VISUAL QUALITY TECHNICAL MEMORANDUM

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

Southbound HOT Lane

July 2008

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TABLE OF CONTENTS

LIST OF EXHIBITS

ACRONYMS AND ABBREVIATIONS

WSDOT	Washington State Department of Transportation
HOT	High-Occupancy Toll
SR	State Route
MP	Milepost
NEPA	National Environmental Policy Act
SEPA	State Environmental Policy Act
DCE	Documented Categorical Exclusion
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
HOV	High-Occupancy Vehicle

EXECUTIVE SUMMARY

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. The construction of the HOT lane will require widening of 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. SR 167 is an important thoroughfare for cars, trucks, and transit in the Green River Valley. This additional capacity will relieve congestion and improve safety for commuters traveling southbound on SR 167.

What is the purpose of this report?

This technical memorandum describes the existing conditions and potential range of effects to the visual environment that may be attributed to the construction and operation of a southbound HOT lane on SR 167, between 8th Street E Vicinity and S 277th Street Vicinity, and the associated noise wall.

How were potential effects on visual quality identified and evaluated?

The potential effects were identified and analyzed based on the guidance provided in the WSDOT Environmental Procedures Manual (Sept. 2007).

This technical memorandum provides a qualitative narrative that identifies key viewpoints through photos and landscape characteristics based on the evaluation of the defined technical visual elements:

- View Distance
- Viewer Position
- Vividness

- Intactness
- Unity

What effects will the project have on the visual environment?

The proposed project will add another lane of traffic to the existing section of southbound SR 167. In addition, during the NEPA environmental analysis of this project, the WSDOT team determined through the *Traffic Noise Impact Analysis – Technical Report* (WSDOT 2008) that a noise wall is necessary to mitigate noise effects.

The proposed 4,340-foot-long noise wall will begin near 6th Avenue N, and continue along the eastern shoulder of northbound SR 167 to the vicinity of 5th Avenue S (MP 12.3 to MP 13.1). The seven to twelve-foot high wall will add an encroaching element to the visual landscape and break up the coherence of the views looking from and toward the roadway. The noise wall will add to the manmade element of the viewshed. However, this noise wall will be constructed to benefit the surrounding communities by decreasing the level of highway noise associated with the project, as well as reduce the amount of light and glare from the road into the surrounding communities.

The proposed noise wall will limit the views of the highway and traffic, as well as reduce noise. The review of the noise wall effects on visual quality is documented in this technical memorandum and, based on the WSDOT/FHWA guidance, is that the improvements outweigh the impacts and that the overall conclusion is that there are no adverse visual quality effects.

CHAPTER 1 INTRODUCTION

What is the proposed project and why is it needed?

The WSDOT plans to widen the State Route (SR) 167 roadway to construct a new southbound 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 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.

Exhibit 1

Vicinity Map

What is the purpose of this visual quality memorandum?

This technical memorandum describes the existing conditions and potential range of effects to visual quality that may be attributed to the construction and operation of the proposed project. Visual perception can be positively and negatively affected by transportation projects. Therefore, views within the project corridor were analyzed looking from and toward the road. Visual impacts such as aesthetics, light, and glare were considered. The impacts to the visual environment were evaluated as a result of the proposed project by assessing vividness, intactness, and unity, as described in Chapter 3.

This technical memorandum also describes viewer groups and their position, exposure, sensitivity and frequency, and duration of the view. This evaluation suggests potential mitigation measures, including ways to avoid or minimize visual quality impacts, as well as ways to restore and enhance visual quality.

This evaluation specifically identifies the visual effects of the proposed noise wall that will be constructed within the study area. Construction of a noise wall between the roadway and the affected receivers will reduce noise levels by physically blocking the transmission of traffic-generated noise.

WSDOT prepared this technical memorandum as part of a National Environmental Policy Act (NEPA) Documented Categorical Exclusion (DCE), which requires all actions sponsored, or those with potential federal funding, permitted, or approved by a federal agency to consider the environmental effects of the Proposal Action. The Washington State Environmental Policy Act (SEPA) requires a similar evaluation of environmental effects of proposed actions for state and local projects. This project is required to comply with both NEPA and SEPA, which includes a review of potential effects and possible mitigation measures. When a potential effect to the visual environment exists as a result of the proposed project, a review of those potential effects and possible mitigation measures is required by both NEPA and SEPA.

How did WSDOT identify the study area for visual quality?

WSDOT identified the study area for evaluating the project's potential effects on visual quality as a half-mile radius of the project alignment, specifically considering the effects of the noise wall that will be constructed as part of the project.

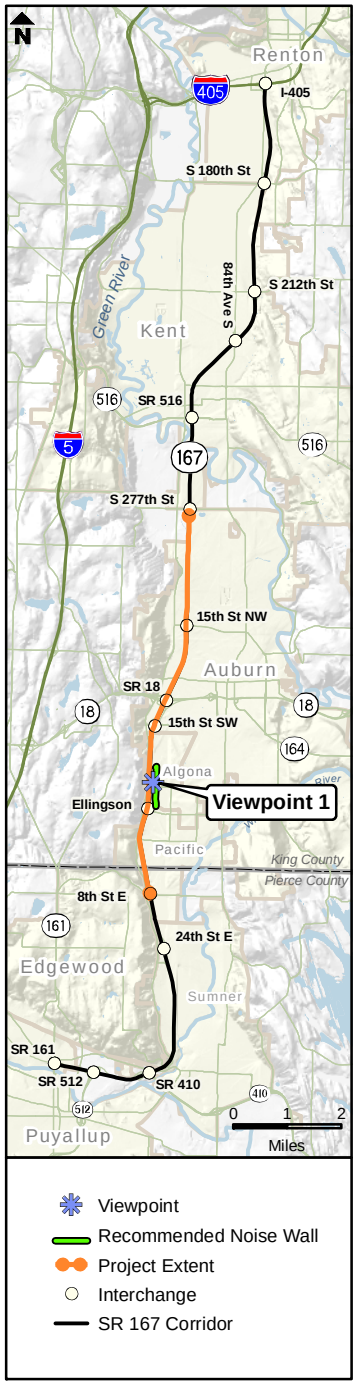
What is the primary visual quality element that is part of this project?

During the NEPA environmental analysis of this project, the WSDOT team determined through the *Traffic Noise Impact Analysis – Technical Report* (WSDOT 2008) that a noise wall was necessary to mitigate noise effects. The proposed 4,340 foot-long noise wall will begin near 6th Avenue N, and continue along the eastern shoulder of northbound SR 167 to the vicinity of 5th Avenue S (MP 12.3 to MP 13.1). The seven to 12-foot high wall will add an encroaching element to the visual landscape and break up the coherence of the views looking from and toward the roadway.

How was the information for visual quality identified and evaluated?

This technical memorandum provides a qualitative narrative that describes key viewpoints and landscape characteristics. It also describes viewer groups and their position, exposure, sensitivity and frequency, and duration of the view. The primary focus of the evaluation in this technical memorandum is the proposed noise wall. Photographs of the existing conditions were taken within the project area where visual effects are anticipated, namely the area where the noise wall is proposed. These photographs were taken from 6th Avenue N to 5th Avenue S in the Algona and Pacific areas. The detailed methodology for evaluating the data is provided in Chapter 3. The approach to the analysis follows the guidance provided in the WSDOT Environmental Procedures Manual (Published March 2006, Updated September 2007).

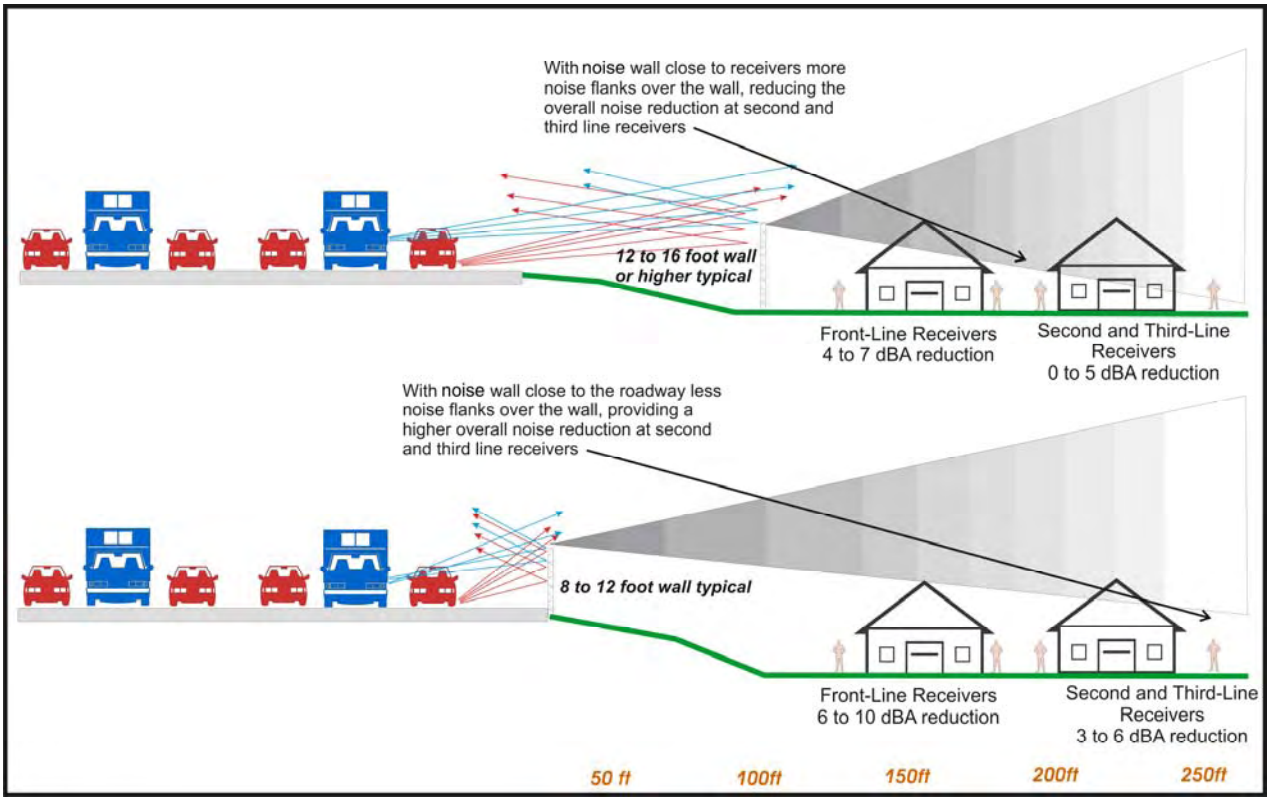
Exhibit 2
Noise Wall Location



How was the noise wall location determined?

WSDOT reviewed five noise wall options to mitigate identified noise effects[1] to properties along SR 167. After the analysis, a 4,340-foot-long noise wall was determined to be reasonable and feasible. The wall will be placed adjacent to the highway parallel to residential properties near the south end of the study area, as illustrated in Exhibit 2. The height of the wall will be in the range of seven to 12-feet, with an average height of 10.9 feet. Breaking the line-of-sight is required for a noise wall to be effective at reducing traffic noise as illustrated in Exhibit 3. The proposed noise wall will be positioned similar to that illustrated in the lower half of Exhibit 3.

Exhibit 3
How a Noise Wall Height Affects Noise Wall Performance



[1] Traffic Noise Impact Analysis – WSDOT 2008

CHAPTER 2 EXISTING CONDITIONS

What is the affected environment?

The proposed project is located in the Green River Valley and crosses six municipalities and two counties including the cities of Auburn, Algona, and Pacific. The Green River Valley communities are connected by SR 167, which runs north-south. In addition, SR 18 provides an east-west route that links the Green River Valley to I-5 in the Federal Way area.

What types of land uses occur in the study area?

The land use in the area includes low density residential, mixed residential and commercial, and commercial uses. Several large undeveloped parcels are also located within the project area along with agriculture use near S 277th Street. Along the east side of SR 167, north of Boundary Boulevard, land use is either undeveloped or commercial. Between 9th Avenue N and 11th Avenue N, land use is primarily residential, with some commercial use between 8th Avenue N and 9th Avenue N. Between 8th Avenue N and 4th Avenue N, land use is a mixture of residential, commercial, and undeveloped. South of 4th Avenue N to 5th Avenue NW, land use is all single-family residential. South of 5th Avenue NW, land use is entirely commercial. On the west side of SR 167, land use is primarily commercial and undeveloped. Several single-family homes are located west of the West Valley Highway near 4th Avenue N.

Who will be affected by changes in the visual environment?

In assessing conditions in the visual environment, groups who can be affected were identified – specifically, viewers. Viewer groups can be differentiated by physical factors that modify perception. The two primary groups include roadway users (who have a view from the road), and roadway neighbors (who have a view toward the road). Viewshed mapping can further categorize these viewer groups by viewer exposure, which consists of the physical location of each viewer group, the number of people in each group, and the duration of their view.

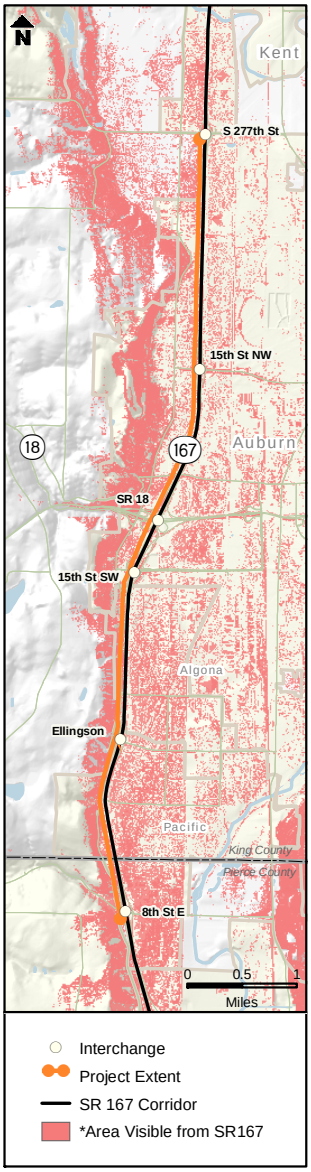
The receptivity of different viewer groups to the visual environment and its elements is not equal because viewer sensitivity is strongly influenced by visual preference. Viewer sensitivity modifies the visual experience directly by viewer activity and awareness, and indirectly by values, opinions, and preconceptions.

Viewer activities, such as driving in heavy commuter traffic or through a construction zone, can distract an observer from much of the visual environment, whereas driving for pleasure can encourage one to look at the view more closely. Viewer awareness is heightened by visual changes such as entering a city, cresting a hill, or the sudden appearance of water or a mountain. Measures that modify viewer exposure, such as selective clearing or screening, may also be used to deliberately modify viewer awareness.

Local values and goals indirectly modify the viewers experience by shading view expectations and aspirations. Viewers may be particularly sensitive to the visual resources of a particular landscape because of its cultural significance or other unique features, such as a stand of trees, a creek, or manmade features, such as buildings or other structures.

Visual experience and perception can be affected by a number of characteristics including the viewer position, the type of viewer, the viewer exposure, the viewer sensitivity, the frequency of viewer exposure, the duration of the view, and the number of viewers. Exhibit 4 illustrates where the viewer from the highway can see topographically. This is the project viewshed.

Exhibit 4
SR 167 Viewshed



*Area shown as visible from SR 167 is based on topography alone and does not include the screening effects of vegetation and structures.

How did WSDOT evaluate potential visual quality effects?

The approach to this analysis follows the guidance provided in the WSDOT Environmental Procedures Manual (September 2007). This technical memorandum provides a qualitative narrative that describes key viewpoints and landscape characteristics. The analysis of the potential effects is based on the following visual elements:

- View Distance
- Viewer Position
- Vividness
- Intactness
- Unity

View Distance

View Distance is the distance between the viewer and the proposed project. This can be described in the general terms of foreground, middle ground, and background. Foreground describes a view of the project that is in front of the viewer and is prominent in appearance. Middle ground describes a view of the project that is midway between other objects. Background describes the view of the project when it is behind something.

Viewer Position

View Position refers to the elevation of the viewer to the project, whether it is inferior, level, or superior. An inferior position means the viewer is at a lower elevation than the proposed project. A level position is when the view is at an equal elevation to the proposed project. Superior indicates the viewer is higher than the proposed project.

Vividness

Vividness measures the memorability of the landscape components as they combine in striking and visual patterns. Vividness has four elements: landform, water form, vegetative form, and manmade form. Landform refers to the landcover and topography such as plateaus, mountains, and valleys. Water form encompasses streams, rivers, lakes, ponds or other waterbodies. Vegetative form refers to trees and plants. Manmade landscape takes form in buildings,

roads, bridges, and similar constructed infrastructure. The quality of a specific element within a landscape scene defines this element. The ratings range from 1 to 7, with a rating of 7 being the highest degree of vividness.

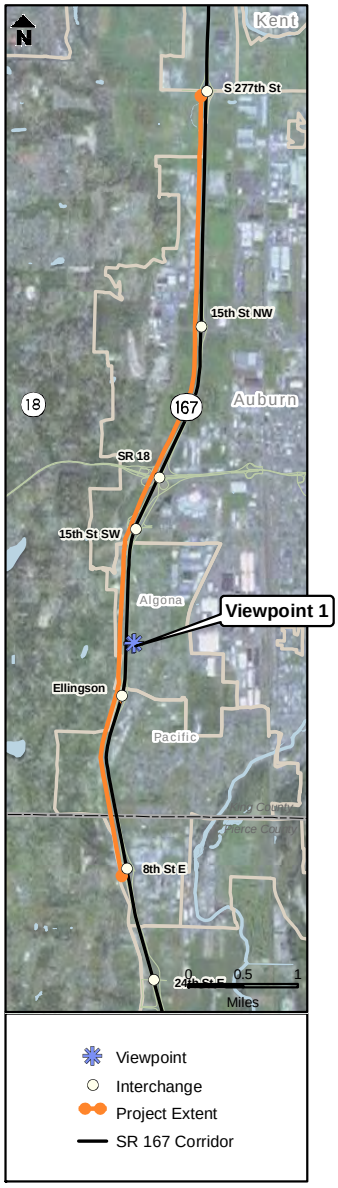
Intactness

Intactness measures the integrity of visual patterns and the extent to which the landscape is free from visually-encroaching elements. This factor can be present in well-kept urban and rural landscapes, as well as natural settings. In a predominantly natural environment, manmade development can be an additive element that does not necessarily encroach on its visual setting. Predominantly manmade landscapes may also have strong visual character. The absence of encroaching features contributes to high visual intactness in either setting. The ratings range from 1 to 7. A rating of 7 indicates a landscape that is highly intact and contains no subtractive disruptions.

Unity

Unity measures the visual coherence and compositional harmony of the landscape considered as a whole. One aspect of this criterion is the unity between manmade and natural pattern elements, and usually attests to the careful design of individual components in the landscape. The ratings range from 1 to 7. A rating of 7 represents a landscape with a coherent, harmonious visual pattern.

Exhibit 5
Location of Viewpoint



What are the characteristics of the current visual environment?

To conduct the visual analysis, WSDOT used a key view location that represents the viewers in an area where the proposed roadway widening and noise wall would be constructed. This viewpoint is illustrated on Exhibit 5. This viewpoint is near the middle of the proposed noise wall alignment in Algona at MP 12.77. Exhibits 6 and 7 show the existing conditions at that viewpoint from the perspective of two viewer groups, drivers on SR 167 looking eastward and

residents living in the neighborhood looking westward, toward the highway. The narrative associated with the photographs describes the change in visual quality from the present view to the view after the proposed project is constructed.

Exhibit 6
Viewpoint 1: Eastward View from SR 167 toward 2nd Avenue N at MP 12.77

Current View from the Highway

Looking east from SR 167 a driver is in a superior or elevated position to a residential neighborhood near 2nd Avenue N in the foreground, taller trees in the middle ground, and the foothills of the Cascade Mountains in the background. The current vividness of this location along the highway is low as it is not a memorable landmark along the highway. The landform in the immediate proximity of the highway is relatively flat, without water features or significant vegetative or man made features. Intactness is average, with a moderate level of natural and man-made development. This viewpoint has a relatively low level of unity, as there are a mixture of textures, colors, and heights of features in the viewpoint.

Proposed View from the Highway

If the proposed project is constructed, a driver would not be able to see the neighborhood from the highway; instead a noise wall would be seen at this location. The noise wall would likely block the foreground, middle ground, and most background views from SR 167 looking east. The vividness of the proposed view from this location would be lower than the current vividness, because the wall would be a uniform structure for approximately one mile without a memorable location. Intactness would include a high level of man-made and low level of natural elements. This viewpoint would have a higher level of unity, as the wall would be the prominent element in view, with a uniform color, texture and height.

Exhibit 7
Viewpoint 1: Current Westward View from 2nd Avenue N toward SR 167 at MP 12.77

Current View toward the Highway

Looking west toward SR 167 a pedestrian is in an inferior or lower position to SR 167 from 2nd Avenue N. In the foreground are taller trees and in the middle ground is the elevated slope of the road bed with shrubs close to the highway. In the background, is a forested bluff on the west side of SR 167. The current vividness of this location is low as it isn't a memorable landmark, there are a number of dead-end roads leading up to SR 167 in this part of town. The landform in the immediate proximity of the highway is relatively flat with a slight grade towards the highway, without water features or significant vegetative or man made features beyond the highway. Intactness is average, with a moderate level of natural and man-made development. This viewpoint has a relatively low level of unity, as there are a mixture of textures, colors, and heights of features in the viewpoint.

Proposed View toward the Highway

Once the noise wall is constructed, a pedestrian would see the existing vegetation and man-made features east of the wall in the foreground. In the middle ground, a pedestrian would see the road bank up to the wall and the noise wall with vegetation on the east side of the wall. Pedestrians would still see much of the forested bluff in the background. The future vividness would decrease as the view will be more uniform and less memorable. Intactness would improve slightly for manmade features and decrease slightly for natural features. However, WSDOT may plant new vegetation on the east side of the wall. Unity would improve as the wall would unify the colors, texture, and height and would block views of moving vehicles, creating a more calm visual experience.

CHAPTER 3 POTENTIAL EFFECTS OF THE PROJECT

The following sections describe possible direct, indirect, and cumulative effects of the project. These effects are related to the construction and/or operation of the facilities associated with the project, which includes bridge widening, fill embankments, and retaining and noise walls.

Direct effects are defined as effects that have a direct, cause-and-effect relationship to the proposed action.

Indirect effects are defined as effects that are "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable" (Federal Regulation on the Protection of the Environment - 40 CFR 1508.8). These effects, which usually result from the initial action, include changes in land use, water quality, social issues, and population density.

Cumulative effects are those that "result from incremental consequences of an action when added to other past, present, and reasonably foreseeable future actions." The cumulative effects of a project may be undetectable when viewed in the individual context of direct or indirect effects. However, cumulative effects can add to other disturbances and eventually lead to a measurable environmental change.

The following exhibit summarizes the effects of the project of visual quality.

Exhibit 8

Analysis of the Proposed Project's Effects on Visual Quality

Visual Analysis Matrix		Exhibit 6		Exhibit 7	
	Current (C)/ Proposed (P)	**C**	**P**	**C**	**P**
	View Orientation[1]	E	E	W	W
View Distance[2]	Foreground	Y	N	Y	N
	Middle ground	Y	N	Y	N
	Background	Y	Y	Y	Y
Viewer Position[2]	Inferior	N	N	Y	Y
	Level	N	N	N	N
	Superior	Y	Y	N	N
Vividness	Landform	4	2	4	4
	Waterform	1	1	1	1
	Vegetative	3	1	5	4
	Human-made	5	6	4	5
	Average	3.3	2.5	3.5	3.5
Intactness	Man-Made Development	4	2	5	4
	Natural Encroachment	3	1	5	4
	Average	3.5	1.5	5.0	4.0
Unity	Overall	3	5	5	5
Total Visual Quality		3.3	3.0	4.5	4.2

1 View Orientation is the direction the viewer is looking toward: north (N), east (E), west (W), or south (S)

2 Viewer Distance and Position are listed as "Y" for yes the view can see from that distance or position and "N" for no.

Total Visual Quality is calculated based on the quantitative average of Vividness, Intactness, and Unity, while the qualitative elements of Viewer Distance and Viewer Position are also considered in the discussion of effects.

Evaluation Scale

Vividness	Intactness		Unity
	Man-made	**Natural Environment**	
7 Very High	7 No development to Non-Existant	7 Very High	7 Very High
6 High	6 Little Development	6 High	6 High
5 Moderately High	5 Some Development	5 Moderately High	5 Moderately High
4 Average	4 Average Level of Development	4 Average	4 Average
3 Moderately Low	3 Moderately High Development	3 Moderately Low	3 Moderately Low
2 Low	2 High Level of Development	2 Low	2 Low
1 Very Low to Non-Existant	1 Very High Level of Development	1 Very Low to Non-Existant	1 Very Low

What direct and indirect effects will the project have on visual quality?

Direct Construction Effects

During construction of the roadway and noise wall, the contractor would remove any existing vegetation, primarily shrubs and grasses growing along the side of the highway. As a result, both viewer groups would have increased visibility, drivers to the east and residents to the west. In addition, the necessary construction equipment, barricades, lights, and signs would add complexity to what freeway users and some neighbors would see.

Direct Operational Effects

In general, after the construction is complete, vividness would be reduced by one point or less for the viewpoint, both looking from and toward the roadway with the highway improvements. This change is a result of the construction of a noise wall to mitigate operational noise effects to residences and businesses near highway widening, which is in a limited portion of the total project area. The noise wall would reduce the landform and vegetative vividness, while increasing the man-made element of vividness. The existing conditions do not represent high value landforms or vegetation in the near vicinity of the project; however, the wall would disrupt any continuity with the landforms and vegetation. Although the project would not remove or displace much vegetation, the wall would break up the long-range view of a forested bluff to the west and neighborhood trees; and potentially some of the driver's view of the Cascade Mountains to the east.

The noise wall would also reduce the overall intactness, since the wall would add man-made elements and break up the coherence of natural elements.

Scores for unity would increase as a result of this project, as the wall would provide a cohesive set of visual characteristics such as size, shape, height, color, and texture from both the eastern and western directions.

Overall scores for the eastern and western views from the viewpoint decrease by one point, which is not a significant effect to visual quality. In addition, the noise wall would reduce the amount of light and glare from the road into the surrounding communities, which is a visual benefit.

Various small retaining walls along the western shoulders of southbound SR 167 are not expected to be seen and therefore are not considered to have any substantial effect on visual quality along the corridor.

Indirect Effects

Future and ongoing development within the study area will be closer to the roadway than the existing occupied buildings. Future buildings will have immediate views of the highway and ramps, if the noise wall is not constructed. However, the noise wall would limit the views of the highway and traffic, as well as reduce the noise from the highway.

Will the proposed project contribute to cumulative effects on visual quality?

The project is not anticipated to have adverse cumulative effects along the SR 167 Corridor and adjacent cities. The study area experienced rapid development and increased traffic in the past three decades. The growth caused more traffic delays and a rise in the accident rate. The vehicular traffic on the highway increased light and glare on surrounding neighborhoods and businesses.

The proposed project would improve the capacity of SR 167, reduce the travel times within the study area, and improve travel times and access to public services.

Once the project is completed, beneficial effects would be realized by a reduction in noise as well as in highway-related light and glare in the communities surrounding the noise wall.

CHAPTER 4 MITIGATION MEASURES

What type of mitigation measures are proposed to alleviate effects?

During construction, the contractor could reduce light and glare effects by shielding roadway lighting and using downcast lighting so light sources would not be directly visible from residential areas and local streets.

If the noise wall is constructed, the contractor would revegetate the construction area on both sides of the noise wall. On the east side of the noise wall, vegetation could be planted parallel to the wall that could potentially grow tall and soften the effects of the wall to the neighborhood viewer group.

The noise wall surfaces would be treated architecturally with texture and color to provide modulation and relief to blend with corridor character and themes of other existing noise walls. The east side of the wall would also have a texture and color to soften the effects of the wall for the viewers from the residential neighborhood.

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CHAPTER 5 REFERENCES

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