TRAFFIC NOISE ANALYSIS
EXECUTIVE SUMMARY

SR 167 – 8th Street E Vic. to S 277th Street Vic.

Southbound HOT Lane

SR 167 – 8th Street E Vic. to 15th Street SW Vic.

Northbound HOT Lane

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EXECUTIVE SUMMARY

What is the purpose of this report?

This report documents the range of noise levels of the existing SR 167 highway, forecasts of future freeway noise levels, and recommended locations for noise walls.

This technical memorandum describes the existing conditions and potential range of effects to the audible environment that may be attributed to the construction and operation of this SR 167 project.

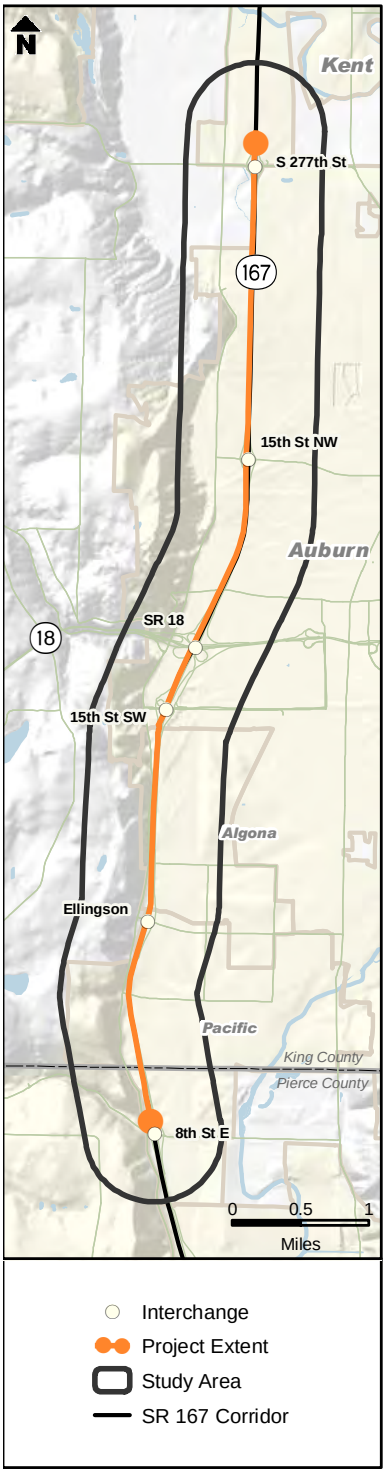
What is the proposed project and why is it needed?

The Washington State Department of Transportation (WSDOT) plans to widen the State Route (SR) 167 roadway to construct a new southbound high-occupancy toll (HOT) lane from the vicinity of 8th Street E (MP 10.2) in Pierce County, Washington to the vicinity of S 277th Street in Kent (MP 18.24), King County, Washington (Exhibit 1). This new HOT lane will be a continuation of a southbound HOT lane that was constructed for the HOT Lane Pilot Project, which extends from the I-405 interchange in Renton to S 277th Street in Kent.

High Occupancy Toll (HOT) lanes are managed lanes intended to increase mobility by allowing more vehicle use of the HOV lane. HOT lanes maintain free, priority status for transit and carpools, the same as a HOV lane, but also allow single occupancy vehicles to pay a toll to use the lane. Toll rates are variable, depending upon the level of congestion.

The construction of the HOT lane will require widening the roadway to the outside of the existing pavement between 6th Avenue N in Algona and 5th Avenue S in Pacific. In addition, it will require widening the southbound bridge at the SR 18 interchange. Ramp meters will be installed at southbound on-ramps at the SR 167 interchanges with 15th Street SW, Ellingson Road, and 8th Street E. In addition, new signals will be installed at the SR 167 southbound ramp terminals with Ellingson Road and 8th Street E. All of the proposed widening work will occur within the WSDOT right-of-way, with the exception of the stormwater site. The

Exhibit 1
Vicinity Map



stormwater site will be purchased at the northwest quadrant of the SR 167 / SR 18 interchange area.

SR 167 is an important thoroughfare for cars, trucks, and transit in the Green River Valley. The additional capacity that this project will provide to SR 167 will relieve congestion and improve safety for commuters traveling southbound. This project, combined with other planned SR 167 projects, could make the highway a viable alternative to I-5.

What is the affected environment?

The land use in the immediate vicinity of the project includes low-density residential, mixed residential and commercial, and commercial uses. Several large undeveloped parcels are also located within the project area along with some agriculture parcels.

How are the effects on different land uses determined?

The different land uses are considered different levels of receivers under the noise analysis process. Residential uses are considered the most sensitive of the receivers.

WSDOT considers a traffic noise effect to occur when predicted project-related noise levels approach the criteria level within 1 dBA, or substantially exceed existing levels. Residential effects occur at 66 dBA and commercial effects at 71 dBA. WSDOT also considers a 10 dBA increase over the existing noise levels as a substantial increase.

How was the project modeled for noise affects?

The field reconnaissance was conducted in order to identify noise-sensitive land uses (for example, residential or parks). The reconnaissance led to the noise measurement locations that best characterize the existing noise environment. Nine noise monitoring location were identified (see Exhibit 3) to best measure the existing traffic noise levels as well as identify other major background (non-freeway related) noise sources in the project area.

The existing peak-hour traffic volumes were measured and traffic modeling software forecasted the 2030 traffic

Decibel

- Traffic noise is measured in decibels (dB), a unit of measure, is a logarithmic conversion of absolute air pressure to units that are more convenient and easier to understand.
- To better approximate the sensitivity of the human ear to sounds of different frequencies, the A-weighted decibel scale was developed. The human ear is less sensitive to higher and lower frequencies; thus, the A-weighted scale, expressed as dBA, reduces the sound level contributions of these frequencies.

volumes for both the Build and No Build Alternatives. Existing and 2030 traffic-noise levels were then calculated using the latest FHWA-approved noise model, Traffic Noise Model (TNM) version 2.5.

Existing noise levels were field measured at the nine monitoring location and this information was used to calibrate the noise model for accuracy. The noise measurements were taken during off-peak commute periods when the noise levels are greatest. During peak commute period's traffic is slow and does not produce as much noise as off-peak, mid-day periods.

Once calibrated, the TNM can predict the noise levels for the Build and No Build Alternatives at each of the receptor locations. In addition to the traffic data, noise-reducing effects of existing structures directly bordering the project roadway, roadway alignment and profiles, topography, ground cover, and foliage are included in the calculations where appropriate.

Noise abatement alternatives are considered (noise walls) in various locations and are modeled for their affects on the receivers. Certain criteria must be met: the wall must produce a certain dBA reduction for several receivers, and the wall construction cost must be reasonable (as defined by federal regulations) in comparison to the benefit per receiver.

How will the project affect noise levels?

In 2030, with both northbound and southbound HOT lane projects (the Build Alternative), noise levels along the corridor are predicted to range from 62 to 73 dBA during peak hours. The highest noise levels are expected for residences (sensitive receptors) located directly adjacent to the project corridor. Those residences are located from Ellingson Road north to 11th Avenue N, predominately in the City of Algona.

Forecasted 2030 noise levels will increase by up to 3 dBA when compared to the existing conditions or the No Build Alternative.

In the forecasted (2030) model an estimated 71 residences are expected to exceed the traffic noise criteria if no mitigation measures are provided, such as noise walls. Of these properties, 49 are on the east side of SR 167 and eight are on the west side.

What is proposed for noise mitigation?

Noise mitigation was considered for all receivers where noise levels exceed the noise criteria. After reviewing the locations of the predicted noise effects and receivers, analysts determined that noise barriers were the only feasible form of noise mitigation.

With the new noise wall proposed in this report, 35 affected residences will be mitigated, leaving an estimated 37 residences with residual noise effects under the Build Alternative. The proposed noise wall will vary in height from 7 to 12 feet with an average height of 10.85 feet. The approximate 4,340-foot-long wall will begin near 6th Avenue N, and continue along the east shoulder of northbound SR 167 to the vicinity of 5th Avenue S. No noise wall is proposed on the 1st Avenue N overpass bridge because it will not meet the WSDOT reasonableness and feasibility criteria. This gap in the wall will be approximately 150 feet wide.

Overall, with the proposed noise wall, future noise levels between 6th Avenue N and 5th Avenue S will be 2 to 7 dBA lower than the current noise levels and 4 to 8 dBA lower than future 2030 conditions without the noise wall. The cost of the noise wall will be approximately $179,400 below the maximum allowable cost based on the WSDOT reasonableness criteria.

Unavoidable or residual noise impacts are expected on both sides of SR 167 where the noise abatement measures examined could not meet the WSDOT feasibility and reasonability requirements. No noise abatement is recommended at these locations.

Thresholds establish different levels of sounds

- Urban nighttime noise levels range from 40 to 50 dBA.
- Urban daytime noise levels area can be frequently as high as 70 to 80 dBA.
- Vacuum cleaner at 50 feet noise levels range up to 70 dBA.
- A food processor at 2 feet or pneumatic drill at 50 feet noise levels range up to 80 dBA.
- Noise levels above 110 dBA become intolerable.

What about unavoidable temporary construction noise effects and mitigation?

Construction noise will be generated by heavy equipment used during major construction periods under the Build Alternative. Construction activities will occur throughout the project area as close as 50 feet from existing residences/businesses. Estimates of maximum hourly noise levels at the closest receivers for various stages of construction can range during the daytime from 70 dBA to 88 dBA.

Offsetting the relatively high noise levels, construction activity will be limited to daylight hours (7:00 am to 8:00 pm), with some nighttime activities upon approval of noise variances. Additionally, the construction will be of short duration and the 70 dBA to 88 dBA noise levels can be expected only when the equipment is within 50 feet of the receiver. All buildings bordering SR 167 can expect maximum construction noise levels in the 80 dBA range when equipment is operating on the roadway immediately next to them. These noise levels will decrease as the construction operations move farther away.

WSDOT will maintain noise levels below the regulated levels. Some night work will be performed and will require approved noise variances from the local cities. WSDOT will implement Best Management Practices (BMPs) to reduce construction related noise at night.