

**v**DDOT

# Flexibility in Design and Design Standards

John D. Lynch, PE  
Northern Virginia District, Location  
and Design

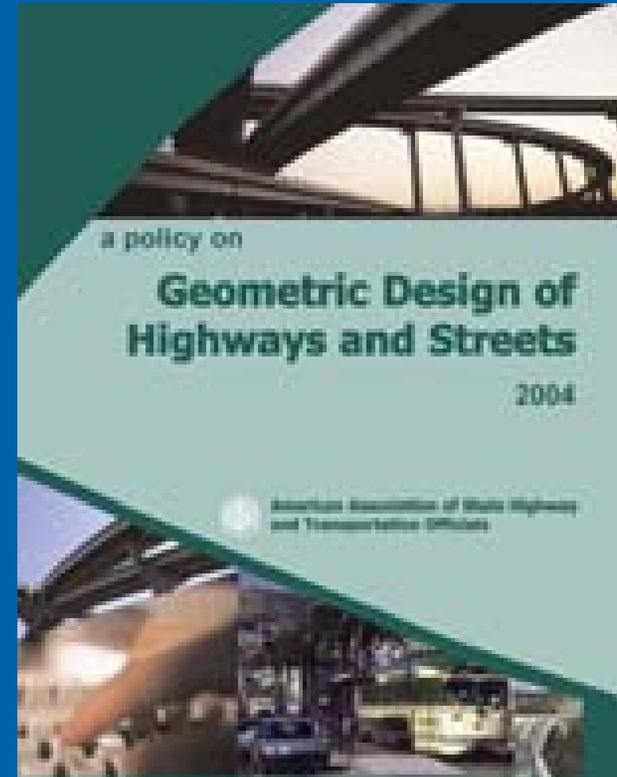
September 12, 2005

- Review of Design Requirements.
- Design Exceptions: Balancing Standards and Public Safety.
- Flexibility Within Current Standards.
- Achieving Flexibility in Design through Context Sensitive Solutions.
- Examples of Context Sensitive Solutions.

- AASHTO publishes Guidelines
- FHWA adopts the Guidelines as the standard for Projects on the National Highway Systems (NHS).
- States establish standards for non-NHS projects.

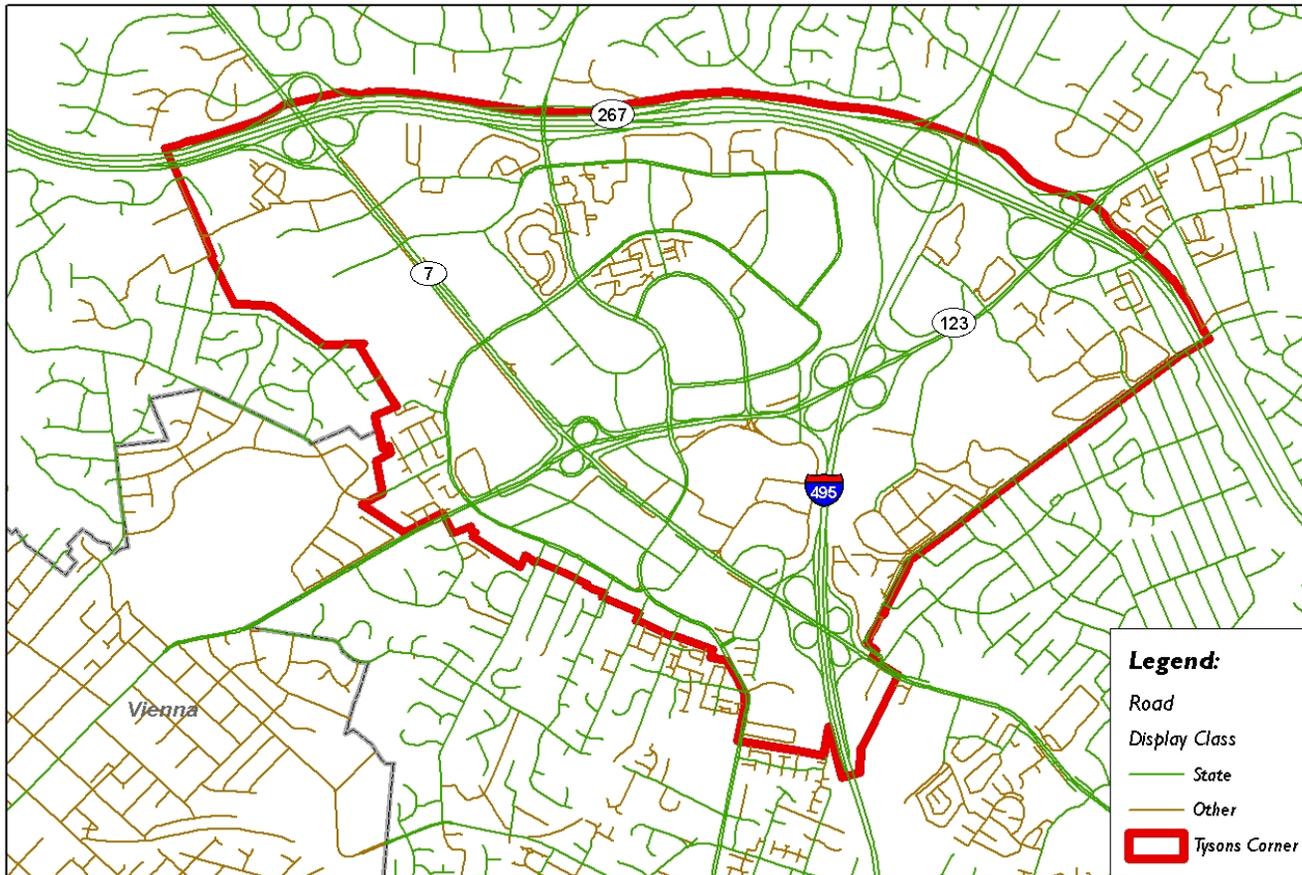
- Guidelines developed to balance operational comfort, safety and convenience to motorists.
- Provides Guidance to the Designer.
- Emphasis on joint use of transportation corridors by cars, pedestrians, cyclists and public transit vehicles.

- Safety
- Cost and Cost effectiveness
- Traffic Operations
- Maintenance
- Constructability



- Functional Class
- Topography and Environment
- Location/Land Use
- Traffic Volume and Level of Service
- Design Vehicle
- Design Speed

## Tysons Corner Roadways



- Local Roads
- Collectors
- Arterials
- Freeways

NHS Routes:

I-495

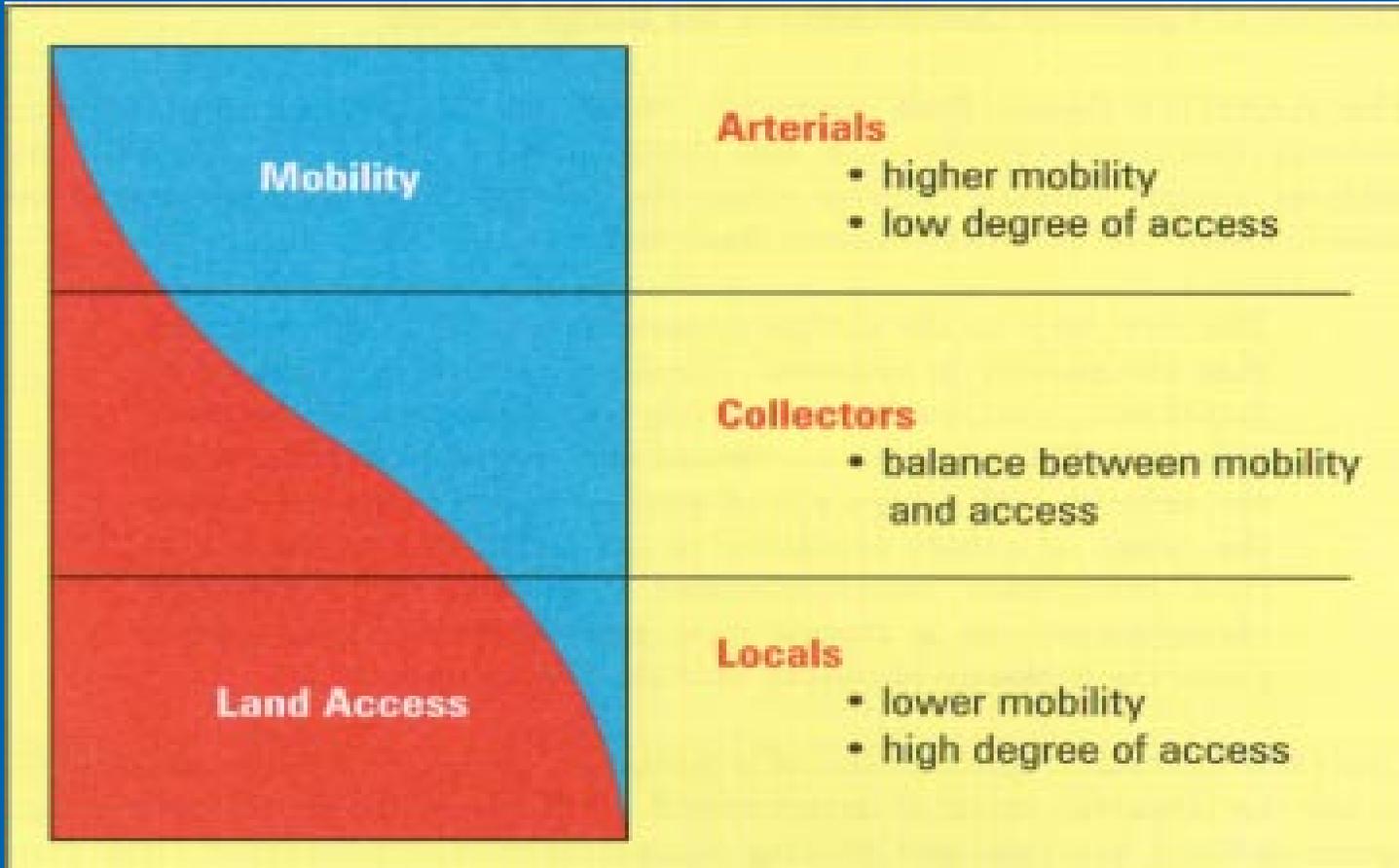
Dulles Toll Road

Rte 7

Rte 123

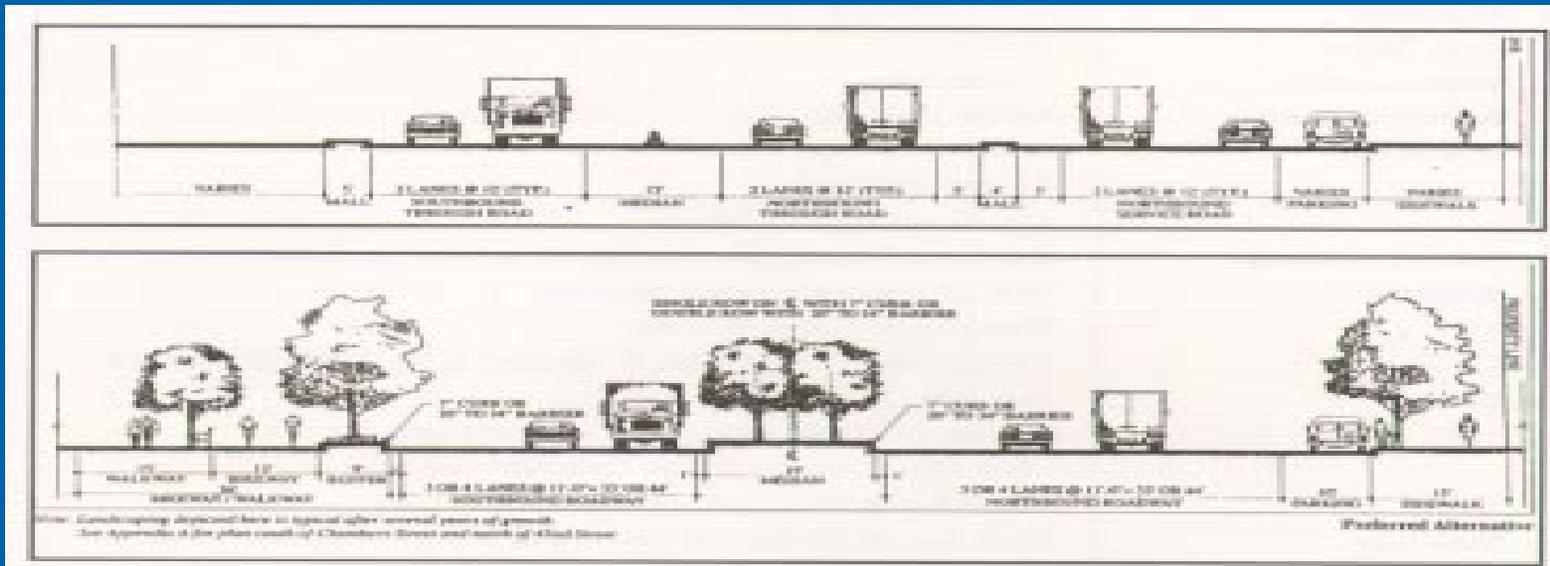
## 14 Design Control Criteria

- Design Speed
- Lane Width
- Shoulder Width
- Cross Slope
- Horizontal Curve
- Superelevation
- Vertical Clearance
- Limited Access
- Vertical Curvature
- Stopping Sight Distance
- Bridge Width
- Horizontal Clearance
- Structural Capacity
- Tangent Grade



<b>Design Controls</b>				
<b>Design Features</b>	<b>Functional Classification</b>	<b>Traffic Data</b>	<b>Terrain Locale</b>	<b>Design Speed</b>
Lane width, rural	X	X		X
Lane width, urban	X		X	
Rural shoulder width, type	X	X		
Urban shoulder width, type	X		X	
Guiderail offset	X	X		
Degree of curve				X
Grades	X		X	X
Bridge clearances (horizontal & vertical)	X	X		
Stopping sight distance				X
Superelevation				X
Widening on curves				X
Rural design speeds	X	X	X	
Urban design speeds	X		X	

# How Many Different Ways Can We Assemble a Typical Section?



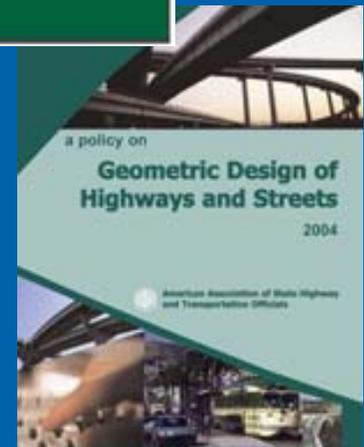
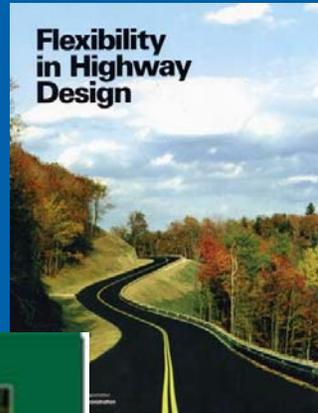
- Lanes (10 to 12 ft; special transit lanes)
- Border Area (provisions for pedestrians, plantings).
- Median (2 to 30 ft; raised versus flushed)
- Median Plantings (yes/no, types)
- Other features (lighting, appurtenances)

When a design value or 'standard' is determined applicable for a particular project, but it can not be applied consistently, it is necessary to request a design exception.



- Adherence to the Green Book does not automatically establish reasonable care.
- Deviation from the Green Book does not automatically establish negligence.
- Designers are expected to make complex decisions and to document them.
- Sometimes, a unique, creative design solution is needed and expected.
- Good design involves applying flexibility and judgment to solve the problem.

- Flexibility
  - AASHTO criteria are flexible
  - The design process includes choices
  
- Responsibility
  - Choices should be reasonable and consistent
  - Choices should reflect purpose and need.
  
- Development partners:
  - FHWA
  - AASHTO
  - Bicycle Federation of America
  - National Trust for Historic Preservation
  - Scenic America



- It is NOT about throwing out design standards and the AASHTO Green Book, the flexibility is already there!

Establish Vision/Goals in which design guidelines are based. Typical examples for urban areas include:

- Integrate land-use and transportation.
- Emphasis on livability
- Transit oriented development
- Pedestrian friendly land use near transit stations.
- Mixed Use

Challenges:

- Development of Comprehensive Vision
- Cooperation among local agencies, private developers and public.

## Context Sensitive Solutions

- Open and inclusive approach to making transportation decisions
- Consider impacts, features, and integration into community

## Context Sensitive Approach

- Asks about Purpose and Need of a transportation project
- Equally addresses safety, mobility and preservation
- Involves a collaborative, multidisciplinary approach
- Instituted at both a project and institutional level.

- Level 1: No Stakeholder Input  
(Regulatory (i.e. ADA))
- Level 2: Agency Make Decision,  
Then Asks Stakeholder  
for Input (Design Criteria)
- Level 3: Agency Asks for Input,  
Then Makes Decision  
(Selecting a design option)
- Level 4: Stakeholders Make  
Decision (Type of aesthetic  
Treatment)

“The design professional applies the design criteria or standards, chooses minimum, above-minimum or desirable values, and develops the composition of the facility in three dimensions. Thus the attitude and capability of the designer can play a significant role in determining operational efficiency and safety.”

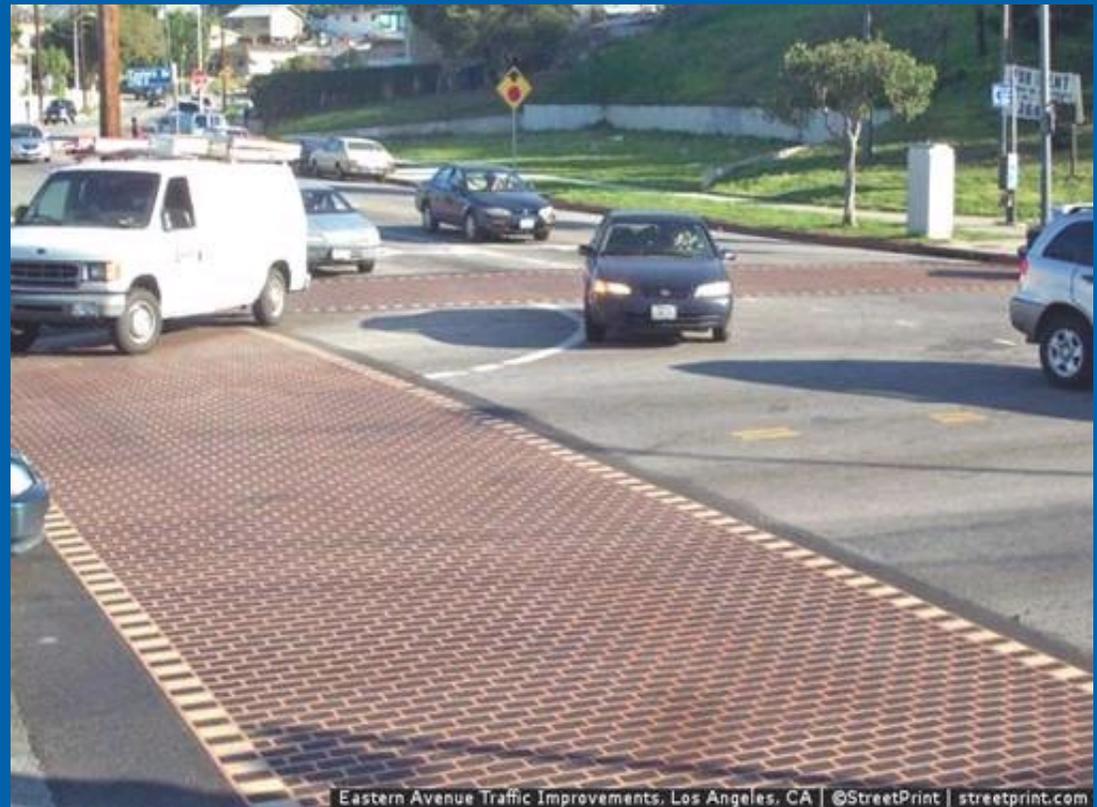
Source: Philosophical Considerations in Highway Design, Jack E. Leisch

**The bottom line is we still must Use our engineering skills and Judgment.**

## Rte 123 and Herndon Parkway Pedestrian Bridge in Fairfax County

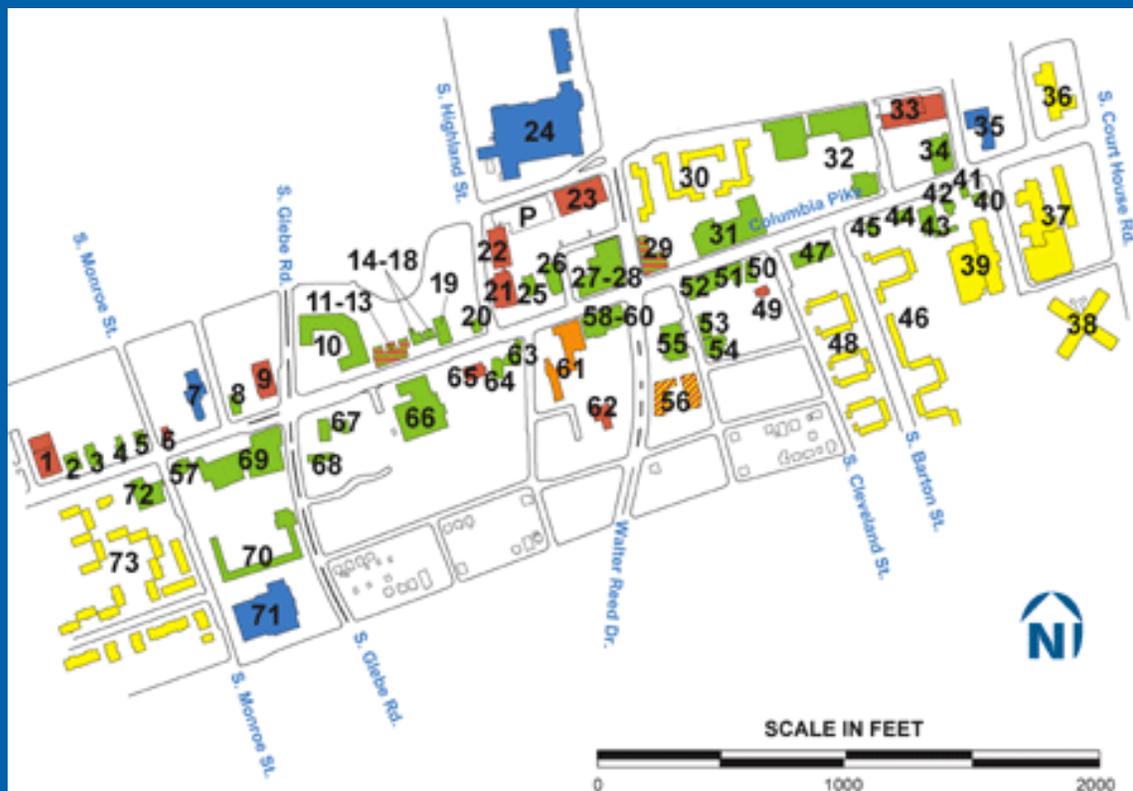


## South Elden Street in Herndon (Proposed Features)





## Columbia Pike in Arlington



## Shelburne/Glebe Road in Loudoun County



## Kelly's Ford in Culpeper-Fauquier



- Arlington County Urban Standards
- Route 50 Traffic Calming
- Wiehle Avenue Over the Dulles Toll Road
- Hunter Mill Road and Dulles Toll Road
- I-66 Inside the Beltway (IDEA 66)

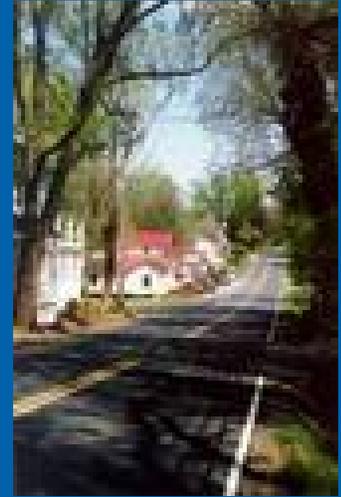
## Median Treatments



## Urban Intersections and Treatments

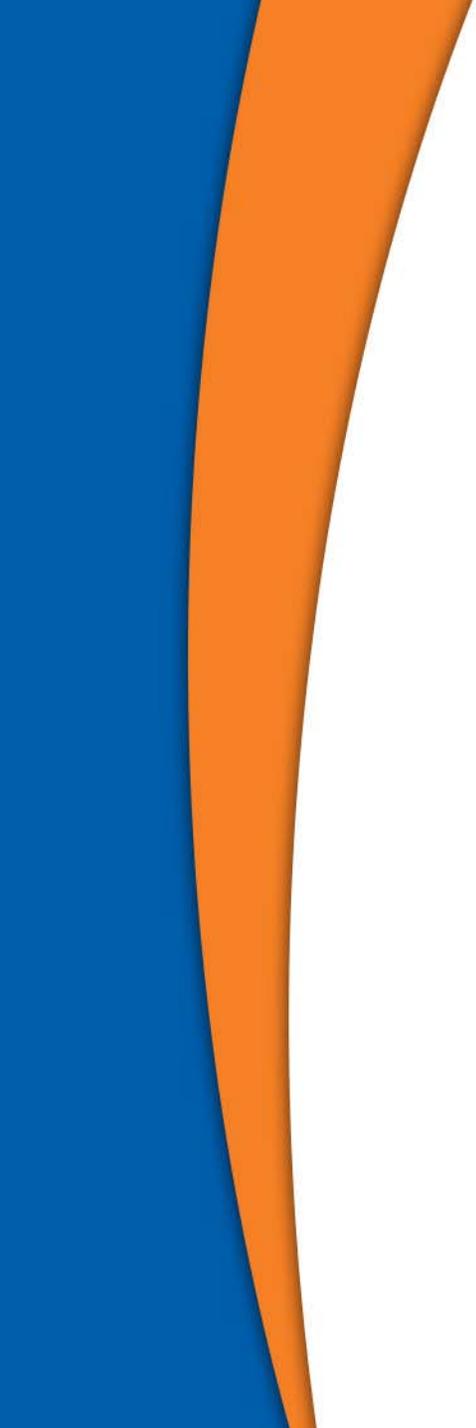


## Intersections and Treatments





## Bridge Landscaping



**V**VDOT