

Go With the Flow / Stay In the Know Variable Speed Limit and Real-Time Travel Information System

Fact Sheet and Frequently Asked Questions

The Virginia Department of Transportation (VDOT) is debuting an innovative traffic management system called Variable Speed Limit (VSL) to assist drivers approaching Beltway/ I-95 lane closures associated with the Telegraph Road Interchange reconstruction, the final element of the Woodrow Wilson Bridge Project.

To maximize traffic flow, specially trained operators will control the system as it varies the speed limit on the Beltway. Variable speed limits will be actively enforced by state and local police. Initially, the system will be used only during night-time lane closures, when traffic volumes are lower. In the future, should VSL prove effective, it may be used on a regular basis in a variety of locations during daylight hours or when major incidents (i.e. crashes) entail lane closures.

VSL operators housed at the Woodrow Wilson Bridge Project Operations Center will oversee the system as it utilizes roadway sensors and cameras to determine optimal speed limits to keep traffic moving. Operators will coordinate VSL operations with the VDOT Smart Traffic Center, other traffic agencies and law enforcement agencies. Drivers will be informed of variable speed limits through changeable highway signs.



To help drivers steer clear of congestion, a host of new information tools are being introduced, including actual delay-time estimates and other information on highway signs placed upstream from backups, enabling motorists to choose alternative routes before encountering congestion. Prior to departing, travelers can view new “Go With the Flow/Stay in the Know” information on www.wilsonbridge.com, including a constantly updated, color-coded map that provides real-time travel speeds and traffic cameras. Both on road and online, the outreach effort is focused on empowering travelers with information so they may choose whether to adjust their travel time, take an alternative route or shift to another means of travel (i.e., transit).

Deployed with success in Europe, VSL is intended to regulate the flow of traffic, thereby improving efficiency and safety. VSL operates under the same premise as rice grains passing through a funnel: Depositing a bag of rice grains all at once will clog the funnel, whereas gradually pouring the grains enables them to pass quickly. VSL’s goals are to:

- Increase traffic flow by integrating vehicles gradually
- Reduce abrupt traffic stoppages, resulting in fewer rear-end/side-swipe crashes
- Make work zones safer for construction workers and motorists
- Empower motorists with actionable information about real-time traffic conditions, enabling them to modify travel times, routes or modes

How can slowing vehicles down help traffic move more efficiently?

While seemingly counterintuitive, slowing down traffic approaching an area of reduced capacity is proven to keep traffic moving more efficiently. Drivers encountering a lane closure often slow down abruptly or even stop, sending a “shock wave” of sudden braking through approaching traffic, which quickly clogs the highway. In addition, sudden slowdowns/stoppages also lead to abrupt lane changes. As a consequence, stretches of highway approaching lane closures often are beset by higher-than-average rear-end and side-swipe crashes, which not only are dangerous but further exacerbate congestion.

VSL will regulate traffic flow much like ramp metering, which uses red/green lights to regulate the in-flow of vehicles, ensuring that entering traffic does not clog the highway.

Why is VSL being used in this location?

The seven-mile stretch of the Beltway/I-95 approaching and including the Telegraph Road Interchange work zone is a promising location to test and refine VSL for the following reasons:

- The reconstruction project has reduced the Beltway/I-95 from four lanes to three lanes until at least 2011
- Periodic additional lane closures will be required during overnights

How will you assess whether the VSL program is successful?

The VSL system constantly records a wide range of aggregated data. Prior to being activated, the VSL system captured a wealth of benchmark data against which the system will be evaluated. Additional data collected in recent years by VDOT and law enforcement agencies also will be used to assess the VSL system. Among the key measures of effectiveness are length of backups, duration of delays and number of crashes.

Should the program demonstrate effectiveness, it may be deployed on an ongoing basis during typically congested daylight hours or when major incidents reduce highway capacity, both in this location as well as other frequently-congested Northern Virginia highways.

How is the Wilson Bridge Project’s VSL system different from other systems around the country?

The Wilson Bridge Project VSL system is “adaptive” in that it responds to real-time data to adjust speed limits. The system takes real-time data from sensors and utilizes an algorithm to calculate average speed, occupancy and vehicle volume. This information is used to determine the optimum speed at which traffic can travel most efficiently.

Most other VSL systems are “time of day” systems, in which travel speed is metered at pre-specified times of day when traffic volumes typically increase (i.e., 4:00 p.m., the start of the evening commuting period). Unlike the Wilson Bridge Project’s VSL system, they do not react to actual real-time traffic conditions.

While adaptive VSL is being used in Europe, the Wilson Bridge system is believed to be the only one of its kind in the United States.

Where has VSL technology improved traffic flow?

Adaptive VSL has been used effectively in a number of other countries, including:

- England: The “MIDAS” system reduced incidents by 18 percent
- Germany: Speed harmonization on the A5 highway between Bad Homburg and Frankfurt is credited with a 30 percent reduction in crashes involving personal injury and a 27 percent reduction in crashes involving heavy property damage
- Netherlands: VSL increased traffic flow from three to five percent and reduced collisions by approximately 16 percent

How will the VSL system monitor traffic and set speed limits?

Specially-trained VSL system operators at the Woodrow Wilson Bridge Project Operations Center will ultimately control the variable speed limits. VSL operators will oversee the system as data is received from 18 sensors and put into an algorithm to determine optimal speeds. The operators will confirm on-road travel conditions and the need to adjust the roadway speed limits by viewing real-time traffic images from three closed-circuit video cameras. VSL will be employed in the following locations:

- Outer Loop: Springfield Interchange through the Telegraph Road work zone
- Inner Loop: Maryland shore through the Telegraph Road work zone

VSL operators will closely coordinate with VDOT’s Smart Traffic Center and MDOT’s CHART system regarding traffic conditions on other portions of the Beltway/I-95 and nearby major highways. They will also monitor other relevant information, such as weather conditions. VSL operators will communicate directly with law enforcement agencies to ensure that officers are expressly notified when the system is activated.

What are the maximum/minimum speeds?

The maximum speed limit in all Wilson Bridge Project work zones is 50 mph. However, the VSL zone on the Outer Loop extends to the Springfield Interchange (west of the work zone) where the maximum speed limit is 55 mph until approximately the Eisenhower Connector. The minimum speed limit will be 35 mph.

By how much and how frequently will speed limits change?

The speed limit will change in five to 10 mile per hour increments. Once changed, the speed limit will not change again until at least 20 minutes have elapsed.

How will variable speed limits be enforced?

Since the VSL system's effectiveness hinges on motorists obeying the posted speed limits, state and local police will enforce speed limits throughout the VSL zones. As part of its ongoing program, the Wilson Bridge Project provides for stepped-up presence in the project corridor by Virginia and Maryland State Police. Officers will allow a brief grace period before they start enforcing adjusted speed limits. In addition, the VSL system will wait at least 20 minutes before implementing subsequent speed limit changes. Police officers will carry out enforcement of VSL in the same manner they enforce static speed limits, bearing in mind that certain locations are better suited to keeping rubber-necking distractions to a minimum.

What happens to the data VSL collects via roadway sensors and cameras? How are privacy rights protected?

The VSL system uses the **aggregate** of all traffic on I-95/Beltway approaching the Telegraph Road work zone to set optimal speed limits. It does not focus on specific vehicles. The system's cameras provide real-time images of traffic conditions to VSL operators, but they do not record those images. VSL's cameras are nearly identical in function as those available for public viewing on sites such as www.trafficland.com.

Will VSL be used in inclement weather?

As a matter of policy, lane closures are not implemented on the Beltway/I-95 during inclement weather. Consequently, VSL will not be used during storm events.

This region is often subject to violent thunderstorms that knock out power. Is VSL vulnerable to power outages?

Three layers of redundancy will protect against power outages:

1. The VSL system has backup power for one hour to protect against short-term loss of power
2. If the outage is longer than one hour, an on-site backup generator will be utilized
3. In the event the backup generator fails, the system can be operated from the provider's home office outside Harrisburg, Pennsylvania

How much does the system cost?

The two-year cost is approximately \$3 million, which includes hardware, software, installation, training and operations support. The system is leased and maintained by the provider for two years, with the option to renew the lease for a longer period of time or to procure the system.