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March 8, 2023

Ali Kia Shabahangi
Spirit Living Group, LLC
101 Larkspur Landing Circle, Suite 220
Larkspur, CA 94939
Via E-Mail: ali@spiritlivinggroup.com

**SUBJECT: Riverfront Parcels 5 Mixed-Use Development, Petaluma, CA
Acoustical Report to address Riverfront Mitigation Measure Noise-1.**

Dear Mr. Shabahangi:

Illingworth & Rodkin Inc. (I&R) has completed a review of the noise control requirements for the mixed-use residential building (Building 2) proposed on Parcel 5 at the Riverfront Development in Petaluma to address compliance of the project with Mitigation Measure Noise-1 of the Riverfront EIR. based on the results of our noise assessment for the project dated 3-8-13 and the current site and building plans for the project dated May 5, 2022. The result of this review indicates that the mixed-use buildings will be located as close as 520 feet south of the SMART rail line centerline and 600 feet west of the edge of Hwy 101.

CRITERIA

Mitigation Measure Noise-1 is shown as follows in the Riverfront EIR:

NOISE-1: Pursuant to General Plan Policy 10-P-3C and the CPSP EIR Mitigation Measure 10-1, a detailed acoustical report shall be prepared by a qualified acoustical specialist as part of design phase to determine the noise control treatments for the residential buildings, offices, and the hotel to meet local and state standards. Noise attenuation measures shall include as appropriate thicker walls, stucco siding, sound insulating windows and/or doors, building and bedroom orientation, and other measures pursuant to the detailed acoustical report. To achieve the noise reduction requirements, some form of forced air mechanical ventilation, satisfactory to the local building official, would be required in all residential units and the hotel. Special sound rated building elements such as windows and doors may also be necessary to reduce the intrusiveness of the train noise given that typical noise levels could reach 95 dBA L_{max} outside the nearest townhomes if Quiet Zone status is not approved.

The City of Petaluma General Plan requires that interior noise levels within any new residential use not exceed 45 dBA CNEL due to exterior noise sources and considers exterior noise levels of up to 65 dBA CNEL to be “normally acceptable” with multi-family residential land uses. In addition, I&R’s 3-8-13 noise assessment for the overall Riverfront development recommended that maximum instantaneous noise level during a train passage not exceed 55 dBA L_{max} inside residential buildings to minimize the intrusiveness of noise from railroad trains.

The City's General Plan also requires that the City's Noise Ordinance and other regulations be met through the placement of fixed equipment, such as air conditioning units and condensers, inside or in the walls of new buildings or on rooftops of central units to reduce noise impacts on any nearby sensitive receptors. Table 21.1 of the City's Noise Ordinance sets exterior noise exposure limit at an hourly L_{eq} of 60 dBA¹ as adjusted by 5 dB increments in areas with higher ambient conditions. Though ambient conditions are typically higher than this in the site vicinity, the level of 60 dBA L_{eq} is used as a performance standard in this study to conduct a conservative analysis. The General Plan also considers an increase of four or more dBA to be "significant" if the resulting noise level would exceed 'normally acceptable' sound level for the affected use.

SITE NOISE EXPOSURE

Freeway Traffic Noise Exposure

Based on the results of our 2013 noise study for Riverfront Development and subsequent noise modeling completed for single family, hotel, and townhome developments within the riverfront development area, we have established that environmental noise levels produced by future Hwy 101 traffic conditions would expose the eastern facades of Building 2 with a clear view of the freeway to noise levels of between 68 and 70 dBA CNEL². These exterior façade noise exposures are shown in Figure 1, attached.

Our study also indicated that with the planned "Quiet Zone" rail designation in place the CNEL at 50 feet from the rail line would be 60 dBA CNEL. This level of noise would result a CNEL of 48 dBA at the northern façade of Building 1, which would be the closest portion of the project to the rail line. However, this level is based on daytime only rail usage, and as reported in the March 2008 Draft Supplemental EIR the NCRA's proposed future freight service on this line could add up to six freight train passbys per day between Novato and Santa Rosa. Considering that most of the passenger train operations will occur during the day, i.e., between 7:00 a.m. and 10:00 p.m., at least some night-time freight operations could be expected along this rail line. With this regard the Draft Supplemental EIR notes that with one night-time freight operation the noise level will increase to "over 68 L_{dn} within 50 feet of the tracks." Based on this and considering a worst case CNEL level of 70 dBA at 50 feet due to night-time freight operations, the northern façade of Building 2, which would be at a distance of about 525 feet from the rail line, would be exposed to a CNEL level of 55 dBA. This level is over 10 dBA below the highest traffic noise exposures at the project facades. Therefore, even if the CNEL levels resulting from traffic and rail noise are considered to be additive,³ the worst-case exterior CNEL noise exposures at Building 2 would remain as discussed for Hwy 101 noise exposures as shown in Figure 1, attached.

Additionally with Quiet Zone implementation, though train horns will not sound, the engines of passing trains would continue to produce maximum noise levels of up to 85 dBA at 100 feet from the track. Considering the setback of the project buildings from the tracks, engines of passing trains would be expected to produce respective maximum sound level of 68 dBA at the northern façade of Building 2. Moreover, subsequent studies conducted by I&R along the SMART rail

¹ This is called out as the "General Plan Ambient" in Chapter 21 Performance Standards of the Noise Ordinance.

² These exposures would occur without the construction of Building 1 on Parcel 2, they are expected to be lower once Building 1 is constructed.

³ Because roadway traffic and rail noise have very different temporal and frequency content these sources may not be additive on a day/night average basis, however they were considered additive for this study to conduct a conservative analysis of noise impacts.

line since it has been operating under the quiet zone designation have determined that recurring maximum noise ($L_{\max 30}$)⁴ from passing SMART trains are between of 78 and 83 dBA at 40 feet. Considering these levels and the setback of the project buildings from the tracks, engines of passing SMART trains would be expected to produce maximum sound levels of 61 to 66 dBA at the northern façade of Building 2.

NOISE CONTROL ANALYSIS

Interior Residential Uses

Our review of project drawings indicates that the exterior wall system will be wood framed with fiberglass batt cavity insulation, and one layer of gypsum board at the interior. Our review of the project elevations indicates that these walls will have one of the following exterior finishes at the project residential uses,

- (1) Stucco (7/8" thick cement plaster),
- (2) Fiber cement siding over exterior gypsum sheathing, or
- (3) Phenolic wood panels over exterior gypsum sheathing.

Considering this assembly and exterior finishes, the sound isolation rating of these exterior wall assemblies would be Sound Transmission Class (STC)-46 for walls with a stucco⁵ exterior finish, STC-42 for walls with fiber cement siding,⁶ and STC-39 for walls with phenolic wood panel siding.⁷

Allowing for these exterior wall sound isolation ratings, exterior noise exposures of between 68 and 70 dBA CNEL and 61 to 66 dBA $L_{\max 30}$, and (as determined for a review of the current plans) window percentages of the residential units proposed of between 26% to 47% of the total unit exterior wall area, the following window STC ratings would be needed to reduce the interior noise levels within residences on the eastern facades of Building 2 to 45 dBA CNEL and 55 dBA $L_{\max 30}$ with an adequate margin of safety⁸ (these ratings are also indicated in Figure 1):

- Windows with a minimum 28-STC rating with Stucco exterior wall finishes,
- Windows with a minimum 30-STC rating with Fiber Cement exterior wall finishes, and
- Windows with a minimum 32-STC rating with Phenolic wood exterior wall finishes.

Also as above, the remainder of the Building 2 facades would be exposed to a CNEL of 65 dBA or less. Considering the STC-29 to STC-46 sound isolation ratings of the exterior wall assembly with the three exterior finishes and the window to wall percentages of the residential units discussed above, we have found the level of noise attenuation provided by these wall types when

⁴ The $L_{\max 30}$ is obtained by logarithmically averaging the loudest 30% of maximum levels of rail passbys over a given time period.

⁵ Based on laboratory test number W-50-71 published by the U.S. National Bureau of Standards.

⁶ Based on laboratory test TL365A as published in James Hardie Building Products Sound Isolation Technical Bulletin 07272007 as adjusted for the use of gypsum sheathing under the exterior siding using the Insul (v.9.0.23) sound attenuation computer program.

⁷ Per similar acoustically assembly in Section 1.2.1.5.5.5 of the Catalog of STC and IIC Ratings for the Wall and Floor/Ceiling Assemblies published by the California Office of Noise Control.

⁸ Illingworth & Rodkin's typical design standards call for a 2 to 3 dBA safety of factor to allow for possible construction faults or the use of minimal or less acoustically absorptive furnishings than normal within residences.

combined with standard thermal insulating windows⁹, would be sufficient to meet the City interior noise standards of 45 dBA CNEL with an adequate margin of safety at the remainder of the Building 1 facades (this finding is also indicated in Figure 1, attached).

However, because entirety of Building 2 will be exposed to noise levels exceeding 60 dBA CNEL, all residences in this building should be equipped with mechanical ventilation to supply fresh air to the units, satisfactory to the local building official, to allow occupants to keep windows closed to control noise. These systems can include an acoustically rated straight air transfer duct such as the Fresh 80, 90 or 100-dB units by Fresh Ventilation or equal. In our experience a standard central air conditioning and/or a central heating system with adequate fresh air supply, equipped with a 'summer switch' that allows the fan to circulate air without furnace operation can also provide adequate mechanical ventilation to provide a habitable interior environment.

Exterior Residential Uses

A review of the current plans indicates that the common use area for the project will be located on the rooftop of Building 2 and will include an open-air rooftop deck. A review of the building sections indicates that there will be a 3-foot-high parapet wall at the roof edge. Considering the elevation of the Hwy 101 road surface is at 44 to 54 feet above sea level (ASL) opposite the building site¹⁰, the proposed finished floor elevation of 13.25 feet ASL, and the roof top elevation of 53.5 feet above the finished floor, this parapet wall would not the block line of sight to Hwy 101 traffic for residents on the rooftop deck. Based on this Hwy 101 traffic noise levels would be expected to exceed 65 dBA CNEL without additional mitigation.

To allow sound levels at the Building 2 rooftop deck to meet the City's exterior noise standard of 65 dBA CNEL, the parapet wall in the vicinity of the rooftop deck should be increased to height of 6 feet above the top of the roof deck. The location and extent of the parapet wall which will allow it to reduce noise levels at the rooftop deck are shown in Figure 2, attached.

PROJECT NOISE GENERATION

The operation of the proposed mixed-use project could introduce additional noise into the environment at the single family uses to the south, the multifamily uses to the east, and transient resident hotel uses to the west. Given the placement of these adjacent residential uses it is expected that the operation of the project would result in typical noises associated with mixed-use residential/commercial developments including voices of the commercial and residential users, building maintenance activities, barking dogs and children. These types of noise are generally compatible with the surrounding land uses.

In addition, given the location perimeter parking and the potential use of parking stackers, vehicle operation, traditional parking and vehicle stacking equipment noise could contribute to noise levels at the adjacent residential uses. In addition, the Heating Ventilation and Air Conditioning (HVAC) and other mechanical equipment associated with mixed use development would also add noise the existing environment as follows:

⁹Though such windows commonly do not have a specific sound rating, due to CSBC energy requirements they typically have equivalent STC values of between 24 and 26.

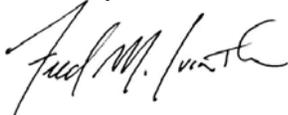
¹⁰ This elevation was determined from Google Earth topographical information.

- Based on measurements of, and experience with, evaluating commercial and residential parking lot noise, we expect noise from the movement and operation of passenger vehicles in the drive aisle and surface parking areas to produce maximum noise levels of between 53 to 63 dBA at 50 feet. Average parking and drive aisle noise would generally be 5 dBA lower. The use of mechanical lift equipment for vertical parking whereby cars are stacked two, or more, high to maximize the number of cars that can be parked on site would also create noise. I&R's measurements of the operation of such mechanical lift parking equipment at other parking facilities has indicated that the use of such equipment can result in respective average and maximum sound levels of 53 and 58 dBA at 50 feet. Considering the location of the adjacent residential uses and the average noise levels from mechanical lift parking equipment, drive aisle and surface parking activities are expected be less than 60 dBA at the closest residential uses to the project.
- A review of the current building plans and elevations, indicates that the building HVAC equipment to be located on the rooftop of the building. Based on noise measurements made at comparable facilities, rooftop exhaust fans, large air handlers and larger outdoor condensing units for the project non-residential uses may produce constant noise levels of between 58 to 63 dBA L_{eq} at 50 feet while the rooftop outdoor condensing units for individual residential units may produce constant sound levels of 47 to 50 dBA L_{eq} at 50 feet. Any wall mounted exhausts vents at the buildings are expected to produce noise levels of less than 40 dBA at 50 feet. Considering these levels and the location of the adjacent residential uses, average noise levels from building HVAC equipment are expected be less than 60 dBA at the closest residential uses to the project.

Based on the above, though noise resulting from project operations may noticeably change the noise environment in some surrounding areas, noise from residential and commercial uses at the project are expected to comply with the City's General Plan Ambient hourly L_{eq} noise level limit of 60 dBA L_{eq} or less.

This concludes I&R's review of the noise control requirements for the mixed-use residential buildings proposed on Parcels 5 and 6 at the Riverfront Development in Petaluma to address compliance of the project with Mitigation Measure Noise-1 of the Riverfront EIR. Please do not hesitate to call with any questions or concerns.

Sincerely,



Fred M. Svinth, INCE, Assoc., AIA
Principal, Senior Consultant
Illingworth & Rodkin, Inc.
Attachments: Figures 1 and 2

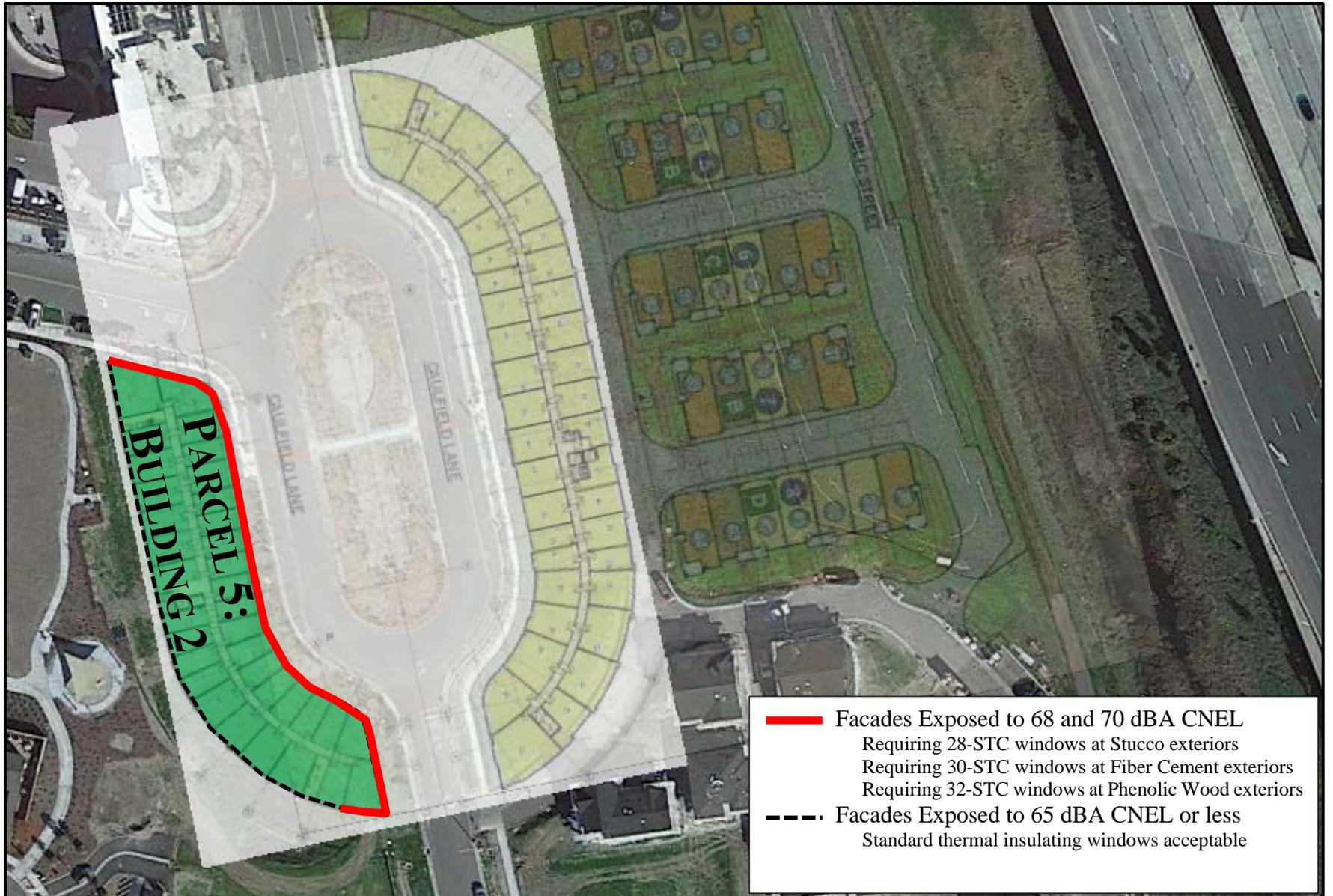


Figure 1: Project Site, Residential Façade Noise Levels, and Window STC Ratings

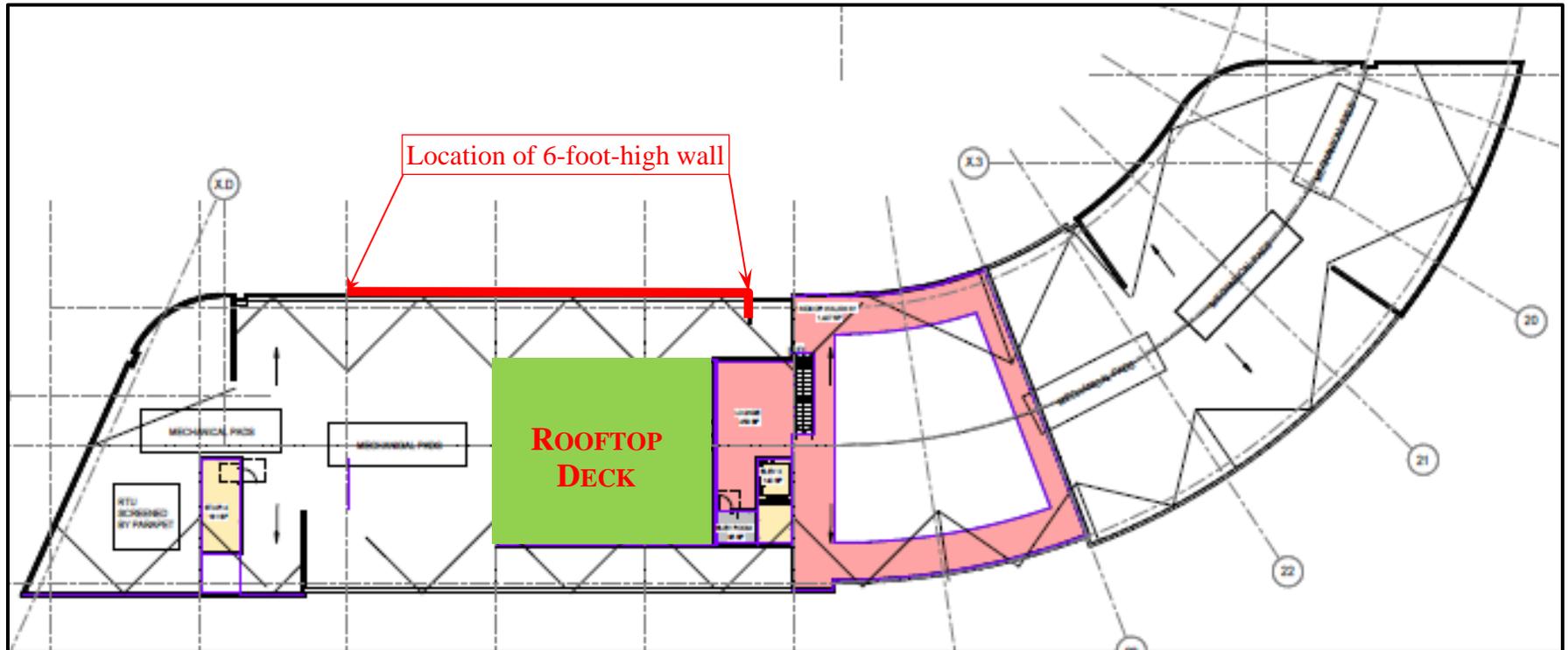


Figure 2: Roof Plan showing location of roof top deck and Proposed 6-foot-high parapet wall