Appendix D-2

Environmental Noise and Vibration Impact Assessment

Avid Hotel, 2101 North Fremont Street

Monterey, CA

ENVIRONMENTAL NOISE AND VIBRATION IMPACT ASSESSMENT

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Salter Project 21-0370

INTRODUCTION

This report presents the results of our noise and vibration impact assessment (NVIA) for the Avid Hotel project. It summarizes the policies and standards applicable to the project, noise data obtained from our on-site acoustical measurements, and our evaluation of potential noise and vibration impacts resulting from the project on existing land-uses. Those readers not familiar with the fundamental concepts of environmental noise may refer to Appendix A. The consideration of existing exterior noise intrusion to the Hotel is addressed in a separate report.

SUMMARY

To reduce potential impacts to adjacent properties, we developed mitigation measures to address mechanical equipment noise. Acknowledging that the nearest neighbors are acoustically-sensitive residences, we are also providing recommendations to further reduce noise. This includes a noise barrier fence along the north property line. This should reduce operational noise from parking and other activities, and it would provide beneficial acoustical shielding from North Fremont Street traffic noise. See Section 1 of this report for specific information. To reduce construction noise and vibration, we are providing recommendations for consideration (see Section 4).

With the proposed mitigation measures described herein, the project is not expected to result in significant noise impacts. Our recommendations, if implemented, would further reduce noise.

PROJECT DESCRIPTION

The project proposes the demolition of an existing one-story, 18 guestroom hotel and restaurant and the construction of a new three-story, 42 guestroom branded hotel. The project site is within the North Fremont Specific Plan at the northeast corner of North Fremont Street and Casa Verde Way.

The project site is zoned as “Visitor Accommodation Facility.” Nearby land-uses are zoned “Planned Community” (i.e., the neighboring retail/commercial), Residential 2 (multi-family), and Residential 1 (primarily single-family). The project site shares property lines with the Mahroom Apartments directly to the north and a State Farm office to the east.

NOISE AND VIBRATION CRITERIA

City of Monterey General Plan

The Noise Element of the City’s General Plan[1] includes Policy d.2 which states that the hours of noise-generating construction activities are to be limited and that this is to be included as a project condition of approval.

[1] https://monterey.org/Portals/0/Policies-Procedures/Planning/GeneralPlan/16_0323-General-Plan.pdf

Table 8 in the Noise Element presents the City's land-use compatibility standards and specifies maximum noise exposures up to the following levels to be "normally acceptable" for various land-uses:

- Commercial and Professional: CNEL[2] 70 dB
- Multi-family residential and transient lodging: CNEL 65 dB
- Low-density residential (e.g., single-family, duplex, mobile homes): CNEL 60 dB

Monterey North Fremont Specific Plan

Chapter 4, Figure 3 of the City's North Fremont Specific Plan[3] identifies nearby residential land-uses as noise-sensitive and specifies that these are to receive "special consideration during site and building designs for new development along North Fremont."

Monterey Municipal Code

Chapter 38 of the City Municipal Code[4] includes the following noise, vibration, and construction standards applicable to this project.

City Code - Noise

As specified in Municipal Code Section 38-111, ambient noise at adjacent uses is not to exceed the levels shown below in Table 1.

Table 1: Maximum Noise Standards by Zoning District

Zone of Property Receiving Noise		Maximum Noise Level (dBA)
OS	Open Space District	60
R	Residential District	60
PS	Public and Semi-Public District	60
C	Commercial District	65
I	Industrial District	70
PD	Planned Development	Study Required

The noise standards in Table 1 shall be modified as follows to account for the effects of time and duration on the impact of noise levels:

2 CNEL (Community Noise Equivalent Level) – A descriptor for a 24-hour A-weighted average noise level. CNEL accounts for the increased acoustical sensitivity of people to noise during the evening and nighttime hours. CNEL penalizes sound levels by 5 dB during the hours from 7 PM to 10 PM and by 10 dB during the hours from 10 PM to 7 AM. For practical purposes, the CNEL and DNL are usually interchangeable.

3 https://www.monterey.org/Portals/0/Policies-Procedures/Planning/WorkProgram/NFSP/16_0817_North_Fremont_SP_Amend_Final_Web.pdf

4 https://monterey.municipal.codes/Code/38-111

- In residential districts, the noise standard shall be 5 dB lower between 10 pm and 7 am
- Noise produced for no more than a cumulative period of five minutes in any hour may exceed the standards by 5 dB
- Noise that is produced for no more than a cumulative period of one minute in any hour may exceed the standards by 10 dB

City Code - Vibration

Per Municipal Code Section 38-111, no use, activity, or process shall produce vibrations that are perceptible without instruments by a reasonable person at the property lines of a site.

Based on feedback from City staff, we understand that the noise levels listed in Table 1 and vibration limitations do not apply to construction activities (as many typical construction activities would be expected to exceed these guidelines). Thus, alternative performance standards for construction noise and vibration are provided below.

City Code - Construction

Municipal Code Section 38-112.2 identifies the allowable hours of construction (without an exception permit) as follows:

- Monday through Friday: 7 am to 7 pm
- Saturday: 8 am to 6 pm
- Sunday: 10 am to 5 pm

Additional Criteria

Based on input from City staff and coordination with the project team, the following criteria have also been proposed for the evaluation of traffic noise and construction noise and vibration. It is acknowledged that these criteria are not currently included in the City standards.

Traffic Noise

Increases in traffic noise would be significant if they exceedthe following thresholds:

- Greater than 5 dB if existing ambient noise less than 60 db
- 3 dB if existing ambient noise is between 60 and 64 db
- 1.5 dB if existing ambient noise is greater than 65

Construction Noise

The Federal Highway Road Construction noise model is to be used to assess the project's construction noise against the Federal Transit Administration's general assessment noise analysis threshold of 90 dBA Leq over 1 hour (Leq(h) [5]).

Construction Vibration

Construction vibration is to be compared to common thresholds for potential building damage. These are provided for reference in **Table 2**.

Table 2: Caltrans Vibration Guidelines for Potential Damage to Structures[6]

Structure and Condition	Maximum PPV (inches/second)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

EXISTING NOISE ENVIRONMENT

To quantify the existing noise environment at the project site, we conducted two continuous long-term noise measurements between 2 and 4 August 2021. Our monitors were mounted to poles at an approximate height of 10 feet above grade. We also conducted a short-term (15 minute) measurement at approximately five feet above grade. The purpose of the measurements was to quantify ambient noise levels at the site, primarily from adjacent roadway traffic. The measurement locations and measured noise levels are indicated on the attached **Figure 1**.

5 $L_{eq(h)}$ – The equivalent steady-state A-weighted sound level that, in an hour, would contain the same acoustic energy as the time-varying sound level during the same period. This metric is commonly used to describe the average noise level over an hour.

6 Caltrans, *Transportation and Construction Vibration Guidance Manual* (Table 19), September 2013.

ANALYSIS

We are providing a separate environmental noise study to address noise levels inside the proposed hotel to meet the related standards. This report addresses the following potential noise and vibration impacts resulting from the project on nearby existing land-uses.

Operating Phase (after Construction of New Hotel)

1. Mechanical Equipment Noise
2. Removal of the Casa Verde Inn
3. Parking Lot Noise

Construction Phase

4. Demolition and Construction Noise and Vibration

1. Mechanical Equipment Noise

Potential Impact: New mechanical equipment associated with the Avid Hotel might generate noise in excess of the City Municipal Code standards at nearby property lines.

Analysis: We understand that the hotel HVAC systems will include Packaged Terminal Air Conditioner (PTAC) units for the guestrooms, rooftop exhaust fans for the bathrooms, and split system rooftop condensing units for the public spaces.

The orientation of the Avid Hotel places it equal to or farther from adjacent property lines than the Casa Verde Inn. The proposed HVAC systems of the size and scope for such a project typically do not exceed 75 dBA at a distance of five feet. This would correlate to approximately 52 dBA at the north property line (Mahroom Apartments) and 56 dBA at the east property line (State Farm office). Furthermore, natural "shielding" of rooftop equipment by the edge of the roof and parapet would provide further noise reduction. Thus, we expect the Municipal Code standards will be met (see Table 1 for reference).

Mitigation Measure 1: Selection of "standard" mechanical equipment is expected to be sufficient to meet the City noise standards. The mechanical systems are to be selected and designed to generate a maximum cumulative noise level of 63 dB at 25 feet from the building. This would reduce noise levels to meet the City's nighttime limit.

2. Removal of the Casa Verde Inn

Potential Impact: Removal of the existing inn (and the proposed location of the Avid Hotel) could increase traffic noise exposure to the Mahroom Apartments.

Analysis: The adjacent Mahroom Apartments are currently "shielded" from North Fremont Street traffic by the existing Casa Verde Inn building structure. The proposed new hotel would have a different footprint, allowing a portion of the apartment building to be exposed to greater traffic noise. Using our noise measurement data, we created a 3D noise model using CadnaA software. CadnaA is an acoustic 3D

modelling software. Our methodology for this project is described in **Appendix B** as well as our model inputs/outputs). At some locations, noise levels might be reduced slightly from additional shielding provided be the increase in building height.

Figures 2 and 3 show CNEL noise levels with the existing and proposed conditions on Level 1 of the south-facing facades of the Mahroom Apartments. The plans and our model include a property line fence of variable height (depending on grade). Locations highlighted in red indicate areas where noise levels are projected to increase. At most of the relevant portions of the Mahroom Apartments, the estimated increase in noise levels would be moderate, approximately 3 to 5 dB with removal of the Casa Verde Inn. However, in a unique and narrow location, noise levels are calculated to increase by approximately 7 to 9 dB.

Figure 2: Existing Conditions – Level 1

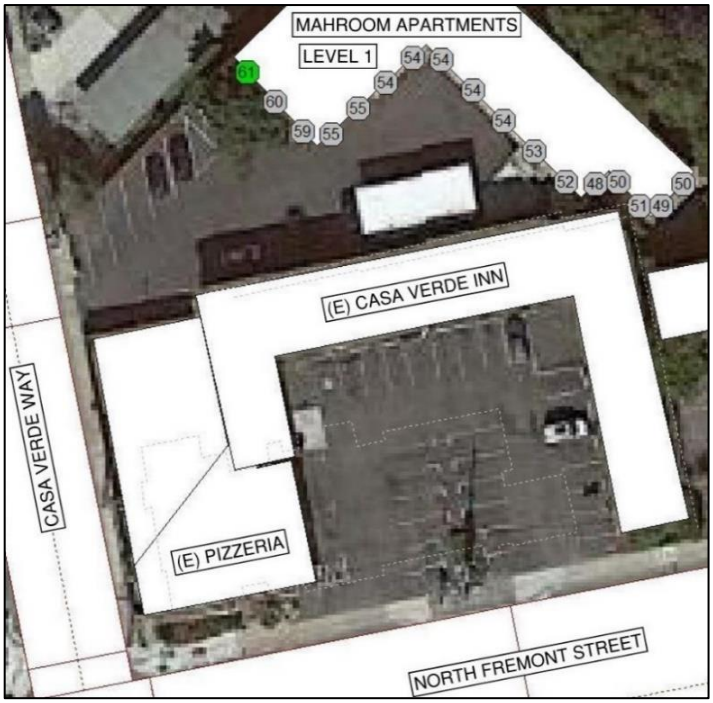
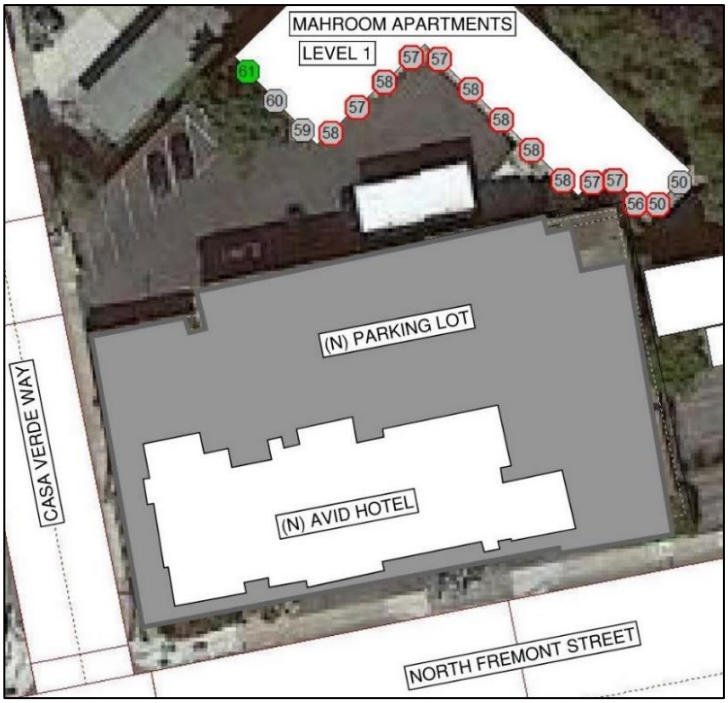


Figure 3: Proposed Conditions – Level 1



Figures 4 and 5 show CNEL noise levels with the existing and proposed conditions on Level 2 of the south-facing facades of the Mahroom Apartments. Locations highlighted in red indicate areas where noise levels are projected to increase. Noise levels are calculated to increase by 1 or 2 dB with removal of the Casa Verde Inn. At the second floor, the existing "shielding" by the Casa Verde Inn is moderate. In the proposed condition, it seems that the smaller footprint of the proposed hotel is balanced by the fact that it will be taller than the existing building.

Figure 4: Existing Conditions – Level 2

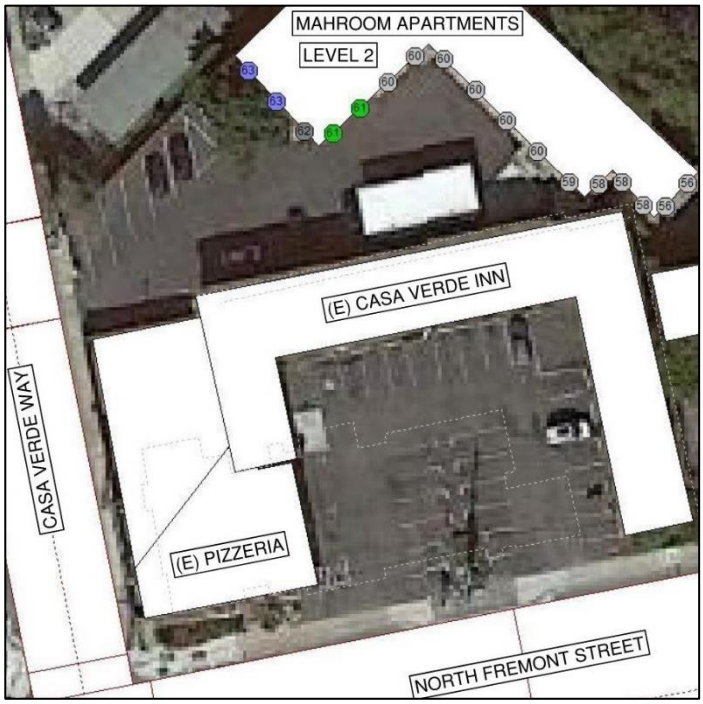
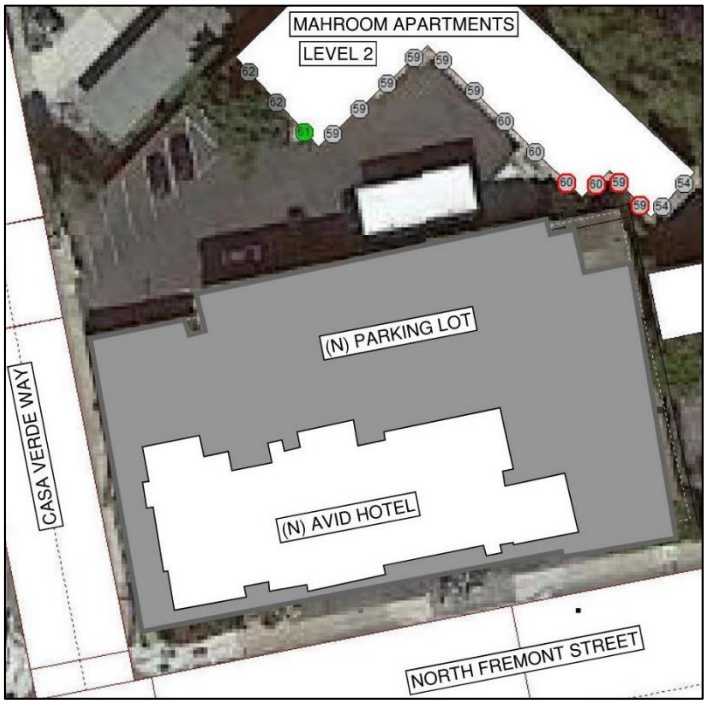


Figure 5: Proposed Conditions – Level 2



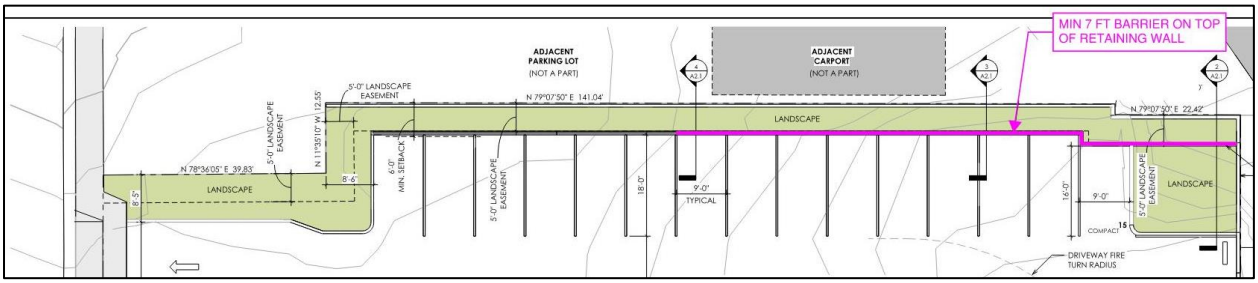
Recommendations: With the addition of the proposed Avid Hotel, noise levels are expected to stay below CNEL 65 dB, which is within the range considered "normally acceptable" for multi-family housing per the City's land-use compatibility standards. Therefore, noise at the neighboring apartments would still meet City land-use compatibility standards with the building and property line fence constructed per the current plans.

To keep noise levels within 5 dB of current conditions at the Mahroom Apartments property, the applicant will be providing a minimum 7-foot-tall barrier on the retaining wall along the north property line. To perform as intended, the barrier would need to be constructed with the following properties:

- Continuous from grade up to specified height
- Free of cracks and gaps
- Constructed of material with a minimum surface density of 3 psf

A solid stucco wall, precast concrete, or heavy-duty board-on-board wooden fence could be appropriate. **Figure 6** indicates the recommended minimum extents of the barrier.

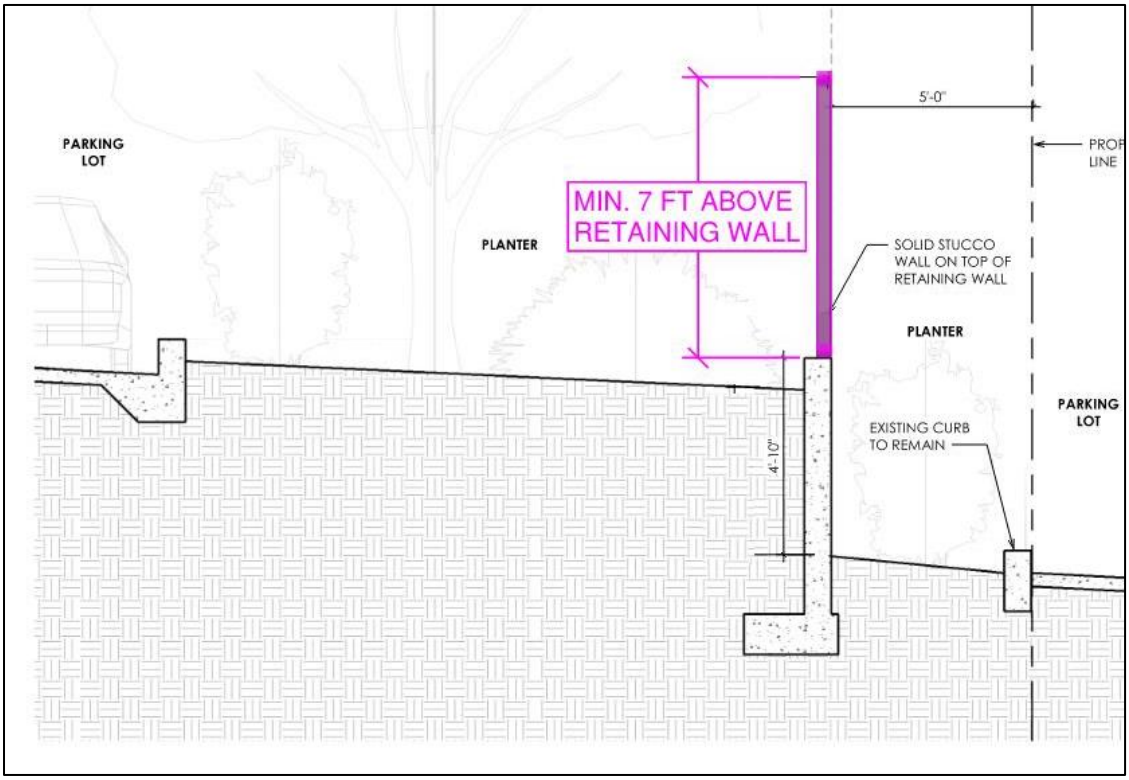
Figure 6: Location of Noise Barrier Fence



We understand that the Mahroom Apartments requested that the wall length be extended to encompass portions of the eastern property line (in addition to the north). We don't expect this to be necessary but have no objection.

For reference, **Figure 7** shows an example section view of the proposed noise barrier fence. Note, the 7-foot dimension is in addition to the retaining wall. This is in line with the site perimeter wall heights indicated on the drawing set dated 6 May 2021 (attached in **Appendix C** for reference).

Figure 7: Noise Barrier Fence Section View



Figures 8 and 9 compare calculated noise levels on Level 1 of the Mahroom Apartments in the existing conditions versus with the recommended noise barrier fence. Calculated CNEL across the Level 1 facades are all within 4 dB. CNEL on Level 2 were calculated to be within 2 dB without the added barrier (see **Figures 4 and 5** for reference).

Figure 8: Existing Conditions – Level 1

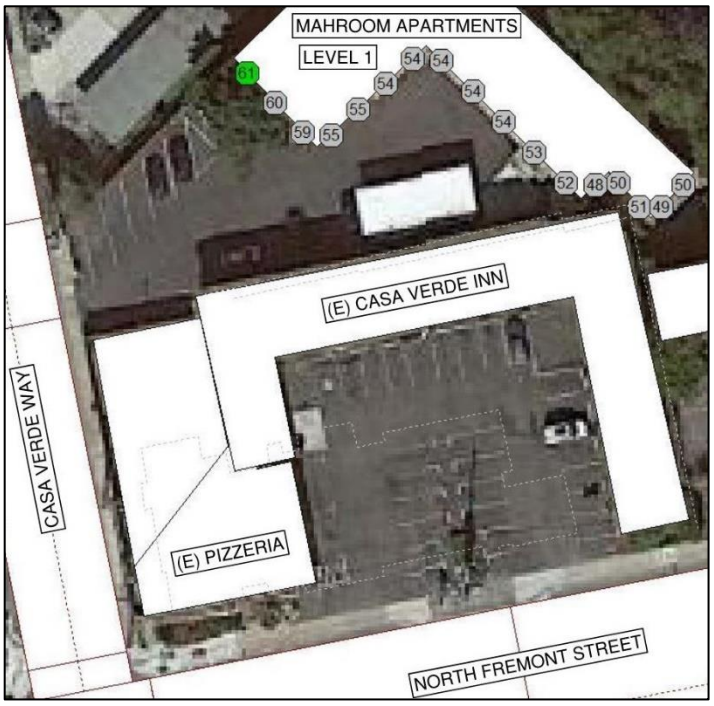
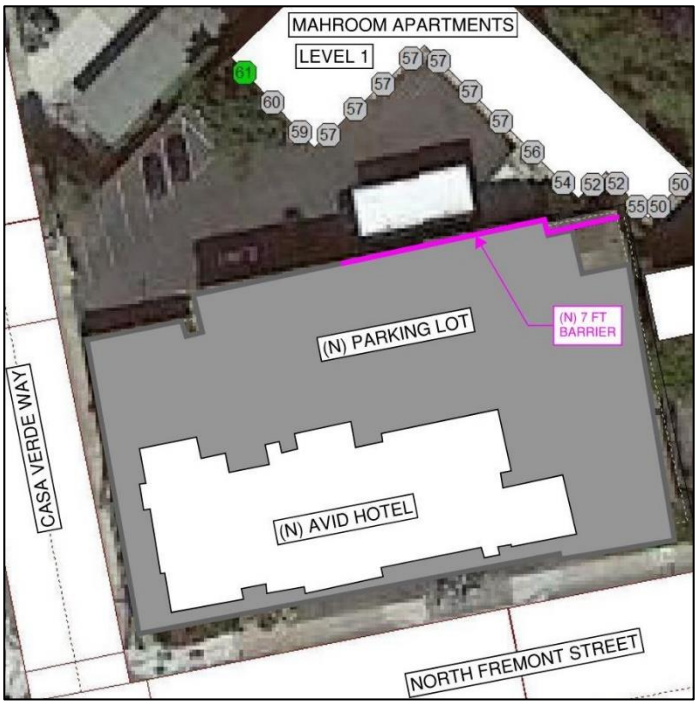


Figure 9: Proposed Conditions with Noise Barrier Fence – Level 1



Our measurements indicate existing ambient noise levels are between 48 and 61 dBA along the facades of the Mahroom Apartments. Therefore, the 5 dB and 3 dB thresholds of exceedance are applicable. Ambient noise at the Mahroom Apartment facades does not exceed 65 dBA. Therefore, the 1.5 dB threshold is not applicable. Our analysis indicates that where ambient noise is between 60 and 64 dB, traffic noise level increases are expected to be less than 3 dB. Where ambient noise is less than 60 dB, traffic noise level increases are expected to be less than 5 dB. This is indicated in Figures 2 to 5, 8, and 9.

3. Parking Lot Noise

Potential Impact: Vehicle noise could increase noise levels at the Mahroom Apartments.

Analysis: Neighboring multi-family residences are already exposed to the activity noise of their own existing parking lots. Therefore, we would not expect activity in the proposed project parking area to have a significant impact.

Nonetheless, we further analyzed potential parking lot noise in comparison to existing noise levels. Parking lot activity noise (e.g., car doors, driving vehicles, engine starting) could generate noise levels between approximately 55 dB and 70 dB at a distance of five feet. At a distance of 15 feet, those noise levels would be reduced to approximately 45 dB to 60 dB. These levels are in-line with existing noise levels at the site. In addition, they are also below City Municipal Code standards of 60 dB to 70 dB for short-term activity noise (that occurs for less than 1 or 5 minutes, daytime and nighttime, residential receptor, see Table 1).

Furthermore, parking activity noise levels are expected to be reduced even further by the proposed noise barrier fence at the property line to the north shared with the nearest residential neighbor, the Mahroom Apartments.

Per the project's Level of Service traffic analysis[7] We understand that the project will result in up to 351 increased traffic trips. Our conservative analysis indicates that the "worst-case" noise increase from the additional daily traffic trips would be 0.6 dB along North Fremont Street. This increase would not be significant.

Recommendations: No further measures are needed. However, the noise barrier fence described in Section 1 of this report and as shown on Sheet A2.1 would be beneficial to further reduce parking lot activity noise at the residential property to the north.

4. Demolition and Construction Noise and Vibration

Potential Impact: Construction activities would include use of heavy equipment for demolition, excavation, grading, foundation construction, building erection, and other activities. This could temporarily increase noise and vibration levels at adjacent land-uses.

Noise Analysis: Neighboring land-uses with direct line-of-sight to construction activities and construction traffic could be affected by construction noise. Potential construction noise impacts would vary with distance. Table 3 summarizes the expected construction phases, equipment, and typical maximum noise levels. Extreme noise generating activities, such as deep foundation construction is not expected.

Table 3: Typical Maximum Construction Noise Levels

Phase	Equipment	Noise at 50'	Noise at 100'
Demolition, Excavation, Grading	Excavator, Ram hoe, Dump truck, Saw cutter, loader, Sheep's foot compactor, Backhoe, 10-Wheel truck, Delivery truck	88	82
Utilities	Excavator, Loader, Sheep's foot compactor, Backhoe, 10-Wheel truck, Concrete truck, Delivery truck, Boom pump, Line pump, Compactor	82	76
Foundations	Excavator, Backhoe, Loader, 10-Wheel Truck, Concrete Truck, Boom pump, Line pump, Compactor, Gradall forklift, Truss crane, Delivery truck	88	82
Building Exterior	Rooftop crane, Boomlift, Stucco pump, Delivery truck	83	76
Building Interior	Gypcrete pump, Gradall forklift, Delivery truck	80	74
Hardscape and Landscape	Skid steer loader, 10-Wheel truck, Paving machine, Roller, Concrete truck, Line pump, Delivery truck	85	79

[7] 27 February 2023, TJKM Transportation Consultants report

The FTA general assessment method provides a maximum daytime noise criterion of Leq(h) 90 dBA at residential properties for the two noisiest pieces of equipment during each phase of construction. For this analysis, we used the construction equipment list provided by the project's general contractor, Avila Construction. This information is included in Appendix D for reference.

The FTA general assessment method assumes that all equipment is operating at the center of the project. The site is approximately 125 feet wide (north to south property lines). Therefore, we have used 62.5 feet (125 divided by 2) as the distance to calculate noise transfer to the north property line (abutting the Mahroom Apartments). We have accounted for a minimum 7-foot construction barrier above the retaining wall as indicated in the drawings. This could be a temporary construction barrier, or the permanent noise barrier could be installed prior to construction. The results of our general assessment calculations are shown in Appendix E. Construction noise is calculated to be below the FTA Leq(h) 90 dBA criterion for each phase of construction.

We understand that the City has not formally adopted this FTA construction noise analysis protocol and Leq(h) 90 dB threshold as a limit for construction noise. Nonetheless, this analysis helps to demonstrate why a construction noise barrier and the following related noise reduction measures are appropriate and should be implemented as feasible.

Required Noise Mitigation: Provide a sound barrier at the northern property line. This could be a solid fence constructed of minimum 7-foot-tall sheets of 5/8-inch thick plywood with appropriate supports. The plywood should overlap at vertical joints by a few inches and be fastened together. Avoid any gap at the ground. Construction noise reduction blankets with a solid layer (e.g., 1-psf vinyl) could also be used. Alternatively, construct the permanent noise barrier fence recommended in Section 1 of this report prior to proceeding with significant site and building construction efforts.

Prior to the demolition of the existing Casa Verde Inn structure, it will serve as a noise barrier. We expect that the demolition of the structure will occur very quickly. Following the demolition, the aforementioned construction noise barrier must be constructed before other significant noise-generating activities commence at the site.

In addition, to address the City Code, construction would need to be limited as follows:

- Monday through Friday: 7 am to 7 pm
- Saturday: 8 am to 6 pm
- Sunday: 10 am to 5 pm

Construction outside of these hours might be approved by obtaining a site-specific permit.

Noise Reduction Recommendations: We understand that the City Code general property line noise limits are not applied to typical construction activities. Nonetheless, due to the sensitivity of neighboring properties, such as the Mahroom Apartments to the north, we are providing the following list of options for consideration, as feasible, to further control construction noise.

1. Require posted signs at the construction site that include permitted construction days and hours, a day and evening contact number for the job site and a day and evening contact number for the City in the event of problems.
2. Notify the City and neighbors within 100 feet in advance of the schedule for each major phase of construction and expected loud activities.
3. When feasible, locate noisy stationary equipment (e.g., generators, pumps, compressors) and material unloading and staging areas away from the sensitive adjacent uses (school and residences).
4. Require that all construction equipment be in good working order and that mufflers are inspected to be functioning properly. If feasible, impact tools shall be shrouded or shielded with intake and exhaust port mufflers when used near noise-sensitive receptors.
5. Avoid unnecessary idling of equipment and engines and to a maximum of 15 minutes near noise-sensitive receptors.
6. The general contractor shall designate a "noise disturbance coordinator" responsible for responding to any local complaints about construction noise. The disturbance coordinator shall determine the cause of any noise complaint (e.g., starting too early, bad muffler, etc.) and shall require that reasonable measures be implemented to correct the problem. A telephone number for the disturbance coordinator shall be posted at the construction site.

Vibration Analysis: Table 4 presents typical vibration levels[8] that could be expected from construction equipment at nearby property lines. Note that exact vibration levels will vary depending on soil conditions, construction methods, and equipment used at the site.

[8] From the Caltrans "Transportation and Construction Vibration Guidance Manual" (September 2013) and the "Transit Noise and Vibration Impact Assessment" report by the United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, May 2006. Estimated levels at setbacks greater than 25 feet are estimated per the Caltrans published formula $PPV_{equipment} = PPV_{ref}(25/D)^n$, where PPV_{ref} is the reference PPV at 25 feet, D is the distance from the equipment to the receiver (in feet), and n is a reference value of 1.1.

Table 4: Expected Construction Vibration Levels Compared to Potential Building Damage Thresholds

Property Line	North & East (Mahroom Apartments and State Farm)	South (El Castell Motel)	West (Alliance Mart)	Potential Building Damage
Equipment	PPV at 25 ft. (in/sec)	PPV at 130 ft. (in/sec)	PPV at 50 ft. (in/sec)	Threshold Limits
Vibratory Roller	0.21	0.02	0.10	0.5 for continuous sources 0.25 for transient sources
Vibratory Driver	0.1 to 0.15	0.02 to 0.02	0.05 to 0.07	
Hoe Ram	0.09	0.01	0.04	
Large bulldozer	0.09	0.01	0.04	
Caisson drilling	0.09	0.01	0.04	
Loaded trucks	0.08	0.01	0.04	
Jackhammer	0.04	0.00	0.02	
Small bulldozer	0.00	0.00	0.00	

As indicated in **Table 4**, maximum construction vibration levels are not expected to exceed 0.21 PPV (in/sec). This is below the threshold for potential damage at historic and some old buildings (see **Table 2**). We expect this will be sufficient for the nearest adjacent structures.

Required Vibration Mitigation: Based on the analysis above, we expect that no construction vibration mitigation is needed to comply with the proposed thresholds for potential building damage.

Vibration Recommendations: In practice, we understand that the City Code standard regarding human perception of vibration is not applied to typical construction activities. Nonetheless, due to the sensitivity of neighboring properties, such as the Mahroom Apartments to the north, we are providing the following list of options for consideration, as feasible, to further control construction vibration[9]. Caltrans guidelines for the assessment of construction vibration as it relates to human perception are between 0.01 PPV and 0.25 PPV. Thus, some construction activities could be perceptible when located close to neighboring receivers.

1. Earth-moving and ground-impacting operations should be phased so as not to occur at the same time along the same property line to reduce cumulative vibration impacts.
2. Minimize discontinuities in roadway pavement where trucks will travel.
3. Avoid using vibratory rollers and tampers within 25 feet of adjacent structures. Non-vibratory sheepsfoot rollers could be used instead.
4. Avoid routing heavily loaded trucks through residential streets.
5. Operate earth-moving equipment on the construction lot as far away from the north and east property lines as possible.

[9] We understand that neither impact nor vibratory deep foundations are needed for this building. Drilled piers, if needed, would be acceptable.

6. Notify adjacent properties of the construction schedule (in particular, prior to days of high-vibration activity, such as demolition) and provide the name and contact information of the project disturbance coordinator.

CONCLUSION

With the proposed mitigation measures described herein, the project's mechanical equipment noise is not expected to result in a significant noise impact. Though additional mitigation is not required to address the published City standards, we have provided recommendations for a property line noise barrier to address additional criteria proposed for traffic and construction noise. In addition, we assume that the Municipal Code standards for noise and vibration do not apply to demolition and construction activities. However, due to the proximity of sensitive neighbors, we have provided recommendations above, to further reduce noise and vibration.

* * *

APPENDIX A

Fundamental Concepts of Environmental Noise

This section provides background information to aid in understanding the technical aspects of this report. Three dimensions of environmental noise are important in determining subjective response. These are:

- The intensity or level of the sound
- The frequency spectrum of the sound
- The time-varying character of the sound

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB), with 0 dB corresponding roughly to the threshold of hearing.

The "frequency" of a sound refers to the number of complete pressure fluctuations per second in the sound. The unit of measurement is the cycle per second (cps) or hertz (Hz). Most of the sounds, which we hear in the environment, do not consist of a single frequency, but of a broad band of frequencies, differing in level. The name of the frequency and level content of a sound is its sound spectrum. A sound spectrum for engineering purposes is typically described in terms of octave bands, which separate the audible frequency range (for human beings, from about 20 to 20,000 Hz) into ten segments.

Many rating methods have been devised to permit comparisons of sounds having quite different spectra. Surprisingly, the simplest method correlates with human response practically as well as the more complex methods. This method consists of evaluating all of the frequencies of a sound in accordance with a weighting that progressively de-emphasizes the importance of frequency components below 1000 Hz and above 5000 Hz. This frequency weighting reflects the fact that human hearing is less sensitive at low frequencies and at extreme high frequencies relative to the mid-range.

The weighting system described above is called "A"-weighting, and the level so measured is called the "A-weighted sound level" or "A-weighted noise level." The unit of A-weighted sound level is sometimes abbreviated "dBA." In practice, the sound level is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting characteristic. All U.S. and international standard sound level meters include such a filter. Typical sound levels found in the environment and in industry are shown in Figure A-1.

Although a single sound level value may adequately describe environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise is a conglomeration of distant noise sources, which results in a relatively steady background noise having no identifiable source. These distant sources may include traffic, wind in trees, industrial activities, etc. and are relatively constant from moment to moment. As natural forces change or as human activity follows its daily cycle, the sound level may vary slowly from hour to hour. Superimposed on this slowly varying background is a succession of identifiable noisy events of brief duration. These may include nearby activities such as single vehicle pass-bys, aircraft flyovers, etc. which cause the environmental noise level to vary from instant to instant.

To describe the time-varying character of environmental noise, statistical noise descriptors were developed. "L10" is the A-weighted sound level equaled or exceeded during 10 percent of a stated time period. The L10 is considered a good measure of the maximum sound levels caused by discrete noise events. "L50" is the A-weighted sound level that is equaled or exceeded 50 percent of a stated time period; it represents the median sound level. The "L90" is the A-weighted sound level equaled or exceeded during 90 percent of a stated time period and is used to describe the background noise.

As it is often cumbersome to quantify the noise environment with a set of statistical descriptors, a single number called the average sound level or "L_{eq}" is now widely used. The term "L_{eq}" originated from the concept of a so-called equivalent sound level which contains the same acoustical energy as a varying sound level during the same time period. In simple but accurate technical language, the L_{eq} is the average A-weighted sound level in a stated time period. The L_{eq} is particularly useful in describing the subjective change in an environment where the source of noise remains the same but there is change in the level of activity. Widening roads and/or increasing traffic are examples of this kind of situation.

In determining the daily measure of environmental noise, it is important to account for the different response of people to daytime and nighttime noise. During the nighttime, exterior background noise levels are generally lower than in the daytime; however, most household noise also decreases at night, thus exterior noise intrusions again become noticeable. Further, most people trying to sleep at night are more sensitive to noise. To account for human sensitivity to nighttime noise levels, a special descriptor was developed. The descriptor is called the L_{dn} (Day/Night Average Sound Level), which represents the 24-hour average sound level with a penalty for noise occurring at night. The L_{dn} computation divides the 24-hour day into two periods: daytime (7:00 am to 10:00 pm); and nighttime (10:00 pm to 7:00 am). The nighttime sound levels are assigned a 10 dB penalty prior to averaging with daytime hourly sound levels.

For highway noise environments, the average noise level during the peak hour traffic volume is approximately equal to the L_{dn}.

The effects of noise on people can be listed in three general categories:

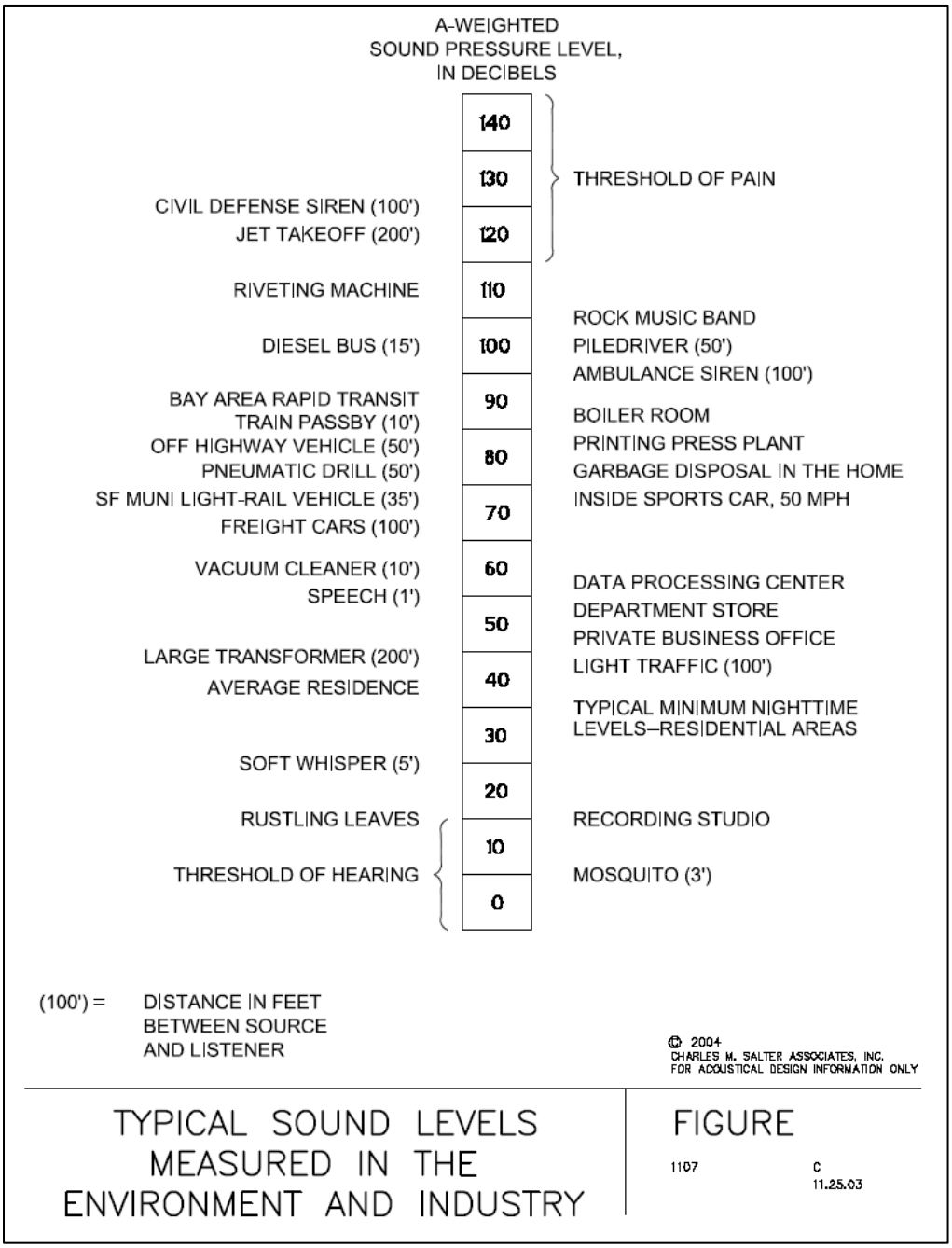
- Subjective effects of annoyance, nuisance, dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as startle, hearing loss

The sound levels associated with environmental noise usually produce effects only in the first two categories. Unfortunately, there has never been a completely predictable measure for the subjective effects of noise nor of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over time.

Thus, an important factor in assessing a person's subjective reaction is to compare the new noise environment to the existing noise environment. In general, the more a new noise exceeds the existing, the less acceptable the new noise will be judged.

With regard to increases in noise level, knowledge of the following relationships will be helpful in understanding the quantitative sections of this report:

Except in carefully controlled laboratory experiments, a change of only 1 dB in sound level cannot be perceived. Outside of the laboratory, a 3 dB change is considered a just-noticeable difference. A change in level of at least 5 dB is required before any noticeable change in community response would be expected. A 10 dB change is subjectively heard as approximately a doubling in loudness, and would almost certainly cause an adverse community response.



APPENDIX B

Project Methodology

Our methodology for this project was as follows:

1. Conduct long-term noise measurements at the project site to determine existing traffic noise levels from North Fremont Street and Casa Verde Way
2. Model the existing project site with the measured traffic noise levels to determine noise levels at the Mahroom Apartments
3. Model the proposed project site (i.e., removal of the Casa Verde Inn and addition of the Avid Hotel) to determine the increase in traffic noise exposure to the Mahroom Apartments
4. Add noise barriers to the model in various configurations to determine the heights and locations necessary to mitigate traffic noise to meet the project criteria

- Input Data: The parameters and information incorporated into our CadnaA computer model
    - The measured noise level of CNEL 68 dB at 20 feet from the centerline of Casa Verde Way
    - The measured noise level of CNEL 72 dB at 50 feet from the centerline of North Fremont Street
    - Building envelopes and heights for the Mahroom Apartments, Casa Verde Inn, surrounding buildings, and proposed Avid Hotel from the site plans and observations on site
    - Noise barrier heights and grade changes as indicated in the project drawings
- Output Data: Noise levels at the facades of the Mahroom Apartments with the existing Casa Verde Inn and proposed Avid Hotel – as shown in Figures 2 to 5, 8 and 9.

Filename (21-0370_Avid Hotel_BDP.cna)

Source		
Name	M.	ID
Casa Verde Way		
N Fremont Street		

Sound Sources

Roads

Name	M.	ID	Lme			Count Data		exact Count Data						Speed Limit		SCS	Surf
			Day	Evening	Night	DTV	Str.class.	M			p (%)			Auto	Truck	Dist.	Dstro
			(dBA)	(dBA)	(dBA)			Day	Evening	Night	Day	Evening	Night	(km/h)	(km/h)		(dB)
Casa Verde Way			61.1	-0.1	61.4											0.0	
N Fremont Street			69.2	-0.1	66.2											0.0	

Receivers

Name	M.	ID	Level Lr		Limit. Value		Land Use			Height		Coordinates	
			CNEL	Leq(h)	CNEL	Leq(h)	Type	Auto	Noise Type			X	Y
			(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)
LT-2: CNEL 73 dB (72+1), Leq(h) 70 dB (69+1)	-		73.0	70.1	0.0	0.0		x	Total	3.66	r	10601797.31	4050705.0
LT-1: CNEL 69 dB (68+1), Leq(h) 69 dB (68+1)	-		69.0	69.0	0.0	0.0		x	Total	3.66	r	10601722.83	4050736.9
ST-1: CNEL 61 dB (60+1), Leq(h) 58 dB (57+1)	-		60.0	58.1	0.0	0.0		x	Total	1.53	r	10601767.06	4050726.9
Test Receiver 1	-		53.5	51.7	0.0	0.0		x	Total	1.53	r	10601788.49	4050739.4
Test Receiver 2	-		60.3	59.3	0.0	0.0		x	Total	1.53	r	10601749.10	4050747.5

Obstacles

Barriers

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			
			left	right		horz.	vert.	Begin		End	
					(m)	(m)	(m)	(m)		(m)	
Retaining Wall 1 ft (E)	+							0.30	r		
Retaining Wall 2 ft (N)	-							15.55	a		
Retaining Wall 7 ft (NE) &.5ft RW	+							17.29	a		
Retaining Wall 7 ft (N) & 0.5ft RW	+							17.29	a		
Retaining Wall 5.5 ft (NW)	+							15.55	a		
Retaining Wall 6 ft (E)	-							16.83	a		

Buildings

Name	M.	ID	RB	Residents	Absorption	Height	
						Begin	
						(m)	
21-0370 Surrounding	+		x	0	0.50	24.00	a
21-0370 Surrounding	+		x	0	0.50	23.00	a
21-0370 Surrounding	+		x	0	0.50	22.00	a
21-0370 Surrounding	+		x	0	0.50	22.00	a
21-0370 Surrounding	+		x	0	0.50	24.00	a
21-0370 Surrounding	+		x	0	0.50	22.00	a

Name	M.	ID	RB	Residents	Absorption	Height	
						Begin	
						(m)	
21-0370 Surrounding	+		x	0	0.50	17.00	a
21-0370 Surrounding	+		x	0	0.50	20.00	a
21-0370 Surrounding	+		x	0	0.50	18.00	a
21-0370 Demo1	-		x	0	0.50	20.00	a
21-0370 Demo2	-		x	0	0.50	20.00	a
21-0370 Demo3 (Pool Slab)	-		x	0	0.50	15.00	a
21-0370 Project Building	+		x	0	0.50	26.46	a
21-0370 Impacted Building	+		x	0	0.50	20.00	a

Geometry Roads

Name	Height				Coordinates				Dist	LSlope
	Begin		End		x	y	z	Ground	(m)	(%)
	(m)		(m)		(m)	(m)	(m)	(m)		
Casa Verde Way	0.00	r			10601702.16	4050807.05	11.69	11.69		
					10601710.47	4050767.70	11.02	11.02		
					10601715.83	4050740.42	12.12	12.12		
					10601717.91	4050729.38	13.81	13.81		
					10601725.14	4050692.70	16.79	16.79		
					10601732.03	4050657.51	16.48	16.48		
					10601749.85	4050568.84	12.23	12.23		
N Fremont Street					10602058.59	4050742.09	18.00	18.28		
					10601775.12	4050686.40	18.00	17.68		
					10601735.44	4050678.53	17.00	17.07		
					10601721.10	4050675.73	17.00	16.76		
					10601655.07	4050662.85	15.00	14.94		
					10601557.76	4050643.18	13.00	12.19		

Geometry Barriers

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height				Coordinates			
			left	right		horz.	vert.	Begin		End		x	y	z	Ground
					(m)	(m)	(m)	(m)		(m)		(m)	(m)	(m)	(m)
Retaining Wall 1 ft (E)	+							0.30	r			10601793.25	4050707.34	17.88	17.58
												10601785.57	4050742.92	14.01	13.71
												10601778.36	4050741.27	14.01	13.71
												10601778.20	4050741.95	13.91	13.61
												10601738.05	4050732.76	14.61	14.31
Retaining Wall 2 ft (N)	-							15.55	a			10601778.57	4050740.35	15.55	15.00
												10601778.67	4050739.93	15.55	15.00
												10601785.48	4050741.45	15.55	15.00
Retaining Wall 7 ft (NE) &.5ft RW	+							17.29	a			10601778.57	4050740.36	17.29	15.00
												10601755.90	4050735.33	17.29	14.98
Retaining Wall 7 ft (N) & 0.5ft RW	+							17.29	a			10601778.56	4050740.36	17.29	15.00
												10601778.66	4050739.93	17.29	15.00
												10601785.48	4050741.45	17.29	15.00
Retaining Wall 5.5 ft (NW)	+							15.55	a			10601755.88	4050735.54	15.55	14.39
												10601742.12	4050732.53	15.55	14.66
Retaining Wall 6 ft (E)	-							16.83	a			10601785.48	4050741.45	16.83	15.00
												10601786.94	4050734.80	16.83	15.00

Geometry Buildings

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(m)		(m)	(m)	(m)	(m)
21-0370 Surrounding	+		x	0	0.50	24.00	a	10601833.60	4050637.42	24.00	15.78
								10601826.19	4050673.68	24.00	17.27
								10601813.88	4050671.17	24.00	17.28
								10601821.02	4050634.64	24.00	15.57
21-0370 Surrounding	+		x	0	0.50	23.00	a	10601809.91	4050671.17	23.00	17.31
								10601815.33	4050644.70	23.00	16.13
								10601801.04	4050641.52	23.00	15.89
								10601796.01	4050668.26	23.00	17.32
21-0370 Surrounding	+		x	0	0.50	22.00	a	10601794.95	4050665.61	22.00	17.24
								10601749.03	4050655.68	22.00	16.45
								10601748.63	4050658.73	22.00	16.65
								10601794.56	4050668.52	22.00	17.34
21-0370 Surrounding	+		x	0	0.50	22.00	a	10601849.80	4050738.58	22.00	17.01
								10601827.87	4050734.42	22.00	17.01
								10601832.79	4050714.32	22.00	17.98
								10601854.55	4050718.91	22.00	17.98
21-0370 Surrounding	+		x	0	0.50	24.00	a	10601787.64	4050735.22	24.00	14.35
								10601806.03	4050738.84	24.00	15.81
								10601807.60	4050731.70	24.00	16.85
								10601789.27	4050727.92	24.00	16.83
21-0370 Surrounding	+		x	0	0.50	22.00	a	10601794.47	4050728.86	22.00	16.88
								10601795.37	4050724.50	22.00	17.08
								10601803.66	4050726.23	22.00	17.11
								10601802.72	4050730.65	22.00	16.86
21-0370 Surrounding	+		x	0	0.50	17.00	a	10601703.58	4050735.76	17.00	12.36
								10601680.29	4050731.13	17.00	12.11
								10601684.13	4050709.69	17.00	13.46
								10601707.68	4050714.38	17.00	14.78
								10601706.16	4050721.80	17.00	13.72
								10601690.41	4050718.69	17.00	13.08
								10601689.22	4050725.44	17.00	12.82
								10601704.90	4050728.74	17.00	12.62
21-0370 Surrounding	+		x	0	0.50	20.00	a	10601700.40	4050709.16	20.00	14.80
								10601701.60	4050702.94	20.00	15.21
								10601688.96	4050700.36	20.00	14.87
								10601687.83	4050706.71	20.00	14.02
21-0370 Surrounding	+		x	0	0.50	18.00	a	10601753.71	4050800.60	18.00	11.91
								10601744.36	4050791.36	18.00	11.29

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(m)		(m)	(m)	(m)	(m)
								10601756.65	4050779.81	18.00	12.10
								10601766.10	4050789.26	18.00	12.71
21-0370 Demo1	-		x	0	0.50	20.00	a	10601748.55	4050714.65	20.00	16.05
								10601744.78	4050713.85	20.00	15.91
								10601744.15	4050716.76	20.00	15.75
								10601739.06	4050715.74	20.00	15.52
								10601739.29	4050714.61	20.00	15.62
								10601731.22	4050712.99	20.00	15.15
								10601731.65	4050710.58	20.00	15.39
								10601730.06	4050710.35	20.00	14.97
								10601732.44	4050697.61	20.00	16.87
								10601751.33	4050701.28	20.00	17.27
21-0370 Demo2	-		x	0	0.50	20.00	a	10601784.90	4050706.65	20.00	17.96
								10601792.36	4050708.23	20.00	17.89
								10601784.53	4050742.10	20.00	13.70
								10601738.05	4050732.86	20.00	14.30
								10601742.36	4050713.64	20.00	15.83
								10601749.03	4050715.08	20.00	16.06
								10601746.77	4050726.14	20.00	15.59
								10601779.54	4050732.75	20.00	15.56
21-0370 Demo3 (Pool Slab)	-		x	0	0.50	15.00	a	10601738.58	4050730.47	15.00	14.99
								10601726.82	4050728.06	15.00	14.96
								10601731.39	4050703.11	15.00	16.03
								10601741.71	4050716.37	15.00	15.63
21-0370 Project Building	+		x	0	0.50	26.46	a	10601735.57	4050698.16	26.46	16.93
								10601743.46	4050699.67	26.46	17.10
								10601743.26	4050700.79	26.46	17.00
								10601745.94	4050701.31	26.46	17.06
								10601746.14	4050700.23	26.46	17.16
								10601750.16	4050701.03	26.46	17.25
								10601750.30	4050700.28	26.46	17.32
								10601758.78	4050702.07	26.46	17.49
								10601758.57	4050703.09	26.46	17.39
								10601769.67	4050705.29	26.46	17.63
								10601769.90	4050704.10	26.46	17.75
								10601771.64	4050704.47	26.46	17.78
								10601771.44	4050705.36	26.46	17.70
								10601772.91	4050705.64	26.46	17.73
								10601772.99	4050705.38	26.46	17.76
								10601779.99	4050706.78	26.46	17.95
								10601778.57	4050713.17	26.46	17.53
								10601771.98	4050711.84	26.46	17.37
								10601771.69	4050713.43	26.46	17.31
								10601772.84	4050713.70	26.46	17.36
								10601771.39	4050720.38	26.46	17.09
								10601758.68	4050717.80	26.46	16.49
								10601758.85	4050716.87	26.46	16.53
								10601755.80	4050716.24	26.46	16.39
								10601755.24	4050719.02	26.46	16.27
								10601749.15	4050717.80	26.46	15.99
								10601749.45	4050715.98	26.46	16.06
								10601747.66	4050715.65	26.46	15.97
								10601747.40	4050716.81	26.46	15.92
								10601745.91	4050716.51	26.46	15.85
								10601746.31	4050714.29	26.46	15.94
								10601741.89	4050713.43	26.46	15.83
								10601741.49	4050715.55	26.46	15.65
								10601738.86	4050715.02	26.46	15.57
								10601738.37	4050717.37	26.46	15.49
								10601732.13	4050716.15	26.46	15.07
								10601732.79	4050712.32	26.46	15.44
								10601732.11	4050712.21	26.46	15.41
								10601732.54	4050709.36	26.46	15.70

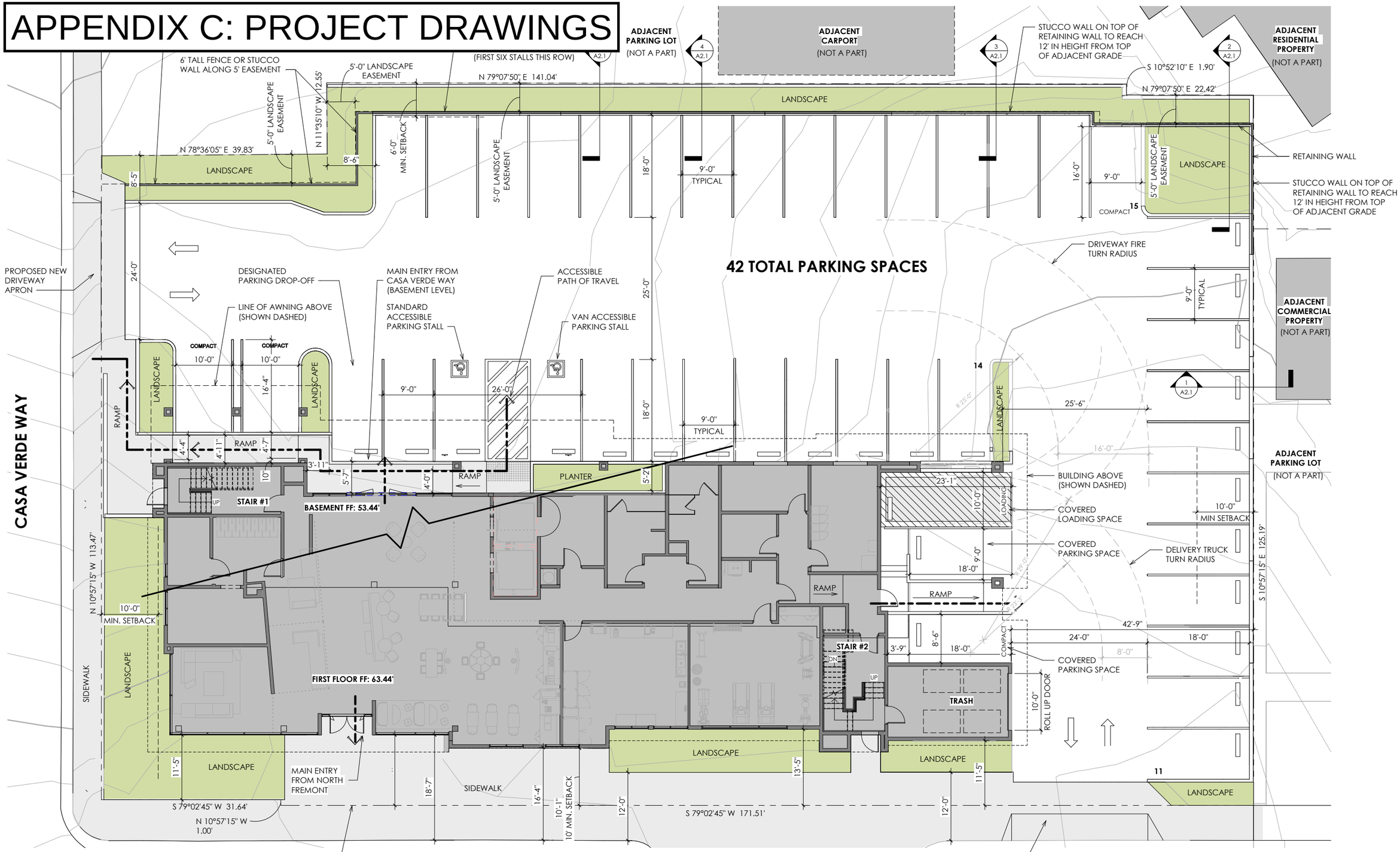
Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(m)		(m)	(m)	(m)	(m)
								10601733.24	4050709.50	26.46	15.74
								10601734.45	4050702.37	26.46	16.48
								10601734.83	4050702.45	26.46	16.49
21-0370 Impacted Building	+		x	0	0.50	20.00	a	10601760.37	4050776.78	20.00	12.83
								10601742.28	4050759.02	20.00	12.82
								10601751.45	4050749.18	20.00	13.10
								10601763.46	4050760.35	20.00	13.12
								10601780.47	4050743.60	20.00	13.62
								10601783.47	4050746.51	20.00	13.62
								10601788.05	4050741.43	20.00	13.77
								10601792.80	4050746.35	20.00	13.77

Geometry Terrain Contours

Name	M.	ID	OnlyPts	Height		Coordinates		
				Begin	End	x	y	z
				(m)	(m)	(m)	(m)	(m)
	+					10601734.78	4050696.98	17.00
						10601780.57	4050705.98	18.00
						10601778.91	4050713.52	17.50
						10601770.84	4050722.52	17.00
						10601738.88	4050715.84	15.50
						10601738.48	4050717.62	15.50
						10601731.14	4050715.97	15.00
						10601734.80	4050696.90	17.00
	+					10601785.51	4050741.48	15.00
						10601778.68	4050739.94	15.00
						10601778.58	4050740.37	15.00
						10601738.55	4050731.63	14.94
						10601726.81	4050729.08	14.94
						10601730.28	4050710.52	14.94
						10601733.64	4050692.43	17.68
						10601772.77	4050700.18	17.68
						10601793.82	4050704.08	17.68
						10601789.27	4050725.15	17.00
						10601787.35	4050733.32	15.00
						10601786.00	4050739.25	15.00
	+					10601793.10	4050706.29	18.00
						10601830.53	4050713.46	18.00
						10601826.12	4050734.30	17.00
						10601850.54	4050738.97	17.00
						10601825.15	4050763.41	16.00
						10601811.39	4050776.33	15.00
						10601800.99	4050786.20	14.00
						10601791.01	4050795.76	13.00
						10601783.63	4050802.94	13.00
						10601763.15	4050780.88	13.00
						10601770.22	4050774.44	13.00
						10601781.25	4050764.46	14.00
						10601791.96	4050755.01	15.00
						10601806.32	4050741.91	16.00
						10601808.32	4050731.40	17.00
						10601788.88	4050727.31	17.00
	+					10601741.06	4050793.10	11.00
						10601757.57	4050777.43	12.00
						10601723.05	4050742.58	12.00
						10601717.96	4050769.09	11.00
						10601740.73	4050792.85	12.00
	+					10601723.42	4050741.21	12.80
						10601761.11	4050779.85	12.80
						10601802.74	4050739.24	14.02
						10601786.89	4050735.98	14.02
						10601785.49	4050742.05	13.72

Name	M.	ID	OnlyPts	Height		Coordinates		
				Begin	End	x	y	z
				(m)	(m)	(m)	(m)	(m)
						10601726.70	4050729.35	14.64
						10601723.49	4050740.87	12.80

APPENDIX C: PROJECT DRAWINGS



ARCHITECTURAL SITE PLAN

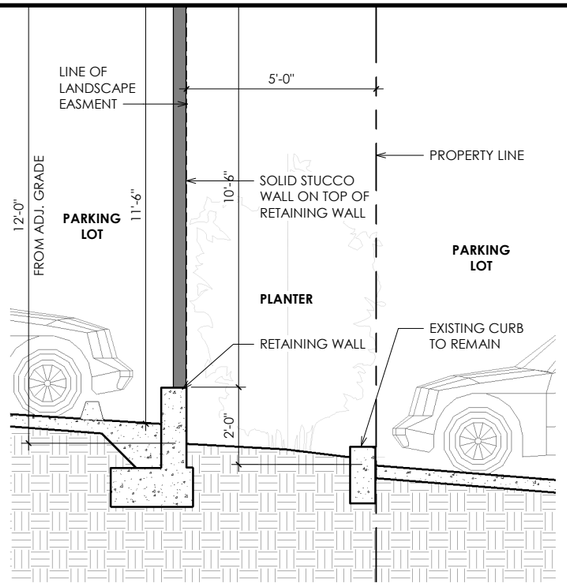
Arris STUDIO ARCHITECTS
ADDRESS 1327 ARCHER STREET, STE. 220 SAN LUIS OBISPO, CA 93401
CONTACT 805.547.2240 ARRIS-STUDIO.COM
THOMAS E. JESS ARCHITECT (CA) #C27068
STEPHEN A. RIGOR ARCHITECT (CA) #C33672

2101 N FREMONT
MONTEREY, CA

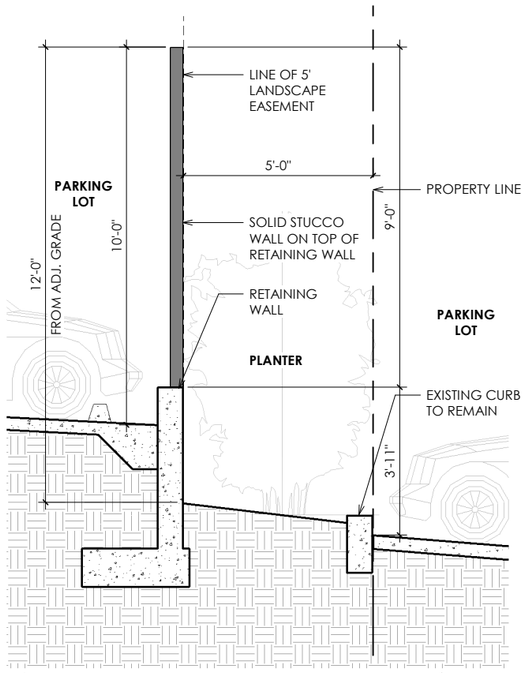
ARCHITECTURAL SITE PLAN

Date 10/14/2020
Scale 24x36: 1/8" = 1' - 0" 11x17: 1/16" = 1' - 0"
Sheet **A2.0**

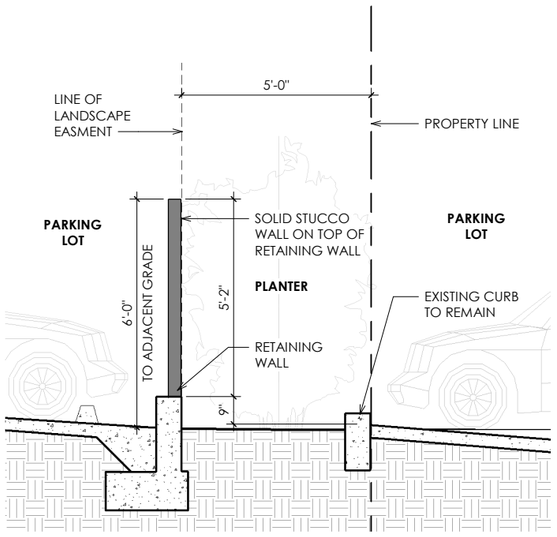
APPENDIX C: PROJECT DRAWINGS



SITE SECTION - 4



SITE SECTION - 3



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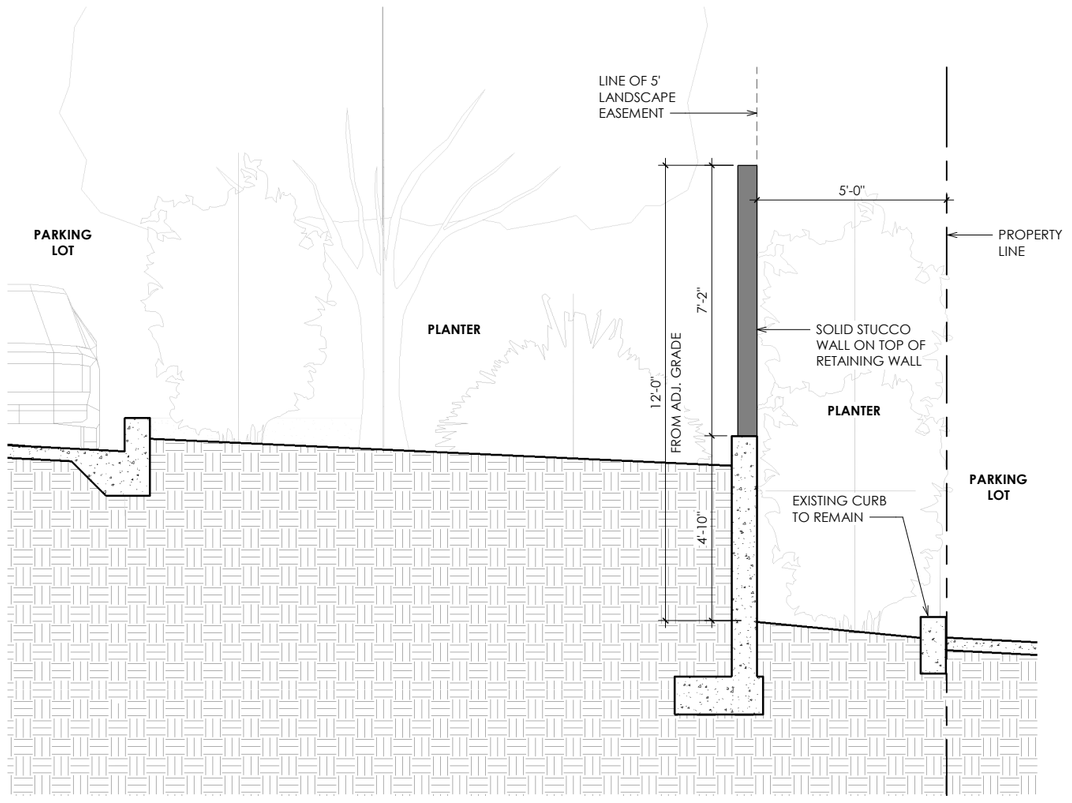

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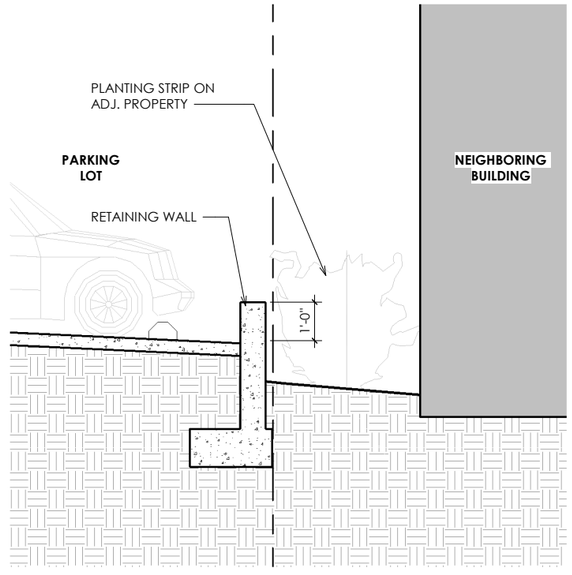


SITE SECTION - 1

Arris STUDIO ARCHITECTS

ADDRESS
1327 ARCHER STREET, STE. 220
SAN LUIS OBISPO, CA 93401

CONTACT
805.547.2240
ARRIS-STUDIO.COM

THOMAS E. JESS
ARCHITECT (CA) #C27068
STEPHEN A. RIGOR
ARCHITECT (CA) #C33672

2101 N FREMONT
MONTEREY, CA

SITE SECTIONS

Date 05/06/21
Scale 24x36: 11x17:
Sheet **A2.1**

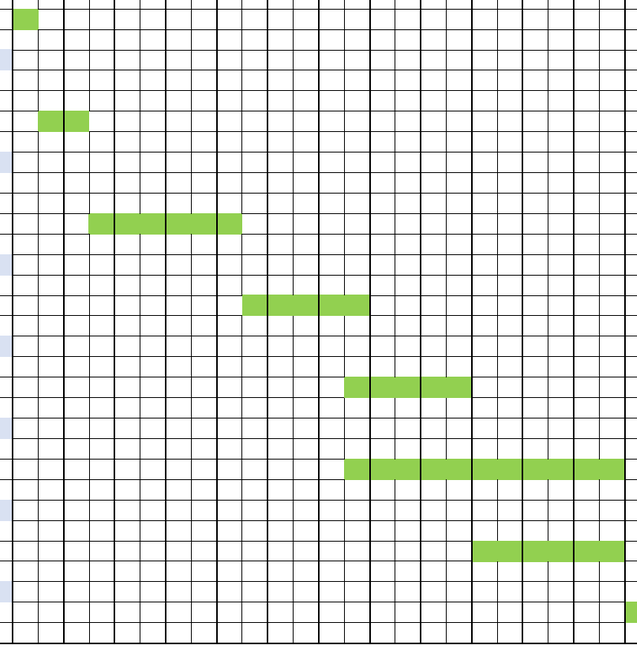
APPENDIX D CONSTRUCTION EQUIPMENT LIST

AVID HOTEL- MONTEREY

Activity Schedule

13 month duration

1 2 3 4 5 6 7 8 9 10 11 12 13



Activity 1
Demolition
.5 month

Activity 2
Grading/Excavations
Underground Utilities
1 month

Activity 3
Foundations- site & bldg
Underground Utilities
3 month

Activity 4
Structure frame
2.5 months

Activity 5
Building Exteriors
2.5 months

Activity 6
Building Interiors
5.5month

Activity 7
Site hard/soft scape
3 months

Activity 8
FF & E fitup
1 month

Activity Equipment

Please note equipment listed will not all be used at the same time and may be utilized in short intervals at various points during the activity

Activity 1	Activity 2	Activity 3	Activity 4	Activity 5	Activity 6	Activity 7	Activity 8
Demolition	**Grading Excavations**	**Foundations- site & bldg**	**Structure frame**	**Building exteriors**	**Building interiors**	**Site hard/ soft scapes**	**FF & E fitup**
	Underground Utilities	**Underground Utilities**					
excavator	excavator	mini excavator	gradall forklift	rooftoop crane	gypcrete pump	skid steer loader	delivery truck
excavator ram hoe	loader	backhoe	truss crane	boomlift	gradall forklift	10 wheel truck	
dump trucks	skip loader	skid steer loader	delivery truck	stucco pump	delivery truck	paving machine	
saw cutter	sheeps foot compactor	skip loader		delivery truck		roller	
	10 wheel truck	10 wheel truck				concrete truck	
	backhoe	concrete truck				line pump	
	delivery truck	boom pump				delivery truck	
		line pump					
		compactor					
		delivery truck					

APPENDIX E: FTA CONSTRUCTION NOISE ANALYSIS

GENERAL ASSESSMENT - CRITERION: Max 90 dBA

Phase 1 - Demolition, Excavation, and Grading

Equipment	Max SPL at 50 ft (dBA)	1 hr Leq at Project Center (62.5 ft) - dBA
Excavator	85	
Hoe Ram	90	88
Dump Truck	84	
Saw cutter	90	88
Loader	80	
Sheep's foot compactor	80	
Backhoe	80	
10-Wheel truck	84	
Delivery truck	55	
Construction noise barrier (7 ft above retaining wall)		-4
Total		**87**

Phase 2 - Utilities

Equipment	Max SPL at 50 ft (dBA)	1 hr Leq at Project Center (62.5 ft) - dBA
Excavator	85	83
Loader	80	
Sheep's foot compactor	80	
Backhoe	80	
10-Wheel truck	84	82
Concrete truck	82	
Delivery truck	55	
Boom pump	77	
Line pump	77	
Compactor	80	
Construction noise barrier (7 ft above retaining wall)		-4
Total		**81**

Phase 3 - Foundations

Equipment	Max SPL at 50 ft (dBA)	1 hr Leq at Project Center (62.5 ft) - dBA
Excavator	85	83
Backhoe	80	
Loader	80	
10-Wheel truck	84	
Concrete truck	82	
Boom pump	77	
Line pump	77	
Compactor	80	
Gradall forklift	85	83
Truss crane	85	
Delivery truck	55	
Construction noise barrier (7 ft above retaining wall)		-4
Total		**82**

APPENDIX E: FTA CONSTRUCTION NOISE ANALYSIS

GENERAL ASSESSMENT - CRITERION: Max 90 dBA

Phase 4 - Building Exterior

Equipment	Max SPL at 50 ft (dBA)	1 hr Leq at Project Center (62.5 ft) - dBA
Rooftop crane	85	83
Boomlift	85	83
Stucco pump	77	
Delivery truck	55	
Construction noise barrier (7 ft above retaining wall)		-4
Total		**82**

Phase 5 - Building Interior

Equipment	Max SPL at 50 ft (dBA)	1 hr Leq at Project Center (62.5 ft) - dBA
Gypcrete pump	77	75
Gradall forklift	85	83
Delivery truck	55	
Construction noise barrier (7 ft above retaining wall)		-4
Total		**79**

Phase 6 - Hardscape and Landscape

Equipment	Max SPL at 50 ft (dBA)	1 hr Leq at Project Center (62.5 ft) - dBA
Skid steer loader	80	
10-Wheel truck	84	
Paving machine	85	83
Roller	85	83
Concrete truck	82	
Line pump	77	
Delivery truck	55	
Construction noise barrier (7 ft above retaining wall)		-4
Total		**82**