

## Noise Discipline Report SDEIS- April 15, 2010

The negative effects from excess noise emitted from the expansion of the SR520 bridge have been documented many times as a high priority for the Laurelhurst neighborhood.

The Laurelhurst Community Club representative at the State Mediation process worked in concert with neighborhoods surrounding the bridge from both East and West to formulate strategies to reduce noise. The Noise Expert Review panel was also given a document which addressed concerns about noise for the rebuild of SR520.

(see Exhibit 1)

### **Why noise factors are significant**

Chronic sound pollution can trigger the body's stress response, and it also can cause excessive stress hormones to be produced.

There are numerous studies conducted by Professor Gary Evans of Cornell University which found that loud environmental noise interferes with children's ability to learn.

In addition, researchers in Austria and Germany also concluded that children in noisier neighborhoods experience marginally higher systolic blood pressure, greater heart rates and higher overnight cortisol levels which indicate modestly elevated levels of physiological stress. As a result, constant noise pollution can be linked to the later development of high blood pressure, heart disease and stroke and the lowering of the body's natural immune system.

These studies added to Dr. Evans findings that children and adults (in later studies) exposed to chronic noise can have serious health, learning and task motivation impairments.

Reducing noise in residential urban neighborhoods is a high priority in the Health Impact Assessment required by law in SB 6099 as part of the SR520 rebuild process.

### **Analysis of the SDEIS**

#### **Measurement of noise**

It is an egregious omission in the SDEIS that no noise mitigation for the Laurelhurst neighborhood is specified. On page 20 of the Noise Discipline Report, the transmission of sound is described in detail. Lines 1-6 state that sound travel across reflective surfaces (e.g. the water on lake Washington) with minimal attenuation (absorption). In addition, weather can accentuate these conditions (lines 7-15) which states that noise levels can increase during temperature inversions as the warmer air atop the trapped layer of cooler air causes a deflection of skyward-bound sound waves back to the receivers (homes) at ground level. This weather condition describes Seattle at least 60% of the year. To dismiss this effect is an unacceptable in measuring noise from SR520 under "normal" Seattle area conditions.

The criteria for an acceptable noise level is defined as 66dBA (page 23) by FHWA and WSDOT. Page 27, lines 20-25, states that only residences within 500 feet are considered (under WSDOT policy). However, this noise (page 20) will carry across **reflective** surfaces such as water **at the same noise level as within 500 feet** and this sound should be measured accurately and mitigated. The report claims that 7 locations in Laurelhurst were "modeled", but Exhibit 10 shows that only 2 locations were actually measured, and of that only 1 for 24 hours. No weather conditions were described. The other location was a very short term one at Belvoir Park, quite a long distance from the bridge, and read for only 15 minutes, providing insufficient readings for total noise received. (page 41) The single reading of 57 dBAs is insufficient.

Exhibit 2 is a list of 70 residences who have complained about loud "bridge noise" in this neighborhood.

Page 33 of the report notes that topography affects sound transmission. (lines 21-33). Given that information, the report states that "Laurelhurst (page 34) has no noise reducing features in its topography". In fact, the new location of the 6 lane bridge brings it closer to Laurelhurst by 150 feet, to the north. These factors **will increase** the noise transmission to residences located at the shorelines and at the top of the hill which will carry the noise upwards as it deflects from the water.

Noise mitigation proposed by WSDOT for SR520 for Laurelhurst is absent.(exhibit 53) The report (page 103) states that "modeled" noise levels will not exceed NAC. Even on the single measurement for one day, it is However, because a new 6 lane bridge is physically closer by 150 feet and carries more traffic at a higher rates of speed, all of these generate more noise to residents. Further, the noise walls proposed on the southern side will create excess noise echo back to bikers, pedestrians and residences to the north of the bridge.

### **Noise comparison to no build**

The noise discipline report is **not accurate** when it states that the "no build alternative" would result in more noise (page 69). This is not true due to increase volumes will result in slower speeds and thus less noise emitted. The "no build" leaves the bridge in its current location, rather than bringing more noise closer to the Laurelhurst neighborhood.

### **Construction noise impacts**

Construction noises should be mitigated as a top priority. the project will take between 4-8 years of pile driving and the use of loud equipment. Pile driving (page 65) is estimated to produce intense noise of 99 to 105 bBA. This is unacceptable to residences.

**The 2009 "tests for pile driving techniques" and its results are not included in the SDEIS.** this is a serious flaw in the noise discipline report, and needs to be published for adjacent neighborhoods and park users.

Pages 172-174 list potential noise reducers during construction. All of these should be required when the project goes out to bid. Monetary incentives should be part of the contract to entice maximum noise reduction during construction. Such practices as restricting use of "back-up" beepers and using spotters makes an enormous difference in reducing annoying noise. Reducing noise from construction is of the highest value to surrounding communities on both the Eastside and Westside to enable their citizens to function more normally.

Not only will people be adversely affected by excess construction noise, it will severely impact wildlife such as the bald eagle during its nesting season. (page 66)In addition, fish will be disturbed as these noises actually transmit directly under water.

### **Mitigation Recommendations**

Mitigation for excess noise from the 6 lane bridge is incomplete (page 107).

Many suggestions listed are effective such as use of heavy landscaping and highway design alignments. However, **the exclusive use of noise walls by WSDOT for mitigation is completely adverse to all of the recommendations made by adjacent neighborhoods, parks and institutions.**

The Noise Expert Review Panel published their findings dated November 24, 2008. These meetings were attended by Mediation representatives and the results were comprehensive. Unfortunately, WSDOT has not integrated these comprehensive and efficient ways to reduce noise into the SDEIS. Only lids and noise walls are recommended (page 171, lines 28-29) Specifically noise mitigation techniques for SR520 should include their following recommendations, rather than just specify 10-15 foot high noise walls.

The Noise Expert Review Panel's recommendations included:

1. Installation of quieter pavements with periodic renewal of surfaces for effectiveness.
2. Reduce or eliminate use of studded tires on bridge.
3. Design of gentler grades.
4. Use of sound absorptive material on all safety barriers
5. Parallel **transparent** barriers on structure (with absorptive bases) for noise reduction between vehicles and bike and pedestrians.
6. Use of short, opaque absorptive barriers, designed low to protect view sheds
7. Absorptive treatment/ textures on retaining walls.
8. Quieter expansion joints on bridge surfaces, especially on high rise segments.
9. Use of under deck covering or coating with sound absorption materials.
10. Traffic calming of adjacent arterials.
11. Quieter pavement on adjacent arterials.
12. Use of absorptive materials on inside of lids
13. Dense vegetation on tops of lids or exterior of walls
14. Jersey barriers to be fabricated out of sound absorption materials
15. Prohibition of the use of compression brakes
16. Construction noise plan including penalties and incentives.
17. Addition of more lids and tunnels

WSDOT has included speed, ramp and grade designs and use of lids in some areas.

**The SDEIS falls short in the inclusion of these other effective measures to reduce the negative health impacts on nearby residents and park and recreational users.**

### **Noise walls as Mitigation**

Pages 113-120 include the explanation of the placement and function of noise walls to reduce noise from the highway. Most of the discussion is focused on the cost/benefit analysis of sound reduction by standards set by WSDOT.

Page 116, lines 35-38 state, "Noise walls would only be constructed if WSDOT determines that they are feasible and reasonable" and yet states that "WSDOT policy also provides for local jurisdiction and community input to the process of assessing mitigation measures"

**This process for local input took place via the noise expert review panel, but the results were ignored in the SDEIS by WSDOT.**

Page 119 discusses the effectiveness of noise walls with "above grade" receivers. This type of topography is characteristic of **most** of the 520 corridor on the Westside approach. Many homes are located up on hills surrounding the bridge in Madison Park, Laurelhurst, North Capital Hill , Portage Bay and Roanoke Park in a "bowl".

Lines 12-15 in the SDEIS states,

"Noise walls are less effective at reducing transportation noise at locations where receivers are elevated above the roadway (such as North Capital Hill) because the receivers are closer to noise that is diffracted over the top of the noise wall."

Thus, residences **over the proposed noise wall of 10 feet would have no benefit from their inclusion as mitigation.** Further, they could carry the sound further to residences above the projection of the noise wall, even to greater distances, increasing impacts.

### **Location of Noise Walls**

Pages 129-138 and pages 148 and 159 specify which neighborhoods that qualify for noise mitigation using sound walls.

Exhibit 54 shows that noise walls would be erected on the south side of SR520 only along Madison Park (pages 135 and 136). The north side (which moves to the north by 155 feet is not protected by installing the same noise walls.

This creates an "echo effect" for the cyclists and walkers and Laurelhurst residences which is shown on USDOT noise wall illustration on page 115.

**All traffic noises will bounce off the noise walls on the south side, and reflect back to the north side which first hits the bikers and pedestrians right on the bridge. Then the noise carries over the reflective surface of water to Laurelhurst residences, increasing significantly the currently measured decibels. Add to that, the increase in noise due to cloud cover, and noise is magnified to warrant mitigation.**

Thus, the SDEIS falls short in evaluating the global effect of adding noise walls to only the south side of the bridge. Magnification and reflection of more noise from the south side back to pedestrians, bikers and residences to the north of the noise walls is not measured nor mitigated adequately.

### **Summary**

In summary, the SDEIS Noise Discipline Report for SR520 is flawed in identifying the complete range of impacted receptors of bridge noise, fails to include acceptable and effective mitigation measures and worse, includes techniques such as one-sided noise walls which will create an increase of noise across to opposite bikers, pedestrians and residences of the Laurelhurst neighborhood.