



July 10, 2013

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RE: Lake Street Place – Roof Deck Noise Analysis

This letter presents the results of an environmental noise analysis conducted for the proposed occupied roof deck of the Lake Street Place Development office project located at 112-150 Lake Street S in Kirkland, WA. The purpose of the analysis is to document the impact of the proposed roof deck to the adjacent noise sensitive receiving properties; the Portsmouth Condominiums to the east and the south, Merrill Gardens to the east, and the 101 Kirkland Apartments to the north. Noise levels generated during maximum anticipated occupancy on the roof are predicted to the property lines of the receiving properties, and compared to the exterior sound level limits established by Kirkland Municipal Code. This analysis is based on the design drawings dated 7/30/12 and occupancy loads provided in email correspondence dated 4/15/13.

This review is based on the anticipated use of the space for commercial offices. Should the use of the spaces change, an additional study would be required to ensure compliance with the noise code limitations.

ZONING

The project site is bounded by the 101 Apartments to the north, Merrill Gardens Assisted Living Facility to the east, the Portsmouth Condominiums to the east and southeast, Second Avenue to the south and Lake Street South to the west.

Per the City of Kirkland, it is our understanding the project and adjacent properties are currently zoned as follows:

- Project Site: CBD-1B
- North: CBD-1B
- East: CBD-1B / CBD-4
- South: CBD-1B
- West: CBD-2

As per the Kirkland Zoning Map, CBD is classified as “Central Business District” zoning. The following figure is a zoning map with the project site highlighted in **blue**, Figure 1.

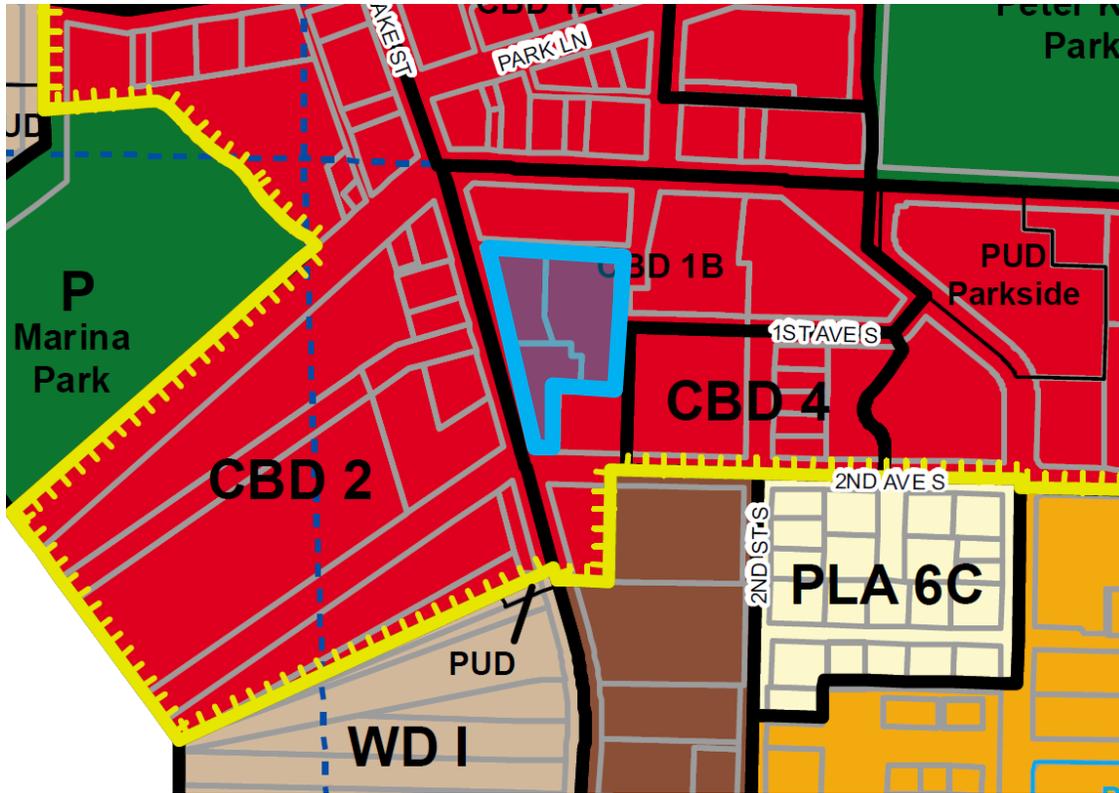


Figure 1 – Project Site Zoning Map

NOISE ORDINANCE

The City of Kirkland Municipal Code adopts the maximum environmental noise levels established in WAC 173-60 by reference. The applicable noise ordinance, as outlined in WAC 173-63-040 *Maximum permissible environmental noise levels*, is based on the Environmental Designation for Noise Abatement (EDNA) for the source and receiving properties. WAC 173-60 defines the EDNA by land use. The maximum permissible environmental noise levels for a commercial source, and residential or commercial receiver per Washington code are listed below in Table 1.

Table 1: Maximum permissible environmental noise levels

EDNA of Sound Source	EDNA of Receiving Property
	EDNA B Commercial (dB(A)) (Leq)
EDNA A Residential	57
EDNA B Commercial	60

WAC Code 173-60-040(B) states that between the hours of ten (10:00) p.m. and seven (7:00) a.m. the limits given by the table above are reduced by ten (10) dB(A) for receiving properties within Class A EDNAs.

In addition, during any hour of the day or night the applicable noise limitations may be exceeded for any receiving property by no more than:

- (a) 5 dB(A) for a total of 15 minutes in any one-hour period; or
- (b) 10 dB(A) for a total of 5 minutes in any one-hour period; or
- (c) 15 dB(A) for a total of 1.5 minutes in any one-hour period.

The 101 Kirkland Apartments north of the site, as well as Merrill Gardens senior housing east of the site, and Portsmouth Condominiums south and east are residential land uses and for the purposes of this report are treated as Class A EDNA, having limits for noise transmission of 57 dBA during daytime hours. As the occupancies of the Lake Street Place project are planned to be commercial offices, these roof decks are not anticipated to be occupied during nighttime hours. Should the planned use of the project change, additional study would be required to ensure compliance with other noise code limitations.

ROOF DECK AND CALCULATION DESCRIPTION

There are three main roof decks shown for the Lake Street Place project; one to the south serving the Kirkland Waterfront Market offices, one to the north serving the Hector's Property Offices, and one to the east serving additional office space. These three areas are shown in the figure below.

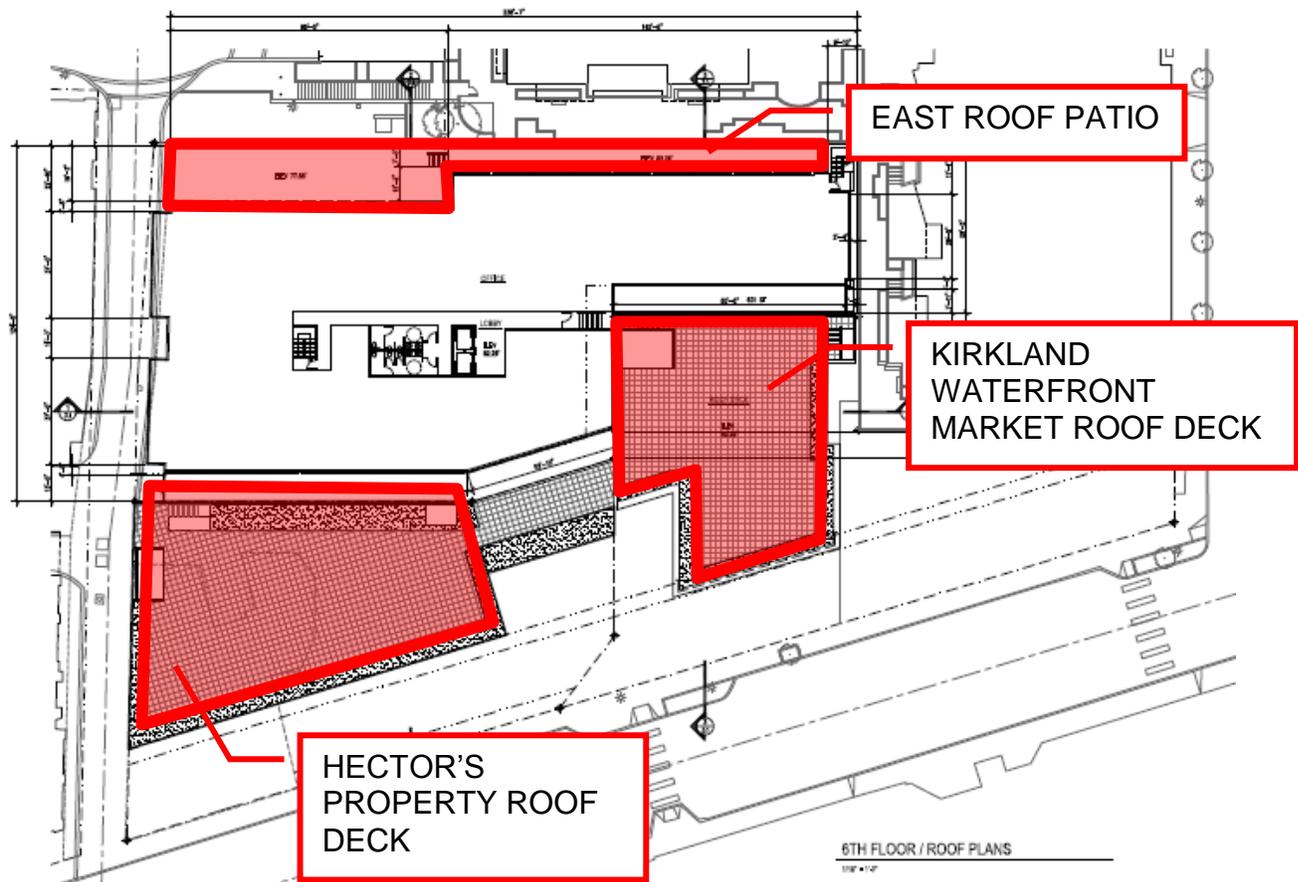


Figure 2 – Roof Deck Plan

For our analysis, we have utilized the maximum occupant loads for each roof deck as provided by the design team. These indicate a maximum of 40 office occupants on the Kirkland Waterfront Market roof deck, a maximum of 64 office occupants on the Hector's office roof deck and 32 office occupants on the east office roof deck. At a maximum, half of these guests would be talking and half listening at any one time, assuming that each person there is engaged in conversation with only one other person. Therefore, we have taken the maximum number of sources to be 20, 32, and 16 people on each roof deck, respectively. In addition, we expect that this conversation would take place for a maximum of 30 minutes in a given hour.

We have used a source level of 62 dBA at 1 meter for normal voice level, based on the ANSI draft standard S3.79. Distance from the closest occupied point on the roof deck is

taken to the adjacent property line to the south, which corresponds to the north edge of the public way, as well as the upper floor window of the Portsmouth condos north façade for the worst-case scenario. The calculation takes into account that all occupants are assumed distributed on the southern edge of the deck.

For the north roof deck, occupied by the Hector's Property offices, we have calculated the noise impact across the alley based on a distribution of all occupants on the northern third of the roof deck. At the east roof deck, we have assumed a distribution of occupants along the east edge of the roof, with a maximum of 50% of the occupants able to be concentrated in one area, at a point closest to the condos, or Merrill Gardens. These receiving points are shown in the figure below.

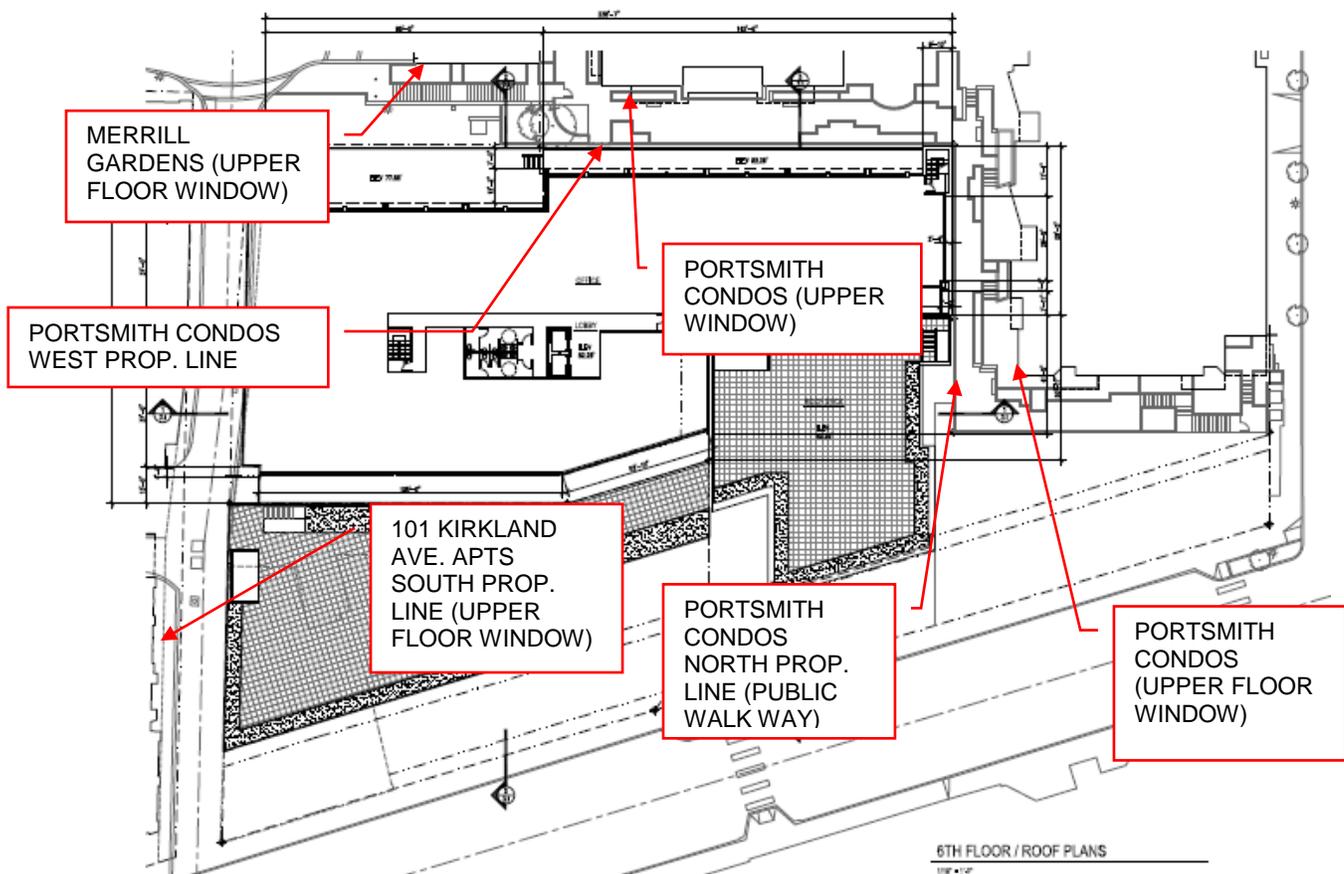


Figure 3 – Sound Prediction Locations



RESULTS & DISCUSSION

Noise levels from the proposed roof top deck areas have been predicted to the closest adjacent property lines, and upper floor windows with direct line of sight for the worst case scenario. The sound predictions are shown in the table below.

Receiving Property Calculation Summary	
Receiver	L_p (dBA)
North Receiving Property (101 Kirkland Apartments South Prop. Line): 32 speakers at a normal voice level, speaking for 50% of a given hour. Speakers distributed on north 1/3 of Hector's property deck. Propagated across the alley.	53
South Receiving Property (Portsmouth Condos North Prop. Line): 20 speakers at a normal voice level speaking for 50% of a given hour, concentrated on southern edge of roof deck. Propagated to the public walk way below.	46
South Receiving Property (Portsmouth Condos Upper Floor Window): 20 speakers at a normal voice level speaking for 50% of a given hour, concentrated on southern edge of roof deck. Propagated across the public walk way below.	50
East Receiving Property (Portsmouth Condos Upper Floor Window): 16 speakers at a normal voice level speaking for 50% of a given hour, concentrated on east edge of roof deck. Propagated across the public walkway. Speakers distributed with 50% at closest point to adjacent property to the east.	53
East Receiving Property (Portsmouth Condos West Property Line): 16 speakers at a normal voice level speaking for 50% of a given hour, concentrated on east edge of roof deck. Propagated to the public walkway. Speakers distributed with 50% at closest point to adjacent property to the east.	50
East Receiving Property (Merrill Gardens West Upper Floor Window): 16 speakers at a normal voice level speaking for 50% of a given hour, concentrated on east edge of roof deck. Propagated across the alley space. Speakers distributed with 50% at closest point to adjacent property to the east.	51

As can be seen above, the predicted noise levels to the North, South, and East will be below the 57 dBA limit imposed by Kirkland Municipal Code. The predicted noise level at the west property line across Lake Street South is well below 60 dBA, which is the City of Kirkland noise limit for B EDNA Source and B EDNA receiver.

SUMMARY

This letter shows that the environmental noise impact from the roof decks planned for the Lake Street Place Project will be below code limits imposed by the City of Kirkland. This document has provided our environmental noise analysis to the nearest adjacent property lines from the planned roof decks at 112-150 Lake Street S in Kirkland, Washington. This analysis has been provided for the office occupancy planned for the project. Should the planned use change, a revised analysis will be provided.

Should there be questions please do not hesitate to contact us.

Sincerely,
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Appendix A. Descriptors

To better understand this report we present a brief overview regarding sound properties, descriptors and terms.

dBA Mechanical noise is often measured as an A-weighted sound level in units of decibels, symbolized as dBA. The A-weighting is a specific weighting filter in a sound level meter that corresponds approximately to the sensitivity of human hearing at the various frequencies.

Sound levels vary significantly depending on location and activities. People normally experience sound levels between about 30 and 90 dB(A), depending on their activity. For example, a nearby noisy vehicle, radio or power tool may produce 90 dB(A); normal conversation is about 55 to 65 dB(A); and a bedroom or quiet office is about 30 to 40 dB(A). The table below approximates human sensitivity to changes in sound level.

Table 2 – Changes in Sound Level

Change in Sound Level (dB)	Change in Apparent Loudness
1	Imperceptible (except for tones)
3	Just barely perceptible
6	Clearly noticeable
10	About twice (or half) as loud
20	About 4 times (or one-fourth) as loud