A Functionally Optimized Wearing Course

Pavement Evaluation 2010
Roanoke, VA

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Project Objective

- Oversee design, production and placement of experimental asphalt concrete pavement in Northern Virginia

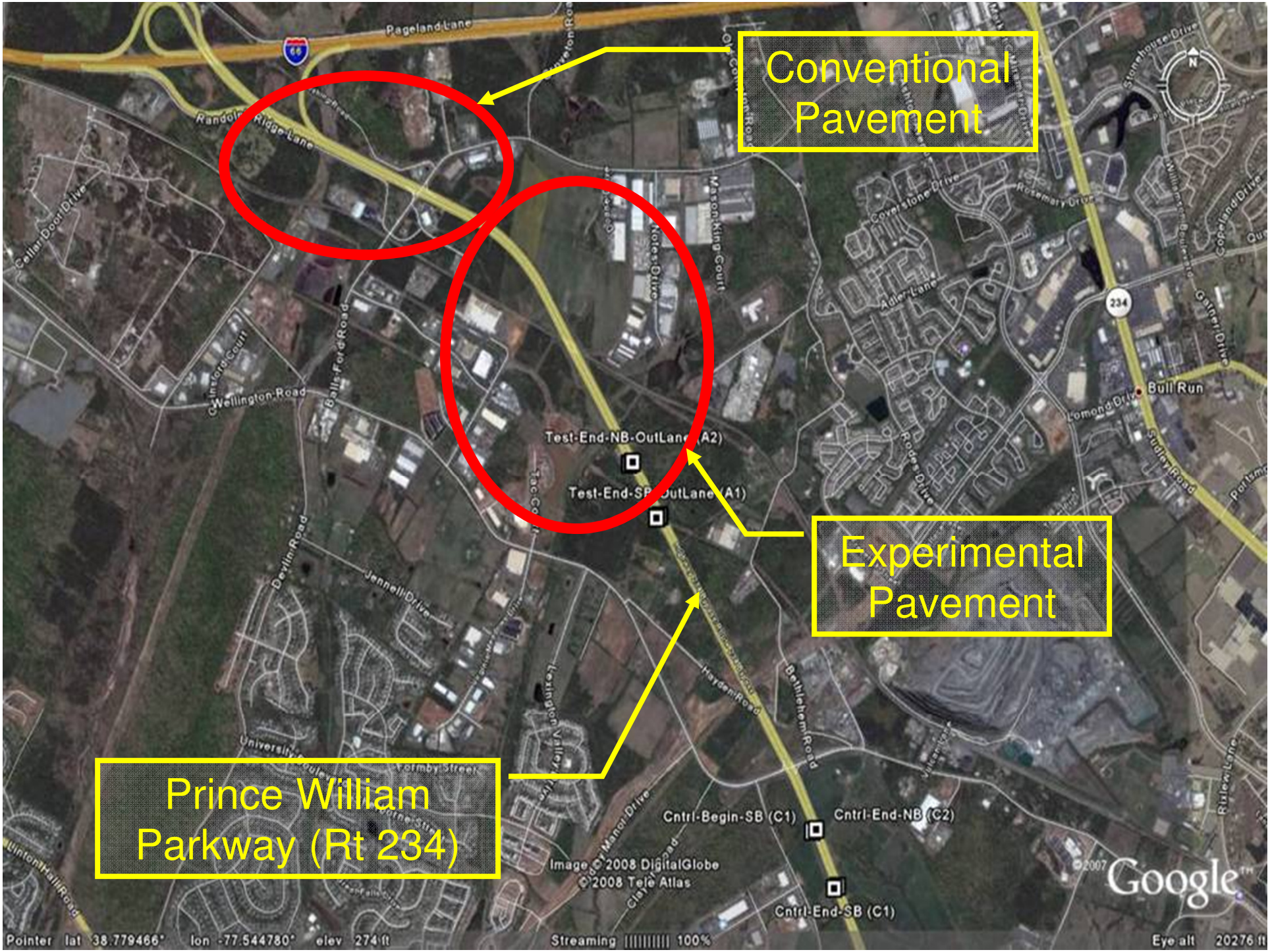
- Assess experimental pavement from standpoint of tire-pavement noise, skid resistance, ride quality, cost, splash/spray and hydroplaning potential

Summary Points

- Sponsored by FHWA and Virginia DOT
- 8,200-foot experimental pavement:
  - Route 234 near Manassas
  - 2,700 tons of Porous Friction Course (PFC)
- Includes comparisons to:
  - Original surface (old asphalt pavement)
  - Conventional surface (new asphalt pavement)
  - Premium structural surface (new Stone Matrix Asphalt)
- Performance defined by:
  - Tire-pavement noise
  - Ride quality
  - Skid resistance
  - Observed/subjective splash-spray

Porous Friction Course

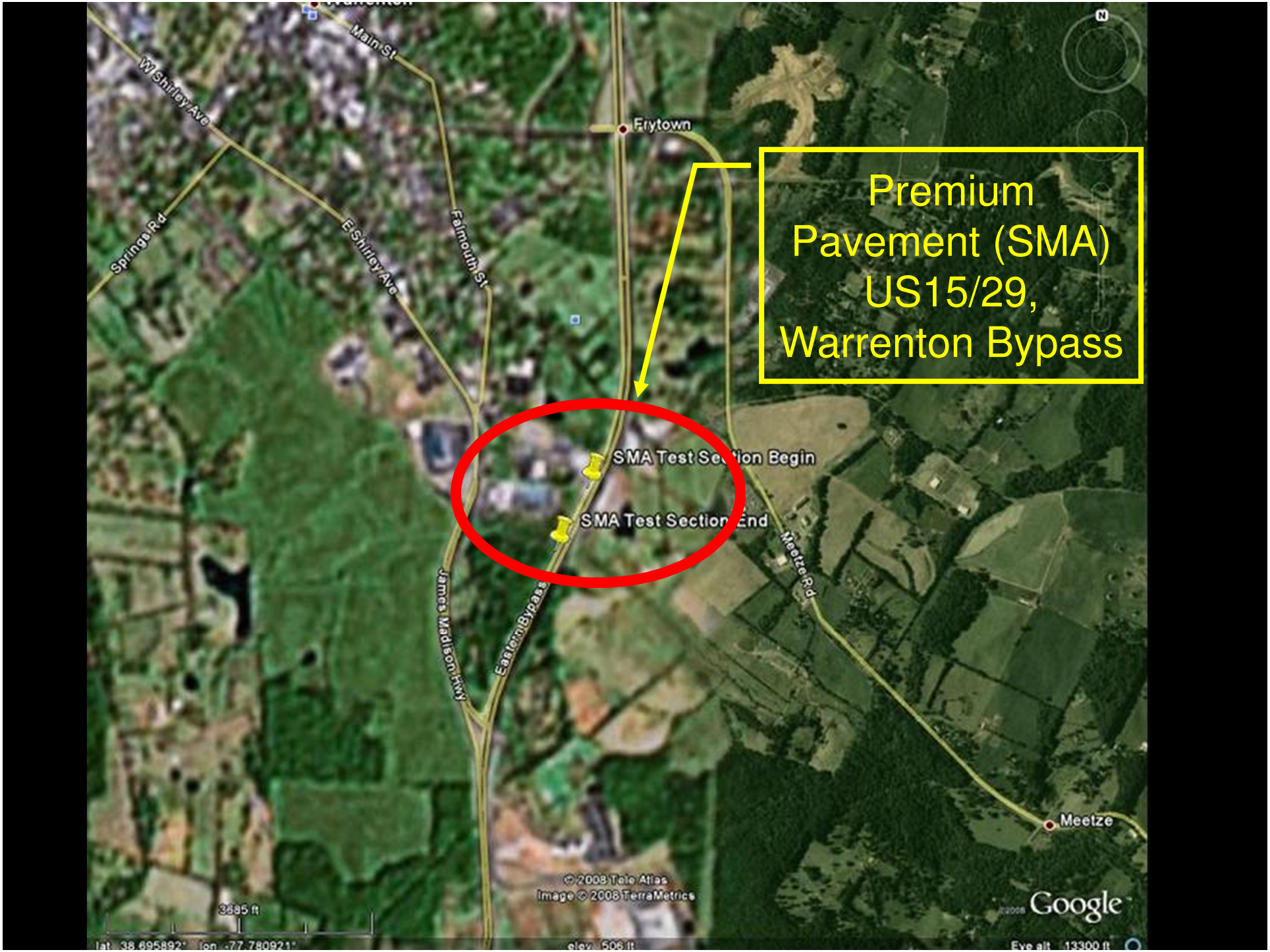
- **Design**
  - 15 percent to 25 percent air voids, which promote rapid surface drainage (normal pavements ~6 percent air)
  - Polymer-modified asphalt binders to ensure durability
  - Thick, high-quality bonding membrane – promotes strong, impervious bond to original surface
- **Production and Placement**
  - Temperature, placement, aggregate size/quality, binder grade, etc., similar to other premium mixes VDOT uses, such as SMA
  - As a riding (non-structural) surface only, designed to be placed at thinner application rates → one-inch or less


Conventional Pavement
Experimental Pavement
Prince William Parkway (Rt 234)
Test-End-NB-OutLane (A2)
Test-End-SB-OutLane (A1)
Cntrl-Begin-SB (C1)
Cntrl-End-NB (C2)
Cntrl-End-SB (C1)
Pageland Lane
Wellington Road
Devlin Road
Jennell Drive
Hayden Road
Bethlehem Road
Bull Run
Image © 2008 DigitalGlobe
© 2008 Tele Atlas
Google
Pointer lat 38.779466° lon -77.544780° elev 274 ft
Streaming 100%
Eye alt 20276 ft


Original - Aged
Conventional Surface


Experimental
(PFC)


New Conventional Surface


Premium Pavement (SMA) US15/29, Warrenton Bypass
Main St
W Shirley Ave
E Shirley Ave
Springs Rd
Fairmouth St
Frytown
SMA Test Section Begin
SMA Test Section End
James Madison Hwy
Eastern Bypass
Meetze Rd
Meetze
© 2008 Tele Atlas
Image © 2008 TerraMetrics
Google
3885 ft


New Premium
Surface (SMA)

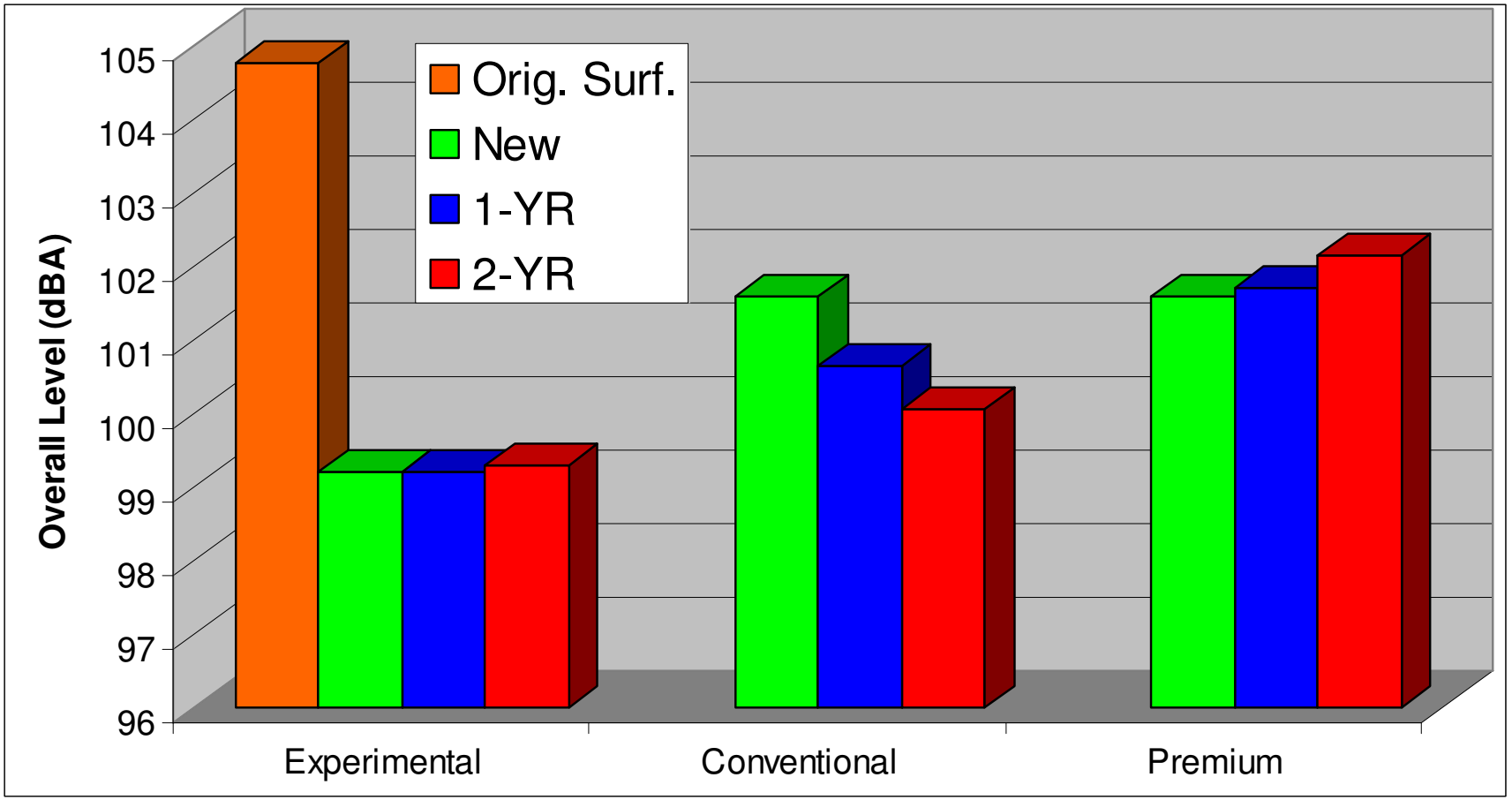
Functional Performance

Ride quality (International Roughness Index)

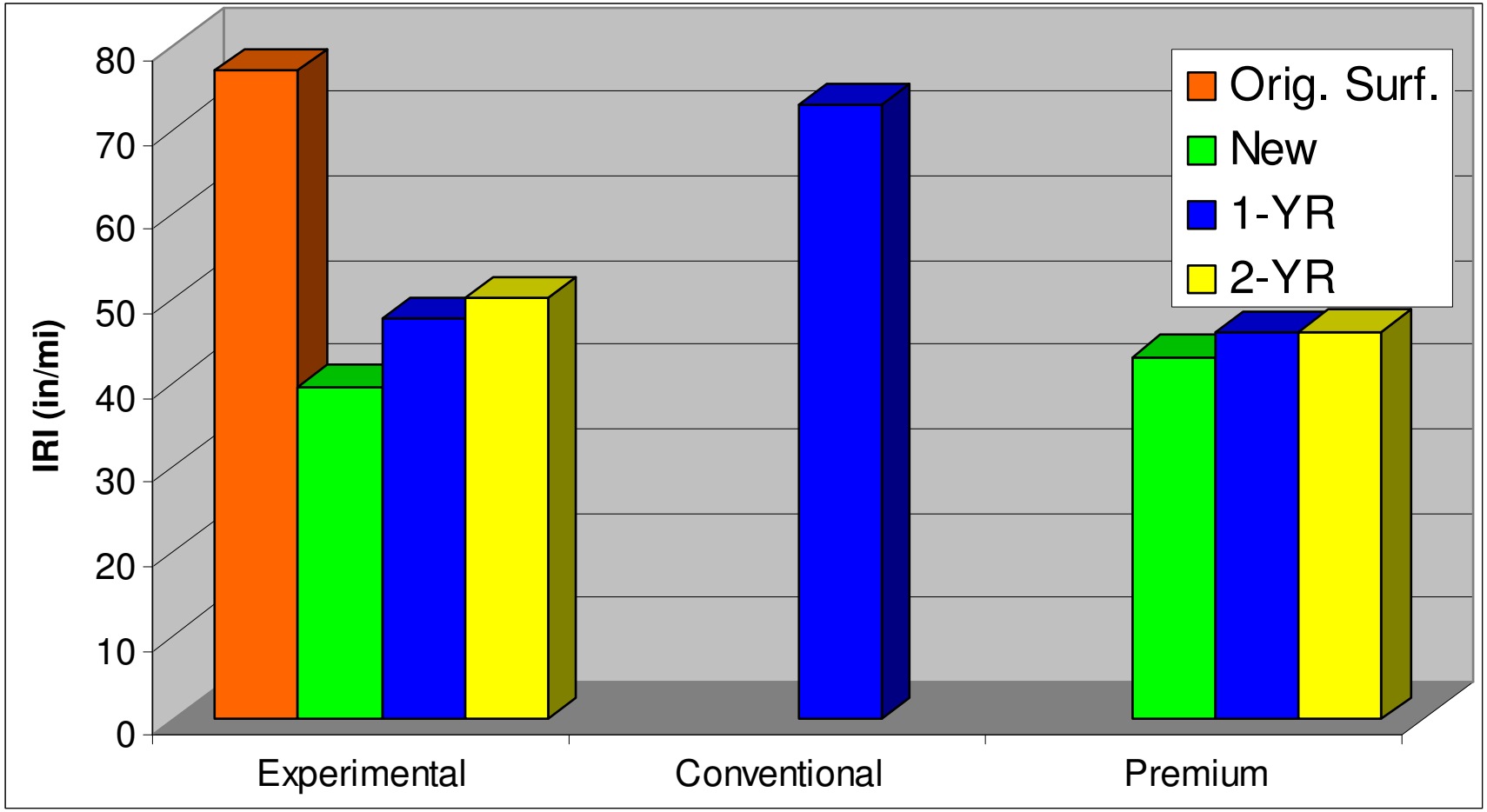
Skid resistance (SN40S)

Tire-pavement noise (on-board sound intensity)

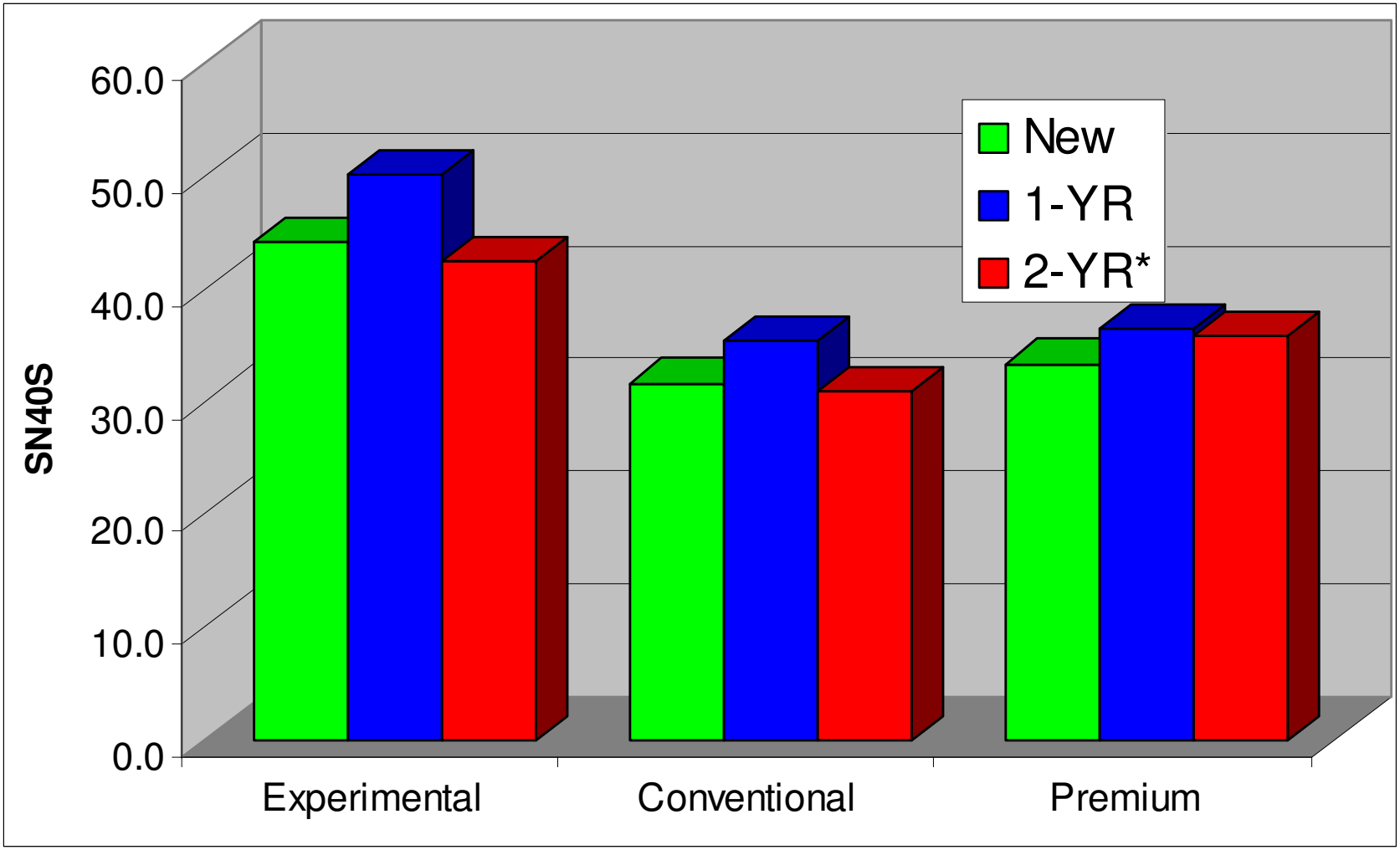
Tire-Pavement Noise (OBSI)



Ride Quality

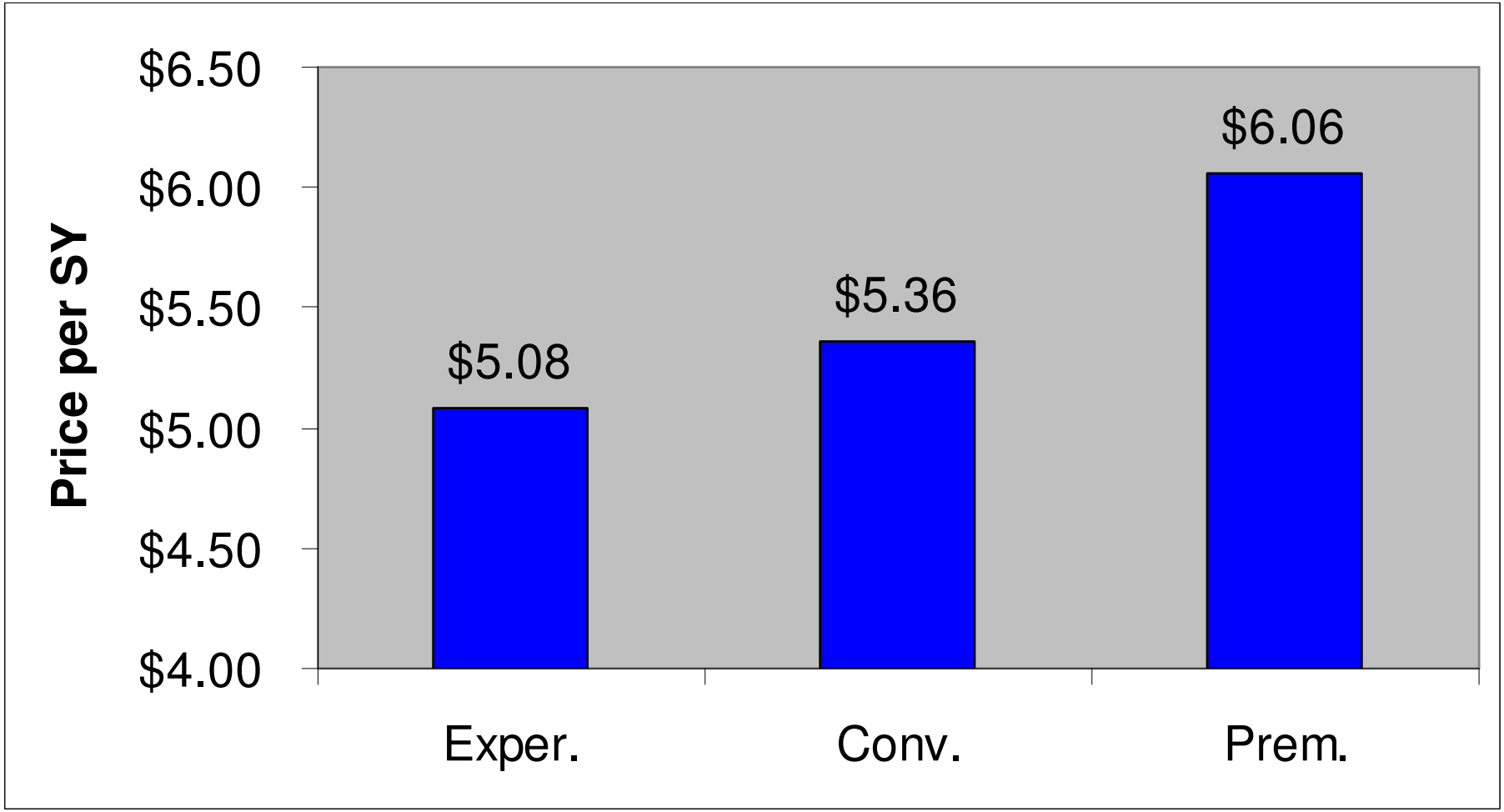


Skid Resistance



Splash and Spray

Cost



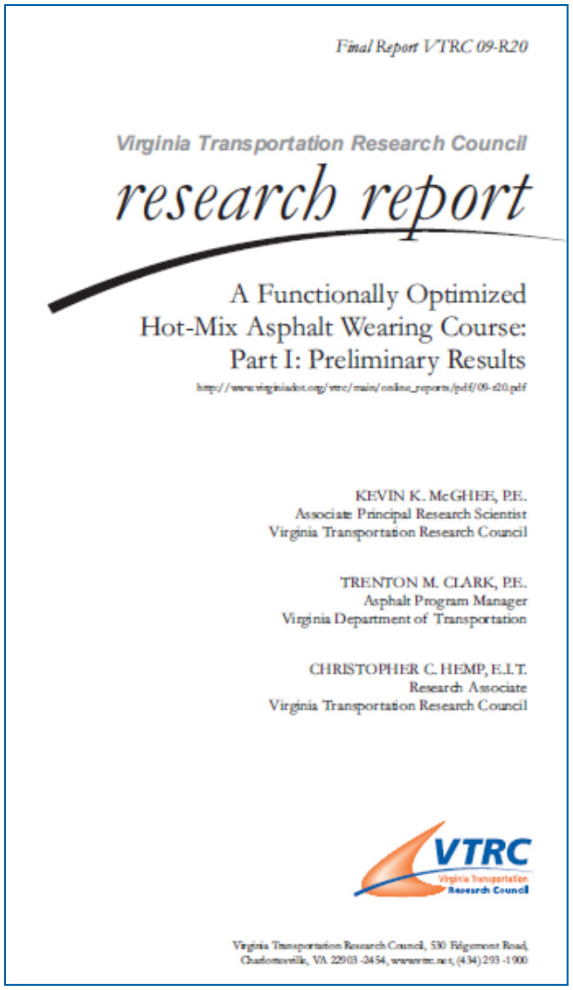
Note: reflect typical application rates

Assessment After One Year

- **Experimental Wearing Course (New-Generation PFC):**
  - Has excellent skid-resistance
  - Provides good ride quality with very thin layer
  - Acoustically superior (as measured at tire-pavement interface) compared to original surface and conventional alternatives
  - Cost-effective in applications where structural improvements to the pavement are not required
- **Candidate Applications:**
  - High-speed, high-volume routes where low tire-pavement noise, high skid-resistance, good ride quality and low splash and spray are critical
  - Facilities where pavement being overlaid is structurally sufficient

The Rest of The Story

- See VTRC 09-R20
- Annual performance monitoring to continue
- Additional reports as warranted



Continued Research

- Monitoring
  - 2-year in-service performance testing underway
  - Noise (OBSI) testing to include survey of other common surfaces (prem. asph., thin bonded wearing courses, tined & ground conc.)
- Statewide VDOT/Industry Asphalt Co-op Meeting→ Quiet Asphalt Implementation Task Force created

Mission: Successful Implementation of Quiet Asphalt Technologies in Virginia

Objectives:

- Develop criteria for site selection and performance evaluation
- Identify “hot spots” for noise mitigation
- Identify candidate sites for application of technologies
- Determine which quiet asphalt mixes/systems are appropriate for use in Virginia
- Identify & address barriers to implementation

Task Force Timeline

- Initial Task Force Meeting – October 18th
- Develop Draft Action Plan – by Governor's Transportation Conference
- Final Action Plan – February 2011
- Install Additional Sites – beginning summer 2011
- Monitor Performance through 2014*
- Full Implementation by - 2015

*to include additional sites each year

Is 2015 Too Long?

Barriers to Implementation:

Title 23 part 772 of the U.S. Code of Federal Regulations requires that noise analysis be conducted when potentially impacted receivers are present. The latest rulings were issued June 21, 2010 and specifically address pavement type: *772.9(b) Average pavement type shall be used in the FHWA TNM* [Traffic Noise Model] *for future noise level prediction unless a highway agency substantiates the use of a different pavement type for approval by the FHWA.*


VDOT
Virginia Department of Transportation