

APPENDIX O

CV Link Noise Impact Analysis
Coachella Valley, County of Riverside

December 12, 2016

And

CV Link Bridge Pile Driving Noise and Vibration Addendum

November 9, 2016

Prepared by

Urban Crossroads, Inc.
41 Corporate Park, Suite 300
Irvine, CA 92606



CV Link

NOISE IMPACT ANALYSIS

COACHELLA VALLEY, COUNTY OF RIVERSIDE

PREPARED BY:

Urban Crossroads, Inc.
41 Corporate Park, Suite 300
Irvine, CA 92606

Bill Lawson, PE, INCE
blawson@urbanxroads.com
(949) 336-5979

Alex Wolfe
awolfe@urbanxroads.com
(949) 336-5977

PREPARED FOR:

Coachella Valley Association of Governments

DECEMBER 12, 2016

TABLE OF CONTENTS

TABLE OF CONTENTS	III
APPENDICES	IV
LIST OF EXHIBITS	V
LIST OF TABLES	V
LIST OF ABBREVIATED TERMS.....	VI
 EXECUTIVE SUMMARY	 1
CV Link Operational Noise Impacts to Sensitive Receivers.....	1
Construction Analysis	2
1 INTRODUCTION.....	5
1.1 Site Location.....	5
1.2 Project Description.....	5
1.3 Project Alternatives.....	6
2 FUNDAMENTALS	9
2.1 Frequency.....	10
2.2 Range of Noise	10
2.3 Noise Descriptors	11
2.4 Sound Propagation.....	11
2.5 Noise Control	12
2.6 Noise Barrier Attenuation.....	13
2.7 Land Use Compatibility With Noise	13
2.8 Community Response to Noise	13
2.9 Vibration	14
2.10 Noise Level Measurements.....	15
3 REGULATORY SETTING.....	17
3.1 State of California Noise Requirements.....	17
3.2 Coachella Valley, County of Riverside Noise Element	19
3.3 Operational Noise Standards	20
3.4 Construction Noise Standards	22
3.5 Construction Vibration Standards.....	22
3.6 Riverside County Airport Land Use Compatibility Standards	29
4 SIGNIFICANCE CRITERIA.....	31
5 EXISTING (2016) NOISE LEVEL MEASUREMENTS	35
5.1 Short-Term Reference Noise Measurement Procedures.....	35
5.2 24-Hour Long-Term Measurement Procedure and Criteria	36
5.3 Long-Term Noise Measurement Results.....	37
6 METHODS AND PROCEDURES	43
6.1 Reference Operational Noise Levels	43
6.2 CadnaA Noise Prediction Model	45
6.3 Construction Activities	46
6.4 Construction Vibration Assessment.....	46

7	CV LINK OPERATIONAL NOISE IMPACTS	49
7.1	Operational Noise Standards	49
7.2	Sensitive Receiver Locations	49
7.3	CV Link Operational Noise Levels.....	50
7.4	Project Operational Noise Contribution	56
8	CONSTRUCTION IMPACTS.....	61
8.1	Construction Noise Standards	61
8.2	Construction Noise Levels.....	61
8.3	Construction Noise Thresholds of Significance.....	64
8.4	Construction Vibration Standards.....	65
8.5	Construction Vibration Analysis.....	65
8.6	Construction Noise and Vibration Mitigation Measures	67
9	REFERENCES.....	69
10	CERTIFICATION	71

APPENDICES

APPENDIX 1.1: CV LINK CONSTRUCTION & SITE PLANS
APPENDIX 5.1: NOISE LEVEL MEASUREMENT LOCATION EXHIBITS
APPENDIX 5.2: STUDY AREA PHOTOS
APPENDIX 5.3: PICCOLO SOUND LEVEL METER CALIBRATION SHEETS
APPENDIX 5.4: NOISE LEVEL MEASUREMENT WORKSHEETS
APPENDIX 6.1: CADNAA MODEL DATA INPUTS
APPENDIX 6.2: RCNM NOISE MODEL
APPENDIX 7.1: OPERATIONAL NOISE CONTOUR BOUNDARIES
APPENDIX 7.2: CADNAA NOISE MODEL RESULTS
APPENDIX 8.1: CONSTRUCTION ACTIVITY NOISE CONTOUR BOUNDARIES

LIST OF EXHIBITS

EXHIBIT 1-A: OVERVIEW OF THE CV LINK ALIGNMENT ALTERNATIVES.....	8
EXHIBIT 2-A: TYPICAL NOISE LEVELS.....	9
EXHIBIT 2-B: AUDIBLE SPECTRUM OF TYPICAL NOISE LEVELS	10
EXHIBIT 2-C: NOISE LEVEL INCREASE PERCEPTION	14
EXHIBIT 3-A: LAND USE COMPATIBILITY FOR COMMUNITY NOISE EXPOSURE	21
EXHIBIT 3-B: MUNICIPAL CODE HOURS BY JURISDICTION	23
EXHIBIT 3-C: AIRPORT NOISE LEVEL CONTOUR BOUNDARIES	30
EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS OVERVIEW	38
EXHIBIT 5-B: OVERVIEW OF AMBIENT NOISE LEVEL MEASUREMENT DATA (DBA LEQ)	41

LIST OF TABLES

TABLE 3-1: BASE OPERATIONAL NOISE LEVEL STANDARDS.....	24
TABLE 3-2: AMBIENT ADJUSTMENTS TO THE BASE OPERATIONAL NOISE STANDARDS.....	26
TABLE 3-3: CONSTRUCTION NOISE STANDARDS	27
TABLE 3-4: CONSTRUCTION VIBRATION STANDARDS.....	29
TABLE 4-1: SIGNIFICANCE OF NOISE IMPACTS AT NOISE-SENSITIVE RECEIVERS.....	32
TABLE 4-2: SUMMARY OF SIGNIFICANCE CRITERIA	34
TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS	39
TABLE 6-1: REFERENCE NOISE LEVEL MEASUREMENTS.....	44
TABLE 6-2: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT	47
TABLE 7-1: EXISTING AMBIENT NOISE LEVEL EXCEEDANCES	52
TABLE 7-2: PROJECT-RELATED OPERATIONAL NOISE LEVEL COMPLIANCE	54
TABLE 7-3: DAYTIME OPERATIONAL NOISE LEVEL CONTRIBUTIONS (DBA LEQ)	57
TABLE 7-4: EVENING OPERATIONAL NOISE LEVEL CONTRIBUTIONS (DBA LEQ)	58
TABLE 7-5: NIGHTTIME OPERATIONAL NOISE LEVEL CONTRIBUTIONS (DBA LEQ).....	59
TABLE 8-1: SITE PREPARATION CONSTRUCTION EQUIPMENT NOISE LEVELS	62
TABLE 8-2: GRADING CONSTRUCTION EQUIPMENT NOISE LEVELS	63
TABLE 8-3: PAVING MOBILE CONSTRUCTION EQUIPMENT NOISE LEVELS	63
TABLE 8-4: PAVING STATIONARY CONSTRUCTION EQUIPMENT NOISE LEVELS.....	63
TABLE 8-5: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY	65
TABLE 8-6: CONSTRUCTION EQUIPMENT VIBRATION LEVELS	66

LIST OF ABBREVIATED TERMS

(1)	Reference
ANSI	American National Standards Institute
CadnaA	Computer Aided Noise Abatement
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
CVAG	Coachella Valley Association of Governments
dBA	A-weighted decibels
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
INCE	Institute of Noise Control Engineering
KMZ	Keyhole Markup Language Zipped
Leq	Equivalent continuous (average) sound level
Lmax	Maximum level measured over the time interval
Lmin	Minimum level measured over the time interval
LSEV	Low-speed elective vehicle
mph	Miles per hour
NEV	Neighborhood Electric Vehicle
NSR	Noise Study Report
PPV	Peak particle velocity
Project	CV Link
RCALUCP	Riverside County Airport Land Use Compatibility Plan
RCNM	Roadway Construction Noise Model
TeNS	Technical Noise Supplement
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this project level Environmental Impact Report (EIR) noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed CV Link ("Project"). As described in the CV Link Master Plan, (1) this multi-modal transportation facility will initially connect eight of the nine cities in the Coachella Valley and three tribal land reservations. Bicycles, pedestrians, and low-speed electric vehicles (LSEVs) will use the corridor to access employment, shopping, schools, friends, and recreational opportunities. As proposed, the CV Link study area includes the cities of Palm Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, La Quinta, Indio, and Coachella; unincorporated Riverside County, and lands belonging to the Agua Caliente Band of Cahuilla Indians, the Cabazon Band of Mission Indians, and the Twenty-Nine Palms Band of Mission Indians. The CV Link pathways will expand on an existing 9.8-mile network of narrow pathways in variable condition to include over 49± miles of "core route" travelways extending from Highway 111 and the Chino Wash in North Palm Springs, to Airport Boulevard in the City of Coachella. The alignment largely follows Tahquitz Creek and the Whitewater River/Coachella Valley Stormwater Channels that serve as the principle stormwater conveyance facilities for the Coachella Valley. While the project is physically located within several jurisdictions, the Coachella Valley Association of Governments (CVAG) is acting as the lead agency with the responsibility of approving, constructing, and managing the Project.

The CV Link project is expected to generate both operational and construction noise level impacts on the land uses located near the multi-modal transportation facility including established noise sensitive residential communities. The Project related operational noise levels will include a variety of activities associated with: bicycles, pedestrians and low-speed electric vehicles. While these activities on their own may not represent substantial noise generators, along some alignments the CV Link pathway alternatives would be located adjacent to noise-sensitive land uses, such as the outdoor living areas (backyards) of single-family and multi-family residences, and therefore, must be evaluated to assess the potential noise impacts. In addition, construction of the CV Link alignments will take place adjacent to noise-sensitive land uses and, therefore, represents a temporary, short-term noise level increase on the existing ambient noise environment.

CV LINK OPERATIONAL NOISE IMPACTS TO SENSITIVE RECEIVERS

To describe the potential CV Link operational noise impacts to nearby sensitive receiver locations, Urban Crossroads collected sample reference noise level measurements of similar activities associated with the planned multi-modal transportation facility. The Project-related operational noise sources with the potential to impact nearby sensitive receivers will include bicycles, pedestrians and low-speed electric vehicles. However, to fully describe the potential noise impacts at sensitive receivers associated with the operation of the CV Link Project, reference noise level measurements were collected throughout the Coachella Valley. The reference noise level measurements include a variety of bicycles, pedestrians and low-speed electric vehicles

activities, such as hiking, dog walking, skateboarding, and golf carts observed throughout the Project study area.

In addition, the Project-only operational noise levels (noise associated only with the Project) will likely be overshadowed by the existing ambient noise environment and the existing and future traffic noise levels on the study area roadway segments, since 19 of the 30 ambient noise level measurements already show (on Table 7-1 of this report) existing noise levels exceeding the base Municipal Code noise level standards at noise-sensitive land uses. Further, this analysis shows that the Project-related operational noise level increases over existing ambient conditions will be *less than significant* at all the nearby sensitive receiver locations. Therefore, the long-term operational noise level impacts associated with the proposed Project activities, such as the bicycles, pedestrians and low-speed electric vehicles, will be *less than significant*.

CONSTRUCTION ANALYSIS

Noise from construction activities may intermittently dominate the noise environment in the immediate area of CV Link construction. Project construction is regulated through Caltrans *Standard Specifications* and by the local jurisdictions' permitted hours of construction activity. To minimize the potential construction noise impacts adjacent to the Project site, construction noise is regulated by Caltrans Standard Specifications, Section 14-8.02 *Noise Control*, which states that construction noise levels shall *...not exceed 86 dBA at 50 feet from the job site activities from 9:00 p.m. to 6:00 a.m.* (2) These provisions shall be adhered to during Project construction. In effect, if the construction activities comply with the permitted hours of each jurisdiction and the nighttime noise level standards identified by Caltrans, the construction noise levels associated with CV Link are considered exempt from the noise standards of the local ordinances.

The worst-case construction noise analysis shows that the highest noise levels will occur within 50 feet of grading activities. The worst-case peak construction noise levels are expected to approach 89.7 dBA Lmax at a distance of 50 feet from the site boundaries, however, the construction noise levels presented in this analysis do not take into account any additional attenuation due to the existing topography and barriers in the Project study area and represent the worst-case noise levels with all equipment operating simultaneously at a single point. Further, the Project pathways are often at different elevations than the adjacent homes which would allow for additional attenuation due to existing topographic conditions. In addition, the noise level standards identified by Caltrans represent the nighttime construction noise level limit for activities occurring between 9:00 p.m. and 6:00 a.m., which the Project will comply with since no nighttime construction activities are planned. With the noise mitigation measures identified in this study, the noise levels due to Project construction activities are expected to create *less than significant* impacts at adjacent sensitive receiver locations.

While some construction-related noise may be *readily perceptible* by adjacent residences, tolerance of construction noise levels by nearby homeowners has been shown to greatly increase when informed that that construction noise is temporary and that the contractor is taking steps to reduce the construction noise levels. (3) Further, periodic exposure to high noise levels in short duration, such as Project-related construction noise, is typically considered an annoyance and not impactful to human health. Caltrans indicates that it would take several years of

exposure to high noise levels to result in hearing impairment; with noise-induced hearing loss from chronic noise exposure showing the greatest impacts over a period of 10 years. (3)

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause intermittent, localized intrusion. Based on the Caltrans construction vibration standard for human annoyance, the proposed Project construction activities will exceed the vibration standard of 0.01 in/sec PPV at receiver locations within 100 feet of large bulldozers if used during Project construction. Therefore, the use of large bulldozers within 100 feet of nearby sensitive land uses (e.g. residential, school, etc.) shall be prohibited unless the vibration levels are shown to be less than the Caltrans *Transportation and Construction Vibration Guidance Manual*, Table 20, peak particle velocity threshold of 0.01 in/sec PPV. With the recommended mitigation measures identified in this report, the Project-related vibration impacts at the nearby sensitive receiver locations represents a *less than significant* impact during the worst-case construction activities at the Project site boundary.

The vibration levels due to Project construction do not represent vibration levels capable of causing building damage to nearby residences. Further, the impacts at the site of the closest sensitive receivers are unlikely to be sustained during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter. Construction at the Project site will be restricted to daytime hours consistent with City requirements thereby eliminating potential vibration impact during the sensitive nighttime hours.

CONSTRUCTION NOISE AND VIBRATION MITIGATION MEASURES

Though construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts, the following practices would reduce any noise level increases produced by the construction equipment to the nearby noise sensitive residential land uses.

- A. Project construction activities shall only occur between the permitted hours of each local jurisdiction's Municipal Code hours, as identified on Table 3-3 of this report. The Project construction supervisor shall ensure compliance with the note.
- B. During all Project site construction, all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction supervisor shall place all stationary construction equipment so that emitted noise is directed away from the noise-sensitive receivers nearest the Project site.
- C. The construction supervisor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site (i.e., at the planned staging areas or further from nearby sensitive receiver locations if possible) during all Project construction.
- D. The use of large bulldozers within 100 feet of nearby sensitive land uses (e.g. residential, school, etc.) shall be minimized.
- E. The construction supervisor shall limit haul truck deliveries to the same hours specified for construction equipment by each local jurisdiction's Municipal Code hours.

This page intentionally left blank

1 INTRODUCTION

This Noise Impact Analysis includes the applicable Federal, State, and local noise criteria and the methodology which will be used to analyze the potential noise impacts associated with the development of the proposed CV Link (“Project”). The subject “core route” of CV Link is a 49± mile alternative transportation corridor for bicycles, pedestrians, and low-speed (up to 25 mph) electric vehicles (LSEVs) along Tahquitz Creek and the Whitewater River/Coachella Valley Stormwater Channels. (1) This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, describes the local regulatory setting, and evaluates the potential Project-related long-term operational and temporary construction noise impacts associated with the Project.

1.1 SITE LOCATION

The CV Link Project is located largely along primary drainages and roadways on the southwest margin and out onto the central valley floor farther east. It is located in the Coachella Valley in County of Riverside. The CV Link Project includes alternatives that traverse the cities of Palm Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, La Quinta, Indio, and Coachella; unincorporated Riverside County, and lands belonging to the Agua Caliente Band of Cahuilla Indians, the Cabazon Band of Mission Indians, and the Twenty-Nine Palms Band of Mission Indians. An overview of the entire CV Link Project study area is shown on Exhibit 1-A.

1.2 PROJECT DESCRIPTION

CV Link expands on 9.8 miles of narrow pathways in variable condition to include over 49± miles of “core route” travelways extending from Highway 111/North Palm Canyon Drive and Tramway in North Palm Springs to Airport Boulevard (Avenue 56) in the City of Coachella. The alignment largely follows the aforementioned floor control channels that serve as principle storm water conveyances for the Coachella Valley (1). The 30% construction staging and access site plans for the proposed facilities are provided in Appendix 1.1.

CV Link will also incorporate and expand the Tahquitz Creek Trail in Palm Springs between South Palm Canyon Drive and the Whitewater Channel. The western termini are at Highway 111 (North Palm Canyon Drive) in northern Palm Springs (the Palm Springs Visitor Center at Tramway Road – access point for the Aerial Tram) and at South Palm Canyon Drive in central Palm Springs (providing access to Downtown Palm Springs and the Tahquitz Canyon Visitor Center). (1)

The eastern terminus is at Airport Boulevard in the City of Coachella and the unincorporated community of Thermal. This terminus provides multi-modal access to the administrative offices of the Coachella Valley Unified School District, John Kelley Elementary School, the La Familia Continuing Education High School, a new Riverside County Sheriff’s Station, the Jacqueline Cochran Airport, the Horses in the Sun (HITS) facility, and the Thermal Club Race Track (under construction).

To the extent possible, CV Link will be constructed on service and maintenance roads located atop channel embankments and levees. Grade-separated crossings (bridges or undercrossings)

of major roadways shall be provided. In areas where the channel corridor is inaccessible, on-street routes will be used. Route variations using the street network are considered in challenging areas.

The design of CV Link will vary based on the width of available right-of-way, variations in the levee or channel structures, street configurations, and local conditions. Generally, it will feature a broad paved path for LSEVs and bicycles, and a softer-surface narrower path for pedestrians. Shade structures, drinking fountains, way finding, and safety features will enhance the user experience. Nearly all pathway construction will occur on previously graded channel embankments or levees, or on paved roadways and improved parkways.

CV Link diverges from the stormwater channels and occurs within road rights-of-way in some areas for several reasons: severe channel constraints, land access issues, or because an on-street alignment provides better connectivity to area destinations.

The CV Link on-street experience is intended to remain as comfortable and intriguing as off-street segments. On-street segments shall provide a higher level of protection than conventional bike lanes. Routes are to be separated from roadways via curbs and planted buffers, similar to cycle track designs. Although on-street alignments have numerous challenges, the engineering team will work with each city involved to identify the best possible outcomes.

The design shall be distinctly recognizable as CV Link. Materials, forms, and color palette shall remain consistent with off-street segments. Patterns and colors in the pathway surface shall be consistent as well as distinct from adjacent sidewalks, resulting in an intuitive navigational experience. Wayfinding signs are anticipated to further clarify the route where directional changes occur.

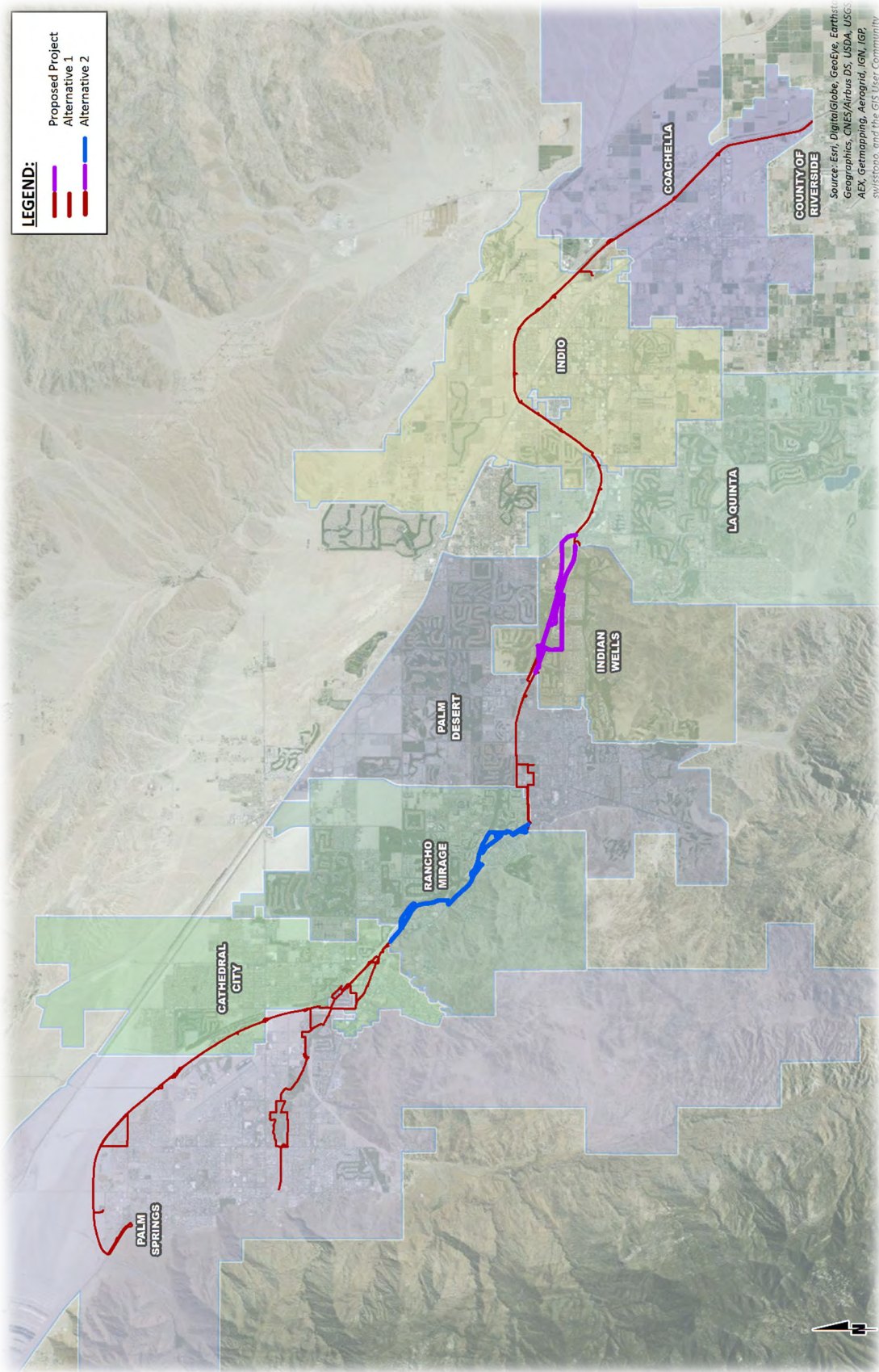
1.3 PROJECT ALTERNATIVES

To ensure that the noise analysis fully describes the potential worst-case conditions, the combined noise level impacts associated all planned CV Link alternative pathways were studied. The Project alternatives are as follows:

- The **Proposed Project** includes the potential CV Link in Palm Springs North, Palm Springs Central, Cathedral City, Palm Desert, Indian Wells, La Quinta, Indio, and Coachella. The Proposed Project does not include CV Link connectivity through Rancho Mirage (between Cathedral City and Palm Desert), because the City of Rancho Mirage recently (2016) adopted Ordinance 1099 prohibiting LSEVs and neighborhood electric vehicles (NEVs) in certain areas and on certain streets within the jurisdiction of the City of Rancho Mirage. The core route length without connectivity through Rancho Mirage is roughly 44.05± miles.
- **Alternative 1 – Project without Rancho Mirage and Indian Wells:** builds off of the Proposed Project, but also eliminates linkage through the City of Indian Wells (between Palm Desert and La Quinta). The core route length of Alternative 1 is approximately 40.53± miles.
- **Alternative 2 – Project with All Eight Cities:** provides linkage between all the Cities listed for the Proposed Project, and also includes connectivity through the City of Rancho Mirage. The core route with all jurisdictions is roughly 49± miles.
- **Alternative 3 – No Build/No Project.**

By analyzing all alternatives, as shown on Exhibit 1-A, as a single combined noise source, this noise impact analysis presents a comprehensive, worst-case Project-related operational noise level analysis for all jurisdictions in which the CV Link pathways may be constructed. The actual Project-related operational noise levels will also vary depending on the frequency and intensity in which the proposed CV Link pathways are used once fully operational.

EXHIBIT 1-A: OVERVIEW OF THE CV LINK ALIGNMENT ALTERNATIVES



2 FUNDAMENTALS

Noise has been simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

EXHIBIT 2-A: TYPICAL NOISE LEVELS

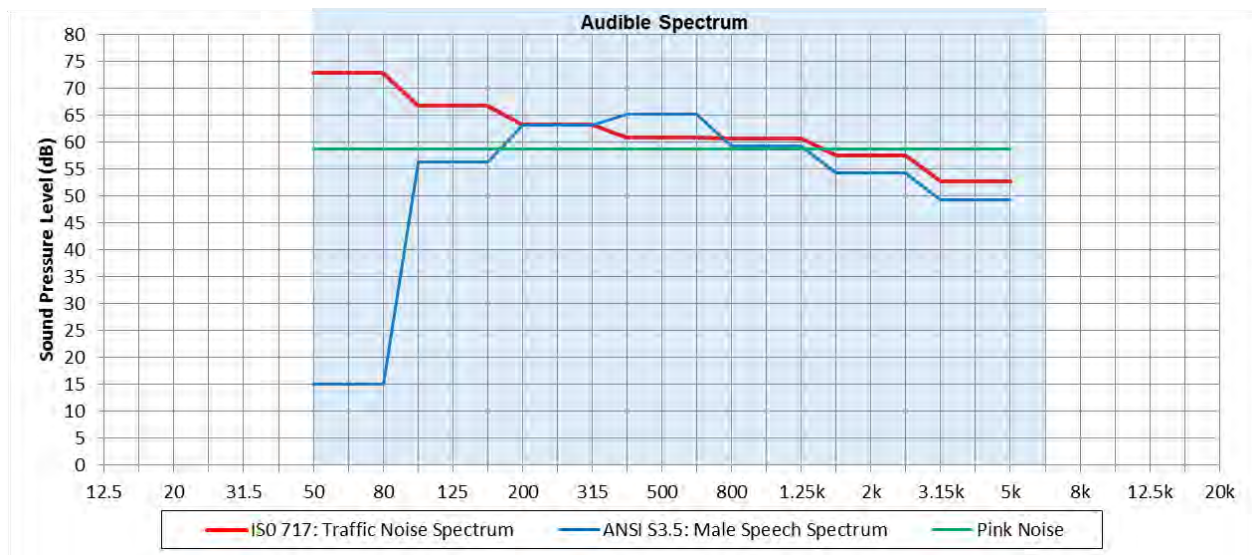
COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	SPEECH INTERFERENCE
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	SLEEP DISTURBANCE
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	NO EFFECT
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		
QUIET SUBURBAN NIGHTTIME	LIBRARY	30		
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20	FAINT	NO EFFECT
	BROADCAST/RECORDING STUDIO	10		
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0	VERY FAINT	NO EFFECT

Source: Environmental Protection Agency Office of Noise Abatement and Control, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA/ONAC 550/9-74-004) March 1974.

2.1 FREQUENCY

The frequency of a sound is defined as the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz), where one Hz equals one cycle per second. (3) The human ear is not equally sensitive to sound of different frequencies. For instance, the human ear is more sensitive to sound in the higher portion of this range than in the lower, and sound waves below 16 Hz or above 20,000 Hz cannot be heard at all. The upper limit decreases as people become older. To describe the frequency range, sound levels are commonly divided into octave or 1/3 octave bands referred to by their center frequencies. (4) Exhibit 2-B shows the spectrum of typical noise levels within the audible A-weighted frequency range. The reference noise sources presented on Exhibit 2-B include traffic noise, the male speech spectrum, and pink noise. (5)

EXHIBIT 2-B: AUDIBLE SPECTRUM OF TYPICAL NOISE LEVELS



Source: INSUL Sound Insulation Prediction Software (v8.0.4) Marshall Day Acoustics, 2014.

2.2 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (3) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA at approximately 100 feet, which can cause serious discomfort. (6) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.3 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most commonly used figure is the equivalent level (Leq). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the “average” noise levels within the environment.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{50} , L_{25} , L_8 and L_2 , are commonly used. The percentile noise descriptors are the noise levels equaled or exceeded during 50 percent, 25 percent, 8 percent and 2 percent of a stated time. Sound levels associated with the L_2 and L_8 typically describe transient or short-term events, while levels associated with the L_{50} describe the steady state (or median) noise conditions. Some City Municipal Codes of the Coachella Valley and County of Riverside rely on the percentile noise levels to describe the stationary source noise level limits. While the L_{50} describes the mean noise levels occurring 50 percent of the time, the Leq accounts for the total energy (average) observed for the entire hour. Therefore, the Leq noise descriptor is generally 1-2 dBA higher than the L_{50} noise level.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of 5 decibels to dBA Leq sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA Leq sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any particular time, but rather represents the total sound exposure. The Cities and County rely on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

2.4 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

2.4.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to

as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

2.4.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receptor, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receptor such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source.

2.4.3 ATMOSPHERIC EFFECTS

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 ft) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

2.4.4 SHIELDING

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an “out of sight, out of mind” effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby resident. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure.

2.5 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for a particular observation point or receptor by controlling the noise source, transmission path, receptor, or all three. This concept is known as the source-path-receptor concept. In general, noise control measures can be applied to any and all of these three elements.

2.6 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receptor. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (7)

2.7 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process.

The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (8)

2.8 COMMUNITY RESPONSE TO NOISE

Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon each individual's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

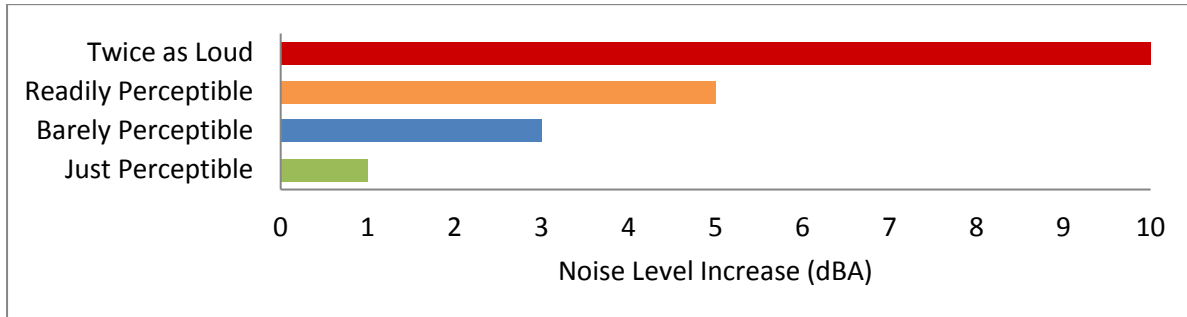
- Fear associated with noise producing activities;
- Socio-economic status and educational level;
- Perception that those affected are being unfairly treated;
- Attitudes regarding the usefulness of the noise-producing activity;
- Belief that the noise source can be controlled.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Another twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (9) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (9)

Despite this variability in behavior on an individual level, the population as a whole can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-C. An increase or decrease of 1 dBA cannot be perceived except in carefully controlled laboratory

experiments, a change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (7)

EXHIBIT 2-C: NOISE LEVEL INCREASE PERCEPTION



2.9 VIBRATION

According to the California Department of Transportation (Caltrans) *Transportation and Construction Vibration Guidance Manual*, (10) vibration is the dynamic excitation of an elastic system, composed of a mass, spring, and some form of damping. As the mass oscillates up and down on a simple mass-spring system, its motion can be described in terms of velocity based on the frequency and amplitude of the mass' displacement. This same principal can be applied to vibration generated by vehicles traveling on highways, and construction and maintenance equipment as they each represent more complex mass-spring systems. Since highway vehicles are supported by flexible suspension systems and pneumatic tires, they are not an efficient source of ground-borne vibration, although, they can impart vibration into the ground when they roll over pavement that is not smooth. Continuous traffic on a smooth highway generates a fairly continuous but relatively low level of vibration. (10)

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings, but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal, and is most frequently used to describe the effect of vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation (VdB) serves to reduce the range of numbers used to describe human response to vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment.

Caltrans identifies perceptible continuous vibration levels for humans ranging from a *barely perceptible* level of 0.01 in/sec PPV to *distinctly perceptible* levels of 0.04 in/sec PPV, with *strongly perceptible* levels approaching 0.10 in/sec PPV. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible.

2.10 NOISE LEVEL MEASUREMENTS

Both short and long-term noise level measurements can be used to assess the existing noise environment and effectively analyze the contributions of a given project on the ambient noise levels. Noise level measurements provide an understanding of existing conditions as they relate to local regulations and the noise-sensitive land uses in a given study area. Further, reference noise level measurements can be used to propagate the noise levels of similar, observable activities which represent the proposed activities of a project.

2.10.1 SOUND LEVEL METER TYPES

The instruments used for measuring or recording noise include a range of manufacturers, models, types, accessories, degrees of accuracy, prices, and levels of sophistication. (3) All noise level measurement equipment must satisfy the American National Standards Institute (ANSI) standard specifications, ANSI S1.4-2014/IEC 61672-1:2013, (11) which identify the following types of sound level meters:

- **Type 0:** Laboratory Standard (designed for laboratory use);
- **Type 1:** Precision (field use);
- **Type 2:** General Purpose (field use).

The expected total allowable error for a Type 1 sound level meter in the field is about 1.5 dB; for a Type 2 sound level meter in the field, the allowable error is about 2.3 dB. (3) For each sound level meter type, the standard requires three frequency weightings (A, B, and C) and two response settings (slow and fast). In addition, the standard permits other optional features in a sound level meter, such as impulse and peak measuring capabilities and wide ranges for the display of sound levels.

2.10.2 SLOW OR FAST RESPONSE

Slow or fast response refers to the time-averaging characteristics of the sound level meter. On the slow setting, the averaging of sound levels takes place over 1-second increments, and on the fast setting, the averaging time is 0.125 second. On a real-time display (digital or analog), the sound level fluctuations are easier to read on the slow setting. The fast setting, however, gives a better resolution of instantaneous sound levels. (3)

This page intentionally left blank

3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains fairly constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared according to guidelines adopted by the Governor's Office of Planning and Research. (12) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts. The California Department of Transportation (Caltrans) identifies its own criteria for highway traffic noise analysis as described below.

3.1.1 CALIFORNIA DEPARTMENT OF TRANSPORTATION

The California Department of Transportation (Caltrans) *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* ("Protocol") provides the Caltrans policy for implementing Federal Regulation 23 CFR 772 in California. (13) The Protocol outlines the requirements for preparing Noise Study Reports (NSRs) for the analysis of highway traffic noise. The Caltrans *Technical Noise Supplement* (TeNS) and the Protocol provide detailed technical guidance for the evaluation of highway traffic noise, including field measurement methods, noise modeling methods, and report preparation guidance. Further, the Caltrans TeNS and Protocol apply to the analysis of highway traffic noise using the Traffic Noise Model (TNM) for noise study reports. While the Caltrans standards for highway traffic noise analysis are described in this noise study, only the Caltrans construction noise standards apply to the Project. The Caltrans construction noise standards presented in this noise study are used to assess the potential impacts to nearby sensitive land uses.

3.1.2 CALTRANS CONSTRUCTION NOISE STANDARDS

The construction noise standards used in this noise study are presented in Section 3.4 and include the Caltrans *Standard Specifications*, Section 14-8.02 *Noise Control*, noise level standards for construction activity. (2) The construction noise standards of the *Standard Specifications* are included under Division II, which applies to all general construction projects under Federal contract with Caltrans unless specified otherwise. (2) Section 14-8.02 of the *Standard Specifications* states that construction noise levels shall ...not exceed 86 dBA at 50 feet from the job site activities from 9:00 p.m. to 6:00 a.m.

3.1.3 CALTRANS VIBRATION STANDARDS

The Caltrans *Transportation and Construction Vibration Guidance Manual* vibration level standards are used to determine the potential for building damage and human annoyance due to construction activity, in compliance with the Federal funding requirements of the Project. Section 3.5 includes a summary of the vibration standards for each jurisdiction in the Project study area, however, the more conservative Caltrans vibration level standards for building damage, 0.12 in/sec PPV, and for human annoyance, 0.01 in/sec PPV, are used in this analysis to evaluate the potential impacts due to Project construction. (10)

3.1.4 CALTRANS TECHNICAL GUIDANCE FOR THE EFFECTS OF NOISE ON ANIMALS

Caltrans provides technical guidance for the assessment and mitigation of the effects of traffic noise and road construction noise on both bats and birds in the following documents, respectively: *Effects of Traffic Noise and Road Construction Noise on Bats*; (14) and *Effects of Traffic Noise and Road Construction Noise on Birds*. (15) Where sensitive biological areas have been identified, the noise levels at nearby bat and bird species' habitats has the potential to adversely affect their communication and their ability to adapt to increased noise levels. Caltrans recommends that if a qualified biologist determines that sensitive bat and/or bird habitats are located near new highway projects that the potential noise impacts to those animals should be addressed.

An important factor in determining whether the noise levels due to Project traffic or construction will affect nearby bats is the distance at which the Project-related noise levels attenuate to meet the existing ambient noise levels. At the distance at which the Project-related and ambient noise levels are equal, the Project-related noise levels are unlikely to exceed the ambient conditions and will not affect nearby bat habitats. However, Caltrans indicates that further research is required to fully understand the potential impacts and identify the criteria required to determine potential impacts to bat roosts (homes) and their hearing and echolocation abilities. This is largely due to the broader hearing range of bats when compared to human hearing; which presents a challenge when assessing noise levels based on A-weighted (i.e. human hearing-based) standards. (14)

Birds on the other hand have been shown to have their ability to communicate with one another be affected by noise levels of 60 dBA, however, the research is limited to certain types of birds and not all species are affected in the same way. Further, no studies have shown that traffic noise levels impact birds, and birds are shown to be overall more resistant to hearing loss than humans. (15) Potentially impacted bat or bird habitats, if identified by a qualified biologist, may require additional noise analysis to determine potential impacts to adjacent wildlife, however, due to limited research there is no direct threshold for bat or bird noise impact analysis.

3.2 COACHELLA VALLEY, COUNTY OF RIVERSIDE NOISE ELEMENT

The cities of Coachella Valley and Riverside County have adopted a Noise Element of the General Plan to control and abate environmental noise, and to protect their citizens of the County of Riverside from excessive exposure to noise. The Noise Element identifies two separate types of noise sources: transportation and stationary; and establishes guidelines for acceptable transportation and stationary community noise levels in the Coachella Valley cities and Riverside County. (16)

3.2.1 LAND USE COMPATIBILITY CRITERIA

The Noise Element specifies the maximum noise levels allowable for new developments impacted by transportation noise sources such as arterial roads, freeways, airports and railroads. The County General Plan standards are derived from standards contained in the General Plan Guidelines, a publication of the California Office of Planning and Research prepared in October, 2003. These standards are used by many California cities and counties. The Noise Element includes standards for land use compatibility for community noise exposure. For single-family residential areas, the exterior noise levels should remain below 65 dBA CNEL, and the interior noise levels should remain below 45 dBA CNEL.

For utilities land uses such as the Project, the *Land Use Compatibility for Community Noise Exposure* matrix sets guidelines according to the predicted noise exposure level. Exhibit 3-A presents the General Plan *Land Use Compatibility for Community Noise Exposure* matrix. According to the noise compatibility matrix, an ambient noise level of up to 70 dBA CNEL is considered *normally acceptable* for neighborhood park land uses such as the Project.

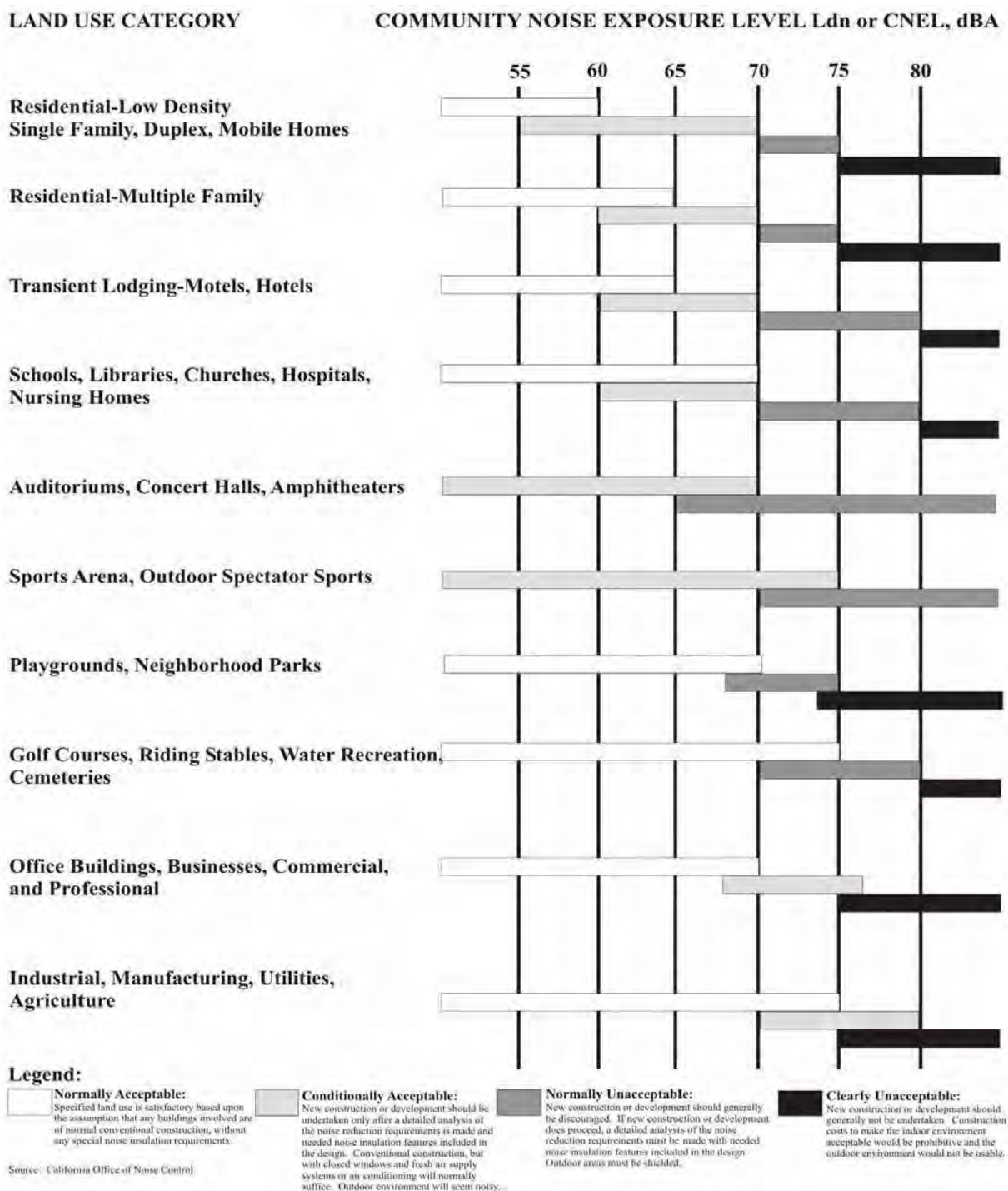
3.2.2 STATIONARY NOISE STANDARDS

The municipalities of the Coachella Valley and Riverside County have set exterior noise limits to control bicycles, pedestrians and low-speed electric vehicles associated with the Project. Policy N-4.1 of the County of Riverside General Plan Noise Element sets an exterior noise limit not to be exceeded for a cumulative period of more than ten minutes in any hour of 65 dBA Leq for daytime hours of 7:00 a.m. to 10:00 p.m., and 45 dBA Leq during the noise-sensitive nighttime hours of 10:00 p.m. to 7:00 a.m. These stationary-source noise level standards are consistent with the municipalities of the Coachella Valley and the County of Riverside Office of Industrial Hygiene guidelines for noise studies within the County. (16) The local operational noise standards used in this analysis are shown on Table 3-1.

3.3 OPERATIONAL NOISE STANDARDS

The Project study area includes the cities of Palm Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, La Quinta, Indio, and Coachella, and unincorporated Riverside County. Therefore, the applicable Municipal Code operational noise level standards from each potentially affected jurisdiction are provided on Table 3-1 in order to determine the appropriate criteria to assess the potential Project-related impacts at nearby sensitive receiver locations. For the purposes of this analysis, the applicable jurisdiction's noise level standards for residential land uses are used to evaluate the Project-related noise sources such as the bicycles, pedestrians and low-speed electric vehicles. Exhibit 3-B shows the municipal code daytime, evening (if applicable), and nighttime hours identified by each jurisdiction used in this analysis to assess the potential Project-related noise level impacts.

Table 3-1 shows the base exterior noise level standards for each jurisdiction, however, some jurisdictions' Municipal Codes include adjustments to their exterior noise level limits if the existing ambient noise levels exceed the base exterior noise level standards. Table 3-2 details the adjustments to the noise level standards for the applicable jurisdictions based on the existing ambient noise level measurements, presented in Section 5 and on Table 5-1 of this report. The operational noise standards shown on Tables 3-1 and 3-2 represent the appropriate thresholds for determining potential impacts due to the operation of the Project.

EXHIBIT 3-A: LAND USE COMPATIBILITY FOR COMMUNITY NOISE EXPOSURE

Source: County of Riverside General Plan Noise Element, Table N-1.

3.4 CONSTRUCTION NOISE STANDARDS

To control noise impacts associated with the construction of the proposed Project, each jurisdiction has established limits to the hours of operation. Table 3-3 shows the permitted hours of construction activity for each jurisdiction, including the Caltrans Standard Specifications, Section 14-8.02 *Noise Control*, noise level standards for construction activity due to the Federal funding requirements of the Project. (2) In effect, if the construction activities comply with the permitted hours of each jurisdiction and the nighttime noise level standards identified by Caltrans, shown on Table 3-3, the construction noise levels associated with CV Link are considered exempt from the noise standards of the local ordinances.

3.5 CONSTRUCTION VIBRATION STANDARDS

To control vibration impacts associated with the construction of the proposed Project, some jurisdictions in the Project study area have specific vibration level standards. Table 3-4 shows the vibration standards for each jurisdiction, including the Caltrans vibration level standards to determine the potential for building damage and human annoyance due to construction activity, in compliance with the Federal funding requirements of the Project.

Both Caltrans, and the County of Riverside and City of Palm Springs, identify a vibration standard of 0.01 in/sec, however, the descriptors used for each velocity level standard vary. The peak-particle-velocity (PPV) standard identified by Caltrans represents the maximum, instantaneous peak of the vibration signal, while the root-mean-square (RMS) velocity standard identified by the County and City of Palm Springs represents roughly 71% of the total PPV, since the RMS vibration levels more closely relate to the levels at which the human body actually responds. This analysis uses the Caltrans 0.01 in/sec PPV threshold for determining the potential vibration impacts as they relate to human annoyance since the PPV descriptor overstates the actual levels capable of being perceived by the human body. Therefore, the more conservative Caltrans vibration level standards for human annoyance, 0.01 in/sec PPV, and the standards for building damage, 0.12 in/sec PPV, are used in this analysis to evaluate the potential impacts due to Project construction. (10)

EXHIBIT 3-B: MUNICIPAL CODE HOURS BY JURISDICTION

Hours	County of Riverside	Palm Springs	Cathedral City	Rancho Mirage	Palm Desert	Indian Wells	La Quinta	Indio					Coachella
								PST		PDT			
0								Mon.-Fri.	Saturdays	Mon.-Fri.	Saturdays	Sundays	
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													

"PST" = Pacific Standard Time; "PDT" = Pacific Daylight Time

	= Daytime
	= Evening
	= Nighttime

TABLE 3-1: BASE OPERATIONAL NOISE LEVEL STANDARDS

Jurisdiction	Land Use	Time Period	Exterior Noise Level Standards ¹							
			Leq (Hourly)	L ₅₀ (30 mins)	L ₂₅ (15 mins)	L ₁₇ (10 mins)	L ₈ (5 mins)	L ₃ (2 min)	L ₂ (1 min)	L _{max} (<1 min)
County of Riverside ²	Residential	7:00 a.m. to 10:00 p.m.	65	-	-	-	-	-	-	-
		10:00 p.m. to 7:00 a.m.	45	-	-	-	-	-	-	-
Palm Springs ³	Residential (Low Density)	7:00 a.m. to 6:00 p.m.	50	53	56	58	61	65	68	71
		6:00 p.m. to 10:00 p.m.	45	-	-	-	-	-	-	-
	10:00 p.m. to 7:00 a.m.	40	-	-	-	-	-	-	-	
	Residential (High Density)	7:00 a.m. to 6:00 p.m.	60	63	66	68	71	75	78	81
		6:00 p.m. to 10:00 p.m.	55	-	-	-	-	-	-	-
Cathedral City ⁴	Residential	10:00 p.m. to 7:00 a.m.	50	-	-	-	-	-	-	-
		Any Time	55	-	-	-	-	-	-	-
Rancho Mirage ⁵	Residential (Low Density)	7:00 a.m. to 6:00 p.m.	-	55	58	60	65	-	70	75
		6:00 p.m. to 10:00 p.m.	-	50	53	55	60	-	65	70
	10:00 p.m. to 7:00 a.m.	-	45	48	50	55	-	60	65	
	Residential (Medium, High Density, Hospital, Open Space)	7:00 a.m. to 6:00 p.m.	-	60	63	65	70	-	75	80
		6:00 p.m. to 10:00 p.m.	-	55	58	60	65	-	70	75
Palm Desert ⁶	Residential (All Zones)	10:00 p.m. to 7:00 a.m.	-	50	53	55	60	-	65	70
		7:00 a.m. to 10:00 p.m.	55	-	-	-	-	-	-	-
		10:00 p.m. to 7:00 a.m.	45	-	-	-	-	-	-	-

Jurisdiction	Land Use	Time Period	Exterior Noise Level Standards ¹							
			Leq (Hourly)	L ₅₀ (30 mins)	L ₂₅ (15 mins)	L ₁₇ (10 mins)	L ₈ (5 mins)	L ₃ (2 min)	L ₂ (1 min)	L _{max} (<1 min)
Indian Wells ⁷	Residential	7:01 a.m. to 10:00 p.m.	55	58	60	-	65	-	70	75
		10:01 p.m. to 7:00 a.m.	50	53	55	-	60	-	65	70
La Quinta ⁸	Residential, Schools, Hospitals & Churches	7:00 a.m. to 10:00 p.m.	-	60	65	-	70	-	75	80
		10:00 p.m. to 7:00 a.m.	-	50	55	-	60	-	65	70
Indio ⁹	Any Other Property	Permitted Hours ¹⁰	65	-	-	-	-	-	-	-
		Any Other Time	45	-	-	-	-	-	-	-
Coachella ¹¹	Residential	6:00 a.m. to 10:00 p.m.	55	-	-	-	-	-	-	-
		10:00 p.m. to 6:00 a.m.	45	-	-	-	-	-	-	-

¹ Leq represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The percent noise level is the level exceeded "n" percent of the time during the measurement period. L25 is the noise level exceeded 25% of the time.

² Source: County of Riverside General Plan Noise Element, Table N-2.

³ Source: City of Palm Springs Municipal Code, Section 11.74.031. The up to 15 seconds per hour duration allowance of +24 dBA is not shown. Instead, the more conservative up to 30 seconds per hour duration +21 dBA allowance is used for Lmax noise levels occurring for a duration of less than one minute.

⁴ Source: City of Cathedral City General Plan Noise Element, Page V-43.

⁵ Source: City of Rancho Mirage Municipal Code, Section 8.45.030 (A) & (B).

⁶ Source: City of Palm Desert Municipal Code, Section 9.24.030 (A).

⁷ Source: City of Indian Wells Municipal Code, Section 9.06.040.

⁸ Source: City of La Quinta Municipal Code, Section 9.100.210 (B) & (C).

⁹ Source: City of Indio Municipal Code, Section 159.107 (H) (1).

¹⁰ City of Indio permitted operation hours for Pacific Standard Time: Monday to Friday 7:00 a.m. to 6:00 p.m., Saturday 8:00 a.m. to 6:00 p.m., Sunday 9:00 a.m. to 5:00 p.m.; for Pacific Daylight Time: Monday to Friday 6:00 a.m. to 6:00 p.m., Saturday 7:00 a.m. to 6:00 p.m., Sunday 9:00 a.m. to 5:00 p.m.; for Government Holidays: 9:00 a.m. to 5:00 p.m.

¹¹ Source: City of Coachella Municipal Code, Section 7.04.030 (A).

TABLE 3-2: AMBIENT ADJUSTMENTS TO THE BASE OPERATIONAL NOISE STANDARDS

Jurisdiction	Ambient Adjustment if Base Noise Level Standards Exceeded ¹
Palm Springs ²	Ambient shall be the standard.
Rancho Mirage ³	+ 5dBA; ambient Lmax shall be the standard.
Palm Desert ⁴	Ambient shall be the standard.
Indian Wells ⁵	+ 5dBA; ambient Lmax shall be the standard.
La Quinta ⁶	Ambient shall be the standard.
Coachella ⁷	Ambient shall be the standard.

¹ Based on the Municipal Code standards for each jurisdiction when the existing ambient noise levels exceed the base exterior noise level standards.

² Source: City of Palm Springs Municipal Code, Section 11.74.031.

³ Source: City of Rancho Mirage Municipal Code, Section 8.45.030 (C).

⁴ Source: City of Palm Desert Municipal Code, Section 9.24.030 (B).

⁵ Source: City of Indian Wells Municipal Code, Section 9.06.040 (a) (3).

⁶ Source: City of La Quinta Municipal Code, Section 9.100.210 (D).

⁷ Source: City of Coachella Municipal Code, Section 7.04.030 (B).

TABLE 3-3: CONSTRUCTION NOISE STANDARDS

Jurisdiction	Municipal Code Section(s)	Permitted Hours of Construction Activity	Construction Activity Exempt from Noise Standards?	Construction Noise Level Standards
Caltrans	Standard Specifications 14-8.02	6:00 a.m. to 9:00 p.m. (noise standard applies 9:00 p.m. to 6:00 a.m.)	No	86 dBA Lmax @ 50'
County of Riverside	9.52.020	6:00 a.m. to 6:00 p.m. June to September; 7:00 a.m. to 6:00 p.m. October to May	Yes	n/a
Palm Springs	8.04.220	7:00 a.m. to 7:00 p.m. on weekdays; 8:00 a.m. to 5:00 p.m. on Saturdays; no activity on Sundays and holidays	Yes	n/a
Cathedral City	11.96.070	October 1st to April 30th 7:00 a.m. to 5:30 p.m. Mondays to Fridays	Yes	n/a
		May 1st to September 30th 6:00 a.m. to 7:00 p.m. Mondays to Fridays		
Rancho Mirage	8.45.050; 15.04.030	All Year 8:00 a.m. to 5:00 p.m. Saturdays; no activity Sundays and holidays	Yes	n/a
		7:00 a.m. to 7:00 p.m. Mondays to Saturdays; no activity on Sundays and holidays		
Palm Desert	9.24.070	October 1st to April 30th 7:00 a.m. to 5:30 p.m. Mondays to Fridays	Yes	n/a
		All Year 8:00 a.m. to 5:00 p.m. Saturdays; no activity Sundays and holidays		
Indian Wells	9.06.047	7:00 a.m. to 5:00 p.m. Mondays to Fridays; 8:00 a.m. to 5:00 p.m. Saturdays; no activity on Sundays or holidays	Yes	n/a

Jurisdiction	Municipal Code Section(s)	Permitted Hours of Construction Activity		Construction Activity Exempt from Noise Standards?	Construction Noise Level Standards
La Quinta	6.08.050	October 1st to April 30th 7:00 a.m. to 5:30 p.m. Mondays to Fridays	May 1st to September 30th 6:00 a.m. to 7:00 p.m. Mondays to Fridays	Yes	n/a
		All Year 8:00 a.m. to 5:00 p.m. Saturdays; no activity Sundays and holidays			
		Pacific Standard Time 7:00 a.m. to 6:00 p.m. Mondays to Fridays; 8:00 a.m. to 6:00 p.m. Saturdays	Pacific Daylight Time 6:00 a.m. to 6:00 p.m. Mondays to Fridays; 7:00 a.m. to 6:00 p.m. Saturdays		
Indio	95C.08	All Year 9:00 a.m. to 5:00 p.m. Sundays and holidays		Yes	n/a
Coachella	7.04.070	October 1st to April 30th 6:00 a.m. to 5:30 p.m. Mondays to Fridays	May 1st to September 30th 5:00 a.m. to 7:00 p.m. Mondays to Fridays	Yes	n/a
		All Year 8:00 a.m. to 5:00 p.m. Saturdays, Sundays, and holidays			

"n/a" = Jurisdiction's municipal code does not specify specific construction noise level standards.

TABLE 3-4: CONSTRUCTION VIBRATION STANDARDS

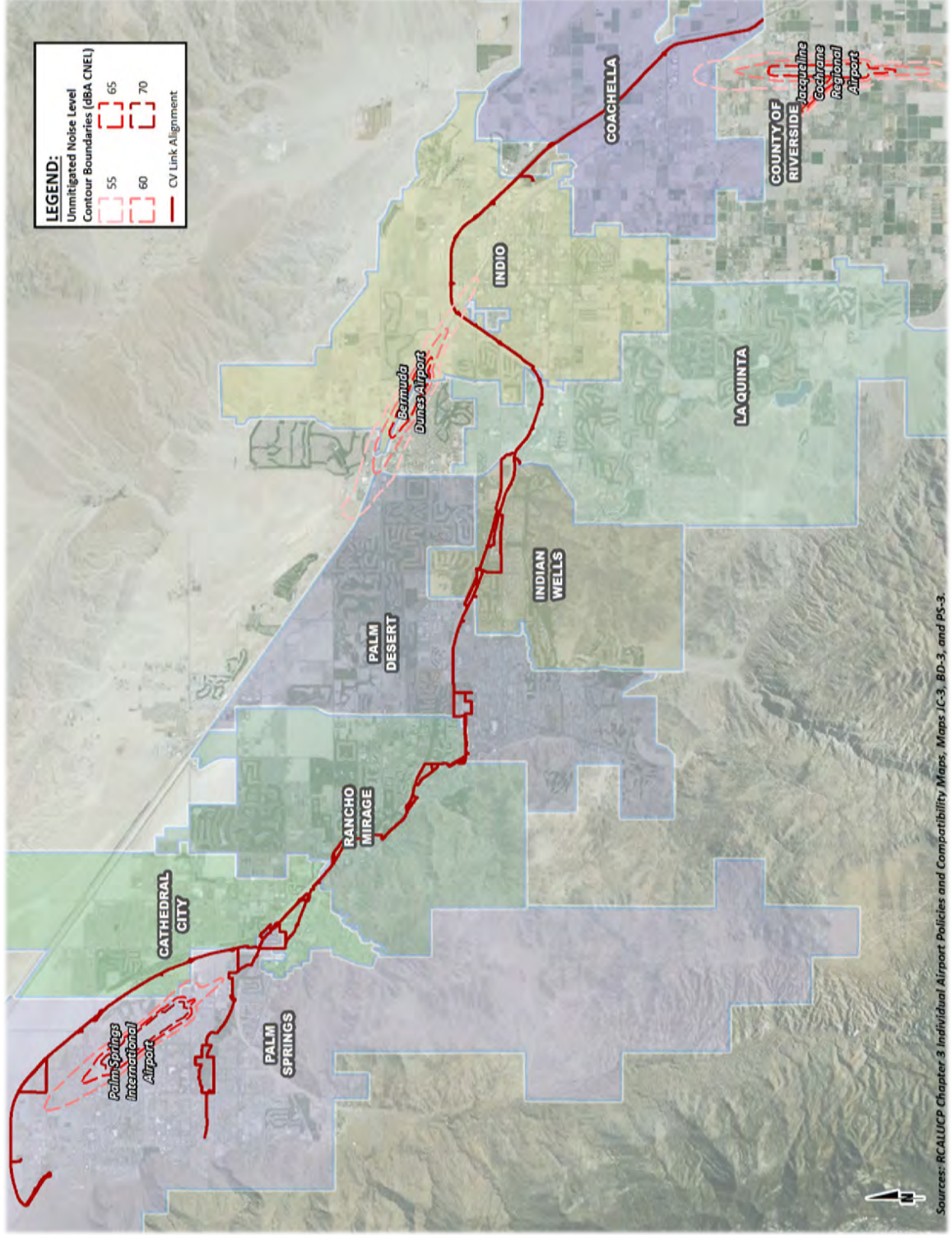
Jurisdiction	Municipal Code Section(s)	Construction Vibration Standards
Caltrans	Transportation- and Construction-Induced Vibration Guidance Manual, Tables 19 & 20	Building Damage: 0.12 in/sec PPV Human Annoyance: 0.01 in/sec PPV
County of Riverside	County of Riverside General Plan Noise Element, Policy 16.3	0.01 in/sec RMS
Palm Springs	11.74.020	0.01 in/sec RMS
Cathedral City	n/a	n/a
Rancho Mirage	n/a	n/a
Palm Desert	n/a	n/a
Indian Wells	n/a	n/a
La Quinta	n/a	n/a
Indio	n/a	n/a
Coachella	n/a	n/a

"PPV" = Peak Particle Velocity; "RMS" = Root-Mean-Square; "n/a" = Jurisdiction's municipal code does not specify specific construction noise level standards.

3.6 RIVERSIDE COUNTY AIRPORT LAND USE COMPATIBILITY STANDARDS

The Project site is located less than 2 miles from both the Palm Springs International Airport, Bermuda Dunes Airport, and Jacqueline Cochrane Regional Airport. According to Table 2B of Chapter 2, *Countywide Policies*, of the *Riverside County Airport Land Use Compatibility Plan (RCALUCP) Policy Document*, recreational land uses including parks and playgrounds are considered *clearly acceptable* with exterior noise levels below 55 dBA CNEL, *normally acceptable* with exterior noise levels of up to 65 dBA CNEL, and *marginally acceptable* with exterior noise levels between 65 to 70 dBA CNEL due to aircraft noise. (17) As shown on Exhibit 3-C, the CV Link alignments are located outside of the 60 dBA CNEL noise contour boundary of the Palm Springs International Airport and the 55 dBA CNEL noise contour boundary of the Jacqueline Cochrane Regional Airport which indicates the Project park land uses will be *clearly acceptable*. A portion of the CV Link pathways within the City of Indio will be located within the 55 dBA CNEL noise level contour boundary of the Bermuda Dunes airport, as shown on Exhibit 3-C, and is considered *normally acceptable* land use. However, no exterior noise mitigation is required based on the Table 2B criteria of the RCALUCP. Therefore, while aircraft flyovers will likely be heard by those using the proposed Project facilities, they will not significantly impact the proposed Project site from a noise standpoint.

EXHIBIT 3-C: AIRPORT NOISE LEVEL CONTOUR BOUNDARIES



4 SIGNIFICANCE CRITERIA

The following significance criteria are based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

- A. Exposure 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;
- B. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.
- C. A substantial permanent increase in ambient noise levels in the Project vicinity above existing levels without the proposed Project; or
- D. A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above noise levels existing without the proposed Project.
- E. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the Project area to excessive noise levels.
- F. For a project within the vicinity of a private airstrip, expose people residing or working in the Project area to excessive noise levels.

While the CEQA Guidelines, General Plans, and Municipal Codes provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts under CEQA Guideline A, they do not define the levels at which increases are considered substantial for use under Guidelines B, C, and D. The thresholds used for Guidelines B, C, and D are established by Federal and state guidelines, as well as General Plans and Municipal Codes for each jurisdiction as outlined below. CEQA Guidelines E and F apply to nearby public and private airports, if any, and the Project's land use compatibility, as discussed below.

The closest airports which would require additional noise analysis under CEQA guidelines E and F are the Palm Springs International Airport, Bermuda Dunes Airport, and Jacqueline Cochrane Regional Airport. As shown on Exhibit 3-C, the CV Link alignments are located outside of the 60 dBA CNEL noise contour boundary of the Palm Springs International Airport and the 55 dBA CNEL noise contour boundary of the Jacqueline Cochrane Regional Airport which indicates the Project park land uses will be *clearly acceptable*. A portion of the CV Link pathways within the City of Indio will be located within the 55 dBA CNEL noise level contour boundary of the Bermuda Dunes airport, as shown on Exhibit 3-C, and is considered *normally acceptable* land use. However, no exterior noise mitigation is required based on the Table 2B criteria of the RCALUCP. Therefore, while aircraft flyovers will likely be heard by those using the proposed Project facilities, they will not significantly impact the proposed Project site from a noise standpoint. The Project will satisfy the RC ALUCP compatibility criteria based on the noise level contour boundaries, and therefore, the potential impacts under CEQA guidelines E and F are *less than significant*, and are not further analyzed in this noise study.

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines C and D described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (18)

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment.

In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (19) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, the FICON guidance specifically defines the equivalent average noise level (Leq) as a noise metric for evaluating project-related noise level increases, and therefore, represents an appropriate threshold for evaluating the significance of the hourly operational activities of the Project (i.e., Leq).

For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur even if the noise level criteria is not exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project related noise level increase is considered a significant impact when the noise criteria for a given land use is exceeded. According to the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance. Table 4-1 below provides a summary of the potential noise impact significance criteria, based on guidance from FICON.

TABLE 4-1: SIGNIFICANCE OF NOISE IMPACTS AT NOISE-SENSITIVE RECEIVERS

Without Project Noise Level	Potential Significant Impact
< 60 dBA	5 dBA or more
60 - 65 dBA	3 dBA or more
> 65 dBA	1.5 dBA or more

Federal Interagency Committee on Noise (FICON), 1992.

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-2 shows the significance criteria summary matrix.

OPERATIONAL NOISE

- If Project-related operational (stationary-source) noise levels exceed the applicable criteria, shown on Tables 3-1 and 3-2, at noise-sensitive receiver locations in the cities of Palm Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, La Quinta, Indio, and Coachella, and unincorporated Riverside County.
- If the existing ambient noise levels at the nearby noise-sensitive receivers near the Project site:
 - are less than 60 dBA Leq and the Project creates a *readily perceptible* 5 dBA Leq or greater Project-related noise level increase; or
 - range from 60 to 65 dBA Leq and the Project creates a *barely perceptible* 3 dBA Leq or greater Project-related noise level increase; or
 - already exceed 65 dBA Leq, and the Project creates a community noise level impact of greater than 1.5 dBA Leq (FICON, 1992).

CONSTRUCTION NOISE

- If Project-related construction activities:
 - occur at any time other than the permitted hours outlined by jurisdiction on Table 3-2; or
 - create noise levels during the hours of 9:00 p.m. to 6:00 a.m. which exceed the Caltrans 86 dBA Lmax acceptable noise level threshold at 50 feet (Caltrans Standard Specifications 14-08.02).

CONSTRUCTION VIBRATION

- If Project-related construction activities generate vibration levels which exceed the Caltrans 0.12 in/sec PPV building damage vibration level threshold, or the 0.01 in/sec PPV human annoyance vibration level threshold at nearby sensitive receiver locations (Caltrans Transportation and Construction Vibration Guidance Manual, Tables 19 & 20).

TABLE 4-2: SUMMARY OF SIGNIFICANCE CRITERIA

Analysis	Land Use	Jurisdiction	Condition(s)	Significance Criteria
Operational ¹	Noise-Sensitive	All	Exterior Noise Level Standards	See Tables 3-1 & 3-2.
			if ambient is < 60 dBA Leq	≥ 5 dBA Leq Project increase
			if ambient is 60 - 65 dBA Leq	≥ 3 dBA Leq Project increase
			if ambient is > 65 dBA Leq	≥ 1.5 dBA Leq Project increase
Construction ²	Permitted hours of construction activity vary by jurisdiction (see Table 3-3).			
	All	Caltrans	Noise Level Threshold @ 50' (9:00 p.m. to 6:00 a.m.)	86 dBA Lmax
			Vibration Level Threshold	Building Damage: 0.12 in/sec PPV
		Annoyance: 0.01 in/sec PPV		
		All Others	Noise Level Threshold	n/a

¹ See Tables 3-1 and 3-2 for the exterior noise level standards by jurisdiction.

² See Tables 3-3 and 3-4 for each jurisdiction's construction noise and vibration standards, respectively.

"PPV" = Peak Particle Velocity; "n/a" = Jurisdiction's municipal code does not specify specific construction noise level standards.

5 EXISTING (2016) NOISE LEVEL MEASUREMENTS

Short-term reference noise level measurements are used in this noise study to describe the potential impacts due to the operation of the Project, and 24-hour long-term noise level measurements were taken at 30 locations in the Project study area to assess the existing ambient noise level environment.

5.1 SHORT-TERM REFERENCE NOISE MEASUREMENT PROCEDURES

Short-term reference noise level measurements were collected to represent the Project-related noise sources including: bicycles, pedestrians and low-speed electric vehicles. The reference noise level measurements were collected by Urban Crossroads, Inc. of similar recreational path activities in the Cities of South El Monte, Irwindale, and Rancho Santa Margarita, and by Entech Northwest at ten different locations throughout Coachella Valley. Consistent with the short-term noise level measurement guidelines outlined in the Caltrans TeNS (3) all reference noise level measurements were collected using the following procedures:

- Calibrate sound level meter before and after each measurement.
- Set up sound level meter at a height of 5 feet for all locations.
- A windscreen was placed over the microphone.
- Frequency weighting was set on “A” and “slow” response.
- Commence noise monitoring.
- Document the wind speed, temperature, humidity, and weather conditions.
- Note any excessive noise contamination such as barking dogs, lawn mowers, and/or aircraft flyovers.
- Calibrate sound level meter.
- Proceed to next monitoring site and repeat.

Consistent with the Caltrans TeNS procedures, all short-term noise level meters were calibrated and located at a height of 5 feet. In addition, windscreens, A-weighted settings and slow response times were configured for the noise level measurements. The use of A-weighted noise levels and slow response is also consistent with the Municipal Code requirements of the Project study area jurisdictions. Since the short-term reference noise level measurements are not used to calibrate the TNM highway traffic noise model used in Caltrans TeNS-compliant noise studies, the specific duration of each measurement was based on the observed reference activity at each measurement location, rather than a 15 to 20-minute sample period of highway traffic noise indicated in the TeNS.

All short-term noise level measurements collected by Urban Crossroads, Inc. using Piccolo Type 2 integrating sound level meters. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150 (Serial No. 2218). The Entech Northwest noise level measurements were taken using a Larson Davis 824 Type 1 (Serial No. A3517) noise level meter. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (11) The short-term reference noise level measurements are presented in Section 6.1.

5.2 24-HOUR LONG-TERM MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, March 23rd and Wednesday, March 30th, 2016. Appendix 5.1 includes the detailed noise measurement location exhibits, and Appendix 5.2 includes study area photos.

By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150 (Serial No. 2218). All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The use of A-weighted noise levels and slow response is consistent with the Municipal Code requirements of the Project study area jurisdictions. The calibration sheets with serial numbers for each measurement location (e.g. L1, L2, etc.) are included in Appendix 5.3. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (11)

5.2.1 NOISE MEASUREMENT CONDITIONS

The long-term noise level measurements were collected over two, 24-hour periods on March 23rd and March 30th, 2016. The weather conditions on March 23rd, 2016 were clear, with temperatures ranging from 59 to 77 degrees Fahrenheit. March 30th, 2016 weather conditions were also clear with temperatures ranging from 45 to 72 degrees Fahrenheit. Over both periods of 24-hours the average wind speeds remained below 7 mph, which is consistent with the Caltrans TeNS methodology which recommends measurements be taken when wind speeds are below 12 mph. (3)

5.2.2 NOISE MEASUREMENT LOCATIONS

A preliminary review of the Project study area was conducted using aerial photography, maps, and Google Earth to identify land uses that could be subject to operational and construction noise impacts from the proposed Project. The long-term noise level measurements (Appendix 5.1) were positioned at nearby sensitive receiver locations to assess the existing ambient hourly noise levels surrounding the Project site. To describe the existing noise environment, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels. Exhibit 5-A shows the 30 long-term noise level measurement locations throughout the Project study area. The access points shown on Exhibit 5-A represent

the proposed access points to the CV Link pathways and are included for a comparison of the location of future Project facilities and the noise level measurement locations.

5.3 LONG-TERM NOISE MEASUREMENT RESULTS

To describe the existing ambient noise environment, the noise measurements presented in this report focus on the energy average or equivalent sound levels (Leq). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the average hourly daytime, evening, and nighttime noise levels based on the jurisdictional hours for each time period at each noise level measurement location. In addition, Table 5-1 provides the (energy average) noise levels used to describe the daytime, evening, and nighttime ambient conditions. These daytime, evening, and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations, and Exhibit 5-B shows the daytime, evening (for those jurisdictions with evening hours), and nighttime noise levels by measurement location. Appendix 5.4 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, L₁, L₂, L₅, L₈, L₂₅, L₅₀, L₉₀, L₉₅, and L₉₉ percentile noise levels observed during the daytime and nighttime periods.

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with the arterial roadway network and the Palm Springs International and Jacqueline Cochrane Regional Airports. This includes auto, heavy truck, and aircraft activities near the noise level measurement locations. The 24-hour existing noise level measurements shown on Table 5-1 present the existing unmitigated ambient noise conditions.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS OVERVIEW

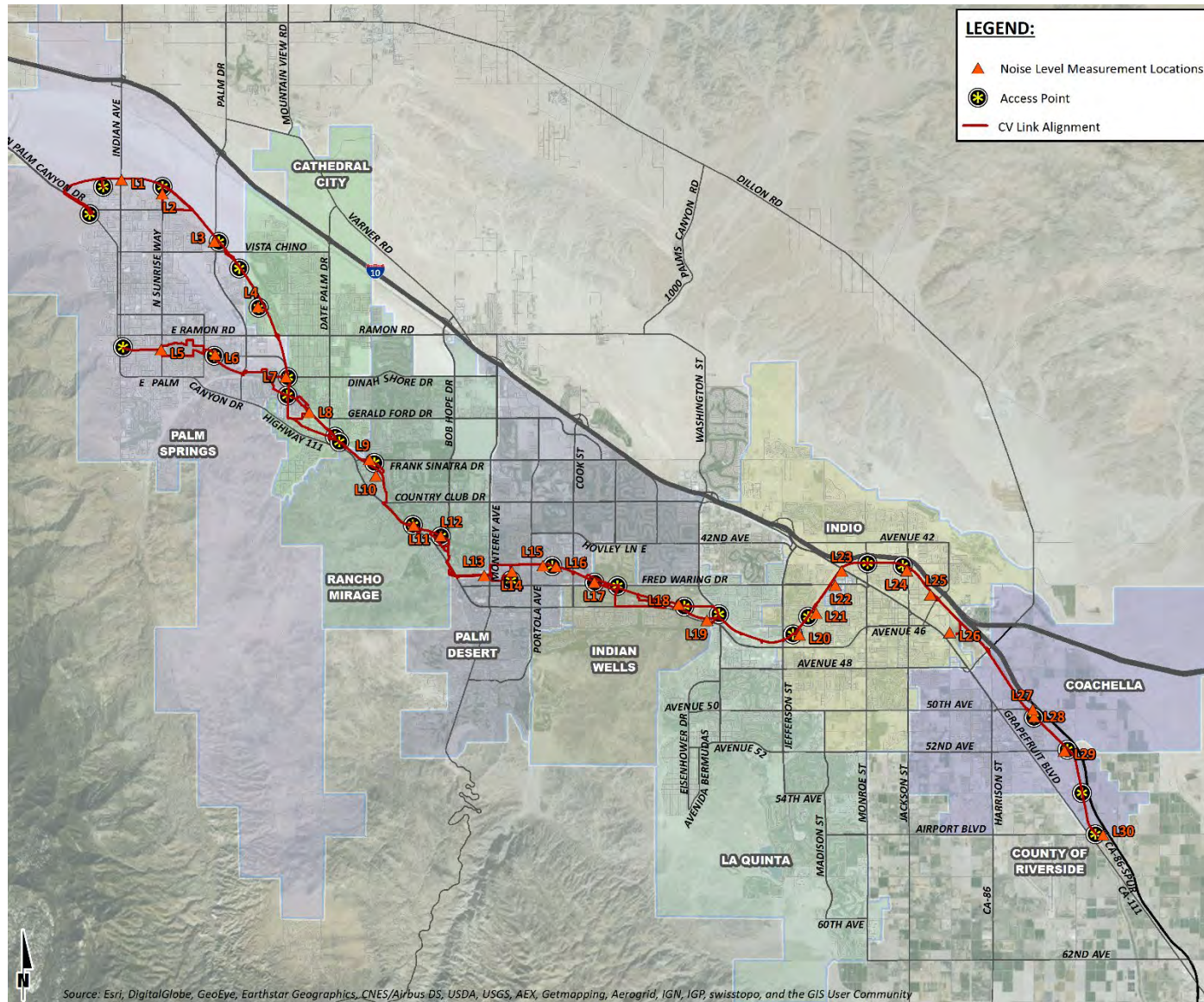


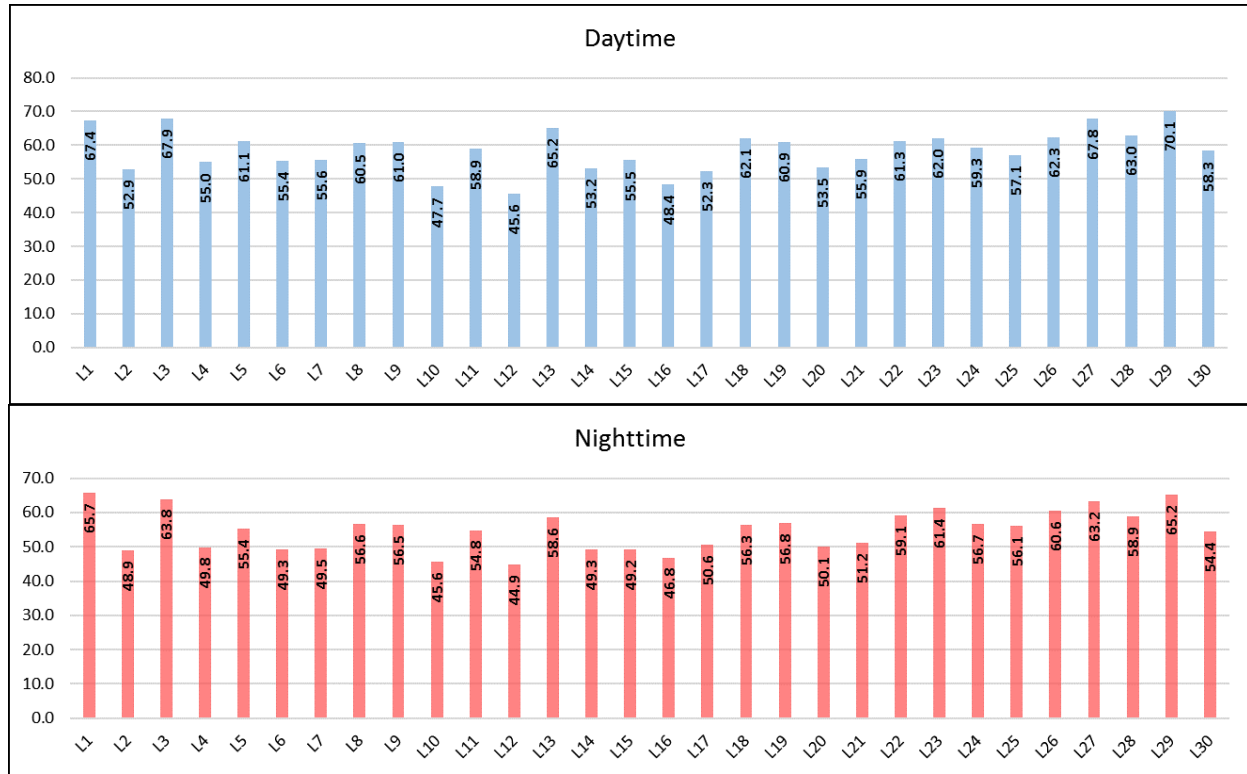
TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS

ID ¹	Date	Distance To CV Link	City	Description	Energy Average Hourly Noise Level (dBA Leq) ²			CNEL
					Daytime	Evening	Nighttime	
L1	3/23/2016	115'	Palm Springs	Located south of the alignment on Indian Canyon Drive near future residential land use.	67.4	66.0	65.7	72.6
L2	3/23/2016	25'	Palm Springs	Located adjacent to the alignment on Sunrise Way near existing residential homes.	52.9	51.7	48.9	56.5
L3	3/23/2016	130'	Palm Springs	Located adjacent to the alignment at the northwest corner of Gene Autry Trail and Via Escuela.	67.9	66.9	63.8	71.4
L4	3/23/2016	185'	Cathedral City	Located west of the alignment and access point on San Gabriel Circle near the Agua Caliente Elementary School and existing residential homes.	55.0	n/a	49.8	57.9
L5	3/23/2016	32'	Palm Springs	Located adjacent to the alignment on Riverside Drive near existing residential homes.	61.1	59.4	55.4	63.5
L6	3/23/2016	42'	Palm Springs	Located adjacent to the alignment in Delmuth Park near existing residential homes.	55.4	55.3	49.3	57.8
L7	3/23/2016	0'	Palm Springs	Located on 34th Avenue near existing residential homes and the future alignment of CV Link.	55.6	52.6	49.5	57.6
L8	3/23/2016	23'	Cathedral City	Located on Cathedral Canyon Drive near existing residential homes in a commercial parking lot.	60.5	n/a	56.6	64.3
L9	3/23/2016	34'	Rancho Mirage	Located adjacent to the alignment on Frank Sinatra Drive near existing residential homes and a bike path.	61.0	60.0	56.5	64.2
L10	3/23/2016	702'	Rancho Mirage	Located on Peterson Avenue south of the future alignment of CV Link near existing residential homes.	47.7	48.9	45.6	53.0
L11	3/23/2016	21'	Rancho Mirage	Located in the parking lot of the Rancho Mirage Library near existing residential homes.	58.9	59.1	54.8	62.6
L12	3/23/2016	19'	Rancho Mirage	Located adjacent to the future alignment in the Rancho Mirage Community Park.	45.6	44.9	44.9	51.6
L13	3/23/2016	72'	Palm Desert	Located on the south side of Park View Drive near existing residential homes, a church, and the College of the Desert.	65.2	n/a	58.6	67.1
L14	3/23/2016	184'	Palm Desert	Located east of the alignment on San Pablo Avenue near the existing Palm Desert Civic Center Park.	53.2	n/a	49.3	56.9
L15	3/30/2016	154'	Palm Desert	Located south of Magnesia Falls Drive at the Palm Desert Charter Middle School south of the CV Link alignment.	55.5	n/a	49.2	57.6

ID ¹	Date	Distance To CV Link	City	Description	Energy Average Hourly Noise Level (dBA Leq) ²			CNEL
					Daytime	Evening	Nighttime	
L16	3/23/2016	14'	Palm Desert	Located on Columbine Drive near existing residential homes and south of an existing bike path and future CV Link alignment.	48.4	n/a	46.8	53.7
L17	3/30/2016	18'	Indian Wells	Located north of Fred Waring Drive near existing residential homes and a future access point to the CV Link Project.	52.3	n/a	50.6	57.6
L18	3/30/2016	0'	Indian Wells	Located at the future CV Link alignment on Miles Avenue near existing residential homes.	62.1	n/a	56.3	64.7
L19	3/30/2016	240'	Indian Wells	Located north of Highway 111 near existing residential homes, south of the CV Link alignment.	60.9	n/a	56.8	64.4
L20	3/30/2016	541'	Indio	Located on Suncastle Road in an existing residential neighborhood east of the CV Link alignment.	53.5	n/a	50.1	57.6
L21	3/30/2016	618'	Indio	Located east of the CV Link alignment near existing residential homes on Villanova Street.	55.9	n/a	51.2	59.0
L22	3/30/2016	537'	Indio	Located on Fred Waring Drive near existing residential homes, east of the future CV Link alignment.	61.3	n/a	59.1	66.3
L23	3/30/2016	202'	Indio	Located south of the future CV Link Alignment on Jonquil Avenue near existing residential homes.	62.0	n/a	61.4	68.2
L24	3/30/2016	360'	Indio	Located south of the CV Link Project on Jackson Street near the Andrew Jackson Elementary School.	59.3	n/a	56.7	64.1
L25	3/30/2016	286'	Indio	Located adjacent to the Amistad Continuation High School on Dillon Avenue south of the CV Link Project.	57.1	n/a	56.1	63.0
L26	3/30/2016	904'	Indio	Located west of the future CV Link alignment on Van Buren Street near the Coachella Valley Wild Bird Center.	62.3	n/a	60.6	67.5
L27	3/30/2016	547'	Coachella	Located east of the future CV Link Project on 50th Avenue.	67.8	n/a	63.2	72.1
L28	3/30/2016	42'	Coachella	Located south of the CV Link alignment on Tyler Street at the Sierra Vista Park.	63.0	n/a	58.9	67.5
L29	3/30/2016	250'	Coachella	Located near a future access point to the CV Link alignment on 52nd Avenue and existing residential homes.	70.1	n/a	65.2	74.9
L30	3/30/2016	787'	Coachella	Located near a future access point to the CV Link alignment on 52nd Avenue and existing residential homes.	58.3	n/a	54.4	63.0

¹ See Exhibit 5-A and Appendix 5.1 for the noise level measurement locations.² The long-term 24-hour measurement worksheets are included in Appendix 5.4.

"Daytime," "Evening," and "Nighttime" hours are based on the municipal code of each jurisdiction as previously shown on Table 3-1.

EXHIBIT 5-B: OVERVIEW OF AMBIENT NOISE LEVEL MEASUREMENT DATA (DBA LEQ)

See Appendix 5.4 for the noise level measurement worksheet for each individual measurement location.

This page intentionally left blank

6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future noise impacts from Project operational and construction activities.

6.1 REFERENCE OPERATIONAL NOISE LEVELS

The Project's operational noise levels were estimated based on short-term reference noise level measurements of similar operational activities collected at comparable recreational facilities. The reference noise levels are intended to describe the expected operational noise sources that include bicycles, pedestrians and low-speed electric vehicles. To estimate the off-site operational noise impacts associated with the CV Link Project, the following reference noise level measurements were collected, as shown on Table 6-1, by Urban Crossroads, Inc. and Entech Northwest to describe the potential noise sources associated with the Project. Table 6-1 shows each reference noise level measurement under the categories of activities expected at the Project facilities. The peak reference noise level measurement under each category is identified for use in the operational noise analysis, and the most descriptive noise source (e.g. pedestrian and golf cart activities) is used to assess the worst-case operational noise conditions at the Project facilities.

To describe the worst-case Project-only operational noise levels associated with the CV Link Project, this noise study relies on the reference pedestrian and golf cart activities noise level of 50.3 dBA Leq at a uniform reference distance of 50 feet. The noise sources included in the peak reference noise level measurement include golf cart pass-by events, pedestrian activities, people talking, and background golf putting and practicing activities. The reference noise level of 50.3 dBA Leq at a distance of 50 feet represents the peak pedestrian and golf cart activities noise level shown on Table 6-1. While the peak pedestrian and golf cart activities reference noise level is lower than the specialty park/sports activities noise levels on Table 6-1, it is used in this analysis to more accurately describe the noise sources associated with the Project, including bicycles, pedestrians and low-speed electric vehicles on the proposed CV Link pathways. Further, the Project-related noise sources are anticipated to consist of mobile point sources (e.g. line sources) moving on the proposed CV Link pathways, and therefore, the mobile pedestrian and golf cart activities noise level better reflects the proposed Project activities than the stationary specialty park/sports activities which are confined to specific areas. This analysis assumes the Project-related operational noise sources will occur 24 hours per day, seven days per week. In reality, the intensity of the bicycles, pedestrians and low-speed electric vehicles activities will vary based many factors including, but not limited to, the time of day and weather conditions throughout the year.

TABLE 6-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Jurisdiction(s)	Duration (mm:ss)	Dist. From Source (Feet)	Noise Source Height (Feet)	Noise Level (dBA Leq)		Sound Power Level (PWL) ¹³
					@ Ref. Distance	@ 50 Feet	
Bike & Pedestrian Activities							
Bike and Pedestrian Activities ¹ Bike and Pedestrian Trail Activities ² Pedestrian, Bike, and Sports Activities ³ Pedestrian, Bike, and Dog Walking Activities ⁴ Pedestrian, Bike, and Sports Activities ⁵	South El Monte & Irwindale	00:21	10'	5'	58.1	47.6	82.2
	Rancho Santa Margarita	02:30	10'	5'	57.7	47.2	82.2
	Palm Springs	09:28	10'	5'	54.4	40.4	81.8
	Palm Springs	01:15	5'	5'	52.4	37.4	75.0
	La Quinta	05:16	20'	5'	48.8	42.8	72.0
Pedestrian & Golf Cart Activities							
Pedestrian and Golf Cart Activities ⁶ Park and Golf Cart Activities ⁷	Palm Springs Palm Desert	01:44 05:45	20' 10'	5' 5'	56.3 59.4	50.3 48.9	84.9 83.5
Hiking Activities							
Hiking and Dog Walking Activities ⁸ Hiking Activities ⁹	Palm Springs Rancho Mirage	05:00 07:31	5' 5'	5' 5'	55.3 55.5	40.3 40.5	75.1 74.9
Specialty Park/Sports Activities							
Skate Park Activity ¹⁰ Dog Park Activity ¹¹ Golf Game and Cart Activities ¹²	Palm Desert Palm Desert Cathedral City	05:17 09:17 01:33	10' 10' 20'	5' 5' 5'	60.3 73.7 57.4	49.8 63.2 51.4	97.8 84.4 97.8 86.0

¹ As measured by Urban Crossroads on 4/12 and 4/14/16 at the Whittier Narrows and Santa Fe Dam Recreation Areas in South El Monte and Irwindale, respectively.

² As measured by Urban Crossroads on 4/13/16 at the Rancho Santa Margarita Lake.

³ As measured by Entech Northwest on behalf of Urban Crossroads on 3/29/16 at Ruth Hardy Park in the City of Palm Springs.

⁴ As measured by Entech Northwest on behalf of Urban Crossroads on 3/29/16 at the North Riverside Trail in the City of Palm Springs.

⁵ As measured by Entech Northwest on behalf of Urban Crossroads on 3/30/16 at the Lake Cahulla Recreation Area in the City of La Quinta.

⁶ As measured by Entech Northwest on behalf of Urban Crossroads on 3/30/16 at the Mesquite Golf Course in Palm Springs.

⁷ As measured by Entech Northwest on behalf of Urban Crossroads on 3/30/16 at the Lake Cahulla Recreation Area in the City of La Quinta.

⁸ As measured by Entech Northwest on behalf of Urban Crossroads on 3/30/16 at the Lykken Trail in the City of Palm Springs.

⁹ As measured by Entech Northwest on behalf of Urban Crossroads on 3/30/16 at the Mike Schuler Trail in the City of Rancho Mirage.

¹⁰ As measured by Entech Northwest on behalf of Urban Crossroads on 3/30/16 at the Civic Center Skate Park in the City of Palm Desert.

¹¹ As measured by Entech Northwest on behalf of Urban Crossroads on 3/30/16 at the Civic Center Dog Park in the City of Palm Desert.

¹² As measured by Entech Northwest on behalf of Urban Crossroads on 3/30/16 at the Cathedral Canyon Golf Club in Cathedral City.

¹³ Sound pressure levels are converted into sound power levels for use in the CadnaA noise prediction model based on the distance to the reference noise source.

6.2 CADNAA NOISE PREDICTION MODEL

To fully describe the exterior operational noise levels from the CV Link Project, Urban Crossroads, Inc. developed a noise prediction model using the CadnaA (Computer Aided Noise Abatement) computer program. CadnaA has the ability to analyze the noise level of multiple types of noise sources and calculates the noise levels at any location using the spatially accurate Project Keyhole Markup Language Zipped (KMZ) files, provided by the Project team. The program has the ability to analyze the noise level of multiple types of noise sources and to calculate the effects of topography, buildings and multiple barriers using the latest calculation standards to predict outdoor noise impacts.

Using the spatially accurate Project KMZ files, a CadnaA noise prediction model of the Project study area was developed. The noise model provides a spatially accurate three dimensional representation of the Project study area using the following key data inputs:

- Ground elevations (topography) in meters;
- Ground absorption;
- Reflections at buildings and barriers;
- Reference noise level sources by type (area, line, point, etc.), frequency spectral content, noise source height and attenuation rate;
- Multiple noise receiver locations and heights;
- Barrier analysis.

Based on these data inputs, the CadnaA noise prediction model will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level calculations at each receiver location and the partial noise level contributions by noise source. The reference sound power level (PWL) for each noise source expected at the Project site is then input into the CadnaA noise prediction model. While sound pressure levels (e.g. Leq) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (PWL) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source, and also diminish as a result of intervening obstacles and barriers, air absorption, wind and other factors. Sound power is the acoustical energy emitted by the sound source, and is an absolute value that is not affected by the environment.

The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. Hard site conditions are used in the operational noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source and at a rate of 3 dBA for each doubling of distance from a line source. The basic noise attenuation equation shown below is used to calculate the distance attenuation based on a reference noise level (SPL₁):

$$SPL_2 = SPL_1 - 20\log(D_2/D_1)$$

Where SPL_2 is the resulting noise level after attenuation, SPL_1 is the source noise level, D_2 is the distance to the reference sound pressure level (SPL_1), and D_1 is the distance to the receiver location. Appendix 6.1 includes the CadnaA noise model inputs and calculation data.

6.3 CONSTRUCTION ACTIVITIES

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers and portable generators that when combined can reach high levels. This construction noise analysis was prepared using the Federal Highway Administration (FHWA) published the Roadway Construction Noise Model (RCNM) that includes a national database of construction equipment reference noise emission levels. (20) The RCNM equipment database, as shown in Appendix 6.2, provides a comprehensive list of the noise generating characteristics for specific types of construction equipment. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

Noise levels generated by heavy construction equipment can approach approximately 86 dBA Lmax when measured at 50 feet. Hard site conditions are used in the construction noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source (i.e. construction equipment). For example, a noise level of 86 dBA measured at 50 feet from the noise source to the receiver would be reduced to 80 dBA at 100 feet from the source to the receiver, and would be further reduced to 74 dBA at 200 feet from the source to the receiver. The Project construction noise impacts will include both short-term mobile equipment and long-term stationary equipment. Short-term mobile construction activities (e.g. excavators, trucks, forklifts, pavers, dozers, nail guns, power tools, etc.) are generated throughout the CV Link pathways and are not staged or stationary. During construction, all of the long-term stationary construction equipment (e.g. generators, compressors, etc.) staging activities will be located in areas identified by the Project team and are based on the *CV Link Construction Staging & Access* plans, included in Appendix 1.1 (21). It is expected that the Project construction activities will consist primarily of short-term mobile equipment.

6.4 CONSTRUCTION VIBRATION ASSESSMENT

This project-level analysis focuses on the potential ground-borne vibration associated with Project construction activities. Construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-2.

Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA. The Caltrans *Transportation and Construction Vibration Guidance Manual* also identifies the FTA reference vibration levels for construction equipment as the most comprehensive list of available vibration source levels for use in construction

equipment analysis. (10) To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation:

$$PPV_{\text{equip}} = PPV_{\text{ref}} \times (25/D)^{1.5}$$

TABLE 6-2: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Jackhammer	0.035
Loaded Trucks	0.076
Large bulldozer	0.089

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.

This page intentionally left blank

7 CV LINK OPERATIONAL NOISE IMPACTS

This section analyzes potential impacts resulting from the activities associated with the operation of the Project, including bicycles, pedestrians and low-speed electric vehicles.

7.1 OPERATIONAL NOISE STANDARDS

The Project study area includes the cities of Palm Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, La Quinta, Indio, and Coachella, and unincorporated Riverside County. Therefore, the applicable Municipal Code operational noise level standards from each potentially affected jurisdiction are provided on Table 3-1 in order to determine the appropriate criteria to assess the potential Project-related impacts at each receiver location. For the purposes of this analysis, the applicable jurisdiction's noise level standards for residential land uses are used to evaluate the Project-related noise sources such as the bicycles, pedestrians and low-speed electric vehicles. Exhibit 3-B shows the municipal code daytime, evening (if applicable), and nighttime hours identified by each jurisdiction used in this analysis to assess the potential Project-related noise level impacts.

Table 3-1 shows the base exterior noise level standards for each jurisdiction, however, some jurisdictions' Municipal Codes include adjustments to their exterior noise level limits if the existing ambient noise levels exceed the base exterior noise level standards. Table 3-2 details the adjustments to the noise level standards for the applicable jurisdictions based on the existing ambient noise level measurements, presented in Section 5 and on Table 5-1 of this report. The operational noise standards shown on Tables 3-1 and 3-2 represent the appropriate thresholds for determining potential impacts due to the operation of the Project.

7.2 SENSITIVE RECEIVER LOCATIONS

Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include: schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include: multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses which are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

This project-level analysis presents the noise level contour boundaries based on the reference noise level measurements used to describe the Project-related operational activities. Since the location of sensitive receivers near the Project pathways will vary, the noise level contour boundaries are presented to show the potential noise level impacts at the surrounding land uses. Appendix 7.1 includes the operational noise level contour boundaries of the Project.

7.3 CV LINK OPERATIONAL NOISE LEVELS

Using reference noise levels in the CadnaA noise prediction model, the Project-related operational noise level contour boundaries were calculated, in addition to the Project-only operational noise levels at each of the ambient noise level measurement locations, previously shown on Exhibit 5-A. The operational noise level calculations provided in this section account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. Hard site conditions are used in the operational noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source and at a rate of 3 dBA for each doubling of distance from a line source. The basic noise attenuation equation shown below is used to calculate the distance attenuation based on a reference noise level (SPL₁):

$$\text{SPL}_2 = \text{SPL}_1 - 20\log(D_2/D_1)$$

Where SPL₂ is the resulting noise level after attenuation, SPL₁ is the source noise level, D₂ is the distance to the reference sound pressure level (SPL₁), and D₁ is the distance to the receiver location. The operational noise contour boundaries due to the Project operational noise sources including bicycles, pedestrians and low-speed electric vehicles, are shown in Appendix 7.1. To determine the potential impacts at noise-sensitive land uses in the Project study area, the Project-related operational noise levels were calculated at the ambient noise level measurement locations, previously discussed in Section 5. By calculating the Project-only operational noise levels at these locations, the compliance with local noise standards can be evaluated. Table 7-1 shows the existing ambient noise levels at each of the noise measurement locations (Table 5-1), the base exterior noise level standards (Table 3-1), whether the ambient exceeds the base exterior noise level standards, and the appropriate ambient adjustment based on each jurisdictions' criteria (Table 3-2). Table 7-2 shows the Project-only operational noise levels at each location in comparison with the adjusted ambient noise level standards at each measurement location.

This analysis presents a conservative approach using a worst-case, continuous-activity reference hourly (Leq) noise level to represent the potential operational noise levels of the CV Link Project. The reference noise level includes pedestrian and golf cart activities observed at an existing golf course and pathway in the Project study area. The actual Project-related operational noise levels will also vary depending on the frequency and intensity in which the proposed CV Link pathways are used once fully operational. It is important to note that the Project operational activities are unlikely to contain the same amount of activity included in the peak reference noise level measurement used to describe the bicycles, pedestrians and low-speed electric vehicles.

The operational noise analysis was conducted using CadnaA (Computer Aided Noise Abatement) modeling software to determine the worst-case hourly Project-related operational noise levels from the proposed CV Link pathways. By calculating the noise level contours produced by the Project, each individual sensitive receiver location adjacent to the proposed pathways can be evaluated for potential impacts. Further, the noise level measurements taken in the Project study area are used as specific locations of analysis to evaluate the compliance with local jurisdictions' Municipal Code standards. The results of the analysis indicate that the Project-related operational noise levels will satisfy the local jurisdictions' noise level standards, as shown on Table 7-2, and therefore, represent *less than significant* impacts at the nearby sensitive land uses.

TABLE 7-1: EXISTING AMBIENT NOISE LEVEL EXCEEDANCES

Meas. Location ¹	Jurisdiction	Land Use ²	Energy Average Hourly Noise Level (dBA Leq) ³			Base Exterior Noise Level Limits (dBA Leq) ⁴			Ambient Exceeds Standards ⁵			Exterior Noise Level Limits After Ambient Adjustment (dBA Leq) ⁶		
			Day	Eve.	Night	Day	Eve.	Night	Day	Eve.	Night	Day	Eve.	Night
L1	Palm Springs	Low Dens. Res.	67.4	66.0	65.7	50	45	40	Yes	Yes	Yes	67	66	66
L2	Palm Springs	CV Link	52.9	51.7	48.9	60	55	50	No	No	No	60	55	50
L3	Palm Springs	Low Dens. Res.	67.9	66.9	63.8	50	45	40	Yes	Yes	Yes	68	67	64
L4	Cathedral City	Residential	55.0	-7	49.8	55	55	55	No	-7	No	55	-7	55
L5	Palm Springs	CV Link	61.1	59.4	55.4	-8	-8	-8	No	No	No	-8	-8	-8
L6	Palm Springs	CV Link	55.4	55.3	49.3	-8	-8	-8	No	No	No	-8	-8	-8
L7	Palm Springs	CV Link	55.6	52.6	49.5	-8	-8	-8	No	No	No	-8	-8	-8
L8	Cathedral City	CV Link	60.5	-7	56.6	-8	-8	-8	No	-7	No	-8	-8	-8
L9	Rancho Mirage	Med. Dens. Res.	61.0	60.0	56.5	60	55	50	Yes	Yes	Yes	65	60	60
L10	Rancho Mirage	Low Dens. Res.	47.7	48.9	45.6	55	50	45	No	No	Yes	55	50	50
L11	Rancho Mirage	CV Link	58.9	59.1	54.8	-8	-8	-8	No	No	No	-8	-8	-8
L12	Rancho Mirage	CV Link	45.6	44.9	44.9	-8	-8	-8	No	No	No	-8	-8	-8
L13	Palm Desert	Residential	65.2	-7	58.6	55	-7	45	Yes	-7	Yes	65	-7	59
L14	Palm Desert	Park	53.2	-7	49.3	55	-7	45	No	-7	Yes	55	-7	49
L15	Palm Desert	School	55.5	-7	49.2	55	-7	45	Yes	-7	Yes	56	-7	49
L16	Palm Desert	CV Link	48.4	-7	46.8	-8	-8	-8	No	-7	No	-8	-8	-8
L17	Indian Wells	CV Link	52.3	-7	50.6	-8	-8	-8	No	-7	No	-8	-8	-8
L18	Indian Wells	CV Link	62.1	-7	56.3	-8	-8	-8	No	-7	No	-8	-8	-8
L19	Indian Wells	Residential	60.9	-7	56.8	55	-7	50	Yes	-7	Yes	65	-7	60
L20	Indio	Residential	53.5	-7	50.1	65	-7	45	No	-7	Yes	65	-7	45
L21	Indio	Residential	55.9	-7	51.2	65	-7	45	No	-7	Yes	65	-7	45
L22	Indio	Residential	61.3	-7	59.1	65	-7	45	No	-7	Yes	65	-7	45
L23	Indio	Residential	62.0	-7	61.4	65	-7	45	No	-7	Yes	65	-7	45
L24	Indio	School	59.3	-7	56.7	65	-7	45	No	-7	Yes	65	-7	45
L25	Indio	School	57.1	-7	56.1	65	-7	45	No	-7	Yes	65	-7	45
L26	Indio	Commercial	62.3	-7	60.6	65	-7	45	No	-7	Yes	65	-7	45
L27	Coachella	Open Space	67.8	-7	63.2	55	-7	45	Yes	-7	Yes	68	-7	63
L28	Coachella	Park	63.0	-7	58.9	55	-7	45	Yes	-7	Yes	63	-7	59

Meas. Location ¹	Jurisdiction	Land Use ²	Energy Average Hourly Noise Level (dBA Leq) ³			Base Exterior Noise Level Limits (dBA Leq) ⁴			Ambient Exceeds Standards? ⁵			Exterior Noise Level Limits After Ambient Adjustment (dBA Leq) ⁶		
			Day	Eve.	Night	Day	Eve.	Night	Day	Eve.	Night	Day	Eve.	Night
L29	Coachella	Residential	70.1	.7	65.2	55	.7	45	Yes	.7	Yes	70	.7	65
L30	Coachella	Residential	58.3	.7	54.4	55	.7	45	Yes	.7	Yes	58	.7	54

¹ See Exhibit 5-A and Appendices 5.1 and 7.1 for the noise level measurement locations.

² Based on the General Plan land use maps of each jurisdiction.

³ Existing ambient noise levels as shown on Table 5-1.

⁴ As previously shown on Table 3-1 for each jurisdiction. For the purposes of this analysis, the L_{50} noise level standards of the Cities of Rancho Mirage and La Quinta are evaluated based on the Leq

hourly noise levels to evaluate the potential worst-case hourly noise levels due to the operation of the Project.

⁵ Do the ambient noise levels at each measurement location exceed the base exterior noise level limits for the given jurisdiction?

⁶ The base exterior noise level limits are adjusted based on each jurisdiction's criteria indicated on Table 3-2.

⁷ The jurisdiction's Municipal Code does not include evening hours.

⁸ The measurement location represents the future CV Link alignment, and therefore, no exterior noise standards are identified since the land use is not noise-sensitive.

"Day" = Daytime; "Eve." = Evening; "Night" = Nighttime hours based on the municipal code of each jurisdiction as previously shown on Table 3-1.

TABLE 7-2: PROJECT-RELATED OPERATIONAL NOISE LEVEL COMPLIANCE

Meas. Location ¹	Jurisdiction	Land Use ²	Exterior Noise Level Limits After Ambient Adjustment (dBA Leq) ³			Project Noise Levels (dBA Leq) ⁴	Threshold Exceeded? ⁵			Significant Impact?
			Daytime	Evening	Nighttime		Daytime	Evening	Nighttime	
L1	Palm Springs	Low Dens. Res.	67	66	66	48.5	No	No	No	No
L2	Palm Springs	CV Link	60	55	50	46.2	No	No	No	No
L3	Palm Springs	Low Dens. Res.	68	67	64	47.4	No	No	No	No
L4	Cathedral City	Residential	55	-7	55	37.8	No	-7	No	No
L5	Palm Springs	CV Link	-8	-8	-8	59.5	No	No	No	No ⁶
L6	Palm Springs	CV Link	-8	-8	-8	54.5	No	No	No	No ⁶
L7	Palm Springs	CV Link	-8	-8	-8	72.2	No	No	No	No ⁶
L8	Cathedral City	CV Link	-8	-8	-8	60.6	No	-7	No	No ⁶
L9	Rancho Mirage	Med. Dens. Res.	65	60	60	57.7	No	No	No	No
L10	Rancho Mirage	Low Dens. Res.	55	50	50	40.1	No	No	No	No
L11	Rancho Mirage	CV Link	-8	-8	-8	60.7	No	No	No	No ⁶
L12	Rancho Mirage	CV Link	-8	-8	-8	73.4	No	No	No	No ⁶
L13	Palm Desert	Residential	65	-7	59	57.4	No	-7	No	No
L14	Palm Desert	Park	55	-7	49	46.5	No	-7	No	No
L15	Palm Desert	School	56	-7	49	44.4	No	-7	No	No
L16	Palm Desert	CV Link	-8	-8	-8	63.8	No	-7	No	No ⁶
L17	Indian Wells	CV Link	-8	-8	-8	63.6	No	-7	No	No ⁶
L18	Indian Wells	CV Link	-8	-8	-8	65.4	No	-7	No	No ⁶
L19	Indian Wells	Residential	65	-7	60	44.9	No	-7	No	No
L20	Indio	Residential	65	-7	45	34.7	No	-7	No	No
L21	Indio	Residential	65	-7	45	39.6	No	-7	No	No
L22	Indio	Residential	65	-7	45	38.6	No	-7	No	No
L23	Indio	Residential	65	-7	45	41.3	No	-7	No	No
L24	Indio	School	65	-7	45	42.7	No	-7	No	No
L25	Indio	School	65	-7	45	43.7	No	-7	No	No
L26	Indio	Commercial	65	-7	45	33.7	No	-7	No	No
L27	Coachella	Open Space	68	-7	63	40.8	No	-7	No	No
L28	Coachella	Park	63	-7	59	55.5	No	-7	No	No

Meas. Location ¹	Jurisdiction	Land Use ²	Exterior Noise Level Limits After Ambient Adjustment (dBA Leq) ³			Project Noise Levels (dBA Leq) ⁴	Threshold Exceeded? ⁵			Significant Impact?
			Daytime	Evening	Nighttime		Daytime	Evening	Nighttime	
L29	Coachella	Residential	70	-7	65	43.5	No	-7	No	No
L30	Coachella	Residential	58	-7	54	31.4	No	-7	No	No

¹ See Exhibit 5-A and Appendices 5.1 and 7.1 for the noise level measurement locations.

² Based on the General Plan land use maps of each jurisdiction.

³ See Table 7-1. The base exterior noise level limits are adjusted based on each jurisdiction's criteria indicated on Table 3-2.

⁴ Project-only operational noise levels are calculated in the CadnaA noise prediction model and provided in Appendix 7.2.

⁵ Do the Project-only operational noise levels at each measurement location exceed the ambient adjusted exterior noise level limits for the given jurisdiction?

⁶ The measurement location is located at the proposed CV Link alignment and does not represent sensitive land uses which would be impacted by the Project-related operational noise levels.

⁷ The jurisdiction's Municipal Code does not include evening hours.

⁸ The measurement location represents the future CV Link alignment, and therefore, no exterior noise standards are identified since the land use is not noise-sensitive.

"Daytime," "Evening," and "Nighttime" hours are based on the municipal code of each jurisdiction as previously shown on Table 3-1.

7.4 PROJECT OPERATIONAL NOISE CONTRIBUTION

To describe the Project operational noise level contributions, the Project operational noise levels were combined with the existing ambient noise levels measurements for the off-site receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (22) Instead, they must be logarithmically added using the following base equation:

$$SPL_{Total} = 10\log_{10}[10^{SPL1/10} + 10^{SPL2/10} + \dots 10^{SPLn/10}]$$

Where “SPL1,” “SPL2,” etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describe the Project noise level contributions. Noise levels that would be experienced at receiver locations when Project-source noise is added to the ambient daytime, evening, and nighttime conditions are presented on Tables 7-3 to 7-5, respectively.

As indicated on Table 7-3, the Project will contribute an operational noise level increase of up to 1.7 dBA Leq during the daytime hours. Table 7-4 shows that the evening Project-related operational noise level increases will approach 2.0 dBA Leq, and Table 7-5 shows the nighttime noise level increases with the Project will be up to 3.7 dBA Leq. Since the Project-related operational noise level contributions will satisfy the FICON significance criteria based on existing ambient noise levels below 60 dBA Leq, between 60 to 65 dBA Leq, and already exceeding 65 dBA Leq, as discussed in Section 4, the increases at the sensitive receiver locations will be *less than significant*. On this basis, Project operational stationary-source noise would not result in a substantial temporary/periodic, or permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project, and impacts in these regards will be *less than significant*.

TABLE 7-3: DAYTIME OPERATIONAL NOISE LEVEL CONTRIBUTIONS (DBA LEQ)

Receiver Location ¹	Total Project Operational Noise Level ²	Measurement Location ³	Reference Ambient Noise Levels ⁴	Combined Project and Ambient ⁵	Project Contribution ⁶	Threshold Exceeded? ⁷
L1	48.5	L1	67.4	67.5	0.1	No
L2	46.2	L2	52.9	53.7	0.8	No
L3	47.4	L3	67.9	67.9	0.0	No
L4	37.8	L4	55.0	55.1	0.1	No
L5	59.5	L5	_8	_8	_8	_8
L6	54.5	L6	_8	_8	_8	_8
L7	72.2	L7	_8	_8	_8	_8
L8	60.6	L8	_8	_8	_8	_8
L9	57.7	L9	61.0	62.7	1.7	No
L10	40.1	L10	47.7	48.4	0.7	No
L11	60.7	L11	_8	_8	_8	_8
L12	73.4	L12	_8	_8	_8	_8
L13	57.4	L13	65.2	65.9	0.7	No
L14	46.5	L14	53.2	54.0	0.8	No
L15	44.4	L15	55.5	55.8	0.3	No
L16	63.8	L16	_8	_8	_8	_8
L17	63.6	L17	_8	_8	_8	_8
L18	65.4	L18	_8	_8	_8	_8
L19	44.9	L19	60.9	61.0	0.1	No
L20	34.7	L20	53.5	53.6	0.1	No
L21	39.6	L21	55.9	56.0	0.1	No
L22	38.6	L22	61.3	61.3	0.0	No
L23	41.3	L23	62.0	62.0	0.0	No
L24	42.7	L24	59.3	59.4	0.1	No
L25	43.7	L25	57.1	57.3	0.2	No
L26	33.7	L26	62.3	62.3	0.0	No
L27	40.8	L27	67.8	67.8	0.0	No
L28	55.5	L28	63.0	63.7	0.7	No
L29	43.5	L29	70.1	70.1	0.0	No
L30	31.4	L30	58.3	58.3	0.0	No

¹ See Exhibit 10-A for the sensitive receiver locations.

² Total Project operational noise levels as shown on Table 10-2.

³ Reference noise level measurement locations as shown on Exhibit 5-A.

⁴ Observed daytime ambient noise levels as shown on Table 5-1.

⁵ Represents the combined ambient conditions plus the Project activities.

⁶ The noise level increase expected with the addition of the proposed Project activities.

⁷ Significance Criteria as defined in Section 4.

⁸ The measurement location represents the future CV Link alignment, and therefore, the land use is not noise-sensitive.

TABLE 7-4: EVENING OPERATIONAL NOISE LEVEL CONTRIBUTIONS (DBA LEQ)

Receiver Location ¹	Total Project Operational Noise Level ²	Measurement Location ³	Reference Ambient Noise Levels ⁴	Combined Project and Ambient ⁵	Project Contribution ⁶	Threshold Exceeded? ⁷
L1	48.5	L1	66.0	66.1	0.1	No
L2	46.2	L2	51.7	52.8	1.1	No
L3	47.4	L3	66.9	66.9	0.0	No
L4	37.8	L4	n/a	n/a	n/a	n/a
L5	59.5	L5	_ ₈	_ ₈	_ ₈	_ ₈
L6	54.5	L6	_ ₈	_ ₈	_ ₈	_ ₈
L7	72.2	L7	_ ₈	_ ₈	_ ₈	_ ₈
L8	60.6	L8	_ ₈	_ ₈	_ ₈	_ ₈
L9	57.7	L9	60.0	62.0	2.0	No
L10	40.1	L10	48.9	49.4	0.5	No
L11	60.7	L11	_ ₈	_ ₈	_ ₈	_ ₈
L12	73.4	L12	_ ₈	_ ₈	_ ₈	_ ₈
L13	57.4	L13	n/a	n/a	n/a	n/a
L14	46.5	L14	n/a	n/a	n/a	n/a
L15	44.4	L15	n/a	n/a	n/a	n/a
L16	63.8	L16	_ ₈	_ ₈	_ ₈	_ ₈
L17	63.6	L17	_ ₈	_ ₈	_ ₈	_ ₈
L18	65.4	L18	_ ₈	_ ₈	_ ₈	_ ₈
L19	44.9	L19	n/a	n/a	n/a	n/a
L20	34.7	L20	n/a	n/a	n/a	n/a
L21	39.6	L21	n/a	n/a	n/a	n/a
L22	38.6	L22	n/a	n/a	n/a	n/a
L23	41.3	L23	n/a	n/a	n/a	n/a
L24	42.7	L24	n/a	n/a	n/a	n/a
L25	43.7	L25	n/a	n/a	n/a	n/a
L26	33.7	L26	n/a	n/a	n/a	n/a
L27	40.8	L27	n/a	n/a	n/a	n/a
L28	55.5	L28	n/a	n/a	n/a	n/a
L29	43.5	L29	n/a	n/a	n/a	n/a
L30	31.4	L30	n/a	n/a	n/a	n/a

¹ See Exhibit 10-A for the sensitive receiver locations.

² Total Project operational noise levels as shown on Table 10-2.

³ Reference noise level measurement locations as shown on Exhibit 5-A.

⁴ Observed evening ambient noise levels as shown on Table 5-1.

⁵ Represents the combined ambient conditions plus the Project activities.

⁶ The noise level increase expected with the addition of the proposed Project activities.

⁷ Significance Criteria as defined in Section 4.

⁸ The measurement location represents the future CV Link alignment, and therefore, the land use is not noise-sensitive.

"n/a" = The jurisdiction's Municipal Code does not include evening hours.

TABLE 7-5: NIGHTTIME OPERATIONAL NOISE LEVEL CONTRIBUTIONS (DBA LEQ)

Receiver Location ¹	Total Project Operational Noise Level ²	Measurement Location ³	Reference Ambient Noise Levels ⁴	Combined Project and Ambient ⁵	Project Contribution ⁶	Threshold Exceeded? ⁷
L1	48.5	L1	65.7	65.8	0.1	No
L2	46.2	L2	48.9	50.8	1.9	No
L3	47.4	L3	63.8	63.9	0.1	No
L4	37.8	L4	49.8	50.1	0.3	No
L5	59.5	L5	_8	_8	_8	_8
L6	54.5	L6	_8	_8	_8	_8
L7	72.2	L7	_8	_8	_8	_8
L8	60.6	L8	_8	_8	_8	_8
L9	57.7	L9	56.5	60.2	3.7	No
L10	40.1	L10	45.6	46.7	1.1	No
L11	60.7	L11	_8	_8	_8	_8
L12	73.4	L12	_8	_8	_8	_8
L13	57.4	L13	58.6	61.1	2.5	No
L14	46.5	L14	49.3	51.1	1.8	No
L15	44.4	L15	49.2	50.4	1.2	No
L16	63.8	L16	_8	_8	_8	_8
L17	63.6	L17	_8	_8	_8	_8
L18	65.4	L18	_8	_8	_8	_8
L19	44.9	L19	56.8	57.1	0.3	No
L20	34.7	L20	50.1	50.2	0.1	No
L21	39.6	L21	51.2	51.5	0.3	No
L22	38.6	L22	59.1	59.1	0.0	No
L23	41.3	L23	61.4	61.4	0.0	No
L24	42.7	L24	56.7	56.9	0.2	No
L25	43.7	L25	56.1	56.3	0.2	No
L26	33.7	L26	60.6	60.6	0.0	No
L27	40.8	L27	63.2	63.2	0.0	No
L28	55.5	L28	58.9	60.5	1.6	No
L29	43.5	L29	65.2	65.2	0.0	No
L30	31.4	L30	54.4	54.4	0.0	No

¹ See Exhibit 10-A for the sensitive receiver locations.

² Total Project operational noise levels as shown on Table 10-2.

³ Reference noise level measurement locations as shown on Exhibit 5-A.

⁴ Observed nighttime ambient noise levels as shown on Table 5-1.

⁵ Represents the combined ambient conditions plus the Project activities.

⁶ The noise level increase expected with the addition of the proposed Project activities.

⁷ Significance Criteria as defined in Section 4.

⁸ The measurement location represents the future CV Link alignment, and therefore, the land use is not noise-sensitive.

This page intentionally left blank

8 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the temporary activities associated with the construction of the Project.

8.1 CONSTRUCTION NOISE STANDARDS

To control noise impacts associated with the construction of the proposed Project, each jurisdiction has established limits to the hours of operation. Table 3-3 shows the permitted hours of construction activity for each jurisdiction, including the Caltrans Standard Specifications, Section 14-8.02 *Noise Control*, noise level standards for construction activity due to the Federal funding requirements of the Project. (2) In effect, if the construction activities comply with the permitted hours of each jurisdiction and the nighttime noise level standards identified by Caltrans, shown on Table 3-3, the construction noise levels associated with CV Link are considered exempt from the noise standards of the local ordinances.

8.2 CONSTRUCTION NOISE LEVELS

During construction of the proposed Project, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. Noise from Project construction would be regulated through Caltrans Standard Specifications and by the local jurisdictions' permitted hours of construction activity. To minimize the construction noise impact for sensitive land adjacent to the Project site, construction noise is regulated by Caltrans Standard Specifications in Section 14-8.02 *Noise Control*. These provisions shall be adhered to during Project construction.

Project construction has the potential to generate two types of potential short-term noise impacts. The first type would be from construction crews commutes and the transportation of construction equipment and materials to the Project, which may incrementally increase the noise levels on access roads leading to the Project. Heavy equipment, such as dozers, will be moved to the Project construction locations and will remain for the duration of construction for that location, which will not add to the daily traffic volume in the Project vicinity. Some high, single-event noise levels may occur from trucks passing at distances of 50 feet to nearby sensitive receiver locations, however, the construction traffic will be short-term and does not represent a long-term perceptible increase in the Project study area. Therefore, short-term construction-related worker commutes and equipment transportation would result in insubstantial noise impacts.

The second type of potential noise impact is related to the noise generated during Project construction activities. The stationary-source RCNM noise prediction model is used to calculate the worst-case noise levels from the mobile and stationary equipment used during Project construction activities. Consistent with the *CV Link Air Quality Impact Analysis* prepared for the Project, the construction equipment is analyzed in the following phases:

- Site Preparation
- Grading

- Paving

Tables 8-1 to 8-4 present the temporary construction noise levels for each phase of Project construction, consistent with the *Air Quality Impact Analysis*. (23) The paving construction equipment is separated by mobile and stationary equipment types in order to analyze the proposed construction staging locations, during the paving phase of Project construction, as shown on Tables 8-3 and 8-4. The analysis shows that the highest construction noise level impacts will occur when mobile equipment is operating on the proposed CV Link pathways during the grading phase of Project construction. As shown on Table 8-5, the unmitigated peak construction noise levels are expected to range from 80.0 to 89.7 dBA Lmax at a distance of 50 feet from the pathways and staging areas. Table 8-5 also shows the distances from each construction phase to the 86 dBA Lmax noise level contour, consistent with the Caltrans nighttime construction noise level threshold, which will range from 25 to 50 feet.

It is important to note that the construction noise contour boundaries provided in this analysis do not account for any additional attenuation provided by existing barriers or topography at the adjacent receiver locations in the Project study area. The peak unmitigated noise contour boundaries encompass the receiver locations which may perceive worst-case noise levels when construction activities occur near the property line and all equipment is operating simultaneously. In addition, the construction equipment used in this analysis represents a worst-case assumption of equipment, which will not occur at every CV Link pathway and staging area. The worst-case noise level contour boundaries for each phase of Project construction are shown in Appendix 8.1.

TABLE 8-1: SITE PREPARATION CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment Type ¹	Quantity	Usage Factor ²	Hours of Operation ³	Reference Noise Level @ 50 Feet (dBA Lmax)
Flat Bed Truck	4	40%	3.2	74.0
Rubber Tired Dozer	4	40%	3.2	82.0
Tractor/Loader/Backhoe	4	40%	3.2	79.0
Combined Hourly Noise Levels 50 Feet (dBA Lmax)				84.2

¹ Source: FHWA's Roadway Construction Noise Model, January 2006.

² Estimates the fraction of time each piece of equipment is operating at full power during a construction operation.

³ Represents the actual hours of peak construction equipment activity out of a typical 8-hour workday.

TABLE 8-2: GRADING CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment Type ¹	Quantity	Usage Factor ²	Hours of Operation ³	Reference Noise Level @ 50 Feet (dBA Lmax)
Excavator	4	40%	3.2	81.0
Grader	4	40%	3.2	85.0
Rubber Tired Dozer	4	40%	3.2	82.0
Scraper	4	40%	3.2	84.0
Tractor/Loader/Backhoe	4	40%	3.2	79.0
Combined Hourly Noise Levels 50 Feet (dBA Lmax)				89.7

¹ Source: FHWA's Roadway Construction Noise Model, January 2006.² Estimates the fraction of time each piece of equipment is operating at full power during a construction operation.³ Represents the actual hours of peak construction equipment activity out of a typical 8-hour workday.**TABLE 8-3: PAVING MOBILE CONSTRUCTION EQUIPMENT NOISE LEVELS**

Equipment Type ¹	Quantity	Usage Factor ²	Hours of Operation ³	Reference Noise Level @ 50 Feet (dBA Lmax)
Pavers	4	50%	4.0	77.0
Paving Equipment	4	40%	3.2	76.0
Rollers	4	20%	1.6	80.0
Combined Hourly Noise Levels 50 Feet (dBA Lmax)				82.8

¹ Source: FHWA's Roadway Construction Noise Model, January 2006.² Estimates the fraction of time each piece of equipment is operating at full power during a construction operation.³ Represents the actual hours of peak construction equipment activity out of a typical 8-hour workday.**TABLE 8-4: PAVING STATIONARY CONSTRUCTION EQUIPMENT NOISE LEVELS**

Equipment Type ¹	Quantity	Usage Factor ²	Hours of Operation ³	Reference Noise Level @ 50 Feet (dBA Lmax)
Drum Mixer	1	50%	4.0	80.0
Combined Hourly Noise Levels 50 Feet (dBA Lmax)				80.0

¹ Source: FHWA's Roadway Construction Noise Model, January 2006.² Estimates the fraction of time each piece of equipment is operating at full power during a construction operation.³ Represents the actual hours of peak construction equipment activity out of a typical 8-hour workday.

8.3 CONSTRUCTION NOISE THRESHOLDS OF SIGNIFICANCE

The construction noise analysis shows that the highest noise levels will occur within 50 feet of construction equipment. As shown on Table 8-5, the worst-case peak construction noise levels are expected to approach 89.7 dBA Lmax at a distance of 50 feet from the site boundaries. To control noise impacts associated with the construction of the proposed Project, each jurisdiction has established limits to the hours of operation. In effect, if the construction activities comply with the permitted hours of each jurisdiction and the nighttime noise level standards identified by Caltrans, previously shown on Table 3-2, the construction noise levels associated with CV Link are considered exempt from the noise standards of the ordinance.

The worst-case peak construction noise levels are expected to approach 89.7 dBA Lmax at a distance of 50 feet from the CV Link pathways during grading activities, and the noise-sensitive receiver locations within 50 feet of the construction activities may perceive a temporary noise level increase. However, the construction noise level contour boundaries presented in this analysis do not take into account any additional attenuation due to the existing topography and barriers in the Project study area and represent the worst-case noise levels with all equipment operating simultaneously at a single point. Further, the Project pathways are often at different elevations than adjacent homes which would allow for additional attenuation due to existing topographic conditions. In addition, the noise level standards identified by Caltrans represent the nighttime construction noise level limit for activities occurring between 9:00 p.m. and 6:00 a.m., which the Project will comply with since no nighttime construction activities are planned. With the noise mitigation measures identified in this study, the noise levels due to Project construction activities are expected to create *less than significant* impacts at adjacent sensitive receiver locations.

While some construction-related noise may be *readily perceptible* by adjacent residences, tolerance of construction noise levels by nearby homeowners has been shown to greatly increase when informed that that construction noise is temporary and that the contractor is taking steps to reduce the construction noise levels. (3) Further, periodic exposure to high noise levels in short duration, such as Project-related construction noise, is typically considered an annoyance and not impactful to human health. Caltrans indicates that it would take several years of exposure to high noise levels to result in hearing impairment; with noise-induced hearing loss from chronic noise exposure showing the greatest impacts over a period of 10 years. (3)

TABLE 8-5: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Construction phase	Construction Noise Levels at 50 Feet (dBA Lmax) ¹	Distance to 86 dBA Lmax Noise Level Contour (Feet) ²	Nighttime Threshold Exceeded? ³
Site Preparation	84.2	41'	No
Grading	89.7	76'	Yes
Paving (Mobile Equipment)	82.8	35'	No
Paving (Stationary Equipment)	80.0	25'	No

¹ Construction equipment noise levels by type are shown on Tables 8-1 to 8-4.

² Estimated distance to the 86 dBA Lmax noise level contour for each phase of construction activity. Exhibits for the construction noise level contours are provided in Appendix 8.1.

³ Does the construction noise level, by phase, exceed the Caltrans 86 dBA Lmax at 50 feet nighttime criteria?

8.4 CONSTRUCTION VIBRATION STANDARDS

To control vibration impacts associated with the construction of the proposed Project, some jurisdictions in the Project study area have specific vibration level standards. Table 3-4 shows the vibration standards for each jurisdiction, including the Caltrans vibration level standards to determine the potential for building damage and human annoyance due to construction activity, in compliance with the Federal funding requirements of the Project. Based on the vibration standards shown on Table 3-4, the more conservative Caltrans vibration level standards for building damage, 0.12 in/sec PPV, and for human annoyance, 0.01 in/sec PPV, are used in this analysis to evaluate the potential impacts due to Project construction. (10)

8.5 CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- **Heavy Construction Equipment:** Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to building, the vibration is usually short-term and is not of sufficient magnitude to cause building damage. It is not expected that heavy equipment such as large bulldozers would operate close enough to any residences to cause a vibration impact.
- **Trucks:** Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration. Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include grading. Using the vibration source level of construction equipment

provided on Table 6-2 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 8-4 presents the expected Project related vibration levels at each of the sensitive receiver locations.

Based on the reference vibration levels provided by the FTA, a large bulldozer represents the peak source of vibration with a reference velocity of 0.089 in/sec PPV at a distance of 25 feet. At distances ranging from 25 to 125 feet from the Project site, construction vibration velocity levels are expected to range from 0.008 to 0.089 in/sec PPV, as shown on Table 8-6. Based on the Caltrans construction vibration standard for human annoyance, the proposed Project construction activities will exceed the vibration standard of 0.01 in/sec PPV at receiver locations within 100 feet of large bulldozers if used during Project construction. Therefore, the use of large bulldozers within 100 feet of nearby sensitive land uses (e.g. residential, school, etc.) shall be minimized unless the vibration levels are shown to be less than the Caltrans *Transportation and Construction Vibration Guidance Manual*, Table 20, peak particle velocity threshold of 0.01 in/sec PPV. With the recommended mitigation measures in Section 8.5, the Project-related vibration impacts at the nearby sensitive receiver locations represents a *less than significant* impact during the worst-case construction activities at the Project site boundary.

The vibration levels due to Project construction do not represent vibration levels capable of causing building damage to nearby residential homes. Caltrans identifies construction vibration levels capable of building damage approaching 0.12 in/sec PPV. (10) The peak Project-construction vibration levels approaching 0.089 in/sec PPV will not exceed the Caltrans vibration levels for building damage at the residential homes near the Project site. Further, the impacts at the site of the closest sensitive receivers are unlikely to be sustained during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter. Construction at the Project site will be restricted to daytime hours consistent with City requirements thereby eliminating potential vibration impact during the sensitive nighttime hours.

TABLE 8-6: CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Distance to Const. Activity (Feet)	Receiver PPV Levels (in/sec) ¹					Threshold Exceeded? ²
	Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Peak Vibration	
25'	0.003	0.035	0.076	0.089	0.089	Yes
50'	0.001	0.012	0.027	0.031	0.031	Yes
100'	0.000	0.004	0.010	0.011	0.011	Yes
125'	0.000	0.003	0.007	0.008	0.008	No

¹ Based on the Vibration Source Levels of Construction Equipment included on Table 6-2.

² Does the peak vibration exceed the maximum acceptable vibration threshold of 0.01 in/sec PPV?

8.6 CONSTRUCTION NOISE AND VIBRATION MITIGATION MEASURES

Though construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts, the following practices would reduce any noise level increases produced by the construction equipment to the nearby noise sensitive residential land uses.

- A. Project construction activities shall only occur between the permitted hours of each local jurisdiction's Municipal Code hours, as identified on Table 3-3 of this report. The Project construction supervisor shall ensure compliance with the note.
- B. During all Project site construction, all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction supervisor shall place all stationary construction equipment so that emitted noise is directed away from the noise-sensitive receivers nearest the Project site.
- C. The construction supervisor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site (i.e., at the planned staging areas or further from nearby sensitive receiver locations if possible) during all Project construction.
- D. The use of large bulldozers within 100 feet of nearby sensitive land uses (e.g. residential, school, etc.) shall be minimized.
- E. The construction supervisor shall limit haul truck deliveries to the same hours specified for construction equipment by each local jurisdiction's Municipal Code hours.

This page intentionally left blank

9 REFERENCES

1. **Coachella Valley Association of Governments.** *CV Link Master Plan*. January 2016.
2. **California Department of Transportation.** *Standard Specifications, Section 14-8.02*. 2015.
3. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol*. Sacramento, CA : s.n., September 2013.
4. **Richards, Leland K. Irvine and Roy L.** *Acoustics and Noise Control Handbook for Architects and Builders*. 1998.
5. **Marshall Day Acoustics.** *INSUL Sound Insulation Prediction Software (v 8.0.4)*. 2014.
6. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. March, 1974. EPA/ONAC 550/9/74-004.
7. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance*. June, 1995.
8. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response*. April 2000. p. 3.
9. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise*. October 1979 (revised July 1981). EPA 550/9/82/106.
10. **California Department of Transportation.** *Transportation and Construction Vibration Guidance Manual*. September 2013.
11. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013*.
12. **Office of Planning and Research.** *State of California General Plan Guidelines 2003*. October 2003.
13. **California Department of Transportation.** *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects*. May 2011.
14. —. *Effects of Traffic Noise and Road Construction Noise on Bats*. July 2016.
15. —. *Effects of Traffic Noise and Road Construction Noise on Birds*. June 2016.
16. **County of Riverside.** *General Plan Noise Element*. December 2014.
17. —. *Riverside County Airport Land Use Compatibility Plan Policy Document*. March 2005.
18. **California Court of Appeal.** *Gray v. County of Madera, F053661*. 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
19. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues*. August 1992.
20. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning.** *FHWA Roadway Construction Noise Model*. January 2006.
21. **Coachella Valley Association of Governments.** *CV Link Construction Staging & Access*. 2016.
22. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol*. Sacramento, CA : s.n., September 2013.
23. **Terra Nova Planning & Research, Inc.** *CV Link Air Quality Impact Analysis*. August 2016.

This page intentionally left blank

10 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed CV Link. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.

Bill Lawson, P.E., INCE
Principal
URBAN CROSSROADS, INC.
41 Corporate Park, Suite 300
Irvine, CA 92606
(949) 660-1994 x203
blawson@urbanxroads.com



EDUCATION

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

PROFESSIONAL REGISTRATIONS

PE – Registered Professional Traffic Engineer – TR 2537 • January, 2009
AICP – American Institute of Certified Planners – 013011 • June, 1997–January 1, 2012
PTP – Professional Transportation Planner • May, 2007 – May, 2013
INCE – Institute of Noise Control Engineering • March, 2004

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
ITE – Institute of Transportation Engineers

PROFESSIONAL CERTIFICATIONS

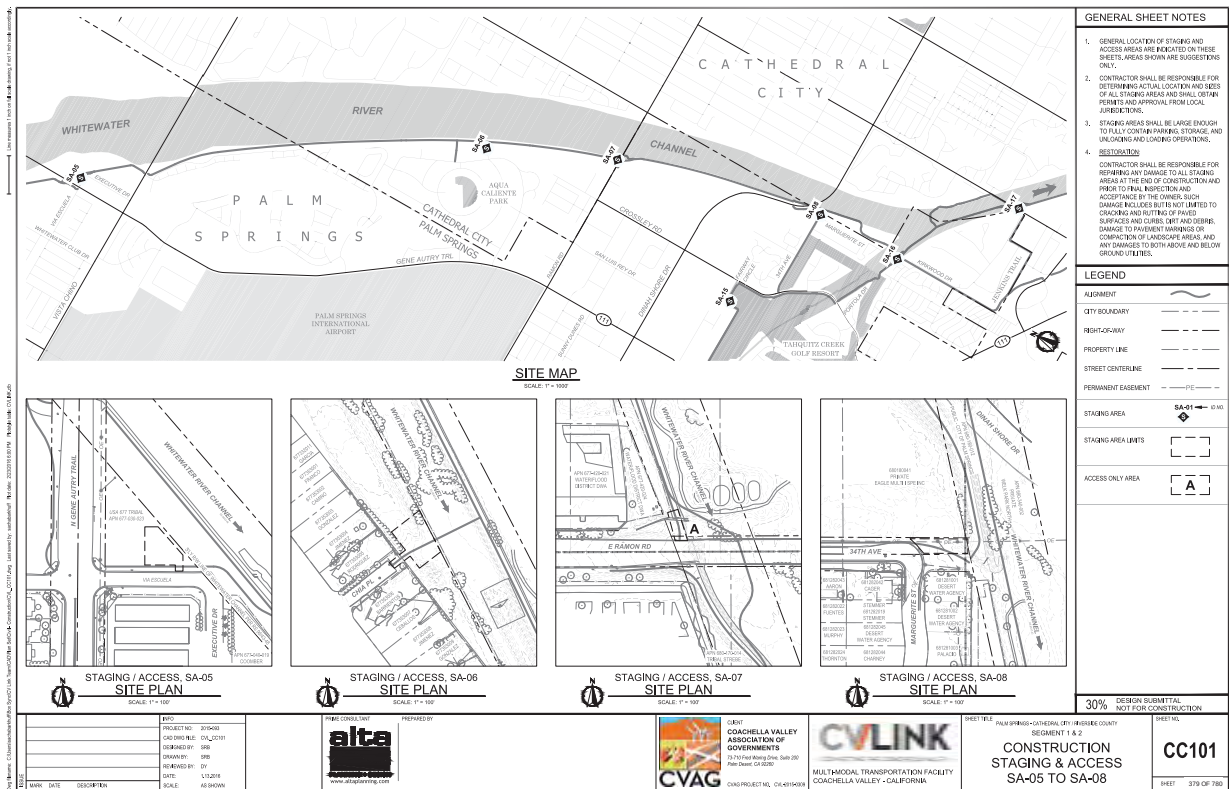
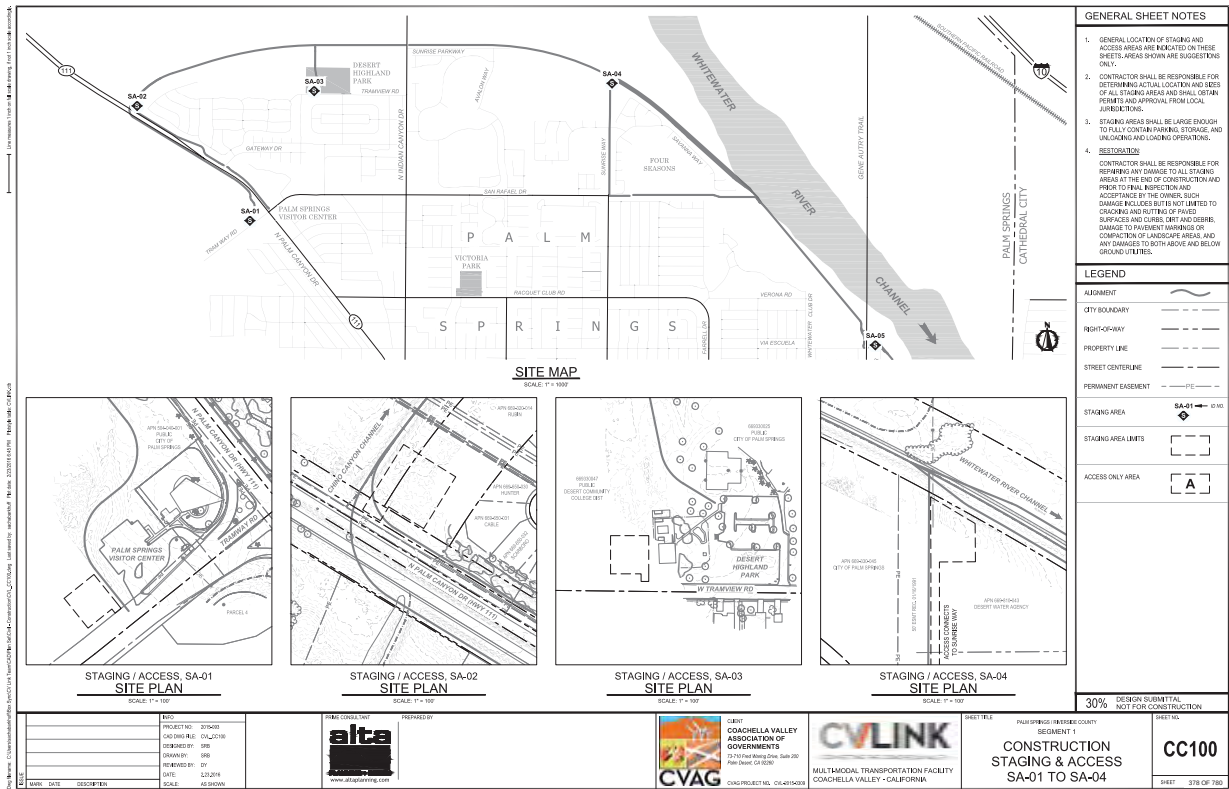
Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

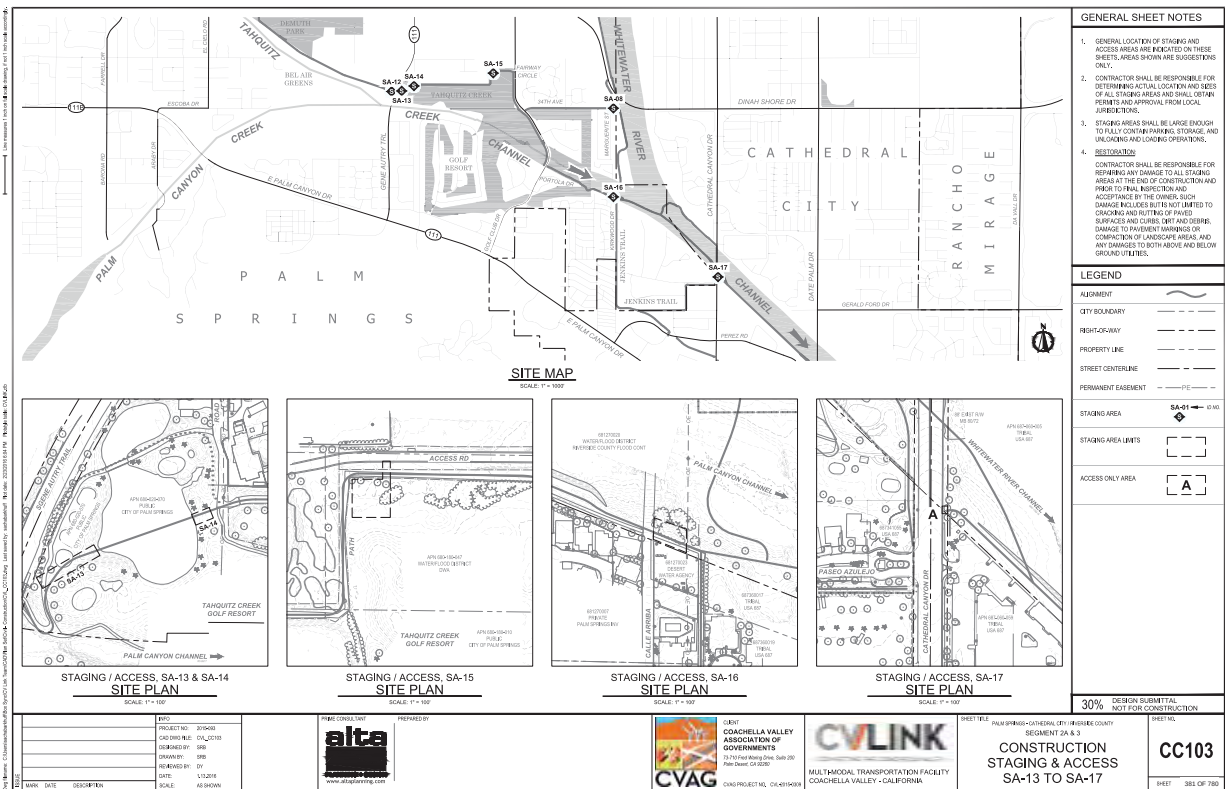
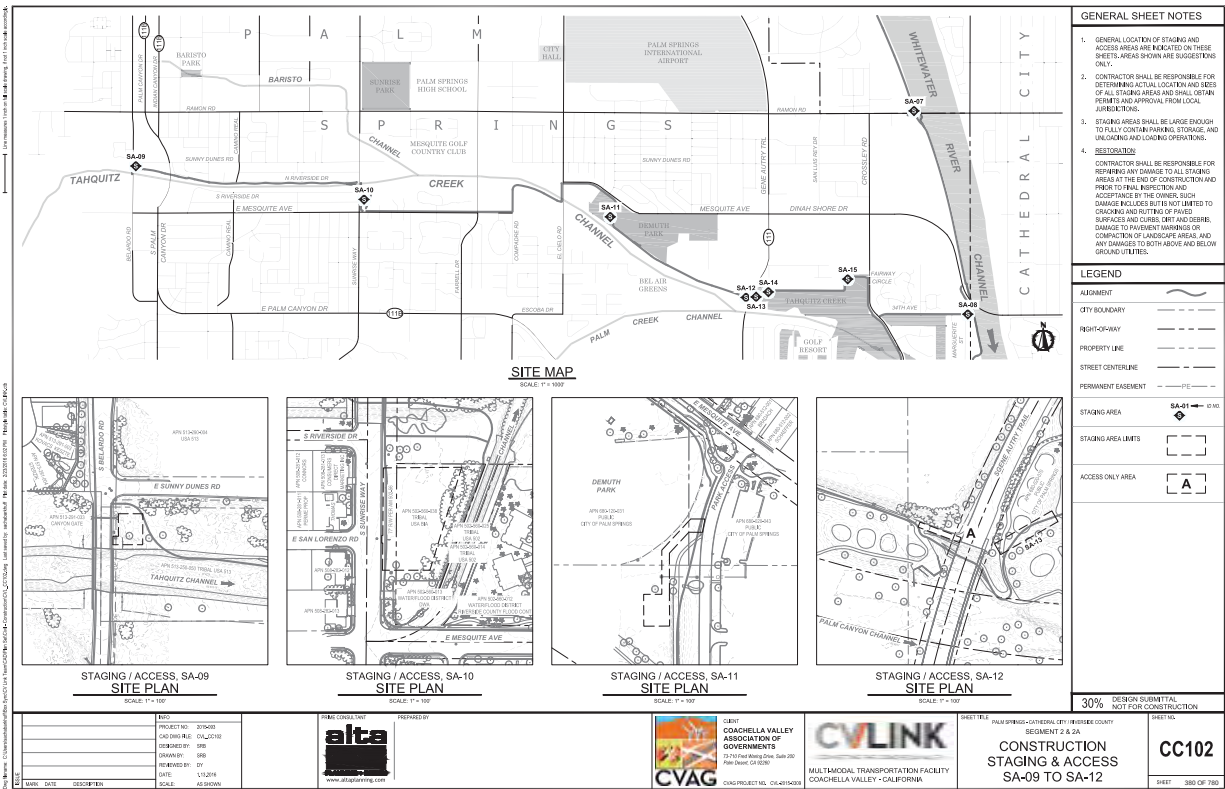
This page intentionally left blank

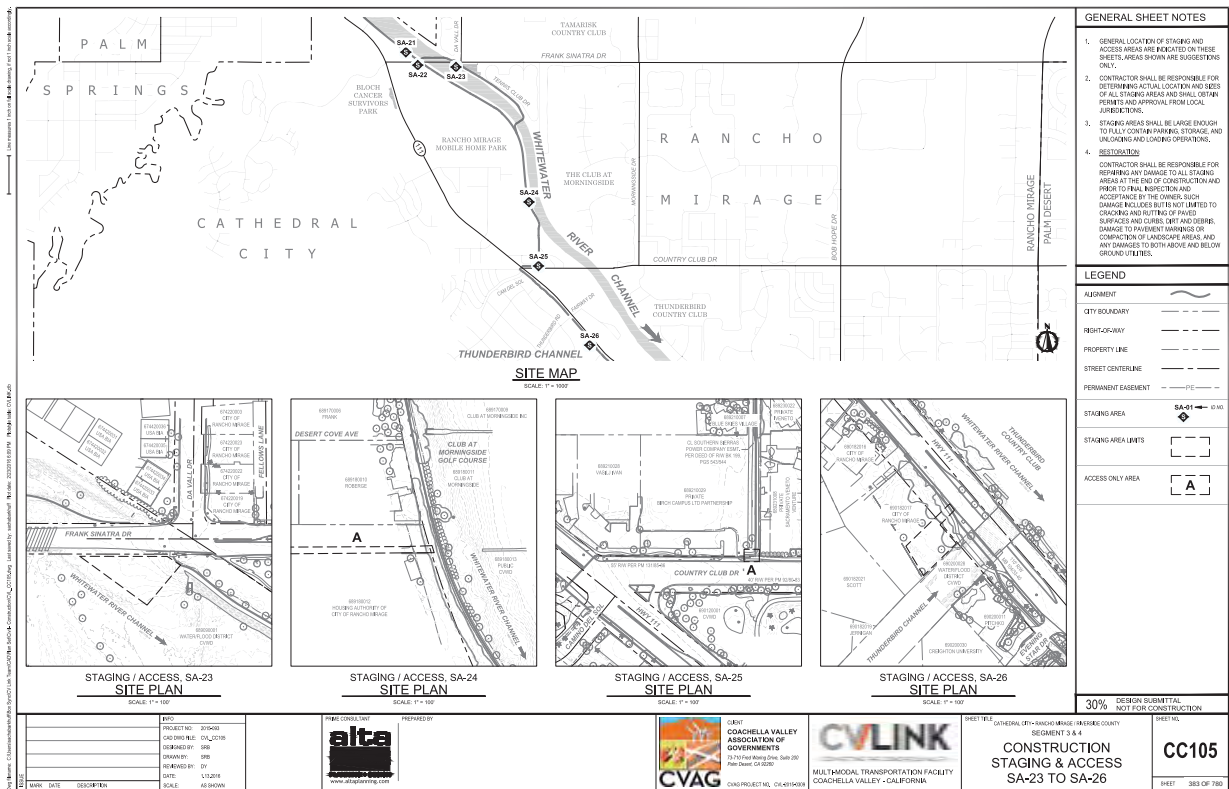
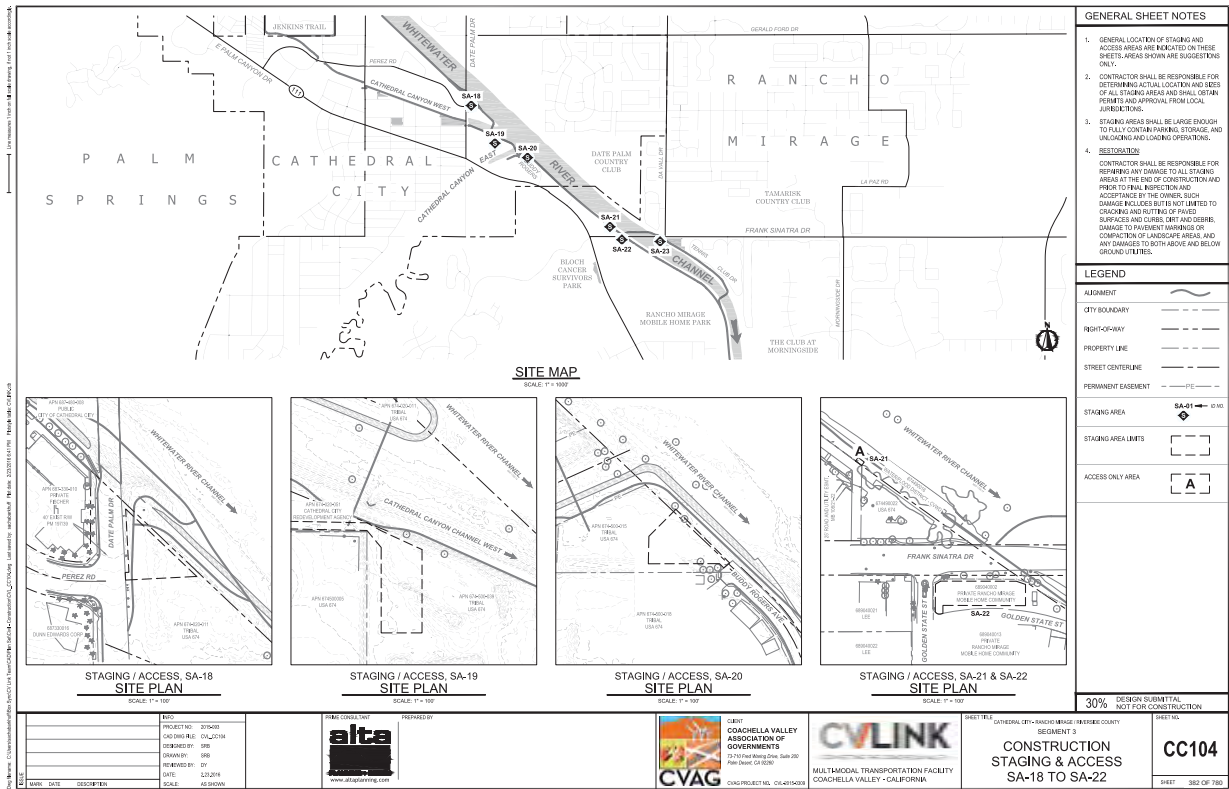
APPENDIX 1.1:

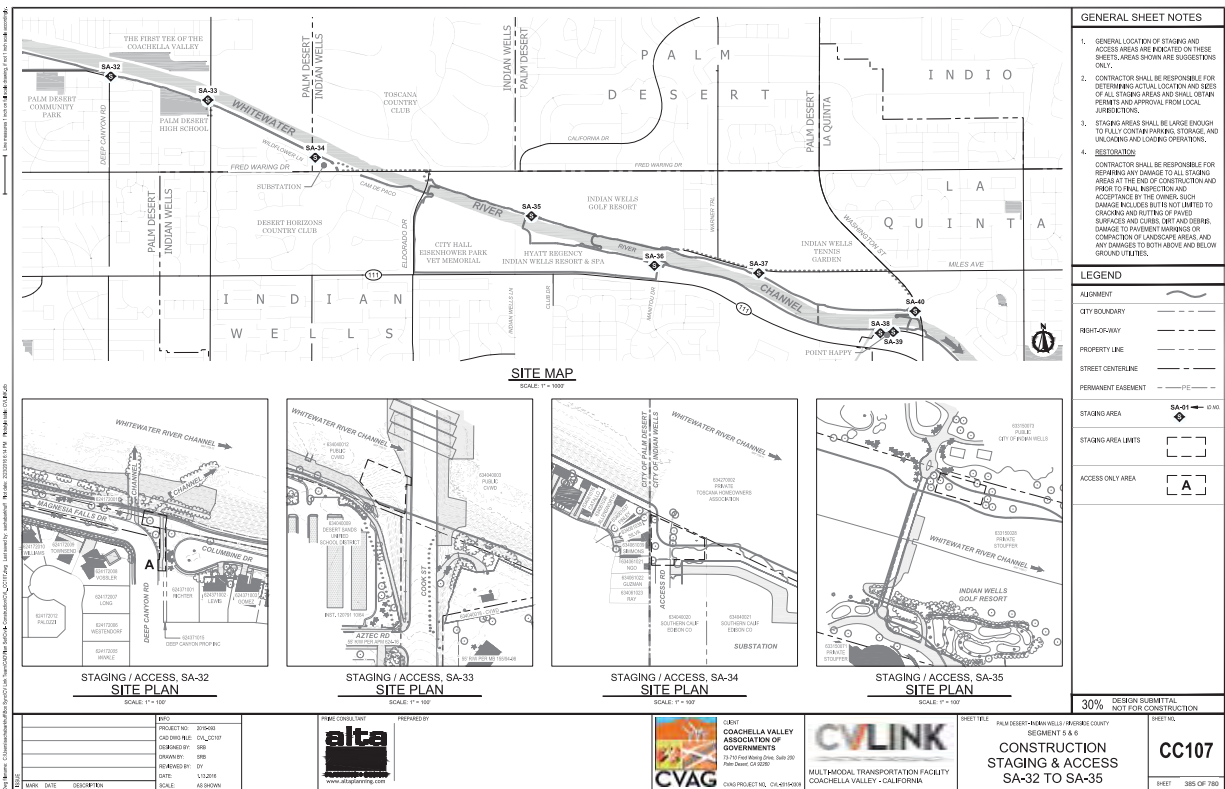
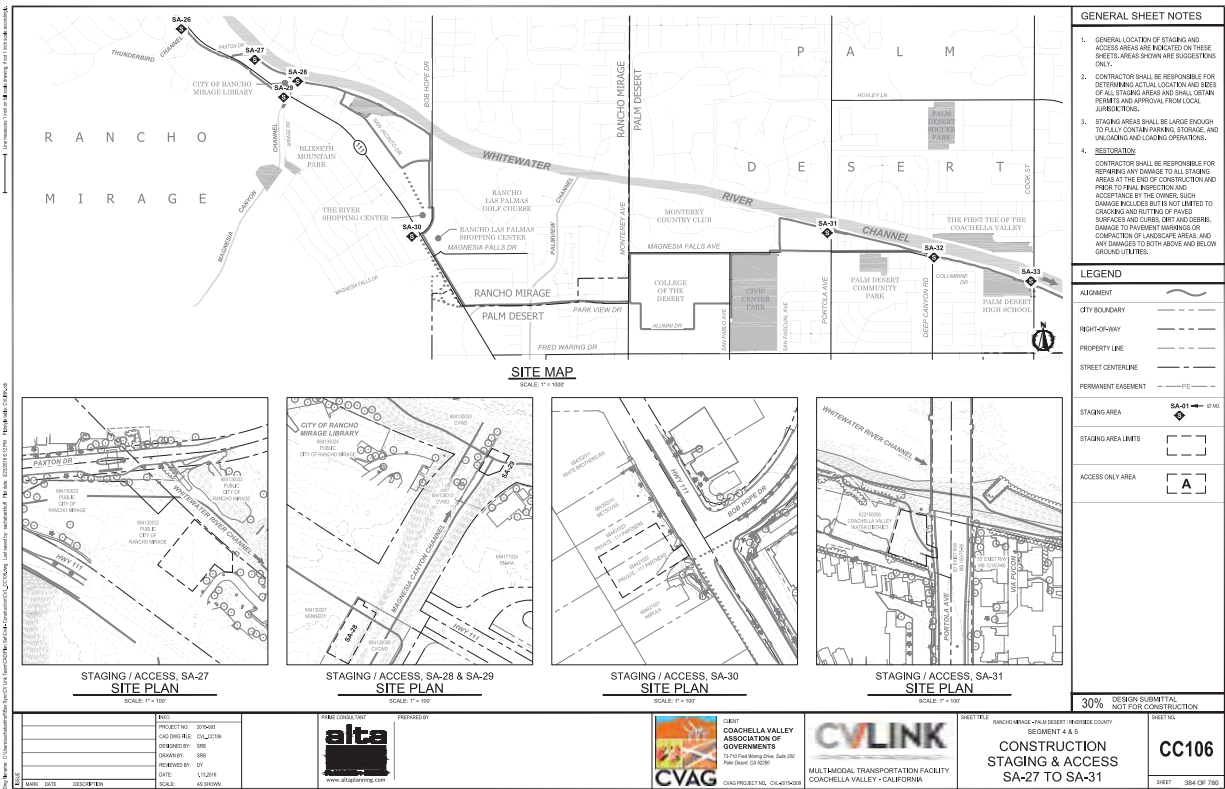
CV LINK CONSTRUCTION & SITE PLANS

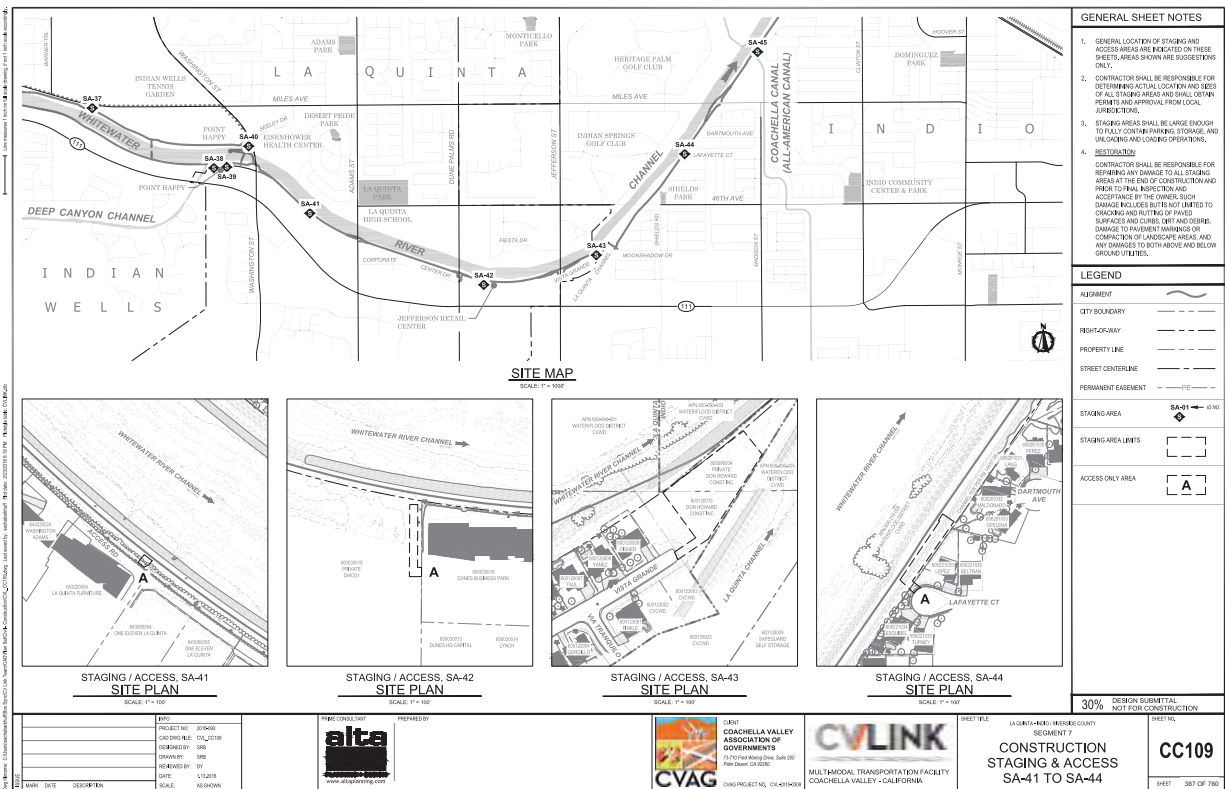
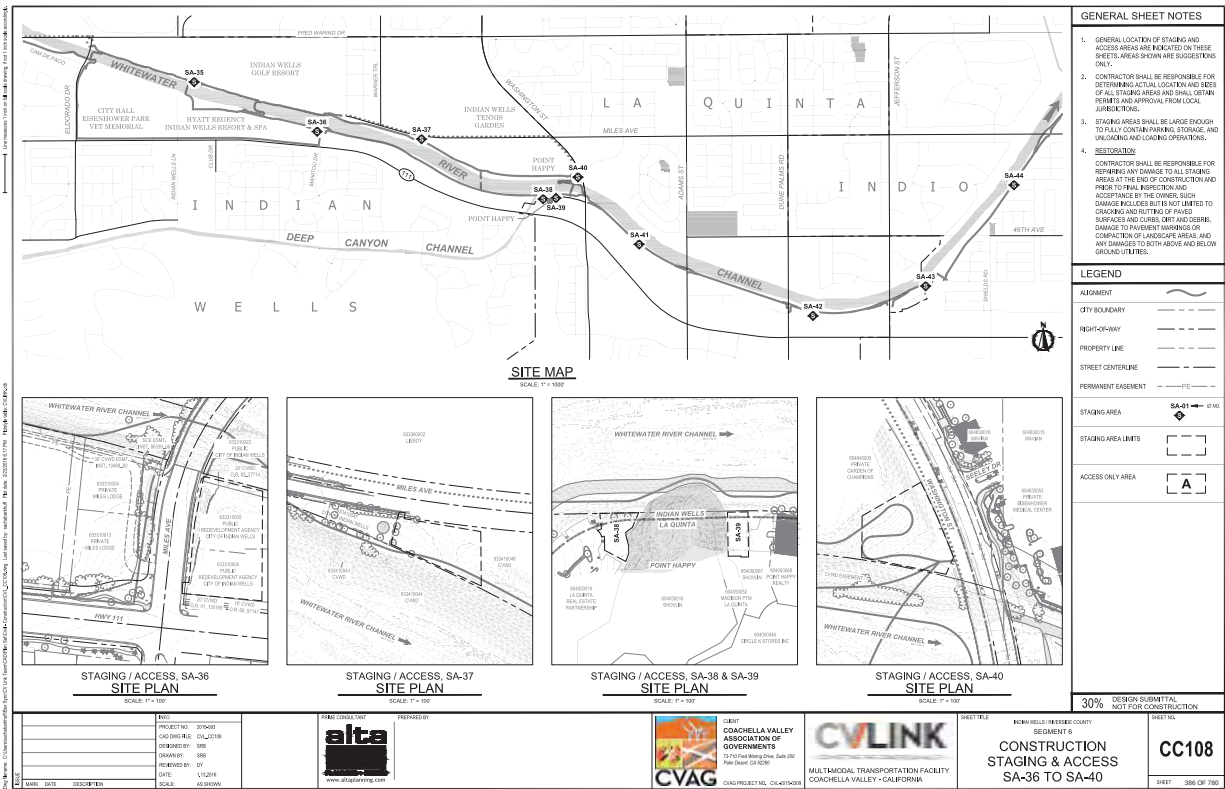
This page intentionally left blank

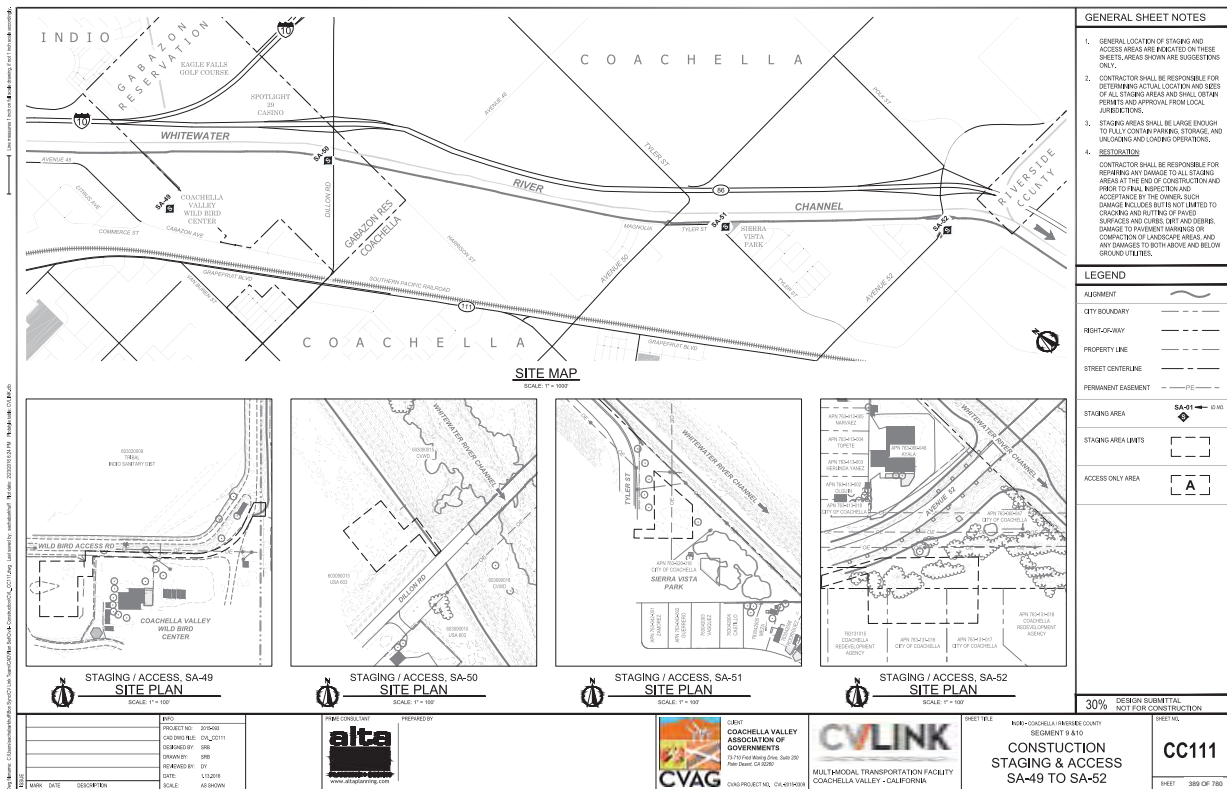
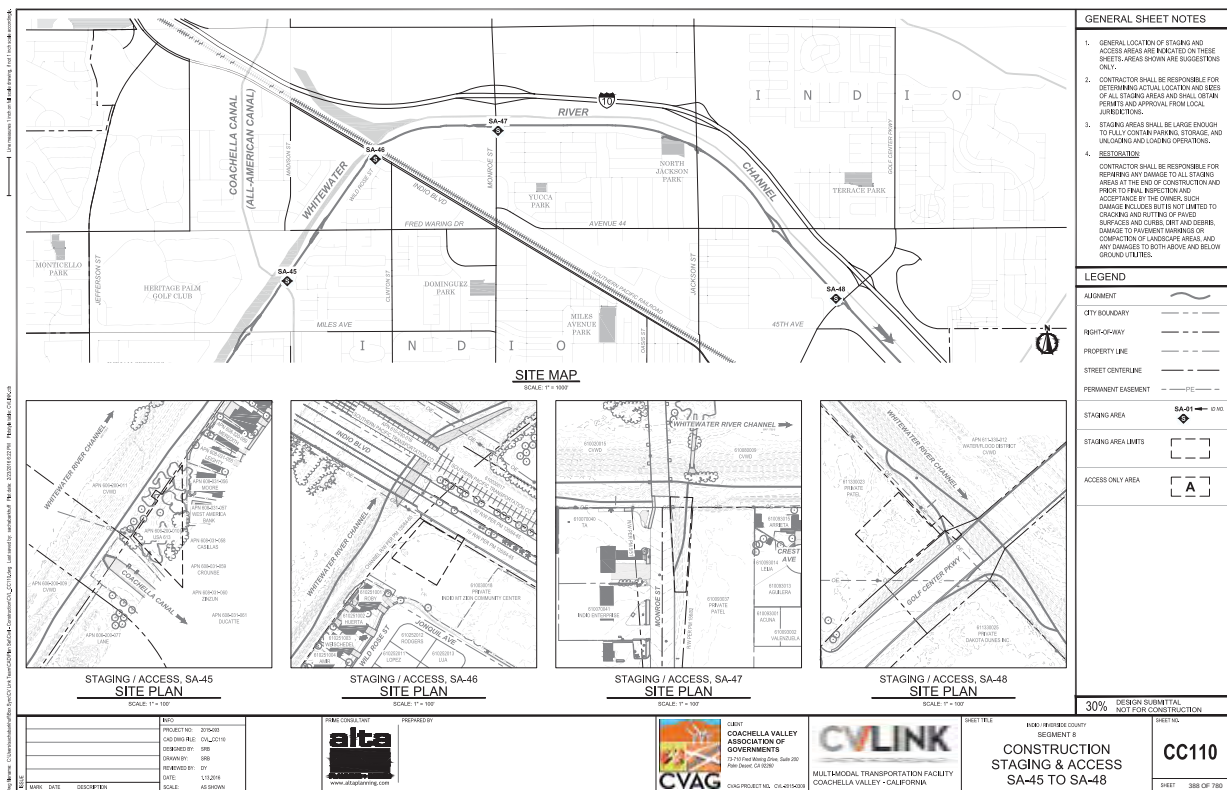


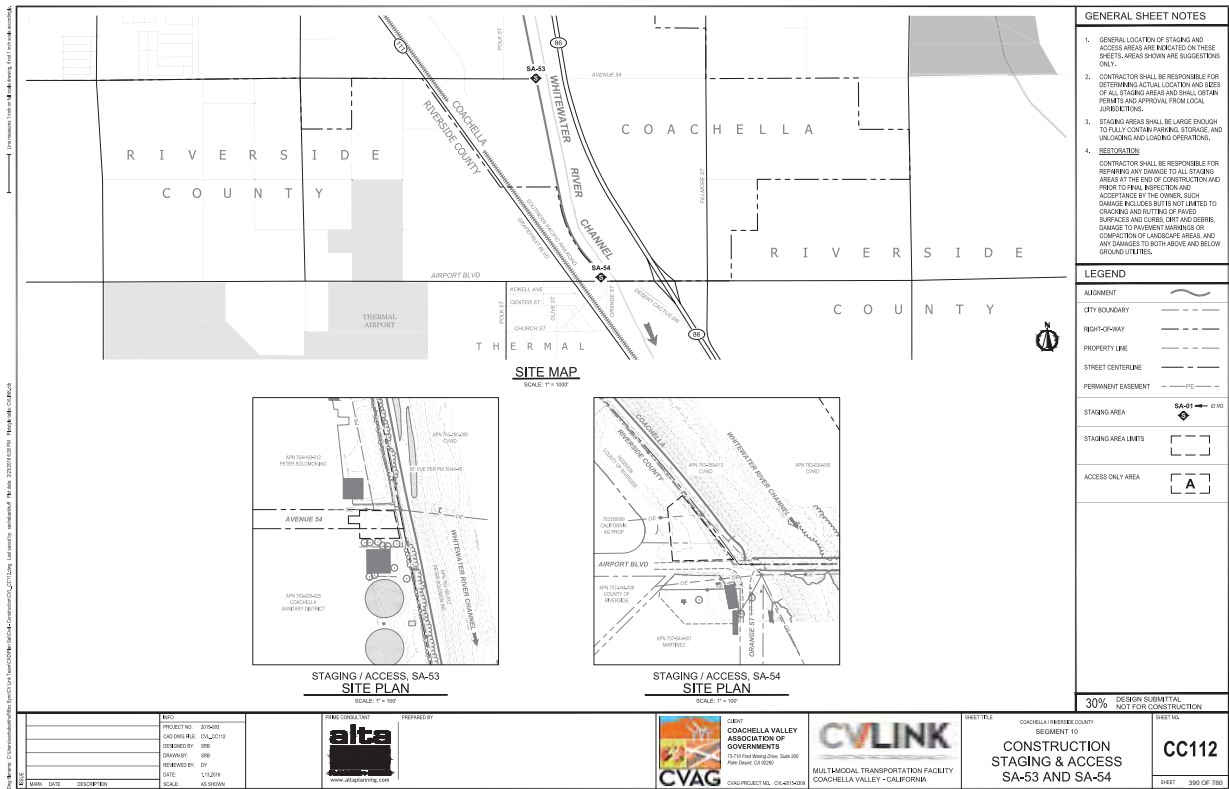












This page intentionally left blank

APPENDIX 5.1:

NOISE LEVEL MEASUREMENT LOCATION EXHIBITS

This page intentionally left blank

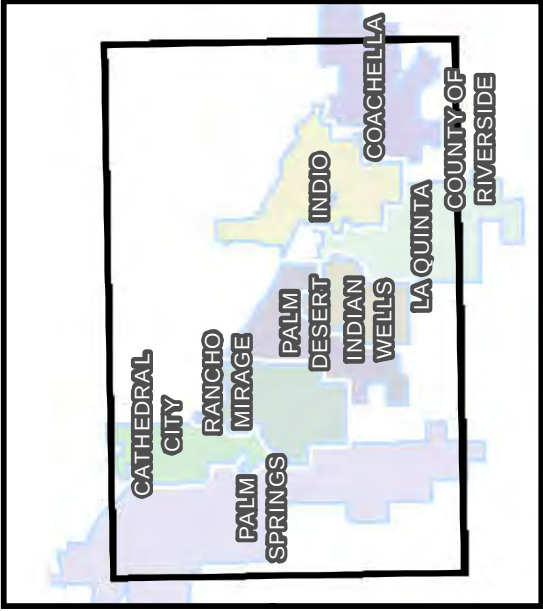
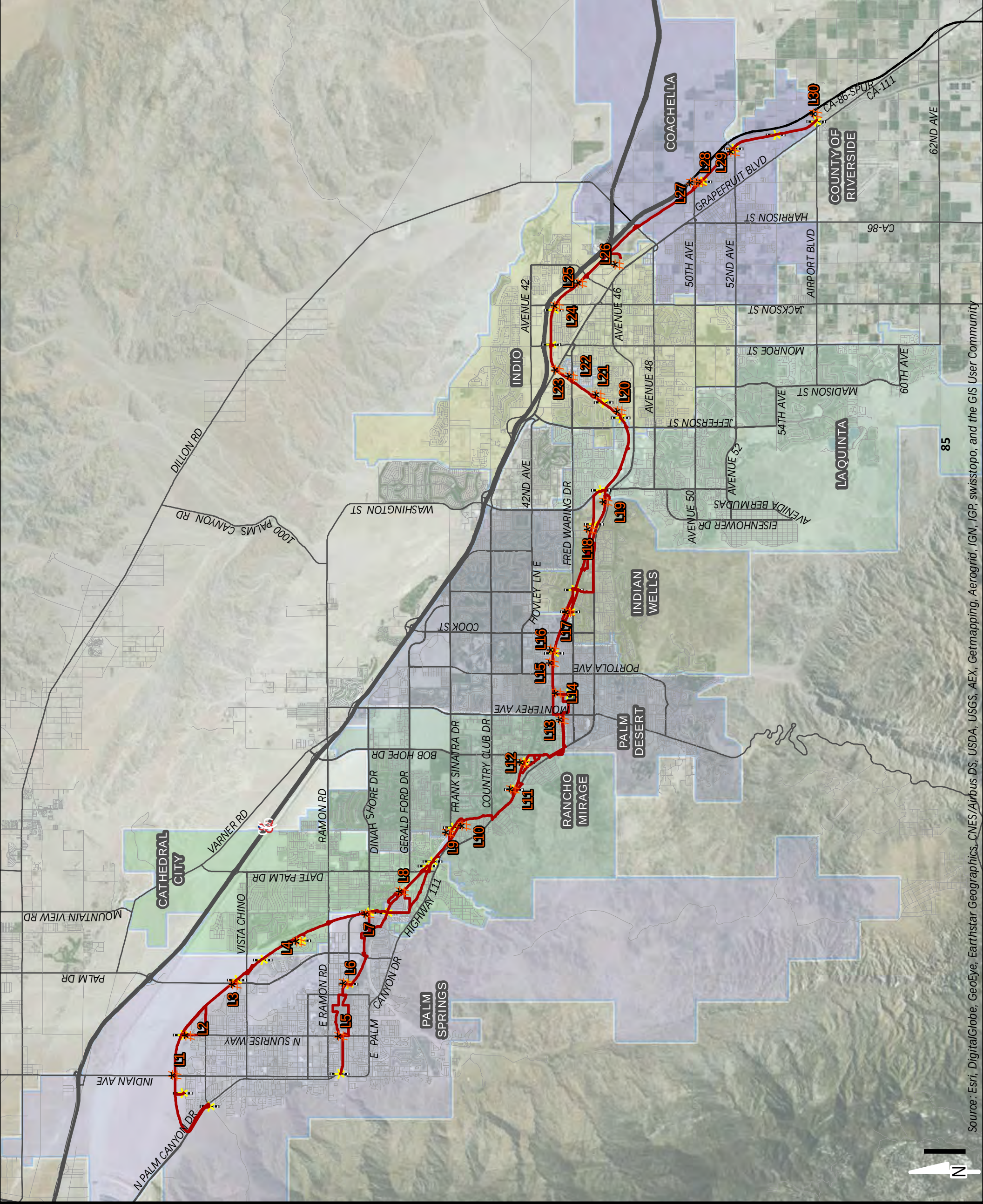
Noise Measurement Locations

Overview

Page 1 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



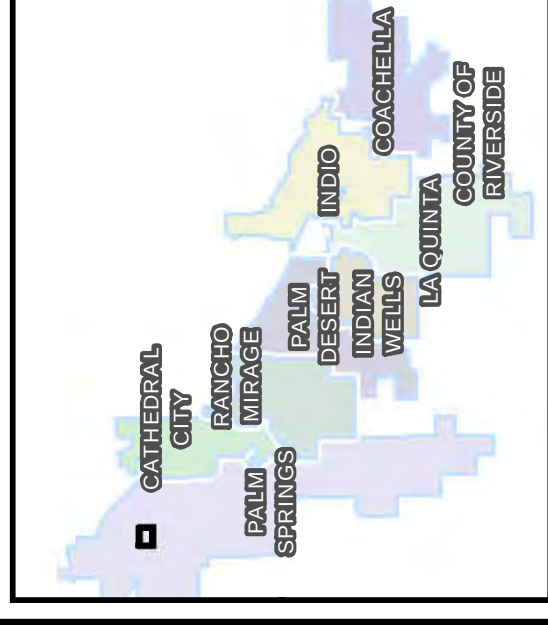
Noise Measurement Locations

1

Page 2 of 31

LEGEND:

-  Noise Level Measurement Locations
 -  Access Point
 -  CV Link Alignment



feet

09276_Mea
8/22/2016

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, Swisstopo, and the GIS User Community



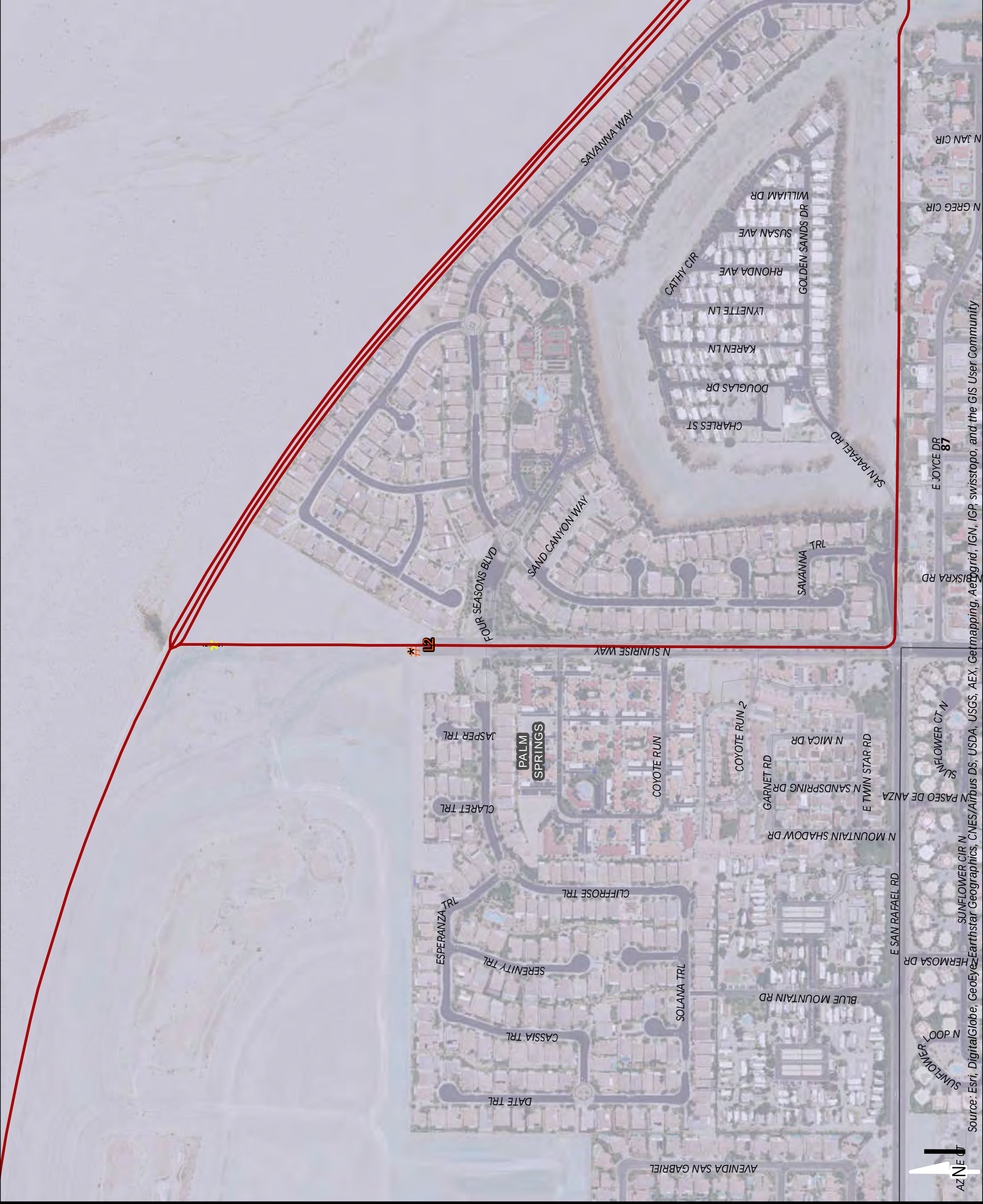
Noise Measurement Locations

L2

Page 3 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



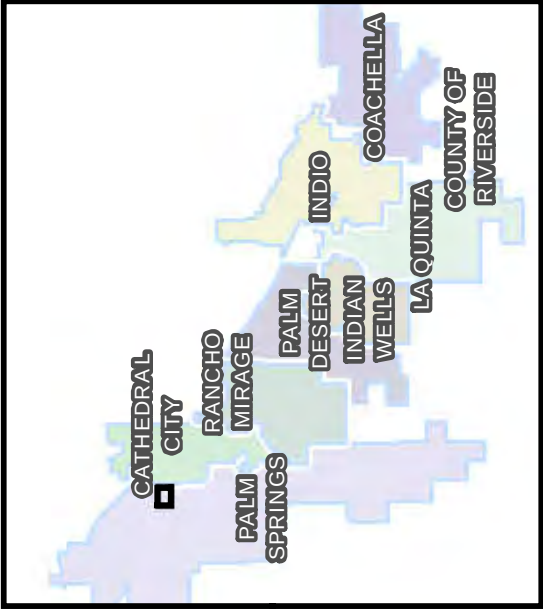
Noise Measurement Locations

L3

Page 4 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

Page 5 of 31

— CV Link Alignment

09276_Measurements_L1-30update
8/22/2016

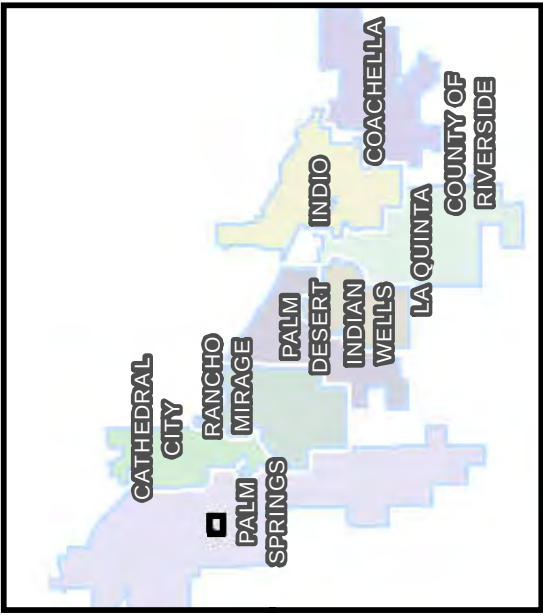
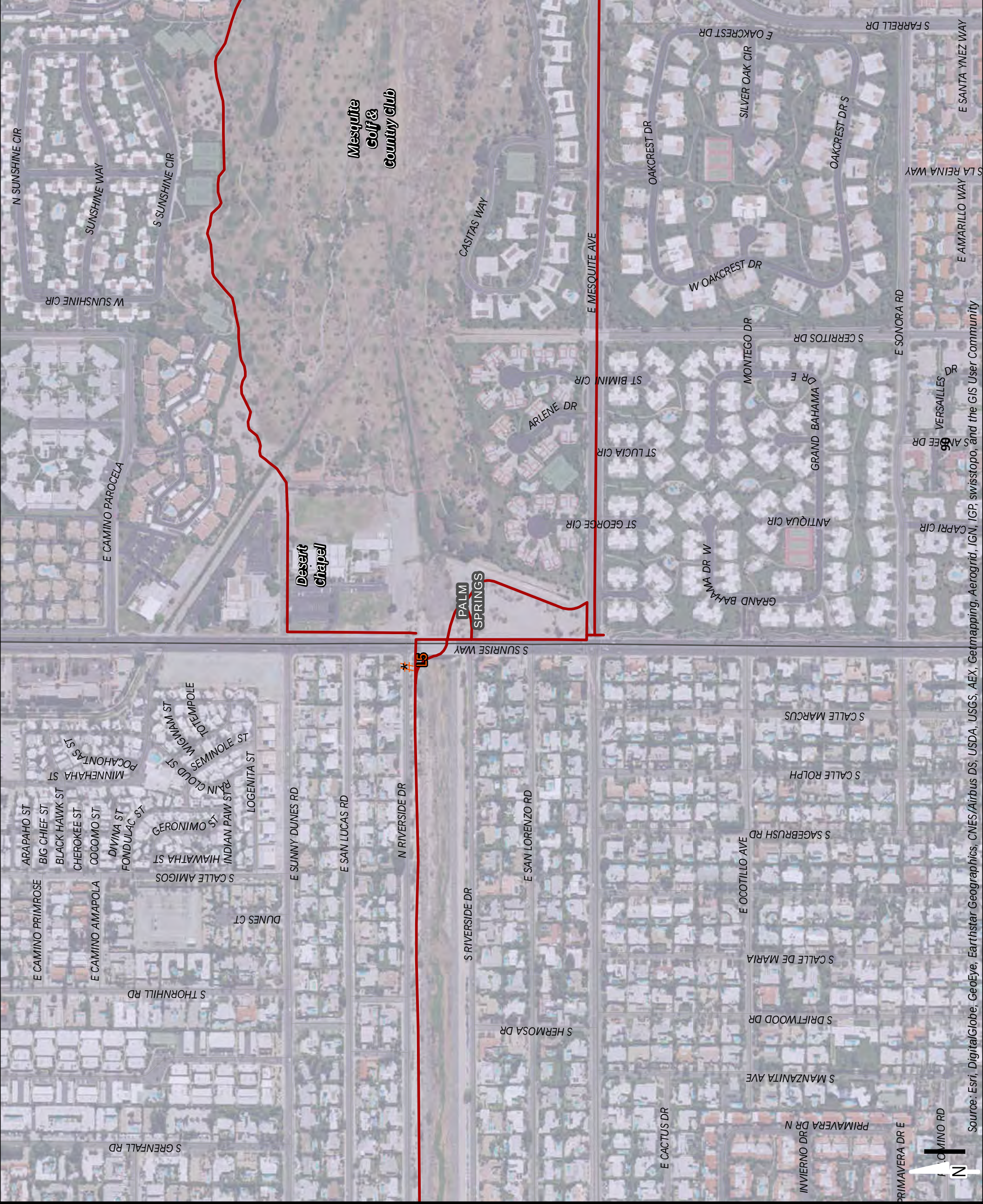
Noise Measurement Locations

L5

Page 6 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



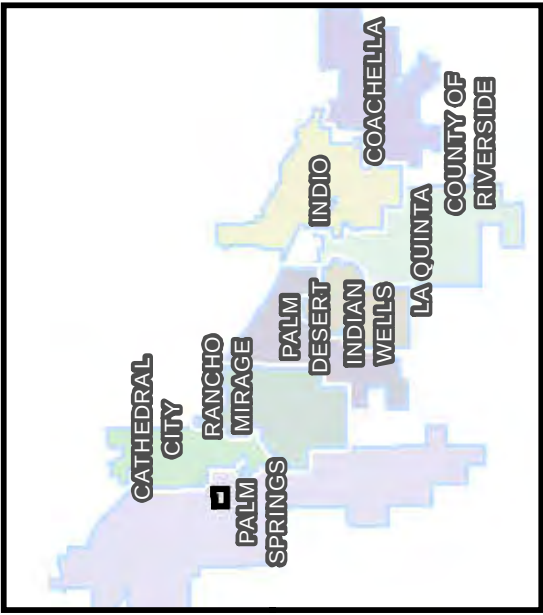
Noise Measurement Locations

L6

Page 7 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

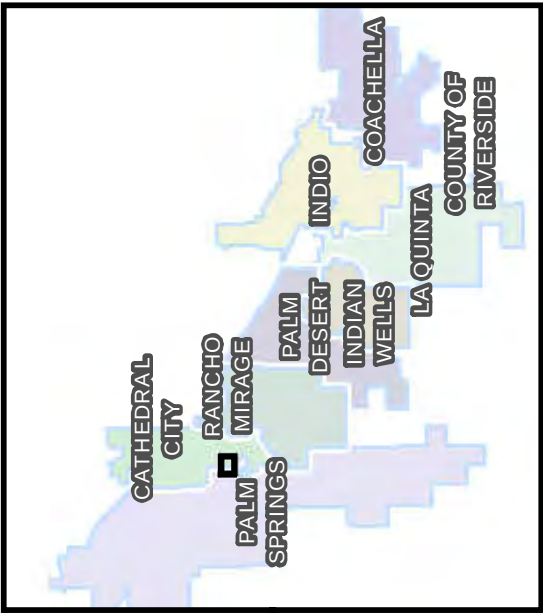
Noise Measurement Locations

L7

Page 8 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

Page 9 of 31

*# Noise Level Measurement Locations

Access Point

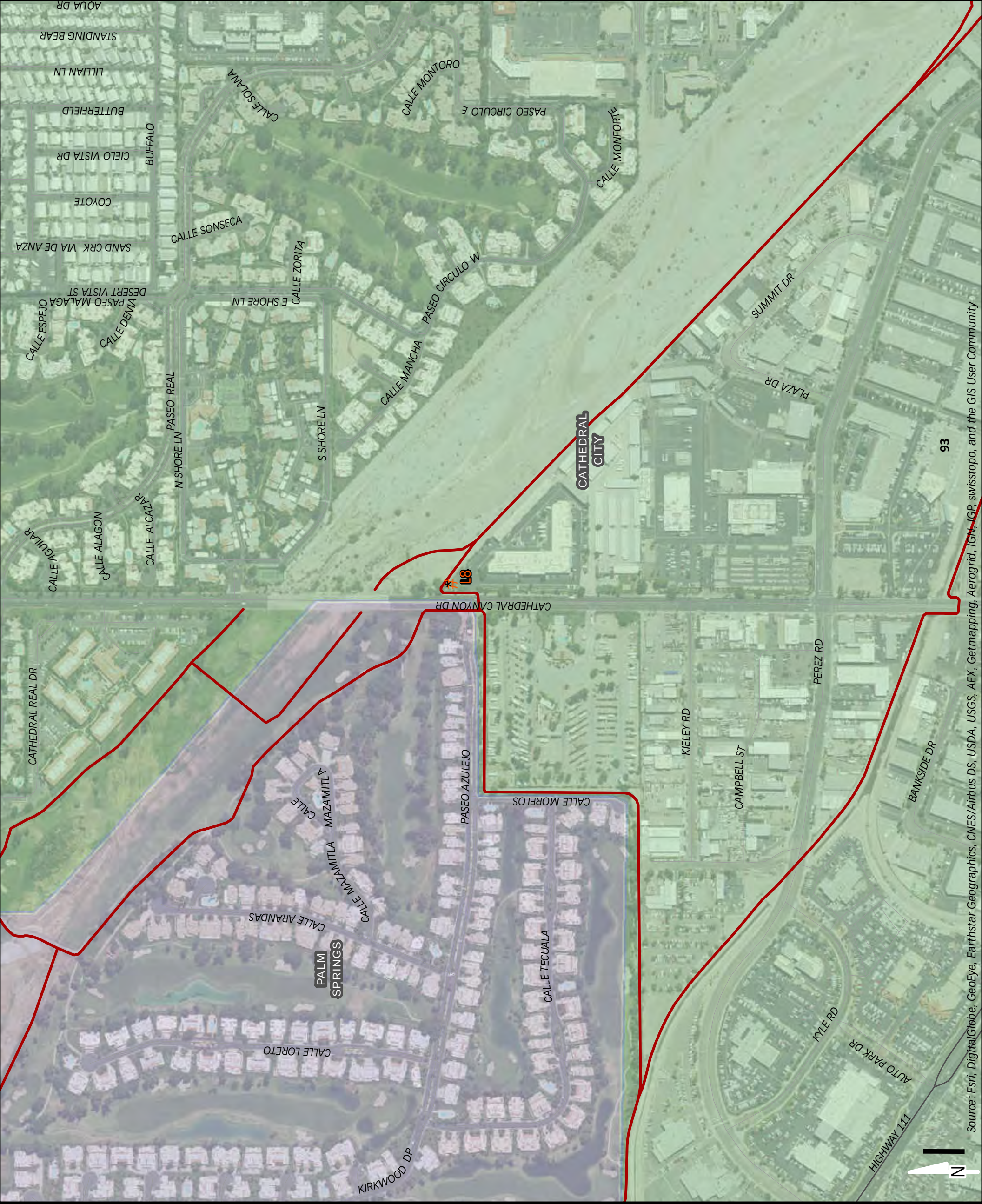
— CV Link Alignment



Feet

09276_Measurements_L1-30update

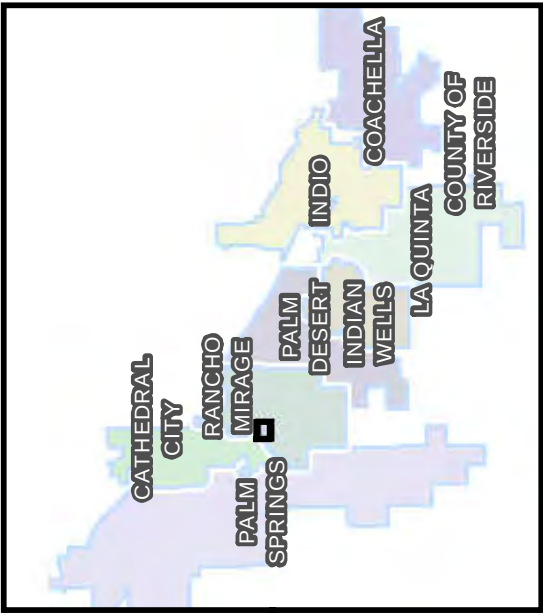
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Noise Measurement Locations

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

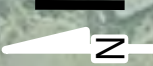
Noise Measurement Locations

L10

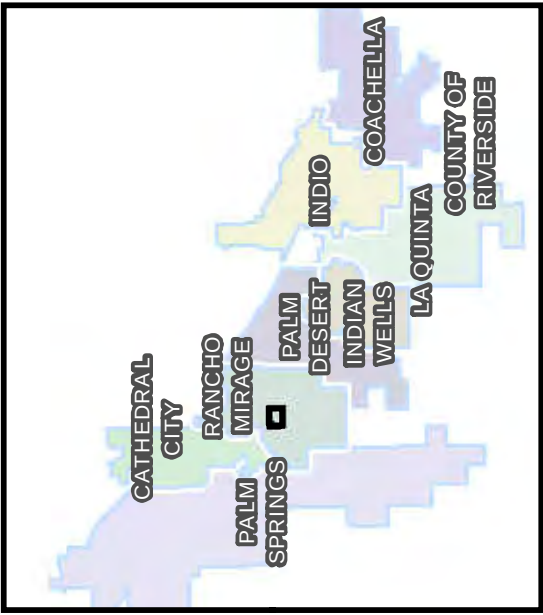
Page 11 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



95



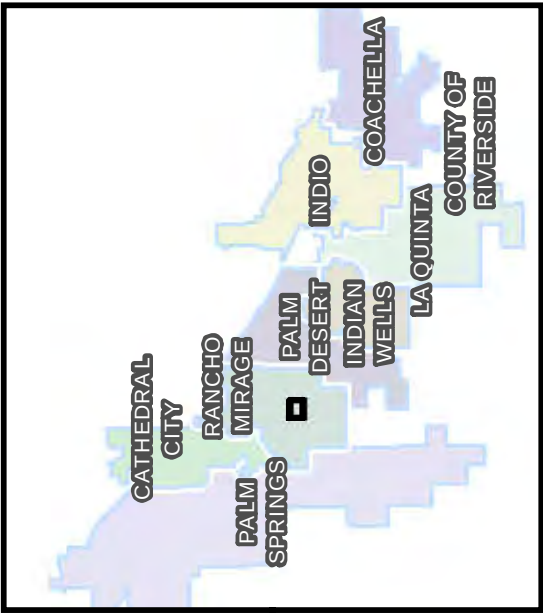
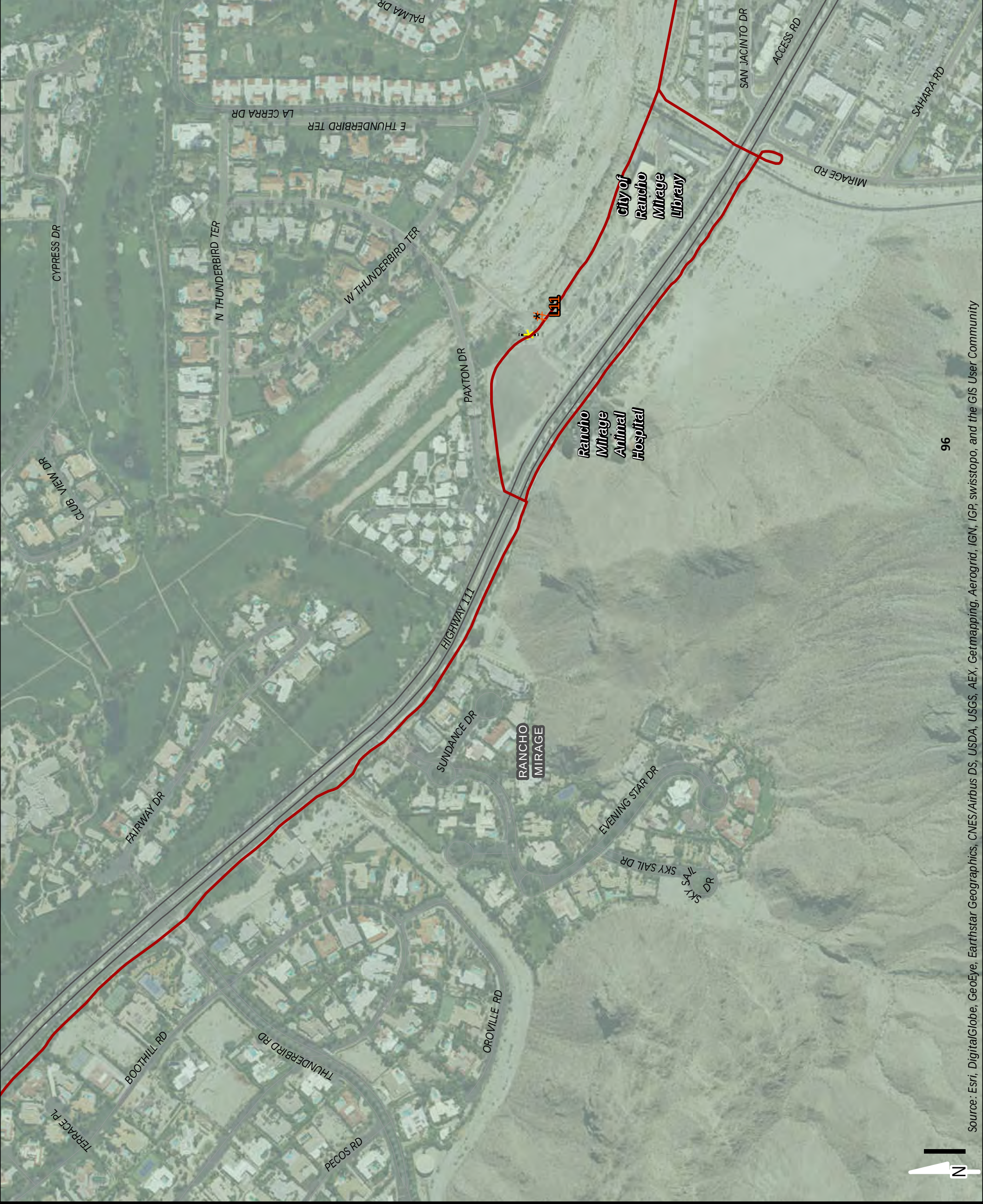
Feet

Noise Measurement Locations

L11
Page 12 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



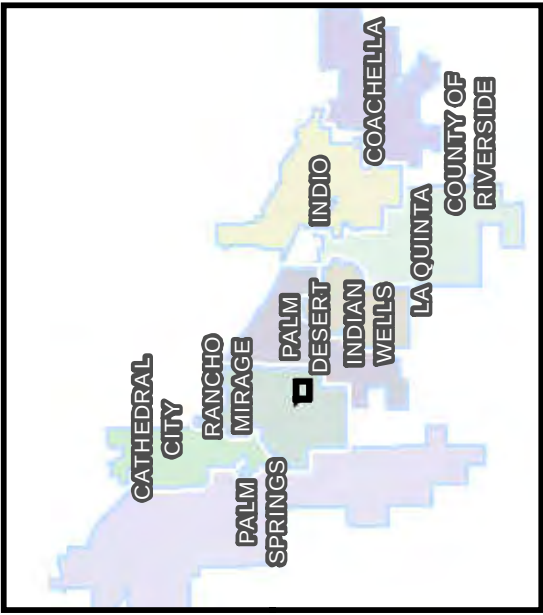
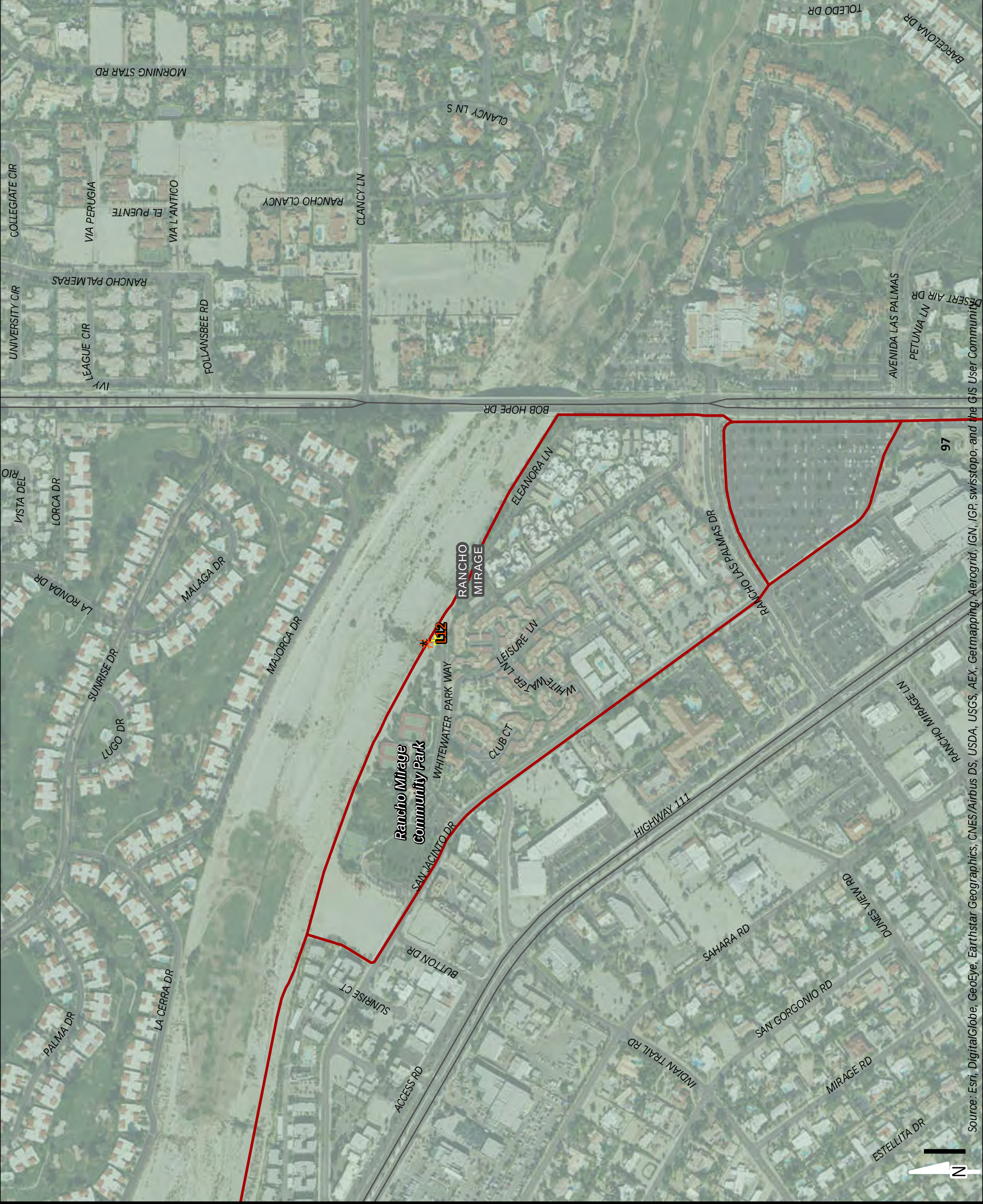
Noise Measurement Locations

L12

Page 13 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



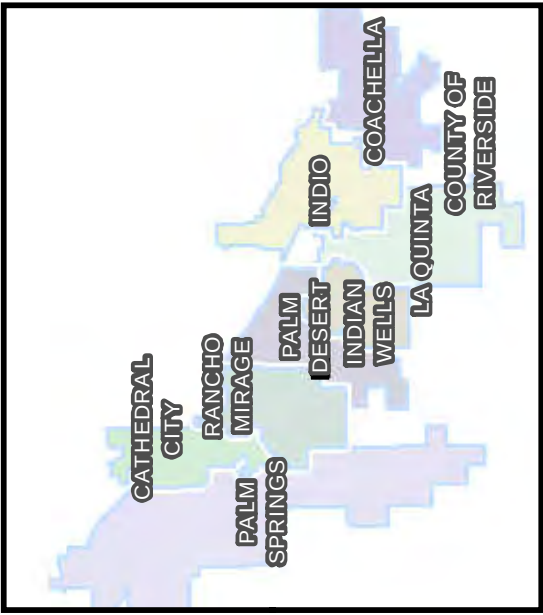
Noise Measurement Locations

L13

Page 14 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

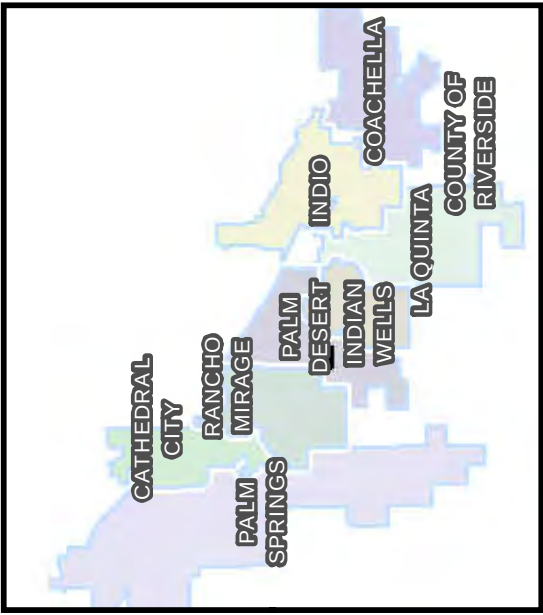
Noise Measurement Locations

L14

Page 15 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

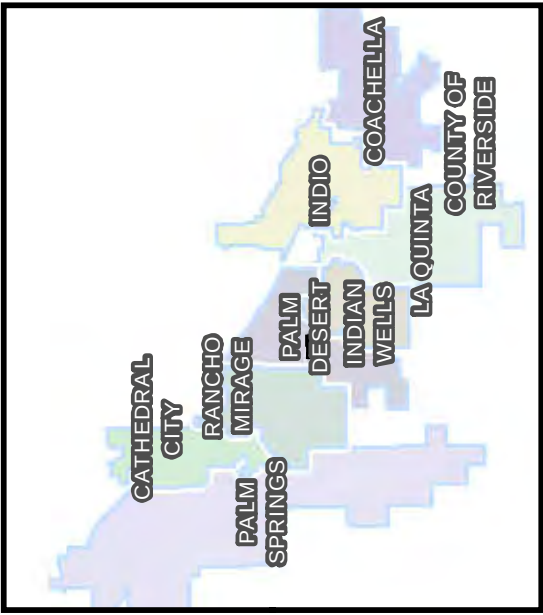
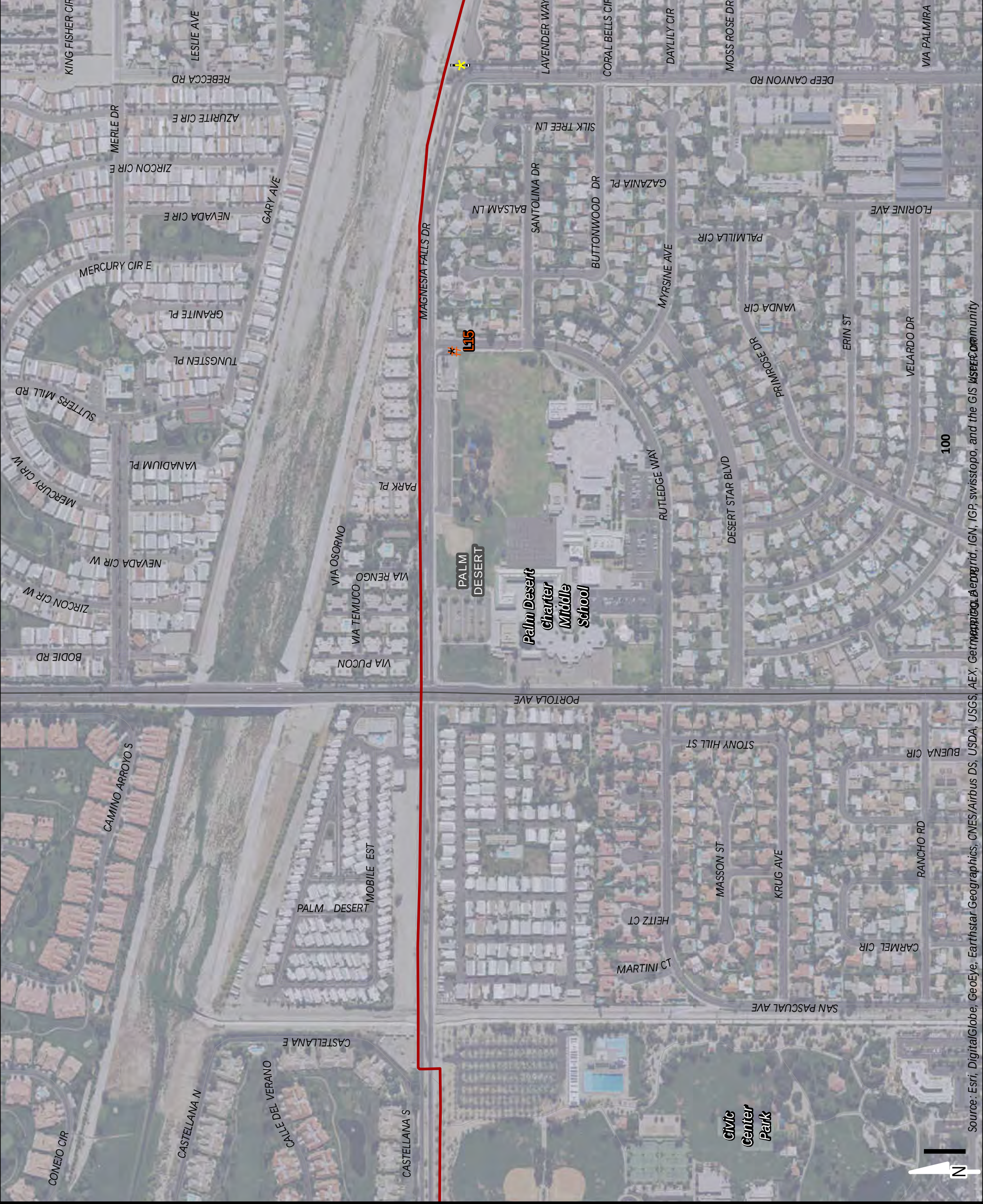
Noise Measurement Locations

L15

Page 16 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

09276_Measurements_L1-30update

8/22/2016

Noise Measurement Locations

L16

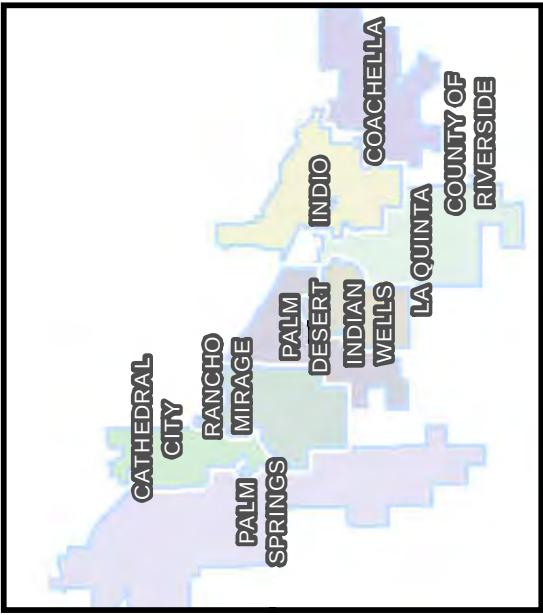
Page 17 of 31

LEGEND:

 Noise Level Measurement Locations

 Access Point

 CV Link Alignment



Feet

09276_Measurements_L1-30update
8/22/2016

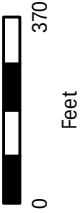
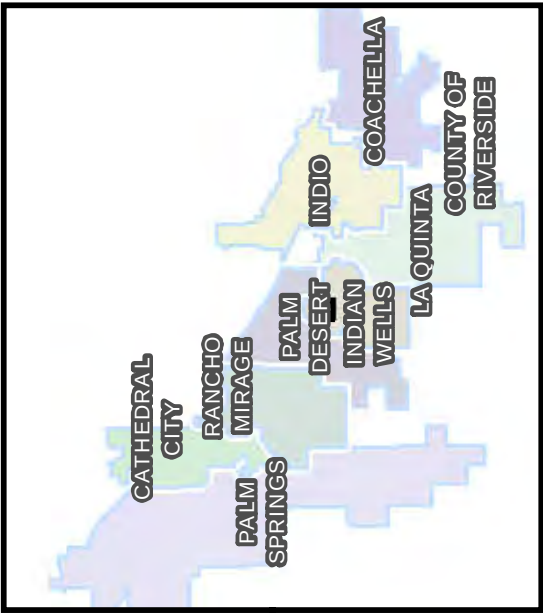
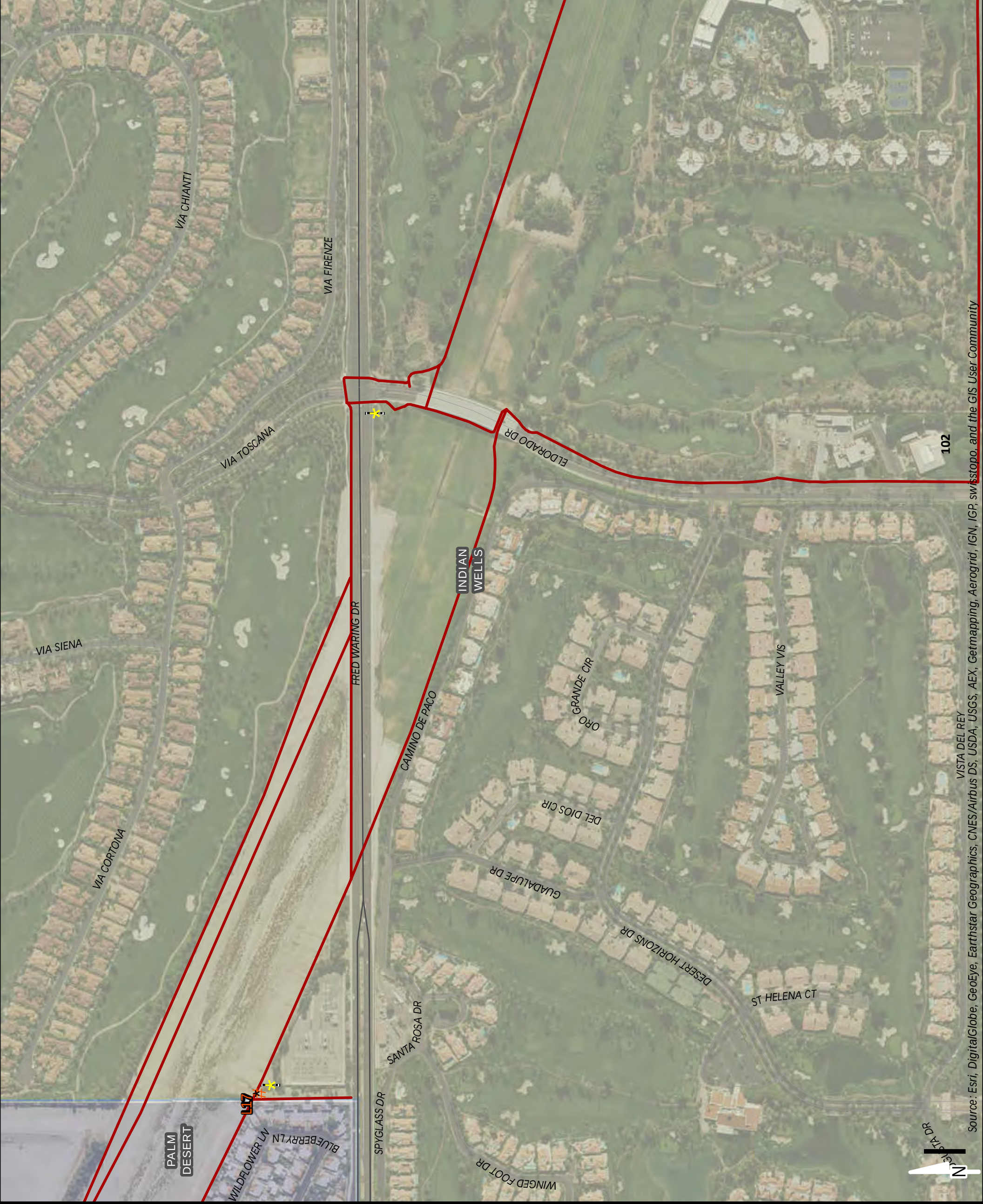


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Geomatics, Aerogrid, IGN, IGH, Swisstopo, and the GIS User Community

Noise Measurement Locations

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



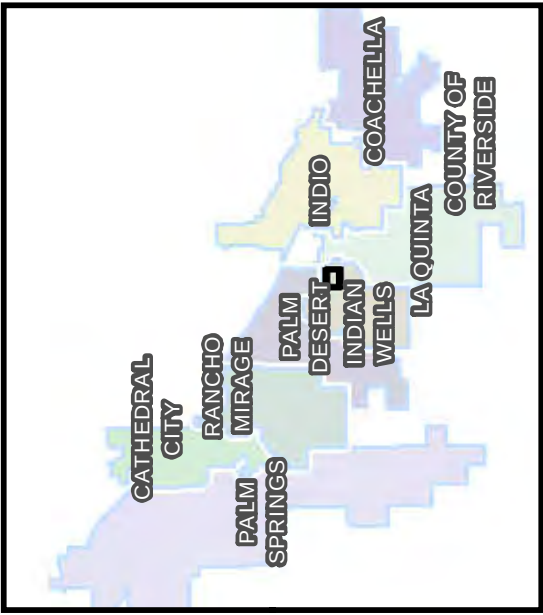
Noise Measurement Locations

L18

Page 19 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

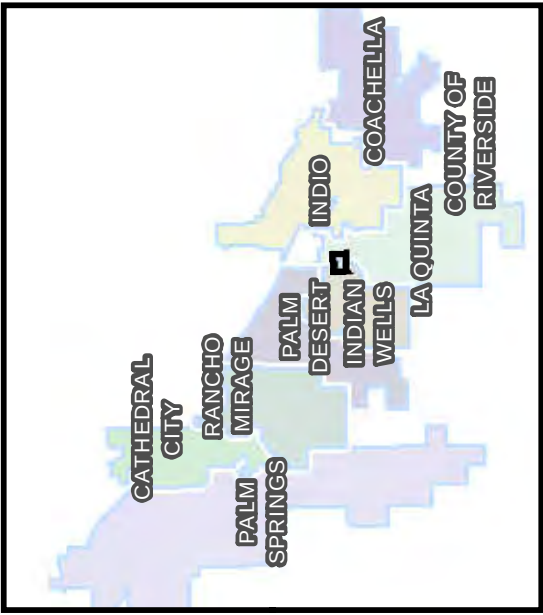
Noise Measurement Locations

L19

Page 20 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

Noise Measurement Locations

L20

Page 21 of 31

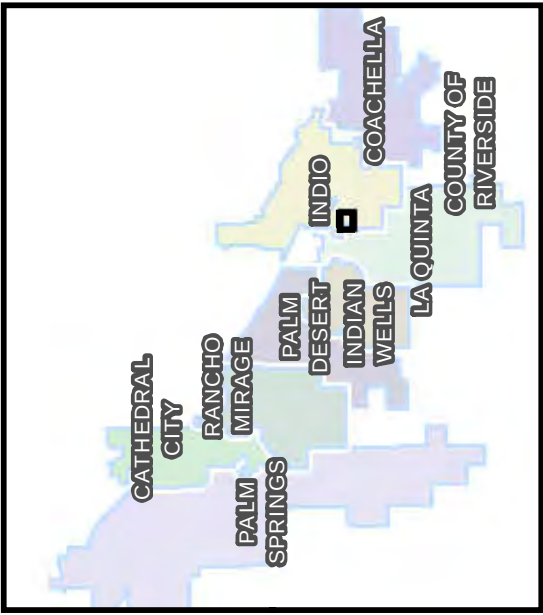
LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



105

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGA, Swisstopo, and the GIS User Community



Feet

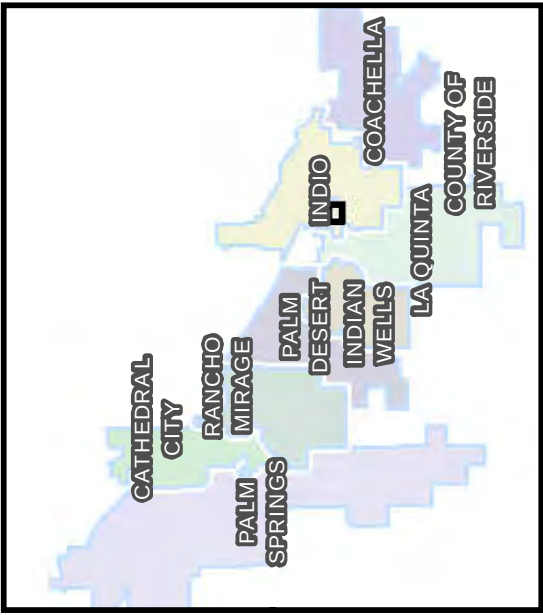
Noise Measurement Locations

L21

Page 22 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

09276_Measurements_L1-30update
8/22/2016

Source: Esri, DigitalGlobe, GeoEye, AeroGrid, IGN, IGR, swisstopo, and the GIS User Community

106

Source: Esri, DigitalGlobe, GeoEye, AeroGrid, IGN, IGR, swisstopo, and the GIS User Community

106

Source: Esri, DigitalGlobe, GeoEye, AeroGrid, IGN, IGR, swisstopo, and the GIS User Community

106

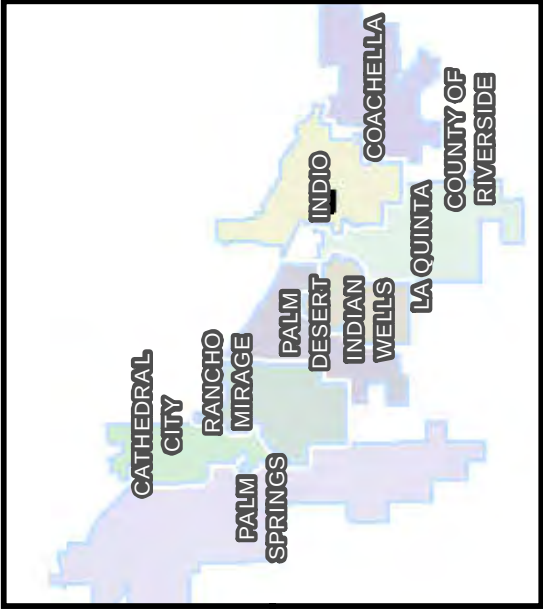
Noise Measurement Locations

L22

Page 23 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

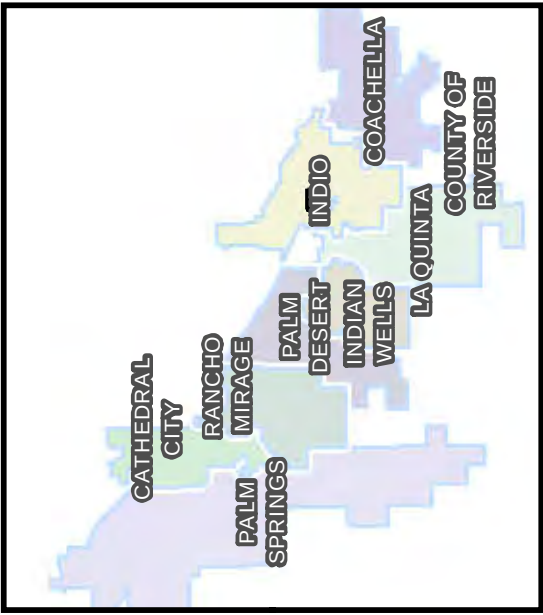
Noise Measurement Locations

L23

Page 24 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

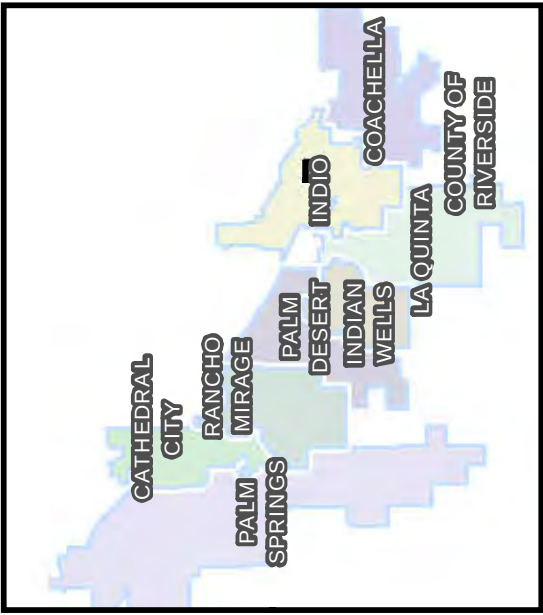
Noise Measurement Locations

L24

Page 25 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

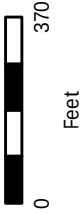
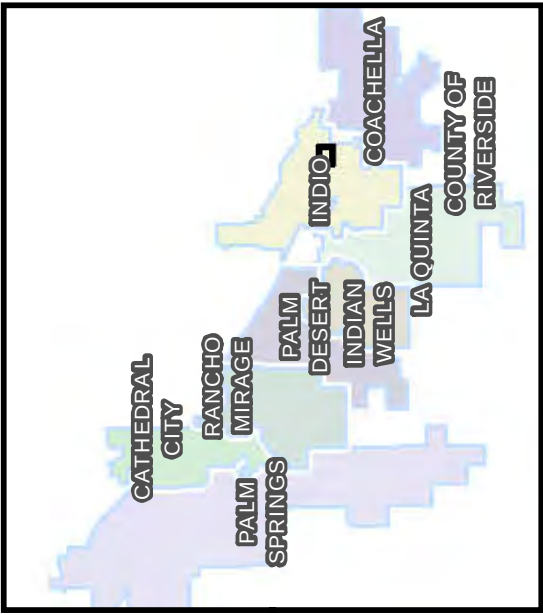
Noise Measurement Locations

L25

Page 26 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



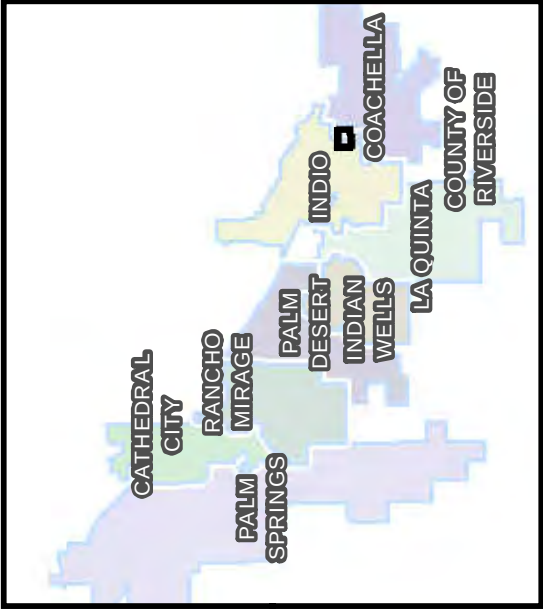
Noise Measurement Locations

L26

Page 27 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

111

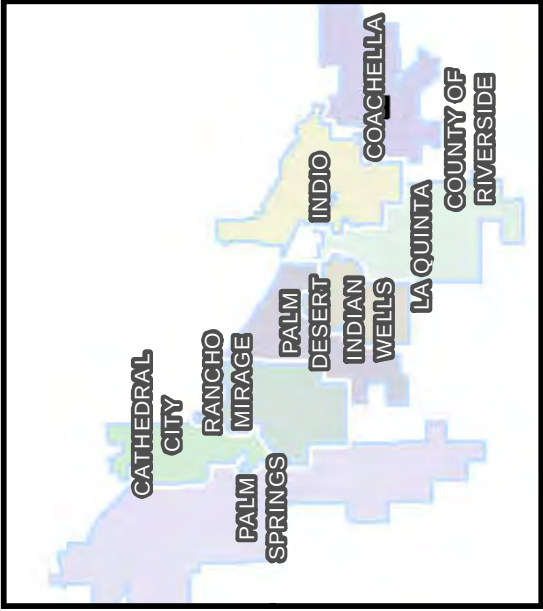
Noise Measurement Locations

L27

Page 28 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



Feet

Noise Measurement Locations

L28

Page 29 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



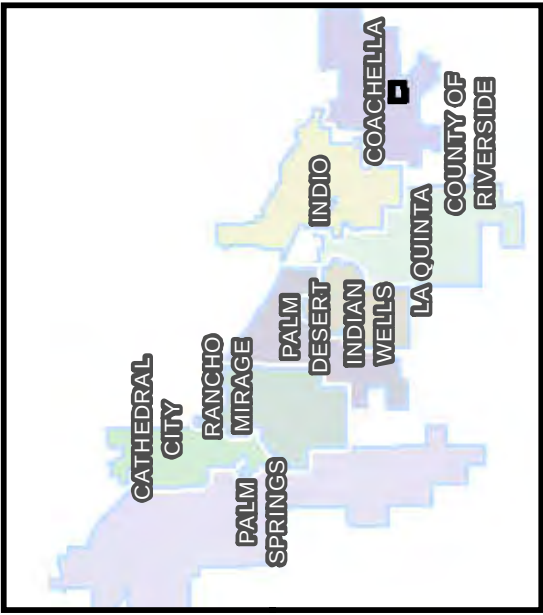
Noise Measurement Locations

L29

Page 30 of 31

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



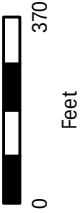
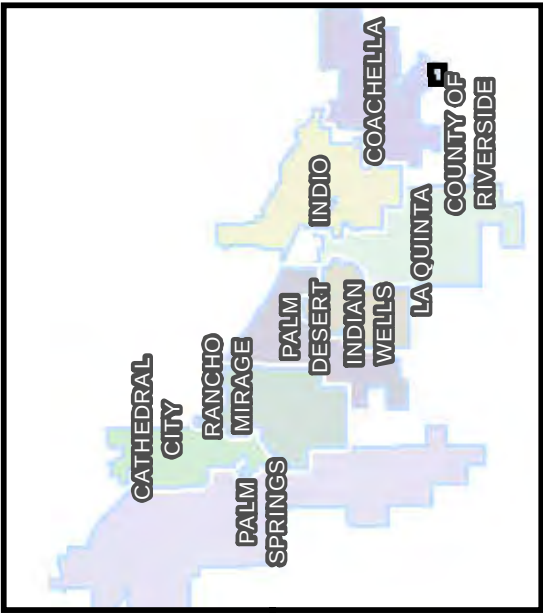
114

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Noise Measurement Locations

LEGEND:

- Noise Level Measurement Locations
- Access Point
- CV Link Alignment



This page intentionally left blank

APPENDIX 5.2:

STUDY AREA PHOTOS

This page intentionally left blank

JN:09276 CV Link



L1
33, 52' 11.831300", 116, 32' 42.734900"



L1_E
33, 52' 11.831300", 116, 32' 42.734900"



L1_E2
33, 52' 11.831300", 116, 32' 42.734900"



L1_NW
33, 52' 11.831300", 116, 32' 42.734900"



L1_S
33, 52' 11.831300", 116, 32' 42.734900"



L1_S2
33, 52' 11.831300", 116, 32' 42.734900"

JN:09276 CV Link



L1_SE
33, 52' 11.803800", 116, 32' 43.146900"



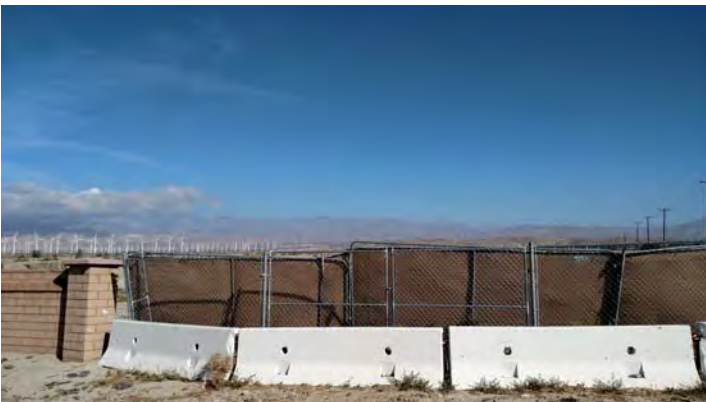
L1_W
33, 52' 11.831300", 116, 32' 42.734900"



L2
33, 51' 54.733800", 116, 31' 41.321400"



L2_E
33, 51' 54.733800", 116, 31' 41.321400"



L2_N
33, 51' 54.733800", 116, 31' 41.321400"



L2_NE
33, 51' 54.733800", 116, 31' 41.321400"

JN:09276 CV Link



L2_S
33, 51' 54.733800", 116, 31' 41.321400"



L2_W
33, 51' 54.733800", 116, 31' 41.321400"



L3
33, 50' 54.927000", 116, 30' 22.961400"



L3_N
33, 50' 54.927000", 116, 30' 22.961400"



L3_NW
33, 50' 54.927000", 116, 30' 22.961400"



L3_S
33, 50' 54.927000", 116, 30' 22.961400"

JN:09276 CV Link



L3_SE
33, 50' 54.927000", 116, 30' 22.961400"



L3_W
33, 50' 54.927000", 116, 30' 22.961400"



L4
33, 49' 33.188700", 116, 29' 17.290600"



L4_E
33, 49' 33.188700", 116, 29' 17.290600"



L4_N
33, 49' 33.188700", 116, 29' 17.290600"



L4_S
33, 49' 33.188700", 116, 29' 17.290600"

JN:09276 CV Link



L4_SE
33, 49' 33.188700", 116, 29' 17.290600"



L5
33, 48' 38.888800", 116, 31' 43.079200"



L5_E
33, 48' 38.888800", 116, 31' 43.079200"



L5_S
33, 48' 38.888800", 116, 31' 43.079200"



L5_SE
33, 48' 38.888800", 116, 31' 43.079200"



L5_W
33, 48' 38.888800", 116, 31' 43.079200"

JN:09276 CV Link



L6
33, 48' 33.024900", 116, 30' 20.956400"



L6_E
33, 48' 33.024900", 116, 30' 20.956400"



L6_NE
33, 48' 33.024900", 116, 30' 20.956400"



L6_NW
33, 48' 33.024900", 116, 30' 20.956400"



L6_S
33, 48' 33.024900", 116, 30' 20.956400"



L6_W
33, 48' 33.024900", 116, 30' 20.956400"

JN:09276 CV Link



L7
33, 48' 5.160800", 116, 28' 34.663600"



L7_E
33, 48' 5.160800", 116, 28' 34.663600"



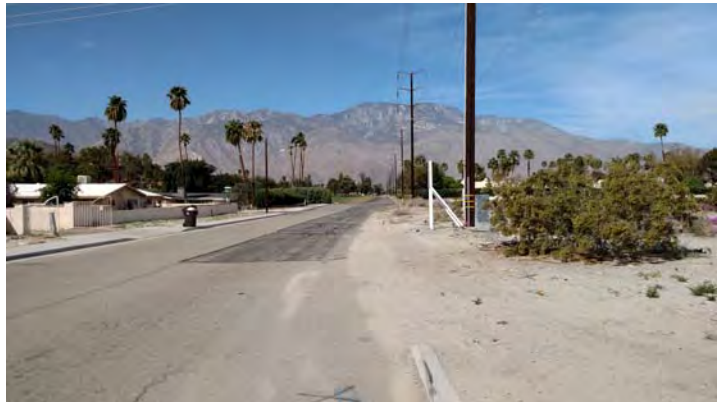
L7_N
33, 48' 5.160800", 116, 28' 34.663600"



L7_NW
33, 48' 5.160800", 116, 28' 34.663600"



L7_SE
33, 48' 5.160800", 116, 28' 34.663600"



L7_W
33, 48' 5.160800", 116, 28' 34.663600"

JN:09276 CV Link



L8
33, 47' 20.693600", 116, 27' 59.425000"



L8_E
33, 47' 20.693600", 116, 27' 59.425000"



L8_N
33, 47' 20.693600", 116, 27' 59.425000"



L8_NW
33, 47' 20.693600", 116, 27' 59.425000"



L8_S
33, 47' 20.693600", 116, 27' 59.425000"



L8_SW
33, 47' 20.693600", 116, 27' 59.425000"

JN:09276 CV Link



L9
33, 46' 21.793200", 116, 26' 30.573100"



L9_N
33, 46' 21.793200", 116, 26' 29.529400"



L9_NW
33, 46' 21.793200", 116, 26' 30.573100"



L9_NW2
33, 46' 21.793200", 116, 26' 29.529400"



L9_S
33, 46' 21.793200", 116, 26' 30.573100"



L9_S2
33, 46' 21.793200", 116, 26' 29.529400"

JN:09276 CV Link



L9_SE
33, 46' 21.793200", 116, 26' 30.573100"



L9_W
33, 46' 21.793200", 116, 26' 30.573100"



L10
33, 46' 16.739500", 116, 26' 25.382000"



L10_E
33, 46' 2.086400", 116, 26' 18.982500"



L10_N
33, 46' 2.086400", 116, 26' 18.982500"



L10_S
33, 46' 2.086400", 116, 26' 18.982500"

JN:09276 CV Link



L10_W
33, 46' 2.086400", 116, 26' 18.982500"



L11
33, 44' 59.093600", 116, 25' 23.144500"



L11_E
33, 44' 59.093600", 116, 25' 23.144500"



L11_N
33, 44' 59.093600", 116, 25' 23.144500"



L11_NE
33, 44' 59.093600", 116, 25' 23.144500"



L11_S
33, 44' 59.093600", 116, 25' 23.144500"

JN:09276 CV Link



L11_SE
33, 44' 59.093600", 116, 25' 23.144500"



L11_SW
33, 44' 59.093600", 116, 25' 23.144500"



L11_W
33, 44' 59.093600", 116, 25' 23.144500"



L12
33, 44' 46.253300", 116, 24' 42.028100"



L12_E
33, 44' 45.910000", 116, 24' 41.506300"



L12_N
33, 44' 45.910000", 116, 24' 41.506300"

JN:09276 CV Link



L12_NW
33, 44' 45.910000", 116, 24' 41.506300"



L13
33, 43' 56.018300", 116, 23' 36.357400"



L13_E
33, 43' 56.018300", 116, 23' 36.357400"



L13_N
33, 43' 56.018300", 116, 23' 36.357400"



L13_NW
33, 43' 56.018300", 116, 23' 36.357400"



L13_S
33, 43' 56.018300", 116, 23' 36.357400"

JN:09276 CV Link



L13_S2
33, 43' 56.018300", 116, 23' 36.357400"



L13_W
33, 43' 56.018300", 116, 23' 36.357400"



L14
33, 44' 1.744900", 116, 22' 55.213600"



L14_N
33, 44' 1.744900", 116, 22' 55.213600"



L14_SE
33, 44' 1.744900", 116, 22' 55.213600"



L14_W
33, 44' 1.744900", 116, 22' 55.213600"

JN:09276 CV Link



L15
33, 44' 9.050900", 116, 22' 8.137200"



L15_N
33, 44' 8.583900", 116, 22' 7.917400"



L15_NW
33, 44' 8.583900", 116, 22' 7.917400"



L15_S
33, 44' 8.583900", 116, 22' 7.917400"



L16
33, 44' 7.512800", 116, 21' 48.828700"



L16_E
33, 44' 7.512800", 116, 21' 48.828700"

JN:09276 CV Link



L16_N
33, 44' 7.512800", 116, 21' 48.828700"



L16_NE
33, 44' 7.512800", 116, 21' 48.828700"



L16_NW
33, 44' 7.512800", 116, 21' 48.828700"



L16_SE
33, 44' 7.512800", 116, 21' 48.828700"



L16_W
33, 44' 7.512800", 116, 21' 48.828700"



L17
33, 43' 47.490200", 116, 20' 50.601100"

JN:09276 CV Link



L17_E
33, 43' 47.490200", 116, 20' 50.601100"



L17_N
33, 43' 47.490200", 116, 20' 50.601100"



L17_NW
33, 43' 47.490200", 116, 20' 50.601100"



L17_SW
33, 43' 47.490200", 116, 20' 50.601100"



L17_W
33, 43' 47.490200", 116, 20' 50.601100"



L18
33, 43' 19.076800", 116, 18' 39.204700"

JN:09276 CV Link



L18_E
33, 43' 19.076800", 116, 18' 39.204700"



L18_N
33, 43' 19.076800", 116, 18' 39.204700"



L18_S
33, 43' 19.076800", 116, 18' 39.204700"



L18_S2
33, 43' 19.076800", 116, 18' 39.204700"



L18_S3
33, 43' 19.076800", 116, 18' 39.204700"



L18_SE
33, 43' 19.076800", 116, 18' 39.204700"

JN:09276 CV Link



L18_SW
33, 43' 19.076800", 116, 18' 39.204700"



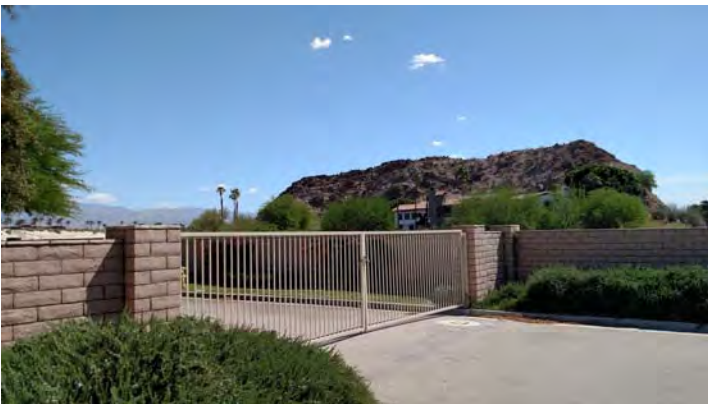
L18_W
33, 43' 19.076800", 116, 18' 39.204700"



L19
33, 43' 0.564800", 116, 18' 1.988500"



L19_E
33, 43' 0.564800", 116, 18' 1.988500"



L19_NE
33, 43' 0.564800", 116, 18' 1.988500"



L19_NE2
33, 43' 0.564800", 116, 18' 1.988500"

JN:09276 CV Link



L19_S
33, 43' 0.564800", 116, 18' 1.988500"



L19_W
33, 43' 0.564800", 116, 18' 1.988500"



L20
33, 42' 42.313800", 116, 15' 42.654400"



L20_N
33, 42' 42.313800", 116, 15' 42.654400"



L20_NW
33, 42' 42.313800", 116, 15' 42.654400"



L20_S
33, 42' 42.313800", 116, 15' 42.654400"

JN:09276 CV Link



L21
33, 43' 9.299000", 116, 15' 17.742900"



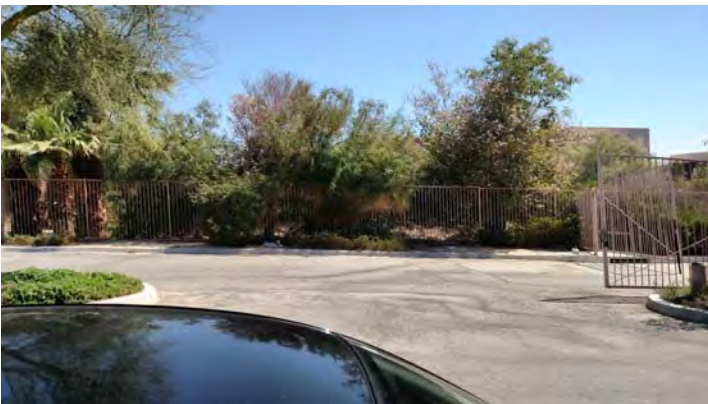
L21_N
33, 43' 9.189100", 116, 15' 17.880200"



L21_S
33, 43' 9.189100", 116, 15' 17.880200"



L22
33, 43' 45.032000", 116, 14' 41.652800"



L22_E
33, 43' 44.208000", 116, 14' 41.021100"



L22_N
33, 43' 44.208000", 116, 14' 41.021100"

JN:09276 CV Link



L22_NE
33, 43' 44.208000", 116, 14' 41.021100"



L22_S
33, 43' 44.208000", 116, 14' 41.021100"



L22_W
33, 43' 44.208000", 116, 14' 41.021100"



L23
33, 44' 2.596400", 116, 14' 38.878700"



L23_E
33, 44' 2.596400", 116, 14' 38.878700"



L23_NW
33, 44' 2.596400", 116, 14' 38.878700"

JN:09276 CV Link



L23_SE
33, 44' 2.596400", 116, 14' 38.878700"



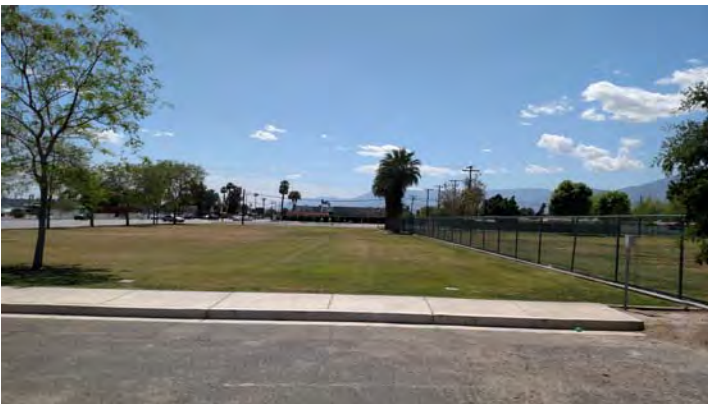
L23_SW
33, 44' 2.596400", 116, 14' 38.878700"



L24
33, 44' 2.651300", 116, 12' 59.562300"



L24_N
33, 44' 2.651300", 116, 12' 59.562300"



L24_S
33, 44' 2.651300", 116, 12' 59.562300"



L24_SE
33, 44' 2.651300", 116, 12' 59.562300"

JN:09276 CV Link



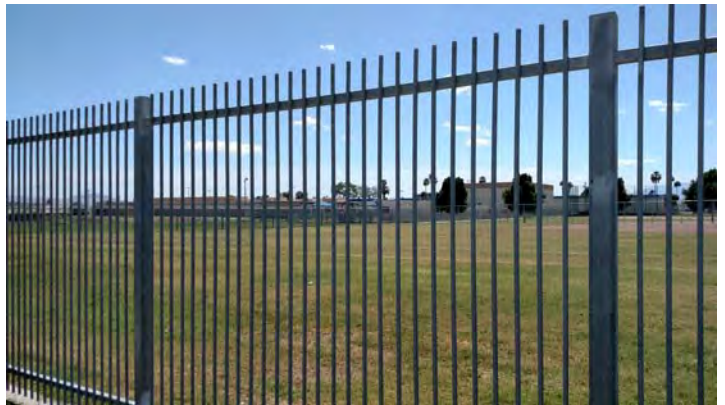
L24_W
33, 44' 2.651300", 116, 12' 59.562300"



L25
33, 43' 32.864600", 116, 12' 26.493500"



L25_N
33, 43' 32.864600", 116, 12' 26.493500"



L25_SE
33, 43' 32.864600", 116, 12' 26.493500"



L25_W
33, 43' 32.864600", 116, 12' 26.493500"



L26
33, 42' 45.664600", 116, 11' 57.050100"

JN:09276 CV Link



L26_E
33, 42' 45.664600", 116, 11' 57.050100"



L26_N
33, 42' 45.664600", 116, 11' 57.050100"



L26_NW
33, 42' 45.664600", 116, 11' 57.050100"



L26_S
33, 42' 45.664600", 116, 11' 57.050100"



L26_SE
33, 42' 45.664600", 116, 11' 57.050100"



L26_SW
33, 42' 45.664600", 116, 11' 57.050100"

JN:09276 CV Link



L27
33, 41' 8.724000", 116, 9' 52.794800"



L27_E
33, 41' 8.724000", 116, 9' 52.794800"



L27_N
33, 41' 8.724000", 116, 9' 52.794800"



L27_S
33, 41' 8.724000", 116, 9' 52.794800"



L27_SE
33, 41' 8.724000", 116, 9' 52.794800"



L27_W
33, 41' 8.724000", 116, 9' 52.794800"

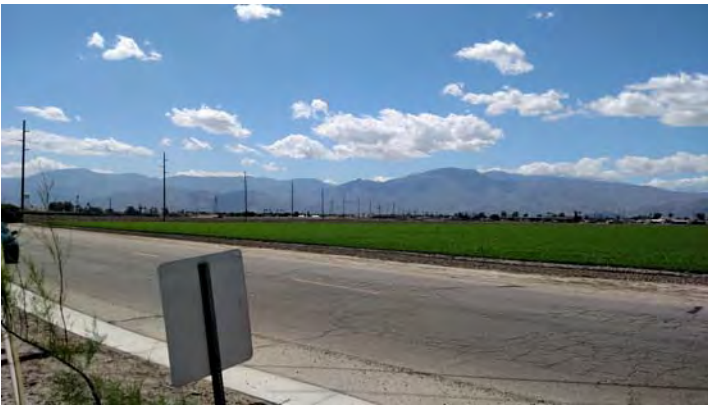
JN:09276 CV Link



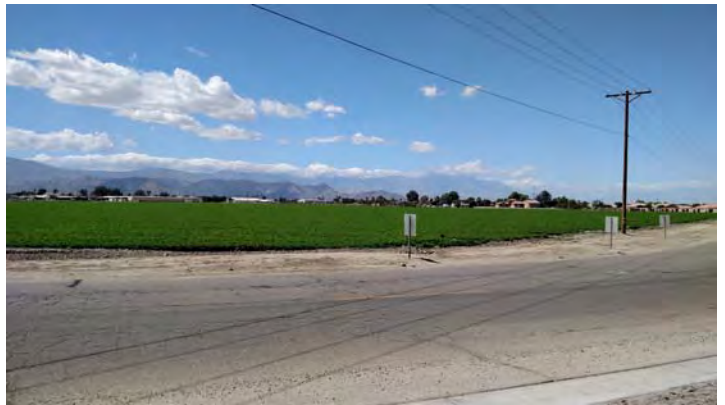
L28
33, 40' 59.729000", 116, 9' 50.597500"



L28_E
33, 40' 59.729000", 116, 9' 50.597500"



L28_SW
33, 40' 59.729000", 116, 9' 50.597500"



L28_W
33, 40' 59.729000", 116, 9' 50.597500"



L29
33, 40' 16.580200", 116, 9' 5.278900"



L29_N
33, 40' 16.580200", 116, 9' 5.278900"

JN:09276 CV Link



L29_NE
33, 40' 16.580200", 116, 9' 5.278900"



L29_NW
33, 40' 16.580200", 116, 9' 5.278900"



L29_SW
33, 40' 16.580200", 116, 9' 5.278900"



L29_W
33, 40' 16.580200", 116, 9' 5.278900"



L30
33, 38' 30.603300", 116, 8' 6.035100"



L30_NE
33, 38' 30.603300", 116, 8' 6.035100"

JN:09276 CV Link



L30_SE
33, 38' 30.603300", 116, 8' 6.035100"

This page intentionally left blank

APPENDIX 5.3:

PICCOLO SOUND LEVEL METER CALIBRATION SHEETS

This page intentionally left blank

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

L1003

Calibration Certificate No. 1608

Instrument: Sound Level Meter
Model: Piccolo
Manufacturer: Soft dB inc.
Serial Number: 150211003
Tested with:

Type (class): 2
Customer: Soft dB inc.
Tel/Fax: 418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- IEC 60651- Specification for Sound Level Meters
- ANSI S1.4- Standard for Sound Level Meters

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/L/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

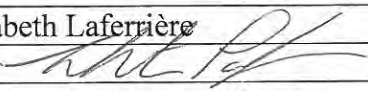
¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator					
A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	54,7	54,4	+/- 3	0,1	pass
63	68,7	67,3	+/- 2	0,9	pass
125	77,9	78,4	+/- 1,5	0	pass
250	85,4	85,8	+/- 1,5	0	pass
500	90,8	90,8	+/- 1,5	0	pass
1000	94	94	+/- 1,5	0	pass
2000	95,4	95,2	+/- 2	0,2	pass
4000	97,2	95	+/- 3	2,2	pass
8000	93,9	92,9	+/- 5	1	pass
C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,4	91	+/- 3	-0,6	pass
63	93	93,7	+/- 2	-0,5	pass
125	93,6	94,2	+/- 1,5	-0,2	pass
250	94	94,5	+/- 1,5	0	pass
500	94	94,3	+/- 1,5	0	pass
1000	93,9	94	+/- 1,5	-0,1	pass
2000	94,2	93,9	+/- 2	0,4	pass
4000	95,4	94,9	+/- 3	2,2	pass
8000	95,4	88,3	+/- 5	4,4	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,6° C	101,1 kPa	53%

Calibrated by	Elisabeth Laferrière
Signature	
Date	2015-03-20

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

L1015

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1533

Instrument: Sound Level Meter
Model: Piccolo
Manufacturer: Soft dB inc.
Serial Number: 141111015
Tested with:

Type (class): 2
Customer: Soft dB inc.
Tel/Fax: 418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- IEC 60651- Specification for Sound Level Meters
- ANSI S1.4- Standard for Sound Level Meters

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/L/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

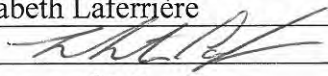
¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator						
A-Weighted						
Frequency	Measure	Reference A	Tolerance		Results	
31	54,7	54,4	+/- 3		0,1	pass
63	67,6	67,3	+/- 2		-0,2	pass
125	78	78,4	+/- 1,5		0,1	pass
250	85,5	85,8	+/- 1,5		0,1	pass
500	90,9	90,8	+/- 1,5		0,1	pass
1000	94	94	+/- 1,5		0	pass
2000	95,3	95,2	+/- 2		0,1	pass
4000	96,5	95	+/- 3		1,5	pass
8000	91,4	92,9	+/- 5		-1,5	pass
C-Weighted						
Frequency	Measure	Reference A	Tolerance		Results	
31	90,8	91	+/- 3		-0,2	pass
63	93,4	93,7	+/- 2		-0,1	pass
125	94	94,2	+/- 1,5		0,2	pass
250	94,4	94,5	+/- 1,5		0,4	pass
500	94,3	94,3	+/- 1,5		0,3	pass
1000	94	94	+/- 1,5		0	pass
2000	93,9	93,9	+/- 2		0,1	pass
4000	94,7	94,9	+/- 3		1,5	pass
8000	89,4	88,3	+/- 5		-1,6	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,8° C	100,9 kPa	57%

Calibrated by	Elisabeth Laferrière
Signature	
Date	2014-12-01

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1726

Instrument: Sound Level Meter
Model: Piccolo
Manufacturer: Soft dB inc.
Serial Number: 150921017
Tested with:

Type (class): 2
Customer: Soft dB inc.
Tel/Fax: 418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- IEC 60651- Specification for Sound Level Meters
- ANSI S1.4- Standard for Sound Level Meters

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/I/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator					
A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	55,5	54,4	+/- 3	0,9	pass
63	68,8	67,3	+/- 2	1	pass
125	78,3	78,4	+/- 1,5	0,4	pass
250	85,8	85,8	+/- 1,5	0,4	pass
500	91	90,8	+/- 1,5	0,2	pass
1000	94	94	+/- 1,5	0	pass
2000	95,3	95,2	+/- 2	0,1	pass
4000	96,3	95	+/- 3	1,3	pass
8000	90,9	92,9	+/- 5	-2	pass
C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,7	91	+/- 3	-0,3	pass
63	93,4	93,7	+/- 2	-0,1	pass
125	94	94,2	+/- 1,5	0,2	pass
250	94,4	94,5	+/- 1,5	0,4	pass
500	94,2	94,3	+/- 1,5	0,2	pass
1000	93,9	94	+/- 1,5	-0,1	pass
2000	93,8	93,9	+/- 2	0	pass
4000	94,3	94,9	+/- 3	1,1	pass
8000	88,8	88,3	+/- 5	-2,2	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,5° C	100,9 kPa	56%

Calibrated by	Elisabeth Laferriere
Signature	
Date	2015-10-23

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1727

<i>Instrument:</i>	Sound Level Meter
<i>Model:</i>	Piccolo
<i>Manufacturer:</i>	Soft dB inc.
<i>Serial Number:</i>	150921018
<i>Tested with:</i>	
<i>Type (class):</i>	2
<i>Customer:</i>	Soft dB inc.
<i>Tel/Fax:</i>	418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- IEC 60651- Specification for Sound Level Meters
- ANSI S1.4- Standard for Sound Level Meters

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/I/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

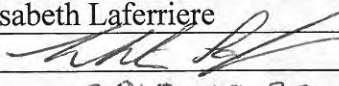
¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator					
A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	55,4	54,4	+/- 3	0,8	pass
63	69	67,3	+/- 2	1,2	pass
125	78,6	78,4	+/- 1,5	0,7	pass
250	85,7	85,8	+/- 1,5	0,3	pass
500	91	90,8	+/- 1,5	0,2	pass
1000	94	94	+/- 1,5	0	pass
2000	95,3	95,2	+/- 2	0,1	pass
4000	96,5	95	+/- 3	1,5	pass
8000	89,2	92,9	+/- 5	-3,7	pass
C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,8	91	+/- 3	-0,2	pass
63	93,5	93,7	+/- 2	0	pass
125	94,1	94,2	+/- 1,5	0,3	pass
250	94,4	94,5	+/- 1,5	0,4	pass
500	94,5	94,3	+/- 1,5	0,5	pass
1000	94	94	+/- 1,5	0	pass
2000	93,9	93,9	+/- 2	0,1	pass
4000	94,7	94,9	+/- 3	1,5	pass
8000	87,3	88,3	+/- 5	-3,7	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,5° C	100,9 kPa	56%

Calibrated by	Elisabeth Laferriere
Signature	
Date	2015-10-23

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1693

<i>Instrument:</i>	Sound Level Meter
<i>Model:</i>	Piccolo
<i>Manufacturer:</i>	Soft dB inc.
<i>Serial Number:</i>	150519001
<i>Tested with:</i>	
<i>Type (class):</i>	2
<i>Customer:</i>	Soft dB inc.
<i>Tel/Fax:</i>	418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- **IEC 60651- Specification for Sound Level Meters**
- **ANSI S1.4- Standard for Sound Level Meters**

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/L/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3, 8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

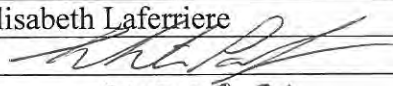
¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator					
A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	54,2	54,4	+/- 3	-0,4	pass
63	67,9	67,3	+/- 2	0,1	pass
125	78,2	78,4	+/- 1,5	0,3	pass
250	85,7	85,8	+/- 1,5	0,3	pass
500	91,1	90,8	+/- 1,5	0,3	pass
1000	93,9	94	+/- 1,5	-0,1	pass
2000	95,3	95,2	+/- 2	0,1	pass
4000	96,4	95	+/- 3	1,4	pass
8000	91,5	92,9	+/- 5	-1,4	pass
C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,6	91	+/- 3	-0,4	pass
63	93,3	93,7	+/- 2	-0,2	pass
125	93,9	94,2	+/- 1,5	0,1	pass
250	94,3	94,5	+/- 1,5	0,3	pass
500	94,4	94,3	+/- 1,5	0,4	pass
1000	94	94	+/- 1,5	0	pass
2000	93,9	93,9	+/- 2	0,1	pass
4000	94,7	94,9	+/- 3	1,5	pass
8000	89,6	88,3	+/- 5	-1,4	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,4° C	101,3 kPa	54%

Calibrated by	Elisabeth Laferriere
Signature	
Date	2015-08-26

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

L7003

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1609

Instrument: Sound Level Meter
Model: Piccolo
Manufacturer: Soft dB inc.
Serial Number: 150217003
Tested with:

Type (class): 2
Customer: Soft dB inc.
Tel/Fax: 418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- IEC 60651- Specification for Sound Level Meters
- ANSI S1.4- Standard for Sound Level Meters

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/I/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

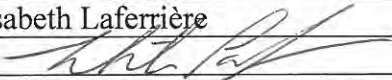
¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator					
A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	54,6	54,4	+/- 3	0	pass
63	67,9	67,3	+/- 2	0,1	pass
125	77,9	78,4	+/- 1,5	0	pass
250	85,4	85,8	+/- 1,5	0	pass
500	90,9	90,8	+/- 1,5	0,1	pass
1000	94	94	+/- 1,5	0	pass
2000	95,6	95,2	+/- 2	0,4	pass
4000	97,3	95	+/- 3	2,3	pass
8000	91,8	92,9	+/- 5	-1,1	pass
C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,6	91	+/- 3	-0,4	pass
63	93,2	93,7	+/- 2	-0,3	pass
125	93,7	94,2	+/- 1,5	-0,1	pass
250	94	94,5	+/- 1,5	0	pass
500	93,9	94,3	+/- 1,5	-0,1	pass
1000	93,9	94	+/- 1,5	-0,1	pass
2000	94,1	93,9	+/- 2	0,3	pass
4000	95,4	94,9	+/- 3	2,2	pass
8000	92,6	88,3	+/- 5	1,6	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,5° C	100,8 kPa	52%

Calibrated by	Elisabeth Laferrière
Signature	
Date	2015-03-20

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

L7006

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1610

Instrument: Sound Level Meter
Model: Piccolo
Manufacturer: Soft dB inc.
Serial Number: 150217006
Tested with:

Type (class): 2
Customer: Soft dB inc.
Tel/Fax: 418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- IEC 60651- Specification for Sound Level Meters
- ANSI S1.4- Standard for Sound Level Meters

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/L/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

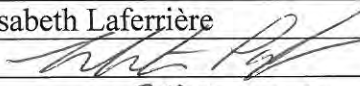
¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator					
A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	54	54,4	+/- 3	-0,6	pass
63	67,8	67,3	+/- 2	0	pass
125	77,9	78,4	+/- 1,5	0	pass
250	85,3	85,8	+/- 1,5	-0,1	pass
500	90,8	90,8	+/- 1,5	0	pass
1000	93,8	94	+/- 1,5	-0,2	pass
2000	95,4	95,2	+/- 2	0,2	pass
4000	97,2	95	+/- 3	2,2	pass
8000	94,7	92,9	+/- 5	1,8	pass
C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,7	91	+/- 3	-0,3	pass
63	93,2	93,7	+/- 2	-0,3	pass
125	93,6	94,2	+/- 1,5	-0,2	pass
250	94	94,5	+/- 1,5	0	pass
500	94,1	94,3	+/- 1,5	0,1	pass
1000	93,8	94	+/- 1,5	-0,2	pass
2000	94	93,9	+/- 2	0,2	pass
4000	93,2	94,9	+/- 3	0	pass
8000	92,7	88,3	+/- 5	1,7	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,5° C	100,8 kPa	52%

Calibrated by	Elisabeth Laferrière
Signature	
Date	2015-03-20

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

L7011

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1611

Instrument: Sound Level Meter
Model: Piccolo
Manufacturer: Soft dB inc.
Serial Number: 150217011
Tested with:

Type (class): 2
Customer: Soft dB inc.
Tel/Fax: 418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- IEC 60651- Specification for Sound Level Meters
- ANSI S1.4- Standard for Sound Level Meters

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/I/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC 60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

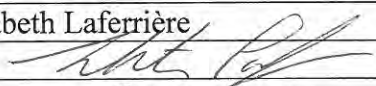
¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator					
A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	54,1	54,4	+/- 3	-0,5	pass
63	67,7	67,3	+/- 2	-0,1	pass
125	77,9	78,4	+/- 1,5	0	pass
250	85,4	85,8	+/- 1,5	0	pass
500	90,9	90,8	+/- 1,5	0,1	pass
1000	93,9	94	+/- 1,5	-0,1	pass
2000	95,6	95,2	+/- 2	0,4	pass
4000	97,6	95	+/- 3	2,6	pass
8000	92,8	92,9	+/- 5	-0,1	pass
C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,5	91	+/- 3	-0,5	pass
63	93,1	93,7	+/- 2	-0,4	pass
125	93,7	94,2	+/- 1,5	-0,1	pass
250	94,1	94,5	+/- 1,5	0,1	pass
500	94,2	94,3	+/- 1,5	0,2	pass
1000	93,9	94	+/- 1,5	-0,1	pass
2000	94,2	93,9	+/- 2	0,4	pass
4000	95,8	94,9	+/- 3	2,6	pass
8000	90,9	88,3	+/- 5	-0,1	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,5° C	100,8 kPa	52%

Calibrated by	Elisabeth Laferrière
Signature	
Date	2015-03-20

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1728

<i>Instrument:</i>	Sound Level Meter
<i>Model:</i>	Piccolo
<i>Manufacturer:</i>	Soft dB inc.
<i>Serial Number:</i>	150921019
<i>Tested with:</i>	
<i>Type (class):</i>	2
<i>Customer:</i>	Soft dB inc.
<i>Tel/Fax:</i>	418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- **IEC 60651- Specification for Sound Level Meters**
- **ANSI S1.4- Standard for Sound Level Meters**

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/L/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

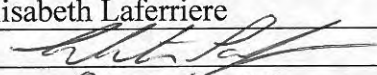
Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator

A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	53,9	54,4	+/- 3	-0,7	pass
63	67,9	67,3	+/- 2	0,1	pass
125	78,1	78,4	+/- 1,5	0,2	pass
250	85,4	85,8	+/- 1,5	0	pass
500	90,9	90,8	+/- 1,5	0,1	pass
1000	93,7	94	+/- 1,5	-0,3	pass
2000	95	95,2	+/- 2	-0,2	pass
4000	96,2	95	+/- 3	1,2	pass
8000	89,3	92,9	+/- 5	-3,6	pass

C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,4	91	+/- 3	-0,6	pass
63	93,1	93,7	+/- 2	-0,4	pass
125	93,8	94,2	+/- 1,5	0	pass
250	94,1	94,5	+/- 1,5	0,1	pass
500	94,2	94,3	+/- 1,5	0,2	pass
1000	93,7	94	+/- 1,5	-0,3	pass
2000	93,6	93,9	+/- 2	-0,2	pass
4000	94,3	94,9	+/- 3	1,1	pass
8000	87,3	88,3	+/- 5	-3,7	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,5° C	100,9 kPa	56%

Calibrated by	Elisabeth Laferriere
Signature	
Date	2015-10-23

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1692

Instrument: Sound Level Meter
Model: Piccolo
Manufacturer: Soft dB inc.
Serial Number: 150320010
Tested with:

Type (class): 2
Customer: Soft dB inc.
Tel/Fax: 418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- IEC 60651- Specification for Sound Level Meters
- ANSI S1.4- Standard for Sound Level Meters

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/I/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator**A-Weighted**

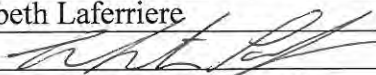
Frequency	Measure	Reference A	Tolerance	Results
31	54	54,6	+/- 3	-0,6 pass
63	67,9	67,8	+/- 2	0,1 pass
125	78,1	77,9	+/- 1,5	0,2 pass
250	85,6	85,4	+/- 1,5	0,2 pass
500	90,9	90,8	+/- 1,5	0,1 pass
1000	93,9	94	+/- 1,5	-0,1 pass
2000	95,3	95,2	+/- 2	0,1 pass
4000	96,4	95	+/- 3	1,4 pass
8000	90,1	92,9	+/- 5	-2,8 pass

C-Weighted

Frequency	Measure	Reference A	Tolerance	Results
31	90,7	91	+/- 3	-0,3 pass
63	93,3	93,5	+/- 2	-0,2 pass
125	93,9	93,8	+/- 1,5	0,1 pass
250	94,3	94	+/- 1,5	0,3 pass
500	94,2	94	+/- 1,5	0,2 pass
1000	93,9	94	+/- 1,5	-0,1 pass
2000	93,8	93,8	+/- 2	0 pass
4000	94,6	93,2	+/- 3	1,4 pass
8000	88,1	91	+/- 5	-2,9 pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,9° C	100,9 kPa	56%

Calibrated by	Elisabeth Laferriere
Signature	
Date	2015-08-26

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1691

Instrument: Sound Level Meter
Model: Piccolo
Manufacturer: Soft dB inc.
Serial Number: 150320006
Tested with:

Type (class): 2
Customer: Soft dB inc.
Tel/Fax: 418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- IEC 60651- Specification for Sound Level Meters
- ANSI S1.4- Standard for Sound Level Meters

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Stanford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/L/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

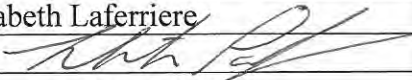
¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator					
A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	54,6	54,6	+/- 3	0	pass
63	67,7	67,8	+/- 2	-0,1	pass
125	77,9	77,9	+/- 1,5	0	pass
250	85,4	85,4	+/- 1,5	0	pass
500	90,6	90,8	+/- 1,5	-0,2	pass
1000	93,7	94	+/- 1,5	-0,3	pass
2000	95	95,2	+/- 2	-0,2	pass
4000	96	95	+/- 3	1	pass
8000	92,5	92,9	+/- 5	-0,4	pass
C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,4	91	+/- 3	-0,6	pass
63	93,1	93,5	+/- 2	-0,4	pass
125	93,6	93,8	+/- 1,5	-0,2	pass
250	94	94	+/- 1,5	0	pass
500	93,9	94	+/- 1,5	-0,1	pass
1000	93,7	94	+/- 1,5	-0,3	pass
2000	93,7	93,8	+/- 2	-0,1	pass
4000	94,2	93,2	+/- 3	1	pass
8000	90,5	91	+/- 5	-0,5	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,9° C	100,9 kPa	56%

Calibrated by	Elisabeth Laferriere
Signature	
Date	2015-08-26

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1729

<i>Instrument:</i>	Sound Level Meter
<i>Model:</i>	Piccolo
<i>Manufacturer:</i>	Soft dB inc.
<i>Serial Number:</i>	150921020
<i>Tested with:</i>	
 <i>Type (class):</i>	 2
<i>Customer:</i>	Soft dB inc.
<i>Tel/Fax:</i>	418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- **IEC 60651- Specification for Sound Level Meters**
- **ANSI S1.4- Standard for Sound Level Meters**

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/L/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

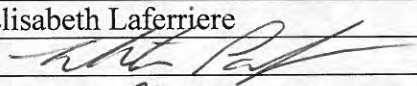
¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator					
A-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	54,2	54,4	+/- 3	-0,4	pass
63	68	67,3	+/- 2	0,2	pass
125	78,3	78,4	+/- 1,5	0,4	pass
250	85,8	85,8	+/- 1,5	0,4	pass
500	91	90,8	+/- 1,5	0,2	pass
1000	94	94	+/- 1,5	0	pass
2000	95,3	95,2	+/- 2	0,1	pass
4000	96,5	95	+/- 3	1,5	pass
8000	88,8	92,9	+/- 5	-4,1	pass
C-Weighted					
Frequency	Measure	Reference A	Tolerance	Results	
31	90,6	91	+/- 3	-0,4	pass
63	93,4	93,7	+/- 2	-0,1	pass
125	94,1	94,2	+/- 1,5	0,3	pass
250	94,4	94,5	+/- 1,5	0,4	pass
500	94,3	94,3	+/- 1,5	0,3	pass
1000	94	94	+/- 1,5	0	pass
2000	93,9	93,9	+/- 2	0,1	pass
4000	94,6	94,9	+/- 3	1,4	pass
8000	86,8	88,3	+/- 5	-4,2	pass

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,5° C	100,9 kPa	56%

Calibrated by	Elisabeth Laferriere
Signature	
Date	2015-10-23

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1736

<i>Instrument:</i>	Sound Level Meter
<i>Model:</i>	Piccolo
<i>Manufacturer:</i>	Soft dB inc.
<i>Serial Number:</i>	160115007
<i>Tested with:</i>	
<i>Type (class):</i>	2
<i>Customer:</i>	Soft dB inc.
<i>Tel/Fax:</i>	418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- **IEC 60651- Specification for Sound Level Meters**
- **ANSI S1.4- Standard for Sound Level Meters**

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/ 6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/I/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator							
A-Weighted							
Frequency	Measure	Reference A	Tolerance	Results			
31	55,4	54,6	+/- 3	0,8	pass		
63	69,1	67,8	+/- 2	1,3	pass		
125	78,6	77,9	+/- 1,5	0,7	pass		
250	85,9	85,4	+/- 1,5	0,5	pass		
500	91	90,8	+/- 1,5	0,2	pass		
1000	94	94	+/- 1,5	0	pass		
2000	95,3	95,2	+/- 2	0,1	pass		
4000	96,8	95	+/- 3	1,8	pass		
8000	92,9	92,9	+/- 5	0	pass		
C-Weighted							
Frequency	Measure	Reference A	Tolerance	Results			
31	91,4	91	+/- 3	0,4	pass		
63	93,8	93,2	+/- 2	0,6	pass		
125	94,4	93,8	+/- 1,5	0,6	pass		
250	94,6	94	+/- 1,5	0,6	pass		
500	94,3	94	+/- 1,5	0,3	pass		
1000	94	94	+/- 1,5	0	pass		
2000	93,9	93,8	+/- 2	0,1	pass		
4000	95	93,2	+/- 3	1,8	pass		
8000	91	91	+/- 5	0	pass		

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,0°C	101,1 kPa	59%

Calibrated by	Elisabeth Laferrière
Signature	
Date	2016-03-08

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1737

<i>Instrument:</i>	Sound Level Meter
<i>Model:</i>	Piccolo
<i>Manufacturer:</i>	Soft dB inc.
<i>Serial Number:</i>	160115008
<i>Tested with:</i>	
<i>Type (class):</i>	2
<i>Customer:</i>	Soft dB inc.
<i>Tel/Fax:</i>	418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- IEC 60651- Specification for Sound Level Meters
- ANSI S1.4- Standard for Sound Level Meters

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7.9/6.9)	X		0.15
Differential Level Linearity (#7.10/6.10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/1/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

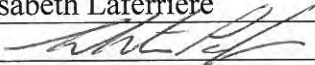
¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator							
A-Weighted							
Frequency	Measure	Reference A	Tolerance	Results			
31	57,1	54,6	+/- 3	2,5	pass		
63	68,7	67,8	+/- 2	0,9	pass		
125	78,3	77,9	+/- 1,5	0,4	pass		
250	85,8	85,4	+/- 1,5	0,4	pass		
500	91	90,8	+/- 1,5	0,2	pass		
1000	94	94	+/- 1,5	0	pass		
2000	95,4	95,2	+/- 2	0,2	pass		
4000	97,1	95	+/- 3	2,1	pass		
8000	89,1	92,9	+/- 5	-3,8	pass		
C-Weighted							
Frequency	Measure	Reference A	Tolerance	Results			
31	91,5	91	+/- 3	0,5	pass		
63	93,9	93,2	+/- 2	0,7	pass		
125	94,5	93,8	+/- 1,5	0,7	pass		
250	94,7	94	+/- 1,5	0,7	pass		
500	94,4	94	+/- 1,5	0,4	pass		
1000	94	94	+/- 1,5	0	pass		
2000	94	93,8	+/- 2	0,2	pass		
4000	95,2	93,2	+/- 3	2	pass		
8000	87,2	91	+/- 5	-3,8	pass		

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,0°C	101,1 kPa	59%

Calibrated by	Elisabeth Laferrière
Signature	
Date	2016-03-08

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

Soft dB

Acoustical Equipment Manufacturer
1040 Belvédère Ave., Suite 215
Québec, Québec G1S 3G3
Canada

Calibration Certificate No. 1739

<i>Instrument:</i>	Sound Level Meter
<i>Model:</i>	Piccolo
<i>Manufacturer:</i>	Soft dB inc.
<i>Serial Number:</i>	160115012
<i>Tested with:</i>	
<i>Type (class):</i>	2
<i>Customer:</i>	Soft dB inc.
<i>Tel/Fax:</i>	418-686-0993 / 418-686-2043

Tested in accordance with the following standard:

- **IEC 60651- Specification for Sound Level Meters**
- **ANSI S1.4- Standard for Sound Level Meters**

Instrument used for calibration

Instrument Manufacturer	Description
4226-Brüel & Kjaer	Acoustical MULTIFUNCTION GENERATOR
Standford System Generator Model DS360	Signal MULTIFUNCTION GENERATOR

Results summary:

Device complies with following clauses of mentioned specifications

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	MESUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Level Linearity Test (#7 9/ 6.9)	X		0.15
Differential Level Linearity (#7 10/6 10)	X		0.21
Weighting Network Tests: A, C, Lin network (#7.2.1/6.2.1-electrical test)	X		0.15
Overload Detector Test: A-Network (#9.3.1/8.3.1)	X		0.15
F/S/I/Peak Test: Steady State Response (#7.4/6.4)	X		0.15
Fast and Slow Overshoot Test (#8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (#9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Acoustical tests: Weighting A Network Tests (#7.2.1/6.2.1)	X		0.2

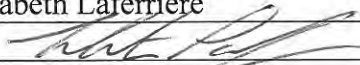
¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

Detail results of the acoustic tests- ANSI S1.4 #5 using MF calibrator						
A-Weighted						
Frequency	Measure	Reference A	Tolerance	Results		
31	54,6	54,6	+/- 3	0	pass	
63	68,3	67,8	+/- 2	0,5	pass	
125	78,4	77,9	+/- 1,5	0,5	pass	
250	85,8	85,4	+/- 1,5	0,4	pass	
500	91	90,8	+/- 1,5	0,2	pass	
1000	94	94	+/- 1,5	0	pass	
2000	95,4	95,2	+/- 2	0,2	pass	
4000	96,9	95	+/- 3	1,9	pass	
8000	92,1	92,9	+/- 5	-0,8	pass	
C-Weighted						
Frequency	Measure	Reference A	Tolerance	Results		
31	91,2	91	+/- 3	0,2	pass	
63	93,8	93,2	+/- 2	0,6	pass	
125	94,4	93,8	+/- 1,5	0,6	pass	
250	94,6	94	+/- 1,5	0,6	pass	
500	94,4	94	+/- 1,5	0,4	pass	
1000	94	94	+/- 1,5	0	pass	
2000	94	93,8	+/- 2	0,2	pass	
4000	95,1	93,2	+/- 3	1,9	pass	
8000	90,1	91	+/- 5	-0,9	pass	

Environnemental test condition

Temperature	Barometric Pressure	Relative Humidity
21,0°C	101,1 kPa	59%

Calibrated by	Elisabeth Laferrière
Signature	
Date	2016-03-08

The overall frequency response of the sound level meter and microphone has shown to conform to the requirements section 6 of the ANSI S1.4 for type 2 Sound Level Meter.

The results of this test apply only to the instrument type with the serial number identified.
Parameter are certified at actual environmental conditions

The instrument was tested for the parameters listed in the table above, using the methods described in the listed standards.
All tests were performed around the reference condition.

APPENDIX 5.4:

NOISE LEVEL MEASUREMENT WORKSHEETS

This page intentionally left blank

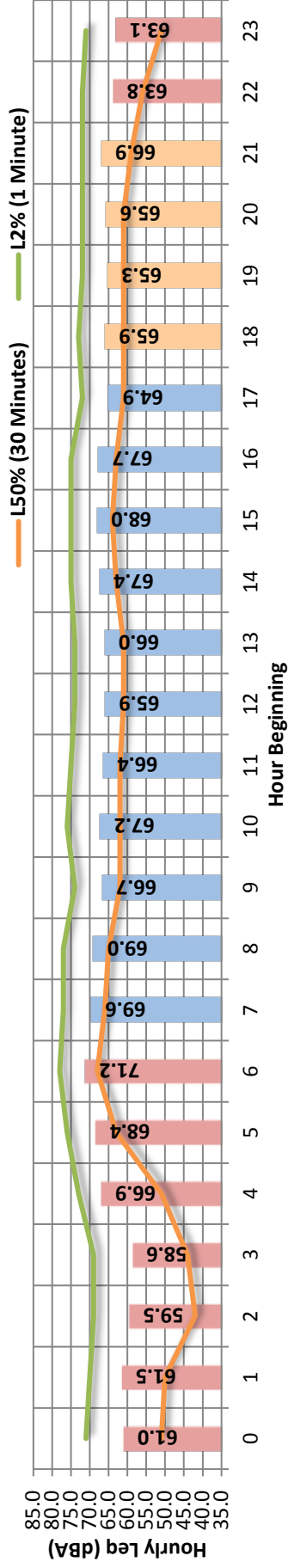
24-Hour Noise Level Measurement Summary

Project Name: CV Link
Location: L1 - Located south of the alignment on Indian Canyon Drive near future residential land use.

JN: 9276
Analyst: A. Wolfe
Date: 3/23/2016

Energy Average Leq				24-Hour CNEL
Day	Evening	Night		
67.4	66.0	65.7		
				72.6

Hourly Leq dBA Readings (unadjusted)



Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	64.9	83.0	37.5	74.0	72.0	70.0	68.0	65.0	61.0	47.0	44.0	39.0
	Max	69.6	90.4	44.1	79.0	77.0	74.0	73.0	70.0	66.0	56.0	53.0	46.0
Evening	Min	65.3	83.3	39.2	74.0	72.0	70.0	69.0	65.0	59.0	45.0	43.0	39.0
	Max	66.9	94.8	40.7	75.0	73.0	71.0	70.0	66.0	61.0	47.0	45.0	40.0
Night	Min	58.6	78.1	37.5	71.0	69.0	64.0	61.0	47.0	42.0	40.0	39.0	37.0
	Max	71.2	95.2	47.6	79.0	78.0	76.0	74.0	71.0	68.0	58.0	55.0	50.0
Energy Average:		65.7	Average:	Average:	74.0	72.1	69.1	67.3	59.2	52.9	45.0	43.8	41.9

Hourly Summary

Night	0	61.0	79.4	47.6	73.0	71.0	67.0	65.0	55.0	51.0	49.0	49.0	48.0
	1	61.5	84.9	41.8	72.0	70.0	68.0	66.0	55.0	50.0	44.0	43.0	42.0
	2	59.5	86.0	39.2	71.0	69.0	64.0	61.0	47.0	42.0	40.0	39.0	39.0
	3	58.6	78.1	39.2	71.0	69.0	66.0	63.0	49.0	44.0	40.0	39.0	39.0
	4	66.9	95.2	39.3	76.0	73.0	70.0	69.0	62.0	51.0	42.0	41.0	40.0
	5	68.4	82.5	41.5	77.0	76.0	74.0	73.0	69.0	63.0	49.0	47.0	43.0
	6	71.2	88.6	46.7	79.0	78.0	76.0	74.0	71.0	68.0	58.0	55.0	50.0
Day	7	69.6	84.1	44.1	79.0	77.0	74.0	73.0	70.0	66.0	56.0	53.0	46.0
	8	69.0	90.4	41.5	79.0	77.0	73.0	72.0	68.0	65.0	52.0	48.0	43.0
	9	66.7	87.5	40.3	76.0	74.0	71.0	70.0	66.0	62.0	49.0	45.0	42.0
	10	67.2	85.6	39.3	78.0	76.0	72.0	70.0	66.0	62.0	47.0	44.0	41.0
	11	66.4	83.5	39.3	77.0	75.0	72.0	70.0	66.0	62.0	47.0	44.0	40.0
	12	65.9	83.0	38.4	76.0	74.0	71.0	70.0	65.0	61.0	47.0	44.0	39.0
	13	66.0	88.5	39.3	75.0	74.0	71.0	69.0	65.0	61.0	49.0	45.0	41.0
Evening	14	67.4	85.8	42.2	77.0	75.0	72.0	71.0	67.0	63.0	52.0	49.0	45.0
	15	68.0	84.7	39.7	77.0	75.0	73.0	72.0	68.0	64.0	51.0	47.0	43.0
	16	67.7	88.3	37.5	77.0	75.0	72.0	71.0	67.0	63.0	55.0	50.0	43.0
	17	64.9	83.8	42.0	74.0	72.0	70.0	68.0	65.0	61.0	51.0	47.0	44.0
Night	18	65.9	84.9	40.7	75.0	73.0	71.0	70.0	66.0	61.0	47.0	45.0	43.0
	19	65.3	83.3	39.3	74.0	72.0	70.0	69.0	66.0	61.0	47.0	44.0	40.0
	20	65.6	85.9	39.3	74.0	72.0	70.0	69.0	66.0	61.0	47.0	44.0	40.0
	21	66.9	94.8	39.2	74.0	72.0	70.0	69.0	65.0	59.0	45.0	43.0	39.0
Night	22	63.8	81.8	39.0	74.0	72.0	69.0	68.0	64.0	56.0	43.0	42.0	39.0
	23	63.1	85.4	37.5	73.0	71.0	68.0	67.0	61.0	51.0	40.0	39.0	37.0

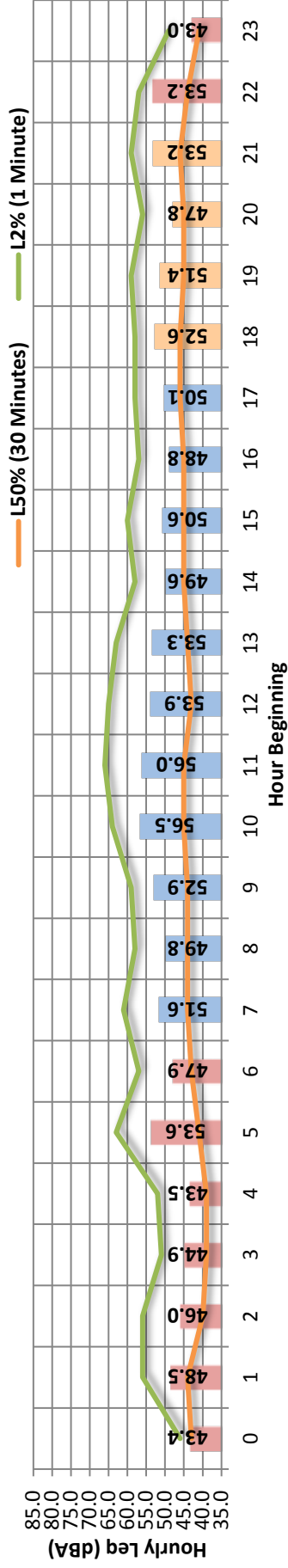
24-Hour Noise Level Measurement Summary

Project Name: CV Link
 Location: L2 - Located adjacent to the alignment on Sunrise Way near existing residential homes.

JN: 9276
 Analyst: A. Wolfe
 Date: 3/23/2016

Energy Average Leq				24-Hour CNEL
Day	Evening	Night		
52.9	51.7	48.9		56.5

Hourly Leq dBA Readings (unadjusted)



Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	48.8	65.2	37.6	59.0	57.0	54.0	51.0	45.0	43.0	40.0	39.0	39.0
	Max	56.5	80.0	41.5	70.0	66.0	61.0	59.0	50.0	46.0	43.0	43.0	42.0
	Energy Average:	52.9	Average:	Average:	64.1	60.8	55.8	53.5	47.6	44.5	40.9	40.1	39.5
Evening	Min	47.8	60.7	37.5	57.0	56.0	53.0	51.0	47.0	45.0	39.0	39.0	37.0
	Max	53.2	75.3	39.4	64.0	59.0	55.0	53.0	49.0	46.0	42.0	41.0	40.0
	Energy Average:	51.7	Average:	Average:	61.5	58.0	54.0	52.3	48.0	45.5	40.8	40.3	38.8
Night	Min	43.0	53.9	37.5	46.0	46.0	45.0	45.0	41.0	39.0	37.0	37.0	37.0
	Max	53.6	81.8	39.3	68.0	63.0	54.0	53.0	47.0	44.0	42.0	41.0	40.0
	Energy Average:	48.9	Average:	Average:	56.3	54.1	50.0	48.3	43.9	41.6	39.4	39.1	38.0

Hourly Summary

Night	0	43.4	53.9	39.3	46.0	46.0	45.0	45.0	44.0	43.0	41.0	40.0	39.0
	1	48.5	61.9	39.3	57.0	56.0	54.0	53.0	47.0	44.0	42.0	41.0	40.0
	2	46.0	67.7	37.6	58.0	56.0	48.0	46.0	42.0	40.0	39.0	37.0	37.0
	3	44.9	66.5	37.5	54.0	51.0	48.0	46.0	41.0	39.0	37.0	37.0	37.0
	4	43.5	60.7	37.5	54.0	52.0	48.0	46.0	41.0	39.0	37.0	37.0	37.0
	5	53.6	76.4	37.6	68.0	63.0	53.0	51.0	45.0	41.0	39.0	39.0	39.0
	6	47.9	65.3	39.3	59.0	57.0	54.0	51.0	46.0	43.0	40.0	40.0	39.0
Day	7	51.6	73.2	39.3	64.0	61.0	54.0	51.0	47.0	44.0	40.0	40.0	40.0
	8	49.8	68.7	39.3	61.0	58.0	54.0	54.0	47.0	44.0	41.0	40.0	39.0
	9	52.9	75.5	39.3	64.0	59.0	55.0	52.0	47.0	44.0	41.0	40.0	39.0
	10	56.5	80.0	41.5	70.0	64.0	57.0	54.0	47.0	45.0	43.0	43.0	42.0
	11	56.0	75.3	39.3	69.0	66.0	61.0	59.0	50.0	45.0	41.0	40.0	39.0
	12	53.9	75.4	39.1	67.0	65.0	58.0	53.0	45.0	43.0	40.0	39.0	39.0
	13	53.3	72.0	39.1	68.0	63.0	57.0	53.0	47.0	44.0	40.0	39.0	39.0
Evening	14	49.6	65.2	39.3	60.0	58.0	54.0	53.0	48.0	45.0	41.0	40.0	40.0
	15	50.6	68.2	38.3	62.0	60.0	56.0	54.0	49.0	45.0	41.0	40.0	39.0
	16	48.8	67.3	38.8	59.0	57.0	54.0	52.0	48.0	45.0	41.0	40.0	39.0
	17	50.1	67.8	37.6	61.0	58.0	54.0	53.0	49.0	46.0	41.0	40.0	39.0
Night	18	52.6	74.2	39.4	62.0	58.0	54.0	52.0	48.0	46.0	42.0	41.0	40.0
	19	51.4	71.1	37.5	64.0	59.0	54.0	53.0	48.0	45.0	39.0	39.0	37.0
	20	47.8	60.7	39.2	57.0	56.0	53.0	51.0	47.0	45.0	40.0	40.0	39.0
	21	53.2	75.3	37.6	63.0	59.0	55.0	53.0	49.0	46.0	42.0	41.0	39.0
	22	53.2	81.8	37.6	62.0	57.0	53.0	51.0	46.0	44.0	41.0	40.0	39.0
	23	43.0	54.1	37.6	49.0	49.0	47.0	46.0	43.0	41.0	39.0	39.0	37.0

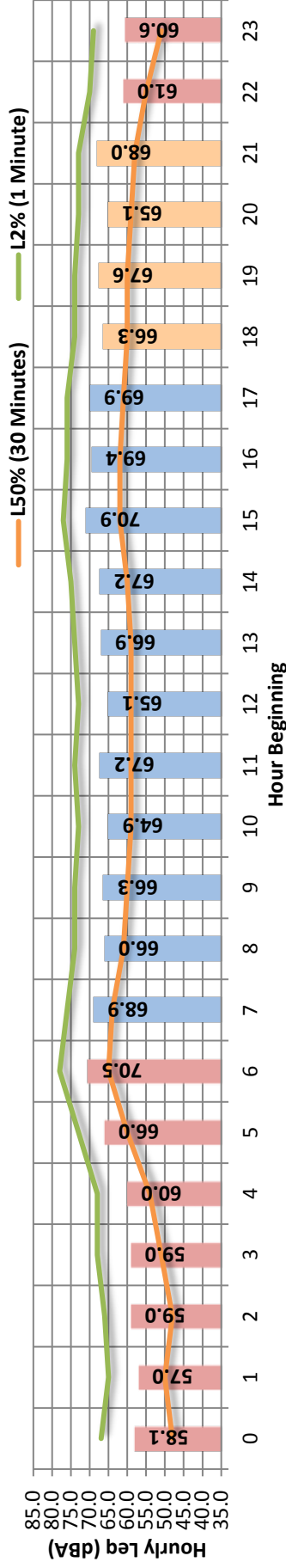
24-Hour Noise Level Measurement Summary

Project Name: CV Link
Location: L3 - Located adjacent to the alignment at the northwest corner of Gene Autry Trail and Via Escuela.

JN: 9276
Analyst: A. Wolfe
Date: 3/23/2016

Energy Average Leq				24-Hour CNEL
Day	Evening	Night		
67.9	66.9	63.8		
				71.4

Hourly Leq dBA Readings (unadjusted)



Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	64.9	81.5	45.7	75.0	73.0	71.0	69.0	63.0	59.0	51.0	49.0	47.0
	Max	70.9	96.9	49.6	79.0	77.0	74.0	73.0	68.0	64.0	57.0	55.0	53.0
Evening	Min	65.1	88.6	46.0	75.0	73.0	70.0	67.0	62.0	58.0	51.0	50.0	48.0
	Max	68.0	98.5	49.3	77.0	74.0	71.0	69.0	64.0	60.0	53.0	52.0	50.0
Night	Min	66.9	91.1	45.2	75.8	73.5	70.5	68.3	63.3	59.3	52.0	50.8	48.8
	Max	70.5	91.1	50.9	80.0	78.0	75.0	74.0	69.0	65.0	57.0	55.0	52.0
Energy Average:		63.8	Average:	Average:	72.0	69.3	65.3	63.6	58.1	53.6	48.4	47.7	46.6

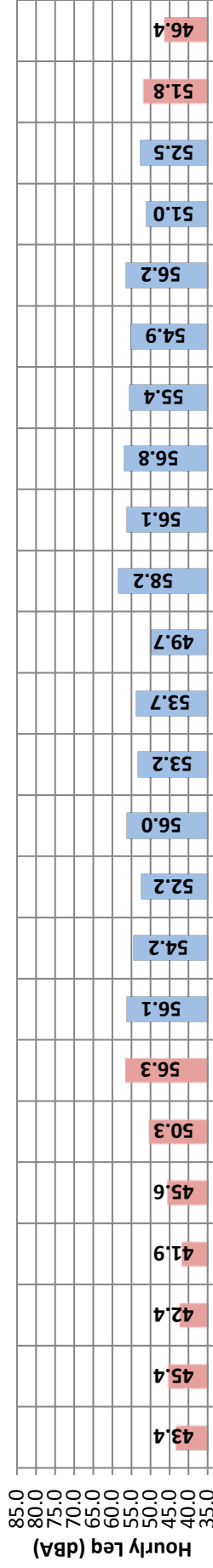
Hourly Summary

Night	0	58.1	81.0	45.8	71.0	67.0	60.0	57.0	51.0	48.0	46.0	46.0	46.0
	1	57.0	78.2	46.0	69.0	65.0	61.0	59.0	54.0	50.0	47.0	46.0	46.0
	2	59.0	84.2	45.2	69.0	66.0	62.0	61.0	54.0	48.0	46.0	45.0	45.0
	3	59.0	77.1	45.3	70.0	68.0	65.0	63.0	57.0	51.0	46.0	45.0	45.0
	4	60.0	81.0	45.3	70.0	68.0	65.0	64.0	59.0	54.0	46.0	46.0	45.0
	5	66.0	91.1	45.7	75.0	73.0	70.0	69.0	64.0	60.0	52.0	51.0	46.0
	6	70.5	91.1	50.9	80.0	78.0	75.0	74.0	69.0	65.0	57.0	55.0	52.0
Day	7	68.9	91.5	49.6	78.0	76.0	74.0	73.0	68.0	64.0	57.0	55.0	53.0
	8	66.0	90.5	46.9	75.0	74.0	71.0	69.0	64.0	61.0	53.0	51.0	48.0
	9	66.3	90.3	46.2	76.0	74.0	71.0	70.0	64.0	60.0	53.0	51.0	49.0
	10	64.9	81.5	45.7	75.0	73.0	71.0	69.0	63.0	59.0	52.0	49.0	47.0
	11	67.2	94.5	46.0	77.0	74.0	72.0	70.0	64.0	59.0	51.0	49.0	47.0
	12	65.1	86.9	46.4	75.0	73.0	71.0	69.0	63.0	59.0	52.0	50.0	48.0
	13	66.9	91.7	46.4	77.0	74.0	71.0	70.0	64.0	59.0	52.0	50.0	48.0
Evening	14	67.2	87.2	49.3	78.0	75.0	72.0	71.0	64.0	60.0	54.0	52.0	50.0
	15	70.9	95.4	49.0	79.0	77.0	74.0	73.0	68.0	62.0	55.0	53.0	51.0
	16	69.4	93.5	47.3	79.0	76.0	74.0	73.0	67.0	62.0	55.0	53.0	50.0
	17	69.9	96.9	47.9	79.0	76.0	73.0	71.0	65.0	61.0	53.0	52.0	49.0
Night	18	66.3	88.6	49.3	76.0	74.0	71.0	69.0	64.0	60.0	53.0	52.0	50.0
	19	67.6	93.8	48.0	77.0	74.0	71.0	69.0	64.0	60.0	52.0	51.0	49.0
	20	65.1	89.0	46.0	75.0	73.0	70.0	67.0	63.0	59.0	52.0	50.0	48.0
	21	68.0	98.5	47.3	75.0	73.0	70.0	68.0	62.0	58.0	51.0	50.0	48.0
Night	22	61.0	79.0	47.4	72.0	70.0	66.0	64.0	60.0	55.0	49.0	49.0	48.0
	23	60.6	84.6	45.6	72.0	69.0	64.0	61.0	55.0	51.0	47.0	46.0	46.0

24-Hour Noise Level Measurement Summary

<i>Project Name:</i> 9276	JN: 9276		24-Hour CNEL
	Analyst: A. Wolfe		
	Date: 3/23/2016		
<i>Location:</i> L4 - Located west of the alignment and access point on San Gabriel Circle near the Agua Caliente Elementary School and existing residential homes.	Energy Average Leq		57.9
	Day	Night	
	55.0	49.8	

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	49.7	72.0	37.5	61.0	57.0	52.0	49.0	45.0	42.0	39.0	37.0	37.0
	Max	58.2	83.8	43.2	70.0	68.0	64.0	61.0	52.0	49.0	47.0	46.0	45.0
	Energy Average:	55.0		Average:	66.1	63.1	58.5	55.3	48.1	44.5	40.9	40.1	39.3
Night	Min	41.9	60.7	37.5	47.0	46.0	44.0	43.0	41.0	39.0	37.0	37.0	37.0
	Max	56.3	75.1	47.1	68.0	65.0	60.0	58.0	53.0	51.0	49.0	48.0	48.0
	Energy Average:	49.8		Average:	55.3	53.0	49.6	48.0	44.8	42.8	40.8	40.2	39.4

Hourly Summary

Night	0	43.4	69.1	37.5	49.0	47.0	44.0	43.0	41.0	40.0	39.0	38.0	37.0
	1	45.4	67.7	39.0	52.0	50.0	49.0	48.0	44.0	41.0	39.0	39.0	39.0
	2	42.4	65.4	37.5	49.0	46.0	44.0	43.0	41.0	39.0	37.0	37.0	37.0
	3	41.9	60.7	37.5	47.0	46.0	45.0	44.0	42.0	40.0	38.0	37.0	37.0
	4	45.6	70.5	37.5	52.0	50.0	47.0	46.0	44.0	42.0	39.0	39.0	37.0
	5	50.3	70.4	39.3	63.0	60.0	54.0	51.0	46.0	44.0	42.0	41.0	40.0
	6	56.3	75.1	47.1	68.0	65.0	60.0	58.0	53.0	51.0	49.0	48.0	48.0
Day	7	56.1	79.3	43.2	67.0	64.0	60.0	57.0	51.0	49.0	47.0	46.0	45.0
	8	54.2	80.0	38.2	66.0	63.0	58.0	54.0	47.0	43.0	40.0	39.0	39.0
	9	52.2	81.2	37.5	61.0	57.0	52.0	49.0	45.0	43.0	40.0	39.0	39.0
	10	56.0	83.8	37.5	68.0	63.0	57.0	54.0	46.0	42.0	39.0	39.0	38.0
	11	53.2	77.8	37.5	65.0	62.0	57.0	54.0	47.0	43.0	39.0	39.0	38.0
	12	53.7	79.1	37.5	66.0	63.0	59.0	55.0	46.0	43.0	39.0	37.0	37.0
	13	49.7	74.0	37.5	61.0	59.0	54.0	51.0	45.0	42.0	39.0	38.0	37.0
	14	58.2	79.9	38.8	70.0	68.0	63.0	60.0	49.0	45.0	40.0	40.0	39.0
	15	56.1	81.4	38.7	67.0	65.0	61.0	59.0	50.0	45.0	41.0	40.0	39.0
	16	56.8	76.7	37.5	68.0	67.0	64.0	61.0	52.0	45.0	40.0	39.0	37.0
	17	55.4	76.5	39.3	68.0	65.0	61.0	58.0	49.0	45.0	42.0	41.0	40.0
	18	54.9	75.2	42.2	67.0	65.0	60.0	57.0	51.0	48.0	44.0	43.0	43.0
	19	56.2	79.6	39.3	68.0	65.0	61.0	58.0	51.0	47.0	42.0	41.0	40.0
	20	51.0	72.0	37.5	64.0	60.0	55.0	51.0	46.0	43.0	39.0	39.0	38.0
	21	52.5	73.5	40.4	66.0	61.0	55.0	52.0	47.0	45.0	42.0	42.0	41.0
	22	51.8	74.6	40.4	64.0	61.0	54.0	51.0	47.0	45.0	43.0	42.0	41.0
	23	46.4	69.3	38.5	54.0	52.0	49.0	48.0	45.0	43.0	41.0	41.0	39.0

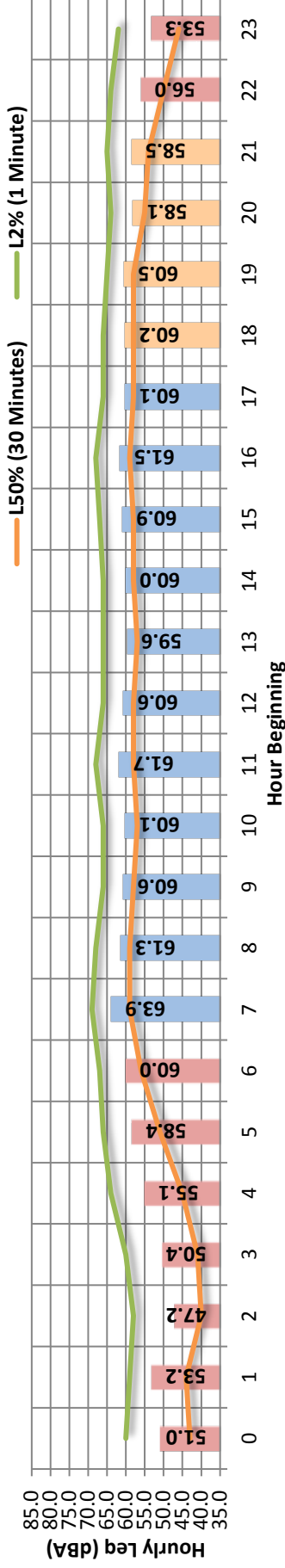
24-Hour Noise Level Measurement Summary

Project Name: CV Link
 Location: L5 - Located adjacent to the alignment on Riverside Drive near existing residential homes.

JN: 9276
 Analyst: A. Wolfe
 Date: 3/23/2016

Energy Average Leq				24-Hour CNEL
Day	Evening	Night		
61.1	59.4	55.4		63.5

Hourly Leq dBA Readings (unadjusted)



Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	59.6	75.5	39.0	67.0	66.0	63.0	62.0	60.0	57.0	49.0	46.0	42.0
	Max	63.9	88.1	45.0	72.0	69.0	66.0	65.0	62.0	59.0	52.0	49.0	46.0
	Energy Average:	61.1		Average:	68.8	66.9	64.4	63.3	60.8	58.1	50.4	47.5	43.5
Evening	Min	58.1	72.2	42.6	66.0	64.0	62.0	61.0	58.0	54.0	49.0	48.0	46.0
	Max	60.5	82.4	47.1	67.0	66.0	64.0	63.0	61.0	58.0	53.0	53.0	50.0
	Energy Average:	59.4		Average:	66.3	65.0	63.3	62.3	59.8	56.3	51.3	50.3	47.5
Night	Min	47.2	67.9	37.2	59.0	58.0	51.0	46.0	42.0	40.0	39.0	39.0	37.0
	Max	60.0	81.3	44.1	68.0	67.0	65.0	64.0	61.0	56.0	48.0	47.0	45.0
	Energy Average:	55.4		Average:	63.8	62.2	59.0	56.7	50.6	46.2	42.1	41.4	40.1

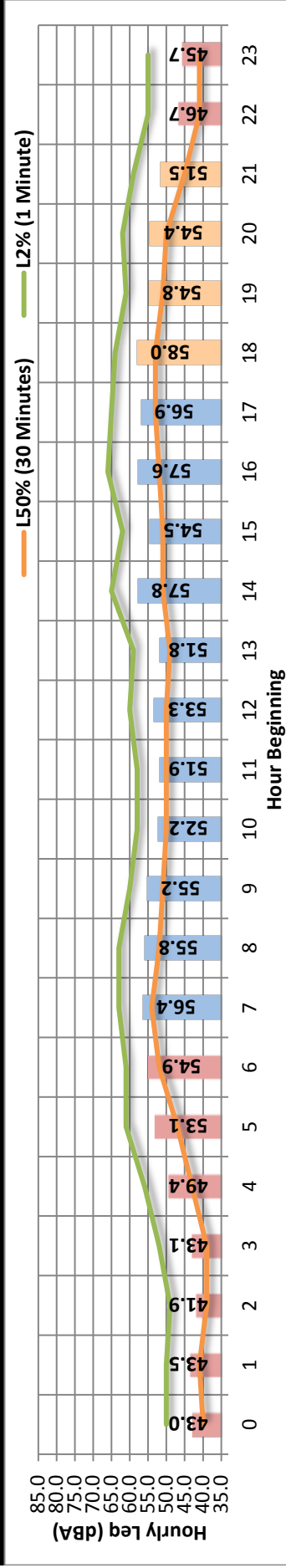
Hourly Summary

Night	0	51.0	70.9	39.3	62.0	60.0	58.0	55.0	46.0	43.0	41.0	40.0	40.0
	1	53.2	81.3	38.6	61.0	59.0	56.0	53.0	46.0	44.0	41.0	40.0	39.0
	2	47.2	67.9	37.2	59.0	58.0	51.0	46.0	42.0	40.0	39.0	39.0	37.0
	3	50.4	74.4	37.2	62.0	60.0	56.0	53.0	44.0	41.0	39.0	39.0	37.0
	4	55.1	77.5	38.9	66.0	64.0	61.0	59.0	52.0	45.0	41.0	41.0	40.0
	5	58.4	78.9	41.2	68.0	66.0	64.0	62.0	58.0	51.0	44.0	43.0	42.0
	6	60.0	75.5	44.1	68.0	67.0	65.0	64.0	61.0	56.0	48.0	47.0	45.0
Day	7	63.9	88.1	42.5	72.0	69.0	66.0	65.0	62.0	59.0	50.0	47.0	43.0
	8	61.3	78.5	45.0	69.0	68.0	65.0	64.0	62.0	59.0	51.0	49.0	46.0
	9	60.6	75.5	41.7	68.0	66.0	64.0	63.0	61.0	58.0	51.0	48.0	43.0
	10	60.1	82.4	41.6	68.0	66.0	64.0	63.0	60.0	57.0	50.0	48.0	44.0
	11	61.7	86.6	41.0	70.0	68.0	65.0	63.0	61.0	58.0	51.0	48.0	44.0
	12	60.6	81.8	40.8	69.0	66.0	64.0	63.0	60.0	58.0	50.0	47.0	42.0
	13	59.6	75.6	39.0	68.0	66.0	63.0	62.0	60.0	57.0	50.0	47.0	42.0
Evening	14	60.0	80.8	42.5	67.0	66.0	64.0	63.0	60.0	58.0	52.0	49.0	46.0
	15	60.9	83.7	41.2	69.0	67.0	64.0	63.0	60.0	58.0	50.0	46.0	42.0
	16	61.5	81.2	41.1	70.0	68.0	65.0	64.0	61.0	59.0	50.0	47.0	43.0
	17	60.1	76.0	41.1	67.0	66.0	64.0	63.0	61.0	58.0	49.0	46.0	43.0
Night	18	60.2	74.3	42.6	67.0	66.0	64.0	63.0	61.0	58.0	52.0	51.0	47.0
	19	60.5	82.4	47.1	66.0	65.0	64.0	63.0	61.0	58.0	53.0	53.0	50.0
	20	58.1	72.2	44.7	66.0	64.0	62.0	62.0	59.0	55.0	51.0	49.0	46.0
	21	58.5	80.9	45.2	66.0	65.0	63.0	61.0	58.0	54.0	49.0	48.0	47.0
Night	22	56.0	74.6	39.0	65.0	64.0	61.0	60.0	55.0	50.0	44.0	43.0	41.0
	23	53.3	74.1	38.8	63.0	62.0	59.0	58.0	51.0	46.0	42.0	41.0	40.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link Location: L6 - Located adjacent to the alignment in Delmuth Park near existing residential homes.	JN: 9276		24-Hour	
	Analyst: A. Wolfe		CNEL	
	Date: 3/23/2016		Energy Average Leq	
			Day	Night
		55.4	55.3	49.3
				57.8

Hourly Leq dBA Readings (unadjusted)



Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	51.8	66.2	39.6	59.0	58.0	56.0	54.0	51.0	49.0	44.0	42.0	40.0
	Max	57.8	79.4	41.6	70.0	66.0	62.0	60.0	57.0	54.0	47.0	46.0	43.0
Evening	Min	55.4	Average:	40.5	63.9	61.7	58.9	57.4	54.0	51.2	45.2	43.6	41.5
	Max	51.5	70.5	46.3	63.0	59.0	55.0	54.0	49.0	45.0	42.0	41.0	40.0
Night	Min	58.0	82.2	49.3	67.0	64.0	61.0	60.0	56.0	53.0	49.0	48.0	47.0
	Max	55.3	Average:	43.7	64.0	61.5	58.3	57.3	53.3	49.8	46.0	45.5	44.5
Night	Min	41.9	57.6	35.9	51.0	49.0	45.0	44.0	41.0	39.0	37.0	37.0	37.0
	Max	54.9	72.8	43.7	64.0	61.0	59.0	58.0	55.0	52.0	47.0	45.0	44.0
Energy Average:		49.3	Average:	43.7	56.7	54.3	51.0	49.4	45.2	42.6	39.7	39.0	38.4

Hourly Summary

Night	0	43.0	62.4	37.8	52.0	50.0	46.0	44.0	43.0	40.0	37.0	37.0	37.0
	1	43.5	63.5	37.8	54.0	50.0	45.0	44.0	42.0	41.0	39.0	38.0	37.0
	2	41.9	57.6	37.1	51.0	49.0	46.0	45.0	41.0	39.0	37.0	37.0	37.0
	3	43.1	62.2	35.9	54.0	52.0	48.0	46.0	41.0	39.0	37.0	37.0	37.0
	4	49.4	72.8	37.8	58.0	56.0	54.0	53.0	47.0	43.0	39.0	37.0	37.0
	5	53.1	71.9	40.3	64.0	61.0	58.0	56.0	51.0	47.0	43.0	42.0	41.0
	6	54.9	71.3	43.7	64.0	61.0	59.0	58.0	55.0	52.0	47.0	45.0	44.0
Day	7	56.4	70.1	40.7	65.0	63.0	60.0	60.0	57.0	54.0	47.0	46.0	43.0
	8	55.8	77.6	41.6	64.0	63.0	61.0	59.0	55.0	52.0	46.0	44.0	43.0
	9	55.2	77.9	40.6	62.0	60.0	58.0	57.0	54.0	51.0	44.0	43.0	41.0
	10	52.2	67.1	40.8	59.0	58.0	56.0	55.0	53.0	50.0	45.0	43.0	42.0
	11	51.9	66.2	40.7	60.0	58.0	56.0	55.0	52.0	50.0	44.0	43.0	41.0
	12	53.3	70.2	40.7	62.0	60.0	58.0	56.0	53.0	50.0	44.0	43.0	41.0
	13	51.8	70.9	39.6	61.0	59.0	56.0	54.0	51.0	49.0	44.0	42.0	40.0
Evening	14	57.8	79.4	40.4	70.0	65.0	61.0	59.0	54.0	51.0	45.0	44.0	41.0
	15	54.5	72.2	39.6	64.0	62.0	59.0	57.0	54.0	51.0	45.0	43.0	41.0
	16	57.6	78.4	39.7	68.0	66.0	62.0	60.0	55.0	52.0	46.0	44.0	41.0
	17	56.9	75.3	39.7	68.0	65.0	61.0	59.0	56.0	53.0	47.0	45.0	42.0
Night	18	58.0	82.2	46.3	67.0	64.0	61.0	60.0	56.0	53.0	49.0	48.0	47.0
	19	54.8	76.8	45.5	63.0	61.0	58.0	57.0	54.0	51.0	47.0	47.0	46.0
	20	54.4	70.5	44.2	63.0	62.0	59.0	58.0	54.0	50.0	46.0	46.0	45.0
	21	51.5	73.4	40.5	63.0	59.0	55.0	54.0	49.0	45.0	42.0	41.0	40.0
Night	22	46.7	63.1	38.8	57.0	55.0	52.0	50.0	44.0	41.0	39.0	39.0	39.0
	23	45.7	65.3	37.9	56.0	55.0	51.0	49.0	43.0	41.0	39.0	39.0	37.0

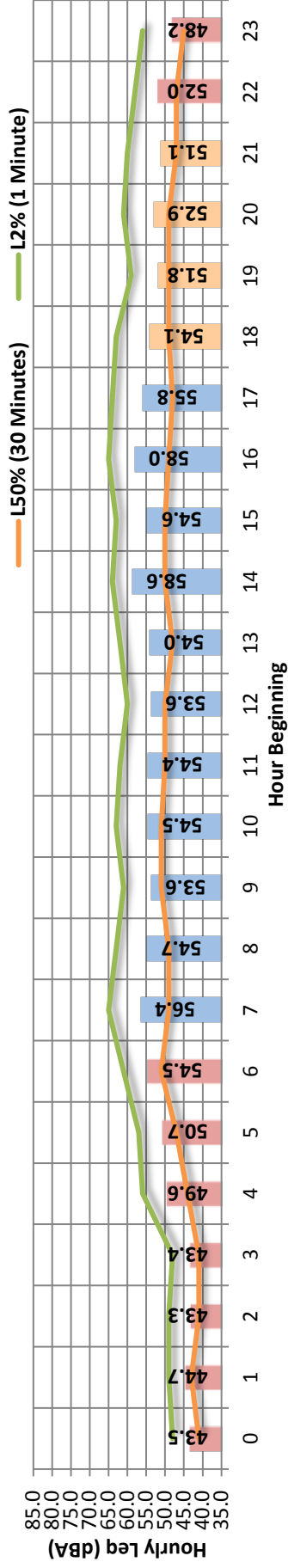
24-Hour Noise Level Measurement Summary

Project Name: CV Link
Location: L7 - Located on 34th Avenue near existing residential homes and the future alignment of CV Link.

JN: 9276
Analyst: A. Wolfe
Date: 3/23/2016

Energy Average Leq				24-Hour CNEL
Day	Evening	Night		
55.6	52.6	49.5		57.6

Hourly Leq dBA Readings (unadjusted)



Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	53.6	69.5	39.1	62.0	60.0	57.0	55.0	50.0	48.0	44.0	43.0	41.0
	Max	58.6	84.9	42.7	70.0	65.0	60.0	57.0	53.0	51.0	47.0	46.0	44.0
Evening	Min	51.1	69.1	40.8	61.0	59.0	54.0	52.0	49.0	47.0	44.0	43.0	42.0
	Max	54.1	73.3	41.9	65.0	63.0	59.0	57.0	51.0	49.0	46.0	45.0	43.0
Night	Min	52.6	62.2	37.4	62.8	60.8	56.0	54.3	50.5	48.5	45.0	44.0	42.3
	Max	43.3	76.2	43.3	50.0	48.0	46.0	45.0	43.0	41.0	38.0	38.0	38.0
Energy Average:		49.5	Average:	Average:	56.1	53.6	50.7	49.3	46.4	44.4	41.0	40.6	39.7

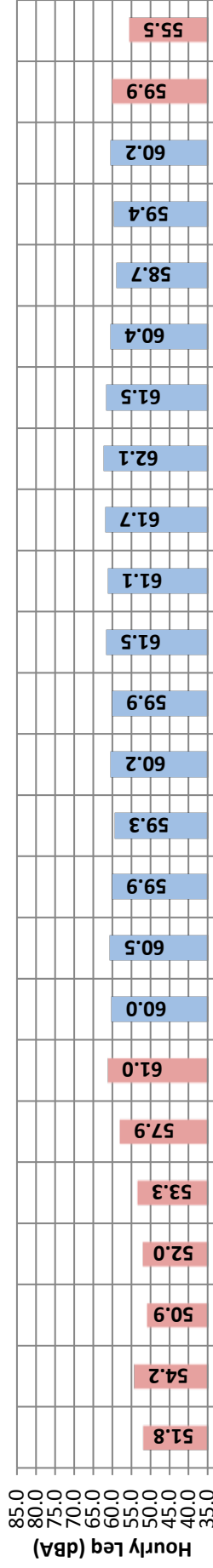
Hourly Summary

Night	0	43.5	62.9	38.0	50.0	48.0	47.0	46.0	43.0	41.0	39.0	39.0	38.0
	1	44.7	64.6	38.0	51.0	49.0	48.0	47.0	45.0	43.0	39.0	39.0	39.0
	2	43.3	62.2	37.9	50.0	49.0	47.0	46.0	43.0	41.0	38.0	38.0	38.0
	3	43.4	65.4	37.4	50.0	48.0	46.0	45.0	43.0	41.0	38.0	38.0	38.0
	4	49.6	71.8	38.0	61.0	56.0	51.0	50.0	46.0	44.0	41.0	41.0	39.0
	5	50.7	72.0	39.9	60.0	57.0	53.0	51.0	49.0	47.0	43.0	42.0	41.0
	6	54.5	76.2	43.3	64.0	61.0	58.0	56.0	53.0	51.0	47.0	46.0	45.0
Day	7	56.4	78.1	40.8	69.0	65.0	59.0	56.0	52.0	49.0	45.0	45.0	43.0
	8	54.7	75.1	41.7	66.0	63.0	59.0	56.0	52.0	49.0	46.0	45.0	43.0
	9	53.6	69.5	39.8	63.0	61.0	58.0	56.0	53.0	51.0	47.0	46.0	43.0
	10	54.5	70.3	42.7	65.0	63.0	59.0	57.0	53.0	51.0	47.0	46.0	44.0
	11	54.4	74.1	41.9	65.0	62.0	58.0	56.0	52.0	50.0	46.0	45.0	43.0
	12	53.6	77.5	41.9	62.0	60.0	57.0	55.0	51.0	50.0	47.0	46.0	44.0
	13	54.0	79.6	40.7	64.0	62.0	58.0	55.0	50.0	48.0	44.0	43.0	42.0
Evening	14	58.6	84.9	39.6	67.0	64.0	60.0	57.0	52.0	50.0	46.0	45.0	42.0
	15	54.6	76.5	40.4	64.0	63.0	59.0	56.0	52.0	50.0	46.0	45.0	42.0
	16	58.0	81.3	39.1	70.0	65.0	60.0	56.0	51.0	49.0	45.0	44.0	42.0
	17	55.8	76.5	39.7	68.0	64.0	60.0	56.0	51.0	48.0	44.0	43.0	41.0
Night	18	54.1	73.3	40.9	65.0	63.0	59.0	57.0	51.0	49.0	45.0	44.0	42.0
	19	51.8	72.5	40.8	61.0	59.0	55.0	54.0	51.0	49.0	45.0	44.0	42.0
	20	52.9	71.4	41.9	62.0	61.0	56.0	54.0	51.0	49.0	45.0	45.0	43.0
	21	51.1	69.1	41.0	63.0	60.0	54.0	52.0	49.0	47.0	44.0	43.0	42.0
Night	22	52.0	74.0	39.7	62.0	58.0	54.0	52.0	49.0	47.0	43.0	42.0	40.0
	23	48.2	66.5	38.2	57.0	56.0	52.0	51.0	47.0	45.0	41.0	40.0	39.0

24-Hour Noise Level Measurement Summary

<i>Project Name:</i> 9276	<i>JN:</i> 9276		<i>24-Hour</i>	
	<i>Analyst:</i> A. Wolfe		<i>Energy Average Leq</i>	
			<i>Day</i>	<i>Night</i>
	<i>Date:</i> 3/23/2016		60.5	56.6
<i>Location:</i>	L8 - Located on Cathedral Canyon Drive near existing residential homes in a commercial parking lot.		CNEL	
			64.3	

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	58.7	73.7	43.0	66.0	65.0	63.0	62.0	59.0	55.0	49.0	47.0	46.0
	Max	62.1	84.1	47.2	70.0	68.0	66.0	65.0	62.0	60.0	53.0	52.0	49.0
	Energy Average:	60.5	Average:	Average:	69.1	67.1	64.4	63.3	60.2	57.1	50.5	49.1	46.9
Night	Min	50.9	69.1	41.1	62.0	60.0	56.0	53.0	47.0	44.0	42.0	42.0	41.0
	Max	61.0	89.4	46.8	69.0	67.0	65.0	64.0	61.0	58.0	51.0	50.0	48.0
	Energy Average:	56.6	Average:	Average:	65.2	63.0	59.9	58.2	52.7	48.6	44.6	43.9	43.2

Hourly Summary

Night	0	51.8	69.1	41.1	63.0	61.0	58.0	55.0	49.0	45.0	42.0	42.0	41.0
	1	54.2	73.8	42.5	65.0	63.0	59.0	58.0	50.0	46.0	43.0	43.0	43.0
	2	50.9	72.2	41.1	62.0	60.0	56.0	53.0	47.0	44.0	42.0	42.0	42.0
	3	52.0	69.9	41.8	64.0	61.0	57.0	55.0	48.0	44.0	43.0	43.0	42.0
	4	53.3	70.5	42.3	63.0	61.0	59.0	57.0	52.0	47.0	44.0	43.0	43.0
	5	57.9	73.4	43.1	67.0	65.0	63.0	62.0	58.0	54.0	47.0	45.0	44.0
	6	61.0	77.3	46.8	69.0	67.0	65.0	64.0	61.0	58.0	51.0	50.0	48.0
Day	7	60.0	76.6	44.3	68.0	67.0	64.0	63.0	60.0	57.0	51.0	49.0	47.0
	8	60.5	80.1	44.8	70.0	68.0	65.0	63.0	60.0	57.0	50.0	48.0	46.0
	9	59.9	83.1	43.0	69.0	66.0	63.0	62.0	59.0	56.0	50.0	49.0	47.0
	10	59.3	76.9	43.3	68.0	66.0	63.0	63.0	59.0	56.0	50.0	49.0	46.0
	11	60.2	76.3	44.1	70.0	67.0	64.0	63.0	60.0	57.0	50.0	49.0	47.0
	12	59.9	77.8	43.5	69.0	67.0	64.0	63.0	60.0	57.0	50.0	49.0	46.0
	13	61.5	84.1	44.1	70.0	68.0	65.0	64.0	61.0	57.0	50.0	48.0	46.0
	14	61.1	81.0	44.0	70.0	67.0	65.0	64.0	61.0	58.0	51.0	50.0	47.0
	15	61.7	75.9	47.2	69.0	68.0	66.0	65.0	62.0	59.0	53.0	52.0	49.0
	16	62.1	80.2	45.9	70.0	68.0	66.0	65.0	62.0	60.0	53.0	51.0	47.0
	17	61.5	83.3	44.1	70.0	68.0	65.0	64.0	61.0	58.0	51.0	49.0	46.0
	18	60.4	81.8	45.2	69.0	67.0	64.0	63.0	60.0	57.0	49.0	47.0	46.0
	19	58.7	73.7	45.5	66.0	65.0	63.0	62.0	59.0	55.0	50.0	49.0	48.0
	20	59.4	78.0	47.0	68.0	67.0	64.0	63.0	59.0	56.0	50.0	49.0	48.0
	21	60.2	79.7	46.4	70.0	67.0	65.0	63.0	60.0	56.0	44.0	49.0	48.0
Night	22	59.9	89.4	42.4	69.0	65.0	61.0	60.0	54.0	49.0	44.0	43.0	43.0
	23	55.5	74.1	42.4	65.0	64.0	61.0	60.0	55.0	50.0	45.0	44.0	43.0

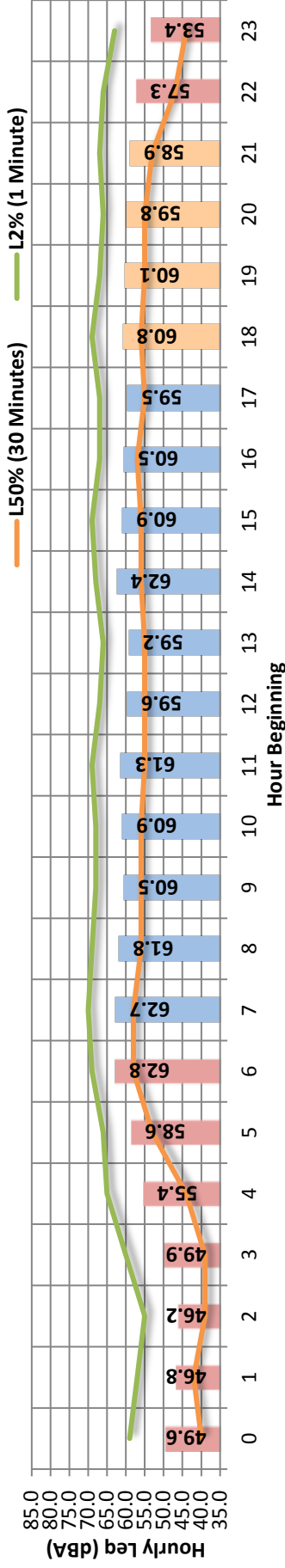
24-Hour Noise Level Measurement Summary

Project Name: CV Link
Location: L9 - Located adjacent to the alignment on Frank Sinatra Drive near existing residential homes and a bike path.

JN: 9276
Analyst: A. Wolfe
Date: 3/23/2016

Energy Average Leq				24-Hour CNEL
Day	Evening	Night		
61.0	60.0	56.5		64.2

Hourly Leq dBA Readings (unadjusted)



Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	59.2	76.1	37.6	68.0	66.0	64.0	63.0	59.0	55.0	45.0	42.0	40.0
	Max	62.7	90.7	43.0	73.0	70.0	67.0	66.0	62.0	58.0	51.0	49.0	46.0
Evening	Min	58.9	78.9	39.3	68.0	66.0	64.0	63.0	58.0	53.0	46.0	45.0	42.0
	Max	60.8	81.0	42.8	70.0	69.0	66.0	65.0	60.0	56.0	47.0	46.0	44.0
Night	Min	46.2	66.3	34.6	59.0	55.0	48.0	44.0	40.0	39.0	37.0	37.0	35.0
	Max	62.8	85.3	43.3	71.0	69.0	67.0	66.0	62.0	58.0	51.0	50.0	47.0
Energy Average:		56.5	Average:	Average:	64.7	62.2	58.0	55.2	48.6	45.1	41.0	40.2	39.2

Hourly Summary

Night	0	49.6	71.3	37.4	62.0	59.0	55.0	51.0	43.0	40.0	37.0	37.0	37.0
	1	46.8	66.3	39.0	59.0	57.0	50.0	47.0	43.0	42.0	40.0	39.0	39.0
	2	46.2	67.1	37.4	59.0	55.0	48.0	44.0	40.0	39.0	37.0	37.0	37.0
	3	49.9	72.3	34.6	62.0	60.0	56.0	52.0	41.0	39.0	37.0	37.0	35.0
	4	55.4	77.8	37.4	67.0	65.0	61.0	58.0	50.0	44.0	39.0	37.0	37.0
	5	58.6	74.8	41.5	67.0	66.0	64.0	63.0	58.0	53.0	45.0	44.0	43.0
	6	62.8	85.3	43.3	71.0	69.0	67.0	66.0	62.0	58.0	51.0	50.0	47.0
Day	7	62.7	82.2	42.2	73.0	70.0	67.0	66.0	62.0	58.0	51.0	49.0	46.0
	8	61.8	86.1	43.0	71.0	69.0	66.0	65.0	61.0	56.0	48.0	46.0	44.0
	9	60.5	80.9	39.3	70.0	68.0	65.0	64.0	60.0	56.0	46.0	44.0	41.0
	10	60.9	83.6	40.5	70.0	68.0	65.0	64.0	60.0	56.0	47.0	46.0	42.0
	11	61.3	82.8	39.3	72.0	69.0	65.0	64.0	59.0	55.0	46.0	44.0	41.0
	12	59.6	78.2	37.6	69.0	67.0	65.0	63.0	59.0	55.0	45.0	43.0	40.0
	13	59.2	81.1	38.6	68.0	66.0	64.0	63.0	59.0	55.0	45.0	42.0	40.0
Evening	14	62.4	90.7	39.3	70.0	68.0	65.0	64.0	60.0	56.0	48.0	45.0	42.0
	15	60.9	78.5	39.2	70.0	69.0	66.0	65.0	60.0	56.0	48.0	45.0	41.0
	16	60.5	76.1	39.3	68.0	67.0	65.0	64.0	61.0	57.0	50.0	48.0	43.0
	17	59.5	76.8	37.6	68.0	67.0	65.0	63.0	59.0	55.0	46.0	44.0	40.0
Night	18	60.8	78.9	39.3	70.0	69.0	66.0	65.0	60.0	56.0	47.0	45.0	42.0
	19	60.1	81.0	42.8	69.0	67.0	65.0	64.0	60.0	55.0	47.0	46.0	44.0
	20	59.8	80.7	41.4	68.0	66.0	64.0	63.0	59.0	55.0	46.0	45.0	43.0
	21	58.9	81.0	41.4	69.0	67.0	65.0	63.0	58.0	53.0	46.0	45.0	43.0
Night	22	57.3	76.5	40.4	69.0	66.0	62.0	60.0	53.0	47.0	43.0	42.0	41.0
	23	53.4	73.8	37.5	66.0	63.0	59.0	56.0	47.0	44.0	40.0	39.0	37.0

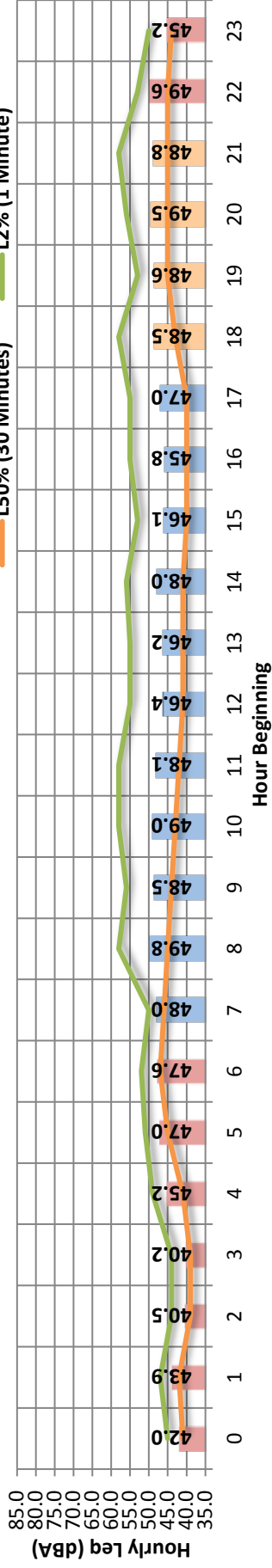
24-Hour Noise Level Measurement Summary

Project Name: CV Link
Location: L10 - Located on Peterson Avenue south of the future alignment of CV Link near existing residential homes.

JN: 9276
Analyst: A. Wolfe
Date: 3/23/2016

Energy Average Leq			24-Hour CNEL
Day	Evening	Night	
47.7	48.9	45.6	53.0

Hourly Leq dBA Readings (unadjusted)



Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	45.8	63.7	37.4	54.0	50.0	48.0	46.0	41.0	40.0	37.0	37.0	37.0
	Max	49.8	73.5	43.9	61.0	58.0	55.0	53.0	47.0	46.0	45.0	44.0	44.0
	Energy Average:	47.7		Average:	58.5	55.4	51.2	48.5	43.5	42.1	41.0	40.5	40.2
Evening	Min	48.5	65.1	39.1	58.0	53.0	50.0	49.0	45.0	43.0	40.0	40.0	39.0
	Max	49.5	71.6	40.4	61.0	58.0	54.0	50.0	47.0	45.0	43.0	43.0	41.0
	Energy Average:	48.9		Average:	60.0	56.3	51.8	49.5	46.5	44.5	42.0	41.8	40.3
Night	Min	40.2	51.0	37.4	45.0	44.0	42.0	42.0	40.0	39.0	37.0	37.0	37.0
	Max	49.6	71.0	43.7	59.0	53.0	50.0	49.0	47.0	47.0	45.0	45.0	44.0
	Energy Average:	45.6		Average:	50.3	48.3	46.6	45.9	43.9	42.6	40.6	39.9	39.4

Hourly Summary

Night	0	42.0	54.4	38.5	46.0	45.0	45.0	44.0	42.0	41.0	39.0	39.0	39.0
	1	43.9	62.1	39.8	48.0	47.0	46.0	45.0	44.0	42.0	40.0	40.0	40.0
	2	40.5	54.2	37.4	45.0	44.0	42.0	42.0	40.0	39.0	37.0	37.0	37.0
	3	40.2	51.0	37.4	45.0	44.0	42.0	42.0	40.0	39.0	37.0	37.0	37.0
	4	45.2	71.0	37.4	52.0	49.0	46.0	45.0	43.0	41.0	39.0	37.0	37.0
	5	47.0	64.6	41.3	53.0	51.0	49.0	49.0	47.0	45.0	43.0	41.0	41.0
	6	47.6	59.2	43.7	53.0	52.0	50.0	49.0	47.0	47.0	45.0	45.0	44.0
Day	7	48.0	67.3	43.9	54.0	50.0	49.0	48.0	47.0	46.0	45.0	44.0	44.0
	8	49.8	71.8	43.3	61.0	58.0	53.0	50.0	46.0	45.0	44.0	43.0	43.0
	9	48.5	67.6	42.8	59.0	56.0	52.0	49.0	45.0	44.0	43.0	42.0	42.0
	10	49.0	65.7	41.4	60.0	58.0	55.0	53.0	44.0	43.0	42.0	42.0	42.0
	11	48.1	66.5	40.9	61.0	58.0	53.0	49.0	43.0	42.0	41.0	41.0	41.0
	12	46.4	63.7	40.4	58.0	55.0	51.0	48.0	42.0	41.0	40.0	40.0	40.0
	13	46.2	65.5	39.9	57.0	55.0	51.0	48.0	42.0	41.0	40.0	40.0	40.0
Evening	14	48.0	70.3	39.1	60.0	56.0	51.0	49.0	44.0	41.0	39.0	39.0	39.0
	15	46.1	72.9	37.4	56.0	53.0	48.0	46.0	42.0	40.0	39.0	37.0	37.0
	16	45.8	64.8	37.4	59.0	55.0	50.0	46.0	41.0	40.0	39.0	38.0	37.0
	17	47.0	73.5	37.4	58.0	55.0	50.0	47.0	43.0	40.0	37.0	37.0	37.0
	18	48.5	65.1	39.1	60.0	58.0	54.0	50.0	45.0	43.0	40.0	40.0	39.0
	19	48.6	71.6	39.4	58.0	53.0	50.0	50.0	47.0	45.0	42.0	42.0	40.0
	20	49.5	70.9	40.3	61.0	56.0	52.0	49.0	47.0	45.0	43.0	42.0	41.0
Night	21	48.8	65.1	40.4	61.0	58.0	51.0	49.0	47.0	45.0	43.0	43.0	41.0
	22	49.6	70.4	40.4	59.0	53.0	50.0	49.0	47.0	45.0	42.0	42.0	41.0
	23	45.2	56.4	37.4	52.0	50.0	48.0	48.0	45.0	44.0	41.0	40.0	39.0

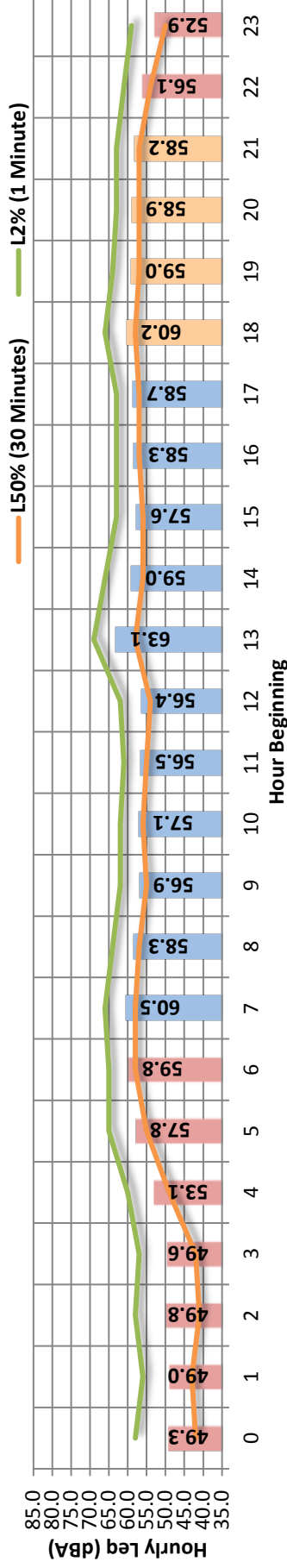
24-Hour Noise Level Measurement Summary

Project Name: CV Link
 Location: L11 - Located in the parking lot of the Rancho Mirage Library near existing residential homes.

JN: 9276
 Analyst: A. Wolfe
 Date: 3/23/2016

Energy Average Leq				24-Hour CNEL
Day	Evening	Night		
58.9	59.1	54.8		
				62.6

Hourly Leq dBA Readings (unadjusted)



Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	56.4	68.2	39.8	61.0	61.0	59.0	57.0	57.0	54.0	49.0	47.0	44.0
	Max	63.1	86.9	44.1	72.0	69.0	64.0	63.0	61.0	58.0	52.0	50.0	47.0
	Energy Average:	58.9	Average:	Average:	65.4	63.7	61.5	60.6	58.5	56.3	50.8	48.8	45.2
Evening	Min	58.2	70.0	43.5	65.0	63.0	62.0	61.0	59.0	57.0	50.0	48.0	45.0
	Max	60.2	78.0	44.1	69.0	66.0	63.0	62.0	60.0	58.0	52.0	50.0	47.0
	Energy Average:	59.1	Average:	Average:	66.3	64.0	62.3	61.3	59.3	57.3	51.0	49.0	46.3
Night	Min	49.0	63.2	38.0	58.0	56.0	54.0	53.0	46.0	41.0	39.0	38.0	38.0
	Max	59.8	73.7	43.3	67.0	65.0	64.0	63.0	61.0	58.0	50.0	48.0	45.0
	Energy Average:	54.8	Average:	Average:	61.6	59.9	57.8	56.8	52.8	48.2	42.6	41.6	40.1

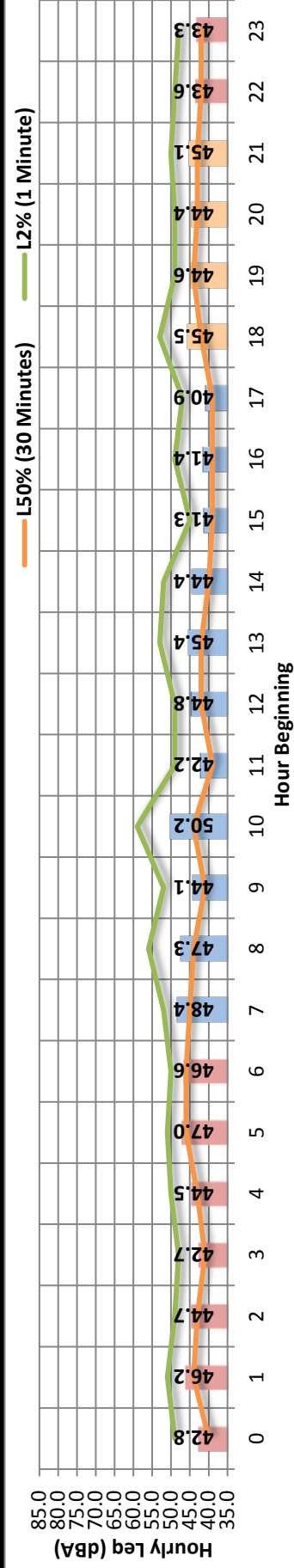
Hourly Summary

Night	0	49.3	63.2	38.1	59.0	58.0	55.0	54.0	49.0	42.0	39.0	39.0	38.0
	1	49.0	65.9	39.8	58.0	56.0	54.0	53.0	48.0	43.0	41.0	41.0	39.0
	2	49.8	68.8	39.7	61.0	58.0	55.0	53.0	46.0	41.0	39.0	39.0	39.0
	3	49.6	67.2	38.0	59.0	57.0	55.0	54.0	49.0	42.0	39.0	38.0	38.0
	4	53.1	64.5	39.2	61.0	60.0	58.0	57.0	54.0	49.0	40.0	39.0	39.0
	5	57.8	73.7	41.4	67.0	65.0	62.0	61.0	58.0	55.0	45.0	43.0	42.0
	6	59.8	69.1	43.3	66.0	65.0	64.0	63.0	61.0	58.0	50.0	48.0	45.0
Day	7	60.5	80.9	43.2	67.0	66.0	64.0	63.0	61.0	58.0	51.0	49.0	46.0
	8	58.3	71.5	42.8	65.0	64.0	62.0	61.0	59.0	57.0	50.0	48.0	45.0
	9	56.9	70.3	43.3	64.0	62.0	61.0	60.0	57.0	55.0	50.0	48.0	45.0
	10	57.1	70.5	43.0	63.0	62.0	60.0	60.0	58.0	56.0	50.0	48.0	44.0
	11	56.5	68.2	42.8	61.0	61.0	59.0	59.0	57.0	55.0	52.0	50.0	47.0
	12	56.4	70.3	42.0	63.0	62.0	60.0	60.0	57.0	54.0	49.0	47.0	44.0
	13	63.1	86.9	44.1	72.0	69.0	64.0	63.0	61.0	58.0	52.0	50.0	47.0
Evening	14	59.0	76.9	41.8	69.0	66.0	62.0	61.0	58.0	56.0	51.0	49.0	46.0
	15	57.6	74.3	42.0	65.0	63.0	61.0	60.0	58.0	56.0	51.0	49.0	45.0
	16	58.3	78.2	39.8	65.0	63.0	61.0	60.0	58.0	57.0	52.0	50.0	44.0
	17	58.7	74.2	39.8	65.0	63.0	62.0	61.0	59.0	57.0	51.0	49.0	44.0
Night	18	60.2	77.4	44.0	69.0	66.0	63.0	62.0	60.0	58.0	52.0	50.0	47.0
	19	59.0	76.4	43.5	66.0	64.0	62.0	61.0	59.0	57.0	50.0	48.0	45.0
	20	58.9	78.0	44.0	65.0	63.0	62.0	61.0	59.0	57.0	50.0	48.0	46.0
	21	58.2	70.0	44.1	65.0	63.0	62.0	61.0	59.0	57.0	50.0	48.0	46.0
Night	22	56.1	71.8	39.7	63.0	61.0	60.0	59.0	56.0	54.0	47.0	45.0	41.0
	23	52.9	63.8	39.8	60.0	59.0	57.0	57.0	54.0	50.0	43.0	42.0	40.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link Location: L12 - Located adjacent to the future alignment in the Rancho Mirage Community Park.	JN: 9276		24-Hour	
	Analyst: A. Wolfe		CNEL	
	Date: 3/23/2016		Energy Average Leq	
			Day	Night
	45.6	44.9	44.9	51.6

Hourly Leq dBA Readings (unadjusted)



Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	40.9	53.7	34.5	46.0	45.0	44.0	43.0	40.0	39.0	37.0	37.0	36.0
	Max	50.2	69.3	40.9	59.0	59.0	57.0	54.0	49.0	45.0	43.0	42.0	41.0
Evening	Min	44.4	54.5	37.5	52.8	51.2	48.6	46.9	43.5	41.3	38.5	38.2	37.7
	Max	45.5	64.2	39.2	55.0	53.0	49.0	47.0	45.0	44.0	40.0	40.0	39.0
Night	Min	44.9	51.1	37.1	51.8	50.3	47.5	46.3	44.0	43.0	40.8	40.3	39.3
	Max	42.7	60.6	41.1	48.0	48.0	46.0	45.0	43.0	40.0	37.0	37.0	37.0
Energy Average:		44.9	Average:	Average:	50.3	51.0	50.0	49.0	47.0	46.0	44.0	43.0	42.0
		44.9	Average:	Average:	50.3	49.4	48.0	47.0	44.8	43.0	40.4	39.4	38.9

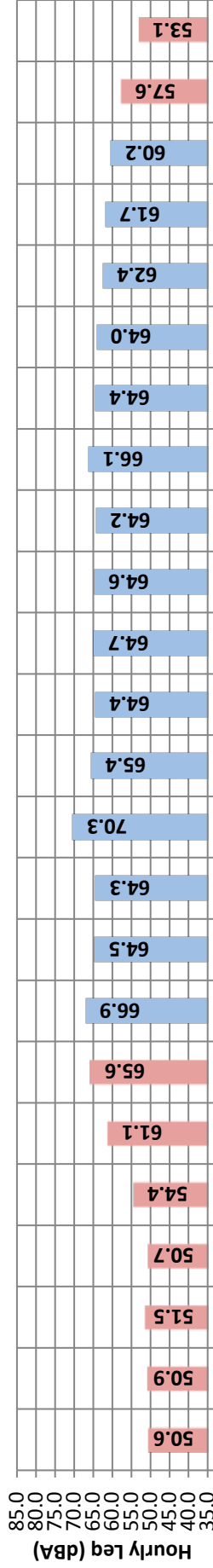
Hourly Summary

Night	0	42.8	52.4	37.1	50.0	49.0	47.0	46.0	43.0	40.0	37.0	37.0	37.0
	1	46.2	55.9	37.5	52.0	51.0	50.0	49.0	47.0	44.0	41.0	40.0	39.0
	2	44.7	53.7	38.9	50.0	49.0	48.0	47.0	45.0	43.0	41.0	40.0	39.0
	3	42.7	51.1	37.3	48.0	48.0	46.0	45.0	43.0	41.0	39.0	37.0	37.0
	4	44.5	53.3	37.4	51.0	50.0	49.0	48.0	45.0	43.0	39.0	37.0	37.0
	5	47.0	54.4	40.3	52.0	51.0	50.0	49.0	47.0	46.0	43.0	41.0	42.0
Day	6	46.6	56.9	41.1	51.0	50.0	49.0	48.0	47.0	46.0	44.0	43.0	42.0
	7	48.4	69.3	40.9	55.0	52.0	50.0	49.0	47.0	45.0	43.0	42.0	41.0
	8	47.3	65.9	38.9	57.0	56.0	53.0	49.0	45.0	44.0	41.0	40.0	40.0
	9	44.1	59.5	37.2	53.0	52.0	48.0	47.0	43.0	41.0	38.0	37.0	37.0
	10	50.2	67.1	37.5	59.0	59.0	57.0	54.0	49.0	44.0	39.0	37.0	37.0
	11	42.2	56.0	37.5	51.0	49.0	47.0	45.0	41.0	39.0	37.0	37.0	37.0
Evening	12	44.8	65.8	38.7	50.0	49.0	47.0	46.0	44.0	42.0	39.0	39.0	39.0
	13	45.4	60.1	37.5	55.0	53.0	51.0	49.0	44.0	42.0	39.0	37.0	37.0
	14	44.4	64.5	37.5	55.0	52.0	48.0	46.0	42.0	40.0	37.0	37.0	37.0
	15	41.3	53.7	37.1	46.0	45.0	44.0	44.0	43.0	39.0	37.0	37.0	37.0
	16	41.4	58.1	34.5	51.0	49.0	46.0	44.0	40.0	39.0	37.0	37.0	37.0
	17	40.9	56.6	34.5	49.0	47.0	44.0	43.0	40.0	39.0	37.0	37.0	36.0
Night	18	45.5	64.2	39.2	55.0	53.0	49.0	47.0	43.0	42.0	40.0	40.0	39.0
	19	44.6	54.5	39.1	50.0	49.0	47.0	46.0	45.0	44.0	41.0	41.0	40.0
	20	44.4	58.2	39.0	51.0	50.0	47.0	46.0	44.0	43.0	41.0	40.0	39.0
Night	21	45.1	63.8	37.5	51.0	50.0	47.0	46.0	44.0	43.0	41.0	40.0	39.0
	22	43.6	60.6	37.8	50.0	49.0	47.0	46.0	43.0	42.0	40.0	39.0	39.0
	23	43.3	53.4	37.5	49.0	48.0	46.0	45.0	43.0	42.0	40.0	39.0	39.0

24-Hour Noise Level Measurement Summary

<i>Project Name:</i> 9276	JN: 9276		Energy Average Leq	24-Hour
	Analyst: A. Wolfe			
	Date: 3/23/2016		Day	58.6
	L13 - Located on the south side of Park View Drive near existing residential homes, a church, and the College of the Desert.			

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	60.2	77.4	37.5	72.0	71.0	67.0	64.0	54.0	47.0	42.0	41.0	40.0
	Max	70.3	100.2	44.6	76.0	74.0	72.0	71.0	66.0	60.0	48.0	47.0	46.0
	Energy Average:	65.2	Average:	Average:	73.7	72.4	70.3	68.7	62.7	55.7	44.5	43.1	41.5
Night	Min	50.6	72.9	36.4	60.0	54.0	49.0	48.0	44.0	41.0	39.0	39.0	37.0
	Max	65.6	86.3	44.8	75.0	74.0	72.0	70.0	65.0	56.0	47.0	46.0	45.0
	Energy Average:	58.6	Average:	Average:	66.6	63.0	57.3	55.2	49.4	45.8	41.7	41.1	40.4

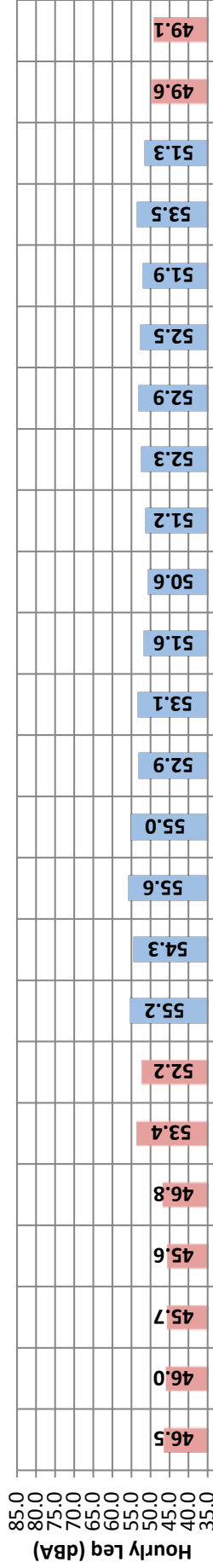
Hourly Summary

Night	0	50.6	72.9	36.9	63.0	60.0	52.0	50.0	45.0	41.0	39.0	39.0	39.0
	1	50.9	78.5	40.8	60.0	55.0	50.0	50.0	47.0	46.0	42.0	41.0	41.0
	2	51.5	74.2	41.0	63.0	57.0	52.0	51.0	48.0	45.0	42.0	42.0	41.0
	3	50.7	75.8	36.4	60.0	54.0	49.0	48.0	45.0	43.0	39.0	39.0	37.0
	4	54.4	75.6	39.3	67.0	64.0	57.0	54.0	49.0	45.0	41.0	39.0	39.0
	5	61.1	86.2	42.3	73.0	71.0	66.0	64.0	54.0	50.0	44.0	44.0	43.0
	6	65.6	86.3	44.8	75.0	74.0	72.0	70.0	65.0	56.0	47.0	46.0	45.0
Day	7	66.9	92.9	44.6	75.0	74.0	72.0	71.0	66.0	60.0	48.0	47.0	46.0
	8	64.5	82.8	43.2	74.0	73.0	71.0	69.0	64.0	57.0	47.0	45.0	44.0
	9	64.3	84.9	40.9	74.0	73.0	70.0	69.0	63.0	55.0	45.0	44.0	42.0
	10	70.3	100.2	39.4	76.0	73.0	71.0	70.0	64.0	56.0	46.0	44.0	41.0
	11	65.4	86.2	39.3	74.0	73.0	71.0	70.0	64.0	58.0	45.0	43.0	41.0
	12	64.4	82.8	39.3	73.0	72.0	71.0	69.0	64.0	57.0	43.0	42.0	40.0
	13	64.7	85.1	39.4	74.0	72.0	71.0	69.0	64.0	58.0	44.0	43.0	41.0
	14	64.6	82.8	37.5	74.0	72.0	71.0	69.0	64.0	58.0	44.0	42.0	40.0
	15	64.2	79.0	39.3	73.0	72.0	70.0	69.0	64.0	57.0	42.0	41.0	40.0
	16	66.1	91.9	40.7	74.0	73.0	71.0	70.0	65.0	60.0	43.0	43.0	42.0
	17	64.4	81.0	39.1	74.0	73.0	71.0	70.0	64.0	56.0	43.0	42.0	40.0
	18	64.0	80.2	40.8	74.0	73.0	71.0	69.0	63.0	55.0	44.0	43.0	41.0
	19	62.4	85.9	41.1	72.0	71.0	68.0	67.0	60.0	51.0	44.0	43.0	42.0
	20	61.7	80.1	41.1	73.0	71.0	69.0	66.0	58.0	50.0	44.0	43.0	42.0
	21	60.2	77.4	40.7	72.0	71.0	67.0	64.0	54.0	47.0	43.0	42.0	41.0
	22	57.6	77.8	39.3	71.0	68.0	63.0	59.0	48.0	44.0	41.0	39.0	39.0
	23	53.1	75.3	38.2	67.0	64.0	55.0	51.0	44.0	42.0	39.0	39.0	39.0

24-Hour Noise Level Measurement Summary

Project Name: 9276	JN: 9276		24-Hour CNEL
	Analyst: A. Wolfe		
	Date: 3/23/2016		
Location: L14 - Located east of the alignment on San Pablo Avenue near the existing Palm Desert Civic Center Park.	Energy Average Leq		56.9
	Day	Night	
	53.2	49.3	

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	50.6	62.3	42.0	58.0	57.0	55.0	53.0	50.0	48.0	44.0	43.0	42.0
	Max	55.6	80.7	47.5	64.0	61.0	59.0	58.0	55.0	53.0	48.0	48.0	48.0
	Energy Average:	53.2	Average:		60.8	58.7	56.3	54.9	51.9	49.6	46.2	45.7	44.9
Night	Min	45.6	51.3	44.1	47.0	46.0	46.0	46.0	45.0	45.0	45.0	44.0	44.0
	Max	53.4	76.8	46.5	64.0	60.0	56.0	55.0	52.0	50.0	48.0	47.0	47.0
	Energy Average:	49.3	Average:		54.4	52.1	49.9	48.9	47.3	46.1	45.6	45.2	44.6

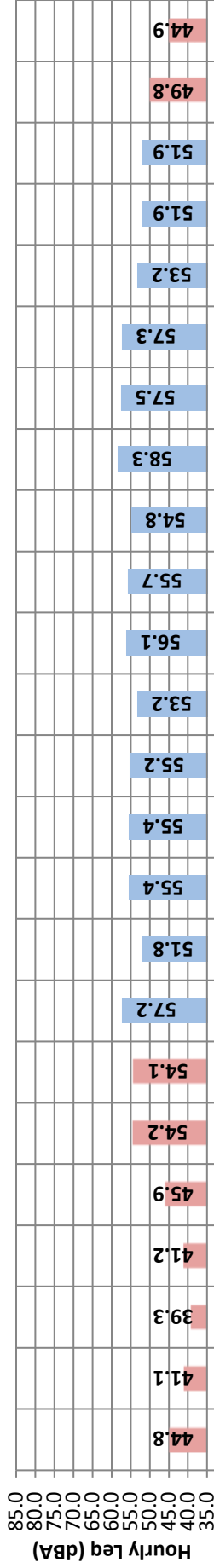
Hourly Summary

Night	0	46.5	63.9	44.1	52.0	49.0	47.0	46.0	46.0	45.0	45.0	44.0	44.0
	1	46.0	58.3	44.5	51.0	49.0	47.0	46.0	46.0	45.0	45.0	45.0	44.0
	2	45.7	51.3	44.6	47.0	46.0	46.0	46.0	45.0	45.0	45.0	45.0	44.0
	3	45.6	56.4	44.2	49.0	47.0	46.0	46.0	45.0	45.0	45.0	44.0	44.0
	4	46.8	62.4	44.7	53.0	51.0	48.0	47.0	46.0	45.0	45.0	45.0	44.0
	5	53.4	76.8	44.9	64.0	60.0	55.0	54.0	50.0	47.0	46.0	46.0	45.0
	6	52.2	67.6	46.5	59.0	58.0	56.0	55.0	52.0	50.0	48.0	47.0	47.0
Day	7	55.2	80.0	46.8	64.0	61.0	58.0	56.0	53.0	51.0	48.0	48.0	47.0
	8	54.3	80.6	44.5	60.0	59.0	56.0	55.0	53.0	51.0	47.0	47.0	45.0
	9	55.6	79.4	44.3	62.0	60.0	59.0	58.0	55.0	53.0	48.0	47.0	45.0
	10	55.0	80.7	42.4	62.0	60.0	56.0	46.0	51.0	48.0	45.0	44.0	43.0
	11	52.9	78.8	43.4	62.0	59.0	57.0	56.0	52.0	49.0	45.0	45.0	44.0
	12	53.1	70.7	42.5	63.0	61.0	57.0	55.0	53.0	50.0	45.0	44.0	43.0
	13	51.6	70.6	42.0	60.0	58.0	56.0	55.0	51.0	49.0	44.0	44.0	43.0
	14	50.6	62.3	42.0	58.0	57.0	55.0	54.0	51.0	48.0	44.0	44.0	42.0
	15	51.2	70.9	42.4	59.0	57.0	55.0	54.0	51.0	48.0	44.0	43.0	43.0
	16	52.3	67.8	44.1	60.0	58.0	56.0	55.0	53.0	50.0	46.0	45.0	45.0
	17	52.9	70.5	44.1	61.0	60.0	57.0	56.0	52.0	50.0	47.0	46.0	45.0
	18	52.5	70.5	46.9	60.0	58.0	56.0	54.0	52.0	50.0	48.0	48.0	47.0
	19	51.9	69.7	47.5	59.0	57.0	55.0	53.0	51.0	50.0	48.0	48.0	48.0
	20	53.5	75.1	46.4	63.0	59.0	56.0	55.0	51.0	49.0	47.0	47.0	47.0
	21	51.3	71.1	45.9	59.0	57.0	55.0	54.0	50.0	48.0	46.0	46.0	45.0
Night	22	49.6	66.3	45.3	57.0	55.0	53.0	51.0	49.0	47.0	46.0	45.0	44.0
	23	49.1	72.6	44.2	58.0	54.0	51.0	49.0	47.0	46.0	45.0	45.0	44.0

24-Hour Noise Level Measurement Summary

<i>Project Name:</i> 9276	JN: 9276		24-Hour CNEL
	Analyst: A. Wolfe		
	Date: 3/30/2016		
<i>Location:</i> L15 - Located south of Magnesia Falls Drive at the Palm Desert Charter Middle School south of the CV Link alignment.	Energy Average Leq		57.6
	Day	Night	
	55.5	49.2	

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	51.8	72.8	37.6	62.0	59.0	54.0	52.0	46.0	42.0	39.0	39.0	37.0
	Max	58.3	86.6	46.9	67.0	65.0	62.0	59.0	56.0	53.0	49.0	48.0	47.0
	Energy Average:	55.5	Average:		65.3	62.7	58.5	56.4	50.8	46.7	41.8	41.1	40.2
Night	Min	39.3	49.3	37.5	43.0	41.0	40.0	40.0	39.0	39.0	37.0	37.0	37.0
	Max	54.2	81.3	42.7	63.0	60.0	56.0	54.0	50.0	48.0	46.0	45.0	43.0
	Energy Average:	49.2	Average:		54.2	50.8	46.9	45.6	42.3	40.8	38.8	38.2	37.9

Hourly Summary

Night	0	44.8	69.1	37.5	55.0	50.0	45.0	44.0	41.0	39.0	38.0	37.0	37.0
	1	41.1	61.9	37.5	49.0	46.0	42.0	42.0	40.0	39.0	37.0	37.0	37.0
	2	39.3	49.3	37.5	43.0	41.0	40.0	40.0	39.0	39.0	37.0	37.0	37.0
	3	41.2	62.1	37.5	48.0	45.0	42.0	41.0	39.0	39.0	37.0	37.0	37.0
	4	45.9	72.9	37.5	52.0	48.0	45.0	44.0	42.0	40.0	37.0	37.0	37.0
	5	54.2	81.3	39.3	63.0	58.0	53.0	51.0	46.0	44.0	40.0	40.0	39.0
	6	54.1	76.9	42.7	62.0	60.0	56.0	54.0	50.0	48.0	46.0	45.0	43.0
Day	7	57.2	75.7	46.9	67.0	65.0	61.0	59.0	56.0	53.0	49.0	48.0	47.0
	8	51.8	74.3	41.4	62.0	60.0	56.0	54.0	50.0	47.0	43.0	42.0	42.0
	9	55.4	77.0	38.3	67.0	63.0	59.0	57.0	51.0	47.0	42.0	41.0	39.0
	10	55.4	77.3	38.4	66.0	65.0	61.0	59.0	52.0	47.0	40.0	40.0	39.0
	11	55.2	78.1	37.6	65.0	64.0	62.0	59.0	51.0	46.0	39.0	39.0	37.0
	12	53.2	78.0	37.6	63.0	61.0	57.0	56.0	50.0	45.0	40.0	39.0	39.0
	13	56.1	79.1	39.1	66.0	64.0	61.0	59.0	53.0	47.0	40.0	40.0	39.0
	14	55.7	82.4	38.3	65.0	62.0	57.0	55.0	49.0	45.0	40.0	39.0	39.0
	15	54.8	72.8	39.3	66.0	65.0	61.0	58.0	51.0	47.0	42.0	42.0	40.0
	16	58.3	86.6	39.5	67.0	64.0	60.0	58.0	54.0	50.0	43.0	42.0	40.0
	17	57.5	81.0	42.3	67.0	64.0	60.0	58.0	54.0	51.0	46.0	45.0	44.0
	18	57.3	84.7	40.7	67.0	62.0	58.0	56.0	51.0	47.0	43.0	42.0	41.0
	19	53.2	78.0	37.6	64.0	60.0	55.0	53.0	47.0	43.0	40.0	39.0	39.0
	20	51.9	76.4	39.2	63.0	59.0	54.0	52.0	47.0	43.0	40.0	40.0	39.0
	21	51.9	74.6	39.2	64.0	62.0	56.0	53.0	46.0	42.0	40.0	40.0	39.0
	22	49.8	74.8	37.5	61.0	57.0	52.0	49.0	43.0	40.0	38.0	37.0	37.0
	23	44.9	66.8	37.5	55.0	52.0	47.0	45.0	41.0	39.0	38.0	37.0	37.0

24-Hour Noise Level Measurement Summary

<i>Project Name:</i> 9276	<i>JN:</i> 9276		24-Hour CNEL
	<i>Analyst:</i> A. Wolfe		
	<i>Date:</i> 3/23/2016		
<i>Location:</i> L16 - Located on Columbine Drive near existing residential homes and south of an existing bike path and future CV Link alignment.	<i>Energy Average Leq</i>		53.7
	<i>Day</i>	<i>Night</i>	
	48.4	46.8	

Hourly Leq dBA Readings (unadjusted)

Hourly Leq (dBA)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
85.0																								
80.0																								
75.0																								
70.0																								
65.0																								
60.0																								
55.0																								
50.0																								
45.0																								
40.0																								
35.0																								
	41.6	44.6	43.9	43.6	42.5	50.8	51.6	51.0	51.7	49.2	47.5	48.2	45.4	48.8	51.1	47.6	48.5	43.5	47.3	47.2	45.2	45.0	43.8	44.9

Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	43.5	60.2	36.1	53.0	50.0	47.0	46.0	42.0	40.0	38.0	37.0	36.0
	Max	51.7	79.5	44.5	62.0	60.0	57.0	55.0	50.0	48.0	46.0	46.0	45.0
	Energy Average:	48.4	Average:	Average:	57.3	54.7	50.7	49.1	45.0	42.6	40.5	39.9	38.9
Night	Min	41.6	49.5	38.7	46.0	46.0	45.0	44.0	42.0	40.0	39.0	39.0	39.0
	Max	51.6	76.9	43.8	63.0	61.0	56.0	52.0	49.0	48.0	46.0	45.0	45.0
	Energy Average:	46.8	Average:	Average:	51.4	50.0	47.9	46.8	44.3	42.8	40.8	40.3	40.1

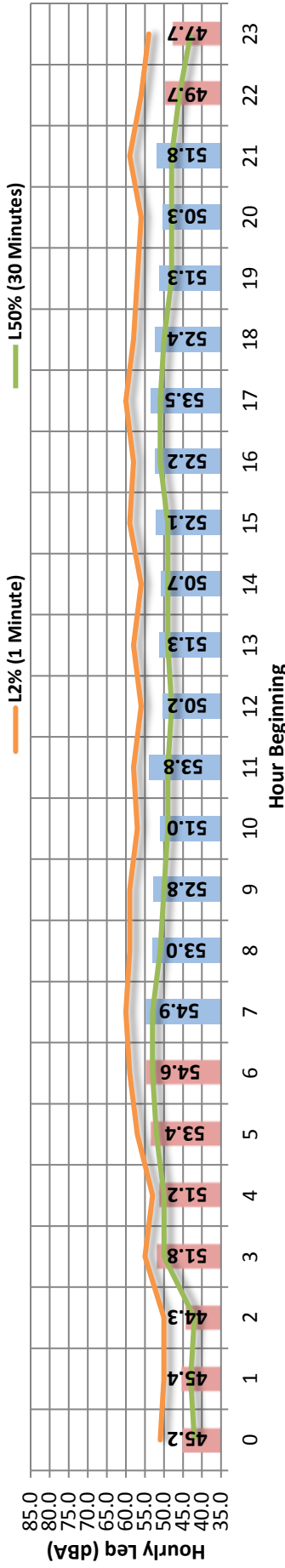
Hourly Summary

Night	0	41.6	55.1	38.7	46.0	46.0	45.0	44.0	42.0	40.0	39.0	39.0	39.0
	1	44.6	60.9	39.1	53.0	50.0	47.0	46.0	44.0	43.0	40.0	40.0	39.0
	2	43.9	51.6	39.1	48.0	47.0	46.0	45.0	44.0	43.0	41.0	40.0	40.0
	3	43.6	57.0	38.9	49.0	48.0	47.0	46.0	44.0	42.0	39.0	39.0	39.0
	4	42.5	49.5	38.9	47.0	46.0	45.0	45.0	43.0	41.0	39.0	39.0	39.0
	5	50.8	68.5	40.8	63.0	61.0	56.0	52.0	46.0	44.0	42.0	42.0	41.0
	6	51.6	76.9	43.8	56.0	54.0	51.0	51.0	49.0	48.0	46.0	45.0	45.0
Day	7	51.0	74.1	44.5	59.0	57.0	53.0	52.0	50.0	48.0	46.0	46.0	45.0
	8	51.7	79.5	42.0	60.0	57.0	54.0	53.0	49.0	47.0	44.0	44.0	43.0
	9	49.2	71.4	39.1	62.0	58.0	50.0	48.0	45.0	43.0	41.0	40.0	40.0
	10	47.5	67.2	38.9	57.0	56.0	52.0	51.0	45.0	43.0	40.0	40.0	39.0
	11	48.2	74.3	36.1	57.0	53.0	49.0	47.0	43.0	40.0	38.0	37.0	36.0
	12	45.4	67.1	36.1	57.0	55.0	49.0	47.0	42.0	40.0	39.0	39.0	36.0
	13	48.8	75.5	36.1	58.0	56.0	53.0	51.0	46.0	42.0	39.0	39.0	38.0
	14	51.1	73.0	36.1	61.0	60.0	57.0	55.0	47.0	42.0	39.0	38.0	36.0
	15	47.6	74.9	36.1	55.0	51.0	48.0	47.0	43.0	41.0	39.0	39.0	38.0
	16	48.5	76.6	36.1	59.0	57.0	52.0	49.0	44.0	41.0	39.0	37.0	36.0
	17	43.5	60.2	36.1	54.0	51.0	47.0	46.0	42.0	40.0	39.0	39.0	37.0
	18	47.3	66.5	36.5	59.0	56.0	51.0	49.0	45.0	42.0	40.0	39.0	39.0
	19	47.2	71.0	41.9	53.0	51.0	49.0	49.0	46.0	45.0	43.0	43.0	42.0
	20	45.2	61.0	40.2	53.0	50.0	48.0	47.0	45.0	43.0	41.0	40.0	40.0
	21	45.0	62.9	39.0	56.0	52.0	49.0	46.0	43.0	42.0	40.0	39.0	39.0
	22	43.8	60.5	40.4	50.0	47.0	45.0	45.0	43.0	42.0	41.0	40.0	40.0
	23	44.9	64.5	39.0	51.0	51.0	49.0	47.0	44.0	42.0	40.0	39.0	39.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link		JN: 9276		24-Hour	
Location: L17 - Located north of Fred Waring Drive near existing residential homes and a future access point to the CV Link Project.		Analyst: A. Wolfe		Energy Average Leq	
		Date: 3/30/2016		Day	Night
				52.3	50.6
				CNEL	
				57.6	

Hourly Leq dBA Readings (unadjusted)



Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	50.2	64.3	37.6	57.0	56.0	54.0	53.0	50.0	48.0	43.0	41.0	39.0
	Max	54.9	79.6	46.4	62.0	60.0	58.0	57.0	55.0	53.0	49.0	48.0	47.0
	Energy Average:	52.3	Average:	Average:	59.5	58.0	55.5	54.5	51.9	49.5	44.4	43.2	41.5
Night	Min	44.3	60.3	39.3	52.0	50.0	47.0	45.0	43.0	42.0	40.0	40.0	40.0
	Max	54.6	75.7	50.1	61.0	59.0	57.0	56.0	54.0	53.0	51.0	51.0	50.0
	Energy Average:	50.6	Average:	Average:	56.0	53.9	51.9	51.0	48.6	46.8	44.6	44.1	43.4

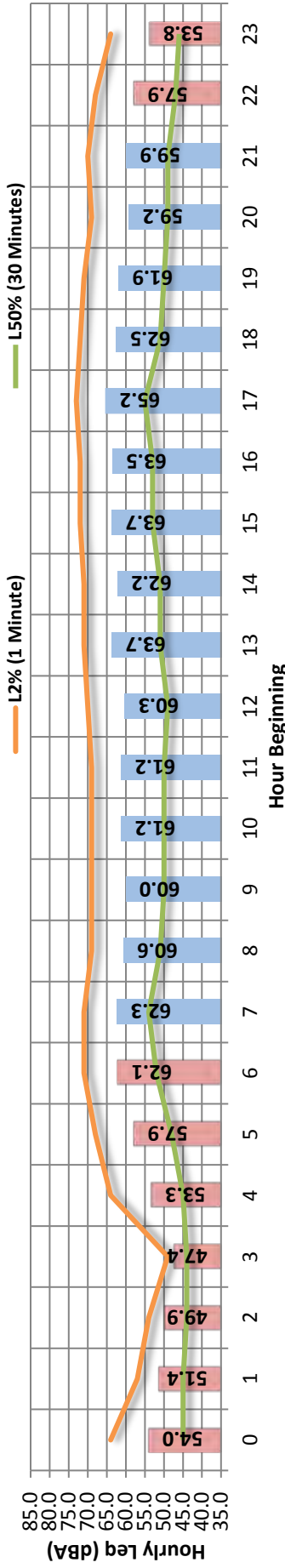
Hourly Summary

Night	0	45.2	61.3	39.3	53.0	51.0	49.0	48.0	44.0	42.0	40.0	40.0	40.0
	1	45.4	60.3	39.8	52.0	50.0	49.0	48.0	46.0	43.0	41.0	40.0	40.0
	2	44.3	60.6	40.6	53.0	50.0	47.0	45.0	43.0	42.0	41.0	41.0	41.0
	3	51.8	75.7	41.3	56.0	55.0	54.0	54.0	51.0	50.0	45.0	42.0	41.0
	4	51.2	61.2	49.1	55.0	53.0	52.0	52.0	51.0	50.0	49.0	49.0	49.0
	5	53.4	70.0	50.1	59.0	57.0	55.0	54.0	53.0	52.0	51.0	51.0	50.0
	6	54.6	69.3	48.1	61.0	59.0	57.0	56.0	54.0	53.0	51.0	51.0	49.0
Day	7	54.9	75.9	46.4	61.0	60.0	58.0	57.0	55.0	53.0	49.0	48.0	47.0
	8	53.0	66.5	42.0	60.0	59.0	57.0	56.0	53.0	51.0	45.0	44.0	43.0
	9	52.8	69.4	39.7	60.0	59.0	56.0	55.0	53.0	50.0	45.0	43.0	41.0
	10	51.0	64.3	39.3	58.0	57.0	55.0	54.0	52.0	49.0	43.0	42.0	40.0
	11	53.8	79.6	38.9	61.0	58.0	55.0	54.0	52.0	49.0	43.0	41.0	39.0
	12	50.2	65.4	38.8	57.0	56.0	54.0	53.0	50.0	48.0	44.0	42.0	40.0
	13	51.3	72.1	39.2	60.0	58.0	55.0	54.0	51.0	49.0	43.0	42.0	40.0
	14	50.7	67.2	37.6	58.0	56.0	54.0	53.0	51.0	49.0	42.0	42.0	39.0
	15	52.1	68.5	39.3	62.0	59.0	56.0	54.0	52.0	49.0	43.0	41.0	40.0
	16	52.2	65.6	40.5	59.0	58.0	56.0	55.0	52.0	51.0	45.0	44.0	42.0
	17	53.5	68.2	43.6	61.0	60.0	57.0	56.0	53.0	51.0	48.0	47.0	45.0
	18	52.4	65.1	42.3	59.0	58.0	56.0	55.0	53.0	50.0	45.0	44.0	43.0
	19	51.3	71.7	40.5	59.0	57.0	55.0	54.0	51.0	48.0	42.0	42.0	41.0
	20	50.3	66.4	41.4	57.0	56.0	54.0	53.0	51.0	48.0	44.0	43.0	42.0
	21	51.8	72.4	41.4	61.0	59.0	55.0	54.0	51.0	48.0	43.0	43.0	41.0
Night	22	49.7	69.3	40.5	58.0	56.0	53.0	52.0	49.0	46.0	42.0	41.0	41.0
	23	47.7	72.2	40.5	57.0	54.0	51.0	50.0	46.0	43.0	41.0	41.0	40.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link		JN: 9276		24-Hour	
Location: L18 - Located at the future CV Link alignment on Miles Avenue near existing residential homes.		Analyst: A. Wolfe		Energy Average Leq	
		Date: 3/30/2016		Day	Night
				62.1	56.3
				CNEL	
				64.7	

Hourly Leq dBA Readings (unadjusted)



Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	59.2	75.6	44.8	70.0	69.0	66.0	64.0	54.0	49.0	46.0	45.0	45.0
	Max	65.2	91.3	46.5	75.0	73.0	71.0	70.0	63.0	55.0	49.0	48.0	47.0
	Energy Average:	62.1	Average:	Average:	72.0	70.5	68.1	66.5	59.0	51.1	46.4	45.0	45.4
Night	Min	47.4	70.4	44.2	53.0	49.0	46.0	46.0	45.0	44.0	44.0	44.0	44.0
	Max	62.1	83.8	46.0	73.0	71.0	68.0	66.0	57.0	52.0	49.0	48.0	46.0
	Energy Average:	56.3	Average:	Average:	65.7	62.1	56.7	54.0	48.4	46.2	45.0	44.8	44.4

Hourly Summary

Night	0	54.0	76.5	44.4	68.0	64.0	56.0	51.0	46.0	45.0	44.0	44.0	44.0
	1	51.4	73.5	44.3	64.0	57.0	50.0	48.0	46.0	45.0	44.0	44.0	44.0
	2	49.9	74.3	44.3	61.0	54.0	48.0	46.0	45.0	44.0	44.0	44.0	44.0
	3	47.4	70.4	44.2	53.0	49.0	46.0	46.0	45.0	44.0	44.0	44.0	44.0
	4	53.3	74.2	44.4	66.0	64.0	57.0	53.0	47.0	45.0	44.0	44.0	44.0
	5	57.9	76.9	44.9	69.0	68.0	64.0	62.0	52.0	48.0	46.0	45.0	45.0
Day	6	62.1	83.8	46.0	73.0	71.0	68.0	66.0	57.0	52.0	49.0	48.0	46.0
	7	62.3	78.4	46.5	72.0	71.0	68.0	67.0	61.0	54.0	49.0	48.0	47.0
	8	60.6	80.3	45.8	71.0	69.0	67.0	65.0	59.0	51.0	46.0	46.0	46.0
	9	60.0	77.7	45.5	70.0	69.0	66.0	65.0	58.0	50.0	46.0	46.0	45.0
	10	61.2	85.8	45.3	71.0	69.0	67.0	65.0	58.0	50.0	46.0	46.0	45.0
	11	61.2	85.5	45.3	71.0	69.0	67.0	65.0	58.0	50.0	46.0	45.0	45.0
	12	60.3	79.9	45.2	71.0	70.0	67.0	65.0	58.0	49.0	46.0	45.0	45.0
	13	63.7	91.3	45.2	73.0	71.0	68.0	67.0	60.0	51.0	46.0	45.0	45.0
	14	62.2	80.7	44.8	72.0	71.0	69.0	67.0	60.0	51.0	46.0	45.0	45.0
	15	63.7	83.2	45.2	74.0	72.0	70.0	69.0	62.0	53.0	46.0	45.0	45.0
	16	63.5	81.3	45.4	73.0	72.0	70.0	69.0	62.0	53.0	47.0	46.0	46.0
	17	65.2	86.6	46.1	75.0	73.0	71.0	70.0	63.0	55.0	48.0	47.0	46.0
	18	62.5	76.5	45.3	73.0	72.0	70.0	68.0	60.0	51.0	46.0	46.0	46.0
	19	61.9	86.1	45.2	72.0	71.0	68.0	66.0	58.0	50.0	46.0	46.0	45.0
	20	59.2	75.6	45.5	71.0	69.0	66.0	64.0	54.0	49.0	46.0	46.0	45.0
	21	59.9	80.1	45.3	71.0	70.0	67.0	65.0	54.0	49.0	46.0	46.0	45.0
Night	22	57.9	78.8	44.8	70.0	68.0	64.0	61.0	51.0	47.0	45.0	45.0	45.0
	23	53.8	74.5	44.8	67.0	64.0	57.0	53.0	47.0	46.0	45.0	45.0	44.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link

JN: 9276

24-Hour

Location: L19 - Located north of Highway 111 near existing residential homes, south of the CV Link alignment.

Analyst: A. Wolfe

Energy Average Leq

Day

Night

CNEL

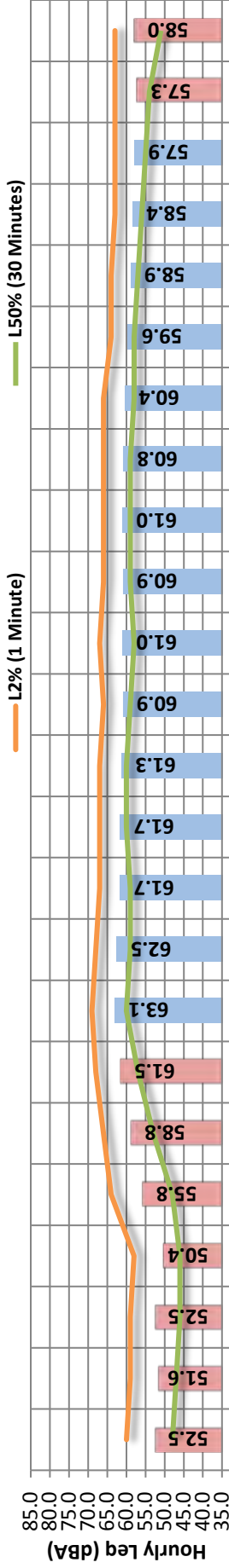
Date: 3/30/2016

60.9

56.8

64.4

Hourly Leq dBA Readings (unadjusted)



Hourly Summary

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	57.9	74.7	47.9	65.0	63.0	62.0	61.0	58.0	55.0	50.0	49.0	48.0
	Max	63.1	86.2	52.0	70.0	69.0	67.0	66.0	64.0	60.0	53.0	50.0	52.0
	Energy Average:	60.9	Average:	Average:	67.8	65.9	64.1	63.4	61.3	58.4	51.3	50.5	49.5
Night	Min	50.4	69.9	44.5	60.0	58.0	55.0	53.0	47.0	46.0	45.0	45.0	45.0
	Max	61.5	86.9	47.6	70.0	68.0	67.0	66.0	62.0	57.0	50.0	49.0	48.0
	Energy Average:	56.8	Average:	Average:	64.0	62.2	59.9	58.6	53.4	50.0	46.9	46.4	45.8

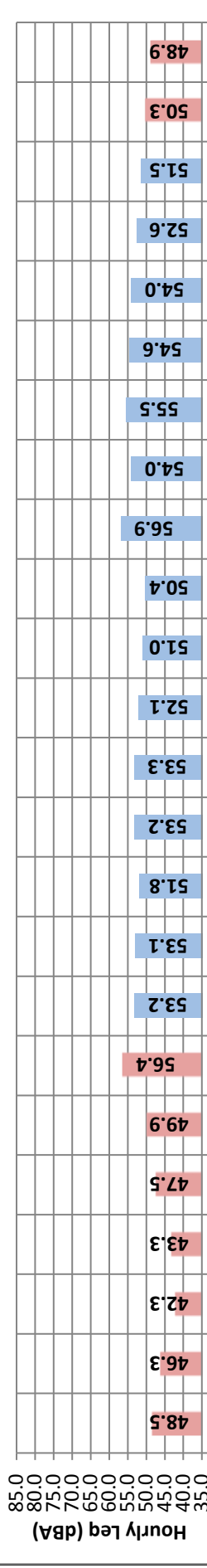
Hourly Summary

Night	0	52.5	69.9	45.4	61.0	60.0	58.0	57.0	51.0	48.0	46.0	45.0	45.0
	1	51.6	71.4	44.8	61.0	59.0	57.0	55.0	49.0	47.0	46.0	45.0	45.0
	2	52.5	78.3	44.9	61.0	59.0	56.0	53.0	48.0	46.0	45.0	45.0	45.0
	3	50.4	70.9	44.7	60.0	58.0	55.0	53.0	47.0	46.0	45.0	45.0	45.0
	4	55.8	73.9	44.5	66.0	64.0	61.0	60.0	53.0	48.0	45.0	45.0	45.0
	5	58.8	80.0	44.8	68.0	66.0	64.0	63.0	58.0	53.0	47.0	46.0	45.0
Day	6	61.5	78.7	46.8	70.0	68.0	67.0	66.0	62.0	57.0	50.0	49.0	47.0
	7	63.1	85.1	48.1	70.0	69.0	67.0	66.0	64.0	60.0	52.0	51.0	49.0
	8	62.5	86.2	48.5	70.0	68.0	66.0	65.0	63.0	59.0	51.0	50.0	49.0
	9	61.7	80.9	47.9	69.0	67.0	65.0	65.0	63.0	59.0	50.0	49.0	48.0
	10	61.7	79.5	48.2	68.0	67.0	65.0	65.0	63.0	60.0	51.0	50.0	49.0
	11	61.3	75.7	48.9	68.0	67.0	65.0	64.0	62.0	60.0	52.0	51.0	50.0
	12	60.9	76.9	49.6	69.0	66.0	64.0	64.0	62.0	59.0	51.0	50.0	50.0
	13	61.0	85.6	48.8	70.0	67.0	64.0	63.0	60.0	58.0	51.0	50.0	49.0
	14	60.9	77.0	50.7	68.0	66.0	64.0	63.0	62.0	59.0	52.0	51.0	51.0
	15	61.0	82.3	52.0	68.0	66.0	64.0	63.0	61.0	59.0	53.0	52.0	52.0
	16	60.8	80.0	51.1	68.0	66.0	64.0	63.0	61.0	59.0	53.0	52.0	51.0
	17	60.4	76.1	49.6	68.0	66.0	64.0	63.0	61.0	58.0	52.0	51.0	50.0
	18	59.6	76.2	48.7	66.0	64.0	63.0	63.0	61.0	58.0	50.0	50.0	49.0
	19	58.9	75.5	48.2	65.0	64.0	63.0	62.0	60.0	57.0	50.0	49.0	48.0
	20	58.4	76.2	48.3	65.0	63.0	62.0	61.0	59.0	56.0	51.0	50.0	49.0
	21	57.9	74.7	48.1	65.0	63.0	62.0	61.0	58.0	55.0	50.0	49.0	48.0
Night	22	57.3	78.2	47.6	64.0	63.0	61.0	61.0	58.0	54.0	49.0	48.0	48.0
	23	58.0	86.9	46.8	65.0	63.0	60.0	59.0	55.0	51.0	48.0	47.0	47.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link	JN: 9276		24-Hour	
	Analyst: A. Wolfe		Energy Average Leq	
	Date: 3/30/2016		Day	Night
Location: L20 - Located on Suncastle Road in an existing residential neighborhood east of the CV Link alignment.			53.5	50.1
			CNEL	
			57.6	

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	50.4	70.4	37.2	62.0	59.0	54.0	53.0	45.0	43.0	40.0	40.0	38.0
	Max	56.9	86.1	44.5	67.0	62.1	62.0	60.0	52.0	49.0	47.0	46.0	45.0
	Energy Average:	53.5	Average:		64.6	62.1	57.7	54.8	48.4	45.7	43.4	42.8	41.9
Night	Min	42.3	50.3	38.9	47.0	46.0	44.0	44.0	42.0	41.0	40.0	39.0	39.0
	Max	56.4	77.6	44.5	68.0	66.0	61.0	57.0	52.0	51.0	48.0	48.0	46.0
	Energy Average:	50.1	Average:		56.9	54.7	51.8	49.8	45.7	44.1	42.3	41.9	41.0

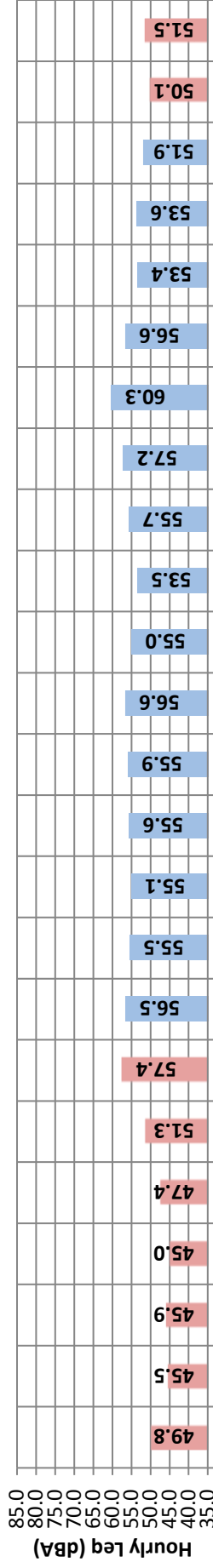
Hourly Summary

Night	0	48.5	70.0	39.8	60.0	56.0	52.0	50.0	44.0	42.0	41.0	41.0	40.0
	1	46.3	67.9	38.9	54.0	53.0	50.0	49.0	44.0	42.0	40.0	39.0	39.0
	2	42.3	50.3	38.9	47.0	46.0	44.0	44.0	42.0	41.0	40.0	40.0	39.0
	3	43.3	55.7	39.0	48.0	47.0	46.0	46.0	44.0	42.0	40.0	40.0	39.0
	4	47.5	69.7	38.9	57.0	54.0	52.0	47.0	44.0	43.0	41.0	40.0	39.0
	5	49.9	67.3	42.0	61.0	57.0	54.0	52.0	48.0	46.0	43.0	43.0	42.0
	6	56.4	77.6	44.5	68.0	66.0	61.0	57.0	52.0	51.0	48.0	48.0	46.0
Day	7	53.2	70.4	44.5	65.0	62.0	57.0	54.0	51.0	49.0	47.0	46.0	45.0
	8	53.1	74.2	41.2	65.0	63.0	58.0	55.0	48.0	46.0	43.0	43.0	42.0
	9	51.8	71.0	38.7	64.0	62.0	58.0	55.0	48.0	44.0	40.0	40.0	39.0
	10	53.2	80.0	41.6	63.0	61.0	56.0	54.0	48.0	45.0	42.0	42.0	42.0
	11	53.3	74.7	42.6	65.0	62.0	58.0	55.0	48.0	44.0	43.0	43.0	42.0
	12	52.1	73.7	42.0	64.0	62.0	57.0	54.0	46.0	44.0	42.0	42.0	42.0
	13	51.0	70.7	41.2	63.0	60.0	56.0	53.0	47.0	43.0	42.0	41.0	41.0
	14	50.4	71.6	41.2	62.0	60.0	56.0	53.0	45.0	43.0	42.0	42.0	41.0
	15	56.9	86.1	37.2	67.0	64.0	58.0	54.0	48.0	45.0	42.0	40.0	38.0
	16	54.0	79.7	37.2	65.0	63.0	59.0	56.0	49.0	46.0	41.0	40.0	39.0
	17	55.5	71.8	43.4	67.0	65.0	62.0	60.0	52.0	48.0	46.0	45.0	44.0
	18	54.6	75.0	43.0	67.0	65.0	60.0	56.0	49.0	47.0	45.0	44.0	43.0
	19	54.0	76.1	42.6	65.0	63.0	59.0	55.0	49.0	47.0	45.0	44.0	43.0
	20	52.6	72.6	43.6	64.0	61.0	57.0	55.0	49.0	47.0	45.0	44.0	44.0
	21	51.5	70.7	43.2	63.0	59.0	54.0	53.0	49.0	47.0	45.0	45.0	44.0
Night	22	50.3	69.2	42.4	60.0	58.0	55.0	53.0	47.0	45.0	44.0	43.0	43.0
	23	48.9	69.8	42.0	57.0	55.0	52.0	50.0	46.0	45.0	43.0	43.0	42.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link	JN: 9276		24-Hour	
	Analyst: A. Wolfe		Energy Average Leq	
	Date: 3/30/2016		Day	Night
Location: L21 - Located east of the CV Link alignment near existing residential homes on Villanova Street.			55.9	51.2
				CNEL
				59.0

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	51.9	70.3	37.7	64.0	61.0	56.0	54.0	49.0	45.0	39.0	38.0	37.0
	Max	60.3	87.4	46.1	68.0	66.0	63.0	61.0	56.0	54.0	49.0	48.0	47.0
	Energy Average:	55.9	Average:		66.0	63.5	59.9	57.9	52.6	49.1	44.5	43.4	42.1
Night	Min	45.0	56.6	39.3	48.0	47.0	45.0	45.0	44.0	43.0	40.0	40.0	39.0
	Max	57.4	76.1	47.5	68.0	65.0	61.0	60.0	56.0	53.0	50.0	49.0	48.0
	Energy Average:	51.2	Average:		56.6	54.8	52.3	50.8	47.7	46.1	44.0	43.3	42.4

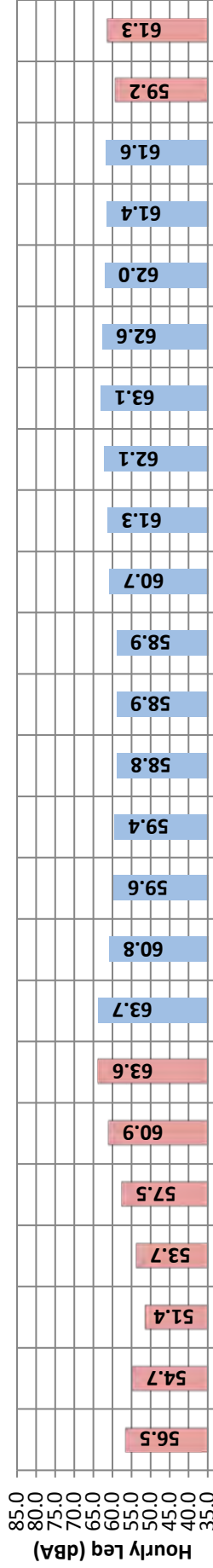
Hourly Summary

Night	0	49.8	72.4	40.7	59.0	55.0	53.0	50.0	46.0	44.0	42.0	41.0	40.0
	1	45.5	56.6	39.3	52.0	52.0	50.0	49.0	45.0	43.0	41.0	40.0	39.0
	2	45.9	73.1	39.4	48.0	47.0	45.0	45.0	44.0	43.0	40.0	40.0	39.0
	3	45.0	63.6	40.6	49.0	48.0	47.0	46.0	45.0	44.0	42.0	42.0	41.0
	4	47.4	66.2	40.9	56.0	55.0	51.0	48.0	46.0	45.0	43.0	42.0	41.0
	5	51.3	71.1	44.7	58.0	56.0	55.0	54.0	50.0	48.0	47.0	46.0	45.0
Day	6	57.4	76.1	47.5	68.0	65.0	61.0	60.0	56.0	53.0	50.0	49.0	48.0
	7	56.5	76.5	46.1	65.0	63.0	61.0	60.0	56.0	53.0	49.0	48.0	47.0
	8	55.5	74.5	44.3	66.0	64.0	60.0	58.0	54.0	51.0	47.0	47.0	45.0
	9	55.1	77.4	40.9	66.0	63.0	60.0	58.0	53.0	49.0	44.0	43.0	42.0
	10	55.6	77.6	37.8	67.0	64.0	61.0	59.0	51.0	46.0	41.0	40.0	39.0
	11	55.9	80.8	37.8	67.0	64.0	60.0	57.0	50.0	46.0	40.0	39.0	38.0
	12	56.6	78.2	37.9	66.0	64.0	62.0	61.0	55.0	51.0	43.0	41.0	39.0
	13	55.0	74.7	37.7	68.0	65.0	59.0	57.0	51.0	46.0	39.0	38.0	37.0
	14	53.5	75.3	37.8	65.0	62.0	59.0	56.0	50.0	45.0	40.0	39.0	37.0
	15	55.7	78.1	39.2	67.0	63.0	60.0	58.0	53.0	48.0	41.0	40.0	39.0
	16	57.2	77.3	39.9	66.0	64.0	61.0	60.0	56.0	54.0	49.0	47.0	46.0
	17	60.3	87.4	44.2	68.0	66.0	63.0	61.0	56.0	53.0	49.0	48.0	45.0
	18	56.6	73.8	44.9	66.0	65.0	62.0	60.0	56.0	52.0	48.0	47.0	46.0
	19	53.4	77.3	41.9	64.0	62.0	57.0	54.0	49.0	47.0	45.0	44.0	43.0
	20	53.6	75.0	44.6	65.0	63.0	57.0	55.0	50.0	48.0	46.0	45.0	44.0
	21	51.9	70.3	42.0	64.0	61.0	56.0	54.0	49.0	47.0	46.0	45.0	44.0
Night	22	50.1	69.8	42.7	59.0	57.0	55.0	53.0	48.0	47.0	45.0	44.0	44.0
	23	51.5	74.3	44.9	60.0	58.0	54.0	52.0	49.0	48.0	46.0	46.0	45.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link	JN: 9276		24-Hour	
	Analyst: A. Wolfe		Energy Average Leq	
	Date: 3/30/2016		Day	Night
Location: L22 - Located on Fred Waring Drive near existing residential homes, east of the future CV Link alignment.			61.3	59.1
				66.3

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	58.8	72.3	39.9	66.0	65.0	63.0	62.0	59.0	55.0	45.0	44.0	41.0
	Max	63.7	86.1	49.0	71.0	69.0	68.0	67.0	64.0	61.0	54.0	52.0	50.0
	Energy Average:	61.3	Average:		68.7	67.1	65.4	64.5	61.2	58.0	49.7	48.1	45.8
Night	Min	51.4	68.2	41.0	63.0	61.0	57.0	54.0	49.0	47.0	44.0	43.0	42.0
	Max	63.6	89.1	51.6	71.0	70.0	68.0	67.0	64.0	61.0	55.0	54.0	52.0
	Energy Average:	59.1	Average:		66.9	65.3	63.0	61.3	55.8	51.9	47.7	46.8	45.2

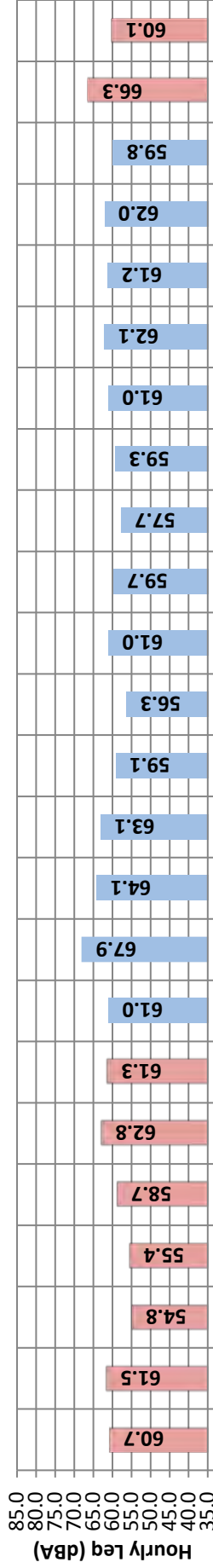
Hourly Summary

Night	0	56.5	69.6	43.4	66.0	65.0	63.0	62.0	54.0	50.0	47.0	46.0	44.0
	1	54.7	72.1	43.0	65.0	63.0	61.0	59.0	52.0	48.0	45.0	45.0	44.0
	2	51.4	68.2	41.0	63.0	61.0	57.0	54.0	49.0	47.0	44.0	43.0	42.0
	3	53.7	72.2	42.5	64.0	63.0	60.0	58.0	50.0	48.0	45.0	44.0	43.0
	4	57.5	71.9	43.6	67.0	66.0	64.0	62.0	56.0	51.0	47.0	46.0	44.0
	5	60.9	76.9	43.6	70.0	68.0	66.0	65.0	61.0	56.0	49.0	48.0	45.0
Day	6	63.6	76.8	51.6	71.0	70.0	68.0	67.0	64.0	61.0	55.0	54.0	52.0
	7	63.7	86.1	48.5	71.0	69.0	68.0	67.0	64.0	61.0	53.0	51.0	49.0
	8	60.8	72.3	46.6	68.0	67.0	65.0	65.0	62.0	58.0	50.0	49.0	47.0
	9	59.6	75.2	44.0	67.0	66.0	64.0	63.0	60.0	57.0	49.0	48.0	45.0
	10	59.4	80.0	41.1	68.0	66.0	64.0	63.0	59.0	56.0	47.0	46.0	45.0
	11	58.8	74.1	41.0	66.0	65.0	64.0	63.0	59.0	56.0	47.0	45.0	42.0
	12	58.9	81.8	40.4	66.0	65.0	63.0	62.0	59.0	55.0	45.0	44.0	41.0
	13	58.9	73.8	41.1	67.0	65.0	64.0	63.0	59.0	56.0	46.0	44.0	42.0
	14	60.7	76.4	39.9	69.0	67.0	65.0	64.0	61.0	58.0	49.0	46.0	43.0
	15	61.3	77.8	43.0	68.0	67.0	66.0	65.0	62.0	59.0	49.0	47.0	45.0
	16	62.1	82.5	45.3	70.0	68.0	66.0	66.0	62.0	59.0	51.0	49.0	47.0
	17	63.1	80.8	49.0	71.0	69.0	67.0	66.0	63.0	60.0	54.0	52.0	50.0
	18	62.6	76.6	48.0	70.0	68.0	67.0	66.0	63.0	60.0	53.0	52.0	50.0
	19	62.0	79.2	47.3	70.0	68.0	66.0	65.0	62.0	59.0	51.0	50.0	48.0
	20	61.4	74.3	46.9	69.0	68.0	66.0	65.0	62.0	59.0	51.0	50.0	48.0
	21	61.6	80.7	46.7	70.0	69.0	66.0	65.0	61.0	57.0	50.0	49.0	48.0
Night	22	59.2	76.8	46.3	67.0	66.0	64.0	63.0	59.0	54.0	49.0	48.0	47.0
	23	61.3	89.1	44.2	69.0	66.0	64.0	62.0	57.0	52.0	48.0	47.0	46.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link		JN: 9276		24-Hour	
Location: L23 - Located south of the future CV Link Alignment on Jonquil Avenue near existing residential homes.		Analyst: A. Wolfe		Energy Average Leq	
		Date: 3/30/2016		Day	Night
				62.0	61.4
				CNEL	
				68.2	

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	56.3	72.4	43.3	67.0	65.0	61.0	59.0	53.0	50.0	47.0	46.0	44.0
	Max	67.9	91.6	55.2	75.0	73.0	72.0	72.0	68.0	62.0	57.0	57.0	56.0
	Energy Average:	62.0	Average:	Average:	70.7	69.1	65.5	63.3	58.9	55.8	52.5	51.8	50.5
Night	Min	54.8	67.3	45.2	60.0	59.0	57.0	57.0	55.0	54.0	51.0	50.0	48.0
	Max	66.3	95.1	56.4	74.0	73.0	68.0	67.0	61.0	60.0	58.0	58.0	57.0
	Energy Average:	61.4	Average:	Average:	69.1	67.6	62.9	61.0	57.3	55.8	53.1	52.6	50.9

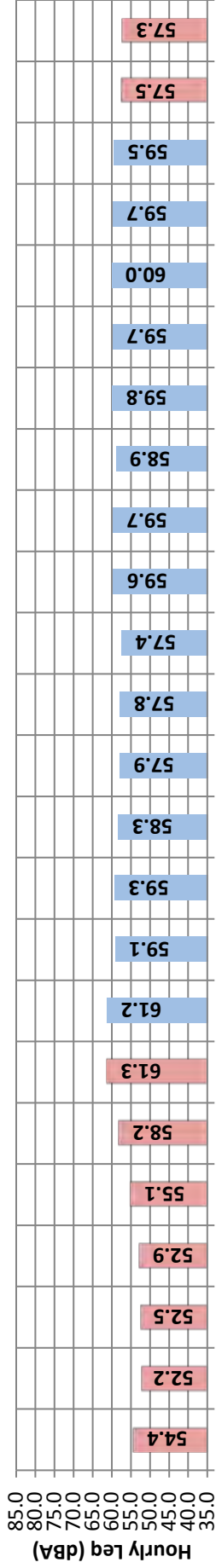
Hourly Summary

Night	0	60.7	74.4	46.5	73.0	71.0	67.0	61.0	57.0	55.0	52.0	51.0	48.0
	1	61.5	79.6	47.8	73.0	70.0	68.0	67.0	56.0	54.0	52.0	50.0	49.0
	2	54.8	70.5	45.2	60.0	59.0	57.0	57.0	55.0	54.0	51.0	50.0	48.0
	3	55.4	67.3	48.4	60.0	59.0	58.0	58.0	56.0	54.0	51.0	51.0	49.0
	4	58.7	74.9	50.6	69.0	68.0	60.0	60.0	58.0	56.0	53.0	53.0	51.0
	5	62.8	77.7	51.7	74.0	73.0	68.0	64.0	59.0	58.0	55.0	55.0	53.0
Day	6	61.3	75.6	56.4	67.0	65.0	63.0	63.0	61.0	60.0	58.0	58.0	57.0
	7	61.0	76.6	55.2	69.0	66.0	63.0	62.0	61.0	59.0	57.0	57.0	56.0
	8	67.9	91.6	53.8	75.0	73.0	72.0	72.0	68.0	62.0	57.0	56.0	55.0
	9	64.1	74.3	51.1	72.0	72.0	71.0	69.0	64.0	58.0	54.0	53.0	52.0
	10	63.1	77.9	46.2	74.0	73.0	68.0	66.0	63.0	56.0	49.0	48.0	45.0
	11	59.1	74.8	44.4	70.0	70.0	66.0	62.0	55.0	52.0	47.0	46.0	44.0
	12	56.3	74.9	43.3	68.0	65.0	61.0	59.0	53.0	50.0	47.0	46.0	44.0
	13	61.0	83.2	43.3	73.0	70.0	67.0	64.0	56.0	51.0	47.0	46.0	44.0
	14	59.7	83.2	43.6	72.0	68.0	63.0	61.0	54.0	51.0	47.0	46.0	45.0
	15	57.7	74.4	46.0	67.0	66.0	64.0	62.0	55.0	53.0	49.0	49.0	47.0
	16	59.3	75.9	50.0	68.0	67.0	64.0	61.0	58.0	56.0	53.0	52.0	51.0
	17	61.0	81.7	54.3	69.0	68.0	64.0	62.0	60.0	59.0	57.0	57.0	56.0
	18	62.1	87.4	54.4	70.0	69.0	65.0	63.0	60.0	59.0	57.0	56.0	55.0
	19	61.2	81.4	51.6	71.0	69.0	66.0	63.0	59.0	57.0	55.0	55.0	53.0
	20	62.0	79.9	52.4	74.0	72.0	66.0	63.0	58.0	57.0	55.0	54.0	53.0
	21	59.8	72.4	51.3	69.0	68.0	63.0	61.0	59.0	57.0	55.0	55.0	53.0
Night	22	66.3	95.1	51.6	73.0	72.0	63.0	60.0	57.0	56.0	54.0	53.0	52.0
	23	60.1	75.6	49.6	73.0	71.0	62.0	59.0	57.0	55.0	53.0	52.0	51.0

24-Hour Noise Level Measurement Summary

<i>Project Name:</i> CV Link	<i>JN:</i> 9276		<i>24-Hour</i>	
	<i>Analyst:</i> A. Wolfe		<i>Energy Average Leq</i>	
	<i>Day</i>	<i>Night</i>		
	59.3	56.7	CNEL	
<i>Location:</i>	L24 - Located south of the CV Link Project on Jackson Street near the Andrew Jackson Elementary School.		64.1	
	<i>Date:</i> 3/30/2016			

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	57.4	70.5	43.6	65.0	63.0	61.0	60.0	58.0	55.0	49.0	47.0	45.0
	Max	61.2	87.5	50.3	68.0	66.0	65.0	64.0	62.0	59.0	54.0	53.0	51.0
	Energy Average:	59.3	Average:	Average:	66.4	64.5	62.5	61.5	59.3	56.7	51.3	49.9	47.9
Night	Min	52.2	67.7	43.1	61.0	60.0	57.0	54.0	51.0	49.0	46.0	45.0	44.0
	Max	61.3	82.9	49.2	69.0	67.0	66.0	65.0	62.0	59.0	54.0	53.0	52.0
	Energy Average:	56.7	Average:	Average:	64.2	62.6	60.2	58.8	54.9	52.2	49.0	48.2	46.9

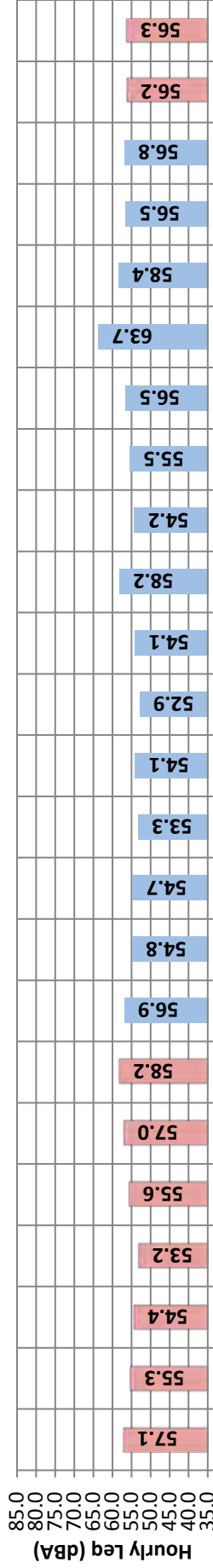
Hourly Summary

Night	0	54.4	71.1	45.4	63.0	61.0	59.0	58.0	54.0	52.0	49.0	48.0	46.0
	1	52.2	67.7	44.6	61.0	60.0	57.0	55.0	51.0	49.0	47.0	47.0	46.0
	2	52.5	74.1	44.1	62.0	60.0	57.0	54.0	51.0	49.0	46.0	45.0	44.0
	3	52.9	70.1	43.1	63.0	61.0	58.0	56.0	51.0	49.0	47.0	46.0	44.0
	4	55.1	72.4	46.3	65.0	63.0	60.0	59.0	53.0	51.0	48.0	48.0	47.0
	5	58.2	80.1	46.1	66.0	65.0	63.0	62.0	58.0	54.0	49.0	48.0	47.0
Day	6	61.3	74.9	49.2	69.0	67.0	66.0	65.0	62.0	59.0	54.0	53.0	52.0
	7	61.2	78.8	49.8	68.0	66.0	65.0	64.0	62.0	59.0	54.0	53.0	51.0
	8	59.1	73.6	47.2	66.0	64.0	63.0	62.0	60.0	57.0	51.0	50.0	48.0
	9	59.3	75.1	45.9	68.0	65.0	63.0	62.0	59.0	57.0	51.0	50.0	48.0
	10	58.3	72.0	44.4	66.0	64.0	62.0	61.0	59.0	56.0	49.0	47.0	45.0
	11	57.9	75.9	43.9	66.0	64.0	62.0	61.0	58.0	55.0	49.0	47.0	45.0
	12	57.8	78.4	44.0	65.0	63.0	61.0	60.0	58.0	55.0	49.0	47.0	45.0
	13	57.4	70.5	43.6	65.0	64.0	61.0	60.0	58.0	55.0	49.0	48.0	45.0
	14	59.6	87.5	43.8	65.0	63.0	61.0	60.0	58.0	56.0	49.0	47.0	45.0
	15	59.7	79.4	44.6	68.0	65.0	62.0	61.0	59.0	57.0	51.0	49.0	46.0
	16	58.9	79.1	47.0	65.0	64.0	62.0	61.0	59.0	57.0	52.0	51.0	49.0
	17	59.8	75.1	49.9	67.0	65.0	63.0	62.0	60.0	58.0	54.0	53.0	51.0
	18	59.7	73.4	50.3	66.0	65.0	63.0	62.0	60.0	58.0	54.0	53.0	51.0
	19	60.0	77.4	49.0	66.0	65.0	63.0	63.0	60.0	58.0	53.0	52.0	50.0
	20	59.7	81.2	48.8	67.0	65.0	63.0	62.0	60.0	57.0	52.0	51.0	50.0
	21	59.5	79.1	48.2	68.0	65.0	63.0	62.0	59.0	56.0	52.0	51.0	49.0
Night	22	57.5	77.8	46.5	65.0	64.0	62.0	61.0	58.0	54.0	51.0	50.0	48.0
	23	57.3	82.9	47.1	64.0	62.0	60.0	59.0	56.0	53.0	50.0	49.0	48.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link	JN: 9276		24-Hour	
	Analyst: A. Wolfe		Energy Average Leq	
	Date: 3/30/2016		Day	Night
Location: L25 - Located adjacent to the Admistad Continuation High School on Dillon Avenue south of the CV Link Project.			57.1	56.1
				CNEL
				63.0

Hourly Leq dBA Readings (unadjusted)



Hourly Summary

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	52.9	70.2	42.5	61.0	58.0	56.0	54.0	51.0	49.0	46.0	45.0	43.0
	Max	63.7	95.2	51.6	71.0	66.0	61.0	59.0	57.0	56.0	54.0	53.0	52.0
	Energy Average:	57.1	Average:		65.1	61.9	58.3	56.6	54.1	52.3	49.7	49.1	48.1
Night	Min	53.2	59.9	46.0	57.0	56.0	56.0	55.0	54.0	52.0	49.0	49.0	48.0
	Max	58.2	74.5	53.8	63.0	62.0	61.0	60.0	58.0	57.0	55.0	55.0	54.0
	Energy Average:	56.1	Average:		60.3	59.3	58.4	57.7	56.3	54.8	51.9	51.1	49.7

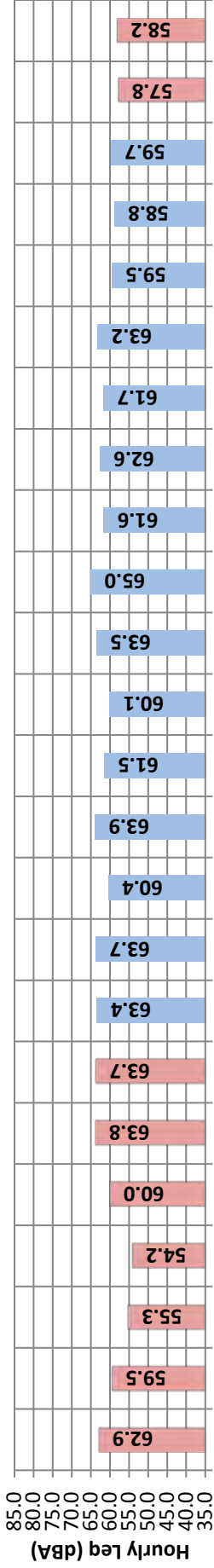
Hourly Summary

Night	0	57.1	64.9	47.3	62.0	62.0	61.0	60.0	58.0	56.0	52.0	51.0	49.0
	1	55.3	69.5	46.4	60.0	59.0	58.0	57.0	56.0	54.0	51.0	50.0	48.0
	2	54.4	62.4	46.1	59.0	58.0	57.0	57.0	55.0	53.0	50.0	49.0	48.0
	3	53.2	59.9	46.0	57.0	56.0	56.0	55.0	54.0	52.0	49.0	49.0	48.0
	4	55.6	62.4	48.0	59.0	59.0	58.0	57.0	56.0	55.0	52.0	51.0	50.0
	5	57.0	71.5	50.1	62.0	61.0	60.0	59.0	57.0	56.0	53.0	52.0	51.0
	6	58.2	72.1	53.8	63.0	61.0	60.0	59.0	58.0	57.0	55.0	55.0	54.0
Day	7	56.9	71.0	51.2	64.0	61.0	59.0	58.0	57.0	56.0	54.0	53.0	52.0
	8	54.8	70.2	48.7	61.0	58.0	57.0	56.0	55.0	53.0	51.0	51.0	50.0
	9	54.7	72.0	47.9	61.0	59.0	57.0	56.0	55.0	53.0	50.0	50.0	49.0
	10	53.3	71.5	44.7	64.0	62.0	57.0	55.0	51.0	49.0	47.0	46.0	45.0
	11	54.1	75.2	42.8	65.0	62.0	58.0	55.0	51.0	49.0	46.0	45.0	44.0
	12	52.9	70.3	42.5	63.0	60.0	57.0	55.0	51.0	49.0	46.0	45.0	43.0
	13	54.1	71.0	43.7	64.0	62.0	58.0	55.0	51.0	49.0	47.0	46.0	45.0
	14	58.2	86.6	43.9	70.0	64.0	60.0	57.0	52.0	50.0	46.0	46.0	45.0
	15	54.2	78.9	43.4	65.0	62.0	56.0	54.0	51.0	49.0	46.0	46.0	44.0
	16	55.5	77.3	45.7	65.0	62.0	58.0	56.0	54.0	53.0	49.0	48.0	46.0
	17	56.5	78.6	49.9	65.0	62.0	59.0	57.0	55.0	54.0	52.0	52.0	51.0
	18	63.7	95.2	51.6	71.0	66.0	61.0	59.0	57.0	56.0	54.0	53.0	52.0
	19	58.4	84.5	50.5	67.0	63.0	59.0	58.0	56.0	55.0	53.0	52.0	52.0
	20	56.5	71.6	50.4	66.0	64.0	59.0	58.0	56.0	55.0	52.0	52.0	51.0
	21	56.8	73.1	50.1	65.0	62.0	59.0	58.0	56.0	55.0	53.0	52.0	52.0
Night	22	56.2	71.1	49.3	61.0	59.0	58.0	57.0	56.0	55.0	53.0	52.0	50.0
	23	56.3	74.5	47.8	60.0	59.0	58.0	58.0	57.0	55.0	52.0	51.0	49.0

24-Hour Noise Level Measurement Summary

<i>Project Name:</i> CV Link	JN: 9276		24-Hour	
	Analyst: A. Wolfe		CNEL	
	Location: L26 - Located west of the future CV Link alignment on Van Buren Street near the Coachella Valley Wild Bird Center.		Energy Average Leq	
			Day	Night
			62.3	60.6
				67.5

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	58.8	75.3	44.4	68.0	67.0	64.0	62.0	56.0	50.0	47.0	47.0	46.0
	Max	65.0	90.3	53.5	76.0	72.0	70.0	68.0	63.0	59.0	56.0	55.0	54.0
	Energy Average:	62.3	Average:		71.8	69.8	67.1	65.3	59.8	55.4	51.5	50.9	49.9
Night	Min	54.2	70.5	46.9	61.0	59.0	57.0	56.0	54.0	52.0	50.0	49.0	48.0
	Max	63.8	87.3	53.5	74.0	73.0	71.0	69.0	62.0	59.0	56.0	56.0	55.0
	Energy Average:	60.6	Average:		68.8	66.6	63.8	62.1	57.4	55.1	52.6	51.9	50.8

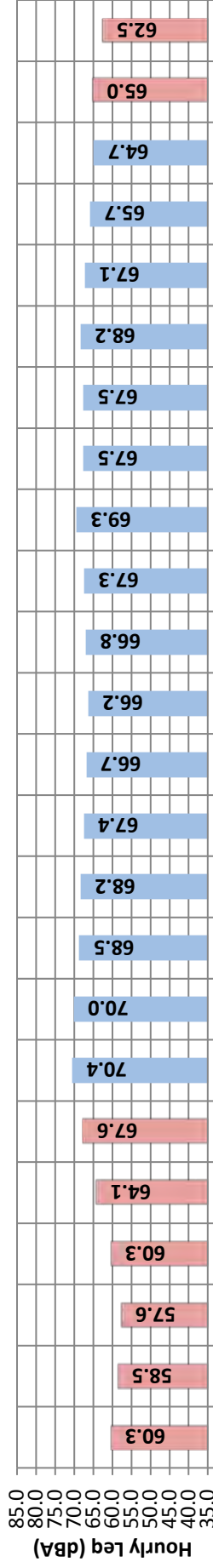
Hourly Summary

Night	0	62.9	76.3	51.0	74.0	72.0	70.0	69.0	59.0	56.0	53.0	53.0	52.0
	1	59.5	74.0	49.2	70.0	69.0	66.0	63.0	57.0	55.0	52.0	51.0	50.0
	2	55.3	71.4	46.9	65.0	61.0	58.0	57.0	55.0	53.0	50.0	49.0	48.0
	3	54.2	70.5	48.1	61.0	59.0	57.0	56.0	54.0	52.0	50.0	49.0	48.0
	4	60.0	87.3	49.4	68.0	64.0	60.0	59.0	57.0	55.0	53.0	52.0	50.0
	5	63.8	79.9	51.1	74.0	73.0	71.0	69.0	60.0	57.0	54.0	53.0	52.0
Day	6	63.7	80.2	53.5	73.0	71.0	69.0	67.0	62.0	59.0	56.0	55.0	55.0
	7	63.4	78.8	53.5	73.0	71.0	69.0	67.0	62.0	58.0	55.0	55.0	54.0
	8	63.7	80.3	51.5	74.0	72.0	70.0	68.0	62.0	57.0	54.0	53.0	52.0
	9	60.4	79.2	48.5	70.0	68.0	66.0	64.0	59.0	55.0	51.0	50.0	49.0
	10	63.9	87.5	46.6	73.0	71.0	68.0	67.0	63.0	58.0	50.0	49.0	48.0
	11	61.5	83.0	46.3	72.0	70.0	68.0	66.0	59.0	53.0	49.0	48.0	47.0
	12	60.1	78.6	44.4	71.0	69.0	66.0	64.0	56.0	50.0	47.0	47.0	46.0
	13	63.5	84.1	46.0	75.0	72.0	68.0	66.0	60.0	55.0	49.0	48.0	47.0
	14	65.0	90.3	46.0	76.0	72.0	68.0	66.0	60.0	52.0	48.0	47.0	47.0
	15	61.6	75.3	46.6	71.0	70.0	68.0	67.0	61.0	54.0	49.0	48.0	47.0
	16	62.6	81.1	49.7	72.0	70.0	68.0	67.0	61.0	58.0	53.0	52.0	51.0
	17	61.7	77.5	51.5	72.0	70.0	67.0	65.0	61.0	57.0	54.0	53.0	52.0
	18	63.2	83.7	53.1	72.0	70.0	67.0	66.0	62.0	59.0	56.0	55.0	54.0
	19	59.5	78.1	51.4	69.0	67.0	64.0	62.0	58.0	56.0	53.0	53.0	52.0
	20	58.8	76.4	50.9	68.0	67.0	65.0	62.0	56.0	54.0	52.0	52.0	51.0
	21	59.7	79.3	51.7	69.0	68.0	65.0	63.0	57.0	55.0	53.0	53.0	52.0
Night	22	57.8	77.7	50.8	67.0	65.0	62.0	60.0	56.0	54.0	52.0	52.0	51.0
	23	58.2	78.4	50.6	67.0	65.0	61.0	59.0	57.0	55.0	53.0	52.0	51.0

24-Hour Noise Level Measurement Summary

<i>Project Name:</i> CV Link	JN: 9276		24-Hour	
	<i>Analyst:</i> A. Wolfe		Energy Average Leq	
			Day	Night
	<i>Location:</i> L27 - Located east of the future CV Link Project on 50th Avenue.	Date: 3/30/216		67.8
CNEL				
				72.1

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	64.7	78.8	39.2	74.0	73.0	71.0	69.0	64.0	59.0	47.0	44.0	41.0
	Max	70.4	95.6	53.4	79.0	77.0	75.0	74.0	70.0	66.0	59.0	57.0	54.0
	Energy Average:	67.8	Average:		76.7	75.1	72.9	71.6	67.0	62.3	52.5	50.4	47.6
Night	Min	57.6	78.5	40.4	68.0	65.0	62.0	60.0	55.0	51.0	45.0	44.0	41.0
	Max	67.6	88.1	47.9	76.0	75.0	73.0	72.0	68.0	63.0	55.0	53.0	50.0
	Energy Average:	63.2	Average:		72.8	70.4	67.3	65.3	59.8	55.1	49.3	47.6	45.3

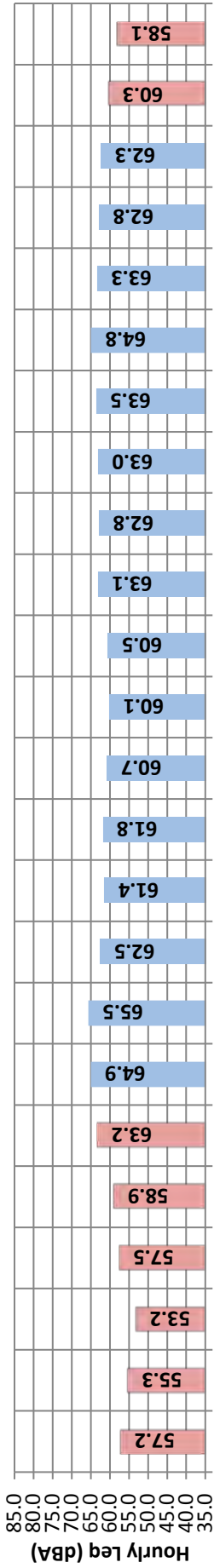
Hourly Summary

Night	0	60.3	78.6	43.9	72.0	68.0	65.0	63.0	58.0	54.0	49.0	47.0	45.0
	1	58.5	78.5	40.4	70.0	67.0	63.0	61.0	56.0	51.0	46.0	44.0	41.0
	2	57.6	81.0	41.2	68.0	65.0	62.0	60.0	55.0	51.0	45.0	44.0	42.0
	3	60.3	78.7	40.9	73.0	70.0	66.0	63.0	57.0	53.0	47.0	46.0	43.0
	4	64.1	85.3	44.0	75.0	73.0	70.0	68.0	61.0	56.0	50.0	48.0	45.0
Day	5	67.6	83.5	47.1	76.0	75.0	73.0	72.0	68.0	63.0	55.0	53.0	50.0
	6	70.4	89.0	53.4	79.0	77.0	75.0	74.0	70.0	66.0	57.0	56.0	54.0
	7	70.0	89.0	52.3	78.0	77.0	75.0	74.0	70.0	66.0	59.0	57.0	54.0
	8	68.5	85.1	47.6	78.0	77.0	74.0	73.0	68.0	63.0	53.0	52.0	50.0
	9	68.2	89.7	43.5	78.0	76.0	74.0	72.0	66.0	61.0	51.0	48.0	45.0
	10	67.4	88.0	40.5	78.0	76.0	73.0	71.0	66.0	60.0	49.0	47.0	44.0
	11	66.7	86.4	42.3	76.0	75.0	72.0	71.0	65.0	60.0	49.0	47.0	45.0
	12	66.2	83.7	40.5	77.0	75.0	72.0	70.0	65.0	59.0	47.0	44.0	41.0
	13	66.8	84.0	40.3	77.0	75.0	72.0	71.0	66.0	61.0	49.0	47.0	43.0
	14	67.3	85.9	39.2	77.0	75.0	73.0	71.0	66.0	61.0	49.0	45.0	41.0
	15	69.3	95.6	42.9	77.0	75.0	73.0	72.0	68.0	64.0	54.0	51.0	47.0
	16	67.5	84.8	42.9	75.0	74.0	73.0	72.0	68.0	64.0	54.0	52.0	49.0
	17	67.5	83.0	44.9	76.0	74.0	73.0	72.0	68.0	64.0	54.0	52.0	49.0
	18	68.2	83.6	49.3	76.0	75.0	73.0	72.0	69.0	65.0	56.0	54.0	51.0
	19	67.1	81.8	48.8	76.0	74.0	72.0	71.0	67.0	63.0	54.0	53.0	51.0
	20	65.7	82.5	48.2	75.0	73.0	71.0	70.0	66.0	61.0	53.0	52.0	50.0
	21	64.7	78.8	47.8	74.0	73.0	71.0	69.0	64.0	59.0	52.0	51.0	49.0
Night	22	65.0	88.1	47.9	75.0	73.0	70.0	68.0	63.0	58.0	52.0	51.0	49.0
	23	62.5	79.7	45.8	73.0	72.0	69.0	67.0	60.0	55.0	50.0	48.0	47.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link	JN: 9276		24-Hour	
	Analyst: A. Wolfe		Energy Average Leq	
	Date: 3/30/216		Day	Night
Location: L28 - Located south of the CV Link alignment on Tyler Street at the Sierra Vista Park.			63.0	58.9
				CNEL
				67.5

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	60.1	76.1	39.3	70.0	68.0	66.0	65.0	60.0	52.0	43.0	42.0	39.0
	Max	65.5	88.5	49.8	74.0	72.0	70.0	69.0	66.0	62.0	54.0	53.0	51.0
	Energy Average:	63.0	Average:		71.3	69.8	67.8	66.6	62.5	57.3	48.5	47.0	44.9
Night	Min	53.2	72.7	41.1	65.0	62.0	57.0	54.0	50.0	47.0	44.0	43.0	42.0
	Max	63.2	82.2	46.6	71.0	70.0	69.0	68.0	63.0	58.0	50.0	48.0	47.0
	Energy Average:	58.9	Average:		68.3	66.4	63.0	60.9	55.1	51.3	46.8	45.6	44.4

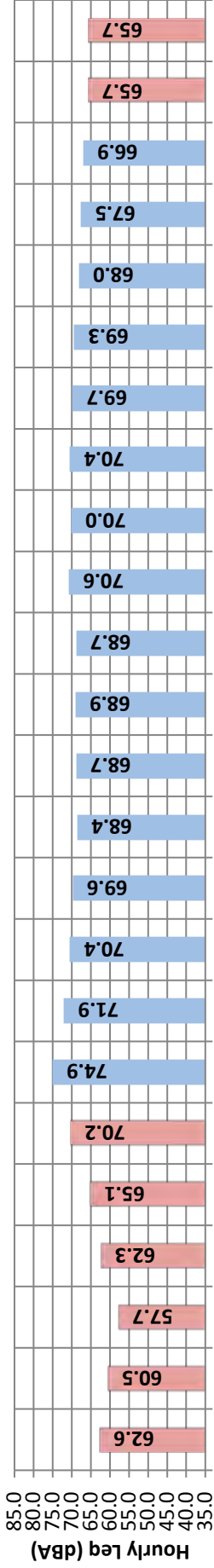
Hourly Summary

Night	0	57.2	73.7	44.1	68.0	66.0	62.0	60.0	56.0	51.0	47.0	46.0	45.0
	1	55.3	72.7	43.2	67.0	65.0	60.0	57.0	52.0	49.0	46.0	45.0	44.0
	2	53.2	73.7	41.1	65.0	62.0	57.0	54.0	50.0	47.0	44.0	43.0	42.0
	3	57.5	82.2	41.1	69.0	66.0	62.0	59.0	51.0	47.0	44.0	43.0	42.0
	4	58.9	81.9	42.2	69.0	68.0	65.0	63.0	55.0	50.0	46.0	45.0	43.0
Day	5	63.2	81.2	44.6	71.0	70.0	69.0	68.0	63.0	58.0	50.0	48.0	47.0
	6	64.9	79.8	49.8	74.0	72.0	70.0	69.0	65.0	61.0	54.0	53.0	51.0
	7	65.5	81.3	49.2	73.0	72.0	70.0	69.0	66.0	62.0	54.0	52.0	50.0
	8	62.5	78.8	45.2	71.0	70.0	68.0	67.0	62.0	57.0	49.0	48.0	47.0
	9	61.4	79.2	42.4	71.0	69.0	67.0	66.0	61.0	56.0	47.0	46.0	44.0
	10	61.8	82.7	41.0	71.0	69.0	67.0	66.0	61.0	54.0	45.0	44.0	42.0
	11	60.7	76.5	39.2	70.0	69.0	67.0	65.0	60.0	54.0	44.0	43.0	41.0
	12	60.1	76.1	36.3	70.0	68.0	66.0	65.0	60.0	52.0	43.0	42.0	39.0
	13	60.5	81.2	39.2	70.0	68.0	66.0	65.0	60.0	53.0	43.0	42.0	40.0
	14	63.1	83.4	39.9	73.0	71.0	68.0	66.0	62.0	55.0	44.0	42.0	41.0
	15	62.8	80.5	40.7	71.0	70.0	68.0	67.0	63.0	58.0	46.0	44.0	43.0
	16	63.0	83.1	40.5	71.0	70.0	68.0	67.0	63.0	58.0	46.0	47.0	43.0
	17	63.5	76.9	43.3	72.0	70.0	68.0	67.0	64.0	60.0	51.0	48.0	46.0
	18	64.8	88.5	48.4	73.0	71.0	69.0	67.0	64.0	60.0	53.0	51.0	50.0
	19	63.3	80.1	47.5	71.0	69.0	68.0	67.0	64.0	60.0	53.0	51.0	49.0
	20	62.8	80.0	47.1	70.0	69.0	67.0	67.0	63.0	59.0	51.0	50.0	48.0
	21	62.3	78.6	46.0	70.0	69.0	67.0	66.0	62.0	58.0	50.0	49.0	47.0
Night	22	60.3	77.4	46.6	69.0	67.0	65.0	64.0	59.0	56.0	49.0	48.0	47.0
	23	58.1	77.3	43.7	68.0	67.0	64.0	62.0	55.0	52.0	48.0	47.0	45.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link	JN: 9276		24-Hour	
	Analyst: A. Wolfe		Energy Average Leq	
	Date: 3/30/216		Day	Night
Location: L29 - Located near a future access point to the CV Link alignment on 52nd Avenue and existing residential homes.			70.1	65.2
				74.9

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	66.9	83.7	41.3	77.0	75.0	72.0	71.0	66.0	60.0	48.0	46.0	43.0
	Max	74.9	101.0	55.0	84.0	81.0	78.0	76.0	72.0	68.0	60.0	59.0	56.0
	Energy Average:	70.1	Average:		79.3	77.5	75.1	73.5	68.3	63.3	52.9	51.4	48.7
Night	Min	57.7	77.7	41.1	70.0	68.0	63.0	60.0	52.0	49.0	45.0	44.0	42.0
	Max	70.2	86.7	45.8	79.0	78.0	76.0	75.0	70.0	65.0	54.0	52.0	48.0
	Energy Average:	65.2	Average:		74.9	72.8	69.1	67.1	59.9	55.0	48.4	46.9	44.5

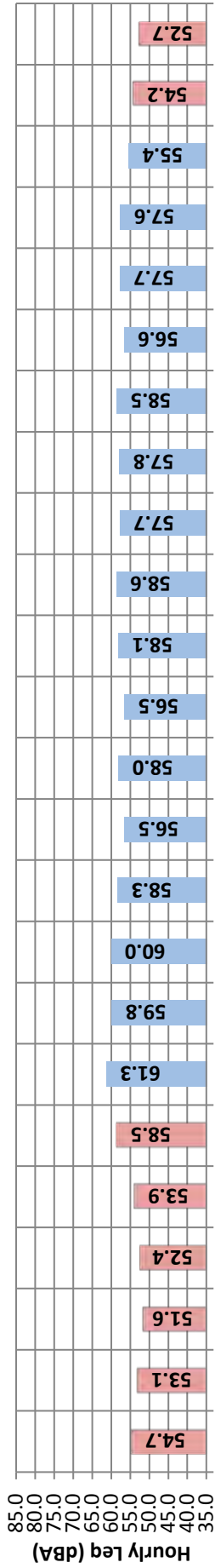
Hourly Summary

Night	0	62.6	84.2	42.3	74.0	71.0	68.0	66.0	59.0	54.0	48.0	46.0	43.0
	1	60.5	82.4	41.2	72.0	70.0	66.0	64.0	55.0	51.0	45.0	44.0	43.0
	2	57.7	77.7	41.3	70.0	68.0	63.0	60.0	52.0	49.0	45.0	44.0	42.0
	3	62.3	83.4	41.1	75.0	72.0	67.0	65.0	56.0	52.0	46.0	45.0	42.0
	4	65.1	84.9	43.5	77.0	75.0	71.0	69.0	61.0	55.0	49.0	47.0	44.0
Day	5	70.2	86.0	45.8	79.0	78.0	76.0	75.0	70.0	65.0	54.0	52.0	48.0
	6	74.9	101.0	55.0	84.0	81.0	78.0	76.0	72.0	68.0	60.0	59.0	56.0
	7	71.9	99.6	51.2	80.0	79.0	76.0	75.0	71.0	66.0	59.0	57.0	54.0
	8	70.4	87.5	50.1	80.0	78.0	76.0	75.0	70.0	65.0	55.0	54.0	51.0
	9	69.6	88.6	48.3	80.0	78.0	75.0	74.0	68.0	63.0	53.0	51.0	49.0
	10	68.4	86.2	45.2	79.0	77.0	74.0	73.0	67.0	60.0	50.0	49.0	47.0
	11	68.7	90.2	42.5	79.0	77.0	75.0	73.0	66.0	60.0	48.0	47.0	44.0
	12	68.9	88.6	44.3	80.0	78.0	75.0	73.0	66.0	60.0	48.0	47.0	45.0
	13	68.7	87.0	41.3	79.0	78.0	75.0	73.0	67.0	61.0	48.0	46.0	44.0
	14	70.6	93.4	42.2	80.0	78.0	76.0	74.0	69.0	63.0	49.0	47.0	43.0
	15	70.0	89.7	44.8	79.0	78.0	76.0	74.0	69.0	65.0	52.0	50.0	47.0
	16	70.4	88.1	42.4	80.0	78.0	76.0	75.0	70.0	65.0	52.0	50.0	45.0
	17	69.7	88.9	47.0	78.0	77.0	75.0	74.0	69.0	65.0	55.0	54.0	52.0
	18	69.3	91.6	48.4	78.0	77.0	75.0	73.0	69.0	64.0	55.0	53.0	50.0
	19	68.0	84.4	49.6	78.0	76.0	74.0	72.0	67.0	63.0	55.0	53.0	51.0
	20	67.5	85.8	50.7	77.0	75.0	73.0	71.0	67.0	62.0	55.0	54.0	52.0
	21	66.9	83.7	48.6	77.0	75.0	72.0	71.0	66.0	62.0	53.0	51.0	49.0
Night	22	65.7	84.2	44.5	76.0	74.0	71.0	69.0	64.0	58.0	51.0	50.0	47.0
	23	65.7	86.7	42.5	76.0	74.0	71.0	69.0	62.0	56.0	49.0	47.0	45.0

24-Hour Noise Level Measurement Summary

Project Name: CV Link	JN: 9276		24-Hour	
	Analyst: A. Wolfe		Energy Average Leq	
	Date: 3/30/216		Day	Night
Location: L30 - Located near a future access point to the CV Link alignment on 52nd Avenue and existing residential homes.			58.3	54.4
				CNEL
				63.0

Hourly Leq dBA Readings (unadjusted)



Hour Beginning

Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	55.4	70.9	42.8	63.0	61.0	59.0	58.0	54.0	52.0	47.0	46.0	44.0
	Max	61.3	86.6	51.9	70.0	67.0	65.0	64.0	61.0	59.0	55.0	54.0	53.0
	Energy Average:	58.3	Average:		68.1	65.6	61.9	60.3	56.3	53.8	49.6	48.6	46.9
Night	Min	51.6	65.0	40.1	59.0	58.0	56.0	55.0	51.0	48.0	43.0	42.0	41.0
	Max	58.5	79.3	44.9	67.0	65.0	62.0	61.0	58.0	55.0	50.0	48.0	47.0
	Energy Average:	54.4	Average:		61.5	60.3	58.3	57.1	53.8	50.6	45.5	44.4	43.0

Hourly Summary

Night	0	54.7	69.8	42.3	63.0	63.0	60.0	58.0	54.0	51.0	46.0	46.0	44.0
	1	59.8	80.1	48.9	70.0	67.0	63.0	62.0	58.0	56.0	52.0	52.0	50.0
	2	60.0	86.6	47.8	69.0	67.0	63.0	61.0	58.0	55.0	51.0	50.0	49.0
	3	51.6	73.4	40.6	59.0	58.0	56.0	55.0	51.0	48.0	43.0	42.0	41.0
	4	52.4	69.6	40.4	60.0	58.0	57.0	56.0	53.0	49.0	43.0	42.0	41.0
	5	53.9	70.7	40.6	61.0	60.0	58.0	57.0	54.0	51.0	45.0	44.0	42.0
Day	6	58.5	79.3	44.9	67.0	65.0	62.0	61.0	58.0	55.0	50.0	48.0	47.0
	7	61.3	79.7	51.9	70.0	67.0	63.0	64.0	61.0	59.0	55.0	54.0	53.0
	8	59.8	80.1	48.9	70.0	67.0	63.0	62.0	58.0	56.0	52.0	52.0	50.0
	9	60.0	86.6	47.8	69.0	67.0	63.0	61.0	58.0	55.0	51.0	50.0	49.0
	10	58.3	83.6	45.6	68.0	65.0	62.0	60.0	56.0	53.0	50.0	48.0	47.0
	11	56.5	73.9	43.0	67.0	65.0	61.0	59.0	55.0	52.0	48.0	47.0	45.0
	12	58.0	77.6	43.9	69.0	67.0	63.0	61.0	55.0	52.0	48.0	47.0	45.0
	13	56.5	75.6	42.8	68.0	65.0	60.0	58.0	54.0	52.0	47.0	46.0	45.0
	14	58.1	80.7	43.0	70.0	67.0	62.0	60.0	54.0	52.0	48.0	47.0	44.0
	15	58.6	76.5	44.4	70.0	67.0	64.0	62.0	57.0	54.0	49.0	48.0	46.0
	16	57.7	74.0	43.7	69.0	67.0	62.0	60.0	56.0	53.0	49.0	48.0	46.0
	17	57.8	77.1	43.9	68.0	66.0	62.0	60.0	56.0	53.0	49.0	48.0	46.0
	18	58.5	76.6	44.3	68.0	66.0	62.0	61.0	58.0	55.0	51.0	50.0	47.0
	19	56.6	70.9	44.0	65.0	63.0	61.0	59.0	56.0	54.0	49.0	48.0	46.0
	20	57.7	76.8	46.1	68.0	64.0	61.0	60.0	56.0	53.0	49.0	48.0	47.0
	21	57.6	77.1	45.6	68.0	65.0	61.0	60.0	56.0	54.0	49.0	48.0	47.0
	22	55.4	72.3	45.3	63.0	61.0	59.0	58.0	55.0	53.0	49.0	48.0	47.0
	23	54.2	73.8	43.2	62.0	60.0	58.0	57.0	54.0	51.0	47.0	46.0	44.0
	24	52.7	65.0	41.8	59.0	58.0	57.0	56.0	53.0	50.0	45.0	44.0	43.0

APPENDIX 6.1:

CADNAA MODEL DATA INPUTS

This page intentionally left blank

09276 - CV Link

CadnaA Noise Prediction Model

09276-16.cna

Date:

28.06.16

Analyst:

A.Wolfe

Line Source(s)

Name	Lw / Li	
	Type	Value
CV Link Alignment 001	Lw'	84.900000
CV Link Alignment 002	Lw'	84.900000
CV Link Alignment 003	Lw'	84.900000
CV Link Alignment 004	Lw'	84.900000
CV Link Alignment 005	Lw'	84.900000
CV Link Alignment 006	Lw'	84.900000
CV Link Alignment 007	Lw'	84.900000
CV Link Alignment 008	Lw'	84.900000
CV Link Alignment 009	Lw'	84.900000
CV Link Alignment 010	Lw'	84.900000
CV Link Alignment 011	Lw'	84.900000
CV Link Alignment 012	Lw'	84.900000
CV Link Alignment 013	Lw'	84.900000
CV Link Alignment 014	Lw'	84.900000
CV Link Alignment 015	Lw'	84.900000
CV Link Alignment 016	Lw'	84.900000
CV Link Alignment 017	Lw'	84.900000
CV Link Alignment 018	Lw'	84.900000
CV Link Alignment 019	Lw'	84.900000
CV Link Alignment 020	Lw'	84.900000
CV Link Alignment 021	Lw'	84.900000
CV Link Alignment 022	Lw'	84.900000
CV Link Alignment 023	Lw'	84.900000
CV Link Alignment 024	Lw'	84.900000
CV Link Alignment 025	Lw'	84.900000
CV Link Alignment 026	Lw'	84.900000
CV Link Alignment 027	Lw'	84.900000
CV Link Alignment 028	Lw'	84.900000
CV Link Alignment 029	Lw'	84.900000
CV Link Alignment 030	Lw'	84.900000
CV Link Alignment 031	Lw'	84.900000
CV Link Alignment 032	Lw'	84.900000
CV Link Alignment 033	Lw'	84.900000
CV Link Alignment 034	Lw'	84.900000
CV Link Alignment 035	Lw'	84.900000
CV Link Alignment 036	Lw'	84.900000
CV Link Alignment 037	Lw'	84.900000
CV Link Alignment 038	Lw'	84.900000
CV Link Alignment 039	Lw'	84.900000
CV Link Alignment 040	Lw'	84.900000
CV Link Alignment 041	Lw'	84.900000
CV Link Alignment 042	Lw'	84.900000
CV Link Alignment 043	Lw'	84.900000
CV Link Alignment 044	Lw'	84.900000
CV Link Alignment 045	Lw'	84.900000
CV Link Alignment 046	Lw'	84.900000
CV Link Alignment 047	Lw'	84.900000
CV Link Alignment 048	Lw'	84.900000
CV Link Alignment 049	Lw'	84.900000
CV Link Alignment 050	Lw'	84.900000
CV Link Alignment 051	Lw'	84.900000
CV Link Alignment 052	Lw'	84.900000
CV Link Alignment 053	Lw'	84.900000
CV Link Alignment 054	Lw'	84.900000
CV Link Alignment 055	Lw'	84.900000
CV Link Alignment 056	Lw'	84.900000
CV Link Alignment 057	Lw'	84.900000
CV Link Alignment 058	Lw'	84.900000
CV Link Alignment 059	Lw'	84.900000
CV Link Alignment 060	Lw'	84.900000
CV Link Alignment 061	Lw'	84.900000
CV Link Alignment 062	Lw'	84.900000
CV Link Alignment 063	Lw'	84.900000
CV Link Alignment 064	Lw'	84.900000
CV Link Alignment 065	Lw'	84.900000
CV Link Alignment 066	Lw'	84.900000

Name	Lw / Li	
	Type	Value
CV Link Alignment 067	Lw'	84.900000
CV Link Alignment 068	Lw'	84.900000
CV Link Alignment 069	Lw'	84.900000
CV Link Alignment 070	Lw'	84.900000
CV Link Alignment 071	Lw'	84.900000
CV Link Alignment 072	Lw'	84.900000
CV Link Alignment 073	Lw'	84.900000
CV Link Alignment 074	Lw'	84.900000
CV Link Alignment 075	Lw'	84.900000

Barrier(s)

Name	Absorption		Height	
	left	right	Begin	
			(m)	
Existing Barrier 001	0.21	0.21	1.83	r
Existing Barrier 002	0.21	0.21	1.83	r
Existing Barrier 003	0.21	0.21	1.83	r
Existing Barrier 004	0.21	0.21	1.83	r
Existing Barrier 005	0.21	0.21	1.83	r
Existing Barrier 006	0.21	0.21	1.83	r
Existing Barrier 007	0.21	0.21	1.83	r
Existing Barrier 008	0.21	0.21	1.83	r
Existing Barrier 009	0.21	0.21	1.83	r
Existing Barrier 010	0.21	0.21	1.83	r
Existing Barrier 011	0.21	0.21	1.83	r
Existing Barrier 012	0.21	0.21	1.83	r
Existing Barrier 013	0.21	0.21	1.83	r
Existing Barrier 014	0.21	0.21	1.83	r
Existing Barrier 015	0.21	0.21	1.83	r
Existing Barrier 016	0.21	0.21	1.83	r
Existing Barrier 017	0.21	0.21	1.83	r
Existing Barrier 018	0.21	0.21	1.83	r
Existing Barrier 019	0.21	0.21	1.83	r
Existing Barrier 020	0.21	0.21	1.83	r
Existing Barrier 021	0.21	0.21	1.83	r
Existing Barrier 022	0.21	0.21	1.52	r
Existing Barrier 023	0.21	0.21	1.83	r
Existing Barrier 024	0.21	0.21	1.22	r
Existing Barrier 025	0.21	0.21	1.83	r
Existing Barrier 026	0.21	0.21	1.83	r
Existing Barrier 027	0.21	0.21	1.83	r
Existing Barrier 028	0.21	0.21	1.83	r
Existing Barrier 029	0.21	0.21	1.83	r
Existing Barrier 030	0.21	0.21	1.83	r
Existing Barrier 031	0.21	0.21	1.22	r
Existing Barrier 032	0.21	0.21	1.22	r
Existing Barrier 033	0.21	0.21	1.83	r
Existing Barrier 034	0.21	0.21	1.83	r
Existing Barrier 035	0.21	0.21	1.83	r
Existing Barrier 036	0.21	0.21	1.83	r
Existing Barrier 037	0.21	0.21	1.83	r
Existing Barrier 038	0.21	0.21	1.83	r
Existing Barrier 039	0.21	0.21	1.83	r
Existing Barrier 040	0.21	0.21	1.83	r
Existing Barrier 041	0.21	0.21	1.83	r
Existing Barrier 042	0.21	0.21	1.83	r
Existing Barrier 043	0.21	0.21	1.83	r
Existing Barrier 044	0.21	0.21	1.83	r
Existing Barrier 045	0.21	0.21	1.83	r
Existing Barrier 046	0.21	0.21	1.83	r
Existing Barrier 047	0.21	0.21	1.83	r
Existing Barrier 048	0.21	0.21	1.83	r
Existing Barrier 049	0.21	0.21	1.83	r
Existing Barrier 050	0.21	0.21	1.83	r
Existing Barrier 051	0.21	0.21	1.83	r
Existing Barrier 052	0.21	0.21	1.22	r
Existing Barrier 053	0.21	0.21	1.22	r
Existing Barrier 054	0.21	0.21	1.22	r
Existing Barrier 055	0.21	0.21	1.22	r
Existing Barrier 056	0.21	0.21	1.22	r
Existing Barrier 057	0.21	0.21	1.83	r
Existing Barrier 058	0.21	0.21	1.83	r
Existing Barrier 059	0.21	0.21	1.83	r
Existing Barrier 060	0.21	0.21	1.22	r
Existing Barrier 061	0.21	0.21	1.83	r
Existing Barrier 062	0.21	0.21	1.22	r

Name	Absorption		Height Begin (m)	
	left	right		
Existing Barrier 063	0.21	0.21	1.83	r
Existing Barrier 064	0.21	0.21	1.83	r
Existing Barrier 065	0.21	0.21	1.83	r
Existing Barrier 066	0.21	0.21	1.83	r
Existing Barrier 067	0.21	0.21	1.83	r
Existing Barrier 068	0.21	0.21	1.83	r
Existing Barrier 069	0.21	0.21	1.83	r
Existing Barrier 070	0.21	0.21	1.83	r
Existing Barrier 071	0.21	0.21	1.83	r
Existing Barrier 072	0.21	0.21	1.83	r
Existing Barrier 073	0.21	0.21	1.83	r
Existing Barrier 074	0.21	0.21	1.83	r
Existing Barrier 075	0.21	0.21	1.83	r
Existing Barrier 076	0.21	0.21	1.22	r
Existing Barrier 077	0.21	0.21	1.22	r
Existing Barrier 078	0.21	0.21	1.83	r
Existing Barrier 079	0.21	0.21	1.83	r
Existing Barrier 080	0.21	0.21	1.83	r
Existing Barrier 081	0.21	0.21	1.52	r
Existing Barrier 082	0.21	0.21	1.52	r
Existing Barrier 083	0.21	0.21	1.52	r
Existing Barrier 084	0.21	0.21	1.83	r
Existing Barrier 085	0.21	0.21	1.83	r
Existing Barrier 086	0.21	0.21	1.83	r
Existing Barrier 087	0.21	0.21	1.83	r
Existing Barrier 088	0.21	0.21	1.83	r
Existing Barrier 089	0.21	0.21	1.83	r
Existing Barrier 090	0.21	0.21	1.83	r
Existing Barrier 091	0.21	0.21	1.83	r
Existing Barrier 092	0.21	0.21	1.83	r
Existing Barrier 093	0.21	0.21	1.83	r
Existing Barrier 094	0.21	0.21	1.83	r
Existing Barrier 095	0.21	0.21	1.83	r
Existing Barrier 096	0.21	0.21	1.83	r
Existing Barrier 097	0.21	0.21	1.83	r
Existing Barrier 098	0.21	0.21	1.83	r
Existing Barrier 099	0.21	0.21	1.83	r
Existing Barrier 100	0.21	0.21	1.83	r
Existing Barrier 101	0.21	0.21	1.83	r
Existing Barrier 102	0.21	0.21	1.83	r
Existing Barrier 103	0.21	0.21	1.83	r
Existing Barrier 104	0.21	0.21	1.83	r
Existing Barrier 105	0.21	0.21	1.83	r
Existing Barrier 106	0.21	0.21	1.83	r
Existing Barrier 107	0.21	0.21	1.83	r
Existing Barrier 108	0.21	0.21	1.52	r
Existing Barrier 109	0.21	0.21	1.52	r
Existing Barrier 110	0.21	0.21	1.52	r
Existing Barrier 111	0.21	0.21	1.83	r
Existing Barrier 112	0.21	0.21	1.83	r
Existing Barrier 113	0.21	0.21	1.83	r
Existing Barrier 114	0.21	0.21	1.83	r
Existing Barrier 115	0.21	0.21	1.52	r
Existing Barrier 116	0.21	0.21	1.83	r
Existing Barrier 117	0.21	0.21	1.83	r
Existing Barrier 118	0.21	0.21	1.83	r
Existing Barrier 119	0.21	0.21	1.83	r
Existing Barrier 120	0.21	0.21	2.44	r
Existing Barrier 121	0.21	0.21	1.83	r
Existing Barrier 122	0.21	0.21	1.83	r
Existing Barrier 123	0.21	0.21	1.52	r
Existing Barrier 124	0.21	0.21	1.83	r
Existing Barrier 125	0.21	0.21	1.83	r
Existing Barrier 126	0.21	0.21	1.83	r
Existing Barrier 127	0.21	0.21	1.83	r
Existing Barrier 128	0.21	0.21	1.83	r
Existing Barrier 129	0.21	0.21	1.83	r
Existing Barrier 130	0.21	0.21	1.83	r
Existing Barrier 131	0.21	0.21	1.83	r
Existing Barrier 132	0.21	0.21	1.83	r
Existing Barrier 133	0.21	0.21	1.83	r
Existing Barrier 134	0.21	0.21	1.83	r
Existing Barrier 135	0.21	0.21	1.83	r
Existing Barrier 136	0.21	0.21	1.83	r
Existing Barrier 137	0.21	0.21	1.83	r
Existing Barrier 138	0.21	0.21	1.83	r

Name	Absorption		Height	
	left	right	Begin	
			(m)	
Existing Barrier 139	0.21	0.21	1.83	r
Existing Barrier 140	0.21	0.21	1.83	r
Existing Barrier 141	0.21	0.21	1.83	r
Existing Barrier 142	0.21	0.21	1.83	r
Existing Barrier 143	0.21	0.21	1.83	r
Existing Barrier 144	0.21	0.21	1.83	r
Existing Barrier 145	0.21	0.21	1.83	r
Existing Barrier 146	0.21	0.21	1.83	r
Existing Barrier 147	0.21	0.21	1.83	r
Existing Barrier 148	0.21	0.21	1.83	r
Existing Barrier 149	0.21	0.21	1.83	r
Existing Barrier 150	0.21	0.21	1.83	r
Existing Barrier 151	0.21	0.21	1.83	r
Existing Barrier 152	0.21	0.21	1.83	r
Existing Barrier 153	0.21	0.21	1.83	r
Existing Barrier 154	0.21	0.21	1.83	r

APPENDIX 6.2:

RCNM NOISE MODEL

This page intentionally left blank



U.S. Department
of Transportation

**Federal Highway
Administration**

FHWA-HEP-05-054
DOT-VNTSC-FHWA-05-01

FHWA

Roadway Construction Noise Model

User's Guide

Final Report
January 2006



Prepared for
U.S. Department of Transportation
Federal Highway Administration
Office of Natural and Human Environment
Washington, DC 20590

Prepared by
U.S. Department of Transportation
Research and Innovative Technology Administration
John A. Volpe National Transportation Systems Center
Acoustics Facility
Cambridge, MA 02142

Table 1. CA/T equipment noise emissions and acoustical usage factors database.

CA/T Noise Emission Reference Levels and Usage Factors					
filename: EQUIPLST.xls					
revised: 7/26/05					
	Impact	Acoustical Use Factor	Spec 721.560 Lmax @ 50ft	Actual Measured Lmax @ 50ft	No. of Actual Data Samples
Equipment Description	Device ?	(%)	(dBA, slow)	(dBA, slow)	(Count)
				(samples averaged)	
All Other Equipment > 5 HP	No	50	85	-- N/A --	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	-- N/A --	0
Blasting	Yes	-- N/A --	94	-- N/A --	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	-- N/A --	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	-- N/A --	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydr. Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	-- N/A --	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarafier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/chipping gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	-- N/A --	0
Tractor	No	40	84	-- N/A --	0
Vacuum Excavator (Vac-truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder / Torch	No	40	73	74	5

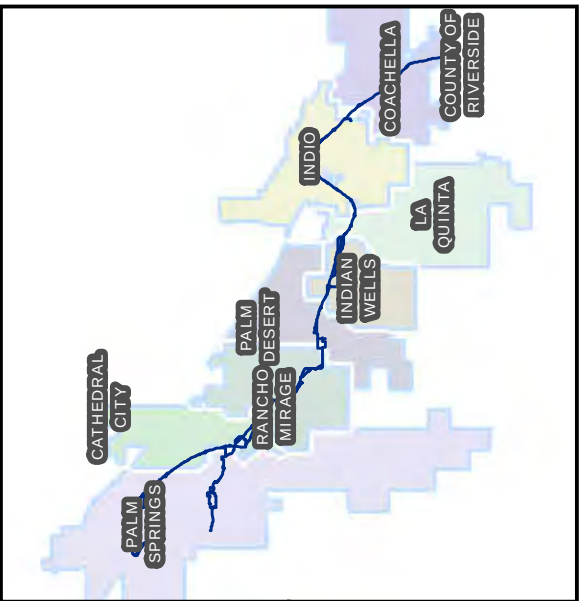
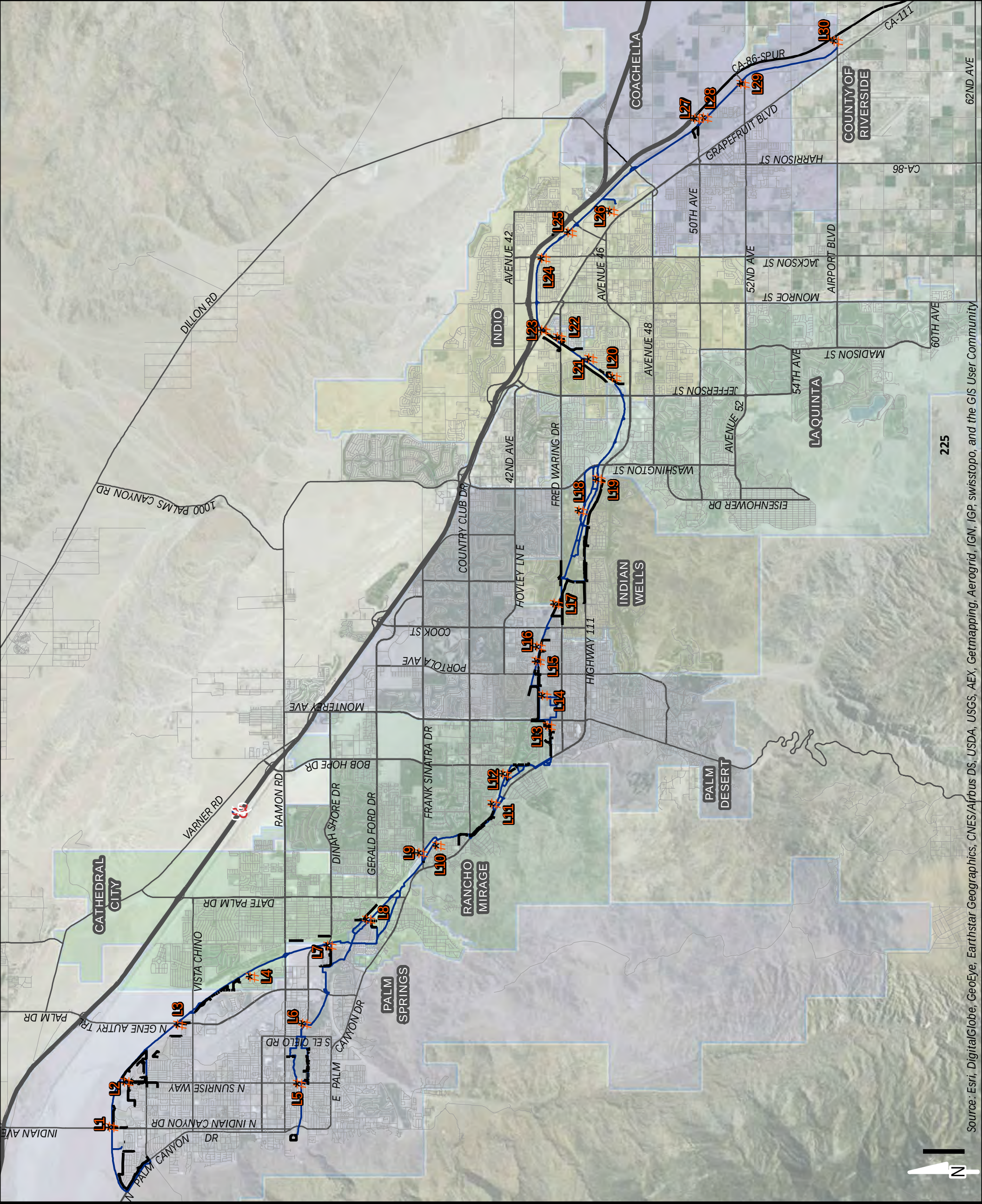
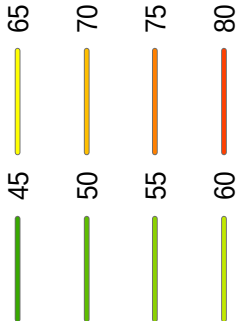
APPENDIX 7.1:

OPERATIONAL NOISE CONTOUR BOUNDARIES

This page intentionally left blank

LEGEND:

- CV Link Alignment
- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)



Feet

LEGEND:

- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80

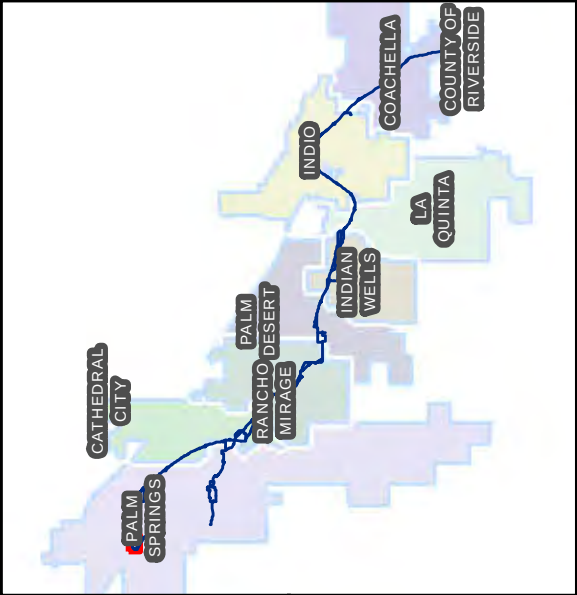
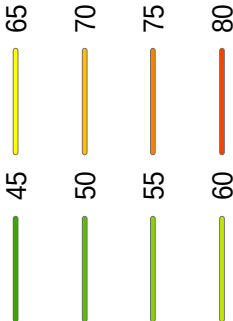


LEGEND:

Existing Barrier Height (in feet)

Existing Barrier

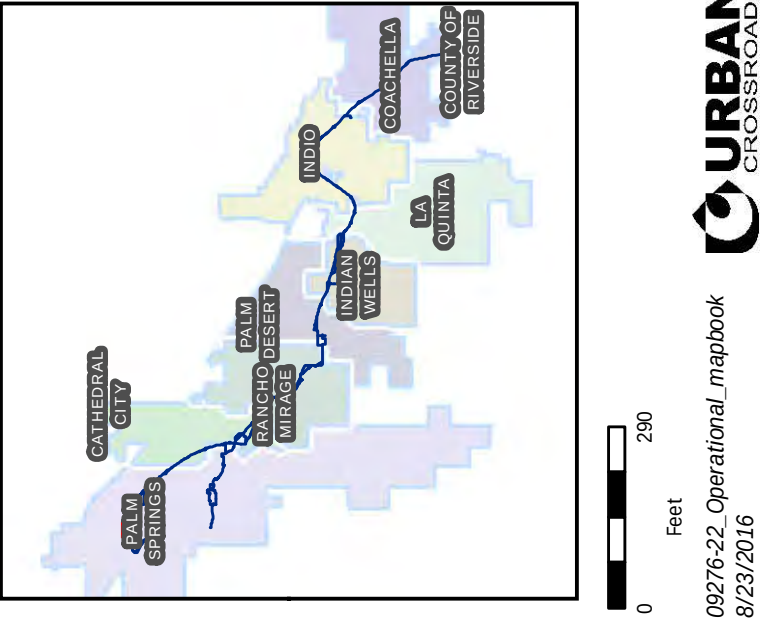
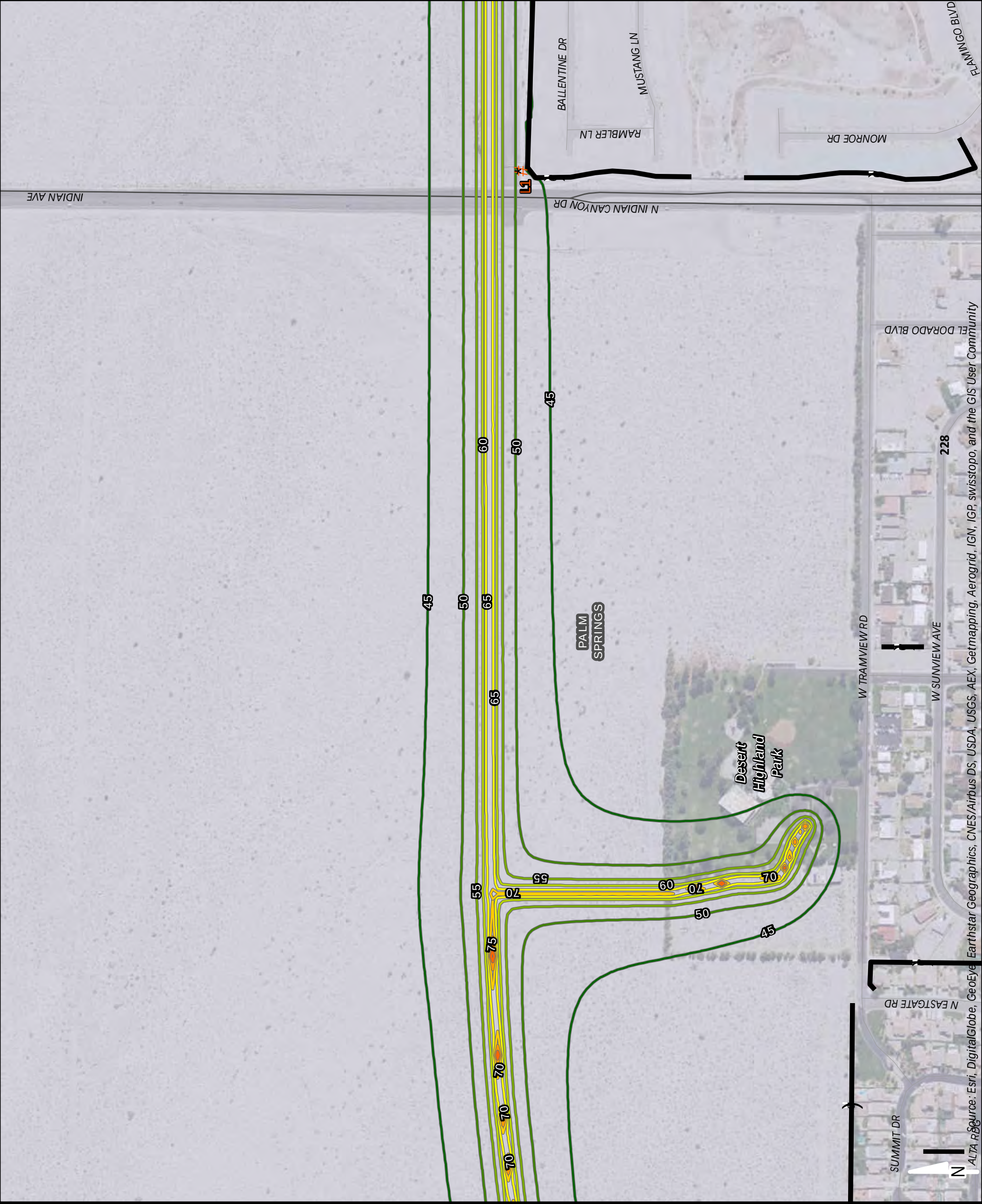
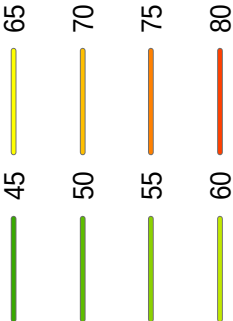
Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

-  Noise Level Measurement Locations
-  Existing Barrier Height (in feet)
-  Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)

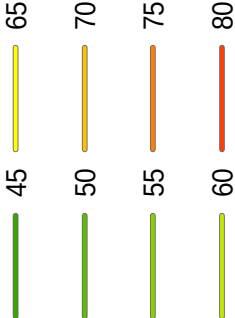


LEGEND:

 Existing Barrier Height (in feet)

 Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



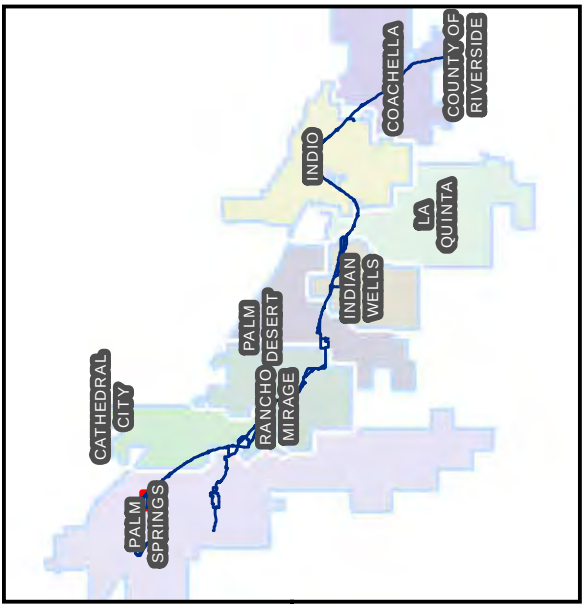
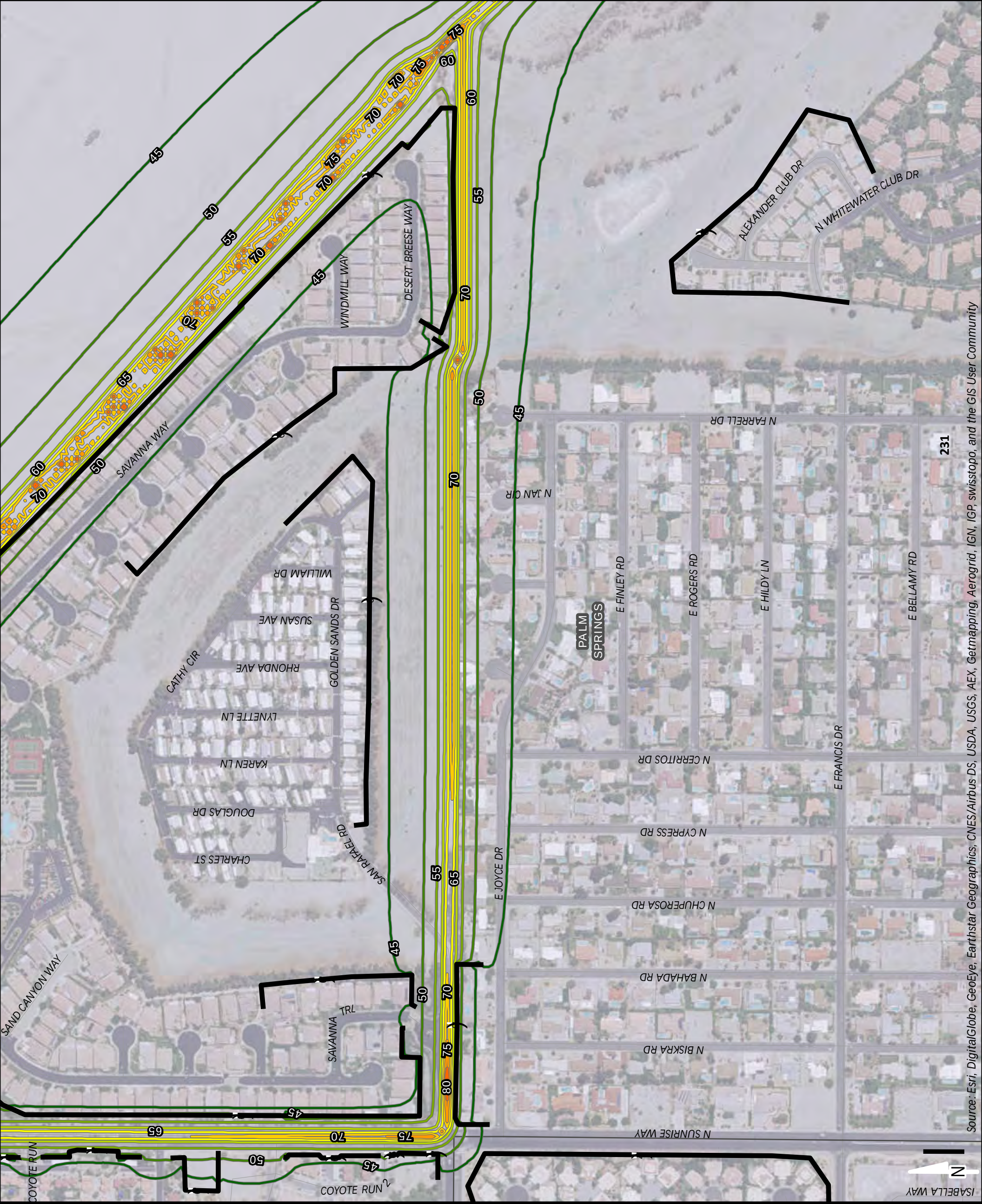
LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
 - 45
 - 50
 - 55
 - 60
 - 65
 - 70
 - 75
 - 80



LEGEND:

- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80

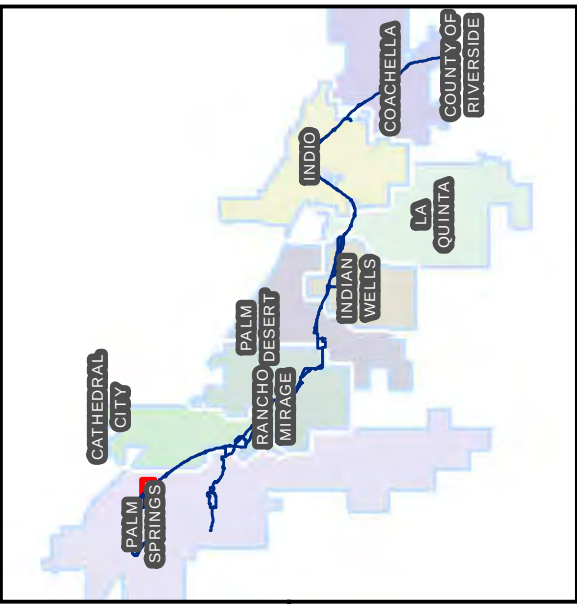
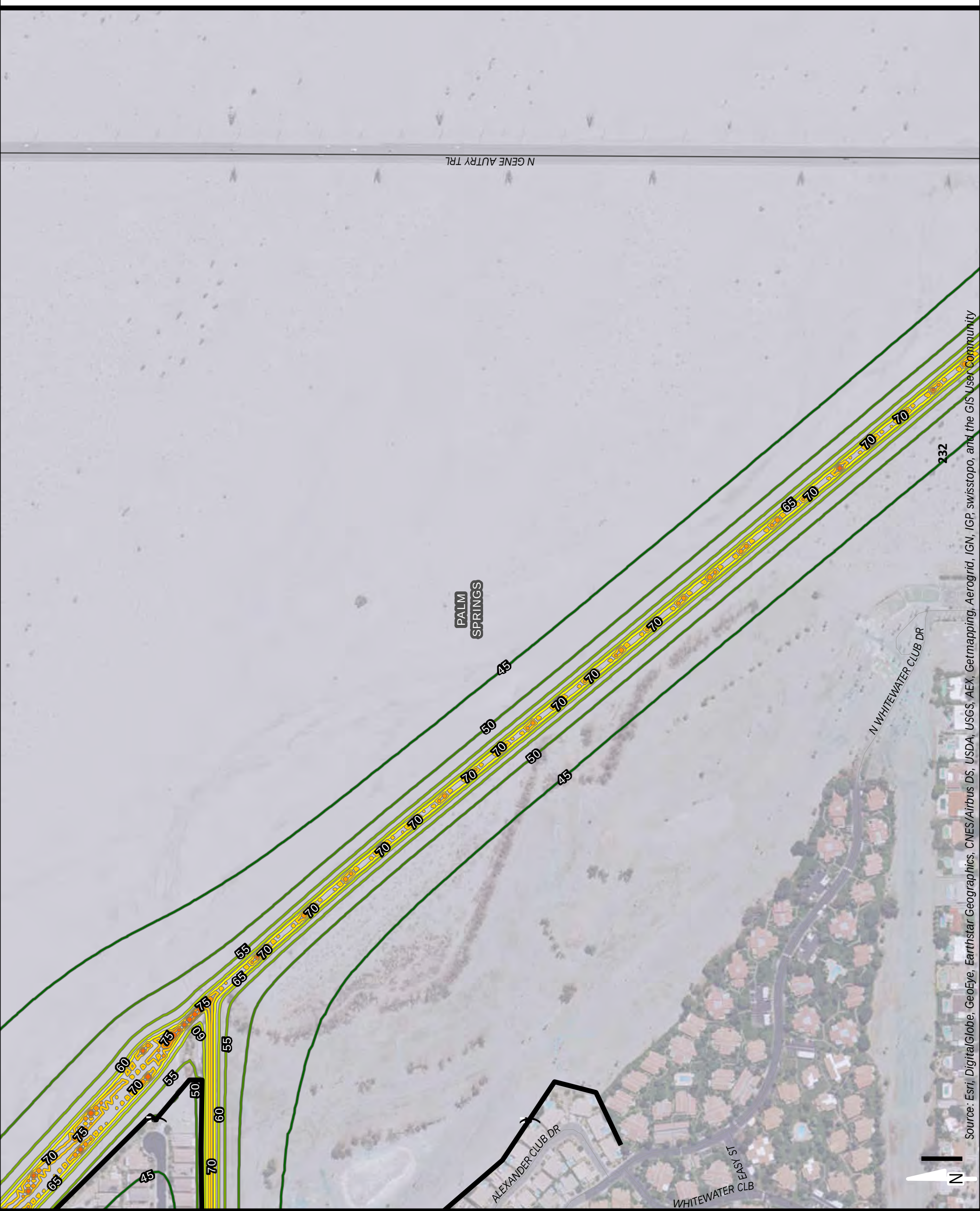
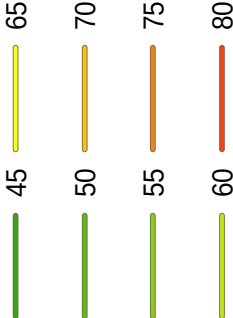


LEGEND:

Existing Barrier Height (in feet)

Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)

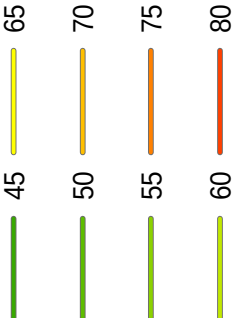


Feet

LEGEND:

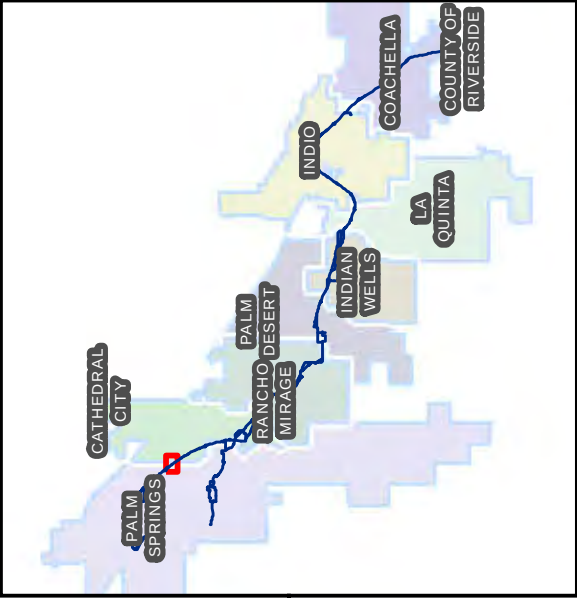
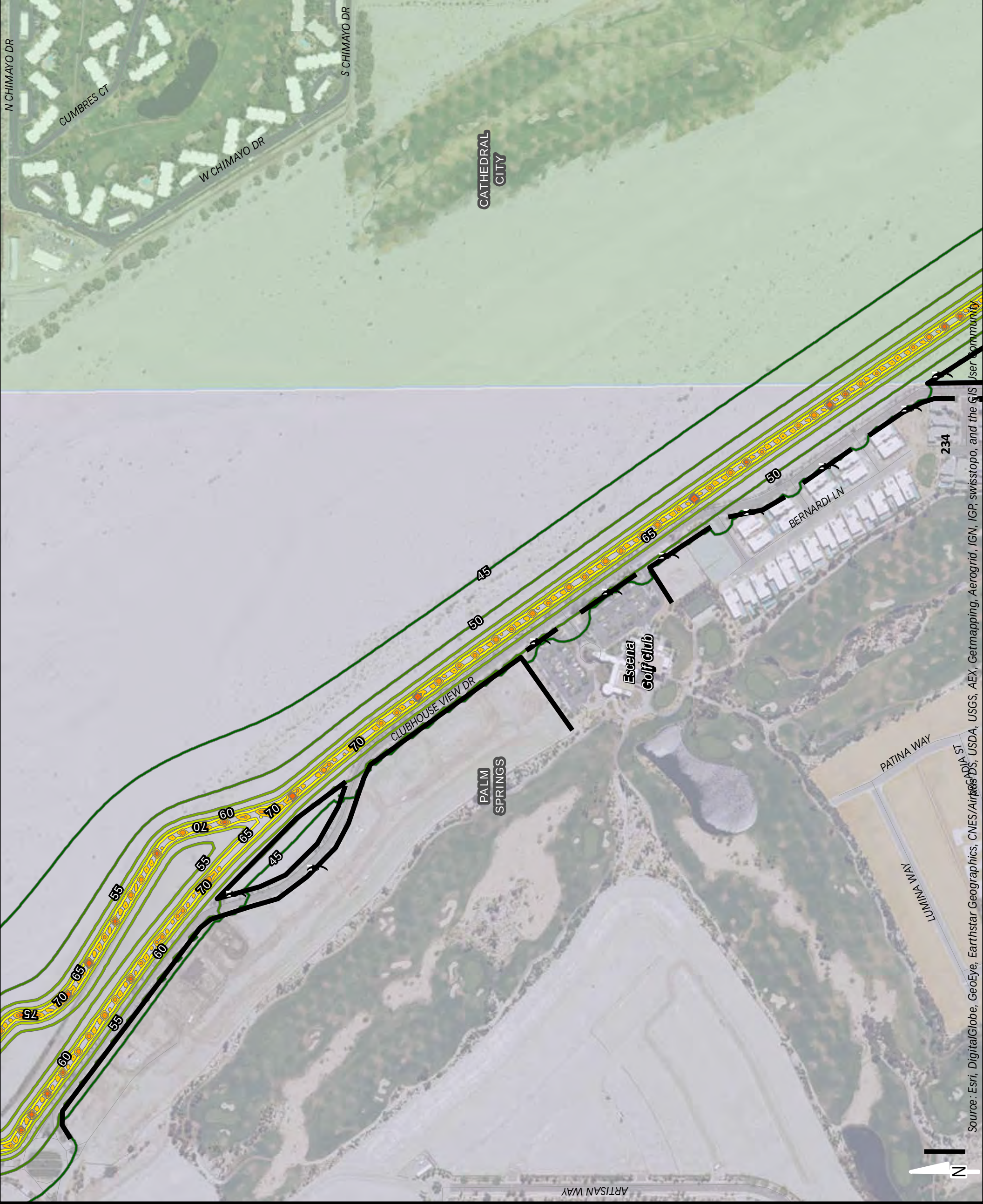
- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80



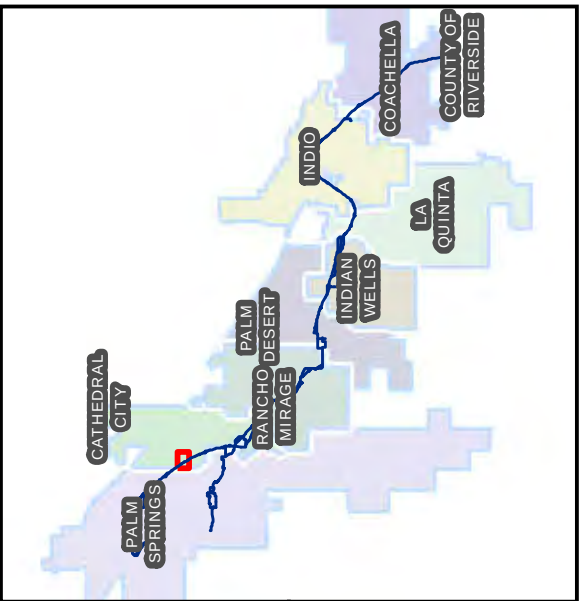
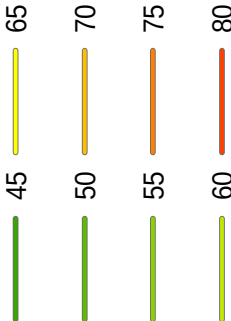
0 290
Feet

LEGEND:

Existing Barrier Height (in feet)

Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)

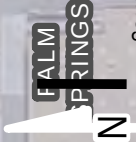
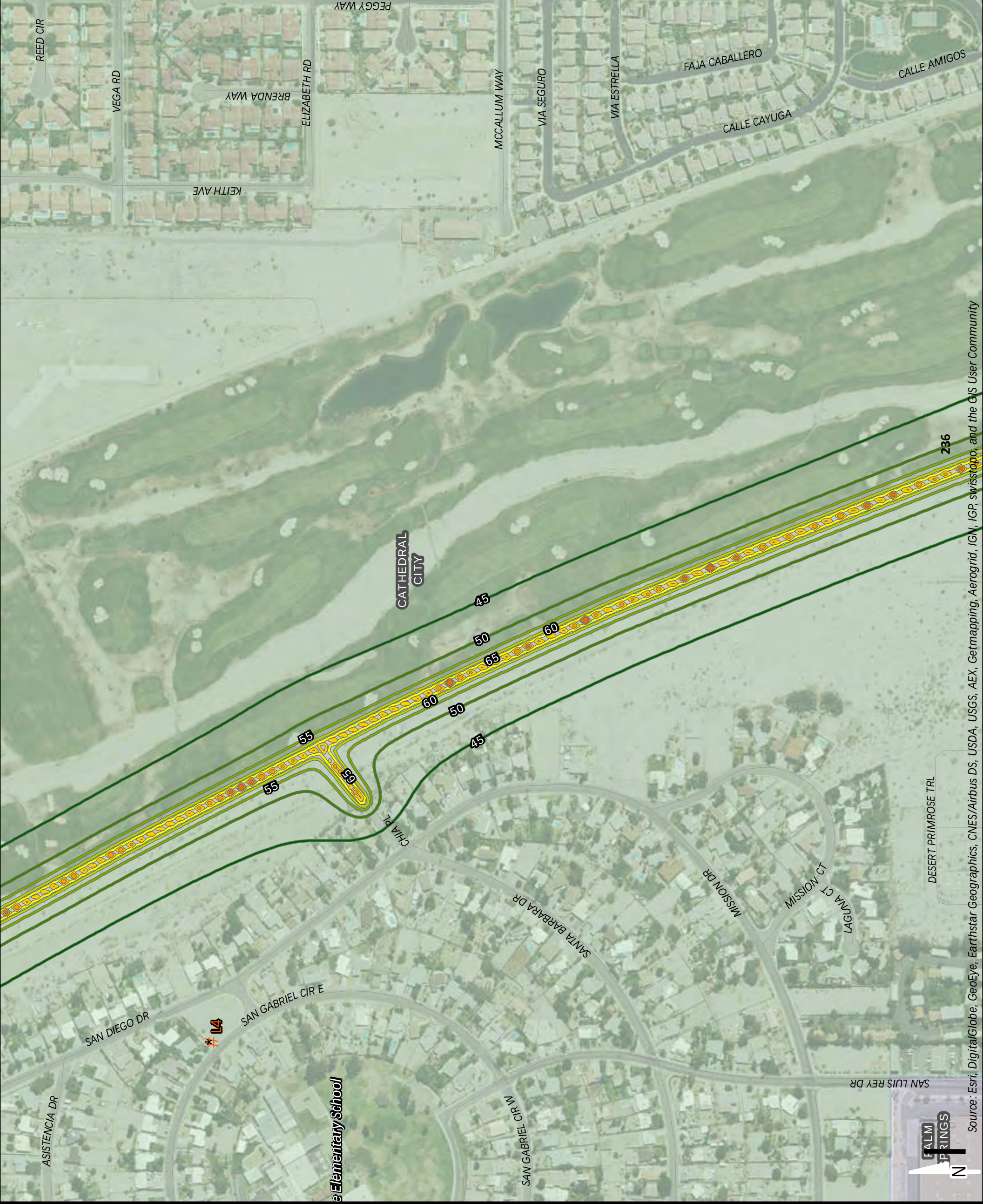
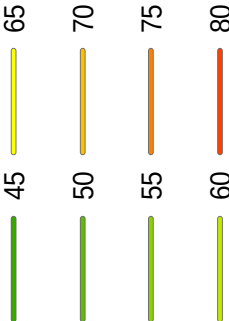


Feet

LEGEND:

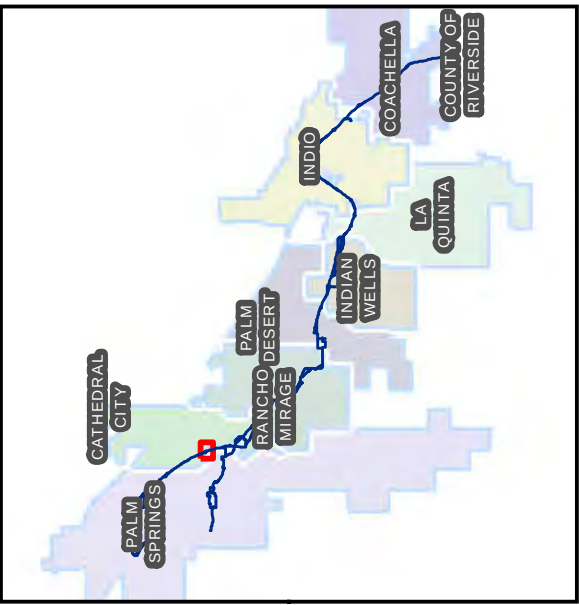
- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

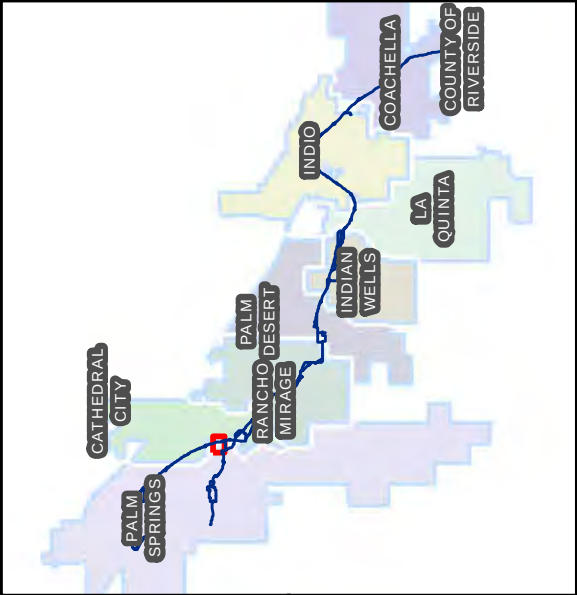
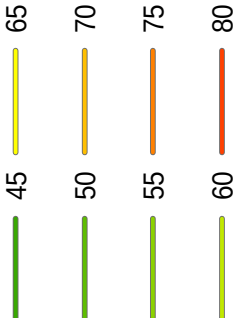
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80



LEGEND:

- Existing Barrier Height (in feet)
- Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



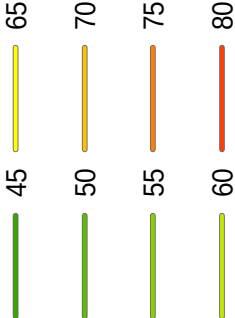
Feet

LEGEND:

Existing Barrier Height (in feet)

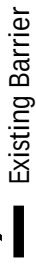
Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)

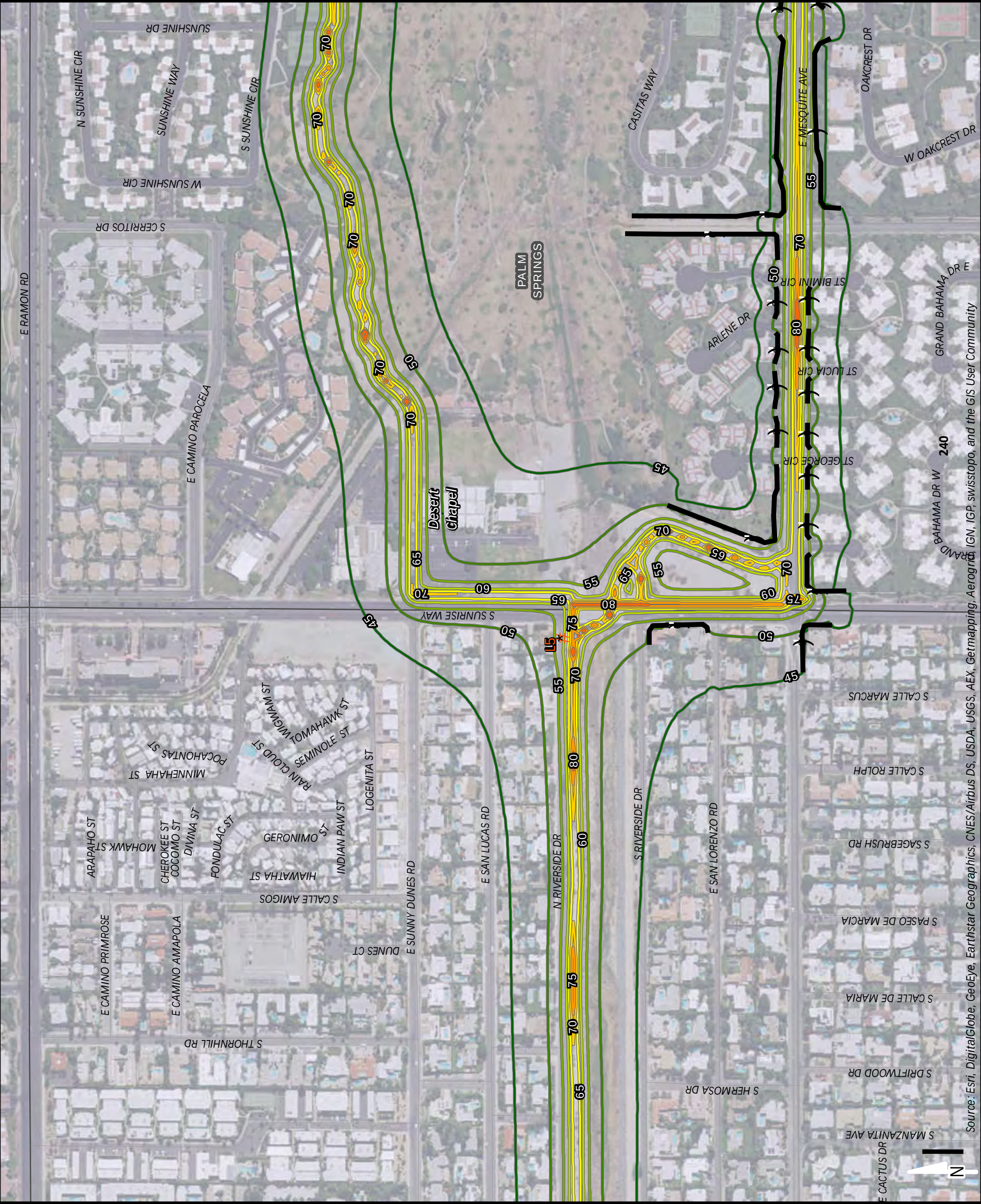
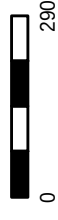
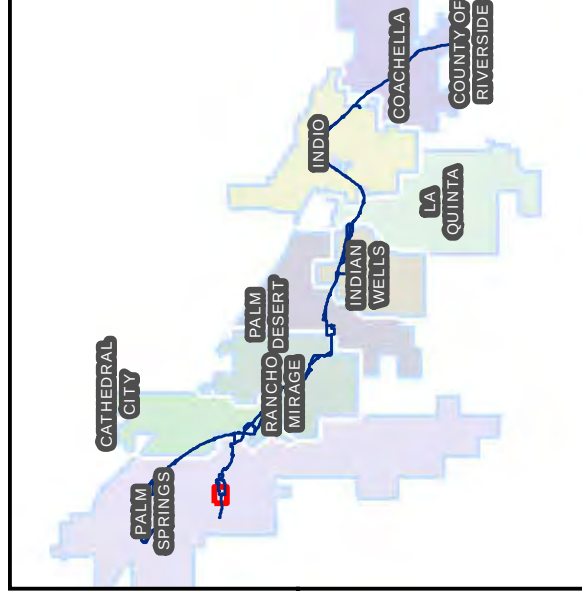
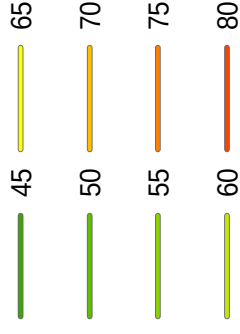


Feet

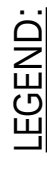
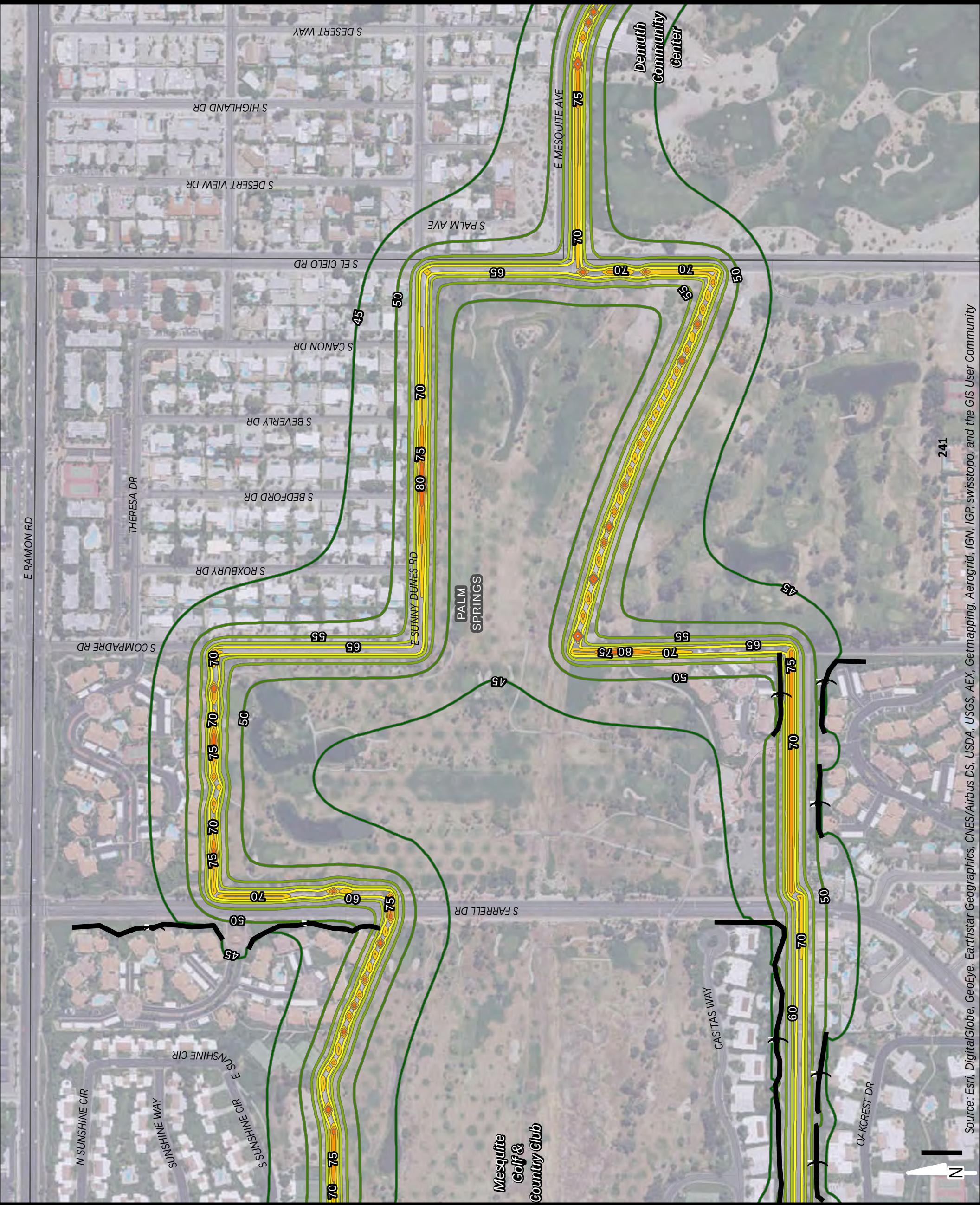
cV Link Operational Noise Level Contour Boundaries



Unmitigated Noise Level
Contour Boundaries (dBA Leq)

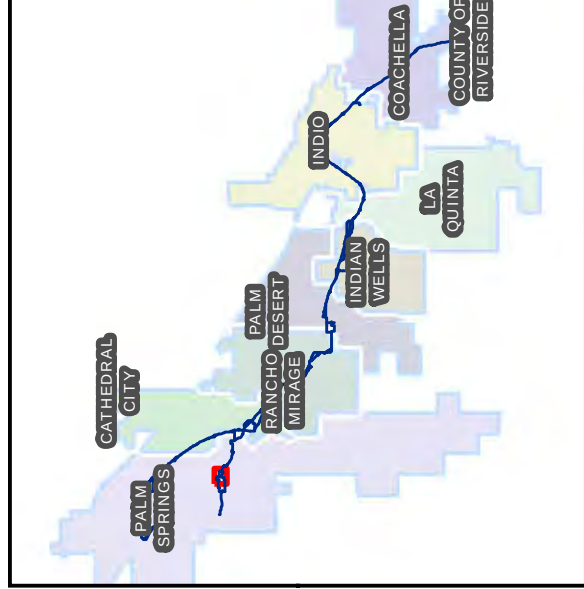
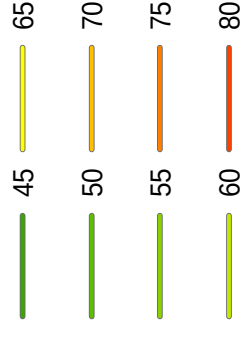


CV Link Operational
Noise Level Contour Boundaries
Page 17 of 60



Existing Barrier Height (in feet)

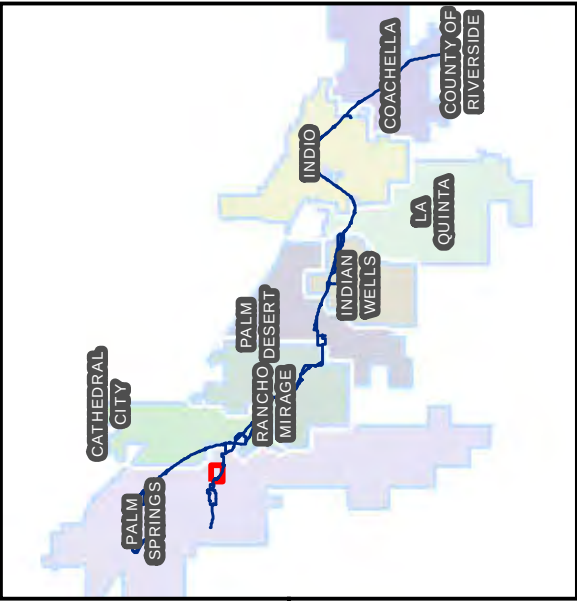
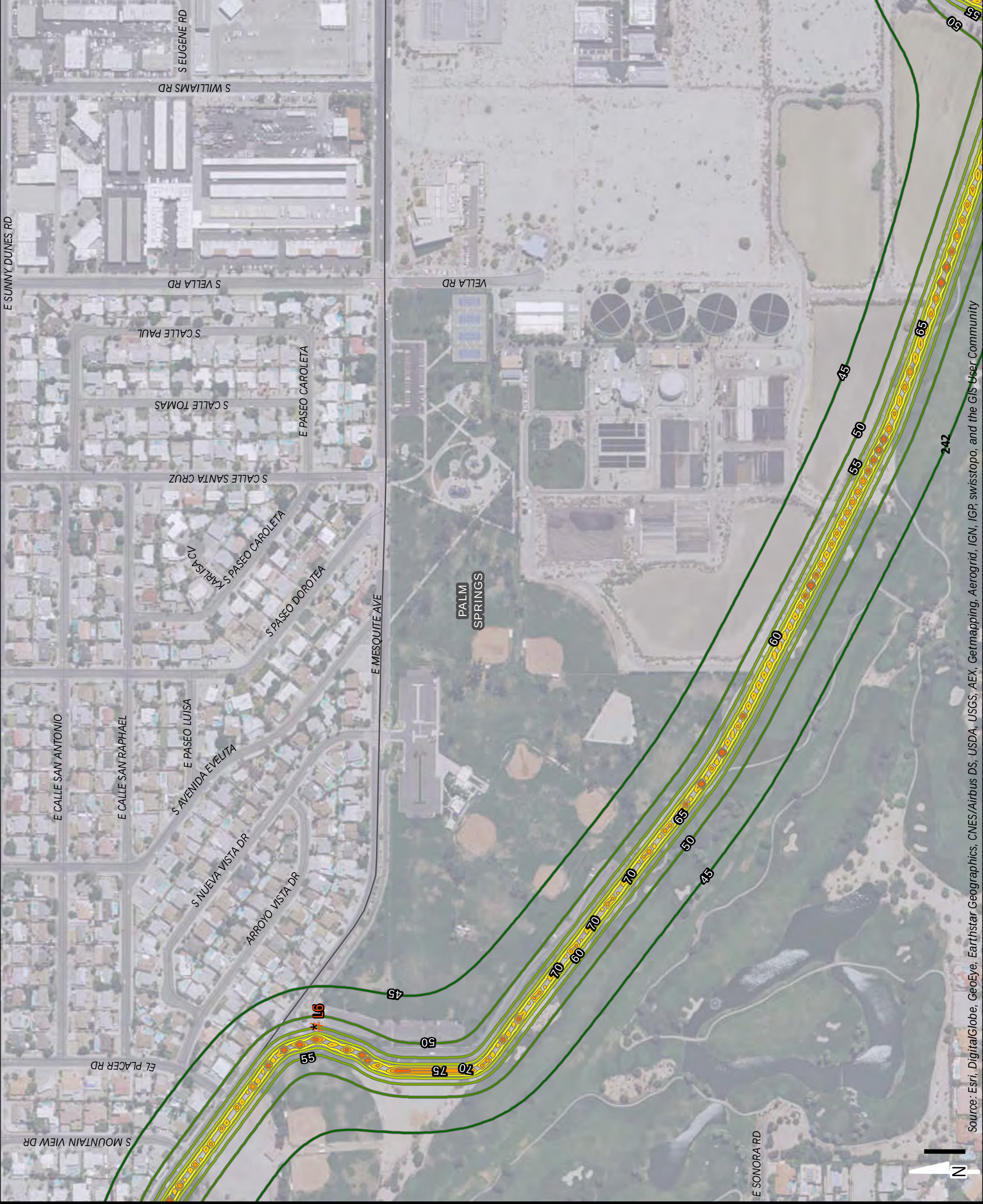
Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)

Feet

LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80

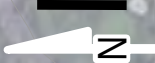
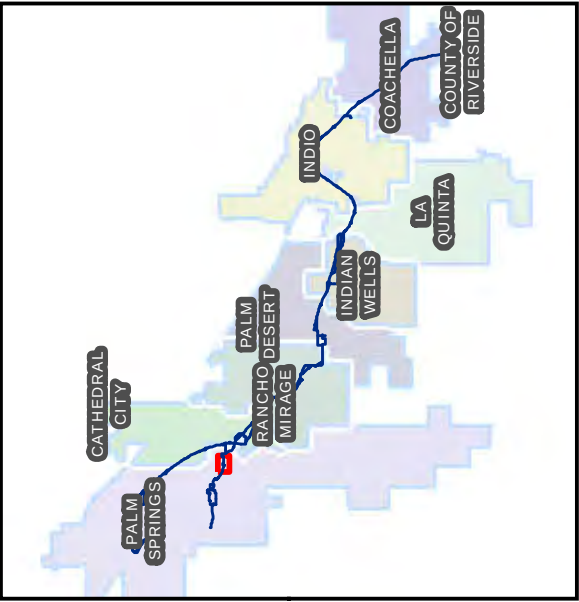
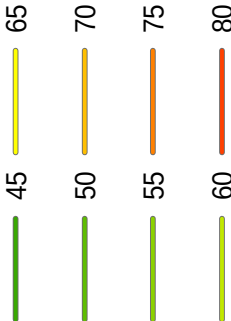


0 290
Feet

LEGEND:

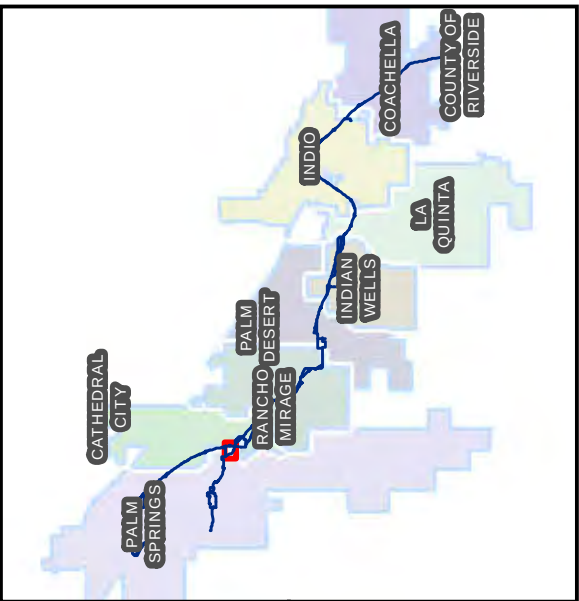
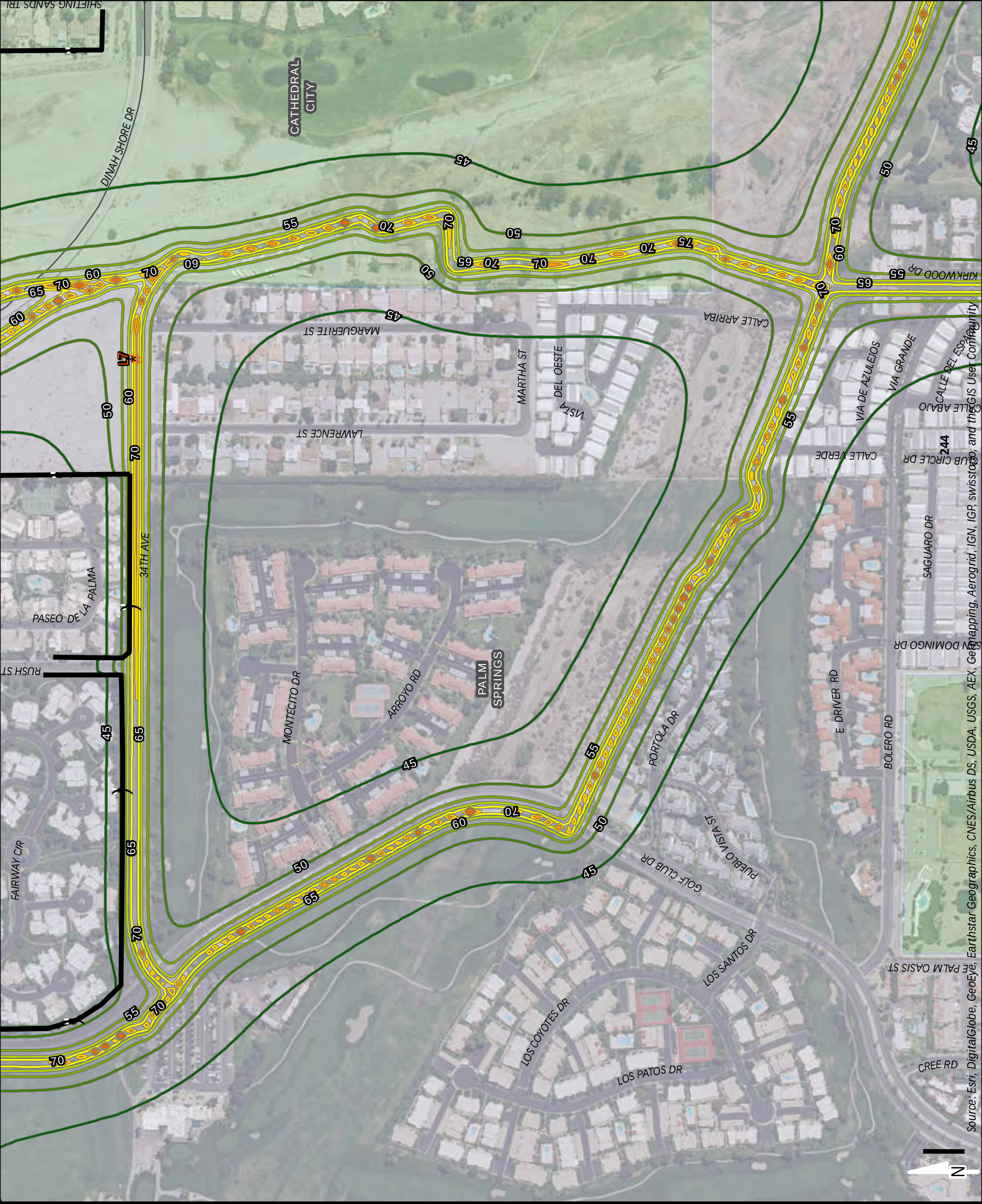
- Existing Barrier Height (in feet)
- Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

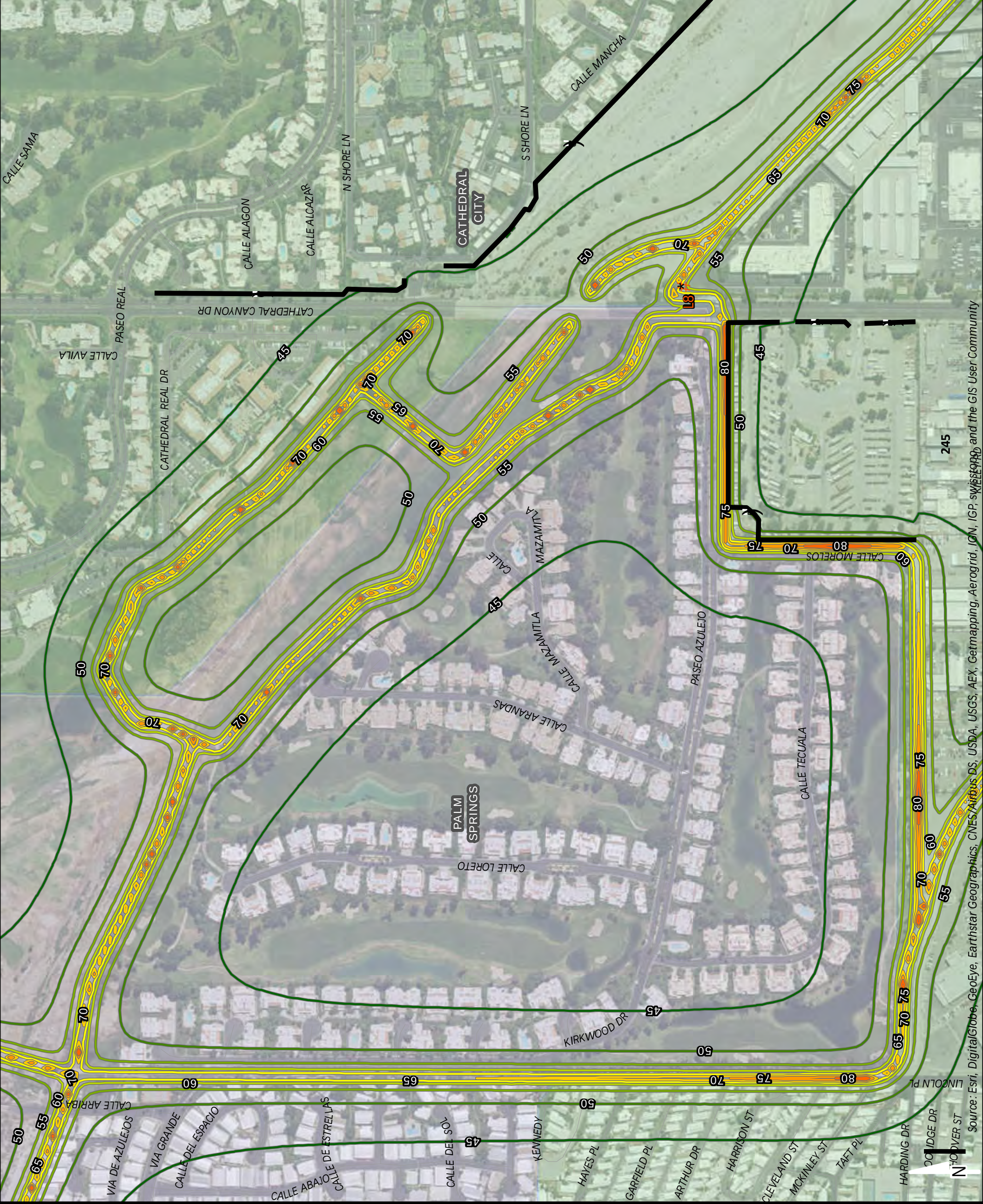
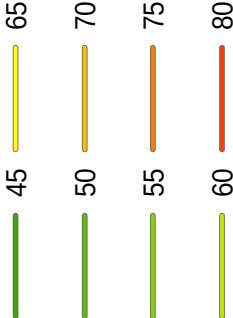
- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80



0 290
Feet

LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)

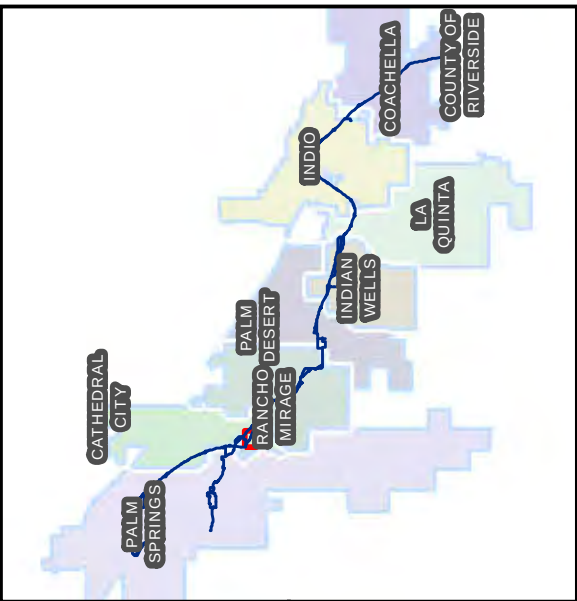
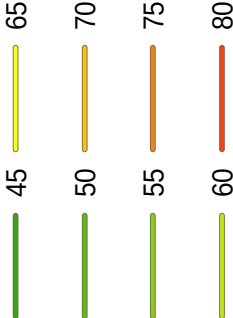


LEGEND:

Existing Barrier Height (in feet)

Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



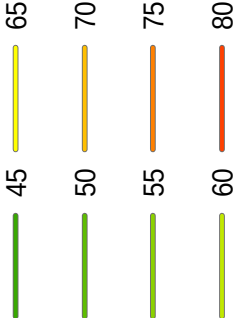
Feet

LEGEND:

Existing Barrier Height (in feet)

Existing Barrier

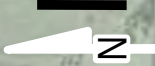
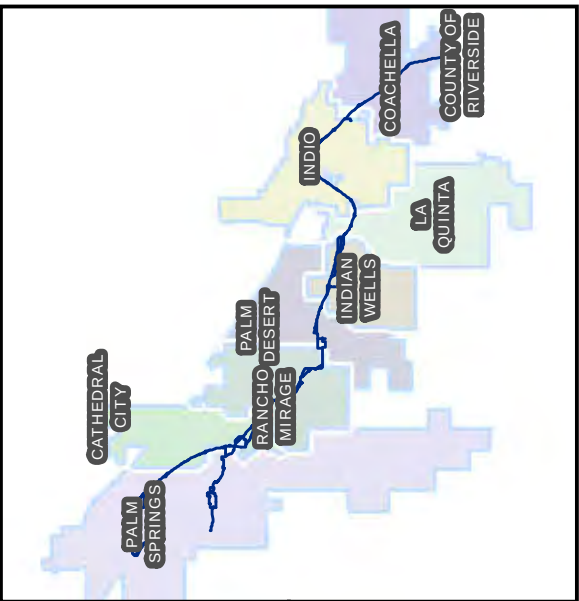
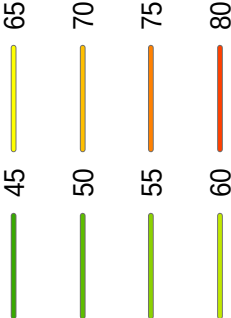
Unmitigated Noise Level
Contour Boundaries (dBA Leq)



B ST

LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)



LEGEND:

-  Noise Level Measurement Locations
-  Existing Barrier Height (in feet)
-  Existing Barrier
- Unmitigated Noise Level

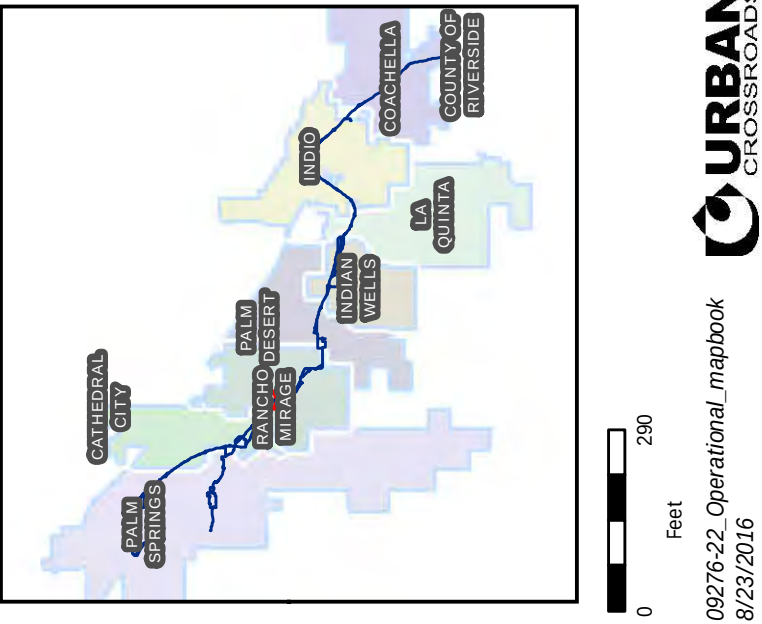
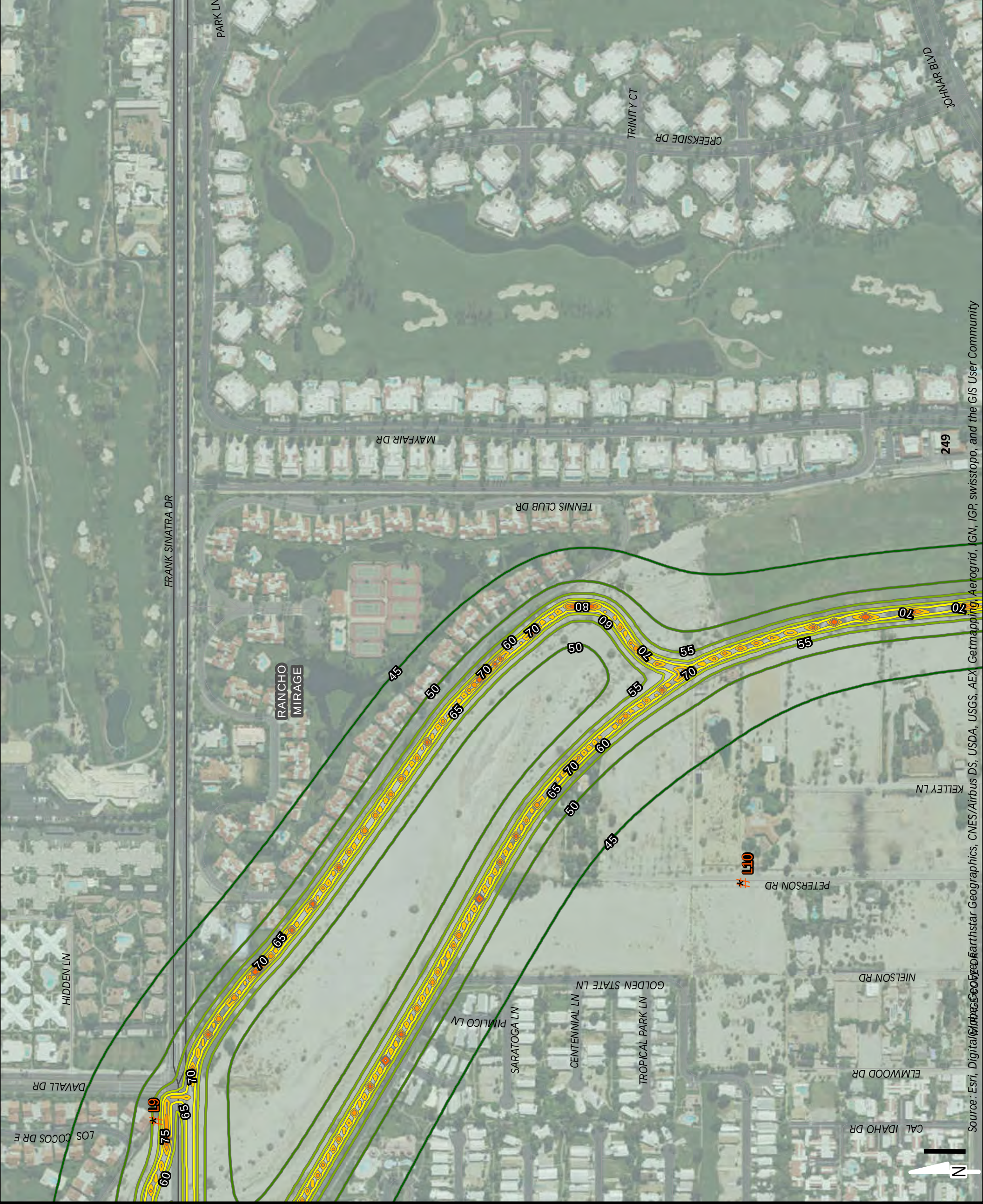
Contour Boundaries (dBA Leq)

4565

5070

5575

6080



LEGEND:

- 

Existing Barrier Height (in feet)
- 

Existing Barrier
- 

Unmitigated Noise Level
Contour Boundaries (dBA Leq)
- 

45
- 

50
- 

55
- 

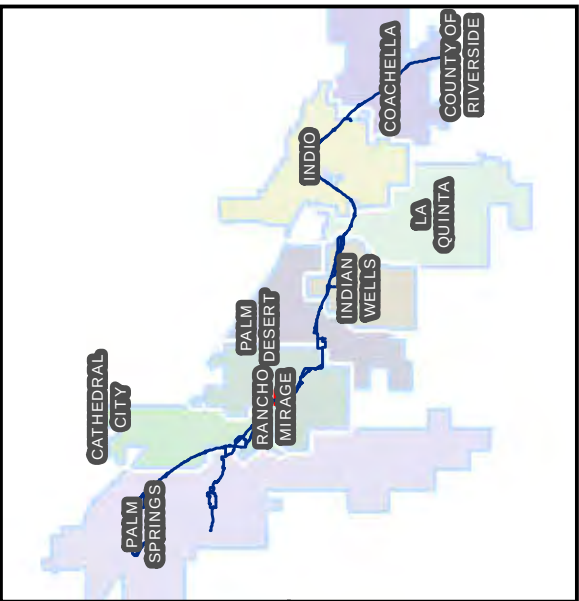
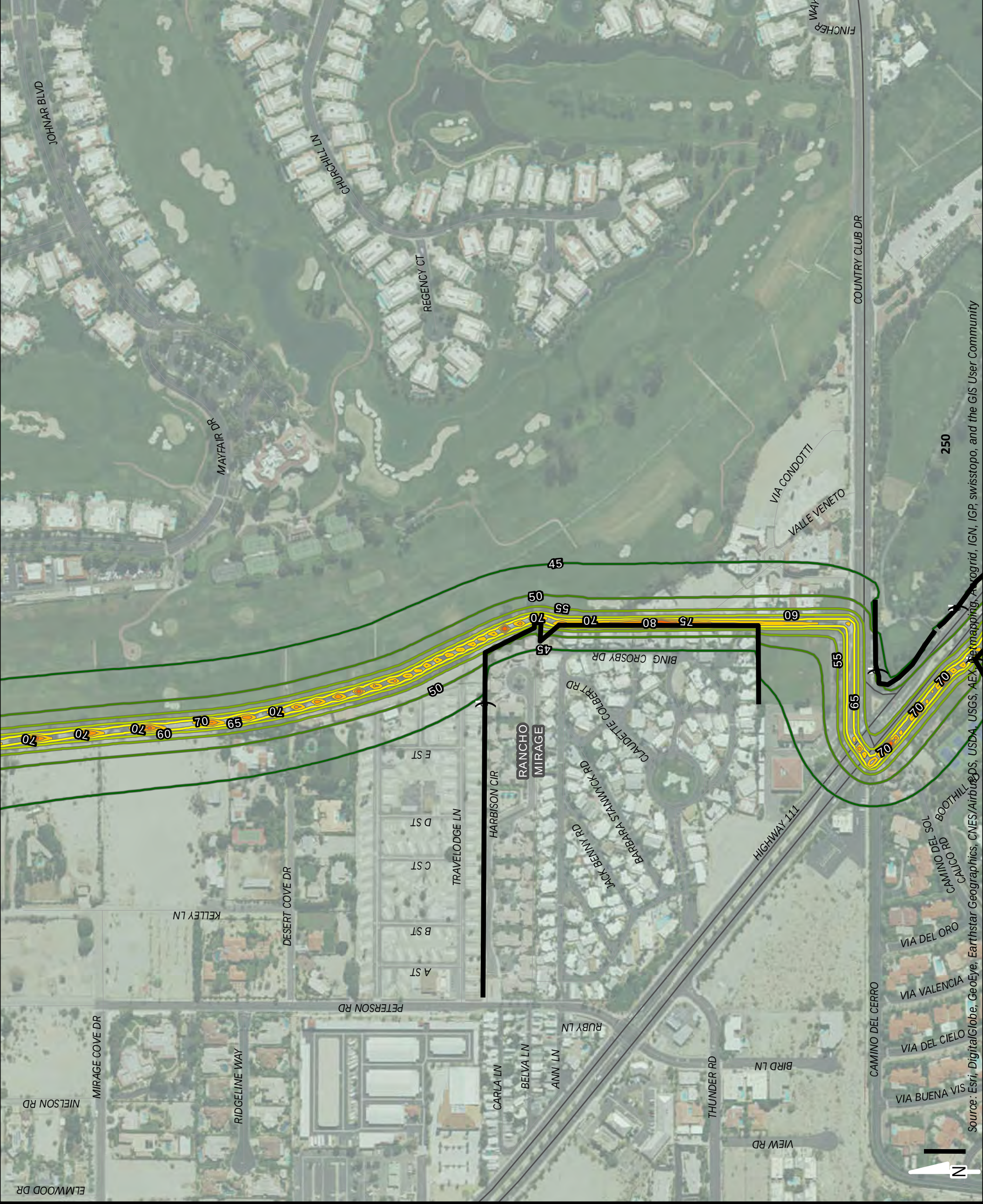
60
- 

65
- 

70
- 

75
- 

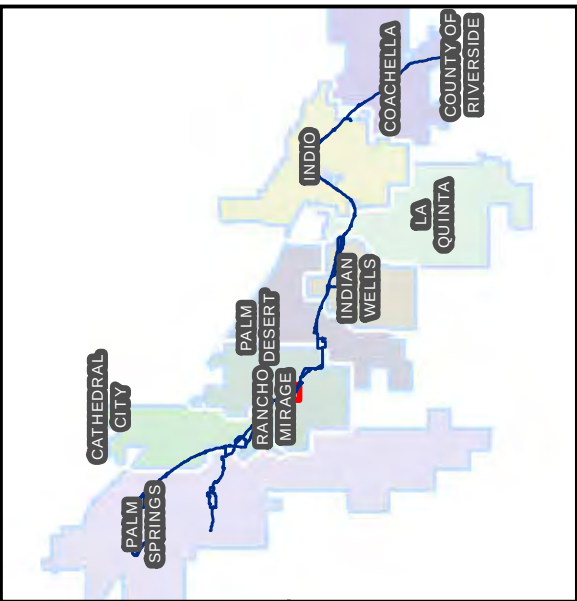
80



Feet

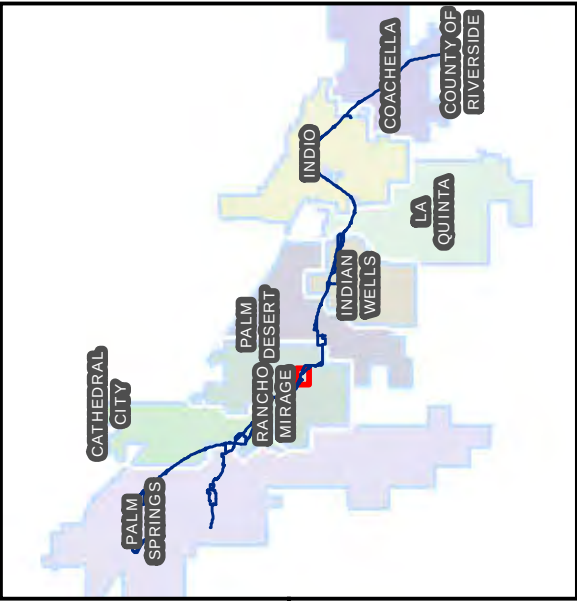
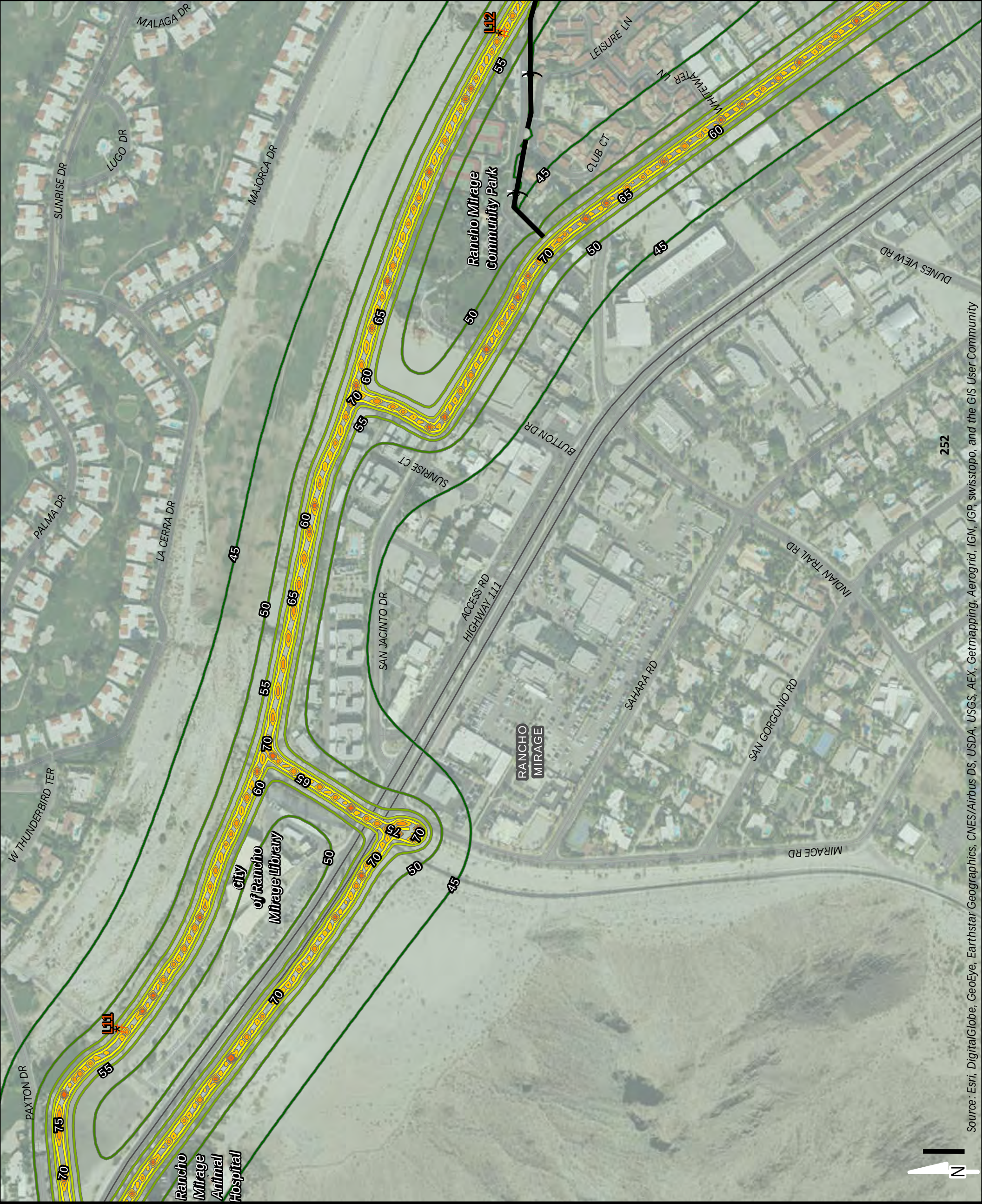
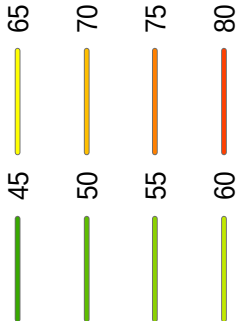
LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80



LEGEND:

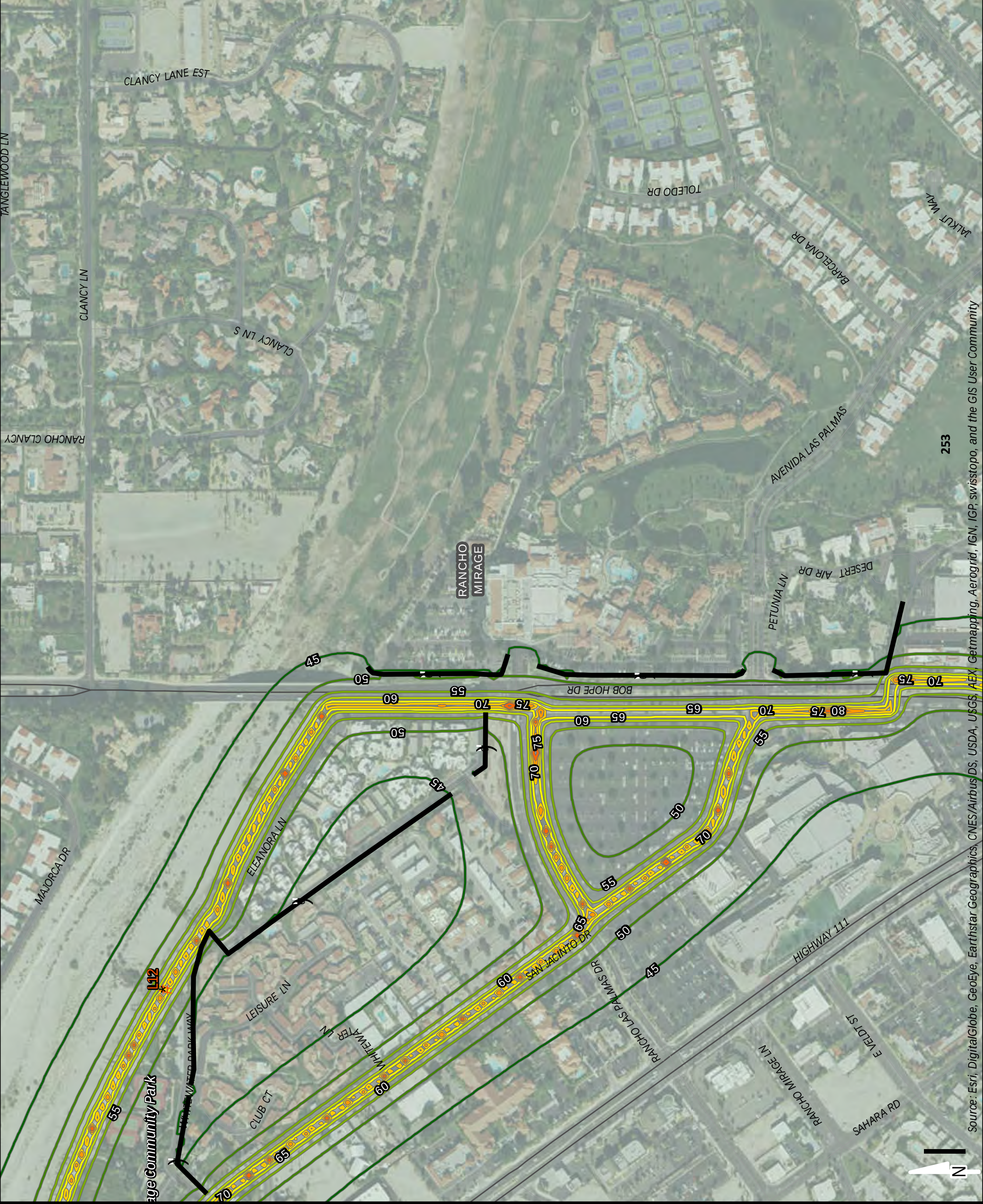
- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)



Feet

LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80



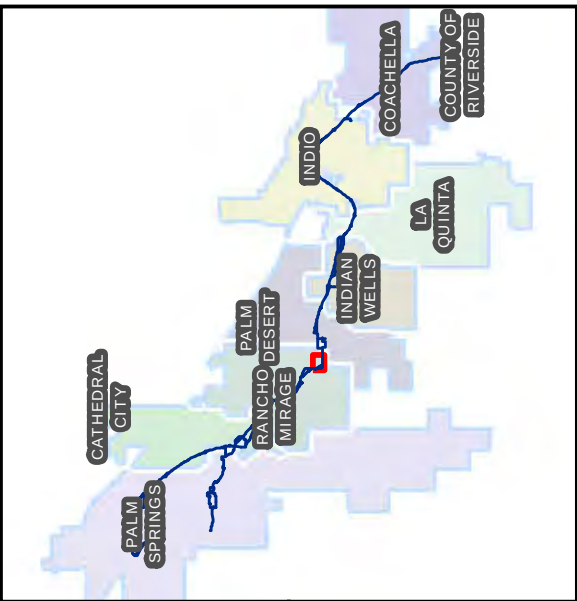
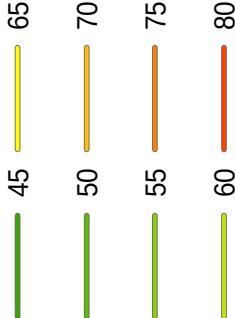
Feet

LEGEND:

Existing Barrier Height (in feet)

Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



Feet

LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level
Contour Boundaries (dBA Leq)
- 45

50

55

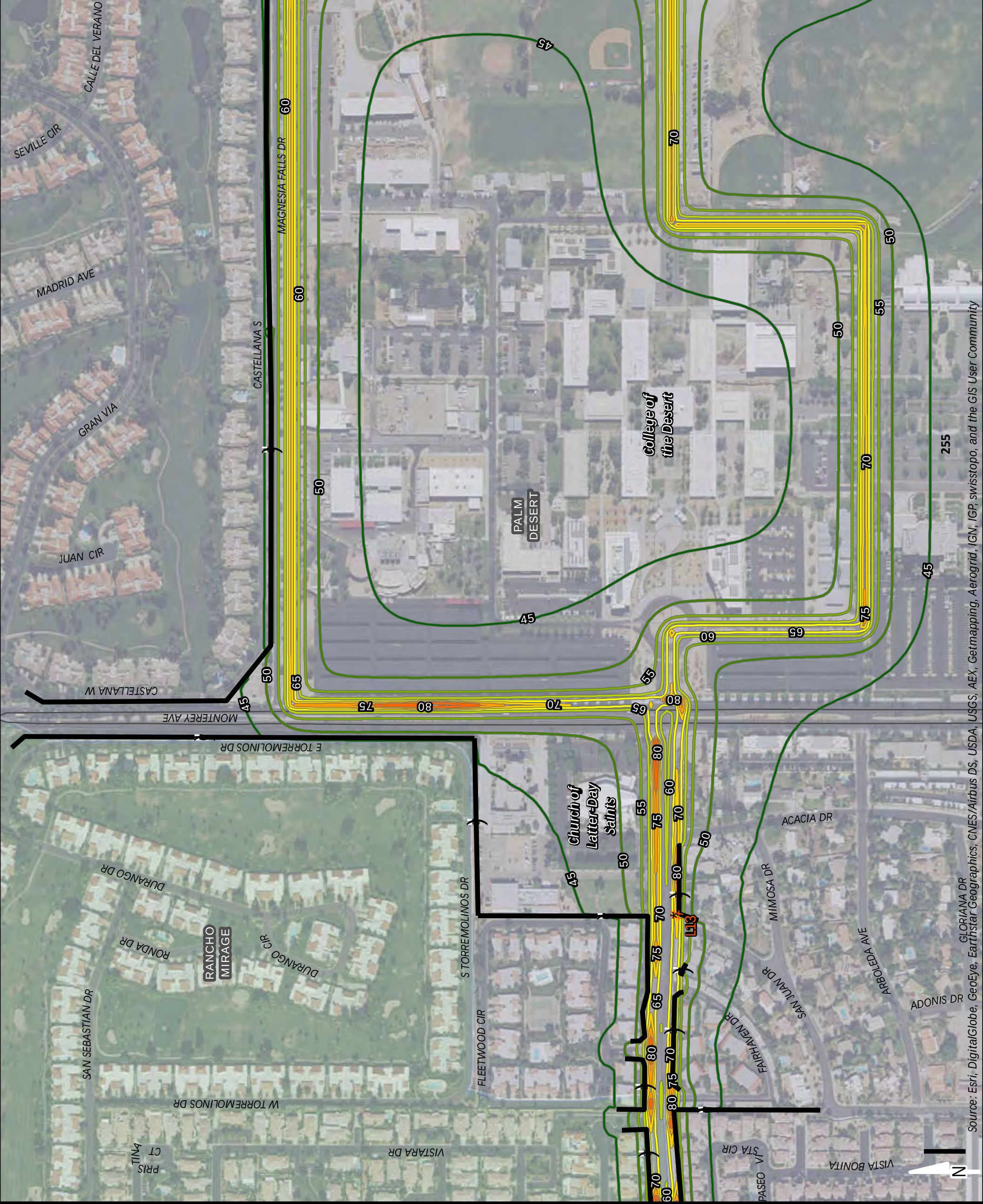
60

65

70

75

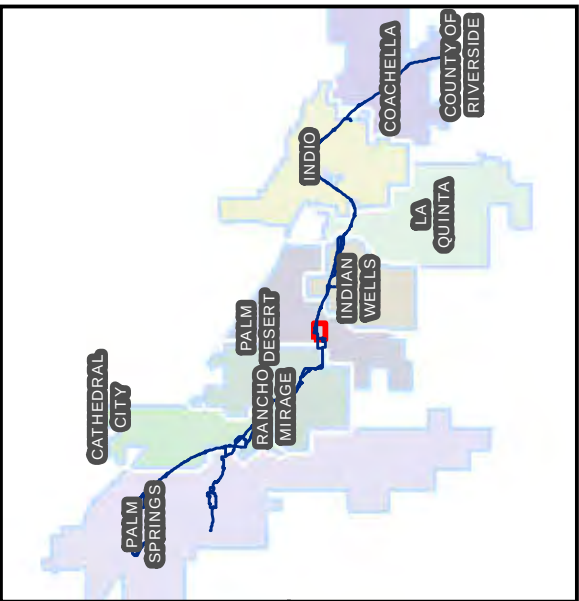
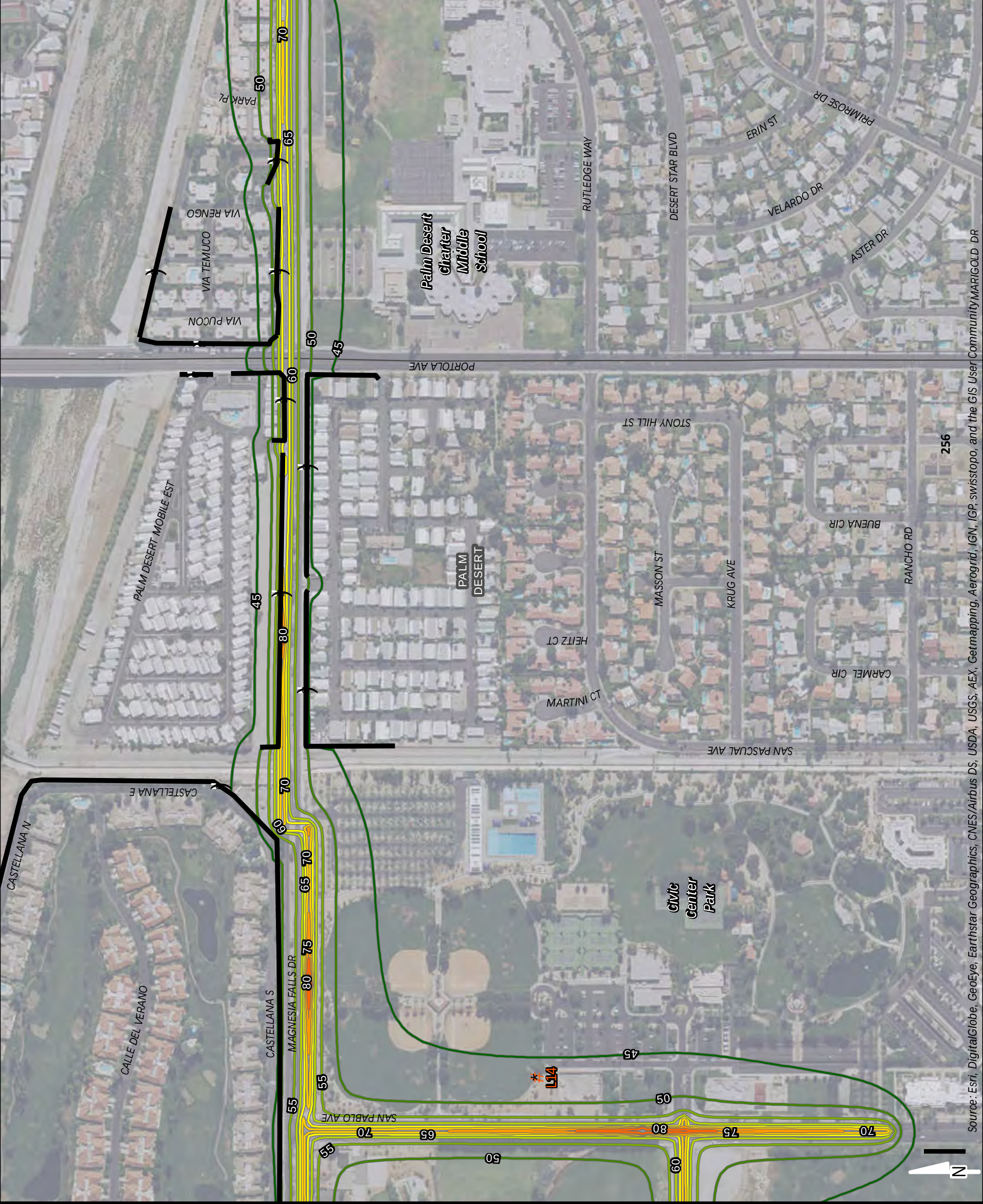
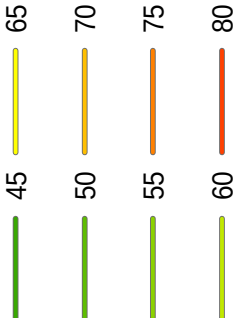
80



LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)

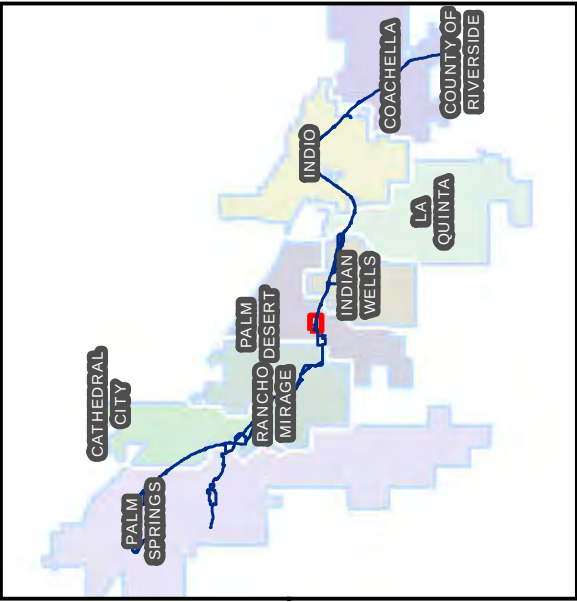
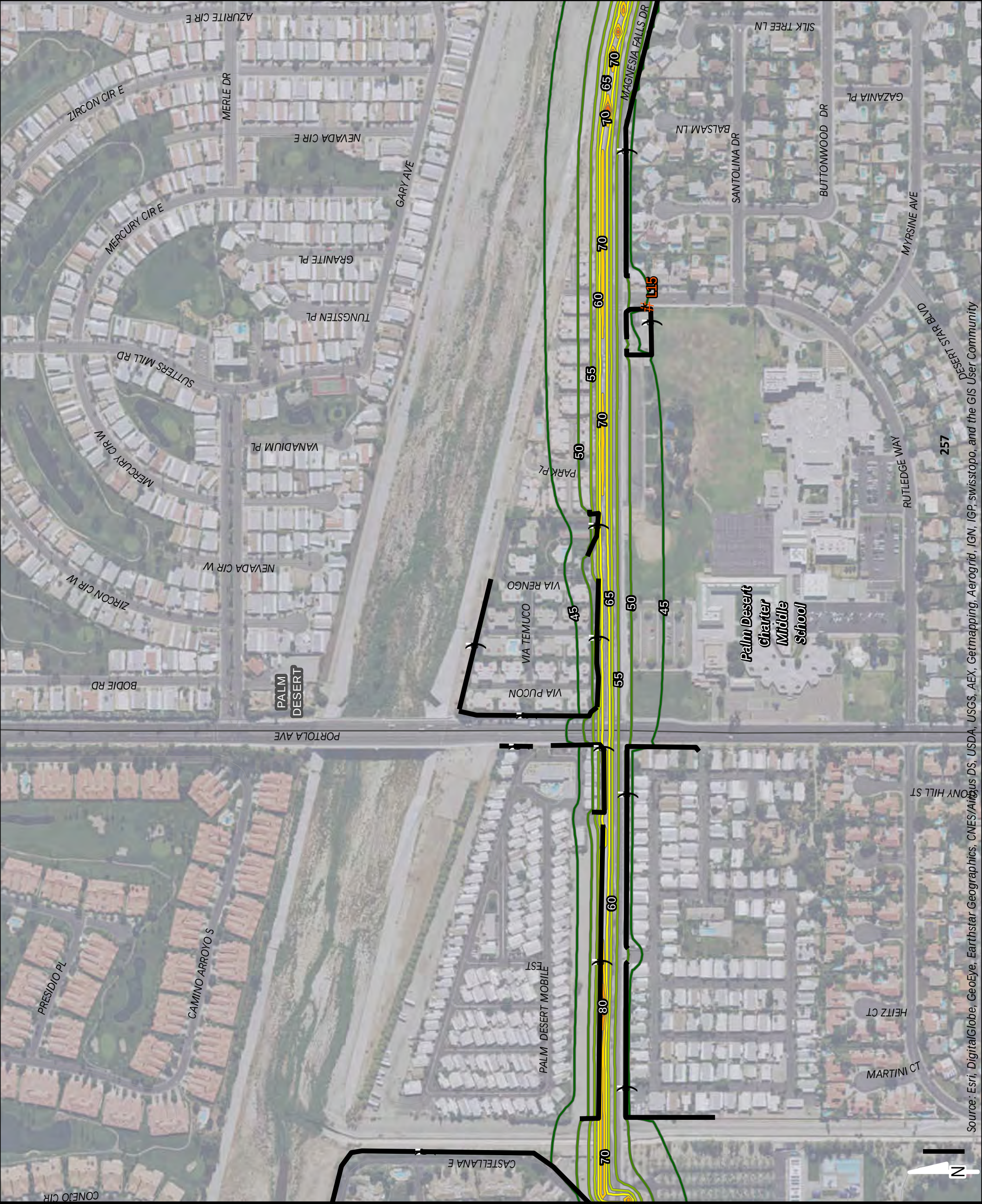
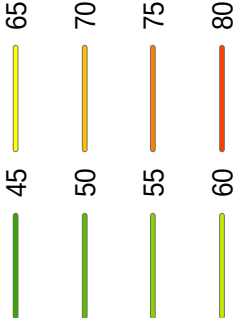


Feet

LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier

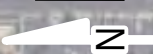
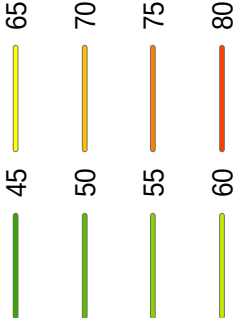
Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier

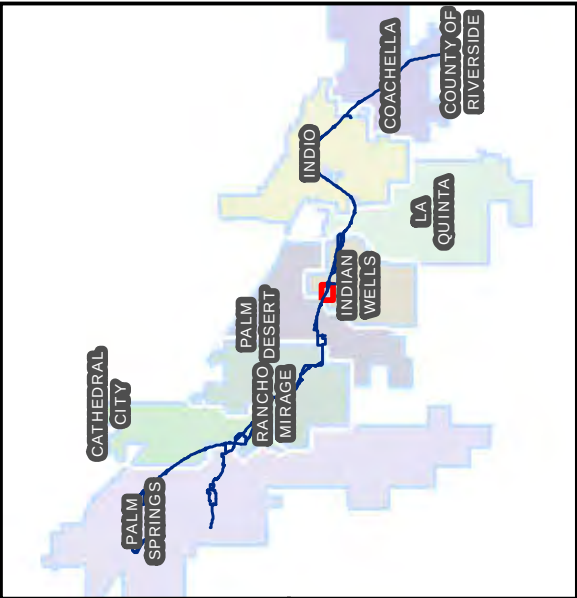
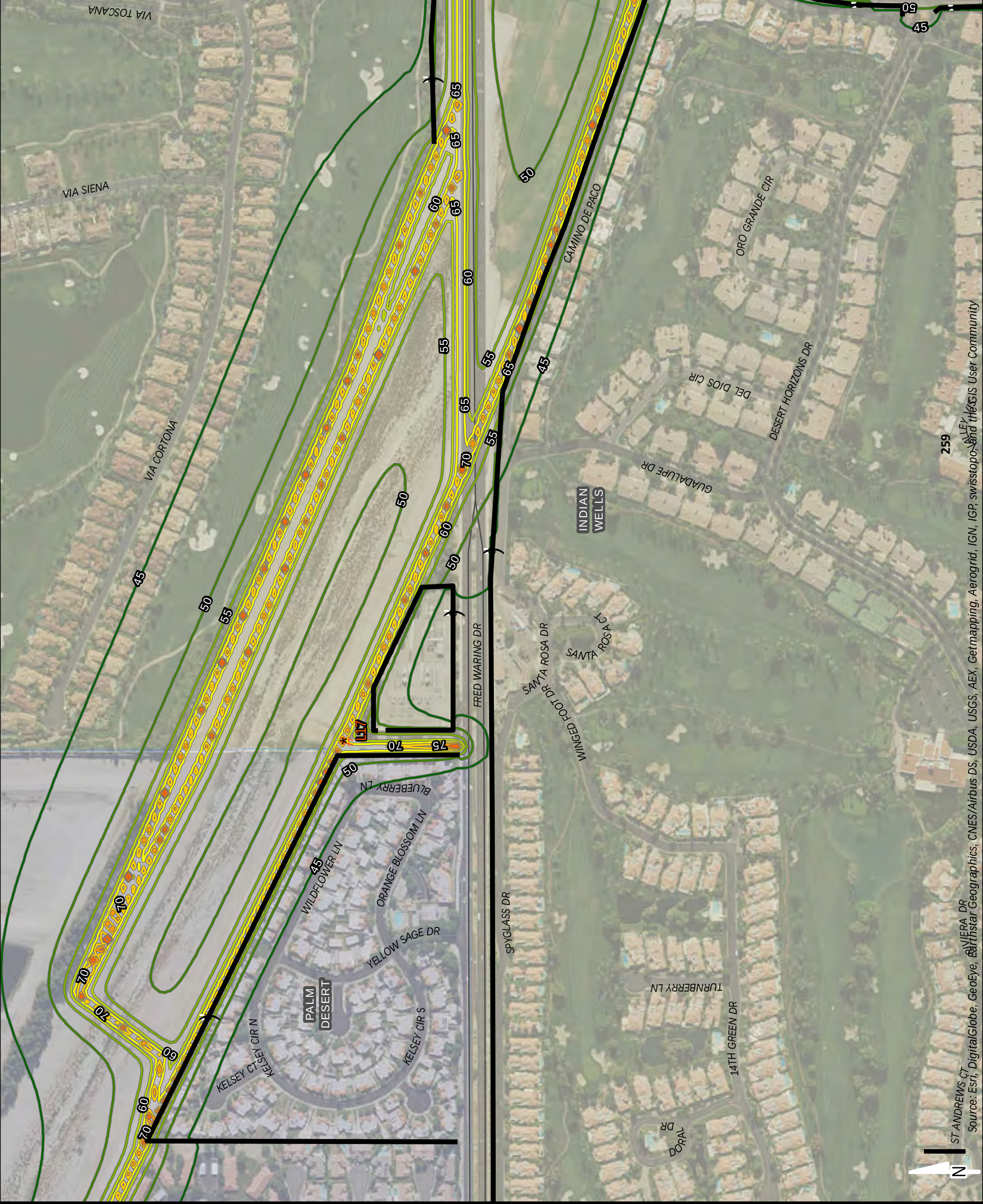
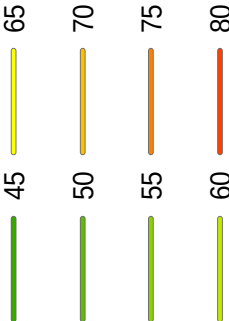
Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



Feet

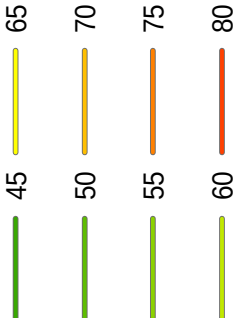
LEGEND:

- 

Existing Barrier Height (in feet)
- 

Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



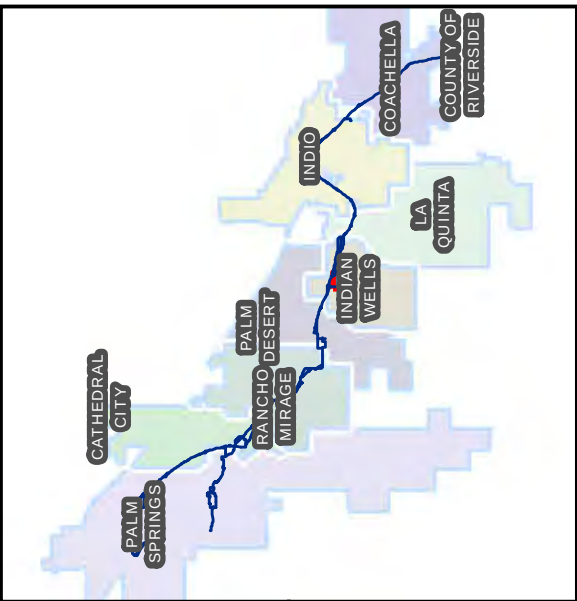
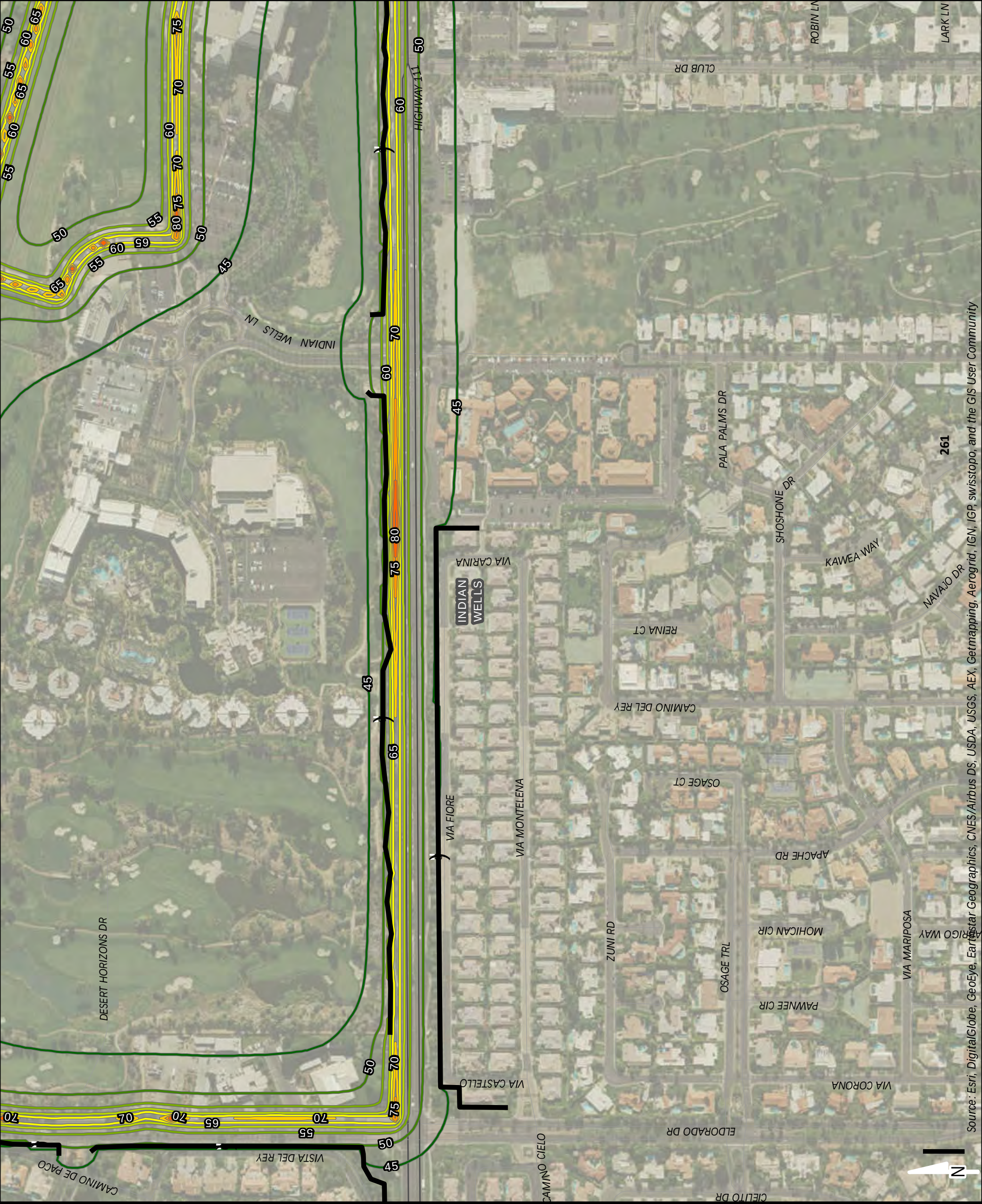
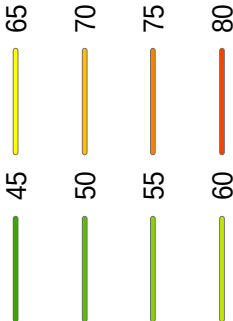
Feet

LEGEND:

Existing Barrier Height (in feet)

Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)

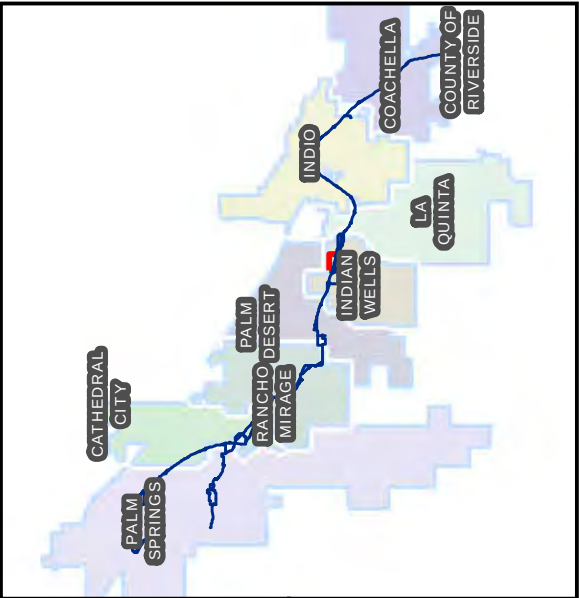
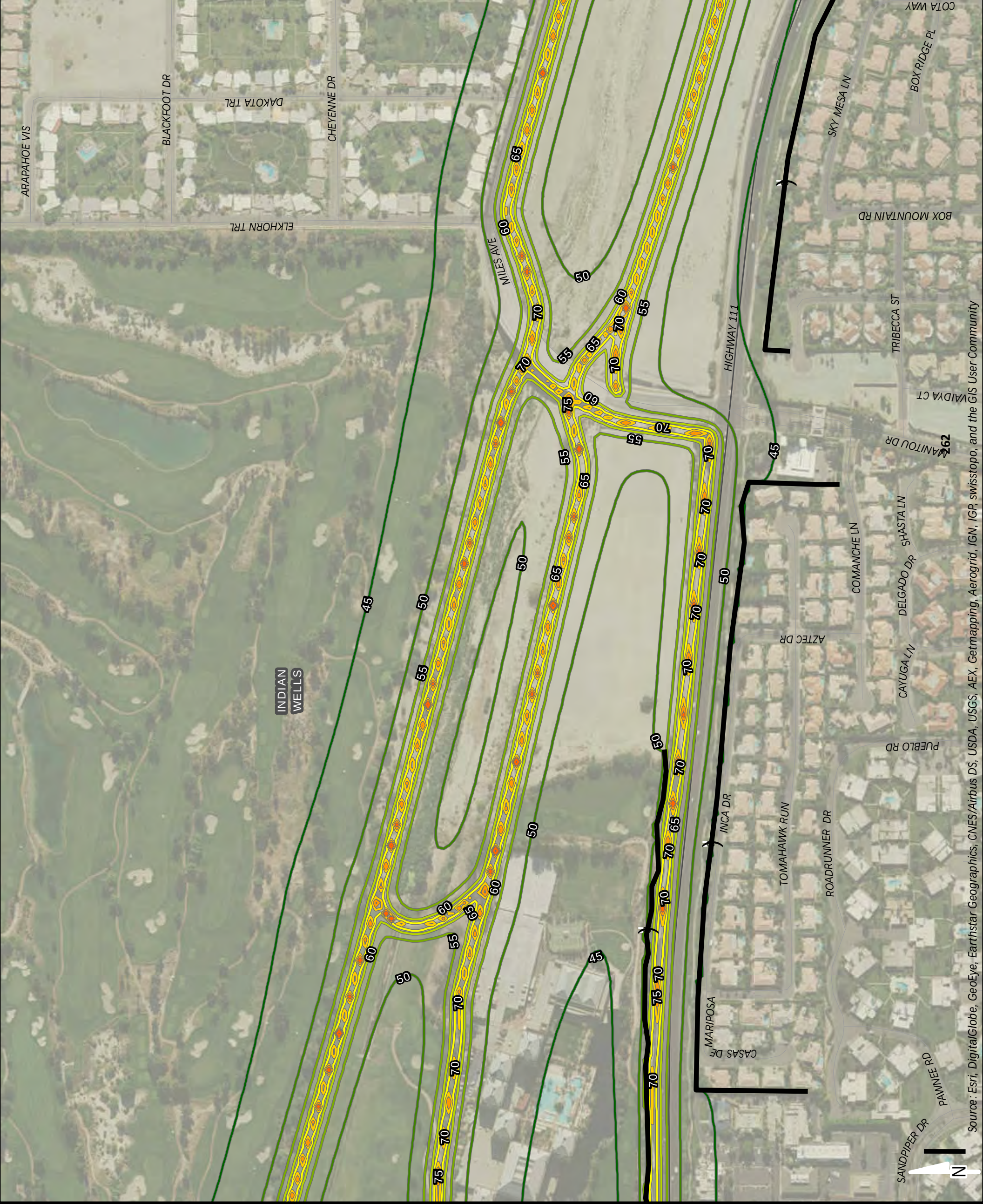
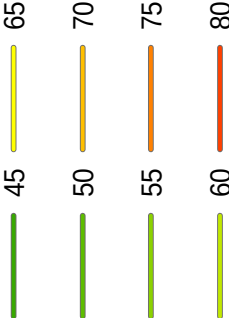


Feet

LEGEND:

- Existing Barrier Height (in feet)
- Existing Barrier

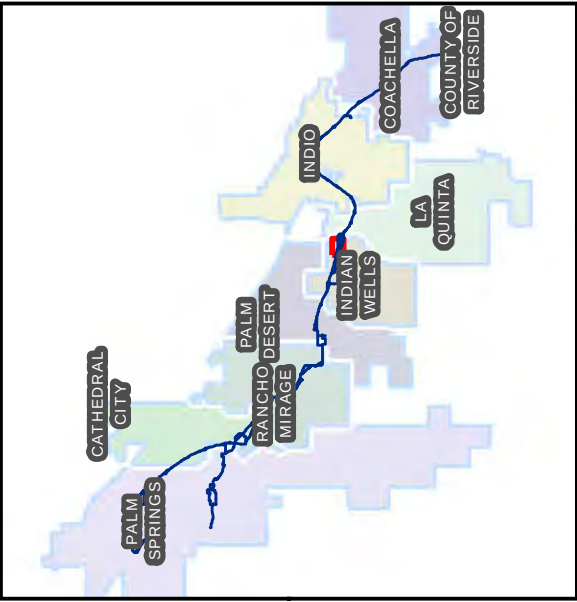
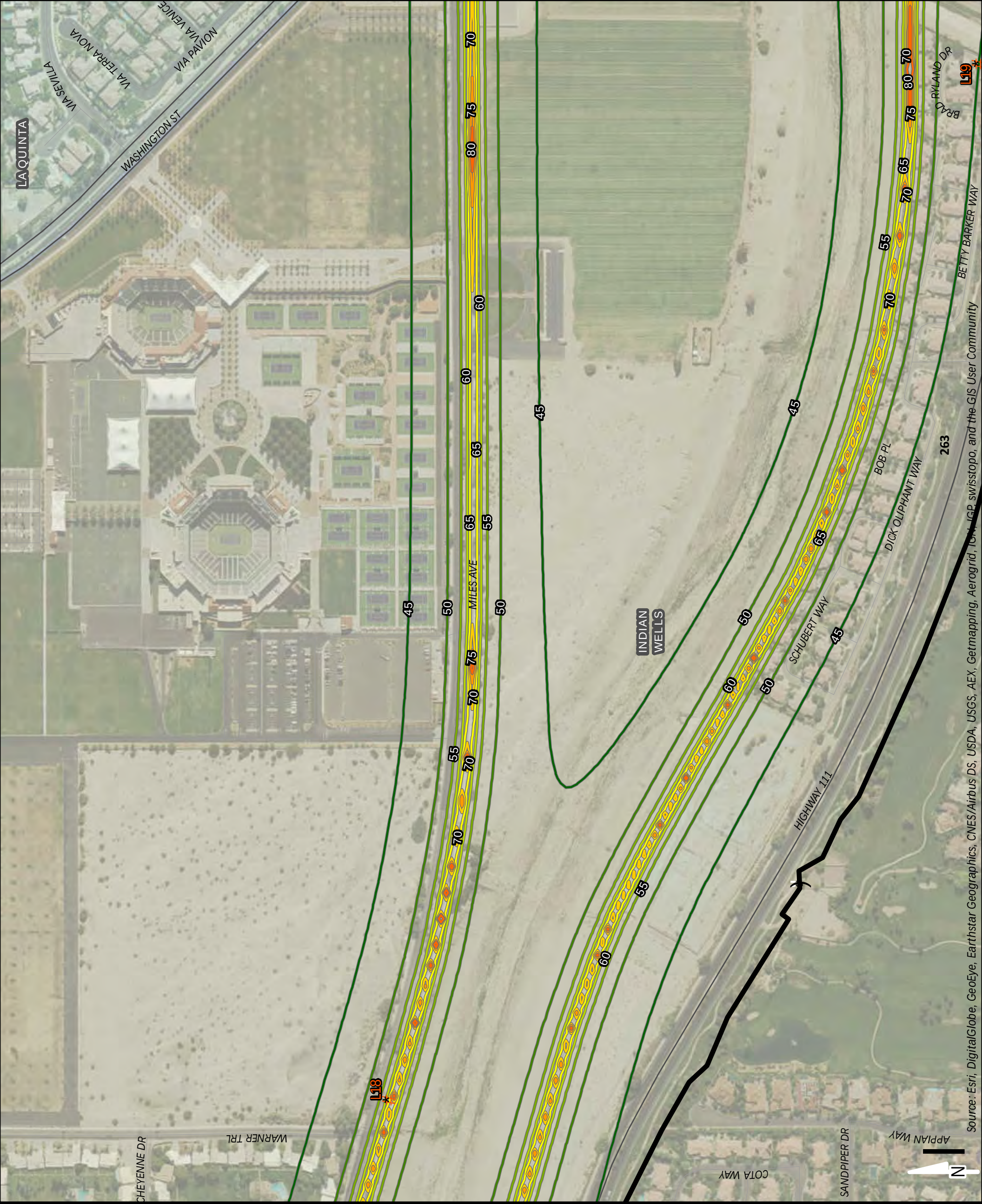
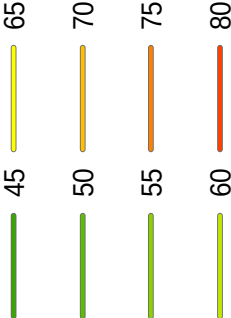
Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

-  Noise Level Measurement Locations
-  Existing Barrier Height (in feet)
-  Existing Barrier

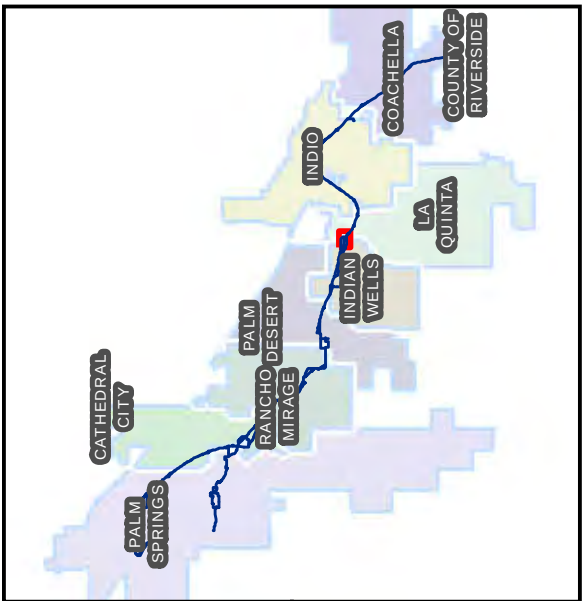
Unmitigated Noise Level
Contour Boundaries (dBA Leq)



Feet

LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80

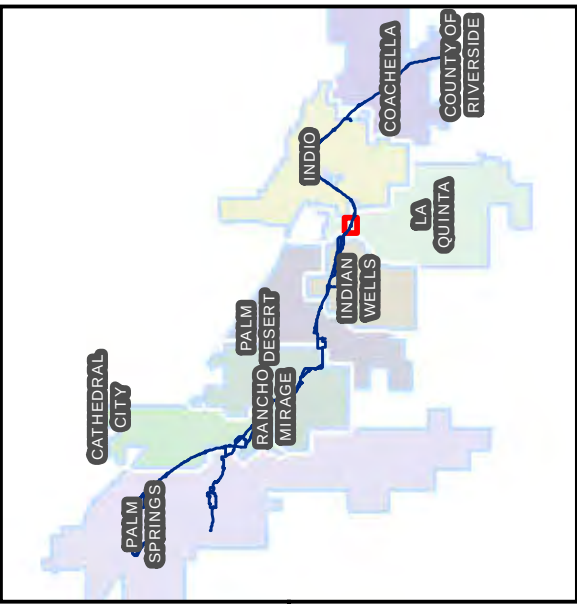
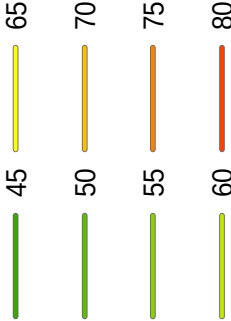


0 290
Feet

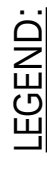
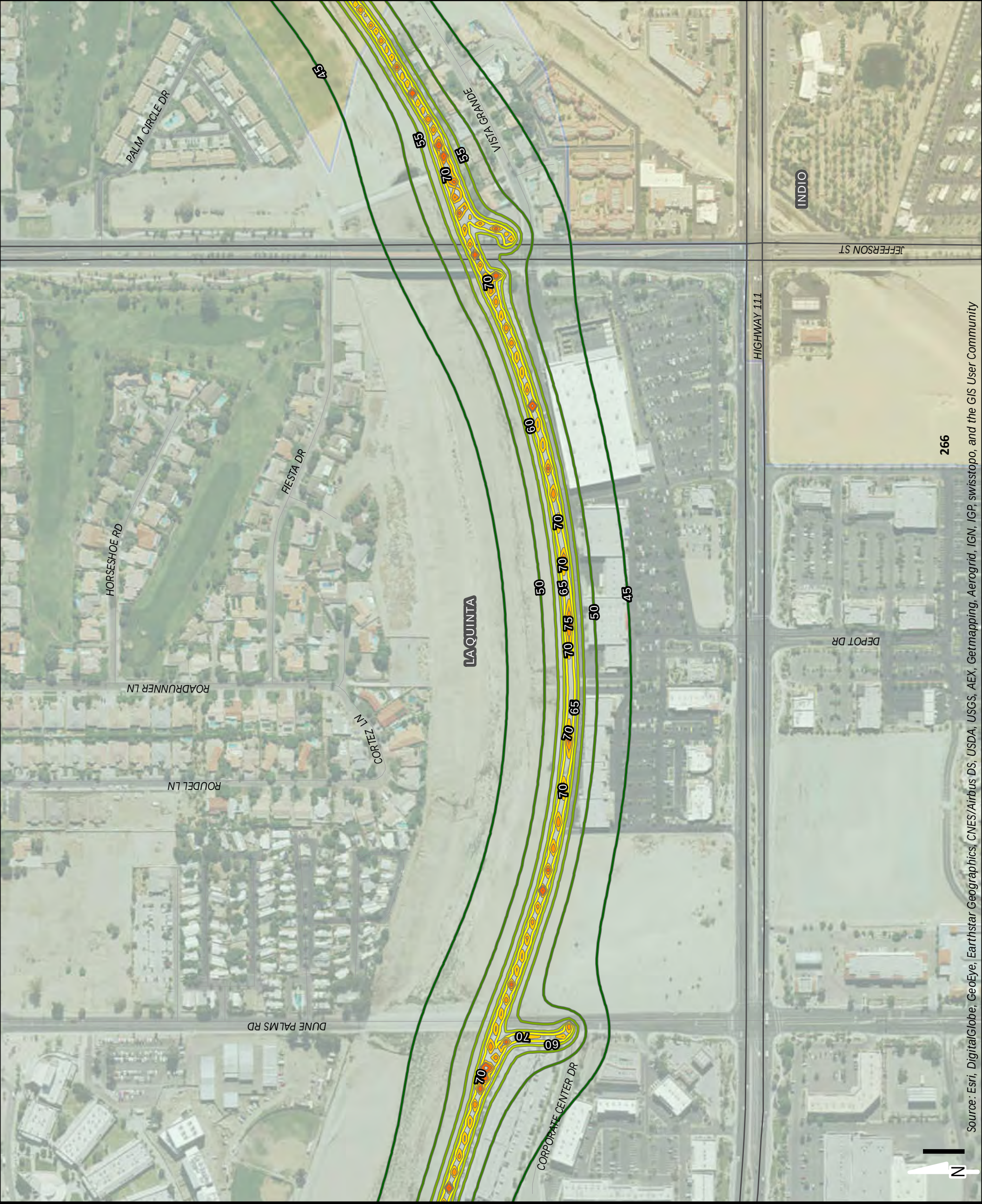
LEGEND:

-  Existing Barrier Height (in feet)
-  Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



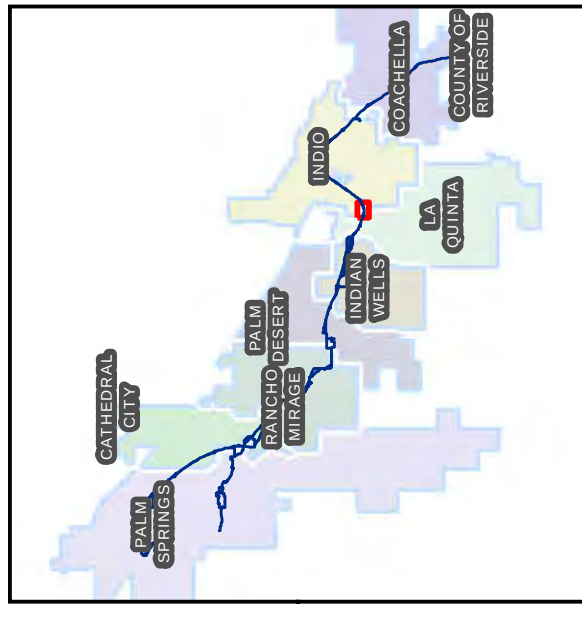
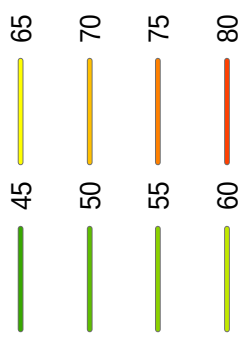
Feet

CV Link Operational
Noise Level Contour Boundaries
Page 42 of 60

Existing Barrier Height (in feet)

Existing Barrier

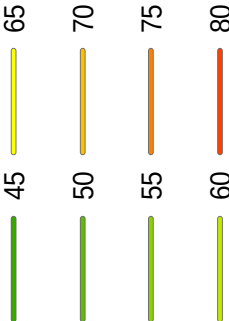
Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

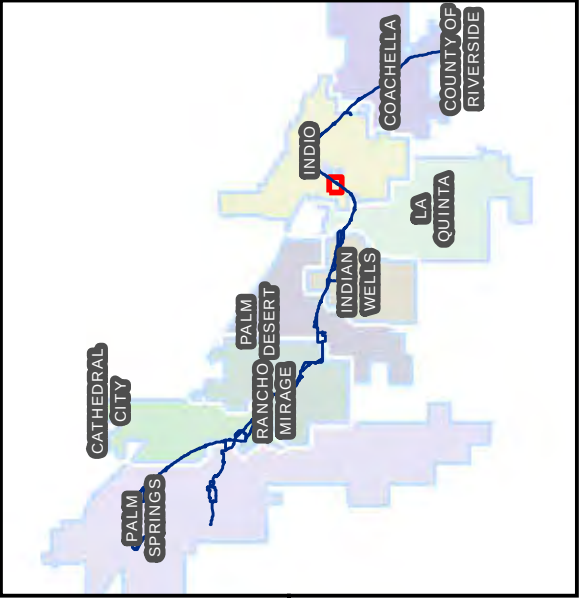
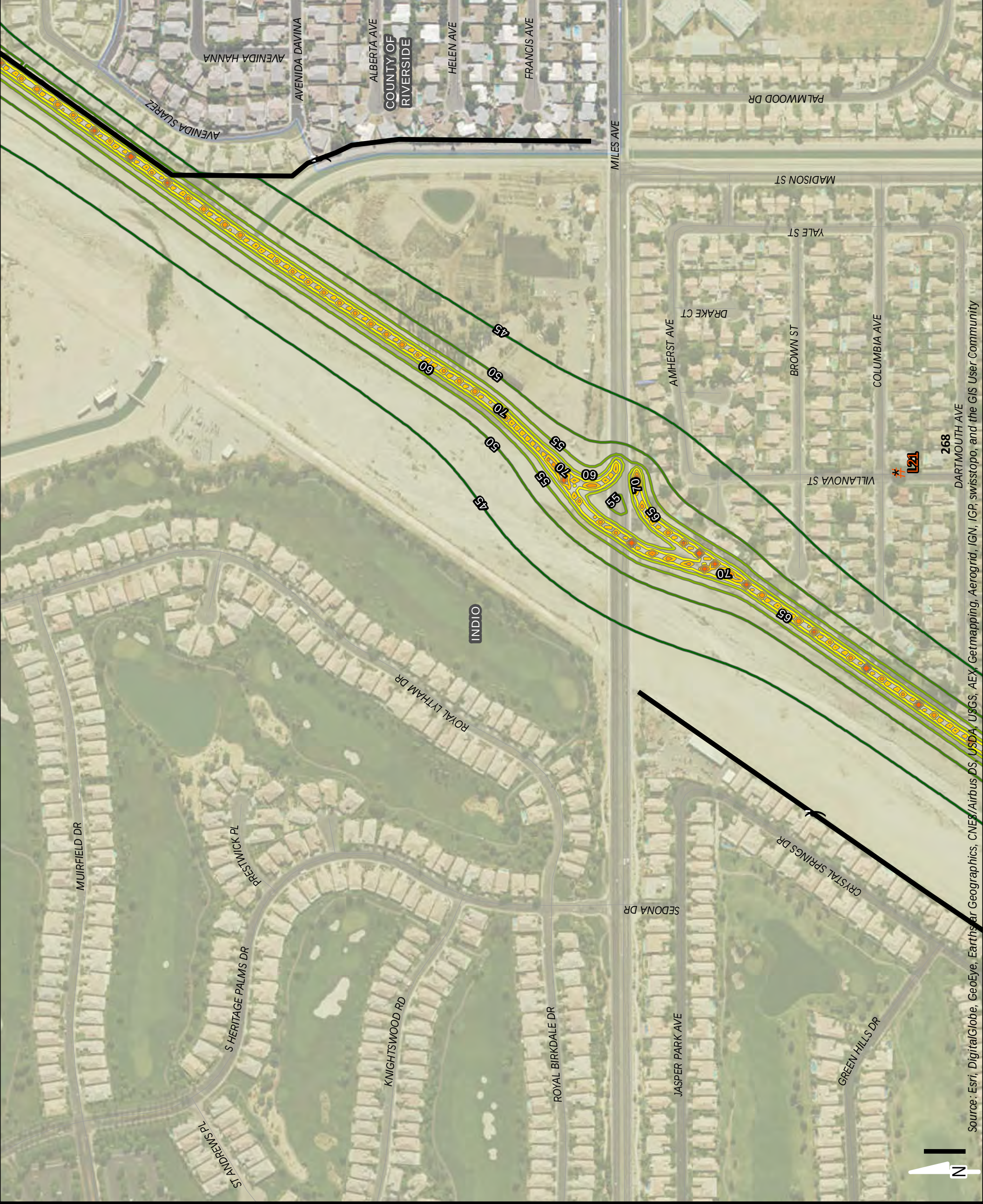
- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

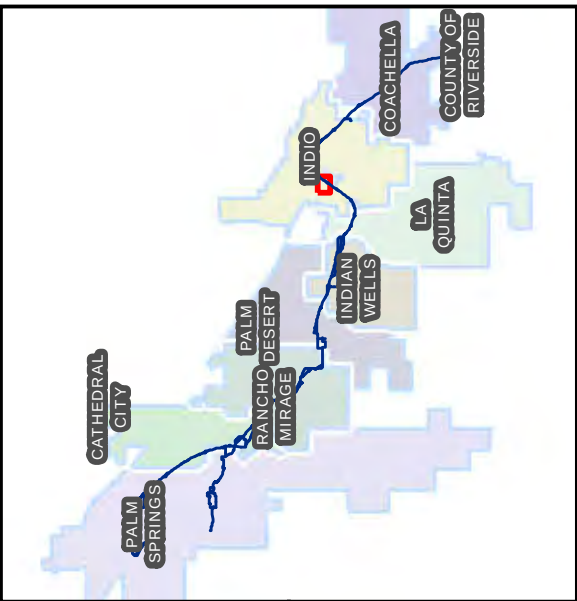
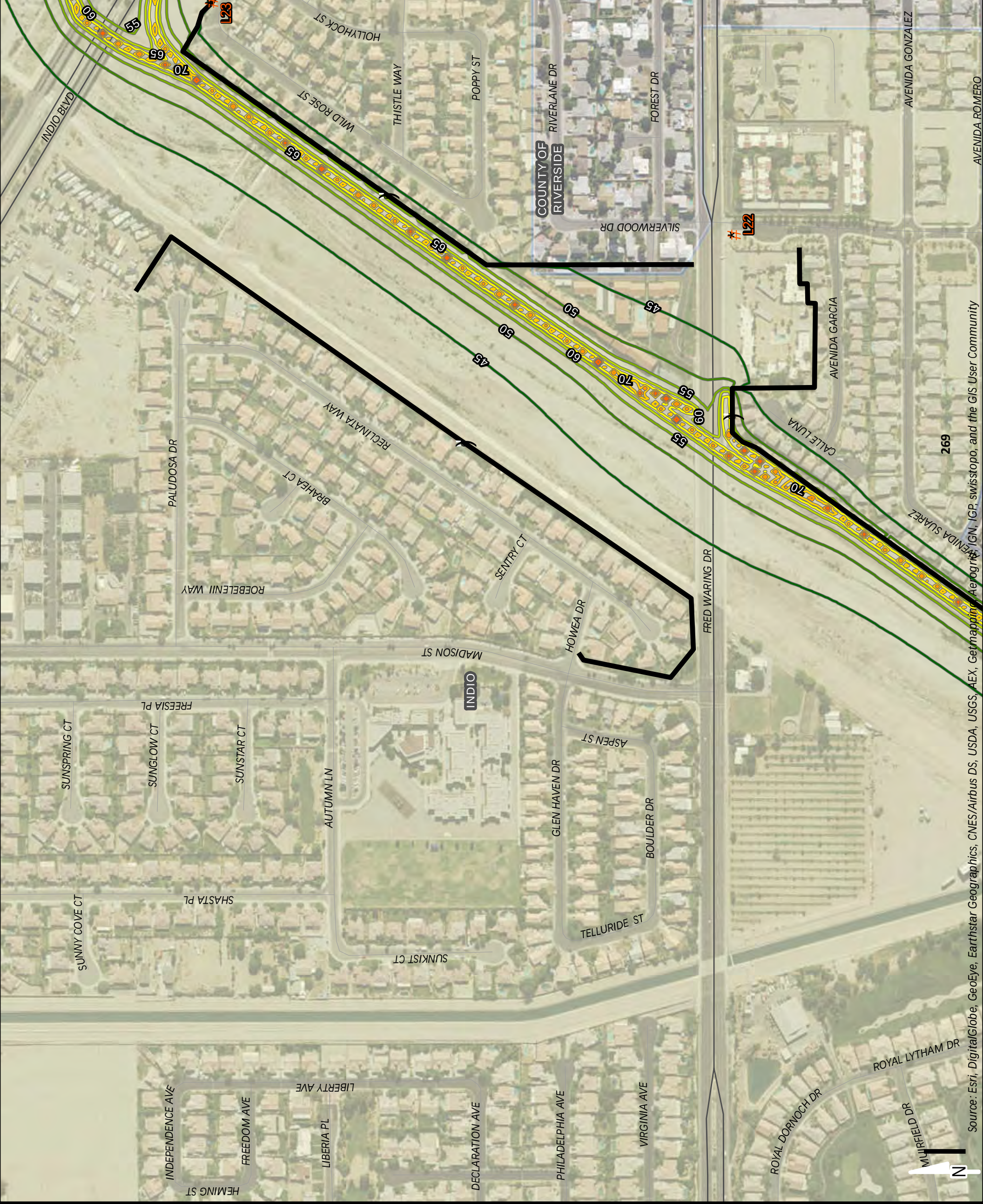
- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80



Feet

LEGEND:

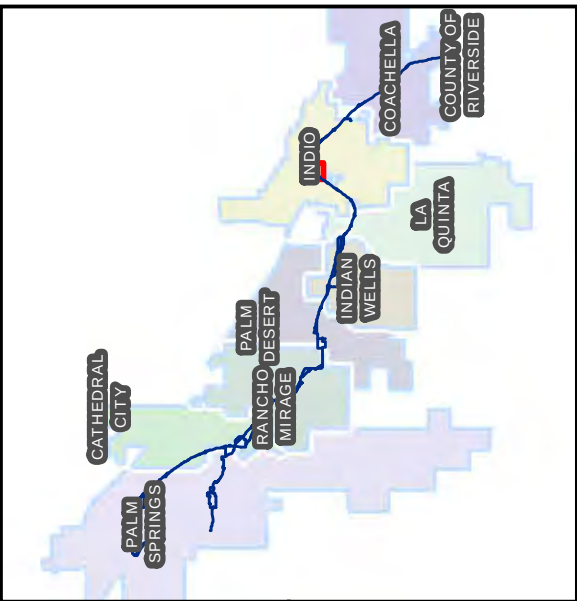
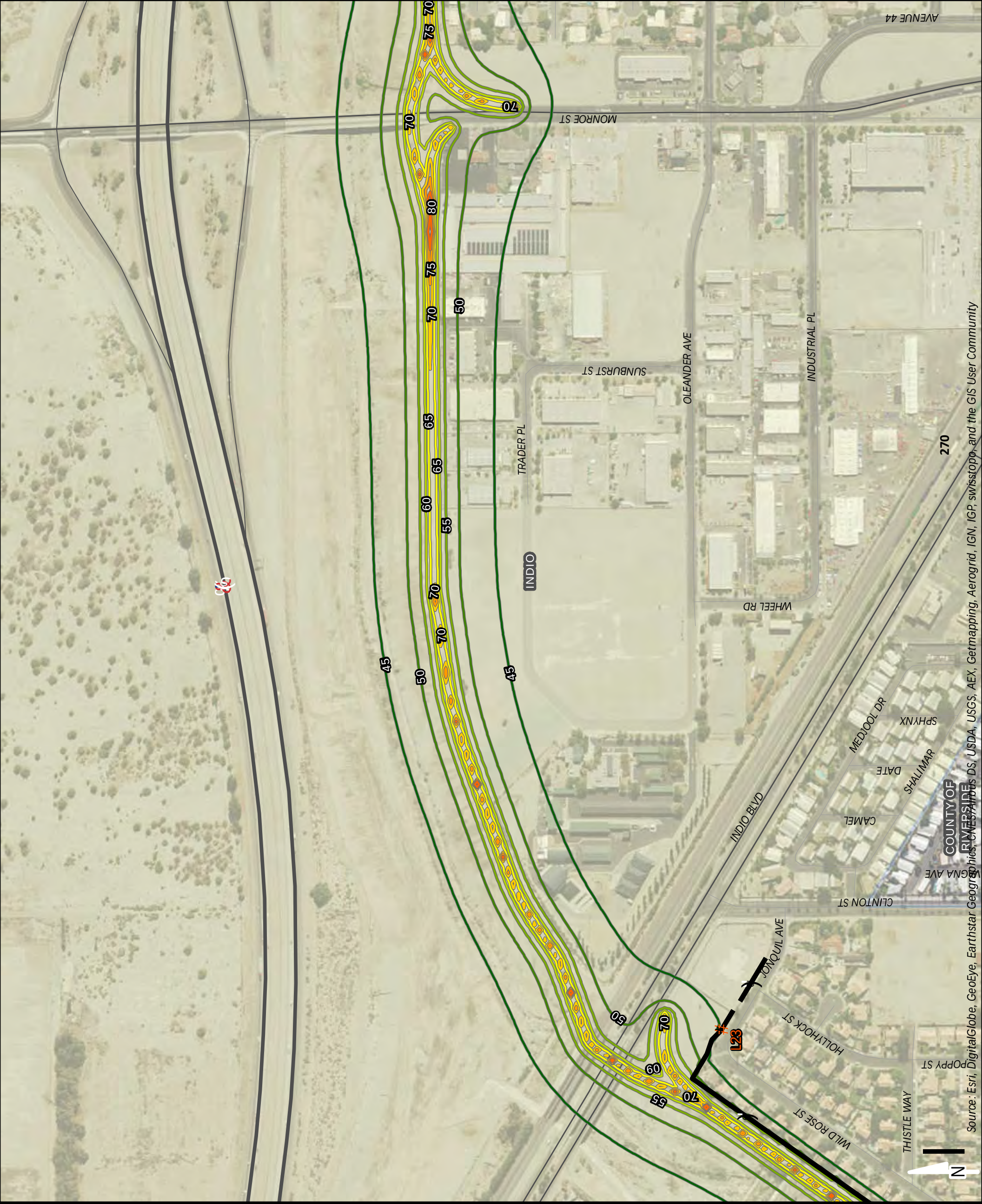
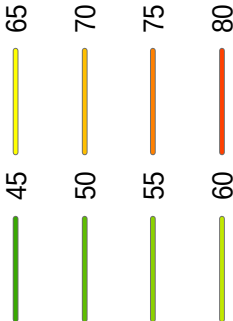
- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80



LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



Feet

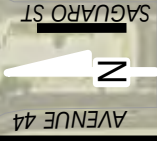
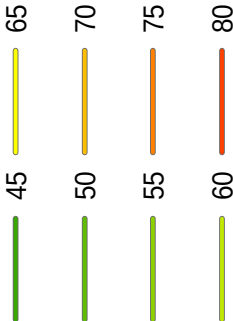


LEGEND:

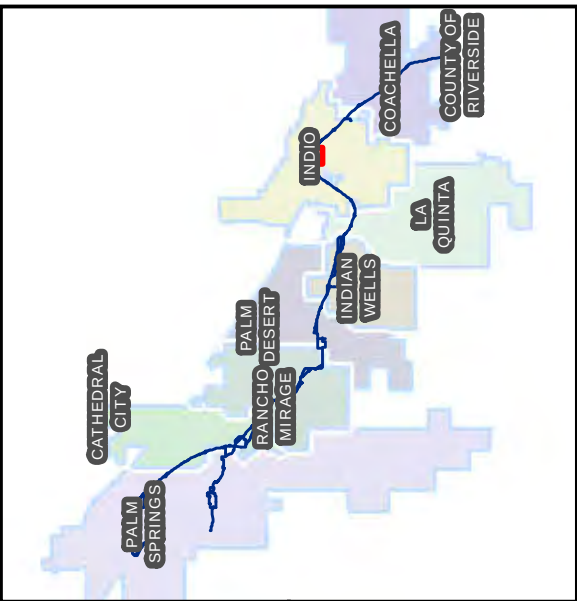
Existing Barrier Height (in feet)

Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)

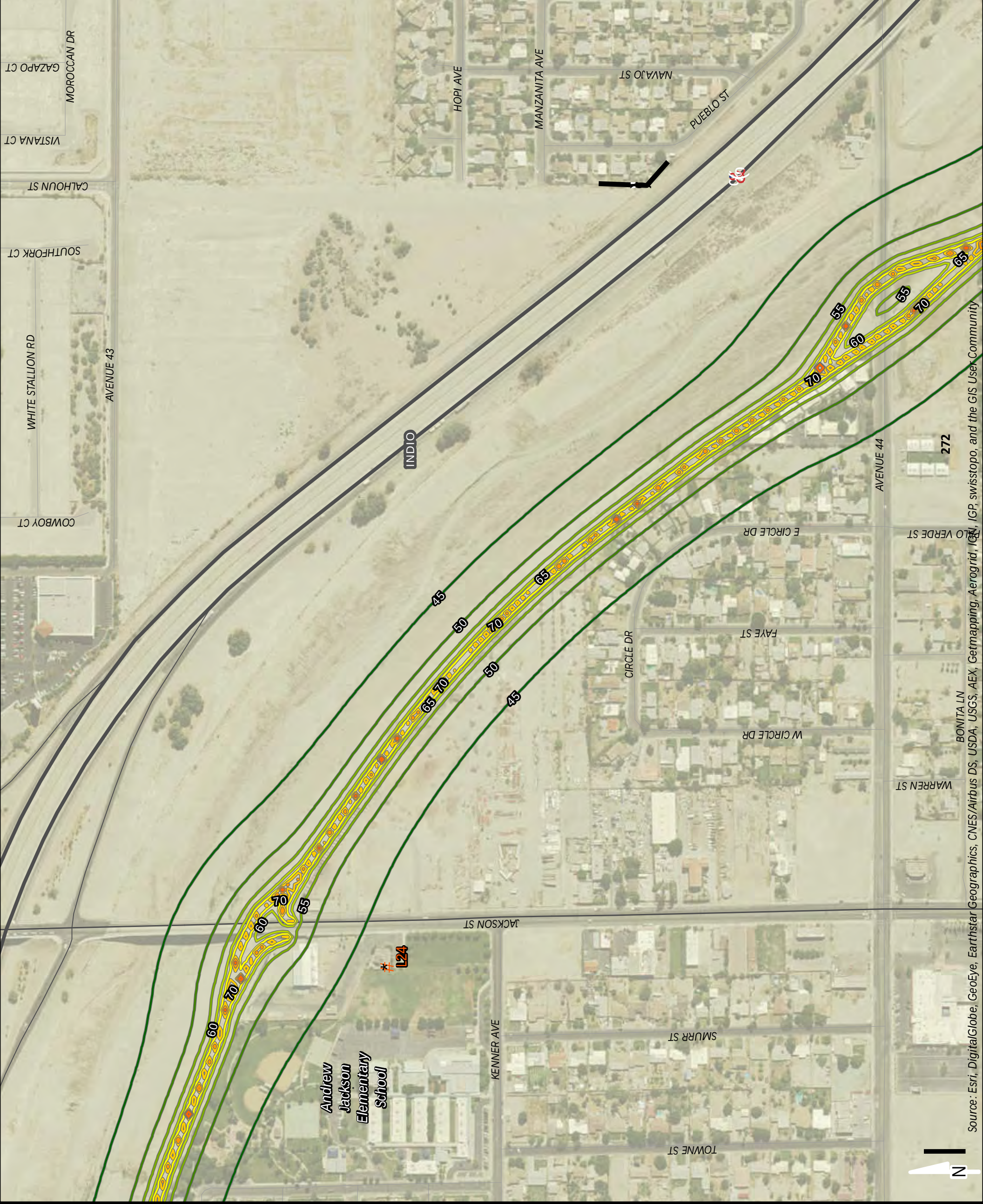


271



LEGEND:

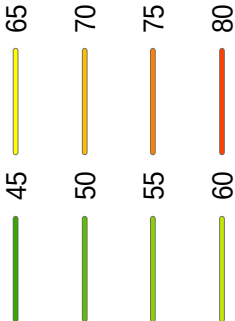
- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80



LEGEND:

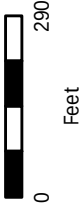
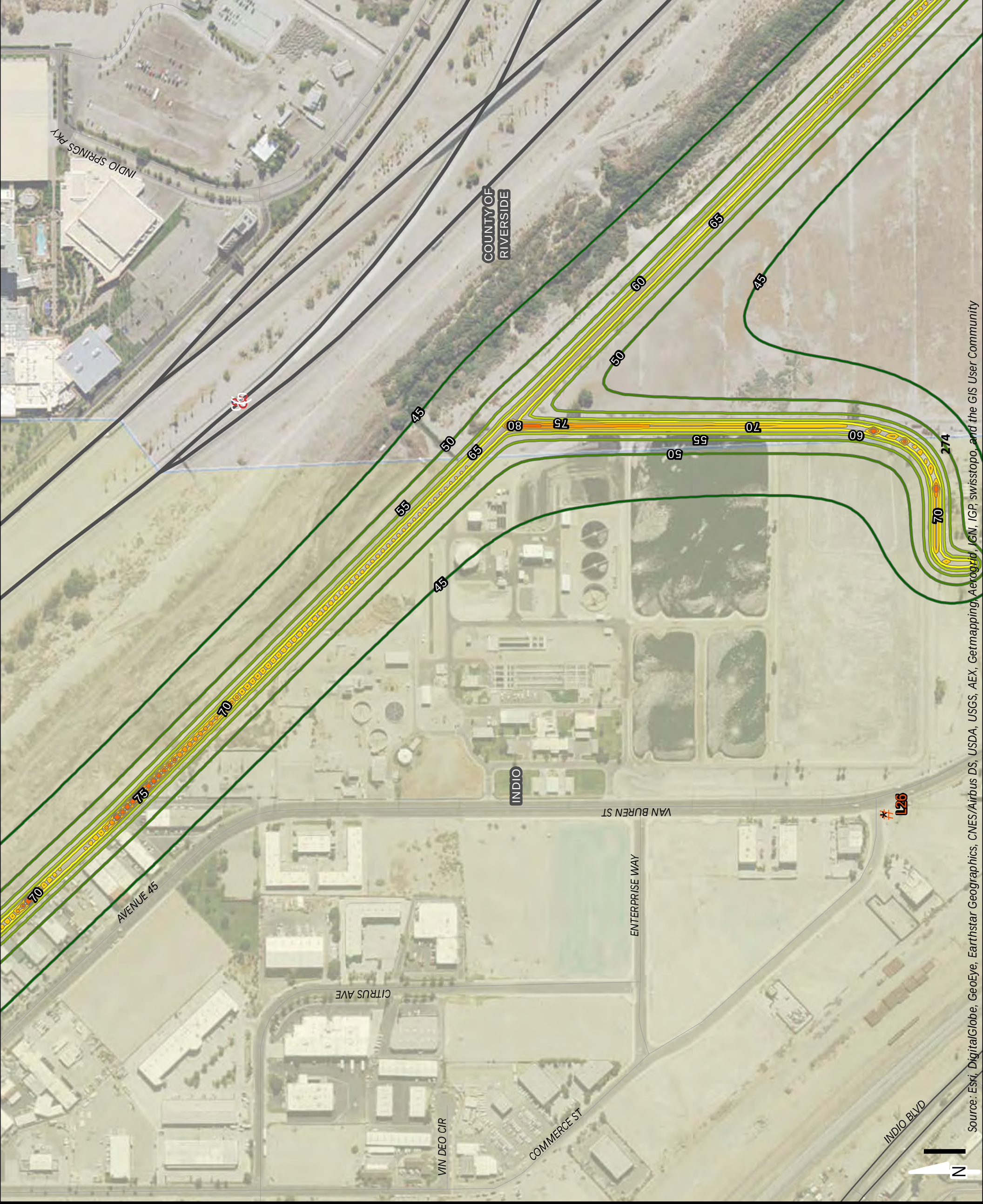
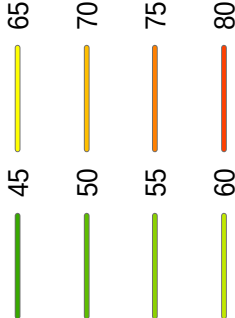
- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)

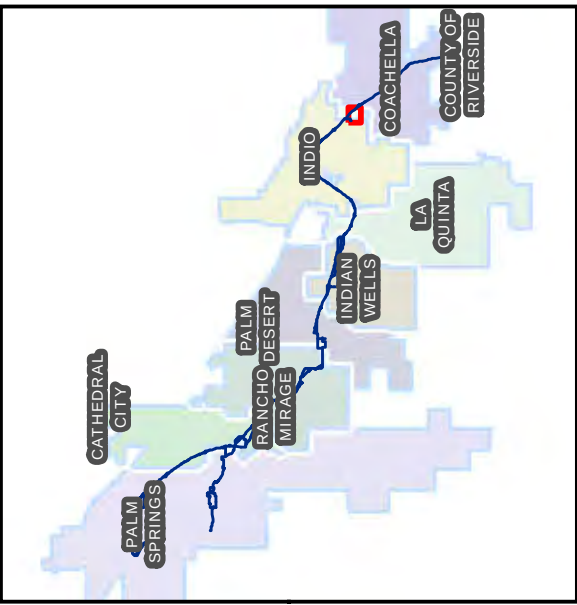
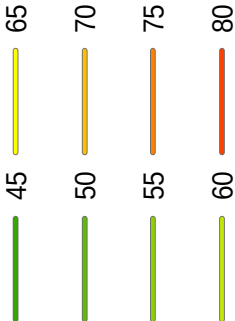


LEGEND:

Existing Barrier Height (in feet)

Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



Feet

LEGEND:

- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level
Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80

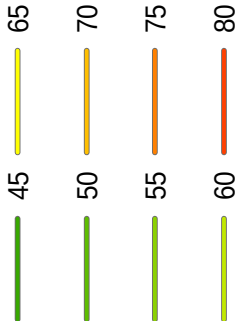


LEGEND:

Existing Barrier Height (in feet)

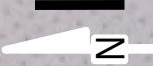
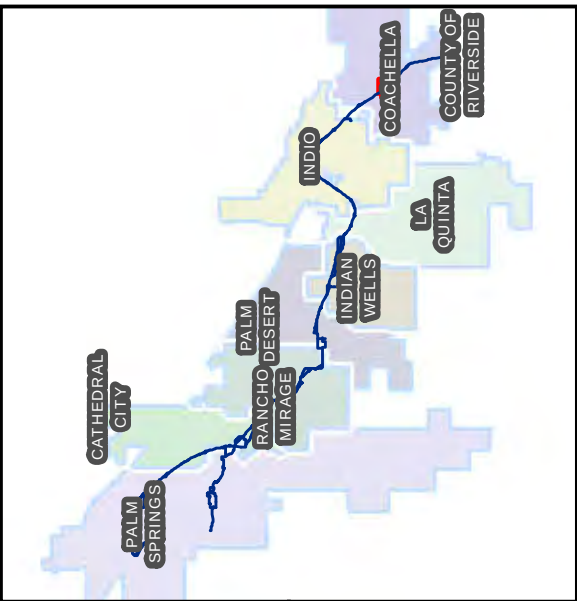
Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

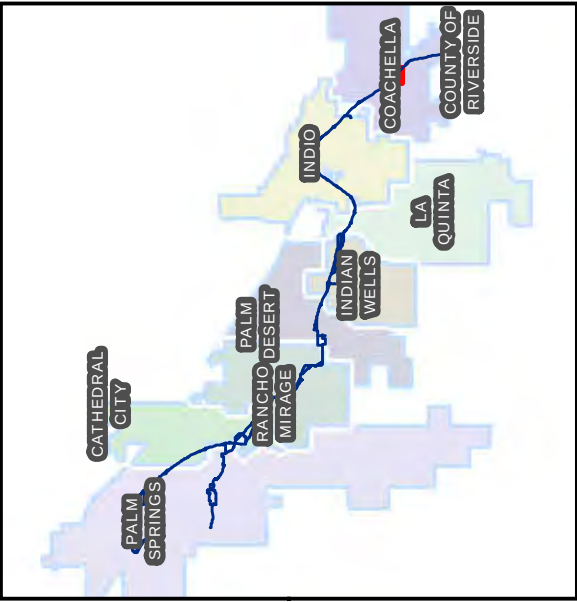
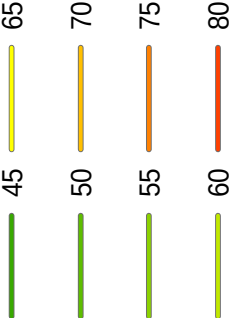
- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80



LEGEND:

-  Noise Level Measurement Locations
-  Existing Barrier Height (in feet)
-  Existing Barrier

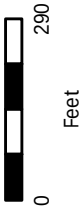
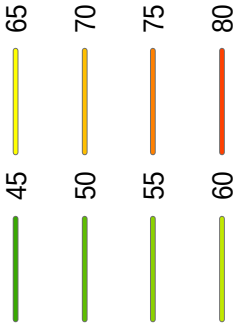
Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

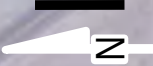
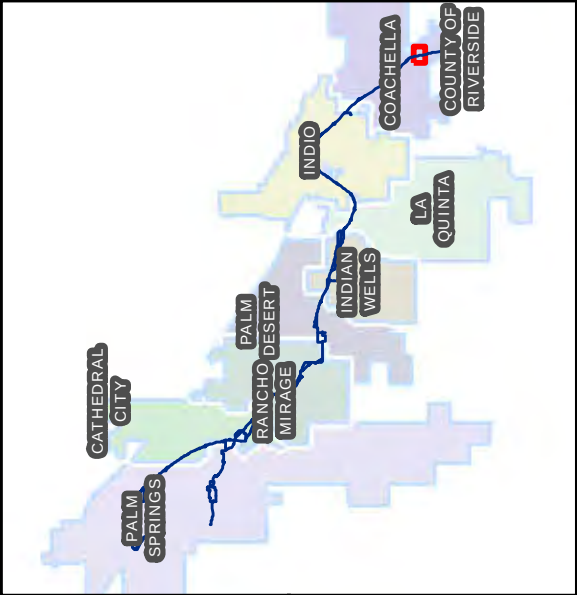
- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

- Existing Barrier Height (in feet)
- Existing Barrier
- Unmitigated Noise Level
Contour Boundaries (dBA Leq)
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80

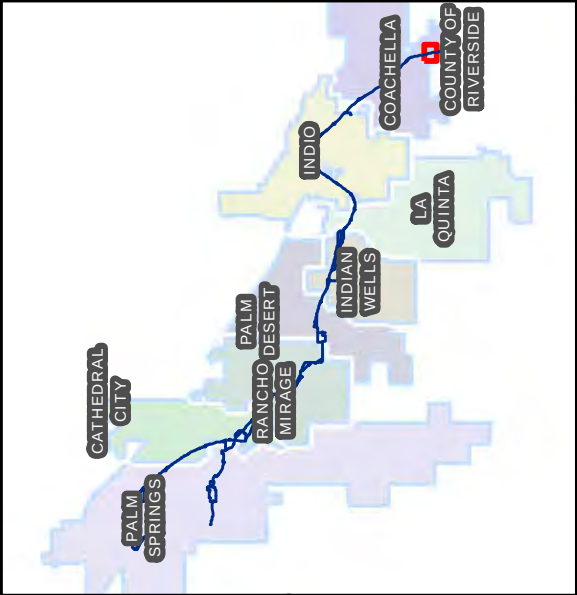
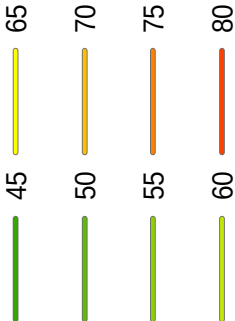


LEGEND:

Existing Barrier Height (in feet)

Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)

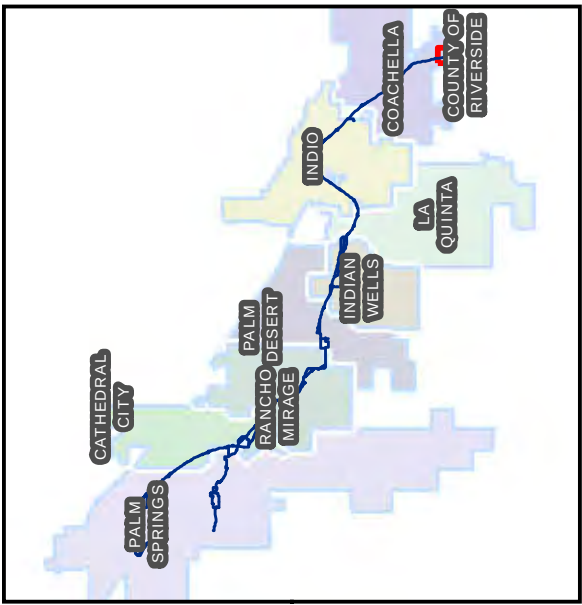
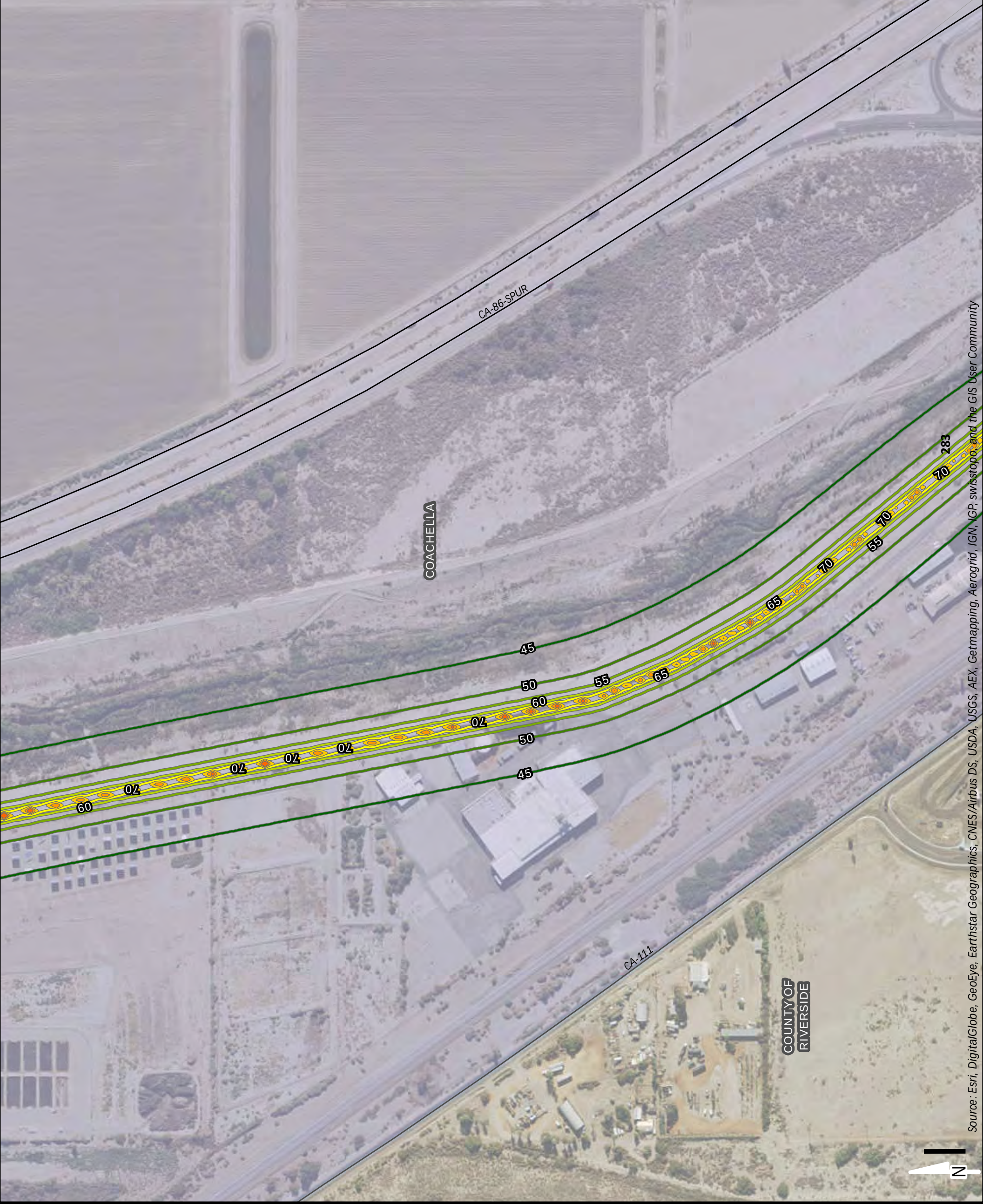
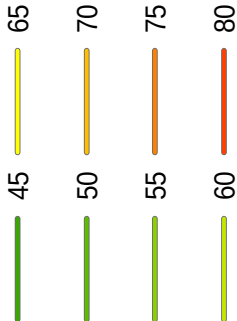


LEGEND:

Existing Barrier Height (in feet)

Existing Barrier

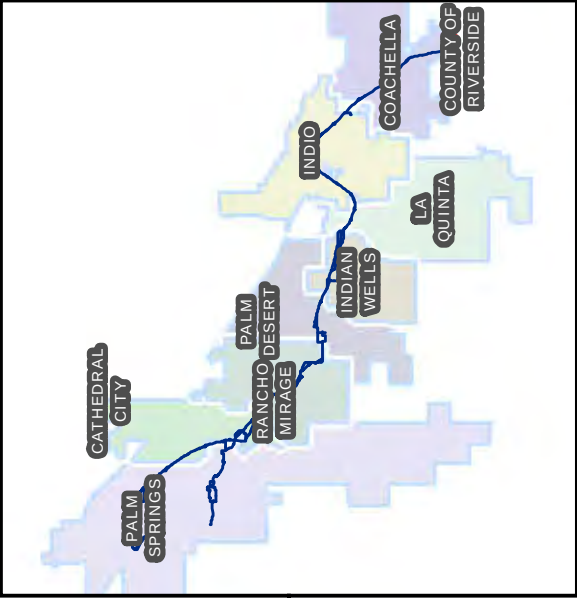
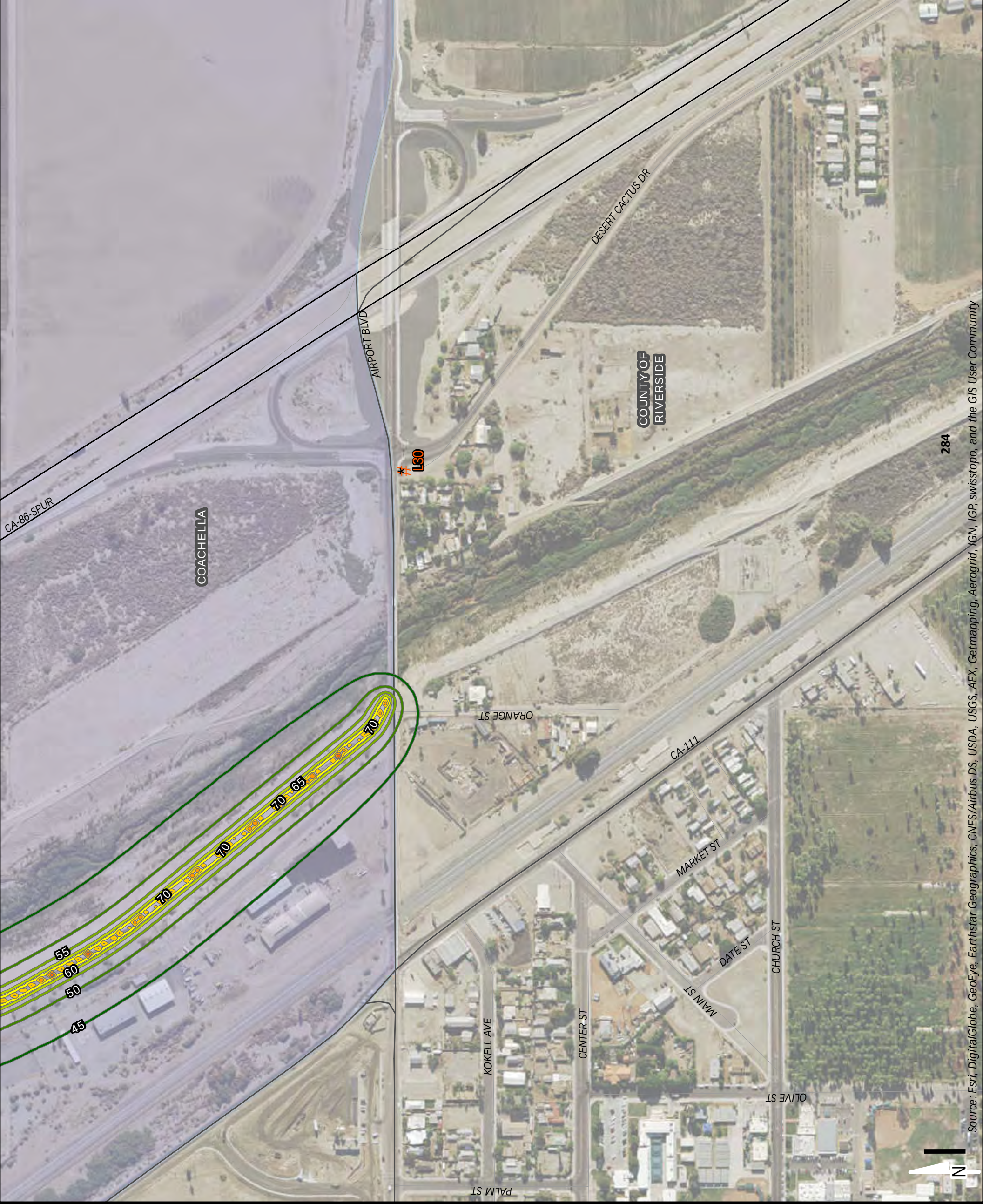
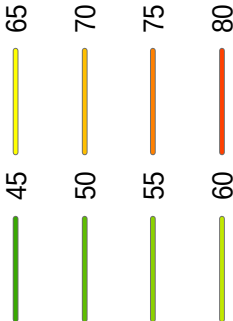
Unmitigated Noise Level
Contour Boundaries (dBA Leq)



LEGEND:

- Noise Level Measurement Locations
- Existing Barrier Height (in feet)
- Existing Barrier

Unmitigated Noise Level
Contour Boundaries (dBA Leq)



APPENDIX 7.2:

CADNAA NOISE MODEL RESULTS

This page intentionally left blank

Name	ID	Level Lr	Height
		Day	
		(dBA)	(m)
L01	1	48.5	1.52
L02	2	46.2	1.52
L03	3	47.4	1.52
L04	4	37.8	1.52
L05	5	59.5	1.52
L06	6	54.5	1.52
L07	7	72.2	1.52
L08	8	60.6	1.52
L09	9	57.7	1.52
L10	10	40.1	1.52
L11	11	60.7	1.52
L12	12	73.4	1.52
L13	13	57.4	1.52
L14	14	46.5	1.52
L15	15	44.4	1.52
L16	16	63.8	1.52
L17	17	63.6	1.52
L18	18	65.4	1.52
L19	19	44.9	1.52
L20	20	34.7	1.52
L21	21	39.6	1.52
L22	22	38.6	1.52
L23	23	41.3	1.52
L24	24	42.7	1.52
L25	25	43.7	1.52
L26	26	33.7	1.52
L27	27	40.8	1.52
L28	28	55.5	1.52
L29	29	43.5	1.52
L30	30	31.4	1.52

This page intentionally left blank

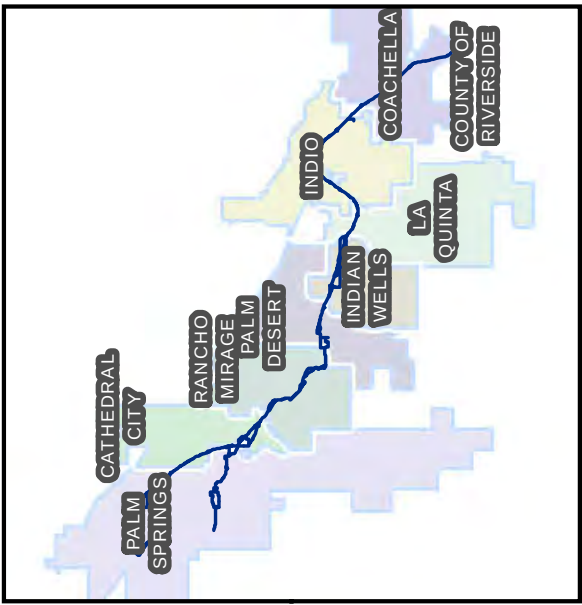
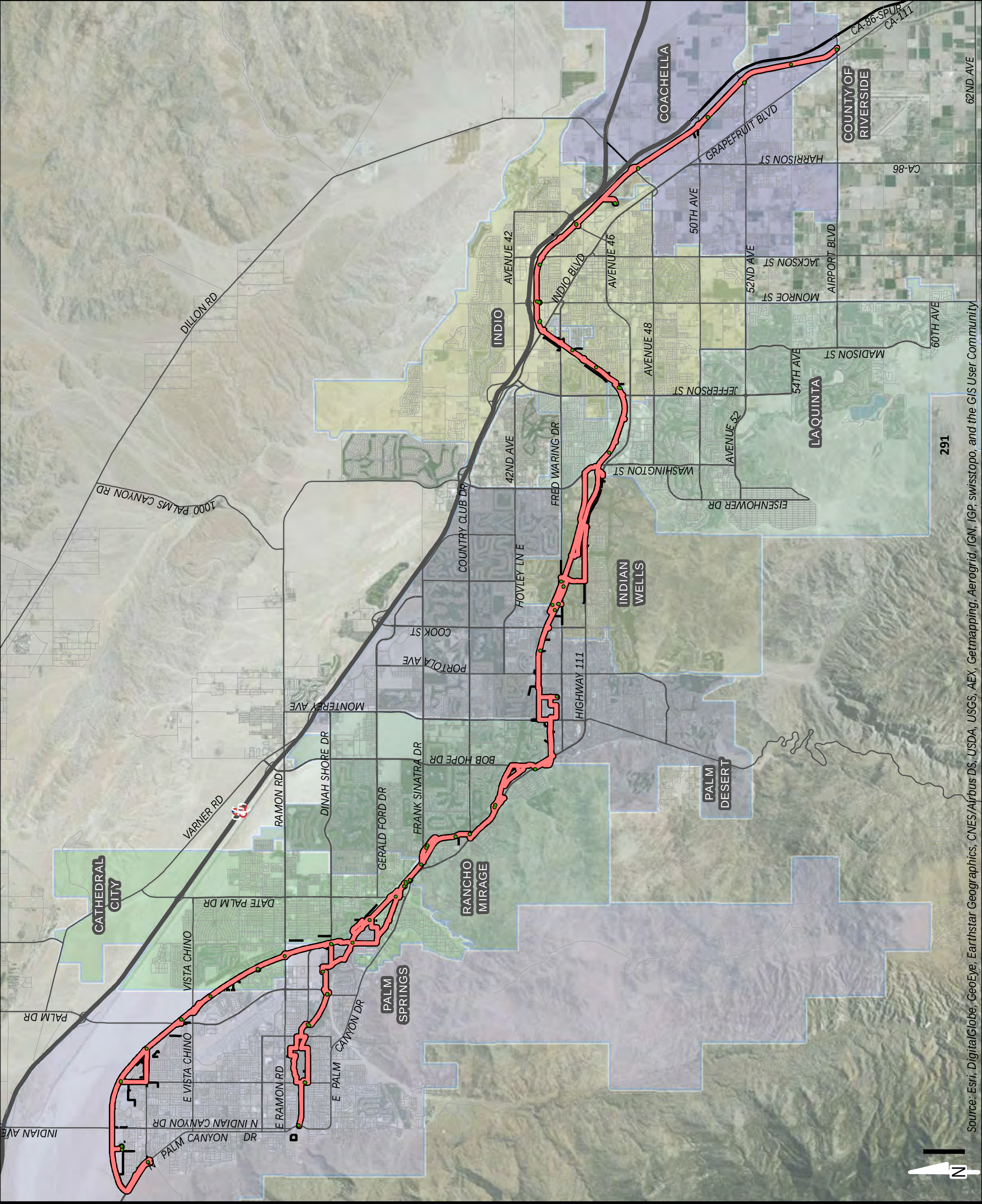
APPENDIX 8.1:

CONSTRUCTION ACTIVITY NOISE CONTOUR BOUNDARIES

This page intentionally left blank

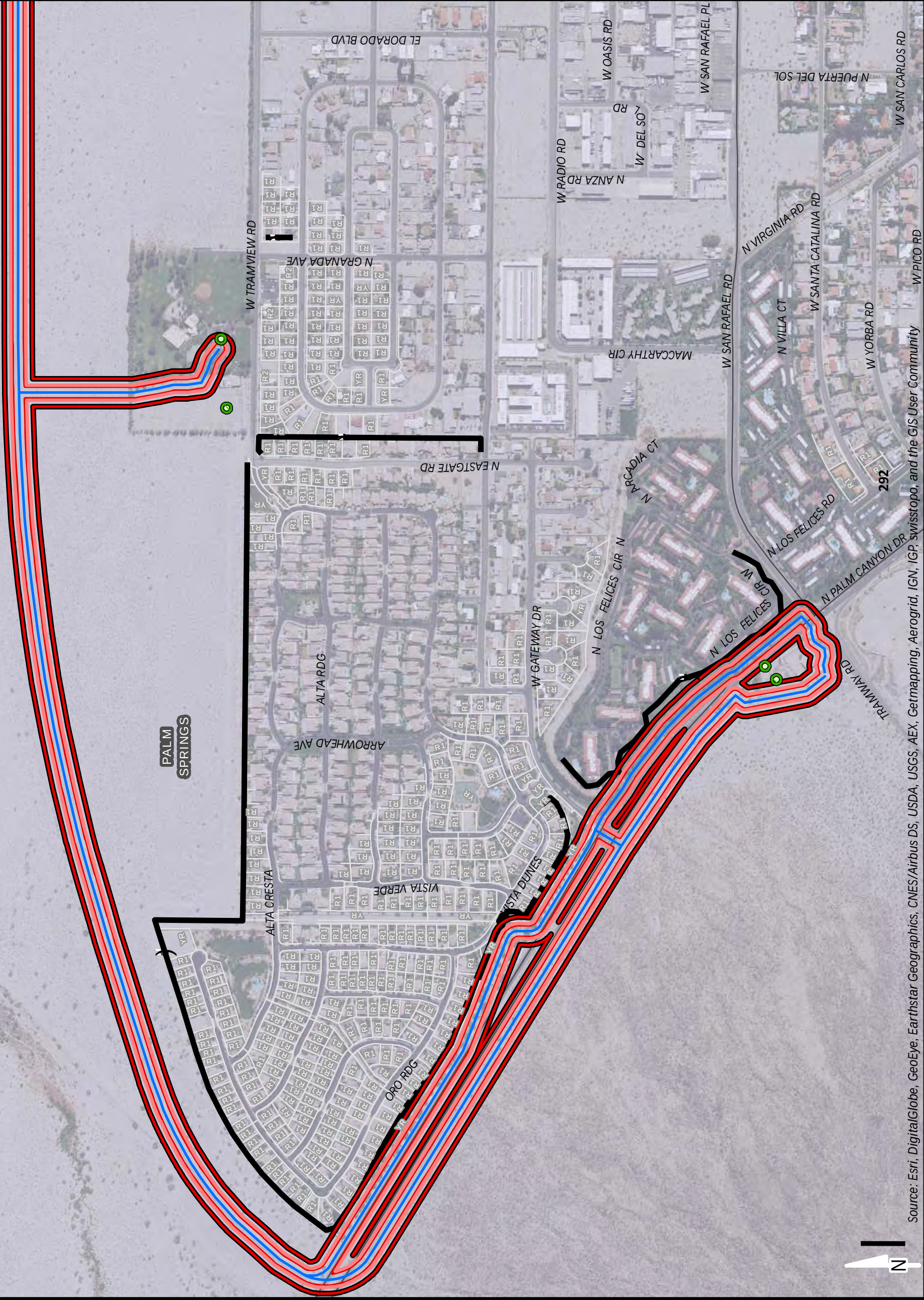
LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax
Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



LEGEND:

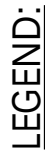
- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax
Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



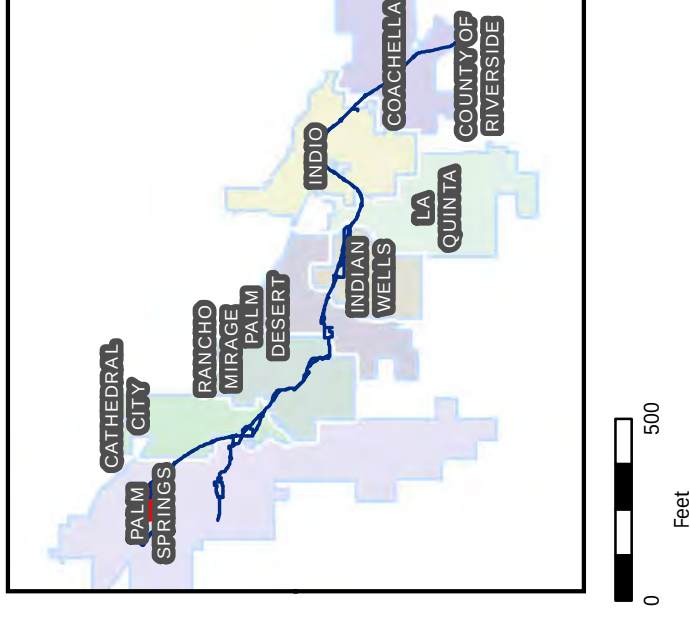
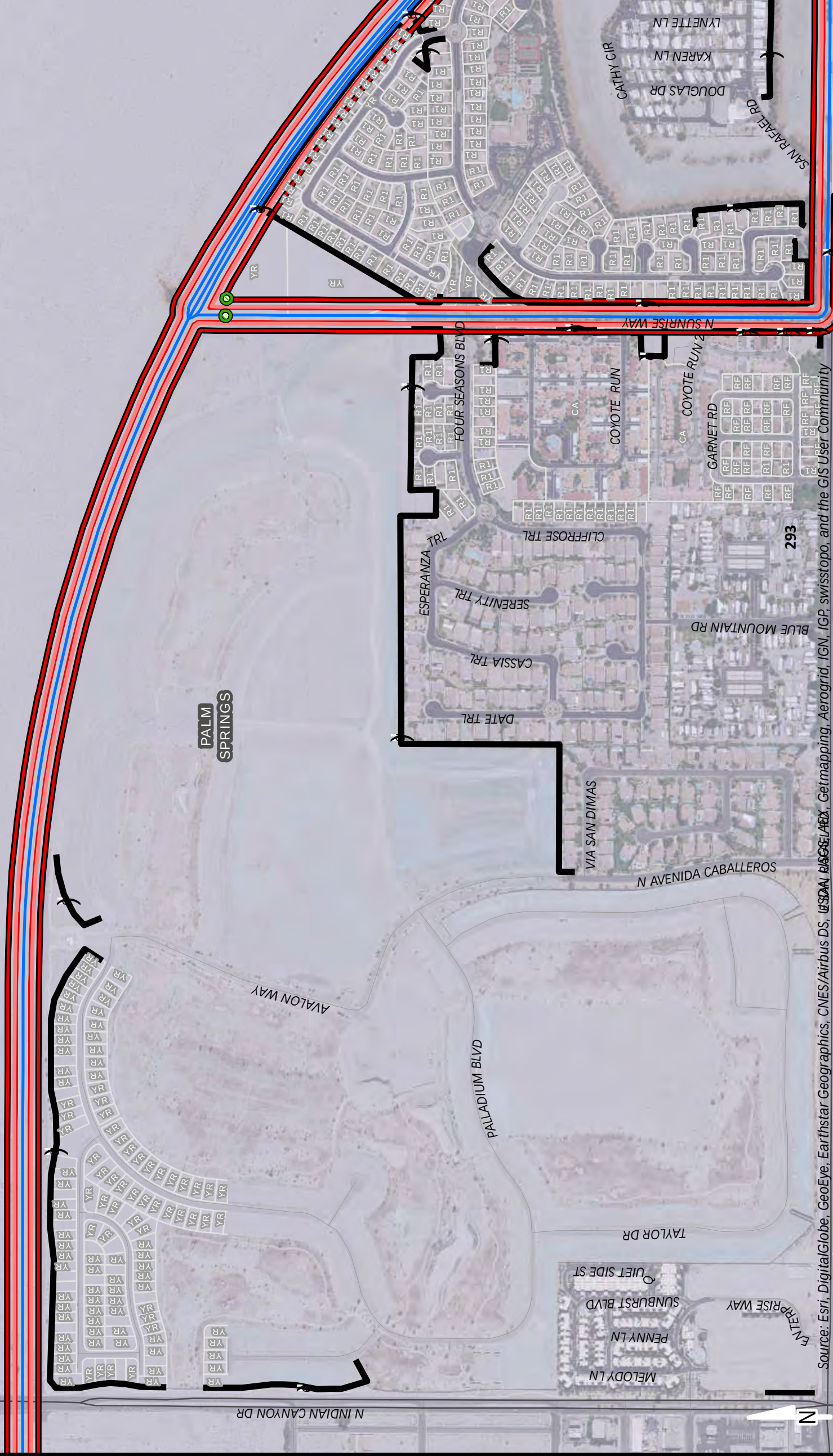
INDIAN AVE

CV Link Construction
Noise Level Contour Boundaries
Page 3 of 31

Page 3 of 31



-
- Legend:
- Mobile Construction Equipment
 - Existing Barrier Height (in feet)
 - Existing Barrier
 - Parcel Zoning Code
 - Unmitigated 86 dBA Lmax Noise Level Contour Boundaries
 - Site Preparation (at 41 Feet)
 - Paving (Mobile Equipment at 35 Feet)
 - Grading (at 76 Feet)
 - Paving (Stationary Equipment at 25 Feet)

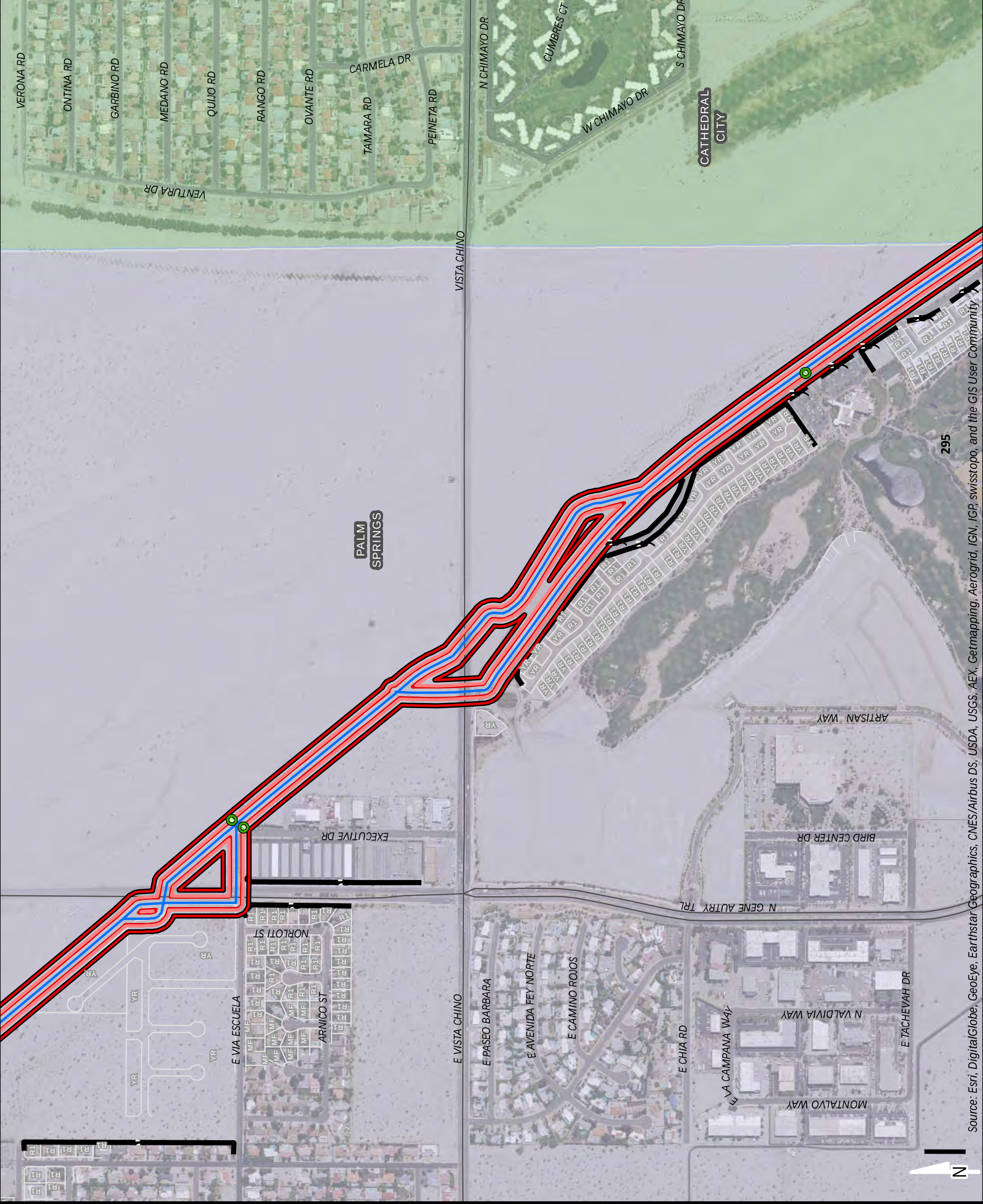


LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)

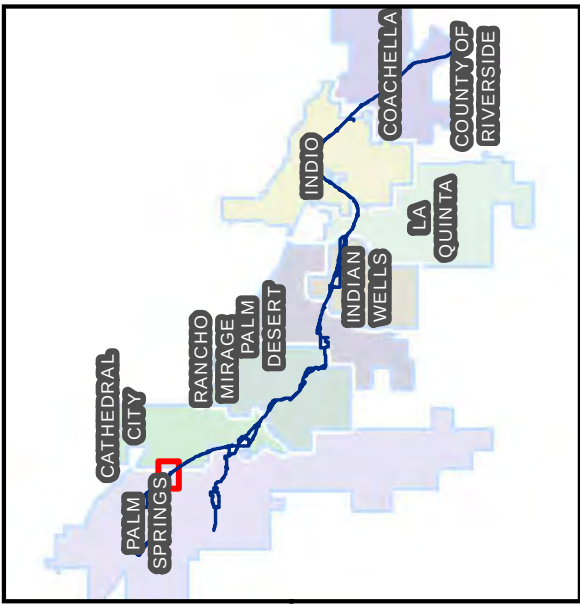


0 500
Feet



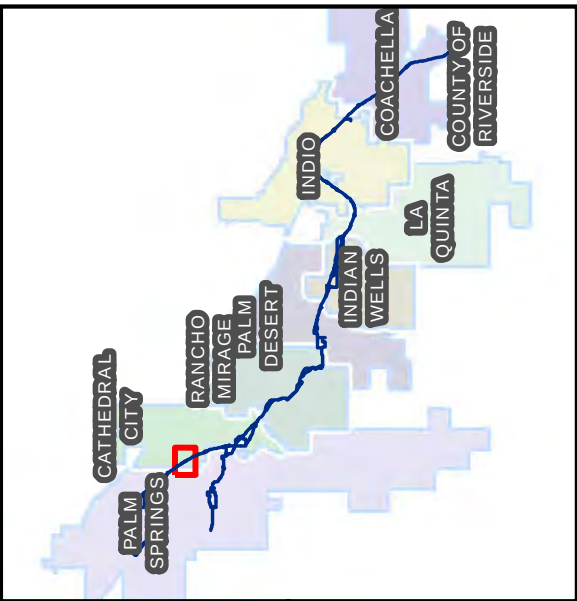
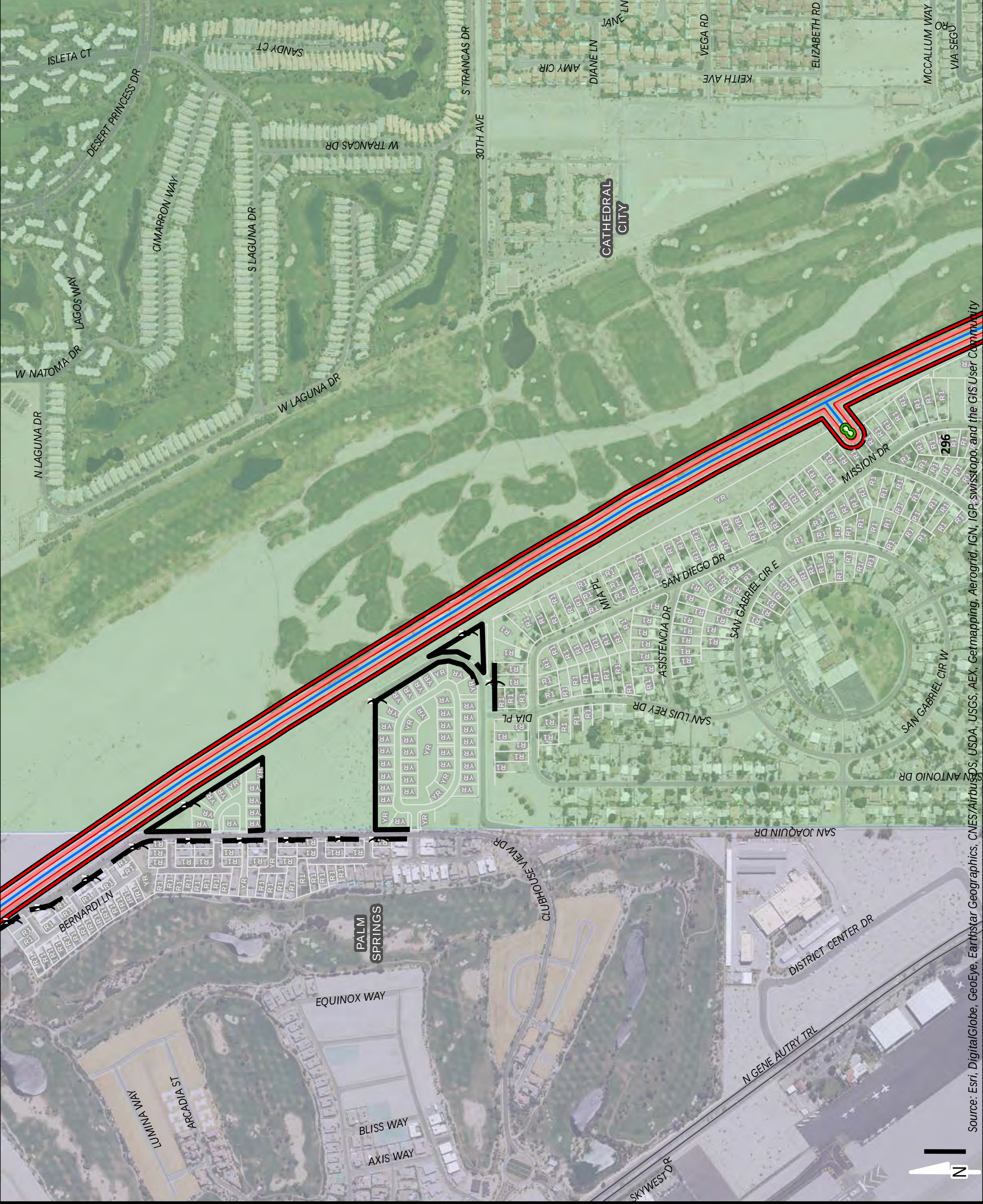
LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)

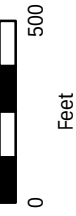


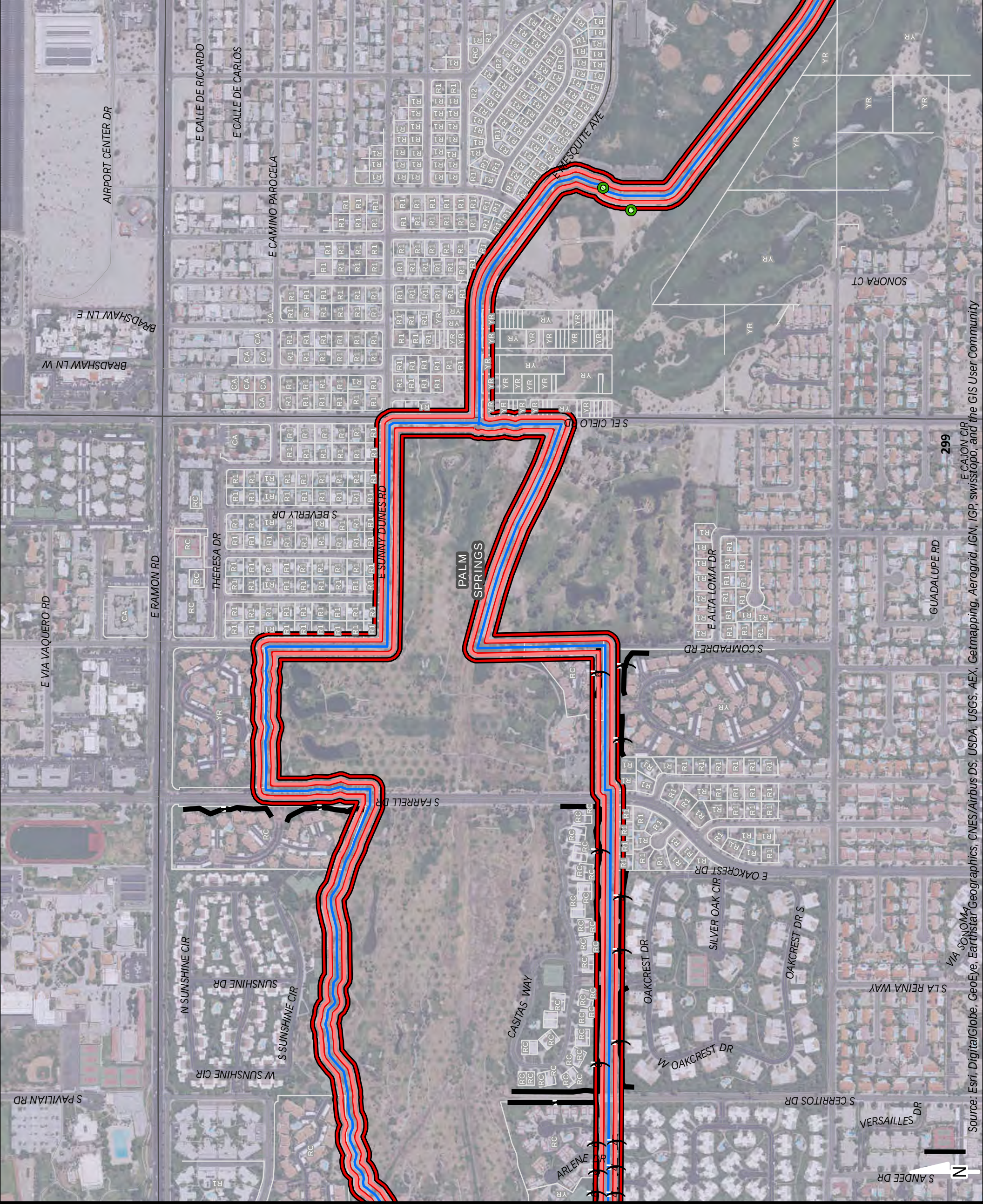
Feet

LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- R1

Parcel Zoning Code
- Unmitigated 86 dBA Lmax
- Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)





LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax
- Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



LEGEND:

- Mobile Construction Equipment
- 

 Existing Barrier Height (in feet)
- Existing Barrier
- R1

 Parcel Zoning Code
- Unmitigated 86 dBA Lmax

Noise Level Contour Boundaries
- 

 Site Preparation (at 41 Feet)
- 

 Paving (Mobile Equipment at 35 Feet)
- 

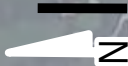
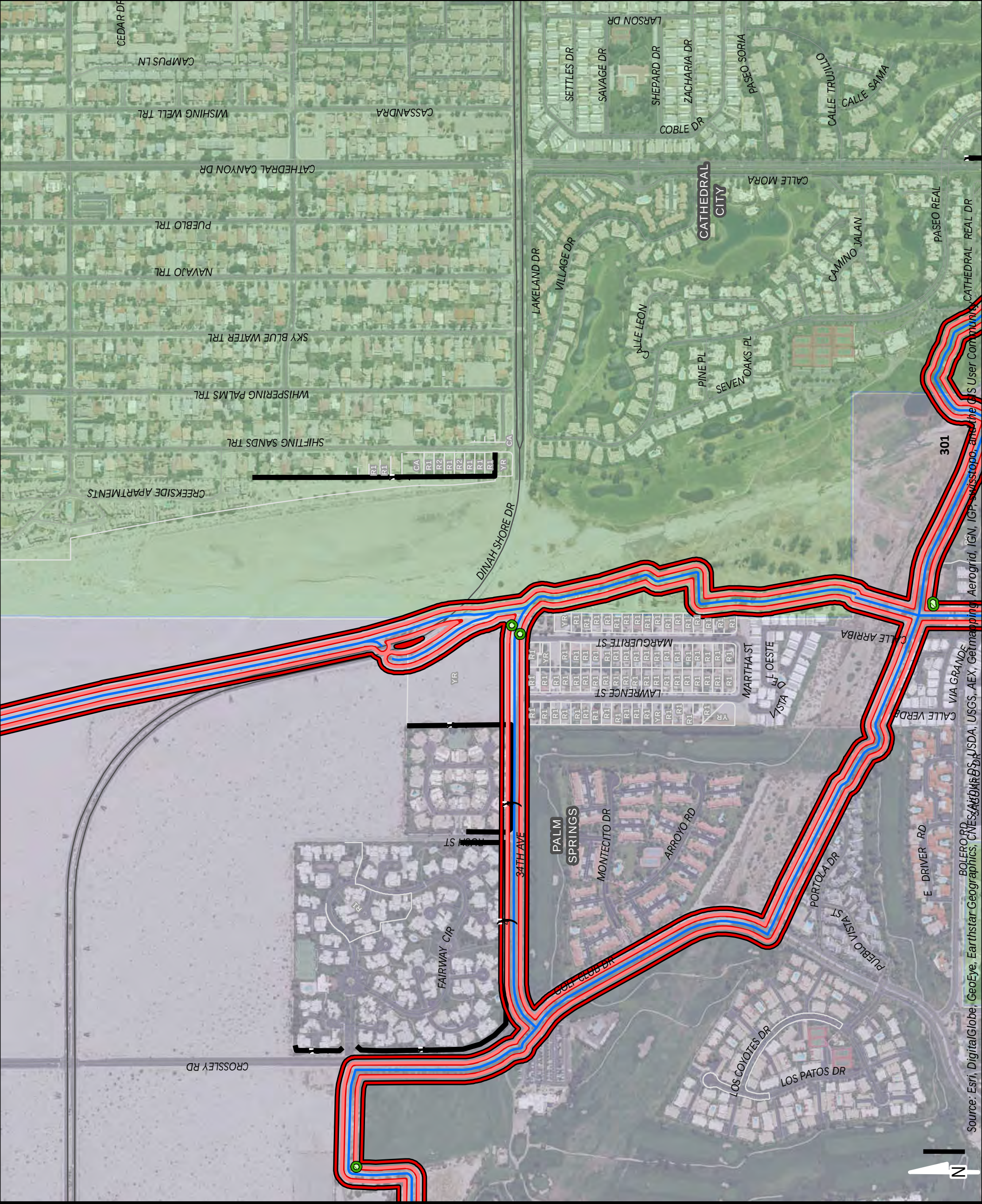
 Grading (at 76 Feet)
- 

 Paving (Stationary Equipment at 25 Feet)



LEGEND:

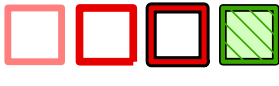
- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



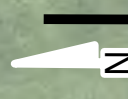
Noise Level Contour Boundaries

LEGEND:

- ## Unmitigated 86 dBA Lmax Noise Level Contour Boundaries

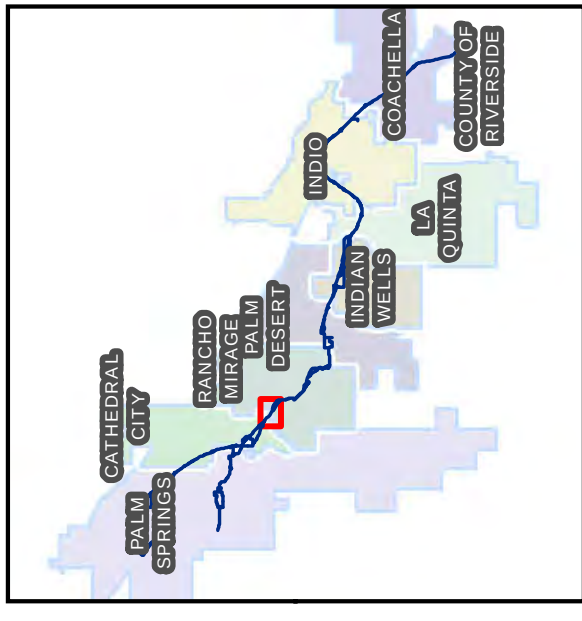
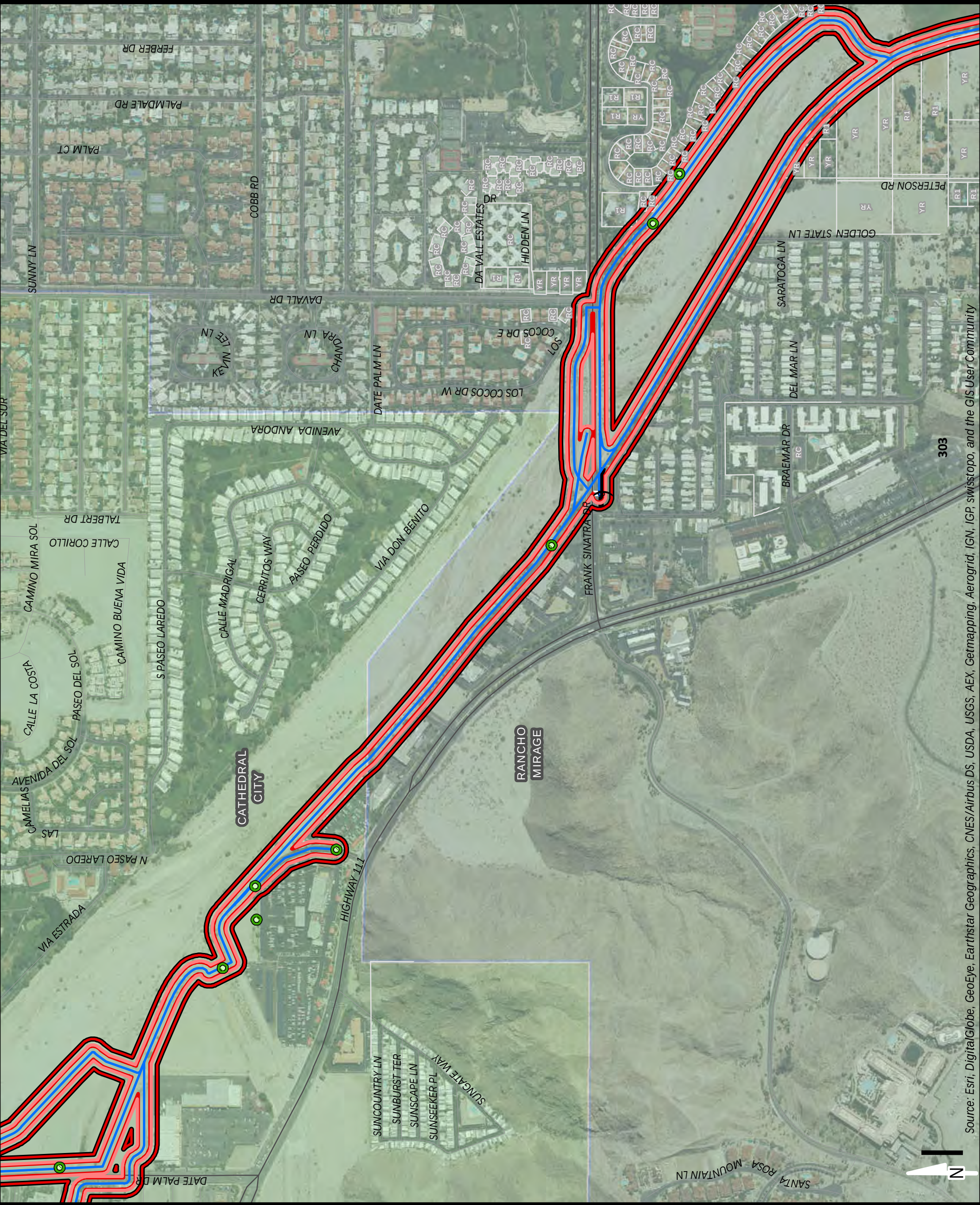


09276-22_Construction_mapbook
8/8/2016



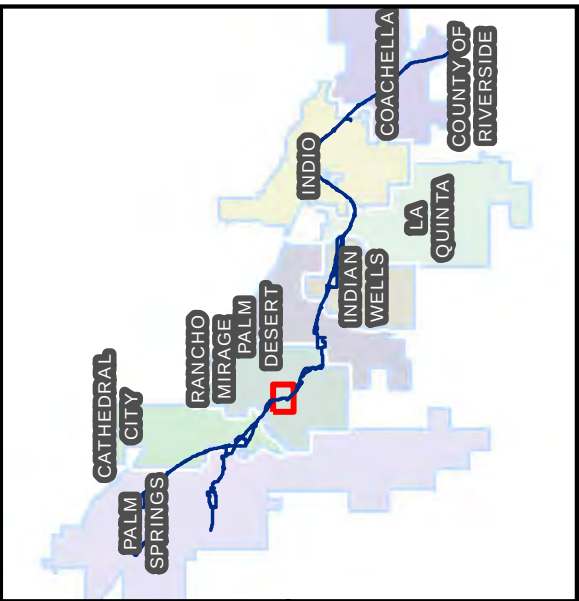
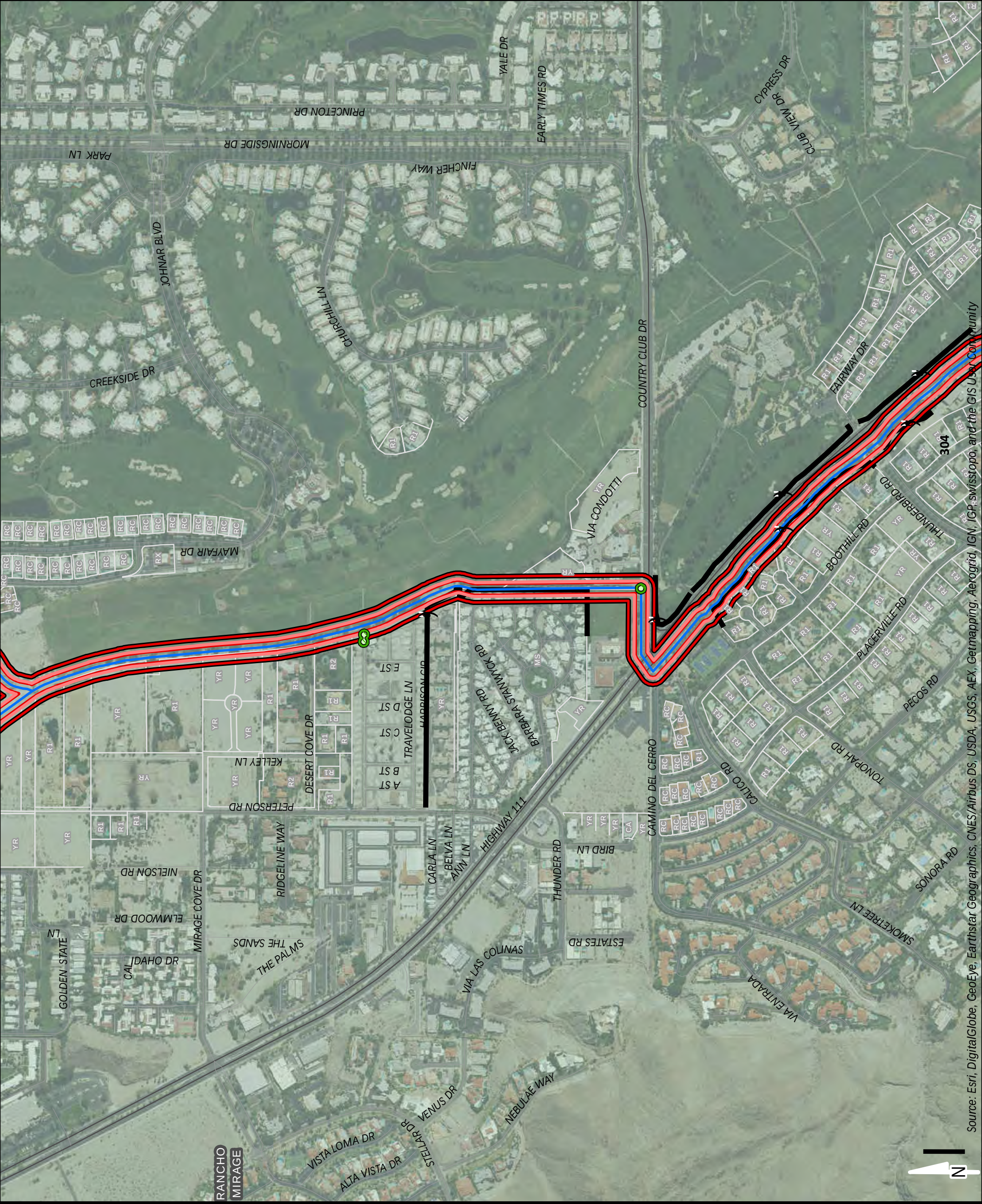
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

CV Link Construction
Noise Level Contour Boundaries
Page 13 of 31

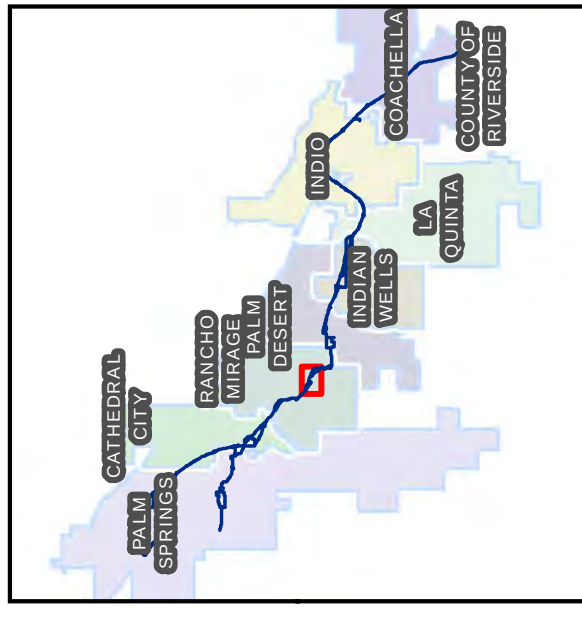
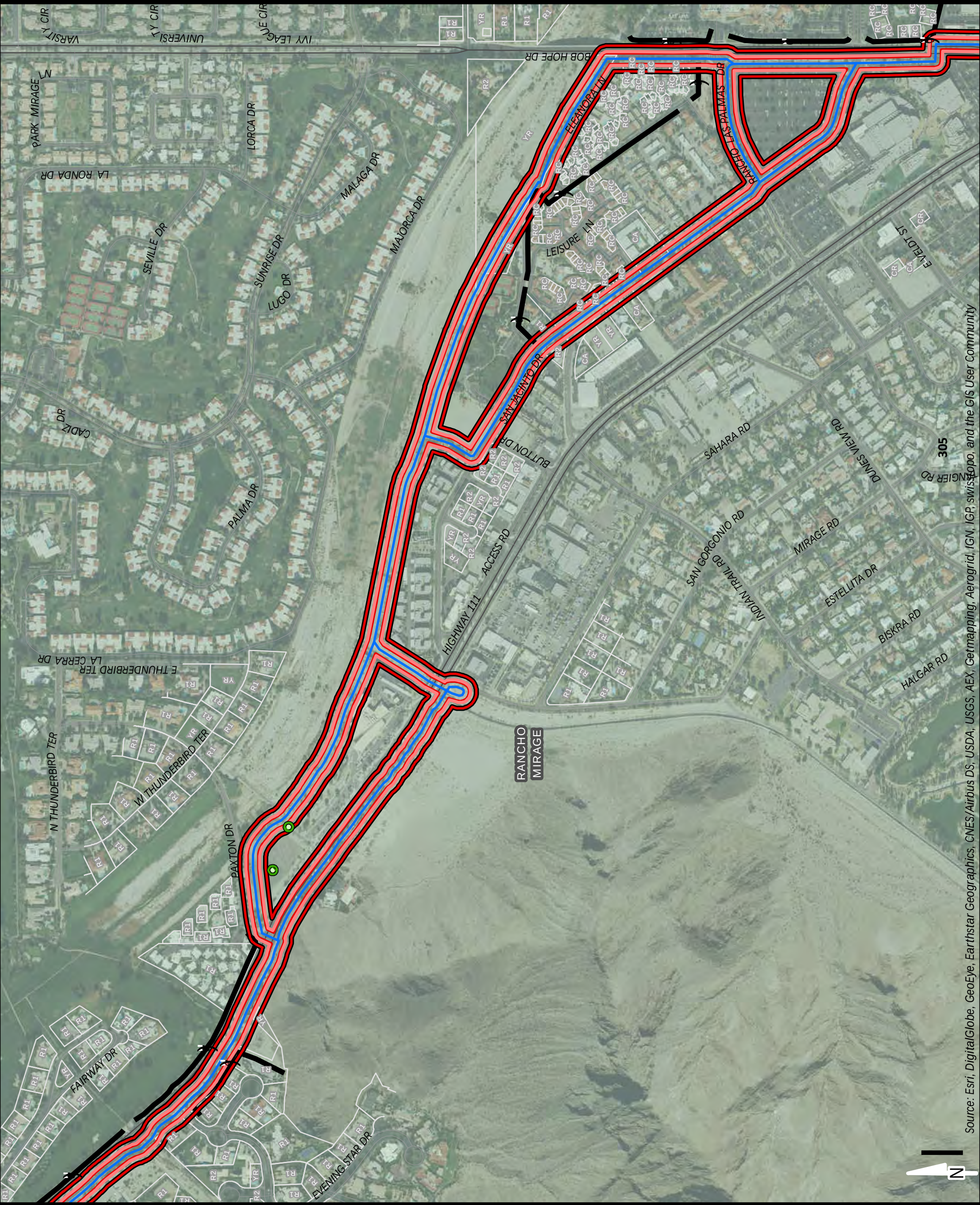


LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)

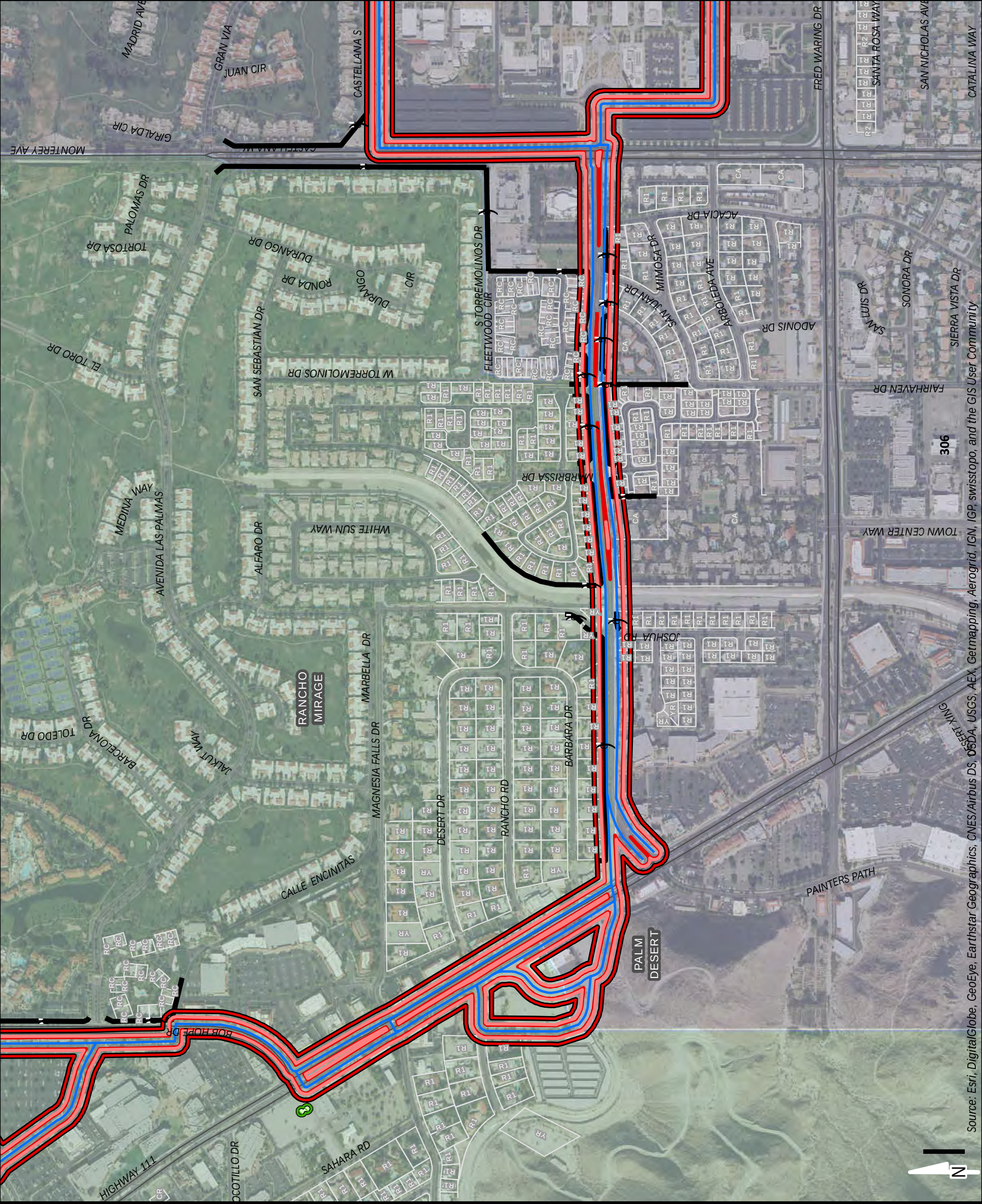


CV Link Construction



LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)

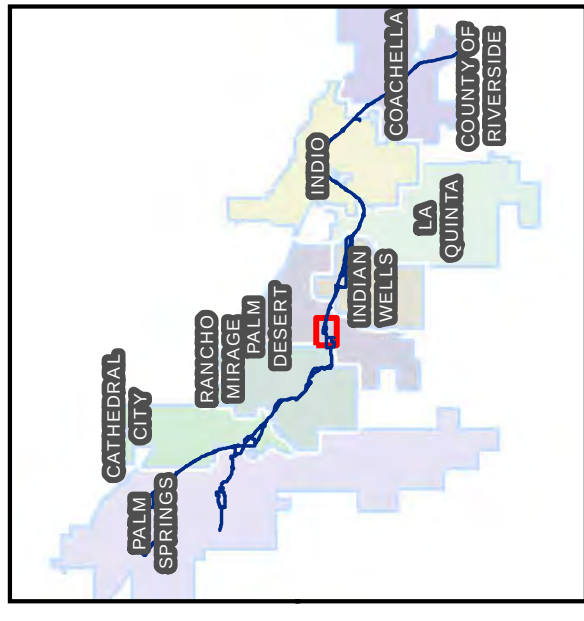


CV Link Construction

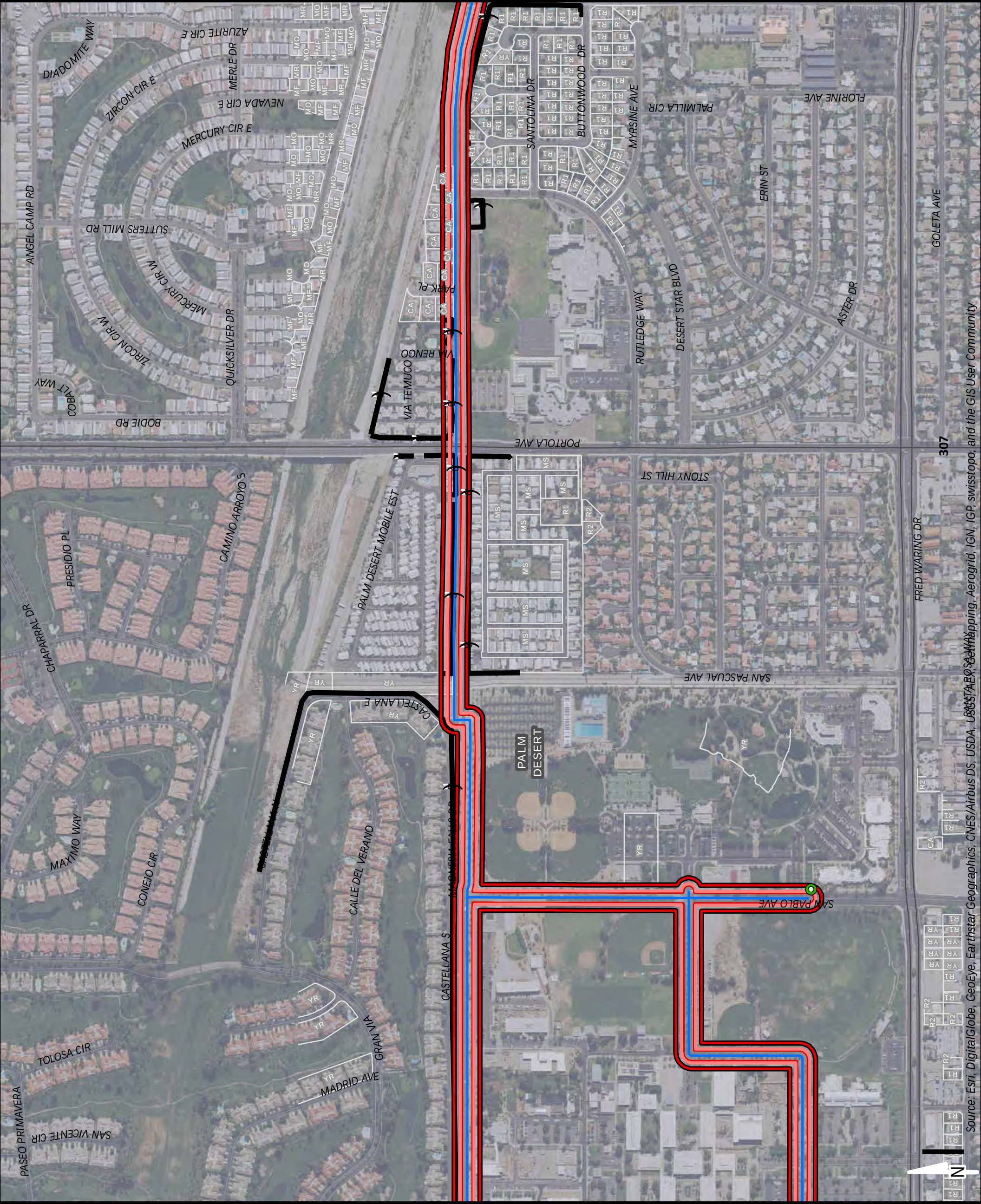
Page 17 of 31

LEGEND:

- Mobile Construction Equipment
- 8' Existing Barrier Height (in feet)
- Existing Barrier
- R1 Parcel Zoning Code
- Unmitigated 86 dBA Lmax
Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- ▨ Paving (Stationary Equipment at 25 Feet)

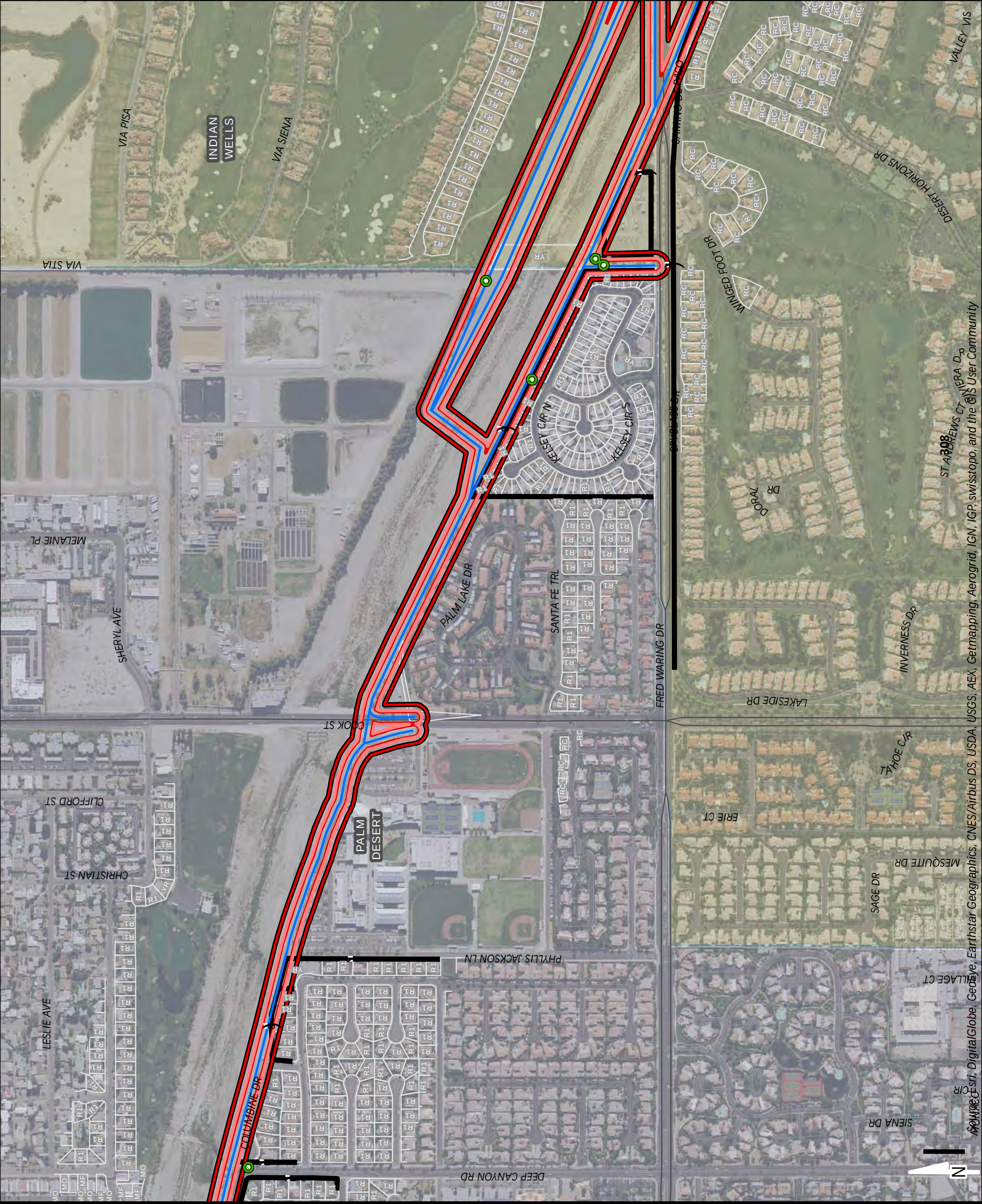


Feet

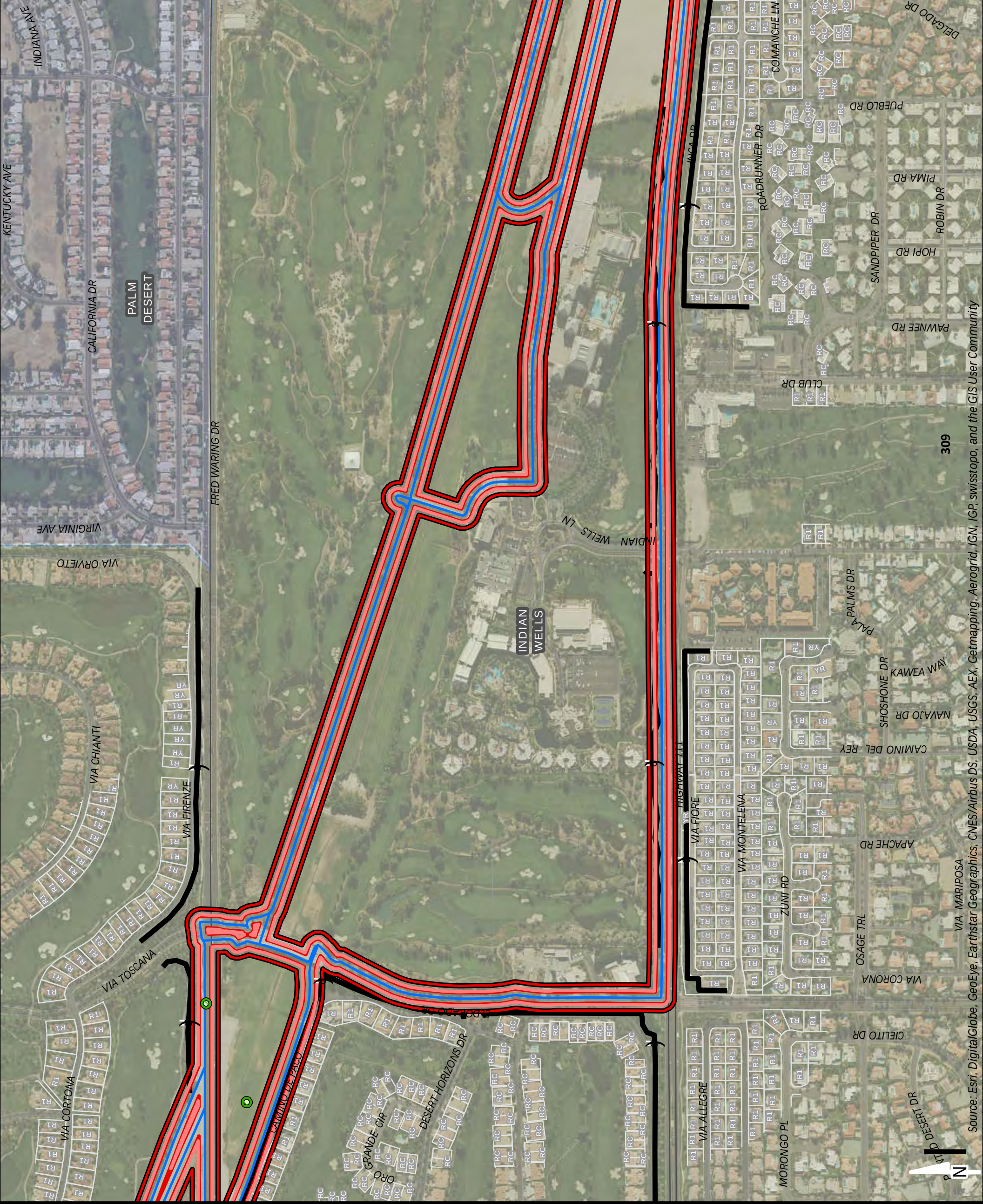


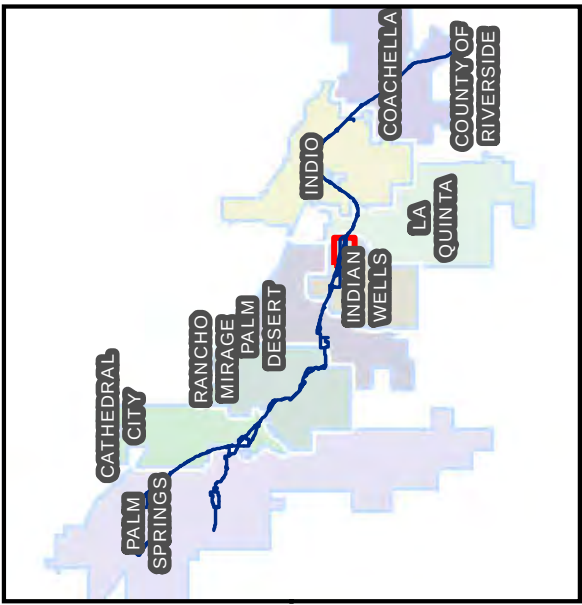
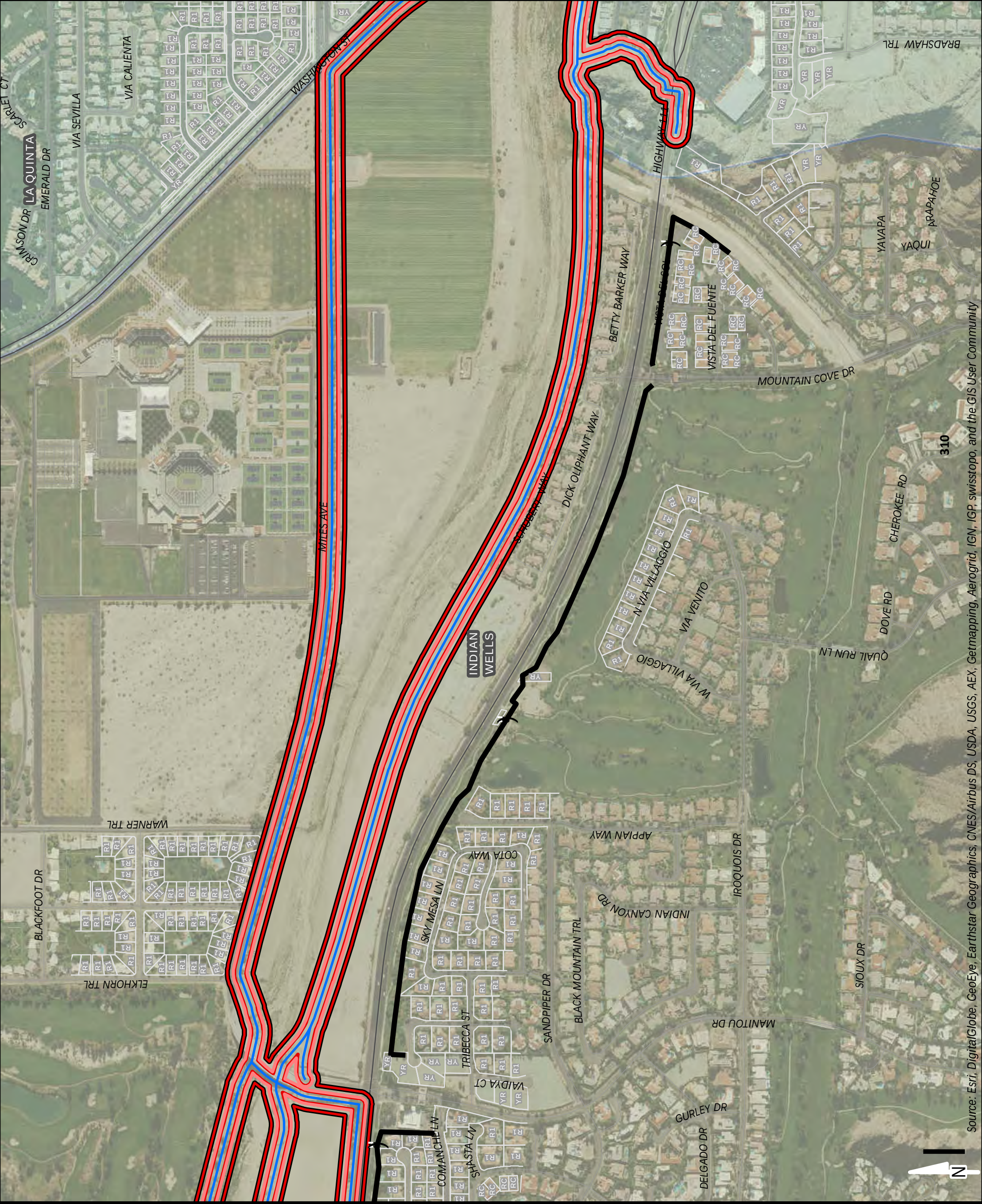
LEGEND:

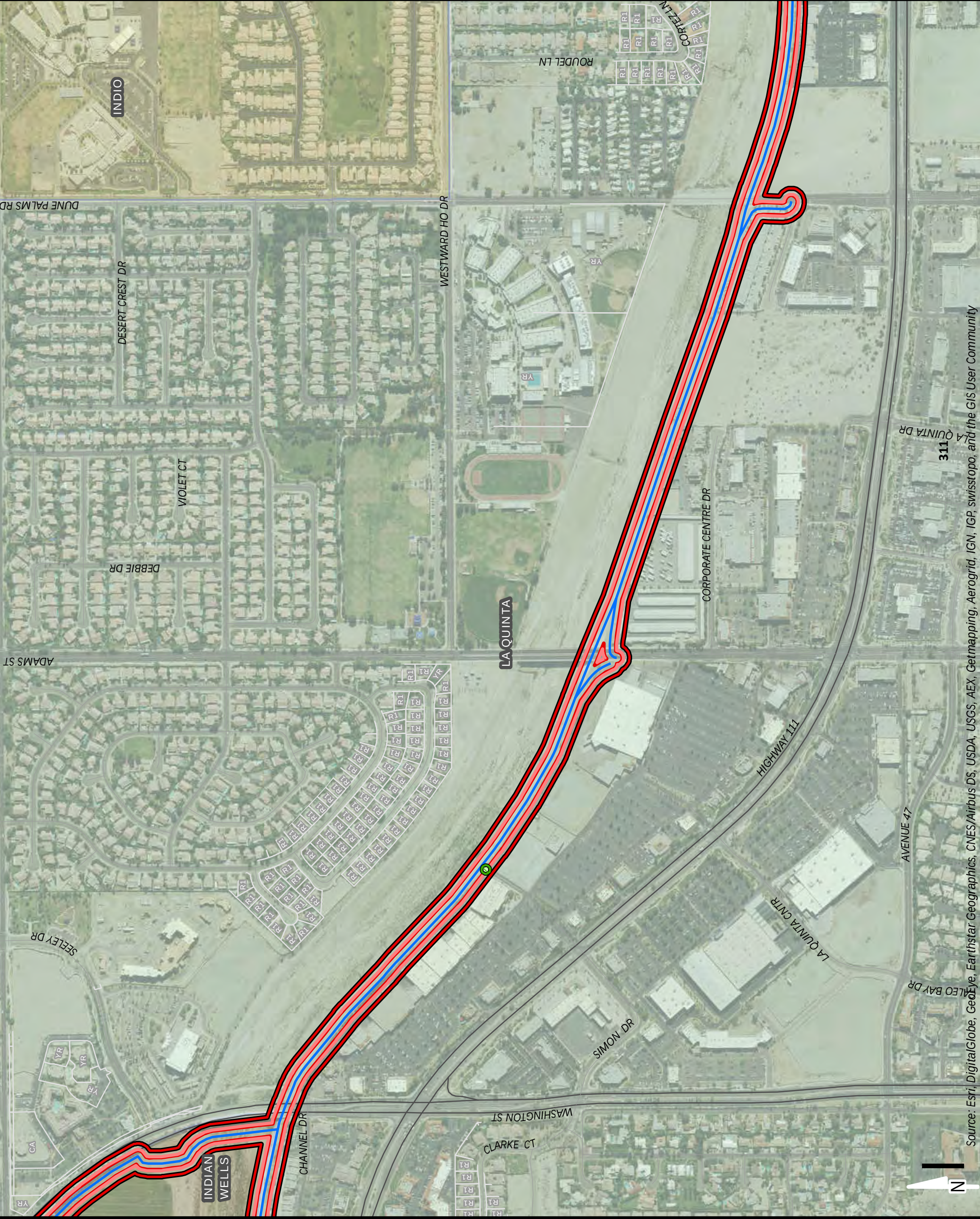
- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax
Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



CV Link Construction
Noise Level Contour Boundaries



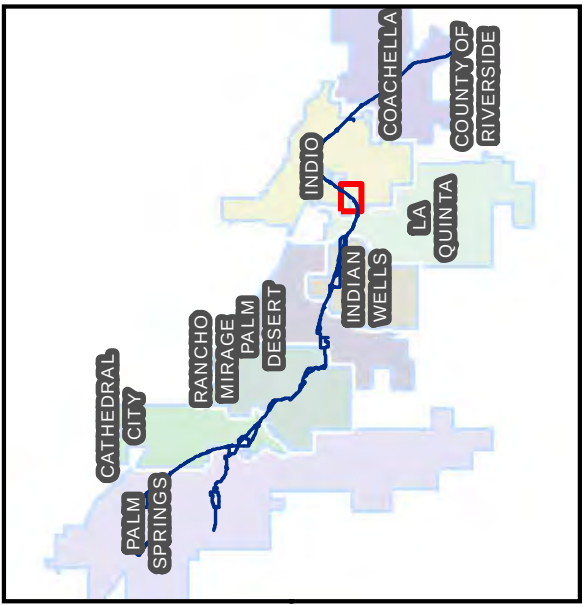
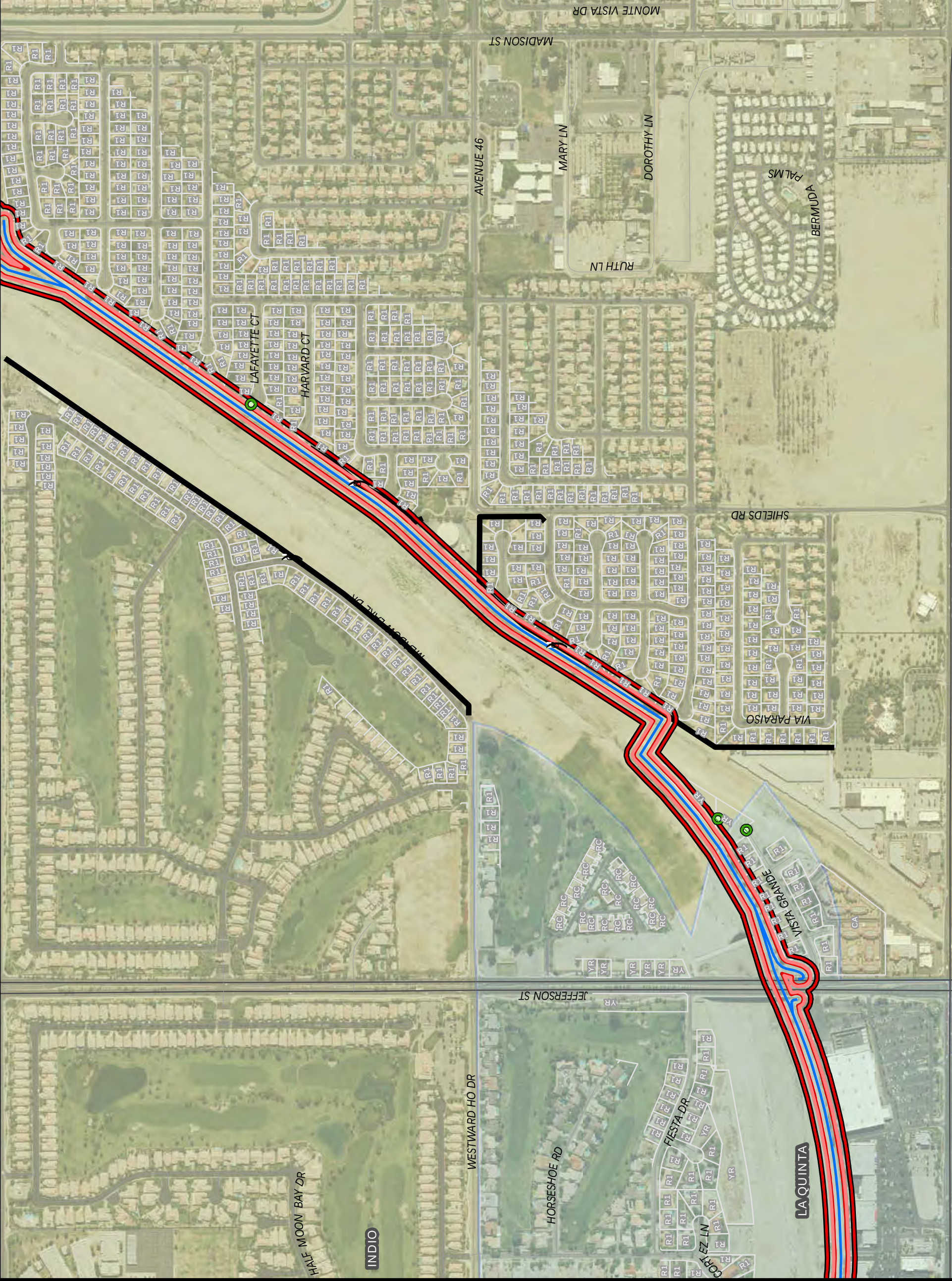




CV Link Construction
Noise Level Contour Boundaries

LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax
Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



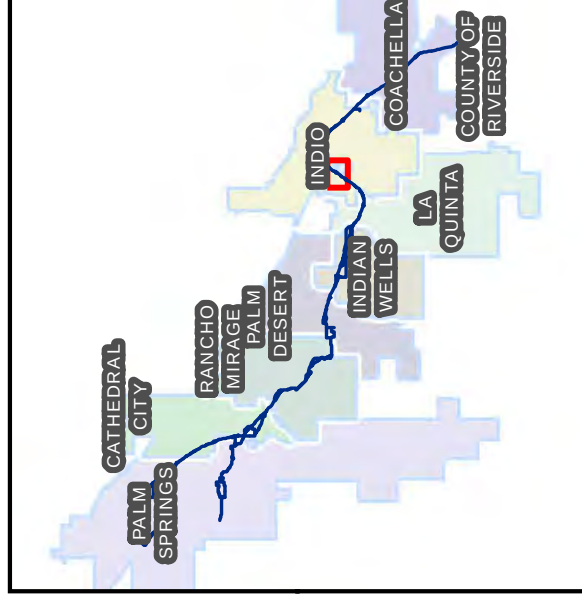
Noise Level Contour Boundaries

LEGEND:

-  Mobile Construction Equipment
 Existing Barrier Height (in feet)
 Existing Barrier
 Parcel Zoning Code

Unmitigated 86 dBA Lmax
Noise Level Contour Boundaries

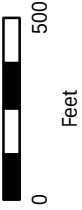
- | | |
|---|--|
|  | Site Preparation (at 41 Feet) |
|  | Paving (Mobile Equipment at 35 Feet) |
|  | Grading (at 76 Feet) |
|  | Paving (Stationary Equipment at 25 Feet) |



Feet

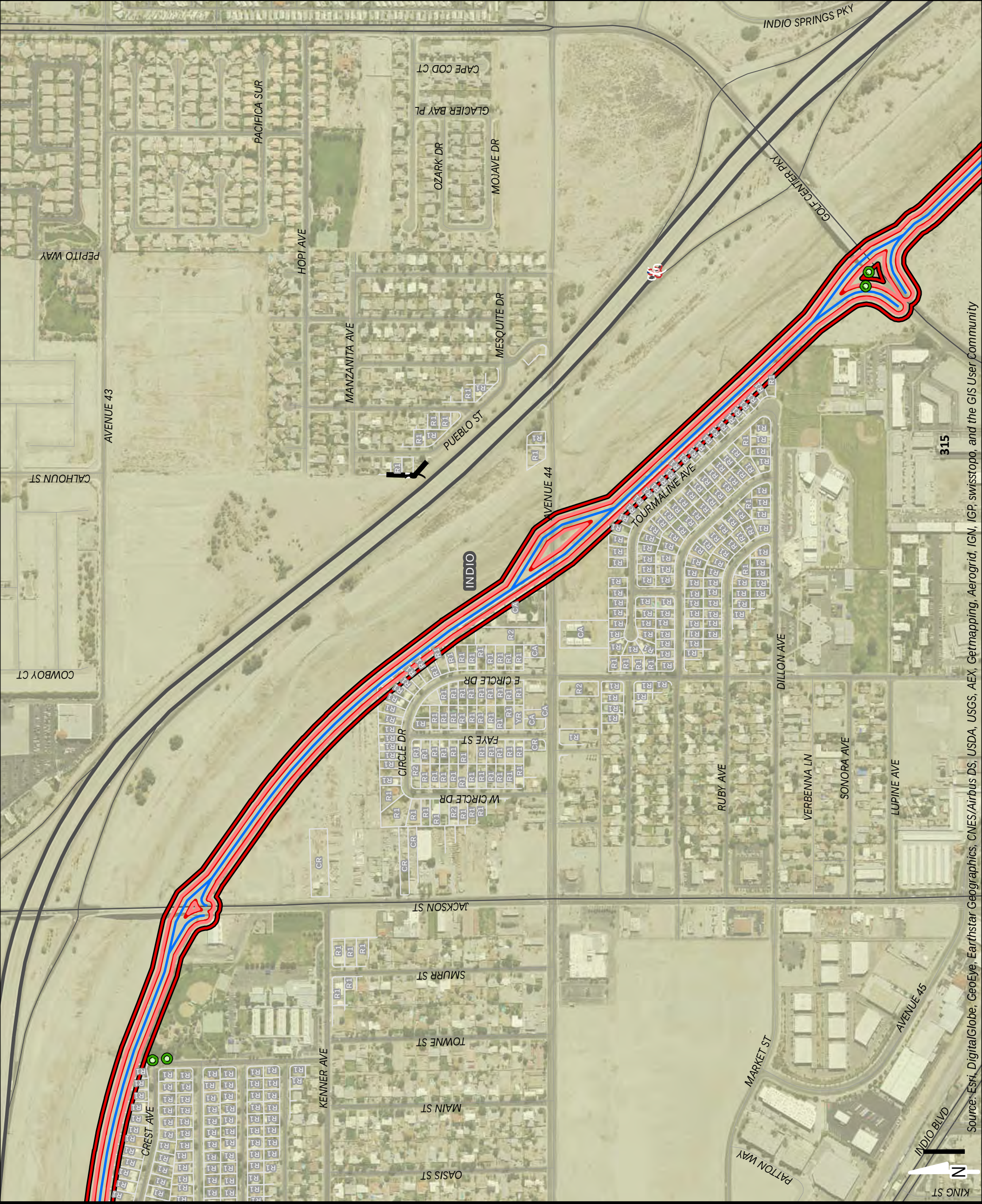
LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax
- Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



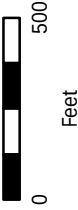
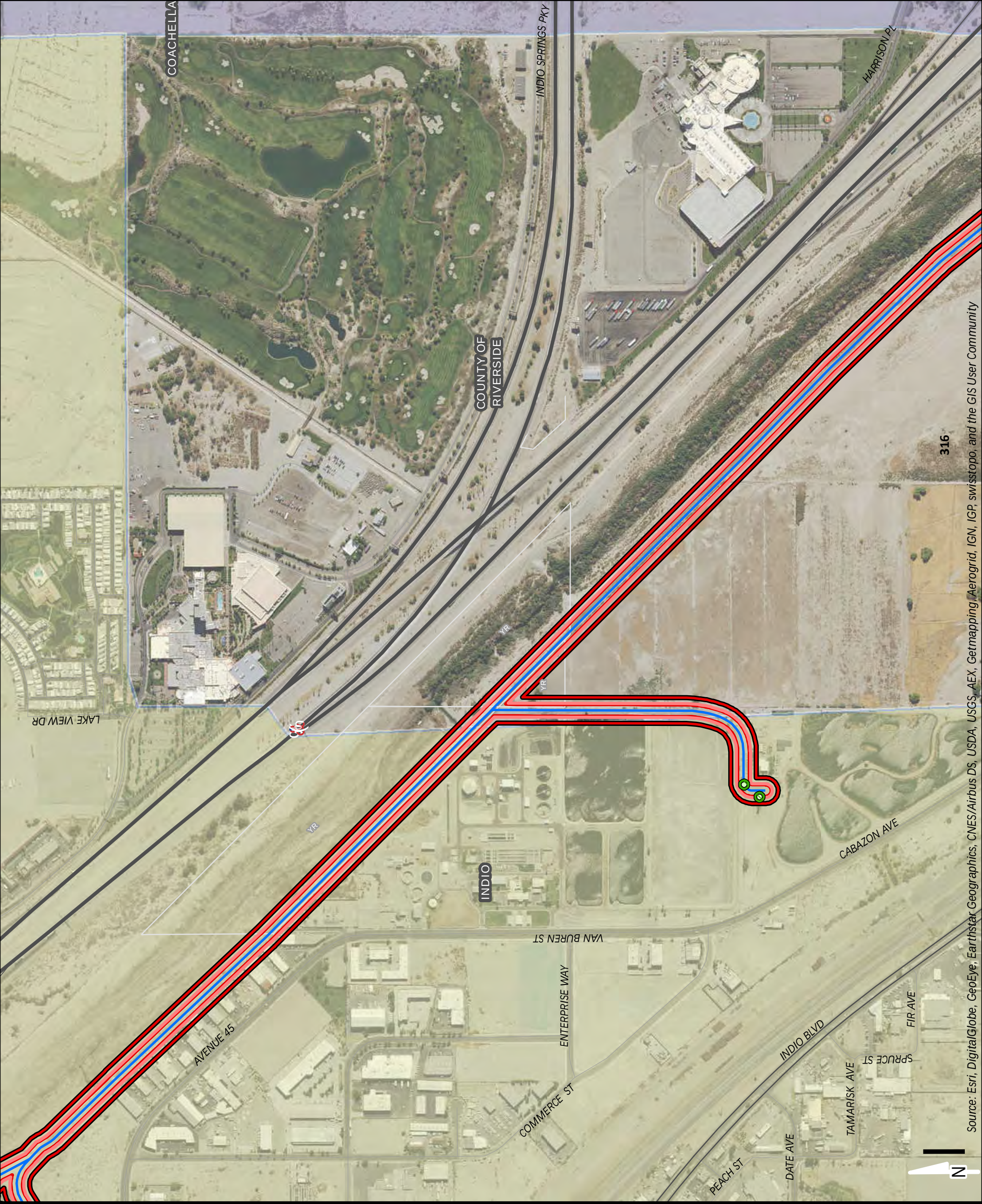
LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax
Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax
Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



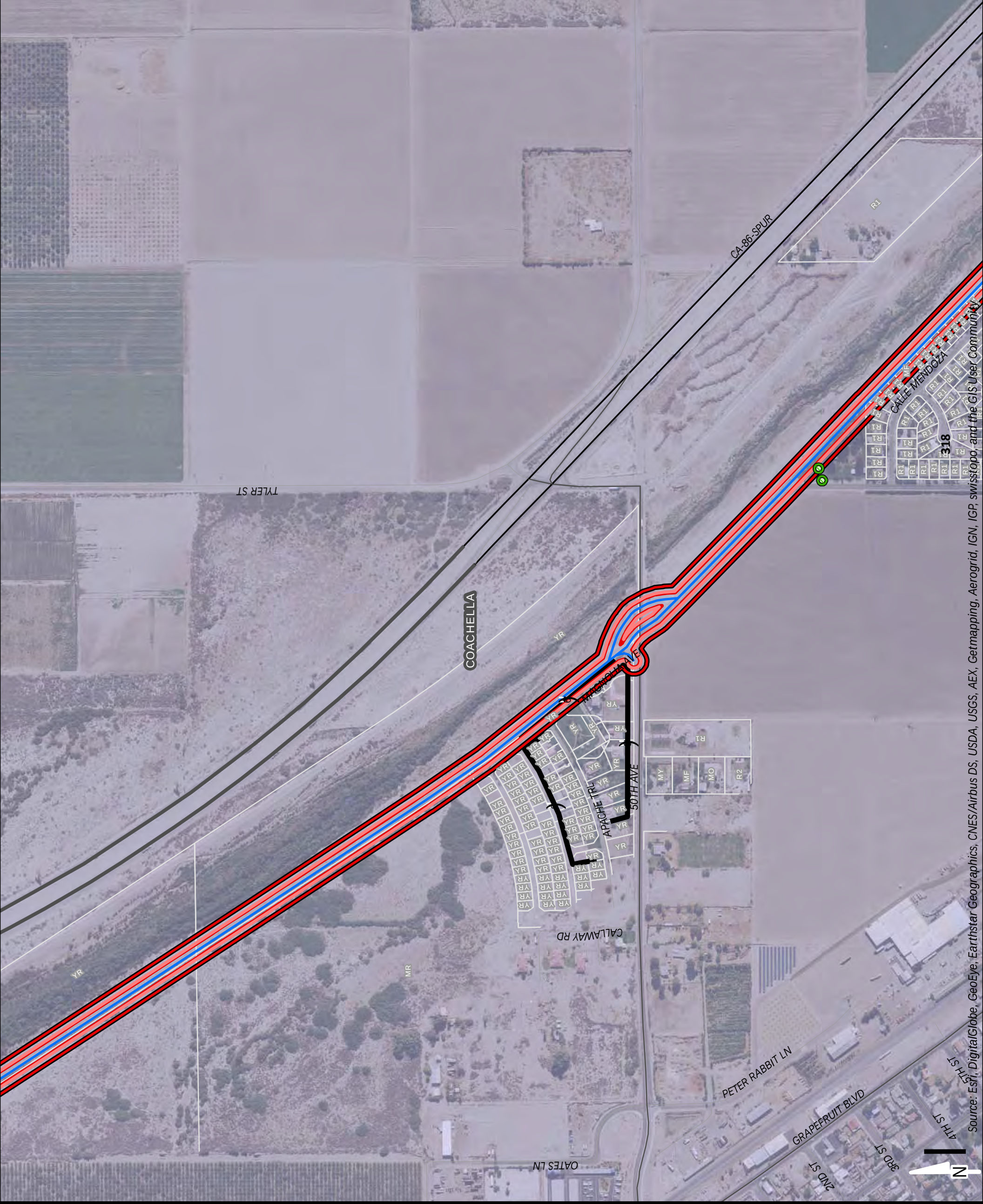
LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax
Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



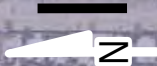
LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



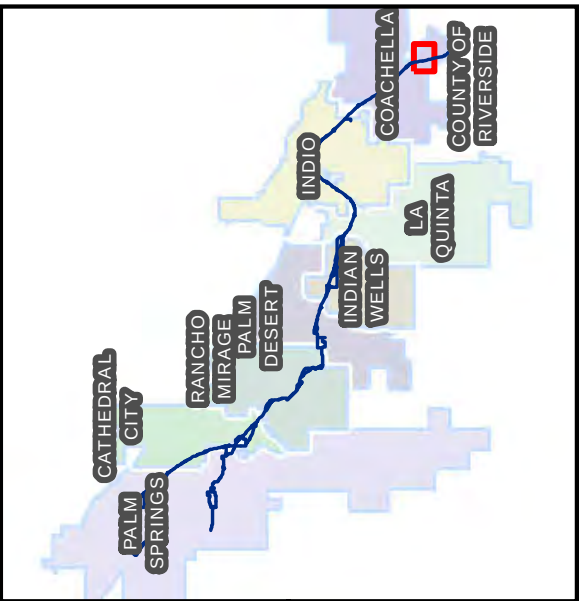
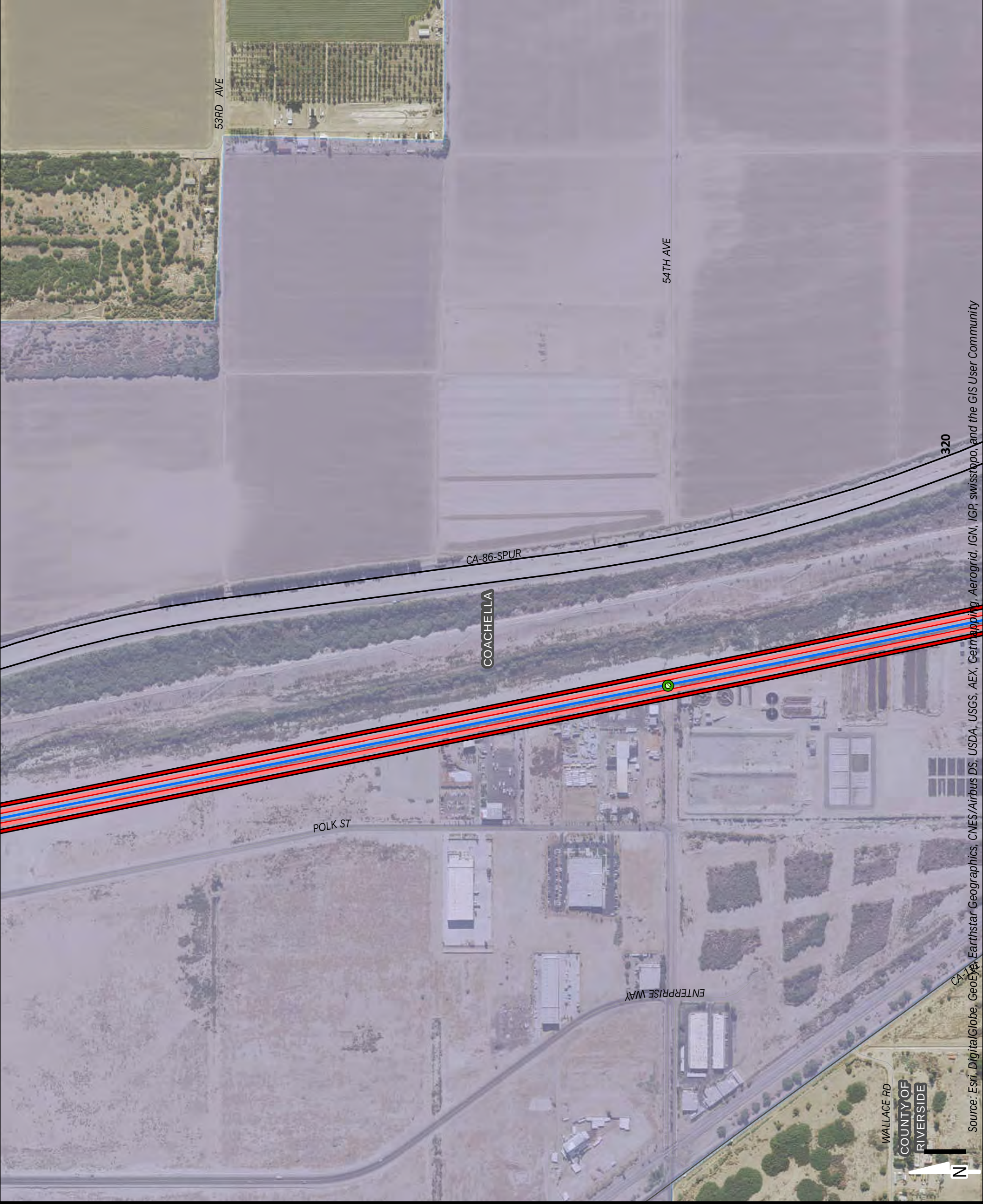
LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax
Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



LEGEND:

- Mobile Construction Equipment
- Existing Barrier Height (in feet)
- Existing Barrier
- Parcel Zoning Code
- Unmitigated 86 dBA Lmax
Noise Level Contour Boundaries
- Site Preparation (at 41 Feet)
- Paving (Mobile Equipment at 35 Feet)
- Grading (at 76 Feet)
- Paving (Stationary Equipment at 25 Feet)



This page intentionally left blank

November 9, 2016

Mr. John Criste
TERRA NOVA PLANNING & RESEARCH, INC.
42635 Melanie Place
Palm Desert, CA 92211

SUBJECT: CV LINK BRIDGE PILE DRIVING NOISE AND VIBRATION ADDENDUM

Dear Mr. John Criste:

Urban Crossroads, Inc. is pleased to provide the following CV Link ("Project") Bridge Pile Driving Noise and Vibration Addendum. It is our understanding that up to 13 bridges will be developed as a part of the CV Link Project, which will potentially generate temporary construction-related noise and vibration levels during pile driving activities. The purpose of work effort is to provide a focused assessment of the potential noise and vibration impacts at nearby sensitive receiver locations due to pile driving construction activities for each bridge as an addendum to the August 23rd, 2016 *CV Link Noise Impact Analysis* ("Noise Study"). Table 1 shows a list of the planned 13 bridges included in this analysis, based on the Project plans provided in Appendix A.

TABLE 1: CV LINK BRIDGES

No.	Bridge Name
1	Highway 111 Overcrossing
2	Boardwalk Over Lake Bridge
3	Cathedral Canyon Channel West Bridge
4	Cathedral Canyon Channel East Bridge
5	Thunderbird Channel Bridge
6	West Magnesia Canyon Channel Bridge at Highway 111
7	West Magnesia Canyon Channel Bridge at Library
8	Cook Street Overcrossing
9	Hyatt Regency Bridge
10	Deep Canyon Channel Bridge
11	Point Happy Bridge
12	Washington Street Cross Channel Bridge
13	La Quinta Channel Bridge

THRESHOLDS OF SIGNIFICANCE

The CV Link Project includes alternatives that traverse the cities of Palm Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, La Quinta, Indio, and Coachella; unincorporated Riverside County, and lands belonging to the Agua Caliente Band of Cahuilla Indians, the Cabazon Band of Mission Indians, and the Twenty-Nine Palms Band of Mission Indians, and therefore, must be evaluated using the local regulations of each applicable jurisdiction. In compliance with the Federal funding requirements of the Project, California Department of Transportation (Caltrans) regulations are also used to assess the potential construction-related noise and vibration impacts to sensitive receiver locations in the Project study area. The detailed construction noise and vibration significance thresholds used in the Noise Study are described below.

CONSTRUCTION NOISE

To control noise impacts associated with the construction of the proposed Project, each jurisdiction has established limits to the hours of operation, as previously described in the Noise Study. Consistent with the Noise Study, the California Department of Transportation (Caltrans) Standard Specifications in Section 14-8.02 *Noise Control* provisions shall be adhered to during construction of the 13 bridges. In effect, if the construction activities comply with the permitted hours of construction for each jurisdiction and the nighttime noise levels satisfy the Caltrans significant criteria of 86 dBA Lmax at 50 feet between the hours of 9:00 p.m. and 6:00 a.m., the construction noise levels associated with CV Link are considered exempt from the noise standards of the ordinance. (1)

CONSTRUCTION VIBRATION

To control vibration impacts associated with the construction of the proposed Project, some jurisdictions in the Project study area have identified specific vibration level standards. The Noise Study identifies the vibration standards for each jurisdiction, including the Caltrans vibration level standards for building damage and human annoyance, in compliance with the Federal funding requirements of the Project. Based on the Noise Study comparison of the vibration standards of each local jurisdiction, the most conservative (worst-case) regulations are identified by Caltrans, which also include a significance threshold for building damage of 0.12 in/sec peak-particle-velocity (PPV), and a *barely perceptible* human annoyance significance threshold of 0.01 in/sec PPV. Therefore, the more conservative Caltrans vibration level thresholds are used in this analysis to evaluate the potential impacts due to Project pile driving activities at the planned 13 bridge locations. (2)

PILE DRIVING REFERENCE NOISE LEVELS

The pile driving methods used during Project construction will include impact pile drivers at all locations. The noise levels used in the pile driving noise analysis are in Lmax based on the impulsive nature of pile driver activities, and the Caltrans Lmax noise level standards for construction noise during the nighttime hours of 9:00 p.m. and 6:00 a.m. The pile driving noise analysis relies on the Roadway Construction Noise Model (RCNM) published by the Federal Highway Administration (FHWA) that includes a national database of construction equipment reference noise emission levels. (3) The RCNM equipment database, as shown in Appendix B, provides a comprehensive list of the noise generating characteristics for specific types of construction equipment. The RCNM reference noise level for an impact pile driver is used to assess the potential noise impacts from the pile driving methods planned at each bridge location. Table 2 shows the RCNM dBA Lmax reference noise level for an impact pile driver at 50 feet, and the sound power level (PWL) calibrated in a CadnaA (Computer Aided Noise Abatement) noise prediction model used in this analysis.

TABLE 2: REFERENCE PILE DRIVING EQUIPMENT NOISE LEVELS

Reference Noise Source for the Planned Pile Driving Methods ¹	Dist. From Source (Feet)	Noise Source Height (Feet)	Reference Noise Level @ 50 Feet (dBA Lmax)	Calibrated Sound Power Level (PWL) ²
Impact Pile Driver	50'	6'	101.0	132.7

¹ Source: FHWA's Roadway Construction Noise Model, January 2006.

² Calculated using the CadnaA noise model at the reference distance to the noise source. Hard site conditions are used in the CadnaA noise prediction model which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source. The basic noise attenuation equation used to calculate the resulting noise level (SPL2) at a given distance (D1) distance attenuation based on a reference noise level (SPL1) at the reference distance (D2) is as follows: $SPL2 = SPL1 - 20\log(D2/D1)$.

CADNAA NOISE PREDICTION MODEL

To fully describe the exterior pile driving noise levels from the construction of bridges for the CV Link Project, Urban Crossroads, Inc. developed a computer noise prediction model using the CadnaA (Computer Aided Noise Abatement) software program. CadnaA has the ability to analyze the noise level of multiple types of noise sources and calculates the noise levels at any location using the spatially accurate Project bridge plans, provided by the Project team. CadnaA can also analyze the noise level of multiple types of noise sources and to calculate the effects of topography, buildings and multiple barriers using the latest calculation standards to predict outdoor noise impacts. Using the spatially accurate Project bridge plans, a CadnaA noise prediction model of the Project study area was developed. The

noise model provides a spatially accurate three-dimensional representation of the Project study area using the following key data inputs:

- Ground elevations (topography) in meters;
- Ground absorption;
- Reflections at buildings and barriers;
- Reference noise level sources by type (area, line, point, etc.), frequency spectral content, noise source height and attenuation rate;
- Multiple noise receiver locations and heights;
- Barrier analysis.

Based on these data inputs, the CadnaA noise prediction model will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level calculations at each receiver location and the partial noise level contributions by noise source. The reference sound power level (PWL) for each noise source expected at the Project site is then input into the CadnaA noise prediction model. While sound pressure levels (e.g. Leq) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (PWL) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source, and also diminish as a result of intervening obstacles and barriers, air absorption, wind and other factors. Sound power is the acoustical energy emitted by the sound source, and is an absolute value that is not affected by the environment. Based on the technical guidance provided for CadnaA, (4) each reference noise source is created in an individual CadnaA noise model with a receiver at the reference distance of the noise level measurement. The PWL of each noise source is then adjusted in each individual CadnaA noise model until the noise level at the given reference distance equals the measured reference noise level previously shown on Table 2. The calibrated PWLs are then input into the operational CadnaA noise model for each Project-related noise source.

The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. Hard site conditions are used in the operational noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source and at a rate of 3 dBA for each doubling of distance from a line source. The basic noise attenuation equation shown below is used to calculate the distance attenuation based on a reference noise level (SPL₁):

$$SPL_2 = SPL_1 - 20\log(D_2/D_1)$$

Where SPL₂ is the resulting noise level after attenuation, SPL₁ is the source noise level, D₂ is the distance to the reference sound pressure level (SPL₁), and D₁ is the distance to the receiver location. The CadnaA noise model data inputs are provided in Appendix C.

PILE DRIVING NOISE LEVEL ANALYSIS

Noise generating activities associated with the construction of the proposed Project shall be restricted to each jurisdictions' established limits to the hours of operation. In effect, if the construction activities comply with the permitted hours of each jurisdiction and the nighttime noise level standards identified by Caltrans of 86 dBA Lmax at 50 feet, the construction noise levels associated with CV Link are considered exempt from the noise standards of the ordinance. Based on the reference noise level for an impact pile driver used in the pile driving process, previously shown on Table 2 approaching 101.0 dBA Lmax at 50 feet, the construction of the Project bridges will exceed the 86 dBA Lmax threshold at 50 feet identified by Caltrans during the nighttime hours of 9:00 p.m. to 6:00 a.m. However, no nighttime construction is planned as a part of Project construction which would require compliance with the Caltrans 86 dBA Lmax at 50 feet nighttime noise level threshold.

The pile driving noise level contour boundaries calculated in the CadnaA noise prediction model, provided in Appendix D, indicate that the noise levels at nearby sensitive receiver locations will approach up to 90 dBA Lmax. It is important to note that the pile driving noise level contour boundaries represent worst-case conditions since they are based on the simultaneous operation of an impact pile driver at each pile location. In reality, the impact activities at each pile location are not anticipated to occur at the same time. Therefore, since the construction activities will be limited to the permitted hours and will not operate at night or generate noise levels above the nighttime 86 dBA Lmax Caltrans threshold at 50 feet, this Bridge Pile Driving Noise and Vibration Addendum demonstrates that the construction of all 13 bridges will be compliant with the Caltrans noise standards for construction.

Tolerance of construction noise levels by nearby homeowners has been shown to greatly increase when informed that construction noise is temporary and that the contractor is taking steps to reduce the construction noise levels. (5) Further, periodic exposure to high noise levels in short duration, such as Project-related construction noise, is typically considered an annoyance and not impactful to human health. Caltrans indicates that it would take several years of exposure to high noise levels to result in hearing impairment; with noise-induced hearing loss from chronic noise exposure showing the greatest impacts over a period of 10 years. (5)

PILE DRIVING VIBRATION LEVELS

Based on reference vibration levels provided by the Caltrans *Transportation and Construction Vibration Guidance Manual* and the Federal Transit Administration (FTA), an impact pile driver has a reference velocity of 0.64 in/sec PPV at 25 feet. (2) At distances ranging from 25 to 400 feet from the planned pile locations, construction vibration velocity levels are expected to range from 0.008 to 0.64 in/sec PPV, as shown on Table 3. Table 3 also shows that the vibration levels due to impact pile driving activities will approach the Caltrans 0.12 in/sec PPV threshold at a distance of 76 feet from each pile location. Further, the vibration levels from impact pile drivers will approach the Caltrans 0.01 in/sec PPV *barely perceptible* human annoyance threshold at roughly 400 feet from each pile location. Appendix E shows the vibration contour boundaries from each impact pile driving location and the potentially impacted sensitive receiver locations within the building damage and human annoyance threshold contours.

The results of this impact pile driving vibration analysis indicate that the vibration levels due to pile driving will exceed the Caltrans 0.12 in/sec PPV building damage threshold at up to two locations, as shown on Exhibit A, and represent *potentially significant* vibration impacts. Additionally, vibration levels exceeding the Caltrans *barely perceptible* human annoyance threshold of 0.01 in/sec PPV will occur at sensitive receiver locations within a 400-foot radius of the pile locations, and result in *potentially significant* vibration levels at up to 55 receiver locations, as shown in Appendix E. Therefore, pile driving mitigation measures are required to reduce the vibration levels at nearby sensitive receiver locations.

Alternative pile driving methods in the form of Cast-In-Drilled-Hole (CIDH) piling, where drilling equipment is used instead of an impact device, are capable of reducing the potential building damage impacts at the two residential homes shown on Exhibit A. Table 3 shows the vibration levels from CIDH piling at distances ranging from 25 to 400 feet will satisfy the Caltrans 0.12 in/sec PPV building damage threshold. However, CIDH piling will still generate vibration levels capable of *barely perceptible* human annoyance based on the Caltrans threshold of 0.01 in/sec PPV at the two sensitive receiver locations shown on Exhibit A. Alternatively, an evaluation by Caltrans of a Tubex alternative piling system shows that lower vibration levels approaching 0.05 in/sec PPV at 25 feet are possible during pile installation. (2) This alternative piling method would result in vibration levels which satisfy both the building damage and human annoyance thresholds identified by Caltrans at the nearby sensitive receiver locations. The potential impacts and required mitigation measures identified in this letter are provided on Table 4 for each bridge location, previously shown on Table 1. With the incorporation of the alternative pile driving mitigation measures, the potential vibration impacts can be reduced to *less than significant* levels. Further, the use of lower vibration-generating piling methods would also reduce the potential noise levels experienced at nearby sensitive receiver locations.

EXHIBIT A: POTENTIAL IMPACTS DUE TO IMPACT PILE DRIVING

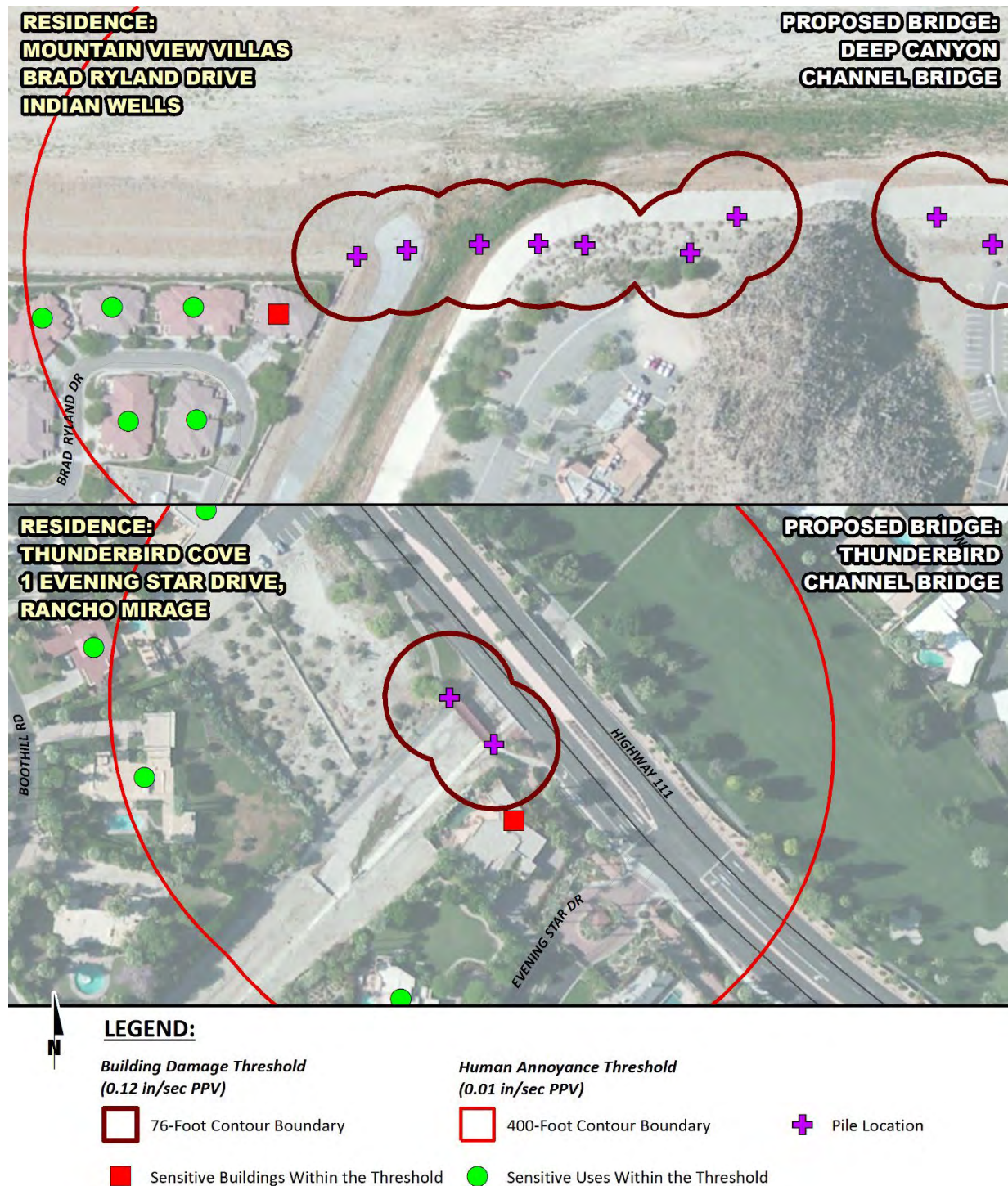


TABLE 3: IMPACT AND CIDH PILING EQUIPMENT VIBRATION LEVELS

Distance to Construction Activity (Feet)	Vibration Levels (in/sec) ¹		Threshold Exceeded? ²			
			Building Damage Threshold (0.12 in/sec)		Barely Perceptible Human Annoyance Threshold (0.01 in/sec)	
	Pile Driver (Impact)	CIDH Pile Auger Drill	Pile Driver (Impact)	CIDH Pile Auger Drill	Pile Driver (Impact)	CIDH Pile Auger Drill
25'	0.640	0.089	Yes	No	Yes	Yes
50'	0.226	0.031	Yes	No	Yes	Yes
76'	0.121	0.017	Yes	No	Yes	Yes
100'	0.080	0.010	No	No	Yes	Yes
125'	0.057	0.008	No	No	Yes	No
400'	0.010	0.001	No	No	Yes	No

¹ Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.

² Does the peak vibration exceed the building damage vibration threshold of 0.12 in/sec PPV or the barely perceptible human annoyance vibration threshold of 0.01 in/sec PPV at the given distance?

"CIDH" = Cast-In-Drilled-Hole

Bold text indicates distances to the extent of the significance thresholds using impact pile driving methods.

PILE DRIVING VIBRATION MITIGATION MEASURES

The following mitigation measures shall be incorporated into the construction of the Project as indicated on Table 4, in addition to mitigation measures A to E identified in the Noise Study, to reduce the potential pile driving-related vibration levels at nearby sensitive receiver locations.

- F. Alternative piling methods shall be used to reduce the potential impacts at nearby sensitive receiver locations as follows:
 - o No impact pile driving devices and CIDH piling methods shall be used within 76 feet of sensitive receiver locations near the Thunderbird Channel and Deep Canyon Channel Bridge (as indicated on Table 4). Alternative piling methods are required to reduce the vibration levels at these locations. Based on an evaluation by Caltrans an alternative method, such as Tubex piles, which can produce lower vibration levels of 0.05 in/sec PPV at 25 feet during installation shall be used. (2) Other pile driving alternatives capable of producing equal or lower vibration levels are acceptable.
 - o Cast-In-Drilled-Hole (CIDH) piling methods, or alternatives capable of producing equal or lower vibration levels, shall be used for the following bridge locations as an alternative to impact pile driving activities planned within 400 feet of sensitive receiver locations (as indicated on Table 4):
 - Highway 111 Overcrossing
 - West Magnesia Canyon Channel Bridge at Highway 111

- West Magnesia Canyon Channel Bridge at Library
- Cook Street Overcrossing
- La Quinta Channel Bridge

G. Residences and other sensitive land uses within 400 feet of the planned pile locations shall be notified of the construction in writing. The notification shall describe the activities anticipated, provide dates and hours, and provide contact information with a description of a noise and vibration complaint and response procedure.

TABLE 4: PILE DRIVING VIBRATION MITIGATION MEASURES

Bridge Name	Threshold Exceeded?		Mitigation to Satisfy Threshold	
	Vibration Level Threshold (PPV)			
	Building Damage (0.12 in/sec)	Human Annoyance (0.01 in/sec)	Building Damage (0.12 in/sec)	Human Annoyance (0.01 in/sec)
Highway 111 Overcrossing	No	Yes	n/a	CIDH Piling
Boardwalk Over Lake Bridge	No	No	n/a	n/a
Cathedral Canyon Channel West Bridge	No	No	n/a	n/a
Cathedral Canyon Channel East Bridge	No	No	n/a	n/a
Thunderbird Channel Bridge	Yes	Yes	CIDH Piling	Alternative
West Magnesia Canyon Channel Bridge at Hwy 111	No	Yes	n/a	CIDH Piling
West Magnesia Canyon Channel Bridge at Library	No	Yes	n/a	CIDH Piling
Cook Street Overcrossing	No	Yes	n/a	CIDH Piling
Hyatt Regency Bridge	No	No	n/a	n/a
Deep Canyon Channel Bridge	Yes	Yes	CIDH Piling	Alternative
Point Happy Bridge	No	No	n/a	n/a
Washington Street Cross Channel Bridge	No	No	n/a	n/a
La Quinta Channel Bridge	No	Yes	n/a	CIDH Piling

"CIDH" = Cast-In-Drilled-Hole; "n/a" = No mitigation required to satisfy the threshold; "Alternative" = An alternative mitigation measure for pile driving capable of lower vibration levels than those generated by impact devices or CIDH drilling methods.

With the recommended mitigation measures identified by this letter and in the Noise Study, the Project-related vibration impacts at nearby sensitive receiver locations represent *less than significant* impacts during the worst-case pile driving activities at 13 bridge locations. Further, the impacts at the site of the closest sensitive receivers are unlikely to be sustained during the entire construction period, but will occur rather only during the times that pile driving activities are scheduled. Construction at the Project site will be restricted to daytime hours consistent with local jurisdiction and Caltrans requirements thereby eliminating potential vibration impacts during the sensitive nighttime hours.

Mr. John Criste
TERRA NOVA PLANNING & RESEARCH, INC.
November 9, 2016
Page 10 of 11

CONCLUSIONS

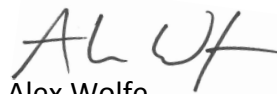
The findings of this Bridge Pile Driving Noise and Vibration Addendum are consistent with the findings of the Noise Study for construction noise and vibration. While pile driving activities involving impact equipment can generate temporary high noise and vibration levels, the alternative methods identified in this letter will reduce the potential noise and vibration levels at nearby sensitive land uses. If you have any questions, please contact me directly at (949) 336-5979.

Respectfully submitted,

URBAN CROSSROADS, INC.



Bill Lawson, P.E., INCE
Principal



Alex Wolfe
Assistant Analyst

REFERENCES

1. **California Department of Transportation.** *Standard Specifications, Section 14-8.02.* 2015.
2. —. *Transportation and Construction Vibration Guidance Manual.* September 2013.
3. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning.** *FHWA Roadway Construction Noise Model.* January 2006.
4. **DataKustik.** *Technical Note: Calibrating Point Sources TN0301e.* 2009.
5. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.

This page intentionally left blank

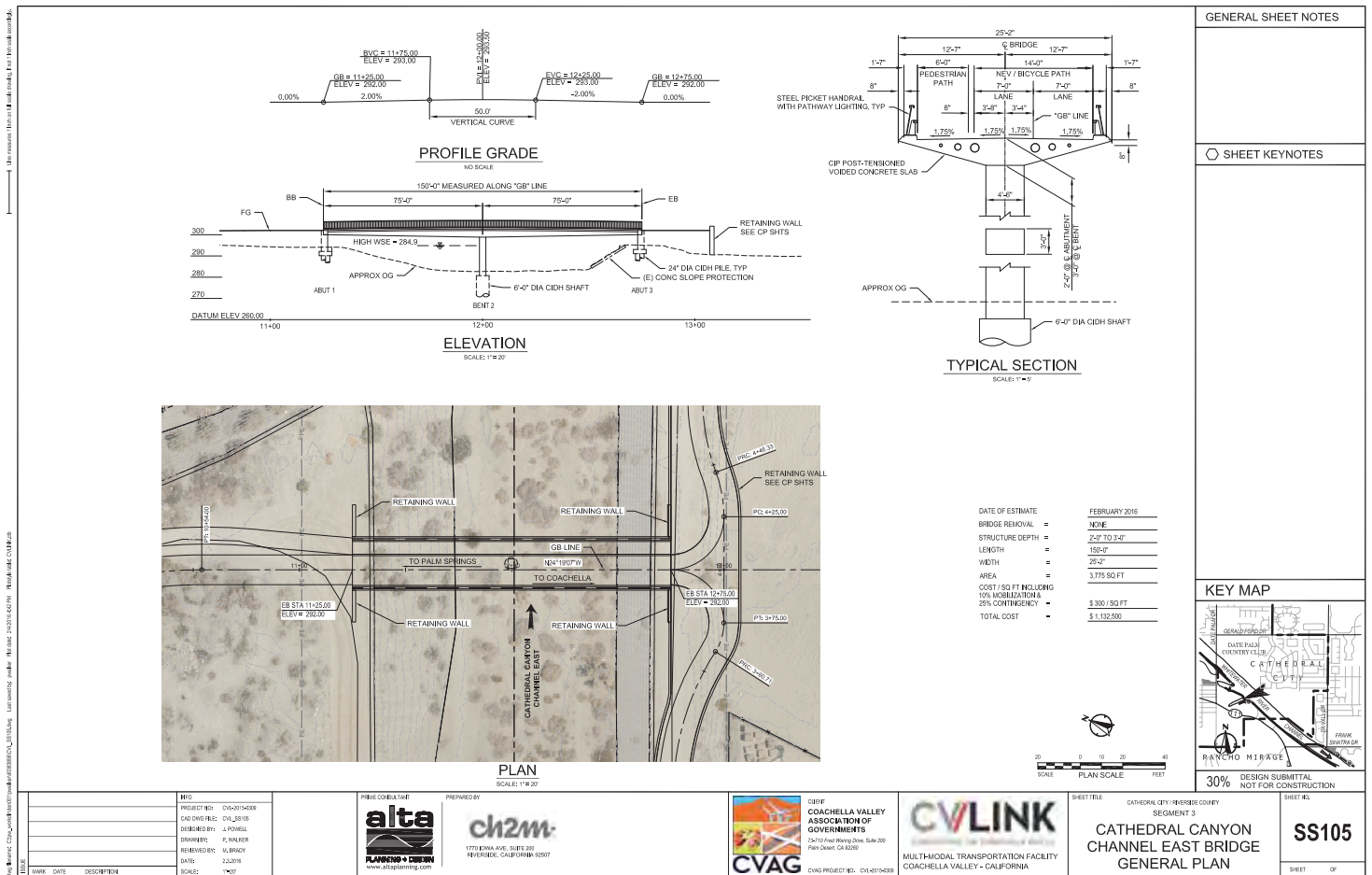
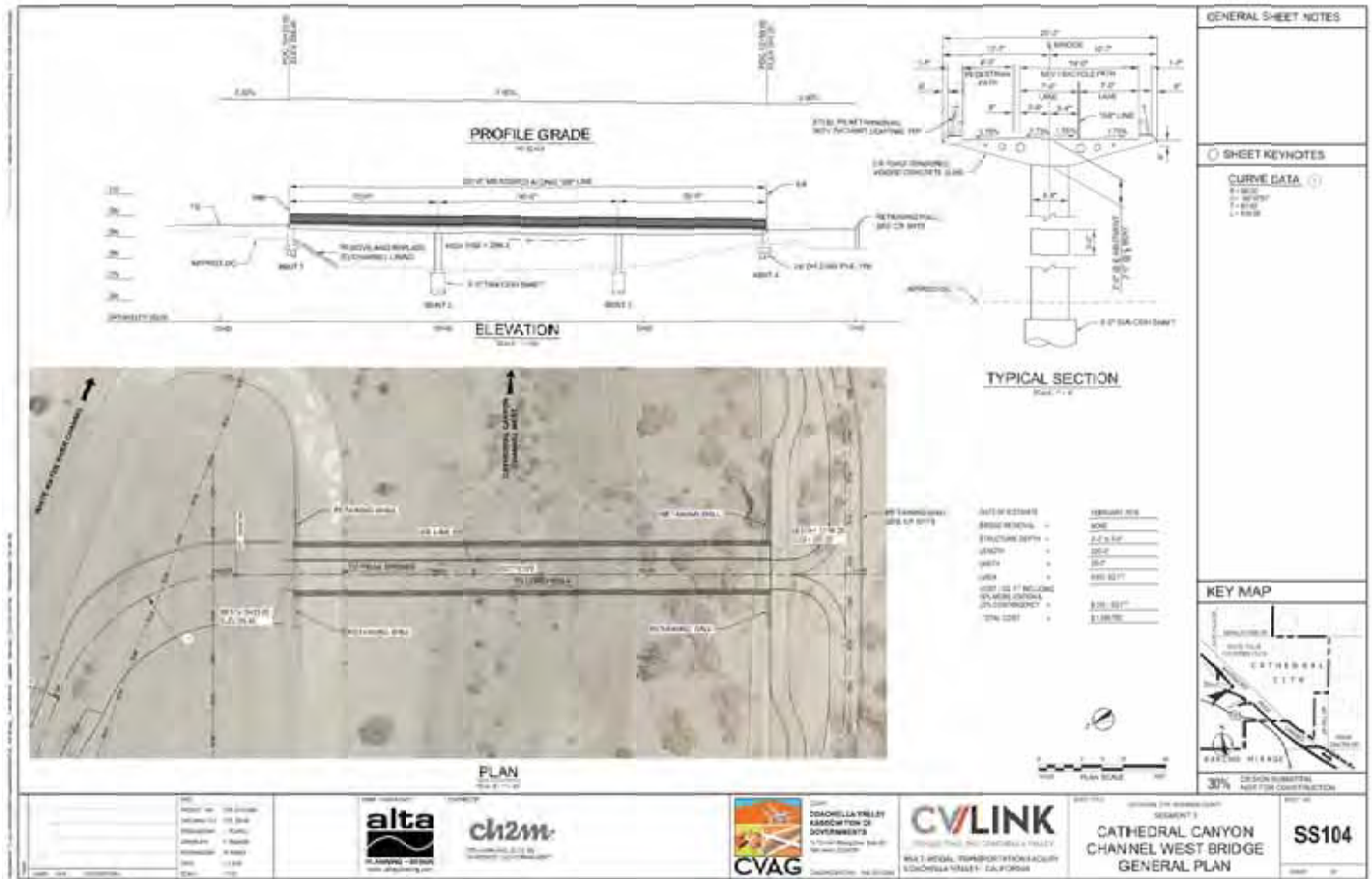
APPENDIX A:

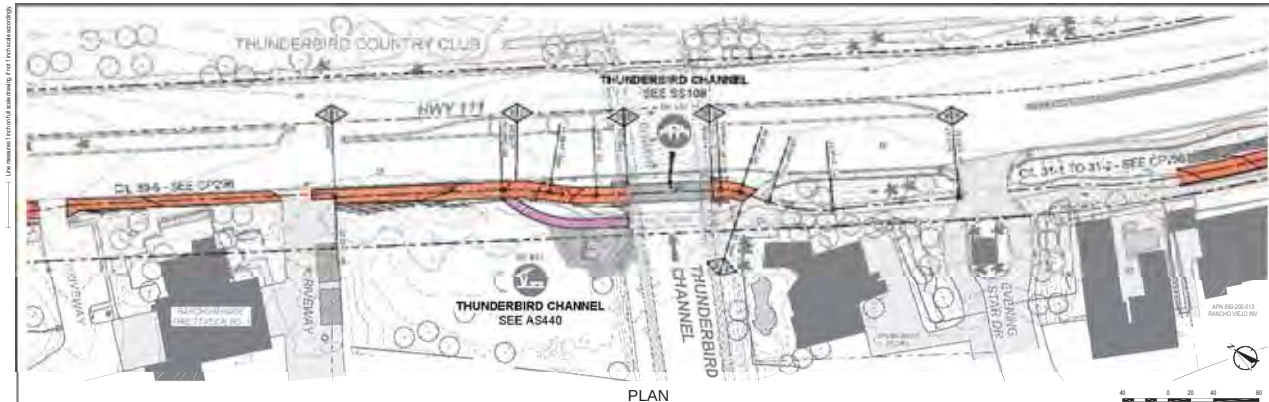
BRIDGE PLANS

This page intentionally left blank

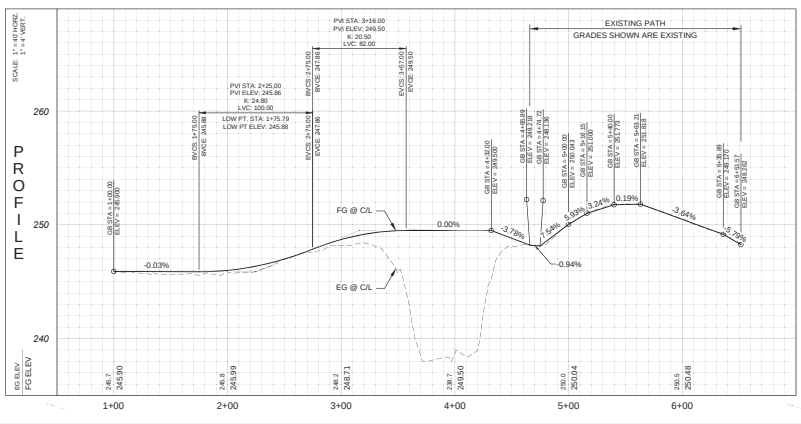
SS101

SS103





PLAN
SCALE: 1" = 40'



PROFILE
SCALE: 1" = 40' VERT
1" = 4' HORIZ

GENERAL SHEET NOTES

- SEE SHEET CD00 FOR TYPICAL PATH SECTIONS
- ALL STATIONING REFERS TO THE CENTERLINE OF THE BIKEWAY PATH (CV LINK)
- FIELD VERIFY EXISTING FEATURES AND UTILITIES AS REQUIRED
- PROTECT ALL EXISTING FEATURES WHETHER SHOWN OR NOT

SHEET KEYNOTES

-
-
-

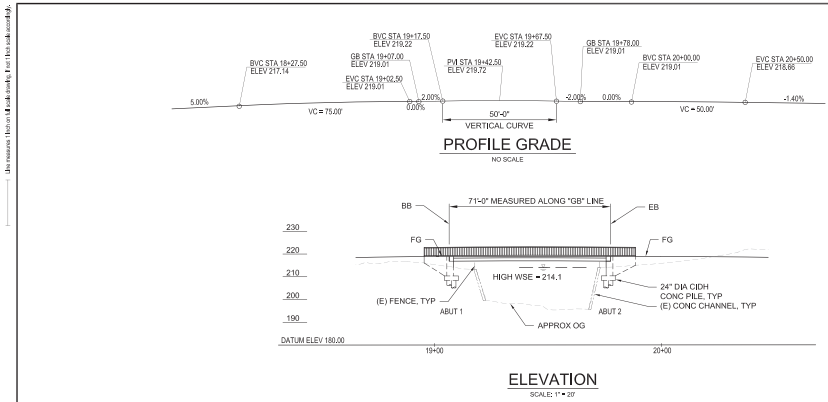
SECTION ASSEMBLY

SECTION 1: 1" = 40' HORIZ
SECTION 2: 1" = 40' HORIZ
SECTION 3: 1" = 40' HORIZ

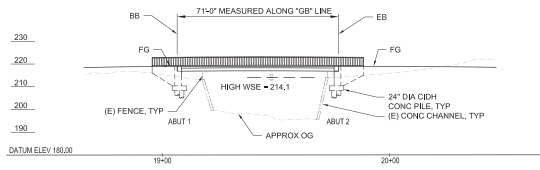
KEY MAP

30% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

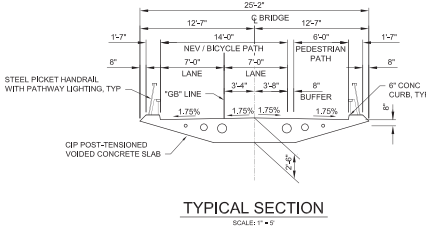
INFO PROJECT NO: 2015-001 OLD DWG FILE: CHL-CP297 DESIGNED BY: JWC DRAWN BY: JWC REVIEWED BY: MMR DATE: 2/23/2016 SCALE: AS SHOWN	PRIME CONSULTANT alta PLANNING + DESIGN www.altaplanning.com	PREPARED BY alta PLANNING + DESIGN www.altaplanning.com	CLIENT COACHELLA VALLEY ASSOCIATION OF GOVERNMENTS 23-770 Field Wing Drive, Suite 200 Palm Desert, CA 92260 DWG PROJECT NO: CVL-2015-009	CVLINK CONNECTING THE COACHELLA VALLEY MULTI-MODAL TRANSPORTATION FACILITY COACHELLA VALLEY - CALIFORNIA	SHEET TITLE RANCHO MIRAGE / REVERDE COUNTY SEGMENT 4 30-7 PLAN & PROFILE STA 1+00 TO END	SHEET NO. CP297 SHEET 185 OF 780
---	---	--	---	---	---	--



PROFILE GRADE
NO SCALE



ELEVATION
SCALE: 1" = 20'



TYPICAL SECTION
SCALE: 1" = 5'

GENERAL SHEET NOTES

- SEE SHEET CD00 FOR TYPICAL PATH SECTIONS
- ALL STATIONING REFERS TO THE CENTERLINE OF THE BIKEWAY PATH (CV LINK)
- FIELD VERIFY EXISTING FEATURES AND UTILITIES AS REQUIRED
- PROTECT ALL EXISTING FEATURES WHETHER SHOWN OR NOT

SHEET KEYNOTES

-
-
-

CURVE DATA

1

R = 125.00'

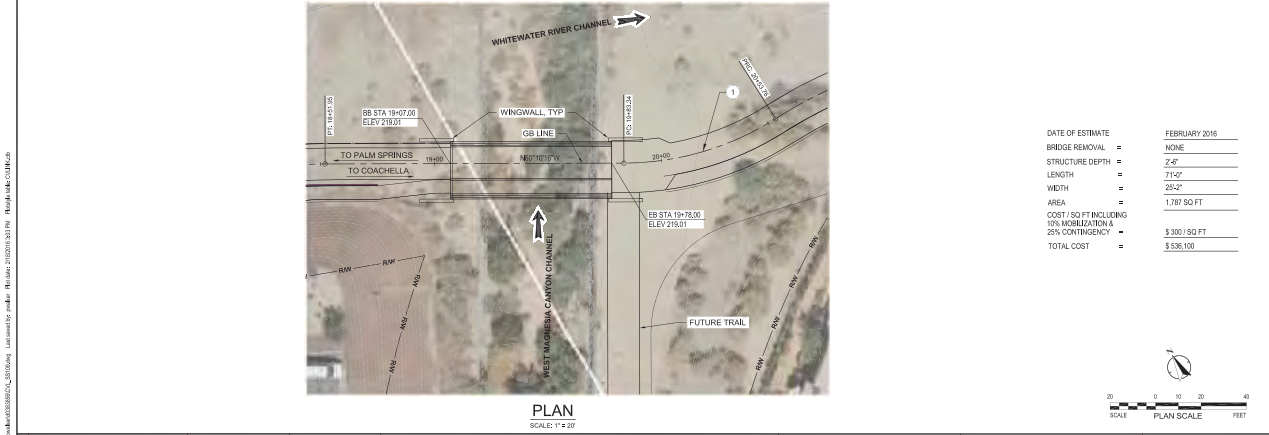
Δ = 32°18'30"

T = 50.17'

L = 70.42'

KEY MAP

30% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

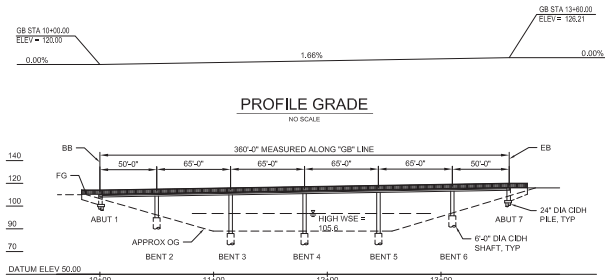


PLAN
SCALE: 1" = 20'

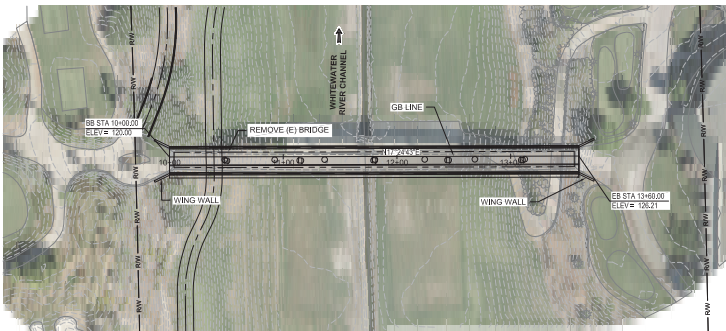
INFO PROJECT NO: CVL-2015-009 OLD DWG FILE: CHL-SS109 DESIGNED BY: G. COOPER DRAWN BY: P. KILMER REVIEWED BY: K. BRADY DATE: 2/23/2016 SCALE: AS SHOWN	PRIME CONSULTANT alta PLANNING + DESIGN www.altaplanning.com	PREPARED BY ch2m 1770 DOW AVE., SUITE 200 WINTER, CALIFORNIA 92707	CLIENT COACHELLA VALLEY ASSOCIATION OF GOVERNMENTS 23-770 Field Wing Drive, Suite 200 Palm Desert, CA 92260 DWG PROJECT NO: CVL-2015-009	CVLINK CONNECTING THE COACHELLA VALLEY MULTI-MODAL TRANSPORTATION FACILITY COACHELLA VALLEY - CALIFORNIA	SHEET TITLE RANCHO MIRAGE / REVERDE COUNTY SEGMENT 4 WEST MAGNESIA CANYON CHANNEL BRIDGE AT LIBRARY GENERAL PLAN	SHEET NO. SS109 SHEET 01
--	---	--	---	---	---	--

SS111

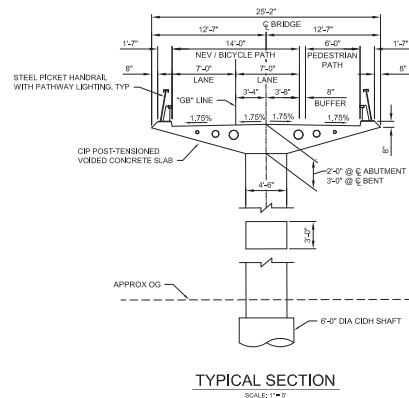
CV LINK CONSULTING, INC. 1500 N. MICHIGAN AVE., SUITE 200, COACHELLA, CA 92310-1500 TEL: (760) 865-1111 FAX: (760) 865-1112 WWW.CVLINKCONSULTING.COM



ELEVATION
SCALE: 1" = 4'



PLAN
SCALE: 1" = 40'



TYPICAL SECTION
SCALE: 1" = 4'

DATE OF ESTIMATE	FEBRUARY 2016
BRIDGE REMOVAL	\$ 47,500
STRUCTURE DEPTH	VARIABLE 2'-0" TO 3'-0"
LENGTH	300'-0"
WIDTH	25'-0"
AREA	9,000 SQ FT
COST / SQ FT INCLUDING 10% MOBILIZATION & 25% CONTINGENCY	\$ 300 / SQ FT
TOTAL COST	\$ 2,700,000

GENERAL SHEET NOTES

SHEET KEYNOTES

KEY MAP

30% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

SS113

SHEET OF

INFO	PROJECT NO. CH-2015-008
CHDING FILE	CH_2015_008
DESIGNED BY	L. GARCIA
DRAWN BY	P. KINER
REVIEWED BY	L. BRADY
DATE	2/2/16
SCALE	1" = 40'

PREPARED BY

alta

ch2m

1710 DENA AVE., SUITE 200

WINTERBURY, CALIFORNIA 92387

CVAG

COACHELLA VALLEY ASSOCIATION OF GOVERNMENTS

25470 Road 100, Suite 200

Palmdale, CA 93550

CVLINK

CONSTRUCTING THE FUTURE OF CALIFORNIA

MULTI-MODAL TRANSPORTATION FACILITY

COACHELLA VALLEY - CALIFORNIA

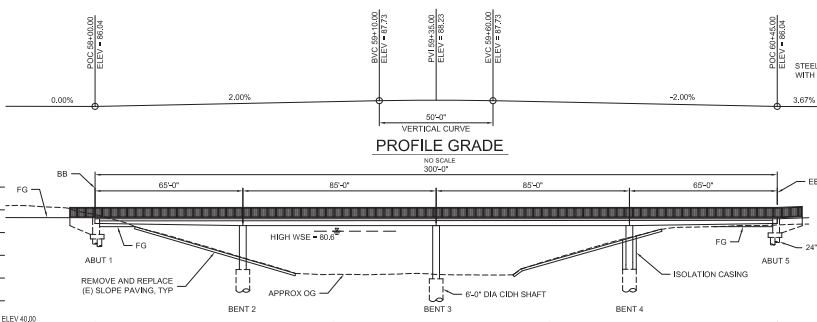
HYATT REGENCY BRIDGE

GENERAL PLAN

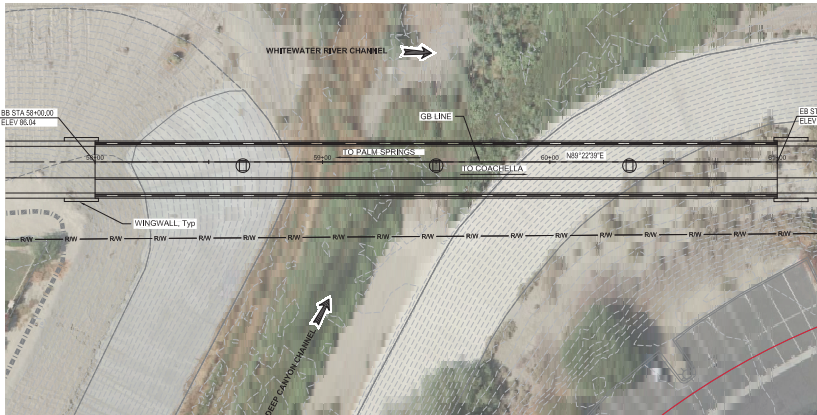
SS113

SHEET OF

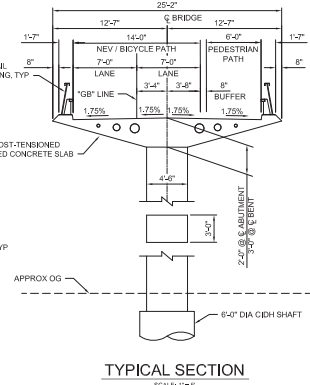
CV LINK CONSULTING, INC. 1500 N. MICHIGAN AVE., SUITE 200, COACHELLA, CA 92310-1500 TEL: (760) 865-1111 FAX: (760) 865-1112 WWW.CVLINKCONSULTING.COM



ELEVATION
SCALE: 1" = 40'



PLAN
SCALE: 1" = 40'



TYPICAL SECTION
SCALE: 1" = 4'

DATE OF ESTIMATE	FEBRUARY 2016
BRIDGE REMOVAL	NONE
STRUCTURE DEPTH	VARIABLE 2'-0" TO 3'-0"
LENGTH	300'-0"
WIDTH	25'-0"
AREA	7,500 SQ FT
COST / SQ FT INCLUDING 10% MOBILIZATION & 25% CONTINGENCY	\$ 300 / SQ FT
TOTAL COST	\$ 2,250,000

GENERAL SHEET NOTES

SHEET KEYNOTES

KEY MAP

30% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

SS114

SHEET OF

INFO	PROJECT NO. CH-2015-008
CHDING FILE	CH_2015_008
DESIGNED BY	L. GARCIA
DRAWN BY	P. KINER
REVIEWED BY	L. BRADY
DATE	2/2/16
SCALE	1" = 40'

PREPARED BY

alta

ch2m

1710 DENA AVE., SUITE 200

WINTERBURY, CALIFORNIA 92387

CVAG

COACHELLA VALLEY ASSOCIATION OF GOVERNMENTS

25470 Road 100, Suite 200

Palmdale, CA 93550

CVLINK

CONSTRUCTING THE FUTURE OF CALIFORNIA

MULTI-MODAL TRANSPORTATION FACILITY

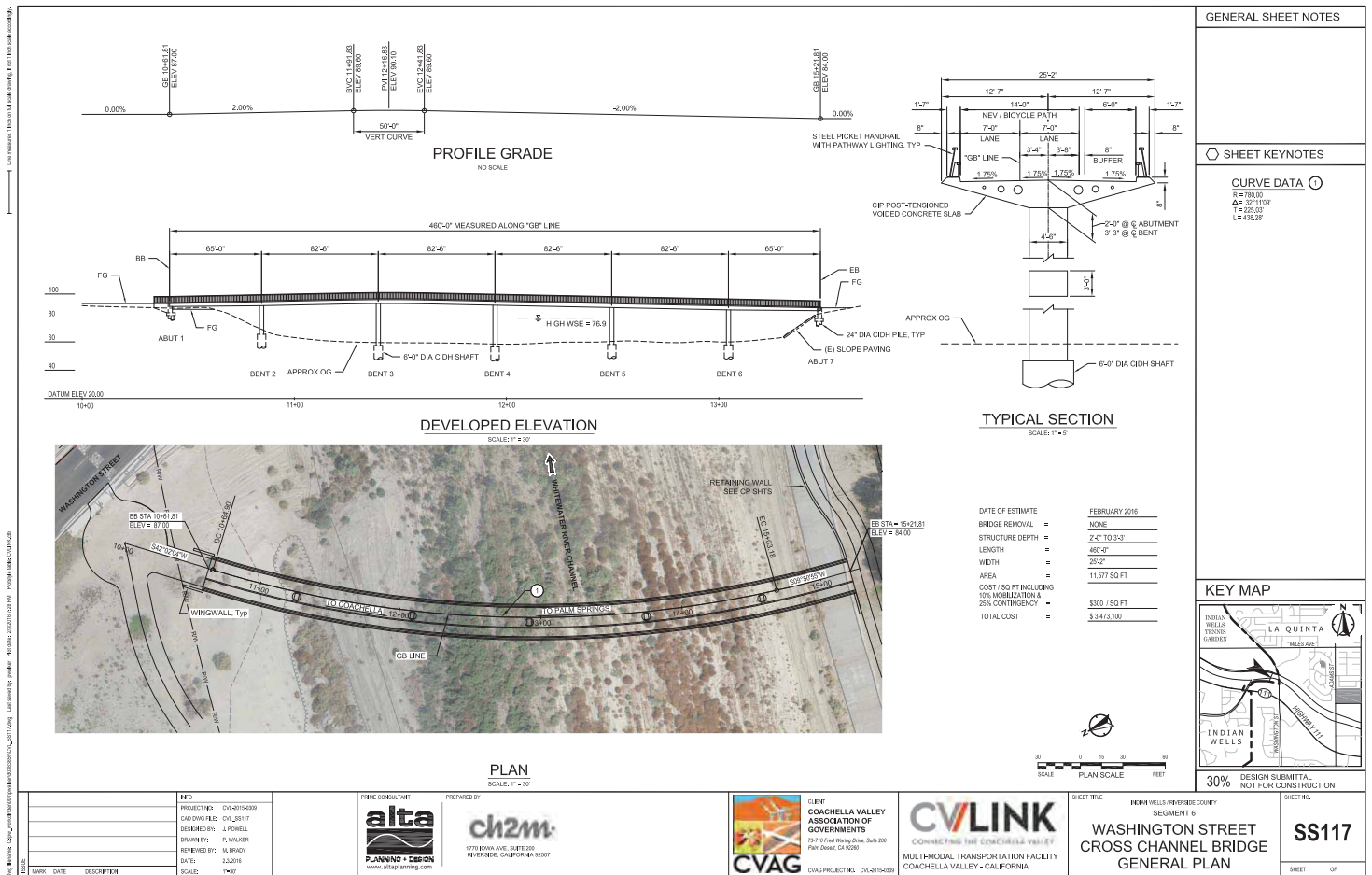
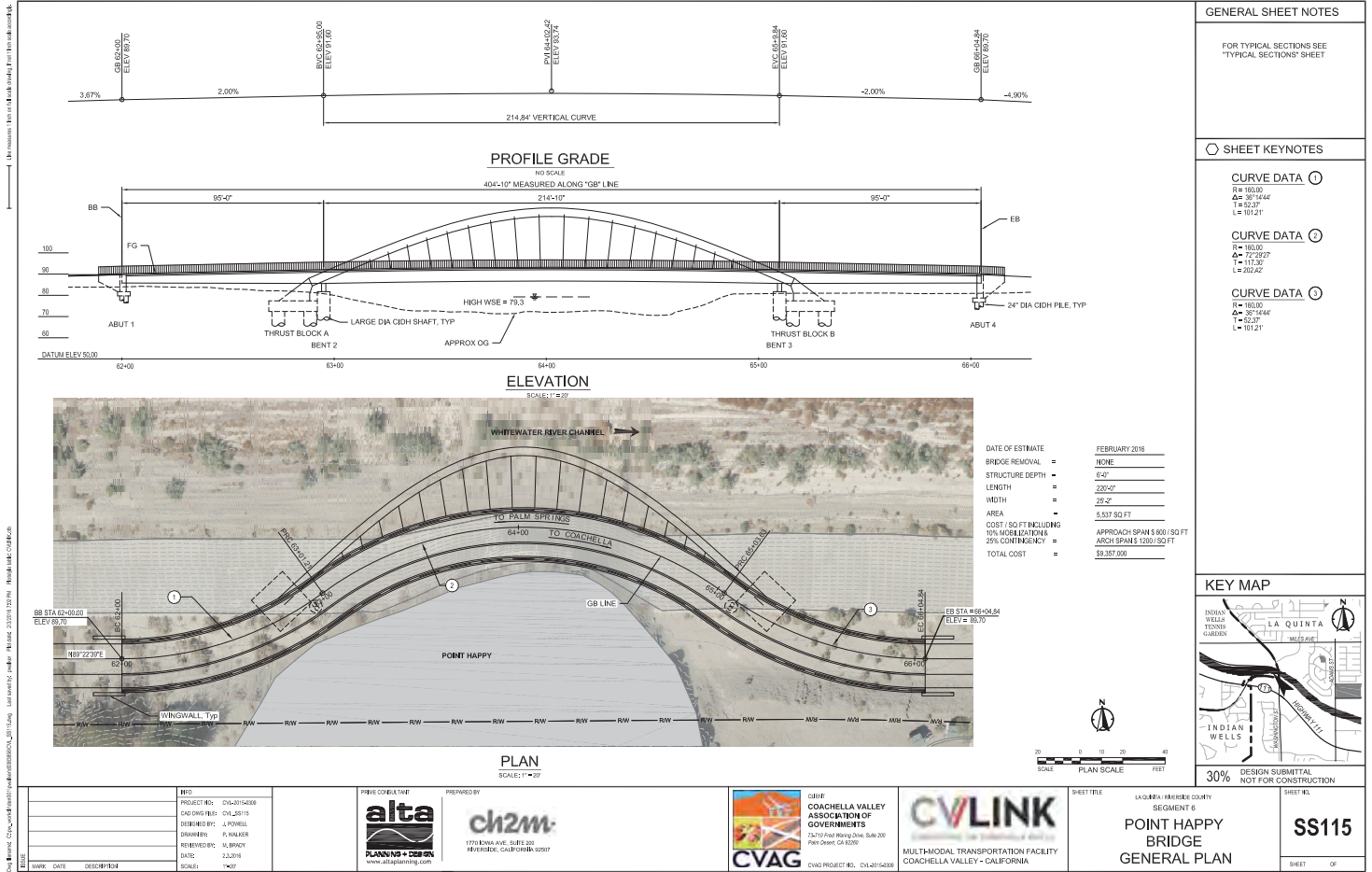
COACHELLA VALLEY - CALIFORNIA

DEEP CANYON CHANNEL BRIDGE

GENERAL PLAN

SS114

SHEET OF

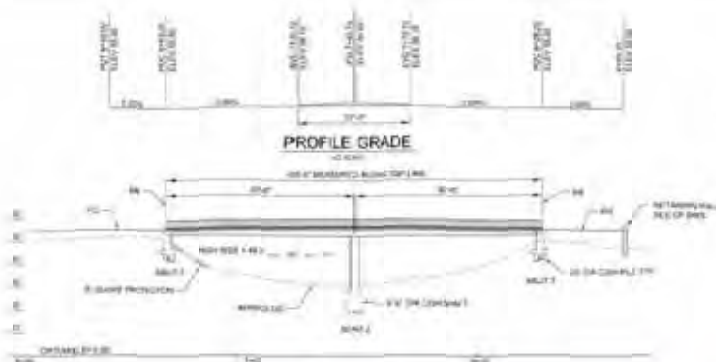


GENERAL SHEET NOTES

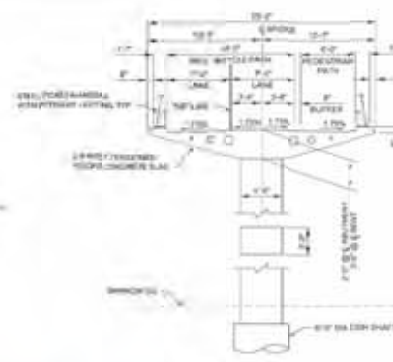
SHEET KEYNOTES

CURVE DATA ①
R = 100 FT
Δ = 10.18°
T = 16.28' ±
L = 100 FT

KEY MAP



ELEVATION

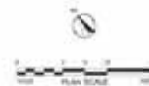


TYPICAL SECTION



PLAN

DATE OF REVISION	REVISION
01/15/2010	1.000
02/15/2010	1.001
03/15/2010	1.002
04/15/2010	1.003
05/15/2010	1.004
06/15/2010	1.005
07/15/2010	1.006
08/15/2010	1.007
09/15/2010	1.008
10/15/2010	1.009
11/15/2010	1.010
12/15/2010	1.011
01/15/2011	1.012
02/15/2011	1.013
03/15/2011	1.014
04/15/2011	1.015
05/15/2011	1.016
06/15/2011	1.017
07/15/2011	1.018
08/15/2011	1.019
09/15/2011	1.020
10/15/2011	1.021
11/15/2011	1.022
12/15/2011	1.023
01/15/2012	1.024
02/15/2012	1.025
03/15/2012	1.026
04/15/2012	1.027
05/15/2012	1.028
06/15/2012	1.029
07/15/2012	1.030
08/15/2012	1.031
09/15/2012	1.032
10/15/2012	1.033
11/15/2012	1.034
12/15/2012	1.035
01/15/2013	1.036
02/15/2013	1.037
03/15/2013	1.038
04/15/2013	1.039
05/15/2013	1.040
06/15/2013	1.041
07/15/2013	1.042
08/15/2013	1.043
09/15/2013	1.044
10/15/2013	1.045
11/15/2013	1.046
12/15/2013	1.047
01/15/2014	1.048
02/15/2014	1.049
03/15/2014	1.050
04/15/2014	1.051
05/15/2014	1.052
06/15/2014	1.053
07/15/2014	1.054
08/15/2014	1.055
09/15/2014	1.056
10/15/2014	1.057
11/15/2014	1.058
12/15/2014	1.059
01/15/2015	1.060
02/15/2015	1.061
03/15/2015	1.062
04/15/2015	1.063
05/15/2015	1.064
06/15/2015	1.065
07/15/2015	1.066
08/15/2015	1.067
09/15/2015	1.068
10/15/2015	1.069
11/15/2015	1.070
12/15/2015	1.071
01/15/2016	1.072
02/15/2016	1.073
03/15/2016	1.074
04/15/2016	1.075
05/15/2016	1.076
06/15/2016	1.077
07/15/2016	1.078
08/15/2016	1.079
09/15/2016	1.080
10/15/2016	1.081
11/15/2016	1.082
12/15/2016	1.083
01/15/2017	1.084
02/15/2017	1.085
03/15/2017	1.086
04/15/2017	1.087
05/15/2017	1.088
06/15/2017	1.089
07/15/2017	1.090
08/15/2017	1.091
09/15/2017	1.092
10/15/2017	1.093
11/15/2017	1.094
12/15/2017	1.095
01/15/2018	1.096
02/15/2018	1.097
03/15/2018	1.098
04/15/2018	1.099
05/15/2018	1.100
06/15/2018	1.101
07/15/2018	1.102
08/15/2018	1.103
09/15/2018	1.104
10/15/2018	1.105
11/15/2018	1.106
12/15/2018	1.107
01/15/2019	1.108
02/15/2019	1.109
03/15/2019	1.110
04/15/2019	1.111
05/15/2019	1.112
06/15/2019	1.113
07/15/2019	1.114
08/15/2019	1.115
09/15/2019	1.116
10/15/2019	1.117
11/15/2019	1.118
12/15/2019	1.119
01/15/2020	1.120
02/15/2020	1.121
03/15/2020	1.122
04/15/2020	1.123
05/15/2020	1.124
06/15/2020	1.125
07/15/2020	1.126
08/15/2020	1.127
09/15/2020	1.128
10/15/2020	1.129
11/15/2020	1.130
12/15/2020	1.131
01/15/2021	1.132
02/15/2021	1.133
03/15/2021	1.134
04/15/2021	1.135
05/15/2021	1.136
06/15/2021	1.137
07/15/2021	1.138
08/15/2021	1.139
09/15/2021	1.140
10/15/2021	1.141
11/15/2021	1.142
12/15/2021	1.143
01/15/2022	1.144
02/15/2022	1.145
03/15/2022	1.146
04/15/2022	1.147
05/15/2022	1.148
06/15/2022	1.149
07/15/2022	1.150
08/15/2022	1.151
09/15/2022	1.152
10/15/2022	1.153
11/15/2022	1.154
12/15/2022	1.155
01/15/2023	1.156
02/15/2023	1.157
03/15/2023	1.158
04/15/2023	1.159
05/15/2023	1.160
06/15/2023	1.161
07/15/2023	1.162
08/15/2023	1.163
09/15/2023	1.164
10/15/2023	1.165
11/15/2023	1.166
12/15/2023	1.167
01/15/2024	1.168
02/15/2024	1.169
03/15/2024	1.170
04/15/2024	1.171
05/15/2024	1.172
06/15/2024	1.173
07/15/2024	1.174
08/15/2024	1.175
09/15/2024	1.176
10/15/2024	1.177
11/15/2024	1.178
12/15/2024	1.179
01/15/2025	1.180
02/15/2025	1.181
03/15/2025	1.182
04/15/2025	1.183
05/15/2025	1.184
06/15/2025	1.185
07/15/2025	1.186
08/15/2025	1.187
09/15/2025	1.188
10/15/2025	1.189
11/15/2025	1.190
12/15/2025	1.191
01/15/2026	1.192
02/15/2026	1.193
03/15/2026	1.194
04/15/2026	1.195
05/15/2026	1.196
06/15/2026	1.197
07/15/2026	1.198
08/15/2026	1.199
09/15/2026	1.200
10/15/2026	1.201
11/15/2026	1.202
12/15/2026	1.203
01/15/2027	1.204
02/15/2027	1.205
03/15/2027	1.206
04/15/2027	1.207
05/15/2027	1.208
06/15/2027	1.209
07/15/2027	1.210
08/15/2027	1.211
09/15/2027	1.212
10/15/2027	1.213
11/15/2027	1.214
12/15/2027	1.215
01/15/2028	1.216
02/15/2028	1.217
03/15/2028	1.218
04/15/2028	1.219
05/15/2028	1.220
06/15/2028	1.221
07/15/2028	1.222
08/15/2028	1.223
09/15/2028	1.224
10/15/2028	1.225
11/15/2028	1.226
12/15/2028	1.227
01/15/2029	1.228
02/15/2029	1.229
03/15/2029	1.230
04/15/2029	1.231
05/15/2029	1.232
06/15/2029	1.233
07/15/2029	1.234
08/15/2029	1.235
09/15/2029	1.236
10/15/2029	1.237
11/15/2029	1.238
12/15/2029	1.239
01/15/2030	1.240



NO.	DESCRIPTION
1	LA QUINTA CHANNEL BRIDGE
2	LA QUINTA CHANNEL BRIDGE
3	LA QUINTA CHANNEL BRIDGE
4	LA QUINTA CHANNEL BRIDGE
5	LA QUINTA CHANNEL BRIDGE
6	LA QUINTA CHANNEL BRIDGE
7	LA QUINTA CHANNEL BRIDGE
8	LA QUINTA CHANNEL BRIDGE
9	LA QUINTA CHANNEL BRIDGE
10	LA QUINTA CHANNEL BRIDGE
11	LA QUINTA CHANNEL BRIDGE
12	LA QUINTA CHANNEL BRIDGE
13	LA QUINTA CHANNEL BRIDGE
14	LA QUINTA CHANNEL BRIDGE
15	LA QUINTA CHANNEL BRIDGE
16	LA QUINTA CHANNEL BRIDGE
17	LA QUINTA CHANNEL BRIDGE
18	LA QUINTA CHANNEL BRIDGE
19	LA QUINTA CHANNEL BRIDGE
20	LA QUINTA CHANNEL BRIDGE
21	LA QUINTA CHANNEL BRIDGE
22	LA QUINTA CHANNEL BRIDGE
23	LA QUINTA CHANNEL BRIDGE
24	LA QUINTA CHANNEL BRIDGE
25	LA QUINTA CHANNEL BRIDGE
26	LA QUINTA CHANNEL BRIDGE
27	LA QUINTA CHANNEL BRIDGE
28	LA QUINTA CHANNEL BRIDGE
29	LA QUINTA CHANNEL BRIDGE
30	LA QUINTA CHANNEL BRIDGE
31	LA QUINTA CHANNEL BRIDGE
32	LA QUINTA CHANNEL BRIDGE
33	LA QUINTA CHANNEL BRIDGE
34	LA QUINTA CHANNEL BRIDGE
35	LA QUINTA CHANNEL BRIDGE
36	LA QUINTA CHANNEL BRIDGE
37	LA QUINTA CHANNEL BRIDGE
38	LA QUINTA CHANNEL BRIDGE
39	LA QUINTA CHANNEL BRIDGE
40	LA QUINTA CHANNEL BRIDGE
41	LA QUINTA CHANNEL BRIDGE
42	LA QUINTA CHANNEL BRIDGE
43	LA QUINTA CHANNEL BRIDGE
44	LA QUINTA CHANNEL BRIDGE
45	LA QUINTA CHANNEL BRIDGE
46	LA QUINTA CHANNEL BRIDGE
47	LA QUINTA CHANNEL BRIDGE
48	LA QUINTA CHANNEL BRIDGE
49	LA QUINTA CHANNEL BRIDGE
50	LA QUINTA CHANNEL BRIDGE
51	LA QUINTA CHANNEL BRIDGE
52	LA QUINTA CHANNEL BRIDGE
53	LA QUINTA CHANNEL BRIDGE
54	LA QUINTA CHANNEL BRIDGE
55	LA QUINTA CHANNEL BRIDGE
56	LA QUINTA CHANNEL BRIDGE
57	LA QUINTA CHANNEL BRIDGE
58	LA QUINTA CHANNEL BRIDGE
59	LA QUINTA CHANNEL BRIDGE
60	LA QUINTA CHANNEL BRIDGE
61	LA QUINTA CHANNEL BRIDGE
62	LA QUINTA CHANNEL BRIDGE
63	LA QUINTA CHANNEL BRIDGE
64	LA QUINTA CHANNEL BRIDGE
65	LA QUINTA CHANNEL BRIDGE
66	LA QUINTA CHANNEL BRIDGE
67	LA QUINTA CHANNEL BRIDGE
68	LA QUINTA CHANNEL BRIDGE
69	LA QUINTA CHANNEL BRIDGE
70	LA QUINTA CHANNEL BRIDGE
71	LA QUINTA CHANNEL BRIDGE
72	LA QUINTA CHANNEL BRIDGE
73	LA QUINTA CHANNEL BRIDGE
74	LA QUINTA CHANNEL BRIDGE
75	LA QUINTA CHANNEL BRIDGE
76	LA QUINTA CHANNEL BRIDGE
77	LA QUINTA CHANNEL BRIDGE
78	LA QUINTA CHANNEL BRIDGE
79	LA QUINTA CHANNEL BRIDGE
80	LA QUINTA CHANNEL BRIDGE
81	LA QUINTA CHANNEL BRIDGE

This page intentionally left blank

APPENDIX B:

RCNM REFERENCE CONSTRUCTION NOISE LEVELS

This page intentionally left blank



U.S. Department
of Transportation

**Federal Highway
Administration**

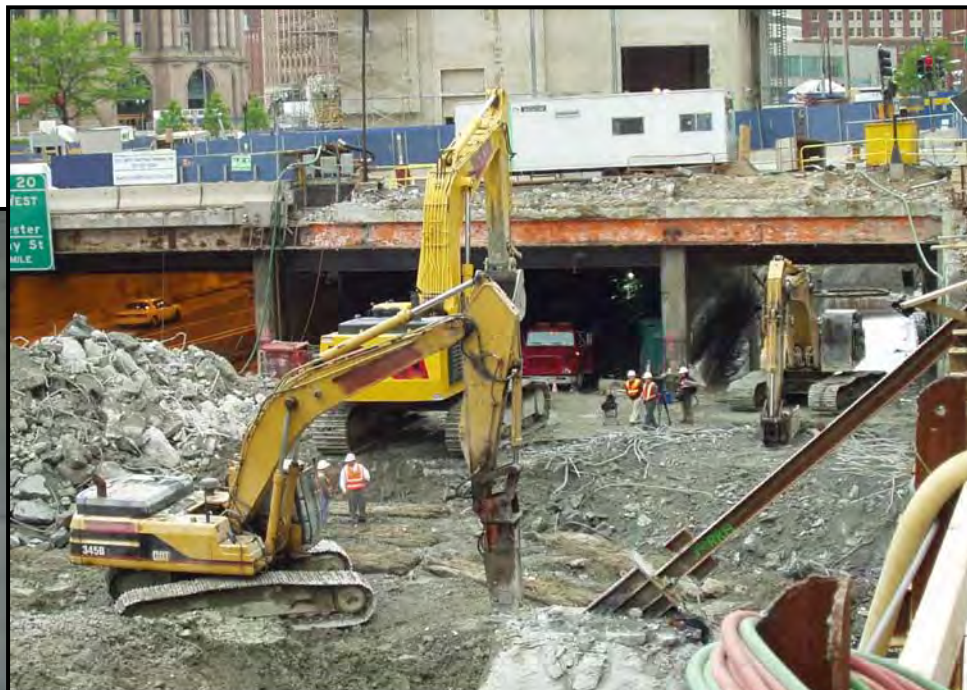
FHWA-HEP-05-054
DOT-VNTSC-FHWA-05-01

FHWA

Roadway Construction Noise Model

User's Guide

Final Report
January 2006



Prepared for
U.S. Department of Transportation
Federal Highway Administration
Office of Natural and Human Environment
Washington, DC 20590

Prepared by
U.S. Department of Transportation
Research and Innovative Technology Administration
John A. Volpe National Transportation Systems Center
Acoustics Facility
Cambridge, MA 02142

Table 1. CA/T equipment noise emissions and acoustical usage factors database.

CA/T Noise Emission Reference Levels and Usage Factors					
filename: EQUIPLST.xls					
revised: 7/26/05					
	Impact	Acoustical Use Factor	Spec 721.560 Lmax @ 50ft	Actual Measured Lmax @ 50ft	No. of Actual Data Samples
Equipment Description	Device ?	(%)	(dBA, slow)	(dBA, slow)	(Count)
				(samples averaged)	
All Other Equipment > 5 HP	No	50	85	-- N/A --	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	-- N/A --	0
Blasting	Yes	-- N/A --	94	-- N/A --	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	-- N/A --	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	-- N/A --	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydr. Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	-- N/A --	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarafier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/chipping gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	-- N/A --	0
Tractor	No	40	84	-- N/A --	0
Vacuum Excavator (Vac-truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder / Torch	No	40	73	74	5

APPENDIX C:

CADNAA NOISE MODEL DATA INPUTS

This page intentionally left blank

JN:09276

CadnaA Noise Prediction Model

09276b-08.cna

Date:

09.11.16

Analyst:

A.Wolfe

Point Source(s)

ID	Lw / Li		Height	Coordinates			
	Type	Value		X	Y	Z	
			(m)	(m)	(m)	(m)	
PILES00001	Lw	132.700000	1.83	a	6464735.82	2258853.74	1.83
PILES00002	Lw	132.700000	1.83	a	6464783.04	2258552.70	1.83
PILES00003	Lw	132.700000	1.83	a	6487592.66	2235789.47	1.83
PILES00004	Lw	132.700000	1.83	a	6487647.34	2235809.78	1.83
PILES00005	Lw	132.700000	1.83	a	6487721.30	2235835.83	1.83
PILES00006	Lw	132.700000	1.83	a	6487789.53	2235860.83	1.83
PILES00007	Lw	132.700000	1.83	a	6487845.78	2235884.26	1.83
PILES00008	Lw	132.700000	1.83	a	6499155.68	2227661.72	1.83
PILES00009	Lw	132.700000	1.83	a	6499125.99	2227594.01	1.83
PILES00010	Lw	132.700000	1.83	a	6499101.51	2227528.39	1.83
PILES00011	Lw	132.700000	1.83	a	6499073.39	2227453.91	1.83
PILES00012	Lw	132.700000	1.83	a	6499723.04	2226895.92	1.83
PILES00013	Lw	132.700000	1.83	a	6499690.40	2226961.55	1.83
PILES00014	Lw	132.700000	1.83	a	6499664.36	2227012.59	1.83
PILES00015	Lw	132.700000	1.83	a	6507099.99	2217351.33	1.83
PILES00016	Lw	132.700000	1.83	a	6507152.08	2217296.47	1.83
PILES00017	Lw	132.700000	1.83	a	6509996.87	2216019.47	1.83
PILES00018	Lw	132.700000	1.83	a	6510064.57	2215991.70	1.83
PILES00019	Lw	132.700000	1.83	a	6509742.09	2215587.62	1.83
PILES00020	Lw	132.700000	1.83	a	6509798.95	2215552.46	1.83
PILES00021	Lw	132.700000	1.83	a	6529494.26	2210574.94	1.83
PILES00022	Lw	132.700000	1.83	a	6529462.32	2210583.97	1.83
PILES00023	Lw	132.700000	1.83	a	6529415.79	2210602.72	1.83
PILES00024	Lw	132.700000	1.83	a	6529288.01	2210636.75	1.83
PILES00025	Lw	132.700000	1.83	a	6529238.01	2210647.86	1.83
PILES00026	Lw	132.700000	1.83	a	6529205.37	2210656.19	1.83
PILES00027	Lw	132.700000	1.83	a	6537644.54	2207742.72	1.83
PILES00028	Lw	132.700000	1.83	a	6537625.10	2207690.64	1.83
PILES00029	Lw	132.700000	1.83	a	6537586.90	2207570.50	1.83
PILES00030	Lw	132.700000	1.83	a	6537536.90	2207408.00	1.83
PILES00031	Lw	132.700000	1.83	a	6537551.48	2207444.80	1.83
PILES00032	Lw	132.700000	1.83	a	6537567.46	2207497.58	1.83
PILES00033	Lw	132.700000	1.83	a	6537615.37	2207658.00	1.83
PILES00034	Lw	132.700000	1.83	a	6546511.58	2204716.33	1.83
PILES00035	Lw	132.700000	1.83	a	6546571.30	2204723.97	1.83
PILES00036	Lw	132.700000	1.83	a	6546658.11	2204730.91	1.83
PILES00037	Lw	132.700000	1.83	a	6546728.94	2204731.61	1.83
PILES00038	Lw	132.700000	1.83	a	6546785.19	2204730.22	1.83
PILES00039	Lw	132.700000	1.83	a	6546911.54	2204720.85	1.83
PILES00040	Lw	132.700000	1.83	a	6546967.79	2204764.07	1.83
PILES00041	Lw	132.700000	1.83	a	6547208.41	2204763.55	1.83
PILES00042	Lw	132.700000	1.83	a	6547275.08	2204731.26	1.83
PILES00043	Lw	132.700000	1.83	a	6547792.38	2205154.01	1.83
PILES00044	Lw	132.700000	1.83	a	6547759.40	2205093.24	1.83
PILES00045	Lw	132.700000	1.83	a	6547738.56	2205013.38	1.83
PILES00046	Lw	132.700000	1.83	a	6547717.73	2204926.57	1.83
PILES00047	Lw	132.700000	1.83	a	6547702.10	2204825.88	1.83
PILES00048	Lw	132.700000	1.83	a	6547693.42	2204760.78	1.83
PILES00049	Lw	132.700000	1.83	a	6547689.08	2204700.01	1.83
PILES00050	Lw	132.700000	1.83	a	6557388.91	2202563.94	1.83
PILES00051	Lw	132.700000	1.83	a	6557248.63	2202655.60	1.83
PILES00052	Lw	132.700000	1.83	a	6557315.99	2202611.16	1.83

Barrier(s)

ID	Absorption		Height	
	left	right	Begin	
			(m)	
BARRIERS00002	0.21	0.21	1.83	a
BARRIERS00086	0.21	0.21	1.83	a
BARRIERS00087	0.21	0.21	1.83	a
BARRIERS00088	0.21	0.21	1.83	a
BARRIERS00089	0.21	0.21	1.83	a
BARRIERS00090	0.21	0.21	1.83	a
BARRIERS00091	0.21	0.21	1.83	a

ID	Absorption		Height	
	left	right	Begin	
			(m)	
BARRIERS00092	0.21	0.21	1.83	a
BARRIERS00127	0.21	0.21	1.83	a
BARRIERS00128	0.21	0.21	1.83	a
BARRIERS00129	0.21	0.21	1.83	a
BARRIERS00130	0.21	0.21	1.83	a
BARRIERS00137	0.21	0.21	1.83	a
BARRIERS00138	0.21	0.21	1.83	a
BARRIERS00139	0.21	0.21	1.83	a
BARRIERS00140	0.21	0.21	1.83	a
BARRIERS00141	0.21	0.21	1.83	a
BARRIERS00142	0.21	0.21	1.83	a
BARRIERS00143	0.21	0.21	1.83	a
BARRIERS00144	0.21	0.21	1.83	a
BARRIERS00145	0.21	0.21	1.83	a
BARRIERS00155	0.21	0.21	1.83	a
BARRIERS00156	0.21	0.21	1.83	a
BARRIERS00157	0.21	0.21	1.83	a
BARRIERS00126	0.21	0.21	1.83	a

Building(s)

ID	RB	Absorption	Height	
			Begin	
			(m)	
BUILDINGS00001	x	0.21	3.05	a
BUILDINGS00002	x	0.21	3.05	a
BUILDINGS00003	x	0.21	3.05	a
BUILDINGS00004	x	0.21	3.05	a
BUILDINGS00005	x	0.21	3.05	a
BUILDINGS00006	x	0.21	3.05	a
BUILDINGS00007	x	0.21	3.05	a
BUILDINGS00008	x	0.21	3.05	a
BUILDINGS00009	x	0.21	3.05	a
BUILDINGS00010	x	0.21	3.05	a
BUILDINGS00011	x	0.21	3.05	a
BUILDINGS00012		0.21	3.05	a
BUILDINGS00013		0.21	3.05	a
BUILDINGS00014		0.21	3.05	a
BUILDINGS00015	x	0.21	3.05	a
BUILDINGS00016	x	0.21	3.05	a
BUILDINGS00017	x	0.21	3.05	a
BUILDINGS00018	x	0.21	3.05	a
BUILDINGS00019	x	0.21	3.05	a
BUILDINGS00020	x	0.21	3.05	a
BUILDINGS00021		0.21	3.05	a
BUILDINGS00022		0.21	3.05	a
BUILDINGS00023		0.21	3.05	a
BUILDINGS00024		0.21	3.05	a
BUILDINGS00025	x	0.21	3.05	a
BUILDINGS00026	x	0.21	3.05	a
BUILDINGS00027	x	0.21	3.05	a
BUILDINGS00028	x	0.21	3.05	a
BUILDINGS00029	x	0.21	3.05	a
BUILDINGS00030	x	0.21	3.05	a
BUILDINGS00031	x	0.21	3.05	a
BUILDINGS00032	x	0.21	3.05	a
BUILDINGS00033	x	0.21	3.05	a
BUILDINGS00034	x	0.21	3.05	a
BUILDINGS00035	x	0.21	3.05	a
BUILDINGS00036	x	0.21	3.05	a
BUILDINGS00037	x	0.21	3.05	a
BUILDINGS00038	x	0.21	3.05	a
BUILDINGS00039		0.21	3.05	a
BUILDINGS00040		0.21	3.05	a
BUILDINGS00041		0.21	3.05	a
BUILDINGS00042	x	0.21	3.05	a
BUILDINGS00043	x	0.21	3.05	a
BUILDINGS00044	x	0.21	3.05	a
BUILDINGS00045	x	0.21	3.05	a
BUILDINGS00046		0.21	3.05	a
BUILDINGS00047	x	0.21	3.05	a
BUILDINGS00048	x	0.21	3.05	a
BUILDINGS00049	x	0.21	3.05	a
BUILDINGS00050	x	0.21	3.05	a
BUILDINGS00051	x	0.21	3.05	a
BUILDINGS00052	x	0.21	3.05	a

ID	RB	Absorption	Height	
			Begin	
			(m)	
BUILDINGS00053	x	0.21	3.05	a
BUILDINGS00054	x	0.21	3.05	a
BUILDINGS00055	x	0.21	3.05	a
BUILDINGS00056	x	0.21	3.05	a
BUILDINGS00057	x	0.21	3.05	a
BUILDINGS00058	x	0.21	3.05	a
BUILDINGS00059	x	0.21	3.05	a
BUILDINGS00060	x	0.21	3.05	a
BUILDINGS00061		0.21	3.05	a
BUILDINGS00062		0.21	3.05	a
BUILDINGS00063	x	0.21	3.05	a
BUILDINGS00064	x	0.21	3.05	a
BUILDINGS00065	x	0.21	3.05	a
BUILDINGS00066	x	0.21	3.05	a
BUILDINGS00067	x	0.21	3.05	a
BUILDINGS00068	x	0.21	3.05	a
BUILDINGS00069	x	0.21	3.05	a
BUILDINGS00070	x	0.21	3.05	a
BUILDINGS00071	x	0.21	3.05	a
BUILDINGS00072	x	0.21	3.05	a
BUILDINGS00073	x	0.21	3.05	a
BUILDINGS00074	x	0.21	3.05	a
BUILDINGS00075	x	0.21	3.05	a
BUILDINGS00076	x	0.21	3.05	a
BUILDINGS00077	x	0.21	3.05	a
BUILDINGS00078		0.21	9.14	a
BUILDINGS00079		0.21	9.14	a
BUILDINGS00080	x	0.21	3.05	a
BUILDINGS00081	x	0.21	3.05	a
BUILDINGS00082	x	0.21	3.05	a
BUILDINGS00083	x	0.21	3.05	a
BUILDINGS00084	x	0.21	3.05	a
BUILDINGS00085	x	0.21	3.05	a
BUILDINGS00086	x	0.21	6.10	a
BUILDINGS00087	x	0.21	9.14	a
BUILDINGS00088	x	0.21	9.14	a
BUILDINGS00089	x	0.21	9.14	a
BUILDINGS00090	x	0.21	9.14	a
BUILDINGS00091	x	0.21	3.05	a
BUILDINGS00092	x	0.21	3.05	a
BUILDINGS00093	x	0.21	3.05	a
BUILDINGS00094	x	0.21	3.05	a
BUILDINGS00095	x	0.21	3.05	a
BUILDINGS00096		0.21	3.05	a
BUILDINGS00097		0.21	3.05	a
BUILDINGS00098		0.21	6.10	a
BUILDINGS00099		0.21	3.05	a
BUILDINGS00100		0.21	3.05	a
BUILDINGS00101		0.21	3.05	a
BUILDINGS00102		0.21	9.14	a
BUILDINGS00103		0.21	3.05	a
BUILDINGS00104	x	0.21	3.05	a
BUILDINGS00105	x	0.21	3.05	a
BUILDINGS00106	x	0.21	3.05	a
BUILDINGS00107	x	0.21	3.05	a
BUILDINGS00108	x	0.21	3.05	a
BUILDINGS00109	x	0.21	3.05	a
BUILDINGS00110	x	0.21	3.05	a
BUILDINGS00111	x	0.21	3.05	a
BUILDINGS00112	x	0.21	3.05	a
BUILDINGS00113	x	0.21	3.05	a
BUILDINGS00114	x	0.21	3.05	a
BUILDINGS00115	x	0.21	3.05	a
BUILDINGS00116	x	0.21	3.05	a
BUILDINGS00117	x	0.21	3.05	a
BUILDINGS00118	x	0.21	3.05	a
BUILDINGS00119	x	0.21	3.05	a
BUILDINGS00120	x	0.21	3.05	a
BUILDINGS00121	x	0.21	3.05	a
BUILDINGS00122	x	0.21	3.05	a
BUILDINGS00123	x	0.21	3.05	a
BUILDINGS00124	x	0.21	3.05	a
BUILDINGS00125	x	0.21	3.05	a
BUILDINGS00126	x	0.21	3.05	a
BUILDINGS00127	x	0.21	3.05	a
BUILDINGS00128		0.21	6.10	a

ID	RB	Absorption	Height	
			Begin	
			(m)	
BUILDINGS00129	x	0.21	3.05	a
BUILDINGS00130		0.21	3.05	a
BUILDINGS00131		0.21	3.05	a
BUILDINGS00132	x	0.21	3.05	a
BUILDINGS00133	x	0.21	3.05	a
BUILDINGS00134	x	0.21	3.05	a
BUILDINGS00135	x	0.21	3.05	a
BUILDINGS00136	x	0.21	3.05	a
BUILDINGS00137	x	0.21	3.05	a
BUILDINGS00138	x	0.21	3.05	a
BUILDINGS00139	x	0.21	3.05	a
BUILDINGS00140	x	0.21	3.05	a
BUILDINGS00141	x	0.21	3.05	a
BUILDINGS00142	x	0.21	3.05	a
BUILDINGS00143	x	0.21	3.05	a
BUILDINGS00144	x	0.21	3.05	a
BUILDINGS00145		0.21	3.05	a

APPENDIX D:

PILE DRIVING NOISE LEVEL CONTOUR BOUNDARIES

This page intentionally left blank

Pile Driving Noise Levels

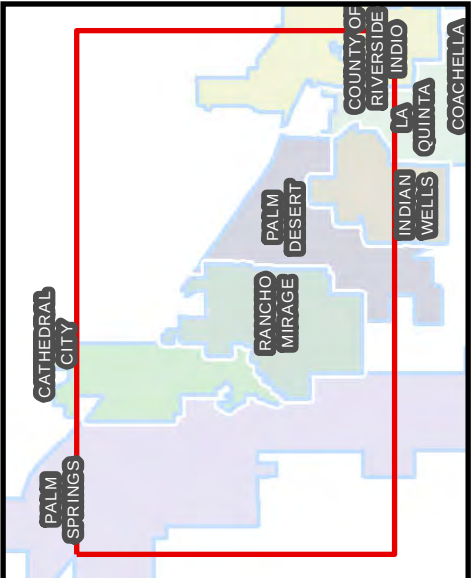
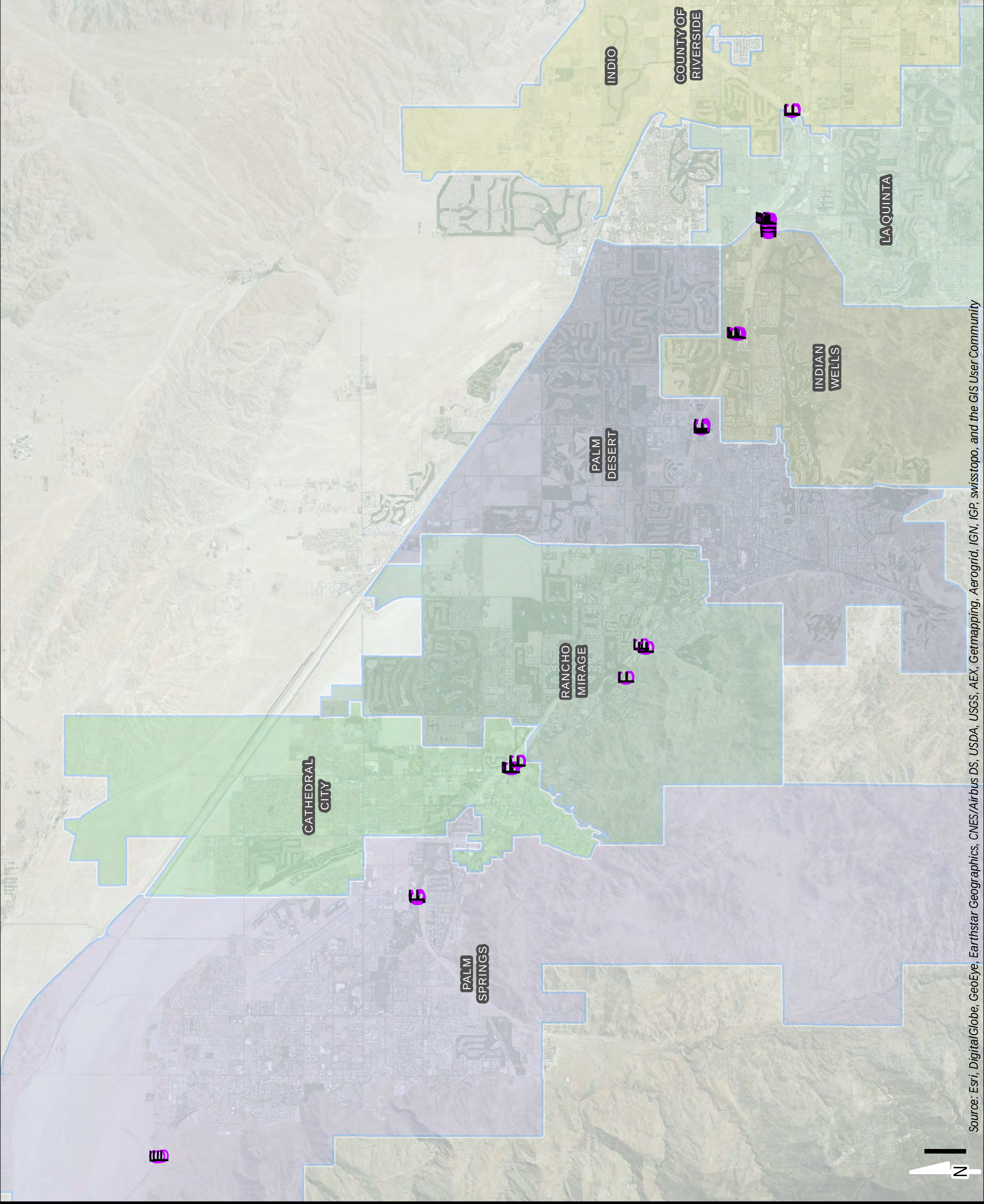
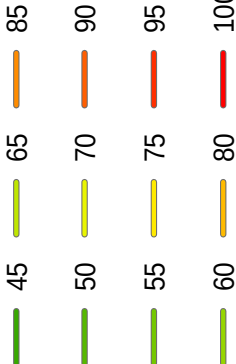
Overview

Page 1 of 9

LEGEND:

 Pile Location

Worst-Case Pile Driving Construction
Noise Levels (dBA Lmax)



Pile Driving Noise Levels

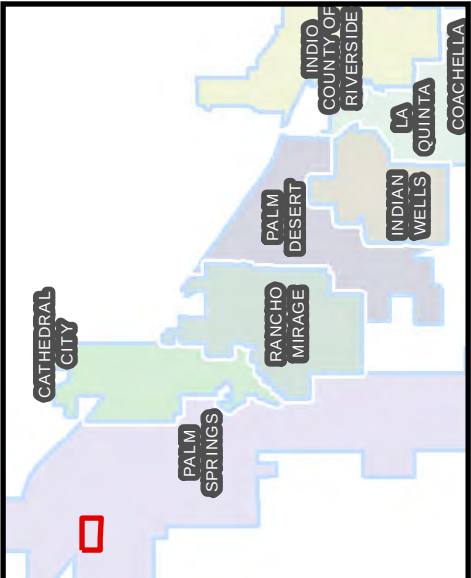
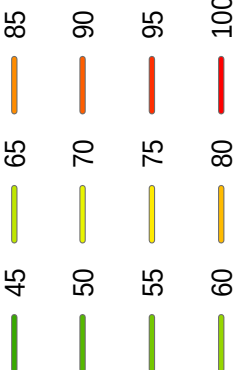
Highway 111 Overcrossing

Page 2 of 9

LEGEND:

 Pile Location

Worst-Case Pile Driving Construction
Noise Levels (dBA Lmax)



Feet

09276_Bridges_CadnaA
11/9/2016

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Page 3 of 9

Category	Green	Yellow	Orange	Red
1	45	65	85	
2	50	70	90	
3	55	75	95	
4	60	80	100	



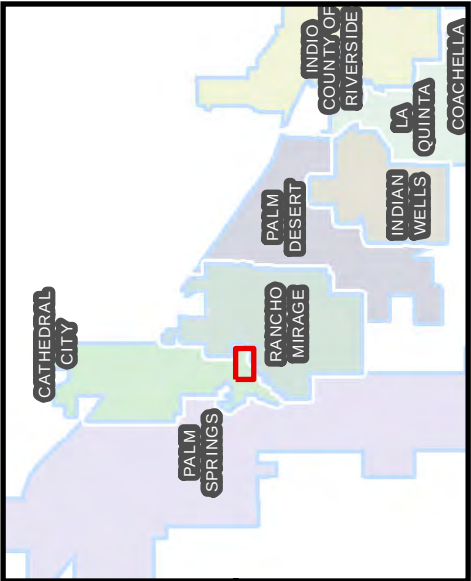
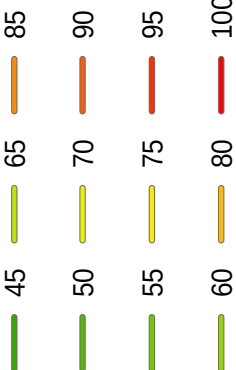
Pile Driving Noise Levels

Cathedral Canyon Channel West & East Bridges

LEGEND:

Pile Location

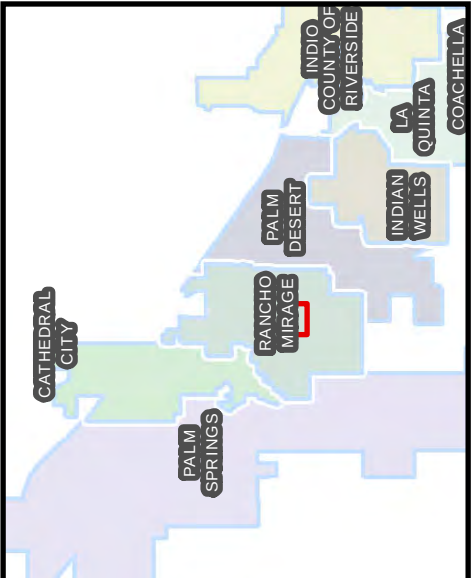
Worst-Case Pile Driving Construction
Noise Levels (dBA Lmax)



Feet

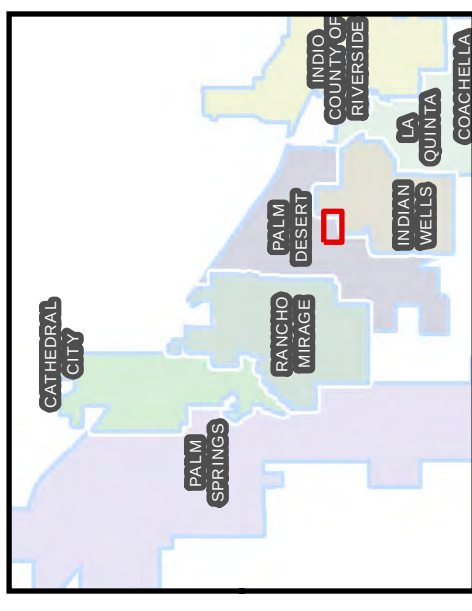
LEGEND:

- Pile Location
 - Worst-Case Pile Driving Construction Noise Levels (dBA Lmax)
- | | | |
|----|----|-----|
| 45 | 65 | 85 |
| 50 | 70 | 90 |
| 55 | 75 | 95 |
| 60 | 80 | 100 |



Page 6 of 9

Category	Green	Yellow	Orange	Red
1	45	65	85	
2	50	70	90	
3	55	75	95	
4	60	80	100	



Pile Driving Noise Levels

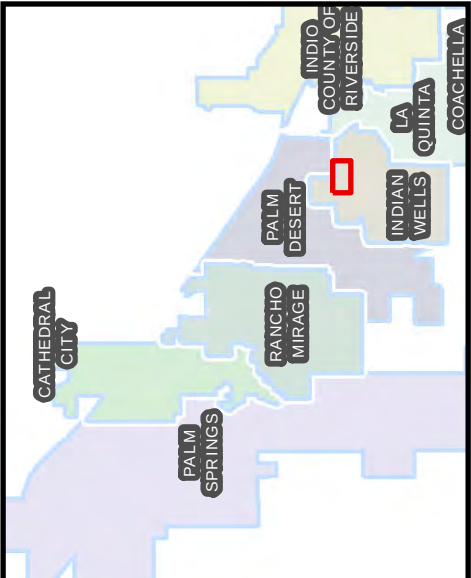
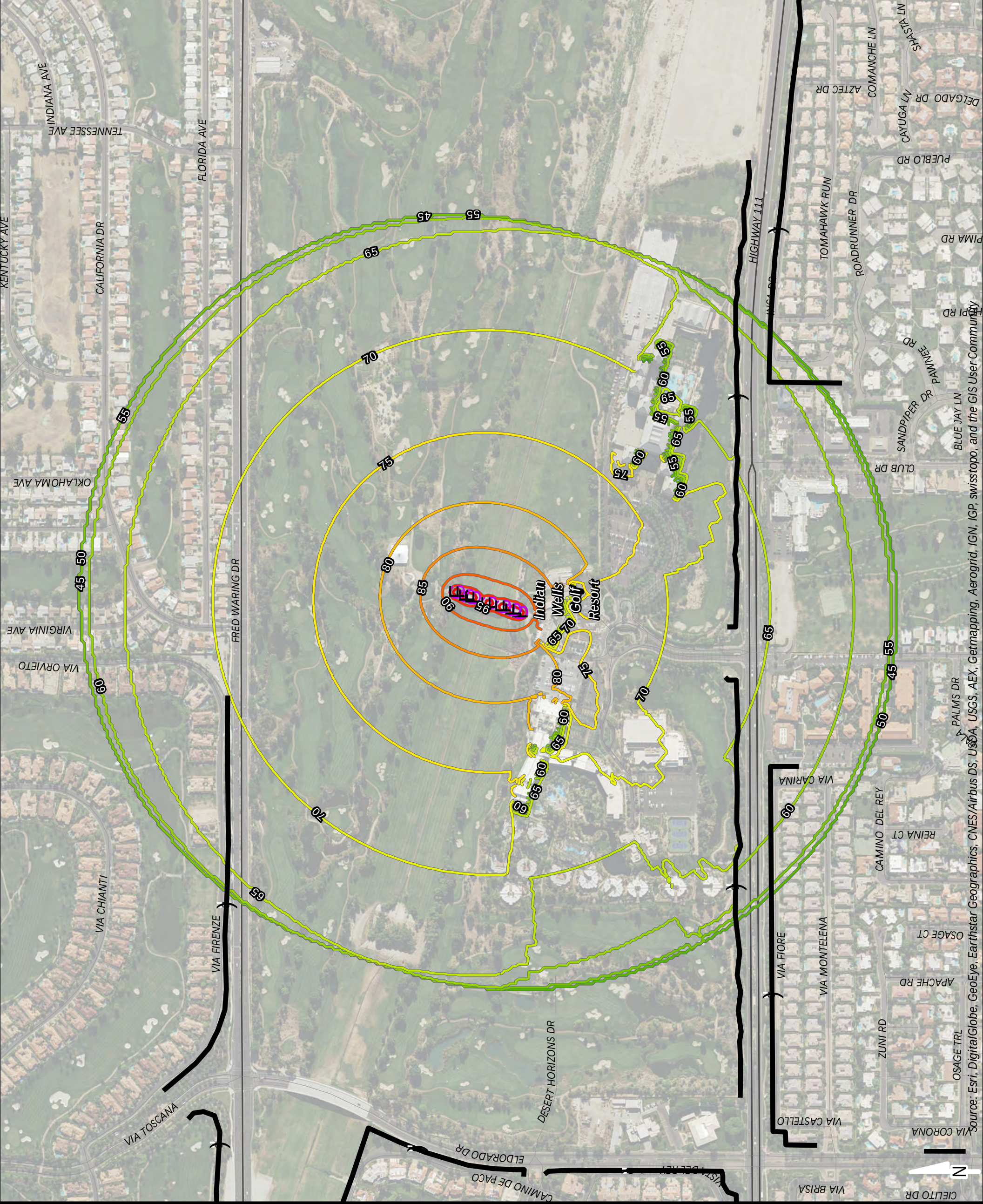
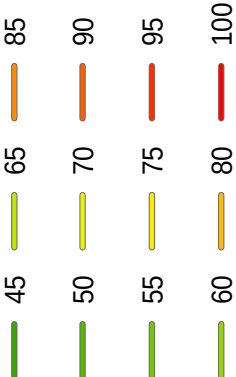
Hyatt Regency Bridge

Page 7 of 9

LEGEND:

Pile Location

Worst-Case Pile Driving Construction Noise Levels (dBA Lmax)



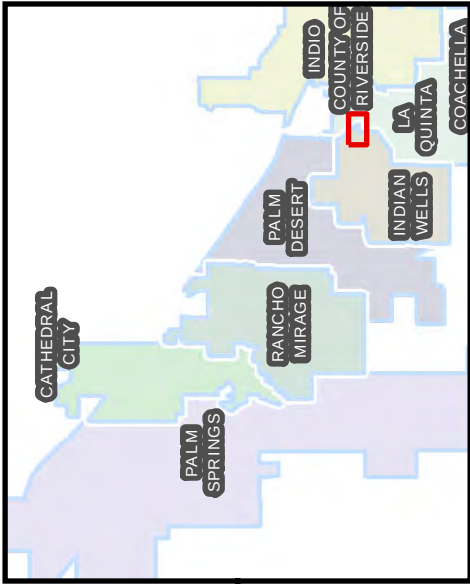
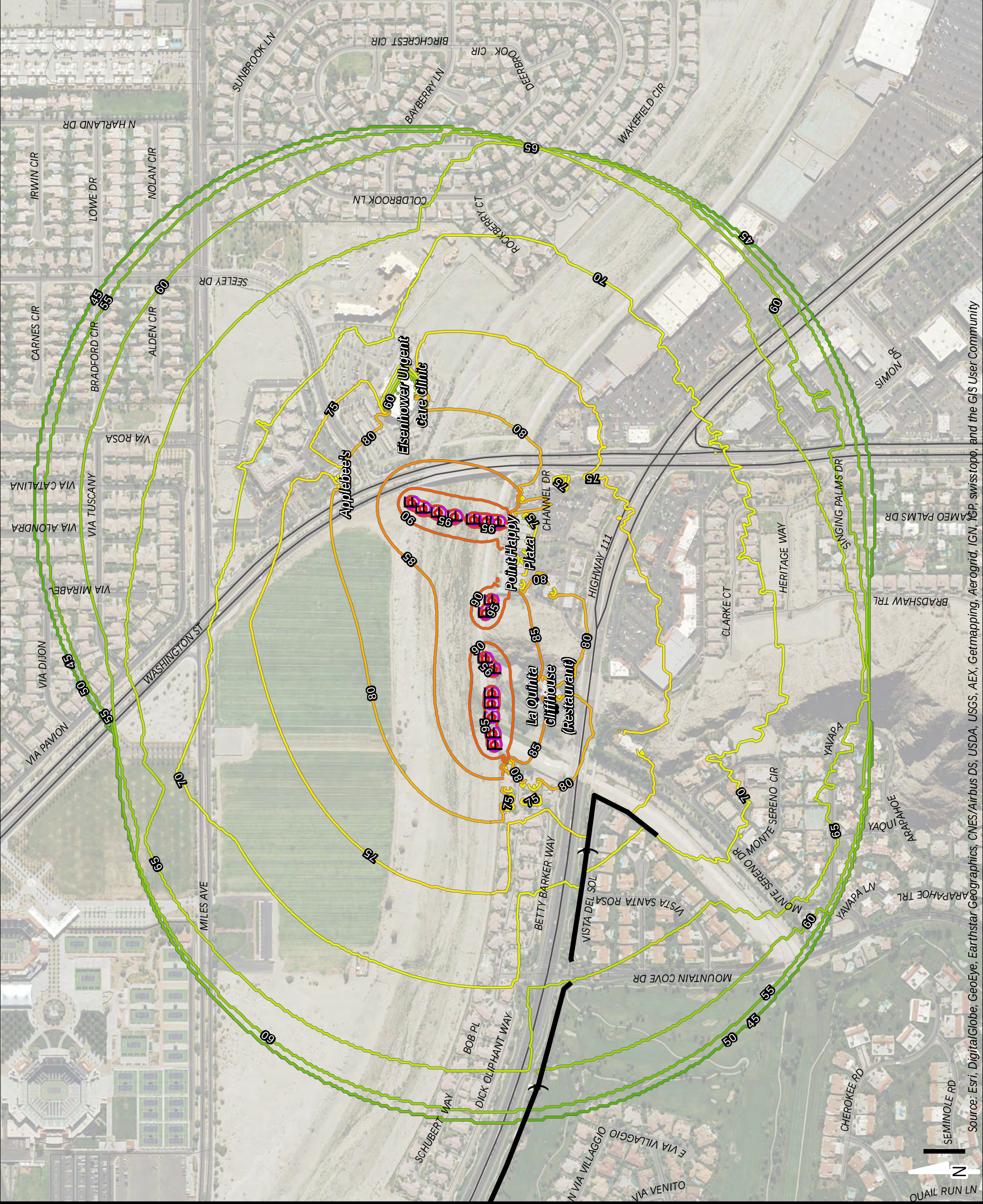
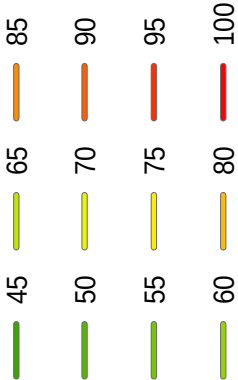
Feet

Pile Driving Noise Levels

LEGEND:

 Pile Location

Worst-Case Pile Driving Construction
Noise Levels (dBA Lmax)



Feet

09276_Bridges_CadnaA
11/9/2016

Pile Driving Noise Levels

La Quinta Channel Bridge

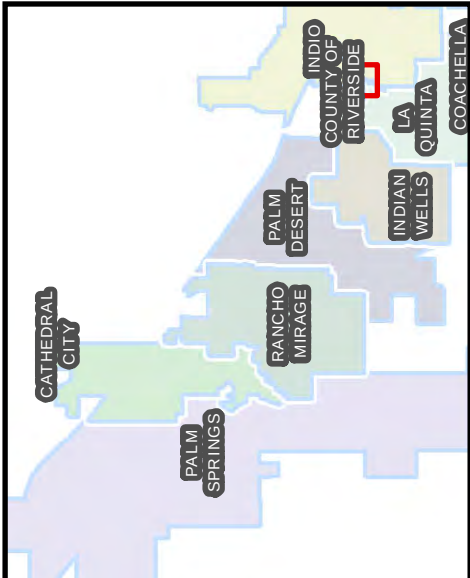
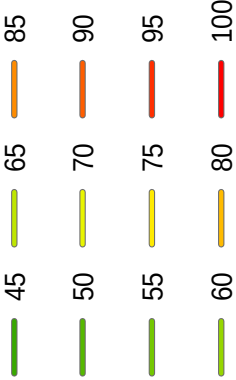
Page 9 of 9

LEGEND:

Pile Location



Worst-Case Pile Driving Construction
Noise Levels (dBA Lmax)



Feet

This page intentionally left blank

APPENDIX E:

PILE DRIVING VIBRATION LEVEL CONTOUR BOUNDARIES

This page intentionally left blank

Pile Driving Vibration Levels

Overview

Page 1 of 9

LEGEND:

 Pile Location

Building Damage Threshold (0.12 in/sec PPV)

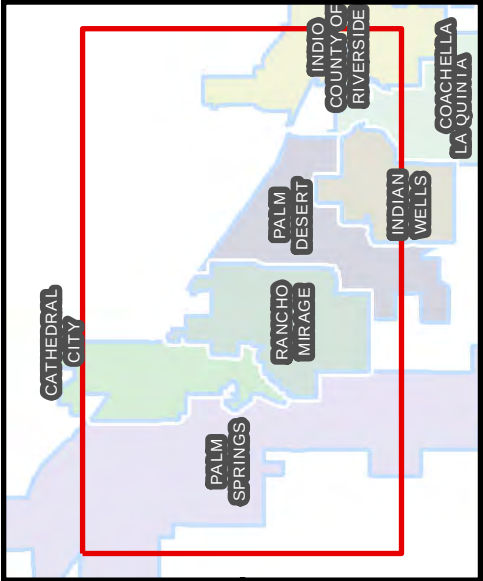
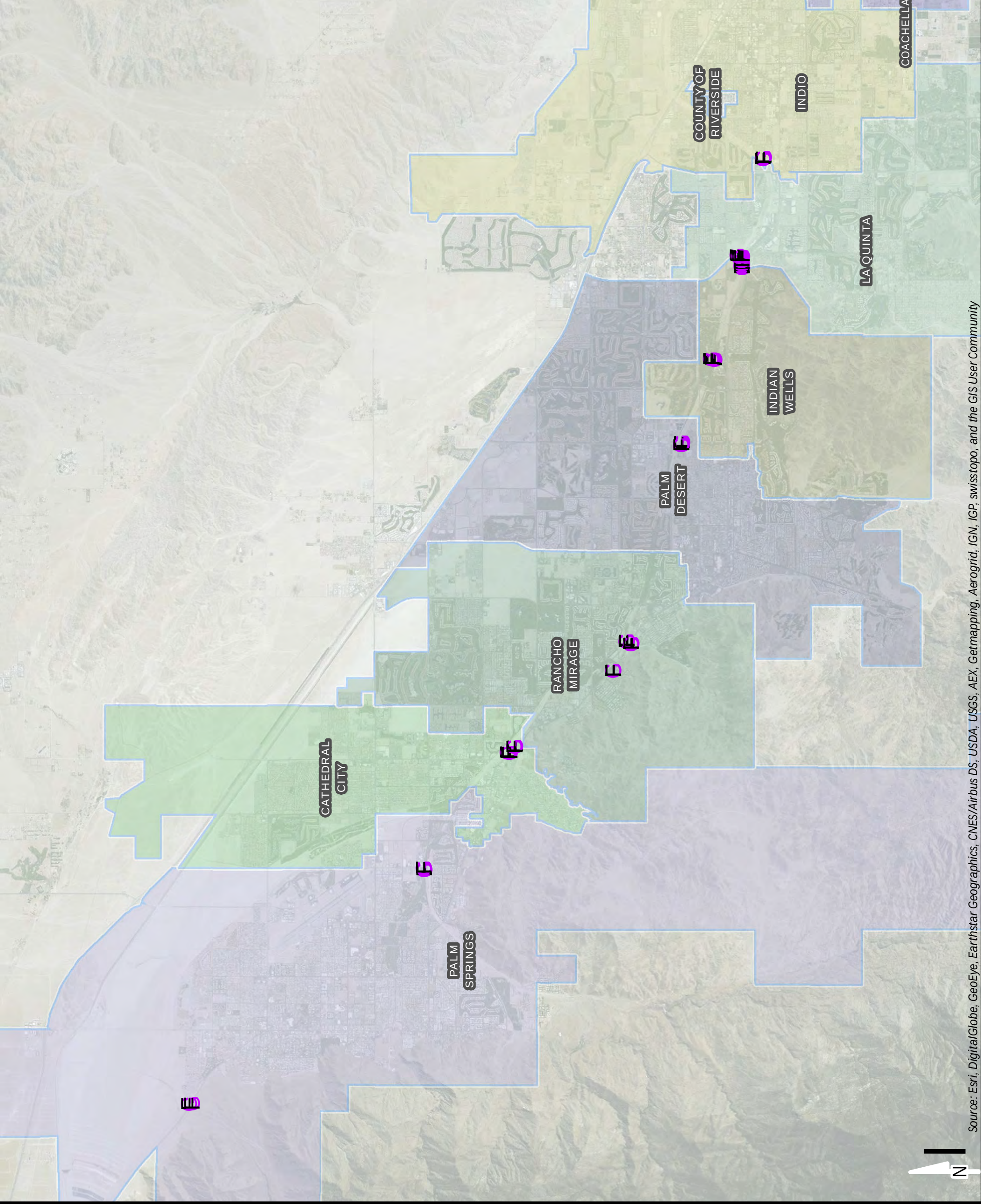
 Sensitive Buildings Within the Threshold

 76-Foot Contour Boundary

Human Annoyance Threshold (0.01 in/sec PPV)

 Sensitive Uses Within the Threshold

 400-Foot Contour Boundary



Pile Driving Vibration Levels

Highway 111 Overcrossing

Page 2 of 9

LEGEND:

 Pile Location

Building Damage Threshold (0.12 in/sec PPV)

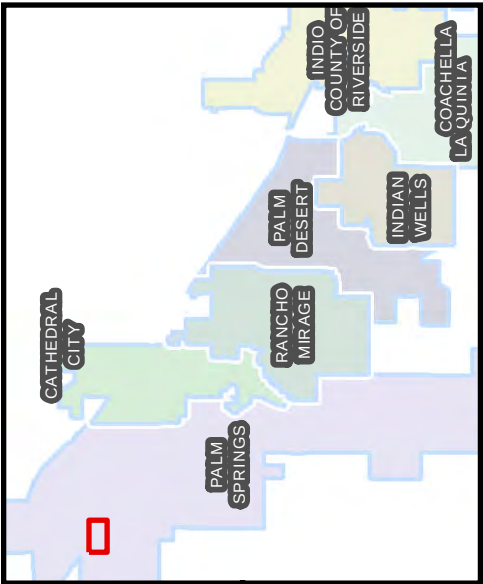
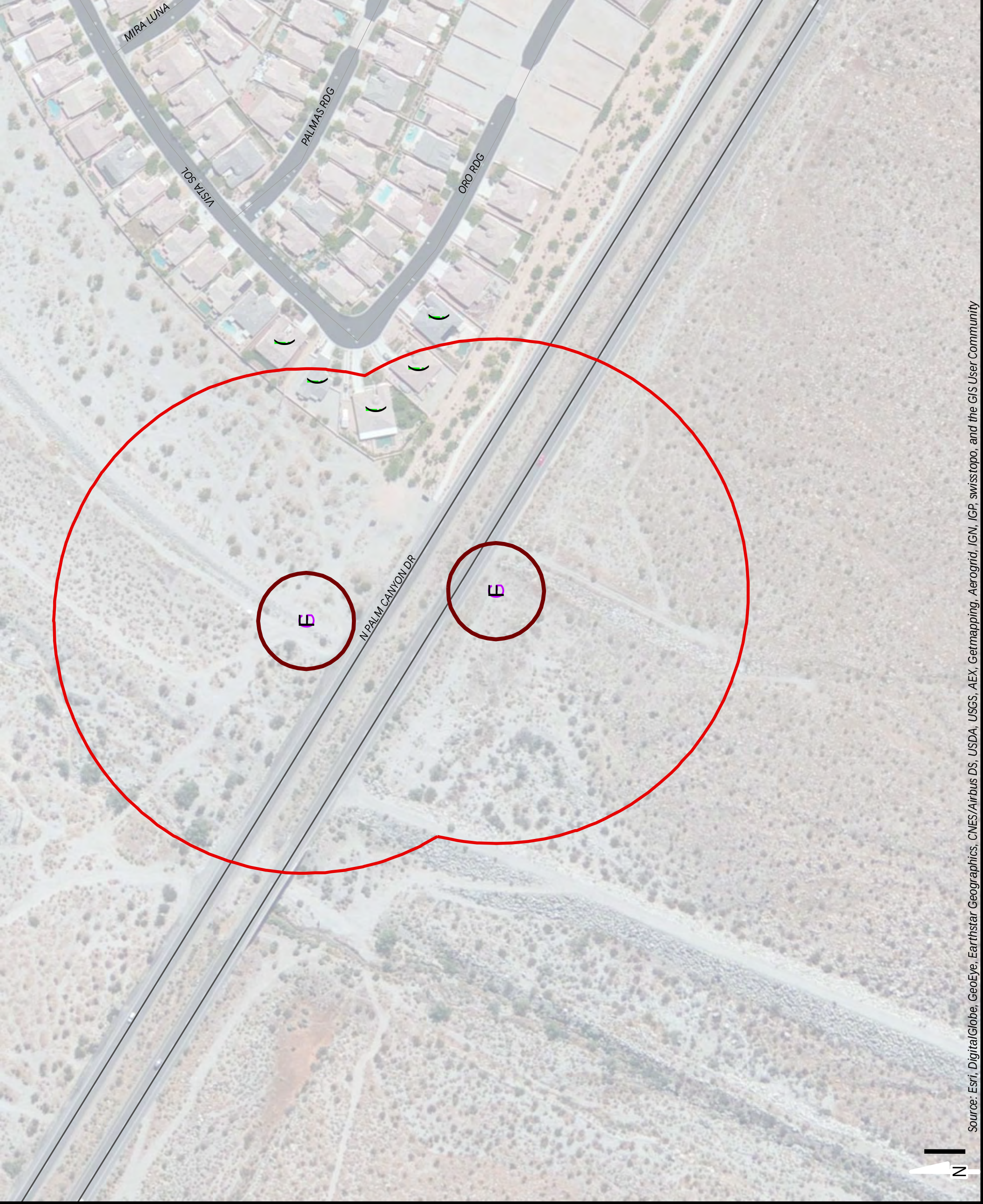
 Sensitive Buildings Within the Threshold

 76-Foot Contour Boundary

Human Annoyance Threshold (0.01 in/sec PPV)

 Sensitive Uses Within the Threshold

 400-Foot Contour Boundary



Feet

Pile Driving Vibration Levels

Boardwalk Over Lake Bridge

Page 3 of 9

LEGEND:

 Pile Location

Building Damage Threshold (0.12 in/sec PPV)

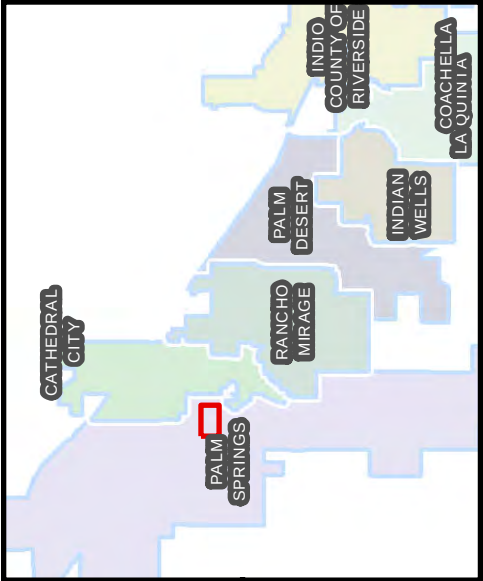
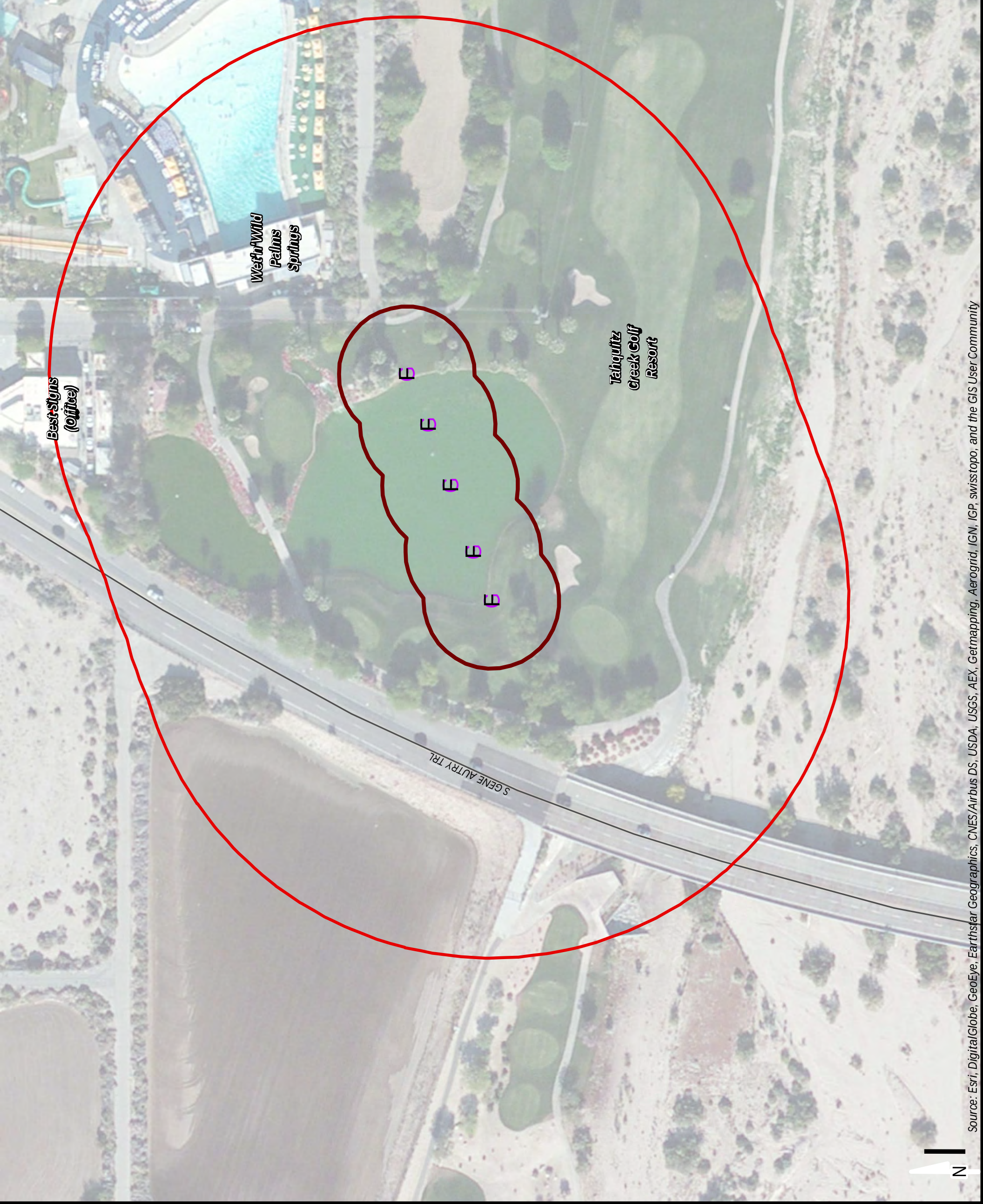
 Sensitive Buildings Within the Threshold

 76-Foot Contour Boundary

Human Annoyance Threshold (0.01 in/sec PPV)

 Sensitive Uses Within the Threshold

 400-Foot Contour Boundary



Feet

Pile Driving Vibration Levels

Thunderbird & West Magnesia Canyon Channel Bridges

Page 5 of 9

LEGEND:

 Pile Location

Building Damage Threshold (0.12 in/sec PPV)

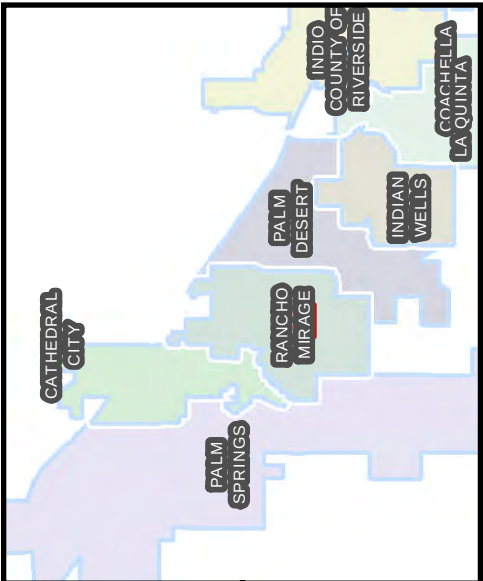
 Sensitive Buildings Within the Threshold

 76-Foot Contour Boundary

Human Annoyance Threshold (0.01 in/sec PPV)

 Sensitive Uses Within the Threshold

 400-Foot Contour Boundary



Feet

Pile Driving Vibration Levels

Cook Street Overcrossing

Page 6 of 9

LEGEND:

 Pile Location

Building Damage Threshold (0.12 in/sec PPV)

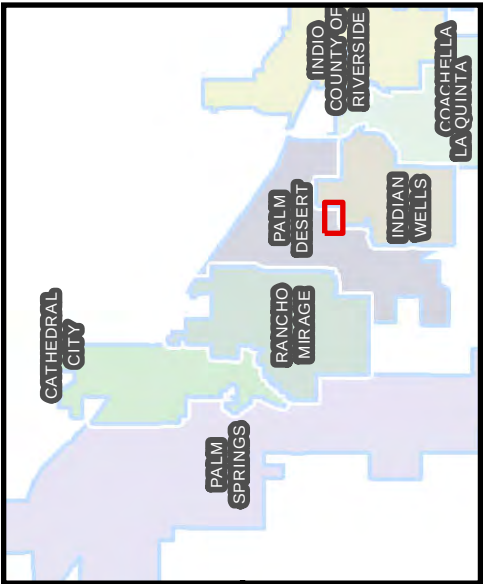
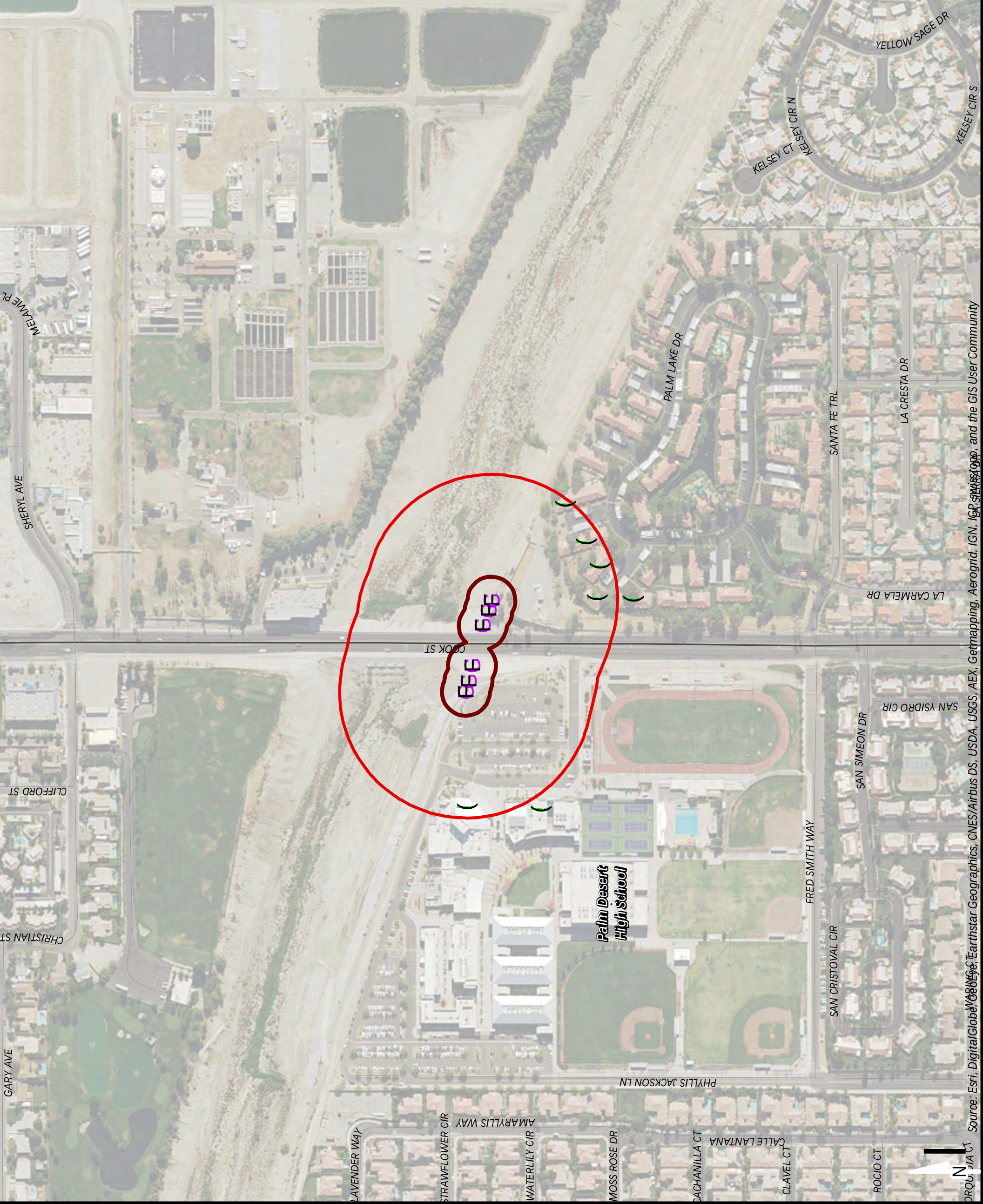
 Sensitive Buildings Within the Threshold

 76-Foot Contour Boundary

Human Annoyance Threshold (0.01 in/sec PPV)

 Sensitive Uses Within the Threshold

 400-Foot Contour Boundary



Pile Driving Vibration Levels

Hyatt Regency Bridge

LEGEND:

 Pile Location

Building Damage Threshold (0.12 in/sec PPV)

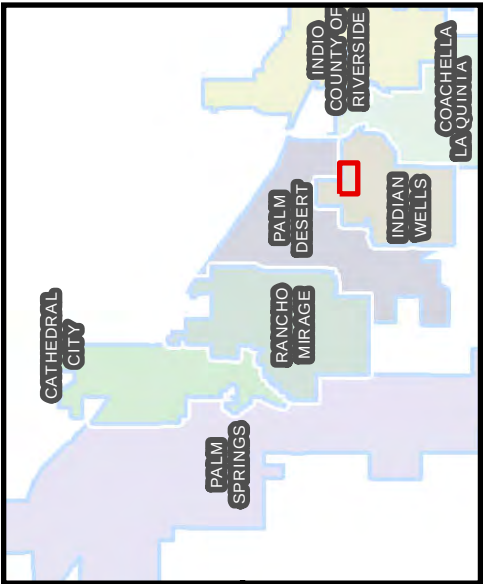
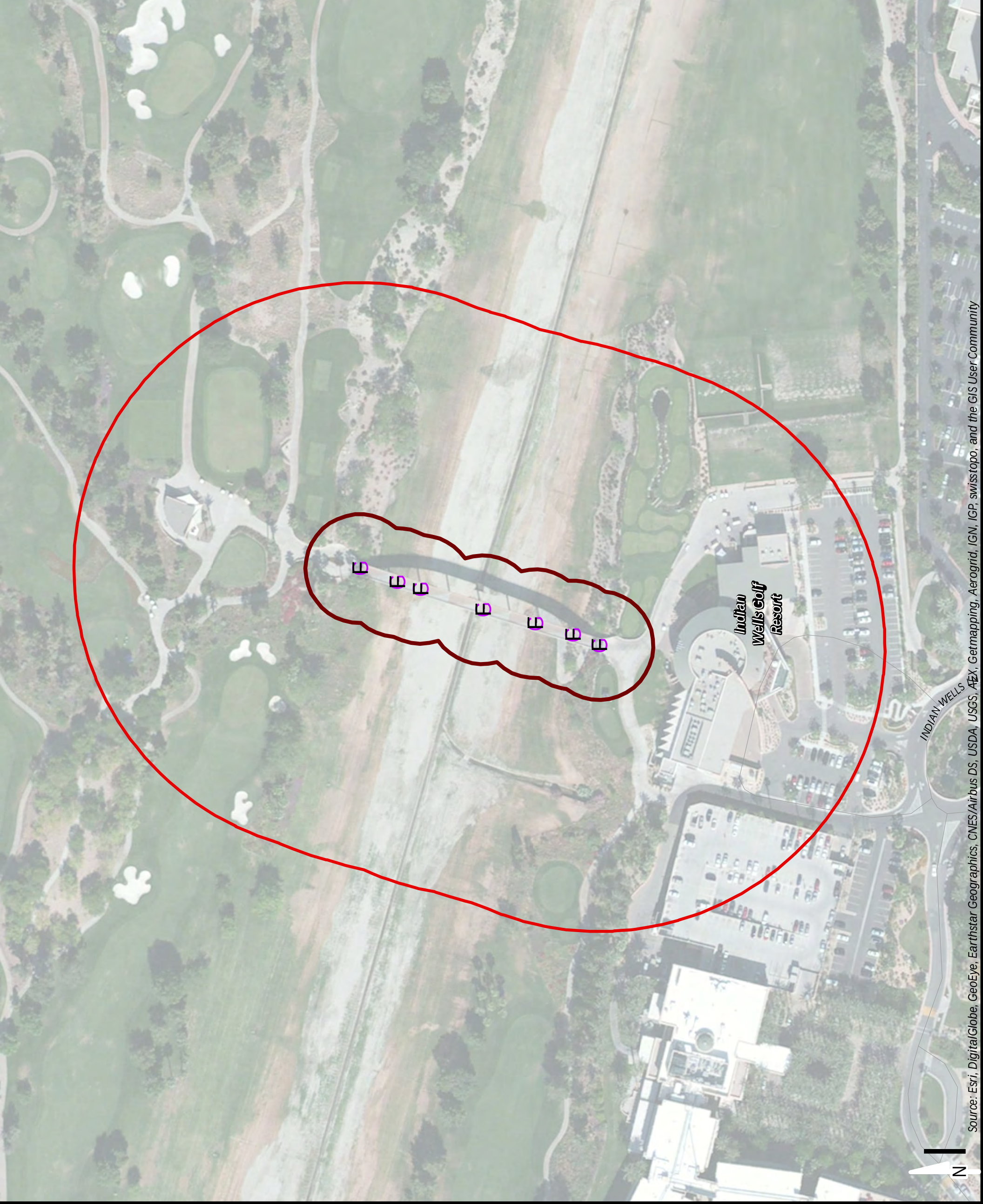
 Sensitive Buildings Within the Threshold

 76-Foot Contour Boundary

Human Annoyance Threshold (0.01 in/sec PPV)

 Sensitive Uses Within the Threshold

 400-Foot Contour Boundary



Pile Driving Vibration Levels

Deep Canyon, Point Happy, & Washington St. Bridges

LEGEND:

 Pile Location

Building Damage Threshold (0.12 in/sec PPV)

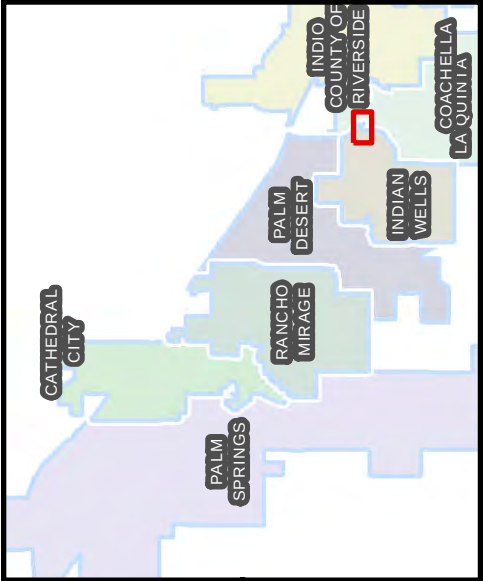
 Sensitive Buildings Within the Threshold

 76-Foot Contour Boundary

Human Annoyance Threshold (0.01 in/sec PPV)

 Sensitive Uses Within the Threshold

 400-Foot Contour Boundary



Feet

Pile Driving Vibration Levels

La Quinta Channel Bridge

Page 9 of 9

LEGEND:

 Pile Location

Building Damage Threshold (0.12 in/sec PPV)

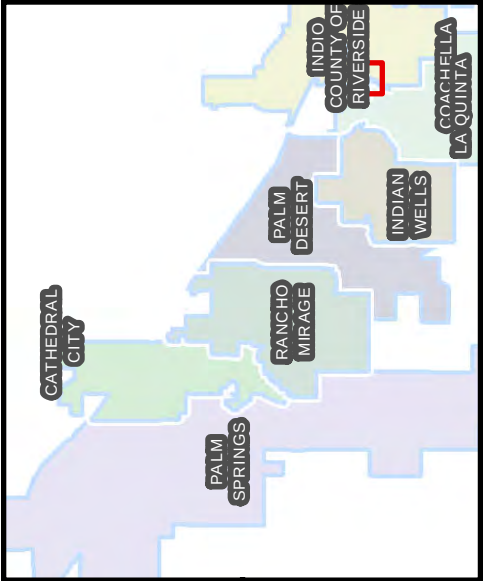
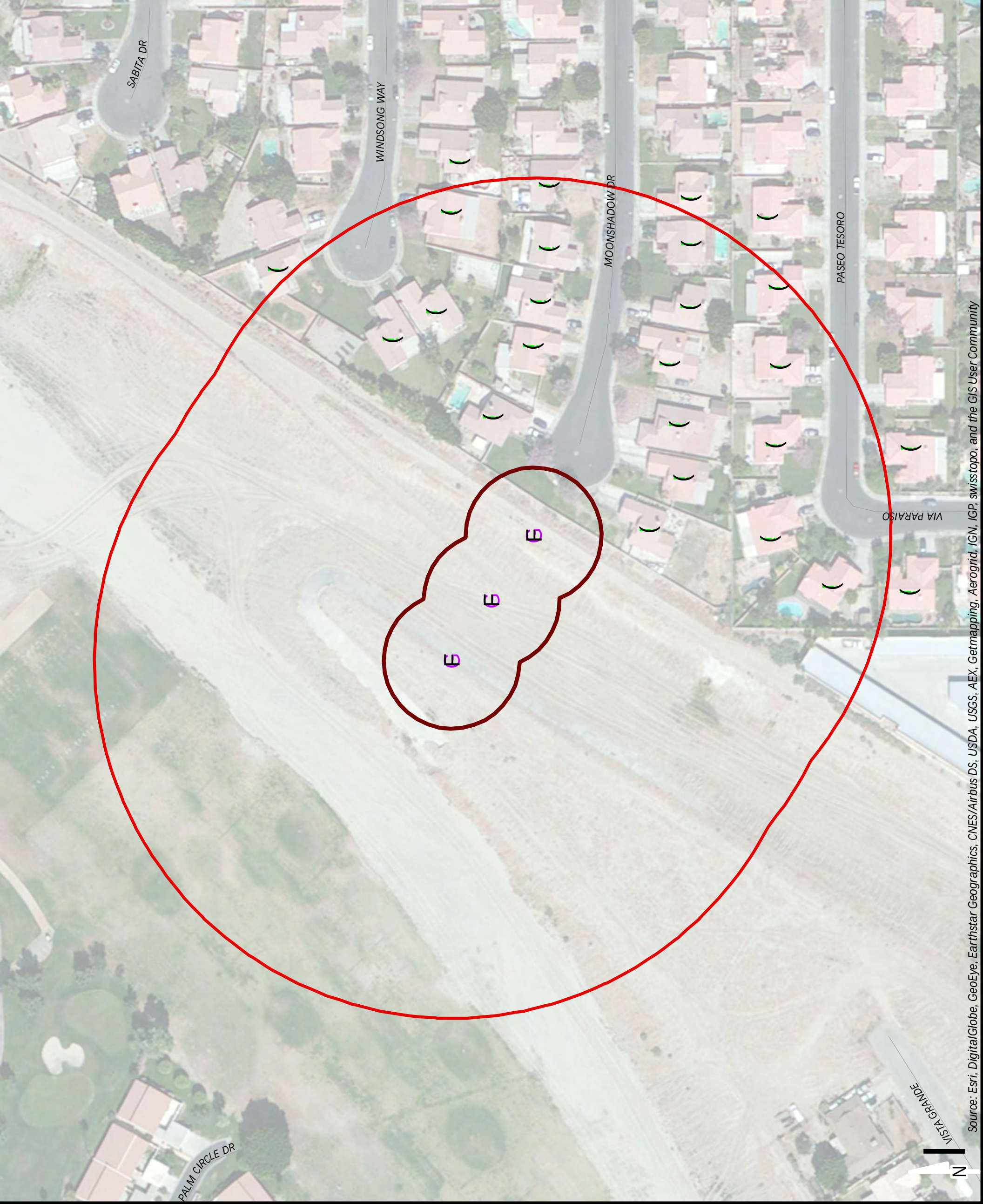
 Sensitive Buildings Within the Threshold

 76-Foot Contour Boundary

Human Annoyance Threshold (0.01 in/sec PPV)

 Sensitive Uses Within the Threshold

 400-Foot Contour Boundary



Feet

This page intentionally left blank