Appendix H

Noise Report

Noise Analysis Technical Report
for the
Costco/Vineyard II Retail Development Project
City of Murrieta, California

Prepared by:

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
City	City of Murrieta
CNEL	community noise equivalent level
dB	decibel
dBA	A-weighted decibel
FICON	Federal Interagency Committee on Noise
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
L_{dn}	day-night average sound level
L_{eq}	equivalent sound level
MM	Mitigation Measure
PPV	peak particle velocity

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Executive Summary

The purpose of this technical report is to assess the potential noise and vibration impacts associated with implementation of the proposed Costco/Vineyard II Retail Development Project (project). This assessment uses the significance thresholds in Appendix G of the California Environmental Quality Act Guidelines (14 CCR 15000 et seq.).

The project site is located in the northern portion of the City of Murrieta (City) in Riverside County, California, at the northwest corner of Interstate 215 and Clinton Keith Road. The project site encompasses approximately 26 acres.

The project applicants, Costco Wholesale and Retail Development Advisors, propose to develop a 26.3-acre vacant site (the site or project site) in the City with the project; this would include construction and operation of approximately 225,362 square feet of new development, including a Costco Wholesale (Costco) and gas station and, in adjoining parcels, standalone retail and fitness buildings and in-line stores, one casual dining restaurant with drive-through and window service, and one drive-through fast-food restaurant. The project would include 1,215 parking spaces adjoining the retail and warehouse uses.

The project would also include construction of two detention basins, construction of the extension of Warm Springs Parkway from the southern site boundary to the northern site boundary of the site between the Costco parcel and the Vineyard II development, a temporary terminus of that road at the northerly boundary of the site, and undergrounding of certain existing power lines north of Linnel Lane back to the next pole north of the property line of the Costco parcel and the Clinton Keith Road/Creighton Road intersection.

This noise analysis evaluates the potential for significant adverse impacts due to project construction and operation. Implementation of the project would result in two primary types of potential noise impacts: short-term (i.e., temporary) noise during construction and long-term noise during operation.

Noise from construction would exceed the City's daytime construction noise standards for mobile equipment (75 A-weighted decibels (dBA) for single-family residences, and 80 dBA for multi-family residences). Additionally, unmitigated construction noise levels could result in annoyance and would be considered substantial; therefore, construction noise impacts would be significant unless mitigated. With implementation of standard and supplemental conditions and mitigation measures as required by the City (see Section 5.5, Mitigation), noise impacts from construction activities would be reduced to less than significant. The project's traffic-related impacts would not result in a significant noise-level increase along adjacent roadways; therefore, traffic noise impacts would be **less than significant** at off-site land uses. On-site operational noise (including mechanical, delivery, and parking lot noise) associated with the proposed project was assessed and determined to result in less-than-significant noise impacts. Vibration levels associated with project construction would likely be perceptible at nearby residences, but they would be below the U.S. Department of Transportation's threshold of potential damage for normal structures (0.20 peak particle velocity in inches per second), and would be mitigated through provided standard mitigation measures. The project site is not located within the vicinity of an airport or private airstrip and, therefore, would not expose people residing or working in the project area to excessive noise levels associated with an airport or airstrip. Finally, the noise analysis concludes that the project would not result in any significant cumulative impacts.

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1 Introduction

1.1 Report Purpose and Scope

The purpose of this report is to evaluate the potential noise and vibration impacts associated with implementation of the proposed Costco/Vineyard II Retail Development Project (project).

1.2 Project Location

The project site is located in the northern portion of the City of Murrieta (City) in Riverside County. Specifically, the project site is located on a vacant lot in the northeastern corner of Antelope Road and Clinton Keith Road, east of Interstate 215 (Figure 1, Project Location).

The approximately 26-acre, rectangular-shaped project site is experiencing an ongoing mass grading operation that is removing the low-lying hills on site. The City's General Plan Land Use Map designates the project site as Commercial (C) (City of Murrieta 2011a). The City's Zoning Map shows the site as zoned Regional Commercial (RC) (City of Murrieta 2014).

The project site is surrounded by commercial development, residential development, and a high school. Specific land uses located in the immediate vicinity of the project site are as follows:

- North: Vacant
- East: Single-family and multi-family residential uses
- South: Vacant and Vista Murrieta High School
- West: Vacant and Interstate 215

1.3 Project Description

The proposed project (as shown in Figure 2, Proposed Site Plan) would involve construction and operation of approximately 225,362 square feet of new development, including a Costco Wholesale (Costco) and gas station and, in adjoining parcels, standalone retail and fitness buildings and in-line stores, one casual dining restaurant with drive-through and window service, and one drive-through fast-food restaurant. The project would include 1,215 parking spaces adjoining the retail and warehouse uses.

The project would also include construction of two detention basins, construction of the extension of Warm Springs Parkway from the southern site boundary to the northern site boundary of the site between the Costco parcel and the Vineyard II development, a temporary terminus of that road at the northerly boundary of the site, and undergrounding of certain existing power lines north of Linnel Lane back to the next pole north of the property line of the Costco parcel and the Clinton Keith Road/Creighton Road intersection.

Costco

Warehouse

The approximately 16.5-acre warehouse parcel would be developed with a 153,362-square-foot warehouse building. A separate gas station parcel would be developed with a 32-pump facility with overhead canopy.

The warehouse would include a bakery and sales of baked goods, alcohol sales, pharmacy, optical center with optical exams and retail optical sales, hearing aid testing exam and retail hearing aid fitting and sales center, food service preparation and sales, meat preparation and sales, and a photo center, along with the sales of over 4,000 products. The Costco warehouse would provide sales only to warehouse members. Temporary Christmas tree sales adjacent to the warehouse would typically occur from late November through December, which may temporarily make 12 to 15 vehicle spaces unavailable.

The truck loading dock would be located at the northern edge of the building, toward the northernmost Antelope Road driveway. The bay doors would be equipped with sealed gaskets to limit noise impacts. Five on-grade doors would be located on the western side of the building for emergency egress only, and four on-grade doors would be on the northern side. The two doors on the northern side of the building, adjacent to the loading docks, would be for receiving deliveries from bread companies and Federal Express–type trucks. The two doors would also be the primary entrance for employees. The other two service doors would be only for maintenance access to the fire riser and mechanical rooms. A transformer and two trash compactors would be located along the north edge of the building. Proposed landscaping and tree planting at the perimeter of the project site would provide screening of these uses.

Parking and Circulation

There would be 799 parking stalls for the Costco warehouse, which exceeds the required parking of 767 stalls. The loading dock is located on the northernmost portion of the Costco warehouse, accessible from the northwestern Antelope Road entrance and away from residences located east. A 30-foot drive aisle surrounds the warehouse to provide fire access and circulation for the delivery trucks. An Americans with Disabilities Act–compliant pedestrian pathway is required from the new warehouse to the public right-of-way to ensure connectivity throughout the site and easy access from adjacent streets and neighboring properties. To provide members with easier accessibility to vehicles, the project would provide for 781 10-foot-wide stalls and 17 accessible stalls that are larger than the minimum requirements. The project would also include three spaces for electrical vehicle charging.

Gas Station

The gas station would include a 12,684-square-foot canopy and would be located on the northeastern portion of the project site. The gas station would dispense regular, premium, and diesel grades of fuel at each fuel pump. The pumps would be fully automated and self-service and would be for Costco members only, with a Costco attendant present to oversee operations and assist members if they have fueling issues.

Vineyard II Development

The Vineyard II Retail Development would be constructed concurrently to the east of the proposed Costco location, within the same shopping center. The square footage of these retail uses would total 79,900 square feet and 416 parking stalls would be provided for the retail uses. Fourteen of these stalls would be for electric vehicle charging. The site improvements include parking, private drive aisles, wet and dry utilities, storm drains, and water quality improvements. The extension of Warm Springs Parkway is also part of this development. Warm Springs Parkway intersects with Clinton Keith Road and forms the western edge of Vineyard II, providing site access.

Fitness Center

The proposed 37,000-square-foot fitness center would include a lap pool; indoor basketball court; showers and lockers; weight room; and areas for group exercise classes, including cycling, yoga, and other stretching classes.

Major Retail Pad

This pad is proposed to be 16,000 square feet. The support retailers may include an office supply store, pet supply store, health and beauty store, shoe store, and other similar retailers.

Retail Shops

The proposed uses for these two retail shops are service-oriented businesses, such as a pick-up and drop-off dry cleaner (no plant on site), hair salon, and phone store. The larger pad is proposed to be 11,900 square feet and the smaller pad is proposed to be 3,500 square feet.

Casual Dining Restaurant

The proposed use is a 1,200-square-foot casual dining space with drive-through and window service.

Fast-Food Restaurant

This proposed 2,400-square-foot fast-food restaurant with a drive-through would service customers needing to be served quickly. The design would match elements of the overall architecture of the shopping center.

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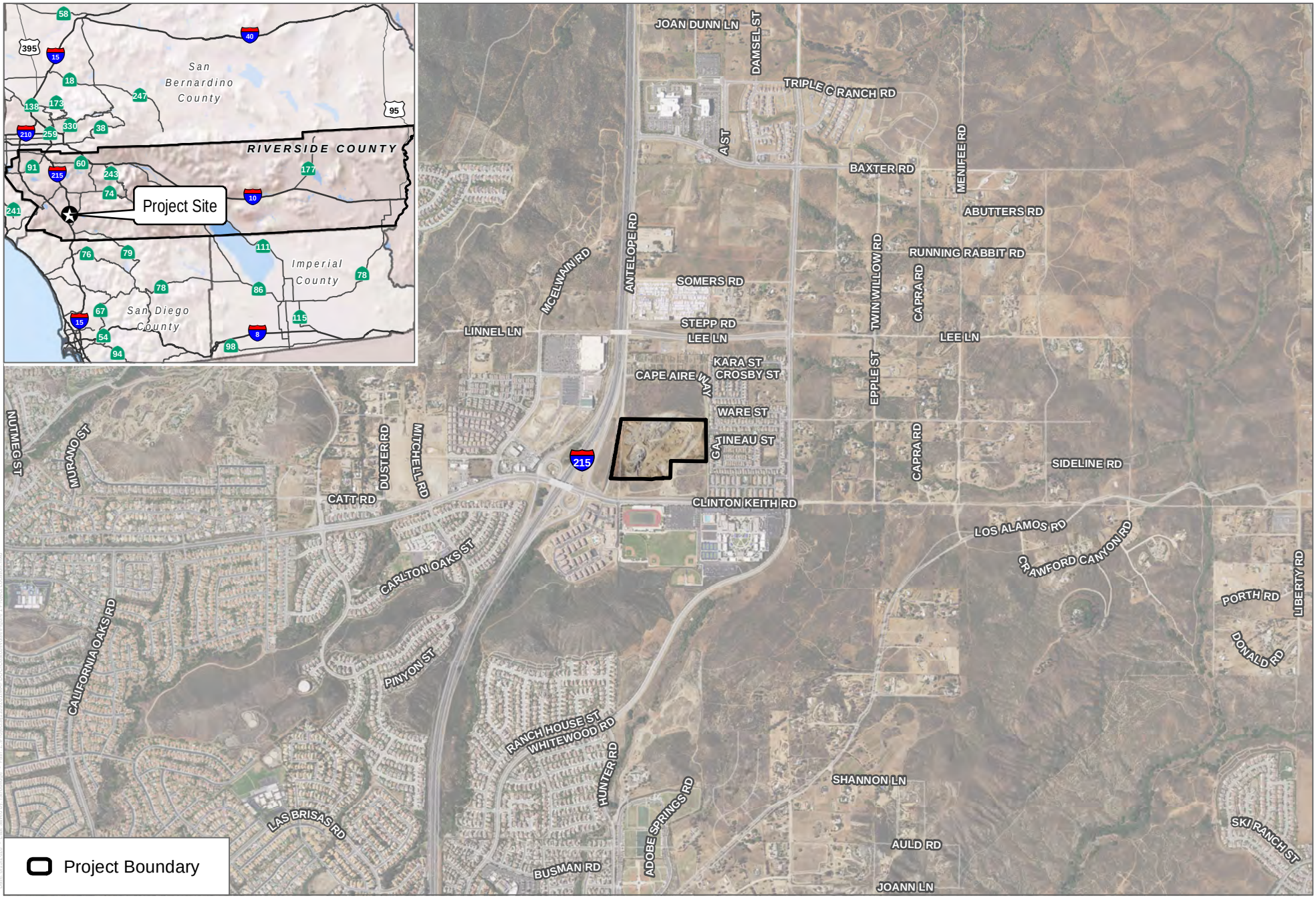

SOURCE: NAIP 2016

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0 1,000 2,000 Feet

FIGURE 1

Project Location

Costco/Candee Property

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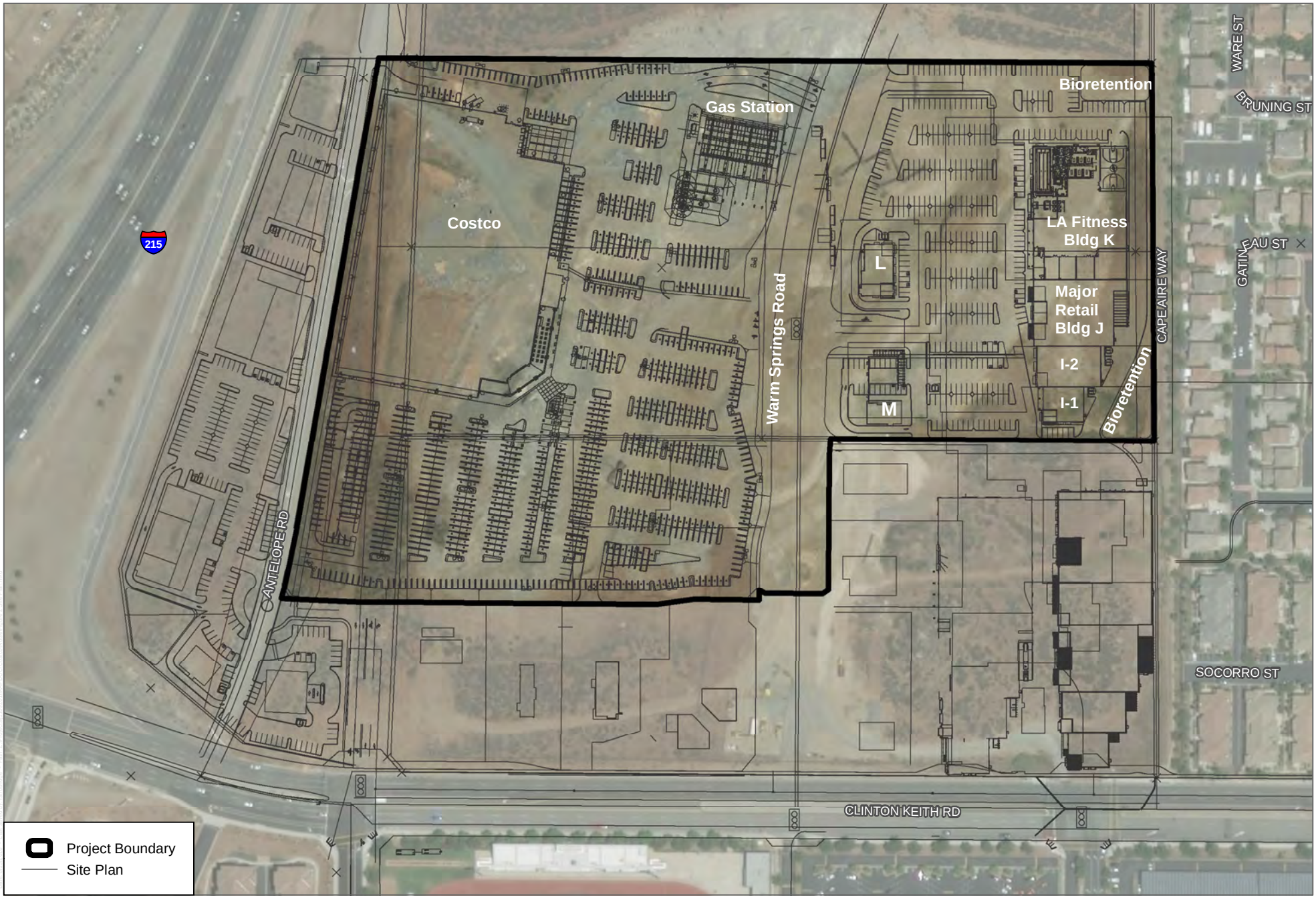

SOURCE: NAIP 2016

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FIGURE 2

Proposed Site Plan

Costco/Candee Property

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2 Existing Conditions

2.1 Noise and Vibration Concepts

Sound may be described in terms of level or amplitude (measured in decibels (dB)), frequency or pitch (measured in hertz, or cycles per second), and duration (measured in seconds or minutes). The standard unit of measurement of the amplitude of sound is the decibel. 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 scale (dBA) performs this compensation by discriminating against low and very high frequencies in a manner approximating the sensitivity of the human ear.

Noise is defined as unwanted sound and is known to have several adverse effects on people, including hearing loss, speech interference, sleep interference, physiological responses, and annoyance. Based on these known adverse effects of noise, the federal government, the State of California, and local agencies have established criteria to protect public health and safety, to prevent disruption of certain human activities, and to minimize annoyance.

Several descriptors of noise (noise metrics) exist to help predict average community reactions to the adverse effects of environmental noise, including traffic-generated noise, on a community. 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 sound energy level averaged over a specified time period (usually 1 hour). L_{eq} is a single numerical value that represents the amount of variable sound energy received by a receptor during a time interval. For example, a 1-hour L_{eq} measurement would represent the average amount of energy contained in all the noise that occurred in that 1 hour. L_{eq} is an effective noise descriptor because of its ability to assess the total time-varying effects of noise on sensitive receptors. L_{max} is the greatest sound level measured during a designated time interval or event.

Unlike the L_{eq} metric, L_{dn} and CNEL metrics always represent 24-hour periods. L_{dn} and CNEL also differ from L_{eq} because they apply a time-weighted factor designed to emphasize noise events that occur during the evening and nighttime 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 a.m.–7 p.m.) receives no penalty. Noise during the evening (7 p.m.–10 p.m.) is penalized by adding 5 dB, and nighttime (10 p.m.–7 a.m.) noise is penalized by adding 10 dB. L_{dn} differs from CNEL in that the daytime period is defined as 7 a.m.–10 p.m., thus eliminating 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 to 1 dB; for that reason, the L_{dn} and CNEL noise metrics are often considered functionally equivalent to one another for most purposes.

Table 1 represents some typical noise levels found in the existing environment. Noise-sensitive uses near the project site include residential uses and a school (Vista Murrieta High School).

Table 1. Typical Sound Levels in the Environment and Industry

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
—	110	Rock band
Jet flyover at 300 meters (1,000 feet)	100	—
Gas lawn mower at 1 meter (3 feet)	90	—
Diesel truck at 15 meters (50 feet), at 80 kph (50 mph)	80	Food blender at 1 meter (3 feet) Garbage disposal at 1 meter (3 feet)
Noisy urban area, daytime gas lawn mower at 30 meters (100 feet)	70	Vacuum cleaner at 3 meters (10 feet)
Commercial area Heavy traffic at 90 meters (300 feet)	60	Normal speech at 1 meter (3 feet)
Quiet urban daytime	50	Large business office Dishwasher, next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime	30	Library
Quiet rural night time	20	Bedroom at night, concert hall (background)
—	10	Broadcast/recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 2013a.
Notes: kph = kilometers per hour; mph = miles per hour.

There are three conceptual components to noise: the source, the transmission path, and the receiver. Noise can be reduced by reducing noise at its source; by lengthening or interrupting the transmission path through diversion, absorption, or dissipation; or by protecting the receiver through noise insulation. The most efficient and effective means of abating noise is to reduce noise at its source. Source noise can be controlled through regulation, such as restrictions outlined in noise ordinances; muffling techniques; or sound proofing. The transmission path can be interrupted through creation of a buffer between the source and the receiver, such as a noise wall, earth embankment, or a building. The receiver can be protected from noise impacts through insulation, building orientation, or shielded areas.

Noise sources can be classified in two forms: point sources, such as individual pieces of stationary or mobile equipment (pumps, heavy construction equipment), and line sources, such as a roadway with a large number of pass-by sources (motor vehicles). Sound generated by a point source typically diminishes (attenuates) at a rate of 6 dB for each doubling of distance from the source to the receptor. For example, a 60 dBA noise level measured at 50 feet from a point source would be 54 dBA at 100 feet from the source and 48 dBA at 200 feet from the source. Sound generated by a line source typically attenuates at a rate of 3 dB and 4.5 dB per doubling of distance from the source to the receptor for hard and soft sites, respectively. Typical sound levels generated by various activities are listed in Table 1.

Sound levels can also be attenuated by built or natural barriers. Intervening noise barriers, such as a solid wall or berm, typically reduce noise levels by 5 dB to 10 dB. Structures can also provide noise reduction by insulating interior spaces from outdoor noise. The exterior-to-interior noise attenuation provided by typical California building structures ranges from 15 dB to 25 dB for windows open and closed, respectively. Acoustically designed enclosures and buildings can provide up to approximately 50 dB of noise reduction, depending on the noise abatement treatments.

Vibration tolerance typically depends on the type of structures that are affected. Structural response to vibration is typically evaluated in terms of peak particle velocity (PPV), generally expressed in inches per second (in/sec). PPV is often used since it is related to the stresses that are experienced by the buildings. Various general standards are contained in the International Standards Organization's Standards 3945, 4866, and 7626-1. Limits set by these standards indicate a low probability of structural damage occurring to common structures at a PPV of 2 in/sec. Older (and non-reinforced) masonry structures would have a limit of 0.75 to 1.0 in/sec (Caltrans 2013b). The U.S. Department of Transportation's Federal Transit Administration identifies a vibration damage threshold criterion of 0.20 in/sec for non-engineered timber and masonry buildings (i.e., fragile buildings) or 0.12 in/sec for buildings extremely susceptible to vibration (i.e., fragile historic buildings) (DOT 2018).

2.2 Existing Noise Environment

The approximately 26-acre project site is located on a vacant lot and is undergoing an ongoing mass-grading operation (with the associated noise from heavy construction equipment) that is removing the low-lying hills on site. Additionally, the surrounding roadways (Interstate 215, Clinton Keith Road, Whitewood Road) generate traffic noise. Surrounding residential and educational land uses also generate noise that contribute to ambient noise levels in the project area.

A sound level survey was conducted on February 23, 2018, and August 13, 2019, to evaluate existing sound levels and assess potential project noise impacts on the surrounding area. Short-term sound levels were measured at existing noise-sensitive receptors adjacent to the project site, as shown in Figure 3, Noise Measurement and Modeling Locations. Noise measurements were taken at the multi-family residences south of the project site (ST1), the high school south of the project site (ST2), the multi-family residences east of the project site (ST3), and the single-family residences east of the project site (ST4 and ST5).

Short-term (1 hour or less), attended sound level measurements were taken with a Rion NL-52 Sound Level Meter. This instrument is categorized as Type 1, Precision Grade. The sound measuring instrument used for the survey was set to the "slow" time response and the dBA scale for all noise measurements. To ensure accuracy, the laboratory calibration of the instrument was field checked before and after each measurement period using an acoustical calibrator. The accuracy of the acoustical calibrator is maintained through a program established through the manufacturer and traceable to the National Institute of Standards and Technology. The sound measurement instrument meets the requirements of American National Standards Institute Standard S 1.4-1983 and International Electrotechnical Commission Publications 804 and 651. In all cases, the microphone height was 5 feet above the ground, and the microphone was equipped with a windscreen.

During the field measurements, physical observations of the predominant noise sources were noted. The primary noise source in the project area was vehicle traffic on Clinton Keith Road, located south of the project site. Other secondary noise sounds included noise from heating, ventilation, and air conditioning (HVAC) equipment, distant construction noise, rustling leaves, birds, distant aircraft overflights, and other community noises. The results of the sound level measurements are summarized in Table 2, and measurement data and notes are provided in Appendix A. As shown in Table 2, measured noise levels ranged from 41 dBA L_{eq} at ST5 to 56 dBA L_{eq} at ST1 when rounded to whole numbers, as is customary for community noise measurements.

Table 2. Short-Term Sound Level Measurement Results

Site ID	Measurement Location	Measurement Period			Noise Sources	Measurement Results (dBA)					
		Date	*Start Time (a.m.)*	*Duration (minutes)*		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
ST1	Multi-family residences south of project site	02-23-18	10:56	10	Traffic, birds, rustling leaves	55.6	71.3	46.3	48.9	52	55.4
ST2	Vista Murrieta High School, south of project site	02-23-18	9:56	15	HVAC, pool pumps, distant traffic, birds, distant aircraft, distant construction noise	55	65.1	46.8	49.2	52	58.4
ST3	Multi-family residential east of project site	02-23-18	10:18	10	Traffic, birds, rustling leaves	54.3	65.8	44.2	47.3	52.6	57.8
ST4	Single-family residential east of project site	02-23-18	10:39	10	Construction noise, birds, distant aircraft, rustling leaves	52.1	63.6	43.9	45.4	48.2	55.9
ST5	Single-family residential east of project site	08-13-19	10:34	15	Construction noise, birds, distant aircraft, distant traffic	40.6	49.7	37.5	38.7	40.1	42.1

Notes: L_{eq} = equivalent continuous sound level (energy-averaged sound level); L_{max} = maximum sound level during the measurement interval; L_{min} = minimum sound level during the measurement interval; L_{90} = sound level exceeded for 90% of the measurement period; L_{50} = sound level exceeded for 50% of the measurement period; L_{10} = sound level exceeded for 10% of the measurement period; HVAC = heating, ventilation, and air conditioning.

SOURCE: NAIP 2016

DUDEK

0 100 200 Feet

FIGURE 3

Noise Measurement and Modeling Locations

Costco/Candee Property

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3 Regulatory Setting

3.1 Federal

Noise Control Act

The Noise Control Act of 1972 recognized the role of the federal government in dealing with major commercial noise sources that require uniform treatment. Since Congress has the authority to regulate interstate and foreign commerce, regulation of noise generated by such commerce also falls under congressional authority. The federal government specifically preempts local control of noise from aircraft, railroads, and interstate highways. The U.S. Environmental Protection Agency has identified acceptable noise levels for various land uses to protect the public, with an adequate margin of safety, and to establish noise emissions standards for interstate commerce.

The Department of Housing and Urban Development's standards define day-night average sound levels (L_{dn}) at below 65 dBA for outdoors as acceptable for residential areas. Outdoor levels up to 75 dBA L_{dn} may be made acceptable through the use of insulation in buildings (HUD 2009).

3.2 State

California Code of Regulations, Title 24, Noise Insulation Standards

The pertinent California noise regulations are contained in the California Code of Regulations. Title 24, Noise Insulation Standards, establishes the acceptable interior environmental noise level for multi-family dwellings at 45 dBA L_{dn}. This may be extended by local legislative action to include single-family dwellings.

California Code of Regulations, Section 65302(f)

California Code of Regulations, Section 65302(f), requires local land use planning jurisdictions to prepare a general plan. The noise element is a mandatory component of general plans. It may include general community noise guidelines developed by the California Health and Human Services Agency and specific planning guidelines for noise/land use compatibility developed by the local jurisdiction. The state guidelines also recommend that the local jurisdiction consider adopting a local noise control ordinance. The California Health and Human Services Agency developed guidelines (OPR 2003) for community noise acceptability for use by local agencies. Selected relevant levels are as follows (OPR 2003):

- CNEL below 60 dBA – normally acceptable for low-density residential use
- CNEL of 55 dBA to 70 dBA – conditionally acceptable for low-density residential use
- CNEL below 65 dBA – normally acceptable for high-density residential use
- CNEL of 60 dBA to 70 dBA – conditionally acceptable for high-density residential use, transient lodging, churches, and educational and medical facilities
- CNEL below 70 dBA – normally acceptable for playgrounds and neighborhood parks

"Normally acceptable" is defined as satisfactory for the specified land use, assuming that normal conventional construction is used in buildings. "Conditionally acceptable" may require some additional noise attenuation or

special study. Under most of these land use categories, overlapping ranges of acceptability and unacceptability are presented, leaving some ambiguity in areas where noise levels fall within the overlapping range. Table 3 presents the complete land use/noise compatibility matrix.

Table 3. Land Use Compatibility for Community Noise Environments

Land Use Category	Community Noise Exposure (CNEL)			
	Normally Acceptable	*Conditionally Acceptable*	*Normally Unacceptable*	*Clearly Unacceptable*
Residential – Low Density, Single-Family, Duplex, Mobile Homes	50–60	55–70	70–75	75–85
Residential – Multiple Family	50–65	60–70	70–75	70–85
Transient Lodging – Motel, Hotels	50–65	60–70	70–80	80–85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50–70	60–70	70–80	80–85
Auditoriums, Concert Halls, Amphitheaters	N/A	50–70	N/A	65–85
Sports Arenas, Outdoor Spectator Sports	N/A	50–75	N/A	70–85
Playgrounds, Neighborhood Parks	50–70	N/A	67.5–77.5	72.5–85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50–70	N/A	70–80	80–85
Office Buildings, Business Commercial and Professional	50–70	67.5–77.5	75–85	N/A
Industrial, Manufacturing, Utilities, Agriculture	50–75	70–80	75–85	N/A

Source: OPR 2003.
Notes: CNEL = community noise equivalent level; N/A = not applicable
Normally Acceptable: Specified land use is satisfactory based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features have been included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Normally Unacceptable: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made, and needed noise-insulation features must be included in the design.
Clearly Unacceptable: New construction or development should generally not be undertaken.

California Occupational Safety and Health Administration Occupational Noise Exposure Regulations

The extensive state regulations pertaining to worker noise exposure are, for the most part, applicable only to the construction phase of any project,[1] or workers in a central plant and/or maintenance facility, or involved in the use of landscape maintenance equipment or heavy machinery.

[1] For example, the California Occupational Safety and Health Administration Occupational Noise Exposure Regulations (8 CCR, General Industrial Safety Orders, Article 105, Control of Noise Exposure, Section 5095, et seq.).

3.3 Local

The project site is within the City of Murrieta. The pertinent noise regulations for the City are summarized below.

Murrieta General Plan 2035

The Noise Element of the Murrieta General Plan includes goals and policies associated with the protection of noise-sensitive land uses, development of a comprehensive land use planning and development review process that ensures noise impacts are adequately addressed, minimization of noise from mobile noise sources, and reduction of noise levels from construction activities, as follows (City of Murrieta 2011b):

Goal N-1 Noise sensitive land uses that are properly and effectively protected from excessive noise generators

Policy N-1.1 Comply with the Land Use Compatibility for Community Noise Environments [shown herein as Table 3].

Policy N-1.2 Protect schools, hospitals, libraries, churches, convalescent homes, and other noise sensitive uses from excessive noise levels by incorporating site planning and project design techniques to minimize noise impacts. The use of noise barriers shall be considered after all practical design-related noise measures have been integrated into the project. In cases where sound walls are necessary, they should help create an attractive setting with features such as setbacks, changes in alignment, detail and texture, murals, pedestrian access (if appropriate), and landscaping.

Goal N-4 Reduced noise levels from construction activities.

Policy N-4.5 Allow exceedance of noise standards on a case-by-case basis for special circumstances including emergency situations, special events, and expedited development projects.

City of Murrieta Noise Ordinance

The City's Noise Ordinance (Section 16.30 of the City's Municipal Code) sets interior and exterior noise standards for specific land uses (Sections 16.30.090 and 16.30.100). The City's Noise Ordinance also has general noise regulations (Section 16.30.130) that regulate noise from construction activities. Construction noise deemed to be disturbing is prohibited from 7 p.m. to 7 a.m. Monday through Friday, or at any time on Sundays or holidays. Construction activities must be conducted in a manner that the maximum noise levels at the affected structures will not exceed those listed in Table 4.

Table 4. City of Murrieta Construction Noise Standards

Equipment Type	Single-Family Residential	Multi-Family Residential	Commercial
Mobile Equipment			
Daily, except Sundays and holidays, 7:00 a.m. to 8:00 p.m.	75 dBA	80 dBA	85 dBA

Table 4. City of Murrieta Construction Noise Standards

Equipment Type	Single-Family Residential	Multi-Family Residential	Commercial
Daily, except Sundays and holidays, 8:00 p.m. to 7:00 a.m.	60 dBA	64 dBA	70 dBA
Stationary Equipment			
Daily, except Sundays and holidays, 7:00 a.m. to 8:00 p.m.	60 dBA	65 dBA	70 dBA
Daily, except Sundays and holidays, 8:00 p.m. to 7:00 a.m.	50 dBA	55 dBA	60 dBA

Source: City of Murrieta 1997.
Note: dBA = A-weighted decibel scale.

Operational noise generated between two properties within the City is regulated by the standards contained in Section 16.30.090 of the City's Noise Ordinance. The City's exterior noise level limits between properties are presented in Table 5. Pursuant to Section 16.30.090(C), if the location in question is on a boundary property between two zoning districts (as is the case for this project), the exterior noise standard is the arithmetic mean of the exterior noise levels. For example, the exterior noise standard between the commercial zone of the project site and the residential area to the east would be 50 dBA from 10 p.m. to 7 a.m., and 55 dBA from 7 a.m. to 10 p.m.

Table 5. City of Murrieta Exterior and Interior Noise Limits

Noise Zone	Land Use (Receptor Property)	Time Period	Allowed Exterior Noise Level (dBA)
Exterior Noise Limits			
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 p.m. to 7:00 a.m.	45
		7:00 a.m. to 10:00 p.m.	50
	Residential properties within 500 feet of a kennel(s)	7:00 a.m. to 10:00 p.m.	70
III	Commercial properties	10:00 p.m. to 7:00 a.m.	55
		7:00 a.m. to 10:00 p.m.	60
IV	Industrial properties	Anytime	70
Interior Noise Limits			
All noise zones	Multi-family residential	10:00 p.m. to 7:00 a.m.	40
		7:00 a.m. to 10:00 p.m.	45

Source: City of Murrieta 1997.
Note: dBA = A-weighted decibel scale.

Vibration Standards

The City's Noise Ordinance Section 16.30.130(K) prohibits the operation of any device that creates vibration above the City's established perception threshold of 0.01 PPV in/sec over the range of 1 to 100 hertz. Typically, the City applies this threshold to both construction and operation, except under certain circumstances, including those listed

under Policy N-4.5 of the General Plan Noise Element (listed above). Additionally, Section 16.30.140 (Modification of Standards) within Title 16 (Development Code) of the City's Municipal Code provides the following exception:

Section 16.30.140 Modification of Standards.

> Modifications to the requirements of this chapter may be granted by the director for a period of up to two years, subject to any terms, conditions, or requirements to minimize adverse effects on the surrounding neighborhood reasonable. Modifications may be granted only if one of the following findings can be made:
>
> A. Additional time is necessary for the applicant to alter or modify the activity, operation, or noise source to comply with this chapter: or
>
> B. The activity, operation, or noise source cannot feasibly be done in a manner that would comply with the provisions of this chapter. and no other reasonable alternative is available to the applicant.

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4 Thresholds of Significance

California has guidelines to address the significance of noise impacts based on Appendix G of the California Environmental Quality Act Guidelines, which provides guidance that a project would have a significant environmental impact if it would do any of the following:

1. 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.
2. Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
3. 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?

The City's noise regulations do not directly address the incremental threshold for community noise increases (i.e., the California Environmental Quality Act Significance Threshold 1: "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"). Neither the City's General Plan Noise Element nor the Municipal Code have quantified levels of increase in noise above ambient that are considered "substantial." Some guidance regarding the determination of a substantial permanent increase in ambient noise levels in the project vicinity above existing levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The FICON recommendations are based on studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a qualitative measure of the adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment (FICON 1992).

The rationale for the FICON recommendations is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of L_{dn} (and by extension, CNEL). The changes in noise exposure that are shown in Table 6 are expected to result in equal changes in annoyance at sensitive land uses. Although the FICON recommendations were specifically developed to address aircraft noise impacts, they are used in this analysis to define a substantial increase in community noise levels related to all transportation noise sources and permanent non-transportation noise sources.

Table 6. Measures of Substantial Increase for Community Noise Sources

Ambient Noise Level Without Project (L_{dn})	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels by Amount Listed
<60 dBA	+5 dB or more
60–65 dBA	+3 dB or more
>65 dBA	+2 dB or more

Notes: L_{dn} = day-night average sound level; dBA = A-weighted decibel scale; dB = decibel.

For stationary operational noise sources related to the proposed project, noise levels exceeding the standards contained in Table 5 are considered significant. For construction related to the proposed project, noise levels exceeding the standards contained in Table 3 are considered significant. For groundborne vibration, project-related activities exceeding the City's vibration threshold of perception (0.01 inches per second PPV) are considered potentially significant, with the proviso that this threshold may be exceeded under certain circumstances based upon Policy N-4.5 of the General Plan Noise Element.

5 Impacts and Mitigation

5.1 Generation of A Substantial Temporary or Permanent Increase in Ambient Noise Levels

Implementation of the proposed project would result in two primary types of potential noise impacts: short-term (i.e., temporary) noise during construction and long-term noise during operation of the project.

Short-Term Construction Noise

Construction of the proposed project would occur in phases, including grading, site preparation, building construction, architectural coatings, and paving.

The types of construction equipment that would be used to construct the proposed project would include standard equipment that would be employed for any routine construction project of this scale, such as excavators, graders, trenchers, cranes, rubber-tired bulldozers, generators, and paving equipment. Additionally, rock crushing would occur on-site, and potential rock "popping"[2] may take place, if necessary. Rock popping, if necessary, is anticipated to take place at least 400 feet from the nearest noise-sensitive receivers.[3] Construction equipment with substantially higher noise-generation characteristics (such as pile drivers, rock drills, blasting equipment) would not be necessary for most proposed project components; however, rock blasting is anticipated to be needed for construction of Warm Springs Parkway, and is addressed below.

The range of maximum noise levels for various types of construction equipment at a distance of 50 feet is depicted in Table 7. The noise values represent maximum noise generation, or full-power operation, of the equipment. For example, a loader and two dozers, all operating at full power and relatively close together, would generate a maximum sound level of approximately 90 dBA at 50 feet from their operations. As the distance between equipment or separation of areas with simultaneous construction activity increases, dispersion and distance reduce the effects of separate noise sources added together. In addition, typical operating cycles may involve 2 minutes of full-power operation, followed by 3 or 4 minutes at lower levels. Therefore, the average noise level during construction activities is generally lower (typical levels of approximately 88 dBA L_{eq} at a distance of 50 feet) than maximum levels, since maximum noise generation may only occur up to 50% of the time. Noise levels from construction operations decrease at a rate of approximately 6 dB per doubling of distance from the source.

Table 7. Typical Maximum Construction Equipment Noise Emissions Levels

Equipment	Typical Maximum Sound Level (dBA) 50 Feet from Source
Air compressor	81
Backhoe	80

[2] A technique used to break up large boulders. Rock popping differs from conventional blasting techniques in that gun-powder capsules, inserted into drilled holes, are used rather than the ammonium nitrate fuel/oil explosives typically used, resulting in substantially lower noise and groundborne vibration levels. Noise from a rock popping event was measured by Dudek staff on the project site on October 26, 2019. Two separate rock popping events were measured, each from an approximate distance of 75 feet. In order to capture the impulsive nature of the events, the measurement intervals were 1/100 of a second in duration. The resultant rock popping noise levels ranged from approximately 52 to 59 dBA, at 75 feet. These noise levels may in fact have been lower if not for the background noise from the high school marching band practice to the south, which was nearly as loud if not louder than the rock popping noise.

[3] Based upon information provided by the property owner, rock popping, if any more is necessary, would not occur any closer than approximately 400 feet from receivers to the south or approximately 1,200 feet from receivers to the east.

Table 7. Typical Maximum Construction Equipment Noise Emissions Levels

Equipment	Typical Maximum Sound Level (dBA) 50 Feet from Source
Compactor	82
Concrete mixer	85
Concrete pump	82
Concrete vibrator	76
Crane, mobile	83
Dozer	85
Generator	81
Grader	85
Impact wrench	85
Jackhammer	88
Loader	85
Paver	89
Pneumatic tool	85
Pump	76
Roller	74
Saw	76
Truck	88

Source: DOT 2018.
Note: dBA = A-weighted decibel scale.

Construction equipment would typically be operating all over the project site, both near and far from any one location in the project vicinity. The nearest point of construction activities to the closest noise-sensitive receivers (single-family residences located east of the project site) would be approximately 40 feet (during site preparation, grading, and paving of the Vineyard II portion of the project), and the farthest would be approximately 1,500 feet (during some of the Costco portion of the project). Because construction taking place within 40 feet would be temporary and intermittent, and because the site is quite large, the distance from the nearby receivers to the "acoustic center" (the point from which the energy sum of all construction activity noise, near and far, would be centered on an average or typical basis) is utilized. For example, the nearest noise-sensitive receivers are located approximately 150 feet away from what would be the acoustic center of Phase I site preparation of the Vineyard II portion of the project site. Thus, the distance to construction activities for the closest residences would be as near as 40 feet away on a temporary and intermittent basis, but would typically be approximately 150 feet away during Phase I site preparation. For other nearby noise-sensitive land uses (such as the high school and the multi-family residences to the south), the nearest point of construction would be approximately 140 feet from adjacent noise-sensitive receivers, and the typical construction activity distance would range from approximately 420 feet to 1,100 feet, depending on the project phase.

The Federal Highway Administration's Roadway Construction Noise Model (FHWA 2008) was used to estimate construction noise levels at these noise-sensitive land uses. Although the model was funded and promulgated by the Federal Highway Administration, the Roadway Construction Noise Model is often used for non-roadway projects, because the same types of construction equipment used for roadway projects are also used for other project types. Input variables for the Roadway Construction Noise Model consist of the receiver/land use type, the equipment type and number of each (e.g., two graders, one loader, one tractor), the duty cycle for each piece of equipment (e.g., percentage of hours the equipment typically works per day), and the distance from the noise-sensitive receiver.

Noise levels from the proposed construction activities are summarized in Table 8. The complete set of Roadway Construction Noise Model input and output data for construction noise is provided in Appendix B. As shown in Table 8, at the nearest residences, located east of the project site, noise levels would range from approximately 42 to 81 dBA L_{eq} when construction would take place at or near the project boundary. More typical construction noise levels at the residences east of the site would range from approximately 41 to 74 dBA L_{eq}. At the residences and the school south of the project site, noise levels would range from approximately 50 to 77 dBA L_{eq} when construction would take place at or near the project boundary; more typically, noise levels would range from approximately 47 to 70 dBA L_{eq}.

As stated previously, it is anticipated that blasting would be necessary during construction of Warm Springs Parkway. Details regarding the amount of blasting needed or duration of such activities are not known at this time. The purpose for blasting is to sufficiently break the rock in order for it to be excavated and removed. To accomplish this, the blaster drills a pattern of boreholes distributed evenly throughout the rock to be shattered. These boreholes are then filled with a pre-determined amount of explosives. Typically, the explosives are detonated in a sequence (separated by fractions of a second) for optimal breakage. The blaster is required to design the burden, stemming, subdrill, spacing, and timing to minimize excessive vibration, airblast, and fly rock. The blaster must monitor the airblast and vibration for every blasting event (or "shot") at the nearest structure. Seismographs are used to monitor the vibration (ODOT 2002). Based upon prior experience with such projects, blasting is typically limited to one or two shots per day.

Based upon the Roadway Construction Noise Model modeling, noise from blasting is estimated to range from approximately 46 to 51 dBA L_{eq}, with maximum (L_{max}) levels ranging from approximately 66 to 71 dBA at the distances (in feet) indicated in Table 8. In the context of the overall construction noise levels, the noise from blasting, while differing in character, would be lower than conventional construction.

Table 8. Construction Noise Modeling Summary Results

Project Phase	Noise-Sensitive Receiver	Nearest or Typical Construction Activity Distance (feet)	L_{eq} (dBA)
Costco			
Site Preparation	Residences to the East of Project Site	Nearest Construction Work (670)	58
		Typical Construction Work (980)	55
	School and Residences to the South of Project Site	Nearest Construction Work (450)	61
		Typical Construction Work (750)	57
Grading	Residences to the East of Project Site	Nearest Construction Work (670)	58
		Typical Construction Work (980)	55
	School and Residences to the South of Project Site	Nearest Construction Work (450)	62
		Typical Construction Work (750)	58
Building Construction	Residences to the East of Project Site	Nearest Construction Work (1.100)	52
		Typical Construction Work (1,260)	51
	School and Residences to the South of Project Site	Nearest Construction Work (780)	59
		Typical Construction Work (970)	58
Paving	Residences to the East of Project Site	Nearest Construction Work (670)	54
		Typical Construction Work (980)	51
	School and Residences to the South of Project Site	Nearest Construction Work (450)	57
		Typical Construction Work (750)	53

Table 8. Construction Noise Modeling Summary Results

Project Phase	Noise-Sensitive Receiver	Nearest or Typical Construction Activity Distance (feet)	L_{eq} (dBA)
Architectural Coating	Residences to the East of Project Site	Nearest Construction Work (1.100)	42
		Typical Construction Work (1,260)	41
	School and Residences to the South of Project Site	Nearest Construction Work (780)	50
		Typical Construction Work (970)	48
Vineyard II			
Phase I Site Preparation	Residences to the East of Project Site	Nearest Construction Work (40)	80
		Typical Construction Work (150)	70
	School and Residences to the South of Project Site	Nearest Construction Work (140)	75
		Typical Construction Work (420)	66
Phase I Grading and Trenching	Residences to the East of Project Site	Nearest Construction Work (40)	81
		Typical Construction Work (150)	74
	School and Residences to the South of Project Site	Nearest Construction Work (140)	77
		Typical Construction Work (420)	70
Phase I Building Construction	Residences to the East of Project Site	Nearest Construction Work (65)	79
		Typical Construction Work (190)	72
	School and Residences to the South of Project Site	Nearest Construction Work (800)	64
		Typical Construction Work (1,100)	62
Phase I Paving	Residences to the East of Project Site	Nearest Construction Work (40)	74
		Typical Construction Work (150)	64
	School and Residences to the South of Project Site	Nearest Construction Work (140)	69
		Typical Construction Work (420)	60
Phase I Architectural Coating	Residences to the East of Project Site	Nearest Construction Work (65)	66
		Typical Construction Work (190)	57
	School and Residences to the South of Project Site	Nearest Construction Work (800)	50
		Typical Construction Work (1,100)	47
Phase II Precise Grading and Footing Trenching	Residences to the East of Project Site	Nearest Construction Work (40)	80
		Typical Construction Work (150)	70
	School and Residences to the South of Project Site	Nearest Construction Work (140)	76
		Typical Construction Work (420)	68
Phase II Building Construction	Residences to the East of Project Site	Nearest Construction Work (65)	75
		Typical Construction Work (190)	68
	School and Residences to the South of Project Site	Nearest Construction Work (800)	60
		Typical Construction Work (1,100)	58
Phase II Paving	Residences to the East of Project Site	Nearest Construction Work (40)	78
		Typical Construction Work (150)	68
	School and Residences to the South of Project Site	Nearest Construction Work (140)	73
		Typical Construction Work (420)	64

Table 8. Construction Noise Modeling Summary Results

Project Phase	Noise-Sensitive Receiver	Nearest or Typical Construction Activity Distance (feet)	L_{eq} (dBA)
Phase II Architectural Coating	Residences to the East of Project Site	Nearest Construction Work (65)	66
		Typical Construction Work (190)	57
	School and Residences to the South of Project Site	Nearest Construction Work (800)	50
		Typical Construction Work (1,100)	47
Warm Springs Parkway			
Blasting	Residences to the East of Project Site	Nearest Construction Work (610)	47 (67 dBA L_{max})
		Typical Construction Work (740)	46 (66 dBA L_{max})
	School and Residences to the South of Project Site	Nearest Construction Work (700)	51 (71 dBA L_{max})
		Typical Construction Work (1,090)	47 (67 dBA L_{max})
Grading	Residences to the East of Project Site	Nearest Construction Work (610)	59
		Typical Construction Work (740)	58
	School and Residences to the South of Project Site	Nearest Construction Work (700)	62
		Typical Construction Work (1,090)	59
Paving	Residences to the East of Project Site	Nearest Construction Work (610)	55
		Typical Construction Work (740)	54
	School and Residences to the South of Project Site	Nearest Construction Work (700)	58
		Typical Construction Work (1,090)	55

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

The estimated construction noise levels indicate that during the relatively brief periods when construction takes place at or near the eastern project boundary, the unmitigated noise levels would exceed the City's daytime construction noise standards for mobile equipment (75 dBA for single-family residences and 80 dBA for multi-family residences). However, with implementation of standard conditions and mitigation measures as required by the City as well as MM-NOI-3 (see Section 5.5, Mitigation Measures), this impact would be reduced to less than significant. To control construction noise levels to a level consistent with the City's General Plan Noise Element and Noise Ordinance, the City would require noise reduction measures as conditions of approval for grading and building permits. Some standard policies include limiting the hours of construction activity, locating noisy equipment as far as possible from noise-sensitive receivers, and requiring establishment of a noise complaint/resolution process.

Long-Term Operational Noise Impact

Traffic Noise Impacts. As a result of regional population growth and growth under the proposed project, traffic on local arterial streets is expected to increase relative to current conditions. Potential noise impacts from vehicular traffic were assessed using the Federal Highway Administration's Traffic Noise Model Version 2.5 (FHWA 2004). Data used to model noise from vehicular traffic were derived from the project-specific Traffic Impact Analysis prepared by Kittelson & Associates (2020). Information used in the modeling included the following scenarios (for

more detailed explanation of these traffic scenarios, please refer to Section 4.13, Transportation, or Appendix I, of the environmental impact report:

- Existing
- Existing with Project with Creighton Avenue Access
- Existing with Project without Creighton Avenue Access
- Year 2021 without Project
- Year 2021 Cumulative Conditions with Project with Creighton Avenue Access
- Year 2021 Cumulative Conditions with Project without Creighton Avenue Access
- Year 2035 without Project with Creighton Avenue Access
- Year 2035 without Project without Creighton Avenue Access
- Year 2035 Cumulative Conditions with Project with Creighton Avenue Access
- Year 2035 Cumulative Conditions with Project without Creighton Avenue Access

Each of the above scenarios was modeled using the provided average daily traffic volumes for typical weekdays and for Saturdays.[4] Noise levels were modeled at representative noise-sensitive receivers. The receivers were modeled to be 5 feet above the local ground elevation. Six receptors (ST1 through ST5, and M1) represent existing off-site residences, as shown in Figure 3.

The information provided from this modeling was compared to the noise impact significance criteria to assess whether project-related traffic noise would cause a significant impact and, if so, where these impacts would occur. The results of the comparisons for the noise-sensitive land uses for the existing conditions are presented in Table 9. The results of the comparisons for the noise-sensitive land uses for future years 2021 and 2035 conditions are presented in Tables 10 and 11, respectively. The input and output files for the Traffic Noise Model modeling are provided in Appendix C.

As shown in Table 9, the Existing-plus-Project traffic noise would generate a noise level increase of 2 dB CNEL or less (rounded to whole numbers) along the studied roads in the vicinity of the project site. Based on the FICON criteria shown in Table 6, an increase of 2 dB is not considered to be a substantial increase for traffic noise levels of less than 65 dBA CNEL. The additional traffic volumes along the adjacent roads would not result in an exceedance of applicable compatibility standards (i.e., 60 dBA CNEL for low-density residential, 65 dBA CNEL for high-density residential, 70 dBA CNEL for playgrounds and park), nor would project traffic substantially increase the existing noise level in the project vicinity. Similarly, as shown in Table 10 and Table 11, the Future-plus-Project traffic noise would generate a noise level increase of 2 dB CNEL or less (rounded to whole numbers), and the additional traffic volumes along the adjacent roads would not result in an exceedance of applicable compatibility standards. Therefore, project-related traffic noise would be **less than significant**, and no mitigation measures would be required.

[4] Traffic data for Saturdays were not provided by the project's traffic consultant for the Year 2035 scenarios because the 2035 scenario was assessed for informational purposes only. As stated in the traffic study and traffic section of this EIR, a long-range analysis is not required per the City's Traffic Impact Analysis Preparation Guide or for CEQA because the project does not propose a zone change. The 2035 analysis was conducted for the weekday PM peak hour to ensure that adequate capacity was provided along Warms Springs Parkway and for information requested by the California Department of Transportation. Therefore, traffic noise on Saturdays for Year 2035 was not modeled..

Table 9. Project-Related Traffic Noise: Existing

Modeled Receptor	Existing Weekday (dBA CNEL)	Existing with Project with Creighton Access Weekday (dBA CNEL)	Existing with Project without Creighton Access Weekday (dBA CNEL)	Maximum Increase (with Project vs. Without Project) (dBA)	Existing Saturday (dBA CNEL)	Existing with Project with Creighton Access Saturday (dBA CNEL)	Existing with Project without Creighton Access Saturday (dBA CNEL)	Maximum Increase (with Project vs. Without Project) - Saturday (dBA)
ST1 – Multi-family residences south of project site, adjacent to Clinton Keith Road	57	58	58	1	56	58	58	2
ST2 – Vista Murrieta High School, south of project sites, adjacent to Clinton Keith Road	57	57	57	0	56	57	57	1
ST3 – Multi-family residential east of project site, adjacent to Clinton Keith Road	59	61	61	2	59	60	61	2
ST4 – Single-family residential east of project site, approximately 500 feet north of Clinton Keith Road	53	53	54	1	52	53	53	1
ST5 – Single-family residential east of project site, approximately 1,100 feet north of Clinton Keith Road	50	50	51	1	50	51	51	1
M1 – Single-family residences east of project site, adjacent to Whitewood Road	57	57	57	0	56	57	57	1

Source: Appendix C.
Notes: dBA = A-weighted decibel scale; CNEL = community noise equivalent level.

Table 10. Project-Related Traffic Noise: Future Year 2021

Modeled Receptor	Year 2021 Weekday without Project (dBA CNEL)	Year 2021 Cumulative Conditions with Project with Creighton Access Weekday (dBA CNEL)	Year 2021 Cumulative Conditions with Project without Creighton Access Weekday (dBA CNEL)	Maximum Increase (with Project vs. Without Project) (dBA)	Year 2021 Saturday without Project (dBA CNEL)	Year 2021 with Project with Creighton Access Saturday (dBA CNEL)	Year 2021 with Project without Creighton Access Saturday (dBA CNEL)	Maximum Increase (with Project vs. Without Project) - Saturday (dBA)
ST1 – Multi-family residences south of project site, adjacent to Clinton Keith Road	58	59	59	1	58	59	59	1
ST2 – Vista Murrieta High School, south of project sites, adjacent to Clinton Keith Road	58	58	59	1	57	58	59	2
ST3 – Multi-family residential east of project site, adjacent to Clinton Keith Road	61	62	62	1	61	62	62	1
ST4 – Single-family residential east of project site, approximately 500 feet north of Clinton Keith Road	54	55	55	1	54	55	56	2
ST5 – Single-family residential east of project site, approximately 1,100 feet north of Clinton Keith Road	51	52	52	1	51	52	52	1
M1 – Single-family residences east of project site, adjacent to Whitewood Road	58	58	58	0	58	58	58	0

Source: Appendix C.
Notes: dBA = A-weighted decibel scale; CNEL = community noise equivalent level.

Table 11. Project-Related Traffic Noise: Future Year 2035

Modeled Receptor	Year 2035 with Creighton Access without Project Weekday (dBA CNEL)	Year 2035 Cumulative Conditions with Project with Creighton Access Weekday (dBA CNEL)	Increase (with Project vs. Without Project) – with Creighton Access (dBA)	Year 2035 without Creighton Access without Project Weekday (dBA CNEL)	Year 2035 Cumulative Conditions with Project Weekday (dBA CNEL)	Increase (with Project vs. Without Project) - without Creighton Access (dBA)
ST1 – Multi-family residences south of project site, adjacent to Clinton Keith Road	59	59	0	59	59	0
ST2 – Vista Murrieta High School, south of project sites, adjacent to Clinton Keith Road	58	59	1	58	59	1
ST3 – Multi-family residential east of project site, adjacent to Clinton Keith Road	62	63	1	62	63	1
ST4 – Single-family residential east of project site, approximately 500 feet north of Clinton Keith Road	55	56	1	55	56	1
ST5 – Single-family residential east of project site, approximately 1,100 feet north of Clinton Keith Road	52	52	0	52	52	0
M1 – Single-family residences east of project site, adjacent to Whitewood Road	60	60	0	60	60	0

Source: Appendix C.
Notes: dBA = A-weighted decibel scale; CNEL = community noise equivalent level.

On-Site Mechanical, Delivery, and Parking Lot Noise

Mechanical HVAC equipment associated with the proposed project would have the potential to generate significant noise levels. Based on information provided by the project applicant, the HVAC equipment (consisting of 5- and 10-ton-capacity units) would be located on the rooftops of the proposed buildings, and the HVAC equipment would be visually and acoustically shielded by parapet walls. Noise emissions information from the HVAC manufacturer, along with standard acoustical formulas for addition of multiple sources, attenuation with distance, and attenuation from structural shielding, were used to estimate the resulting noise levels at the nearest residences, east of the project site. The source-noise data and calculations are provided in Appendix D. As shown in Table 12, the resultant combined noise level with all HVAC units running would be approximately 45 dBA at the nearest noise-sensitive land uses. The noise from HVAC equipment would be below the City's Municipal Code noise standards for the boundary between a commercial zone and a residential zone (55 dBA during daytime hours (7 a.m. to 10 p.m.) and 50 dBA during nighttime hours (10 p.m. to 7 a.m.)). Noise from HVAC equipment related to the proposed project would be **less than significant**.

Table 12. Project-Related Heating, Ventilation, and Air Conditioning Noise

Building Type	HVAC Units		Distance from residents (approximate worst-case) (feet)	Resultant Unattenuated Noise Level (dBA)	Attenuation from Building and Parapet (dB)	Resultant noise level with Attenuation (dBA)
	Quantity	*Capacity (in tons)*				
Fitness Center	16	10	105	60.1	15.8	44.3
Major	8	10	200	51.5	12.9	38.5
Shop	1	5	300	38.9	17.6	21.4
Shops	4	5	500	40.5	17.9	22.6
Fast Food	1	10	600	32.9	14.8	18.2
	1	5	600	32.9	14.8	18.2
Combined noise level at nearest noise-sensitive receivers (worst-case) (dBA L_{eq})						**45.4**

Source: Appendix D
Notes: HVAC = heating, ventilation, and air conditioning; dBA = A-weighted decibel; dB = decibel.

Noise would occur from retail store deliveries and gas station deliveries. Costco warehouse hours are anticipated to be Monday through Friday from 10:00 a.m. to 8:30 p.m., Saturday from 9:30 a.m. to 6:00 p.m., and Sunday from 10:00 a.m. to 6:00 p.m. The gas station hours are anticipated to be daily from 5:00 a.m. to 10:00 p.m. Costco anticipates an average of approximately 10 trucks delivering goods to the warehouse on a typical weekday. The trucks range in size from 26 feet long for single-axle trailers to 70 feet long for double-axle trailers. Receiving times would vary based on jurisdictional restrictions, but would typically take place in the early morning, with most deliveries completed before the 10:00 a.m. warehouse opening time. Deliveries to the warehouse would be made primarily in Costco trucks from its freight consolidation facility in Mira Loma, California, entering the site from Interstate 215 and exiting at Clinton Keith Road. The Costco warehouse location (in the northwestern portion of the project site), and the delivery area (in the northeasterly corner of the warehouse building) would result in truck delivery activities taking place approximately 800 feet or more from the nearest noise-sensitive receivers, and shielded from a direct view by intervening structures (either the Costco warehouse building itself or the Vineyard II buildings).

It is estimated that fuel would be delivered to the gasoline facility via eight to nine trucks per day,[5] as needed. The gas station's proposed location near the northern project boundary, the acoustical shielding provided by proposed on-site structures and existing residential boundary walls, and the relatively large distances (approximately 650 feet or more from the nearest noise-sensitive receivers) would minimize gas-station-related noise.

The Costco warehouse building would include a tire center. The proposed 2,720-square-foot tire center would have five bays and hydraulic lifts where customers could have new tires installed on their vehicles. The tire center would be located approximately 780 feet from the nearest noise-sensitive land uses (the school and residences to the south) and would be physically separated from those residences by Clinton Keith Road and the proposed retail structures to the south, which would likely provide some degree of structural shielding by blocking the direct view (and thus, the direct source-receiver path) of the work area.

Noise-generating equipment at the tire center would most likely include tire changers, wheel balancers, air compressors, and various tools. The primary noise sources would be the power and pneumatic tools, as well as noise from hitting and banging car parts such as hubcaps, tires, car hoods, and car doors being closed. The tire center would operate during the same hours as the Costco warehouse retail hours (Monday through Friday from 10:00 a.m. to 8:30 p.m., Saturday from 9:30 a.m. to 6:00 p.m., and Sunday from 10:00 a.m. to 6:00 p.m.). Additionally, it is anticipated that the tire center would receive one to two tire delivery trucks twice a week between the hours of 6:00 a.m. and 9:00 a.m.

Based on a prior noise study conducted at an existing Costco tire center (Giroux & Associates 2015), the noise level during a noisy period (with five air guns in intermittent operation) was approximately 53 dBA L_{eq} at a distance of 70 feet directly in front of the open bay doors. Very brief, maximum noise levels of approximately 67 dBA L_{max} at 70 feet were measured. All related work would take place within the building, which would have a solid wall with no openings to the residences to the east. However, there would be service bay doors on the south side of the building, and these would likely be open much of the time for ventilation and in order to move the cars in and out of the facility.

The closest residential properties would be approximately 780 feet or more from the tire center. At this distance, the average noise level from the tire center activities would be approximately 32 dBA L_{eq} or less, conservatively neglecting likely shielding from intervening structures. This noise level would be well below the City's noise ordinance standard for residential uses of 50 dBA L_{eq} from 7:00 a.m. to 10:00 p.m. Very brief, maximum noise levels of approximately 46 dBA L_{max} at residences are estimated; these would likely not be readily audible, because the existing ambient maximum noise levels are substantially higher (a noise level of 71 dBA L_{max} was measured at ST1 and a noise level of 65 dBA L_{max} was measured at ST2). Similarly, the tire delivery noise, occurring 780 feet of more from nearby noise-sensitive uses, would be negligible.[6] Therefore, noise from auto-related services would be less than significant. No mitigation is required.

For the Vineyard II Retail Development, deliveries would be through the front doors before 10:30 a.m., except at the major retail pad (Building J), which has an enclosed truck door dock to control sound in the rear of the building. Operating hours for the retail development would vary and are subject to the policies of each building

[5] Based upon reference noise levels conducted for a proposed gas station by others (Extant Acoustics 2016), fuel delivery trucks are estimated to create maximum 1-second noise levels of approximately 71 dBA at 50 feet. At the nearest residences, located approximately 650 feet away, the resultant noise level would be approximately 49 dBA, not accounting for acoustical shielding. Thus, noise from this activity (likely the loudest activity associated with the fueling station) would not be loud or intrusive.

[6] A study in the Journal of Environmental Engineering and Landscape Management (Baltrënas et al. 2004) published cargo truck delivery noise levels of 96 dBA (L_{max}) at 1 meter (3.28 feet) from the boundary of the truck activity area. At a distance of 780 feet, the resulting noise level would be approximately 48 dBA L_{max}. Average delivery truck noise levels would be substantially lower.

occupant; however, operating hours for the retail uses are expected to be 8:30 a.m. to 6:00 p.m. Operating hours for the restaurant uses are expected to be 11:00 a.m. to 10:00 p.m. The fitness center is expected to operate from 6 a.m. to 11 p.m.

Parking for the project would primarily be provided in the center of the retail center, with stores on the perimeter. Primary access to the proposed parking lots would be via Warm Springs Parkway from Clinton Keith Road to the south. Noise sources from parking lots include car alarms, door slams, radios, and tire squeals. The instantaneous sound pressure levels from these sources typically range from approximately 30 dBA to 66 dBA at a distance of 100 feet (Gordon Bricken & Associates 1996) and are generally short-term and intermittent. Parking lots have the potential to generate instantaneous noise levels that exceed 60 dBA depending on the location of the source; however, noise sources from the parking lot would be different from each other in kind, duration, and location, so that the overall effects would be separate, and, in most cases, would not affect noise-sensitive receptors at the same time. Other parking lot activities such as periodic parking lot cleaning, which could occur prior to or after retail business hours, would create additional noise; however, such activities would be quite brief at any one location on site and would be conducted in accordance with the City of Murrieta Municipal Code. Furthermore, the proposed parking areas would, for the most part, be shielded from a direct view of residences to the east by the intervening proposed fitness center and other retail buildings. Additionally, the existing perimeter wall (approximately 6 feet in height) at the eastern project boundary would provide noise reduction from the on-site noise-generating activities. Therefore, noise impacts from on-site operational noise would be less than significant. Therefore, noise impacts from parking structure noise would be **less than significant**.

5.2 Excessive Groundborne Vibration or Groundborne Noise Levels

Groundborne vibration is a small, rapidly fluctuating motion transmitted through the ground that diminishes (attenuates) fairly rapidly over distance.

Construction activities may generate excessive groundborne vibration or groundborne noise, causing a potentially significant impact. Heavier pieces of construction equipment, such as bulldozers, have peak particle velocities of approximately 0.089 inches/second or less at a distance of 25 feet (DOT 2018).

Groundborne vibration typically attenuates over short distances. At the distance from the nearest residence to the construction area (approximately 40 feet) and with the anticipated construction equipment (i.e., heavier equipment such as bulldozers), the PPV would be approximately 0.044 inches/second. If extended construction work with heavy equipment were to occur adjacent to the closest sensitive receptors, vibration levels would exceed the City's established perception threshold of 0.01 PPV inches/sec (Section 16.30.130(K)), and thus result in a significant impact. However, this is not anticipated, because work would only occur intermittently near the project boundary. This is due to the majority of the project work not being adjacent to the project boundary. Furthermore, based upon Policy N-4.5 of the General Plan Noise Element, the City permits the exceedance of noise standards on a case-by-case basis for special circumstances, including expedited development projects, of which this project is one.

Regarding groundborne vibration from anticipated blasting activities during construction of Warm Springs Parkway, vibration levels would be negligible at the nearest sensitive receptors, located 600 feet away or further. Based upon reference Blast Vibration Prediction Curves per Oriard (Caltrans 2013b), vibration levels would typically range from

less than 0.001 PPV in/second to approximately 0.008 PPV in/second at 600 feet, and thus would not exceed the City's established perception threshold of 0.01 PPV in/second at the nearest sensitive receptors.

Implementation of MM-NOI-1 (Section 5.5) would ensure that construction staging and stockpiling is situated as far from nearby noise- and vibration-sensitive receivers as possible and that sensitive receptors are notified of construction activities and are provided contact information for noise- or vibration-related complaints, as well as a resolution process. Implementation of these measures would reduce vibration impacts at sensitive receptor locations to a less-than-significant-level.

Construction can also affect nearby buildings by inflicting damage from vibration. However, construction vibration associated with this project would not result in structural building damage. Building damage typically occurs at vibration levels of 0.5 inches/second or greater for buildings of reinforced concrete, steel, or timber construction (DOT 2018). As discussed above, the anticipated vibration levels during construction would be well below potential structural damage thresholds.

Once operational, the project would not generate substantial levels of groundborne vibration. Off-site delivery trucks, for example, are not anticipated to generate significant levels of vibration, because vehicles traveling on pneumatic tires with flexible suspension systems minimize such vibration, provided that the road surface is relatively smooth (Caltrans 2013b). Thus, upon compliance with MM-NOI-1, impacts associated with vibration would be **less than significant with mitigation incorporated**.

5.3 Airport Land Use Plan or Private Airstrip

The closest airport to the project site is French Valley Airport, located at 37600 Sky Canyon Drive in Murrieta, California, approximately 2.5 miles southeast of the project site. The project would not be located within 2 miles of any airport, and would not expose people residing or working in the project area to excessive noise levels associated with an airport. Additionally, there are no private airstrips in the vicinity of the project site. Therefore, the project would result in **no impact** related to airports.

5.4 Cumulative Impacts

Non-transportation noise sources (e.g., project operation) and construction noise impacts are typically project-specific and highly localized (i.e., these do not generally affect the community noise level at distances beyond several hundred feet). Construction activities associated with proposed or future development within the area would contribute to cumulative noise levels, but in a geographically limited and temporary manner. As other development occurs in the area, noise from different types of uses (e.g., traffic, aircraft, fixed noise sources) would continue to combine, albeit on a localized basis, to cause increases in overall background noise conditions within the area. However, such sources do not significantly contribute to cumulative noise impacts at distant locations, and so were not evaluated on a cumulative level.

The future (Year 2021 and Year 2035) traffic volumes used for the analysis of traffic noise include cumulative growth. As shown in Tables 10 and 11, the project's future traffic-related impacts would not result in a significant noise level increase along adjacent roadways. Table 13 compares Future (Year 2035) Cumulative with Project Conditions traffic noise to the Existing traffic noise scenario.

Table 13. Project-Related Traffic Noise: Cumulative Impacts (Future with Project vs. Existing)

Modeled Receptor	Existing Weekday without Project (dBA CNEL)	Year 2035 Cumulative Conditions with project with Creighton Access Weekday (dBA CNEL)	Year 2035 Cumulative Conditions with project without Creighton Access Weekday (dBA CNEL)	Maximum Cumulative Increase (dBA)
ST1 – Multi-family residences south of project site, adjacent to Clinton Keith Road	57	59	59	2
ST2 – Vista Murrieta High School, south of project sites, adjacent to Clinton Keith Road	57	59	59	2
ST3 – Multi-family residential east of project site, adjacent to Clinton Keith Road	59	63	63	4
ST4 – Single-family residential east of project site, approximately 500 feet north of Clinton Keith Road	53	56	56	3
ST5 – Single-family residential east of project site, approximately 1,100 feet north of Clinton Keith Road	50	52	52	2
M1 – Single-family residences east of project site, adjacent to Whitewood Road	57	60	60	3

Notes: dBA = A-weighted decibel scale; CNEL = community noise equivalent level.

As shown in Table 13, the cumulative noise increase is estimated to range from 2 to 4 dB. The resulting increase would not be substantial based upon the FICON noise thresholds. Therefore, impacts would not be cumulatively considerable and would be **less than significant**.

5.5 Mitigation

Standard Conditions

The following standard condition (SC) applies to the project:

SC-NOI-1 The applicant shall ensure that construction activities be limited to no more than the hours of 7:00 a.m. to 7:00 p.m. Monday through Saturday except in the event of emergency declared by City, State, or Federal officials. These conditions shall be listed on the project's final design plans to the satisfaction of the City.

Mitigation Measures

The following mitigation measures (MM) would be implemented as a condition of project approval:

MM-NOI-1 Prior to grading permit issuance, the applicant shall ensure the following:

- All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers.
- Construction noise reduction methods, such as shutting off idling equipment, maximizing the distance between construction equipment staging areas and occupied sensitive receptor areas, and use of electric air compressors and similar power tools rather than diesel equipment, shall be used where feasible.
- Noise attenuation measures, which may include temporary noise barriers or noise blankets, shall be placed around stationary construction noise sources.
- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from or shielded from sensitive receptors.
- During construction, stockpiling and vehicle staging areas shall be located as far as practical from noise-sensitive receptors while being located on the project site or on existing developed areas.
- Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow surrounding property owners and residents to contact the job superintendent if necessary. In the event that the City of Murrieta receives a complaint, appropriate corrective actions (such as eliminating the use of high-noise and vibration-producing equipment or replacing with smaller equipment types or other equivalent methods) shall be implemented and a report of the action provided to the reporting party.

MM-NOI-2 The applicant shall require that all construction equipment be operated with mandated noise control equipment (mufflers or silencers). Enforcement shall be accomplished by random field inspections by applicant personnel during construction activities to the satisfaction of the City of Murrieta Engineering Department.

MM-NOI-3 A temporary construction noise barrier shall be constructed along the eastern boundary of the project site during construction of Vineyard II. The noise barrier shall be a minimum of 8 feet in height, must have a surface density of at least 4 pounds per square foot, and be free of openings and cracks and shall be designed to achieve a noise reduction of at least 5 A-weighted decibels.

The effectiveness of MM-NOI-1 and MM-NOI-2 would vary from several dB (which in general is a relatively small change) to 10 or more dB (which subjectively would be perceived as a substantial change), depending on the specific equipment, the original condition of that equipment, the specific locations of the noise sources and the receivers, and other factors. Installation of more effective silencers could range from several dB to well over 10 dB. MM-NOI-3, which requires the construction of an 8-foot-high temporary noise barrier along the eastern boundary of the project site during construction of Vineyard II site, would provide an additional noise reduction of approximately 5 dB. Cumulatively, these measures would result in substantial decreases in the noise from construction. Assuming a nominal reduction of 7 dB from the combination of these measurements, the maximum estimated noise level from construction activities would be reduced to below the City construction noise standard of 75 dBA Leq. With implementation of MM-NOI-1, MM-NOI-2, and MM-NOI-3, short-term construction impacts associated with exposure of persons to or generation of noise levels in excess of established standards would be **less than significant**.

6 Summary and Conclusions

This noise analysis evaluated the potential for significant adverse impacts due to project construction and operation. Implementation of the project would result in two primary types of potential noise impacts: short-term (i.e., temporary) noise during construction and long-term noise during operation of the project.

Noise from construction would exceed the City's daytime construction noise standards for mobile equipment (75 dBA for single-family residences, and 80 dBA for multi-family residences). Additionally, unmitigated construction noise levels could result in annoyance and would be considered substantial; therefore, construction noise impacts would be significant unless mitigated. With implementation of standard conditions and mitigation measures as required by the City (see Section 5.5) noise impacts from construction activities would be reduced to less than significant. The project's traffic-related impacts would not result in a significant noise level increase along adjacent roadways; therefore, traffic noise impacts would be less than significant at off-site land uses. On-site mechanical and parking lot noise associated with the proposed project was assessed and determined to result in less-than-significant noise impacts. Vibration levels associated with project construction would likely be briefly perceptible at nearby residences, but they would be below the Department of Transportation's threshold of potential damage for normal structures (0.20 PPV in/sec), and would not be considered excessive. The project site is not located within the vicinity of an airport or private airstrip and, therefore, would not expose people residing or working in the project area to excessive noise levels associated with an airport or airstrip. Finally, this noise analysis concludes that the proposed project would not result in any significant cumulative impacts.

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8 List of Preparers

Mike Greene, INCE Bd. Cert., Environmental Specialist/Acoustician
Connor Burke, Environmental Specialist/Acoustics and Air Quality

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Appendix A

Field Noise Measurement Data

DUDEK
CREATOR OF KERATA TECHNOLOGY

FIELD DATA REPORT

Field Noise Measurement Data

Record: 854	
Project Name	*RDA Curci*
Observer(s)	*Connor Burke*
Date	*2018-02-23*

Meteorological Conditions	
Temp (F)	*51*
Humidity % (R.H.)	*29*
Wind	*Light*
Wind Speed (MPH)	*8*
Wind Direction	*East*
Sky	*Partly Cloudy*

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*

Recordings	
Record #	*1*
Site ID	*ST2*
Site Location Lat/Long	*33.596960, -117.167317*
Begin (Time)	*09:56:00*
End (Time)	*10:11:00*
Leq	*55*
Lmax	*65.1*
Lmin	*46.8*
Other Lx?	*L90, L50, L10*
L90	*49.2*
L50	*52*
L10	*58.4*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*HVAC / pool pumps.*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Traffic*
Other Noise Sources Additional Description	*Backup alarms. Hvac. School construction site.*
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	
Comments / Description	*Facing northwest towards Clinton Keith.*

Recordings

Record #	*2*
Site ID	*ST3*
Site Location Lat/Long	*33.598021, -117.166866*
Begin (Time)	*10:18:00*
End (Time)	*10:28:00*
Leq	*54.3*
Lmax	*65.8*
Lmin	*44.2*
Other Lx?	*L90, L50, L10*
L90	*47.3*
L50	*52.6*
L10	*57.8*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Rustling Leaves*
Other Noise Sources Additional Description	*Backup alarms.*
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	*5*
Lane Width (feet)	*10*
Roadway Width (feet)	*50*
Roadway Width (m)	*15*
Distance to Roadway (feet)	*60*
Distance to Roadway (m)	*60*
Distance Measured to Centerline or Edge of Pavement?	*Centerline*
Estimated Vehicle Speed (MPH)	*40*
Count Duration (Min)	*10*

Traffic Counts	
Vehicle Count Summary	*Autos 102, MT 1, HT 1, Buses 0, MC 0*
Count Duration (minutes)	*0*
Counting Both Directions?	*Yes*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Use Counter (+/-)*
Autos	*102*
Medium Trucks	*1*
Heavy Trucks	*1*
Buses	*0*
Motorcycles	*0*

Description / Photos

Site Photos	
Photo	
Comments / Description	*Facing south east towards Clinton Keith.*

Recordings	
Record #	*3*
Site ID	*ST4*
Site Location Lat/Long	*33.600975, -117.166889*
Begin (Time)	*10:39:00*
End (Time)	*10:49:00*
Leq	*52.1*
Lmax	*63.6*
Lmin	*43.9*
Other Lx?	*L90, L50, L10*
L90	*45.4*
L50	*48.2*
L10	*55.9*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Construction noise.*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Rustling Leaves*
Other Noise Sources Additional Description	*Backup alarms. Excavator.*
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	
Comments / Description	*Facing west towards project site.*

DUDEK
CREATOR OF KERATA TECHNOLOGY

FIELD DATA REPORT

Recordings	
Record #	4
Site ID	ST1
Site Location Lat/Long	33.597558, -117.172063
Begin (Time)	10:56:00
End (Time)	11:06:00
Leq	55.6
Lmax	71.3
Lmin	46.3
Other Lx?	L90, L50, L10
L90	48.9
L50	52
L10	55.4
Other Lx (Specify Metric)	L
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Traffic, Rustling Leaves
Other Noise Sources Additional Description	Siren. Hvac
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	0
Lane Width (feet)	10
Roadway Width (feet)	0
Roadway Width (m)	0
Distance to Roadway (feet)	50
Distance to Roadway (m)	50
Distance Measured to Centerline or Edge of Pavement?	Centerline
Estimated Vehicle Speed (MPH)	40
Count Duration (Min)	10

Traffic Counts	
Vehicle Count Summary	Autos 0, MT 0, HT 0, Buses 0, MC 0
Count Duration (minutes)	0
Counting Both Directions?	Yes
Vehicle Count Tally	
Select Method for Vehicle Counts	Enter Manually
Autos	0
Number of Vehicles - Autos	123
Medium Trucks	0
Number of Vehicles - Medium Trucks	3
Heavy Trucks	0
Number of Vehicles - Heavy Trucks	2
Buses	0
Motorcycles	0

Description / Photos

Site Photos	
Photo	
Comments / Description	*Facing north towards Clinton Keith*

Appendix B

Construction Noise Modeling Input/Output Files

Report date: 1/16/2020
Case Description: Costco Murrieta - Costco Site Prep

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	670	5
Dozer	No	40		81.7	700	5
Dozer	No	40		81.7	750	5
Tractor	No	40	84		680	5
Front End Loader	No	40		79.1	750	5
Backhoe	No	40		77.6	800	5
Front End Loader	No	40		79.1	700	5

Equipment	Results Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Dozer	54.1	50.1	N/A	N/A	N/A	N/A
Dozer	53.7	49.8	N/A	N/A	N/A	N/A
Dozer	53.1	49.2	N/A	N/A	N/A	N/A
Tractor	56.3	52.3	N/A	N/A	N/A	N/A
Front End Loader	50.6	46.6	N/A	N/A	N/A	N/A
Backhoe	48.5	44.5	N/A	N/A	N/A	N/A
Front End Loader	51.2	47.2	N/A	N/A	N/A	N/A
Total	56.3	57.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	980	5
Dozer	No	40		81.7	980	5
Dozer	No	40		81.7	980	5
Tractor	No	40	84		980	5
Front End Loader	No	40		79.1	980	5
Backhoe	No	40		77.6	980	5
Front End Loader	No	40		79.1	980	5

Equipment	Results Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Dozer	50.8	46.8	N/A	N/A	N/A	N/A
Dozer	50.8	46.8	N/A	N/A	N/A	N/A
Dozer	50.8	46.8	N/A	N/A	N/A	N/A
Tractor	53.2	49.2	N/A	N/A	N/A	N/A
Front End Loader	48.3	44.3	N/A	N/A	N/A	N/A
Backhoe	46.7	42.7	N/A	N/A	N/A	N/A
Front End Loader	48.3	44.3	N/A	N/A	N/A	N/A
Total	53.2	54.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	450	5
Dozer	No	40		81.7	470	5
Dozer	No	40		81.7	500	5
Tractor	No	40	84		460	5
Front End Loader	No	40		79.1	500	5
Backhoe	No	40		77.6	600	5
Front End Loader	No	40		79.1	650	5

Equipment	Results Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Dozer	57.6	53.6	N/A	N/A	N/A	N/A
Dozer	57.2	53.2	N/A	N/A	N/A	N/A
Dozer	56.7	52.7	N/A	N/A	N/A	N/A
Tractor	59.7	55.7	N/A	N/A	N/A	N/A
Front End Loader	54.1	50.1	N/A	N/A	N/A	N/A
Backhoe	51	47	N/A	N/A	N/A	N/A
Front End Loader	51.8	47.9	N/A	N/A	N/A	N/A
Total	59.7	60.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	750	5
Dozer	No	40		81.7	750	5
Dozer	No	40		81.7	750	5
Tractor	No	40	84		750	5
Front End Loader	No	40		79.1	750	5
Backhoe	No	40		77.6	750	5
Front End Loader	No	40		79.1	750	5

Equipment	Results Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Dozer	53.1	49.2	N/A	N/A	N/A	N/A
Dozer	53.1	49.2	N/A	N/A	N/A	N/A
Dozer	53.1	49.2	N/A	N/A	N/A	N/A
Tractor	55.5	51.5	N/A	N/A	N/A	N/A
Front End Loader	50.6	46.6	N/A	N/A	N/A	N/A
Backhoe	49	45.1	N/A	N/A	N/A	N/A
Front End Loader	50.6	46.6	N/A	N/A	N/A	N/A
Total	55.5	57.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #1 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	670	5
Grader	No	40	85		700	5
Dozer	No	40		81.7	750	5
Tractor	No	40	84		680	5
Front End Loader	No	40		79.1	750	5
Dozer	No	40		81.7	800	5

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	53.2	49.2	N/A	N/A	N/A	N/A
Grader	57.1	53.1	N/A	N/A	N/A	N/A
Dozer	53.1	49.2	N/A	N/A	N/A	N/A
Tractor	56.3	52.3	N/A	N/A	N/A	N/A
Front End Loader	50.6	46.6	N/A	N/A	N/A	N/A
Dozer	52.6	48.6	N/A	N/A	N/A	N/A
Total	57.1	58.2	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	980	5
Grader	No	40	85		980	5
Dozer	No	40		81.7	980	5
Tractor	No	40	84		980	5
Front End Loader	No	40		79.1	980	5
Dozer	No	40		81.7	980	5

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	49.9	45.9	N/A	N/A	N/A	N/A
Grader	54.2	50.2	N/A	N/A	N/A	N/A
Dozer	50.8	46.8	N/A	N/A	N/A	N/A
Tractor	53.2	49.2	N/A	N/A	N/A	N/A
Front End Loader	48.3	44.3	N/A	N/A	N/A	N/A
Dozer	50.8	46.8	N/A	N/A	N/A	N/A
Total	54.2	55.4	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

Excavator	No	40		80.7	450	5
Grader	No	40	85		470	5
Dozer	No	40		81.7	500	5
Tractor	No	40	84		460	5
Front End Loader	No	40		79.1	500	5
Dozer	No	40		81.7	600	5

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	56.6	52.6	N/A	N/A	N/A	N/A
Grader	60.5	56.6	N/A	N/A	N/A	N/A
Dozer	56.7	52.7	N/A	N/A	N/A	N/A
Tractor	59.7	55.7	N/A	N/A	N/A	N/A
Front End Loader	54.1	50.1	N/A	N/A	N/A	N/A
Dozer	55.1	51.1	N/A	N/A	N/A	N/A
Total	60.5	61.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	750	5
Grader	No	40	85		750	5
Dozer	No	40		81.7	750	5
Tractor	No	40	84		750	5
Front End Loader	No	40		79.1	750	5
Dozer	No	40		81.7	750	5

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	52.2	48.2	N/A	N/A	N/A	N/A
Grader	56.5	52.5	N/A	N/A	N/A	N/A
Dozer	53.1	49.2	N/A	N/A	N/A	N/A
Tractor	55.5	51.5	N/A	N/A	N/A	N/A
Front End Loader	50.6	46.6	N/A	N/A	N/A	N/A
Dozer	53.1	49.2	N/A	N/A	N/A	N/A
Total	56.5	57.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/16/2020
Case Description: Costco Murrieta - Costco Paving

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	670	5
Paver	No	50		77.2	700	5
Concrete Pump Truck	No	20		81.4	750	5

Concrete Mixer Truck	No	40	78.8	680	5
Roller	No	20	80	750	5
Roller	No	20	80	800	5

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	49.7	46.7	N/A	N/A	N/A	N/A
Paver	49.3	46.3	N/A	N/A	N/A	N/A
Concrete Pump Truck	52.9	45.9	N/A	N/A	N/A	N/A
Concrete Mixer Truck	51.1	47.1	N/A	N/A	N/A	N/A
Roller	51.5	44.5	N/A	N/A	N/A	N/A
Roller	50.9	43.9	N/A	N/A	N/A	N/A
Total	52.9	53.7	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	980	5
Paver	No	50		77.2	980	5
Concrete Pump Truck	No	20		81.4	980	5
Concrete Mixer Truck	No	40		78.8	980	5
Roller	No	20		80	980	5
Roller	No	20		80	980	5

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	46.4	43.4	N/A	N/A	N/A	N/A
Paver	46.4	43.4	N/A	N/A	N/A	N/A
Concrete Pump Truck	50.6	43.6	N/A	N/A	N/A	N/A
Concrete Mixer Truck	48	44	N/A	N/A	N/A	N/A
Roller	49.2	42.2	N/A	N/A	N/A	N/A
Roller	49.2	42.2	N/A	N/A	N/A	N/A
Total	50.6	50.9	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	450	5
Paver	No	50		77.2	470	5
Concrete Pump Truck	No	20		81.4	500	5
Concrete Mixer Truck	No	40		78.8	460	5
Roller	No	20		80	500	5
Roller	No	20		80	600	5

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	53.1	50.1	N/A	N/A	N/A	N/A
Paver	52.8	49.7	N/A	N/A	N/A	N/A

Concrete Pump Truck		56.4	49.4	N/A	N/A	N/A	N/A
Concrete Mixer Truck		54.5	50.5	N/A	N/A	N/A	N/A
Roller		55	48	N/A	N/A	N/A	N/A
Roller		53.4	46.4	N/A	N/A	N/A	N/A
	Total	56.4	57	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	750	5
Paver	No	50		77.2	750	5
Concrete Pump Truck	No	20		81.4	750	5
Concrete Mixer Truck	No	40		78.8	750	5
Roller	No	20		80	750	5
Roller	No	20		80	750	5

			Results			
	Calculated (dBA)			Noise Limits (dBA)		
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	48.7	45.7	N/A	N/A	N/A	N/A
Paver	48.7	45.7	N/A	N/A	N/A	N/A
Concrete Pump Truck	52.9	45.9	N/A	N/A	N/A	N/A
Concrete Mixer Truck	50.3	46.3	N/A	N/A	N/A	N/A
Roller	51.5	44.5	N/A	N/A	N/A	N/A
Roller	51.5	44.5	N/A	N/A	N/A	N/A
Total	52.9	53.3	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/16/2020
Case Description: Costco Murrieta - Costco Bldg Const

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane	No	16		80.6	1100	5
Man Lift	No	20		74.7	1150	5
Man Lift	No	20		74.7	1300	5
Man Lift	No	20		74.7	1400	5
Generator	No	50		80.6	1100	5
Tractor	No	40	84		1200	5
Front End Loader	No	40		79.1	1300	5
Backhoe	No	40		77.6	1350	5
Welder / Torch	No	40		74	1200	5

			Results			
	Calculated (dBA)			Noise Limits (dBA)		
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	48.7	40.7	N/A	N/A	N/A	N/A
Man Lift	42.5	35.5	N/A	N/A	N/A	N/A

Man Lift		41.4	34.4	N/A	N/A	N/A	N/A
Man Lift		40.8	33.8	N/A	N/A	N/A	N/A
Generator		48.8	45.8	N/A	N/A	N/A	N/A
Tractor		51.4	47.4	N/A	N/A	N/A	N/A
Front End Loader		45.8	41.8	N/A	N/A	N/A	N/A
Backhoe		43.9	40	N/A	N/A	N/A	N/A
Welder / Torch		41.4	37.4	N/A	N/A	N/A	N/A
	Total	51.4	51.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	1260	5
Man Lift	No	20		74.7	1260	5
Man Lift	No	20		74.7	1260	5
Man Lift	No	20		74.7	1260	5
Generator	No	50		80.6	1260	5
Tractor	No	40	84		1260	5
Front End Loader	No	40		79.1	1260	5
Backhoe	No	40		77.6	1260	5
Welder / Torch	No	40		74	1260	5

	Results					
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	47.5	39.6	N/A	N/A	N/A	N/A
Man Lift	41.7	34.7	N/A	N/A	N/A	N/A
Man Lift	41.7	34.7	N/A	N/A	N/A	N/A
Man Lift	41.7	34.7	N/A	N/A	N/A	N/A
Generator	47.6	44.6	N/A	N/A	N/A	N/A
Tractor	51	47	N/A	N/A	N/A	N/A
Front End Loader	46.1	42.1	N/A	N/A	N/A	N/A
Backhoe	44.5	40.6	N/A	N/A	N/A	N/A
Welder / Torch	41	37	N/A	N/A	N/A	N/A
Total	51	51.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	780	0
Man Lift	No	20		74.7	800	0
Man Lift	No	20		74.7	850	0
Man Lift	No	20		74.7	900	0
Generator	No	50		80.6	800	0
Tractor	No	40	84		900	0
Front End Loader	No	40		79.1	950	0
Backhoe	No	40		77.6	1000	0
Welder / Torch	No	40		74	850	0

	Results					
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq

Crane		56.7	48.7	N/A	N/A	N/A	N/A
Man Lift		50.6	43.6	N/A	N/A	N/A	N/A
Man Lift		50.1	43.1	N/A	N/A	N/A	N/A
Man Lift		49.6	42.6	N/A	N/A	N/A	N/A
Generator		56.5	53.5	N/A	N/A	N/A	N/A
Tractor		58.9	54.9	N/A	N/A	N/A	N/A
Front End Loader		53.5	49.6	N/A	N/A	N/A	N/A
Backhoe		51.5	47.6	N/A	N/A	N/A	N/A
Welder / Torch		49.4	45.4	N/A	N/A	N/A	N/A
	Total	58.9	59.3	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane	No	16		80.6	970	0
Man Lift	No	20		74.7	970	0
Man Lift	No	20		74.7	970	0
Man Lift	No	20		74.7	970	0
Generator	No	50		80.6	970	0
Tractor	No	40	84		970	0
Front End Loader	No	40		79.1	970	0
Backhoe	No	40		77.6	970	0
Welder / Torch	No	40		74	970	0

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	54.8	46.8	N/A	N/A	N/A	N/A
Man Lift	48.9	42	N/A	N/A	N/A	N/A
Man Lift	48.9	42	N/A	N/A	N/A	N/A
Man Lift	48.9	42	N/A	N/A	N/A	N/A
Generator	54.9	51.9	N/A	N/A	N/A	N/A
Tractor	58.2	54.3	N/A	N/A	N/A	N/A
Front End Loader	53.4	49.4	N/A	N/A	N/A	N/A
Backhoe	51.8	47.8	N/A	N/A	N/A	N/A
Welder / Torch	48.2	44.3	N/A	N/A	N/A	N/A
Total	58.2	58.4	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Report date: 1/16/2020
Case Description: Costco Murrieta - Costco Arch Coating

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	1100	5

			Results			
	Calculated (dBA)		Noise Limits (dBA)			

Equipment		*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq
Compressor (air)		45.8	41.8	N/A	N/A	N/A	N/A
	Total	45.8	41.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	1260	5

Results

Calculated (dBA)				Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		44.6	40.7	N/A	N/A	N/A	N/A
	Total	44.6	40.7	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	780	0

Results

Calculated (dBA)				Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		53.8	49.8	N/A	N/A	N/A	N/A
	Total	53.8	49.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	970	0

Results

Calculated (dBA)				Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		51.9	47.9	N/A	N/A	N/A	N/A
	Total	51.9	47.9	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Report date: 1/16/2020
Case Description: Costco Murrieta - Vineyard II Ph 1 Site Prep

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	40	5
Dozer	No	40		81.7	50	5
Dozer	No	40		81.7	75	5
Tractor	No	40	84		50	5
Front End Loader	No	40		79.1	60	5

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	78.6	74.6	N/A	N/A	N/A	N/A
Dozer	76.7	72.7	N/A	N/A	N/A	N/A
Dozer	73.1	69.2	N/A	N/A	N/A	N/A
Tractor	79	75	N/A	N/A	N/A	N/A
Front End Loader	72.5	68.5	N/A	N/A	N/A	N/A
Total	79	79.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	150	5
Dozer	No	40		81.7	150	5
Dozer	No	40		81.7	150	5
Tractor	No	40	84		150	5
Front End Loader	No	40		79.1	150	5

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	67.1	63.1	N/A	N/A	N/A	N/A
Dozer	67.1	63.1	N/A	N/A	N/A	N/A
Dozer	67.1	63.1	N/A	N/A	N/A	N/A
Tractor	69.5	65.5	N/A	N/A	N/A	N/A
Front End Loader	64.6	60.6	N/A	N/A	N/A	N/A
Total	69.5	70.4	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	140	0
Dozer	No	40		81.7	150	0

Dozer	No	40		81.7	175	0
Tractor	No	40	84		200	0
Front End Loader	No	40		79.1	160	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	72.7	68.7	N/A	N/A	N/A	N/A
Dozer	72.1	68.1	N/A	N/A	N/A	N/A
Dozer	70.8	66.8	N/A	N/A	N/A	N/A
Tractor	72	68	N/A	N/A	N/A	N/A
Front End Loader	69	65	N/A	N/A	N/A	N/A
Total	72.7	74.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	420	0
Dozer	No	40		81.7	420	0
Dozer	No	40		81.7	420	0
Tractor	No	40	84		420	0
Front End Loader	No	40		79.1	420	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	63.2	59.2	N/A	N/A	N/A	N/A
Dozer	63.2	59.2	N/A	N/A	N/A	N/A
Dozer	63.2	59.2	N/A	N/A	N/A	N/A
Tractor	65.5	61.5	N/A	N/A	N/A	N/A
Front End Loader	60.6	56.6	N/A	N/A	N/A	N/A
Total	65.5	66.4	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/16/2020
Case Description: Costco Murrieta - Vineyard II Ph 1 Paving

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	40	5
Paver	No	50		77.2	50	5
Roller	No	20		80	60	5

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	75.7	71.8	N/A	N/A	N/A	N/A

Paver		72.2	69.2	N/A	N/A	N/A	N/A
Roller		73.4	66.4	N/A	N/A	N/A	N/A
	Total	75.7	74.4	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	150	5
Paver	No	50		77.2	150	5
Roller	No	20		80	150	5

	Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	64.3	60.3	N/A	N/A	N/A	N/A
Paver	62.7	59.7	N/A	N/A	N/A	N/A
Roller	65.5	58.5	N/A	N/A	N/A	N/A
Total	65.5	64.3	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	140	0
Paver	No	50		77.2	150	0
Roller	No	20		80	160	0

	Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	69.9	65.9	N/A	N/A	N/A	N/A
Paver	67.7	64.7	N/A	N/A	N/A	N/A
Roller	69.9	62.9	N/A	N/A	N/A	N/A
Total	69.9	69.4	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	425	0
Paver	No	50		77.2	425	0
Roller	No	20		80	425	0

	Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq

Concrete Mixer Truck		60.2	56.2	N/A	N/A	N/A	N/A
Paver		58.6	55.6	N/A	N/A	N/A	N/A
Roller		61.4	54.4	N/A	N/A	N/A	N/A
	Total	61.4	60.3	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/16/2020
Case Description: Costco Murrieta - Vineyard II Ph 1 Bldg Const

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	65	5
Man Lift	No	20		74.7	75	5
Generator	No	50		80.6	80	5
Generator	No	50		80.6	100	5
Generator	No	50		80.6	90	5
Generator	No	50		80.6	80	5
Generator	No	50		80.6	100	5
Generator	No	50		80.6	75	5
Tractor	No	40	84		110	5
Tractor	No	40	84		80	5
Front End Loader	No	40		79.1	90	5
Backhoe	No	40		77.6	120	5
Welder / Torch	No	40		74	100	5
Welder / Torch	No	40		74	110	5
Welder / Torch	No	40		74	80	5
Welder / Torch	No	40		74	110	5
Compressor (air)	No	40		77.7	90	5

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		73.3	65.3	N/A	N/A	N/A	N/A
Man Lift		66.2	59.2	N/A	N/A	N/A	N/A
Generator		71.5	68.5	N/A	N/A	N/A	N/A
Generator		69.6	66.6	N/A	N/A	N/A	N/A
Generator		70.5	67.5	N/A	N/A	N/A	N/A
Generator		71.5	68.5	N/A	N/A	N/A	N/A
Generator		69.6	66.6	N/A	N/A	N/A	N/A
Generator		72.1	69.1	N/A	N/A	N/A	N/A
Tractor		72.2	68.2	N/A	N/A	N/A	N/A
Tractor		74.9	70.9	N/A	N/A	N/A	N/A
Front End Loader		69	65	N/A	N/A	N/A	N/A
Backhoe		65	61	N/A	N/A	N/A	N/A
Welder / Torch		63	59	N/A	N/A	N/A	N/A
Welder / Torch		62.2	58.2	N/A	N/A	N/A	N/A
Welder / Torch		64.9	60.9	N/A	N/A	N/A	N/A
Welder / Torch		62.2	58.2	N/A	N/A	N/A	N/A
Compressor (air)		67.6	63.6	N/A	N/A	N/A	N/A
	Total	74.9	78.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night

Residential to east - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	190	5
Man Lift	No	20		74.7	190	5
Generator	No	50		80.6	190	5
Generator	No	50		80.6	190	5
Generator	No	50		80.6	190	5
Generator	No	50		80.6	190	5
Generator	No	50		80.6	190	5
Generator	No	50		80.6	190	5
Tractor	No	40	84		190	5
Tractor	No	40	84		190	5
Front End Loader	No	40		79.1	190	5
Backhoe	No	40		77.6	190	5
Welder / Torch	No	40		74	190	5
Welder / Torch	No	40		74	190	5
Welder / Torch	No	40		74	190	5
Welder / Torch	No	40		74	190	5
Compressor (air)	No	40		77.7	190	5

Equipment	Results Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Crane	64	56	N/A	N/A	N/A	N/A
Man Lift	58.1	51.1	N/A	N/A	N/A	N/A
Generator	64	61	N/A	N/A	N/A	N/A
Generator	64	61	N/A	N/A	N/A	N/A
Generator	64	61	N/A	N/A	N/A	N/A
Generator	64	61	N/A	N/A	N/A	N/A
Generator	64	61	N/A	N/A	N/A	N/A
Generator	64	61	N/A	N/A	N/A	N/A
Tractor	67.4	63.4	N/A	N/A	N/A	N/A
Tractor	67.4	63.4	N/A	N/A	N/A	N/A
Front End Loader	62.5	58.5	N/A	N/A	N/A	N/A
Backhoe	61	57	N/A	N/A	N/A	N/A
Welder / Torch	57.4	53.4	N/A	N/A	N/A	N/A
Welder / Torch	57.4	53.4	N/A	N/A	N/A	N/A
Welder / Torch	57.4	53.4	N/A	N/A	N/A	N/A
Welder / Torch	57.4	53.4	N/A	N/A	N/A	N/A
Compressor (air)	61.1	57.1	N/A	N/A	N/A	N/A
Total	67.4	71.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	800	0
Man Lift	No	20		74.7	810	0
Generator	No	50		80.6	820	0
Generator	No	50		80.6	850	0
Generator	No	50		80.6	900	0
Generator	No	50		80.6	950	0
Generator	No	50		80.6	830	0
Generator	No	50		80.6	820	0
Tractor	No	40	84		840	0
Tractor	No	40	84		850	0
Front End Loader	No	40		79.1	900	0

Backhoe	No	40	77.6	860	0
Welder / Torch	No	40	74	900	0
Welder / Torch	No	40	74	820	0
Welder / Torch	No	40	74	900	0
Welder / Torch	No	40	74	850	0
Compressor (air)	No	40	77.7	880	0

	Results					
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	56.5	48.5	N/A	N/A	N/A	N/A
Man Lift	50.5	43.5	N/A	N/A	N/A	N/A
Generator	56.3	53.3	N/A	N/A	N/A	N/A
Generator	56	53	N/A	N/A	N/A	N/A
Generator	55.5	52.5	N/A	N/A	N/A	N/A
Generator	55.1	52	N/A	N/A	N/A	N/A
Generator	56.2	53.2	N/A	N/A	N/A	N/A
Generator	56.3	53.3	N/A	N/A	N/A	N/A
Tractor	59.5	55.5	N/A	N/A	N/A	N/A
Tractor	59.4	55.4	N/A	N/A	N/A	N/A
Front End Loader	54	50	N/A	N/A	N/A	N/A
Backhoe	52.8	48.9	N/A	N/A	N/A	N/A
Welder / Torch	48.9	44.9	N/A	N/A	N/A	N/A
Welder / Torch	49.7	45.7	N/A	N/A	N/A	N/A
Welder / Torch	48.9	44.9	N/A	N/A	N/A	N/A
Welder / Torch	49.4	45.4	N/A	N/A	N/A	N/A
Compressor (air)	52.8	48.8	N/A	N/A	N/A	N/A
Total	59.5	63.7	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane	No	16		80.6	1100	0
Man Lift	No	20		74.7	1100	0
Generator	No	50		80.6	1100	0
Generator	No	50		80.6	1100	0
Generator	No	50		80.6	1100	0
Generator	No	50		80.6	1100	0
Generator	No	50		80.6	1100	0
Generator	No	50		80.6	1100	0
Tractor	No	40	84		1100	0
Tractor	No	40	84		1100	0
Front End Loader	No	40		79.1	1100	0
Backhoe	No	40		77.6	1100	0
Welder / Torch	No	40		74	1100	0
Welder / Torch	No	40		74	1100	0
Welder / Torch	No	40		74	1100	0
Welder / Torch	No	40		74	1100	0
Compressor (air)	No	40		77.7	1100	0

	Results					
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	53.7	45.7	N/A	N/A	N/A	N/A
Man Lift	47.9	40.9	N/A	N/A	N/A	N/A
Generator	53.8	50.8	N/A	N/A	N/A	N/A
Generator	53.8	50.8	N/A	N/A	N/A	N/A
Generator	53.8	50.8	N/A	N/A	N/A	N/A
Generator	53.8	50.8	N/A	N/A	N/A	N/A

Generator		53.8	50.8	N/A	N/A	N/A	N/A
Generator		53.8	50.8	N/A	N/A	N/A	N/A
Tractor		57.2	53.2	N/A	N/A	N/A	N/A
Tractor		57.2	53.2	N/A	N/A	N/A	N/A
Front End Loader		52.3	48.3	N/A	N/A	N/A	N/A
Backhoe		50.7	46.7	N/A	N/A	N/A	N/A
Welder / Torch		47.2	43.2	N/A	N/A	N/A	N/A
Welder / Torch		47.2	43.2	N/A	N/A	N/A	N/A
Welder / Torch		47.2	43.2	N/A	N/A	N/A	N/A
Welder / Torch		47.2	43.2	N/A	N/A	N/A	N/A
Compressor (air)		50.8	46.8	N/A	N/A	N/A	N/A
	Total	57.2	61.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/16/2020
Case Description: Costco Murrieta - Vineyard II Ph 1 Arch Coating

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	65	5

		Results			
	Calculated (dBA)		Noise Limits (dBA)		
		Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	70.4	66.4	N/A	N/A	N/A	N/A
Total	70.4	66.4	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	190	5

		Results			
	Calculated (dBA)		Noise Limits (dBA)		
		Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	61.1	57.1	N/A	N/A	N/A	N/A
Total	61.1	57.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)

Compressor (air)		No	40	77.7	800	0

		Results			
	Calculated (dBA)		Noise Limits (dBA)		
		Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	53.6	49.6	N/A	N/A	N/A	N/A
Total	53.6	49.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

		---- Receptor #4 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	1100	0

		Results			
	Calculated (dBA)		Noise Limits (dBA)		
		Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	50.8	46.8	N/A	N/A	N/A	N/A
Total	50.8	46.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:	1/16/2020
Case Description:	Costco Murrieta - Vineyard II Ph i Grading and Trenching

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	40	5
Excavator	No	40		80.7	50	5
Excavator	No	40		80.7	75	5
Excavator	No	40		80.7	50	5
Tractor	No	40	84		60	5
Front End Loader	No	40		79.1	70	5
Scraper	No	40		83.6	80	5
Scraper	No	40		83.6	100	5
Grader	No	40	85		75	5

		Results			
	Calculated (dBA)		Noise Limits (dBA)		
		Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	78.6	74.6	N/A	N/A	N/A	N/A
Excavator	75.7	71.7	N/A	N/A	N/A	N/A
Excavator	72.2	68.2	N/A	N/A	N/A	N/A
Excavator	75.7	71.7	N/A	N/A	N/A	N/A
Tractor	77.4	73.4	N/A	N/A	N/A	N/A

Front End Loader		71.2	67.2	N/A	N/A	N/A	N/A
Scraper		74.5	70.5	N/A	N/A	N/A	N/A
Scraper		72.6	68.6	N/A	N/A	N/A	N/A
Grader		76.5	72.5	N/A	N/A	N/A	N/A
	Total	78.6	81.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	150	5
Excavator	No	40		80.7	150	5
Excavator	No	40		80.7	150	5
Excavator	No	40		80.7	150	5
Tractor	No	40	84		150	5
Front End Loader	No	40		79.1	150	5
Scraper	No	40		83.6	150	5
Scraper	No	40		83.6	150	5
Grader	No	40	85		150	5

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	67.1	63.1	N/A	N/A	N/A	N/A
Excavator	66.2	62.2	N/A	N/A	N/A	N/A
Excavator	66.2	62.2	N/A	N/A	N/A	N/A
Excavator	66.2	62.2	N/A	N/A	N/A	N/A
Tractor	69.5	65.5	N/A	N/A	N/A	N/A
Front End Loader	64.6	60.6	N/A	N/A	N/A	N/A
Scraper	69	65.1	N/A	N/A	N/A	N/A
Scraper	69	65.1	N/A	N/A	N/A	N/A
Grader	70.5	66.5	N/A	N/A	N/A	N/A
Total	70.5	73.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	140	0
Excavator	No	40		80.7	150	0
Excavator	No	40		80.7	175	0
Excavator	No	40		80.7	200	0
Tractor	No	40	84		160	0
Front End Loader	No	40		79.1	180	0
Scraper	No	40		83.6	175	0
Scraper	No	40		83.6	250	0
Grader	No	40	85		220	0

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	72.7	68.7	N/A	N/A	N/A	N/A
Excavator	71.2	67.2	N/A	N/A	N/A	N/A
Excavator	69.8	65.8	N/A	N/A	N/A	N/A

Excavator		68.7	64.7	N/A	N/A	N/A	N/A
Tractor		73.9	69.9	N/A	N/A	N/A	N/A
Front End Loader		68	64	N/A	N/A	N/A	N/A
Scraper		72.7	68.7	N/A	N/A	N/A	N/A
Scraper		69.6	65.6	N/A	N/A	N/A	N/A
Grader		72.1	68.2	N/A	N/A	N/A	N/A
	Total	73.9	76.9	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	425	0
Excavator	No	40		80.7	425	0
Excavator	No	40		80.7	425	0
Excavator	No	40		80.7	425	0
Tractor	No	40	84		425	0
Front End Loader	No	40		79.1	425	0
Scraper	No	40		83.6	425	0
Scraper	No	40		83.6	425	0
Grader	No	40	85		425	0

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	63.1	59.1	N/A	N/A	N/A	N/A
Excavator	62.1	58.1	N/A	N/A	N/A	N/A
Excavator	62.1	58.1	N/A	N/A	N/A	N/A
Excavator	62.1	58.1	N/A	N/A	N/A	N/A
Tractor	65.4	61.4	N/A	N/A	N/A	N/A
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A
Scraper	65	61	N/A	N/A	N/A	N/A
Scraper	65	61	N/A	N/A	N/A	N/A
Grader	66.4	62.4	N/A	N/A	N/A	N/A
Total	66.4	69.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/16/2020
Case Description: Costco Murrieta - Vineyard II Ph 2 Prcs Grdng Ftng Trnchg

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Excavator	No	40		80.7	40	5
Excavator	No	40		80.7	50	5
Grader	No	40	85		75	5
Tractor	No	40	84		50	5
Front End Loader	No	40		79.1	60	5
Dozer	No	40		81.7	70	5

Results

Equipment	Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Excavator	77.6	73.7	N/A	N/A	N/A	N/A
Excavator	75.7	71.7	N/A	N/A	N/A	N/A
Grader	76.5	72.5	N/A	N/A	N/A	N/A
Tractor	79	75	N/A	N/A	N/A	N/A
Front End Loader	72.5	68.5	N/A	N/A	N/A	N/A
Dozer	73.7	69.8	N/A	N/A	N/A	N/A
Total	79	80.2	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	190	5
Excavator	No	40		80.7	190	5
Grader	No	40	85		190	5
Tractor	No	40	84		190	5
Front End Loader	No	40		79.1	190	5
Dozer	No	40		81.7	190	5

Results

Equipment	Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Excavator	64.1	60.1	N/A	N/A	N/A	N/A
Excavator	64.1	60.1	N/A	N/A	N/A	N/A
Grader	68.4	64.4	N/A	N/A	N/A	N/A
Tractor	67.4	63.4	N/A	N/A	N/A	N/A
Front End Loader	62.5	58.5	N/A	N/A	N/A	N/A
Dozer	65.1	61.1	N/A	N/A	N/A	N/A
Total	68.4	69.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	140	0
Excavator	No	40		80.7	150	0
Grader	No	40	85		175	0
Tractor	No	40	84		200	0
Front End Loader	No	40		79.1	160	0
Dozer	No	40		81.7	180	0

Results

Equipment	Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Excavator	71.8	67.8	N/A	N/A	N/A	N/A
Excavator	71.2	67.2	N/A	N/A	N/A	N/A
Grader	74.1	70.1	N/A	N/A	N/A	N/A
Tractor	72	68	N/A	N/A	N/A	N/A
Front End Loader	69	65	N/A	N/A	N/A	N/A
Dozer	70.5	66.6	N/A	N/A	N/A	N/A

	Total	74.1	75.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	425	0
Excavator	No	40		80.7	425	0
Grader	No	40	85		425	0
Tractor	No	40	84		425	0
Front End Loader	No	40		79.1	425	0
Dozer	No	40		81.7	425	0

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		62.1	58.1	N/A	N/A	N/A	N/A
Excavator		62.1	58.1	N/A	N/A	N/A	N/A
Grader		66.4	62.4	N/A	N/A	N/A	N/A
Tractor		65.4	61.4	N/A	N/A	N/A	N/A
Front End Loader		60.5	56.5	N/A	N/A	N/A	N/A
Dozer		63.1	59.1	N/A	N/A	N/A	N/A
	Total	66.4	67.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/16/2020
Case Description: Costco Murrieta - Vineyard II Ph 2 Paving

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		40	5
Paver	No	50		77.2	50	5
Roller	No	20		80	60	5
Roller	No	20		80	60	5

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor		80.9	77	N/A	N/A	N/A	N/A
Paver		72.2	69.2	N/A	N/A	N/A	N/A
Roller		73.4	66.4	N/A	N/A	N/A	N/A
Roller		73.4	66.4	N/A	N/A	N/A	N/A
	Total	80.9	78.2	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		150	5
Paver	No	50		77.2	150	5
Roller	No	20		80	150	5
Roller	No	20		80	150	5

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	69.5	65.5	N/A	N/A	N/A	N/A
Paver	62.7	59.7	N/A	N/A	N/A	N/A
Roller	65.5	58.5	N/A	N/A	N/A	N/A
Roller	65.5	58.5	N/A	N/A	N/A	N/A
Total	69.5	67.7	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		140	0
Paver	No	50		77.2	150	0
Roller	No	20		80	160	0
Roller	No	20		80	150	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	75.1	71.1	N/A	N/A	N/A	N/A
Paver	67.7	64.7	N/A	N/A	N/A	N/A
Roller	69.9	62.9	N/A	N/A	N/A	N/A
Roller	70.5	63.5	N/A	N/A	N/A	N/A
Total	75.1	73	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84		425	0
Paver	No	50		77.2	425	0
Roller	No	20		80	425	0
Roller	No	20		80	425	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	65.4	61.4	N/A	N/A	N/A	N/A
Paver	58.6	55.6	N/A	N/A	N/A	N/A
Roller	61.4	54.4	N/A	N/A	N/A	N/A
Roller	61.4	54.4	N/A	N/A	N/A	N/A
Total	65.4	63.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/16/2020
Case Description: Costco Murrieta - Vineyard II Ph 2 Bldg Const

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	65	5
Man Lift	No	20		74.7	75	5
Generator	No	50		80.6	80	5
Generator	No	50		80.6	100	5
Tractor	No	40	84		90	5
Welder / Torch	No	40		74	80	5
Welder / Torch	No	40		74	100	5
Welder / Torch	No	40		74	75	5
Welder / Torch	No	40		74	110	5
Compressor (air)	No	40		77.7	80	5

Equipment	Results Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Crane	73.3	65.3	N/A	N/A	N/A	N/A
Man Lift	66.2	59.2	N/A	N/A	N/A	N/A
Generator	71.5	68.5	N/A	N/A	N/A	N/A
Generator	69.6	66.6	N/A	N/A	N/A	N/A
Tractor	73.9	69.9	N/A	N/A	N/A	N/A
Welder / Torch	64.9	60.9	N/A	N/A	N/A	N/A
Welder / Torch	63	59	N/A	N/A	N/A	N/A
Welder / Torch	65.5	61.5	N/A	N/A	N/A	N/A
Welder / Torch	62.2	58.2	N/A	N/A	N/A	N/A
Compressor (air)	68.6	64.6	N/A	N/A	N/A	N/A
Total	73.9	75.2	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	190	5
Man Lift	No	20		74.7	190	5
Generator	No	50		80.6	190	5
Generator	No	50		80.6	190	5
Tractor	No	40	84		190	5
Welder / Torch	No	40		74	190	5
Welder / Torch	No	40		74	190	5
Welder / Torch	No	40		74	190	5
Welder / Torch	No	40		74	190	5
Compressor (air)	No	40		77.7	190	5

Results
Calculated (dBA) Noise Limits (dBA)

Equipment		*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq
Crane		64	56	N/A	N/A	N/A	N/A
Man Lift		58.1	51.1	N/A	N/A	N/A	N/A
Generator		64	61	N/A	N/A	N/A	N/A
Generator		64	61	N/A	N/A	N/A	N/A
Tractor		67.4	63.4	N/A	N/A	N/A	N/A
Welder / Torch		57.4	53.4	N/A	N/A	N/A	N/A
Welder / Torch		57.4	53.4	N/A	N/A	N/A	N/A
Welder / Torch		57.4	53.4	N/A	N/A	N/A	N/A
Welder / Torch		57.4	53.4	N/A	N/A	N/A	N/A
Compressor (air)		61.1	57.1	N/A	N/A	N/A	N/A
	Total	67.4	68.2	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	800	0
Man Lift	No	20		74.7	810	0
Generator	No	50		80.6	820	0
Generator	No	50		80.6	850	0
Tractor	No	40	84		900	0
Welder / Torch	No	40		74	950	0
Welder / Torch	No	40		74	830	0
Welder / Torch	No	40		74	820	0
Welder / Torch	No	40		74	840	0
Compressor (air)	No	40		77.7	850	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Crane		56.5	48.5	N/A	N/A	N/A	N/A
Man Lift		50.5	43.5	N/A	N/A	N/A	N/A
Generator		56.3	53.3	N/A	N/A	N/A	N/A
Generator		56	53	N/A	N/A	N/A	N/A
Tractor		58.9	54.9	N/A	N/A	N/A	N/A
Welder / Torch		48.4	44.4	N/A	N/A	N/A	N/A
Welder / Torch		49.6	45.6	N/A	N/A	N/A	N/A
Welder / Torch		49.7	45.7	N/A	N/A	N/A	N/A
Welder / Torch		49.5	45.5	N/A	N/A	N/A	N/A
Compressor (air)		53.1	49.1	N/A	N/A	N/A	N/A
	Total	58.9	60.2	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	1100	0
Man Lift	No	20		74.7	1100	0
Generator	No	50		80.6	1100	0
Generator	No	50		80.6	1100	0
Tractor	No	40	84		1100	0
Welder / Torch	No	40		74	1100	0
Welder / Torch	No	40		74	1100	0

Welder / Torch	No	40	74	1100	0
Welder / Torch	No	40	74	1100	0
Compressor (air)	No	40	77.7	1100	0

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	53.7	45.7	N/A	N/A	N/A	N/A
Man Lift	47.9	40.9	N/A	N/A	N/A	N/A
Generator	53.8	50.8	N/A	N/A	N/A	N/A
Generator	53.8	50.8	N/A	N/A	N/A	N/A
Tractor	57.2	53.2	N/A	N/A	N/A	N/A
Welder / Torch	47.2	43.2	N/A	N/A	N/A	N/A
Welder / Torch	47.2	43.2	N/A	N/A	N/A	N/A
Welder / Torch	47.2	43.2	N/A	N/A	N/A	N/A
Welder / Torch	47.2	43.2	N/A	N/A	N/A	N/A
Compressor (air)	50.8	46.8	N/A	N/A	N/A	N/A
Total	57.2	58	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/16/2020
Case Description: Costco Murrieta - Vineyard II Ph 2 Arch Coating

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	65	5

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	70.4	66.4	N/A	N/A	N/A	N/A
Total	70.4	66.4	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	190	5

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	61.1	57.1	N/A	N/A	N/A	N/A
Total	61.1	57.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
		Impact	Lmax	Lmax	Distance	Shielding
Description		Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)		No	40		77.7	800	0

		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		53.6	49.6	N/A	N/A	N/A	N/A
	Total	53.6	49.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
		Impact	Lmax	Lmax	Distance	Shielding
Description		Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)		No	40		77.7	1100	0

		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		50.8	46.8	N/A	N/A	N/A	N/A
	Total	50.8	46.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/16/2020
Case Description: Costco Murrieta - Costco Site Prep

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
		Impact	Lmax	Lmax	Distance	Shielding
Description		Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer		No	40		81.7	670	5
Dozer		No	40		81.7	700	5
Dozer		No	40		81.7	750	5
Tractor		No	40	84		680	5
Front End Loader		No	40		79.1	750	5
Backhoe		No	40		77.6	800	5
Front End Loader		No	40		79.1	700	5

		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		54.1	50.1	N/A	N/A	N/A	N/A
Dozer		53.7	49.8	N/A	N/A	N/A	N/A

Dozer		53.1	49.2	N/A	N/A	N/A	N/A
Tractor		56.3	52.3	N/A	N/A	N/A	N/A
Front End Loader		50.6	46.6	N/A	N/A	N/A	N/A
Backhoe		48.5	44.5	N/A	N/A	N/A	N/A
Front End Loader		51.2	47.2	N/A	N/A	N/A	N/A
	Total	56.3	57.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	980	5
Dozer	No	40		81.7	980	5
Dozer	No	40		81.7	980	5
Tractor	No	40	84		980	5
Front End Loader	No	40		79.1	980	5
Backhoe	No	40		77.6	980	5
Front End Loader	No	40		79.1	980	5

		Results				
		Calculated (dBA)		Noise Limits (dBA)		
				Day	Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		50.8	46.8	N/A	N/A	N/A	N/A
Dozer		50.8	46.8	N/A	N/A	N/A	N/A
Dozer		50.8	46.8	N/A	N/A	N/A	N/A
Tractor		53.2	49.2	N/A	N/A	N/A	N/A
Front End Loader		48.3	44.3	N/A	N/A	N/A	N/A
Backhoe		46.7	42.7	N/A	N/A	N/A	N/A
Front End Loader		48.3	44.3	N/A	N/A	N/A	N/A
	Total	53.2	54.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	450	5
Dozer	No	40		81.7	470	5
Dozer	No	40		81.7	500	5
Tractor	No	40	84		460	5
Front End Loader	No	40		79.1	500	5
Backhoe	No	40		77.6	600	5
Front End Loader	No	40		79.1	650	5

		Results				
		Calculated (dBA)		Noise Limits (dBA)		
				Day	Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		57.6	53.6	N/A	N/A	N/A	N/A
Dozer		57.2	53.2	N/A	N/A	N/A	N/A
Dozer		56.7	52.7	N/A	N/A	N/A	N/A
Tractor		59.7	55.7	N/A	N/A	N/A	N/A
Front End Loader		54.1	50.1	N/A	N/A	N/A	N/A
Backhoe		51	47	N/A	N/A	N/A	N/A
Front End Loader		51.8	47.9	N/A	N/A	N/A	N/A
	Total	59.7	60.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	750	5
Dozer	No	40		81.7	750	5
Dozer	No	40		81.7	750	5
Tractor	No	40	84		750	5
Front End Loader	No	40		79.1	750	5
Backhoe	No	40		77.6	750	5
Front End Loader	No	40		79.1	750	5

Equipment	Results Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Dozer	53.1	49.2	N/A	N/A	N/A	N/A
Dozer	53.1	49.2	N/A	N/A	N/A	N/A
Dozer	53.1	49.2	N/A	N/A	N/A	N/A
Tractor	55.5	51.5	N/A	N/A	N/A	N/A
Front End Loader	50.6	46.6	N/A	N/A	N/A	N/A
Backhoe	49	45.1	N/A	N/A	N/A	N/A
Front End Loader	50.6	46.6	N/A	N/A	N/A	N/A
Total	55.5	57.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/18/2020
Case Description: Costco Murrieta - Warm Springs Pkwy Blasting

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Blasting	Yes	1	94		610	5

Equipment	Results Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Blasting	67.3	47.3	N/A	N/A	N/A	N/A
Total	67.3	47.3	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Blasting	Yes	1	94		740	5

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Blasting		65.6	45.6	N/A	N/A	N/A	N/A
	Total	65.6	45.6	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

Equipment

			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Blasting	Yes	1	94		700	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Blasting		71.1	51.1	N/A	N/A	N/A	N/A
	Total	71.1	51.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

Equipment

			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Blasting	Yes	1	94		1090	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Blasting		67.2	47.2	N/A	N/A	N/A	N/A
	Total	67.2	47.2	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/16/2020
Case Description: Costco Murrieta - Warm Springs Pkwy Grading

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

Equipment

			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	610	5
Excavator	No	40		80.7	620	5

Tractor	No	40	84		650	5
Front End Loader	No	40		79.1	700	5
Backhoe	No	40		77.6	680	5
Grader	No	40	85		700	5

	Results					
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	54.9	51	N/A	N/A	N/A	N/A
Excavator	53.8	49.9	N/A	N/A	N/A	N/A
Tractor	56.7	52.7	N/A	N/A	N/A	N/A
Front End Loader	51.2	47.2	N/A	N/A	N/A	N/A
Backhoe	49.9	45.9	N/A	N/A	N/A	N/A
Grader	57.1	53.1	N/A	N/A	N/A	N/A
Total	57.1	58.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	740	5
Excavator	No	40		80.7	740	5
Tractor	No	40	84		740	5
Front End Loader	No	40		79.1	740	5
Backhoe	No	40		77.6	740	5
Grader	No	40	85		740	5

	Results					
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	53.3	49.3	N/A	N/A	N/A	N/A
Excavator	52.3	48.3	N/A	N/A	N/A	N/A
Tractor	55.6	51.6	N/A	N/A	N/A	N/A
Front End Loader	50.7	46.7	N/A	N/A	N/A	N/A
Backhoe	49.2	45.2	N/A	N/A	N/A	N/A
Grader	56.6	52.6	N/A	N/A	N/A	N/A
Total	56.6	57.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	700	0
Excavator	No	40		80.7	710	0
Tractor	No	40	84		750	0
Front End Loader	No	40		79.1	800	0
Backhoe	No	40		77.6	770	0
Grader	No	40	85		800	0

	Results					
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	58.7	54.8	N/A	N/A	N/A	N/A

Excavator		57.7	53.7	N/A	N/A	N/A	N/A
Tractor		60.5	56.5	N/A	N/A	N/A	N/A
Front End Loader		55	51	N/A	N/A	N/A	N/A
Backhoe		53.8	49.8	N/A	N/A	N/A	N/A
Grader		60.9	56.9	N/A	N/A	N/A	N/A
	Total	60.9	62.3	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	1090	0
Excavator	No	40		80.7	1090	0
Tractor	No	40	84		1090	0
Front End Loader	No	40		79.1	1090	0
Backhoe	No	40		77.6	1090	0
Grader	No	40	85		1090	0

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	54.9	50.9	N/A	N/A	N/A	N/A
Excavator	53.9	50	N/A	N/A	N/A	N/A
Tractor	57.2	53.3	N/A	N/A	N/A	N/A
Front End Loader	52.3	48.4	N/A	N/A	N/A	N/A
Backhoe	50.8	46.8	N/A	N/A	N/A	N/A
Grader	58.2	54.3	N/A	N/A	N/A	N/A
Total	58.2	59.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/16/2020
Case Description: Costco Murrieta - Warm Springs Pkwy Paving

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - nearest	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	610	5
Paver	No	50		77.2	620	5
Concrete Pump Truck	No	20	82		650	5
Concrete Mixer Truck	No	40		78.8	700	5
Roller	No	20		80	680	5
Roller	No	20		80	700	5

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	50.5	47.5	N/A	N/A	N/A	N/A
Paver	50.4	47.3	N/A	N/A	N/A	N/A
Concrete Pump Truck	54.7	47.7	N/A	N/A	N/A	N/A

Concrete Mixer Truck		50.9	46.9	N/A	N/A	N/A	N/A
Roller		52.3	45.3	N/A	N/A	N/A	N/A
Roller		52.1	45.1	N/A	N/A	N/A	N/A
	Total	54.7	54.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential to east - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	740	5
Paver	No	50		77.2	740	5
Concrete Pump Truck	No	20	82		740	5
Concrete Mixer Truck	No	40		78.8	740	5
Roller	No	20		80	740	5
Roller	No	20		80	740	5

		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver		48.8	45.8	N/A	N/A	N/A	N/A
Paver		48.8	45.8	N/A	N/A	N/A	N/A
Concrete Pump Truck		53.6	46.6	N/A	N/A	N/A	N/A
Concrete Mixer Truck		50.4	46.4	N/A	N/A	N/A	N/A
Roller		51.6	44.6	N/A	N/A	N/A	N/A
Roller		51.6	44.6	N/A	N/A	N/A	N/A
	Total	53.6	53.5	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - nearest	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	700	0
Paver	No	50		77.2	710	0
Concrete Pump Truck	No	20	82		750	0
Concrete Mixer Truck	No	40		78.8	800	0
Roller	No	20		80	770	0
Roller	No	20		80	800	0

		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver		54.3	51.3	N/A	N/A	N/A	N/A
Paver		54.2	51.2	N/A	N/A	N/A	N/A
Concrete Pump Truck		58.5	51.5	N/A	N/A	N/A	N/A
Concrete Mixer Truck		54.7	50.7	N/A	N/A	N/A	N/A
Roller		56.2	49.3	N/A	N/A	N/A	N/A
Roller		55.9	48.9	N/A	N/A	N/A	N/A
	Total	58.5	58.4	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
School/Resi to south - typical	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	1090	0
Paver	No	50		77.2	1090	0
Concrete Pump Truck	No	20	82		1090	0
Concrete Mixer Truck	No	40		78.8	1090	0
Roller	No	20		80	1090	0
Roller	No	20		80	1090	0

	Results					
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	50.5	47.4	N/A	N/A	N/A	N/A
Paver	50.5	47.4	N/A	N/A	N/A	N/A
Concrete Pump Truck	55.2	48.2	N/A	N/A	N/A	N/A
Concrete Mixer Truck	52	48.1	N/A	N/A	N/A	N/A
Roller	53.2	46.2	N/A	N/A	N/A	N/A
Roller	53.2	46.2	N/A	N/A	N/A	N/A
Total	55.2	55.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Appendix C

Traffic Noise Modeling Input/Output Files

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: Costco Murrieta Exist Wkdy Rev 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: Costco Murrieta Exist Wkdy Rev 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	2526	97	40	2	40	1	40	0	0	0	0
	point3	3	2526	97	40	2	40	1	40	0	0	0	0
	point4	4	2526	97	40	2	40	1	40	0	0	0	0
	point5	5	2526	97	40	2	40	1	40	0	0	0	0
	point6	6	2526	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1250	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 11092
RUN: Costco Murrieta Exist Wkdy Rev 012020

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: Costco Murrieta Exist Wkdy Rev 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek			**5 February 2020**	
M Greene			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**11092**			
RUN:	**Costco Murrieta Exist Wkdy Rev 012020**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line2	2	1,605.9	2,030.4	1,522.00
	3	1,685.8	2,007.1	1,522.00
	4	1,825.5	1,990.5	1,522.00
Terrain Line3	5	3,208.7	1,970.8	1,512.00
	6	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: Costco Murrieta Exist Wkdy Rev 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	56.8	66	56.8	10	----	56.8	0.0	8	-8.0
ST2	2	1	0.0	56.5	66	56.5	10	----	56.5	0.0	8	-8.0
ST3	3	1	0.0	59.4	66	59.4	10	----	59.4	0.0	8	-8.0
ST4	4	1	0.0	52.9	66	52.9	10	----	52.9	0.0	8	-8.0
ST5	5	1	0.0	50.3	66	50.3	10	----	50.3	0.0	8	-8.0
M1	7	1	0.0	56.6	66	56.6	10	----	56.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: Costco Murrieta Exis Sat Rev 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: Costco Murrieta Exis Sat Rev 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	2028	97	40	2	40	1	40	0	0	0	0
	point3	3	2028	97	40	2	40	1	40	0	0	0	0
	point4	4	2028	97	40	2	40	1	40	0	0	0	0
	point5	5	2028	97	40	2	40	1	40	0	0	0	0
	point6	6	2028	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1067	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 11092
RUN: Costco Murrieta Exis Sat Rev 012020

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: Costco Murrieta Exis Sat Rev 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek			5 February 2020	
M Greene			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	11092			
RUN:	Costco Murrieta Exis Sat Rev 012020			
Terrain Line	Points			
Name	No.	Coordinates (ground)		
		X	Y	Z
		ft	ft	ft
Terrain Line1	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line2	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: Costco Murrieta Exis Sat Rev 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	56.1	66	56.1	10	----	56.1	0.0	8	-8.0
ST2	2	1	0.0	55.7	66	55.7	10	----	55.7	0.0	8	-8.0
ST3	3	1	0.0	58.5	66	58.5	10	----	58.5	0.0	8	-8.0
ST4	4	1	0.0	52.3	66	52.3	10	----	52.3	0.0	8	-8.0
ST5	5	1	0.0	50.2	66	50.2	10	----	50.2	0.0	8	-8.0
M1	7	1	0.0	55.9	66	55.9	10	----	55.9	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Exst + Prj w Crt Wkdy 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Exst + Prj w Crt Wkdy 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	3268	97	40	2	40	1	40	0	0	0	0
	point3	3	3268	97	40	2	40	1	40	0	0	0	0
	point4	4	3268	97	40	2	40	1	40	0	0	0	0
	point5	5	3268	97	40	2	40	1	40	0	0	0	0
	point6	6	3268	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1361	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	1659	97	35	2	35	1	35	0	0	0	0
	point41	41	1659	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek						5 February 2020					
M Greene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	11092										
RUN:	CstcoMrrta Exst + Prj w Crt Wkdy 012020										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Exst + Prj w Crt Wkdy 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					
Barrier23	W	0.00	99.99	0.00				0.00	point72	72	3,063.8	3,151.9	1,510.00	20.00	0.00	0	0		
									point74	74	3,218.3	3,150.1	1,510.00	20.00	0.00	0	0		
									point75	75	3,215.2	2,869.0	1,510.00	20.00	0.00	0	0		
									point76	76	3,204.4	2,869.2	1,510.00	20.00	0.00	0	0		
									point77	77	3,204.2	2,844.6	1,510.00	20.00	0.00	0	0		
									point78	78	3,174.9	2,845.0	1,510.00	20.00	0.00	0	0		
									point79	79	3,174.2	2,780.4	1,510.00	20.00	0.00	0	0		
									point80	80	3,143.7	2,780.7	1,510.00	20.00	0.00	0	0		
									point81	81	3,143.1	2,724.9	1,510.00	20.00	0.00	0	0		
									point82	82	3,083.0	2,725.5	1,510.00	20.00	0.00	0	0		
									point83	83	3,083.5	2,776.9	1,510.00	20.00	0.00	0	0		
									point84	84	3,074.2	2,777.0	1,510.00	20.00	0.00	0	0		
									point85	85	3,074.9	2,837.7	1,510.00	20.00	0.00	0	0		
									point73	73	3,060.3	2,837.9	1,510.00	20.00					
Barrier24	W	0.00	99.99	0.00				0.00	point86	86	1,928.5	3,214.4	1,530.00	20.00	0.00	0	0		
									point88	88	1,850.4	2,782.1	1,530.00	20.00	0.00	0	0		
									point89	89	2,100.4	2,747.4	1,530.00	20.00	0.00	0	0		
									point90	90	2,102.1	2,782.1	1,530.00	20.00	0.00	0	0		
									point91	91	2,147.3	2,773.4	1,530.00	20.00	0.00	0	0		
									point92	92	2,192.4	2,804.7	1,530.00	20.00	0.00	0	0		
									point93	93	2,242.7	3,112.0	1,530.00	20.00	0.00	0	0		
									point94	94	2,168.1	3,122.4	1,530.00	20.00	0.00	0	0		
									point87	87	2,176.8	3,181.4	1,530.00	20.00					

Dudek			**5 February 2020**	
M Greene			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**11092**			
RUN:	**CstcoMrrta Exst + Prj w Crt Wkdy 012020**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line1	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line2	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Exst + Prj w Crt Wkdy 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	57.7	66	57.7	10	----	57.7	0.0	8	-8.0
ST2	2	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
ST3	3	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0
ST4	4	1	0.0	53.3	66	53.3	10	----	53.3	0.0	8	-8.0
ST5	5	1	0.0	50.4	66	50.4	10	----	50.4	0.0	8	-8.0
M1	7	1	0.0	57.0	66	57.0	10	----	57.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Exst + Prj w Crt Sat 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Exst + Prj w Crt Sat 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	3040	97	40	2	40	1	40	0	0	0	0
	point3	3	3040	97	40	2	40	1	40	0	0	0	0
	point4	4	3040	97	40	2	40	1	40	0	0	0	0
	point5	5	3040	97	40	2	40	1	40	0	0	0	0
	point6	6	3040	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1212	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	2172	97	35	2	35	1	35	0	0	0	0
	point41	41	2172	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek						5 February 2020					
M Greene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	11092										
RUN:	CstcoMrrta Exst + Prj w Crt Sat 012020										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Exst + Prj w Crt Sat 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					
Barrier23	W	0.00	99.99	0.00				0.00	point72	72	3,063.8	3,151.9	1,510.00	20.00	0.00	0	0		
									point74	74	3,218.3	3,150.1	1,510.00	20.00	0.00	0	0		
									point75	75	3,215.2	2,869.0	1,510.00	20.00	0.00	0	0		
									point76	76	3,204.4	2,869.2	1,510.00	20.00	0.00	0	0		
									point77	77	3,204.2	2,844.6	1,510.00	20.00	0.00	0	0		
									point78	78	3,174.9	2,845.0	1,510.00	20.00	0.00	0	0		
									point79	79	3,174.2	2,780.4	1,510.00	20.00	0.00	0	0		
									point80	80	3,143.7	2,780.7	1,510.00	20.00	0.00	0	0		
									point81	81	3,143.1	2,724.9	1,510.00	20.00	0.00	0	0		
									point82	82	3,083.0	2,725.5	1,510.00	20.00	0.00	0	0		
									point83	83	3,083.5	2,776.9	1,510.00	20.00	0.00	0	0		
									point84	84	3,074.2	2,777.0	1,510.00	20.00	0.00	0	0		
									point85	85	3,074.9	2,837.7	1,510.00	20.00	0.00	0	0		
									point73	73	3,060.3	2,837.9	1,510.00	20.00					
Barrier24	W	0.00	99.99	0.00				0.00	point86	86	1,928.5	3,214.4	1,530.00	20.00	0.00	0	0		
									point88	88	1,850.4	2,782.1	1,530.00	20.00	0.00	0	0		
									point89	89	2,100.4	2,747.4	1,530.00	20.00	0.00	0	0		
									point90	90	2,102.1	2,782.1	1,530.00	20.00	0.00	0	0		
									point91	91	2,147.3	2,773.4	1,530.00	20.00	0.00	0	0		
									point92	92	2,192.4	2,804.7	1,530.00	20.00	0.00	0	0		
									point93	93	2,242.7	3,112.0	1,530.00	20.00	0.00	0	0		
									point94	94	2,168.1	3,122.4	1,530.00	20.00	0.00	0	0		
									point87	87	2,176.8	3,181.4	1,530.00	20.00					

Dudek			**5 February 2020**	
M Greene			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**11092**			
RUN:	**CstcoMrrta Exst + Prj w Crt Sat 012020**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line2	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line3	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Exst + Prj w Crt Sat 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
ST2	2	1	0.0	56.9	66	56.9	10	----	56.9	0.0	8	-8.0
ST3	3	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
ST4	4	1	0.0	53.2	66	53.2	10	----	53.2	0.0	8	-8.0
ST5	5	1	0.0	50.6	66	50.6	10	----	50.6	0.0	8	-8.0
M1	7	1	0.0	56.5	66	56.5	10	----	56.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Ex+Prj w/o Crt Wkdy 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Ex+Prj w/o Crt Wkdy 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	3395	97	40	2	40	1	40	0	0	0	0
	point3	3	3395	97	40	2	40	1	40	0	0	0	0
	point4	4	3395	97	40	2	40	1	40	0	0	0	0
	point5	5	3395	97	40	2	40	1	40	0	0	0	0
	point6	6	3395	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1361	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	1843	97	35	2	35	1	35	0	0	0	0
	point41	41	1843	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Ex+Prj w/o Crt Wkdy 012020

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Ex+Prj w/o Crt Wkdy 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	Perturbs #Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					
Barrier23	W	0.00	99.99	0.00				0.00	point72	72	3,063.8	3,151.9	1,510.00	20.00	0.00	0	0		
									point74	74	3,218.3	3,150.1	1,510.00	20.00	0.00	0	0		
									point75	75	3,215.2	2,869.0	1,510.00	20.00	0.00	0	0		
									point76	76	3,204.4	2,869.2	1,510.00	20.00	0.00	0	0		
									point77	77	3,204.2	2,844.6	1,510.00	20.00	0.00	0	0		
									point78	78	3,174.9	2,845.0	1,510.00	20.00	0.00	0	0		
									point79	79	3,174.2	2,780.4	1,510.00	20.00	0.00	0	0		
									point80	80	3,143.7	2,780.7	1,510.00	20.00	0.00	0	0		
									point81	81	3,143.1	2,724.9	1,510.00	20.00	0.00	0	0		
									point82	82	3,083.0	2,725.5	1,510.00	20.00	0.00	0	0		
									point83	83	3,083.5	2,776.9	1,510.00	20.00	0.00	0	0		
									point84	84	3,074.2	2,777.0	1,510.00	20.00	0.00	0	0		
									point85	85	3,074.9	2,837.7	1,510.00	20.00	0.00	0	0		
									point73	73	3,060.3	2,837.9	1,510.00	20.00					
Barrier24	W	0.00	99.99	0.00				0.00	point86	86	1,928.5	3,214.4	1,530.00	20.00	0.00	0	0		
									point88	88	1,850.4	2,782.1	1,530.00	20.00	0.00	0	0		
									point89	89	2,100.4	2,747.4	1,530.00	20.00	0.00	0	0		
									point90	90	2,102.1	2,782.1	1,530.00	20.00	0.00	0	0		
									point91	91	2,147.3	2,773.4	1,530.00	20.00	0.00	0	0		
									point92	92	2,192.4	2,804.7	1,530.00	20.00	0.00	0	0		
									point93	93	2,242.7	3,112.0	1,530.00	20.00	0.00	0	0		
									point94	94	2,168.1	3,122.4	1,530.00	20.00	0.00	0	0		
									point87	87	2,176.8	3,181.4	1,530.00	20.00					

Dudek			5 February 2020	
M Greene			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	11092			
RUN:	CstcoMrrta Ex+Prj w/o Crt Wkdy 012020			
Terrain Line	Points			
Name	No.	Coordinates (ground)		
		X	Y	Z
		ft	ft	ft
Terrain Line1	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line2	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Ex+Prj w/o Crt Wkdy 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
ST2	2	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
ST3	3	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0
ST4	4	1	0.0	53.5	66	53.5	10	----	53.5	0.0	8	-8.0
ST5	5	1	0.0	50.5	66	50.5	10	----	50.5	0.0	8	-8.0
M1	7	1	0.0	57.0	66	57.0	10	----	57.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Ex+Prj w/o Crt Sat 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Ex+Prj w/o Crt Sat 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	3215	97	40	2	40	1	40	0	0	0	0
	point3	3	3215	97	40	2	40	1	40	0	0	0	0
	point4	4	3215	97	40	2	40	1	40	0	0	0	0
	point5	5	3215	97	40	2	40	1	40	0	0	0	0
	point6	6	3215	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1212	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	2414	97	35	2	35	1	35	0	0	0	0
	point41	41	2414	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek						5 February 2020					
M Greene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	11092										
RUN:	CstcoMrrta Ex+Prj w/o Crt Sat 012020										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Ex+Prj w/o Crt Sat 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					
Barrier23	W	0.00	99.99	0.00				0.00	point72	72	3,063.8	3,151.9	1,510.00	20.00	0.00	0	0		
									point74	74	3,218.3	3,150.1	1,510.00	20.00	0.00	0	0		
									point75	75	3,215.2	2,869.0	1,510.00	20.00	0.00	0	0		
									point76	76	3,204.4	2,869.2	1,510.00	20.00	0.00	0	0		
									point77	77	3,204.2	2,844.6	1,510.00	20.00	0.00	0	0		
									point78	78	3,174.9	2,845.0	1,510.00	20.00	0.00	0	0		
									point79	79	3,174.2	2,780.4	1,510.00	20.00	0.00	0	0		
									point80	80	3,143.7	2,780.7	1,510.00	20.00	0.00	0	0		
									point81	81	3,143.1	2,724.9	1,510.00	20.00	0.00	0	0		
									point82	82	3,083.0	2,725.5	1,510.00	20.00	0.00	0	0		
									point83	83	3,083.5	2,776.9	1,510.00	20.00	0.00	0	0		
									point84	84	3,074.2	2,777.0	1,510.00	20.00	0.00	0	0		
									point85	85	3,074.9	2,837.7	1,510.00	20.00	0.00	0	0		
									point73	73	3,060.3	2,837.9	1,510.00	20.00					
Barrier24	W	0.00	99.99	0.00				0.00	point86	86	1,928.5	3,214.4	1,530.00	20.00	0.00	0	0		
									point88	88	1,850.4	2,782.1	1,530.00	20.00	0.00	0	0		
									point89	89	2,100.4	2,747.4	1,530.00	20.00	0.00	0	0		
									point90	90	2,102.1	2,782.1	1,530.00	20.00	0.00	0	0		
									point91	91	2,147.3	2,773.4	1,530.00	20.00	0.00	0	0		
									point92	92	2,192.4	2,804.7	1,530.00	20.00	0.00	0	0		
									point93	93	2,242.7	3,112.0	1,530.00	20.00	0.00	0	0		
									point94	94	2,168.1	3,122.4	1,530.00	20.00	0.00	0	0		
									point87	87	2,176.8	3,181.4	1,530.00	20.00					

Dudek			**5 February 2020**	
M Greene			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**11092**			
RUN:	**CstcoMrrta Ex+Prj w/o Crt Sat 012020**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line1	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line2	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta Ex+Prj w/o Crt Sat 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	57.7	66	57.7	10	----	57.7	0.0	8	-8.0
ST2	2	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
ST3	3	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0
ST4	4	1	0.0	53.4	66	53.4	10	----	53.4	0.0	8	-8.0
ST5	5	1	0.0	50.6	66	50.6	10	----	50.6	0.0	8	-8.0
M1	7	1	0.0	56.6	66	56.6	10	----	56.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: Cstco Mrrta 2021 w InPrcs Wkdy 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: Cstco Mrrta 2021 w InPrcs Wkdy 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	3637	97	40	2	40	1	40	0	0	0	0
	point3	3	3637	97	40	2	40	1	40	0	0	0	0
	point4	4	3637	97	40	2	40	1	40	0	0	0	0
	point5	5	3637	97	40	2	40	1	40	0	0	0	0
	point6	6	3637	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1662	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	118	97	35	2	35	1	35	0	0	0	0
	point41	41	118	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 11092
RUN: Cstco Mrrta 2021 w InPrcs Wkdy 012020

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: Cstco Mrrta 2021 w InPrcs Wkdy 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek			5 February 2020	
M Greene			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	11092			
RUN:	Cstco Mrrta 2021 w InPrcs Wkdy 012020			
Terrain Line	Points			
Name	No.	Coordinates (ground)		
		X	Y	Z
		ft	ft	ft
Terrain Line1	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line2	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: Cstco Mrrta 2021 w InPrcs Wkdy 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
ST2	2	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
ST3	3	1	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0
ST4	4	1	0.0	54.4	66	54.4	10	----	54.4	0.0	8	-8.0
ST5	5	1	0.0	51.0	66	51.0	10	----	51.0	0.0	8	-8.0
M1	7	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: Cstco Mrrta 2021 w InPrcs Sat 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

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	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: Cstco Mrrta 2021 w InPrcs Sat 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	3355	97	40	2	40	1	40	0	0	0	0
	point3	3	3355	97	40	2	40	1	40	0	0	0	0
	point4	4	3355	97	40	2	40	1	40	0	0	0	0
	point5	5	3355	97	40	2	40	1	40	0	0	0	0
	point6	6	3355	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1625	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	197	97	35	2	35	1	35	0	0	0	0
	point41	41	197	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 11092
RUN: Cstco Mrrta 2021 w InPrcs Sat 012020

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: Cstco Mrrta 2021 w InPrcs Sat 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Increment	Perturbs #Up	#Dn	On Struct?	Important Reflections?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek			5 February 2020	
M Greene			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	11092			
RUN:	Cstco Mrrta 2021 w InPrcs Sat 012020			
Terrain Line	Points			
Name	No.	Coordinates (ground)		
		X	Y	Z
		ft	ft	ft
Terrain Line1	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line2	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: Cstco Mrrta 2021 w InPrcs Sat 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
ST2	2	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
ST3	3	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
ST4	4	1	0.0	54.2	66	54.2	10	----	54.2	0.0	8	-8.0
ST5	5	1	0.0	51.0	66	51.0	10	----	51.0	0.0	8	-8.0
M1	7	1	0.0	57.7	66	57.7	10	----	57.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta2021wPNoInPrcsWkdy012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta2021wPNoInPrcsWkdy012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	3470	97	40	2	40	1	40	0	0	0	0
	point3	3	3470	97	40	2	40	1	40	0	0	0	0
	point4	4	3470	97	40	2	40	1	40	0	0	0	0
	point5	5	3470	97	40	2	40	1	40	0	0	0	0
	point6	6	3470	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1461	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	1659	97	35	2	35	1	35	0	0	0	0
	point41	41	1659	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta2021wPNoInPrcsWkdy012020

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta2021wPNoInPrcsWkdy012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek			**5 February 2020**	
M Greene			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**11092**			
RUN:	**CstcoMrrta2021wPNoInPrcsWkdy012020**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line1	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line2	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta2021wPNoInPrcsWkdy012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0
ST2	2	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0
ST3	3	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
ST4	4	1	0.0	54.7	66	54.7	10	----	54.7	0.0	8	-8.0
ST5	5	1	0.0	51.5	66	51.5	10	----	51.5	0.0	8	-8.0
M1	7	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta2021 PNoInPrcs Sat 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta2021 PNoInPrcs Sat 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	3202	97	40	2	40	1	40	0	0	0	0
	point3	3	3202	97	40	2	40	1	40	0	0	0	0
	point4	4	3202	97	40	2	40	1	40	0	0	0	0
	point5	5	3202	97	40	2	40	1	40	0	0	0	0
	point6	6	3202	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1297	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	2172	97	35	2	35	1	35	0	0	0	0
	point41	41	2172	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek						5 February 2020					
M Greene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	11092										
RUN:	CstcoMrrta2021 PNoInPrcs Sat 012020										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta2021 PNoInPrcs Sat 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: CstcoMrrta2021 PNoInPrcs Sat 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
ST2	2	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
ST3	3	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0
ST4	4	1	0.0	54.6	66	54.6	10	----	54.6	0.0	8	-8.0
ST5	5	1	0.0	51.6	66	51.6	10	----	51.6	0.0	8	-8.0
M1	7	1	0.0	56.8	66	56.8	10	----	56.8	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: CtcMrrta2021woPNoInPrcsWkdy012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: CtcMrrta2021woPNoInPrcsWkdy012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	3598	97	40	2	40	1	40	0	0	0	0
	point3	3	3598	97	40	2	40	1	40	0	0	0	0
	point4	4	3598	97	40	2	40	1	40	0	0	0	0
	point5	5	3598	97	40	2	40	1	40	0	0	0	0
	point6	6	3598	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1461	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	1843	97	35	2	35	1	35	0	0	0	0
	point41	41	1843	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek						5 February 2020					
M Greene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	11092										
RUN:	CtcMrrta2021woPNoInPrcsWkdy012020										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: CtcMrrta2021woPNoInPrcsWkdy012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Increment	#Up	#Dn	On Struct?	Important Reflections?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek			5 February 2020	
M Greene			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	11092			
RUN:	CtcMrrta2021woPNoInPrcsWkdy012020			
Terrain Line	Points			
Name	No.	Coordinates (ground)		
		X	Y	Z
		ft	ft	ft
Terrain Line1	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line2	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: CtcMrrta2021woPNoInPrcsWkdy012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	58.0	66	58.0	10	----	58.0	0.0	8	-8.0
ST2	2	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
ST3	3	1	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
ST4	4	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
ST5	5	1	0.0	51.6	66	51.6	10	----	51.6	0.0	8	-8.0
M1	7	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: CtcMrrta2021woPNoInPrcsSat 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: CtcMrrta2021woPNoInPrcsSat 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	3377	97	40	2	40	1	40	0	0	0	0
	point3	3	3377	97	40	2	40	1	40	0	0	0	0
	point4	4	3377	97	40	2	40	1	40	0	0	0	0
	point5	5	3377	97	40	2	40	1	40	0	0	0	0
	point6	6	3377	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1297	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	2414	97	35	2	35	1	35	0	0	0	0
	point41	41	2414	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek						5 February 2020					
M Greene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	11092										
RUN:	CtcMrrta2021woPNoInPrcsSat 012020										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: CtcMrrta2021woPNoInPrcsSat 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek			5 February 2020	
M Greene			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	11092			
RUN:	CtcMrrta2021woPNoInPrcsSat 012020			
Terrain Line	Points			
Name	No.	Coordinates (ground)		
		X	Y	Z
		ft	ft	ft
Terrain Line1	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line2	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: CtcMrrta2021woPNoInPrcsSat 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
ST2	2	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
ST3	3	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0
ST4	4	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
ST5	5	1	0.0	51.7	66	51.7	10	----	51.7	0.0	8	-8.0
M1	7	1	0.0	56.8	66	56.8	10	----	56.8	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: 2021CmwPwwoCtnwInPrcsWkd 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: 2021CmwPwwoCtnwInPrcsWkd 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	4506	97	40	2	40	1	40	0	0	0	0
	point3	3	4506	97	40	2	40	1	40	0	0	0	0
	point4	4	4506	97	40	2	40	1	40	0	0	0	0
	point5	5	4506	97	40	2	40	1	40	0	0	0	0
	point6	6	4506	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1773	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	1961	97	35	2	35	1	35	0	0	0	0
	point41	41	1961	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 11092
RUN: 2021CmwPwwoCtnwInPrcsWkd 012020

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: 2021CmwPwwoCtnwInPrcsWkd 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: 2021CmwPwwoCtnwInPrcsWkd 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	58.9	66	58.9	10	----	58.9	0.0	8	-8.0
ST2	2	1	0.0	58.5	66	58.5	10	----	58.5	0.0	8	-8.0
ST3	3	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
ST4	4	1	0.0	55.4	66	55.4	10	----	55.4	0.0	8	-8.0
ST5	5	1	0.0	51.8	66	51.8	10	----	51.8	0.0	8	-8.0
M1	7	1	0.0	58.2	66	58.2	10	----	58.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: 2021CmwPwwoCtnwInPrcsSat 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: 2021CmwPwwoCtnwInPrcsSat 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	4542	97	40	2	40	1	40	0	0	0	0
	point3	3	4542	97	40	2	40	1	40	0	0	0	0
	point4	4	4542	97	40	2	40	1	40	0	0	0	0
	point5	5	4542	97	40	2	40	1	40	0	0	0	0
	point6	6	4542	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1770	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	2611	97	35	2	35	1	35	0	0	0	0
	point41	41	2611	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 11092
RUN: 2021CmwPwwoCtnwInPrcsSat 012020

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: 2021CmwPwwoCtnwInPrcsSat 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: 2021CmwPwwoCtnwInPrcsSat 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	58.9	66	58.9	10	----	58.9	0.0	8	-8.0
ST2	2	1	0.0	58.5	66	58.5	10	----	58.5	0.0	8	-8.0
ST3	3	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
ST4	4	1	0.0	55.6	66	55.6	10	----	55.6	0.0	8	-8.0
ST5	5	1	0.0	52.0	66	52.0	10	----	52.0	0.0	8	-8.0
M1	7	1	0.0	58.2	66	58.2	10	----	58.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: 2021CumwPwCrtnwInPrcsWkd 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: 2021CumwPwCrtnwInPrcsWkd 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	4378	97	40	2	40	1	40	0	0	0	0
	point3	3	4378	97	40	2	40	1	40	0	0	0	0
	point4	4	4378	97	40	2	40	1	40	0	0	0	0
	point5	5	4378	97	40	2	40	1	40	0	0	0	0
	point6	6	4378	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1773	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	1776	97	35	2	35	1	35	0	0	0	0
	point41	41	1776	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 11092
RUN: 2021CumwPwCrtnwInPrcsWkd 012020

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: 2021CumwPwCrtnwlnPrcsWkd 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: 2021CumwPwCrtnwlnPrcsWkd 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
ST2	2	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0
ST3	3	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
ST4	4	1	0.0	55.3	66	55.3	10	----	55.3	0.0	8	-8.0
ST5	5	1	0.0	51.7	66	51.7	10	----	51.7	0.0	8	-8.0
M1	7	1	0.0	58.2	66	58.2	10	----	58.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: CumwPwCrtnwInPrcsSat 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: CumwPwCrtnwInPrcsSat 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	4367	97	40	2	40	1	40	0	0	0	0
	point3	3	4367	97	40	2	40	1	40	0	0	0	0
	point4	4	4367	97	40	2	40	1	40	0	0	0	0
	point5	5	4367	97	40	2	40	1	40	0	0	0	0
	point6	6	4367	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	1770	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	2369	97	35	2	35	1	35	0	0	0	0
	point41	41	2369	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek						5 February 2020					
M Greene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	11092										
RUN:	CumwPwCrtnwInPrcsSat 012020										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: CumwPwCrtnwlnPrcsSat 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek			**5 February 2020**	
M Greene			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**11092**			
RUN:	**CumwPwCrtnwInPrcsSat 012020**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line2	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line3	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: CumwPwCrtnwInPrcsSat 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
ST2	2	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0
ST3	3	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
ST4	4	1	0.0	55.4	66	55.4	10	----	55.4	0.0	8	-8.0
ST5	5	1	0.0	51.9	66	51.9	10	----	51.9	0.0	8	-8.0
M1	7	1	0.0	58.2	66	58.2	10	----	58.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: 2035woPwoCrtnNoInPrcsWkd 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: 2035woPwoCrtnNoInPrcsWkd 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	4355	97	40	2	40	1	40	0	0	0	0
	point3	3	4355	97	40	2	40	1	40	0	0	0	0
	point4	4	4355	97	40	2	40	1	40	0	0	0	0
	point5	5	4355	97	40	2	40	1	40	0	0	0	0
	point6	6	4355	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	2566	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	1098	97	35	2	35	1	35	0	0	0	0
	point41	41	1098	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek						5 February 2020					
M Greene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	11092										
RUN:	2035woPwoCrtnNoInPrcsWkd 012020										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: 2035woPwoCrtnNoInPrcsWkd 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Increment	#Up	#Dn	On Struct?	Important Reflections?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek			5 February 2020	
M Greene			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	11092			
RUN:	2035woPwoCrtnNoInPrcsWkd 012020			
Terrain Line	Points			
Name	No.	Coordinates (ground)		
		X	Y	Z
		ft	ft	ft
Terrain Line1	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line2	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: 2035woPwoCrtnNoInPrcsWkd 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
ST2	2	1	0.0	58.3	66	58.3	10	----	58.3	0.0	8	-8.0
ST3	3	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
ST4	4	1	0.0	55.2	66	55.2	10	----	55.2	0.0	8	-8.0
ST5	5	1	0.0	51.5	66	51.5	10	----	51.5	0.0	8	-8.0
M1	7	1	0.0	59.7	66	59.7	10	----	59.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: 2035woPwCrtnwInPrcsWkd 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: 2035woPwCrtnwInPrcsWkd 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	4483	97	40	2	40	1	40	0	0	0	0
	point3	3	4483	97	40	2	40	1	40	0	0	0	0
	point4	4	4483	97	40	2	40	1	40	0	0	0	0
	point5	5	4483	97	40	2	40	1	40	0	0	0	0
	point6	6	4483	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	2566	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	988	97	35	2	35	1	35	0	0	0	0
	point41	41	988	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek						5 February 2020					
M Greene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	11092										
RUN:	2035woPwCrtnwInPrcsWkd 012020										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: 2035woPwCrtnwlnPrcsWkd 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Increment	Perturbs #Up	Perturbs #Dn	On Struct?	Important Reflections?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: 2035woPwCrtnwlnPrcsWkd 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
ST2	2	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0
ST3	3	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
ST4	4	1	0.0	55.2	66	55.2	10	----	55.2	0.0	8	-8.0
ST5	5	1	0.0	51.5	66	51.5	10	----	51.5	0.0	8	-8.0
M1	7	1	0.0	59.7	66	59.7	10	----	59.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2020
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 11092
RUN: 2035CumIwPwoCrtnWkd 012020

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: 2035CumIwPwoCrtnWkd 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	5224	97	40	2	40	1	40	0	0	0	0
	point3	3	5224	97	40	2	40	1	40	0	0	0	0
	point4	4	5224	97	40	2	40	1	40	0	0	0	0
	point5	5	5224	97	40	2	40	1	40	0	0	0	0
	point6	6	5224	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	2676	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	2941	97	35	2	35	1	35	0	0	0	0
	point41	41	2941	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: 2035CumlwPwoCrtnWkd 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: 2035CumIwPwoCrtnWkd 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	59.4	66	59.4	10	----	59.4	0.0	8	-8.0
ST2	2	1	0.0	59.1	66	59.1	10	----	59.1	0.0	8	-8.0
ST3	3	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
ST4	4	1	0.0	56.0	66	56.0	10	----	56.0	0.0	8	-8.0
ST5	5	1	0.0	52.2	66	52.2	10	----	52.2	0.0	8	-8.0
M1	7	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek					**5 February 2020**						
M Greene					**TNM 2.5**						
INPUT: ROADWAYS							**Average pavement type shall be used unless**				
PROJECT/CONTRACT:	**11092**						**a State highway agency substantiates the use**				
RUN:	**2035CumIwPwCrtnWkd 012020**						**of a different type with the approval of FHWA**				
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	%		
Clinton Keith Road	100.0	point1	1	4,540.0	2,082.1	1,500.00				Average	
		point3	3	1,894.7	2,071.7	1,518.00				Average	
		point4	4	1,877.4	2,071.7	1,520.00				Average	
		point5	5	1,705.5	2,092.5	1,530.00				Average	
		point6	6	1,367.1	2,194.9	1,530.00				Average	
		point7	7	540.4	2,474.8	1,530.00					
I-215	120.0	point29	29	734.8	1,945.7	1,515.00				Average	
		point9	9	963.2	2,315.1	1,515.00					
I-215 NB Onramp	45.0	point31	31	1,561.4	2,190.7	1,530.00				Average	
		point21	21	1,456.5	2,282.5	1,530.00				Average	
		point22	22	1,412.7	2,356.9	1,530.00				Average	
		point23	23	1,421.5	2,492.5	1,530.00				Average	
		point24	24	1,780.2	3,485.3	1,530.00				Average	
		point25	25	1,850.1	3,730.3	1,530.00					
Whitewood Road	100.0	point33	33	4,478.8	2,121.8	1,500.00				Average	
		point27	27	4,496.4	4,024.5	1,500.00					
I-215 NB Offramp	45.0	point36	36	717.3	1,648.3	1,520.00				Average	
		point17	17	1,167.8	1,871.4	1,525.00				Average	
		point18	18	1,281.5	1,989.5	1,528.00				Average	
		point19	19	1,355.9	2,173.2	1,530.00					
I-215-2	120.0	point39	39	980.0	2,337.3	1,515.00				Average	
		point10	10	1,294.7	2,754.9	1,520.00				Average	
		point11	11	1,552.7	3,192.3	1,525.00				Average	
		point12	12	1,727.6	3,603.4	1,530.00				Average	
		point13	13	1,823.9	3,918.3	1,530.00				Average	

		point14	14	1,876.4	4,123.9	1,530.00				Average	
		point15	15	1,950.7	4,425.7	1,530.00					
Warm Springs Road	40.0	point40	40	2,652.7	2,103.5	1,515.00				Average	
		point41	41	2,655.6	3,085.9	1,515.00				Average	
		point42	42	2,702.6	3,323.4	1,515.00					

Dudek 5 February 20
M Greene TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 11092
RUN: 2035CumIwPwCrtnWkd 012020

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Clinton Keith Road	point1	1	5224	97	40	2	40	1	40	0	0	0	0
	point3	3	5224	97	40	2	40	1	40	0	0	0	0
	point4	4	5224	97	40	2	40	1	40	0	0	0	0
	point5	5	5224	97	40	2	40	1	40	0	0	0	0
	point6	6	5224	97	40	2	40	1	40	0	0	0	0
	point7	7											
I-215	point29	29	11700	93	65	3	65	4	65	0	0	0	0
	point9	9											
I-215 NB Onramp	point31	31	100	97	45	2	45	1	45	0	0	0	0
	point21	21	100	97	45	2	45	1	45	0	0	0	0
	point22	22	100	97	45	2	45	1	45	0	0	0	0
	point23	23	100	97	45	2	45	1	45	0	0	0	0
	point24	24	100	97	45	2	45	1	45	0	0	0	0
	point25	25											
Whitewood Road	point33	33	2676	97	45	2	45	1	45	0	0	0	0
	point27	27											
I-215 NB Offramp	point36	36	100	97	45	2	45	1	45	0	0	0	0
	point17	17	100	97	45	2	45	1	45	0	0	0	0
	point18	18	100	97	45	2	45	1	45	0	0	0	0
	point19	19											
I-215-2	point39	39	11700	93	65	3	65	4	65	0	0	0	0
	point10	10	11700	93	65	3	65	4	65	0	0	0	0
	point11	11	11700	93	65	3	65	4	65	0	0	0	0

INPUT: TRAFFIC FOR LAeq1h Percentages **11092**

	point12	12	11700	93	65	3	65	4	65	0	0	0	0
	point13	13	11700	93	65	3	65	4	65	0	0	0	0
	point14	14	11700	93	65	3	65	4	65	0	0	0	0
	point15	15											
Warm Springs Road	point40	40	2647	97	35	2	35	1	35	0	0	0	0
	point41	41	2647	97	35	2	35	1	35	0	0	0	0
	point42	42											

Dudek						**5 February 2020**					
M Greene						**TNM 2.5**					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	**11092**										
RUN:	**2035CumlwPwCrtnWkd 012020**										
Receiver											
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**				**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**		**NR**	**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**	**Goal**	**Calc.**
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ST1	1	1	1,702.5	1,982.2	1,512.00	5.00	0.00	66	10.0	8.0	Y
ST2	2	1	3,422.5	1,820.0	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST3	3	1	3,310.7	2,162.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST4	4	1	3,272.5	2,640.2	1,510.00	5.00	0.00	66	10.0	8.0	Y
ST5	5	1	3,312.4	3,256.6	1,510.00	5.00	0.00	66	10.0	8.0	Y
M1	7	1	4,402.0	2,379.6	1,510.00	5.00	0.00	66	10.0	8.0	Y

Dudek
M Greene

5 February 2020
TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: 11092
RUN: 2035CumIwPwCrtnWkd 012020

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Increment	Perturbs #Up	#Dn	On Struct?	Important Reflections?
		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	3,293.2	2,144.9	1,510.00	6.00	0.00	0	0		
									point2	2	3,801.1	2,135.3	1,510.00	6.00	0.00	0	0		
									point3	3	3,891.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point4	4	4,384.6	2,142.2	1,510.00	6.00	0.00	0	0		
									point5	5	4,413.2	2,143.7	1,510.00	6.00	0.00	0	0		
									point6	6	4,422.0	3,547.7	1,510.00	6.00					
Barrier11	W	0.00	99.99	0.00				0.00	point10	10	3,293.3	2,145.3	1,510.00	10.00	0.00	0	0		
									point8	8	3,289.2	2,570.5	1,510.00	10.00					
Barrier21	W	0.00	99.99	0.00				0.00	point11	11	3,201.5	1,661.5	1,510.00	20.00	0.00	0	0		
									point37	37	3,204.3	1,713.9	1,510.00	20.00	0.00	0	0		
									point38	38	3,413.7	1,713.9	1,510.00	20.00	0.00	0	0		
									point39	39	3,411.0	1,653.3	1,510.00	20.00					
Barrier8	W	0.00	99.99	0.00				0.00	point48	48	3,325.9	2,270.4	1,510.00	20.00	0.00	0	0		
									point13	13	3,323.7	2,163.3	1,510.00	20.00	0.00	0	0		
									point14	14	3,787.3	2,158.9	1,510.00	20.00	0.00	0	0		
									point15	15	3,787.3	2,272.6	1,510.00	20.00					
Barrier9	W	0.00	99.99	0.00				0.00	point50	50	3,894.5	2,263.9	1,510.00	20.00	0.00	0	0		
									point17	17	3,901.0	2,165.4	1,510.00	20.00	0.00	0	0		
									point18	18	4,275.0	2,158.9	1,510.00	20.00	0.00	0	0		
									point46	46	4,272.8	2,266.0	1,510.00	20.00					
Barrier10	W	0.00	99.99	0.00				0.00	point52	52	4,323.8	2,378.3	1,510.00	20.00	0.00	0	0		
									point20	20	4,321.0	2,157.9	1,510.00	20.00	0.00	0	0		
									point21	21	4,395.4	2,160.7	1,510.00	20.00	0.00	0	0		
									point22	22	4,398.2	2,381.1	1,510.00	20.00					
Barrier 5	W	0.00	99.99	0.00				0.00	point54	54	4,086.8	2,609.8	1,510.00	20.00	0.00	0	0		
									point24	24	4,097.8	2,923.9	1,510.00	20.00	0.00	0	0		
									point25	25	4,340.3	2,918.4	1,510.00	20.00	0.00	0	0		
									point45	45	4,343.1	3,406.1	1,510.00	20.00	0.00	0	0		
									point26	26	3,403.5	3,411.6	1,510.00	20.00	0.00	0	0		
									point27	27	3,422.8	2,609.8	1,510.00	20.00					
Barrier7	W	0.00	99.99	0.00				0.00	point56	56	3,305.6	2,340.4	1,510.00	20.00	0.00	0	0		
									point29	29	4,282.4	2,337.0	1,510.00	20.00	0.00	0	0		
									point30	30	4,276.9	2,546.4	1,510.00	20.00	0.00	0	0		
									point31	31	3,309.8	2,557.5	1,510.00	20.00	0.00	0	0		
									point33	33	3,308.6	2,342.3	1,510.00	20.00					

Barrier6	W	0.00	99.99	0.00				0.00	point58	58	3,297.8	3,093.6	1,510.00	20.00	0.00	0	0		
									point35	35	3,289.5	2,583.9	1,510.00	20.00	0.00	0	0		
									point36	36	3,355.7	2,581.1	1,510.00	20.00	0.00	0	0		
									point12	12	3,361.2	3,088.1	1,510.00	20.00					
Barrier20	W	0.00	99.99	0.00				0.00	point60	60	3,433.3	1,768.9	1,510.00	20.00	0.00	0	0		
									point41	41	3,434.4	1,876.1	1,510.00	20.00	0.00	0	0		
									point42	42	3,552.5	1,875.0	1,510.00	20.00	0.00	0	0		
									point43	43	3,552.5	1,771.1	1,510.00	20.00					
Barrier19	W	0.00	99.99	0.00				0.00	point61	61	1,708.0	2,180.4	1,530.00	0.00	0.00	0	0		
									point62	62	1,819.1	2,524.1	1,540.00	0.00	0.00	0	0		
									point63	63	1,871.2	2,975.4	1,550.00	0.00	0.00	0	0		
									point64	64	1,968.4	3,697.5	1,550.00	0.00	0.00	0	0		
									point65	65	1,975.3	4,003.0	1,540.00	0.00					
Barrier22	W	0.00	99.99	0.00				0.00	point67	67	1,779.6	1,933.4	1,530.00	20.00	0.00	0	0		
									point68	68	1,659.0	1,949.5	1,530.00	20.00	0.00	0	0		
									point69	69	1,506.3	2,035.2	1,530.00	20.00	0.00	0	0		
									point70	70	1,238.3	1,737.8	1,530.00	20.00	0.00	0	0		
									point71	71	1,160.6	1,692.2	1,530.00	20.00					

Dudek			5 February 2020	
M Greene			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	11092			
RUN:	2035CumlwPwCrtnWkd 012020			
Terrain Line	Points			
Name	No.	Coordinates (ground)		
		X	Y	Z
		ft	ft	ft
Terrain Line1	1	1,605.9	2,030.4	1,522.00
	2	1,685.8	2,007.1	1,522.00
	3	1,825.5	1,990.5	1,522.00
Terrain Line2	4	3,208.7	1,970.8	1,512.00
	5	3,671.8	1,962.1	1,512.00

Dudek
M Greene

5 February 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 11092
RUN: 2035CumlwPwCrtnWkd 012020
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ST1	1	1	0.0	59.4	66	59.4	10	----	59.4	0.0	8	-8.0
ST2	2	1	0.0	59.1	66	59.1	10	----	59.1	0.0	8	-8.0
ST3	3	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
ST4	4	1	0.0	56.0	66	56.0	10	----	56.0	0.0	8	-8.0
ST5	5	1	0.0	52.1	66	52.1	10	----	52.1	0.0	8	-8.0
M1	7	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Appendix D

Mechanical Equipment Noise Calculations

HVAC Noise Calculations

Building Type	HVAC Units		Distance from residents (approximate worst-case) (feet)	Resultant Unattenuated Noise Level (dBA)	Attenuation from Building and Parapet (dB)	Resultant noise level with Attenuation (dBA)
	Quantity	Capacity (in tons)				
Fitness Center						
	16	10	105	60.1	15.8	44.3
Major						
	8	10	200	51.5	12.9	38.5
Shop						
	1	5	300	38.9	17.6	21.4
Shops						
	4	5	500	40.5	17.9	22.6
Fast Food						
	1	10	600	32.9	14.8	18.2
	1	5	600	32.9	14.8	18.2
Combined noise level at nearest noise-sensitive receivers (worst-case)						**45.4**

Assumptions:
SPLs (shown) calculated based upon Lennox specifications (provided in Appendix D)

5	49.5
10	54.5

RAY-TRACE PROGRAM (FOR A POINT-SOURCE)

Uses the Equation: $(A_{e4})_{point}=20*\log[(2*pi*N)^{1/2}/\tanh(2*pi*N)^{1/2}]+5dB$

(Ref. Pg.174, Noise and Vibration Control, L.L. Beranek Editor, 1971 Ed.

Project: Costco Murrieta Project
Date: 8/14/18
By: MGG

Please Enter: Using English (E) units or Metric (M) units ? E

Ray Trace Number/Description	Source-Receiver Distance (ft. or m)	Source Base Elev. (ft. or m)	Source Height above Ground (ft. or m)	Receiver Base Elev. (ft. or m)	Receiver Height above Ground (ft. or m)	Horizontal Barrier Dist. (in ref. to source) (ft. or m)	Barrier Base Elev. (ft. or m)	Barrier Height (ft. or m)	Dominant Freq.(Hz)	Source-Rcvr Straight-Line Dist. (ft. or m)	Source-Top-of-Barrier Dist. (ft. or m)	Receiver-Top-of-Barrier Dist. (ft. or m)	Lambda	N_{max}	$AE_{(barriers)}$ (dB)
1. Source -HVAC Noise	105.0	120.0	4.0	100.0	5.0	55.0	120.0	**5.0**	500.0	106.7	55.0	53.9	2.3	1.9	**15.8**
2. Source -HVAC Noise	200.0	120.0	4.0	100.0	5.0	100.0	120.0	**5.0**	500.0	200.9	100.0	102.0	2.3	1.0	**12.9**
2. Source -HVAC Noise	300.0	120.0	4.0	100.0	5.0	250.0	120.0	**5.0**	500.0	300.6	250.0	53.9	2.3	2.9	**17.6**
2. Source -HVAC Noise	500.0	120.0	4.0	100.0	5.0	450.0	120.0	**5.0**	500.0	500.4	450.0	53.9	2.3	3.1	**17.9**
2. Source -HVAC Noise	600.0	120.0	4.0	100.0	5.0	500.0	120.0	**5.0**	500.0	600.3	500.0	102.0	2.3	1.5	**14.8**

AIR CONDITIONERS

ELS

ELITE® COMMERCIAL SPLIT SYSTEMS

R-410A - 60 HZ

Bulletin No. 210804
February 2018

PRODUCT SPECIFICATIONS

072-090 Models

120-150 Models

ELITE® SERIES

180-240 Models

EER up to 12.0
6 to 20 Tons
Cooling Capacity - 71,000 to 232,000 Btuh

MODEL NUMBER IDENTIFICATION

EL S 120 S 4 S T 1 Y

Brand/Family
EL = Elite® Product Line

Unit Type
S = Split System Air Conditioner

Nominal Cooling Capacity – Tons
072 = 6 Tons
090 = 7.5 Tons
120 = 10 Tons
150 = 12.5 Tons
180 = 15 Tons
240 = 20 Tons

Cooling Efficiency
S = Standard Efficiency

Refrigerant Type
4 = R–410A

Refrigerant Circuits
S = Single Circuit
D = Dual Circuits

Part Load Capability
S = Single StageCompressor
T = Dual Stage Compressor

Minor Design Sequence
1 = 1st Revision
2 = 2nd Revision
3 = 3rd Revision

Voltage
Y = 208/230V-3 phase-60hz
G = 460V-3 phase-60hz
J = 575V-3 phase-60hz

AHRI SYSTEM MATCHES

Model	Cooling Btuh	EER	IEER	Air Handler	Expansion Device	AHRI Reference
ELS072S4S	71,000	12.0	16.0	ELA072S4S	Factory TXV	201753420
ELS090S4S	89,000	11.2	14.4	ELA090S4D	Factory TXV	201753421
ELS120S4S	115,000	11.2	14.4	ELA120S4D	Factory TXV	201753423
ELS120S4D	115,000	11.2	12.9	ELA120S4D	Factory TXV	201753422
ELS150S4D	136,000	11.0	12.4	ELA150S4D	Factory TXV	201753424
ELS180S4D	178,000	11.0	12.4	ELA180S4D	Factory TXV	201753975
ELS240S4D	232,000	11.0	12.4	ELA240S4D	Factory TXV	201753426

NOTES - Units with capacity of 65,000 Btuh or greater are AHRI Certified to AHRI Standard 340/360: 95°F outdoor air temperature, 80°F db/67°F wb entering evaporator air (minimum external duct static pressure) with 25 ft. of connecting refrigerant lines.

SOUND DATA

[1] Unit Model No.	Octave Band Linear Sound Power Levels dB, re 10^{-12} Watts Center Frequency - HZ							[1] Sound Rating Number (dB)
	125	250	500	1000	2000	4000	8000	
ELS072S4S	65	68	73	76	72	68	63	81
ELS090S4S	64	69	73	77	74	70	63	81
ELS120S4S	70	77	82	81	77	75	71	86
ELS120S4D	71	77	80	80	77	72	67	85
ELS150S4D	68	77	80	82	78	73	65	86
ELS180S4D	73	80	83	83	79	74	66	88
ELS240S4D	73	80	85	84	80	78	74	89

NOTE - the octave sound power data does not include tonal correction.

[1] Tested according to AHRI Standard 270 test conditions.