

## Study Finding: ATM Could Provide Benefits for Puget Sound

The initial findings from this study are positive, especially with respect to collision reduction. Implementation of ATM techniques was found to have merit in the Central Puget Sound region. Implementation of a successful ATM system that works synergistically to reduce collisions and improve traffic flow requires careful consideration of each location's geometric and operational characteristics. Ensuring maximum efficiency and effectiveness of ATM techniques and systems will require 24/7 traffic operations center staffing. The key to successful deployment of active traffic management activities will be to establish a coordinated system of location-specific ATM techniques and on-going operations and maintenance funding commitments for their continued operations.

### Recommended Next Steps?

- ◇ Coordinate with the I-405, SR 520 and Alaskan Way Viaduct projects to determine what ATM techniques can be implemented prior to construction activities and over the long-term.
- ◇ Further investigate other locations for potential implementation of ATM techniques.
- ◇ Outreach to elected and appointed officials providing information on the benefits of ATM implementation.
- ◇ Explore local and federal funding opportunities for capital project costs, as well as on-going system operations and maintenance costs.
- ◇ Solicit experimental use provisions for ATM infrastructure/signing with appropriate federal regulators.
- ◇ Coordinate with local partners, especially law enforcement.



Example of speed harmonization and queue warning system as part of the I-405 Corridor Program roadway expansion.

### For More Information

Additional information on Active Traffic Management can be found in the July 2007, FHWA/AASHTO report titled *Active Traffic Management: The Next Step in Congestion Management*.



#### Local Contacts

##### Ted Trepanier, P.E.

State Traffic Engineer  
Co-Director, Maintenance and Operations  
Washington State Department of Transportation  
(360) 705-7280 or TrepanT@wsdot.wa.gov

##### Craig Stone, P.E.

Deputy Administrator, Urban Corridors Office  
Washington State Department of Transportation  
(206) 464-1222 or StoneC@wsdot.wa.gov

##### Charlie Howard

Transportation Planning Director  
Puget Sound Regional Council  
(206) 464-7122 or choward@psrc.org



**Americans with Disabilities Act (ADA) Information:** Persons with disabilities may request this information be prepared and supplied in alternate formats by calling the Washington State Department of Transportation ADA Accommodation Hotline collect (206) 389-2839. Persons with hearing impairments may access Washington State Telecommunications Relay Service at TTY 1-800-833-6388, Tele-Braille 1-800-833-6385, Voice 1-800-833-6384, and ask to be connected to (360) 705-7097.

**Title VI Statement to Public:** WSDOT ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities. For questions regarding WSDOT's Title VI Program, you may contact the Department's Title VI Coordinator at (360) 705-7098.

## What is Active Traffic Management?

Active traffic management can be defined as dynamically managing and controlling traffic based on prevailing conditions. Using integrated systems and a coordinated response, both recurrent and non-recurrent congestion can be managed to provide improved roadway safety and throughput. With travel demand on the rise and increasing congestion, coupled with the reality of today's financial constraints, active traffic management can be an excellent operational strategy.

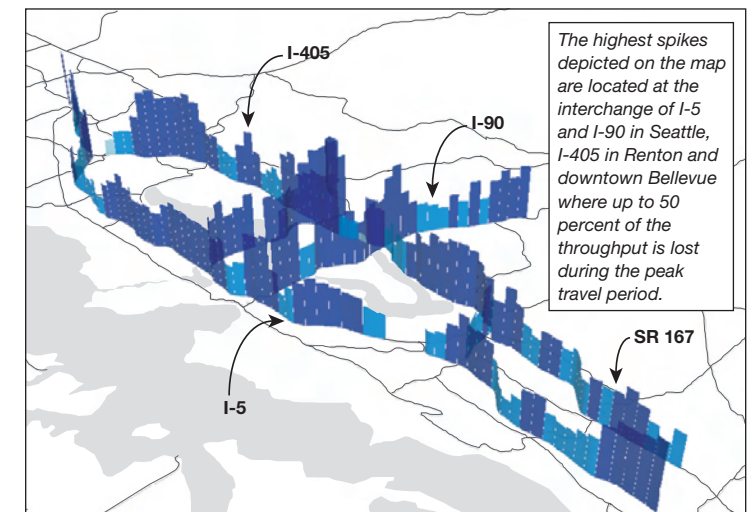
## Why Study Active Traffic Management?

Traffic congestion plagues our Puget Sound roadways. Hours of backups and delays are an everyday occurrence, stretching commuting hours out longer, frustrating drivers and delaying freight. Portions of Interstate 405 between Renton and downtown Bellevue lose half of roadway capacity during peak-hour congestion. This means that our roadways provide the least performance when it is needed most. Just one stalled vehicle or a small collision can create hours of additional delay.

WSDOT is looking into ways to improve vehicle flow and test various ways to manage traffic on the busiest routes in Central Puget Sound. One of these ways is an innovative, high-tech approach called Active Traffic Management (ATM). WSDOT already uses several ATM techniques including ramp meters, reversible lanes, congestion sensors, real-time traffic information, HOV lanes, incident response vehicles, and traffic cameras. While these have all been successful, WSDOT is also looking at other countries' traffic management success.

ATM is used successfully in Germany, England, the Netherlands and Denmark to help manage the number of vehicles and roadway flows. ATM dynamically manages and controls traffic based on congestion conditions to provide increased flow and safety. Examples of this include using integrated systems to dynamically route vehicles to a less-congested route, move vehicles to specific lanes to avoid a collision ahead or signs to warn drivers of backups ahead.

Our region is projected to continue growing in population and employment. An estimated 1.7 million new people and 1.1 million new jobs will locate to the Central Puget Sound during the next 30 years. This could mean an estimated 1.5 million vehicles will be added to our roadway system, which is already bursting at the seams. Central Puget Sound drivers experienced 520,000 person hours (370,000 vehicle hours) of delay in 2004. With such travel demand on the rise, increasing congestion and financial constraints, WSDOT must look at managing our current system more dynamically.



Representation of lost throughput on Central Puget Sound roadways during the peak travel period. The result is increased delay and lost time.

## Safety is Key

By addressing congestion, we are also making roadways safer. Congestion contributes to rear-end and sideswipe collisions; collisions contribute to more congestion. The correlation between rear-end collisions and congestion is well-documented on our Puget Sound roadways. Accidents and disabled vehicles disrupt traffic to a greater extent than everyday, workday congestion. Twenty-five percent of our congestion comes from incidents such as collisions, stalls and medical emergencies. Using the I-405 project traffic model, the Active Traffic Management project team simulated a 15 minute incident that blocked one traffic lane and found that it resulted in a total of 50 hours of delay. Just reducing collisions and their associated congestion can improve WSDOT's ability to manage collision related congestion and improve roadway efficiency.

### Active Traffic Management Techniques to Consider

**Speed Harmonization** – to dynamically and automatically reduce speed limits approaching areas of congestion, collisions, or special events. **Benefit:** to maintain flow and reduce risk of collisions.

**Queue Warning** – to warn motorists of downstream queues (or backups) and direct through-traffic to alternate lanes. **Benefit:** to effectively utilize available roadway capacity and reduce the likelihood of speed differentials and collisions related to queuing.

**Junction Control** – to use variable traffic signs, dynamic pavement markings, and lane use control to direct traffic to specific lanes (mainline or ramp) based on varying traffic demand. **Benefit:** to effectively utilize available roadway capacity and manage traffic flows to reduce congestion.

**Hard Shoulder Running** – to use the shoulder as a travel lane during congested periods or to allow traffic to move around an incident. **Benefit:** to minimize recurrent congestion and manage traffic during incidents.

**Dynamic Rerouting** – to change destination signs to account for current traffic conditions. **Benefit:** to effectively utilize available roadway capacity by redirecting traffic to less congested facilities.

**Travel Time Signs** – to provide estimated travel time and other condition reports and communicate travel and traffic conditions. **Benefit:** to allow for better en-route decisions by travelers.



Speed harmonization signing in the Netherlands.



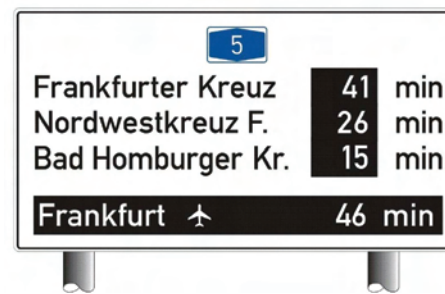
Queue warning in England.



Hard shoulder lane in England.



Dynamic route information displayed on VMS in the Netherlands.



Travel time signs in Germany.

### Improving I-405 Traffic Flow & Safety: Recommended ATM Techniques

A study team (WSDOT, FHWA, PSRC) developed three recommendations for the I-405 corridor based on the ATM feasibility study. They are:

- ◇ Implement speed harmonization in both directions in the study area (I-90 south to SR 518/North Airport Expressway).
- ◇ Incorporate queue warning on southbound I-405 at the SR 167 interchange.
- ◇ Install specialty travel time signs on southbound I-405 at I-90, westbound I-90 at I-405, southbound I-405 at SR 167 and northbound I-5 at I-405.

Additional information on the benefits and costs of the recommendations are presented below.

#### Speed Harmonization & Queue Warning

**Expected benefits of speed harmonization and queue warning include:**

- **Collision Reduction:** Injury collisions 30 percent and other collisions 16 percent or 586 fewer collisions per 3 year period
- **Potential Savings:** \$13,300,000/year in collision avoidance  
\$275,000/year in collision avoidance delay\*
- **Delay Reduction:** 110 hours per day from queue warning
- **Potential Savings:** \$385,000/year\*

*Conceptual Capital Cost: \$4.7M per mile (both directions)  
Total of \$56M for 12 mile segment  
Operations and Maintenance Costs: \$464K per year*

#### Travel Time Signs

- WSDOT currently provides travel times via variable message signs
- Additional locations and special purpose signs would be beneficial, providing drivers with additional information en-route

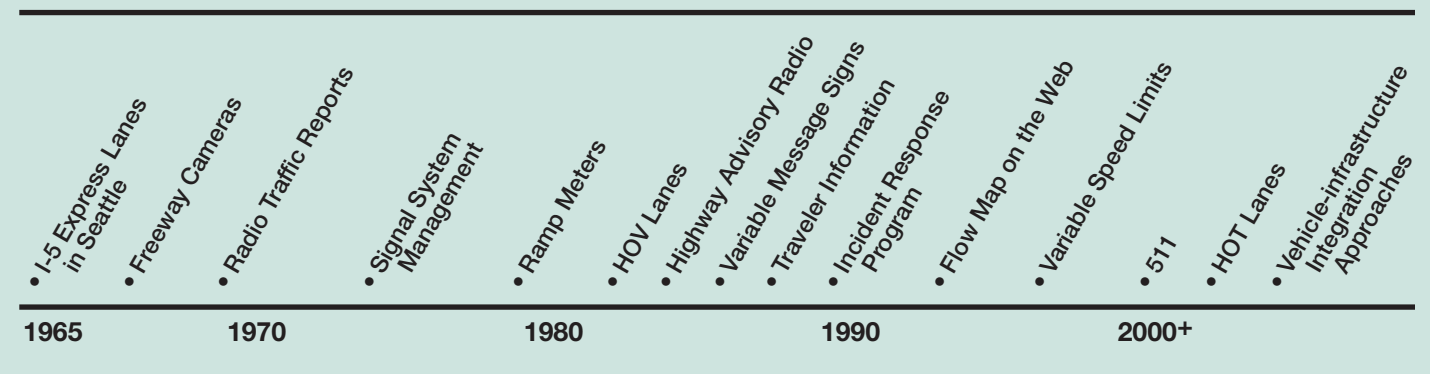
*Conceptual Capital Cost: \$1.2M for 2 sign concept in a single location  
Operations and Maintenance Costs: \$43K/year for four locations*



#### Reducing Collisions – More Than Improving Safety

The National Safety Council estimates that avoiding one property-damage-only collision saves \$8,200 and avoiding one injury collision saves \$119,650.

#### Progression of Traffic Management Activities/Facilities in Washington State



\* Delay cost savings were developed using 2005 Washington State Employment Security Department annual employment and wage averages for King, Pierce and Snohomish Counties to calculate value of time estimates.