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November 29, 2023

Amanda Mauceri 13914
Dauntless Development

SUBJECT: 101 Garden Street, Santa Barbara, California
Proposed Hotels Development
Environmental Noise and Vibration Study - UPDATED

Dear Ms. Mauceri:

This report contains our assessment of the future transportation-related noise environment at the proposed hotels project at 101 Garden Street, located in the City of Santa Barbara. The assessment has been conducted primarily in conformance with the City of Santa Barbara's General Plan Environmental Resources Element (ERE, Noise sub-section) requirement that the Community Noise Equivalent Level (CNEL) not exceed 70 dBA within any dedicated exterior use spaces (i.e., pool deck, patio, balcony, roof deck) for a commercial lodging facility and not exceed 65 dBA within any dedicated exterior use spaces for a multi-family residential development. Discussion and analysis are also provided regarding the Cabrillo Plaza Project Specific Plan (CPPSP) directive that exterior noise levels for usable yards, courtyards, open spaces, and recreational areas not exceed 60 dBA, where feasible. Finally. the report contains a preliminary analysis of interior noise levels based upon the conceptual building designs, for comparison with the City's 45 dB CNEL interior noise criterion for transient lodging facilities and multi-family residential dwellings as stipulated in the CPPSP and in the ERE. All sound levels discussed in this report are A-weighted[1]. The acoustical terminology used in this report is defined in *Attachment 1*.

The project would include dedicated outdoor use spaces for selected hotel rooms and for proposed employee living units, in the form of ground-level patio area or upper level attached balcony areas. The project would also include outdoor use areas in the form of decking around two "optional" pool areas. Lastly, a roof deck is planned on the third level which would be shared space for the two separate hotels. The combined future noise levels from rail activity along the adjacent Union Pacific Railroad (UPRR) line and Year 2030 traffic volumes on Garden, Yanonali, and Santa Barbara Streets adjacent to the project site are calculated to fall below the ERE 70 dBA CNEL criterion within the project designated outdoor use areas associated with the commercial

[1] A-Weighted Sound Level, (dB[A]) The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.

lodging use, and below the ERE 65 dBA CNEL criterion for multi-family residences within the patio areas for the employee living units. However, noise in most of these areas would exceed the CPPSP recommended maximum of 60 dBA CNEL. If the development is required to comply with the CPPSP 60 dBA CNEL limit for exterior use areas (i.e., patios, balconies and pool decks) noise barriers ranging in height from 3 feet to 7 feet would be required around selected balconies and the southern pool area.

To comply with the City's 45 dB CNEL transient lodging and multi-family residential interior noise standard, an interior noise analysis will be required for the development, prior to issuance of building permits. However, based on a preliminary review, hotel guest rooms in the southern hotel with direct exposure to the UPRR alignment would most likely require sound-rated windows and doors; such windows would also need to be in the closed position to achieve compliance with the interior noise standard of 45 dB CNEL. Air conditioning or mechanical ventilation system would be required so that the hotel guests could keep the windows closed at their discretion.

The project architect indicates that individual guest rooms would be equipped with a vertical heat pump system for controlling the interior space temperature, including both heating and cooling capabilities. Shared areas including lobby, restaurant, meeting rooms, etc., would be served by roof-top heating, ventilation, and air conditioning (HVAC) units. The City of Santa Barbara municipal code restricts mechanical systems operational noise levels for commercial uses to no greater than 53 dBA L_{eq} at any nearby residential properties. Mechanical systems noise levels from project operation have been calculated to be no greater than 48 dBA L_{eq} at the closest residential properties (the condominiums across Yanonali Street). Thus, mechanical systems noise would comply with municipal code limits.

Project construction is anticipated to have a duration of approximately 15-18 months. The City of Santa Barbara does not have an adopted policy to require noise control for construction projects lasting more than one year; however, the City does have a general guideline regarding noise control during lengthy construction periods, and depending upon circumstances and surrounding land uses, measures could be required for projects of shorter duration. Mitigation measures are identified to achieve compliance with this City guideline.

Project construction would generate temporary groundborne vibration via the use of heavy equipment within the site. The City of Santa Barbara does not have an adopted policy identifying vibration level limits for construction activities; however, Caltrans has established a human annoyance vibration threshold of 0.24 in/sec peak particle velocity (PPV) and a threshold for potential damage to residential structures of 0.5 in/sec PPV. Calculated construction-related vibration levels for the closest structures to future project construction zones would remain well below these threshold levels.

1.0 BACKGROUND

1.1 Project Setting

The subject property is currently identified as 101 Garden Street. There are several small to medium-sized buildings, multiple storage/shipping containers, and open storage areas on the site that are proposed to be demolished or removed. The proposed development would have a single level below-grade shared parking garage, and two separate hotel facilities joined together near the center of the site. In the western wing of the northern hotel, six living units would be provided for employees of the project (5 studios and 1 two-bedroom unit). A shared roof deck is proposed on the third level of the connected structures, and exterior living areas are also provided for selected guest rooms in the form of ground level patios or upper-level balconies; each of the employee living units would have a ground-level patio area. An optional pool is proposed for a courtyard in the northern hotel, a separate optional pool area is indicated on the south side of the southern hotel.

The project site is located on the southerly side of Yanonali Street, along the westerly side of Garden Street in Santa Barbara. The project vicinity is depicted in *Figure 1,* along with a color rendered site plan. The first level floor plan for the proposed project is graphically depicted on *Figure 2,* second and third level floor plans are illustrated on *Figure 3 and 4*, respectively.

As part of the application review process by the City of Santa Barbara, an acoustical study is required. The analysis is based on the *Site Plan, Floor Plan, and Elevations*, August 2023, by Delawie Architecture.

1.2 City Noise Criteria

Cabrillo Plaza Project Specific Plan

In 1983 the City of Santa Barbara approved the Cabrillo Plaza Project Specific Plan (CPPSP), which encompasses the Project Site and surrounding areas. The Noise Protection portion of the Specific Plan is provided below.

G. Noise Protection

1. *Where feasible, usable yard areas, courtyards, open space, and recreational areas shall be separated from the noise sources by buildings or noise barriers so that those areas are not exposed to noise levels greater than 60 dBA.*
2. *Building construction methods shall be utilized in the building design to attain interior noise levels no greater than 45 dBA.*

City of Santa Barbara General Plan

The City of Santa Barbara adopted a General Plan Update in December 2011. The Environmental Resources Element (ERE) of the General Plan provides land use compatibility guidelines for noise. Per the General Plan, ambient exterior noise levels of up to 70 dBA DNL are "normally acceptable" for hotels (transient lodging) while ambient exterior noise levels of up to 65 dBA DNL are "normally acceptable" for multi-family residences. Interior noise levels of up to 45 dBA DNL are normally acceptable. (City of Santa Barbara, 2011).

City of Santa Barbara Municipal Code

Noise impacts from construction and stationary sources are regulated through the City's Municipal Code. Santa Barbara Municipal Code, Chapter 9.16.015 - Construction Work at Night - includes guidelines applicable to the project's construction. Chapter 9.16.015 stipulates:

> *"It shall be unlawful for any person, between the hours of 8:00 p.m. of any day and 7:00 a.m. of the following day to erect, construct, demolish, excavate for, alter or repair any building or structure if the noise level created thereby is in excess of the ambient noise level by 5 dBA at the nearest property line of a property used for residential purposes unless a special permit therefore has been applied for and granted."*

Municipal Code Chapter 9.16.070 regulates the production of noise from mechanical equipment, where such noise would have the potential to affect residential land uses.

> *"All mechanical equipment other than vehicles (including heating, ventilation, and air conditioning systems) shall be insulated. Sound at the property line of any adjacent parcel used or zoned for residential, public, or semi-public uses shall not exceed fifty three A-weighted decibels 53dB(A). All wind machines are prohibited In the City."*

Discussion:

The 60 dBA CNEL exterior noise limit referenced in the CPPSP is consistent with the recommended maximum exterior noise exposure limit for residential land uses that was in effect for the City of Santa Barbara in 1983 (when the CPPSP was adopted). Multi-family residential land uses were permitted under the CPPSP, and it is therefore reasonable to assume this 60 dBA CNEL limit was intended to apply to exterior living spaces associated only with multi-family residential development allowed within the CPPSP. Because the City of Santa Barbara ERE establishes a normally acceptable exposure limit of 70 dBA CNEL for exterior use areas associated with transient lodging, the 70 dBA CNEL limit would appear to be the most appropriate exterior noise limit to apply to the non-residential portions of the proposed project, with 65 dBA CNEL applicable to the dedicated outdoor living areas associated with the employee residence units.

1.3 Federal Transit Administration Construction Noise Guidance

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 eight-hour period when detailed construction noise assessments are performed to evaluate potential impacts to community residences surrounding a project (FTA 2006). Although this FTA guidance is not a regulation, it can serve as a quantified standard in the absence of such limits at the local jurisdictional level.

2.0 EXISTING CONDITIONS AND METHODOLOGY FOR ANALYSES

The project site is exposed primarily to rail noise along the UPRR line, located approximately 65 feet south of the southern property boundary. Secondary contributors to the noise environment at the site include traffic noise from Garden Street and Yanonali Street. Garden Street carries a current volume of approximately 4986 average daily trips (ADT); Yanonali Street carries a current volume of approximately 8,552 ADT (City of Santa Barbara, 2015).

2.1 Ambient Noise Monitoring

Noise measurements were conducted adjacent to Garden Street, Yanonali Street, and the UPRR line in the immediate vicinity of the subject property to determine the existing noise level resulting from UPRR operations and traffic on Garden and Yanonali Streets at the project site. The measurements included an unattended 24-hour measurement and two short-term attended measurements with manual traffic counts.

Dudek conducted the sound level measurements using a calibrated SoftDB Piccolo integrating sound level meter meeting the current American National Standards Institute (ANSI) standard for a Type 2 general-purpose sound level meter. The sound level meters were positioned at a height of approximately five feet above the ground.

The noise measurement locations are depicted as ST1, ST2 and LT1 on *Figure 5*. ST1 and ST2 are located within 10 feet of the edge of the adjacent street, with no obstructions between the measurement location and travel lanes. LT1 was located at the existing fence-line at the south end of the property, with no obstructions between the measurement location and adjacent UPRR track alignment, and at a distance of 66 feet from the center of the UPRR tracks.

A 68-hour sound level measurement at LT1 was conducted from December 28 -31, 2018. The hourly average noise level ($L_{EQ\ hour}$) recorded at LT1 ranged from 48 to 75 dBA L_{EQ} and the calculated 24-hour average from the collected data is 74 dBA CNEL. *Attachment 2* provides the hourly sound level data collected over the 68 hour measurement, as well as the spreadsheet results for calculated CNEL based on the hourly data (which range from 73 to 74 dBA CNEL across the nearly 3-day measurement period).

The measured average noise level was 68 dB L_{EQ} at ST1 and 64 dB L_{EQ} at ST2. *Table 1* shows the measured noise levels and concurrent traffic volumes on the two roadway facilities.

Table 1
Measured Average Traffic Sound Level and Manual Traffic Count Results

Site	Traffic Noise Source	Date/Time	L_{EQ}[1]	Cars	MT[2]	HT[3]	MC[4]	Bus
ST1	Yanonali Street	12/20/18 4:00 to 4:10 p.m.	**68 dB**	142	6	1	1	1
ST2	Garden Street	12/28/18 3:20 to 3:30 p.m.	**64 dB**	111	2	0	1	0

Notes:
[1] Equivalent Continuous Sound Level
[2] Medium Trucks
[3] Heavy Trucks
[4] Motorcycle
General Notes: Temperature 82 degrees, sunny, 2 mph southwesterly wind.

2.2 Traffic Noise Modeling

The Federal Highway Administration (FHWA) Traffic Noise Model (TNM 2.5) was calibrated first, before using the model to evaluate existing and future noise levels from traffic. The same traffic volume and vehicle composition ratios counted during the noise measurements were used to calibrate the model and verify the input used in the noise model. The modeled existing traffic speed was 35 mph along Garden Street and along Yanonali Street.

The modeled L_{EQ} for ST1 and ST2 is within one dBA of the measured noise levels. This result generally confirms the assumptions used in the noise model.

A standard urban road vehicle mix of 1 percent heavy trucks and 4 percent medium trucks was employed in the model for evaluation of existing and future anticipated noise levels from the adjacent segment of Yanonali Street and Garden Street; these ratios correlated well with observations during the noise measurements.

The modeled existing noise level is 68 dB CNEL at ST1 and 63 dB CNEL at ST2**.** It should be noted that these noise levels are in terms of the CNEL and not the L_{EQ} as shown in Table 1. It should also be noted LT1 and LT2 represent the existing noise exposure of a receiver at the back of sidewalk along Garden Street and Yanonali Street in the vicinity of the subject property.

2.3 Stationary Equipment Noise Modeling (Mechanical Equipment Background)

The project architect indicates that individual guest rooms would be equipped with a vertical heat pump system for controlling the interior space temperature, including both heating and cooling

capabilities. Shared areas including lobby, restaurant, meeting rooms, etc., would be served by roof-top heating, ventilation, and air conditioning (HVAC) units. Table 2 provides reference sound levels for HVAC equipment considered representative of that which could be employed.

TABLE 2
HVAC SOUND DATA

Make & Model	Sound Level
Trane 5-Ton Package Unit (Roof Mounted Unit for Shared Areas)	**64 dB(A) at 3.3 feet**
Friedrich Vert-I-Pak (Guest Room Heat Pump)	**67 dB(A) at 3.3 feet**

2.3.1 Stationary Equipment Noise Assessment Methodology

The closest portion of the project hotels containing shared areas would not be closer than 375 feet from the condominium residences along Yanonali Street. As indicated in Table 2, Typical HVAC package units (Trane 5-ton capacity) generate noise up to 64 dBA L_{eq} at 3.28 feet. At 375 feet from a typical roof-mounted HVAC package unit, the sound level would be approximately 23 dBA L_{eq} (ignoring attenuation that would be provided by the roof parapet). These sound levels would not be audible off-site over background (ambient) levels, and therefore detailed modeling of noise from the roof-top HVAC package units was not performed.

The vertical heat pumps for individual guest rooms would be installed with a louvered opening in the exterior wall of the building to allow heat exchange between the heat pump and outside air. The sound rating in Table 2 addresses the outside (exterior) sound level at 3.3 feet from the louver opening. Within approximately 170 feet of the condominiums on Yanonali Street, there would be 12 guest rooms that contain heat pumps with louvered openings facing the Yanonali Street condominiums. The sound level at the distance of the condominiums was calculated for the combined 12 heat pump units, using standard logarithmic-based calculations for the addition of sound levels and for the attenuation of sound outdoors with distance.

2.4 Construction Description (Background)

Construction of the development proposed in the project would generate noise that could expose nearby receptors to elevated noise levels that may disrupt communication and routine activities. The magnitude of the impact would depend on the type of construction activity, equipment,

duration of the construction, distance between the noise source and receiver, and intervening structures. This section of the report discusses the noise levels calculated to result from construction of the project, at nearby sensitive receptors (i.e., residences).

2.4.1 Construction - Equipment Inventory

The California Air Resources Board CalEEMod (California Emissions Evaluation Model) was used to identify the construction equipment anticipated for development of the 250 room hotels complex on an approximately 4-acre site. Based on this information, CalEEMod (Version: CalEEMod.2016.3.2) identified the following anticipated equipment for each phase of the project construction, presented in *Table 3*.

Table 3
Construction Equipment Per Phase

Construction Activity	Grading/Earthwork
Equipment Needed	(1) Grader (2) Backhoe (1) Dozer (1) Water Truck
Construction Activity	Trenching
Equipment Needed	(3) Backhoe
Construction Activity	Building Construction
Equipment Needed	(1) Crane (1) Generator (1) Backhoe (3) Front End Loader (1) Welder
Construction Activity	Paving
Equipment Needed	(1) Concrete Truck (1) Backhoe (1) Paver (2) Roller (1) Torch
Construction Activity	Architectural Coatings
Equipment Needed	(1) Air Compressor

2.4.2 Construction Noise Assessment Methodology

With the construction equipment noise sources identified above, a noise analysis was performed using a model developed under the auspices of the Federal Highway Administration (FHWA) called the Roadway Construction Noise Model (RCNM) (FHWA 2008). Input variables for RCNM consist of the receiver / land use types, the equipment type (i.e., backhoe, crane, truck, etc.), the number of equipment pieces, the duty cycle for each piece of equipment (i.e., percentage of time the equipment typically works in a given time period), and the distance from the noise sensitive receiver to the construction zone. The reader is referred to *Attachment 3* for the inputs used in the RCNM model, as well as results.

Noise-sensitive land uses exist to the north of the project site, across Yanonali Street. The closest noise-sensitive receivers consist of condominium residences that are approximately 110 feet from the closest edge of construction limits for the project. This residential land use to the north of the project was used to analyze potential construction noise effects during all phases of site preparation and construction, because it represents the nearest noise-sensitive receiver.

However, the above distance separation assumption would not be representative of more typical construction noise, because in general the construction activities would not take place either at the nearest or at the farthest portions of the project site, but somewhere in between. Thus, in order to provide information on typical construction noise levels, the distance from the nearest receivers to the project's "acoustic center" was also analyzed. The acoustic center represents the idealized point from which the energy sum of all construction activity noise, near and far, would be centered. The acoustic center is derived by taking the square root of the product of the nearest and the farthest distances. For this project, the acoustic center was found to be 254 feet from the nearest noise sensitive receivers located to the north.

Given the overall size of the project site, and the relatively equal distribution of proposed development across the property, noise levels derived from the acoustic center of construction activity would provide a better representation of average noise level exposure across the entire construction process for a given off-site receiver, than the noise levels identified using the minimum distance worst-case method.

2.5 Construction Vibration Background

Per the Caltrans Transportation and Construction Vibration Guidance Manual (2020), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment).

Peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal and is expressed in inches/second (in/sec). PPV is most frequently used to describe vibration impacts to buildings but can also be used to quantify vibration annoyance potential for humans. Caltrans has established a human annoyance vibration threshold of 0.24 in/sec PPV (distinctly perceptible level) for construction-related vibration levels (Caltrans 2020). The Caltrans threshold for potential damage to residential structures is 0.5 in/sec PPV (Caltrans 2020). The threshold for potential damage to other types of structures are greater than for residences, and therefore the potential damage threshold for residential structures is employed in this analysis.

2.5.1 Construction Vibration Assessment Methodology

Construction activity can result in varying degrees of ground vibration at local receptors, depending on the equipment and methods used, distance to the affected structures, and soil type. Ground-borne vibration levels resulting from typical construction activities occurring within the Project site were estimated by data and methods published by Caltrans (2020). Ground vibration levels associated with various types of construction equipment that could be used in construction of the project are summarized in Table 4 (Caltrans 2020).

Table 4
Vibration Source Levels for Construction Equipment

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Loaded Trucks	0.076
Large bulldozer	0.089
Vibratory roller	0.21

Groundborne vibration attenuates rapidly, even over short distances. The attenuation of groundborne vibration as it propagates from source to receptor through intervening soils and rock strata can be estimated with expressions found in Caltrans guidance (Caltrans 2020). The following equation is used to calculate Peak Particle Velocity (PPV) at any distance of interest from the operating construction equipment.

$$PPV_{rcvr} = PPV_{ref} * (25/D)^{1.5}$$

In the above equation, PPV_{rcvr} is the predicted vibration velocity at the receiver position, PPV_{ref} is the reference value at 25 feet from the vibration source (as listed in Table 3), and D is the actual horizontal distance to the receiver.

The closest off-site structures to the project site are commercial buildings along the opposite side of Santa Barbara Street, no closer than approximately 60 feet from the closest future project construction boundary. The closest vibration-sensitive receivers would be residents of condominium structures across Yanonali Street that are approximately 110 feet from the closest edge of construction limits for the project. The distances to the commercial structures across Santa Barbara Street and to the condominium structures across Yanonali Street were used in the calculation of construction related vibration levels at the closest receivers.

3.0 ANALYSIS

3.1 Transportation Noise Sources

The adjacent UPRR line will continue to be the primary transportation noise source at the project site in the future. Dudek's multiple day noise measurement of UPRR operations at the southern property boundary yielded noise levels between 73 and 74 dBA CNEL. A noise level of 74 dBA CNEL (at 66 feet, the distance from the rail line to the measurement point) was therefore used to model train noise at future exterior use areas (i.e., patio, balcony, pool area) of the project. The U.S. Department of Housing and Urban Development (HUD) Site DNL Calculator uses an attenuation rate of 4.5 dBA per doubling of distance. This attenuation rate was employed to determine train noise levels at varying distances throughout the project site.

Traffic along Garden Street and Yanonali Street will continue to be secondary noise contributors to the noise environment at the site. Santa Barbara Street, due to very low traffic trips, would be a minor tertiary contributor. The City's General Plan does not identify average daily trip (ADT) volumes for Garden Street or Yanonali Street adjacent to the project site. Therefore, Dudek used the 2015 ADT counts for these two streets (City of Santa Barbara 2015), and an annual growth rate of 1%, to predict the Year 2030 ADT volumes on these streets. Using this method, Garden Street is expected to carry a volume of approximately 5,785 ADT in 2030, while Yanonali Street is expected to carry a volume of 9,920 ADT in 2030. For Santa Barbara Street, it was assumed that no more than approximately 10% of the project-generated trips would use Santa Barbara Street, or approximately 160 ADT.

3.2 Exterior Noise Exposure

The future exterior noise level within selected dedicated exterior use areas from Year 2030 traffic along Yanonali Street and Garden Street, along with predicted hotel-related traffic along Santa Barbara Street, was calculated using TNM 2.5 (refer to *Attachment 4*). Refer to *Figure 5* that illustrates the modelled receivers in representative outdoor areas closest to traffic noise sources. Modelled roadway traffic noise levels are summarized in *Table 5*.

Based upon the proposed project design, distances between the UPRR rail line and the closest exterior use areas were determined. Patio and balcony areas on the west and south facades of the southern hotel, and the southern hotel pool area, would have direct exposure to the UPRR operations and would be the closest receptors to this noise source. Patio and balcony areas for the northern hotel would be shielded from UPRR operations by the southern hotel structure. There is however a single patio at the northwest corner of the northern hotel with some exposure to the UPRR alignment. *Figure 5* illustrates the location of the modelled receiver locations which are closest to the UPRR alignment. (A spreadsheet is provided in *Attachment 4* with the calculated

rail noise level at selected exterior use areas, based on the HUD attenuation formula). Modelling of rail noise level exposure was not conducted for the roof deck area, because this area is at a further distance from the UPRR alignment than the modelled patios and pool.

The future transportation-related noise levels (from rail and roadway traffic sources) in selected exterior use areas of the proposed project are presented in *Table 5*, below.

TABLE 5
Calculated Future Sound Levels in Selected Exterior Living Spaces

Outdoor Space	Train Noise (dBA CNEL)	Traffic Noise (dBA CNEL)	Combined Future Sound Level (dBA CNEL)
Patio 1 (ground level)	67	48	**67**
Balcony 1 (third level)	67	52	**67**
Patio 2 (ground level)	68	48	**68**
Balcony 2 (third level)	68	52	**68**
Patio 3 (ground level)	69	49	**69**
Balcony 3 (third level)	69	53	**69**
Patio 4 (ground level)	67	51	**67**
Balcony 4 (third level)	67	55	**67**
Southern Pool (ground level)	64	52	**64**
Patio 6 (ground level)	shielded	59	**59**
Patio 7 (ground level)	shielded	61	**61**
Balcony 7 (second level)	shielded	63	**63**
Balcony 7 (third level)	shielded	63	**63**
Patio 8 (ground level)	60	60	**63**

Within the proposed exterior areas closest to transportation noise sources, future noise levels would range up to 69 dBA CNEL; future noise levels within these exterior living areas would be within the City's adopted exterior noise criterion of 70 dBA CNEL maximum for transient lodging facilities, without the need for exterior noise mitigation. The Patio 8 receiver represents the exterior noise exposure level within patios serving as dedicated outdoor living spaces for the employee living units (residences). The predicted maximum exposure of 63 dBA CNEL for the residential patio areas would fall within the ERE acceptable level of 65 dBA CNEL for multi-family residential structures, without the need for exterior noise mitigation.

Remaining exterior use areas not specifically modelled in this report are at greater distances from transportation noise sources and would therefore have transportation noise exposure levels less than 70 dBA CNEL in all cases. As such, the project as designed would be in compliance with exterior noise exposure limits established in the City of Santa Barbara ERE for all required exterior living areas.

3.2.1 Cabrillo Plaza Specific Plan Exterior Noise Limit Discussion

The Cabrillo Plaza Specific Plan recommends an exterior noise exposure limit of 60 dBA CNEL for any land use (where feasible), which is more stringent than the ERE limit of 70 dBA CNEL that is specifically applicable to transient lodging or the 65 dBA CNEL limit applicable to multi-family residential land uses. In order to reduce transportation related noise exposure for all exterior use areas of the project to 60 dBA CNEL or less, certain balcony and pool areas of the project would require noise barriers to be employed. *Figure 6* illustrates two groupings of balcony areas, for which noise barrier specifications are identified in *Table 6*. No other barriers would be required for patio, balcony, or pool deck areas located outside the boundaries of the Group 1 or Group 2 (as illustrated on *Figure 6*).

TABLE 6
Required Noise Barriers to Achieve 60 dBA CNEL

	Height of Required Barrier (feet)		
Grouping [a]	**Ground Level Patio / Pool Deck**	**Second Level Balcony**	**Third Level Balcony**
Group 1	5	4	3
Group 2	7	6	5

[a] Refer to Figure 6 for identification of grouping areas.

3.3 Interior Noise

A detailed interior noise analysis was not conducted at this preliminary project design phase. However, the following conceptual discussion is provided for interior noise concerns. Standard construction materials and techniques for commercial development normally result in a minimum exterior to interior noise attenuation of 20 dB with doors and windows closed. Therefore, an exterior noise exposure not exceeding 65 dBA CNEL would result in interior noise levels of 45 dBA CNEL or less. For the majority of the hotel property, no specialized construction techniques or materials would be required for the proposed structures in order to achieve compliance with the interior criterion of 45 dBA CNEL maximum.

Exterior noise levels for façades of the southern hotel with direct exposure to the UPRR alignment are expected to range up to approximately 69 dBA CNEL. The interior noise level within the portion of the southern hotel with direct exposure to the UPRR alignment (west, south, and east façades of the southern "L" shaped extension) could exceed the City's interior transient lodging noise criterion of 45 dBA CNEL, unless specific noise control construction materials and techniques are incorporated. Refer to the Mitigation section later in this report.

3.4 Stationary Equipment Noise Impacts

As discussed in Section 2.3.1, individual heat pumps in the 12 guest rooms closest to, and facing, the Yanonali Street condominiums would be the primary source of project stationary noise that could impact these residences. Based on the sound pressure rating provided by the mechanical equipment manufacturers, we calculated the noise levels for the combined operation of all 12 units at the closest residential property boundary (i.e., the residential property across Yanonali Street. The hotel façade containing louvered openings for the guest room heat pumps would be located at approximately 110 feet from the property line of the condominium parcel.

The resulting project operational noise level at the condominium property line was modeled based upon the published sound level for each piece of equipment, the sum of sound levels from the 12 individual heat pumps, and standard outdoor distance attenuation rates for point source under hard-site conditions (most conservative) applied to the distance between the equipment and the property line. The calculation involves two sets of equations.

Sum of Multiple Equipment Noise Sources

The equation to sum multiple sound sources (which are logarithmic values) is:

$$Lt = Ls + 10 \text{ Log } (N)$$

Where: Ls is the level from one source N is the number of sources

Distance Attenuation

Sound attenuation due to distance, for a point source is calculated with the equation:

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

Where:
- SPL_1 is the calculated sound pressure level (in dB) at specified distance [D_2]
- SPL_2 is a known (measured) sound pressure level at a known distance [D_1]
- D_1 is distance from source to measured sound pressure level
- D_2 is distance from source to location of calculated sound pressure level

The sound level for each heat pump was reported as a sound pressure at a distance of 3.3 feet from the exterior louvered opening for the unit (according to manufacturer's literature). The first equation was used to determine the combined sound pressure level for 12 units. Then, the sound level for the 12 combined units was calculated at the distance to the condominium property line, using the second equation. A spreadsheet for the calculations is provided in *Attachment 5.* Results of the calculations are provided in *Table 7*, below.

TABLE 7
Calculated Sound Level
L_{EQ} dB(A)

Location	Sound Level
Yanonali Street Condominiums Property Line	48

As indicated in *Table 7,* the worst-case calculated noise from guest rooms heat pump operation (based on simultaneous operation of all 12 heat pumps) at the closest residential property boundary, is **48 dB(A) L_{eq}**. Consequently, operational noise levels of the mechanical equipment at the closest residential property line would be well below the Santa Barbara municipal code limits of 53 dBA L_{eq}. Stationary noise would therefore comply with applicable limits, and no noise control methods or measures would be necessary.

3.5 Construction Noise Impacts

Using the construction equipment inventory derived from CalEEMod (Version: CalEEMod.2016.3.2), the RCNM construction noise model was used to predict noise from on-site construction activities. The results are summarized in *Table 8* (see *Attachment 3* for complete results). As shown, the highest noise levels from construction along the construction zone boundary closest to off-site receivers are predicted to range from approximately 78 dBA L_{EQ} (during Paving) to 67 dBA L_{EQ} (during architectural coating) at the nearest receivers (i.e., 110 feet from the closest point of construction). These predicted levels for construction activity along the closest construction zone boundary to off-site receivers for each phases would remain below the FTA recommended maximum construction noise exposure of 80 dBA $L_{EQ.}$ However, these noise levels would be substantially higher than ambient noise levels in the area (i.e., existing traffic noise level along Yanonali Street is 68 dBA L_{EQ}), and would be considered annoying or disruptive for daily activities at the closest off-site receptor (i.e., 110 feet from the northern property line).

This maximum noise level is considered to be a peak exposure, applicable not more than 10-15% of the total construction period, only while the construction activity is taking place in one location at a distance of 110 feet from any of the off-site receivers. The average construction noise levels (for construction taking place at a range of locations on-site and modeled at the acoustical center for analysis purposes) range from approximately 70 dBA L_{EQ} (during grading and paving phases) to approximately 60 dBA L_{EQ} (during architectural coating), and are also shown in *Table 8*. The average noise levels (based upon the acoustic center) are considered a better representation of the overall noise exposure experience for the closest adjacent receivers north of the project site,

over the duration of each construction phase. These average construction noise levels would generally be only slightly greater than ambient noise levels in the project vicinity.

Table 8
On-Site Construction Noise Summary of Results (dBA L_{EQ})

Receiver Location/ Description	Land Use	Construction Noise Level by Construction Phase				
		Phase 1: Grading	Phase 2: Trenching	Phase 3: Building Construction	Phase 4: Paving	Phase 5: Architectural Coating
Nearest Receivers / Construction at Nearest Property Boundary (110')	Residential	77	75	75	78	67
Nearest Receivers /Construction at Acoustic Center (254')	Residential	70	68	67	70	60

Ref: Roadway Construction Noise Model (RCNM),Version 1.1

Table 9 shows the construction noise analysis results in terms of the Community Noise Equivalent Level (CNEL), the 24-hour weighted average noise level. It was assumed for this calculation that construction would occur over an 8-hour workday. In terms of CNEL, the worst-case noise levels based upon the minimum separation distance from construction activities to off-site receivers are predicted to range from approximately 63 dBA CNEL (during Phase 5) to 74 dBA CNEL (during Phase 4) at the nearest receivers.

As also indicated in *Table 9*, the average construction-related noise levels (for construction taking place at a range of locations on-site and modeled at the acoustical center for analysis purposes) range from approximately 56 dBA CNEL (during Phase 5) to approximately 66 dBA CNEL (during Phase 1 and 4). Once again, these construction noise levels at the closest off-site receivers would be up to approximately 6 dBA above ambient noise levels, being clearly audible and likely annoying for the closest off-site receptors.

Table 9
On-Site Construction Noise Summary of Results (dBA L_{EQ})

Receiver Location/ Description	Land Use	Construction Noise Level by Construction Phase				
		Phase 1: Grading	**Phase 2: Trenching**	**Phase 3: Building Construction**	**Phase 4: Paving**	**Phase 5: Architectural Coating**
Nearest Receivers / Construction at Nearest Property Boundary (110')	Residential	73	71	71	74	63
Nearest Receivers /Construction at Acoustic Center (254')	Residential	66	64	63	66	56

Ref: Roadway Construction Noise Model (RCNM),Version 1.1

Noise during construction is anticipated to be clearly audible at adjacent residences, likely creating annoyance and possibly disruption of routine household activities while construction is occurring. The City has not established numerical thresholds related to construction noise, but construction with a duration of greater than one year is required to incorporate reasonable noise control methods. Please refer to the Mitigation section of this report for specific construction noise control measures.

3.6 Construction Vibration Impacts

Using the vibration source level of construction equipment provided in Table 3, the distance to the closest off-site structure (commercial building at 60 feet, across Santa Barbara Street) and closest off-site residence (condominiums at 100 feet across Yanonali Street), and the equation supplied in the Caltrans (2020) construction vibration assessment methodology (above), Dudek estimated the Project construction-related vibration impacts at the closest structures. *Table 10* presents the results of the construction vibration assessment for the closest commercial structure and residence. A spreadsheet with the calculations is provided in *Attachment 6*.

Table 10
Construction Vibration Levels at Closest Off-site Structures

Equipment	PPV (in/sec) Closest Structure (60 feet)	PPV (in/sec) Closest Residence (110 feet)	Significance Threshold PPV (in/sec)	Significant?
Small Bulldozer	0.0008	0.0003	0.24	NO
Loaded Trucks	0.020	0.0082		NO
Large bulldozer	0.024	0.0096		NO
Vibratory roller	0.056	0.021		NO

As illustrated in *Table 10*, Project construction-related vibration levels at the commercial structure closest to the Project would in all cases represent less than 40% of the significance threshold for human annoyance (0.24 PPV in/sec); calculated vibration levels at the closest residence would in all cases represent no more than 10% of the human annoyance threshold. The threshold for structural damage to typical residential structures is even higher (0.5 PPV in/sec). As such, Project construction would have no potential to cause structural damage to the closest commercial structures or residences, or to result in annoyance for the occupants of such buildings.

4.0 MITIGATION

4.1 Exterior Noise

The project as designed provides exterior use areas which would have noise levels that comply with the ERE exterior criterion of 70 dBA CNEL for transient lodging facilities and 65 dBA CNEL for multi-family residences. If the ERE exposure limits are applied in favor of the Cabrillo Plaza Specific Plan recommendation, no mitigation would be required. If the project is required to comply with the Cabrillo Plaza Specific Plan recommended exterior maximum of 60 dBA CNEL, noise barriers will be required in selected balcony and pool areas.

1. Barriers of the minimum heights indicated in Table 4 for the southern pool and for balconies within Group 1 and Group 2 shall be included in the final project design. The noise barriers may be constructed of a material such as tempered glass, acrylic glass, or any masonry material with a surface density of at least three pounds per square foot. The noise barriers should have no openings or cracks. The indicated height of the barrier is measured from the patio or balcony surface.

4.2 Interior Noise

Combined rail and traffic exposure levels for the façade of the southern hotel structure with direct exposure to the UPRR alignment structure would range up to 69 dBA CNEL, which could result in interior noise levels that exceed the 45 dBA CNEL criterion. The following measure is therefore required.

2. To comply with the City's 45 dB CNEL interior noise standard, the building shell for the portion of the southern hotel structure with direct exposure to the UPRR alignment shall have a composite STC rating of not less than 30. Mechanical ventilation and/or air conditioning systems shall be provided for all guest rooms of the hotel such that windows may be kept in the closed position if desired by guests.

4.3 Construction Noise

To minimize annoyance at nearby residences, the following noise control measures are required. Potential noise levels that may be experienced during project construction are consistent with those anticipated in the City's Noise Element for construction activities.

3. At least 30 days prior to commencement of construction, the contractor shall provide written notice to all residential property owners and tenants within 300 feet of the project area (this is the standard noticing distance the City employs) that proposed construction activities could affect outdoor or indoor living areas. The notice shall contain a description of the proposed project, a construction schedule including days and hours of construction, and a description of noise-reduction measures.

4. Noise-generating construction activities (which may include preparation for construction work) shall be permitted weekdays between the hours of 7:00 AM and 5:00 PM, excluding holidays observed by the City as legal holidays: New Year's Day (January 1); Martin Luther King Jr.'s birthday (3rd Monday in January); President's Day (3rd Monday in February); Memorial Day (Last Monday in May); Independence Day (July 4); Labor Day (1st Monday in September); Thanksgiving Day (4th-Thursday in November); Day Following Thanksgiving Day (Friday following Thanksgiving); Christmas Day (December 25). When a holiday falls on a Saturday or Sunday, the preceding Friday or following Monday respectively shall be observed as a legal holiday. Occasional night work may be approved for the hours between 5:00 PM and 7:00 AM weekdays by the Chief of Building and Zoning (per Section 9.13.015 of the Municipal Code). In the event of such night work approval, the applicant shall provide written notice to all property owners and occupants within 450 feet of the project property boundary and the City Planning and Building Divisions at least 48 hours prior to commencement of night work. Night work shall not be permitted on weekends or holidays.

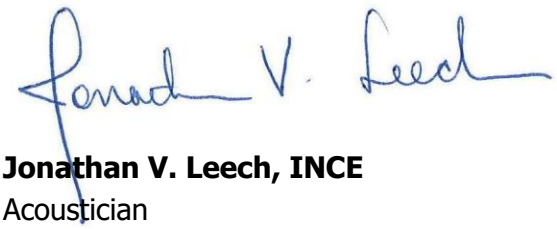
5. All construction equipment powered by internal combustion engines shall be properly muffled and maintained. No internal combustion engine shall be operated on the site without a muffler. All diesel equipment shall be operated with closed engine doors and shall be equipped with factory recommended mufflers. Unnecessary idling of internal combustion engines shall be prohibited.

6. Air compressors and generators used for construction shall be surrounded by temporary acoustical shelters. Whenever feasible, electrical power shall be used to run air compressors and similar power tools.

7. Install a temporary construction sound barrier wall along the northern site boundary. The barrier should be made of sound attenuating material (not landscaping). To effectively reduce sound transmission through the barrier, the material chosen must be rigid and sufficiently dense (at least 20 kilograms/square meter). All noise barrier material types are equally effective, acoustically, if they have this density. For example, 5/8 inch plywood, mounted with no gaps between adjacent sheets, would be of sufficient density to achieve the target attenuation. The barrier shall be 8 feet in height from the ground surface on the construction side of the wall, to achieve the goal of blocking direct line of sight to the adjacent residence windows. It is estimated that a noise barrier of the prescribed density would reduce average noise levels to sensitive receptors by up to 5 dB by blocking direct line of sight to ground-level receptors.

This concludes our noise assessment, if you have any questions please do not hesitate to contact me via email or telephone.

Sincerely yours,
DUDEK



Jonathan V. Leech, INCE
Acoustician

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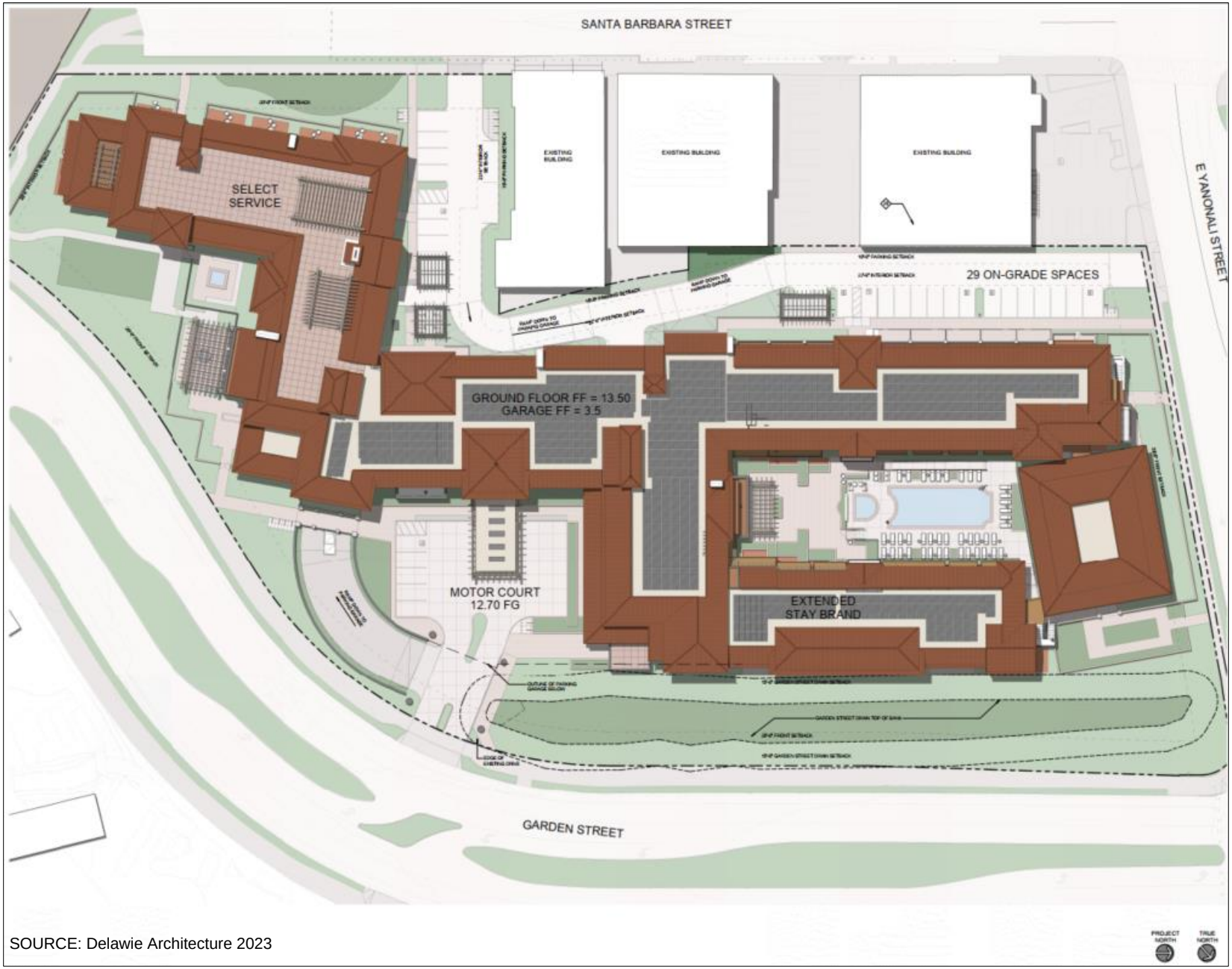
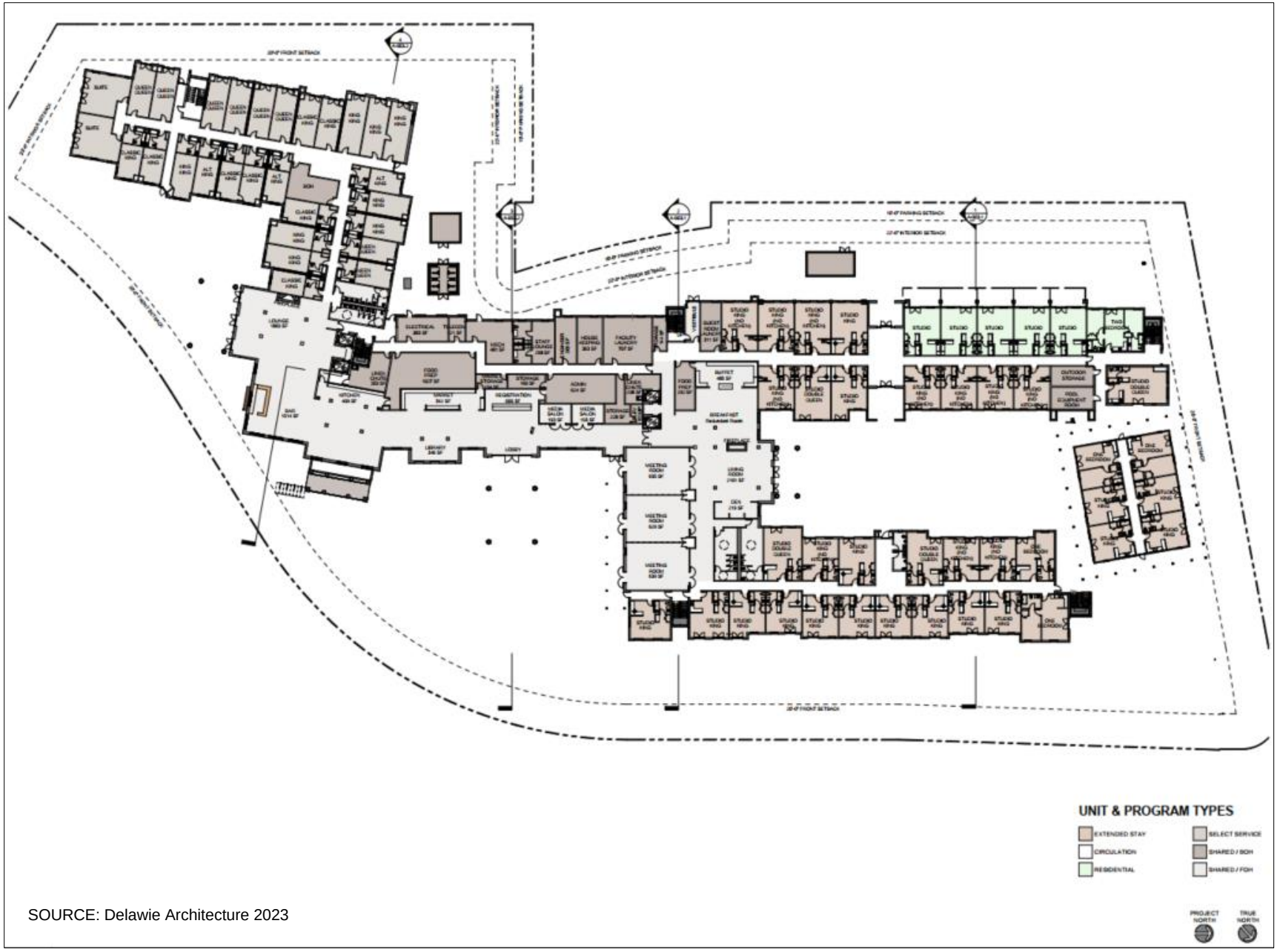


SOURCE: Delawie Architecture 2023

FIGURE 1
RENDERED SITE PLAN AND LOCAL SETTING
101 GARDEN STREET HOTELS UPDATED NOISE STUDY

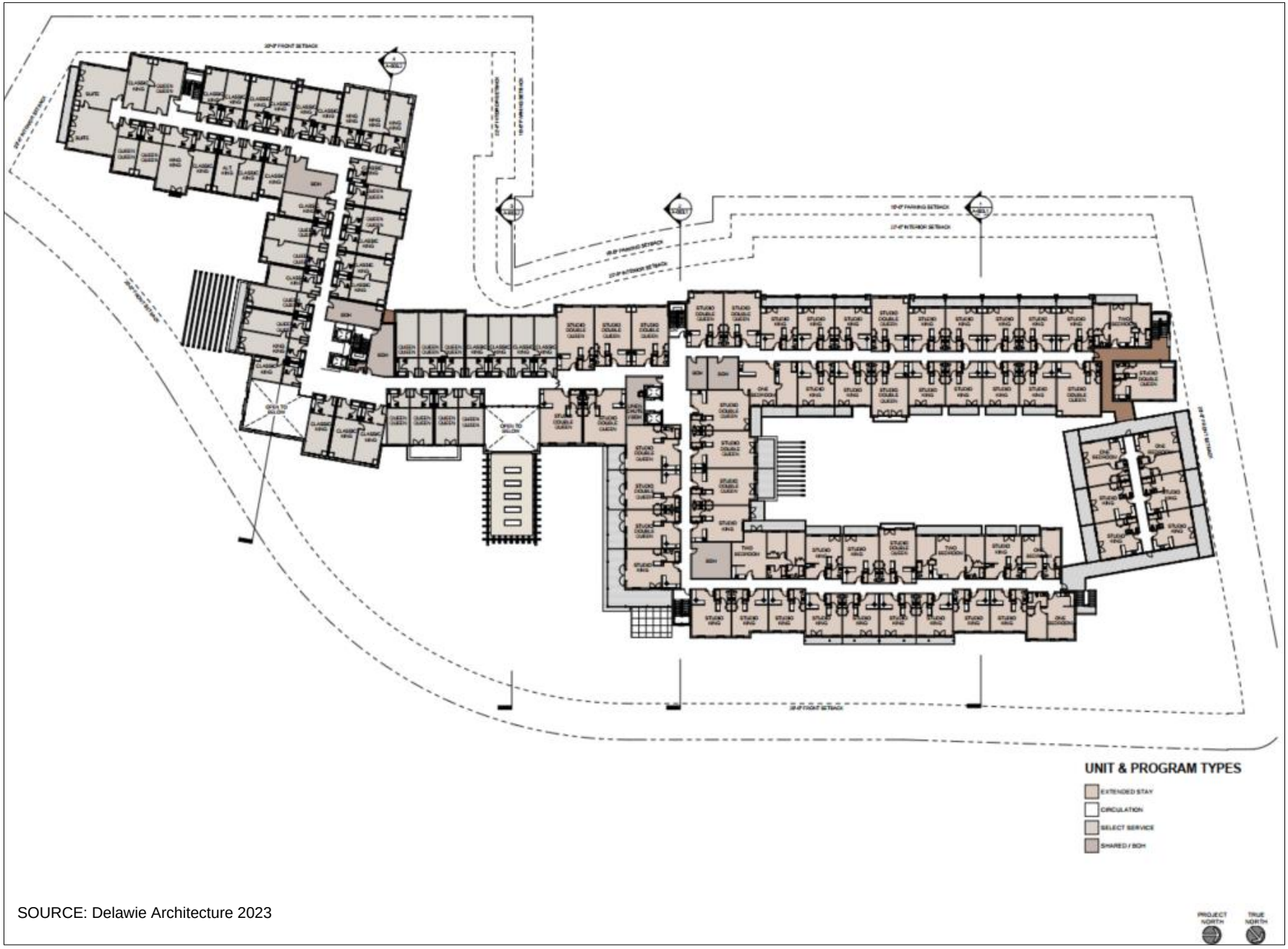


SOURCE: Delawie Architecture 2023

FIGURE 2

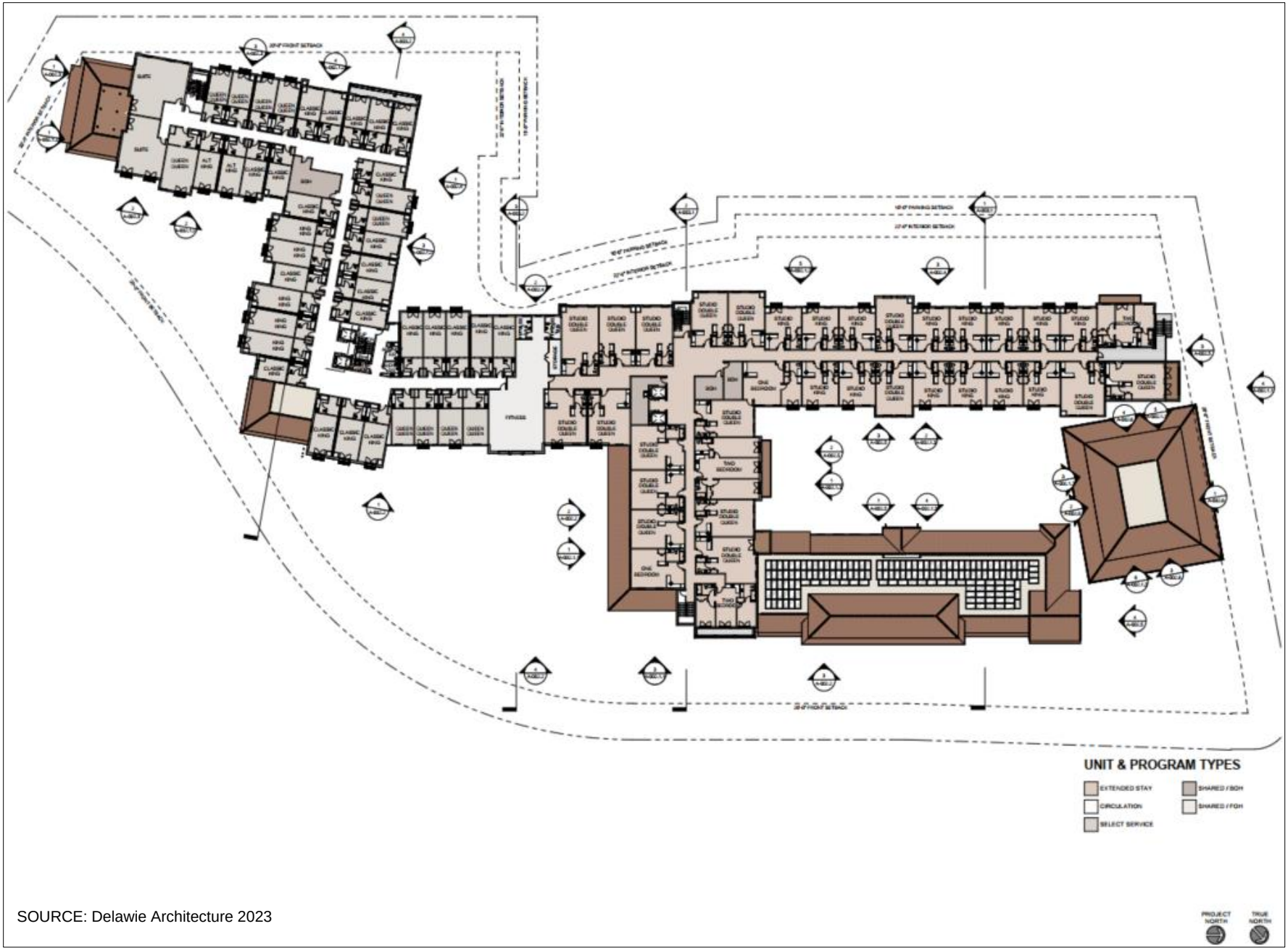
FIRST LEVEL PLAN

101 GARDEN STREET HOTELS UPDATED NOISE STUDY



SOURCE: Delawie Architecture 2023

FIGURE 3
SECOND LEVEL FLOOR PLAN
101 GARDEN STREET HOTELS UPDATED NOISE STUDY

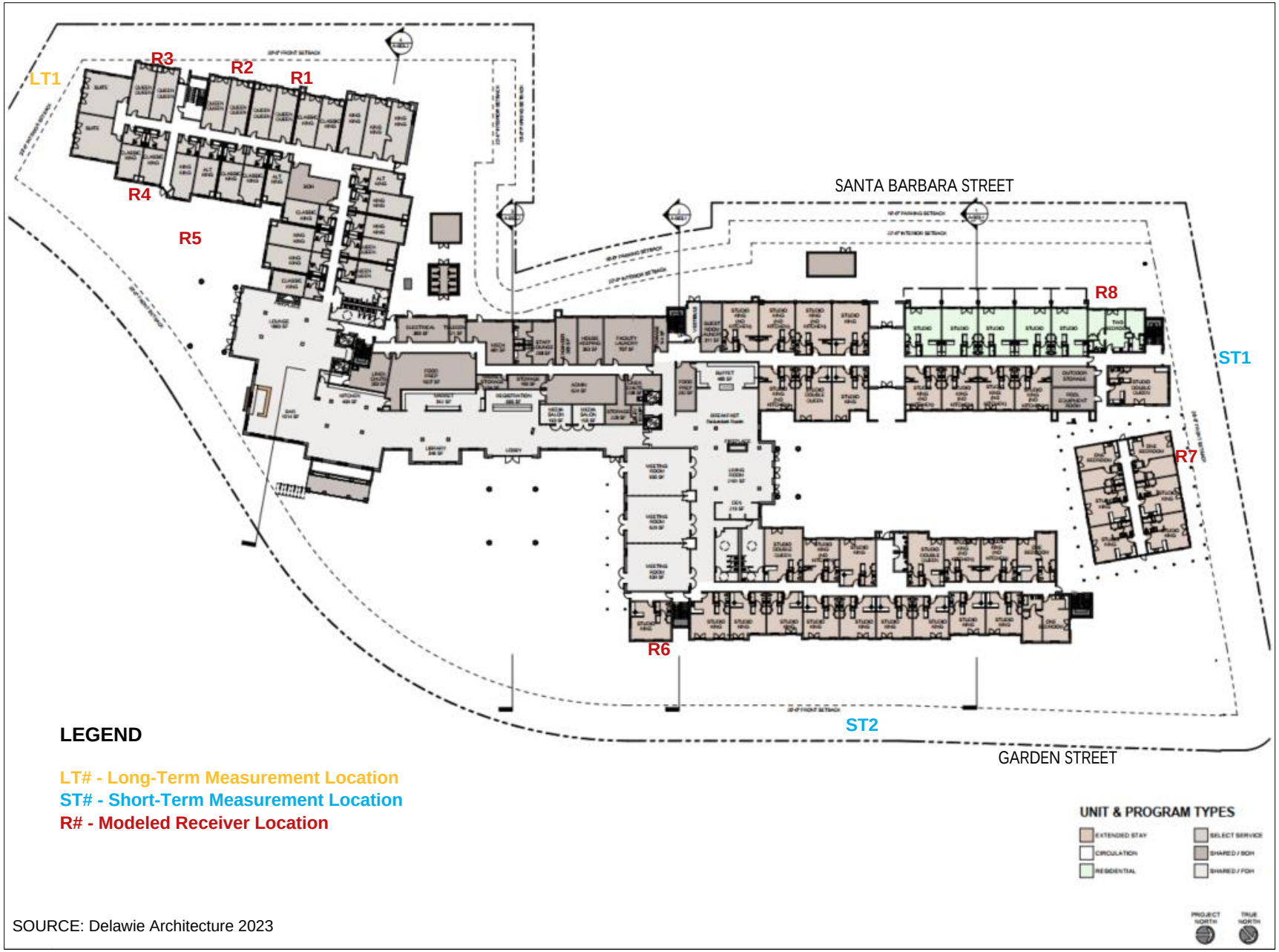


SOURCE: Delawie Architecture 2023

FIGURE 4

THIRD LEVEL FLOOR PLAN

101 GARDEN STREET HOTELS UPDATED NOISE STUDY



SOURCE: Delawie Architecture 2023

FIGURE 5

NOISE MEASUREMENT AND MODELLED RECEIVER LOCATIONS

101 GARDEN STREET HOTELS UPDATED NOISE STUDY

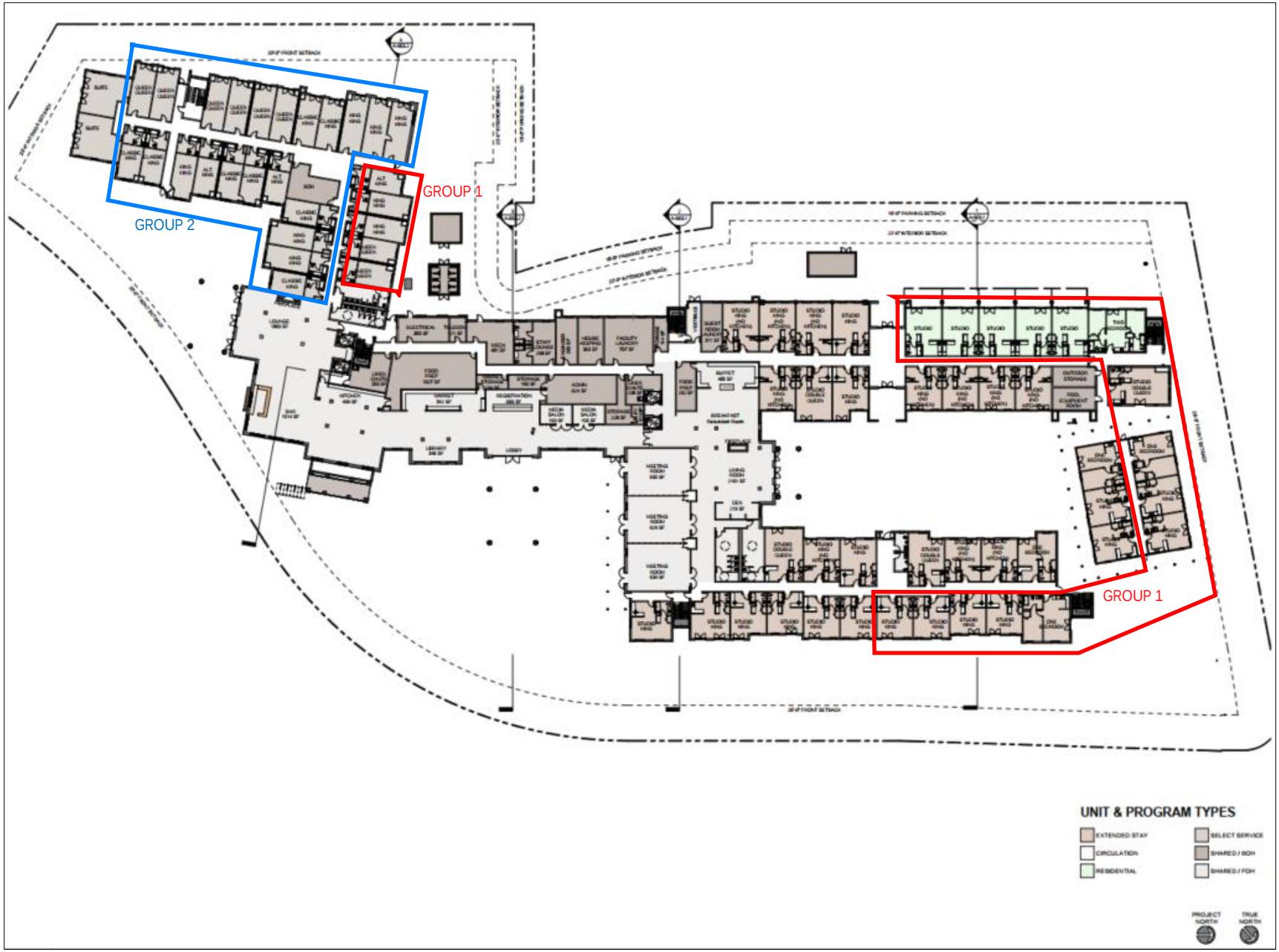


FIGURE 6

EXTERIOR NOISE MITIGATION REFERENCE EXHIBIT

101 GARDEN STREET HOTELS UPDATED NOISE STUDY

ATTACHMENT 1

ACOUSTIC TERMINLOGY AND DEFIITIONS

ACOUSTIC TERMINOLOGY AND DEFINITIONS

Term	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
A-Weighted Sound Level, (dB[A])	The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Community Noise Equivalent Level, (CNEL)	CNEL is the A-weighted equivalent continuous sound exposure level for a 24-hour period with a ten dB adjustment added to sound levels occurring during nighttime hours (10 pm to 7 am) and a five dB adjustment added to the sound levels occurring during the evening hours (7 pm to 10 pm).
Decibel, (dB)	A unit for measuring sound pressure level, equal to 10 times the logarithm to the base 10 of the ratio of the measured sound pressure squared to a reference pressure, which is 20 micropascals.
Average Sound Level (L_{eq})	The sound level corresponding to a steady state sound level and containing the same total energy as a time varying signal over a given sample period. L_{eq} is designed to average all of the loud and quiet sound levels occurring over a specific time period.
Sound Transmission Class, (STC)	A single number rating of the noise reduction of a building element.

ATTACHMENT 2

AMBIENT NOISE MEASUREMENT DATA

DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: GARDEN STREET — PROJECT #: 9228
SITE ID: ST1
SITE ADDRESS: YANONALI — OBSERVER(S): PG ; JL
START DATE: 12/20/18 — END DATE: 12/20/18
START TIME: 1600 — END TIME: 1610

METEOROLOGICAL CONDITIONS

TEMP: 73 F — HUMIDITY: 42 % R.H. — WIND: (CALM) LIGHT MODERATE VARIABLE STEADY GUSTY
WINDSPD: 0 MPH — DIR. N NE S SE S SW W NW
SKY: (SUNNY) CLEAR OVRCAST (PRTLY CLDY) FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: PICCOLO — TYPE 1 (2) — SERIAL # 15092100 8
CALIBRATOR: REED R8090 — SERIAL # B008580VR2
CALIBRATION CHECK — PRE-MEASUREMENT: 94 dBA SPL — POST-MEASUREMENT: 94 dBA SPL — WINDSCRN: Y

SETTINGS: A-WTD SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
28	1600	1610	68.3	89.5	58.7	61	66	81	

COMMENTS
PHOTOS: ST01_01 ; ST01_02

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER:
ROADWAY TYPE: ARTERIAL — DIST. TO RDWY C/L OR (EOP): 10 ft
TRAFFIC COUNT DURATION: 10 MIN — SPEED 30

	DIRECTION	COUNT 1 (OR RDWY 1) NB/EB	COUNT 1 (OR RDWY 1) SB/WB	COUNT 1 NB/EB	COUNT 1 SB/WB	COUNT 2 (OR RDWY 2) NB/EB	COUNT 2 (OR RDWY 2) SB/WB	COUNT 2 NB/EB	COUNT 2 SB/WB
		MIN		SPEED		MIN		SPEED	
	AUTOS	142							
	MED TRKS	6							
	HVY TRKS	1							
	BUSES	1							
	MOTRCLS								

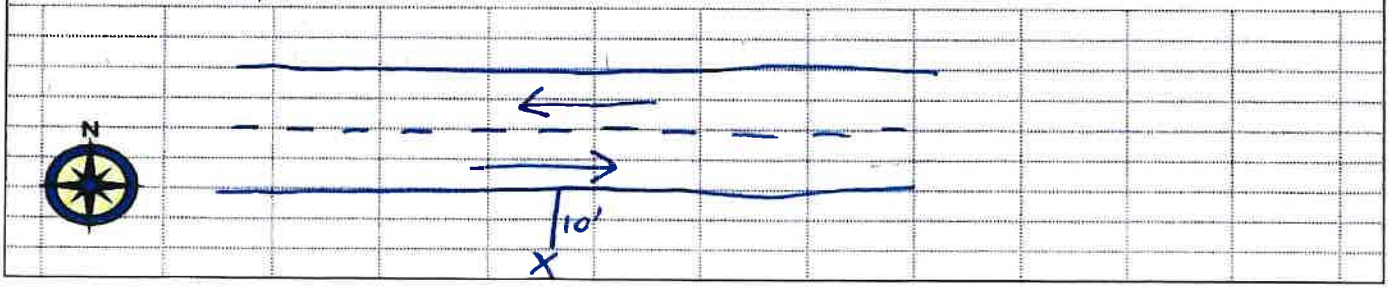
IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ✓

SPEEDS ESTIMATED BY: RADAR / (DRIVING THE PACE)
POSTED SPEED LIMIT SIGNS SAY: 25

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES DIST. BARKING DOGS BIRDS DIST. INDUSTRIAL
DIST. KIDS PLAYING DIST. CONVRSTNS / YELLING DIST. TRAFFIC (LIST RDWYS BELOW) DISTD GARDENERS/LANDSCAPING NOISE
OTHER:

DESCRIPTION / SKETCH

TERRAIN (HARD) SOFT MIXED (FLAT) OTHER:
PHOTOS
OTHER COMMENTS / SKETCH



FIELD NOISE MEASUREMENT DATA

DUDEK

PROJECT: GARDEN STREET — PROJECT #: 9228
SITE ID: ST 2
SITE ADDRESS:
START DATE: 12/28/18 — END DATE: 12/28/18 — OBSERVER(S): PG.
START TIME: 1520 — END TIME: 1530

METEOROLOGICAL CONDITIONS

TEMP: 71 F — HUMIDITY: 29 % R.H. — WIND: (CALM) LIGHT MODERATE VARIABLE STEADY GUSTY
WINDSPD: 01 MPH — DIR. N NE S SE S SW (W) NW
SKY: (SUNNY) (CLEAR) OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: PICCOLO — TYPE 1 (2) — SERIAL # 1S092108
CALIBRATOR: REED R8090 — SERIAL # B008500VR2
CALIBRATION CHECK — PRE-MEASUREMENT: 94 dBA SPL — POST-MEASUREMENT: ____ dBA SPL — WINDSCRN: Y

SETTINGS: (A-WTD) (SLOW) FAST (FRONTAL) RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
001	1520	1530	63.6	74.4	49.0	51	57	67	

COMMENTS: PHOTOS: ST02_01; ST02_02

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER:
ROADWAY TYPE: ARTERIAL — DIST. TO RDWY C/L OR (EOP): 6 FT.
TRAFFIC COUNT DURATION: 10 MIN — SPEED: 30

COUNT 1 (OR RDWY 1)

DIRECTION	NB/EB	SB/WB	NB/EB SPEED	SB/WB SPEED
AUTOS	111			
MED TRKS	2			
HVY TRKS	0			
BUSES	0			
MOTRCLS	1			

IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE: X

COUNT 2 (OR RDWY 2)

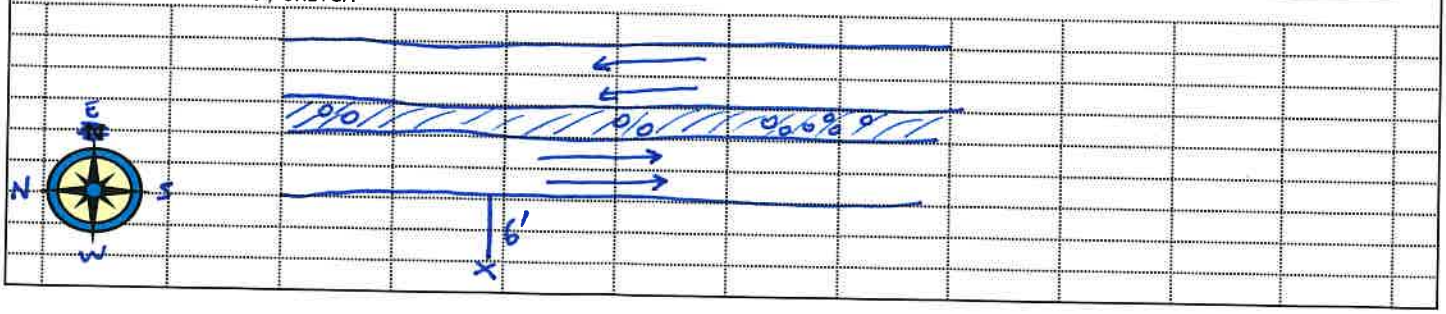
NB/EB MIN	SB/WB MIN	NB/EB SPEED	SB/WB SPEED

SPEEDS ESTIMATED BY: RADAR / (DRIVING THE PACE)
POSTED SPEED LIMIT SIGNS SAY: 30

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES DIST. BARKING DOGS BIRDS DIST. INDUSTRIAL
DIST. KIDS PLAYING DIST. CONVRSTNS / YELLING DIST. TRAFFIC (LIST RDWYS BELOW) DISTD GARDENERS/LANDSCAPING NOISE
OTHER: SMALL GENERATOR APPX. 80M NORTH, TURNED ON FOR LENGTH OF SURVEY

DESCRIPTION / SKETCH

TERRAIN HARD SOFT (MIXED) FLAT OTHER: SIDEWALK APPROX. 1' ABOVE ROAD ELEVATION.
PHOTOS
OTHER COMMENTS / SKETCH



DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: 101 GARDEN ST. | PROJECT #: 9228
SITE ID: LT1
SITE ADDRESS: RAILROAD TRACKS | OBSERVER(S): SL
START DATE: ~~11~~ 12/28/18 | END DATE: 12/31/18
START TIME: 1400 | END TIME: 10:00

METEOROLOGICAL CONDITIONS

TEMP: 66 F | HUMIDITY: 28 % R.H. | WIND: CALM (LIGHT) MODERATE
WINDSPD: 4 MPH | DIR. N NE S SE S SW (W) NW | VARIABLE STEADY GUSTY
SKY: (SUNNY) (CLEAR) OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: PICCOLO | TYPE 1 (0) | SERIAL # 11
CALIBRATOR: REED R8090 | SERIAL #
CALIBRATION CHECK: PRE-MEASUREMENT 94 dBA SPL | POST-MEASUREMENT ____ dBA SPL | WINDSCRN

SETTINGS: A-WTD SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
001									

COMMENTS: LONG-TERM RAIL NOISE MEASUREMENT AT SOUTH P.L. (NOT ATTENDED).

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT (RAIL) INDUSTRIAL OTHER:
ROADWAY TYPE: | DIST. TO RDWY C/L OR EOP:
TRAFFIC COUNT DURATION: ___ MIN

COUNT 1 (OR RDWY 1) DIRECTION	NB/EB	SB/WB	NB/EB SPEED	SB/WB SPEED
AUTOS				
MED TRKS				
HVY TRKS				
BUSES				
MOTRCLS				

IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ___

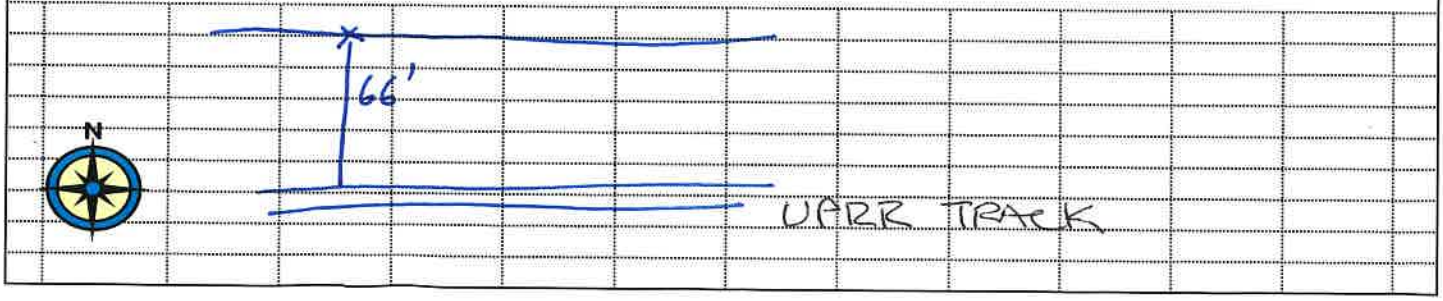
COUNT 2 (OR RDWY 2) ___ MIN	NB/EB	SB/WB	NB/EB SPEED	SB/WB SPEED

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY:

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES DIST. BARKING DOGS BIRDS DIST. INDUSTRIAL
DIST. KIDS PLAYING DIST. CONVRSTNS / YELLING DIST. TRAFFIC (LIST RDWYS BELOW) DISTD GARDENERS/LANDSCAPING NOISE
OTHER:

DESCRIPTION / SKETCH

TERRAIN HARD SOFT (MIXED) FLAT OTHER:
PHOTOS
OTHER COMMENTS / SKETCH



Leq	Time	Adjustment					
74.4	Midnight	10	84.4	84.4			
50.1	1	10	60.1	60.1			
49.5	2	10	59.5	59.5			
50.1	3	10	60.1	60.1			
51.3	4	10	61.3	61.3			
53.1	5	10	63.1	63.1			
63.1	6	10	73.1	73.1			
55.7	7am		55.7	55.7			
53.5	8		53.5	53.5			
66.7	9		66.7	66.7			
69.8	10		69.8	69.8			
55.6	11		55.6	55.6			
67.7	noon		67.7	67.7			
61.5	1		61.5	61.5			
53.4	2		53.4	53.4			
52.0	3		52	52			
66.9	4		66.9	66.9			
74.7	5		74.7	74.7			
54.7	6		54.7	54.7			
65.7	7	5	70.7	65.7			
51.2	8	5	56.2	51.2			
51.6	9	5	56.6	51.6			
73.7	10	10	83.7	83.7			
64.3	11	10	74.3	74.3			
			74.2	74.2			
			CNEL	LDN			

Leq	Time	Adjustment					
50.9	Midnight	10	60.9	60.9			
74.0	1	10	84	84			
50.3	2	10	60.3	60.3			
48.5	3	10	58.5	58.5			
52.4	4	10	62.4	62.4			
52.5	5	10	62.5	62.5			
68.9	6	10	78.9	78.9			
53.3	7am		53.3	53.3			
48.9	8		48.9	48.9			
46.7	9		46.7	46.7			
65.7	10		65.7	65.7			
68.2	11		68.2	68.2			
70.5	noon		70.5	70.5			
55.1	1		55.1	55.1			
68.6	2		68.6	68.6			
53.1	3		53.1	53.1			
58.0	4		58	58			
66.8	5		66.8	66.8			
70.7	6		70.7	70.7			
59.0	7	5	64	59			
52.1	8	5	57.1	52.1			
52.4	9	5	57.4	52.4			
52.0	10	10	62	62			
69.6	11	10	79.6	79.6			
			73.0	73.0			
			CNEL	LDN			

Leq	Time	Adjustment					
50.9	Midnight	10	60.9	60.9			
74	1	10	84	84			
50.3	2	10	60.3	60.3			
48.5	3	10	58.5	58.5			
52.4	4	10	62.4	62.4			
52.5	5	10	62.5	62.5			
68.9	6	10	78.9	78.9			
53.3	7am		53.3	53.3			
48.9	8		48.9	48.9			
46.7	9		46.7	46.7			
65.7	10		65.7	65.7			
68.2	11		68.2	68.2			
70.5	noon		70.5	70.5			
55.1	1		55.1	55.1			
72	2		72	72			
50.2	3		50.2	50.2			
64.1	4		64.1	64.1			
64	5		64	64			
72.1	6		72.1	72.1			
63.4	7	5	68.4	63.4			
52.2	8	5	57.2	52.2			
51.1	9	5	56.1	51.1			
67.8	10	10	77.8	77.8			
50.1	11	10	60.1	60.1			
			72.9	72.8			
			CNEL	LDN			

ATTACHMENT 3

CONSTRUCTION NOISE MODELING DATA

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/6/2019
Case Description: 101 Garden Street Hotels - Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 110'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		110	0
Dozer	No	40		81.7	110	0
Backhoe	No	40		77.6	110	0
Backhoe	No	40		77.6	110	0

Results

Equipment		Calculated (dBA) *Lmax	Leq
Grader		78.2	74.2
Dozer		74.8	70.8
Backhoe		70.7	66.7
Backhoe		70.7	66.7
	Total	78.2	76.8

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Acoustical Center 254	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		254	0
Dozer	No	40		81.7	254	0
Backhoe	No	40		77.6	254	0
Backhoe	No	40		77.6	254	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Grader		70.9	66.9
Dozer		67.6	63.6
Backhoe		63.4	59.5
Backhoe		63.4	59.5
	Total	70.9	69.5

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/6/2019
Case Description: 101 Garden Street Hotels - Trenching

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 110'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	75	0
Backhoe	No	40		77.6	75	0
Backhoe	No	40		77.6	75	0

Results

Equipment	Calculated (dBA) *Lmax	Leq
Backhoe	74	70.1
Backhoe	74	70.1
Backhoe	74	70.1
Total	74	74.8

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Acoustical Center 254'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	160	0
Backhoe	No	40		77.6	160	0
Backhoe	No	40		77.6	160	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Backhoe		67.5	63.5
Backhoe		67.5	63.5
Backhoe		67.5	63.5
	Total	67.5	68.2

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/6/2019
Case Description: Covina Park Hotel_Building Construction

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 110'	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	110	0
Man Lift	No	20		74.7	110	0
Man Lift	No	20		74.7	110	0
Generator	No	50		80.6	110	0
Backhoe	No	40		77.6	110	0
Welder / Torch	No	40		74	110	0
Welder / Torch	No	40		74	110	0
Welder / Torch	No	40		74	110	0

Results

		Calculated (dBA)	
Equipment		*Lmax	Leq
Crane		73.7	65.7
Man Lift		67.9	60.9
Man Lift		67.9	60.9
Generator		73.8	70.8
Backhoe		70.7	66.7
Welder / Torch		67.2	63.2
Welder / Torch		67.2	63.2
Welder / Torch		67.2	63.2
	Total	73.8	74.6

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Acoustical Center 254'	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	254	0
Man Lift	No	20		74.7	254	0
Man Lift	No	20		74.7	254	0
Generator	No	50		80.6	254	0
Backhoe	No	40		77.6	254	0
Welder / Torch	No	40		74	254	0
Welder / Torch	No	40		74	254	0
Welder / Torch	No	40		74	254	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Crane		66.4	58.5
Man Lift		60.6	53.6
Man Lift		60.6	53.6
Generator		66.5	63.5
Backhoe		63.4	59.5
Welder / Torch		59.9	55.9
Welder / Torch		59.9	55.9
Welder / Torch		59.9	55.9
	Total	66.5	67.4

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/6/2019
Case Description: Covina Park Hotel_Paving

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 110'	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	110	0
Paver	No	50		77.2	110	0
All Other Equipment > 5 HP	No	50	85		110	0
Roller	No	20		80	110	0
Roller	No	20		80	110	0
Backhoe	No	40		77.6	110	0

Results

		Calculated (dBA)	
Equipment		*Lmax	Leq
Concrete Mixer Truck		72	68
Paver		70.4	67.4
All Other Equipment > 5 HP		78.2	75.1
Roller		73.2	66.2
Roller		73.2	66.2
Backhoe		70.7	66.7
	Total	78.2	77.6

*Calculated Lmax is the Loudest value.

				---- Receptor #2 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Acoustical Center 254'	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	254	0
Paver	No	50		77.2	254	0
All Other Equipment > 5 HP	No	50	85		254	0
Roller	No	20		80	254	0
Roller	No	20		80	254	0
Backhoe	No	40		77.6	254	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Concrete Mixer Truck		64.7	60.7
Paver		63.1	60.1
All Other Equipment > 5 HP		70.9	67.9
Roller		65.9	58.9
Roller		65.9	58.9
Backhoe		63.4	59.5
	Total	70.9	70.3

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/6/2019
Case Description: 101 Garden Street Hotels - Architectural Coating

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 110'	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	110	0

Results

Equipment		Calculated (dBA) *Lmax	Leq
Compressor (air)		70.8	66.8
	Total	70.8	66.8

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Acoustical Center 254'	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	254	0

Results

Equipment		Calculated (dBA) *Lmax	Leq
Compressor (air)		63.6	59.6
	Total	63.6	59.6

*Calculated Lmax is the Loudest value.

ATTACHMENT 4

TRAFFIC NOISE MODELING DATA

COMBINED RAIL AND TRAFFIC NOISE MODELING DATA

Dudek
JVL
6 February 2019
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 101 Garden Street
RUN: Existing
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 (Yanonali Street)	1	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
ST2 (Garden Street)	2	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	2	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 6 February 2019
JVL TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 101 Garden Street
RUN: Existing

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	%		
Santa Barbara St. SB	12.0	North End	1	0.0	35.0	0.00				Average	
		point2	2	100.0	35.0	0.00				Average	
		point3	3	200.0	35.0	0.00				Average	
		point4	4	300.0	35.0	0.00				Average	
		point5	5	400.0	35.0	0.00				Average	
		point6	6	500.0	35.0	0.00				Average	
		point7	7	600.0	35.0	0.00				Average	
		point8	8	700.0	35.0	0.00				Average	
		point9	9	800.0	35.0	0.00				Average	
		South End	10	900.0	35.0	0.00					
Santa Barbara St. NB	12.0	South End	11	900.0	52.0	0.00				Average	
		point12	12	800.0	52.0	0.00				Average	
		point13	13	700.0	52.0	0.00				Average	
		point14	14	600.0	52.0	0.00				Average	
		point15	15	500.0	52.0	0.00				Average	
		point16	16	400.0	52.0	0.00				Average	
		point17	17	300.0	52.0	0.00				Average	
		point18	18	200.0	52.0	0.00				Average	
		point19	19	100.0	52.0	0.00				Average	
		North End	20	0.0	52.0	0.00					
Yanonali St WB	12.0	East End	21	16.0	550.0	0.00				Average	
		point22	22	27.0	500.0	0.00				Average	
		point23	23	49.0	400.0	0.00				Average	
		point24	24	71.0	300.0	0.00				Average	
		point25	25	93.0	200.0	0.00				Average	

		point26	26	115.0	100.0	0.00				Average	
		West End	27	122.5	60.0	0.00					
Yanonali Street EB	12.0	West End	28	137.5	60.0	0.00				Average	
		point29	29	130.0	100.0	0.00				Average	
		point30	30	108.0	200.0	0.00				Average	
		point31	31	86.0	300.0	0.00				Average	
		point32	32	64.0	400.0	0.00				Average	
		point33	33	42.0	500.0	0.00				Average	
		East End	34	31.0	550.0	0.00					
Garden St. SB1	12.0	point35	35	160.0	502.0	0.00				Average	
		point36	36	200.0	502.0	0.00				Average	
		point37	37	300.0	502.0	0.00				Average	
		point38	38	400.0	502.0	0.00				Average	
		point39	39	500.0	502.0	0.00				Average	
		point48	48	550.0	502.0	0.00				Average	
		point40	40	600.0	468.0	0.00				Average	
		point41	41	650.0	435.0	0.00				Average	
		point42	42	700.0	392.0	0.00				Average	
		point43	43	750.0	340.0	0.00				Average	
		point44	44	800.0	265.0	0.00				Average	
		point45	45	825.0	225.0	0.00					
Garden Street SB2	12.0	point49	49	160.0	514.0	0.00				Average	
		point50	50	200.0	514.0	0.00				Average	
		point51	51	300.0	514.0	0.00				Average	
		point52	52	400.0	514.0	0.00				Average	
		point53	53	500.0	514.0	0.00				Average	
		point54	54	550.0	514.0	0.00				Average	
		point55	55	600.0	482.0	0.00				Average	
		point56	56	650.0	449.0	0.00				Average	
		point57	57	700.0	406.0	0.00				Average	
		point58	58	750.0	354.0	0.00				Average	
		point59	59	800.0	279.0	0.00				Average	
		point60	60	825.0	239.0	0.00					
Garden Street NB1	12.0	point61	61	825.0	273.0	0.00				Average	
		point62	62	800.0	313.0	0.00				Average	
		point63	63	750.0	388.0	0.00				Average	
		point64	64	700.0	440.0	0.00				Average	
		point65	65	650.0	483.0	0.00				Average	
		point66	66	600.0	516.0	0.00				Average	

		point67	67	550.0	544.0	0.00				Average	
		point68	68	500.0	544.0	0.00				Average	
		point69	69	400.0	544.0	0.00				Average	
		point70	70	300.0	544.0	0.00				Average	
		point71	71	200.0	544.0	0.00				Average	
		point72	72	160.0	544.0	0.00					
Garden Street NB2	12.0	South End	73	825.0	285.0	0.00				Average	
		point74	74	800.0	325.0	0.00				Average	
		point75	75	750.0	400.0	0.00				Average	
		point76	76	700.0	452.0	0.00				Average	
		point77	77	650.0	495.0	0.00				Average	
		point78	78	600.0	528.0	0.00				Average	
		point79	79	550.0	554.0	0.00				Average	
		point80	80	500.0	554.0	0.00				Average	
		point81	81	400.0	554.0	0.00				Average	
		point82	82	300.0	554.0	0.00				Average	
		point83	83	200.0	554.0	0.00				Average	
		North End	84	160.0	554.0	0.00					

Dudek				**6 February 2019**								
JVL				**TNM 2.5**								
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	**101 Garden Street**											
RUN:	**Existing**											
Roadway	**Points**											
Name	**Name**	**No.**	**Segment**									
			Autos		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**	
			V	**S**	**V**	**S**	**V**	**S**	**V**	**S**	**V**	**S**
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Santa Barbara St. SB	North End	1	0	0	0	0	0	0	0	0	0	0
	point2	2	0	0	0	0	0	0	0	0	0	0
	point3	3	0	0	0	0	0	0	0	0	0	0
	point4	4	0	0	0	0	0	0	0	0	0	0
	point5	5	0	0	0	0	0	0	0	0	0	0
	point6	6	0	0	0	0	0	0	0	0	0	0
	point7	7	0	0	0	0	0	0	0	0	0	0
	point8	8	0	0	0	0	0	0	0	0	0	0
	point9	9	0	0	0	0	0	0	0	0	0	0
	South End	10										
Santa Barbara St. NB	South End	11	0	0	0	0	0	0	0	0	0	0
	point12	12	0	0	0	0	0	0	0	0	0	0
	point13	13	0	0	0	0	0	0	0	0	0	0
	point14	14	0	0	0	0	0	0	0	0	0	0
	point15	15	0	0	0	0	0	0	0	0	0	0
	point16	16	0	0	0	0	0	0	0	0	0	0
	point17	17	0	0	0	0	0	0	0	0	0	0
	point18	18	0	0	0	0	0	0	0	0	0	0
	point19	19	0	0	0	0	0	0	0	0	0	0
	North End	20										
Yanonali St WB	East End	21	398	35	17	35	4	35	4	35	4	35
	point22	22	398	35	17	35	4	35	4	35	4	35
	point23	23	398	35	17	35	4	35	4	35	4	35

	point24	24	398	35	17	35	4	35	4	35	4	35
	point25	25	398	35	17	35	4	35	4	35	4	35
	point26	26	398	35	17	35	4	35	4	35	4	35
	West End	27										
Yanonali Street EB	West End	28	399	35	17	35	4	35	4	35	4	35
	point29	29	399	35	17	35	4	35	4	35	4	35
	point30	30	399	35	17	35	4	35	4	35	4	35
	point31	31	399	35	17	35	4	35	4	35	4	35
	point32	32	399	35	17	35	4	35	4	35	4	35
	point33	33	399	35	17	35	4	35	4	35	4	35
	East End	34										
Garden St. SB1	point35	35	117	35	5	35	1	35	1	35	2	35
	point36	36	117	35	5	35	1	35	1	35	2	35
	point37	37	117	35	5	35	1	35	1	35	2	35
	point38	38	117	35	5	35	1	35	1	35	2	35
	point39	39	117	35	5	35	1	35	1	35	2	35
	point48	48	117	35	5	35	1	35	1	35	2	35
	point40	40	117	35	5	35	1	35	1	35	2	35
	point41	41	117	35	5	35	1	35	1	35	2	35
	point42	42	117	35	5	35	1	35	1	35	2	35
	point43	43	117	35	5	35	1	35	1	35	2	35
	point44	44	117	35	5	35	1	35	1	35	2	35
	point45	45										
Garden Street SB2	point49	49	117	35	5	35	1	35	1	35	1	35
	point50	50	117	35	5	35	1	35	1	35	1	35
	point51	51	117	35	5	35	1	35	1	35	1	35
	point52	52	117	35	5	35	1	35	1	35	1	35
	point53	53	117	35	5	35	1	35	1	35	1	35
	point54	54	117	35	5	35	1	35	1	35	1	35
	point55	55	117	35	5	35	1	35	1	35	1	35
	point56	56	117	35	5	35	1	35	1	35	1	35
	point57	57	117	35	5	35	1	35	1	35	1	35
	point58	58	117	35	5	35	1	35	1	35	1	35
	point59	59	117	35	5	35	1	35	1	35	1	35
	point60	60										
Garden Street NB1	point61	61	117	35	5	35	1	35	1	35	1	35

	point62	62	117	35	5	35	1	35	1	35	1	35
	point63	63	117	35	5	35	1	35	1	35	1	35
	point64	64	117	35	5	35	1	35	1	35	1	35
	point65	65	117	35	5	35	1	35	1	35	1	35
	point66	66	117	35	5	35	1	35	1	35	1	35
	point67	67	117	35	5	35	1	35	1	35	1	35
	point68	68	117	35	5	35	1	35	1	35	1	35
	point69	69	117	35	5	35	1	35	1	35	1	35
	point70	70	117	35	5	35	1	35	1	35	1	35
	point71	71	117	35	5	35	1	35	1	35	1	35
	point72	72										
Garden Street NB2	South End	73	117	35	5	35	1	35	1	35	1	35
	point74	74	117	35	5	35	1	35	1	35	1	35
	point75	75	117	35	5	35	1	35	1	35	1	35
	point76	76	117	35	5	35	1	35	1	35	1	35
	point77	77	117	35	5	35	1	35	1	35	1	35
	point78	78	117	35	5	35	1	35	1	35	1	35
	point79	79	117	35	5	35	1	35	1	35	1	35
	point80	80	117	35	5	35	1	35	1	35	1	35
	point81	81	117	35	5	35	1	35	1	35	1	35
	point82	82	117	35	5	35	1	35	1	35	1	35
	point83	83	117	35	5	35	1	35	1	35	1	35
	North End	84										

Dudek 6 February 2019
JVL TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 101 Garden Street
RUN: Existing

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 (Yanonali Street)	1	1	128.0	190.0	0.00	4.92	0.00	66	10.0	8.0	Y
ST2 (Garden Street)	2	1	275.0	480.0	0.00	4.92	0.00	66	10.0	8.0	Y

Dudek
JVL
5 February 2019
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 101 Garden Street
RUN: Year 2030
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 (Yanonali Street)	1	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
ST2 (Garden Street)	2	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
Patio 1	3	1	0.0	48.1	66	48.1	10	----	48.1	0.0	8	-8.0
Balcony 1 - Level 3	4	1	0.0	52.5	66	52.5	10	----	52.5	0.0	8	-8.0
Patio 2	5	1	0.0	48.3	66	48.3	10	----	48.3	0.0	8	-8.0
Balcony 2 - Level 3	6	1	0.0	52.7	66	52.7	10	----	52.7	0.0	8	-8.0
Patio 3	7	1	0.0	48.6	66	48.6	10	----	48.6	0.0	8	-8.0
Balcony 3 - Level 3	8	1	0.0	53.0	66	53.0	10	----	53.0	0.0	8	-8.0
Patio 4	9	1	0.0	50.8	66	50.8	10	----	50.8	0.0	8	-8.0
Balcony 4 - Level 3	10	1	0.0	55.1	66	55.1	10	----	55.1	0.0	8	-8.0
Pool 5 (South Optional)	11	1	0.0	52.1	66	52.1	10	----	52.1	0.0	8	-8.0
Patio 6	12	1	0.0	59.1	66	59.1	10	----	59.1	0.0	8	-8.0
Patio 7	13	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
Balcony 7 - Level 2	14	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
Balcony 7 - Level 3	15	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
Patio 8	16	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	16	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Dudek 5 February 2019
JVL TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: 101 Garden Street
RUN: Year 2030

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	%		
Santa Barbara St. SB	12.0	North End	1	0.0	35.0	0.00				Average	
		point2	2	100.0	35.0	0.00				Average	
		point3	3	200.0	35.0	0.00				Average	
		point4	4	300.0	35.0	0.00				Average	
		point5	5	400.0	35.0	0.00				Average	
		point6	6	500.0	35.0	0.00				Average	
		point7	7	600.0	35.0	0.00				Average	
		point8	8	700.0	35.0	0.00				Average	
		point9	9	800.0	35.0	0.00				Average	
		South End	10	900.0	35.0	0.00					
Santa Barbara St. NB	12.0	South End	11	900.0	52.0	0.00				Average	
		point12	12	800.0	52.0	0.00				Average	
		point13	13	700.0	52.0	0.00				Average	
		point14	14	600.0	52.0	0.00				Average	
		point15	15	500.0	52.0	0.00				Average	
		point16	16	400.0	52.0	0.00				Average	
		point17	17	300.0	52.0	0.00				Average	
		point18	18	200.0	52.0	0.00				Average	
		point19	19	100.0	52.0	0.00				Average	
		North End	20	0.0	52.0	0.00					
Yanonali St WB	12.0	East End	21	16.0	550.0	0.00				Average	
		point22	22	27.0	500.0	0.00				Average	
		point23	23	49.0	400.0	0.00				Average	
		point24	24	71.0	300.0	0.00				Average	
		point25	25	93.0	200.0	0.00				Average	

		point26	26	115.0	100.0	0.00				Average	
		West End	27	122.5	60.0	0.00					
Yanonali Street EB	12.0	West End	28	137.5	60.0	0.00				Average	
		point29	29	130.0	100.0	0.00				Average	
		point30	30	108.0	200.0	0.00				Average	
		point31	31	86.0	300.0	0.00				Average	
		point32	32	64.0	400.0	0.00				Average	
		point33	33	42.0	500.0	0.00				Average	
		East End	34	31.0	550.0	0.00					
Garden St. SB1	12.0	point35	35	160.0	502.0	0.00				Average	
		point36	36	200.0	502.0	0.00				Average	
		point37	37	300.0	502.0	0.00				Average	
		point38	38	400.0	502.0	0.00				Average	
		point39	39	500.0	502.0	0.00				Average	
		point48	48	550.0	502.0	0.00				Average	
		point40	40	600.0	468.0	0.00				Average	
		point41	41	650.0	435.0	0.00				Average	
		point42	42	700.0	392.0	0.00				Average	
		point43	43	750.0	340.0	0.00				Average	
		point44	44	800.0	265.0	0.00				Average	
		point45	45	825.0	225.0	0.00					
Garden Street SB2	12.0	point49	49	160.0	514.0	0.00				Average	
		point50	50	200.0	514.0	0.00				Average	
		point51	51	300.0	514.0	0.00				Average	
		point52	52	400.0	514.0	0.00				Average	
		point53	53	500.0	514.0	0.00				Average	
		point54	54	550.0	514.0	0.00				Average	
		point55	55	600.0	482.0	0.00				Average	
		point56	56	650.0	449.0	0.00				Average	
		point57	57	700.0	406.0	0.00				Average	
		point58	58	750.0	354.0	0.00				Average	
		point59	59	800.0	279.0	0.00				Average	
		point60	60	825.0	239.0	0.00					
Garden Street NB1	12.0	point61	61	825.0	273.0	0.00				Average	
		point62	62	800.0	313.0	0.00				Average	
		point63	63	750.0	388.0	0.00				Average	
		point64	64	700.0	440.0	0.00				Average	
		point65	65	650.0	483.0	0.00				Average	
		point66	66	600.0	516.0	0.00				Average	

		point67	67	550.0	544.0	0.00				Average	
		point68	68	500.0	544.0	0.00				Average	
		point69	69	400.0	544.0	0.00				Average	
		point70	70	300.0	544.0	0.00				Average	
		point71	71	200.0	544.0	0.00				Average	
		point72	72	160.0	544.0	0.00					
Garden Street NB2	12.0	South End	73	825.0	285.0	0.00				Average	
		point74	74	800.0	325.0	0.00				Average	
		point75	75	750.0	400.0	0.00				Average	
		point76	76	700.0	452.0	0.00				Average	
		point77	77	650.0	495.0	0.00				Average	
		point78	78	600.0	528.0	0.00				Average	
		point79	79	550.0	554.0	0.00				Average	
		point80	80	500.0	554.0	0.00				Average	
		point81	81	400.0	554.0	0.00				Average	
		point82	82	300.0	554.0	0.00				Average	
		point83	83	200.0	554.0	0.00				Average	
		North End	84	160.0	554.0	0.00					

Dudek 5 February 2019
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INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: 101 Garden Street
RUN: Year 2030

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Santa Barbara St. SB	North End	1	8	30	0	0	0	0	0	0	0	0
	point2	2	8	30	0	0	0	0	0	0	0	0
	point3	3	8	30	0	0	0	0	0	0	0	0
	point4	4	8	30	0	0	0	0	0	0	0	0
	point5	5	8	30	0	0	0	0	0	0	0	0
	point6	6	8	30	0	0	0	0	0	0	0	0
	point7	7	8	30	0	0	0	0	0	0	0	0
	point8	8	8	30	0	0	0	0	0	0	0	0
	point9	9	8	30	0	0	0	0	0	0	0	0
	South End	10										
Santa Barbara St. NB	South End	11	8	30	0	0	0	0	0	0	0	0
	point12	12	8	30	0	0	0	0	0	0	0	0
	point13	13	8	30	0	0	0	0	0	0	0	0
	point14	14	8	30	0	0	0	0	0	0	0	0
	point15	15	8	30	0	0	0	0	0	0	0	0
	point16	16	8	30	0	0	0	0	0	0	0	0
	point17	17	8	30	0	0	0	0	0	0	0	0
	point18	18	8	30	0	0	0	0	0	0	0	0
	point19	19	8	30	0	0	0	0	0	0	0	0
	North End	20										
Yanonali St WB	East End	21	461	35	20	35	5	35	5	35	5	35
	point22	22	461	35	20	35	5	35	5	35	5	35
	point23	23	461	35	20	35	5	35	5	35	5	35

	point24	24	461	35	20	35	5	35	5	35	5	35
	point25	25	461	35	20	35	5	35	5	35	5	35
	point26	26	461	35	20	35	5	35	5	35	5	35
	West End	27										
Yanonali Street EB	West End	28	461	35	20	35	5	35	5	35	5	35
	point29	29	461	35	20	35	5	35	5	35	5	35
	point30	30	461	35	20	35	5	35	5	35	5	35
	point31	31	461	35	20	35	5	35	5	35	5	35
	point32	32	461	35	20	35	5	35	5	35	5	35
	point33	33	461	35	20	35	5	35	5	35	5	35
	East End	34										
Garden St. SB1	point35	35	135	35	6	35	1	35	0	0	2	35
	point36	36	135	35	6	35	1	35	0	0	2	35
	point37	37	135	35	6	35	1	35	0	0	2	35
	point38	38	135	35	6	35	1	35	0	0	2	35
	point39	39	135	35	6	35	1	35	0	0	2	35
	point48	48	135	35	6	35	1	35	0	0	2	35
	point40	40	135	35	6	35	1	35	0	0	2	35
	point41	41	135	35	6	35	1	35	0	0	2	35
	point42	42	135	35	6	35	1	35	0	0	2	35
	point43	43	135	35	6	35	1	35	0	0	2	35
	point44	44	135	35	6	35	1	35	0	0	2	35
	point45	45										
Garden Street SB2	point49	49	135	35	5	35	2	35	0	0	1	35
	point50	50	135	35	5	35	2	35	0	0	1	35
	point51	51	135	35	5	35	2	35	0	0	1	35
	point52	52	135	35	5	35	2	35	0	0	1	35
	point53	53	135	35	5	35	2	35	0	0	1	35
	point54	54	135	35	5	35	2	35	0	0	1	35
	point55	55	135	35	5	35	2	35	0	0	1	35
	point56	56	135	35	5	35	2	35	0	0	1	35
	point57	57	135	35	5	35	2	35	0	0	1	35
	point58	58	135	35	5	35	2	35	0	0	1	35
	point59	59	135	35	5	35	2	35	0	0	1	35
	point60	60										
Garden Street NB1	point61	61	135	35	6	35	1	35	0	0	2	35

	point62	62	135	35	6	35	1	35	0	0	2	35
	point63	63	135	35	6	35	1	35	0	0	2	35
	point64	64	135	35	6	35	1	35	0	0	2	35
	point65	65	135	35	6	35	1	35	0	0	2	35
	point66	66	135	35	6	35	1	35	0	0	2	35
	point67	67	135	35	6	35	1	35	0	0	2	35
	point68	68	135	35	6	35	1	35	0	0	2	35
	point69	69	135	35	6	35	1	35	0	0	2	35
	point70	70	135	35	6	35	1	35	0	0	2	35
	point71	71	135	35	6	35	1	35	0	0	2	35
	point72	72										
Garden Street NB2	South End	73	135	35	6	35	2	35	0	0	1	35
	point74	74	135	35	6	35	2	35	0	0	1	35
	point75	75	135	35	6	35	2	35	0	0	1	35
	point76	76	135	35	6	35	2	35	0	0	1	35
	point77	77	135	35	6	35	2	35	0	0	1	35
	point78	78	135	35	6	35	2	35	0	0	1	35
	point79	79	135	35	6	35	2	35	0	0	1	35
	point80	80	135	35	6	35	2	35	0	0	1	35
	point81	81	135	35	6	35	2	35	0	0	1	35
	point82	82	135	35	6	35	2	35	0	0	1	35
	point83	83	135	35	6	35	2	35	0	0	1	35
	North End	84										

Dudek 5 February 2019
JVL TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: 101 Garden Street
RUN: Year 2030

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 (Yanonali Street)	1	1	128.0	190.0	0.00	4.92	0.00	66	10.0	8.0	Y
ST2 (Garden Street)	2	1	275.0	480.0	0.00	4.92	0.00	66	10.0	8.0	Y
Patio 1	3	1	630.0	100.0	0.00	4.92	0.00	66	10.0	8.0	Y
Balcony 1 - Level 3	4	1	630.0	100.0	0.00	29.00	0.00	66	10.0	8.0	Y
Patio 2	5	1	660.0	100.0	0.00	4.92	0.00	66	10.0	8.0	Y
Balcony 2 - Level 3	6	1	660.0	100.0	0.00	29.00	0.00	66	10.0	8.0	Y
Patio 3	7	1	700.0	107.0	0.00	4.92	0.00	66	10.0	8.0	Y
Balcony 3 - Level 3	8	1	700.0	107.0	0.00	29.00	0.00	66	10.0	8.0	Y
Patio 4	9	1	700.0	182.0	0.00	4.92	0.00	66	10.0	8.0	Y
Balcony 4 - Level 3	10	1	700.0	182.0	0.00	29.00	0.00	66	10.0	8.0	Y
Pool 5 (South Optional)	11	1	680.0	225.0	0.00	4.92	0.00	66	10.0	8.0	Y
Patio 6	12	1	365.0	450.0	0.00	4.92	0.00	66	10.0	8.0	Y
Patio 7	13	1	150.0	335.0	0.00	4.92	0.00	66	10.0	8.0	Y
Balcony 7 - Level 2	14	1	150.0	335.0	0.00	17.00	0.00	66	10.0	8.0	Y
Balcony 7 - Level 3	15	1	150.0	335.0	0.00	29.00	0.00	66	10.0	8.0	Y
Patio 8	16	1	182.0	258.0	0.00	4.92	0.00	66	10.0	8.0	Y

101 Garden Street Hotels Project

Exterior Noise Level Evaluation - Train and Roadway Traffic Sources

Location-Equipment	CNEL at 66' (dBA)	Source to Receiver (feet)	Train CNEL (dBA)	Traffic CNEL (dBA)	Combined CNEL (dBA)
Patio 1	74	198	67	48	67
Balcony 1	74	198	67	52	67
Patio 2	74	171	68	48	68
Balcony 2	74	171	68	52	68
Patio 3	74	146	69	49	69
Balcony 3	74	146	69	53	69
Patio 4	74	191	67	51	67
Balcony 4	74	191	67	55	67
Patio 5 (Pool)	74	316	64	52	64
Patio 8	74	575	60	60	63

ATTACHMENT 5

MECHANICAL EQUIPMENT NOISE MODELING DATA

Conversion for Lw to Lp at distance:

$Lp = Lw - 10 [\log 2/(4 \pi \times r^2)]$

Where: Lp = sound pressure

Lw = sound power

r = distance source to receiver (in meters)

For one meter distance:

	4 pi	2 /4 pi	log of 2/4 pi
	12.5663706	0.159154943	-0.79818

Lw	Lp at 1 meter	
75.4	**67.42**	1 meter = 3.28 feet

Adding equal sound levels from N sources

Lt = Ls + 10 Log (N)

Where Ls is the level from one source

N is the number of sources

Sound source is: 67.42 dBA @ 3.28 feet

Number of sources: 12

1.08 is the Log10 of 12 X 10 = 10.79

Lt = **78.21** dBA @ 3.28 feet

Outdoor Attenuation for Point Source

$L_{receiver}$ = (L_{source} at distance D1)-20x(LOG[Distance to Receiver[D2]/D1)

Source Sound Level (dBA Lp)	Distance (D1 in ft)	Receiver Distance (D2 in ft.)	Lp at Receiver (dBA)
78.21	3.28	110	**47.7**

ATTACHMENT 6

CONSTRUCTION VIBRATION MODELING DATA

Vibration in PPV

$PPV(D) = PPV_{25} \times (25/D)^{1.5}$

Where PPV(D) is vibration level at distance D
And PPV_{25} is reported vibration level at 25 feet from selected equipment

	PPV_{25}	Distance (D)	PVV @ D
Small Dozer	0.003	60	0.0008
Large Dozer	0.089	60	0.024
Loaded Truck	0.076	60	0.020
Vibratory Roller	0.21	60	0.056

Distance to Closest Off-site Structure (feet) 60
Direction / Building: SW / Commercial Bld.
Significance Threshold for Structure: (PPV ips) 0.5
Significance Threshold for Human Annoyance: (PPV ips) 0.24

Vibration in PPV

$PPV(D) = PPV_{25} \times (25/D)^{1.5}$

Where PPV(D) is vibration level at distance D
And PPV_{25} is reported vibration level at 25 feet from selected equipment

	PPV_{25}	Distance (D)	PVV @ D
Small Dozer	0.003	110	0.0003
Large Dozer	0.089	110	0.010
Loaded Truck	0.076	110	0.008
Vibratory Roller	0.21	110	0.023

MITIGATION Distance to Closest Off-site Structure (feet) 110
Direction / Building: NW / Residential Condos.
Significance Threshold for Structure: (PPV ips) 0.5
Significance Threshold for Human Annoyance: (PPV ips) 0.24