Appendix I
Noise Technical Memorandum

MEMORANDUM

To:	Michael Haberkorn, Gatzke Dillon & Ballance
From:	Cole Martin, INCE & Mark Storm, INCE Bd. Cert.
Subject:	SDSU Imperial Valley – Brawley, Brawley Sciences Building Project- Noise Technical Memorandum
Date:	August 16, 2023
cc:	Kirsten Burrowes, Sarah Lozano, Dudek
Attachments:	A – Figures B – Construction Noise Prediction Model Worksheets

Dudek has conducted an evaluation pursuant to the requirements of the California Environmental Quality Act (CEQA), California Public Resources Code 21000, et seq., to determine the presence of and potential impacts related to noise associated with the proposed San Diego State University (SDSU) Imperial Valley – Brawley, Brawley Sciences Building Project (project or proposed project), located east of Brawley, California. This technical memorandum provides the results of the noise assessment.

1 Project Location and Setting

The project is located at 560 California State Route (SR) 78 (also referred to as Ben Hulse Highway) in Imperial County, east of the City of Brawley (see Attachment A: Figure 1). Regional access to the campus is provided by SR 111 and SR 86 to the west and northwest, respectively, and SR 115 to the east. The proposed project site is surrounded by agricultural uses to the north, south, and west. Undeveloped land and a solar farm are located directly east of the proposed project site. The proposed building would be constructed northeast of existing campus Building 101, and the associated parking lot. Project construction staging areas would occupy the area of campus located southeast of the site and north of SR 78 (see Attachment A: Figure 2).

2 Project Description

In September 2003, CSU certified an environmental impact report (EIR) and approved a Campus Master Plan for development of Brawley Center (Brawley campus or center), which would serve as an extension of the existing SDSU Imperial Valley Campus (IVC) located in Imperial County. The IVC is an extension of SDSU's main campus located in San Diego and furthers the university's regional educational mission to provide additional educational opportunities to the outlying communities of Imperial County. The approved Campus Master Plan and certified environmental impact report (EIR) provided the sufficient environmental analysis and authorization necessary for enrollment of 850 full-time equivalent (FTE) students and corresponding faculty and staff and provided a framework for development of the facilities necessary to serve the approved campus enrollment.

The Brawley campus is approximately 200 acres in size and is located east of the city of Brawley (City). See Attachment A: Figure 1. Currently, the campus has been partially built out with educational and support facilities, although much of the campus remains undeveloped or used for active agriculture. As noted above, the environmental impacts associated with development of the Brawley campus, including a student enrollment up to

850 FTE, were evaluated at a program level of review in the previously certified 2003 SDSU Imperial Valley Campus Master Plan Project EIR (2003 EIR) (SCH 200251010). In CSU's effort to build out the IVC consistent with the previously approved Campus Master Plan, SDSU now proposes construction and operation of a sciences building that would be located on the Brawley campus.

The proposed project involves the construction and operation of a sciences building that would house teaching labs, lecture spaces, faculty/administration offices, research spaces, and conference rooms, as well as mechanical, electrical, and telecom support spaces. The proposed project does not include/propose any increase in the previously authorized and approved maximum student enrollment of 850 FTE.

The proposed project site is approximately 3.2-acres in size and the construction staging areas would occupy approximately 1-acre in the area of campus located southeast of the site and north of California State Route (SR) 78. The project includes 61,119 sf of on-site landscaping, including the construction of bio-retention areas to capture stormwater runoff from stormwater drainages systems that will be located throughout the project site. Hardscape improvements will include 41,297 sf of sidewalks and pedestrian walkways, which will connect the project site to existing campus buildings and parking lot.

Additionally, the project would require new points of connection to domestic water, fire water, and sewer lines from existing utility lines to serve the new building, as well as new domestic water line infrastructure. Potable water will be provided by the City of Brawley, as well as sewer and wastewater collection services. New utility infrastructure will also be required to support electrical services for the building, as well as a back-up diesel operated generator.

The proposed project building would have an area of 36,900 gross sf and would be approximately 35 feet in height. The project is expected to be built over the course of 19 months, with construction estimated to begin in 2024. Construction and equipment staging would require 1-acre of space within the campus, directly east of existing Building 101 and the parking lot. The project would involve site preparation, grading, and excavation associated with project construction. Excavation depths are anticipated to be 2-5 feet. Waste (i.e., excavated gravel/soil) generated during project construction would be balanced within the site.

3 Analysis Methodology

The analysis presented here considers the potential environmental impacts of the proposed project relative to existing conditions. Establishment of the project site's existing noise conditions and assessment of project-attributed environmental noise impacts has been prepared using information contained in the previously certified 2003 SDSU Imperial Valley Campus Master Plan Project EIR (SDSU 2003), with the information updated, as applicable, with the following contemporary data sources and techniques:

- Federal Transit Administration guidance (FTA 2018) to estimate outdoor ambient sound levels in the project vicinity; and
- Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) reference maximum sound levels (L_{max} at 50 feet distance) and acoustical usage factors (AUF).

4 Noise

4.1 Acoustical Fundamentals

4.1.1 Sound

Noise is defined as unwanted sound. 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 dBA scale performs this compensation by discriminating against low and very high frequencies in a manner approximating the sensitivity of the human ear. Several descriptors of noise (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 statistical sound level, the day–night average noise level (L_{dn}), and the Community Noise Equivalent Level (CNEL). Each of these descriptors uses units of dBA. Table 1, Typical Exterior and Interior Sound Levels in the Environment, provides examples of A-weighted noise levels from common sounds. In general, human sound perception is such that a change in sound level of 3 dBA is barely noticeable, a change of 5 dBA is clearly noticeable, and a change of 10 dBA is perceived as either doubling or halving the sound level depending on whether the sound is increasing or decreasing.

Table 1. Typical Exterior and Interior Sound Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	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 kilometers per hour (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 nighttime	20	Bedroom at night, concert hall (background)
—	10	Broadcast/recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 2020.
Note: dBA = A-weighted decibel.

The L_{eq} value is a sound level energy-averaged over a specified period (typically no less than 15 minutes for environmental studies). It is a single numerical value that, if constant over time, represents the same 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 hour. L_{eq} is an effective noise descriptor because of its ability to assess the total time-varying effects of noise on sensitive receptors.

Unlike the L_{eq} metric, L_{dn} and CNEL descriptors always represent 24-hour periods, often on an annualized basis. L_{dn} and CNEL also differ from L_{eq} because they apply a time-weighted dB adjustment 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 (7:00 a.m.–7:00 p.m.) receives no penalty. Noise during the evening (7:00 p.m.–10:00 p.m.) is penalized by adding 5 dB, while nighttime (10:00 p.m.–7:00 a.m.) noise is penalized by adding 10 dB. L_{dn} differs from CNEL in that the daytime period is defined as 7:00 a.m.–10:00 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 dB to 1 dB and, as such, are often treated as equivalent to one another.

4.1.2 Sensitive Receptors

Noise-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Consistent with types discussed in the 2003 EIR, residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would be considered noise sensitive and may warrant unique measures for protection from intruding noise. Sensitive receptors in the vicinity of the project site consist of a residential use located to the west. This sensitive receptor represents the nearest sensitive land use with the potential to be impacted by construction and/or operation of the project.

4.2 Existing Noise Conditions

The FTA has offered guidance on estimating existing outdoor ambient sound levels due to proximity to roadways and rail, or based on an approximation formula with population density as the input parameter (FTA 2018). By way of example, the former of these techniques predicts that daytime L_{eq} can be 55 dBA at a distance of 800 feet to an Interstate highway, and 75 dBA at a distance of only 50 feet. Similar estimates are offered by the FTA with respect to receptor proximity to operating railroads, parkways, and arterial roads. Previously conducted outdoor ambient sound level surveys for other cities in California, exhibited in a variety of published project studies that are publicly available, show daytime L_{eq} values that are generally consistent with these estimates but also account for other acoustical contributors to the measured environment at a specific surveyed location.

Utilizing a combination of data from the aforementioned FTA guidance, the following Table 2, Estimated Outdoor Ambient Sound Level (dBA, CNEL) per FTA Guidance, provides a matrix from which the pre-existing outdoor ambient sound level, expressed as day-night sound levels (L_{dn}, which for purposes of this assessment, are considered equivalent to CNEL values) can be estimated.

Table 2. Estimated Outdoor Ambient Sound Level (dBA, CNEL) per FTA Guidance

Population Density (people per square mile) in Vicinity of Project Implemented under Program	300–1,000	1,000–3,000	3,000–10,000	10,000–30,000
Distance to Interstate Highway 1,2 = 10–50 feet	75	75	75	75
50–100 feet	70	70	70	70
100–200 feet	65	65	65	65
200–400 feet	60	60	60	60
400–800 feet	55	55	55	60
800 or more feet	50	50	55	60
Parkway (55 mph) or City Streets (30 mph) 1,3 = 10–50 feet	70	70	70	70
50–100 feet	65	65	65	65
100–200 feet	60	60	60	60
200–400 feet	55	55	55	60
400 or more feet	50	50	55	60
Railway 1,4 = 10–30 feet	75	75	75	75
30–60 feet	70	70	70	70
60–120 feet	65	65	65	65
120–240 feet	60	60	60	60
240–500 feet	55	55	55	60
500–800 feet	50	50	55	60
800 or more	45	50	55	60

Notes:

1 Distances are perpendicular to transportation route centerline and do not include shielding from intervening rows of buildings.
2 Roadways with 4 or more lanes that permit trucks, with traffic at 60 mph.
3 Parkways with traffic at 55 mph, but without trucks, and city streets with the equivalent of 75 or more heavy trucks per hour and 300 or more medium trucks per hour at 30 mph.
4 Main line railroad corridors typically carrying 5-10 trains per day at speeds of 30-40 mph.

Source: FTA 2018

By way of example, online aerial photographs indicate that the population density surrounding the project is likely to be less than 300 people per square mile due to the rural nature of the project area, which FTA guidance would suggest results in a relatively quiet outdoor ambient sound level (45 dBA CNEL) when highways, parkways, and rail transportation routes are very far away. But since the project area is approximately 200-400 feet from Highway 78, FTA guidance then suggests that the estimated outdoor ambient sound level would be at least 55 dBA CNEL. FTA guidance also suggests that published airport noise contours should be consulted, which may show outdoor ambient sound in a project near an airport or airfield is actually much higher than what the values in Table 2 suggest.

Estimates of outdoor ambient sound levels at the project site are consistent with the sound level survey described in Appendix F of the 2003 EIR, which states that 59.7 dBA L_{eq} was sampled over an hour at a distance of 100 feet from the SR 78 centerline. This 2003 EIR baseline sound level is consistent with the 60 dBA magnitude appearing in Table 2 for the "Other Roadway" type and a distance of 100 feet.

4.3 Regulatory Setting

Because SDSU is part of the California State University system, which is a state agency, the proposed project is not subject to local government planning and land use plans, policies, or regulations. Furthermore, as described in Section 2, Project Description, the environmental impacts associated with development of the Brawley Campus Master Plan, including impacts attributable to noise, were previously evaluated at a program level of review in the certified 2003 EIR, and the proposed project (operation of a Lithium Research Hub/STEM research and instruction facility) would be implemented under the approved program. As such, noise impacts related to development of the overall Campus Master Plan, such as those impacts attributable to the increased vehicle traffic generated by 850 FTE students, were previously analyzed and no further analysis of vehicle traffic noise under CEQA is required. Accordingly, the following subsections, which summarize relevant laws, ordinances, regulations, policies, standards, and other guidance that typically would be considered by other development projects in Imperial County, is provided for informational purposes and background context only.

4.3.1 Federal

There are no federal noise standards that would directly regulate environmental noise during construction and operation of the project. The following is provided because guidance summarized herein is provided for informative context with respect to typical noise level thresholds for environmental impact assessment.

Federal Transit Administration

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

4.3.2 State of California

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 dBA CNEL and "conditionally acceptable" up to 70 dBA CNEL. Multiple-family residential uses are "normally acceptable" up to dBA 65 CNEL and "conditionally acceptable" up to dBA 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 dBA CNEL, as are office buildings and business, commercial, and professional uses.

4.3.3 Imperial County

The following information is provided for information and background purposes only as CSU/SDSU, as a state agency, is not subject to local planning laws and regulations.

As summarized in Section IV.C.1 of its General Plan Noise Element, Imperial County utilizes an interior background sound level standard of 45 dBA CNEL (due to intrusion of exterior noise sources) for inhabited spaces and 50 dBA hourly L_{eq} for schools, libraries and other non-residential facilities with only daytime occupancy.

Consistent with state land use planning guidelines, Imperial County also has its own matrix of noise levels considered compatible for the exteriors of various land uses. Section IV.C.2 of the Noise Element summarizes property line noise limits, expressed as hourly L_{eq} values, that vary with the time of day (i.e., 7 a.m. to 10 p.m. for daytime, and 10 p.m. to 7 a.m. for nighttime, during which time thresholds are more stringent by 5 dB).

With respect to construction noise, Section IV.C.3 limits off-site exposures to 75 dBA L_{eq} over an 8-hour period at the nearest sensitive receptor, and prohibits construction equipment operation outside of the 7 a.m. to 7 p.m. period on weekdays and outside of 9 a.m. to 5 p.m. on Saturdays. Commercial construction activities are prohibited on Sundays and holidays.

Imperial County also has standards relating to the outdoor ambient environment, permissible increases in noise levels that may result due to a noise-generating project:

- If the future noise level after completion of the project causes a 5 dB CNEL increase or greater but within a "normally acceptable" range per the Noise/Land Use Compatibility Guidelines; or
- If the future noise level after completion of the project causes a 3 dB CNEL increase and at a magnitude greater than that of the "normally acceptable" range per the Noise/Land Use Compatibility Guidelines.

5 Impact Analysis and Conclusions

5.1 Thresholds of Significance

The thresholds of significance used to evaluate the impacts of the proposed project related to noise are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines (Cal. Code Regs., Title 14, Chapter. 3, sections 15000-15387.). A significant impact under CEQA would occur if the proposed project would:

a) 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?
b) Result in generation of excessive groundborne vibration or groundborne noise levels?
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels?

5.2 Impact Analysis

The Initial Study (IS) prepared for the 2003 EIR determined that there would be "no impact" with respect to generation of noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies. The IS similarly concluded no impact due to generation of excessive groundborne vibration or groundborne noise levels; and, no significant impact regarding exposure of people working

or residing in the area to excessive aviation noise levels from sufficiently proximate public or private airports or airfields. For these reasons, the 2003 EIR focused on an assessment of potentially significant temporary or permanent increases to outdoor ambient noise levels. A summary of the prior analysis, including significance determinations and mitigation, if applicable, is provided below.

Consistent with the 2003 EIR, the impact assessment herein includes predictive analyses of construction noise (i.e., temporary noise sources) and permanent noise sources, such as HVAC equipment, etc., that would be installed as part of the proposed Project. Durable but localized acoustical additions to the outdoor sound environment on site due to intermittent and continuous sources, such as steady-state operating heating, ventilating, and air-conditioning (HVAC) systems are discussed qualitatively and consistent with the IS finding of no impact to persons on site.

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

Short-Term Construction Noise

Chapter 3.9, Noise, of the 2003 EIR included an evaluation of potential impacts related to construction noise based on the technical analysis undertaken and presented in EIR Appendix F. Based on the necessarily programmatic analysis, the 2003 EIR determined that no impact would occur with regard to construction noise.

Construction noise is considered a short-term (i.e., temporary) impact. As CSU is not subject to County standards or thresholds, we note for information purposes only that construction-related noise would be considered significant if construction activities exceed the allowable hours of operation as permitted by the County threshold of 75 dBA L_{eq} over an 8-hour period at the nearest sensitive receptor. Such noise-sensitive land uses in the vicinity of the proposed project include a single family-residence to the west (approximately 1,390 feet from the construction boundary). Although additional residences and other noise-sensitive receptors are further afield, the construction noise assessment conducted for the present analysis focused on project-attributed noise exposure levels predicted to occur at these nearest existing residences. Construction noise levels at more distant receptors would be substantially lower, consistent with established acoustical principles of attenuation with geometric divergence and other factors.

Project-generated construction noise will vary depending on the construction process, the type of equipment involved, the location of the construction site with respect to sensitive receptors, the schedule proposed to carry out each task (e.g., hours and days of the week), and the duration of the construction work. Using construction equipment information provided by SDSU, project-level construction noise was calculated using a spreadsheet-based model emulating the Federal Highway Administration (FHWA) Roadway Construction Noise Model (FHWA 2008). Table 3, Construction Scenario Assumptions, presents the equipment list used for the construction noise analysis.

Table 3. Construction Scenario Assumptions (default 5 days per week)

Phase	Equipment Type	Quantity	Usage Hours
Site Preparation	Graders	1	8
	Rubber Tired Dozers	1	7
	Tractors/Loaders/Backhoes	1	8
Grading	Graders	1	8
	Rubber Tired Dozers	1	8
	Tractors/Loaders/Backhoes	2	7
Building Construction	Cranes	1	6
	Forklifts	1	6
	Generator Sets	1	8
	Tractors/Loaders/Backhoes	1	6
	Welders	3	8
Architectural Coating	Air Compressors	1	6

Using the information presented above, construction noise for the proposed project was predicted at a distance of 300 feet (i.e., the same distance used for the prediction of construction noise in the 2003 EIR), as well as 1,390 feet (for the nearest noise-sensitive receptor). Attachment B displays the construction noise model worksheet for the analysis.

As shown in Attachment B, Construction Noise Prediction Model Worksheets, and as a consequence of using construction equipment reference noise data that was available after the 2003 EIR was certified, the predicted aggregate construction noise level at a distance of 300 feet from the project site is expected to be 70 dBA L_{eq} over an 8-hour period for the noisiest phase (Grading) and is one dB higher than the 68.8 dBA 8-hour L_{eq} estimated in the 2003 EIR. Although the 2003 EIR did not identify a particular quantified dB limit against which to assess construction noise impact, this predicted exposure level during daytime hours is below Imperial County's criterion of 75 dBA 8-hour L_{eq} or the FTA guidance-based 8-hour L_{eq} threshold of 80 dBA. At the exterior of the nearest apparent noise-sensitive receptor (1,390 feet from the project), the predicted construction noise level is 57 dBA L_{eq} during the Grading phase and would not only be much quieter than these standards, but very likely comparable to or less than existing outdoor ambient noise levels as may be estimated by the matrix in Table 2. For these reasons, and consistent with the 2003 EIR conclusions, potential impacts associated with project-generated construction noise would be **less than significant**.

Long-Term Operational Noise

Chapter 3.9, Noise, of the 2003 EIR, and the noise study prepared for the EIR, determined that buildout of the Campus Master Plan, including the vehicle trips that would be generated by the approved 850 FTE students, would not result in potentially significant impacts related to traffic roadway noise. The analysis determined that vehicle trips generated by the Campus Master Plan would result in a roadway noise increase over existing conditions of approximately 2.0 dBA, which is below the accepted level of human detectability, and the resulting noise levels would not exceed the applicable significance criteria.

Project-Generated Off-Site Traffic Noise

As noted, the 2003 EIR determined that buildout of the entire Campus Master Plan, including the vehicle trips that would be generated by 850 enrolled FTE students, would not result in significant impacts related to roadway traffic noise. Because roadway noise generated by student enrollment vehicle trips is the primary source of roadway noise, and because the proposed Project does not seek to increase, nor would it increase, enrollment beyond the previously approved FTE, no further analysis of potential impacts related to vehicle roadway noise is necessary under CEQA. Moreover, because the proposed project would implement only a portion of the development planned under the approved Campus Master Plan, the project is expected to generate a number less than 2,000 daily trips to the roadway system, which is the average daily traffic (ADT) volume expected for the entire 850 FTE students. Therefore, based on the lower anticipated level of traffic that would be generated by the proposed project, as compared to that of the entire Brawley Campus Master Plan, impacts would also be expected to be **less than significant**.

Project-Generated Operations Noise

The proposed project is consistent with the development of new classroom and administrative buildings described in the 2003 EIR for the future Brawley campus. As a new building, with added available on-site parking that incorporates modern construction techniques and materials, anticipated heating, ventilating and air-conditioning (HVAC) equipment, the project would be sized and constructed in a manner comparable with similar CSU structures and compatible with other buildings in the Brawley area with respect to climate conditions. Electro-mechanical equipment such as HVAC systems tend to operate continuously and from fixed locations that are typically shielded from direct view by building rooftop parapets or similar solid screens or enclosures—for both visual and security reasons. Hence, and due to the location of the proposed project on the Brawley campus, noise emissions from these stationary sources of steady-state noise would attenuate with distance, intervening structures, acoustical air absorption, and acoustical ground absorption until reaching the nearest noise-sensitive receptor at which the exposure level would be far below Imperial County property line standards or the existing outdoor ambient level and thus a **less than significant** impact.

The proposed project would also emit modest levels of noise due to on-site low-speed (or idling) passenger vehicle traffic associated with full and part-time students, CSU staff and service contractors, and visitors (e.g., deliveries). At such low speeds, engine exhaust noise levels are far less than those emitted by roadway traffic and would thus contribute only low levels of added noise to the outdoor ambient sound environment. For this reason, such on-site traffic noise would be considered a **less than significant** noise impact.

Conclusion

As described above, the proposed project would be consistent with buildout of the Brawley Campus Master Plan that was contemplated in 2003 EIR. As a result, impacts related to generation of a substantial temporary or permanent increase in ambient noise levels during project construction and operation would be **less than significant**.

b) Result in generation of excessive groundborne vibration or groundborne noise levels.

The IS prepared for the 2003 EIR determined that there would be no impact with respect to generation of groundborne vibration or groundborne noise levels. Consistent with this finding, due to source-to-receiver distances expected between construction activities undertaken in connection with the proposed project and the nearest potential off-site vibration-sensitive receptors, which are of sufficient distance to attenuate groundborne vibration to less than perceptible levels, impacts would be considered **less than significant**.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

The IS prepared for the 2003 EIR determined that there would be no impact with respect to people on campus exposed to excessive aviation noise from nearby public and private airports and airfields. According to Figure 4-C (Noise Impact Area) of the local Airport Land Use Compatibility Plan (ALUCP) pertaining to Brawley Municipal Airport (Imperial County Airports 1996), the Brawley campus is located east of the 65 dBA CNEL aviation noise contour and, thus, impacts would be considered **less than significant.**

6 References

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FHWA. 2008. Roadway Construction Noise Model (RCNM), Software Version 1.1. U.S. Department of Transportation, Research and Innovative Technology Administration, John A. Volpe National Transportation Systems Center, Environmental Measurement and Modeling Division.

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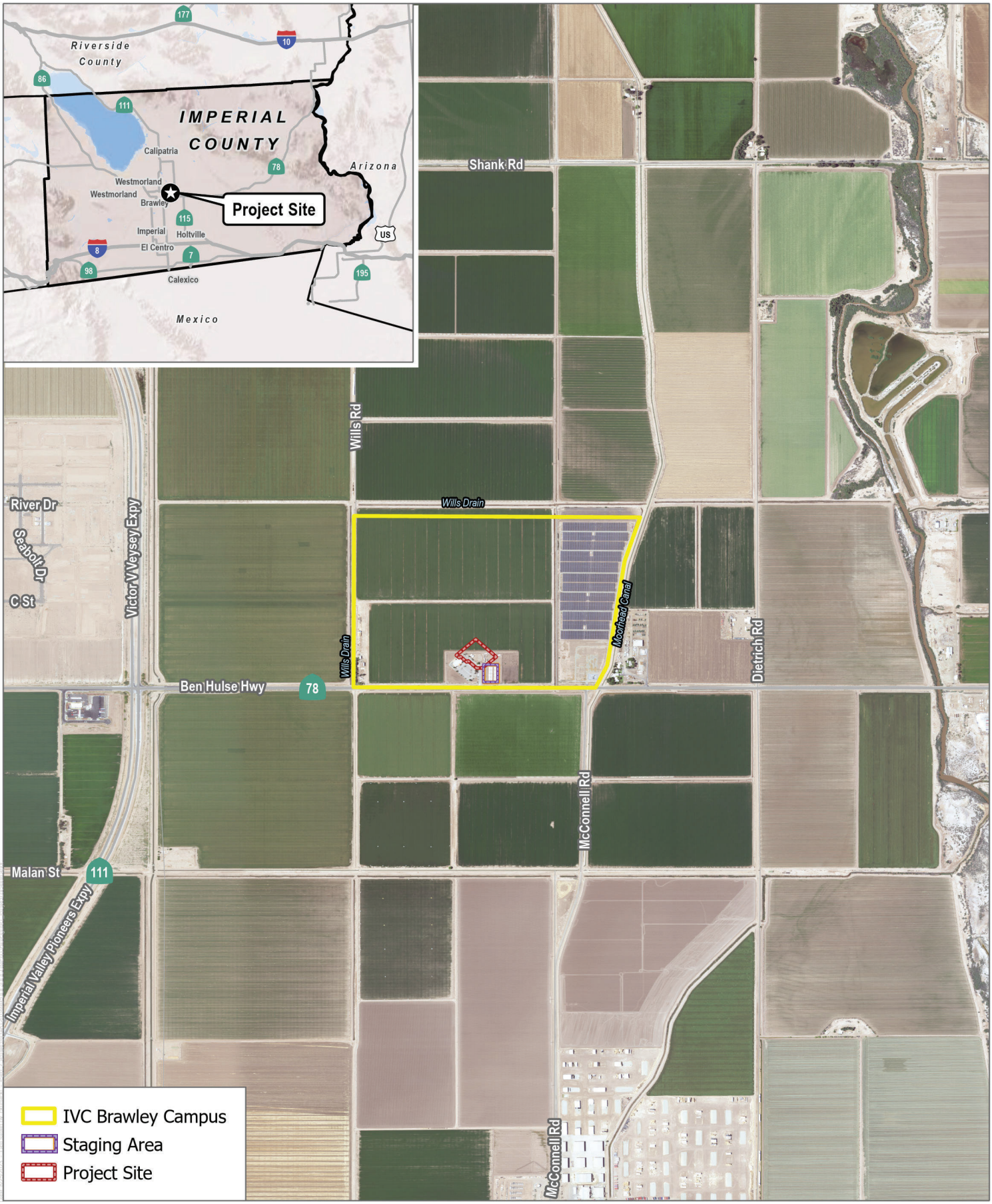
Imperial County Airports. 1996. Airport Land Use Compatibility Plan https://www.icpds.com/assets/hearings/airport-land-use-commission/aluc-compatibility-plan-1996-part-1.pdf

Mooney & Associates. 2003. Environmental Impact Report and Initial Study for SDSU Imperial Valley Campus Master Plan Project. July 2003.

Attachment A

Figures



SOURCE: NAIP 2020, Open Streets Map 2019

DUDEK

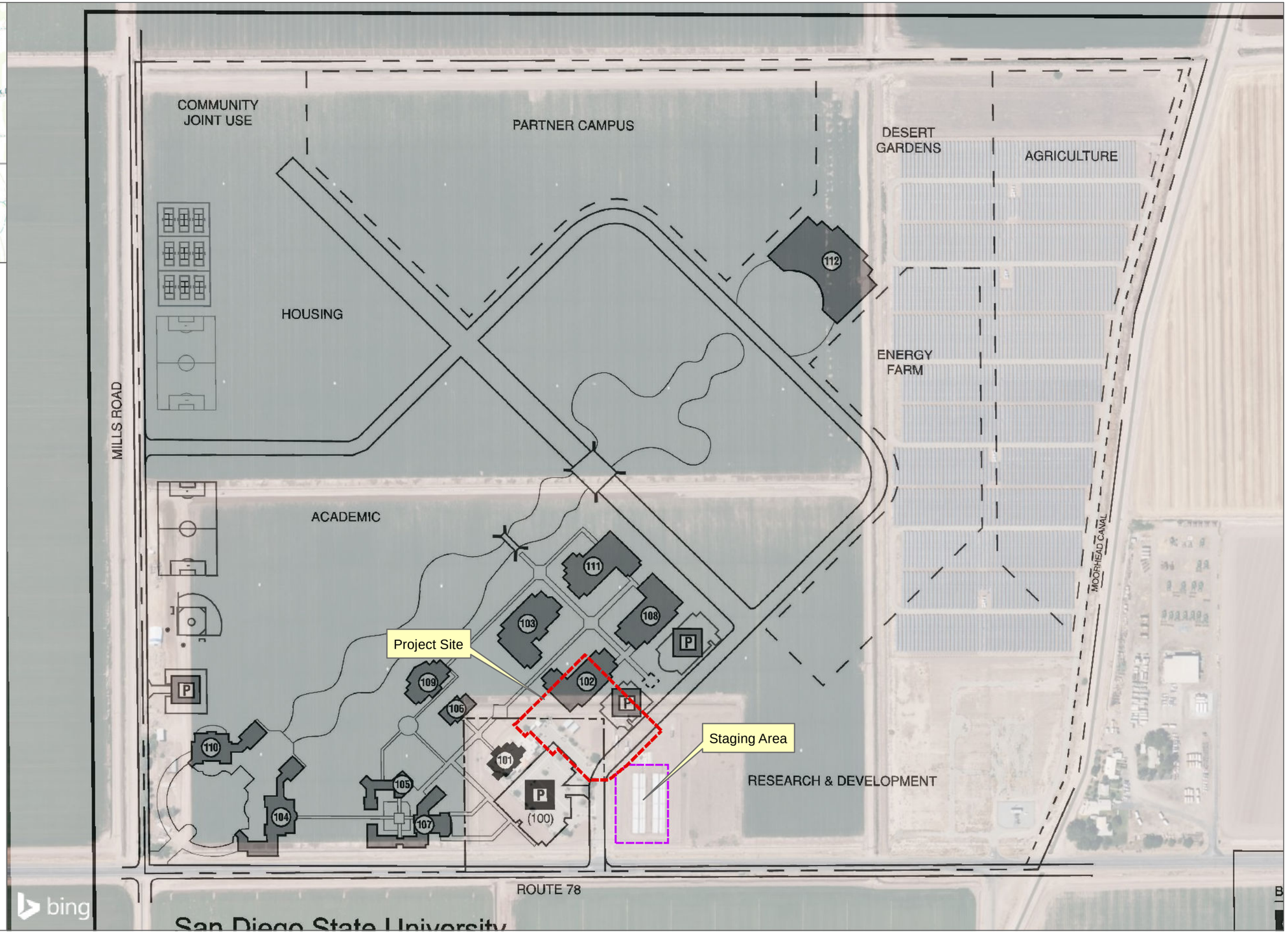
0 1,000 2,000 Feet

FIGURE 1

Regional/Campus Location

SDSU Brawley Sciences Building Project

Project Site
Staging Area



SOURCE: AERIAL-BING MAPPING SERVICE 2022; CAMPUS MASTER PLAN 2003

DUDEK

0 175 350 Feet

FIGURE 2

SDSU Brawley Project Site and Staging Area

SDSU Brawley Sciences Building Project

Attachment B

Construction Noise Prediction Model Worksheets

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

noise level limit for construction phase at residential land use, per County guidance =	75
allowable hours over which Leq is to be averaged =	8

= temporary barrier (TB) of input height inserted between source and receptor

Construction Activity	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	Heff (with barrier)	Heff (wout barrier)	G (with barrier)	G (without barrier)	ILbarr (dB)
All Phases	Man Lift	2	20	75	Fork Lift - 175 HP	300	0.1		54.9	4	240	48	5	5	0	295	5	300	295.0	7.1	300.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Dump Truck	9	40	76	Off-Highway Trucks	300	0.1		55.9	4	240	59	5	5	0	295	5	300	295.0	7.1	300.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Front End Loader	1	40	79	Tracked Loaders	300	0.1		58.9	4	240	52	5	5	0	295	5	300	295.0	7.1	300.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Tractor	2	40	84	Tracked Tractor/Dozer	300	0.1		63.9	4	240	60	5	5	0	295	5	300	295.0	7.1	300.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Scraper	1	40	84	Scraper	300	0.1		63.9	4	240	57	5	5	0	295	5	300	295.0	7.1	300.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Roller	1	20	80	Roller	300	0.1		59.9	4	240	50	5	5	0	295	5	300	295.0	7.1	300.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Grader	1	40	85	Grader/Paver	300	0.1		64.9	4	240	58	5	5	0	295	5	300	295.0	7.1	300.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
									Total for All Phases Phase:			**65.0**																

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

noise level limit for construction phase at residential land use, per County guidance = 75

allowable hours over which Leq is to be averaged = 8

= temporary barrier (TB) of input height inserted between source and receptor

Construction Activity	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	Heff (with barrier)	Heff (wout barrier)	G (with barrier)	G (without barrier)	ILbarr (dB)
All Phases	Man Lift	2	20	75	Fork Lift - 175 HP	1390	0.1		40.0	4	240	33	5	5	0	1385	5	1390	1385.0	7.1	1390.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Dump Truck	9	40	76	Off-Highway Trucks	1390	0.1		41.0	4	240	44	5	5	0	1385	5	1390	1385.0	7.1	1390.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Front End Loader	1	40	79	Tracked Loaders	1390	0.1		44.0	4	240	37	5	5	0	1385	5	1390	1385.0	7.1	1390.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Tractor	2	40	84	Tracked Tractor/Dozer	1390	0.1		49.0	4	240	45	5	5	0	1385	5	1390	1385.0	7.1	1390.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Scraper	1	40	84	Scraper	1390	0.1		49.0	4	240	42	5	5	0	1385	5	1390	1385.0	7.1	1390.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Roller	1	20	80	Roller	1390	0.1		45.0	4	240	35	5	5	0	1385	5	1390	1385.0	7.1	1390.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
	Grader	1	40	85	Grader/Paver	1390	0.1		50.0	4	240	43	5	5	0	1385	5	1390	1385.0	7.1	1390.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
									Total for All Phases Phase:			**50.0**																

Attachment C

Traffic Noise Modeling Calculations - Summary

Project: 14812 SDSU Brawley STEM Facility

Number	Name	Segment Description and Location From	To	Existing (2020)	Existing (2020) + Project	Δ Existing (2020) – Existing (2020) + Project
Summary of Net Changes						
1	Highway 78	Highway 111	Detrich Road	67.9	69.5	1.6

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Attachment C

Traffic Noise Model Calculations

Project: 14812 SDSU Brawley STEM Facility

Noise Level Descriptor: CNEL
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor: 10

Segment Description and Location				Input										Output				
						Distance to Directional Centerline, (feet)[4]		Traffic Distribution Characteristics						CNEL,	Distance to Contour, (feet)[3]			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night	(dBA)[5,6,7]	70 dBA	65 dBA	60 dBA	55 dBA
Existing (2020) Conditions																		
1	Highway 78	Highway 111	Detrich Road	4,350	55	90	112	47.0%	30.0%	23.0%	80.0%	5.0%	15.0%	67.9	73	156	337	726

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Attachment C

Traffic Noise Model Calculations

Project: 14812 SDSU Brawley STEM Facility

Noise Level Descriptor: CNEL
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor: 10

	Segment Description and Location			Input										Output				
						Distance to Directional Centerline, (feet)[4]		Traffic Distribution Characteristics						CNEL, (dBA)[5,6,7]	Distance to Contour, (feet)[3]			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night		70 dBA	65 dBA	60 dBA	55 dBA
Existing (2020) + Project Conditions																		
1	Highway 78	Highway 111	Detrich Road	6,350	55	90	112	47.0%	30.0%	23.0%	80.0%	5.0%	15.0%	69.5	93	201	434	934

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.