |    |  |

## 2.2.2 City Noise Abatement and Control Ordinance

The City Code of Ordinances includes controls for excessive and annoying noise from a variety of sources. Maximum hourly average sound levels have been established for each land use designation and these levels vary by time of day.

### 2.2.2.1 General Noise Level Limits

City Code of Ordinances Section 17.1, also known as the Noise Abatement and Control Ordinance, specifies noise level limits for on-site noise sources. Noise level limits are summarized in Table 3. Noise level limits do not apply to construction equipment.

| <b>Table 3</b><br><b>City of El Centro Noise Abatement and Control Ordinance</b><br><b>Noise Level Limits</b> |                         |  |
|---|-------------------------|--|
| Zone*   | Time of Day             | One-Hour Average Sound Level [dB(A) $L_{eq}$ ] |
| Single-family Residential Zones   | 7:00 a.m. to 10:00 p.m. | 50   |
|   | 10:00 p.m. to 7:00 a.m. | 45   |
| Multiple-family Residential Zones   | 7:00 a.m. to 10:00 p.m. | 55   |
|   | 10:00 p.m. to 7:00 a.m. | 50   |
| Commercial, Civic, and Limited Use Zones  | 7:00 a.m. to 10:00 p.m. | 60   |
|   | 10:00 p.m. to 7:00 a.m. | 55   |
| Manufacturing Zones   | 7:00 a.m. to 10:00 p.m. | 75   |
|   | 10:00 p.m. to 7:00 a.m. | 70   |

SOURCE: City Code of Ordinances Section 17.1-4.  
 \*The zone which exists on the abutting or nearby property at whose boundary the measurement is taken.

The sound level limit at a location on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts.

If the measured ambient sound level exceeds the applicable limit shown, the allowable sound level shall be the ambient noise level minus 5 dB, but not less than the sound level limit specified above.

The project site would be zoned General Manufacturing (MG). Properties to the west, across Dogwood Avenue, are zoned Limited Use (LU); thus applicable noise level limits at the property line of these parcels would be the arithmetic mean between the MG and LU zones, which is 67.5 dB(A)  $L_{eq}$  during daytime hours and 62.5 dB(A)  $L_{eq}$  during nighttime hours.

Properties to the south of the project site, south of the Holton Interurban Railroad Parcel, are zoned Manufacturing Business Park; thus applicable noise level limits at the property line of these parcels would be 75 dB(A)  $L_{eq}$  during daytime hours and 70 dB(A)  $L_{eq}$  during nighttime hours.

Properties to the north and east of the project site, across Villa Avenue and Cooley Road, are not within the City; there is no City zoning for parcels to the north and east of the site. The zoning for parcels to the north is General Agriculture (A-2) and the zoning for parcels to the east is Agriculture-Urban Area (A-2U). The applicable noise level limit at and beyond the northern and eastern property line of the project site would be 75 dB(A)  $L_{eq}$  during daytime hours and 70 dB(A)  $L_{eq}$  during nighttime hours.

### **2.2.2.2 Construction Equipment Noise Level Limits**

Noise Abatement and Control Ordinance Section 17.1-8 addresses noise generated by construction activities. As stated:

Except for emergency work, it shall be unlawful for any person to operate construction equipment at any construction site, except as outlined in subsections (a) and (b) below:

- a) It shall be unlawful for any person to operate construction equipment at any construction site on Sundays, and days appointed by the president, governor, or the city council for a public holiday. Notwithstanding the above, a person may operate construction equipment on the above specified days between the hours of 10:00 a.m. and 5:00 p.m. in compliance with the requirements of subsection (b) of this section at his residence or for the purpose of constructing a residence for himself, provided such operation of construction equipment is not carried on for profit or livelihood. In addition, it shall be unlawful for any person to operate construction equipment at any construction site on Mondays through Saturdays except between the hours of 6:00 a.m. and 7:00 p.m.
- b) No such equipment, or combination of equipment regardless of age or date of acquisition, shall be operated so as to cause noise at a level in excess of seventy-five (75) decibels for more than eight (8) hours during any twenty-four (24) hour period when measured at or within the property lines of any property which is developed and used either in part or in whole for residential purposes.

### **2.2.3 City Municipal Code**

Municipal Code Section 29-156, Commercial and Industrial Standards, regulates sources of groundborne vibration. It states:

Every use shall be so operated that the ground vibration inherently and recurrently generated does not cause a displacement of the earth greater than three thousandths (0.003) of one (1) inch as measured at any point along the property line of the use.

## **2.3 Imperial County Standards**

### **2.3.1 County Land Use Compatibility Standards**

Similar to the City, the County's General Plan Noise Element policies and plans are designed to protect the existing and planned land uses identified in the Land Use Element from excessive noise. The County's Land Use Compatibility Standards are shown in Table 4. County standards would not apply to the project; they are included for reference.

| <b>Table 4<br/>Imperial County Noise/Land Use Compatibility Matrix</b> |   |    |    |    |    |    |    |  |  |
|--|---|----|----|----|----|----|----|--|--|
| Land Use   | Community Noise Exposure<br>(L <sub>dn</sub> or CNEL)   |    |    |    |    |    |    |  |  |
|  | 50  | 55 | 60 | 65 | 70 | 75 | 80 |  |  |
| Residential  |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
| Transient Lodging – Motel, Hotel                                       |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
| Schools, Libraries, Churches, Hospitals,<br>Nursing Homes              |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
| Auditoriums, Concert Halls, Amphitheaters                              |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
| Sports Arena, Outdoor Spectator Sports                                 |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
| Playgrounds, Parks   |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
| Golf Course, Riding Stables, Water<br>Recreation, Cemeteries           |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
| Office Buildings, Business Commercial, and<br>Professional             |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
| Industrial Manufacturing, Utilities,<br>Agriculture                    |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
|  |   |    |    |    |    |    |    |  |  |
|  | <b>Zone A – Normally Acceptable:</b> Specified land use is satisfactory, based upon the assumption that any buildings involved meet conventional Title 24 construction standards. No special noise insulation requirements.                                 |    |    |    |    |    |    |  |  |
|  | <b>Zone B – Conditionally Acceptable:</b> New Construction or development shall be undertaken only after a detailed noise analysis is made and noise reduction measures are identified and included in the design.  |    |    |    |    |    |    |  |  |
|  | <b>Zone C – Normally Unacceptable:</b> New construction or development is discouraged. If new construction is proposed, a detailed analysis is required, noise reduction measures must be identified, and noise insulation features included in the design. |    |    |    |    |    |    |  |  |
|  | <b>Zone D – Clearly Unacceptable:</b> New construction or development clearly should not be undertaken.   |    |    |    |    |    |    |  |  |
| SOURCE: Imperial County General Plan Noise Element Table 7.            |   |    |    |    |    |    |    |  |  |

## 2.3.2 County Noise Abatement and Control Ordinance

### 2.3.2.1 General Noise Level Limits

Imperial County Code of Ordinances Title 9, Division 7: Noise Abatement and Control, specifies noise level limits. Noise level limits are summarized in Table 5. Noise level limits do not apply to construction equipment. County standards would not apply to the project; they are included for reference.

| Zone*   | Time                    | One-Hour Average<br>Sound Level<br>[dB(A) $L_{eq}$ ] |
|---|-------------------------|--|
| Residential Zones   | 7:00 a.m. to 10:00 p.m. | 50   |
|   | 10:00 p.m. to 7:00 a.m. | 45   |
| Multi-Residential Zones                                       | 7:00 a.m. to 10:00 p.m. | 55   |
|   | 10:00 p.m. to 7:00 a.m. | 50   |
| Commercial Zones  | 7:00 a.m. to 10:00 p.m. | 60   |
|   | 10:00 p.m. to 7:00 a.m. | 55   |
| Light Industrial/Industrial Park Zones                        | (anytime)               | 70   |
| General Industrial Zones                                      | (anytime)               | 75   |
| SOURCE: Imperial County Noise Abatement and Control Ordinance |                         |  |

### 2.3.2.2 Construction Noise Standards

Imperial County General Plan Noise Element Section IV.C.3 addresses noise generated by construction activities. It states:

- c) Construction noise, from a single piece of equipment or a combination of equipment, shall not exceed 75 dB  $L_{eq}$ , when averaged over an eight (8) hour period, and measured at the nearest sensitive receptor. This standard assumes a construction period, relative to an individual sensitive receptor of days or weeks. In cases of extended length construction times, the standard may be tightened so as not to exceed 75 dB  $L_{eq}$  when averaged over a one (1) hour period.
- d) Construction equipment operation shall be limited to the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. Saturday. No commercial construction operations are permitted on Sunday or holidays. In cases of a person constructing or modifying a residence for himself/herself, and if the work is not being performed as a business, construction equipment operations may be performed on Sundays and holidays between the hours of 9 a.m. and 5 p.m. Such non-commercial construction activities may be further restricted where disturbing, excessive, or offensive noise causes discomfort or annoyance to reasonable persons of normal sensitivity residing in an area.

## 2.4 Imperial County Airport Land Use Commission

The County ALUC is empowered to review and make determinations for the use of land within an airport’s sphere of influence. The County ALUC is responsible for the preparation of the County Airport Land Use Compatibility Plan and associated aircraft noise level contour mapping. The County’s General Plan identifies the noise compatibility criteria of the County ALUC. Noise compatibility criteria are shown in Table 6.

| <b>Table 6<br/>Imperial County ALUC Noise Compatibility Criteria</b> |                                 |  |       |       |       |
|--|---------------------------------|--|-------|-------|-------|
| Land Use   | Community Noise Exposure (CNEL) |  |       |       |       |
|  | 50-55                           | 55-60  | 60-65 | 65-70 | 70-75 |
| <b>Residential</b>   |                                 |  |       |       |       |
| Single family, nursing homes, mobile homes                           | +                               | 0  | -     | --    | --    |
| Multi-family, apartments, condominiums                               | ++                              | +  | 0     | --    | --    |
| <b>Public</b>  |                                 |  |       |       |       |
| Schools, libraries, hospitals  | +                               | 0  | -     | --    | --    |
| Churches, auditoriums, concert halls                                 | +                               | 0  | 0     | -     | --    |
| Transportation, parking, cemeteries                                  | ++                              | ++   | ++    | +     | 0     |
| <b>Commercial and Industrial</b>                                     |                                 |  |       |       |       |
| Offices, retail trade  | ++                              | +  | 0     | 0     | -     |
| Service commercial, wholesale trade, warehousing, light industrial   | ++                              | ++   | +     | 0     | 0     |
| General manufacturing, utilities, extractive industry                | ++                              | ++   | ++    | +     | +     |
| <b>Agricultural and Recreational</b>                                 |                                 |  |       |       |       |
| Cropland   | ++                              | ++   | ++    | ++    | +     |
| Livestock breeding   | ++                              | +  | 0     | 0     | -     |
| Parks, playgrounds, zoos   | ++                              | +  | +     | 0     | -     |
| Golf courses, riding stables, water recreation                       | ++                              | ++   | +     | 0     | 0     |
| Outdoor spectator sports   | ++                              | ++   | +     | 0     | 0     |
| Amphitheaters  | +                               | 0  | -     | --    | --    |
| ++   | Clearly Acceptable              | The activities associated with the specified land use can be carried out with essentially no interference from the noise exposure.   |       |       |       |
| +  | Normally Acceptable             | Noise is a factor to be considered in that slight interference with outdoor activities may occur. Conventional construction methods will eliminate most noise intrusions upon indoor activities.   |       |       |       |
| 0  | Marginally Acceptable           | The indicated noise exposure will cause moderate interference with outdoor activities and with indoor activities when windows are open. The land use is acceptable on the conditions that outdoor activities are minimal and construction features which provide sufficient noise attenuation are used (e.g., installation of air conditioning so that windows can be kept closed). Under other circumstances, the land use should be discouraged. |       |       |       |
| -  | Normally Unacceptable           | Noise will create substantial interference with both outdoor and indoor activities. Noise intrusion upon indoor activities can be mitigated by requiring special noise insulation construction. Land uses which have conventionally constructed structures and/or involve outdoor activities which would be disrupted by noise should generally be avoided.  |       |       |       |
| --   | Clearly Unacceptable            | Unacceptable noise intrusion upon land use activities will occur. Adequate structural noise insulation is not practical under most circumstances. The indicated land use should be avoided unless strong overriding factors prevail and it should be prohibited if outdoor activities are involved.  |       |       |       |

SOURCE: Imperial County General Plan Noise Element Table 8.

## 3.0 Existing Conditions

### 3.1 Land Use Environment

The site is located within the City's sphere of influence. Per the City's General Plan, the western third of the site is currently designated as Planned Industrial and the eastern two-thirds are designated as Low Density Residential.

El Centro zoning districts in the vicinity of the project site or in the vicinity of roads analyzed in the project traffic report include Single-Family Residential (R1) west of Dogwood Avenue and south of East State Street, General Commercial (CG) south of Evan Hewes Highway and east of Earl Street, Heavy Commercial (CH) along both sides of Main Street, Light Manufacturing (ML) south of Commercial Avenue and west of Dogwood Road, General Manufacturing (MG) north of Commercial Avenue and west of Dogwood Road, Manufacturing Business Park (MBP) south of the project site and north of Evan Hewes Highway, and Limited Use (LU) west of the project site across Dogwood Road.

Imperial County zoning districts in the vicinity of the project site or in the vicinity of roads analyzed in the by project-generated traffic report include Limited Agriculture (A-1), General Agriculture (A-2), and Agriculture Related Light Industrial (AM-1), with smaller Medium Commercial (C-2), Light Industrial (L-1), and Medium Industrial (M-2) zoning districts along Evan Hewes Highway and State Route 111.

Land uses in the vicinity of the project site or in the vicinity of roads anticipated to be used by traffic associated with future development are generally limited to industrial or agricultural uses.<sup>1</sup> Exceptions include the 40-acre tract at the southeast corner of Dogwood Road and Cruickshank Road (rural residential uses non-conforming to County General Agricultural [A-2] zone); the 40-acre tract north of Villa Avenue and inclusive of Villa Lane (rural residential uses non-conforming to County General Agricultural [A-2] zone); the Palm Villa Mobile Home Park at the northwest corner of Evan Hewes Highway and Cooley Road (residential use [trailer park] non-conforming to City Manufacturing Business Park [MBP] zone); and parcels to the south of Evan Hewes Highway and east of Cooley Road (rural residential uses non-conforming to County Medium Commercial [C-2] zone). Additionally, the New Destiny International Christian Center is located at the southwest corner of Evan Hewes Highway and Cooley Road (conditionally permitted use in the City).

### 3.2 Ambient Noise Environment

Three short-term noise measurements and one 24-hour measurement were taken on August 2 and 3, 2017, using a Larson-Davis Model LxT Type 1 Integrating Sound Level

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<sup>1</sup>Agricultural uses may include up to one residential structure per parcel where the residence is accessory to a permitted agricultural use (See Municipal Code Section 29-16).

Meter, serial number 3829. The meter was calibrated before and after measurements. The following parameters were used:

|                      |                     |
|----------------------|---------------------|
| Filter:              | A-weighted          |
| Response:            | Slow                |
| Time History Period: | 5 seconds           |
| Height               | 5 feet above ground |

Noise measurements were taken to obtain existing ambient noise levels. Noise measurements are described below and shown in Table 7. The locations of the measurements are shown on Figure 3, and the noise measurement data are contained in Attachment 1.

Measurement 1 was located at the northeast corner of the project site, southeast of the intersection of Villa Avenue and Cooley Road. Noise measurements were taken at this location to obtain existing noise levels from free-flow traffic on Villa Avenue and Cooley Road. During the measurement, one pickup truck, one passenger car, and one tractor passed. The average measured noise level during Measurement 1 was 51.6 dB(A)  $L_{eq}$ .

Measurement 2 was located along the western boundary of the project site, 50 feet east of the edge of Dogwood Road. Noise measurements were taken at this location to obtain existing noise levels from free-flow traffic on Dogwood Road. Traffic volumes were counted on Dogwood Road, and the results are shown in Table 8. The average measured noise level during Measurement 2 was 66.5 dB(A)  $L_{eq}$ .

| Table 7<br>Noise Measurement Data |   |            |            |                     |           |           |   |
|-----------------------------------|---|------------|------------|---------------------|-----------|-----------|---|
| Site ID*                          | Location  | Start Time | Duration   | Noise Level (dB[A]) |           |           | Noise Sources   |
|                                   |   |            |            | $L_{eq}$            | $L_{max}$ | $L_{min}$ |   |
| 1                                 | Southeast of the intersection of Villa Avenue and Cooley Road                             | 1:11 p.m.  | 30 minutes | 51.6                | 76.5      | 31.3      | Flow in canal and a tractor and two cars on Cooley Road |
| 2                                 | 50 feet east of the edge of Dogwood Road  | 2:09 p.m.  | 30 minutes | 66.5                | 79.4      | 41.5      | Vehicle traffic on Dogwood Road                         |
| 3                                 | Evan Hewes Highway and the Central Drain Three Canal                                      | 3:01 p.m.  | 30 minutes | 68.4                | 81.1      | 42.3      | Vehicle traffic on Evan Hewes Highway                   |
| 4                                 | Center of the project site, approximately 500 feet west of the Central Drain Three Canal. | 12:51 p.m. | 24 hours   | 50.9                | 88.0      | 31.2      | Wind, distant vehicle traffic, and helicopter flyovers  |

\*The Site ID corresponds to locations shown in Figure 3.



 Project Boundary



**Noise Measurements**

 24-Hour

 30-Minute

**FIGURE 3**  
Noise Measurements

Measurement 3 was located south of the project site, at the northeast of the intersection of Evan Hewes Highway and the Central Drain Three Canal. Noise measurements were taken at this location to obtain existing noise levels from free-flow traffic on Evan Hewes Highway. Traffic volumes were counted on Evan Hewes Highway, and the results are shown in Table 8. The average measured noise level during Measurement 3 was 68.4 dB(A)  $L_{eq}$ .

Measurement 4, the 24-hour measurement, was located near the center of the project site and approximately 500 feet west of the Central Drain Three Canal. Noise measurements were taken at this location to document the fluctuation in ambient noise levels on the project site throughout the day. The average measured noise level during Measurement 4 was 50.9 dB(A)  $L_{eq}$ . Measured hourly average noise levels generally ranged from 38 to 53 dB(A)  $L_{eq}$ . Higher hourly average noise levels of 58.1 and 61.5 dB(A)  $L_{eq}$  were measured during two hours due to helicopter passes at 5:23 p.m. and 11:44 p.m.

| Measurement | Roadway            | Direction  | Autos | Medium Trucks | Heavy Trucks | Buses | Motor-Cycles |
|-------------|--------------------|------------|-------|---------------|--------------|-------|--------------|
| 1           | Cooley Road        | Any        | 2     | 0             | 1*           | 0     | 0            |
| 2           | Dogwood Road       | Southbound | 124   | 7             | 4            | 2     | 0            |
|             |                    | Northbound | 126   | 2             | 1            | 0     | 0            |
| 3           | Evan Hewes Highway | Eastbound  | 158   | 2             | 3            | 0     | 0            |
|             |                    | Westbound  | 158   | 2             | 3            | 0     | 0            |

SOURCE: Field traffic counts.  
\*Tractor on Cooley Road categorized as a heavy truck.

## 4.0 Thresholds of Significance

Thresholds used to evaluate potential impacts related to noise are based on applicable criteria in the California Environmental Quality Act (CEQA) Guidelines Appendix G. In accordance with Appendix G of the CEQA Guidelines, implementation of the project would result in a potentially significant impact if it were to:

1. Expose of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
2. Expose of persons to, or generation of, excessive groundborne vibration or groundborne noise levels;
3. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
4. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project; or
5. Result in the exposure of people residing or working in the project area to excessive noise levels from airport or aircraft operations.

## 5.0 Analysis Methodology

Noise level predictions and contour mapping were developed using noise modeling software, SoundPlan Essential (SoundPlan), version 3.0 (Navcon Engineering 2015). SoundPLAN calculates noise propagation based on algorithms and reference levels published by various government agencies, FHWA, and the International Standards Organization. For traffic the model uses the FHWA traffic noise model algorithms to predict noise levels. For stationary sources SoundPlan models propagation based on ISO Standard 9613-2, “Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation.” The ISO Standard 9613-2 assumes that all receptors would be downwind of stationary sources. This is a worst-case assumption for total noise impacts, since, in reality, only some receptors will be downwind at any one time. The model uses various input parameters, such as distances between sources, barriers, and receivers; and shielding provided by intervening terrain, barriers, and structures. Receivers, sources, and barriers were input into the model using three-dimensional coordinates. The model outputs include noise level contours and noise levels at specific receivers. In all cases, receivers were modeled at 5 feet above ground elevation, which represents the average height of the human ear.

### 5.1 Construction Noise Analysis

Construction equipment may be either stationary or mobile. Equipment that operates in one location for one or more days at a time, with either a fixed-power operation, such as pumps, generators, and compressors, or a variable noise operation, such as pile drivers, rock drills, and pavement breakers, is considered a stationary noise source. Equipment such as bulldozers, graders, and loaders that move around the construction site, is considered a mobile noise source.

Construction equipment with diesel engines typically generate maximum noise levels from 80 to 90 dB(A)  $L_{eq}$  at a distance of 50 feet (FHWA 2006). Table 9 summarizes typical construction equipment noise levels. During excavation, grading, and paving operations, equipment moves to different locations and goes through varying load cycles, and there are breaks for the operators and for non-equipment tasks, such as measurement. Thus, average hourly noise levels would be less than maximum noise levels.

| Table 9<br>Typical Construction Equipment Noise Levels |  |                    |
|--|--|--------------------|
| Equipment  | Noise Level at 50 Feet<br>[dB(A) L <sub>eq</sub> ] | Typical Duty Cycle |
| Auger Drill Rig  | 85   | 20%                |
| Backhoe  | 80   | 40%                |
| Blasting   | 94   | 1%                 |
| Chain Saw  | 85   | 20%                |
| Clam Shovel  | 93   | 20%                |
| Compactor (ground)                                     | 80   | 20%                |
| Compressor (air)                                       | 80   | 40%                |
| Concrete Mixer Truck                                   | 85   | 40%                |
| Concrete Pump  | 82   | 20%                |
| Concrete Saw   | 90   | 20%                |
| Crane (mobile or stationary)                           | 85   | 20%                |
| Dozer  | 85   | 40%                |
| Dump Truck   | 84   | 40%                |
| Excavator  | 85   | 40%                |
| Front End Loader                                       | 80   | 40%                |
| Generator (25 kilovolt amps or less)                   | 70   | 50%                |
| Generator (more than 25 kilovolt amps)                 | 82   | 50%                |
| Grader   | 85   | 40%                |
| Hydra Break Ram  | 90   | 10%                |
| Impact Pile Driver (diesel or drop)                    | 95   | 20%                |
| In situ Soil Sampling Rig                              | 84   | 20%                |
| Jackhammer   | 85   | 20%                |
| Mounted Impact Hammer (hoe ram)                        | 90   | 20%                |
| Paver  | 85   | 50%                |
| Pneumatic Tools  | 85   | 50%                |
| Pumps  | 77   | 50%                |
| Rock Drill   | 85   | 20%                |
| Roller   | 74   | 40%                |
| Scraper  | 85   | 40%                |
| Tractor  | 84   | 40%                |
| Vacuum Excavator (vac-truck)                           | 85   | 40%                |
| Vibratory Concrete Mixer                               | 80   | 20%                |
| Vibratory Pile Driver                                  | 95   | 20%                |
| SOURCE: FHWA 2006.                                     |  |                    |

The project site and the area surrounding all off-site roadway extensions are relatively flat. This analysis conservatively assumes no attenuation from barriers and topography.

Ground conditions typically change during construction due to fugitive dust control practices such as soil stabilization through site watering and best management practices such as subgrade compaction. This analysis conservatively models ground conditions as acoustically hard. Thus, construction noise would be characterized by hard site attenuation rate of 6 dB(A) per doubling of distance.

### 5.1.1 Project Site Development

Construction would be anticipated to commence in January 2020 and complete in December 2024 (i.e., a five-year duration). No specific development is proposed at this time; thus, construction phasing and equipment parameters are not available at this time. Typical construction activities that would be anticipated to occur include site preparation; grading; loading, unloading, and placing materials; and paving. Additionally, diesel engine-driven trucks would be anticipated to bring materials to the site and remove construction waste.

Earthwork and paving activities generally result in the highest noise levels at adjacent properties. In the absence of specifics, it was assumed that the loudest noise levels would occur during earthworks or paving operations. During earthworks and paving operations, equipment moves to different locations and goes through varying load cycles, and there are breaks for the operators and for non-equipment tasks, such as measurement. Although maximum noise levels reach 80 to 90 dB(A) at a distance of 50 feet during most construction activities, hourly equivalent noise level generated by typical earthworks and paving activities is generally 82 dB(A)  $L_{eq(8h)}$  at 50 feet from the center of construction activity when assessing the loudest pieces of equipment working simultaneously.

### 5.1.2 Off-site Roadway Improvements

As discussed in Section 1.1.1, the project would require improvements to local roadways. Specific improvements include intersection signalizations, construction of additional intersection turn lanes, construction of a new roadway, and widening of two existing roadways. Specific roadway construction details are not known at this time and were estimated based on previous experience.

Project roadway improvement construction noise levels would vary based on the type of construction equipment used and the rate at which work progresses. Similar to construction associated with project site development, maximum noise levels reach 80 to 90 dB(A) at a distance of 50 feet during most construction activities, and hourly average equivalent noise levels would generally reach 82 dB(A)  $L_{eq}$  at 50 feet from the center of construction activity.

Construction noise from a linear project, such as a roadway, is assessed from the centerline of the alignment and work area. Maximum noise levels would occur when the loudest construction equipment is nearest to a noise sensitive receiver. Although construction equipment may temporarily be located at the point on the alignment nearest to a receiver, over time equipment would move along the alignment. Therefore, the distance from a receiver to the centerline of the alignment is not the same as the average distance during a given day from the receiver to construction equipment. Thus, average noise levels inversely correlate to the rate at which construction progresses along the alignment; average noise levels would be greatest at receivers proximate to areas where construction progresses slowly because equipment would linger for extended durations.

## 5.2 Traffic Noise Analysis

### 5.2.1 Project Site Land Use Compatibility

Traffic parameters include roadway lengths and gradients; projected hourly traffic volumes; and vehicle mix, distribution, and speed. Noise level contours were calculated based on the peak hour traffic volumes, which were estimated to be 10 percent of the total average daily traffic (ADT) volume. Typically, the predicted CNEL and the calculated maximum daytime hourly  $L_{eq}$  are equal. Traffic noise contours were developed assuming flat topography with no intervening terrain between roadways and receivers.

Existing roadways in the vicinity of the project site include Dogwood Road, Villa Avenue, Commercial Avenue, Main Street, and Evan Hewes Highway. Additionally, project Phases 2 and 3 uses would require paving Cooley Road as a 2-lane road from the project site to Aten Road.

Traffic noise compatibility was assessed based on buildout of the roadway network as identified in the City's General Plan Circulation Element. This roadway network buildout accounts for cumulative development within the community and therefore includes greater roadway capacities than the near-term roadway improvements identified in the Transportation Impact Analysis.

The maximum level of service (LOS) C ADT volume of the roadway, were conservatively selected because LOS C conditions result in the highest traffic noise levels. The maximum LOS C condition represents the maximum number of vehicles that can travel on a roadway at the maximum vehicle speeds. LOS A and B conditions also represent maximum vehicle speeds but are characterized by fewer vehicles; LOS E and F conditions represent greater traffic volumes, but are characterized by lower vehicle speeds due to congestion, thus generating less noise.

Caltrans Truck Traffic Counts indicate traffic on the nearest segment of Interstate 8 includes 10.2 percent truck traffic (4.1 percent medium trucks and 6.1 percent heavy trucks), and traffic on the nearest segment of State Route 111 includes 12.4 percent truck traffic (7.2 percent medium trucks and 5.2 percent heavy trucks) (Caltrans 2015). Based on the average of these segments, a vehicle classification mix of 88.6 percent passenger vehicles, 5.7 percent medium trucks, and 5.7 percent heavy trucks was assumed. Traffic speeds were modeled based on posted speed limits. Traffic parameters are summarized in Table 10.

| <b>Table 10<br/>Land Use Compatibility – Modeled Traffic Volumes</b>  |                   |                           |                                    |
|---|-------------------|---------------------------|------------------------------------|
| Roadway   | Speed Limit (mph) | Roadway Classification    | Maximum LOS C Traffic Volume (ADT) |
| Dogwood Road <sup>1</sup>   | 45                | 6-Lane Prime Arterial     | 43,000                             |
| Cooley Road <sup>2</sup>  | 40                | 4-Lane Undivided Arterial | 22,000                             |
| Villa Avenue  | 45                | 2-Lane Arterial           | 14,500                             |
| Commercial Avenue   | 45                | 2-Lane Collector          | 9,000                              |
| Main Street   |                   |                           |                                    |
| S. 4 <sup>th</sup> St. to Dogwood Rd.   | 40                | 4-Lane Undivided Arterial | 22,000                             |
| Dogwood Rd. to Earls St.  | 55                | 4-Lane Undivided Arterial | 22,000                             |
| Evan Hewes Highway  | 55                | 4-Lane Undivided Arterial | 22,000                             |
| <p>SOURCES: El Centro General Plan Circulation Element Figure C-1 and Table C-2; El Centro Code of Ordinances Section 17-57; Linscott, Law &amp; Greenspan, Engineers 2018.</p> <p><sup>1</sup>The Transportation Impact Analysis implies that Dogwood would be widened to 6-lanes by recommending that the project be conditioned to dedicate sufficient frontage to the Dogwood Road to meet standards for a 6-lane Prime Arterial.</p> <p><sup>2</sup>The speed limit for Cooley Road has not been identified. As Cooley Road would be a 4-lane undivided Arterial with a signalized intersection with Evan Hewes Highway a speed limit of 40 mph was assumed.</p> |                   |                           |                                    |

### 5.2.2 Traffic Noise Increases

As identified in the Transportation Impact Analysis, project Phases 1, 2, and 3 would result in 3,820 trips per day, 7,640 trips per day, or 11,460 trips per day, respectively (LLG 2018). Potential traffic noise increases associated with project Phase 3 were assessed; the other project Phases 1 and 2 would result in lesser traffic noise increases. Whereas project land use compatibility was assessed based on the maximum LOS C/minimum LOS D condition, traffic noise level increases were estimated based on forecasted traffic volumes from the Transportation Impact Analysis with and without development of the project site (LLG 2018). Forecasted traffic volumes are summarized in Table 11.

| <b>Table 11<br/>Modeled Traffic Volume Increases</b>                  |                   |                               |                                 |              |
|---|-------------------|-------------------------------|---------------------------------|--------------|
| Roadway   | Speed Limit (mph) | Existing Traffic Volume (ADT) | Year 2025 Traffic Volumes (ADT) |              |
|   |                   |                               | Without Project                 | With Project |
| Dogwood Road  |                   |                               |                                 |              |
| Aten Rd. to Villa Ave.  | 45                | 5,430                         | 6,360                           | 6,820        |
| Villa Ave. to Commercial Ave.   | 45                | 5,050                         | 5,960                           | 12,030       |
| Commercial Ave. to Main St.   | 45                | 6,100                         | 7,000                           | 12,730       |
| Main St. to Ross Ave.   | 45                | 6,140                         | 6,520                           | 7,670        |
| Villa Avenue  |                   |                               |                                 |              |
| Dogwood Rd. to Cooley Rd.   | 45                | 500                           | 500                             | 7,380        |
| Main Street   |                   |                               |                                 |              |
| Dogwood Rd. to Earl St.   | 55                | 5,960                         | 6,770                           | 10,210       |
| Evan Hewes Highway  |                   |                               |                                 |              |
| Earl St. to Cooley Rd.  | 55                | 5,800                         | 7,980                           | 9,890        |
| Cooley Rd. to Cannon Rd.  | 55                | 5,300                         | 7,300                           | 9,210        |
| Cooley Road   |                   |                               |                                 |              |
| Aten Rd. to Project Site  | 40                | NA                            | NA                              | 4,580        |
| SOURCE: Linscott, Law & Greenspan Engineers 2018.                     |                   |                               |                                 |              |
| NA = not available; mph = miles per hour; ADT = average daily traffic |                   |                               |                                 |              |

The City has not established criteria for assessing traffic noise increases. Caltrans’ Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects (Traffic Noise Protocol) states that traffic noise impacts may occur when the predicted noise level substantially exceeds the existing noise level and define a noise increase as substantial when the predicted traffic noise levels exceed existing noise levels by 12 dB(A) or more (Caltrans 2011). For this analysis, the 12 dB(A) threshold is used to assess significance.

### 5.3 Vibration Analysis

A quantitative assessment of potential vibration impacts from construction activities, such as blasting, pile-driving, vibratory compaction, demolition, drilling, or excavation, may be conducted using the following equations (Caltrans 2013b).

Vibration impacts from normal equipment to structures may be estimated at any distance from the following equation:

$$PPV_{equipment} = PPV_{reference} \times \left(\frac{25}{Distance}\right)^{1.5}$$

where:  $PPV_{equipment}$  is the peak particle velocity in inches per second of the equipment adjusted for distance; and  $PPV_{reference}$  is the reference vibration level in inches per second at 25 feet as shown in Table 12.

**Table 12**  
**Typical Construction Equipment Vibration Levels**

| Equipment             | PPV at 25 feet (inches/second) <sup>1</sup> | Approximate Groundborne Noise Level at 25 feet <sup>2</sup> |
|-----------------------|---|---|
| Large Bulldozer       | 0.089                                       | 87  |
| Trucks                | 0.076                                       | 86  |
| Mounted Impact Hammer | 0.089                                       | 87  |

SOURCE: Federal Transit Authority (FTA) 2006; Caltrans 2013b.  
<sup>1</sup>Where PPV is the peak particle velocity.  
<sup>2</sup>Where noise level is the level in decibels referenced to 1 micro-inch/second and based on the root mean square (RMS) velocity amplitude.

The City has not established criteria for assessing construction-related groundborne vibration. Caltrans’ standards and methodologies used to determine when local land uses may be subject to unacceptable vibrations are based on the Transportation and Construction Vibration Guidance Manual (Caltrans 2013b). Maximum recommended vibration limits, set in units of inches per second as measured by the peak particle velocity (PPV), by the American Association of State Highway and Transportation Officials (AASHTO) are identified in Table 13.

**Table 13**  
**AASHTO Maximum Vibration Levels for Preventing Damage**

| Structure  | PPV (inches/second) |
|--|---------------------|
| Historic sites or other critical locations                   | 0.1                 |
| Residential buildings, plastered walls                       | 0.2–0.3             |
| Residential buildings in good repair with gypsum board walls | 0.4–0.5             |
| Engineered structures, without plaster                       | 1.0–1.5             |

SOURCE: Caltrans 2013b.

Based on AASHTO recommendations, limiting vibration levels to below 0.2 PPV at residential structures would prevent structural damage regardless of building construction type. These limits are applicable regardless of the persistence of the source. However, as shown in Tables 14 and 15, potential human response associated with vibration is typically dependent on the persistence (i.e., is it a steady or transient vibration source). These levels are summarized in Tables 14 and 15.

**Table 14**  
**Human Response to Steady State Vibration**

| Human Response         | PPV (inches / second)         |
|------------------------|-------------------------------|
| Very disturbing        | 3.6 (at 2 Hz)–0.4 (at 20 Hz)  |
| Disturbing             | 0.7 (at 2 Hz)–0.17 (at 20 Hz) |
| Strongly perceptible   | 0.10                          |
| Distinctly perceptible | 0.035                         |
| Slightly perceptible   | 0.012                         |

SOURCE: Caltrans 2013b.

| Human Response          | PPV (inches/second) |
|-------------------------|---------------------|
| Severe                  | 2.0                 |
| Strongly perceptible    | 0.9                 |
| Distinctly perceptible  | 0.24                |
| Barely perceptible      | 0.035               |
| SOURCE: Caltrans 2013b. |                     |

As shown in Table 15, the vibration level threshold at which transient vibration sources (such as construction equipment) are considered to be distinctly perceptible is 0.24 PPV. Although groundborne vibration is sometimes noticeable in outdoor environments, groundborne vibration is almost never annoying to people who are outdoors due to the lack of a reference for the vibration, such as an object on a shelf. Therefore, the vibration level threshold for human perception is assessed at occupied structures (FTA 2006).

## 6.0 Future Acoustical Environment and Impact Analysis

### 6.1 Construction Noise

#### 6.1.1 Project Site Development

Noise associated with the grading, building, and paving for the project will potentially result in short-term impacts to surrounding properties. A variety of noise-generating equipment such as scrapers, backhoes, front-end loaders, and concrete saws, along with others, would be used during each construction phase.

As discussed in Section 5.1, the loudest construction activities typically result in hourly average noise levels of approximately 82 dB(A)  $L_{eq}$  at 50 feet from the center of the construction activity. Actual noise levels would vary depending on the nature of the construction phase, including the duration of specific activities, nature of the equipment involved, location of the particular receiver, and nature of intervening barriers. Therefore, the use of 82 dB(A)  $L_{eq(8h)}$  at 50 feet is considered a conservative value.

As discussed in Section 2.2.2, the City's Noise Abatement and Control Ordinance establishes construction time of day restrictions and noise level limits. Construction activities may only occur Monday through Saturday between the hours of 6:00 a.m. and 7:00 P.M., excluding holidays. Additionally, construction noise may not exceed 75 dB(A)  $L_{eq(8h)}$  at or beyond the property line of a property that is developed and used for residential purposes.

Construction activities can be evaluated as point sources and noise from construction sites typically attenuate at a rate of 6 dB(A) for every doubling of the distance. As the loudest construction phases typically generate noise levels of 82 dB(A)  $L_{eq(8h)}$  at 50 feet from the

center of activity, noise levels would be anticipated to exceed 75 dB(A)  $L_{eq(8h)}$  if the center of activity for any phase is within 112 feet of the property line of a residential use. If the project site was developed as a single-phase project, the distance from the center of construction activity to the nearest project site boundary would be approximately 1,300 feet. Thus, construction noise levels would attenuate to 54 dB(A)  $L_{eq(8h)}$  within the project site boundaries.

Due to the large size of the project site, construction activities are anticipated to be phased. This analysis assumes construction may be temporarily focused in a 10-acre area for at least 8 hours; this focused area is equivalent to approximately one-quarter of a typical 40-acre lot (i.e. land division quarter-quarter section). The assumption that construction would be focused in a small area is conservative because it would reduce the average distance between construction equipment and adjacent receivers. In a worst-case scenario with all construction activity occurring in the 10-acre area nearest to properties to the north of Villa Avenue, the distance between the center of construction activity to the nearest property line would be approximately 700 feet. Where a 10-acre phase was located nearest to the Palm Villa Mobile Home Park, the distance between the center of construction activity to the nearest property line would be approximately 760 feet. Thus, construction noise levels would attenuate to 59 dB(A)  $L_{eq(8h)}$  at the property line of properties to the north of Villa Avenue and 58 dB(A)  $L_{eq(8h)}$  at the property line the Palm Villa Mobile Home Park.

Thus, construction noise levels would comply with 75 dB(A)  $L_{eq(8h)}$  noise level limit established by City Noise Abatement and Control Ordinance Section 17.1-8. Impacts would be less than significant.

## 6.1.2 Off-site Roadway Improvements

As discussed in Section 1.1.1, the project would require improvements to local roadways. Specific improvements include intersection signalizations, construction of additional intersection turn lanes, construction of a new roadway, and widening of two existing roadways. Specific roadway construction details are not known at this time and were estimated based on previous experience.

Intersection signalization typically involves installing conduits/wiring for street lights and traffic loop detectors, pouring foundations, placing the pole and mast arm, connecting wiring through lights, detectors and controller cabinet, and reforming sidewalks and ramps. Heavy-equipment required for each intersection signalization would be anticipated to include two traffic signal boards, a concrete saw, a crane, and an aerial lift. Non-equipment tasks such as measurement, demarcation, electrical work, and traffic control are frequent. Due the limited duration of heavy-duty construction equipment use and the substantial amount of non-equipment tasks, intersection improvements to do not typically generate substantial noise levels. Noise impacts associated with intersection improvements would be less than significant.

Construction of additional intersection turn lanes involves cutting existing concrete, grading, laying and compacting subgrade layers, asphalt paving, roadway striping, and various other activities. Each additional lane typically requires 12 feet of additional right-of-way width and 300 feet of right-of-way length<sup>2</sup>. Heavy-equipment required for each additional intersection turn lane would be anticipated to include two traffic signal boards, a concrete saw, a rubber-tired loader, a water truck, a paver and paving equipment, and two rollers. Similar to intersection signalizations, non-equipment tasks such as measurement, demarcation, electrical work, and traffic control are frequent. Due the limited duration of heavy-duty construction equipment use and the substantial amount of non-equipment tasks, intersection improvements to do not typically generate substantial noise levels. Noise impacts associated with construction of additional intersection turn lanes would be less than significant.

Construction of a new roadway or widening of existing roadways would also involve grading, laying and compacting subgrade layers, asphalt paving, and roadway striping; however, construction of a new roadway or widening of existing roadways would require greater use of heavy duty equipment than intersection signalizations or construction of additional intersection turn lanes. Heavy-equipment required for roadway construction would be anticipated to include two rubber-tired loaders, a water truck, a paver, and paving equipment, and two rollers. Daily construction activities would include an active work area of 350 linear feet along the roadway improvement area. Based on an average working distance of 350 feet per day, when the active work area is directly adjacent to a given receiver, construction activities throughout the day would be at an average distance of 175 feet along an active portion of the alignment from the receiver. For a receiver that is set back 50 feet from the active work area alignment, using the Pythagorean theorem ( $a^2 + b^2 = c^2$ ), it is calculated that the receiver is at an average distance of 182 feet from the construction equipment ( $\sqrt{50^2 + 175^2} = 182$ ).

As discussed previously, the City's Noise Abatement and Control Ordinance establishes construction time of day restrictions and noise level limits. Construction activities may only occur Monday through Saturday between the hours of 6:00 a.m. and 7:00 P.M., excluding holidays. Additionally, construction noise may not exceed 75 dB(A)  $L_{eq(8h)}$  at or beyond the property line of a property that is developed and used for residential purposes.

The project would include improving Villa Avenue to a 2-lane Arterial between Dogwood Road and Cooley Road. Lands along this segment of Villa Avenue are in Imperial County. The land use designation and zoning for parcels adjacent to Villa Avenue between Dogwood Road and Cooley Road is General Agriculture (A-2). Agricultural lands include eight residences directly north of Villa Avenue. When the construction work area is directly adjacent to residential receivers, the distance from the centerline to the property line would be 38 feet (half of 76-foot minimum right-of-way for 2-lane Arterial) and the average distance from construction equipment would be 179 feet. Noise levels at the residences

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<sup>2</sup> The City's Circulation Element indicates that stacking distances for turn lanes shall be a minimum of 300 feet or as determined by an intersection traffic study.

would reach up to 71 dB(A)  $L_{eq(8h)}$ . Noise levels would be less than noise standards for residential uses. Impacts would be less than significant.

Paving Cooley Road from Aten Road to the project site would not involve construction in the vicinity of a residential property; agricultural lands are located to the west and east of this segment of Cooley Road. Agricultural lands include one residence at the southeast corner of Cooley Road and Cruickshank Road (residence is 225 feet east of the centerline of Cooley Road). When the construction work area is directly adjacent to this residence, the average distance from construction equipment would be 285 feet. Noise levels at the residence would reach up to 67 dB(A)  $L_{eq(8h)}$ . Noise levels would be less than noise standards for residential uses. Impacts would be less than significant.

Improving Dogwood Road to include a second southbound lane from Villa Avenue to Commercial Avenue would not involve construction in the vicinity of a residential property; an Imperial Irrigation District electricity generation facility is located west of this segment of Dogwood Road and the project site is located to the east. Impacts would be less than significant.

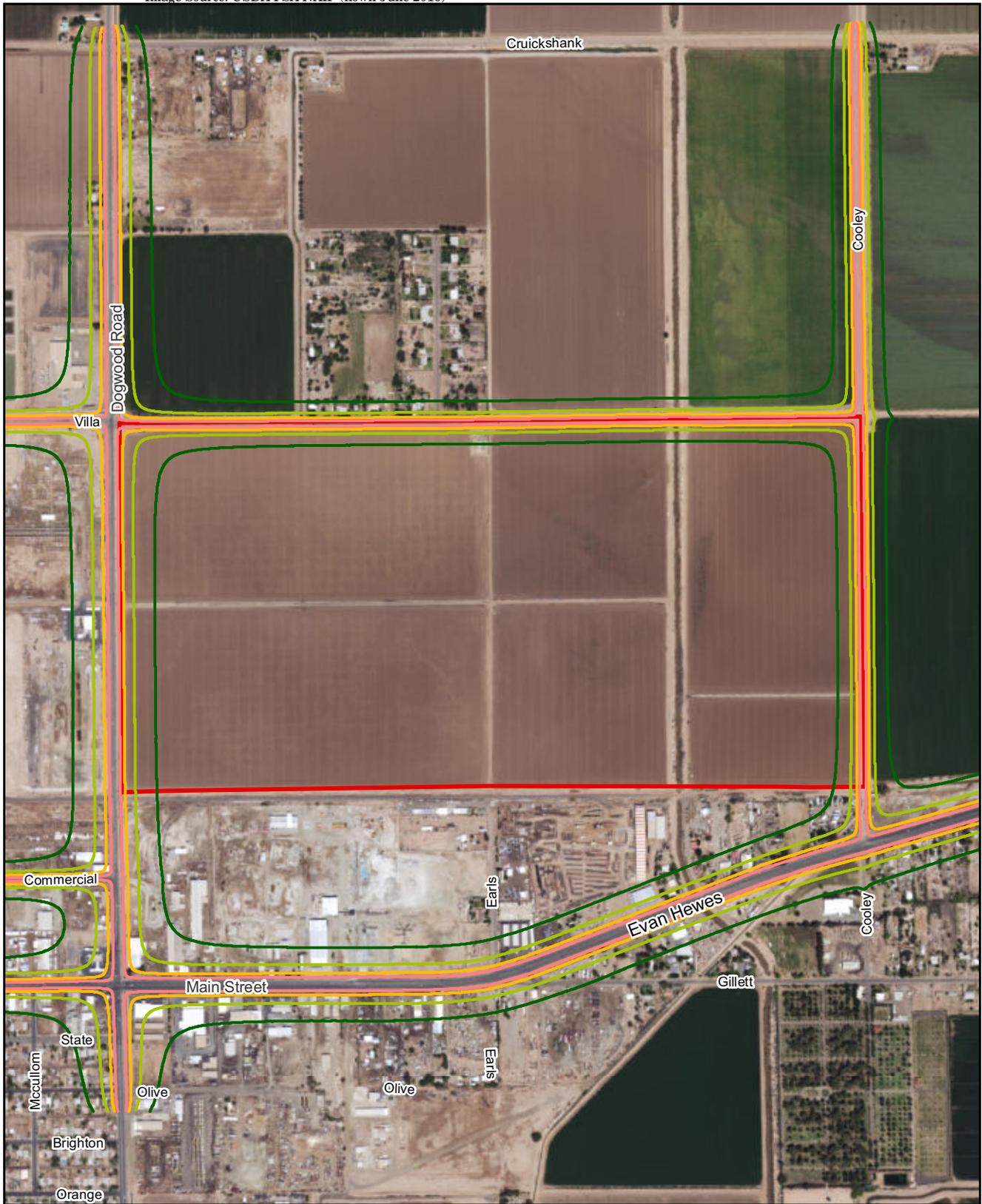
## 6.2 Traffic Noise

### 6.2.1 Traffic Noise Land Use Compatibility

Traffic noise contours were developed using the SoundPLAN program and are based on the parameters discussed in Section 5.2. Noise level contours are shown in Figure 4. SoundPLAN data are contained in Attachment 2.

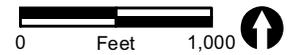
As discussed in Section 2.2.1, the future development of the project site is anticipated to be normally acceptable if ambient noise levels are 70 CNEL or less, conditionally unacceptable if ambient noise levels are 80 CNEL or less, and normally unacceptable if ambient noise levels are above 80 CNEL.

As shown in Figure 4, maximum traffic noise levels would reach up to 75 CNEL along the perimeter of the project site. Based on roadway right-of-way widths, noise levels would exceed the normally acceptable compatibility criteria within the westernmost 21 feet of the project site and the northernmost 20 feet of the project site. Noise levels for Cooley Road would attenuate to less than 70 CNEL within the proposed right-of-way for Cooley Road. Maximum traffic noise levels would not exceed the conditionally acceptable criterion, 80 CNEL, at any portion of the site.



 Project Boundary **Noise Contours**

-  60 CNEL
-  65 CNEL
-  70 CNEL
-  75 CNEL



**FIGURE 4**  
Traffic Noise Compatibility

The General Plan Noise Element states that where ambient noise levels are conditionally acceptable “new Construction or development shall be undertaken only after a detailed noise analysis is made and noise reduction measures are identified and included in the design”. As discussed in Section 2.1.1, standard construction techniques required for compliance with 2016 CalGreen requirements would reduce noise levels in the interior noise environment to less than 50 dB(A)  $L_{eq}$  in occupied areas. Therefore no impacts related to traffic noise compatibility impacts would occur as a result of construction of buildings within areas of exposed to traffic noise.

Future development of the project site may place noise-sensitive exterior use areas such as employee break areas in areas exposed to traffic noise levels that are conditionally acceptable (i.e., 70 to 80 CNEL). In the absence of specific details, the following mitigation is required to reduce potentially significant impacts associated with traffic noise compatibility:

***NOI-1 Increased Site Setbacks along Major Roadways***

Prior to the issuance of a building permit for the project site, the City shall require the Project Applicant to demonstrate that site design would include buildings or walls to shield any on-site noise-sensitive exterior use areas such as employee break areas from traffic noise or would set back all exterior use areas at least (1) 21 feet from the western project site boundary and (2) 20 feet from the northern project site boundary.

If proposed development would not conform to these criteria, the City shall require (1) preparation of a noise technical analysis by a qualified professional prior to construction that illustrates noise reduction measures will reduce noise levels to 70 CNEL in exterior use areas and (3) identification of these noise reduction measures on the site plan.

Mitigation Measure NOI-1 would require that exterior use areas be shielded from traffic noise or be set back from major roadways to prevent noise compatibility conflicts, or proper noise attention for exterior use areas in accordance with the General Plan noise compatibility standards. With incorporation of Mitigation Measure NOI-1, future development of the project site would not include development of uses in areas that are exposed to noise levels that exceed normally acceptable compatibility criteria. Impacts associated with traffic noise compatibility would be reduced to less than significant.

## **6.2.2 Traffic Noise Increases**

Following the methodology discussed in Section 5.2.2, existing and future traffic noise levels were calculated along local roadways. Cumulative noise level increases and the project’s contribution to cumulative noise level increases are shown in Table 16. Noise level estimates are contained in Attachment 2.

| <b>Table 16<br/>Direct and Cumulative Traffic Noise Increases</b> |                          |           |                        |                                       |                         |
|---|--------------------------|-----------|------------------------|---------------------------------------|-------------------------|
| Roadway   | Noise Level <sup>1</sup> |           |                        | Cumulative<br>Noise Level<br>Increase | Project<br>Contribution |
|   | Existing<br>(2017)       | Year 2025 | Year 2025<br>+ Project |                                       |                         |
| Dogwood Road  |                          |           |                        |                                       |                         |
| Aten Rd. to Villa Ave.  | 68                       | 69        | 69                     | 1                                     | 1                       |
| Villa Ave. to Commercial Ave.                                     | 68                       | 69        | 72                     | 4                                     | 3                       |
| Commercial Ave. to Main St.                                       | 69                       | 69        | 72                     | 3                                     | 3                       |
| Main St. to Ross Ave.   | 69                       | 69        | 70                     | 1                                     | 1                       |
| Villa Avenue  |                          |           |                        |                                       |                         |
| Dogwood Rd. to Cooley Rd.   | 58                       | 58        | 70                     | 12                                    | 12                      |
| Main Street   |                          |           |                        |                                       |                         |
| Dogwood Rd. to Earl St.   | 66                       | 71        | 73                     | 7                                     | 2                       |
| Evan Hewes Highway  |                          |           |                        |                                       |                         |
| Earl St. to Cooley Rd.  | 70                       | 72        | 73                     | 3                                     | 1                       |
| Cooley Rd. to Cannon Rd.  | 70                       | 71        | 72                     | 2                                     | 1                       |
| Cooley Road <sup>2</sup>  |                          |           |                        |                                       |                         |
| Aten Rd. to Project Site  | --                       | --        | 67                     | --                                    | --                      |

SOURCE: Linscott, Law & Greenspan Engineers 2018.  
<sup>1</sup>Estimated hourly equivalent noise levels at 50 feet from the centerline of the roadway.  
<sup>2</sup>Cooley Road would be a new road. There is no existing traffic noise from Cooley Road.

A 3 dB(A) increase in noise levels is barely perceptible (Caltrans 2013a). Cumulative traffic noise level increases would be 3 dB(A) or greater, and therefore perceptible, along:

- Dogwood Road, Villa Avenue to Commercial Avenue
- Dogwood Road, Commercial Avenue to Main Street
- Villa Avenue, Dogwood Road to Cooley Road
- Main Street, Dogwood Road to Earl Street
- Evan Hewes Highway, Earl Street to Cannon Road
- Cooley Road, Aten Road to the project site

Traffic noise increases along these segments would be perceptible change from existing conditions. As discussed in Section 5.2.1, Caltrans’ defines a traffic noise increase as “substantial” when the predicted noise levels with project implementation exceed existing noise levels by 12 dB(A) or more (Caltrans 2013a). No impacts would occur where traffic noise increases would be less than perceptible (less than 3 dB[A]); less than significant impacts would occur where traffic noise increases would be perceptible, but would be less than substantial (less than 12 dB[A]); potentially significant impacts may occur where substantial traffic noise increases would occur (12 dB[A] or more). Substantial traffic noise level increases would occur along:

- Villa Avenue, Dogwood Road to Cooley Road
- Cooley Road, Aten Road to the project site (new roadway)

The land use designation and zoning for parcels adjacent to Cooley Road between Aten Road and the project site is General Agriculture (A-2). Land uses include cultivation of row crops on four large parcels (three 160-acre parcels and one 120-acre parcel). One residence

at the southeast corner of Cooley Road and Cruickshank Road (residence is 225 feet east of the centerline of Cooley Road). The residence supports the agricultural use on the same parcel; noise-compatibility standards for agricultural uses would be applicable. As shown in Table 2, noise levels up to 70 CNEL are normally acceptable at agricultural uses and noise levels up to 80 CNEL are conditionally acceptable. Noise levels would attenuate to normally acceptable levels within the proposed right-of-way for Cooley Road and there are no exterior use areas along that could be impacted by high noise levels. Although a substantial traffic noise increase would occur along the segment of Cooley Road between Aten Road and the project site, no noise-sensitive use would be impacted. Thus, impacts associated with the traffic noise increase along Cooley Road between Aten Road and the project site would be less than significant.

A substantial noise increase would occur along Villa Avenue between Dogwood Road and Cooley Road. Lands along this segment of Villa Avenue are in Imperial County. The land use designation and zoning for parcels adjacent to Villa Avenue between Dogwood Road and Cooley Road General Agriculture (A-2), several properties appear to function as residential uses with no associated agricultural use. Noise levels up to 60 CNEL are normally acceptable at residential uses and noise levels up to 70 CNEL are conditionally acceptable. Exterior use areas include the backyards of residences; the nearest backyards are 125 feet from the centerline of Villa Avenue. Site orientation would result in limited shielding of parts for the backyards from residences. Thus, future cumulative traffic noise levels at exterior use areas (backyards) would be 69 CNEL and would be consistent with applicable compatibility standards. Traffic noise level increases would result in noise levels that exceed residential compatibility standards. Although residential compatibility standards do not apply to agricultural uses, this analysis conservatively considers the impact to residences on agricultural lands to be significant.

### ***Mitigation Framework***

Each of the following mitigation options would reduce potentially significant impacts from traffic noise increases:

#### ***NOI-2 Buffer Site Access from Villa Avenue Residences***

The posted speed limit for Villa Avenue shall be 25 miles per hour. Roadway improvements to Villa Avenue shall include features indicative of the reduced speed limit such as speed bumps, stop signs, crosswalks, reduced lane widths, etc. along the segment of Villa Avenue adjacent to residential uses as determined to be appropriate by the City Engineer.

Prior to the issuance of a building permit for the project site, the City shall require the Project Applicant to demonstrate that site access from Villa Avenue would be located within one-quarter mile of Dogwood Road (i.e., west of residences).

Prior to the issuance of a permit to pave Cooley Road from Aten Road to the project site, the City shall require the Project Applicant to demonstrate that

secondary site access from Villa Avenue would be located within one-half mile of Cooley Road (i.e., east of residences).

If proposed development would not conform to these criteria, the City shall require (1) preparation of a noise technical analysis by a qualified professional prior to construction, and (2) noise-reduction measures are identified and included in the design.

### ***Significance after Mitigation***

With incorporation of Mitigation Measure NOI-2, project-generated traffic would be redirected away from residences along Villa Avenue. Although substantial traffic noise increases would occur along the segment of Villa Avenue between the project site access and Dogwood Road and along the segment of Villa Avenue between secondary project site access and Cooley Road, however no noise-sensitive uses would be impacted. Thus, impacts associated with the traffic noise increases would be less than significant.

## **6.3 Railroad Noise**

There is a railway that runs immediately adjacent to the southern project site boundary. The eastern terminus of the railway is approximately in line with the Central Drain Three Canal to the south of the project site. Connecting tracks allow for freight to and from the EW Corporation and Cemex USA industrial facilities. Individual instances of train approaches would temporarily elevate noise levels in the vicinity of the railway. Due to the limited connections, railway activity on this segment is anticipated to be infrequent, with no railway activity on most days. Thus, the railway would not substantially contribute to the ambient noise environment, and the increase in CNEL would be less than measurable. Railway noise would not be anticipated to result in noise levels that exceed the City Land Use Compatibility Standards.

## **6.4 Aircraft Noise**

The project site is approximately 2.75 miles southeast of the Imperial County Airport. The County ALUC most recently updated compatibility zones for the Imperial County airport in September 2004. Compatibility maps are shown in Figure 5. As shown, the furthest zone extends 7,000 feet (1.3 miles) southeast of the airport runway (County ALUC 2004). Thus, aircraft noise would not be anticipated to result in noise levels that exceed the County ALUC noise compatibility criteria.

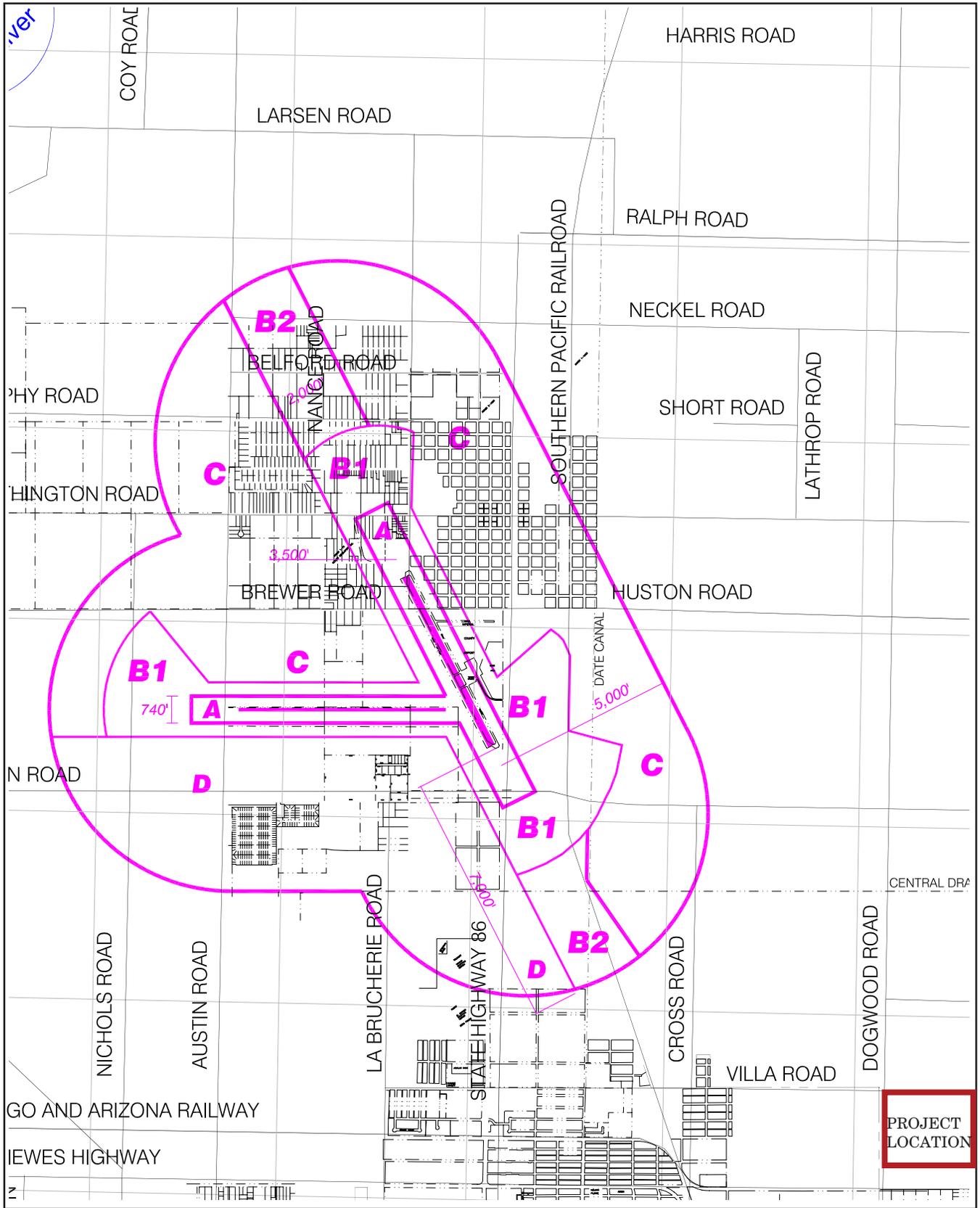


FIGURE 5

Imperial County Airport Compatibility Map

## 6.5 On-Site Generated Noise

No specific development is proposed at this time; the proposed zoning for the project site, General Manufacturing, accommodates a wide variety of use associated with manufacturing, processing, fabrication, assembly of goods and materials, and other industrial uses. Noise sources that would vary widely depending on the type of use that is developed. Common noise sources of concern for such uses include, but not be limited to, heating ventilation, and air conditioning (HVAC) equipment, air handlers, cooling towers, boilers, generators, loading bay activities, and truck traffic. Additional noise sources would also be likely to be associated with any connections to the railway that runs along the southern project site boundary.

Agricultural uses consistent with the existing land use designation include the use of heavy agricultural equipment, which would generate peak noise levels that are similar to noise levels associated with typical industrial equipment.

As discussed in Section 2.2.1, City policies in place to control noise and reduce noise conflict between various land uses. The City's noise policies, as contained in the General Plan and Noise Abatement and Control Ordinance, include policies and regulations that require noise studies for land uses proposed for potentially incompatible locations, limits on hours of operation for various noise-generating activities, and standards for the compatibility of various land uses with the existing and future noise environment. In addition, enforcement of the federal, state, and local noise regulations reduces noise conflicts. Given that enforcement of the Noise Abatement and Control Ordinance Section 17.1 of the Municipal Code limit noise conflicts, impacts would be less than significant at the program level.

## 6.6 Vibration

### 6.6.1 Construction Vibration

As discussed in Section 5.3, vibration level threshold at which construction equipment are considered to be distinctly perceptible is 0.24 PPV and limiting vibration levels to below 0.2 PPV at residential structures would prevent structural damage regardless of building construction type. Groundborne noise and vibration from common construction equipment such as large bulldozers, loaded trucks, and jackhammers would attenuate to less than 0.2 PPV at 12, 10, and 5 feet, respectively. Groundborne noise and vibration from less common construction equipment such as pile drivers would attenuate to less than 0.2 PPV at 72 feet.

#### 6.6.1.1 Project Site Development

The project site is bounded by right-of-way for Dogwood Road to the west, right-of-way for Villa Avenue to the north, proposed right-of-way for Cooley Road to the east, and the 100-foot wide Holton Interurban Railroad Parcel to the south. Due to the size of the project site and as public right-of-way and the Holton Interurban Railroad Parcel would buffers

construction activities from any adjacent structures, construction associated with project site development would not be anticipated to result in substantial groundborne vibration at any structure. Impacts would be less than significant.

### **6.6.1.2 Off-site Roadway Improvements**

Off-site roadway segment improvements would include pavement widening or extension along segments of Villa Avenue, Cooley Road, and Dogwood Road. As construction details are not currently known accurate estimation of groundborne vibration at adjacent structures is not feasible. Construction activities would include use of standard construction equipment. Due to building setbacks standard roadway construction does not generally result in substantial vibration at adjacent structures. The vibrations from standard construction activities are almost never of sufficient amplitude to cause more than minor cosmetic damage to buildings (FTA 2006). Impacts would be less than significant at the program level.

## **6.6.2 Operation Vibration**

No specific development is proposed at this time; the proposed zoning for the project site, General Manufacturing, accommodates a wide variety of use associated with manufacturing, processing, fabrication, assembly of goods and materials, and other industrial uses. Vibration sources would vary widely depending on the type of use that is developed. Substantial vibration sources are not common and may include specialized equipment.

As discussed in Section 2.2.3, City policies in place to control vibration and reduce noise conflict between various land uses. Given that no specific vibration source is proposed and that enforcement of the Municipal Code limits groundborne vibration, impacts would be less than significant at the program level.

# **7.0 Conclusions**

## **7.1 Construction Noise**

As discussed in Section 5.1.1, due to the large size of the project site, average construction noise levels over the life of project construction would attenuate to 54 dB(A)  $L_{eq(8h)}$  within the project site boundaries. When construction activities are focused in a small area near the project site boundary, higher construction noise levels would be expected. For example, if construction were focused in a 10-acre portion of the project site that is nearest to residences along Villa Avenue, construction noise levels would reach 59 dB(A)  $L_{eq(8h)}$  at the property line of properties to the north of Villa Avenue. Similarly, if construction activities were focused near Palm Villa Mobile Home Park, construction noise levels would reach 58 dB(A)  $L_{eq(8h)}$  at the property line of Palm Villa Mobile Home Park. Construction activities associated with development of the project site would comply with standards from the City

Noise Abatement and Control Ordinance Section 17.1-8. Impacts would be less than significant.

The project would include improving Villa Avenue to a 2-lane Arterial between Dogwood Road and Cooley Road, paving Cooley Road from Aten Road to the project site, and improving Dogwood Road to include a second southbound lane from Villa Avenue to Commercial Avenue. Noise levels at the residences north of Villa Avenue would reach up to 71 dB(A)  $L_{eq(8h)}$  and noise levels at the southeast corner of Cooley Road and Cruickshank Road would reach up to 67 dB(A)  $L_{eq(8h)}$ . Construction noise levels would be less than noise standards for residential uses. Impacts would be less than significant.

## 7.2 Traffic Noise

### 7.2.1 Land Use Compatibility

Project compatibility with traffic noise was assessed based on the maximum noise levels that could be generated by vehicle traffic on adjacent roadway conditions (i.e., roadway LOS C conditions). Vehicle traffic on nearby roadways would result in noise levels reaching up to 75 CNEL along the perimeter of the project site. The City Land Use Compatibility Standard for general manufacturing uses is 70 CNEL. As shown in Figure 4, portions of the project site that would be exposed to noise levels that exceed this noise level would include the westernmost 21 feet of the project site and the northernmost 20 feet of the project site. Mitigation Measure NOI-1 would require that all buildings and exterior use areas be set back or shielded from major roadways to prevent noise compatibility conflicts. With incorporation of Mitigation Measure NOI-1, future development of the project site would not include development of uses that conflict with the City Land Use Compatibility Standards. Impacts associated with traffic noise compatibility would be reduced to less than significant.

### 7.2.2 Traffic Noise Increases

Project-generated traffic would increase volumes on local roadways and thereby increase traffic noise levels. Based on recommended criterion from Caltrans' Protocol, substantial traffic noise increases would occur along the segment of Villa Avenue between Dogwood Road to Cooley Road and along the segment of Cooley Road between Aten Road to the project site. The land use designation and zoning for parcels adjacent to these segments is agricultural. Nonetheless, residences along Villa Avenue function as residential uses with no associated agricultural use. Traffic noise level increases would result in noise levels that exceed residential compatibility standards. Thus, mitigation measure NOI-2 would require that project access driveways be situated to direct project traffic away from residential uses along Villa Avenue. Although a substantial traffic noise increases would occur, no noise-sensitive use would be impacted. With incorporation of mitigation measure NOI-2, impacts associated with traffic noise increases would be reduced to less than significant.

## 7.3 Railroad Noise

Railway activity on the segment of railway that runs immediately adjacent to the southern project site boundary is anticipated to be infrequent, with no railway activity on most days. Railway activity would not substantially contribute to the ambient noise environment, and the increase in CNEL would be less than measurable. Railway noise would not be anticipated to result in noise levels that exceed the City Land Use Compatibility Standards.

## 7.4 Aircraft Noise

As shown in Figure 5, the project site is not located within the aircraft impact zone for the Imperial County Airport. Thus, aircraft noise would not be anticipated to result in noise levels that exceed the County ALUC noise compatibility criteria.

## 7.5 On-Site Generated Noise

The proposed project site zoning designation, General Manufacturing, accommodates a wide variety of uses associated with manufacturing, processing, fabrication, assembly of goods and materials, and other industrial uses. Noise sources would vary widely depending on the type of use that is developed. Common noise sources of concern for such uses include, but not be limited to, HVAC equipment, air handlers, cooling towers, boilers, generators, loading bay activities, and truck traffic. Additional noise sources would also be likely to be associated with any connections to the railway that runs along the southern project site boundary.

City policies are in place to control noise and reduce noise conflicts between various land uses. Given that no specific noise source is proposed and that enforcement of the Municipal Code Section 17.1 limits noise generation, impacts would be less than significant at the program level.

## 7.6 Vibration

During construction, use of standard construction equipment associated with project site development and off-site roadway improvements would generate limited groundborne vibration. The project is not anticipated to include any substantial sources of groundborne vibration such as explosive blasting. Due to the size of the project site and as public right-of-way and the Holton Interurban Railroad Parcel would buffers construction activities from any adjacent structures, construction activities associated with project site development would not be anticipated to result in substantial vibration at adjacent structures. Due to building setbacks and as standard roadway construction does not generally result in vibration impacts, construction activities associated with off-site roadway improvements would not be anticipated to result in substantial vibration at adjacent structures. Impacts associated with project construction would be less than significant.

No specific development is proposed at this time; however vibration sources may be constructed. These vibration sources would vary widely depending on the type of use that is developed. As discussed in Section 2.2.3, City policies in place to control vibration and reduce noise conflict between various land uses. Given that no specific vibration source is proposed and that enforcement of the Municipal Code Section 29-156 limits groundborne vibration, impacts would be less than significant at the program level.

## 8.0 References Cited

### California Department of Transportation (Caltrans)

2011 Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects. May. Sacramento, CA. Available: [http://www.dot.ca.gov/hq/env/noise/pub/ca\\_tnap\\_may2011.pdf](http://www.dot.ca.gov/hq/env/noise/pub/ca_tnap_may2011.pdf).

2013a Technical Noise Supplement. November.

2013b Transportation and Construction Vibration Guidance Manual. September.

2015 Annual Average Daily Truck Traffic on the California Highway System.

### Federal Highway Administration (FHWA)

2006 FHWA Roadway Construction Noise Model User's Guide, Final Report. January.

### Federal Transit Authority (FTA)

2006 Transit Noise and Vibration Impact Assessment. Office of Planning and Environment. FTA-VA-90-1003-06. May.

### Imperial County Airport Land Use Commission (ALUC)

2004 Imperial County Airport Land Use Compatibility Map. Accessed on October 31, 2017 at <http://www.icpds.com/?pid=1195>.

### Linscott, Law & Greenspan, Engineers (LLG)

2018 Transportation Impact Analysis, Dogwood and Villa Avenue Site. September 4.

### Navcon Engineering, Inc.

2015 SoundPLAN Essential version 3.0. August 3.

## **ATTACHMENTS**

**ATTACHMENT 1**  
Noise Measurement Data

**Summary**

Filename LxT\_Data.006  
 Serial Number 3829  
 Model SoundExpert™ LxT  
 Firmware Version 2.301  
 User  
 Location  
 Job Description  
 Note  
 Measurement Description  
 Start 2017/08/02 13:12:12  
 Stop 2017/08/02 13:42:12  
 Duration 0:30:00.7  
 Run Time 0:30:00.7  
 Pause 0:00:00.0  
 Pre Calibration 2017/08/02 13:11:52  
 Post Calibration None  
 Calibration Deviation ---

**Overall Settings**

RMS Weight A Weighting  
 Peak Weight A Weighting  
 Detector Slow  
 Preamp PRMLxT1L  
 Microphone Correction Off  
 Integration Method Linear  
 OBA Range Normal  
 OBA Bandwidth 1/1 and 1/3  
 OBA Freq. Weighting A Weighting  
 OBA Max Spectrum At Lmax  
 Overload 122.0 dB

|                   | <b>A</b>    | <b>C</b> | <b>Z</b> |
|-------------------|-------------|----------|----------|
| Under Range Peak  | <b>78.3</b> | 75.3     | 80.3 dB  |
| Under Range Limit | <b>26.2</b> | 25.3     | 32.2 dB  |
| Noise Floor       | 16.3        | 16.2     | 22.1 dB  |

**Results**

LAeq 51.6 dB  
 LAE 84.2 dB  
 EA 29.030  $\mu\text{Pa}^2\text{h}$   
 LApeak (max) 2017/08/02 13:40:08 88.7 dB  
 LASmax 2017/08/02 13:40:09 76.5 dB  
 LASmin 2017/08/02 13:35:08 31.3 dB  
 SEA -99.9 dB

|  |   |       |
|--|---|-------|
| LAS > 85.0 dB (Exceedence Counts / Duration)     | 0 | 0.0 s |
| LAS > 115.0 dB (Exceedence Counts / Duration)    | 0 | 0.0 s |
| LApeak > 135.0 dB (Exceedence Counts / Duration) | 0 | 0.0 s |
| LApeak > 137.0 dB (Exceedence Counts / Duration) | 0 | 0.0 s |
| LApeak > 140.0 dB (Exceedence Counts / Duration) | 0 | 0.0 s |

**Community Noise**

**Ldn LDay 07:00-22:00**  
 51.6 51.6  
 LCeq 59.1 dB  
 LAeq 51.6 dB  
 LCeq - LAeq 7.5 dB  
 LAleq 52.7 dB  
 LAeq 51.6 dB  
 LAleq - LAeq 1.1 dB  
 # Overloads 0  
 Overload Duration 0.0 s  
 # OBA Overloads 0  
 OBA Overload Duration 0.0 s

**Statistics**

LAS5.00 46.0 dB  
 LAS10.00 42.1 dB  
 LAS33.30 36.2 dB  
 LAS50.00 34.1 dB  
 LAS66.60 33.4 dB  
 LAS90.00 32.5 dB

**Calibration History**

| Preamp   | Date                | dB re. 1V/Pa |
|----------|---------------------|--------------|
| Direct   | 2017/01/31 6:59:36  | -26.0        |
| Direct   | 2017/01/31 6:35:22  | -26.0        |
| PRMLxT1L | 2017/08/02 13:11:49 | -28.3        |
| PRMLxT1L | 2017/05/19 13:32:19 | -28.2        |
| PRMLxT1L | 2017/05/19 13:13:14 | -28.1        |
| PRMLxT1L | 2017/05/19 13:10:06 | -28.3        |
| PRMLxT1L | 2017/05/19 12:38:13 | -28.1        |
| PRMLxT1L | 2017/05/19 12:33:49 | -28.2        |
| PRMLxT1L | 2017/05/19 9:26:32  | -28.1        |
| PRMLxT1L | 2017/05/18 14:32:06 | -28.2        |
| PRMLxT1L | 2017/05/18 14:19:25 | -28.2        |
| PRMLxT1L | 2017/05/16 11:34:27 | -28.3        |
| PRMLxT1L | 2017/05/16 11:24:55 | -28.3        |

**Summary**

**Filename** LxT\_Data.008  
**Serial Number** 3829  
**Model** SoundExpert™ LxT  
**Firmware Version** 2.301  
**User**  
**Location**  
**Job Description**  
**Note**  
**Measurement Description**  
**Start** 2017/08/02 14:09:45  
**Stop** 2017/08/02 14:39:46  
**Duration** 0:30:01.3  
**Run Time** 0:30:01.3  
**Pause** 0:00:00.0  
  
**Pre Calibration** 2017/08/02 14:06:34  
**Post Calibration** None  
**Calibration Deviation** ---

**Overall Settings**

**RMS Weight** A Weighting  
**Peak Weight** A Weighting  
**Detector** Slow  
**Preamp** PRMLxT1L  
**Microphone Correction** Off  
**Integration Method** Linear  
**OBA Range** Normal  
**OBA Bandwidth** 1/1 and 1/3  
**OBA Freq. Weighting** A Weighting  
**OBA Max Spectrum** At Lmax  
**Overload** 121.9 dB

|                          | <b>A</b>    | <b>C</b> | <b>Z</b> |
|--------------------------|-------------|----------|----------|
| <b>Under Range Peak</b>  | <b>78.2</b> | 75.2     | 80.2 dB  |
| <b>Under Range Limit</b> | <b>26.1</b> | 25.3     | 32.1 dB  |
| <b>Noise Floor</b>       | 16.3        | 16.1     | 22.0 dB  |

**Results**

**LAeq** 66.5 dB  
**LAE** 99.1 dB  
**EA** 897.493  $\mu\text{Pa}^2\text{h}$   
**LApeak (max)** 2017/08/02 14:35:40 93.0 dB  
**LASmax** 2017/08/02 14:35:40 79.4 dB  
**LASmin** 2017/08/02 14:29:59 41.5 dB  
**SEA** -99.9 dB

|  |   |       |
|--|---|-------|
| <b>LAS &gt; 85.0 dB (Exceedence Counts / Duration)</b>     | 0 | 0.0 s |
| <b>LAS &gt; 115.0 dB (Exceedence Counts / Duration)</b>    | 0 | 0.0 s |
| <b>LApeak &gt; 135.0 dB (Exceedence Counts / Duration)</b> | 0 | 0.0 s |
| <b>LApeak &gt; 137.0 dB (Exceedence Counts / Duration)</b> | 0 | 0.0 s |
| <b>LApeak &gt; 140.0 dB (Exceedence Counts / Duration)</b> | 0 | 0.0 s |

**Community Noise**

**Ldn LDay 07:00-22:00**  
 66.5 66.5  
**LCeq** 73.1 dB  
**LAeq** 66.5 dB  
**LCeq - LAeq** 6.6 dB  
**LAleq** 68.1 dB  
**LAeq** 66.5 dB  
**LAleq - LAeq** 1.6 dB  
**# Overloads** 0  
**Overload Duration** 0.0 s  
**# OBA Overloads** 0  
**OBA Overload Duration** 0.0 s

**Statistics**

**LAS5.00** 72.4 dB  
**LAS10.00** 70.9 dB  
**LAS33.30** 66.5 dB  
**LAS50.00** 61.5 dB  
**LAS66.60** 54.4 dB  
**LAS90.00** 45.4 dB

**Calibration History**

| <b>Preamp</b> | <b>Date</b>         | <b>dB re. 1V/Pa</b> |
|---------------|---------------------|---------------------|
| Direct        | 2017/01/31 6:59:36  | -26.0               |
| Direct        | 2017/01/31 6:35:22  | -26.0               |
| PRMLxT1L      | 2017/08/02 14:06:34 | -28.2               |
| PRMLxT1L      | 2017/08/02 13:44:14 | -28.3               |
| PRMLxT1L      | 2017/08/02 13:11:49 | -28.3               |
| PRMLxT1L      | 2017/05/19 13:32:19 | -28.2               |
| PRMLxT1L      | 2017/05/19 13:13:14 | -28.1               |
| PRMLxT1L      | 2017/05/19 13:10:06 | -28.3               |
| PRMLxT1L      | 2017/05/19 12:38:13 | -28.1               |
| PRMLxT1L      | 2017/05/19 12:33:49 | -28.2               |
| PRMLxT1L      | 2017/05/19 9:26:32  | -28.1               |
| PRMLxT1L      | 2017/05/18 14:32:06 | -28.2               |
| PRMLxT1L      | 2017/05/18 14:19:25 | -28.2               |

**Summary**

Filename LxT\_Data.009  
 Serial Number 3829  
 Model SoundExpert™ LxT  
 Firmware Version 2.301  
 User  
 Location  
 Job Description  
 Note  
 Measurement Description  
 Start 2017/08/02 15:01:36  
 Stop 2017/08/02 15:31:38  
 Duration 0:30:01.6  
 Run Time 0:30:01.6  
 Pause 0:00:00.0  
 Pre Calibration 2017/08/02 14:59:40  
 Post Calibration None  
 Calibration Deviation ---

**Overall Settings**

RMS Weight A Weighting  
 Peak Weight A Weighting  
 Detector Slow  
 Preamp PRMLxT1L  
 Microphone Correction Off  
 Integration Method Linear  
 OBA Range Normal  
 OBA Bandwidth 1/1 and 1/3  
 OBA Freq. Weighting A Weighting  
 OBA Max Spectrum At Lmax  
 Overload 122.0 dB

|                   | <b>A</b>    | <b>C</b> | <b>Z</b> |
|-------------------|-------------|----------|----------|
| Under Range Peak  | <b>78.3</b> | 75.3     | 80.3 dB  |
| Under Range Limit | <b>26.1</b> | 25.3     | 32.1 dB  |
| Noise Floor       | 16.3        | 16.2     | 22.1 dB  |

**Results**

LAeq 68.4 dB  
 LAE 101.0 dB  
 EA 1.395 mPa<sup>2</sup>h  
 LApeak (max) 2017/08/02 15:13:21 95.1 dB  
 LASmax 2017/08/02 15:13:21 81.1 dB  
 LASmin 2017/08/02 15:18:44 42.3 dB  
 SEA -99.9 dB

|  |   |       |
|--|---|-------|
| LAS > 85.0 dB (Exceedence Counts / Duration)     | 0 | 0.0 s |
| LAS > 115.0 dB (Exceedence Counts / Duration)    | 0 | 0.0 s |
| LApeak > 135.0 dB (Exceedence Counts / Duration) | 0 | 0.0 s |
| LApeak > 137.0 dB (Exceedence Counts / Duration) | 0 | 0.0 s |
| LApeak > 140.0 dB (Exceedence Counts / Duration) | 0 | 0.0 s |

**Community Noise**

**Ldn LDay 07:00-22:00**  
 68.4 68.4  
 LCeq 73.0 dB  
 LAeq 68.4 dB  
 LCeq - LAeq 4.5 dB  
 LAleq 69.8 dB  
 LAeq 68.4 dB  
 LAleq - LAeq 1.4 dB  
 # Overloads 0  
 Overload Duration 0.0 s  
 # OBA Overloads 0  
 OBA Overload Duration 0.0 s

**Statistics**

LAS5.00 74.1 dB  
 LAS10.00 72.5 dB  
 LAS33.30 68.3 dB  
 LAS50.00 64.3 dB  
 LAS66.60 59.6 dB  
 LAS90.00 50.0 dB

**Calibration History**

| Preamp   | Date                | dB re. 1V/Pa |
|----------|---------------------|--------------|
| Direct   | 2017/01/31 6:59:36  | -26.0        |
| Direct   | 2017/01/31 6:35:22  | -26.0        |
| PRMLxT1L | 2017/08/02 14:59:39 | -28.3        |
| PRMLxT1L | 2017/08/02 14:44:15 | -28.3        |
| PRMLxT1L | 2017/08/02 14:06:34 | -28.2        |
| PRMLxT1L | 2017/08/02 13:44:14 | -28.3        |
| PRMLxT1L | 2017/08/02 13:11:49 | -28.3        |
| PRMLxT1L | 2017/05/19 13:32:19 | -28.2        |
| PRMLxT1L | 2017/05/19 13:13:14 | -28.1        |
| PRMLxT1L | 2017/05/19 13:10:06 | -28.3        |
| PRMLxT1L | 2017/05/19 12:38:13 | -28.1        |
| PRMLxT1L | 2017/05/19 12:33:49 | -28.2        |
| PRMLxT1L | 2017/05/19 9:26:32  | -28.1        |

**Summary**  
 Filename LxT\_Data.052  
 Serial Number 3896  
 Model SoundTrack LxT@  
 Firmware Version 2.301  
 User  
 Location  
 Job Description  
 Note  
**Measurement Description**  
 Start 2017/08/02 12:51:28  
 Stop 2017/08/03 13:54:07  
 Duration 1 Day 01:02:38.4  
 Run Time 1 Day 01:02:38.4  
 Pause 0:00:00.0  
 Pre Calibration 2017/08/02 12:47:38  
 Post Calibration None  
 Calibration Deviation ---

**Overall Settings**  
 RMS Weight A Weighting  
 Peak Weight A Weighting  
 Detector Slow  
 Preamp PRMLxT1  
 Microphone Correction Off  
 Integration Method Linear  
 Overload 144.3 dB  

|                   | A     | C    | Z        |
|-------------------|-------|------|----------|
| Under Range Peak  | 100.5 | 97.5 | 102.5 dB |
| Under Range Limit | 37.3  | 35.3 | 43.3 dB  |
| Noise Floor       | 24.5  | 25.0 | 32.4 dB  |

**Results**  
 LAeq 50.9 dB  
 LAE 100.4 dB  
 EA 1.222 mPa<sup>2</sup>h  
 EA8 390.329 μPa<sup>2</sup>h  
 EA40 1.952 mPa<sup>2</sup>h  
 LApeak (max) 2017/08/02 12:51:35 109.9 dB  
 LASmax 2017/08/02 23:45:21 88.0 dB  
 LASmin 2017/08/02 17:42:30 31.2 dB  
 SEA -99.9 dB

LAS > 85.0 dB (Exceedence Counts / Duration) 1 9.7 s  
 LAS > 115.0 dB (Exceedence Counts / Duration) 0 0.0 s  
 LApeak > 135.0 dB (Exceedence Counts / Duration) 0 0.0 s  
 LApeak > 137.0 dB (Exceedence Counts / Duration) 0 0.0 s  
 LApeak > 140.0 dB (Exceedence Counts / Duration) 0 0.0 s

LCeq 64.9 dB  
 LAeq 50.9 dB  
 LCeq - LAeq 14.1 dB  
 LAleq 53.9 dB  
 LAeq 50.9 dB  
 LAleq - LAeq 3.0 dB  
 # Overloads 0  
 Overload Duration 0.0 s

**Dose Settings**  
 Dose Name OSHA-1 OSHA-2  
 Exch. Rate 5 5 dB  
 Threshold 90 80 dB  
 Criterion Level 90 90 dB  
 Criterion Duration 8 8 h

**Results**  
 Dose -99.9 0.03 %  
 Projected Dose -99.9 0.01 %  
 TWA (Projected) -99.9 23.3 dB  
 TWA (t) -99.9 31.5 dB  
 Lep (t) 55.8 55.8 dB

**Statistics**  
 LAS5.00 48.5 dB  
 LAS10.00 46.9 dB  
 LAS33.30 41.9 dB  
 LAS50.00 40.0 dB  
 LAS66.60 37.9 dB  
 LAS90.00 34.6 dB

**Calibration History**  

| Preamp   | Date                | dB re. 1V/Pa |
|----------|---------------------|--------------|
| PRMLxT1  | 2017/08/02 12:47:35 | -50.6        |
| PRMLxT1  | 2017/06/13 15:29:44 | -50.7        |
| PRMLxT1  | 2017/06/13 6:52:03  | -50.8        |
| PRMLxT1  | 2017/06/12 17:29:34 | -50.9        |
| PRMLxT1  | 2017/06/12 6:52:55  | -50.7        |
| PRMLxT1  | 2017/06/10 16:05:09 | -50.7        |
| PRMLxT1  | 2017/06/10 8:23:50  | -50.7        |
| PRMLxT1  | 2017/06/09 17:29:15 | -50.8        |
| PRMLxT1  | 2017/06/09 7:59:32  | -50.8        |
| PRMLxT1  | 2017/06/07 17:29:55 | -50.6        |
| PRMLxT1  | 2017/06/07 8:09:21  | -50.8        |
| PRMLxT1L | 2015/06/03 6:52:20  | -28.2        |
| PRMLxT1L | 2015/05/28 6:52:51  | -28.2        |
| PRMLxT1L | 2015/05/27 11:50:01 | -28.2        |
| PRMLxT1L | 2015/02/06 11:01:55 | -28.1        |
| PRMLxT1L | 2015/02/06 10:59:52 | -28.1        |
| Other    | 2016/09/07 6:44:51  | -50.7        |

## **ATTACHMENT 2**

### **Traffic Noise Compatibility and Increase Modeling**

# Roadway Construction Noise

---

Lmax 90 dBA at 50 feet  
 Leq 82 dBA at 50 feet

Daily Progress 350 feet  
 Active Work Area Per Day 350 feet

## *Residences Along East Villa Road*

| Distance         | Traverse | Along Alignment | Hypotenuse |
|------------------|----------|-----------------|------------|
| Minimum Distance | 38       | 0               | 38         |
| Average Distance | 38       | 175             | 179        |

| Noise Source | Ground Type | Reference Leq (dBA) | Reference Distance (Feet) | Receiver Distance | Leq @ Receiver (dBA) |
|--------------|-------------|---------------------|---------------------------|-------------------|----------------------|
| Point        | Hard        | 82                  | 50                        | 179               | 71                   |

## *Ag Residence Along Cooley Road*

| Distance         | Traverse | Along Alignment | Hypotenuse |
|------------------|----------|-----------------|------------|
| Minimum Distance | 225      | 0               | 225        |
| Average Distance | 225      | 175             | 285        |

| Noise Source | Ground Type | Reference Leq (dBA) | Reference Distance (Feet) | Receiver Distance | Leq @ Receiver (dBA) |
|--------------|-------------|---------------------|---------------------------|-------------------|----------------------|
| Point        | Hard        | 82                  | 50                        | 285               | 67                   |





**FHWA RD-77-108  
Traffic Noise Prediction Model**

Data Input Sheet

**Project Name :** Dogwood Road at Villa Avenue Project  
**Project Number :** 8757  
**Modeled Condition :** With and Without Project - 2025 Buildout Condition

**Surface Refelction:** Hard  
**Assessment Metric:** CNEL  
**Peak ratio to ADT:** 10.00  
**Traffic Desc. (Peak or ADT) :** ADT

| Segment | Roadway            | Segment   | Traffic Vol. | Speed (Mph) | Distance to CL | % Autos | %MT  | % HT | Day % | Eve % | Night % | K-Factor |
|---------|--------------------|---|--------------|-------------|----------------|---------|------|------|-------|-------|---------|----------|
| 1       | Dogwood Road       | Aten Rd. to East Villa Rd. - Existing               | 5,430        | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 2       | Dogwood Road       | East Villa Rd. to Commercial Ave. - Existing        | 5,050        | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 3       | Dogwood Road       | Commercial Ave. to Main St. - Existing              | 6,100        | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 4       | Dogwood Road       | Main St. to Ross Ave. - Existing                    | 6,140        | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 5       | Villa Avenue       | Dogwood Rd. to Cooley Rd. - Existing                | 500          | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 6       | Main Street        | Dogwood Rd. to Earl St. - Existing                  | 5,960        | 55          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 7       | Evan Hewes Highway | Earl St. to Cooley Rd. - Existing                   | 5,800        | 55          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 8       | Evan Hewes Highway | Cooley Rd. to Cannon Rd. - Existing                 | 5,300        | 55          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 9       | Cooley Road        | Aten Rd. to Project Site - Existing                 | 0            | 40          | 50             |         | 5.70 | 5.70 | 80.00 | 10.00 |         |          |
| 10      | Dogwood Road       | Aten Rd. to East Villa Rd. - Without Project        | 6,360        | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 11      | Dogwood Road       | East Villa Rd. to Commercial Ave. - Without Project | 5,960        | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 12      | Dogwood Road       | Commercial Ave. to Main St. - Without Project       | 7,000        | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 13      | Dogwood Road       | Main St. to Ross Ave. - Without Project             | 6,520        | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 14      | Villa Avenue       | Dogwood Rd. to Cooley Rd. - Without Project         | 500          | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 15      | Main Street        | Dogwood Rd. to Earl St. - Without Project           | 6,770        | 55          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 16      | Evan Hewes Highway | Earl St. to Cooley Rd. - Without Project            | 7,980        | 55          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 17      | Evan Hewes Highway | Cooley Rd. to Cannon Rd. - Without Project          | 7,300        | 55          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 18      | Cooley Road        | Aten Rd. to Project Site - Without Project          | 0            | 40          | 50             |         | 5.70 | 5.70 | 80.00 | 10.00 |         |          |
| 19      | Dogwood Road       | Aten Rd. to East Villa Rd. - With Project           | 6,820        | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 20      | Dogwood Road       | East Villa Rd. to Commercial Ave. - With Project    | 12,030       | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 21      | Dogwood Road       | Commercial Ave. to Main St. - With Project          | 12,730       | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 22      | Dogwood Road       | Main St. to Ross Ave. - With Project                | 7,670        | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 23      | Dogwood Road       | Dogwood Rd. to Cooley Rd. - With Project            | 7,380        | 45          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 24      | Villa Avenue       | Dogwood Rd. to Earl St. - With Project              | 10,210       | 55          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 25      | Main Street        | Earl St. to Cooley Rd. - With Project               | 9,890        | 55          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 26      | Evan Hewes Highway | Cooley Rd. to Cannon Rd. - With Project             | 9,210        | 55          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |
| 27      | Evan Hewes Highway | Aten Rd. to Project Site - With Project             | 4,580        | 40          | 50             | 88.60   | 5.70 | 5.70 | 80.00 | 10.00 | 10.00   |          |

**FHWA RD-77-108  
Traffic Noise Prediction Model**

Predicted Noise Levels

**Project Name :** Dogwood Road at Villa Avenue Project  
**Project Number :** 8757  
**Modeled Condition :** With and Without Project - 2025 Buildout Condition  
**Assessment Metric:** CNEL

| Segment | Roadway            | Segment   | Noise Levels, dBA CNEL |      |      |       | Distance to Traffic Noise Level Contours, Feet |       |       |       |       |       |
|---------|--------------------|---|------------------------|------|------|-------|--|-------|-------|-------|-------|-------|
|         |                    |   | Auto                   | MT   | HT   | Total | 75 dB  | 70 dB | 65 dB | 60 dB | 55 dB | 50 dB |
| 1       | Dogwood Road       | Aten Rd. to East Villa Rd. - Existing               | 64.1                   | 60.4 | 64.9 | 68    | 11   | 34    | 107   | 338   | 1,069 | 3,380 |
| 2       | Dogwood Road       | East Villa Rd. to Commercial Ave. - Existing        | 63.8                   | 60.1 | 64.6 | 68    | 10   | 32    | 100   | 315   | 998   | 3,155 |
| 3       | Dogwood Road       | Commercial Ave. to Main St. - Existing              | 64.6                   | 60.9 | 65.4 | 69    | 12   | 38    | 120   | 379   | 1,199 | 3,793 |
| 4       | Dogwood Road       | Main St. to Ross Ave. - Existing                    | 64.6                   | 60.9 | 65.4 | 69    | 12   | 38    | 120   | 379   | 1,199 | 3,793 |
| 5       | Villa Avenue       | Dogwood Rd. to Cooley Rd. - Existing                | 53.7                   | 50.0 | 54.5 | 58    | 1  | 3     | 10    | 31    | 97    | 308   |
| 6       | Main Street        | Dogwood Rd. to Earl St. - Existing                  | 67.0                   | 62.2 | 66.1 | 70    | 17   | 54    | 169   | 536   | 1,694 | 5,358 |
| 7       | Evan Hewes Highway | Earl St. to Cooley Rd. - Existing                   | 66.9                   | 62.1 | 66.0 | 70    | 17   | 52    | 166   | 524   | 1,656 | 5,236 |
| 8       | Evan Hewes Highway | Cooley Rd. to Cannon Rd. - Existing                 | 66.5                   | 61.7 | 65.6 | 70    | 15   | 48    | 151   | 477   | 1,510 | 4,775 |
| 9       | Cooley Road        | Aten Rd. to Project Site - Existing                 |                        |      |      | ##### |  |       |       |       |       |       |
| 10      | Dogwood Road       | Aten Rd. to East Villa Rd. - Without Project        | 64.8                   | 61.1 | 65.6 | 69    | 13   | 40    | 126   | 397   | 1,256 | 3,972 |
| 11      | Dogwood Road       | East Villa Rd. to Commercial Ave. - Without Project | 64.5                   | 60.8 | 65.3 | 69    | 12   | 37    | 117   | 371   | 1,172 | 3,707 |
| 12      | Dogwood Road       | Commercial Ave. to Main St. - Without Project       | 65.2                   | 61.5 | 66.0 | 69    | 14   | 44    | 138   | 435   | 1,377 | 4,355 |
| 13      | Dogwood Road       | Main St. to Ross Ave. - Without Project             | 64.9                   | 61.2 | 65.7 | 69    | 13   | 41    | 129   | 406   | 1,285 | 4,064 |
| 14      | Villa Avenue       | Dogwood Rd. to Cooley Rd. - Without Project         | 53.7                   | 50.0 | 54.5 | 58    | 1  | 3     | 10    | 31    | 97    | 308   |
| 15      | Main Street        | Dogwood Rd. to Earl St. - Without Project           | 67.5                   | 62.7 | 66.7 | 71    | 19   | 62    | 195   | 615   | 1,945 | 6,151 |
| 16      | Evan Hewes Highway | Earl St. to Cooley Rd. - Without Project            | 68.3                   | 63.4 | 67.4 | 72    | 23   | 72    | 229   | 723   | 2,285 | 7,227 |
| 17      | Evan Hewes Highway | Cooley Rd. to Cannon Rd. - Without Project          | 67.9                   | 63.1 | 67.0 | 71    | 21   | 66    | 208   | 659   | 2,084 | 6,591 |
| 18      | Cooley Road        | Aten Rd. to Project Site - Without Project          |                        |      |      | ##### |  |       |       |       |       |       |
| 19      | Dogwood Road       | Aten Rd. to East Villa Rd. - With Project           | 65.1                   | 61.4 | 65.9 | 69    | 13   | 43    | 135   | 426   | 1,346 | 4,256 |
| 20      | Dogwood Road       | East Villa Rd. to Commercial Ave. - With Project    | 67.5                   | 63.9 | 68.4 | 72    | 23   | 74    | 234   | 740   | 2,339 | 7,396 |
| 21      | Dogwood Road       | Commercial Ave. to Main St. - With Project          | 67.8                   | 64.1 | 68.6 | 72    | 25   | 79    | 251   | 792   | 2,506 | 7,924 |
| 22      | Dogwood Road       | Main St. to Ross Ave. - With Project                | 65.6                   | 61.9 | 66.4 | 70    | 15   | 48    | 151   | 477   | 1,510 | 4,775 |
| 23      | Dogwood Road       | Dogwood Rd. to Cooley Rd. - With Project            | 65.4                   | 61.7 | 66.2 | 70    | 14   | 46    | 144   | 456   | 1,442 | 4,560 |
| 24      | Villa Avenue       | Dogwood Rd. to Earl St. - With Project              | 69.3                   | 64.5 | 68.4 | 73    | 29   | 91    | 288   | 910   | 2,877 | 9,099 |
| 25      | Main Street        | Earl St. to Cooley Rd. - With Project               | 69.2                   | 64.4 | 68.3 | 73    | 28   | 89    | 281   | 889   | 2,812 | 8,891 |
| 26      | Evan Hewes Highway | Cooley Rd. to Cannon Rd. - With Project             | 68.9                   | 64.1 | 68.0 | 72    | 26   | 83    | 262   | 830   | 2,624 | 8,298 |
| 27      | Evan Hewes Highway | Aten Rd. to Project Site - With Project             | 61.9                   | 58.9 | 63.7 | 67    | 7  | 23    | 74    | 234   | 740   | 2,339 |