

Gading Drive Development

Hayward, CA

Environmental Noise Assessment

27 April 2016

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INTRODUCTION

This report summarizes our environmental noise assessment for the Gading Drive Development near Gading Court in Hayward, California. The project consists of 20 two-story single-family residences. Surrounding land-uses are a mix of single-family and multi-family residences. The purpose of this study is to quantify the noise environment, compare it with applicable City and State standards, and recommend noise reduction measures, such as sound rated windows and doors, and noise barriers, as needed. Following is a summary of our findings:

- Estimated future environmental noise levels at the site range from below DNL¹ 60 dB² to DNL 68 dB.
- Incorporating sound-rated windows and exterior doors at exterior facades, as shown in the attached Figure 2, reduces estimated interior noise levels to the California Building Code³ requirement of DNL 45 dB and the City of Hayward's maximum noise level criterion for trains.
- The project will need to incorporate solid noise barriers along Gading Road in order to meet the City's 60 dB goal in backyards.

ACOUSTICAL CRITERIA

The City of Hayward General Plan

The Hazards Element of the Hayward General Plan, Goal 8, contains residential noise standards for the community. A summary of the policies is as follows:

- "Normally acceptable"⁴ land-use compatibility for single-family homes defined as DNL 60 dB or less.
- A maximum indoor noise level from exterior sources of DNL 45 dB, as consistent with the California Building Code.
- Maximum instantaneous noise levels for projects that are primarily exposed to aircraft, train, and BART noise of 50 dB in bedrooms at night (10:00 PM – 7:00 AM) and 55 dB during the day (7:00 AM – 10:00 PM) in all interior rooms.
- A maximum acceptable exterior noise level of DNL 60 dB at the center of the primary open space for single-family residences (e.g., backyards).

NOISE ENVIRONMENT

The noise environment at the site is most impacted by traffic on Gading Road and Amtrak and freight trains in the right-of-way approximately 270 feet to the northeast of the site. To quantify the existing noise environment, two long-term monitors continuously measured noise levels at the site between 6 and

¹ DNL (Day-Night Average Sound Level) – A descriptor for a 24-hour A-weighted average noise level. DNL accounts for the increased acoustical sensitivity of people to noise during the nighttime hours. DNL penalizes sound levels by 10 dB during the hours from 10 PM to 7 AM. For practical purposes, the DNL and CNEL are usually interchangeable. DNL is sometimes written as L_{dn} .

² A-Weighted Sound Level (dBA) — A term for the A-Weighted sound pressure level. The sound level is obtained by use of a standard sound level meter and is expressed in decibels. All noise data in this report are A-Weighted.

³ 1 July 2015 Addendum, California Code of Regulations, Title 24, Part 2: 2013 California Building Code, Chapter 12, Section 1207: Sound Transmission.

⁴ Specified land use defined as satisfactory and uses the assumption that any building is of normal conventional construction without special noise mitigation. Projects located along major transportation corridors (major freeways, arterials, and rail lines), may exceed the "normally acceptable" for certain areas of the site (e.g., frontages adjacent to a transportation corridor or parking areas).

8 April 2016. In addition, a short-term “spot” measurement was conducted and compared with corresponding time periods of the long-term monitors to determine how noise levels vary across the site. Table 1, below, summarizes measured existing noise levels. Figure 1, attached, shows the approximate measurement locations.

Table 1: Existing Noise Environment

Site	Location	Date / Time	DNL
L1	Gading Road Monitor Approximately 60' E of Gading Road centerline, 10' above grade	6 to 8 April 2016	67 dB
L2	Back of Site Monitor Approximately 400' E of Gading Road centerline, 10' above grade		59 dB
S1	Northwest Site Spot Approximately 140' E of Gading Road centerline, 150' S of Huntwood Ave centerline, 5' above grade	10:45 – 11:00 8 April 2016	60 dB

Over the 2-day measurement period, there were 16 noise events categorized as trains, which were noted both during the day and at night. The typical maximum noise level⁵ from trains at monitor L2 was 81 dB.

In a report dated November 2007, the Metropolitan Transportation Commission estimates that vehicle trips in the San Francisco Bay Area will increase by approximately 1 percent per year through the year 2035⁶. Over a ten-year period, this corresponds with an approximate 1-decibel increase in environmental noise. Therefore, the following analysis assumes a 1-decibel increase in vehicle traffic-related DNL across the site.

ANALYSIS AND RECOMMENDATIONS

Estimated future environmental noise levels at the site range from below DNL 60 dB to DNL 68 dB at the locations of the homes. The project will need to incorporate sound-rated windows and exterior doors to reduce transportation noise to the Code criterion of DNL 45 dB or lower at residences and meet the City's maximum instantaneous noise level criterion of 50 dB at night from trains. Initial window and exterior door sound insulation ratings, in terms of STC⁷, are shown in Figure 2, attached. The initial estimates are based on the following:

- Floor plans and elevations dated 17 February 2016. The STC ratings will need to be revised as unit plans and window sizes are further developed.
- Exterior walls equivalent to 7/8-inch cement plaster over wood sheathing, insulation in stud cavities, and one layer of gypsum board on the interior (approximately STC 45).
- Ventilation systems that do not compromise sound insulation of the exterior wall assemblies. This will be provided via ducted systems and the design will be reviewed during the design phase.

⁵ L_{max30} (Typical Maximum Sound Level) – There is no standardized metric to quantify “typical” maximum sound levels in an environment (instead of the absolute maximum sound level for a measurement period). The metric L_{max30} comes from a paper by Rob Greene (“Max Level Intrusive Noise Limit: 1982 National Conference on Environmental and Occupational Noise”). It is based on the logarithmic average of the noisiest 30 percent of single events (e.g., train passbys, aircraft flyovers).

⁶ Transportation 2035 Change in Motion, Travel Forecasts for the San Francisco Bay Area 2009 Regional Transportation Plan Vision 2035 Analysis, November 2007, Tables E.17.2 and E.18.2.

⁷ Sound Transmission Class (STC) — A single number used to compare walls, floor/ceiling assemblies, windows and doors for their sound insulating properties with respect to speech and small household appliance noise.

Estimated future noise levels at the center of backyards are as high as DNL 65 dB at Lot 1 and Lot 20. In order to meet the City's goal of DNL 60 dB, provide a noise barrier at the current location of the wood fences along Gading Road for the backyards of Lots 1 and 20. Noise barriers should be solid from bottom to a minimum 6-foot height with no cracks or gaps, and should have a minimum surface density of approximately three pounds per square foot. Effective barriers can be constructed out of CMU block or framed plaster walls. Enhanced wood fences may also be used, however special care must be taken to ensure that gaps do not form as the wood expands and shrinks over time. Details should be determined during the design phase and revised by an acoustical consultant.

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GADING DRIVE DEVELOPMENT AERIAL VIEW SHOWING APPROXIMATE NOISE MEASUREMENT LOCATIONS

FIGURE 1

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- STC 36 BR, STC 32 OTHER ROOMS
- STC 32 BR, STC 28 OTHER ROOMS
- STC 30
- STC 28

FIGURE 2 – GADING DRIVE DEVELOPMENT
 MINIMUM RECOMMENDED STC RATINGS FOR EXTERIOR WINDOWS AND DOORS
 NO SCALE
 SALTER PROJECT NO. 16-0221
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