



WI #20-044

MEMORANDUM

June 30, 2020

To: Pietro Martinez, Assoc. AIA

From: Timothy Johnson

Cc: James Nelson, PhD, PE

Subject: **Marin Healthcare District Phase II Parking Structure, Ambulatory Services Building & Pedestrian Bridge – Noise Report**

This memorandum presents our noise analysis for the Marin Healthcare District Phase II Parking Structure, Ambulatory Services Building & Pedestrian Bridge project. We include our review comments and recommendations for consideration by the design team.

This evaluation is based on our review of the Marin Healthcare District Ambulatory Services Building Design Review Board Application submittal drawings dated 3/5/20; Marin General Hospital Hillside Parking Structure Electrical drawings dated 4/10/15; and correspondence with Pietro Martinez of PMB and the project team.

1 Project Background

The Marin Healthcare District is expanding with the addition of a new Ambulatory Services Building, Phase II Parking Structure and Pedestrian Bridge at 250 Bon Air Road, Kentfield, CA. The new parking structure will be located directly adjacent to the existing parking garage from Phase I. The new Ambulatory Services Building (ASB) will be located to the west and connected to the new garage by a pedestrian bridge. Both the new parking structure and the ASB will be constructed where there are currently surface parking lots. One small existing IT building will be demolished to accommodate the ASB.

2 Noise Environment

The Marin Healthcare District project is located in Greenbrae, an unincorporated community of Marin County. The project site is bordered by noise-sensitive receptors on all sides. The closest noise-sensitive receptors to the project lie to the east and include multi-family residential buildings on Vie Hidalgo and Vie Casitas. To the south the nearest noise-sensitive receptors are multi-family

residential buildings on Corte Oriental. North of the site lies Marin Catholic High School. Hal Brown Park is located to the west of the site.

A noise monitoring survey was conducted as part of the Marin General Hospital Replacement Building Project Draft EIR (ESA / 210606, August 2012.) Traffic on Bon Air Road was found to be the dominant noise source at the noise-sensitive receptors near the project site. Noise from mechanical equipment at the existing hospital was also found to contribute to noise during the nighttime.

Two of the noise measurement sites conducted for the Draft EIR were located at or near the noise-sensitive receptors discussed in this report, one near residences on Vie Casitas and one near residences on Corte Oriental. The short-term noise measurement near Vie Casitas indicated that the 10-minute equivalent noise level was an L_{eq} of 53 dBA. The long-term noise measurement near Corte Oriental indicated that hourly equivalent noise levels typically ranged from 51 to 63 dBA during the daytime and 48 to 52 dBA during the nighttime.

3 Criteria

The regulatory setting and noise limits for the project are summarized in the Draft EIR. The Federal and State regulations apply to heavy trucks meeting the noise standard of 80 dBA at 15 meters (approximately 50 feet) from the roadway centerline. For this project this noise limit would apply to construction vehicles to and from the site.

The Local regulations summarized in the project Draft EIR include the Marin Countywide Plan, the Marin County Municipal Code, The City of Larkspur General Plan, and the City of Larkspur Municipal Code. The noise limits in the Marin Countywide Plan are what apply to this project and serve as the basis of the analysis for this report as stated in the project EIR

The EIR states that significant impact would be identified where noise levels would exceed the County's guidelines for noise and land use compatibility. The EIR states that "A substantial temporary noise level increase would occur where noise from construction activities exceeds 60 dBA L_{eq} and the ambient noise environment by at least 5.0 dBA L_{eq} at noise-sensitive uses in the project vicinity for a period of one year or more. The Marin County General Plan noise limits for continuous noise from stationary mechanical equipment is 50 dBA L_{eq} during the daytime and 45 dBA L_{eq} during the nighttime.

The Marin County Municipal Code also applies to the project in that it establishes allowable hours of operation for construction-related activities. The project EIR states "As a condition of permit approval for projects generating significant construction noise impacts during the construction phase, construction management for any project shall develop a construction noise reduction plan and designate a disturbance coordinator at the construction site to implement the provisions of the plan. Sections 6.70.030(5) and 6.70.040 of the Marin County Municipal Code are included below.

6.70.030 Enumerated Noises.

5) Construction Activities and Related Noise.

- a. Hours for construction activities and other work undertaken in connection with building, plumbing, electrical, and other permits issued by the community development agency shall be limited to the following:
 - i. Monday through Friday: 7:00 a.m. to 6:00 p.m.

- ii. Saturday: 9:00 a.m. to 5:00 p.m.
- iii. Prohibited on Sundays and Holidays (New Year's Day, President's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.)
- b. Loud noise-generating construction-related equipment (e.g., backhoes, generators, jackhammers) can be maintained, operated, or serviced at a construction site for permits administered by the community development agency from 8:00 a.m. to 5:00 p.m. Monday through Friday only.
- c. Special exceptions to these limitations may occur for:
 - i. Emergency work as defined in Section 22.130.030 of this code provided written notice is given to the community development director within forty-eight hours of commencing work;
 - ii. Construction projects of city, county, state, other public agency, or other public utility;
 - iii. When written permission of the community development director has been obtained, for showing of sufficient cause;
 - iv. Minor jobs (e.g., painting, hand sanding, sweeping) with minimal/no noise impacts on surrounding properties;
 - v. Modifications required by the review authority as a discretionary permit condition of approval.

6.70.040 Penalty for Violation of Section 6.70.030 (5). Violation of Section 6.70.030 (5) of this code is enforceable as an infraction, punishable by fines, or by administrative or civil action, except that failure to obey a directive by a peace or enforcement officer to cease the noise-generating activity shall be a misdemeanor, punishable by fines or jail time or both. In addition, cessation of some or all of the permitted work may be ordered through a stop work order issued by the building and safety division.

4 Construction

Construction of the ASB, Phase II Parking Structure, and Pedestrian Bridge will create increased noise levels at nearby noise-sensitive receptors. The following Table 1 summarizes the construction phases, the construction activities, and the assumed most significant noise generating equipment that would be used. The construction noise analysis is based on the standard noise reference levels included in the Federal Highway Administration's Roadway Construction Noise Model. The construction noise analysis calculates hourly L_{eq} noise levels at each sensitive receptor location, for each phase, and typical activity category. The most typical loudest pieces of equipment used for each construction activity are included in the calculations. The noise calculations include standard assumptions for typical amounts of time each piece of equipment may be used in a given hour, known as acoustical usage factors, for the purpose of calculating the L_{eq} noise levels.

Table 1 Construction Activities and Equipment List

Phase	Construction Activity	Equipment
Phase A Construction of New Garage	Demolition	Concrete Saw
		Backhoe
		Jackhammer
		Excavator
		Dump Truck
		Generator
Phase A Construction of New Garage	Site Prep	Compactor (ground)
		Dozer
		Front End Loader
		Grader
		Dump Truck
		Generator
Phase A Construction of New Garage	Foundations	Concrete Mixer Truck
		Concrete Pump Truck
		Front End Loader
		Dump Truck
		Generator
Phase A Construction of New Garage	Foundations	Concrete Mixer Truck
		Concrete Pump Truck
		Crane
		Dump Truck
		Generator
Phase A Construction of New Garage	Paving	Paver
		Dump Truck
		Generator
Phase B.1 Demo / Grading of New Ambulatory Services Building	Demolition	Concrete Saw
		Backhoe
		Jackhammer
		Excavator
		Dump Truck
		Generator
Phase B.1 Demo / Grading of New Ambulatory Services Building	Site Prep	Compactor (ground)
		Dozer
		Front End Loader
		Grader
		Dump Truck
		Generator
Phase B.2 Construction of New Ambulatory Services Building	Foundations	Concrete Mixer Truck
		Concrete Pump Truck
		Front End Loader
		Dump Truck
		Generator
Phase B.2 Construction of New Ambulatory Services Building	Steel Erection, Concrete Decks	Concrete Mixer Truck
		Concrete Pump Truck
		Crane
		Dump Truck

Phase	Construction Activity	Equipment
Phase C Pedestrian Bridge Construction	Site Prep / Excavation	Generator
		Pneumatic Tools
		Compactor (ground)
		Dozer
		Front End Loader
		Grader
		Dump Truck
Phase C Pedestrian Bridge Construction	Column & Bridge Installation	Generator
		Concrete Mixer Truck
		Concrete Pump Truck
		Crane
		Dump Truck
		Generator

The results of the construction noise analysis are summarized in Table 2 below. The results indicate that hourly L_{eq} noise levels will exceed the construction noise limits of 60 dBA for some activities at some locations.

Table 2 Construction Noise Analysis Results

Noise-Sensitive Location	Land Use	Location	Construction Activity	Hourly Leq (dBA)
Phase A Construction of New Garage				
429 Vie Hidalgo	Apartment Building	East of site	Demolition	74
			Site Prep	71
			Foundations	68
			Columns & Deck Pours	68
			Paving	68
441 Vie Hidalgo	Apartment Building	East of site	Demolition	75
			Site Prep	72
			Foundations	69
			Columns & Deck Pours	69
			Paving	68
461 Vie Hidalgo	Apartment Building	East/Northeast of site	Demolition	73
			Site Prep	70
			Foundations	67
			Columns & Deck Pours	67
			Paving	67
625-627 Vie Casitas	Multi-family Residential	Southeast of site	Demolition	67
			Site Prep	65
			Foundations	62
			Columns & Deck Pours	62
			Paving	61
622-624 Vie Casitas		Southeast of site	Demolition	67

Noise-Sensitive Location	Land Use	Location	Construction Activity	Hourly Leq (dBA)
	Multi-family Residential		Site Prep	64
			Foundations	61
			Columns & Deck Pours	61
			Paving	61
Hal Brown Park	Park	West of site	Demolition	65
			Site Prep	62
			Foundations	59
			Columns & Deck Pours	59
			Paving	59
Marin Catholic High School	School	West of site	Demolition	65
			Site Prep	62
			Foundations	59
			Columns & Deck Pours	59
			Paving	59
50-70 Corte Oriental	Single-Family Residential Buildings	South of site	Demolition	65
			Site Prep	62
			Foundations	59
			Columns & Deck Pours	59
			Paving	59
Phase B.1 Demo / Grading of New Ambulatory Services Building Phase B.2 Construction of New Ambulatory Services Building				
429 Vie Hidalgo	Apartment Building	East of site	Demolition	64
			Site Prep	61
			Foundations	58
			Steel Erection, Concrete Decks	62
441 Vie Hidalgo	Apartment Building	East of site	Demolition	64
			Site Prep	61
			Foundations	58
			Steel Erection, Concrete Decks	62
461 Vie Hidalgo	Apartment Building	East/Northeast of site	Demolition	64
			Site Prep	61
			Foundations	58
			Steel Erection, Concrete Decks	62
625-627 Vie Casitas	Multi-family Residential	Southeast of site	Demolition	64
			Site Prep	61
			Foundations	58
			Steel Erection, Concrete Decks	62
622-624 Vie Casitas	Multi-family Residential	Southeast of site	Demolition	64
			Site Prep	61

Noise-Sensitive Location	Land Use	Location	Construction Activity	Hourly Leq (dBA)
			Foundations	58
			Steel Erection, Concrete Decks	62
Hal Brown Park	Park	West of site	Demolition	66
			Site Prep	63
			Foundations	60
			Steel Erection, Concrete Decks	64
Marin Catholic High School	School	West of site	Demolition	60
			Site Prep	57
			Foundations	54
			Steel Erection, Concrete Decks	57
50-70 Corte Oriental	Single-Family Residential Buildings	South of site	Demolition	65
			Site Prep	62
			Foundations	59
			Steel Erection, Concrete Decks	63
Phase C Pedestrian Bridge Construction				
429 Vie Hidalgo	Apartment Building	East of site	Site Prep / Excavation	63
			Column & Bridge Installation	59
441 Vie Hidalgo	Apartment Building	East of site	Site Prep / Excavation	63
			Column & Bridge Installation	60
461 Vie Hidalgo	Apartment Building	East/Northeast of site	Site Prep / Excavation	62
			Column & Bridge Installation	59
625-627 Vie Casitas	Multi-family Residential	Southeast of site	Site Prep / Excavation	61
			Column & Bridge Installation	58
622-624 Vie Casitas	Multi-family Residential	Southeast of site	Site Prep / Excavation	61
			Column & Bridge Installation	58
Hal Brown Park	Park	West of site	Site Prep / Excavation	63
			Column & Bridge Installation	60
Marin Catholic High School	School	West of site	Site Prep / Excavation	57
			Column & Bridge Installation	54

Noise-Sensitive Location	Land Use	Location	Construction Activity	Hourly Leq (dBA)
50-70 Corte Oriental	Single-Family Residential Buildings	South of site	Site Prep / Excavation	61
			Column & Bridge Installation	58

Consistent with the Project EIR, the construction noise analysis indicates that there will be significant noise impact. The EIR and Addendum #2 summarize the required mitigation measures for this significant noise impact. The construction noise impact mitigation measures are presented below verbatim from the EIR.

Mitigation Measure NOI-2:

- a) Pursuant to Sections 6.70.030(5) and 6.70.040 of the Marin County Municipal Code, restrict noise-generating activities at the construction site or in areas adjacent to the construction site to the hours of 7:00 a.m. to 6:00 p.m., Monday through Friday and 9:00 a.m. to 5:00 p.m. on Saturday. Construction will be prohibited on Sundays and holidays. Loud noise-generating construction-related equipment (e.g., backhoes, generators, jackhammers) can be maintained, operated, or serviced at a construction site for permits administered by the community development agency from 8:00 a.m. to 5:00 p.m. Monday through Friday only.
- b) If during construction it is determined that construction noise disrupts on-going hospital operations for workers or patients within patient rooms or existing medical offices, the project shall erect temporary noise control blanket barriers along existing hospital building facades facing the construction area. The specific location and height of barriers would depend on the extent of the problem indoors. Noise control blanket barriers can be rented and quickly erected to reduce the intrusiveness of construction noise indoors. If construction noise is not problematic and does not disrupt hospital or medical office operations, the temporary noise barriers would not be necessary.
- c) Where it is feasible to block the line-of-sight to construction activities, construct solid plywood fences (minimum eight feet in height either around the construction zone or at the common property line) to shield adjacent residences or other noise-sensitive land uses prior to major noise generating phases of demolition and construction;
- d) Shield adjacent sensitive uses from stationary equipment with individual noise barriers or partial acoustical enclosures;
- e) Develop a plan to relocate patient rooms and sensitive medical offices away from areas undergoing construction;
- f) Use manually adjustable or self-adjusting back-up alarms to increase or decrease the volume of the alarm based on background noise levels. Installation and use of the back-up alarms will be consistent with OSHA (Occupational Safety and Health Administration) regulations;

- g) Utilize ‘quiet’ models of air compressors and other stationary noise sources where technology exists;
- h) Equip all internal combustion engine-driven equipment with intake and exhaust mufflers, which are in good condition and appropriate for the equipment;
- i) Pavement breakers and jackhammers will also be equipped with acoustical attenuating shields or shrouds recommended by the manufacturers;
- j) Locate all stationary noise-generating equipment, such as air compressors and portable power generators, as far away as possible from residences or noise-sensitive land uses;
- k) Locate staging areas and construction material areas as far away as possible from residences or noise-sensitive land uses;
- l) Route all construction traffic to and from the project site via designated truck routes where possible. Prohibit construction related heavy truck traffic in residential areas where feasible;
- m) Control noise from construction workers’ radios to a point that they are not audible at existing residences bordering the project site;
- n) Conduct sensitivity training to inform construction personnel about the requirements of the construction noise control plan and about methods to reduce noise;
- o) Prohibit all unnecessary idling of internal combustion engines;
- p) Notify all adjacent business, residences, and noise-sensitive land uses of the construction schedule in writing;
- q) Designate a “disturbance coordinator” who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler) and would require that reasonable measures warranted to correct the problem be implemented. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

5 Operations

Noise from the operation of the new Ambulatory Services Building and Phase II Parking Structure are presented below.

5.1 ASB Mechanical Equipment

The design for the ASB includes five air handling units (AHUs) to be located on the roof of the building. The AHUs would each serve one of the floors of the ASB. The ASBs are planned to be typical packaged DX units that will be approximately 60-70 ton capacity units. The design currently includes a 15-foot-high screen on the rooftop around the mechanical equipment.

Noise from the ASB mechanical equipment is subject to the Marin County General Plan noise level limits for continuous noise from stationary equipment which are an hourly L_{eq} of 50 dBA during the daytime and 45 dBA during the nighttime. The noise analysis calculates the maximum noise that can

be generated by the ASB mechanical equipment to ensure that the noise limits are met at all the adjacent noise-sensitive locations.

The noise analysis included the nearest residential buildings to the ASB on Vie Hidalgo, Vie Casitas, and Corte Oriental, as well as Hal Brown Park and Marin Catholic High School. The closest residential buildings are 622-624 Vie Casitas approximately 500 feet away, which will have a line of sight down to the ASB rooftop. Elevations of the rooftop mechanical equipment and of the noise-sensitive receptors were accounted for in the calculations. Standard acoustical calculations for hemispherical spreading were used. An engineering factor of safety of 5 dB was included in these calculations.

The calculations indicate that the noise from the ASB rooftop mechanical equipment will meet noise limits as long as the maximum total sound power from all equipment operating simultaneously does not exceed 91 dBA during the nighttime (96 dBA during the daytime.) Assuming the sound power from all five AHUs is the same, then the maximum sound power from each of the AHUs must not exceed 84 dBA during nighttime (89 dBA during daytime.) These calculations are conservative in that they do not account for any additional acoustical shielding that will be provided by the rooftop screen. The 15-foot-high rooftop screen would break the line of sight to all the nearest receptors which will likely further reduce noise levels. The design of the rooftop screen can also be detailed to reduce noise levels by ensuring there are no air gaps.

The AHUs to be installed have not yet been specified. However, this noise analysis is sufficient to design and specify units that will ensure the noise limits are met. There are various ways that manufacturers provide noise reduction of air handling units. Variable speed drives can be used at night to reduce noise output. Compressors inside the air handlers can be acoustically treated and packaged units can use absorption inside the unit to reduce noise radiating out from the enclosure. The outside air fans can use acoustical louvers if necessary. Inlets can also be treated with acoustical absorption.

Manufacturer's sound data from a similar project's packaged air handling units was also reviewed to verify that the noise limits for the equipment on the ASB are typical. That data for larger 90-130 ton packaged rooftop air handling units was within 3 dB of our results. Therefore, we are confident that specific AHUs can be specified to ensure compliance with the noise limits. We do not anticipate that the noise from the AHUs will be a major factor at nearby noise-sensitive receptors.

We recommend that the final mechanical submittal be reviewed, and the sound power calculations be confirmed once the actual air handling equipment has been specified.

5.2 Phase II Parking Structure

The new Phase II Parking Structure will be constructed adjacent to the existing Phase I Parking Structure. The noise analysis summarized in the Project Draft EIR looked at vehicular noise from the garage. The EIR concluded that noise levels generated by the use of the parking structure would not exceed the daytime or nighttime noise limits at the nearest receptors.

The current design of the new parking structure indicates that due to the close proximity to the existing garage and the hillside, that the ground level and 2nd level of both parking structures will not meet the building code openness requirements in the future and will therefore need to be

mechanically ventilated. An analysis was conducted in coordination with the design team to investigate noise from the parking structure mechanical ventilation system.

Noise from the parking structure mechanical ventilation system is subject to the Marin County General Plan noise level limits for continuous noise from stationary equipment which are an hourly L_{eq} of 50 dBA during the daytime and 45 dBA during the nighttime. The noise analysis calculates the maximum noise that can be generated by the mechanical equipment to ensure that the noise limits are met at all the adjacent noise-sensitive locations.

The noise analysis included the nearest residential buildings to the parking structure on Vie Hidalgo, Vie Casitas, and Corte Oriental, as well as Hal Brown Park and Marin Catholic High School. The closest residential buildings are 429 and 441 Vie Hidalgo approximately 200 feet away, which will have a line of sight down to the garage rooftop. Elevations of the garage mechanical equipment and of the noise-sensitive receptors were accounted for in the calculations. Standard acoustical calculations for hemispherical spreading were used. An engineering factor of safety of 5 dB was included in these calculations.

The calculations indicate that the noise from the garage mechanical ventilation equipment will meet noise limits as long as the maximum total sound power from all equipment in both garages does not exceed 83 dBA during the nighttime (88 dBA during the daytime.) These calculations are conservative in that they do not account for any additional acoustical shielding that will be provided by the intake and exhaust louvers physical locations. The ventilation louvers will not be located on the garage rooftops but will be located at Level 2 (or possibly Level 3 pending noise control design details.) Therefore, the parking structures themselves and the hillside will both provide some acoustical shielding by blocking the line of sight between some of the intake/exhaust louvers and the noise-sensitive receptors.

The garage ventilation system design will include two supply fans and two exhaust fans on each of the lowest two levels of both garages. The fans will be installed at each of the four corners of both garages on the ground and 2nd levels. No mechanical ventilation would be required on the upper levels of the parking structures. The supply fans will be located along the southwest side of the garages and the exhaust fans will be located on the northeast side of the garages, closest to the residential buildings on Vie Hidalgo.

The ventilation design will move the air from one end of the building and wash over the entire garage floor. CO monitors will be specified for the enclosed garage floors so that the supply and exhaust fans can modulate and ventilate the floors at reduced capacities. At each of the four corners of both garages there will be supply and exhaust shafts (respectively) that will extend from the top of the 2nd level down to the ground level. The supply and exhaust shafts will be lined with acoustical absorption. There will be air intake and exhaust louvers installed a minimum of 10 feet above grade. If necessary, acoustical louvers will be incorporated to ensure the noise limits are met. Candidate fans have been identified at this time. Specific fans will be identified at a later time.

As stated above, the interior of the supply and exhaust shafts will be lined with acoustical absorption such as 2 inches of glass fiber. The shaft acoustical absorption should be 3 lbs. per cubic foot duct liner. The length and cross-sectional area of the shafts will be designed in conjunction with the specified fans to ensure that the appropriate noise control is installed.

We recommend that the final mechanical submittal for the parking structures' mechanical ventilation system be reviewed, and that noise control calculations be confirmed once the design has been developed to ensure the noise limits are met at the nearest noise-sensitive receptors.

5.3 Emergency Generator

There is an emergency backup generator currently installed at the project site for the existing parking structure. The generator is an 80 kW unit and is located just southeast of the garage. It is operated only in the case of an emergency utility outage and for periodic testing. The testing occurs approximately once per month for approximately 30 minutes during the daytime.

This emergency generator will also serve the new Phase II parking structure. The closest noise-sensitive receptors are located approximately 300 feet away on Vie Casitas.

The EIR Addendum #2 for the 2015 Modified Project analyzed the emergency generator noise at adjacent noise-sensitive locations and concluded that during the infrequent testing it would be audible, but that there would be not be a significant noise impact.