3.6 Noise

This section presents the results of a project level noise analysis. The Tier I EIS and Record of Decision required such a study be completed during the Tier II NEPA process.

Construction and operation of the proposed SR 167 present potential noise impacts. In general, an increase in volume, speed, or vehicle size increases traffic noise levels. The majority of traffic noise comes from the engine, exhaust, and tires. Other conditions affecting noise include defective mufflers, steep grades, terrain, distance from the roadway, and shielding by barriers and buildings.

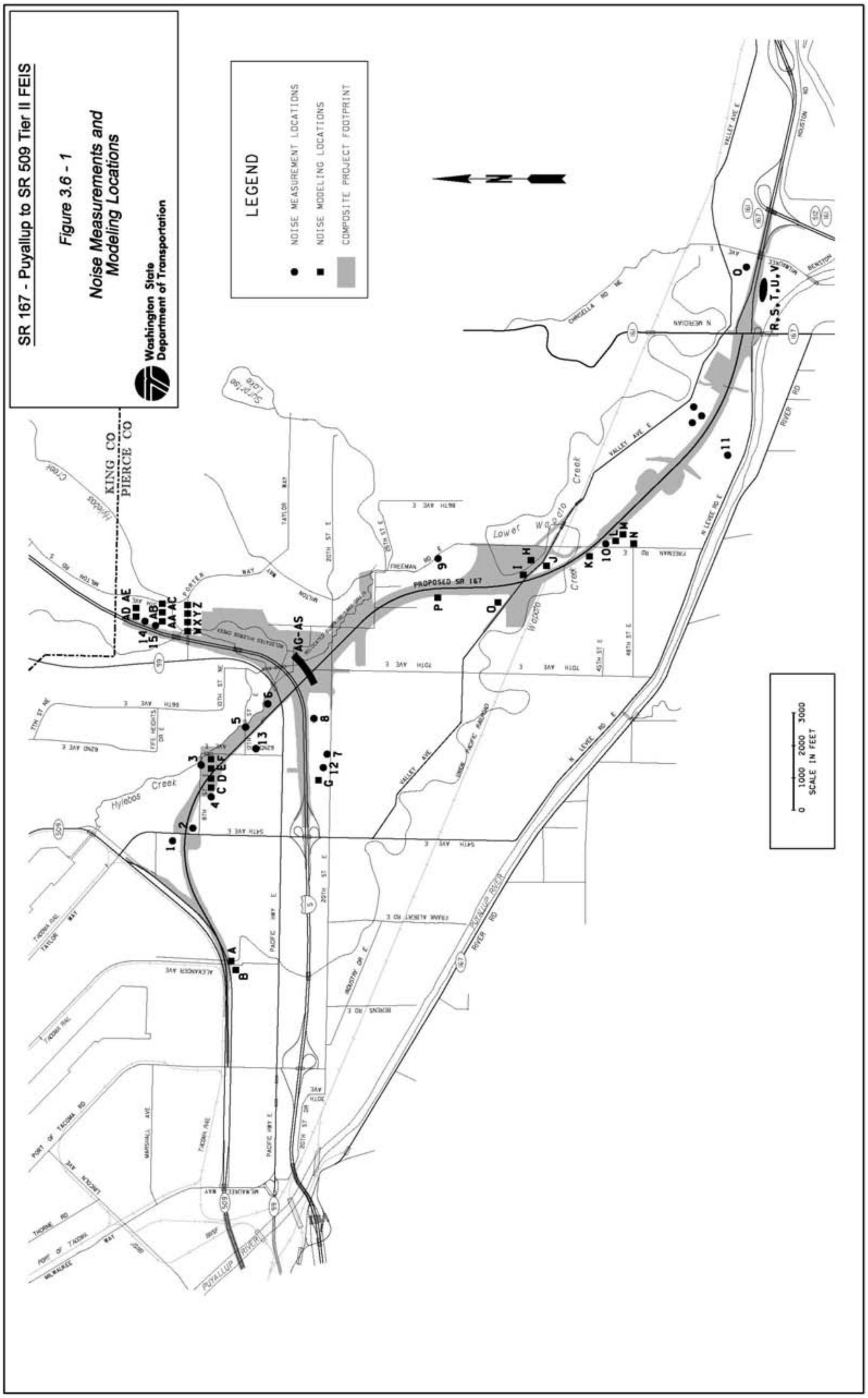
Construction noise impacts are described based on maximum noise levels for construction equipment, published by the U.S. Environmental Protection Agency (EPA). Traffic noises are predicted at specific noise-sensitive locations (receptors), and based on projected future traffic operations using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM). FHWA noise abatement criteria (NAC) are used to evaluate noise impacts. Projects must also comply with local noise ordinances.

3.6.1 Studies Performed and Coordination Conducted

This section incorporates information compiled in the *Noise Discipline Report* for the SR 167 Tier II EIS (Parsons Brinkerhoff 2001, WSDOT 2004, and WSDOT 2006). Ambient noise levels were measured at 13 sites representing 36 residences along the proposed corridor to describe the existing noise environment, identify major noise sources in the project area, and calibrate the noise model. After the existing conditions were assessed, an additional 16 sites were added to the model to represent another 27 residences. In total, 29 sites were modeled for the DEIS, representing 63 residences along the proposed SR 167 corridor.

Supplemental noise studies were conducted in response to comments on the DEIS (WSDOT 2004) and to evaluate the SR 167 Interchange with I-5 (WSDOT 2006). Six more sites were modeled, yielding 60 total sites modeled, representing 137 residences (Figure 3.6-1). Ten noise walls were re-evaluated for the FEIS. In addition, two noise wall locations near the SR 161 Interchange and four noise wall locations near the I-5 Interchange were also evaluated for this FEIS.

Additional noise modeling was also conducted at the Puyallup Recreation Center (WSDOT 2005). Two additional locations were modeled based on the likelihood that people would tend to congregate there.


SR 167 - Puyallup to SR 509 Tier II FEIS
Figure 3.6 - 1
Noise Measurements and Modeling Locations
Washington State Department of Transportation
LEGEND
NOISE MEASUREMENT LOCATIONS
NOISE MODELING LOCATIONS
COMPOSITE PROJECT FOOTPRINT
0 1000 2000 3000
SCALE IN FEET
KING CO
PIERCE CO
PROPOSED SR 167

3.6.2 Affected Environment

Environmental noise is composed of many frequencies, each occurring simultaneously at its own sound pressure level. The range of magnitude, from the faintest to the loudest sound the ear can hear, is so large that sound pressure is expressed on a logarithmic scale in units called decibels (dB). The commonly used frequency weighting for environmental noise is A-weighting (dBA), which simulates how an average person hears sound. Some typical noise levels are shown in Table 3.6-1. A widely used descriptor for environmental noise is the equivalent sound level (L_{eq}). The L_{eq} can be considered a measure of the average noise level during a specified period of time. L_{eq} measured over a 1-hour period is the hourly L_{eq} [L_{eq}(h)]. The maximum sound level (L_{max}) is the greatest short-duration sound level that occurs during a single event. L_{max} is related to impacts on speech interference and sleep disruption.

Table 3.6-1: Typical Noise Levels

Transportation Sources (distance from source)	Noise Level (dBA)	Other Sources	Description
	130		Painfully loud
Jet takeoff (200 feet)	120		
Car horn (3 feet)			Maximum vocal
	110		Effort
	100	Shout (.5 feet)	
			Very annoying
Heavy truck (50 feet)	90	Jack hammer (50 feet)	Loss of hearing with
		Home shop tools (3 feet)	prolonged exposure
Train on a structure (50 feet)	85	Backhoe (50 feet)	
City bus (50 feet)	80	Bulldozer (50 feet)	Annoying
		Vacuum cleaner (3 feet)	
Train (50 feet)	75	Blender (3 feet)	
City bus at stop (50 feet)			
Freeway traffic (50 feet)	70	Lawn mower (50 feet)	
		Large office	
Train in station (50 feet)	65	Washing machine (3 feet)	Intrusive
	60	TV (10 feet)	
Light traffic (50 feet)		Talking (10 feet)	
Light traffic (100 feet)	50		Quiet
		Refrigerator (3 feet)	
	40	Library	
	30	Soft whisper (15 feet)	Very quiet

Sources: USDOT/FTA 1995; EPA 1971; EPA 1974

Existing noise levels were measured in the field at 15 locations (Figure 3.6-1). Fifteen-minute noise measurements were taken at each location during one or more periods of the day. The measured noise levels were used to validate the existing conditions traffic noise model, as described in the Methodology section of the *Noise Discipline Report*. Noise levels at the 15 measured sites were modeled using TNM. Forty-five additional sites were added to the TNM model, to represent the additional residences not represented by the 15 previously measured sites. Traffic noise was the dominant noise source in the project area.

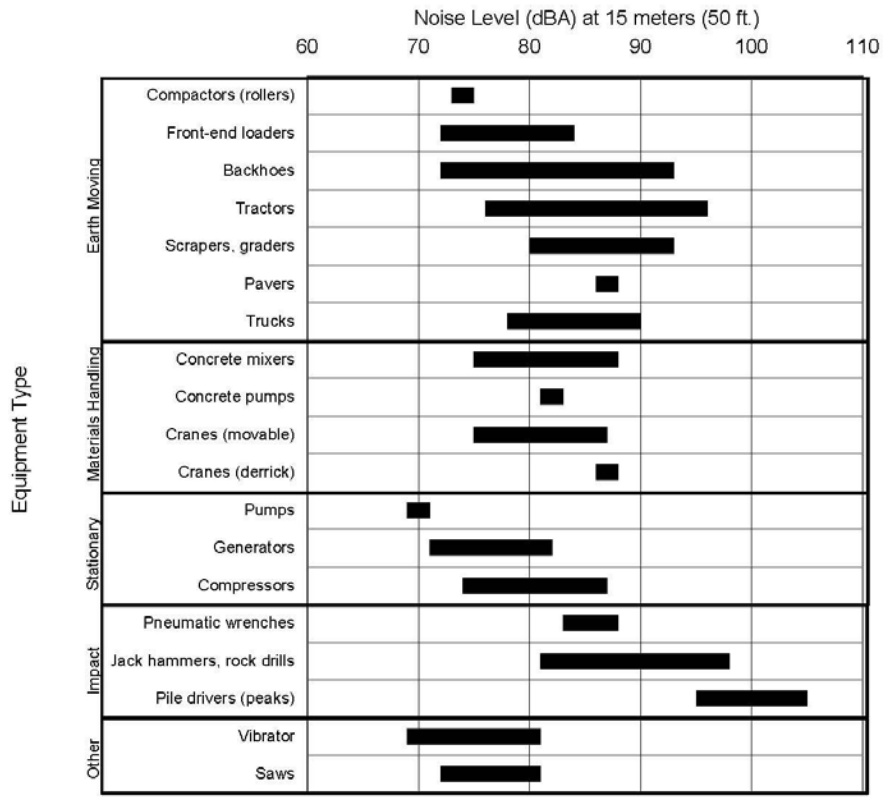
3.6.3 Impacts of Construction

Construction activities will pose a temporary impact over the duration of the construction period. Construction is usually carried out in several steps, each with different types of equipment, and with various noise characteristics. Roadway construction will involve bridge construction, clearing, cut-and-fill activities, removing old roadways, importing fill, paving, and other related activities.

The most common noise source at construction sites will be internal combustion engines. Engine-powered equipment includes earth-moving equipment, material-handling equipment, and stationary equipment. Mobile equipment operates in a cyclic fashion, while stationary equipment (such as generators and compressors) operates at sound levels fairly constant over time. Because trucks will be present during most phases and will not be confined to the project site, noise from trucks could affect more receptors. Other noise sources will include impact equipment and tools such as pile drivers. Impact tools like pile drivers and jack hammers generate very loud noises in short bursts. They are typically pneumatically powered, hydraulic, or electric. Construction noise will be intermittent over an approximate 10-year period. Noise levels will depend on the type, amount, and location of construction activities. The type of construction methods will establish the maximum noise levels of construction equipment used. The amount of construction activity will quantify how often construction noise will occur throughout the day. The location of construction equipment relative to adjacent properties will determine any effects of distance in reducing construction noise levels.

Maximum noise levels from construction equipment ranges from 69 to 106 dBA at 50 feet for pumps to pile-drivers respectively, as shown in the Table 3.6-2. Construction noise at residences farther away will decrease at a rate of 6 dBA per doubling of distance from the source. The number of occurrences of the L_{max} noise peaks will increase during construction, particularly during pile-driving activities. Because various pieces of equipment will be turned off, idling, or operating at less than full power at any given time, and because construction machinery is typically used to complete short-term tasks at any given location, average L_{eq} noise levels during the day will be less than the maximum noise levels.

Table 3.6-2: Typical Construction Equipment Noise Level (dBA) at 50 feet



Source: EPA, 1971 and WSDOT, 1991.

Pierce County limits noise levels at property lines of neighboring properties (Table 3.6-3). The Pierce County noise code is adopted from the Washington State Department of Ecology standards (WAC Chapter 173-60) and applies within Pierce County and the City of Tacoma. The other local jurisdictions do not have their own noise standards. Since the entire project is in Pierce County, the Pierce County noise code will apply to the entire project. Maximum permissible noise levels depend on the land use district of both the noise source and the receiving property.

Table 3.6-3: Pierce County Maximum Permissible Sound Levels (dBA)

Noise Source	Receiving Property			
	Residential		Commercial	Industrial
	Day[1]	Night[2]		
Residential	55	45	57	60
Commercial	57	47	60	65
Industrial	60	50	65	70

Notes: [1] Construction noise is exempt during daytime hours
[2] The maximum permissible noise levels are reduced by 10 dBA for residential receiving properties between 10 p.m. and 7 a.m.

Source: Pierce County Code.

Construction noise is exempt from local property line regulations during daytime hours. Nighttime work will have to meet the property line standards or will require a nighttime noise variance from Pierce County. The contractor awarded the work will be encouraged to perform noise-generating activities in the daytime except when it is essential to carry out such activities in the night. Construction workers will also be subject to construction noise while working on the site.

The Pierce County standard does not include noise from traffic, aircraft, and railway operations in public right of way. Therefore, the standards do not apply to operational noise from SR 167.

3.6.4 Impacts of Operation

Once construction is complete, the proposed SR 167 will begin generating noise from traffic using the facilities. The noise impacts of operation are estimated through the modeling of existing and future conditions. The future conditions are the build out year of 2030. The noise model is not sensitive enough to distinguish the noise levels of the mainline from those of the different interchange options. Therefore, the analysis of impacts examines the mainline only. The traffic volumes on the interchanges are expected to be substantially below those of the mainline and therefore the noise impacts are likely to also be lower.

Applicable noise regulations and guidelines provide a basis for evaluating potential noise impacts. For federally funded highway projects, traffic noise impacts occur when predicted L_{eq}(h) noise levels (1) approach or exceed the NAC established by FHWA, or (2) substantially exceed existing noise levels (USDOT, 1982). The FHWA NAC specify exterior L_{eq}(h) noise levels for various land activity categories (Table 3.6-4). Typically, noise impacts are modeled only for categories A and B because these represent the sensitive receptor sites. This procedure is consistent with WSDOT Noise Abatement Policy and Procedures 1997, which has been approved by FHWA.

WSDOT considers a noise impact to occur if predicted L_{eq}(h) noise levels approach within 1 dBA of the NAC. Although the term “substantially exceed” is not defined, WSDOT considers an increase of 10 dBA or more to be a substantial increase above existing noise levels.

Table 3.6-4: FHWA Noise Abatement Criteria

Activity Category	L_{eq} (h) (dBA)	Description of Activity Category
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where preserving these qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	-	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: U.S. Department of Transportation, 1982.

Tables 3.6-5 and 3.6-6 illustrate the results of the noise modeling for existing (2000) and future conditions (2030). The predicted levels were based on PM peak-hour traffic conditions. Existing peak-hour traffic volumes for 2000 and forecast traffic volumes for 2030 were modeled at the posted speed limit. The 60 modeled sites include those closest to the I-5 and proposed SR 167 alignments, as well as other local noise-sensitive sites that could be affected by either increases or decreases in traffic noise as a result of this project.

Table 3.6-5: Revised Noise Modeling Results at Measured Sites

Measured Sites	Residences Represented	Existing 2000 (L_{eq})	No-Build 2030 (L_{eq})	Build 2030 (L_{eq})
1	2	63	65	**69**
2	3	63	**66**	**70**
3	4	55	57	64
4	3	54	56	62
5	2	58	60	**67**
6	10	63	64	**69**
7	Future Development (20th Street East and 70th Avenue East)	**69**	**71**	**75**
8	1	**71**	**73**	**74**
9	2	58	61	63
10	2	55	58	**72**
11	15 (Puyallup Rec Ctr.)	52	52	**70**
12	Future Development (20th Street East and 70th Avenue East)	65	**67**	**72**
13	2	60	61	**67**
14*	1	**79**	**81**	**81**
15*	1	**80**	**81**	**81**

Highlighted numbers approach or exceed the FHWA NAC of 67 dBA for Category B land activities.
Note: See Figure 3.6-1 for noise measurement and modeling locations
* New measured sites not in DEIS.

Table 3.6-6: Revised Noise Modeling Results at Modeled Sites

Modeled Sites	Residences Represented	Existing 2000 (L_{eq})	No-Build 2030 (L_{eq})	Build 2030 (L_{eq})
A	1	61	64	**66**
B	2	59	61	63
C	3	54	56	62
D	2	55	57	63
E	2	55	56	62
F	1	55	57	63
G	Future Development (20th Street East and 70th Avenue East)	63	**66**	**71**
H	2	62	64	**70**
I	2	59	62	**73**
J	3	60	62	**69**
K	3	55	59	**72**
L	1	61	65	65
M	1	59	63	63
N	2	61	64	63
O	Future Development Tribal Lands	55	58	65
P	Future Development Tribal Lands	51	51	**69**
Q*	4	**68**	**70**	**72**
R*	2	**71**	**74**	**74**
S*	7	**70**	**72**	**71**
T*	4	**70**	**74**	**74**
U*	1	**67**	**70**	**71**
V*	3	65	**74**	**74**
W*	1	**71**	**73**	**73**
X*	1	**70**	**72**	**72**
Y*	1	**67**	**69**	**69**
Z*	1	**67**	**69**	**69**
AA*	1	**72**	**74**	**73**
AB*	1	**68**	**69**	**78**
AC*	1	**70**	**71**	**77**
AD*	1	**79**	**78**	**78**
AE*	1	**75**	**73**	**73**
AF**	1	**75**	**77**	**77**
AG*	2	63	65	65
AH*	1	60	62	62
AI*	3	**67**	**69**	**69**
AJ*	6	57	61	**67**
AK*	2	62	**67**	**67**
AL*	2	57	65	**66**
AM*	2	57	**66**	**66**
AN*	2	57	**67**	**67**
AO*	2	58	**67**	**68**
AP*	2	57	**69**	**69**

Modeled Sites	Residences Represented	Existing 2000 (L_{eq})	No-Build 2030 (L_{eq})	Build 2030 (L_{eq})
AQ*	3	64	**68**	**69**
AR*	3	62	**69**	**69**
AS*	3	65	**71**	**71**

Highlighted numbers approach or exceed the FHWA NAC of 67 dBA for Category B land activities.
Note: See Figure 3.6-1 for noise measurement and modeling locations
* New modeled receivers not in DEIS.

No Build Alternative

Under the No Build Alternative, noise levels are projected to increase by 2 to 4 dBA at most receptors in the study area (Table 3.6-5), as a result of increased traffic in the future. Some receptors near I-5 are predicted to have increases of 9 to 12 dBA, while noise is predicted to decrease at others. Actual maximum noise-level increases may be less than the predicted increase, as congestion increases in the peak hour and slows traffic. A 1 to 2 dBA increase is not perceptible to most individuals. Under the No Build Alternative, noise levels would approach or exceed the FHWA noise abatement criteria at 32 out of 60 modeled sites.

Build Alternative

Under the Build Alternative, noise levels were predicted to increase in the SR 167 study area from 2 to 18 dBA, relative to existing modeled noise levels (Table 3.6-6). The greatest increase in noise levels under the Build Alternative will be at receptor 11, near the Puyallup Recreation Center along the portion of Valley Road approaching North Meridian. This increase will result from traffic traveling on the new portion of SR 167. However, additional modeling (WSDOT 2005) indicated that noise will remain below FHWA criteria where people are likely to congregate. Noise levels at 45 out of 60 sites will approach or exceed the FHWA criteria under the Build Alternative in 2030.

3.6.5 Cumulative Impacts

Cumulative effects to noise are not typically studied. Noise naturally decreases exponentially with distance from the source, and often is further attenuated by topography, vegetation, and man-made structures. Thus, the proposed transportation project is not likely to alter substantially the magnitude of other foreseeable impacts.

3.6.6 Mitigating Measures

Noise mitigation or abatement is usually necessary only where frequent human use occurs and where a lower noise level would have benefits (USDOT 1982). Noise can be controlled at three locations: (1) at the source, such as with mufflers and quieter engines; (2) along the noise path, with barriers; and (3) at the receptor, with insulation.

Mitigation of Construction Impacts

Daytime construction noise within permitted hours of operation is not regulated by either local ordinance or the NAC. Only nighttime construction work is regulated by local ordinances. WSDOT contract documents require contractors to adhere to a variety of standard specifications aimed at reducing and minimizing day and nighttime construction noise impacts. To reduce construction noise impacts at nearby receptors, the following mitigation measures could be incorporated into construction plans and special provisions:

- Erecting noise berms and barriers as early as possible to provide noise shielding
- Limiting construction activities to between 7 a.m. and 10 p.m., to reduce construction noise level during nighttime hours in residential areas
- Equipping construction equipment engines with adequate mufflers, intake silencers, and engine enclosures. This could reduce their noise by 5 to 10 dBA (EPA 1971)
- Turning off construction equipment during prolonged periods of nonuse, to eliminate noise from construction equipment during those periods
- Requiring contractors to maintain all equipment and train their equipment operators, to minimize noise levels and increase operating efficiency
- Locating stationary equipment away from receiving properties to decrease noise from this equipment in relation to the increased distance
- Constructing temporary noise barriers or curtains around stationary equipment that must be located close to residences, to decrease noise levels at nearby sensitive receptors
- Discussing noise issues at the pre-construction stage and develop community involvement to identify haul roads and sensitive noise receptors
- Establishing the complaint mechanism during construction of the project

WSDOT's contract specifications require the contractor to notify the community about construction activities that will cause noise.

Mitigation of Operational Impacts

A variety of mitigation methods can serve as effective traffic noise impact reducers. For example, noise impacts from the project's long-term operation can be minimized by the following methods: implementing traffic management measures, acquiring land as buffer zones, realigning the roadway, and constructing noise barriers or berms. These mitigation measures were evaluated for their potential to reduce noise impacts from the proposed action, and the results of the evaluation are summarized below. The final determination of noise barrier or berm size and placement, and the implementation of other mitigation methods will take place during detailed project design, after an opportunity for public involvement and approval at the local, state, and federal levels.

Traffic Management Measures

Traffic Management Measures reduce noise by reducing traffic. However, it takes a 50 percent reduction in traffic to decrease traffic noise by 3 dBA. Traffic management measures include time restrictions, traffic control devices, signing to prohibit certain vehicle types (e.g., motorcycles and heavy trucks), modified speed limits, and exclusive lane designations. Restriction of vehicle types and lower speed limits on the proposed SR 167 could increase congestion on SR 167 and other roadways, and produce results contrary to the purpose of this project. For example, restricting trucks on SR 167 would shift traffic to other facilities, increasing congestion on the other roadways and reducing freight reliability. A transportation system management plan combined with increased transit facilities that encourage carpooling and public transit use, would reduce vehicle trips. It is unlikely that such a plan could reduce traffic by 50 percent.

Land Acquisition for Noise Buffers or Barriers

The proposed SR 167 is bordered by residential and commercial properties, including single- and multi-family units (see Section 3.11 for zoning information). Land acquisition for noise buffers or barriers would require relocating residents and would be unreasonably expensive for noise mitigation purposes.

Realigning the Roadway

Noise reduction could occur by realigning the proposed SR 167 both horizontally and vertically. The horizontal alignment has been determined by design criteria for a highway of this nature. In those locations where a change in horizontal alignment might provide some noise reduction to receptors, the alignment is constrained by other design criteria. The vertical alignment was established largely to provide adequate clearances over roads, highways, and railroad tracks. The elevated alignment results in slightly lower noise levels than a comparable at-grade alignment at the same location because the higher roadway shoulder and safety barrier provide some additional noise reduction compared to their at-grade equivalents.

Noise Barriers

Noise barriers include noise walls and berms. The effectiveness of a noise barrier is determined by its height and length and by the project site's topography. To be effective, the barrier must block the "line of sight" between the highest point of a noise source (e.g., a truck exhaust stack) and the highest part of a receiver. A barrier must be long enough to prevent sounds from passing around its ends, have no openings such as driveway connections, and be dense enough so that noise would not be transmitted through it (USDOT 1973).

WSDOT evaluates noise barriers for feasibility and reasonableness. The determination of engineering feasibility includes whether barriers could be built in a location to achieve a noise reduction of at least 7 dBA at the closest receptors. The determination of reasonableness includes the number of sensitive receptors benefited by at least 3 dBA, the cost-effectiveness of the barriers, and concerns such as the desires of nearby residents, aesthetics, and safety. WSDOT has established a reasonableness criterion for the maximum allowed wall surface area per household. Noise walls that exceed the maximum allowed wall surface area are deemed not reasonable.

At the 45 locations where future noise levels approached or exceeded the NAC, 16 noise wall configurations were evaluated (Figure 3.6-2). Six of the 16 noise barriers were found to be feasible and one of the noise barriers was determined to be reasonable at this time. Table 3.6-7 shows a summary and basis of not-feasible walls. They could not achieve a noise reduction of at least 7 dBA at the closest receptors in accordance with WSDOT Noise Abatement Policy and Procedures 1997.

Table 3.6-7: Revised Summary and Basis of Not-Feasible Noise Walls

Wall	Height (ft)	Length Required (ft)	Area (ft²)	Benefited Receptors	Residence # Represented	Maximum reduction in dBA
1	16	1,100	17,600	A,B	3	5
2	12	1,100	13,200	1	2	2
3	12	1,100	13,200	2	3	4
5	12	2,400	28,800	7,8	4	1
6	12	2,400	28,800	G,12	4	3
8	12	1,500	18,000	H	2	3
11	20	841	16,820	Q	4	4
13	20	373	7,460	W,X,Y,Z	4	6
15	20	373	7,460	15,AD,AF,AG	5	6
16	30	925	27,760	AG-AS	33	4

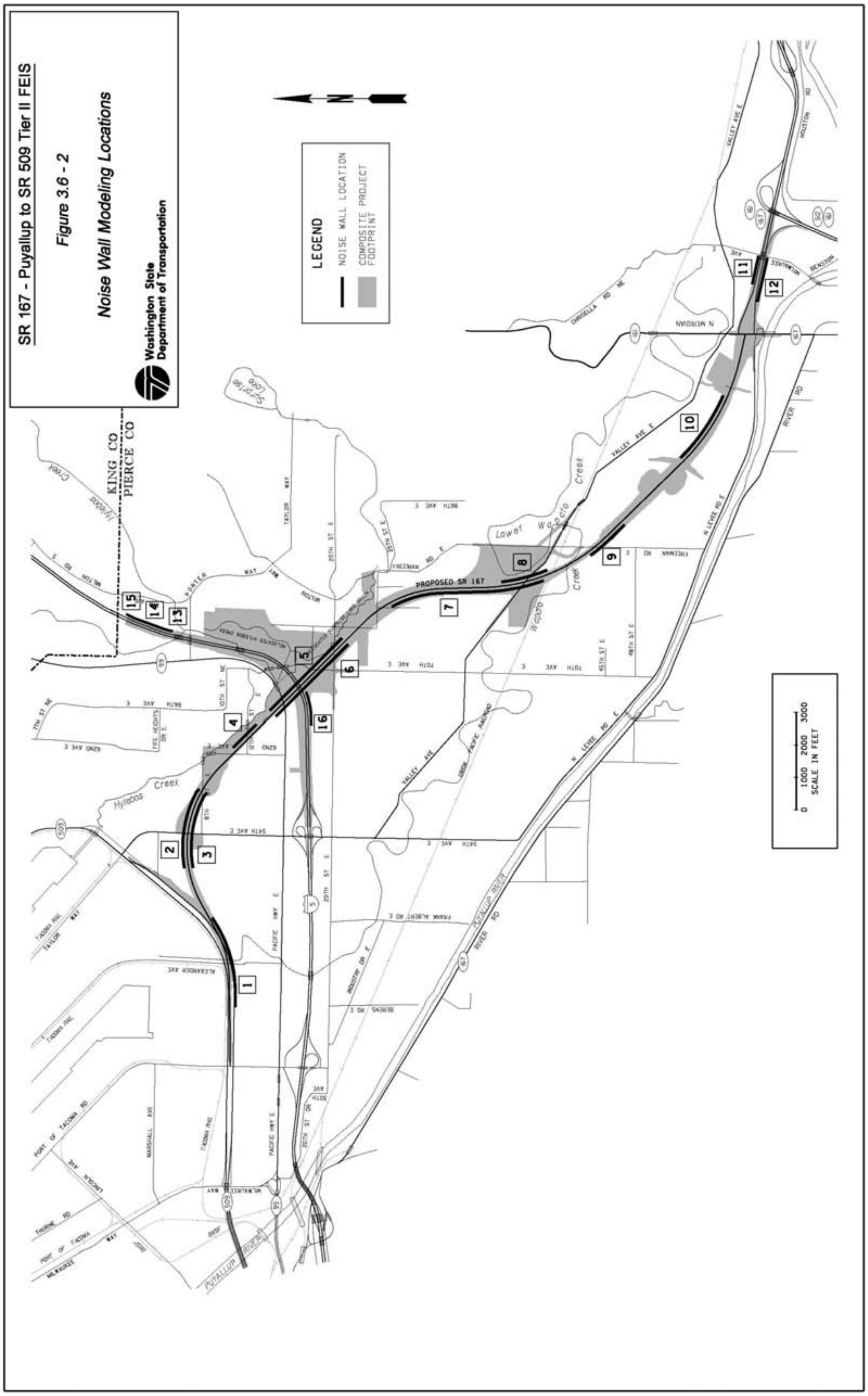
Note: Receptors 5 and 6 and W through AS receive largely I-5 traffic noise

Table 3.6-8 shows a summary of feasible and not-reasonable walls per WSDOT Noise Abatement Policy and Procedures 1997.

Table 3.6-8: Revised Summary of Feasible and Not-Reasonable Noise Walls

Wall	Height (ft)	Length Required (ft)	Area (ft²)	Benefited Receptors	Residence # Represented	Allowed Area (ft²)
4	14-16	802	11,544	5	4	3,080
7	10	2,950	29,500	I,O,P	2	2,342
9	15	1,200	18,000	10,K	5	5,067
10	10	2,400	24,000	11	15 (Puyallup Recreation Center)	14,595
14	18	600	10,800	14,AA,AB,AC	4	4,344

The first feasible noise wall (#4) was found feasible because it was possible to obtain a 7-dBA reduction in noise for the four residences represented by site 5, which is northwest of the I-5 interchange. A wall of 14-foot average height (16-foot maximum) and 802 feet long (11,544 square feet) would provide a reduction of 7-dBA. A wall of this size is not reasonable because it exceeds the 2,218 square feet allowed, based on the number of residences and their future decibel levels. This area currently receives most of its noise from local traffic, I-5 and SR 99 traffic.


SR 167 - Puyallup to SR 509 Tier II FEIS
Figure 3.6 - 2
Noise Wall Modeling Locations
Washington State Department of Transportation
LEGEND
NOISE WALL LOCATION
COMPOSITE PROJECT FOOTPRINT
0 1000 2000 3000
SCALE IN FEET
PROPOSED SR 167
KING CO
PIERCE CO
Hylebos Creek
Lower Wapato Creek
PUYALLUP RIVER
VALLEY AVE E
N MERIDIAN
RIVER RD
N LEVEE RD E
FREEMAN RD E
PACIFIC HWY E
ALEXANDER AVE
54TH AVE E
70TH AVE E
20TH ST E

The second feasible noise wall (# 7) would reduce noise levels by 3 to 7 dBA at receptors I, O and P west of the Valley Avenue interchange. This noise wall was found to be feasible but not reasonable at this time. A 10-foot-high wall, extending for 2,950 feet, would provide a 3- to 7-dBA reduction within the Tribal Trust lands that border the SR 167 alignment to the west. Because the land is currently undeveloped, a reasonableness calculation could not be completed. If this land is developed, the barrier found feasible for this area could be evaluated for reasonableness. To be reasonable, the proposed barrier would have to protect the residential equivalency of 25 units. The one existing noise sensitive receptor (I) has two residences that would benefit from the evaluated wall.

The third feasible noise wall (# 9) was found feasible because it was possible to obtain a 7-dBA reduction for the residents in the area. A 15-foot-high wall, 1,200 feet long, would provide a 7-dBA reduction. This wall was found to be not reasonable because the necessary wall area of 18,000 square feet exceeds the allowed area of 5,067 square feet. To be reasonable, the proposed barrier would have to protect the residential equivalency of 18 units.

The fourth feasible noise wall (# 10) would reduce noise levels by 7 dBA at receptor 11, the Puyallup Recreation Center. This noise wall was found to be feasible because a 10-foot-high wall, 2,400 feet long, would provide a 7-dBA reduction for the Recreation Center. This wall was found to be not reasonable because the necessary wall area of 24,000 square feet exceeds the allowed area of 14,595 square feet for the residential equivalency of 15 homes calculated using average attendance for activities at the Puyallup Recreation Center.

The fifth feasible noise wall (#14) would reduce noise levels by 7 dBA at one of the four residences that would benefit. An 18-foot-high wall, 600 feet long would be required. A wall of this size (10,800 square feet) is not reasonable because it exceeds the 4,344 square feet allowed for the number of residences and future decibel levels at this location.

Feasible, Reasonable Noise Barrier

A noise barrier in Area 12, along the south shoulder of SR 167 between stations 410 and 424 west of Milwaukee Avenue East, was analyzed since the DEIS and found to be feasible and reasonable. It is feasible because a 14,400-square foot wall (10 feet high and 1,400 feet long) would reduce noise levels by 6 to 9 dBA at receptors R, S, T, U, and V. It is reasonable because 16,401 square feet is the allowed wall area based on the residences represented and future decibel levels. Because it is both feasible and reasonable, a noise barrier will be included in the final design of the preferred Urban Interchange option for this area, which receives most of its noise from traffic on SR 167, SR 512, and SR 161.

FHWA and WSDOT remain committed to providing a noise barrier between the Tribal Trust property with residences along 48th Avenue East and the proposed SR 167 when warranted. Because the project is on an elevated structure through this area, landscaping may not be possible. Technical guidance to the Puyallup Tribe of Indians on the placement of businesses in order to effectively use the noise barrier will be provided at the time of development of the Tribal parcels. WSDOT will also retrofit houses on Tribal Trust land near Valley Avenue with storm windows as mitigation to minimize noise impacts.