THE GREENBUSCH GROUP, INC.

Memorandum

DATE: June 6, 2014

TO: *Terrie Battuello, terrieb@portofeverett.com*

CC: *Denny Derickson, dennisd@portofeverett.com*

FROM: *Julie Wiebusch*

RE: *Letter of Opinion Waterfront Place @ Port of Everett*

Transmitted by: ☐ Mail ☒ Delivery ☐ Fax ☐ E-mail

INTRODUCTION

The intent of this document is to present an evaluation of the Waterfront Place @ Port of Everett project in comparison with the previous North Marina Redevelopment/Port Gardner Warf project.

SUMMARY

Previous studies by Greenbusch in 2003 and by Geomatrix in 2005 analyzed the potential increase in sound levels in the adjacent residential community on the hill overlooking the site. The sources of sound studied were from existing train and traffic along West Marine View Drive. The reflected sound associated with the increased building massing and building heights associated with the projects was predicted.

Both previous studies concluded that the potential increase in sound due to the reflections was, at most, 1 to 2 dBA. This level of increase in sound would be difficult for most people to discern in an active outdoor environment.

The current project, Waterfront Place @ Port of Everett, includes buildings near West Marine View Drive which are similar in height to the original project evaluated. The buildings associated with the Waterfront Place project are similar in massing to the previous projects. It is anticipated that any sound reflected off of these buildings will not increase the ambient sound levels by more than 1 dBA.

Comparing this 1 dBA increase with the EPA Guideline of few complaints if the increases in noise levels do not exceed 5 dBA; we would expect the impact from reflected train noise to be minimal.

NOMENCLATURE

Noise is generally considered unwanted sound. The auditory response to sound is a complex process which occurs over a wide range of frequencies and intensities. Decibel levels, or "dB", are a form of shorthand that compresses this broad range of intensities with a convenient numerical scale. The decibel scale is logarithmic. For example, using the decibel scale, a doubling or halving of energy causes the sound level to change by 3 dB; it does not double or halve the sound level as might be expected.

The minimum sound level variation perceptible to a human observer is generally around 3 dB. A 5 dB change is clearly perceptible, and an 8 to 10 dB change is associated with a perceived doubling or halving of loudness.

The human ear has a unique response to sound pressure fluctuations (changes in the intensity of sound waves). It is less sensitive to those sounds falling outside of the speech frequency range (the higher and lower frequencies). Sound level meters and monitors utilize a weighting system to approximate human perception of sound. Measurements made utilizing this weighting system are referred to as "A weighted" and are called "dBA". All sound level measurements presented in this report are A weighted. The "A" may be dropped from the decibel notation for convenience.

For comparison, Table 1 is a compiled list of typical noise levels from various sources.

Table 1: Common Noise Sources

Sound	***Sound Pressure Level, (dBA)***	***Relative Loudness[1]***
Jet Plane 100'	130	128
Rock Music with Amplifier	120	64
Thunder, Danger of Permanent Hearing Loss	110	32
Boiler Shop, Power Mower	100	16
Orchestral Crescendo at 25 feet	90	8
Busy Street	80	4
Interior of Department Store	70	2
Ordinary Conversation	60	1
Quiet Car at Low Speed	50	½
Average Office	40	¼
City Residence, Interior	30	1/8
Quiet Country Residence, Interior	20	1/16
Rustle of Leaves	10	1/32
Threshold of Hearing	0	1/64

Note 1: As compared to ordinary conversation at 3 feet.
Source: US Department of Housing and Urban Development, Aircraft Noise Impact Planning Guidelines for Local Agencies, November 1972.

METRICS

Responses to noise are subjective and unique to each listener. Metrics have been developed to provide more convenient descriptors of sounds that vary with time and with human responses to them. The following descriptor was selected to characterize various components of sound and to aid in the prediction of the community's response:

- Equivalent Sound Level, L_{eq}

  L_{eq} is a single-value description of average noise exposure over various specified time intervals. The L_{eq} is used to characterize complex, fluctuating sound levels with a single number.

REGULATORY CRITERIA

Everett Municipal Code Chapter 20.08 outlines maximum permissible sound levels for sound sources located within the City of Everett. However, this regulation does not apply to train or other transportation activity.

NON-REGULATORY CRITERIA

The EPA guidelines are not codified standards, but do serve as useful indicators for potential perception of noise impacts.

EPA Region X "Environmental Impact Statement Guidelines." (EPA Region X, 1973.) discusses the increases in noise in relation to expected community response to the new noise source. The responses are described as follows:

- Up to 5 dBA increase - few complaints if gradual increase
- 5 to 10 dBA increase - more complaints, especially if conflict with sleeping hours
- over 10 dBA increase - substantial number of complaints

According to the published Region X document, generally no mitigation is required if the increase is less than 5 dBA. Some mitigation should be considered for increases of 5 to 10 dBA. Increases greater than 10 dBA would be considered serious and would warrant close attention.

The published 1973 document does not indicate either the time interval (e.g., hourly or daily) or the noise metric (e.g., Leq or Lmax) to which these impact/mitigation thresholds should be applied. For this study, these guideline recommendations are applied to the L_{max} levels of train activity.

PREVIOUS MEASUREMENTS OF AMBIENT SOUND

Testing to determine the pre-construction ambient sound condition was conducted between May 5-8, 2003 by Greenbusch and December 15-17, 2005 by Geomatrix.

Both tests were conducted at residences along Grand Avenue with line- of-sight to the project. A third set of measurements was completed in June 26-27, 2006 by Greenbusch to document ambient sound levels on the site of the Port Gardner Warf project at a location near West Marine View Drive. All three measurement periods documented hourly Leq (averages) in the mid 50's dBA to low 60's dBA. Traffic was identified as the most consistent source of sound. The sound associated with the trains was reported as the dominant source but sporadic in schedule.

EVALUATION

Our original 2003 evaluation considered three profiles.

- **Location A** was cut through an area where an existing building was located along Marine Drive. The residence was setback from the hillside slightly, experiencing some shielding from the cliff. The building height increased to 55 feet.
- **Location B** was cut through an area where the existing building was set back from Marine Drive. The residence was located near the hillside with direct line of sight to the tracks below. Little shielding from the topography was experienced at this location. The new building was located along Marine Drive with an increased height to 55 feet.
- **Location C** was cut through an area where an existing building had a substantial setback from Marine Drive and the residence was also set back from the hill side edge. The new building was proposed to be located along Marine Drive and the height increased to 55 feet.

An acoustical model of the area was developed to predict noise levels at these three locations. Topography and distance were considered in the model. Results of our analysis showed a potential increase due to reflected sound off of the new larger buildings of 0 to 2 dBA for each of the locations.

The 2006 study by Geomatrix noted that building heights associated with the project had been reduced from the original Greenbusch analysis. Geomatrix conclusion was that increases due to reflections would be 1dBA or less.