TRANSNOW

Transportation Northwest Newsletter

Vol. XXII, No. 3
Spring-Summer 2010

University Transportation Center for Federal Region X at the University of Washington

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Transportation Northwest Regional Center Newsletter

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The Transportation Northwest Newsletter is published triannually by the TransNow Regional Center to inform readers about its research, educational, professional, and service activities.
Opinions expressed by the authors do not necessarily imply endorsement by the University of Washington or Washington State University, a TransNow Consortium partner.

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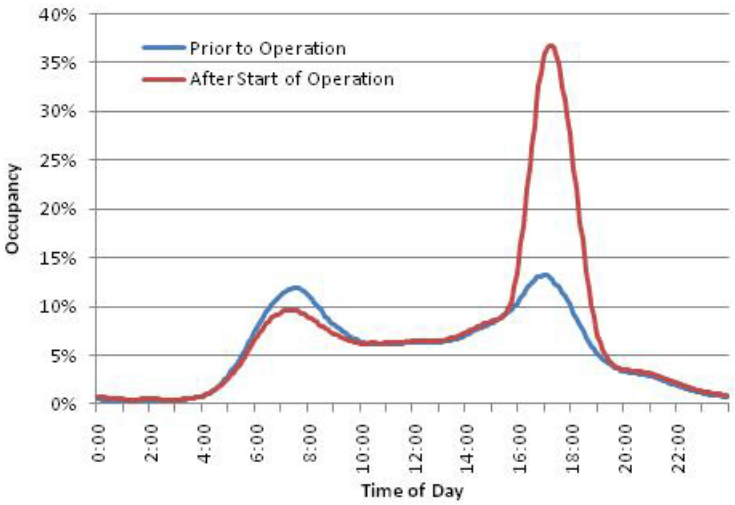
Initial Impacts on Congestion Due to VSL Operations on I-90 Westbound Between I-5 and I-405

By Trevor Louviere, WSDOT TMC Intern and UW Undergraduate

On April 27th, 2009 the Washington State Department of Transportation (WSDOT) began operation of Variable Speed Limit Signs (VSLs) on westbound I-90 between I-5 and I-405 as part of the I-90 Two-Way Transit Project. WSDOT aimed to relieve congestion and increase throughput along the corridor as well as reduce the occurrence of rear-end collisions with operation of the VSL system. This project was significant because it is a first of its kind in the Seattle metropolitan area. This study shows the effects of the system shortly after the start of operations and is significant because the VSL system did not have the expected outcome during the one-year test period.

The VSLs are signs on either side of the roadway which automatically adjust the speed limit on a roadway using data taken from loop detectors imbedded in the roadway. The loop detectors measure volume, speed, and occupancy (percentage of time that loops are occupied by vehicles) in each lane of the roadway. The occupancy data is used in an algorithm to calculate a safe traveling speed under the current roadway condition, such as traffic due to high volumes of vehicles or incidents ahead. The VSLs should theoretically reduce congestion because larger volumes of drivers can pass an incident scene or highly congested area at lower speeds. In addition, when drivers see the VSLs displaying lower speeds they are aware they will need to slow down and prepare, thus reducing the number of rear end collisions.

Occupancy vs. Time of Day on the East Channel Bridge of Westbound I-90, 1st and 2nd quarters of 2009, Tue-Thurs.



Drastic increases in congestion were noted at the start of VSL operation. The largest impacts occurred near the east end of Mercer Island, with an increase of 24 percent occupancy on the East Channel Bridge and an increase of 21 percent occupancy at E Mercer Way. This occupancy increase translates to longer travel times for drivers between Bellevue and Seattle.

Negative effects on congestion were noted throughout the entirety of the corridor. Prior to operations, no stop-and-go traffic was seen on westbound I-90, and afterward stop-and-go traffic was seen across most of Mercer Island, a 3 mile segment of I-90.

The project did not see an increase in throughput as expected by WSDOT. In some areas of the corridor throughput increased slightly, but other areas experienced slight decreases. One of the main

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VSL Signs

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reasons congestion increased significantly was the formation of a new check point at the East Highrise. Further from this location, residual effects exist where the large increases in congestion were noted. With the increase in congestion, throughput could not increase, so the VSLs initially failed to improve throughput through the corridor. The VSL system will be removed within the next year and replaced with an Active Traffic Management (ATM) system. VSLs are one component of the new ATM system. To learn more about ATM, visit http://international.fhwa.dot.gov/pubs/pl07012/.

Trevor Louviere performed an independent, one-year analysis of the results of the system. His study was overseen by Prof. Nancy Nihan. Trevor was an undergraduate intern at the WSDOT Traffic Management Center in Shoreline. He received his BSCE in spring, 2010.

Project Spotlight: UW's Engineers Without Borders in Bolivia

During 2009-2010, TransNow helped support the UW chapter of Engineers Without Borders (EWB) in their mission to improve infrastructure in Bolivia. Rural communities in Bolivia are struck hard by harsh climate conditions that are detrimental to their roads; every year, people are cut off from schools, markets, and clinics due to erosion and rocks slides along the road. With help from TransNow, the UW EWB begins construction in July to improve road conditions. The design team is confident that the improvements will prevent some of the frequent road washouts that impede travel to or from the rural communities. In addition, the team is emphasizing roads maintenance education so that the people will have the tools, experience, and knowledge to prevent future road problems. TransNow is excited and grateful to be a part of the great work the UW EWB is doing to restore the way of life and ensure a more viable future for rural Bolivians. To learn more about the UW EWB and their work in Bolivia, visit http://students.washington.edu/ewbuw/.

Photo courtesy of UW EWB

WSU Research: Accessible Education Via Accessible Public Transportation

By Jeremy Sage, WSU PhD Student and TransNow Fellow

The Washington State Board for Community and Technical Colleges (SBCTC) recently commissioned Washington State University's Transportation Research Group (WSU-TRG) to conduct a transportation access study to evaluate the degree to which transportation access inhibits current community and technical college students. The purpose of this study was to understand how well the community and technical college system is geographically distributed and serving the people of Washington State in all three of the SBCTC's mission areas: academic transfer, workforce education, and basic skills. As part of its planning and policy development process, SBCTC sought to understand the future needs and challenges involved with effective delivery of education to clientele and to make policy recommendations as appropriate regarding the future size and shape of this college system. One critical aspect to these planning and policy discussions is how far current students must travel to attend a community and technical college campus or satellite campus and the extent to which transportation access inhibits attendance.

To assist the SBCTC in exploring these transportation constraints, researchers Jeremy Sage and Dr. Eric Jessup at the WSU-TRG utilized Geographic Information Systems software (GIS) to identify the relationship between the residential locations of current students by mission area and their associated campuses. GIS has become a powerful tool within the WSU-TRG, as it permits us to employ spatially explicit models. For this project, we were able to demonstrate that the current distribution and location of Washington State Community and Technical College campuses are reasonably well situated in relation to the location and density of existing students, as well as to the population density of Washington as a whole. Statewide, this results in relatively short commute times for a large proportion of students. Over 42 percent of all students travel 10 minutes or less, and over 72 percent of all students travel 20 minutes or less to attend college campuses. We further compared the variability in travel requirements by student type and socioeconomic status (SES). We found that the students with the shortest commute times are the English as a Second Language (ESL) students followed by the Adult Basic Education (ABE/GED) students. Additionally, throughout much of the state low SES students have, on average, shorter commute times than their high SES counterparts; however, the opposite is true in King County and the South Sound region. While low SES students are primarily concentrated relatively close to campus sites,

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WSU Research

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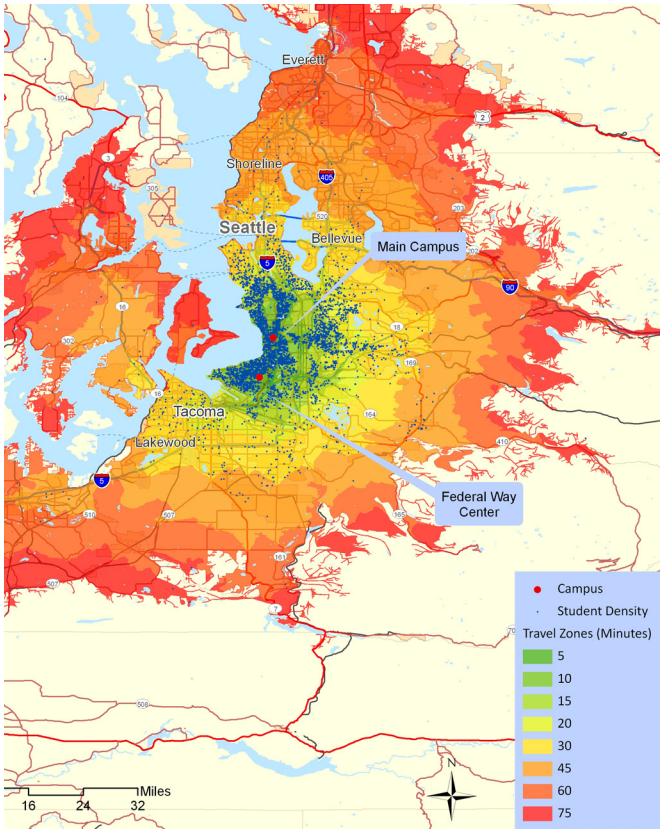

they also display more geographical variance when compared to the high SES students who are tightly concentrated in the 15-30 minute zones with few high SES students scattered throughout region.

A final concern we helped in addressing was whether substantial overlaps or gaps in service were apparent. Though we did not conduct this analysis in relation to specific program offerings, we were able to find that the degree of geographic overlap, as indicated by the number of campuses within a 15 minute drive, was quite low with the exception of the most heavily populated areas of King and Pierce Counties. As far as gaps are concerned, we found little evidence to suggest that many large communities are being geographically disadvantaged by lack of access to the Community College system. Several moderately sized towns throughout the central part of the state were found to have high student enrollment but were also required to drive substantially further than most students.

The map to the left, from Highline Community College, depicts some of our typical findings from this study in which it is apparent that students tend to be tightly packed in the nearby neighborhoods surrounding a campus and less-so further away from campus. This observed clustering of students suggests that viewing student enrollment numbers for various mission categories at an entire state level can miss some of the intricacies of local variability. As such, narrowing in on the composition of the areas around present campuses can aid in the determination of equitable distribution of educational facilities about the state and highlight areas or regions which may be over or underserved.

Region X News

Region X Transportation Consortium Meets

The Region X Transportation Consortium (RXTC) met at Portland State University for the biennial meeting in May. Members discussed the Region X Pooled Fund study, interfacing between states, the 2011 CUTC meeting in Portland, and the Region X Reception at the Transportation Research Board Annual Meeting.

Members of the RXTC at the 2009 Region X Reception, photo courtesy of OTREC

NIATT Researchers Début Smart Signals in Minnesota

In February, a new Smart Signals Technology design for Accessible Pedestrian Signals was installed at a public intersection in a suburb of St. Paul, MN. A team of researchers from the University of Idaho (UI), that has been involved in the development of the new system, were on hand to observe technicians with the Minnesota DOT install the systems at two intersections. Smarts Signals is an enabling technology initially conceived by UI Professor Richard Wall in 2004 as a means to improve the capability and safety of controlling traffic signals at intersections using distributed microprocessor based controls that use safety critical network design methodologies. The focus has been placed on improving access and safety for low vision and mobility impaired pedestrians.

Oregon Students Design Bicycle Shelter for Community

In this OTREC-funded education project, led by Professor Nico Larco, the students of *designBridge* undertook the design and construction of a new transportation shelter for Roosevelt Middle School in Eugene, Oregon. The project results include not only the completion of the shelter but also the continued development of a service learning program that can effectively address small community transportation-related needs. To learn more about the project, read the final report at http://otrec.us/project/247.

TransNews

2010-2011 TransNow Research

TransNow's Board of Directors met in June to decide research awards for the 2010-2011 academic year. The Board decided to fund 17 new research projects for a total of approximately $900,000 in federal funds. For more information about the research, read project descriptions on our website at www.transnow.org/research/research-project-descriptions/.

UW Students Win ITE Awards

Aaron Knight (U) and Felipe Sandoval (G) from the University of Washington were awarded ITE scholarships for 2010. TransNow matched both awards for a total of $1500 and $2000, respectively. Congratulations to Aaron and Felipe!

Congratulations to TransNow Graduates

Kudos and best wishes to all our Advanced Institute graduates:

From the University of Washington:

Nick Connolly, BSCE
Joshua Hatfield, BSCE
Elyse Hanson, BSCE
Trevor Louviere, BSCE
Jaedi Stevens, BSCE
Elizabeth Thomas, MSCE
Jonathan Corey, MSCE
Xiaolei Ma, MSCE
Victor Stover, MSCE and MUP
Ariel Davis, MSCE
Chilan Ta, MS and MUP
Lin Lin, PhD

From Washington State University:

Carrie Schramm, MSEE
Greg Karlovits, MSCE
Gudmundur Hannesson, MS
Haitham Dawood, MSCE
Josh Van Wie, MSCE
Mengqi Wu, MSCE
Muhammad Barik, MS
Xiaojun Li, MS
Xuping Huo, PhD

A Fond Farewell to Pete

In June, TransNow said goodbye to Pete Briglia, the Associate Director of Communications and New Initiatives in Freight and ITS. We are grateful for his four years of service and wish him well as he takes on a new role as the Director of Operations in Tolling at the WSDOT.

TransNow Welcomes Dan Dailey

Dan Dailey, Professor of Electrical Engineering, joins TransNow as Associate Director of Communications and Intelligent Transportation Systems.

Students Win WTS Awards

Congratulations to Kelsey Anderson (WSU), Julie Rausch (WSU), and Erica Wygonik (UW) for the honor of receiving WTS Scholarships. TransNow matched the awards for a total of $6400 per student. Way to go, Kelsey, Julie, and Erica!