



**AGENDA**  
**Commonwealth Transportation Board Environmental Subcommittee**  
Richmond, Virginia

Residence Inn Downtown Charlottesville  
315 West Main Street  
Charlottesville, Virginia 22903  
May 24, 2023

Immediately following the adjournment of the May 24, 2023, Action meeting

- I. Welcome**
- II. Approval of February 2023 minutes**
- III. Resilience**
  - a. PROTECT Program Update
    - Formula Money
  - b. On-Going Studies on Adaptive Design Criteria
- IV. Land Management and Stewardship**
  - a. Wildlife Corridor Action Plan
- V. Next Meeting**
  - a. TBD
- VI. Public Comment**



## **Commonwealth Transportation Board Environmental Subcommittee**

VDOT Central Office  
1221 East Broad Street  
Richmond, Virginia 23219

February 21, 2023

Minutes

*The meeting was called to order at 9:00 a.m.*

Members of the Subcommittee in attendance: Angel Deem (Chair), Tom Fowlkes, Mary Hynes, Scott Kasproicz, Thomas Lawson, Mark Merrill, and Raymond Smoot.

### **Welcome**

Angel Deem, VDOT Chief of Policy, welcomed everyone and introduced Chris Swanson, VDOT Environmental Division Director, as the meeting's facilitator.

### **Approval of October 2022 minutes**

Minutes approved.

### **Sustainability Office**

#### *Staffing Update*

Mr. Swanson introduced Amy Golden as the Office of Transportation Sustainability (OTS) Land Stewardship Lead. The staffing effort for current positions within OTS is now complete.

### **Resilience**

#### *Overview of VDOT Resilience Plan*

Maria Mutuc, VDOT Resilience Program Lead, presented an overview of VDOT's Resilience Plan, which was released in November 2022. Ms. Mutuc discussed the background and drivers behind the plan, its relation to other statewide and local resilience planning efforts, and VDOT's definition of transportation resilience. Ms. Mutuc outlined the data-driven framework established by the plan to ensure the cost-effective allocation of resources, which relies on data and analysis, network and asset prioritization, and the identification of resilience measures to implement resilience solutions. Discussion from CTB members included a recognition of slides as an important resilience consideration not directly tied to flooding, and the need for a statewide authoritative data set to plan for sea level rise and other impacts. CTB members inquired as to how the Board could help facilitate consensus decisions on these data sets. In response Ms. Mutuc, Ms. Deem, and Mr. Swanson discussed VDOT's participation in statewide cross-agency resilience planning efforts that are working toward the identification of such data sets.

Ms. Mutuc outlined the six objectives established by the plan and discussed how VDOT is working to address all six objectives concurrently over the two year implementation of the initial plan. Ms. Mutuc discussed the federal Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) program established by the Infrastructure

Investment and Jobs Act (IIJA) and provided an overview of eligible activities. CTB members asked why the Resilience Plan funding objective only discussed PROTECT funding rather than pursuing the incorporation of resilience across a suite of VDOT programs, and requested information at the next meeting on the estimated cost increases required to incorporate resilience into future projects. CTB members also requested a future update on who is coordinating PROTECT formula and grant funding and how VDOT is planning to use this funding. Ms. Hynes asked if information could be provided on those SMART SCALE projects that are already funded and potentially at-risk given current vulnerability assessments. Ms. Mutuc concluded by outlining next steps for implantation of the Resilience Plan, including continued coordination and outreach, research efforts, the identification of at-risk infrastructure, and the development and implementation of resilience strategies.

## **Land Management and Stewardship**

### *Land Stewardship Update*

Chris Berg, Director of OTS, provided an update on ongoing land management and stewardship efforts and the role of OTS moving forward. Mr. Berg discussed OTS's focus on evaluating existing and future opportunities to utilize VDOT maintained land, right of way, and facility parcels for beneficial land uses that support VDOT commitments and goals and provide a return on investment or cost savings. OTS will support a holistic approach to land management decisions across various programs, and is working to inventory, map, and track land uses to optimize future decisions.

Mr. Berg discussed an effort lead by VDOT's Location and Design Division to create a statewide map of VDOT's right of way. This effort, currently in final internal review, is drawing on a number of data sources to develop a spatial data layer cataloguing VDOT's right of way. Once this initial mapping is complete, VDOT will explore methods to improve and maintain the data layer, integrate into web applications, and incorporate additional data sets. OTS intends to utilize this mapping to support the inventorying, assessment, and tracking of current and potential beneficial land uses and stewardship efforts. Several examples of beneficial land uses and stewardship efforts were discussed, including stormwater management, monarch habitat, nature-based resilience solutions, solar photovoltaic arrays, and broadband and electric transmission lines. CTB members expressed a desire to have the program incorporate elements that minimize resource inputs, such as the use of fossil fuels and pesticides, as well as the development of a community outreach plan that could also be extended to General Assembly members. In addition, CTB members expressed interest in a future CTB resolution to affirm principles of land management and stewardship strategies and expressed a desire to be engaged with a broad review of potential beneficial uses. Ms. Hynes suggested that expectations of potential revenue generation from these practices be managed as there may be limitations or prohibitions.

Mr. Berg also discussed VDOT's efforts related to travelers and wildlife movement, including support for the development of Virginia's first Wildlife Corridor Action Plan being drafted by the Department of Wildlife Resources, with additional support from the Department of Conservation and Recreation and the Department of Forestry. VDOT is supporting the identification of areas of wildlife-vehicle conflict (WVC), with the goal of increasing traveler safety, reducing incident costs, and protecting wildlife habitat corridors. For white-tailed deer, the most common species involved in WVCs, Virginia currently sees an average of 60,000 deer collisions annually with total annual damages of \$533 million. In addition to terrestrial wildlife planning efforts, VDOT is also working with District offices and partner agencies to identify potential sites to improve aquatic organism passage to pursue IIJA grant funding and other opportunities.

**Next Meeting**

Mr. Swanson shared that the next Environmental Subcommittee meeting will be held May 23, 2023.

**Public Comment**

There was no public comment.

*The meeting was adjourned at 10:27 a.m.*



# VDOT RESILIENCE UPDATES

Commonwealth Transportation Board, Environmental Subcommittee

| Chris Swanson, PE, Environmental Division Director

5/24/2023

# PROTECT Formula Money

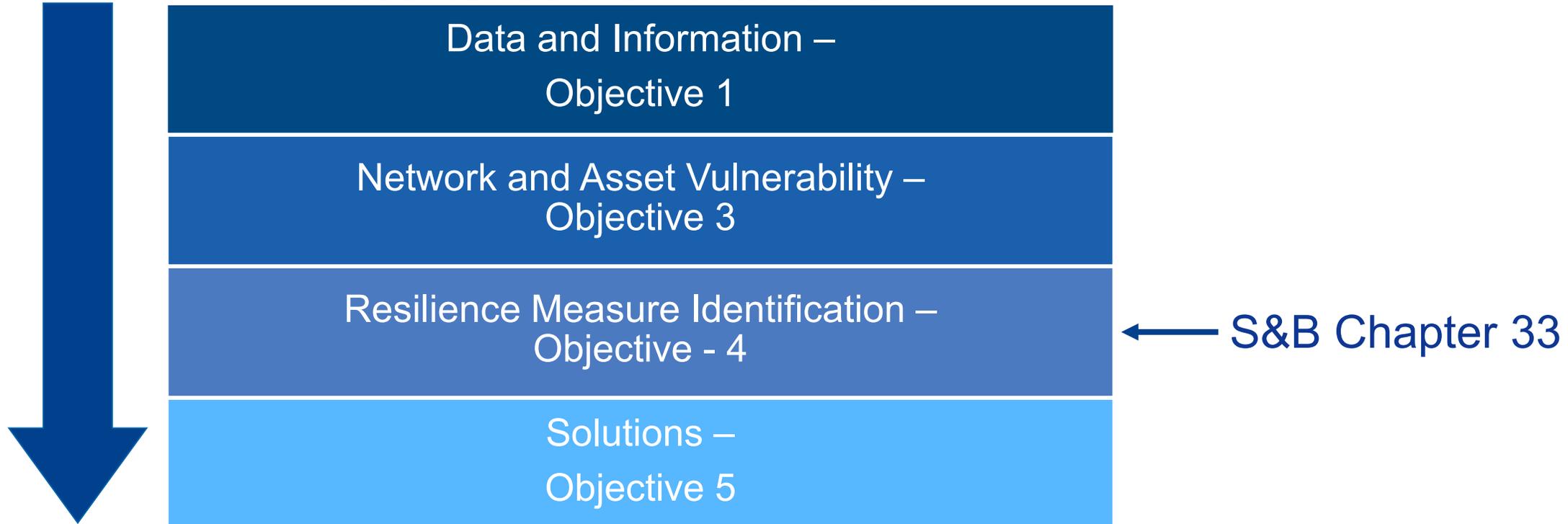
## PROTECT formula funds can only cover incremental cost increase

- Evaluating potential use on bridge work since Chapter 33 of the Structure & Bridge (S&B) Division Design Manual establishes the practices and specific requirements for the design of structures for climate change and coastal storms
- S&B Division evaluating short-term and long-term opportunities
  - Projects programmed and nearing advertisement

# Cost Increase to Incorporate Resilience

- To estimate the incremental cost increase to incorporate additional resilience is based on the cost-effective measures and solutions that are implemented

## Resilience Plan Framework



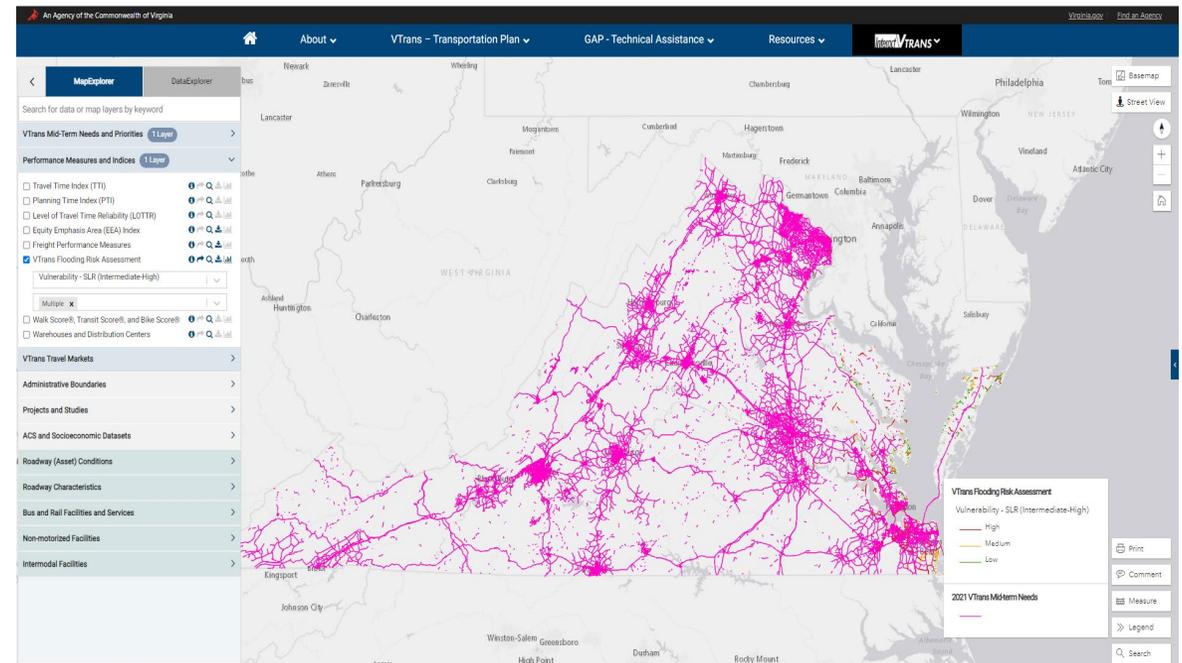
# OIPI Vulnerability Assessment

Screening-level vulnerability assessment of Virginia's transportation system to help understand magnitude

- Hazards
  - Sea Level Rise
  - Inland Riverine Flooding
  - Storm Surge

Objective from Resilience Plan:

Network and Asset Vulnerability



NEED TO BETTER UNDERSTAND WHAT SOLUTIONS ARE APPROPRIATE

# Adaptive Design Criteria Study - Hydraulics

## Project Background/Objectives

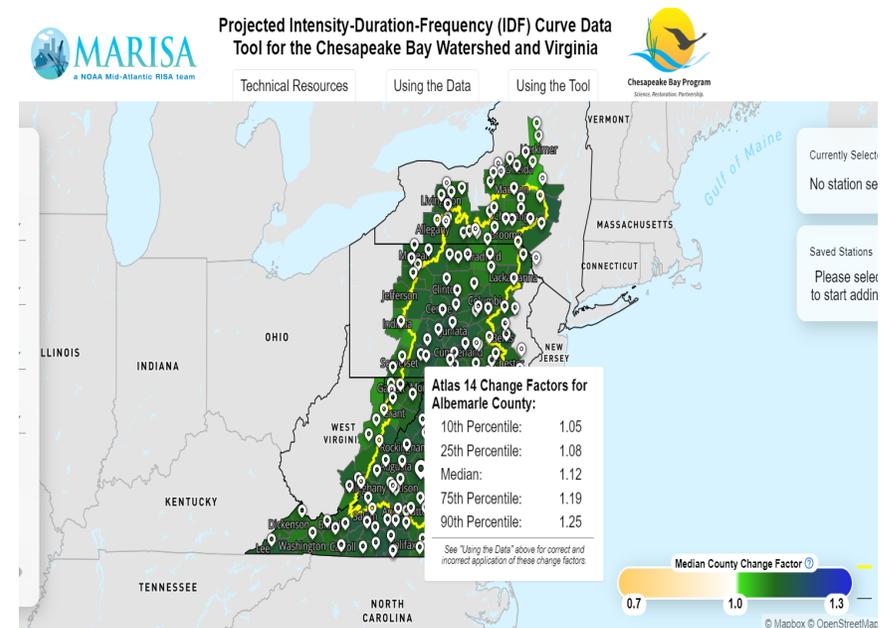
- Account for precipitation increase and sea level rise (SLR) in the design of drainage infrastructure?
- Which climate scenario and planning horizon do we choose?
  - Representative concentration pathways (RCP)
    - RCP 4.5 and 8.5
    - MARISA Study to project future rainfall
  - 2020-2070
- Is there regional variability?

This will better inform what are the potential cost implications

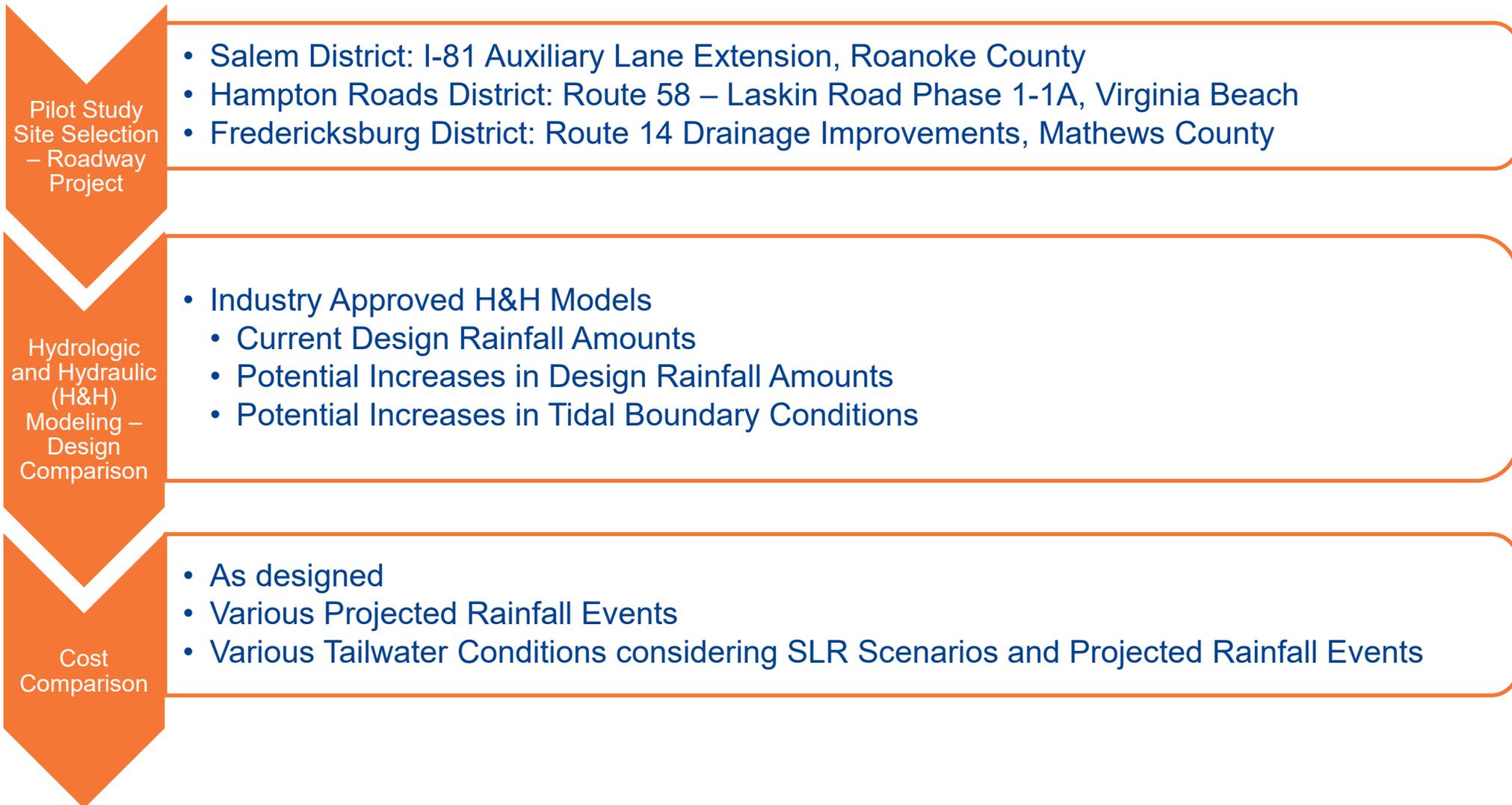
## Strategy 4a

### Network and Asset Vulnerability

### Resilience Measure Identification



# Hydraulics Study - Methodology



# Hydraulics Study – Preliminary Findings

## Projected Rainfall Amounts – Drainage Systems Costs

MARISA RCP 4.5 would increase costs by 0.0 - 26.8%

MARISA RCP 8.5 would increase costs by 0.0 - 32.8%

## Projected Tidal Influence – Drainage Systems Costs

Tidal boundary impacts the drainage system much more than increased in rainfall amount

- 1.5 feet design tailwater would increase costs by 0.0 -13.3%
- 3.0 feet design tailwater would increase costs by 16.8 - 36.0%
- 4.0 feet design tailwater would increase costs by 163.1% for one project, while creating an infeasible\* design situation for the other

*\*simply upsizing the drainage system would not be sufficient*

# Adaptive Design Criteria Study - Materials

- Identify impacts from flooding and excessive precipitation events on pavement and geotechnical assets
- Assess if current design standards adequately address the changed conditions
  - Gap analysis
  - Literature review

## Strategy 4a

Network and Asset Vulnerability

Resilience Measure Identification



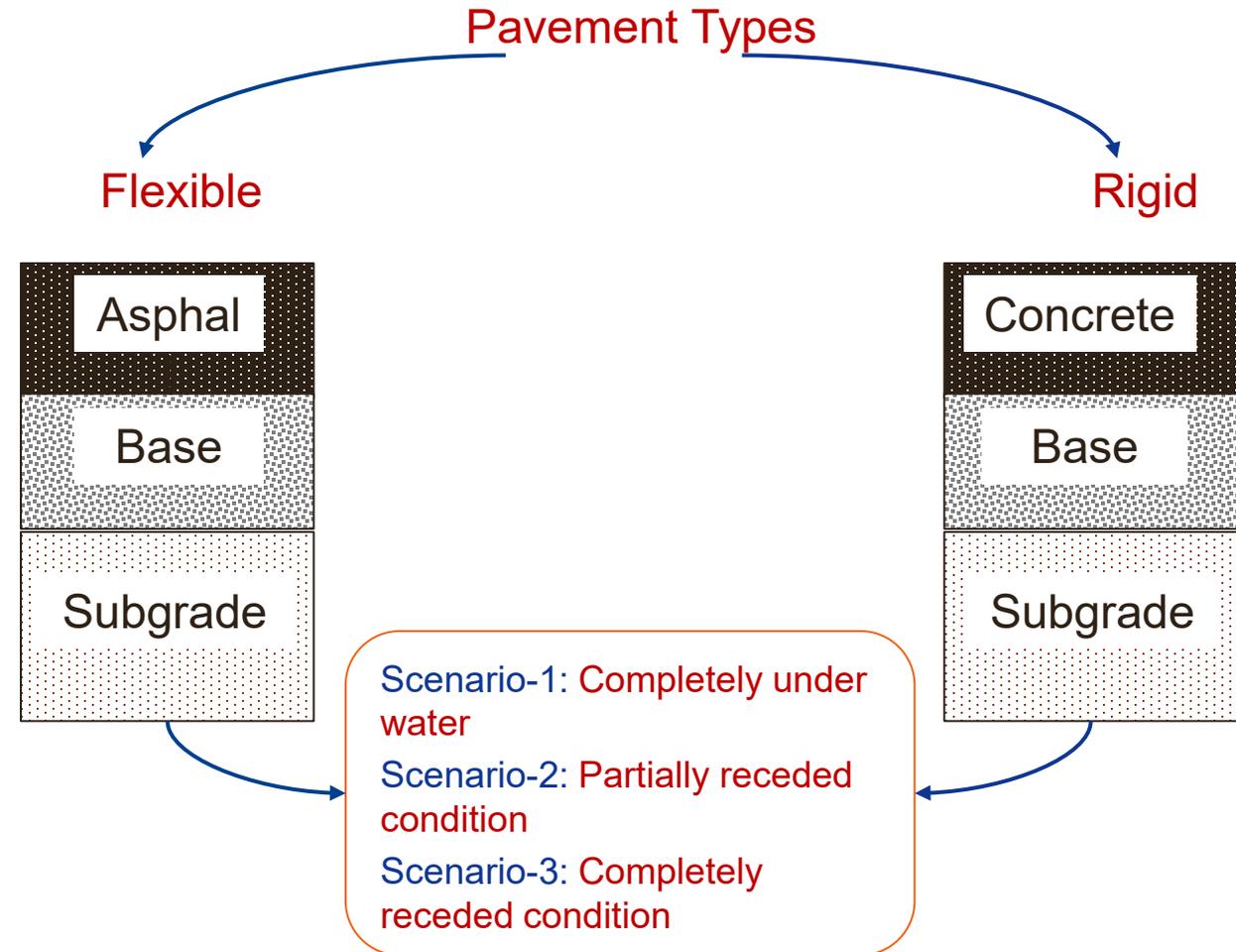
# Geotechnical Design Study

- Hazards
  - Precipitation
  - Riverine Flooding
  - Storm Surge
- Potential impacts of hazards on geotechnical assets
  - Embankments, soil cut slope, global stability, surficial slope stability, rock slope stability, rock fall



# Pavement Design Study

- Hazards
  - Precipitation
  - Riverine Flooding
  - Storm Surge
  - Sea Level Rise
- Potential impacts of hazards on pavement assets
  - Unbound layer softening (i.e., drop in stiffness)
    - Expedited damages
    - Reduced service life
    - Localized and extensive failure



# Geotechnical and Pavement Studies - Current Status

- Research
  - Virginia Transportation Research Council
  - Impacts and potential resilience measures to address increased precipitation, flooding, and sea level rise

# VIRGINIA WILDLIFE CORRIDOR ACTION PLAN

Commonwealth Transportation Board, Environmental Subcommittee

| Chris Swanson, PE, Environmental Division Director

5/24/2023

# Virginia Wildlife Corridor Action Plan (WCAP)

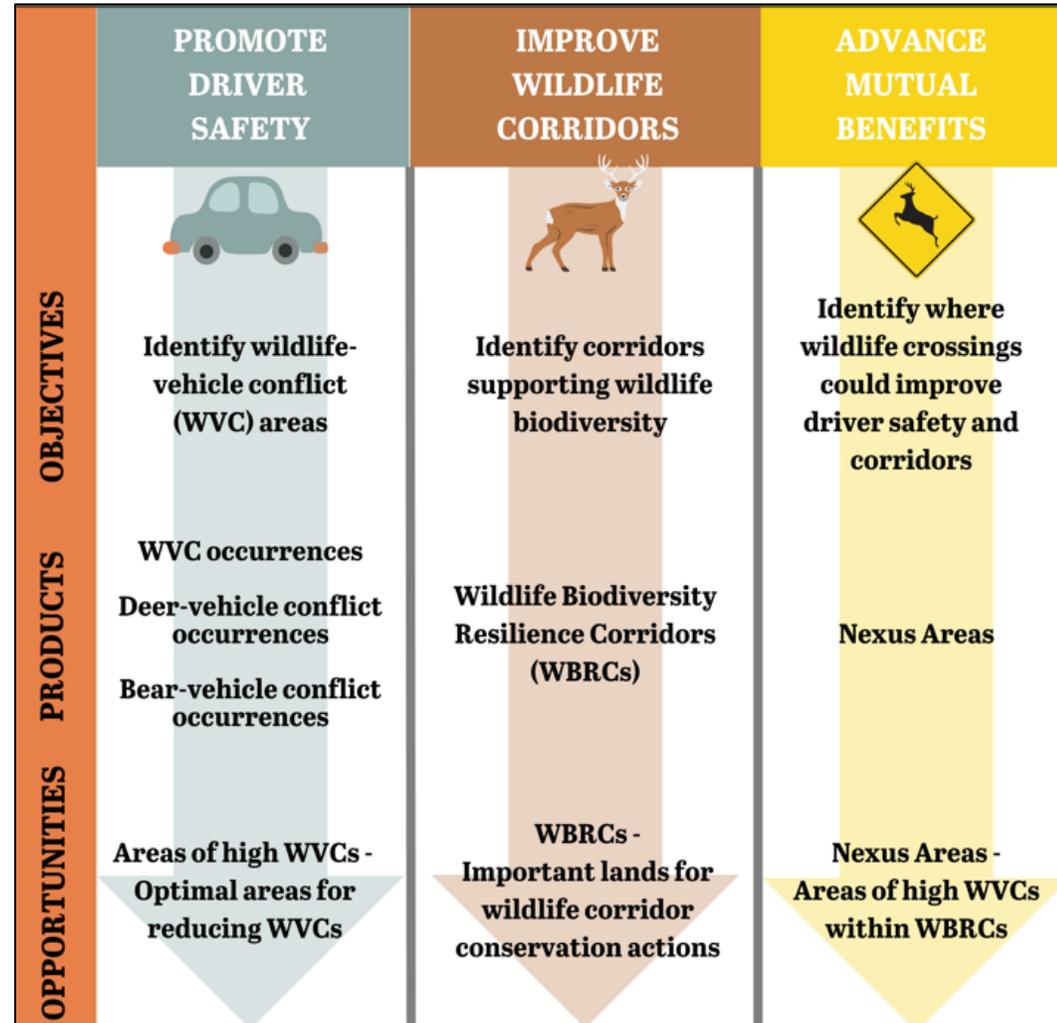
- 2021 and 2022 legislation required creation of WCAP
  - VDOT
  - Department of Wildlife Resources (DWR)
  - Department of Conservation and Recreation (DCR)
  - Department of Forestry (DOF)
- Identify wildlife corridors, areas of high risk for wildlife vehicle conflict, and prioritize wildlife crossing projects
- Final plan released April 2023, along with supporting data

# WCAP Framework

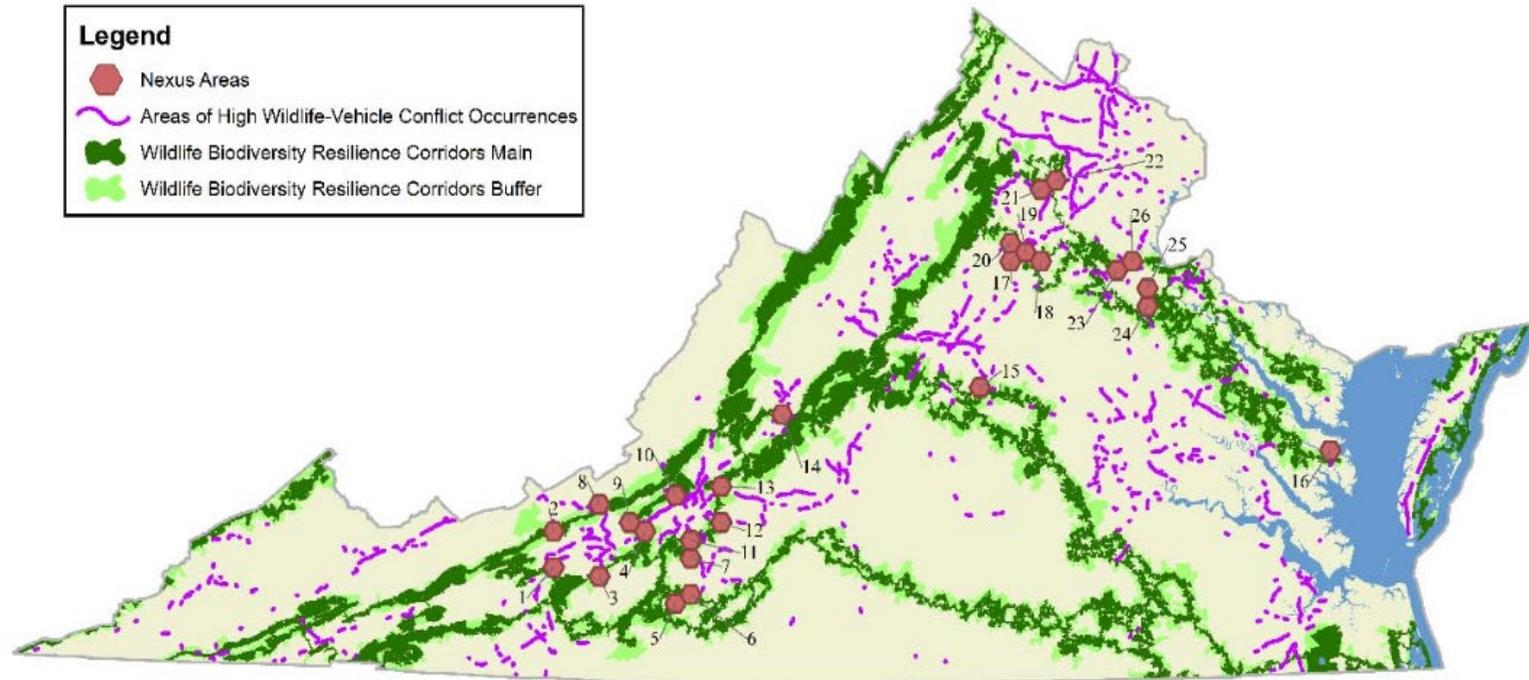


**VIRGINIA WILDLIFE CORRIDOR  
ACTION PLAN**





# WCAP Nexus Areas



- 26 Nexus Areas show areas of overlap between Wildlife Biodiversity Corridors and Areas of High Wildlife Vehicle Conflict
- Areas to advance mutual benefits of safety and wildlife conservation

# WCAP Recommended Actions

## 1) Refine Wildlife Corridors

- Identify target at-risk wildlife species and refine habitat corridors
- Identify aquatic organism passage priority areas

## 2) Refine Wildlife Vehicle Conflict Areas

- Identify road segments at higher risk of wildlife collisions

## 3) Develop Geospatial mapping tool for planning purposes

## 4) Prioritize Wildlife Crossing Projects

- Based on refined wildlife corridors and conflict area analysis

# Wildlife Crossing Pilot Program – Competitive Grant

- \$111M nationally available for distribution in FY22-23
- Goal of protecting motorist and wildlife
  - Reducing Wildlife Vehicle Collisions
  - Improving habitat connectivity for terrestrial and aquatic species
- Research, planning studies, feasibility analysis
- Project engineering, design, construction
- VDOT developing application to refine Wildlife Vehicle Conflict areas

# Wildlife Vehicle Conflict Countermeasures



Shuttershock



Patrick Rocchio



Bridget Donaldson

# Opportunities to Align Aquatic and Terrestrial Passage



Corrugated metal arch pipe provides terrestrial and aquatic habitat values (USFWS).



Bear travelling through culvert (California DOT).



Box culvert with flat natural stream bottom providing fish and wildlife habitat values (USFWS).



Virginia Department of Transportation