

Appendix D

Noise Technical Memorandum

MEMORANDUM

To: Ino Cruz, J&T Management, Inc.
From: Connor Burke, Dudek
Subject: Noise Assessment for the Hemet Retail Development Project
Date: December 23, 2020
Attachments: Figures 1–2; Attachment A: Construction Noise Model Input and Output; Attachment B Construction Noise Modeling Input and Output; Attachment C: Traffic Noise Modeling (V.2.5) Input and Output; Attachment D: Operational Noise Modeling Input and Output

The purpose of this technical memorandum is to assess the noise impacts during construction and operation of the proposed Hemet Retail Development Project (Proposed Project). This assessment utilizes the significance thresholds in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.).

1 Project Description

The Project is located on the southeast corner of State Route (SR-) 74 and SR-79/Winchester Road (SR-79) in Riverside County (County). The Project would consist of the development of a 2,425-square-foot fast food restaurant with drive-through; a 2,097-square-foot, 24-hour convenience market; and 30 parking spaces on 1.22 acres (Figure 1, Proposed Site Plan).

1.2 Noise Characteristics

Sound is mechanical energy transmitted by pressure waves in a compressible medium, such as air. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired. The sound pressure level (SPL) has become the most common descriptor used to characterize the loudness of an ambient sound level. The unit of measurement of sound pressure is a decibel (dB). Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern changes in sound levels of 1 dB when exposed to steady, single-frequency signals in the mid-frequency range. Outside such controlled conditions, the trained ear can detect changes of 2 dB in normal environmental noise. It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dB. A change of 5 dB is readily perceptible, and a change of 10 dB is perceived as twice or half as loud (Caltrans 2013a). A doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g., doubling the number of daily trips along a given road) would result in a barely perceptible change in sound level.

Sound may be described in terms of level or amplitude (measured in dB), frequency or pitch (measured in hertz or cycles per second), and duration (measured in seconds or minutes). Because the human ear is not

equally sensitive to sound at all frequencies, a special frequency-dependent rating scale is used to relate noise to human sensitivity. The A-weighted decibel (dBA) scale performs this compensation by discriminating against low and very high frequencies in a manner approximating the sensitivity of the human ear.

Several descriptors of noise (a.k.a., noise metrics) exist to help predict average community reactions to the adverse effects of environmental noise, including traffic-generated noise. These descriptors include the equivalent noise level over a given period (L_{eq}), the day-night average noise level (L_{dn}), and the community noise equivalent level (CNEL). Each of these descriptors uses units of dBA.

L_{eq} is a decibel quantity that represents the constant or energy-averaged value equivalent to the amount of variable sound energy received by a receptor during a time interval. For example, a 1-hour L_{eq} measurement of 60 dBA would represent the average amount of energy contained in all the noise that occurred in that hour. L_{eq} is an effective noise descriptor because of its ability to assess the total time-varying effects of noise on sensitive receptors, which can then be compared to an established L_{eq} standard or threshold of the same duration. Another descriptor is maximum sound level (L_{max}), which is the greatest sound level measured during a designated time interval or event. The minimum sound level (L_{min}) is often called the *floor* of a measurement period.

Unlike the L_{eq} , L_{max} , and L_{min} metrics, L_{dn} and CNEL descriptors always represent 24-hour periods and differ from a 24-hour L_{eq} value because they apply a time-weighted factor designed to emphasize noise events that occur during the non-daytime hours (when speech and sleep disturbance is of more concern). *Time weighted* refers to the fact that L_{dn} and CNEL penalize noise that occurs during certain sensitive periods. In the case of CNEL, noise occurring during the daytime (7:00 a.m. to 7:00 p.m.) receives no penalty. Noise during the evening (7:00 p.m. to 10:00 p.m.) is penalized by adding 5 dB to the actual levels, and nighttime (10:00 p.m. to 7:00 a.m.) noise is penalized by adding 10 dB to the actual levels. L_{dn} differs from CNEL in that the daytime period is longer (defined instead as 7:00 a.m. to 10:00 p.m.), thus eliminating the dB adjustment for the evening period. L_{dn} and CNEL are the predominant criteria used to measure roadway noise affecting residential receptors. These two metrics generally differ from one another by no more than 0.5–1 dB and are often considered or defined as being essentially equivalent by many jurisdictions.

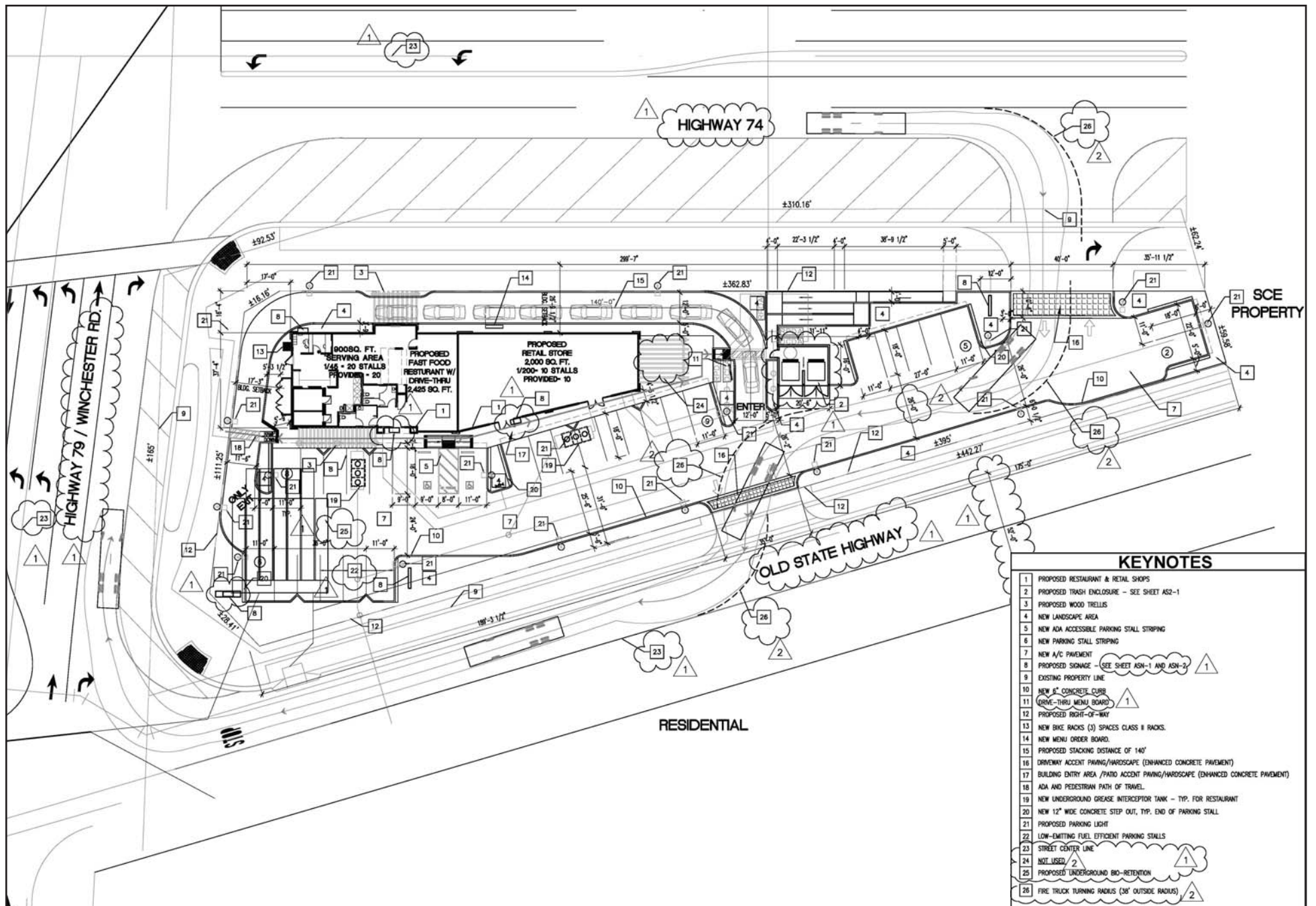
1.3 Vibration Fundamentals

Vibration is oscillatory movement of mass (typically a solid) over time. It is described in terms of frequency and amplitude and, unlike sound, can be expressed as displacement, velocity, or acceleration. For environmental studies, vibration is often studied as a velocity that, akin to the discussion of sound pressure levels, can also be expressed in dB in order to cast a wide range of vibration levels in a more convenient scale and with respect to a reference quantity. Vibration impacts to buildings are generally discussed in terms of inches per second (ips) peak particle velocity (PPV), which will be used herein to discuss vibration levels for ease of reading and comparison with relevant standards. Vibration can also be annoying and thereby impact occupants of structures, and vibration of sufficient amplitude can disrupt sensitive equipment and processes (Caltrans 2013b), such as those involving the use of electron microscopes and lithography equipment. Common sources of vibration within communities include construction activities and railroads. Groundborne vibration generated by construction projects is usually highest during pile driving, rock blasting, soil compacting, jack hammering, and demolition-related activities where sudden releases of subterranean energy or powerful impacts of tools

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on hard materials occur. Depending on their distances to a sensitive receptor, operation of large bulldozers, graders, loaded dump trucks, or other heavy construction equipment and vehicles on a construction site also have the potential to cause high vibration amplitudes.



Source: Absolute Design Methods 2018.

FIGURE1
Project Site

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2 Regulatory Setting

2.1 Federal

Federal Transit Administration

In its Transit Noise and Vibration Impact Assessment guidance manual, the Federal Transit Administration (FTA) recommends a daytime construction noise level threshold of 80 dBA L_{eq} over an 8-hour period (FTA 2018) when detailed construction noise assessments are performed to evaluate potential impacts to community residences surrounding a project. Although this FTA guidance is not a regulation, it can serve as a quantified standard in the absence of such noise limits at the state and local jurisdictional levels.

2.2 State

California Code of Regulations, Title 24

Title 24 of the California Code of Regulations sets standards that new development in California must meet. According to Title 24, interior noise levels are not to exceed 45 dBA CNEL in any habitable room (ICC 2019).

California Department of Health Services Guidelines

The California Department of Health Services has developed guidelines of community noise acceptability for use by local agencies (OPR 2017). Selected relevant levels are listed here:

- Below 60 dBA CNEL: normally acceptable for low-density residential use
- 50 to 70 dBA: conditionally acceptable for low-density residential use
- Below 65 dBA CNEL: normally acceptable for high-density residential use and transient lodging
- 60 to 70 dBA CNEL: conditionally acceptable for high-density residential, transient lodging, churches, educational, and medical facilities

The normally acceptable exterior noise level for transient lodging use is up to 65 dBA CNEL. Additionally, this exterior noise level limit is consistent with the City of Chula Vista General Plan Noise Element, which considers hospitals noise-sensitive land uses.

California Department of Transportation

In its Transportation and Construction Vibration Guidance Manual (Caltrans 2013b), the California Department of Transportation (Caltrans) recommends 0.5 ips PPV as a threshold for the avoidance of structural damage to typical newer residential buildings exposed to continuous or frequent intermittent sources of groundborne vibration. For transient vibration events, such as blasting, the damage risk threshold would be 1.0 ips PPV (Caltrans 2013b) at the same type of newer residential structures. For older structures, these guidance thresholds would be more stringent: 0.3 ips PPV for continuous/intermittent vibration sources, and 0.5 ips PPV for transient vibration events. With respect to human annoyance, Caltrans guidance indicates that building occupants exposed to continuous

groundborne vibration in the range of 0.2 ips to 0.6 ips PPV would find it “unpleasant or “annoying” and thus a likely significant impact. Although these Caltrans guidance thresholds are not regulations, they can serve as quantified standards in the absence of such limits at the local jurisdictional level.

2.3 Local

The following are summarized or reproduced portions of relevant County regulations and General Plan policies.

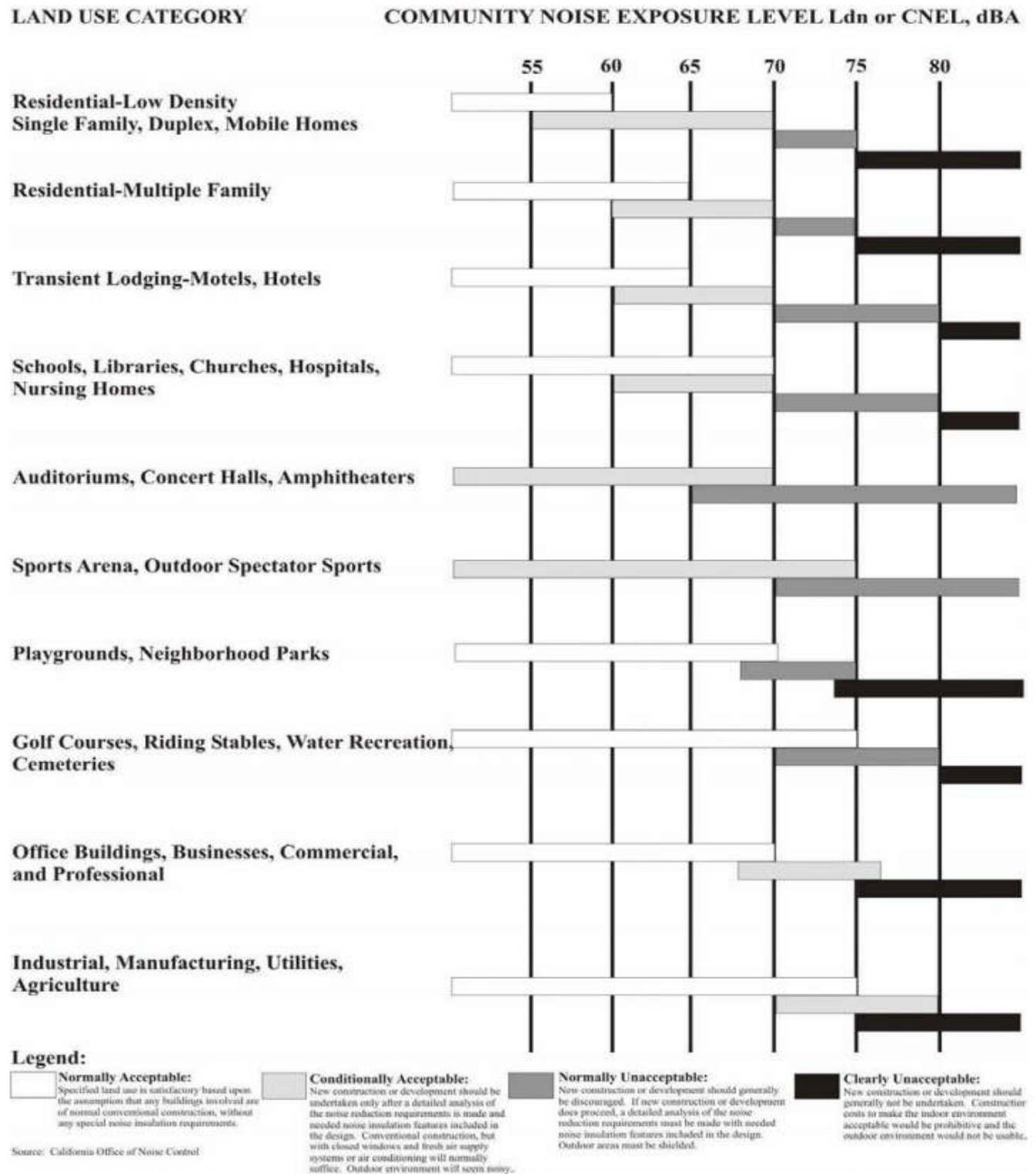
County of Riverside General Plan Noise Element

The County of Riverside has adopted a Noise Element of the General Plan to control and abate environmental noise, and to protect the citizens of the County of Riverside from excessive exposure to noise. The Noise Element identifies two separate types of noise sources: (1) transportation and (2) stationary and establishes guidelines for acceptable transportation and stationary community noise levels in the County of Riverside General Plan. (12)

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. For the purposes of this Project, the noise impacts associated with traffic are controlled by the General Plan Noise Element. 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 commercial uses, the Land Use Compatibility for Community Noise Exposure matrix sets guidelines per the predicted noise exposure level. Table 1 presents the General Plan Land Use Compatibility for Community Noise Exposure matrix. Per the noise compatibility matrix, an ambient noise level of up to 70 dBA CNEL is considered normally acceptable for the development of commercial uses.

Table 1: General Plan Land Use Compatibility for Community Noise Exposure Matrix



Policy N 4.1 of the 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 L_{eq} for daytime hours of 7:00 a.m. to 10:00 p.m., and 45 dBA L_{eq} 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 County of Riverside Office of Industrial Hygiene guidelines for noise studies within the County. Policy N 4.8 of the Noise Element requires that loading docks of commercial land uses minimize the potential noise impacts of vehicles on the site, as well on the adjacent land uses. (12) The County of Riverside operational noise standards used in this analysis are shown in Table 2.

TABLE 2: OPERATIONAL NOISE STANDARDS

Jurisdiction	Land Use	Time Period	Exterior Noise Level Standards (dBA L_{eq}) ²
County of Riverside ¹	Residential	Daytime (7:00 a.m. - 10:00 p.m.)	65
		Nighttime (10:00 p.m. - 7:00 a.m.)	45

¹ Source: County of Riverside General Plan Noise Element, Table N-2.

² L_{eq} represents a steady-state sound level containing the same total energy as a time-varying signal over a given sample period.

County of Riverside Code of Ordinances (Municipal Code)

Construction Noise Standards

To control noise impacts associated with the construction of the Proposed Project, the County has established limits on hours of operation. Section 9.52.020 (Noise Regulation) of the County's Code of Ordinances indicates that noise associated with any private construction activity located within one-quarter of a mile from an inhabited dwelling is considered exempt between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May.

Neither the County's General Plan nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*.

3. Existing Conditions

SPL measurements were conducted near the Proposed Project site on July 28, 2020, to quantify and characterize the existing outdoor ambient sound levels. Table 3 provides the location, date, and time period at which these baseline noise level measurements were performed by an attending Dudek field investigator using a Rion-branded Model NL-52 sound level meter (SLM) equipped with a 0.5-inch, pre-polarized condenser microphone with pre-amplifier. The SLM meets the current American National Standards Institute standard for a Type 1 (Precision Grade) sound level meter. The accuracy of the SLM was verified using a field calibrator before and after the measurements, and the measurements were conducted with the microphone positioned approximately 5 feet above the ground.

Four (4) short-term (ST) noise level measurement locations (ST1–ST4) that represent existing noise-sensitive receivers were selected near the Proposed Project site. These locations are depicted as receivers ST1–ST4 on Figure 3, Noise Measurement Locations. The measured L_{eq} and L_{max} noise levels are provided in Table 3. The primary noise sources at the sites identified in Table 3 consisted of traffic along adjacent roadways, the sounds of leaves rustling, and birdsong. As shown in Table 3, the measured SPL ranged from approximately 62.4 dBA L_{eq} at ST1 to 68.7 dBA L_{eq} at ST2. Beyond the summarized information presented in Table 3, detailed noise measurement data is included in Attachment A, Baseline Noise Measurement Field Data.

Table 3. Measured Baseline Outdoor Ambient Noise Levels

Site	Location/Address	Date/Time	L_{eq}	L_{max}
ST1	East of 33555 Old State Hwy Hemet, CA 92545	2020-07-28, 09:40 AM to 09:50 AM	62.4	72.6
ST2	North of Hwy 74, adjacent to Proposed Project	2020-07-28, 10:15 AM to 10:25 AM	68.7	83.7
ST3	North of 25080 Winchester Rd, Hemet, CA 92545	2020-07-28, 09:20 AM to 09:30 AM	65.7	80
ST4	East of 33661 Old State Hwy, Hemet, CA 92545	2020-07-28, 10:00 AM to 10:10 AM	67	94.8

Source: Attachment A.

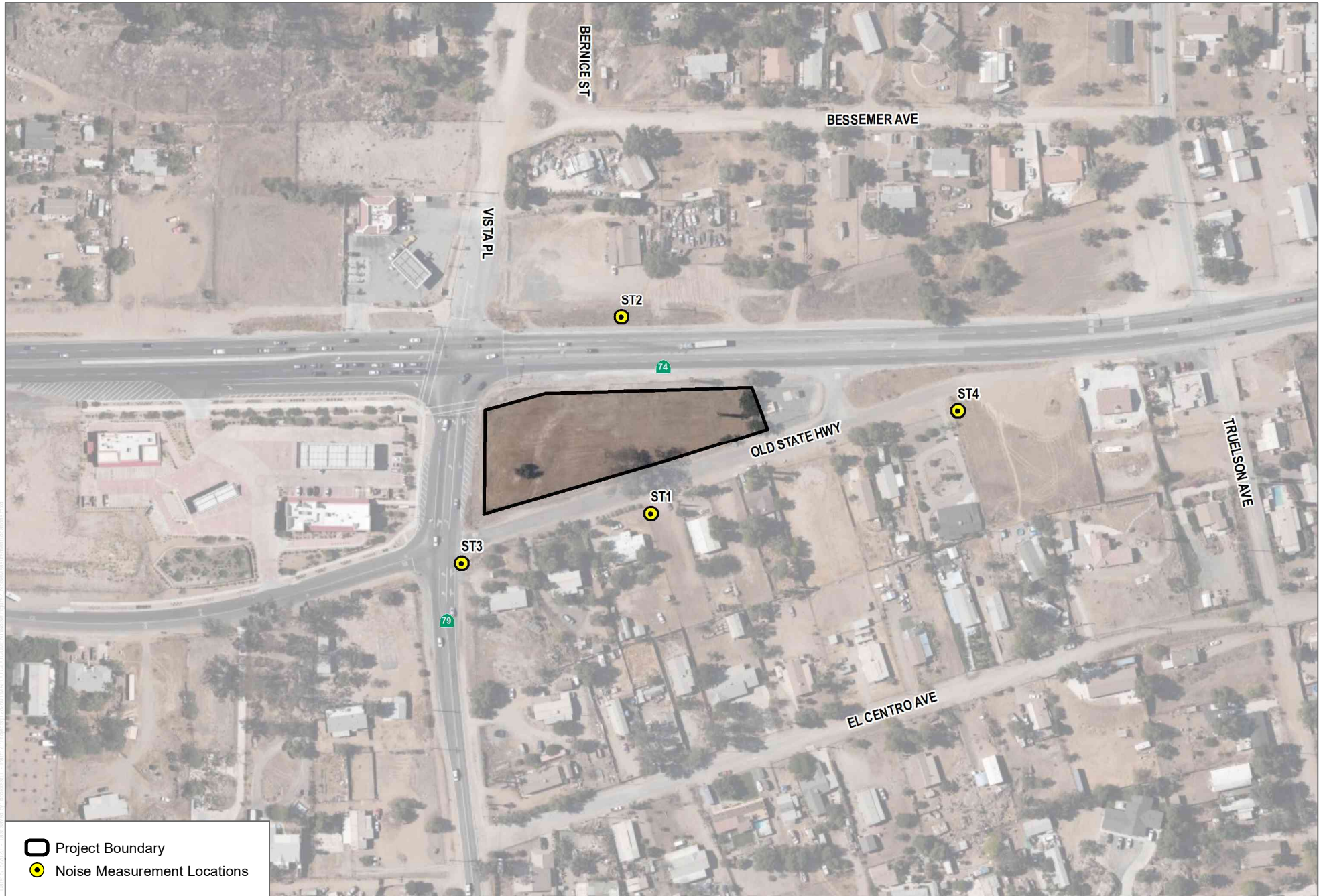
Notes: L_{eq} = equivalent continuous sound level (time-averaged sound level); L_{max} = maximum sound level during the measurement interval; dBA = A-weighted decibels; ST = short-term noise measurement locations.

Generally, the measured samples of daytime L_{eq} agree with expectations: ST2 is above 68 dBA due largely to its proximity to highway 74, a major roadway; ST1 is near a less-trafficked Old State Highway. The primary noise sources at the sites identified in Table 3 consisted of traffic along adjacent roadways, the sounds of leaves rustling, dogs barking, and birdsong.

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SOURCE: Bing 2020, Riverside County (Accessed 2020)

FIGURE 2

Noise Measurement Locations

Hemet Retail Project

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4. Thresholds of Significance

County of Riverside Significance Determination Thresholds

The following significance criteria are based on Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.) and will be used to determine the significance of potential noise impacts. Such potential noise and vibration impacts to the community would be considered significant if the Proposed Project would result in the following:

- a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- b. Generation of excessive groundborne vibration or groundborne noise levels; and,
- c. Expose people residing or working in the project area to excessive noise levels (for a project located within the vicinity of a private airstrip or an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport).

In light of these above significance criteria, this analysis uses the following standards to evaluate potential noise and vibration impacts.

- Construction noise – The County regulates construction noise by restricting the allowable hours of construction. Section 9.52.020 of the County's Noise Regulation ordinance, indicates that noise associated with any private construction activity located within one-quarter of a mile from an inhabited dwelling is considered exempt between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May. Through adherence to the limitation of allowable construction times provided in the Riverside County Municipal Code, the construction-related noise levels would not exceed any standards. However, the apparent proximity of existing residential receptors to the west of the Proposed Project site suggests that source-to-receiver distances could be as short as 15 feet. Additionally, most construction equipment and vehicles on a project site do not operate continuously. Therefore, consistent with the FTA guidance mentioned in Section 2, Regulatory Setting, this analysis will use 80 dBA L_{eq} over an 8-hour period as the construction noise impact criterion during daytime hours 7:00 a.m. and 10:00 p.m. Monday through Friday, and 8:00 a.m. to 10:00 p.m., Saturday and Sunday.
- Off-site project-attributed transportation noise – For purposes for this analysis, a direct roadway noise impact would be considered significant if increases in roadway traffic noise levels attributed to the Proposed Project were greater than 3 dBA CNEL at an existing noise-sensitive land use.

- Off-site project-attributed stationary noise – For purposes for this analysis, a noise impact would be considered significant if noise from typical operation of heating, ventilation, and air conditioning and other mechanical systems associated with the Proposed Project exceeded 65 dBA hourly L_{eq} at the property line from 7:00 a.m. to 9:59 p.m., and 45 dBA hourly L_{eq} from 10:00 p.m. to 6:59 a.m.
- Construction vibration – Guidance from Caltrans indicates that a vibration velocity level of 0.2 ips PPV received at a structure would be considered annoying by occupants within (Caltrans 2013b). As for the receiving structure itself, aforementioned Caltrans guidance from Section 3 recommends that a vibration level of 0.3 ips PPV would represent the threshold for building damage risk.

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5 Impact Discussion

- a) *Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

Short-Term Construction

Construction noise and vibration are temporary phenomena. Construction noise and vibration levels vary from hour to hour and day to day, depending on the equipment in use, the operations performed, and the distance between the source and receptor.

Equipment that would be in use during construction would include, in part, graders, backhoes, rubber-tired dozers, cranes, forklifts, cement mixers, pavers, rollers, and air compressors. The typical maximum noise levels for various pieces of construction equipment at a distance of 50 feet are presented in Table 4. Note that the equipment noise levels presented in Table 4 are maximum noise levels. Usually, construction equipment operates in alternating cycles of full power and low power, producing average noise levels over time that are less than the maximum noise level. The average sound level of construction activity also depends on the amount of time that the equipment operates and the intensity of construction activities during that time.

Table 4. Typical Construction Equipment Maximum Noise Levels

Equipment Type	Typical Equipment (L_{max} , dBA at 50 Feet)
Air compressor	78
Backhoe	78
Concrete pump truck	81
Grader	85
Crane	81
Dump Truck	76
Dozer	82
Paver	77
Roller	80

Source: DOT 2006.

Note: L_{max} = maximum sound level; dBA = A-weighted decibels.

Aggregate noise emission from Proposed Project construction activities, broken down by sequential phase, was predicted at two distances to the nearest existing noise-sensitive receptor: 1) from the nearest position of the construction site boundary and 2) from the geographic center of the construction site, which serves as the time-averaged location or geographic *acoustical centroid* of active construction equipment for the phase under study. The intent of the former distance is to help evaluate anticipated construction noise from a limited quantity of equipment or vehicle activity expected to be at the boundary for some period of time, which would be most appropriate for phases such as site preparation, grading, and paving. The latter distance is used in a manner similar to the general assessment technique as described in the FTA guidance for construction noise assessment, when the location of individual equipment for a given construction phase is uncertain over some extent of (or the entirety

of) the construction site area. Because of this uncertainty, all the equipment for a construction phase is assumed to operate—on average—from the acoustical centroid. Table 5 summarizes these two distances to the apparent closest noise-sensitive receptor for each of the seven sequential construction phases. At the site boundary, this analysis assumes that up to only one piece of equipment of each listed type per phase will be involved in the construction activity for a limited portion of the 8-hour period. In other words, at such proximity, the operating equipment cannot “stack” or crowd the vicinity and still operate. For the acoustical centroid case, which intends to be a geographic average position for all equipment during the indicated phase, this analysis assumes that the equipment may be operating up to all 8 hours per day.

Table 5. Estimated Distances between Construction Activities and the Nearest Noise-sensitive Receptors

Construction Phase (and Equipment Types Involved)	Distance from Nearest Noise-Sensitive Receptor to Construction Site Boundary (Feet)	Distance from Nearest Noise-Sensitive Receptor to Acoustical Centroid of Site (Feet)
Grading (grader, dozer, excavator, backhoe)	60	170
Building construction (crane, man-lift, welder)	130	170
Paving (paver, roller, backhoe, concrete mixer truck)	90	170
Architectural Coating (compressor)	130	170

A Microsoft Excel-based noise prediction model emulating and using reference data from the Federal Highway Administration Roadway Construction Noise Model (RCNM) (FHWA 2008) was used to estimate construction noise levels at the nearest occupied noise-sensitive land use. (Although the RCNM was funded and promulgated by the Federal Highway Administration, it is often used for non-roadway projects, because the same types of construction equipment used for roadway projects are often used for other types of construction.) Input variables for the predictive modeling consist of the equipment type and number of each (e.g., two graders, a loader, a tractor), the duty cycle for each piece of equipment (e.g., percentage of time within a specific time period, such as an hour, when the equipment is expected to operate at full power or capacity and thus make noise at a level comparable to what is presented in Table 4), and the distance from the noise-sensitive receiver. The predictive model also considers how many hours that equipment may be on site and operating (or idling) within an established work shift. Conservatively, no topographical or structural shielding was assumed in the modeling. The RCNM has default duty-cycle values for the various pieces of equipment, which were derived from an extensive study of typical construction activity patterns. Those default duty-cycle values were used for this noise analysis, which is detailed in Attachment B, Construction Noise Modeling Input and Output, and produce the predicted results displayed in Table 6.

Table 6. Predicted Construction Noise Levels per Activity Phase

Construction Phase (and Equipment Types Involved)	8-Hour L_{eq} at Nearest Noise-Sensitive Receptor to Construction Site Boundary (dBA)	8-Hour L_{eq} at Nearest Noise-Sensitive Receptor to Acoustical Centroid of Site (dBA)
Grading (grader, dozer, excavator, backhoe)	79	73
Building construction (crane, man-lift, welder)	69	67
Paving (paver, roller, backhoe, concrete mixer truck)	79	70
Architectural Coating (compressor)	66	63

Source: Attachment B

Notes: L_{eq} = equivalent noise level; dBA = A-weighted decibels.

As presented in Table 6, the estimated construction noise levels are predicted to be 80 dBA L_{eq} or less over an 8-hour period (what the FTA recommends as a daytime threshold for construction noise exposure over an 8-hour period at a residential receptor) at the nearest existing residences (as close as 60 feet away) when grading activities take place near the southern Project boundaries. Note that these estimated noise levels at a source-to-receiver distance of 60 feet would only occur when noted pieces of heavy equipment would each operate for a cumulative period from up to 5 hours a day. By way of example, a grader might make multiple passes on site that are this close to a receiver; but, for the remaining time during the day, the grader is sufficiently farther away, performing work at a more distant location, or simply not operating. Under these conditions, predicted operation of construction equipment and processes do not exceed noise levels of 80 dBA L_{eq} and would therefore result in a **less-than-significant impact**.

Although nearby off-site residences would be exposed to elevated construction noise levels, the increase to existing outdoor noise levels would typically be relatively short term. It is anticipated that construction activities associated with the Proposed Project would take place within the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May.

In summary, daytime construction noise would not exceed the aforementioned FTA guidance-based standard. Thus, temporary construction-related noise impacts would be considered **less than significant**.

Long-Term Operational

Roadway Traffic Noise

The Proposed Project would result in the creation of additional vehicle trips on local roadways (i.e., Old State Highway, SR-74 and SR-79), which could result in increased traffic noise levels at adjacent noise-sensitive land uses. Attachment C, Traffic Noise Modeling Input and Output, contains a spreadsheet with traffic volume data (average daily traffic) converted to peak hour traffic for Old State Highway and surrounding arterial roadways. These peak hour volumes were calculated by taking 10% of the average daily traffic and using a vehicle distribution of 97% autos, 2% medium trucks, and 1% heavy trucks. Consistent with the example in the Caltrans Technical Noise Supplement ("TeNS") that is considered "fairly typical," peak hour volume is assumed to be 10% of Average Daily Traffic (ADT) (Caltrans 2013a). In particular, the Proposed Project would create additional traffic along Old State

Highway, which according to the Traffic Impact Assessment prepared for the pProposed Project (Rick Engineering 2018) would add 2,037 average daily trips to the adjacent roadways surrounding the Project site. ADT volumes are summarized on Table 7, Roadway Segment ADT Volumes.

Table 7. Roadway Segment ADT Volumes

Roadway Segment	Existing	Existing plus Ambient	Existing plus Ambient plus Project	Existing plus Ambient plus Cumulative	Existing plus Ambient plus Cumulative plus Project
	ADT ¹	ADT ¹	ADT ¹	ADT ¹	ADT ¹
SR-74, West of Winchester Road/SR-79	27,488	28,038	28,547	41,190	41,699
SR-74, Winchester Road/SR-79 to Old State Highway	34,367	35,054	35,268	51,454	51,668
Winchester Road/SR-79, Old State Highway to SR-74	11,852	12,089	12,395	26,632	26,938
Old State Highway, Winchester Road/SR-79 to SR-74	827	844	1,506	844	1,506

Source: Rick Engineering 2018.

Notes:

¹ ADT – Average Daily Traffic

Potential noise effects from vehicular traffic were assessed using the Federal Highway Administration's Traffic Noise Model version 2.5 (FHWA 2004). Information used in the model included the roadway geometry, posted traffic speeds, and traffic volumes for the above roadway segments with the following scenarios: existing (year 2019), existing plus ambient, existing plus ambient plus Project, existing plus ambient plus cumulative, and existing plus ambient plus cumulative plus Project. Noise levels were modeled at representative noise-sensitive receivers ST1 through ST4, as shown in Figure 3. Demonstrating validity of the TNM model, predicted traffic noise levels for the existing (2018) without Proposed Project case shown in Table 7 compare well (i.e., within an average difference of 3 dBA) with the measured L_{eq} magnitudes of ST2 and ST3, which were used to calibrate traffic.

Hence, on the basis of the TNM model accuracy for the existing (2018) without project case, future traffic noise levels can be predicted with confidence.

The County's Noise Element establishes a policy for exterior sensitive areas to be protected from high noise levels. The Noise Element sets 65 dBA CNEL for the outdoor areas and 45 dBA CNEL for interior areas as the normally acceptable levels. However, existing levels from traffic already exceed this threshold. For the purposes of this noise analysis, such impacts are considered significant when they cause an increase of 3 dB from existing noise levels. An increase or decrease in noise level of at least 3 dB is required before any noticeable change in community response would be expected (Caltrans 2013a). The receivers were modeled to be 5 feet above the local ground elevation. The noise model results are summarized in Table 8.

Table 8. Roadway Traffic Noise Modeling Results

Modeled Receiver Tag (Location Description)	Existing (2018) Noise Level (dBA CNEL)	Existing (2018) Plus Ambient Noise Level (dBA CNEL)	Existing (2018) Plus Ambient plus Project Noise Level (dBA CNEL)	Existing (2018) Plus Ambient plus Cumulative Noise Level (dBA CNEL)	Existing (2018) Plus Ambient plus Cumulative plus Project Noise Level (dBA CNEL)	Maximum Project-Related Noise Level Increase (dB)
ST1	63.4	63.5	62.4	65.3	64.2	0.0
ST2	69.9	70	70.1	71.7	71.8	0.2
ST3	68.2	68.4	68.2	71.5	71.4	0.0
ST4	70.9	71	71	72.6	72.7	0.2

Source: Attachment C

Notes: dBA = A-weighted decibel; CNEL = Community Noise Equivalent Level; dB = decibel.

Table 8 shows that at all four listed representative receivers, the addition of Proposed Project traffic to the roadway network would result in a CNEL increase of less than 3 dB, which is below the discernible level of change for the average healthy human ear. At some modeled locations, expected traffic noise levels are predicted to decrease due to introduction of the proposed new buildings as sound path occlusion between them and the roadway noise source. Thus, a **less-than-significant impact** is expected for Proposed Project-related off-site traffic noise increases affecting existing residences in the vicinity.

Stationary Operations Noise

The incorporation of new facilities attributed to development of the Proposed Project will add a variety of noise-producing mechanical equipment that include those presented and discussed in the following paragraphs. Most of these noise-producing equipment or sound sources would be considered stationary, or limited in mobility to a defined area. Using a Microsoft Excel-based outdoor sound propagation prediction model that features International Organization of Standardization (ISO) 9613-2 algorithms and reference data, project-attributed operational noise at nearby community receptors was predicted using several assumptions:

- The 2,097 square foot retail store and a 2,425 square foot drive-thru fast food restaurant would both likely feature a packaged air-conditioner on its roof, which we could assume would be something like a 5-ton (refrigeration) air-cooled condensing unit resembling a Carrier CA16NA 060 and thus having a reference sound power level of 78 dBA (or 76 dBA if equipped with a “sound shield” [Carrier 2012]). These two rooftop HVAC units would also operate during some or all nighttime hours.
- Four (4) idling vehicles in line for the fast food restaurant drive thru window. Conservatively, a pick-up truck is considered idling with $L_{eq} = 79$ dBA at 3 feet
- Point-source sound propagation (i.e., 6 dB per doubling of distance) that conservatively ignores acoustical absorption from atmospheric and ground surface effects; and,
- Conservative treatment of potential noise path occlusion due to intervening building locations having no effect on emitted sound levels. Hence, should the Proposed Project design develop further and position these condenser units at-grade level; the predictive analysis would still be considered accurate.

The closest existing noise-sensitive residential receptor to the south of the Proposed Project’s buildings would be as close as approximately 135 horizontal feet to what would be an arrangement of up to 2 HVAC units and 4 idling vehicles. However, due to the higher relative elevation of the sources on the roof and sound occlusion from the distance of the units to the edge of the building, and their horizontal distances away from the noise sensitive receivers as modeled, the predicted sound emission level from the combination of these units would be no more than 45 dBA L_{eq} , and would thus be compliant with the County’s daytime threshold of 65 dBA hourly L_{eq} and nighttime threshold of 45 dBA hourly L_{eq} . Please see Attachment D, Operational Noise Modeling Input and Output, for a graphical display of the predicted aggregate noise level from these units, superimposed on an aerial image of the expected layout of the HVAC equipment and Proposed Project buildings and the proximate neighboring residence to the south. Under such conditions, the operation of residential air-conditioning units would result in **less-than-significant** noise impacts.

b) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Conventional Construction Activity Vibration

Construction activities may expose persons to excessive groundborne vibration or groundborne noise, causing a potentially significant impact. Caltrans has collected groundborne vibration information related to construction activities (Caltrans 2013b). Information from Caltrans indicates that continuous vibrations with a PPV of approximately 0.2 ips is considered annoying. For context, heavier pieces of construction equipment, such as a bulldozer that may be expected on the Project site, have peak particle velocities of approximately 0.089 ips or less at a reference distance of 25 feet (DOT 2006).

Groundborne vibration attenuates rapidly, even over short distances. The attenuation of groundborne vibration as it propagates from source to receptor through intervening soils and rock strata can be estimated with expressions found in FTA and Caltrans guidance. By way of example, for a bulldozer operating on site and as close as the southern Project boundary (i.e., 60 feet from the nearest receiving sensitive land use) the estimated vibration velocity level would be 0.024 ips per the equation as follows (FTA 2006):

$$PPV_{rcvr} = PPV_{ref} * (25/D)^{1.5} = 0.023 = 0.089 * (25/60)^{1.5};$$

where PPV_{rcvr} is the predicted vibration velocity at the receiver position, PPV_{ref} is the reference value at 25 feet from the vibration source (the bulldozer), and D is the actual horizontal distance to the receiver. Therefore, at this predicted PPV, the impact of vibration-induced annoyance to occupants of nearby existing homes would be **less than significant**.

Construction vibration, at sufficiently high levels, can also present a building damage risk. However, the predicted 0.023 ips PPV at the nearest residential receiver 60 feet away from on-site operation of the bulldozer during grading would not surpass the guidance limit of 0.3 to 0.5 ips PPV for preventing damage to residential structures (Caltrans 2013b). Because the predicted vibration level at 60 feet is less than both the annoyance and building damage risk thresholds, vibration from project conventional construction activities is considered less than significant.

Once operational, the Proposed Project would not be expected to feature major on-site producers of groundborne vibration. Anticipated mechanical systems like pumps are designed and manufactured to feature rotating components (e.g., impellers) that are well-balanced with isolated vibration within or external to the equipment casings. On this basis, potential vibration impacts due to Proposed Project operation would be **less than significant**.

- c) *For a project located within the vicinity of a private airstrip or 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, would the project expose people residing or working in the project area to excessive noise levels?*

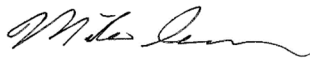
There are no private airstrips within the vicinity of the Project site. The closest airport to the Project site is the Ryan Field Airport approximately 3.0 miles southeast of the site. The Project site is not located within an airport land use plan's Airport Influence Area (Riverside County 2004). Impacts from aviation overflight noise exposure would be considered **less than significant**.

5 Conclusions

This noise memo was conducted to predictively quantify construction and operation noise and vibration attributed to the Proposed Project. The results indicate that potential noise and groundborne vibration impacts during construction activities would be less than significant. Additionally, noise levels from operation of the Proposed Project are not in excess of County standards at the Project boundary with its neighbors.

We trust that this technical memorandum meets your Project needs with the County. Should you have any questions or require additional information, please do not hesitate to contact Mike Greene at (949) 373-8317, mgreene@dudek.com; or, Connor Burke at (760) 479-4272, cburke@dudek.com.

Sincerely,



Mike Greene, INCE Bd. Cert.
Environmental Specialist / Acoustics



Connor Burke
Environmental Analyst

Att. A: Baseline Noise Measurement Field Data
 B: Construction Noise Modeling Input and Output
 C: Traffic Noise Model (v. 2.5) Input and Output Data
 D: Operational Noise Model Input and Output Data

6 References

- 14 CCR 15000–15387 and Appendices A–N. Guidelines for Implementation of the California Environmental Quality Act, as amended.
- Caltrans (California Department of Transportation). 2013a. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. September 2013.
- Caltrans. 2013b. *Transportation and Construction Vibration Guidance Manual*. Division of Environmental Analysis, Environmental Engineering, Hazardous Waste, Air, Noise, Paleontology Office. Sacramento, California. September 2013.
- Carrier Corporation. 2012. CA16NA 018-61 Single-Stage Air Conditioner with Puron Refrigerant – Product Data. Catalog No. CA16NA-06PD. September.
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- DOT (U.S. Department of Transportation). 2006. *FHWA Roadway Construction Noise Model: User's Guide*. Final Report. FHWA-HEP-06-015. DOT-VNTSC-FHWA-06-02. Cambridge, Massachusetts: DOT, Research and Innovative Technology Administration. August 2006.
- Federal Highway Administration (FHWA). 2008. Roadway Construction Noise Model (RCNM). Accessed May 2017 at: https://www.fhwa.dot.gov/Environment/noise/construction_noise/rcnm/.
- Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. Accessed May 2017 at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf
- Rick Engineering. 2018. *Highway 74/79 (Hemet Retail Development) Traffic Impact Analysis*. July 23, 2018.

Memorandum

Subject: Noise Analysis for the Hemet Retail Development Project



Attachment A

Baseline Noise Measurement Field Data

Field Noise Measurement Data

Record: 1291

Project Name	Hemet Retail
Observer(s)	Connor Burke
Date	2020-07-28

Meteorological Conditions

Temp (F)	82
Humidity % (R.H.)	36
Wind	Light
Wind Speed (MPH)	3
Wind Direction	South
Sky	Sunny

Instrument and Calibrator Information

Instrument Name List	(ENC) Rion NL-52
Instrument Name	(ENC) Rion NL-52
Instrument Name Lookup Key	(ENC) Rion NL-52
Manufacturer	Rion
Model	NL-52
Serial Number	553896
Calibrator Name	(ENC) LD CAL150
Calibrator Name	(ENC) LD CAL150
Calibrator Name Lookup Key	(ENC) LD CAL150
Calibrator Manufacturer	Larson Davis
Calibrator Model	LD CAL150
Calibrator Serial #	5152
Pre-Test (dBA SPL)	94
Post-Test (dBA SPL)	94
Windscreen	Yes
Weighting?	A-WTD
Slow/Fast?	Slow
ANSI?	Yes

Monitoring

Record #	1
Site ID	ST3
Site Location Lat/Long	33.738271, -117.076328
Begin (Time)	09:20:00
End (Time)	09:30:00
Leq	65.7
Lmax	80
Lmin	45.5
Other Lx?	L90, L50, L10
L90	50.9
L50	60
L10	68.6
Other Lx (Specify Metric)	L
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Traffic
Other Noise Sources Additional Description	Rooster nearby
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

Source Info and Traffic Counts

Number of Lanes	2
Lane Width (feet)	10
Roadway Width (feet)	20
Roadway Width (m)	6.1
Distance to Roadway (feet)	30
Distance to Roadway (m)	9.2
Distance Measured to Centerline or Edge of Pavement?	Edge of Pavement
Estimated Vehicle Speed (MPH)	40

Traffic Counts

Vehicle Count Summary	A 102, MT 4, HT 0, B 0, MC 0
Select Method for Recording Count Duration	Enter Manually
Counting Both Directions?	Yes
Count Duration (minutes)	10
Vehicle Count Tally	
Select Method for Vehicle Counts	Enter Manually
Number of Vehicles - Autos	102
Number of Vehicles - Medium Trucks	4
Number of Vehicles - Heavy Trucks	0
Number of Vehicles - Buses	0
Number of Vehicles - Motorcycles	0

Description / Photos

Site Photos

Photo



Monitoring

Record #	2
Site ID	ST1
Site Location Lat/Long	33.738754, -117.074801
Begin (Time)	09:40:00
End (Time)	09:50:00
Leq	62.4
Lmax	72.6
Lmin	49.7
Other Lx?	L90, L50, L10
L90	52.2
L50	60.3
L10	65.9
Other Lx (Specify Metric)	L
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Dog Barking
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

Description / Photos

Site Photos

Photo



Monitoring

Record #	3
Site ID	ST4
Site Location Lat/Long	33.738923, -117.073915
Begin (Time)	10:00:00
End (Time)	10:10:00
Leq	67
Lmax	94.8
Lmin	41.8
Other Lx?	L90, L50, L10
L90	55.5
L50	64.8
L10	70.3
Other Lx (Specify Metric)	L
Primary Noise Source	Traffic
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

Source Info and Traffic Counts

Number of Lanes	4
Lane Width (feet)	10
Roadway Width (feet)	40
Roadway Width (m)	12.2
Distance to Roadway (feet)	75
Distance to Roadway (m)	22.9
Distance Measured to Centerline or Edge of Pavement?	Edge of Pavement
Estimated Vehicle Speed (MPH)	60

Traffic Counts

Vehicle Count Summary	A 250, MT 11, HT 7, B 0, MC 0
Select Method for Recording Count Duration	Enter Manually
Counting Both Directions?	Yes
Count Duration (minutes)	10
Vehicle Count Tally	
Select Method for Vehicle Counts	Enter Manually
Number of Vehicles - Autos	250
Number of Vehicles - Medium Trucks	11
Number of Vehicles - Heavy Trucks	7
Number of Vehicles - Buses	0
Number of Vehicles - Motorcycles	0

Description / Photos

Site Photos

Photo

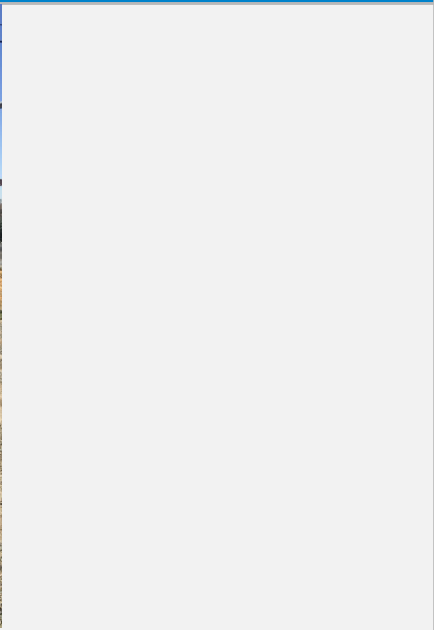


Monitoring	
Record #	4
Site ID	ST2
Site Location Lat/Long	33.739460, -117.076218
Begin (Time)	10:15:00
End (Time)	10:25:00
Leq	68.7
Lmax	83.7
Lmin	52.7
Other Lx?	L90, L50, L10
L90	57.2
L50	64.4
L10	70.1
Other Lx (Specify Metric)	L
Primary Noise Source	Traffic
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

Description / Photos

Site Photos

Photo





Attachment B

Construction Noise Modeling Input and Output

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase, per County = 80
allowable hours over which Leq is to be averaged (example: 8 for County of San Diego, FTA guidance) = 8

Construction Phase	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Grading	Grader	1	40	85		60	83.4	5	300	77
	Excavator	1	40	81		60	79.4	5	300	73
	Backhoe	1	40	78		60	76.4	5	300	70
	Total for Grading Phase:									79.4
Building Construction	Crane	1	16	81		130	72.7	8	480	65
	Man Lift	3	20	75		130	66.7	8	480	64
	Welder / Torch	2	40	73		130	64.7	8	480	64
	Total for Building Construction Phase:									69.1
Architectural Coating	Compressor (air)	1	40	78		130	69.7	8	480	66
Total for Architectural Coating Phase:										65.7
Paving	Concrete Mixer Truck	1	40	79		60	77.4	8	480	73
	Paver	1	50	77		60	75.4	8	480	72
	Roller	1	20	80		60	78.4	8	480	71
	Backhoe	1	40	78		60	76.4	8	480	72
	Total for Paving Phase:									78.5

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase, per County = 80

allowable hours over which Leq is to be averaged (example: 8 for County of San Diego, FTA guidance) = 8

Construction Phase	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Grading	Grader	1	40	85		170	74.4	8	480	70
	Excavator	2	40	81		170	70.4	8	480	69
	Backhoe	1	40	78		170	67.4	8	480	63
	Total for Grading Phase:									73.4
Building Construction	Crane	1	16	81		170	70.4	8	480	62
	Man Lift	3	20	75		170	64.4	8	480	62
	Welder / Torch	2	40	73		170	62.4	8	480	61
	Total for Building Construction Phase:									66.8
Architectural Coating	Compressor (air)	1	40	78		170	67.4	8	480	63
Total for Architectural Coating Phase:										63.4
Paving	Concrete Mixer Truck	1	40	79		170	68.4	8	480	64
	Paver	1	50	77		170	66.4	8	480	63
	Roller	1	20	80		170	69.4	8	480	62
	Backhoe	1	40	78		170	67.4	8	480	63
	Total for Paving Phase:									69.5

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Lesser of or available Lmax	Spec. 721 Lmax	Measured L _{max} @50ft (dBA, slow)
All Other Equipment > 5 HP	No	50	85	85	-- N/A --
Auger Drill Rig	No	20	84	85	84
Backhoe	No	40	78	80	78
Bar Bender	No	20	80	80	-- N/A --
Blasting	Yes	-- N/A --	94	94	-- N/A --
Boring Jack Power Unit	No	50	80	80	83
Chain Saw	No	20	84	85	84
Clam Shovel (dropping)	Yes	20	87	93	87
Compactor (ground)	No	20	80	80	83
Compressor (air)	No	40	78	80	78
Concrete Batch Plant	No	15	83	83	-- N/A --
Concrete Mixer Truck	No	40	79	85	79
Concrete Pump Truck	No	20	81	82	81
Concrete Saw	No	20	90	90	90
Crane	No	16	81	85	81
Dozer	No	40	82	85	82
Drill Rig Truck	No	20	79	84	79
Drum Mixer	No	50	80	80	80
Dump Truck	No	40	76	84	76
Excavator	No	40	81	85	81
Flat Bed Truck	No	40	74	84	74
Front End Loader	No	40	79	80	79
Generator	No	50	72	72	81
Generator (<25KVA, VMS signs)	No	50	70	70	73
Gradall	No	40	83	85	83
Grader	No	40	85	85	-- N/A --
Grapple (on backhoe)	No	40	85	85	87
Horizontal Boring Hydr. Jack	No	25	80	80	82
Hydra Break Ram	Yes	10	90	90	-- N/A --
Impact Pile Driver	Yes	20	95	95	101
Jackhammer	Yes	20	85	85	89
Man Lift	No	20	75	85	75
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	90
Pavement Scarafier	No	20	85	85	90
Paver	No	50	77	85	77
Pickup Truck	No	40	55	55	75
Pneumatic Tools	No	50	85	85	85
Pumps	No	50	77	77	81
Refrigerator Unit	No	100	73	82	73
Rivit Buster/chipping gun	Yes	20	79	85	79

Rock Drill	No	20	81	85	81
Roller	No	20	80	85	80
Sand Blasting (Single Nozzle)	No	20	85	85	96
Scraper	No	40	84	85	84
Shears (on backhoe)	No	40	85	85	96
Slurry Plant	No	100	78	78	78
Slurry Trenching Machine	No	50	80	82	80
Soil Mix Drill Rig	No	50	80	80	-- N/A --
Tractor	No	40	84	84	-- N/A --
Vacuum Excavator (Vac-truck)	No	40	85	85	85
Vacuum Street Sweeper	No	10	80	80	82
Ventilation Fan	No	100	79	85	79
Vibrating Hopper	No	50	85	85	87
Vibratory Concrete Mixer	No	20	80	80	80
Vibratory Pile Driver	No	20	95	95	101
Warning Horn	No	5	83	85	83
Welder / Torch	No	40	73	73	74



Attachment C

Traffic Noise Modeling (v.2.5) Input and Output

INPUT: ROADWAYS

<Project Name?>

Dudek					19 August 2020						
Hemet Retail Project					TNM 2.5						
INPUT: ROADWAYS					Average pavement type shall be used unless						
PROJECT/CONTRACT: Existing					a State highway agency substantiates the use						
RUN:					of a different type with the approval of FHWA						
Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control	Speed	Percent	Pvmt	On
							Device	Constraint	Vehicles	Type	Struct?
									Affected		
	ft			ft	ft	ft		mph	%		
Hwy 74 east	30.0	point1	1	1,616,806.6	12,248,081.0	0.00				Average	
		point2	2	1,616,959.6	12,248,088.0	0.00				Average	
		point3	3	1,617,202.5	12,248,092.0	0.00					
Hwy 74	30.0	point8	8	1,616,936.1	12,248,119.0	0.00				Average	
		point23	23	1,617,200.6	12,248,126.0	0.00					
Hwy 79	35.0	point10	10	1,617,187.8	12,248,070.0	0.00				Average	
		point11	11	1,617,186.6	12,248,037.0	0.00				Average	
		point12	12	1,617,175.6	12,247,923.0	0.00				Average	
		point13	13	1,617,165.4	12,247,715.0	0.00				Average	
		point14	14	1,617,171.4	12,247,560.0	0.00				Average	
		point15	15	1,617,196.0	12,247,367.0	0.00					
old st Hwy	35.0	point16	16	1,617,760.9	12,248,092.0	0.00				Average	
		point17	17	1,617,781.5	12,248,022.0	0.00				Average	
		point18	18	1,617,670.4	12,247,981.0	0.00				Average	
		point19	19	1,617,517.9	12,247,931.0	0.00				Average	
		point20	20	1,617,397.2	12,247,888.0	0.00				Average	
		point21	21	1,617,290.1	12,247,855.0	0.00				Average	
		point22	22	1,617,181.2	12,247,822.0	0.00					
Hwy 74-2	30.0	point27	27	1,617,200.6	12,248,126.0	0.00				Average	
		point24	24	1,617,531.6	12,248,134.0	0.00				Average	
		point25	25	1,617,829.4	12,248,141.0	0.00				Average	
		point9	9	1,618,127.1	12,248,148.0	0.00					
Hwy 74 east-2	30.0	point28	28	1,617,202.5	12,248,092.0	0.00				Average	
		point4	4	1,617,431.8	12,248,096.0	0.00				Average	
		point5	5	1,617,637.4	12,248,102.0	0.00				Average	

INPUT: ROADWAYS

<Project Name?>

		point6	6	1,617,881.4	12,248,109.0	0.00				Average	
		point7	7	1,618,135.0	12,248,119.0	0.00					

INPUT: TRAFFIC FOR LAeq1h Volumes

<Project Name?>

<Organization?>												
<Analysis By?>												
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:												
RUN:	Existing											
Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Hwy 74 east	point1	1	1333	50	27	50	13	50	0	0	0	0
	point2	2	1333	50	27	50	13	50	0	0	0	0
	point3	3										
Hwy 74	point8	8	1333	50	27	50	13	50	0	0	0	0
	point23	23										
Hwy 79	point10	10	1149	45	23	45	11	45	0	0	0	0
	point11	11	1149	45	23	45	11	45	0	0	0	0
	point12	12	1149	45	23	45	11	45	0	0	0	0
	point13	13	1149	45	23	45	11	45	0	0	0	0
	point14	14	1149	45	23	45	11	45	0	0	0	0
	point15	15										
old st Hwy	point16	16	80	20	1	20	0	0	0	0	0	0
	point17	17	80	20	1	20	0	0	0	0	0	0
	point18	18	80	20	1	20	0	0	0	0	0	0
	point19	19	80	20	1	20	0	0	0	0	0	0
	point20	20	80	20	1	20	0	0	0	0	0	0
	point21	21	80	20	1	20	0	0	0	0	0	0
	point22	22										
Hwy 74-2	point27	27	1666	50	34	50	17	50	0	0	0	0
	point24	24	1666	50	34	50	17	50	0	0	0	0
	point25	25	1666	50	34	50	17	50	0	0	0	0
	point9	9										
Hwy 74 east-2	point28	28	1666	50	34	50	17	50	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

		<Project Name?>										
	point4	4	1666	50	34	50	17	50	0	0	0	0
	point5	5	1666	50	34	50	17	50	0	0	0	0
	point6	6	1666	50	34	50	17	50	0	0	0	0
	point7	7										

INPUT: RECEIVERS

<Project Name?>

<Organization?>											
<Analysis By?>											
19 August 2020											
TNM 2.5											
INPUT: RECEIVERS											
PROJECT/CONTRACT:	Existing										
RUN:											
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	L _{Aeq} 1h	L _{Aeq} 1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,617,477.2	12,247,876.0	0.00	4.92	62.40	66	10.0	8.0	Y
ST2	2	1	1,617,247.5	12,248,217.0	0.00	4.92	68.70	66	10.0	8.0	Y
ST3	4	1	1,617,224.4	12,247,807.0	0.00	4.92	65.70	66	10.0	8.0	Y
ST4	6	1	1,617,946.6	12,248,039.0	0.00	4.92	67.00	66	10.0	8.0	Y

RESULTS: SOUND LEVELS

<Project Name?>

<Organization?>													
<Analysis By?>													
19 August 2020 TNM 2.5 Calculated with TNM 2.5													
RESULTS: SOUND LEVELS PROJECT/CONTRACT: RUN: Existing BARRIER DESIGN:													
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.													
ATMOSPHERICS: 68 deg F, 50% RH													
Receiver													
Name	No.	#DUs	Existing	No Barrier					With Barrier				
			LAeq1h	LAeq1h	Increase over existing		Type	Calculated	Noise Reduction				
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated	
							Sub'l Inc					minus	
												Goal	
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	dB
ST1	1	1	62.4	63.4	66	1.0	10	----	63.4	0.0	8	-8.0	
ST2	2	1	68.7	69.9	66	1.2	10	Snd Lvl	69.9	0.0	8	-8.0	
ST3	4	1	65.7	68.2	66	2.5	10	Snd Lvl	68.2	0.0	8	-8.0	
ST4	6	1	67.0	70.9	66	3.9	10	Snd Lvl	70.9	0.0	8	-8.0	
Dwelling Units		# DUs	Noise Reduction										
			Min	Avg	Max								
			dB	dB	dB								
All Selected		4	0.0	0.0	0.0								
All Impacted		3	0.0	0.0	0.0								
All that meet NR Goal		0	0.0	0.0	0.0								

INPUT: ROADWAYS

<Project Name?>

<Organization?>				19 August 2020							
<Analysis By?>				TNM 2.5							
INPUT: ROADWAYS											
PROJECT/CONTRACT:		Existing + Ambient								Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA	
RUN:											
Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Hwy 74 east	30.0	point1	1	1,616,806.6	12,248,081.0	0.00				Average	
		point2	2	1,616,959.6	12,248,088.0	0.00				Average	
		point3	3	1,617,202.5	12,248,092.0	0.00					
Hwy 74	30.0	point8	8	1,616,936.1	12,248,119.0	0.00				Average	
		point23	23	1,617,200.6	12,248,126.0	0.00					
Hwy 79	35.0	point10	10	1,617,187.8	12,248,070.0	0.00				Average	
		point11	11	1,617,186.6	12,248,037.0	0.00				Average	
		point12	12	1,617,175.6	12,247,923.0	0.00				Average	
		point13	13	1,617,165.4	12,247,715.0	0.00				Average	
		point14	14	1,617,171.4	12,247,560.0	0.00				Average	
		point15	15	1,617,196.0	12,247,367.0	0.00					
old st Hwy	35.0	point16	16	1,617,760.9	12,248,092.0	0.00				Average	
		point17	17	1,617,781.5	12,248,022.0	0.00				Average	
		point18	18	1,617,670.4	12,247,981.0	0.00				Average	
		point19	19	1,617,517.9	12,247,931.0	0.00				Average	
		point20	20	1,617,397.2	12,247,888.0	0.00				Average	
		point21	21	1,617,290.1	12,247,855.0	0.00				Average	
		point22	22	1,617,181.2	12,247,822.0	0.00					
Hwy 74-2	30.0	point27	27	1,617,200.6	12,248,126.0	0.00				Average	
		point24	24	1,617,531.6	12,248,134.0	0.00				Average	
		point25	25	1,617,829.4	12,248,141.0	0.00				Average	
		point9	9	1,618,127.1	12,248,148.0	0.00					
Hwy 74 east-2	30.0	point28	28	1,617,202.5	12,248,092.0	0.00				Average	
		point4	4	1,617,431.8	12,248,096.0	0.00				Average	
		point5	5	1,617,637.4	12,248,102.0	0.00				Average	

INPUT: ROADWAYS

<Project Name?>

		point6	6	1,617,881.4	12,248,109.0	0.00				Average	
		point7	7	1,618,135.0	12,248,119.0	0.00					

INPUT: TRAFFIC FOR LAeq1h Volumes

<Project Name?>

<Organization?>												
<Analysis By?>												
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	Existing + Ambient											
RUN:												
Roadway	Points											
Name	Name	No.	Segment		MTrucks		HTrucks		Buses		Motorcycles	
			Autos									
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Hwy 74 east	point1	1	1359	50	28	50	14	50	0	0	0	0
	point2	2	1359	50	28	50	14	50	0	0	0	0
	point3	3										
Hwy 74	point8	8	1359	50	28	50	14	50	0	0	0	0
	point23	23										
Hwy 79	point10	10	1172	45	24	45	12	45	0	0	0	0
	point11	11	1172	45	24	45	12	45	0	0	0	0
	point12	12	1172	45	24	45	12	45	0	0	0	0
	point13	13	1172	45	24	45	12	45	0	0	0	0
	point14	14	1172	45	24	45	12	45	0	0	0	0
	point15	15										
old st Hwy	point16	16	81	20	1	20	0	0	0	0	0	0
	point17	17	81	20	1	20	0	0	0	0	0	0
	point18	18	81	20	1	20	0	0	0	0	0	0
	point19	19	81	20	1	20	0	0	0	0	0	0
	point20	20	81	20	1	20	0	0	0	0	0	0
	point21	21	81	20	1	20	0	0	0	0	0	0
	point22	22										
Hwy 74-2	point27	27	1700	50	35	50	17	50	0	0	0	0
	point24	24	1700	50	35	50	17	50	0	0	0	0
	point25	25	1700	50	35	50	17	50	0	0	0	0
	point9	9										
Hwy 74 east-2	point28	28	1700	50	35	50	17	50	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

<Project Name?>											
	point4	4	1700	50	35	50	17	50	0	0	0
	point5	5	1700	50	35	50	17	50	0	0	0
	point6	6	1700	50	35	50	17	50	0	0	0
	point7	7									

INPUT: RECEIVERS

<Project Name?>

<Organization?>											
<Analysis By?>											
19 August 2020											
TNM 2.5											
INPUT: RECEIVERS											
PROJECT/CONTRACT:											
RUN:											
Existing + Ambient											
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	L _{Aeq} 1h	L _{Aeq} 1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,617,477.2	12,247,876.0	0.00	4.92	62.40	66	10.0	8.0	Y
ST2	2	1	1,617,247.5	12,248,217.0	0.00	4.92	68.70	66	10.0	8.0	Y
ST3	4	1	1,617,224.4	12,247,807.0	0.00	4.92	65.70	66	10.0	8.0	Y
ST4	6	1	1,617,946.6	12,248,039.0	0.00	4.92	67.00	66	10.0	8.0	Y

RESULTS: SOUND LEVELS

<Project Name?>

<Organization?>													
<Analysis By?>													
RESULTS: SOUND LEVELS													
PROJECT/CONTRACT:													
RUN:													
BARRIER DESIGN:													
ATMOSPHERICS:													
Receiver													
Name	No.	#DUs	Existing	No Barrier						With Barrier			
			LAeq1h	LAeq1h			Increase over existing	Type		Calculated	Noise Reduction		
				Calculated	Crit'n		Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
								Sub'l Inc					minus
													Goal
			dBA	dBA	dBA	dB	dB			dBA	dB	dB	dB
ST1	1	1	62.4	63.5	66	1.1	10	----		63.5	0.0	8	-8.0
ST2	2	1	68.7	70.0	66	1.3	10	Snd Lvl		70.0	0.0	8	-8.0
ST3	4	1	65.7	68.4	66	2.7	10	Snd Lvl		68.4	0.0	8	-8.0
ST4	6	1	67.0	71.0	66	4.0	10	Snd Lvl		71.0	0.0	8	-8.0
Dwelling Units		# DUs	Noise Reduction										
			Min	Avg	Max								
			dB	dB	dB								
All Selected		4	0.0	0.0	0.0								
All Impacted		3	0.0	0.0	0.0								
All that meet NR Goal		0	0.0	0.0	0.0								

INPUT: ROADWAYS

<Project Name?>

<Organization?>				19 August 2020							
<Analysis By?>				TNM 2.5							
INPUT: ROADWAYS											
PROJECT/CONTRACT:		Existing + Ambient + Project								Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA	
RUN:											
Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)		Flow Control				Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Hwy 74 east	30.0	point1	1	1,616,806.6	12,248,081.0	0.00				Average	
		point2	2	1,616,959.6	12,248,088.0	0.00				Average	
		point3	3	1,617,202.5	12,248,092.0	0.00					
Hwy 74	30.0	point8	8	1,616,936.1	12,248,119.0	0.00				Average	
		point23	23	1,617,200.6	12,248,126.0	0.00					
Hwy 79	35.0	point10	10	1,617,187.8	12,248,070.0	0.00				Average	
		point11	11	1,617,186.6	12,248,037.0	0.00				Average	
		point12	12	1,617,175.6	12,247,923.0	0.00				Average	
		point13	13	1,617,165.4	12,247,715.0	0.00				Average	
		point14	14	1,617,171.4	12,247,560.0	0.00				Average	
		point15	15	1,617,196.0	12,247,367.0	0.00					
old st Hwy	35.0	point16	16	1,617,760.9	12,248,092.0	0.00				Average	
		point17	17	1,617,781.5	12,248,022.0	0.00				Average	
		point18	18	1,617,670.4	12,247,981.0	0.00				Average	
		point19	19	1,617,517.9	12,247,931.0	0.00				Average	
		point20	20	1,617,397.2	12,247,888.0	0.00				Average	
		point21	21	1,617,290.1	12,247,855.0	0.00				Average	
		point22	22	1,617,181.2	12,247,822.0	0.00					
Hwy 74-2	30.0	point27	27	1,617,200.6	12,248,126.0	0.00				Average	
		point24	24	1,617,531.6	12,248,134.0	0.00				Average	
		point25	25	1,617,829.4	12,248,141.0	0.00				Average	
		point9	9	1,618,127.1	12,248,148.0	0.00					
Hwy 74 east-2	30.0	point28	28	1,617,202.5	12,248,092.0	0.00				Average	
		point4	4	1,617,431.8	12,248,096.0	0.00				Average	
		point5	5	1,617,637.4	12,248,102.0	0.00				Average	

INPUT: ROADWAYS

<Project Name?>

		point6	6	1,617,881.4	12,248,109.0	0.00				Average	
		point7	7	1,618,135.0	12,248,119.0	0.00					

INPUT: TRAFFIC FOR LAeq1h Volumes

<Project Name?>

<Organization?>												
<Analysis By?>												
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	Existing + Ambient + Project											
RUN:												
Roadway	Points											
Name	Name	No.	Segment		MTrucks		HTrucks		Buses		Motorcycles	
			Autos									
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Hwy 74 east	point1	1	1384	50	28	50	14	50	0	0	0	0
	point2	2	1384	50	28	50	14	50	0	0	0	0
	point3	3										
Hwy 74	point8	8	1384	50	28	50	14	50	0	0	0	0
	point23	23										
Hwy 79	point10	10	1202	45	24	45	12	45	0	0	0	0
	point11	11	1202	45	24	45	12	45	0	0	0	0
	point12	12	1202	45	24	45	12	45	0	0	0	0
	point13	13	1202	45	24	45	12	45	0	0	0	0
	point14	14	1202	45	24	45	12	45	0	0	0	0
	point15	15										
old st Hwy	point16	16	146	20	3	20	1	20	0	0	0	0
	point17	17	146	20	3	20	1	20	0	0	0	0
	point18	18	146	20	3	20	1	20	0	0	0	0
	point19	19	146	20	3	20	1	20	0	0	0	0
	point20	20	146	20	3	20	1	20	0	0	0	0
	point21	21	146	20	3	20	1	20	0	0	0	0
	point22	22										
Hwy 74-2	point27	27	1710	50	35	50	17	50	0	0	0	0
	point24	24	1710	50	35	50	17	50	0	0	0	0
	point25	25	1710	50	35	50	17	50	0	0	0	0
	point9	9										
Hwy 74 east-2	point28	28	1710	50	35	50	17	50	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

<Project Name?>

	point4	4	1710	50	35	50	17	50	0	0	0	0
	point5	5	1710	50	35	50	17	50	0	0	0	0
	point6	6	1710	50	35	50	17	50	0	0	0	0
	point7	7										

INPUT: RECEIVERS

<Project Name?>

<Organization?>											
<Analysis By?>											
INPUT: RECEIVERS PROJECT/CONTRACT: RUN:						Existing + Ambient + Project					
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	L _{Aeq} 1h	L _{Aeq} 1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,617,477.2	12,247,876.0	0.00	4.92	62.40	66	10.0	8.0	Y
ST2	2	1	1,617,247.5	12,248,217.0	0.00	4.92	68.70	66	10.0	8.0	Y
ST3	4	1	1,617,224.4	12,247,807.0	0.00	4.92	65.70	66	10.0	8.0	Y
ST4	6	1	1,617,946.6	12,248,039.0	0.00	4.92	67.00	66	10.0	8.0	Y

INPUT: BARRIERS

<Project Name?>

				19 August 2020															
<Organization?>																			
<Analysis By?>				TNM 2.5															
INPUT: BARRIERS																			
PROJECT/CONTRACT:				Existing + Ambient + Project															
RUN:																			
Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	\$ per Unit	\$ per Unit	Top Width	Run:Rise	\$ per Unit			X	Y	Z	at Point	Seg Ht	Perturbs	On	Important	
				Area	Vol.			Length							ment	#Up	#Dn	Reflec-	
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft			ft	ft	ft	ft	ft			tions?	
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	1,617,424.8	12,248,016.0	0.00	20.00	0.00	0	0		
									point2	2	1,617,338.0	12,247,995.0	0.00	20.00	0.00	0	0		
									point3	3	1,617,259.5	12,247,994.0	0.00	20.00	0.00	0	0		
									point4	4	1,617,258.8	12,248,030.0	0.00	20.00	0.00	0	0		
									point5	5	1,617,313.4	12,248,032.0	0.00	20.00	0.00	0	0		
									point6	6	1,617,425.5	12,248,037.0	0.00	20.00	0.00	0	0		
									point7	7	1,617,424.8	12,248,016.0	0.00	20.00					

RESULTS: SOUND LEVELS

<Project Name?>

<Organization?>		19 August 2020										
<Analysis By?>		TNM 2.5										
		Calculated with TNM 2.5										
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:												
RUN:												
BARRIER DESIGN:		Existing + Ambient + Project										
		Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.										
ATMOSPHERICS:		68 deg F, 50% RH										
Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h	Increase over existing		Type	Calculated LAeq1h	Noise Reduction			
				Calculated	Crit'n	Calculated	Crit'n	Impact		Calculated	Goal	Calculated minus Goal
							Sub'l Inc					
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	62.4	62.4	66	0.0	10	----	62.4	0.0	8	-8.0
ST2	2	1	68.7	70.1	66	1.4	10	Snd Lvl	70.1	0.0	8	-8.0
ST3	4	1	65.7	68.2	66	2.5	10	Snd Lvl	68.2	0.0	8	-8.0
ST4	6	1	67.0	71.0	66	4.0	10	Snd Lvl	71.0	0.0	8	-8.0
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		4	0.0	0.0	0.0							
All Impacted		3	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

INPUT: ROADWAYS

<Project Name?>

<Organization?>				19 August 2020							
<Analysis By?>				TNM 2.5							
INPUT: ROADWAYS											
PROJECT/CONTRACT:		Existing + Ambient + Cumulative								Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA	
RUN:											
Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Hwy 74 east	30.0	point1	1	1,616,806.6	12,248,081.0	0.00				Average	
		point2	2	1,616,959.6	12,248,088.0	0.00				Average	
		point3	3	1,617,202.5	12,248,092.0	0.00					
Hwy 74	30.0	point8	8	1,616,936.1	12,248,119.0	0.00				Average	
		point23	23	1,617,200.6	12,248,126.0	0.00					
Hwy 79	35.0	point10	10	1,617,187.8	12,248,070.0	0.00				Average	
		point11	11	1,617,186.6	12,248,037.0	0.00				Average	
		point12	12	1,617,175.6	12,247,923.0	0.00				Average	
		point13	13	1,617,165.4	12,247,715.0	0.00				Average	
		point14	14	1,617,171.4	12,247,560.0	0.00				Average	
		point15	15	1,617,196.0	12,247,367.0	0.00					
old st Hwy	35.0	point16	16	1,617,760.9	12,248,092.0	0.00				Average	
		point17	17	1,617,781.5	12,248,022.0	0.00				Average	
		point18	18	1,617,670.4	12,247,981.0	0.00				Average	
		point19	19	1,617,517.9	12,247,931.0	0.00				Average	
		point20	20	1,617,397.2	12,247,888.0	0.00				Average	
		point21	21	1,617,290.1	12,247,855.0	0.00				Average	
		point22	22	1,617,181.2	12,247,822.0	0.00					
Hwy 74-2	30.0	point27	27	1,617,200.6	12,248,126.0	0.00				Average	
		point24	24	1,617,531.6	12,248,134.0	0.00				Average	
		point25	25	1,617,829.4	12,248,141.0	0.00				Average	
		point9	9	1,618,127.1	12,248,148.0	0.00					
Hwy 74 east-2	30.0	point28	28	1,617,202.5	12,248,092.0	0.00				Average	
		point4	4	1,617,431.8	12,248,096.0	0.00				Average	
		point5	5	1,617,637.4	12,248,102.0	0.00				Average	

INPUT: ROADWAYS

<Project Name?>

		point6	6	1,617,881.4	12,248,109.0	0.00				Average	
		point7	7	1,618,135.0	12,248,119.0	0.00					

INPUT: TRAFFIC FOR LAeq1h Volumes

<Project Name?>

<Organization?>												
<Analysis By?>												
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	Existing + Ambient + Cumulative											
RUN:												
Roadway	Points											
Name	Name	No.	Segment		MTrucks		HTrucks		Buses		Motorcycles	
			Autos									
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Hwy 74 east	point1	1	1997	50	41	50	20	50	0	0	0	0
	point2	2	1997	50	41	50	20	50	0	0	0	0
	point3	3										
Hwy 74	point8	8	1997	50	41	50	20	50	0	0	0	0
	point23	23										
Hwy 79	point10	10	2583	45	53	45	26	45	0	0	0	0
	point11	11	2583	45	53	45	26	45	0	0	0	0
	point12	12	2583	45	53	45	26	45	0	0	0	0
	point13	13	2583	45	53	45	26	45	0	0	0	0
	point14	14	2583	45	53	45	26	45	0	0	0	0
	point15	15										
old st Hwy	point16	16	81	20	1	20	0	0	0	0	0	0
	point17	17	81	20	1	20	0	0	0	0	0	0
	point18	18	81	20	1	20	0	0	0	0	0	0
	point19	19	81	20	1	20	0	0	0	0	0	0
	point20	20	81	20	1	20	0	0	0	0	0	0
	point21	21	81	20	1	20	0	0	0	0	0	0
	point22	22										
Hwy 74-2	point27	27	2495	50	51	50	25	50	0	0	0	0
	point24	24	2495	50	51	50	25	50	0	0	0	0
	point25	25	2495	50	51	50	25	50	0	0	0	0
	point9	9										
Hwy 74 east-2	point28	28	2495	50	51	50	25	50	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

<Project Name?>

	point4	4	2495	50	51	50	25	50	0	0	0	0
	point5	5	2495	50	51	50	25	50	0	0	0	0
	point6	6	2495	50	51	50	25	50	0	0	0	0
	point7	7										

INPUT: RECEIVERS

<Project Name?>

<Organization?>											
<Analysis By?>											
INPUT: RECEIVERS											
PROJECT/CONTRACT:			Existing + Ambient + Cumulative								
RUN:											
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	L _{Aeq} 1h	L _{Aeq} 1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,617,477.2	12,247,876.0	0.00	4.92	62.40	66	10.0	8.0	Y
ST2	2	1	1,617,247.5	12,248,217.0	0.00	4.92	68.70	66	10.0	8.0	Y
ST3	4	1	1,617,224.4	12,247,807.0	0.00	4.92	65.70	66	10.0	8.0	Y
ST4	6	1	1,617,946.6	12,248,039.0	0.00	4.92	67.00	66	10.0	8.0	Y

RESULTS: SOUND LEVELS

<Project Name?>

<Organization?>													
<Analysis By?>													
RESULTS: SOUND LEVELS PROJECT/CONTRACT: Existing + Ambient + Cumulative RUN: BARRIER DESIGN: Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA. ATMOSPHERICS: 68 deg F, 50% RH													
Receiver													
Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h					With Barrier				
				Calculated	Crit'n	Calculated	Crit'n	Impact	Calculated LAeq1h	Calculated	Noise Reduction	Goal	Calculated minus Goal
							Sub'l Inc						
			dB	dB	dB	dB	dB		dB	dB	dB	dB	dB
ST1	1	1	62.4	65.3	66	2.9	10	----	65.3	0.0	8	-8.0	
ST2	2	1	68.7	71.7	66	3.0	10	Snd Lvl	71.7	0.0	8	-8.0	
ST3	4	1	65.7	71.5	66	5.8	10	Snd Lvl	71.5	0.0	8	-8.0	
ST4	6	1	67.0	72.6	66	5.6	10	Snd Lvl	72.6	0.0	8	-8.0	
Dwelling Units		# DUs	Noise Reduction										
			Min	Avg	Max								
			dB	dB	dB								
All Selected		4	0.0	0.0	0.0								
All Impacted		3	0.0	0.0	0.0								
All that meet NR Goal		0	0.0	0.0	0.0								

INPUT: ROADWAYS

<Project Name?>

<Organization?>				19 August 2020							
<Analysis By?>				TNM 2.5							
INPUT: ROADWAYS											
PROJECT/CONTRACT:		Existing + Ambient + Cumulative								Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA	
RUN:											
Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Hwy 74 east	30.0	point1	1	1,616,806.6	12,248,081.0	0.00				Average	
		point2	2	1,616,959.6	12,248,088.0	0.00				Average	
		point3	3	1,617,202.5	12,248,092.0	0.00					
Hwy 74	30.0	point8	8	1,616,936.1	12,248,119.0	0.00				Average	
		point23	23	1,617,200.6	12,248,126.0	0.00					
Hwy 79	35.0	point10	10	1,617,187.8	12,248,070.0	0.00				Average	
		point11	11	1,617,186.6	12,248,037.0	0.00				Average	
		point12	12	1,617,175.6	12,247,923.0	0.00				Average	
		point13	13	1,617,165.4	12,247,715.0	0.00				Average	
		point14	14	1,617,171.4	12,247,560.0	0.00				Average	
		point15	15	1,617,196.0	12,247,367.0	0.00					
old st Hwy	35.0	point16	16	1,617,760.9	12,248,092.0	0.00				Average	
		point17	17	1,617,781.5	12,248,022.0	0.00				Average	
		point18	18	1,617,670.4	12,247,981.0	0.00				Average	
		point19	19	1,617,517.9	12,247,931.0	0.00				Average	
		point20	20	1,617,397.2	12,247,888.0	0.00				Average	
		point21	21	1,617,290.1	12,247,855.0	0.00				Average	
		point22	22	1,617,181.2	12,247,822.0	0.00					
Hwy 74-2	30.0	point27	27	1,617,200.6	12,248,126.0	0.00				Average	
		point24	24	1,617,531.6	12,248,134.0	0.00				Average	
		point25	25	1,617,829.4	12,248,141.0	0.00				Average	
		point9	9	1,618,127.1	12,248,148.0	0.00					
Hwy 74 east-2	30.0	point28	28	1,617,202.5	12,248,092.0	0.00				Average	
		point4	4	1,617,431.8	12,248,096.0	0.00				Average	
		point5	5	1,617,637.4	12,248,102.0	0.00				Average	

INPUT: ROADWAYS

<Project Name?>

		point6	6	1,617,881.4	12,248,109.0	0.00				Average	
		point7	7	1,618,135.0	12,248,119.0	0.00					

INPUT: TRAFFIC FOR LAeq1h Volumes

<Project Name?>

<Organization?>												
<Analysis By?>												
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	Existing + Ambient + Project + Cumulative											
RUN:												
Roadway	Points											
Name	Name	No.	Segment		MTrucks		HTrucks		Buses		Motorcycles	
			Autos									
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Hwy 74 east	point1	1	2022	50	41	50	20	50	0	0	0	0
	point2	2	2022	50	41	50	20	50	0	0	0	0
	point3	3										
Hwy 74	point8	8	2022	50	41	50	20	50	0	0	0	0
	point23	23										
Hwy 79	point10	10	2613	45	53	45	26	45	0	0	0	0
	point11	11	2613	45	53	45	26	45	0	0	0	0
	point12	12	2613	45	53	45	26	45	0	0	0	0
	point13	13	2613	45	53	45	26	45	0	0	0	0
	point14	14	2613	45	53	45	26	45	0	0	0	0
	point15	15										
old st Hwy	point16	16	146	20	3	20	1	20	0	0	0	0
	point17	17	146	20	3	20	1	20	0	0	0	0
	point18	18	146	20	3	20	1	20	0	0	0	0
	point19	19	146	20	3	20	1	20	0	0	0	0
	point20	20	146	20	3	20	1	20	0	0	0	0
	point21	21	146	20	3	20	1	20	0	0	0	0
	point22	22										
Hwy 74-2	point27	27	2505	50	51	50	25	50	0	0	0	0
	point24	24	2505	50	51	50	25	50	0	0	0	0
	point25	25	2505	50	51	50	25	50	0	0	0	0
	point9	9										
Hwy 74 east-2	point28	28	2505	50	51	50	25	50	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Volumes

<Project Name?>

	point4	4	2505	50	51	50	25	50	0	0	0	0
	point5	5	2505	50	51	50	25	50	0	0	0	0
	point6	6	2505	50	51	50	25	50	0	0	0	0
	point7	7										

INPUT: RECEIVERS

<Project Name?>

<Organization?>											
<Analysis By?>											
INPUT: RECEIVERS	Existing + Ambient + Project + Cumulative										
PROJECT/CONTRACT:											
RUN:											
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	L _{Aeq} 1h	L _{Aeq} 1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,617,477.2	12,247,876.0	0.00	4.92	62.40	66	10.0	8.0	Y
ST2	2	1	1,617,247.5	12,248,217.0	0.00	4.92	68.70	66	10.0	8.0	Y
ST3	4	1	1,617,224.4	12,247,807.0	0.00	4.92	65.70	66	10.0	8.0	Y
ST4	6	1	1,617,946.6	12,248,039.0	0.00	4.92	67.00	66	10.0	8.0	Y

INPUT: BARRIERS

<Project Name?>

				19 August 2020															
<Organization?>																			
<Analysis By?>				TNM 2.5															
INPUT: BARRIERS																			
PROJECT/CONTRACT:																			
RUN: Existing + Ambient + Project + Cumulative																			
Barrier																			
Name		Type	Height		If Wall	If Berm		Add'tnl	Points										
		Min	Max	\$ per Unit	\$ per Unit	Top Width	Run:Rise	\$ per Unit	Name	No.	Coordinates (bottom)		Height at Point	Segment					
				Area	Vol.			Length			X	Y	Z		Seg Ht	Perturbs	On		
															ment	#Up	#Dn		
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft			ft	ft	ft	ft	ft				
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	1,617,424.8	12,248,016.0	0.00	20.00	0.00	0	0		
									point2	2	1,617,338.0	12,247,995.0	0.00	20.00	0.00	0	0		
									point3	3	1,617,259.5	12,247,994.0	0.00	20.00	0.00	0	0		
									point4	4	1,617,258.8	12,248,030.0	0.00	20.00	0.00	0	0		
									point5	5	1,617,313.4	12,248,032.0	0.00	20.00	0.00	0	0		
									point6	6	1,617,425.5	12,248,037.0	0.00	20.00	0.00	0	0		
									point7	7	1,617,424.8	12,248,016.0	0.00	20.00					

RESULTS: SOUND LEVELS

<Project Name?>

<Organization?>													
<Analysis By?>													
RESULTS: SOUND LEVELS													
PROJECT/CONTRACT:													
RUN:													
BARRIER DESIGN:													
ATMOSPHERICS:													
Receiver													
Name	No.	#DUs	Existing	No Barrier						With Barrier			
			LAeq1h	LAeq1h			Increase over existing	Type		Calculated	Noise Reduction		
				Calculated	Crit'n		Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
								Sub'l Inc					minus
													Goal
			dBA	dBA	dBA	dB	dB			dBA	dB	dB	dB
ST1	1	1	62.4	64.2	66	1.8	10	----		64.2	0.0	8	-8.0
ST2	2	1	68.7	71.8	66	3.1	10	Snd Lvl		71.8	0.0	8	-8.0
ST3	4	1	65.7	71.4	66	5.7	10	Snd Lvl		71.4	0.0	8	-8.0
ST4	6	1	67.0	72.7	66	5.7	10	Snd Lvl		72.7	0.0	8	-8.0
Dwelling Units		# DUs	Noise Reduction										
			Min	Avg	Max								
			dB	dB	dB								
All Selected		4	0.0	0.0	0.0								
All Impacted		3	0.0	0.0	0.0								
All that meet NR Goal		0	0.0	0.0	0.0								



Attachment D

Operational Noise Modeling Input and Output

Predicted Sound Propagation from Operational Activities

