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February 19, 2016 4253-03

Mr. Jud Dutrisac
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Subject: Westar Mixed-Use Village Project, Goleta
DP Amendment – LLA Final Phase Site
Exterior Noise Assessment

Dear Mr. Dutrisac:

This noise analysis has been prepared to assess exterior noise exposure levels within the Final Phase Site of the Westar Mixed-Use Village project, in order to determine the suitability of this portion of the site for residential apartments proposed under an amendment to the approved development plan for the project.

This report provides a summary of the analysis within the following sections: Fundamentals of Environmental Noise (Section 1), Project Background and Setting (Section 2), applicable Noise Standards (Section 3), Noise Analysis (Section 4), and Findings (Section 5). A summary of acoustical terms used in this report is presented in Attachment "A".

1.0 FUNDAMENTALS OF ENVIRONMENTAL NOISE

Vibrations, traveling as waves through air from a source, exert a force perceived by the human ear as sound. Sound pressure level (referred to as sound level) is measured on a logarithmic scale in decibels (dB) that represent the fluctuation of air pressure above and below atmospheric pressure. Frequency, or pitch, is a physical characteristic of sound and is expressed in units of cycles per second or hertz (Hz). The normal frequency range of hearing for most people extends from about 20 to 20,000 Hz. The human ear is more sensitive to middle and high frequencies, especially when the noise levels are quieter. As noise levels get louder, the human ear starts to hear the frequency spectrum more evenly. To accommodate for this phenomenon, a weighting system to evaluate how loud a noise level is to a human was developed. The frequency weighting called "A" weighting is typically used for quieter noise levels which de-emphasizes the low frequency components of the sound in a manner similar to the response of a human ear. This A-weighted sound level is called the "noise level" and is referenced in units of dBA.

An individual's noise exposure occurs over a period of time; however, noise level is a measure of noise at a given instant in time. Community noise sources vary continuously, being the product of many noise sources at various distances, all of which constitute a relatively stable background or ambient noise environment. The background, or ambient, noise level gradually changes throughout a typical day, corresponding to distant noise sources, such as traffic volume, as well as changes in atmospheric conditions.

Noise levels are generally higher during the daytime and early evening when traffic (including airplanes), commercial, and industrial activity is the greatest. However, noise sources experienced during nighttime hours when background levels are generally lower can be potentially more conspicuous and irritating to the receiver. In order to evaluate noise in a way that considers periodic fluctuations experienced throughout the day and night, a concept termed "community noise equivalent level" (CNEL) was developed, wherein noise measurements are weighted, added, and averaged over a 24-hour period to reflect magnitude, duration, frequency, and time of occurrence.

Noise sources are classified in two forms: (1) point sources, such as stationary equipment or a group of construction vehicles and equipment working within a spatially limited area at a given time, and (2) line sources, such as a roadway with a large number of pass-by sources (motor vehicles). Sound generated by a point source typically diminishes (attenuates) at a rate of 6.0 dBA for each doubling of distance from the source to the receptor at acoustically "hard" sites and at a rate of 7.5 dBA for each doubling of distance from source to receptor at acoustically "soft" sites. Sound levels can also be attenuated by man-made or natural barriers. For the purpose of sound attenuation discussion, a "hard" or reflective site does not provide any excess ground-effect attenuation and is characteristic of asphalt or concrete ground surfaces, as well as very hard-packed soils. An acoustically "soft" or absorptive site is characteristic of unpaved loose soil or vegetated ground.

2.0 PROJECT BACKGROUND AND SETTING

The approved Westar Mixed-Use Village project includes two retail structures and one structure with live-work units within the Final Phase area bordered by Village Way on the north/west, Drive "D4" on the south, and Glen Annie Road on the east. The amendment proposes to replace these commercial and quasi-commercial structures with residential apartments. According to the Project EIR (*Westar Mixed-Use Village Project Environmental Impact Report,* Envicom Corporation, October, 2011), noise exposure levels within the Final Phase area from transportation sources including the UPRR corridor, US Highway 101, and Hollister Avenue would fall below 65 dBA CNEL. However, the EIR identifies the potential for noise impacts to occur to residential uses from on-site commercial operations and activities.

The preliminary civil engineering improvement plans (Preliminary Grading & Drainage Plan, Westar Hollister Village, DP Amendment/LLA – Final Phase, Stantec, 02/18/16) depict two adjacent apartment buildings oriented roughly southwest to northeast, with a landscaped area occupying the southeast corner of the triangle lot. The western apartment building (Building 1) is located north of commercial retail Building E (Lot 8). Building E includes a loading dock along the north side of the building; the loading dock is a distance of 90 feet from the closest outdoor living area of proposed Building 1 and 260 feet from the closest outdoor living area of proposed Building 2. The parking lot for Building E is located a distance of approximately 54 feet from the closest outdoor living area of proposed Building 1.

The eastern apartment building (Building 2) is located north of commercial retail Building F (Lot 7). Building F does not include a loading dock; deliveries would likely involve only side-step trucks. The parking lot for Building F is located a distance of approximately 120 feet from the closest outdoor living area of proposed Building 2.

3.0 NOISE STANDARDS

The City of Goleta General Plan\Coastal Land Use Plan, Chapter 9.0, Noise Element provides the following policy regarding noise exposure levels for various noise-sensitive land uses.

> **NE 1.1 Land Use Compatibility Standards.**
>
> The City shall use the standards and criteria of Table 9-2 to establish compatibility of land use and noise exposure. The City shall require appropriate mitigation, if feasible, or prohibit development that would subject proposed or existing land uses to noise levels that exceed acceptable levels as indicated in this table. Proposals for new development that would cause standards to be exceeded shall only be approved if the project would provide a substantial benefit to the City (including but not limited to provision of affordable housing units or as part of a redevelopment project), and if adequate mitigation measures are employed to reduce interior noise levels to acceptable levels.

Table 9-2 indicates that the limit of "normally acceptable" exterior noise level for residences is 60 dBA CNEL; the limit for "conditionally acceptable" is 65 dBA CNEL.

The City also imposed the mitigation below to address potential nuisance noise from commercial activities upon project residences.

> **Measure N 3-1:** A noise mitigation plan must be prepared for the commercial component of the project to avoid potential noise nuisance. While the specific design of a noise mitigation plan depends upon the types of commercial uses that are ultimately in operation, a prototype plan that assumes noise-generating uses such as high volume retail or late evening entertainment would include the following:
>
> - Rear-of-store activities including deliveries and trash collection must be restricted to daytime hours (7:00AM to 7:00PM).

4.0 COMMERCIAL OPERATIONS NOISE LEVELS ANALYSIS

4.1 Truck Loading Dock Operations

Noise impacts due to loading dock activities include truck traffic arrivals and departures, back-up alarm use while backing to the loading dock, and truck off-loading activities at the loading dock area. The loading dock for Building E faces north, and the distance is 90 feet from the loading dock to the closest outdoor living area for triangle lot Building 1 and 260 feet to the closest outdoor living area of Building 2. Trucks at the loading dock would be instructed not to leave their engines idling, but rather to turn off their vehicles during the loading/unloading process.

To determine typical loading dock and truck circulation noise levels associated with the proposed project, Dudek used reported noise level measurement data collected at a Safeway Store loading dock during a peak morning hour (Draft EIR, Knighton & Churn Creek Commons Retail Center). Noise level measurements were conducted at a distance of 50 feet from the loading dock. During the one hour sample of loading dock noise levels, there were 3 semi-truck arrivals (including back-up alarm use to approach the loading dock) and 4 semi-truck departures, unloading activities, and delivery by 4 step side-delivery trucks. This equates to 7 semi-truck movements (arrival or departure) during the hour, along with 8 smaller truck movements (arrival and departure).

The noise level measurements were conducted for a one hour period, during a busy hour of loading dock operations. The Safeway loading dock had capacity for four trucks, whereas the Building E loading dock can accommodate a single truck at a time; the Safeway example therefore represents up to four times the activity level at the loading dock during a busy hour, and consequently would constitute a very conservative worst-case example of noise levels for the Building E loading dock. The analysis indicated that during a busy hour of loading dock operations, the measured hourly Leq noise level was 60 dBA at a distance of 50 feet from the loading dock, with a peak noise level of 80 dBA (associated with back-up alarm use).

The distance between the loading dock and the closest outdoor living area of proposed Building 1 is 90 feet. Using the formula for attenuation of point source noise at a hard site (the truck maneuvering area would be paved), the loading dock noise levels would be reduced to 55 dBA Leq at the closest outdoor living area for proposed Building 1. With loading dock operation restricted to the period between 7 AM and 7 PM, with an hourly Leq of 55 dBA for each of these hours, the CNEL at the closest outdoor living area of proposed Building 1 would be 52 dBA CNEL. The peak noise level associated with back-up alarm use (lasting approximately 2 minutes per hour), would be reduced to 75 dBA at the closest residential outdoor living area.

The distance between the loading dock and the closest outdoor living area of proposed Building 2 is 260 feet. Using the formula for attenuation of point source noise at a hard site, the loading dock noise levels would be reduced to 46 dBA Leq at the closest outdoor living area for proposed Building 2. With loading dock operation restricted to the period between 7 AM and 7 PM, with an hourly Leq of 46 dBA for each of these hours, the CNEL at the closest outdoor living area of triangle lot Building 1 would be 43 dBA CNEL. The peak noise level associated with back-up alarm use (lasting approximately 2 minutes per hour), would be reduced to 65 dBA at the closest residential outdoor living area.

4.2 Parking Lot Activities

Commercial parking lots are provided for Building E (lot 8) and Building F (Lot 7). The distance from a commercial parking lot to the closest outdoor living area of proposed Building 1 is approximately 54 feet. The distance from a commercial parking lot to the closest outdoor living area of proposed Building 2 is approximately 120 feet. Various noise events, including noise related to vehicle movements, car alarms, and door closures, may occur within the commercial parking lot areas. These sources typically range from about 30 to 66 dBA at a distance of 35 feet (Gordon Bricken & Associates 1996), and are generally short-term and intermittent. Using the middle of the reported range for parking area activity noise (i.e., 48 dBA at 35 feet) as an average noise value for parking lot area activity (which is considered reasonable), the average parking lot area noise level at the closest outdoor living area of proposed Building 1 would be 44 dBA; average parking lot noise at the closest outdoor living area of proposed Building 2 would be 37 dBA.

Assuming commercial parking lot activity 24-hours per day (which represents a worst-case scenario), with an hourly Leq of 44 dBA for each of these hours, the CNEL at the closest outdoor living area of proposed Building 1 would be 51 dBA. Assuming commercial parking activity 24-hours per day with an hourly Leq of 37 dBA for each of these hours, the CNEL at the closest outdoor living area of proposed Building 2 would be 44 dBA.

4.3 HVAC Equipment

According to the Project EIR (Envicom 2011), roof-mounted HVAC equipment was assumed to produce a sound level of 60 dBA at 20 feet. Based upon the mechanical roof plans (Menemsha Architecture, 8/3/2015), the distance between Building E (Lot 8) HVAC equipment and the closest outdoor living area of proposed Building 1 would be approximately 120 feet. The distance between Building F (Lot 7) HVAC equipment and the closest outdoor living area of proposed Building 2 would be approximately 200 feet.

Using the formula for attenuation of point source noise at a hard site, the Building E HVAC noise levels would be reduced to 44 dBA Leq at the closest outdoor living area for proposed Building 1. Assuming HVAC operation 24-hours per day (which represents a worst-case scenario), with an hourly Leq of 44 dBA for each of these hours, the HVAC noise CNEL at the closest outdoor living area of proposed Building 1 would be 51 dBA.

Using the formula for attenuation of point source noise at a hard site, the Building F HVAC noise levels would be reduced to 40 dBA Leq at the closest outdoor living area for proposed Building 2. Assuming HVAC operation 24-hours per day (which represents a worst-case scenario), with an hourly Leq of 40 dBA for each of these hours, the HVAC noise CNEL at the closest outdoor living area of proposed Building 2 would be 47 dBA.

4.3 Combined Commercial Operations and Activities Noise Levels

Because noise levels are reported as logarithmic values, the process to add noise levels involves a logarithmic equation, rather than simple addition. *Table 1* below provides the results for combining the noise levels from loading dock operations, parking lot activities, and HVAC systems at the closest outdoor living area for each of the proposed residential apartment structures within the Final Phase area.

TABLE 1

Noise Levels from Combined Commercial Operations & Activities at Final Phase Residences

Noise Source	Noise Level at Building 1 dBA CNEL	Noise Level at Building 2 dBA CNEL
Loading Dock	52	43
Parking Lot	51	44
HVAC Systems	51	47
TOTAL	**56**	**50**
Noise Element Exterior Limit	**60**	

5.0 FINDINGS

Noise levels at the outdoor living areas of the proposed Final Phase residences closest to adjacent commercial portions of the Hollister Mixed-Use Village would be exposed to exterior noise levels from commercial activities ranging up to 56 dBA CNEL. These noise levels would fall within the 60 dBA CNEL limit of "normally acceptable" exterior noise exposure according to the Noise Element (Goleta General Plan\Coastal Land Use Plan, Chapter 9.0). Consequently, the proposed residential structures would comply with the noise element criterion, without the need for noise control measures. Additionally, the structures would not require construction materials or techniques beyond those already required for current Title 24 energy conservation in order to achieve the interior noise criterion of 45 dBA CNEL.

As noise impacts associated with the Final Phase construction/operations would be less than significant, noise impacts would not be substantially more severe than those impacts originally identified in the Project EIR; no additional noise mitigation measures would be required.

Respectfully submitted,

DUDEK

Jonathan V. Leech, INCE
Senior Environmental Planner, Acoustician

Att: Attachment A, Acoustic Terminology

REFERENCES

City of Goleta

City of Goleta General Plan / Coastal Land Use Plan, Chapter 9.0, Noise Element – September 2006.

County of Shasta.

Draft EIR, Knighton & Churn Creek Commons Retail Center. 2009.

Gordon Bricken & Associates

Parking Lot Noise Estimates, 1996.

Westar Mixed-Use Village Project Environmental Impact Report

Envicom – October 2011

ATTACHMENT A

Acoustic Terminology

Term	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
A-Weighted Sound Level, Dba	The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Community Equivalent) Sound Level (CNEL)	CNEL is the A-weighted equivalent continuous sound exposure (CNEL) level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during the nighttime hours (10 p.m. to 7 a.m.) and 5 dB added to the sound during the evening hours (7 p.m. to 10 p.m.).
Decibel, (dB)	A unit for measuring sound pressure level and is equal to 10 times the logarithm to the base 10 of the ratio of the measured sound pressure squared to a reference pressure, which is 20 micropascals.
Sound Transmission Class, STC	A single number rating of the noise reduction of a building element.
Time-Average Sound Level (L_{EQ})	The sound level corresponding to a steady state level containing the same total energy as a time varying signal over a given sample period. L_{EQ} is designed to average all of the loud and quiet sound levels occurring over a time period.