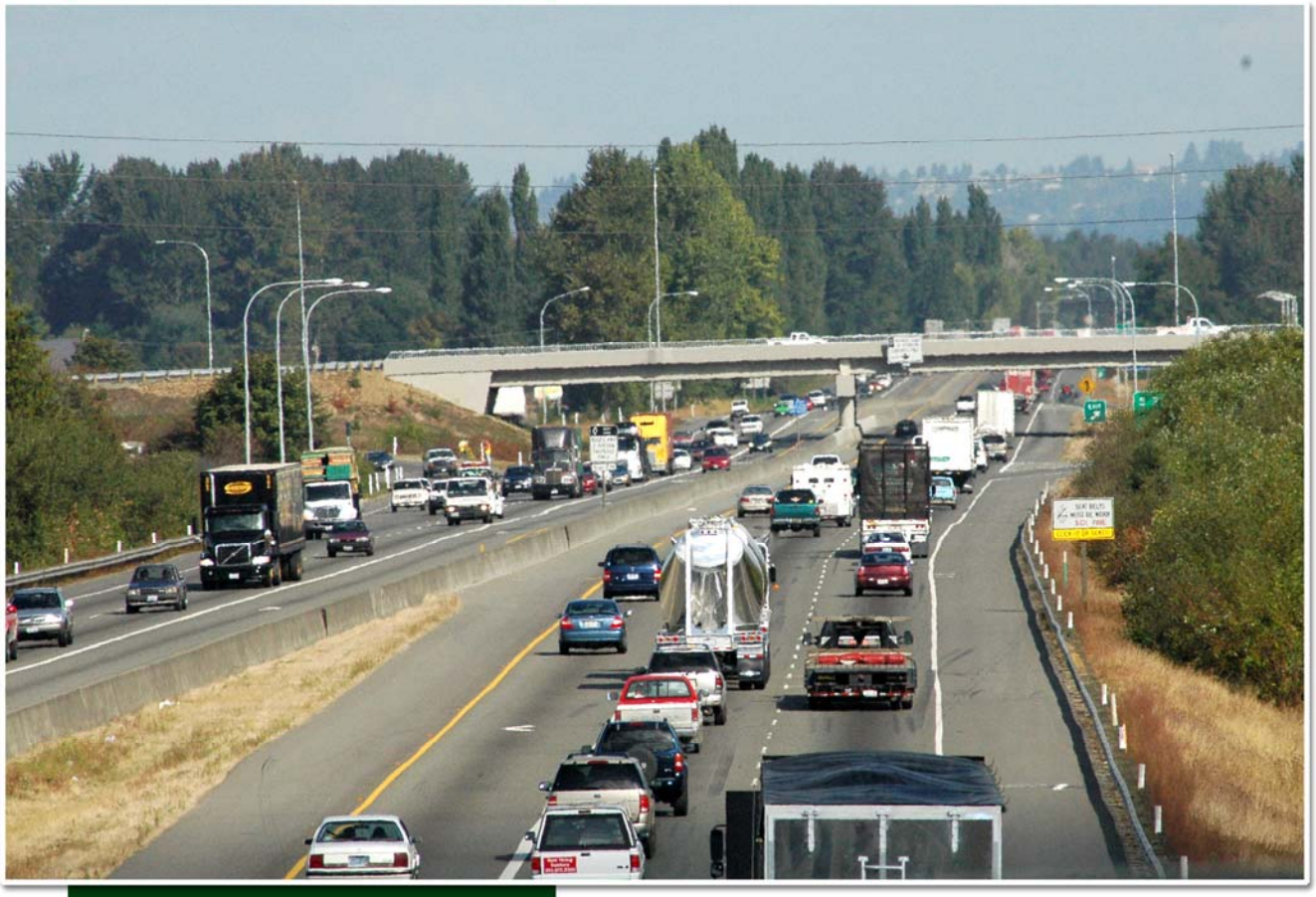
SR 167 Corridor Plan

Technical Memorandum 2: Improvement Options Screening Criteria



Washington State Department of Transportation

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Introduction

The Washington State Department of Transportation (WSDOT) and the cities and counties between Renton and Puyallup are developing strategies to ease traffic congestion along the State Route (SR) 167 corridor. They are developing the SR 167 Corridor Plan, which will identify a series of traffic improvement projects to increase safety and travel efficiency for all users of the highway.

The SR 167 Corridor Plan will identify a long-term vision for the corridor. It will also identify projects that can be completed in the short-term to improve the route's capacity and safety. The final projects selected for the corridor will:

- Provide an efficient set of transportation solutions within the SR 167 corridor;
- Make many communities within the corridor more livable;
- Maintain or improve air quality, protect and enhance fish-bearing streams, and continue to protect the integrity of the local natural environment;
- Contribute to a vigorous state and regional economy by satisfying existing and future travel needs; and
- Accommodate planned regional growth.

In order to screen the options for improving the SR 167 corridor, WSDOT must develop screening criteria. Screening criteria is information used to compare and measure the outcomes of each project option.

WSDOT needs to evaluate several long-term options for improving capacity, and many short-term options for relieving the corridor's most critical bottlenecks.

In 2000, nearly 300,000 residents in the communities of Renton, Kent, Auburn, Algona, Pacific, Sumner, Edgewood and Puyallup used SR 167 as their access to the rest of the Puget Sound region. Also in 2000, more than 180,000 employees worked in the SR 167 corridor that WSDOT is

Long-term goals of the SR 167 Corridor Plan:

- Provide transportation solutions
- Make communities in the corridor more livable
- Protect the integrity of the local natural environment, including air quality and fish-bearing streams
- Contribute to a vigorous state and regional economy by satisfying existing and future travel needs
- Accommodate planned regional growth

The Steps to Creating a Corridor Plan Include:

- Determining Existing Conditions (Technical Memorandum 3)
- Identifying a full range of options (Technical Memorandum 2)
- Evaluating and screening improvement options (Technical Memorandum 5)
- Advancing the range of improvement options through environmental screening (Technical Memorandum 7)

studying. Additionally, this route is the primary connection between manufacturing and industry in the Green River Valley and the greater Puget Sound area which includes the Port of Tacoma and the Port of Seattle. There is heavy traffic on SR 167 at several times of the day, and the route requires significant investments to allow more vehicles to use the highway.

Why screen the options?

Screening criteria help WSDOT consider various improvement options for the route. With the long-term goals of the SR 167 corridor in mind, WSDOT will weigh the details of each option and pick the ones that are the most feasible. Each option will be evaluated for how well it could improve corridor safety, meet current and future corridor travel demands, and meet state budget and environmental constraints.

Selecting suitable criteria by which to judge each option is one of the more important decisions in the corridor evaluation. The SR 167 Corridor Working Group (CWG) representing the communities along the corridor and WSDOT developed and approved the method used to assess each option. Appendix A includes a complete listing of the CWG membership.

Technical Memorandum 5: Corridor Improvement Options

Reviewed Long Term Corridor Options:

- Seven lanes by adding a reversible HOV/HOT lane.
- Eight lanes, including three general purpose lanes and one HOV/HOT lane in each direction.
- Nine lanes, including three general purpose lanes and one reversible HOV/HOT lane.
- Ten lanes, including three general purpose lanes and two HOV/HOT lanes in each direction.

Reviewed Bottleneck Segment Options:

- SB HOV/HOT lane between S. 277th St. and 8th St. E.
- NB HOV/HOT lane between 8th St. E. and 15th St. SW
- NB and SB HOV/HOT lane between 8th St. E. and SR 410.
- Renton / Kent GP Lanes – NB and SB GP lane between S. 180th St. and 84th Ave. S.
- Kent Auxiliary Lanes – NB and SB auxiliary lane between SR 516 and S. 277th St.
- S. 180th St. Interchange Project
- SR 18 Interchange Improvements / 15th St. SW Interchange Improvements
- SR 410 / SR 512 Interchange Projects

Screening Criteria

The SR 167 Corridor Plan's screening criteria are measures of how well each option meets the needs and goals of the corridor. They have been grouped into six key objectives and analytical tools used:

Screening Criteria are analytical measurements of traffic and environmental impacts.

1. Move more people – traffic modeling
2. Reduce congestion and save time – traffic modeling
3. Improve truck mobility and efficiency – traffic modeling
4. Improve safety – traffic modeling
5. Be cost effective – CEVP
6. Be environmentally effective – GIS Screening

Why are these six criteria important?

The six criteria listed above were chosen during discussions with the CWG as the most important criteria to judge the relative value of each option under consideration for the SR 167 Corridor Plan. Each of these criteria has a subset of evaluations that will lead to the completed ranking. See Appendix B for details of the criteria.

How are the screening criteria measured?

Evaluating each option requires some kind of measurement to achieve each of the six key objectives. For effectively evaluating the key objectives, WSDOT developed performance indicators. Performance indicators are information that can be used to measure the success and effectiveness of each goal.

The six key objectives of the SR 167 Corridor Plan, along with performance indicators, are shown in Exhibit 2-1.

How do the screening criteria for the corridor plan relate to previous studies?

The screening criteria for the SR 167 Corridor Plan are very similar to those in the 2003 – 1st screening - *SR 167 Valley Freeway Corridor Analysis*, though some measures from the previous study

have been consolidated. Freight movement and research on the level of freight growth was one of the new factors recognizing the importance of freight transport along SR 167 for Green River Valley businesses.

Exhibit 2-1

Key Screening Criteria with Performance Indicators

Objective 1: *Move More People*	• Number of people carried in single occupant vehicles (SOV) • Number of people carried in car pools and van pools, known as high occupancy vehicles (HOV) • Number of people carried on buses and commuter trains
Objective 2: *Reduce Congestion and Save Time*	• Number of hours of traffic congestion • Number of person hours of travel • Average speed or travel time from one point to another • Traffic effects on local arterials
Objective 3: *Improve Truck Mobility and Efficiency*	• Number of hours of travel for delivery trucks and tractor-trailers • Travel time along SR 167 • Ease of access to the freeway
Objective 4: *Improve Safety*	• Total number of collisions • Rate and severity of collisions • Truck collisions
Objective 5: *Be Cost Effective*	• Cost effective for WSDOT and other agencies in terms of capital and operating costs. • Cost savings of reduced collisions • Costs of moving freight
Objective 6: *Be Environmentally Effective*	• Quality of stormwater • Quality of air due to emissions • Level of effects on environmentally sensitive areas • Level of effects on displaced properties, particularly lower income residents • Consistent with the Washington State Growth Management Act and the local agencies' Urban Center policies.

Environmentally Sensitive Areas could include wetlands, rivers, streams, fish and wildlife habitats and floodplains, just to name a few.

How are the performance indicators calculated for each objective?

1 Move More People

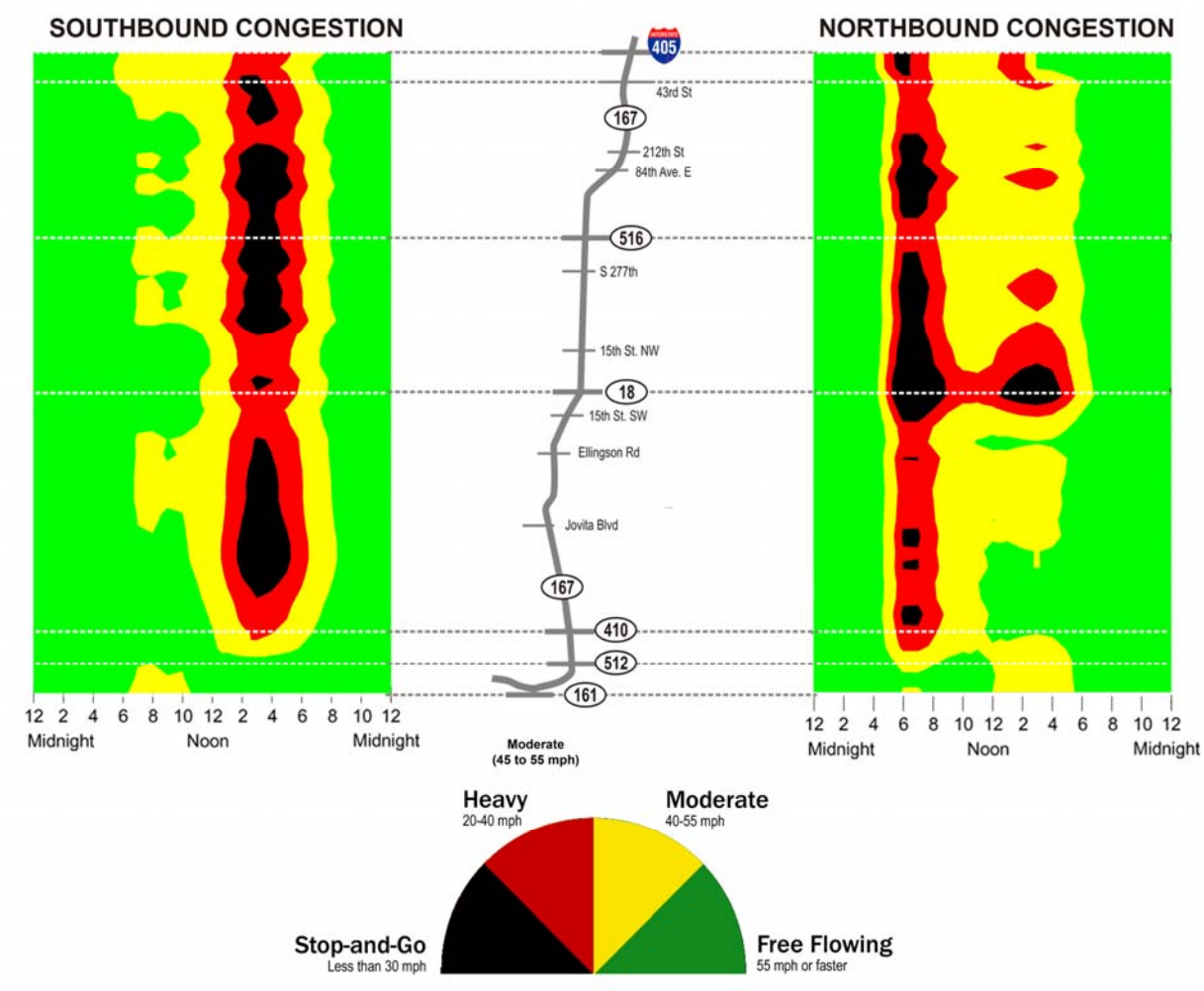
WSDOT can compare the effectiveness of each option by counting the total number of people that move through the corridor during a peak period of the day. The number of people driving alone, using carpools or vanpools, and riding on transit buses and commuter trains can be forecasted by using computer software that predicts travel demand. For each option, WSDOT will use the EMME/2 travel demand model to calculate how many people will likely travel through the corridor through the year 2030.

2 Reduce Congestion and Save Time

To find out how much traffic to expect for each long term or bottleneck segment option, WSDOT will compare the predicted number of vehicles on a particular section of road to the number of vehicles that each lane in that particular section can hold. In conjunction, WSDOT will also assess traffic levels by using a thermoscan, which is a graphical representation of complex traffic flows that uses colors to demonstrate the level of traffic congestion along each section. The thermoscan in Exhibit 2-2 shows traffic congestion in the year 2005. To determine the effectiveness of each option in saving time, ensuring travel time reliability, and reducing congestion. WSDOT will also calculate the average travel time from one point to another along the corridor.

Exhibit 2-2

Congestion Thermoscan (Year 2005 Traffic Data)



3 Improve Truck Mobility and Efficiency

WSDOT will calculate the amount of time it takes trucks to travel along SR 167. Travel time in the corridor will be extracted from the EMME/2 travel demand model. The travel time for the various options will then be applied to truck traffic. By predicting future travel times and improvements to interchanges, WSDOT can estimate the impact the various options will have on freight trucks using SR 167.

4 Improve Safety

Many vehicular collisions are related to physical driving limits such as poor sight distance, inadequate weaving distances or short acceleration lanes. WSDOT can cut down on some collisions by improving road geometry and on others by reducing the amount of traffic congestion. WSDOT will estimate the number and severity of collisions that can be eliminated in each of the options that are being considered. WSDOT will also specifically look at collisions involving trucks and estimate what effect design improvements might have on reducing truck accidents.

5 Be Cost Effective

WSDOT will estimate the costs of building new lanes and bridges for each option, as well as the annual costs for maintenance and law enforcement. These costs may then be weighed along with the route's capacity, travel times and congestion to determine overall cost effectiveness. WSDOT will also calculate the how much money can be saved by improving safety in the corridor and by moving freight more efficiently.

6 Be Environmentally Responsive

WSDOT will generally measure how each option could affect air quality by calculating the number of solid, or impervious, surfaces needed for each option. These may include new bridges and pavement. WSDOT will then look at how that affects existing streams, wetlands and other wildlife habitats along the SR 167 corridor. WSDOT will also estimate each option's effects on the

quality of stormwater runoff, as well as each option's effects on environmentally sensitive areas such as floodplains.

WSDOT will also look at how possible projects could affect low-income or minority populations, as well as identified historical or archaeological resources.

WSDOT will also look at the consistency of the overall project improvements with regional and local Growth Management Act and Urban Centers policies. Specifically now that the options have been found to support the urban centers in the area of transportation demand management (TDM) and transit oriented development (TOD).

What agencies were involved in selecting the screening criteria?

A number of agencies and jurisdictions along the SR 167 corridor worked together in a committee called the Corridor Working Group (CWG) to develop the plan's screening criteria, or the information used to measure the success and effectiveness of each option. Those involved include the cities and counties SR 167 passes through, as well as the state and regional governing agencies. See Appendix A for the complete list of CWG members.

What options will be evaluated in this corridor study?

The SR 167 Corridor Study will evaluate two types of options:

- Long-term corridor options
- Bottleneck segment improvement options

Transportation Demand Management (TDM) is a general term for strategies that result in more efficient use of transportation resources and reduce the demand of overtaxed roadways. Examples may include:

- Improving pedestrian oriented design elements, such as short pedestrian crossings and wide sidewalks
- Requiring parking users to directly pay the costs as opposed to sharing the costs indirectly with others through increased rents, tax subsidies, etc.
- Improving transit infrastructure, such as subway entrances and bus stops.
- Subsidizing transit costs for employees and residents.
- Bicycle friendly facilities which may include secure bike storage areas and showers.

Transit Oriented Development (TOD) is a term which refers to a residential or commercial area designed to maximize access to public transport, and often incorporates features to encourage transit ridership. A TOD neighborhood typically has a center with a train station, metro station, tram stop, or bus station, surrounded by relatively high-density development with progressively lower-density development spreading outwards from the center. TODs generally are located within a radius of one-quarter to one-half mile (0.4 to 0.8 km) from a transit stop, as this is considered to be an appropriate scale for pedestrians.

Evaluation of Options

Options for the SR 167 Corridor will be evaluated in two stages:

1. First-level screening
2. Evaluation of final options

WSDOT will use slightly different techniques to assess long-term corridor options versus bottleneck segment options.

First-level screening

Because the 2003 *SR 167 Valley Freeway Corridor Analysis* took significant steps to identify long-term options for the SR 167 corridor, its four basic suggestions for the route can be included along with more detailed cost estimates for each. The first level of screening will reduce the long-term options to two basic options:

- Expanding SR 167 to eight lanes, with three GP lanes and one HOV lane in each direction.
- Expanding SR 167 to ten lanes, with five lanes in each direction including HOT lanes.

What is a long-term corridor option?

A long-term corridor option provides a vision of how SR 167 will function in the year 2030. The four proposed options evaluated in the 2003 *SR 167 Valley Freeway Corridor Analysis* are examples of long-term options for the corridor.

The long-term options may include a number of design characteristics, such as:

- General purpose lanes for all traffic
- Managed lanes
- HOV lanes for buses and carpools
- High Occupancy Toll (HOT)

Long-term corridor options may also include any new interchanges or improvements to existing interchanges.

What are GP Lanes?

General Purpose (GP) lanes are unrestricted lanes of traffic that any motorist can use.

What are Managed Lanes?

Managed lanes can be considered:

HOV Lanes

High Occupancy Vehicle (HOV) lanes, sometimes called carpool or diamond lanes, are freeway lanes reserved for the use of carpools, vanpools and buses. HOV lanes enable those who share the ride to bypass traffic in the regular lanes.

Or:

HOT Lanes

High Occupancy Toll (HOT) lanes are lanes that are open to carpools, vanpools, transit, and a limited number of solo drivers who will pay a fee. The lanes preserve priority status for transit and HOV vehicles, but allow solo drivers to use extra room in the lane if they pay a toll.

Evaluation of long-term options

Because of limited transportation funding, there may be slight variations in how the lanes are operated or in how many lanes can be completed by 2030. Due to this fact, the first level of evaluating SR 167's options may result in more than two long-term alternatives.

When WSDOT decides on the final, long-term options, it will use the six key screening criteria described in Section 2 and base the plan on a 2030 completion date.

How will screening results be presented for the long-term corridor plans?

The results from the first level of screening will be presented in a technical memorandum that defines the comparative costs and effects for each option, as well as the rationale for eliminating two of the original 2003 *SR 167 Valley Freeway Corridor Analysis* options. This memorandum will define and detail the two remaining long-term corridor options.

An evaluation of the two final long-term options will then be summarized.

What is a bottleneck segment improvement option?

A bottleneck segment option is a short-term project. These projects can include strategic improvements to a section of SR 167, such as adding traffic lanes to relieve congestion near an off-ramp or on-ramp, adding a general purpose lane or HOV lane in a section of the highway, or improving interchanges.

Bottleneck segment options are essentially stages to achieving the ultimate, long-term goals of the corridor. In this case, bottleneck segment options will be evaluated to establish a priority for construction budgets.

How will bottleneck segment improvement options be evaluated?

Bottleneck segment options will also go through a screening level, or a comparison of effectiveness, prior to a full evaluation. In this case, the screening will identify projects in specific sections of the corridor

Using Computers to Forecast Traffic

To build a highway that will serve its community well for years to come, transportation planners, engineers and designers use computer models to predict how much traffic a roadway will see as the population grows.

The EMME/2 model refers to the **4-county regional travel demand model** developed by Puget Sound Regional Council (PSRC). It is primarily used for regional planning studies.

The VISSIM model refers to **visual-simulation models** that are developed to look at how transportation along a corridor operates. These models are custom-developed to analyze bottle-neck and congestion areas.

The SYNCHRO model refers to **operational models** that look at local arterials and intersections.

that can be completed within two years. WSDOT will also look for any relevant interchange improvements that could be made in conjunction with road widening.

The first-level screening will also identify which projects should be considered for completion within the first five to ten years, and which projects should be considered for completion within the next ten-year period.

For future traffic projection purposes, the bottleneck segment improvement options will be analyzed for the years 2010 and 2020 using computer software that predicts traffic demand. Because the bottleneck segment options are more defined than the long-term projects, traffic operations models will also be used. WSDOT will use the VISSIM operations model for freeway and ramp analyses and the Synchro operations model for analyzing the intersections of freeway ramps at arterial streets. The VISSIM model will also be used to analyze interchange options.

How will screening results for bottleneck segment improvement options be presented?

The first level of screening results for bottleneck segment options will be presented in a technical memorandum that defines the scope and potential time-frame for each option. This document will include reasons for developing each project, including the benefits of adding lanes and improving interchanges, the project's relationship with the long-term corridor development, and any possible budgetary constraints. The memorandum will outline the final evaluations needed to select the preferred projects.