Mead & Hunt

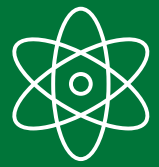
TSMO Survey

MWCOG
SPOTS Subcommittee

08/15/2024

Outline

Project Overview



Survey Results

Conclusions & Next Steps

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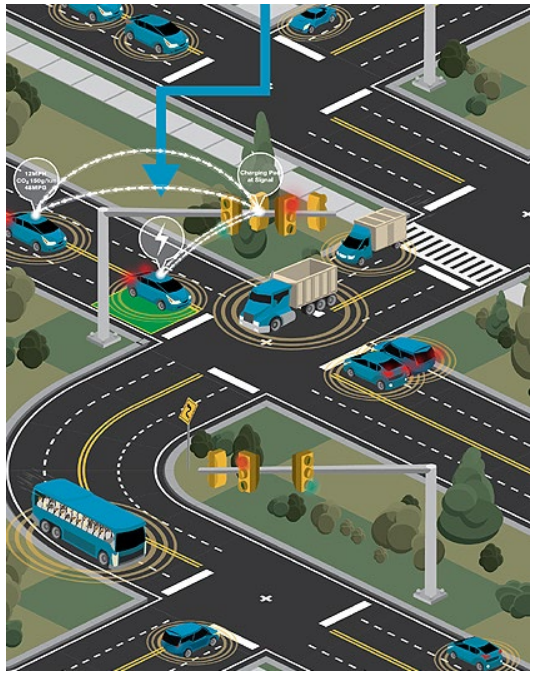
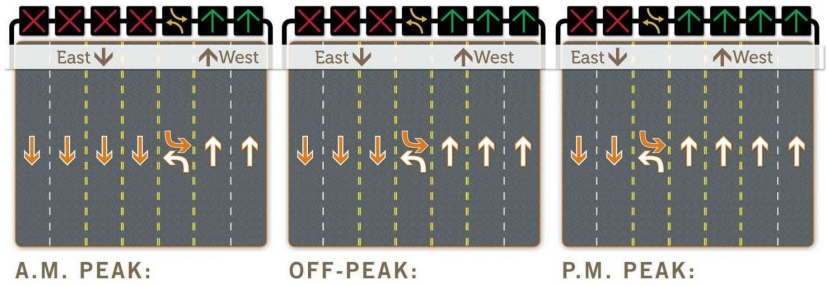
Background

Transportation Systems Management & Operations (TSMO) Technology Inventory

- Technology changes fast
- Expand on previous TPB work
- Update traffic signal information





Source for all Images: FHWA
https://ops.fhwa.dot.gov/publications/fhwahop17025/index.htm
https://www.its.dot.gov/infographs/Eco_traffic_signal_timing.htm

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Project Approach

- Determined a manageable and useful set of TSMO items and technologies to quantify at an agency level
  - Defined major service areas (categories) as the focus of the survey:
    - Active Traffic and Demand Management
    - Traffic Management Centers
    - Traffic Signal Operations
    - Integrated Corridor Management
    - Traveler Information
    - Work Zone Operations
    - Emergency Transportation Operations
    - Connected and Automated Vehicle Deployment
  - Existing technologies versus planned technologies
  - Emerging technologies that are not listed
  - Communication networks
  - GIS datasets on geolocation of assets

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TSMO Survey

Word Doc Version

Active Traffic and Demand Management:

Strategy	Type of Control	Implementation Status		Available on GIS	Location
		Existing (Count)	Planned (Count)		
Ramp Metering	Pre-timed				
	Actuated				
	Adaptive				

Strategy	Type of Control	Link for more info + Additional comments
Ramp Metering	Pre-timed	
	Actuated	
	Adaptive	

Strategy	Communication	Implementation Status		Available on GIS	Location
		Existing (Locations)	Planned (Locations)		
Ramp Metering	Fiber Optic Cables				
	Radio				
	Cellular				
	Twisted Pair Cable				

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TSMO Survey

Online Version

TSMO Inventory Survey - Active Traffic and Demand Management

kamar.amine@meadhunt.com Switch account

Not shared

* Indicates required question

Active Traffic & Demand Management - Ramp Metering

Does your agency operate **Ramp Metering**? *

- Yes
- No

Active Traffic & Demand Management - Ramp Metering Signals

Does your agency own/manage **Pre-timed Ramp Metering Signals**? *

- Yes
- No

Pre-timed Ramp Metering

Ramp Metering - Type of Control: **Pre-timed** - Existing Signals: *

Enter Count:

Your answer

Ramp Metering - Type of Control: **Pre-timed** - Planned Signals: *

Enter Count: (Note: Planned means implementation is within 2 years in the future)

Your answer

Ramp Metering - Type of Control: **Pre-timed** - Available on GIS? *

- Yes
- No

Insert Link for additional information on the above (if applicable)

Your answer

Additional Comments on the above

Your answer

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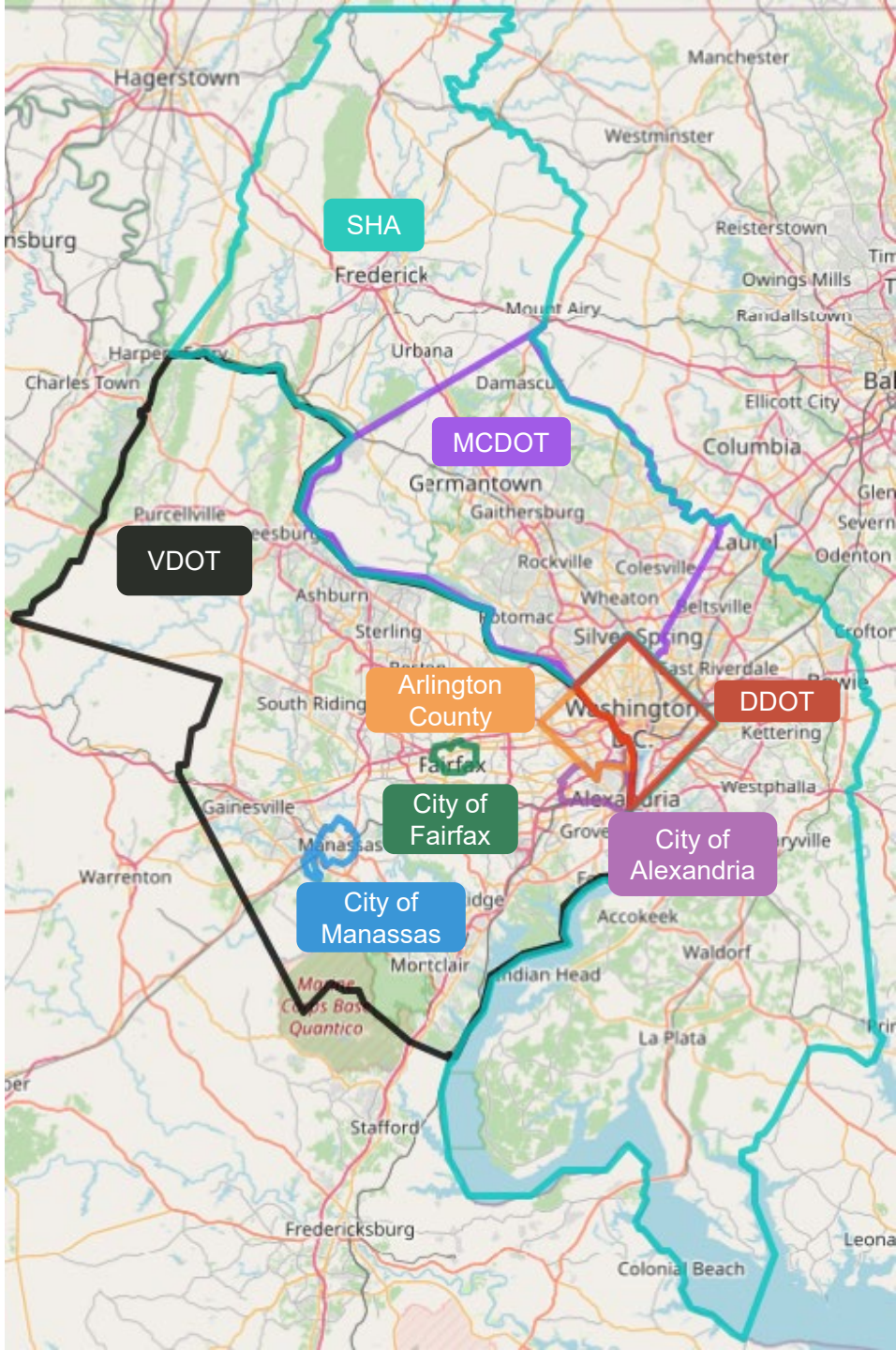
Participating Agencies

	Agency
State DOT	Maryland Department of Transportation State Highway Administration (SHA) Virginia Department of Transportation (VDOT)
County & Local Government	Arlington County City of Alexandria City of Fairfax City of Gaithersburg City of Manassas Montgomery County Department of Transportation (MCDOT) The District Department of Transportation (DDOT)



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TSMO Survey Results:

Active Traffic & Demand Management

Active Traffic & Demand Management

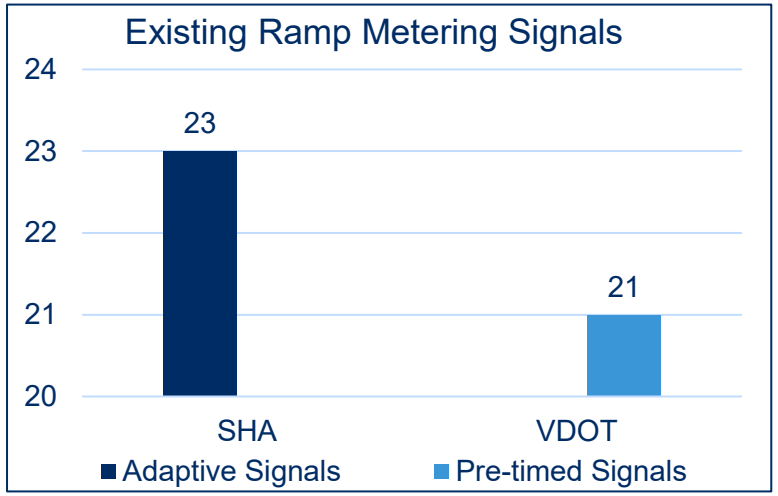
Strategies

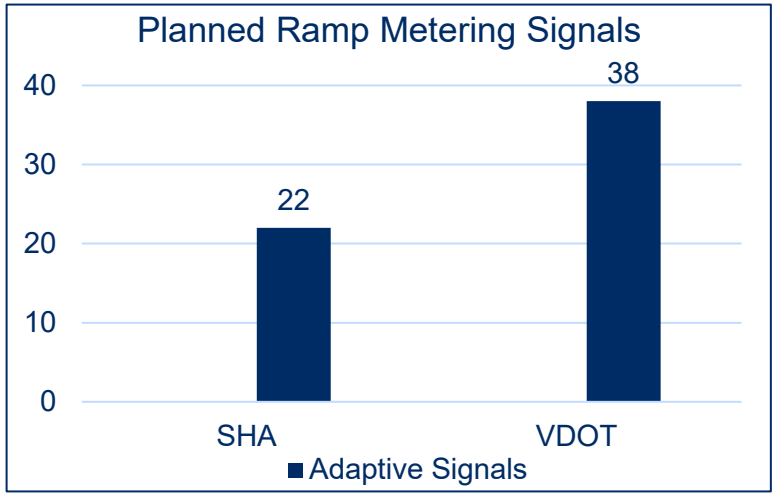
- Ramp Metering
- Managed Lanes
- Dynamic Lane Use Control
- Dynamic Junction Control
- Dynamic Speed Limit
- Variably Priced Parking Meters
- Dynamic Message Signs with Number of Available Parking Spots
- Weigh-in-motion Sensors
- Truck Restrictions
- Continuous Count Stations

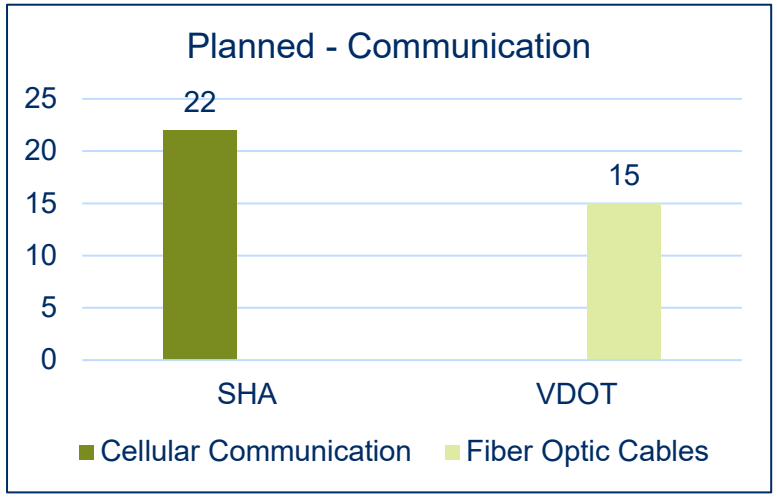
Agencies

- SHA
- VDOT
- MCDOT
- DDOT
- City of Alexandria
- City of Fairfax
- City of Manassas

Active Traffic & Demand Management – Ramp Metering







Ramp Metering Detectors:

- **SHA:**
  - 23 Locations with Existing Video Detectors, 23 Locations Existing Radar Detectors
  - 22 Locations Planned Video Detectors, 22 Locations Planned Radar Detectors

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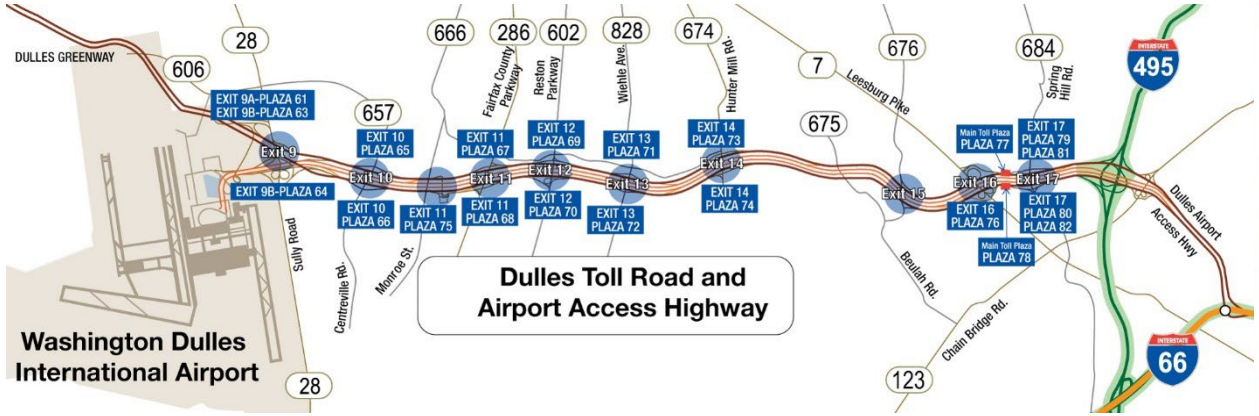
Active Traffic & Demand Management – Managed Lanes

VDOT:



Fixed Toll: 2 Lanes, 30 miles

Entry

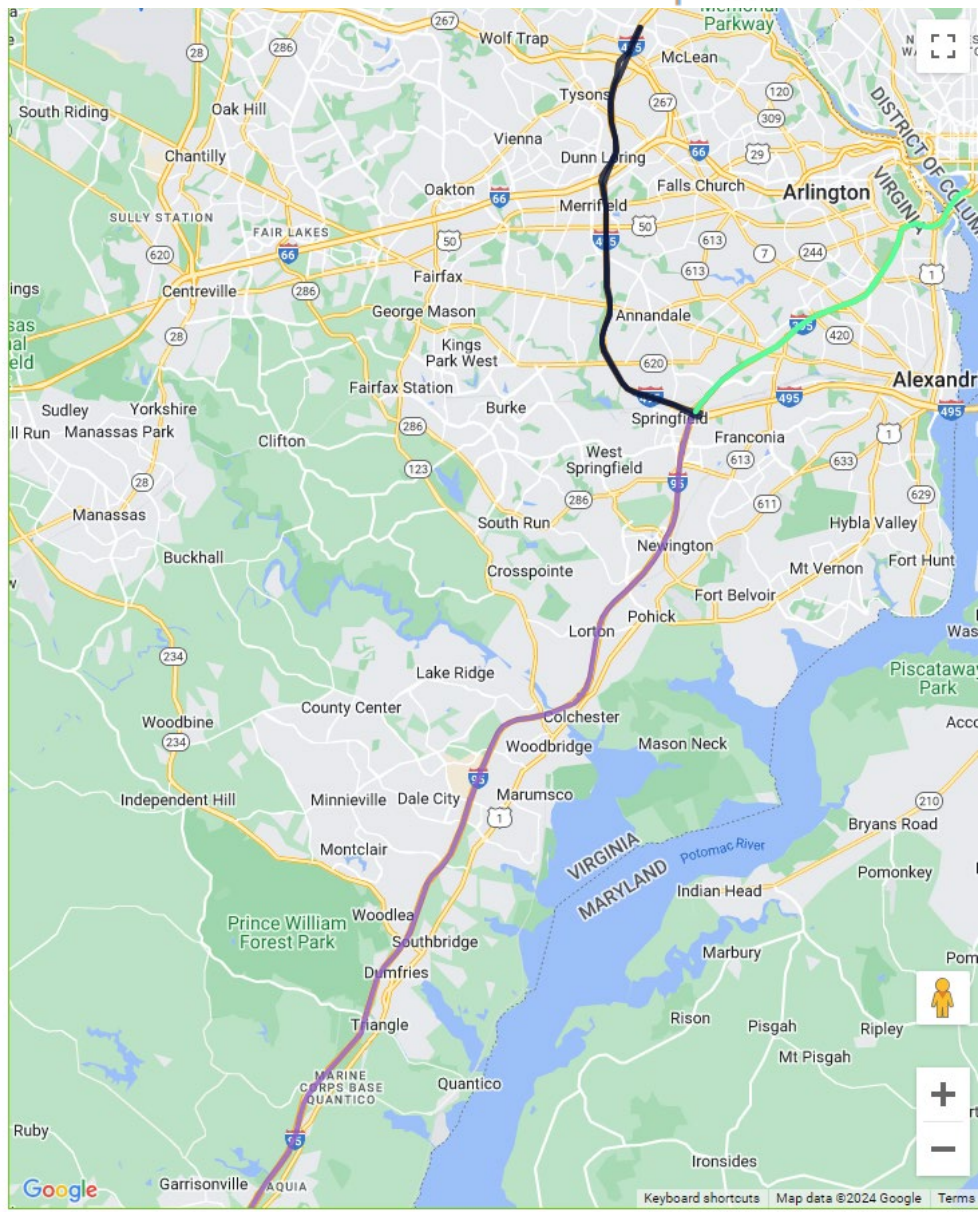
Exit

95 Express Lanes

495 Express Lanes

395 Express Lanes

Variable Toll



5 HOT Lanes at 137.5 miles in total

Map Source: VDOT, TSMO Inventory Survey

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Active Traffic & Demand Management – Dynamic Lane Use Control

VDOT:

- 58 miles
- 95 and 395 express lanes are reversible lanes

SHA:

- 2.75 miles

MCDOT:

- 7 miles

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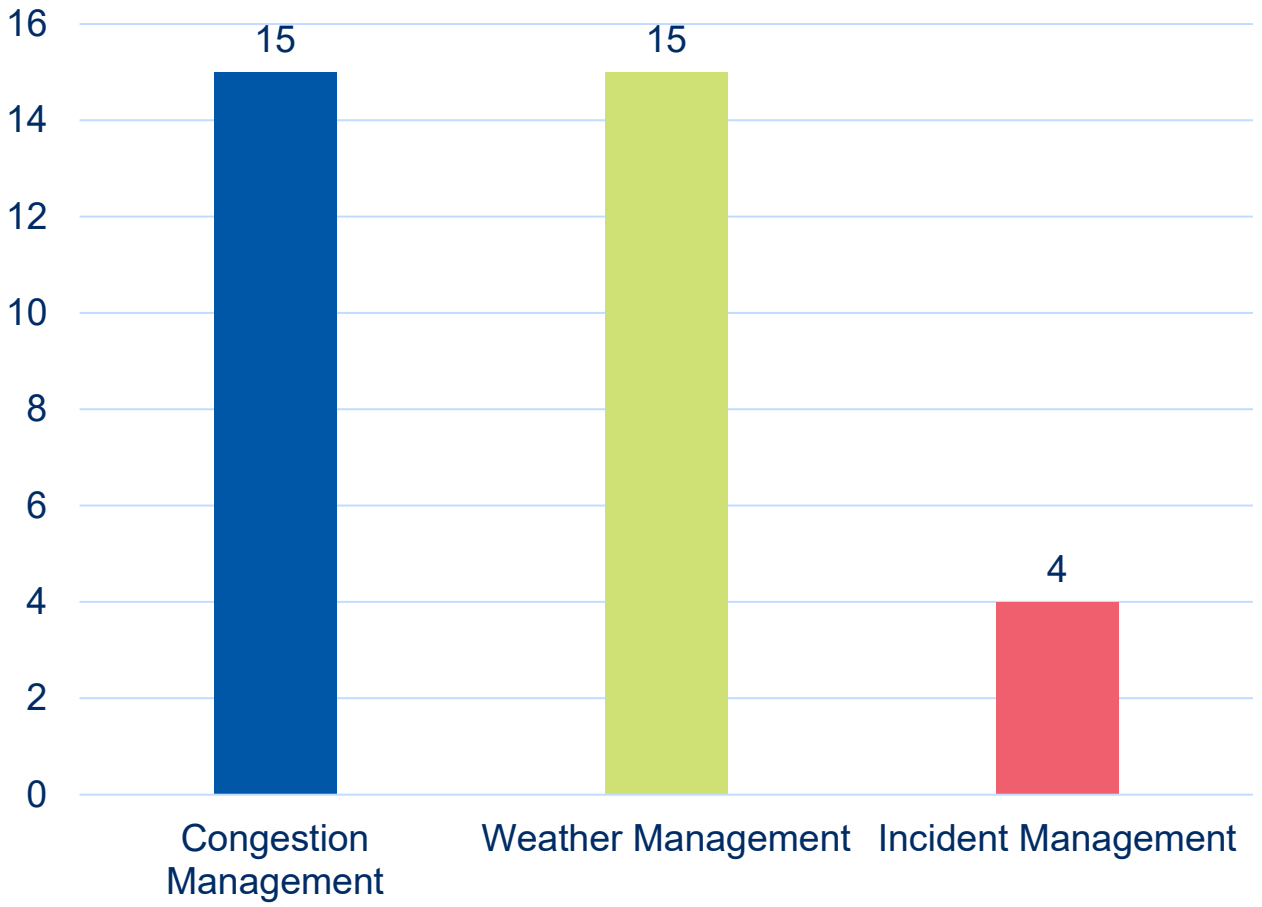
Active Traffic & Demand Management – Dynamic Speed Limit

VDOT

Number of Locations with Dynamic Speed Limit per Purpose



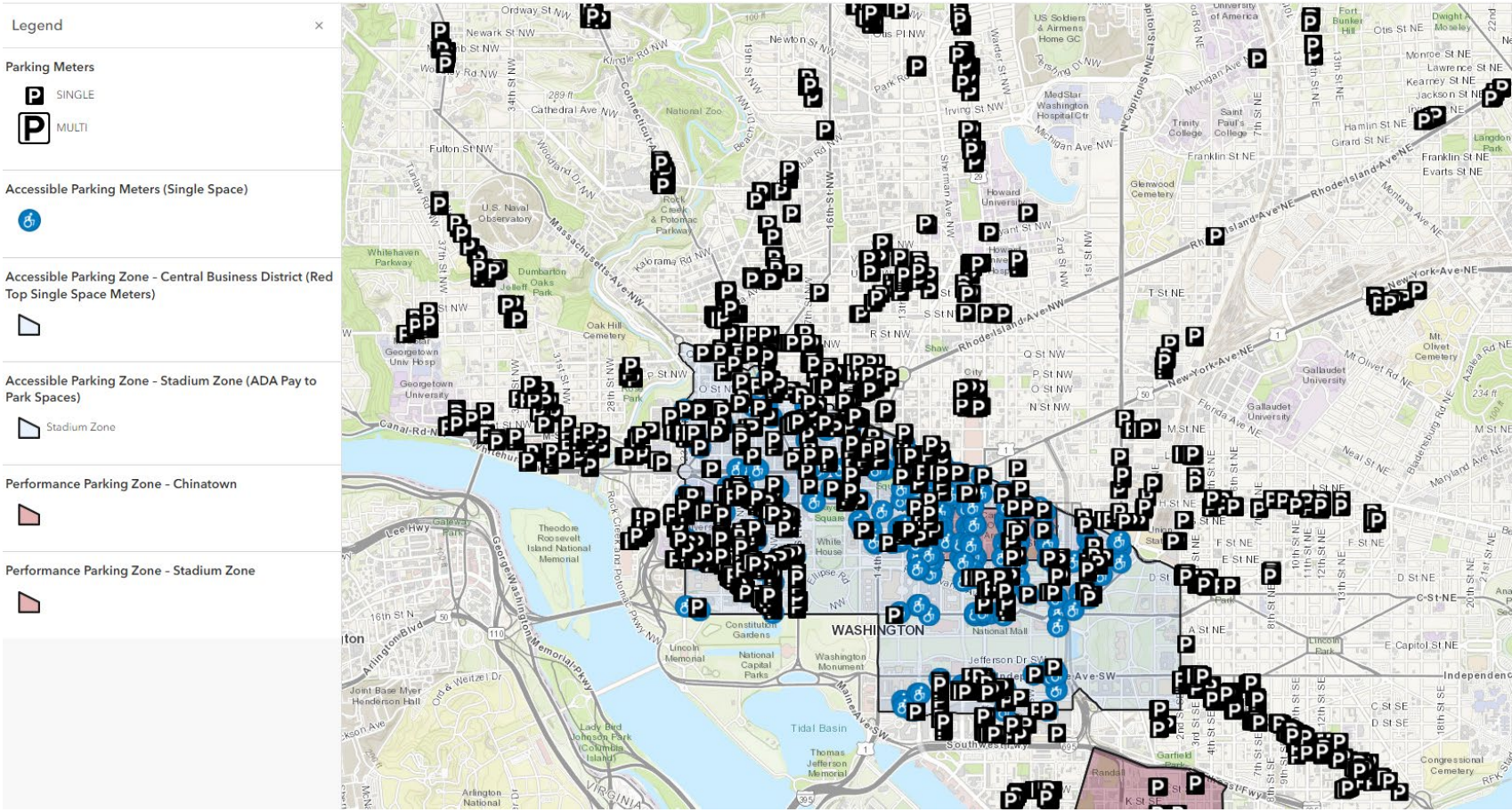
48 locations with Automated Dynamic Speed Limit Signs

Active Traffic & Demand Management – Active Parking Management

Variably Priced Parking Meters:

DDOT

- 210 Existing Parking Meters
- Planning to add 103 more parking meters



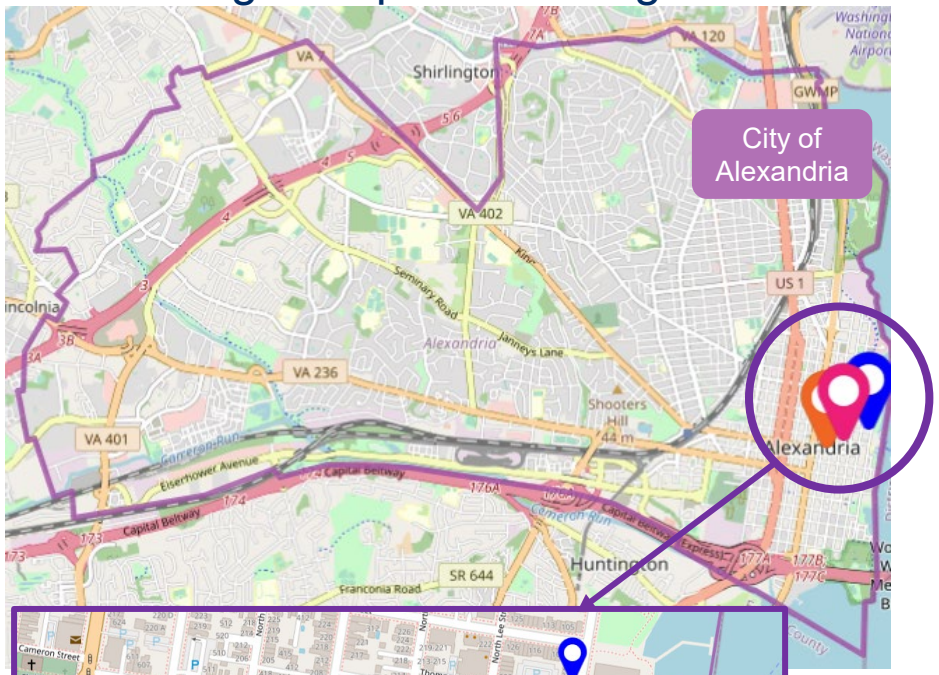
Map Source: DDOT, TSMO Inventory Survey

Active Traffic & Demand Management – Active Parking Management

Dynamic Message Signs with Number of Available Parking Spots:

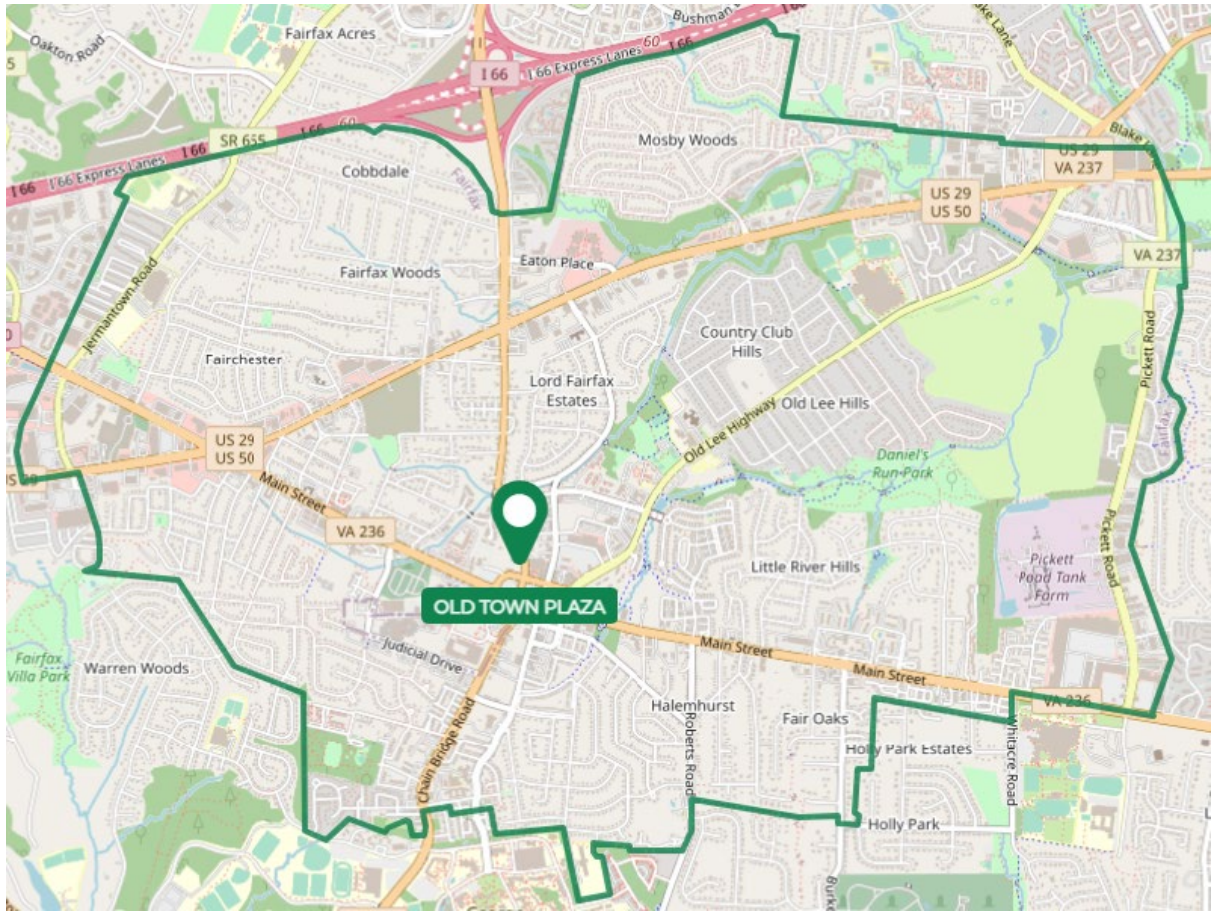
City of Alexandria:

- Planning to implement 3 signs



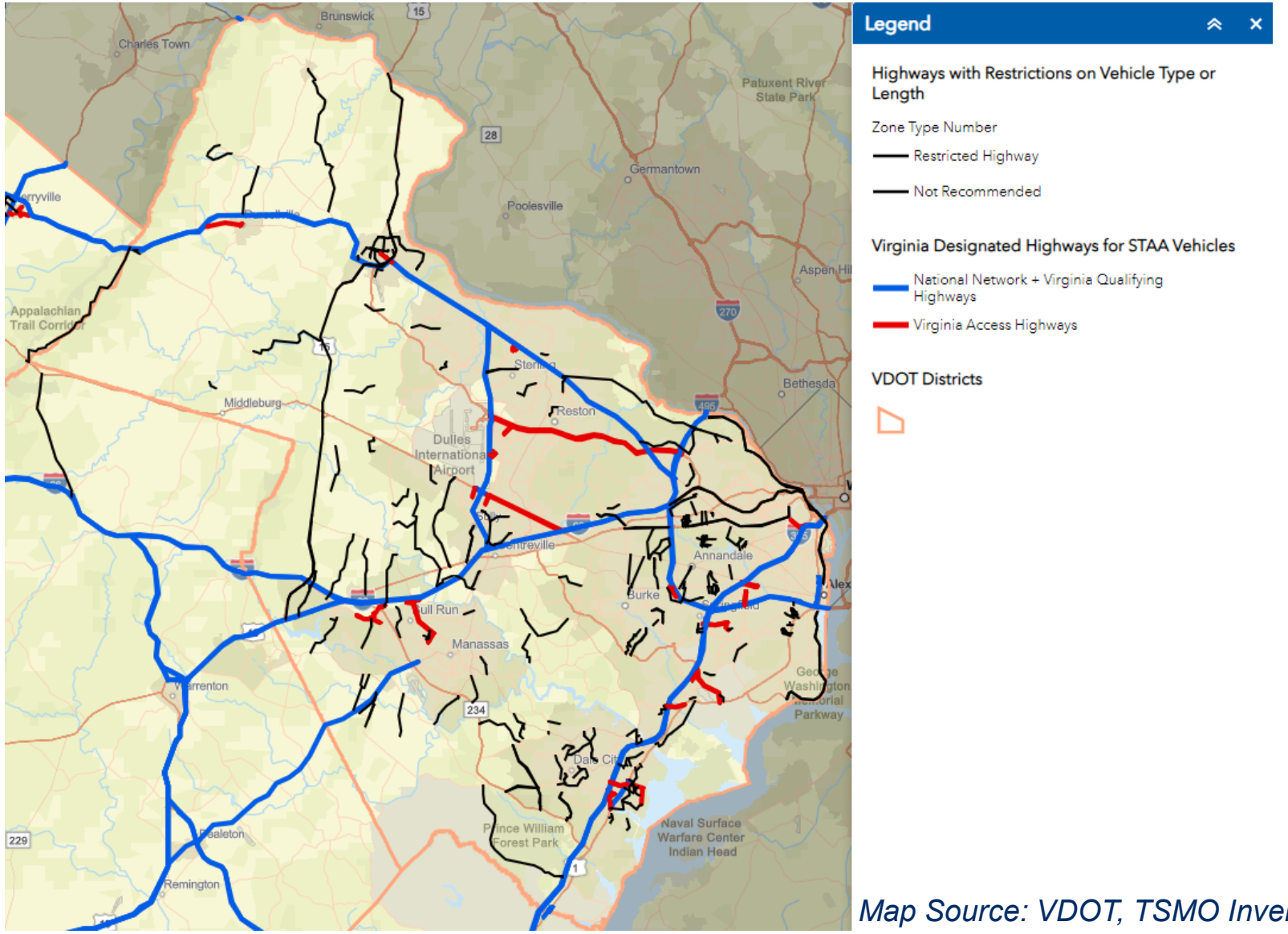
City of Fairfax:

- 1 existing garage with sensors and remote signage



Active Traffic & Demand Management – Truck Restrictions

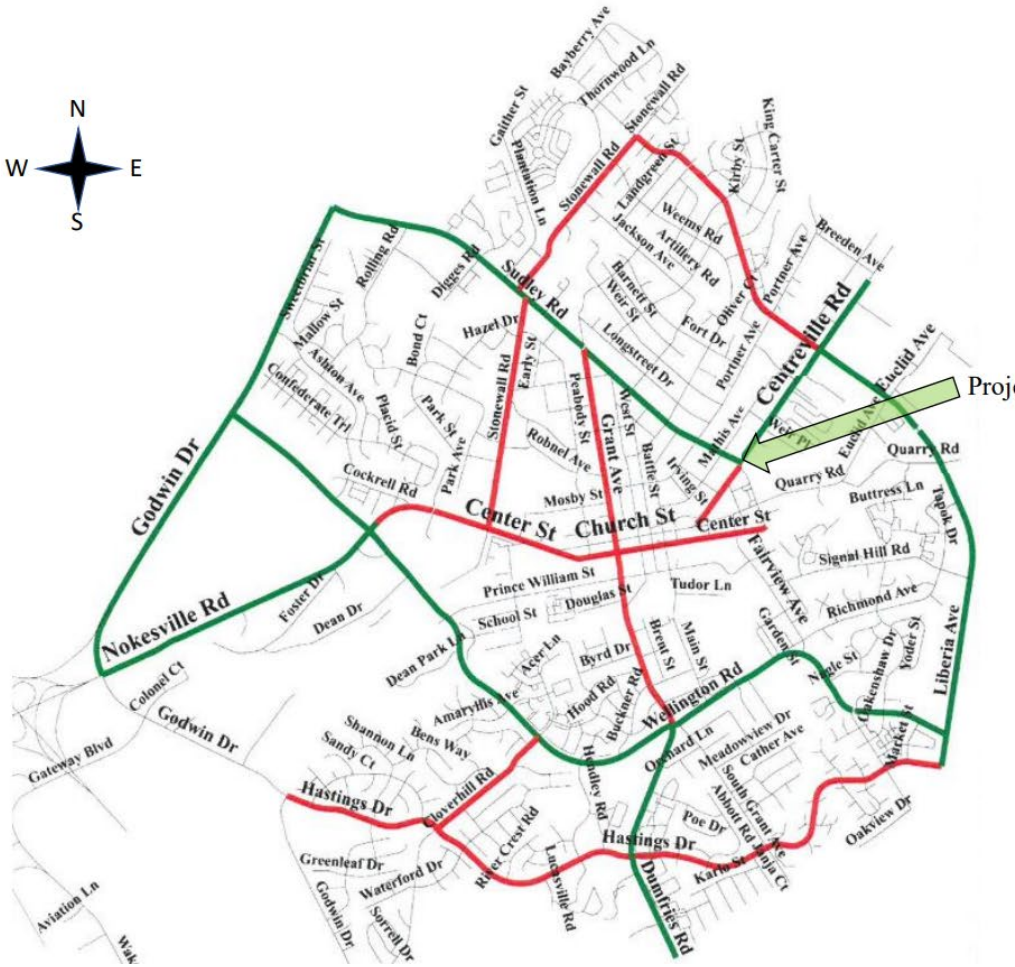
VDOT



Map Source: VDOT, TSMO Inventory Survey

Active Traffic & Demand Management – Truck Restrictions

City of Manassas



CITY OF MANASSAS

TRUCK ROUTE/RESTRICTIONS

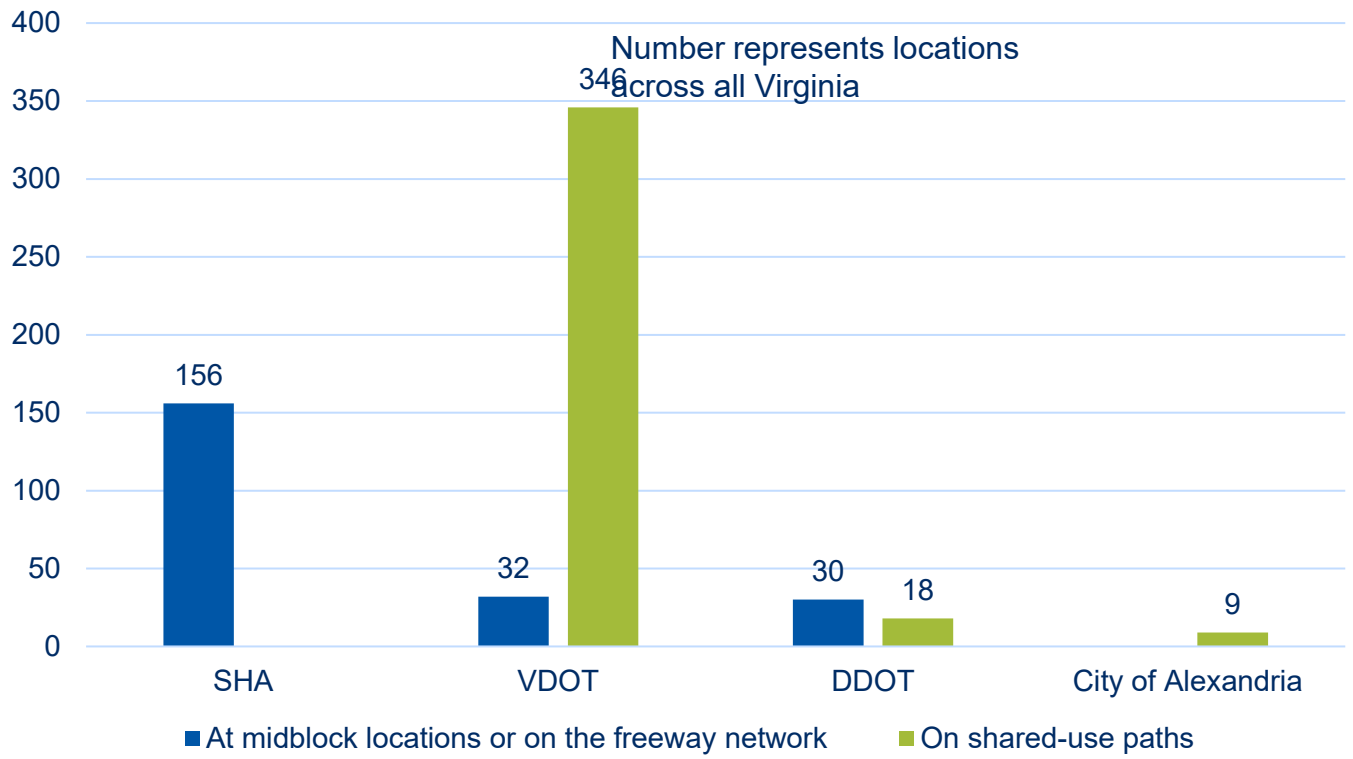
Legend
- Truck Route
- Truck Restriction
- Undesignated

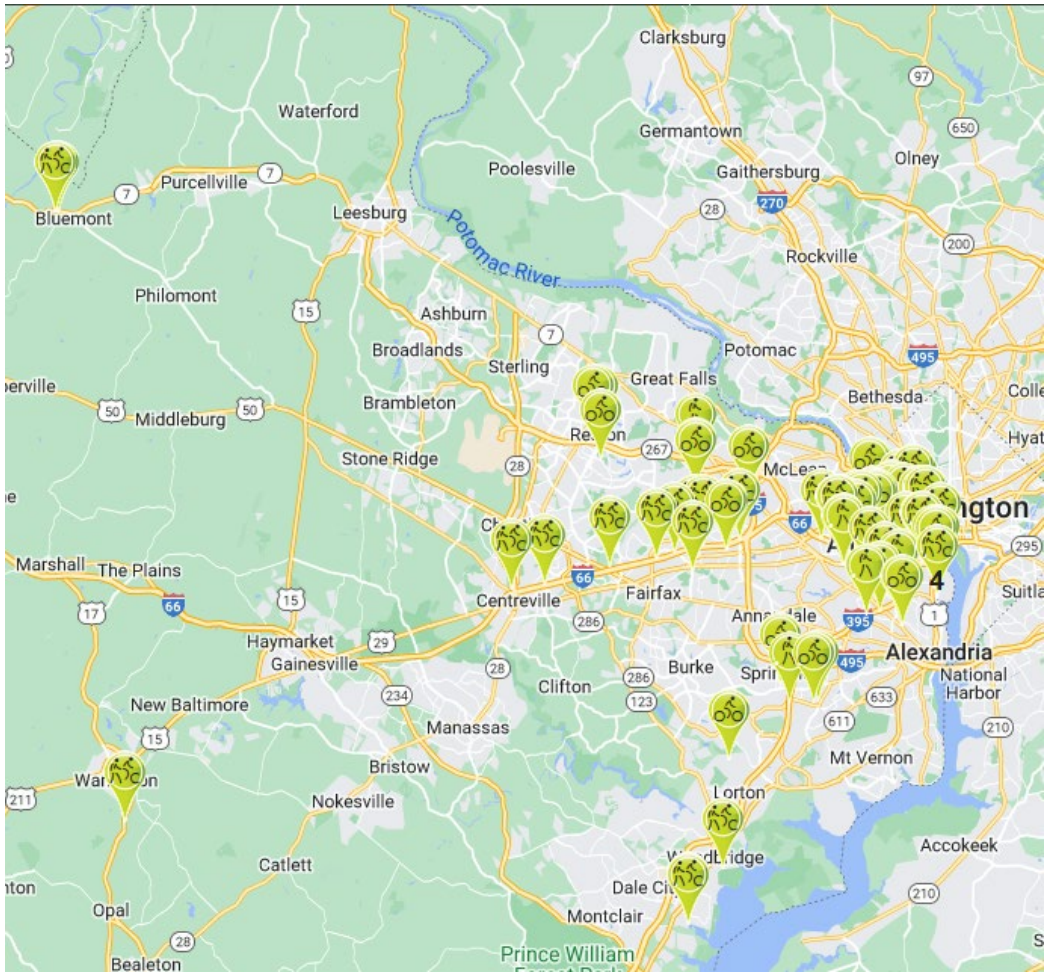
Truck Volume Percentages
(Existing % = Future %)
- Sudley Road (Rte. 234) – 2.3%
- NB Centreville Road (Rte. 28) - 3.5%
- SB Centreville Road (Rte. 28) – 2.7%
- Prescott Avenue – 2.2%

Note: City expects to add additional truck restriction signs on Quarry Road.

Map Source: City of Manassas, TSMO Inventory Survey

Active Traffic & Demand Management – Continuous Count Stations





Map Source: VDOT, TSMO Inventory Survey

TSMO Survey Results:

Traffic Signal Operations

Traffic Signal Operations

Strategies

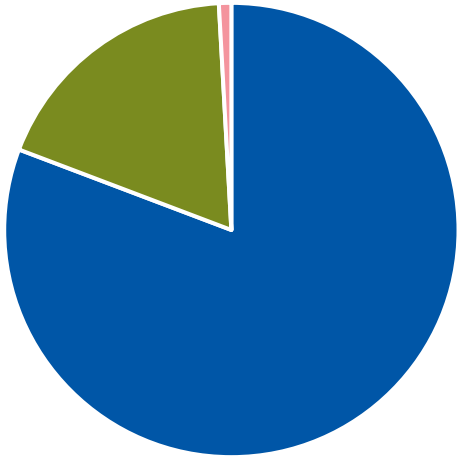
- Types of Signals
- Types of Cabinets
- Types of Controllers
- Types of Strategies at Signals
- Types of Communication
- Detectors
- Pedestrian/Bike Strategies

Agencies

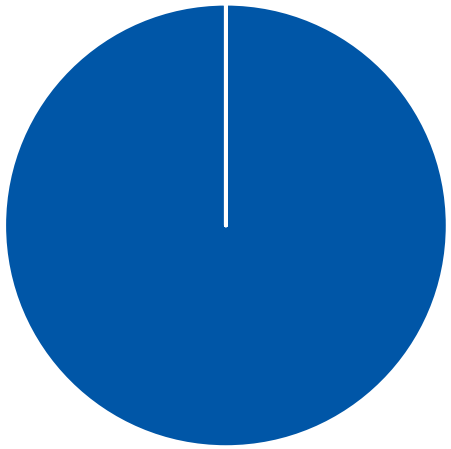
- SHA
- VDOT
- MCDOT
- DDOT
- Arlington County
- City of Alexandria
- City of Fairfax

Traffic Signal Operations – Signal Ownership

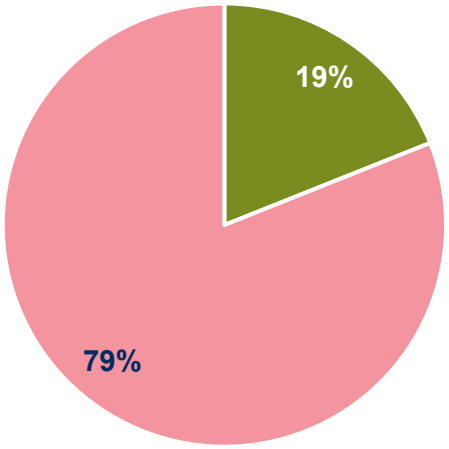
SHA



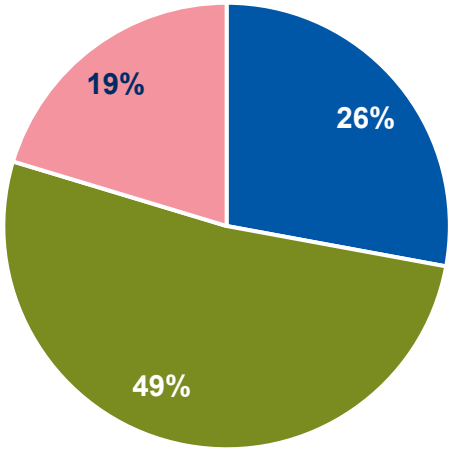
VDOT



DDOT

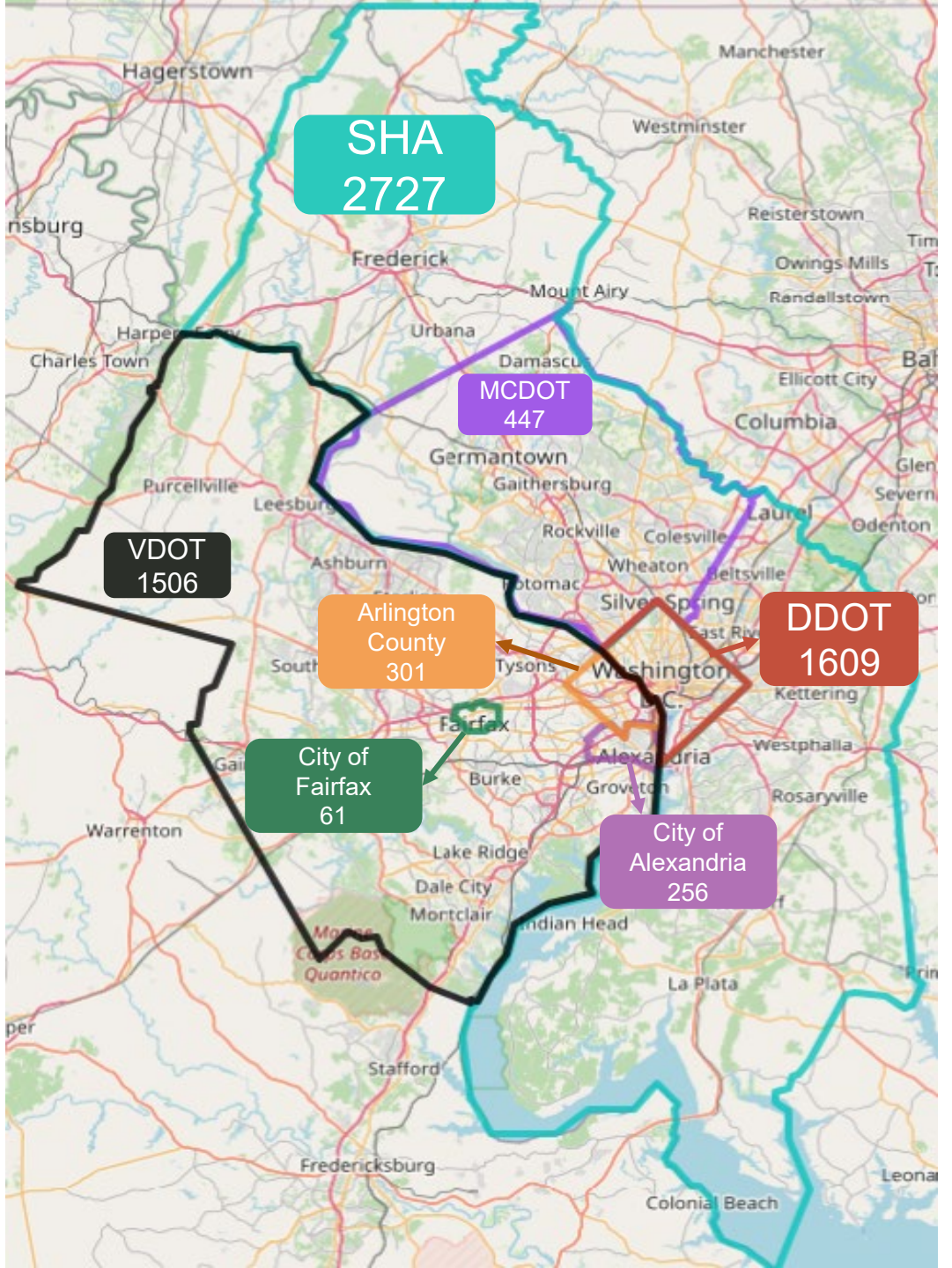


MCDOT



■ Fully Actuated ■ Semi-Actuated ■ Pre-timed

Total Number of Signals **Owned** by Agencies = 6,907
Total Number of Signals **Maintained** by Agencies = 7,132



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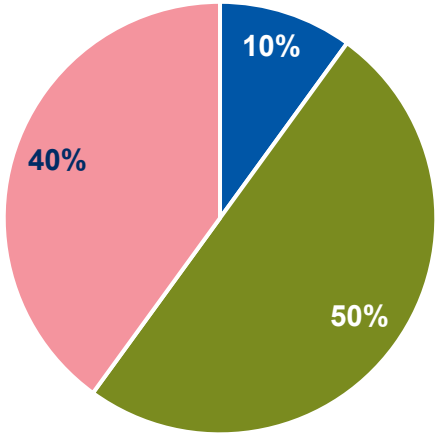
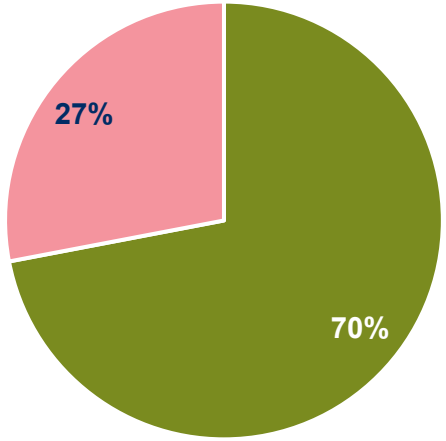
Traffic Signal Operations – Signal Ownership

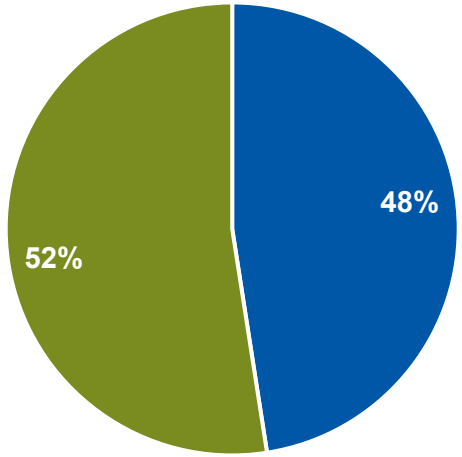
Arlington County



City of Alexandria



City of Fairfax



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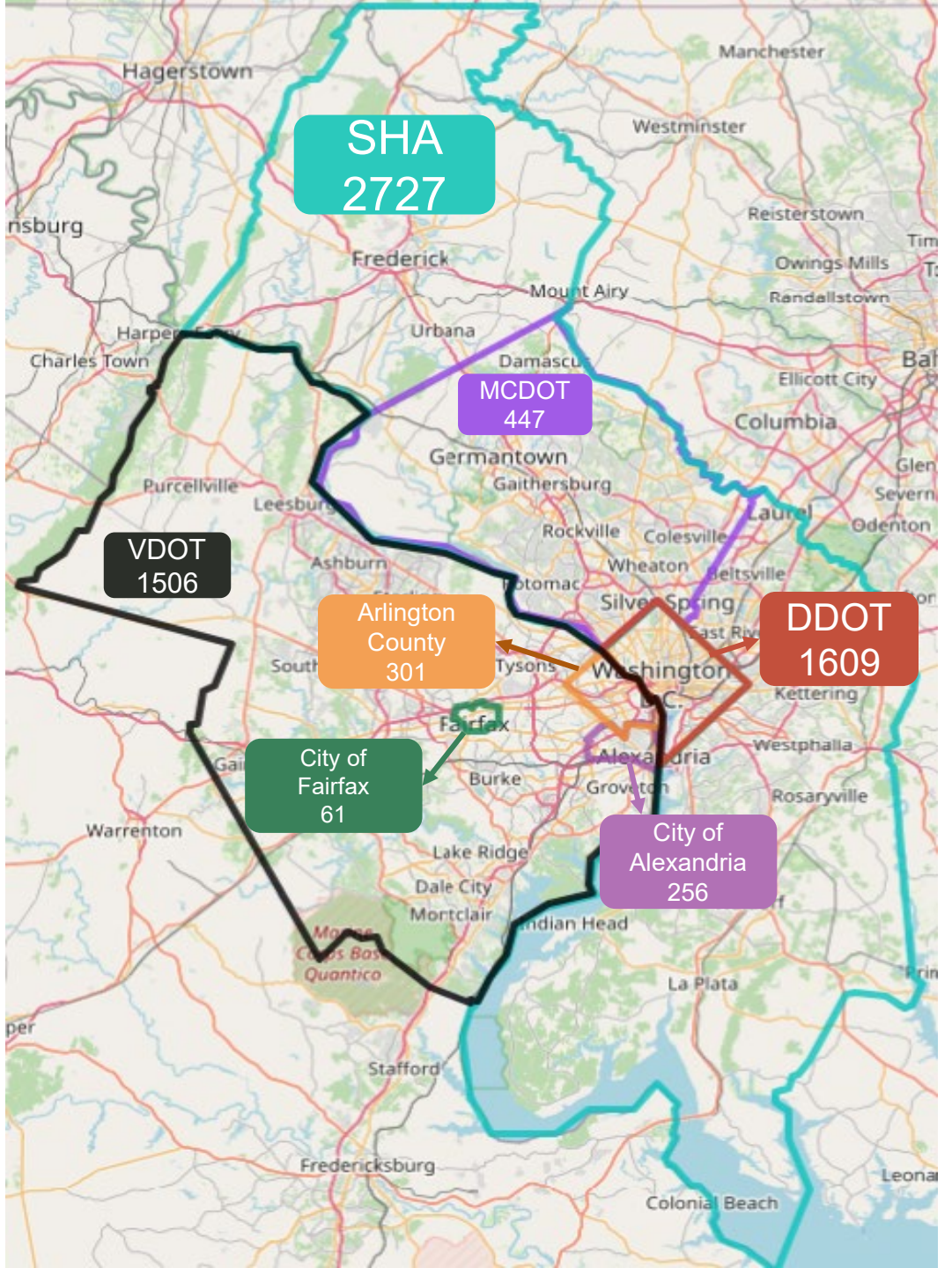

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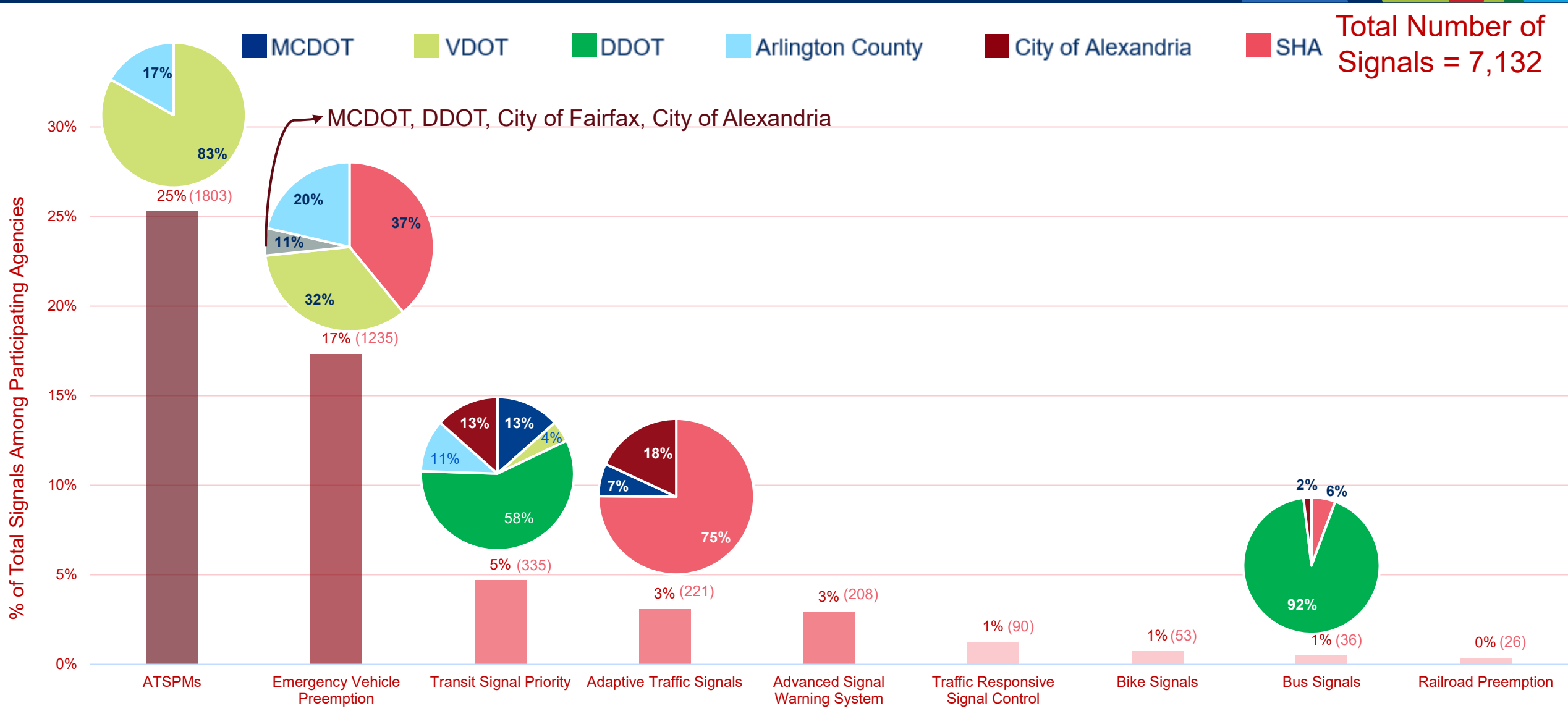
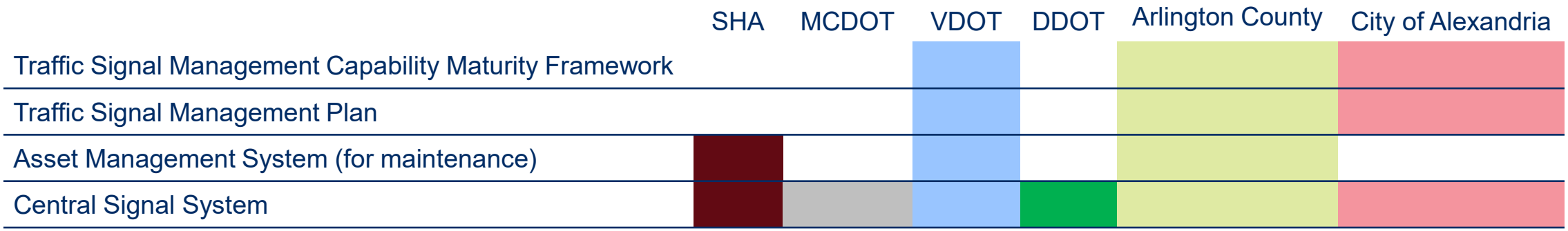
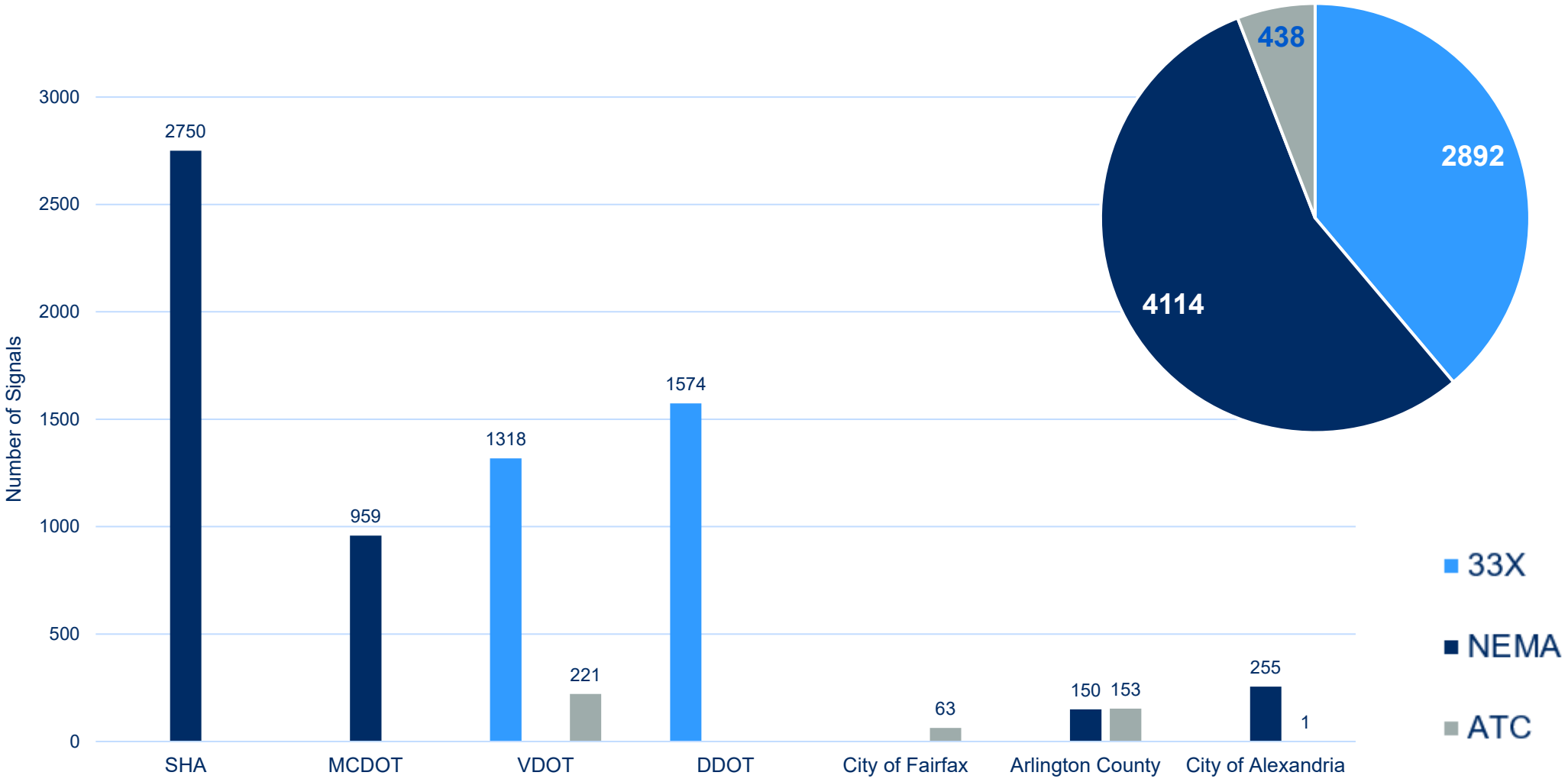
Traffic Signal Operations - Strategies



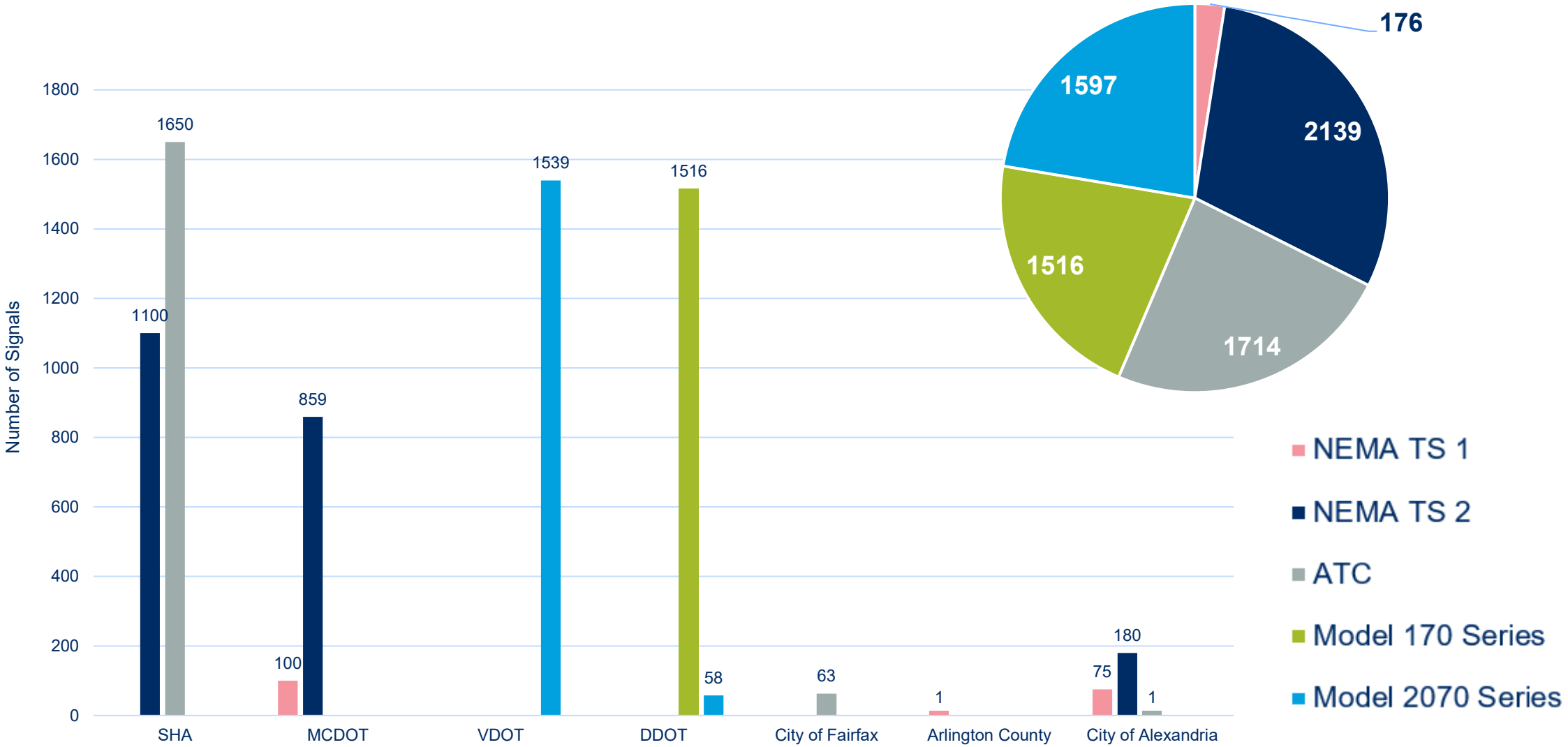
Traffic Signal Operations - Strategies



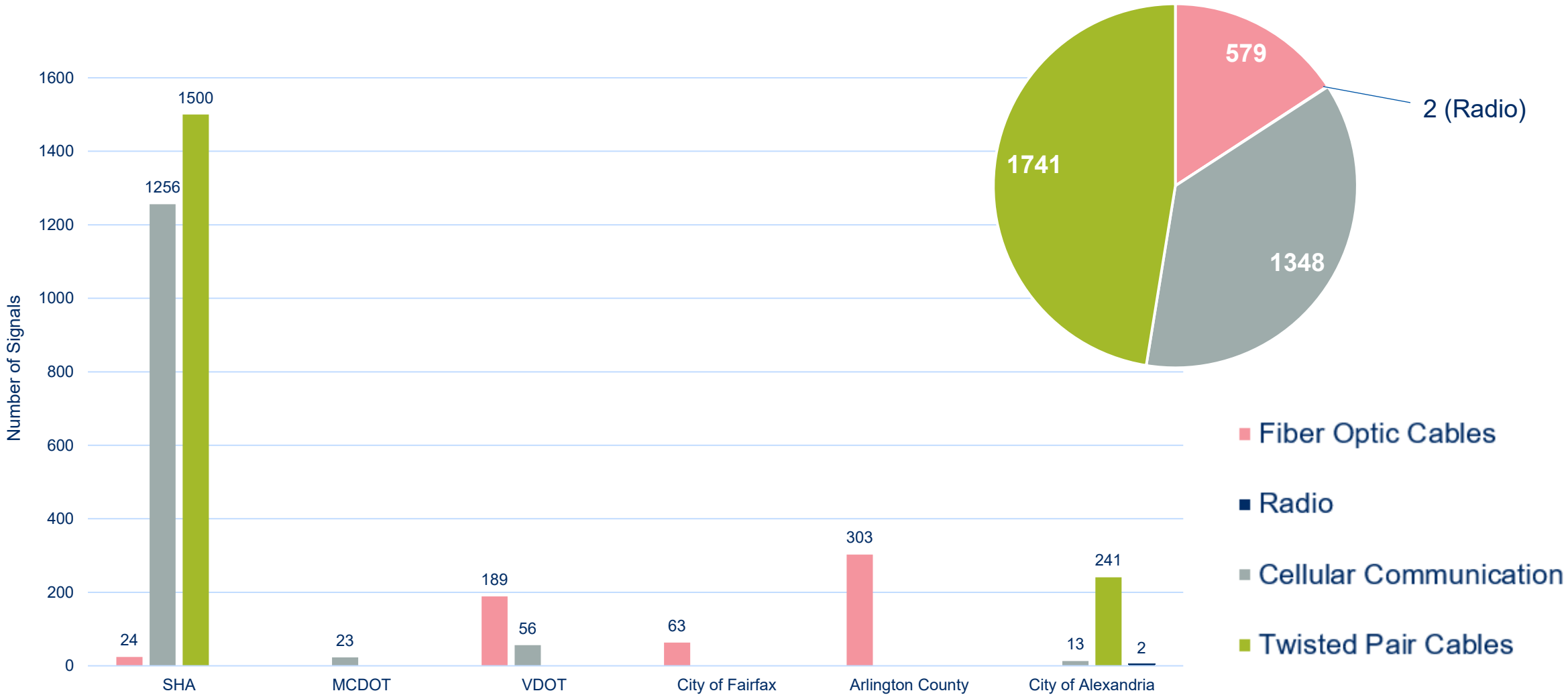
Traffic Signal Operations - Cabinets



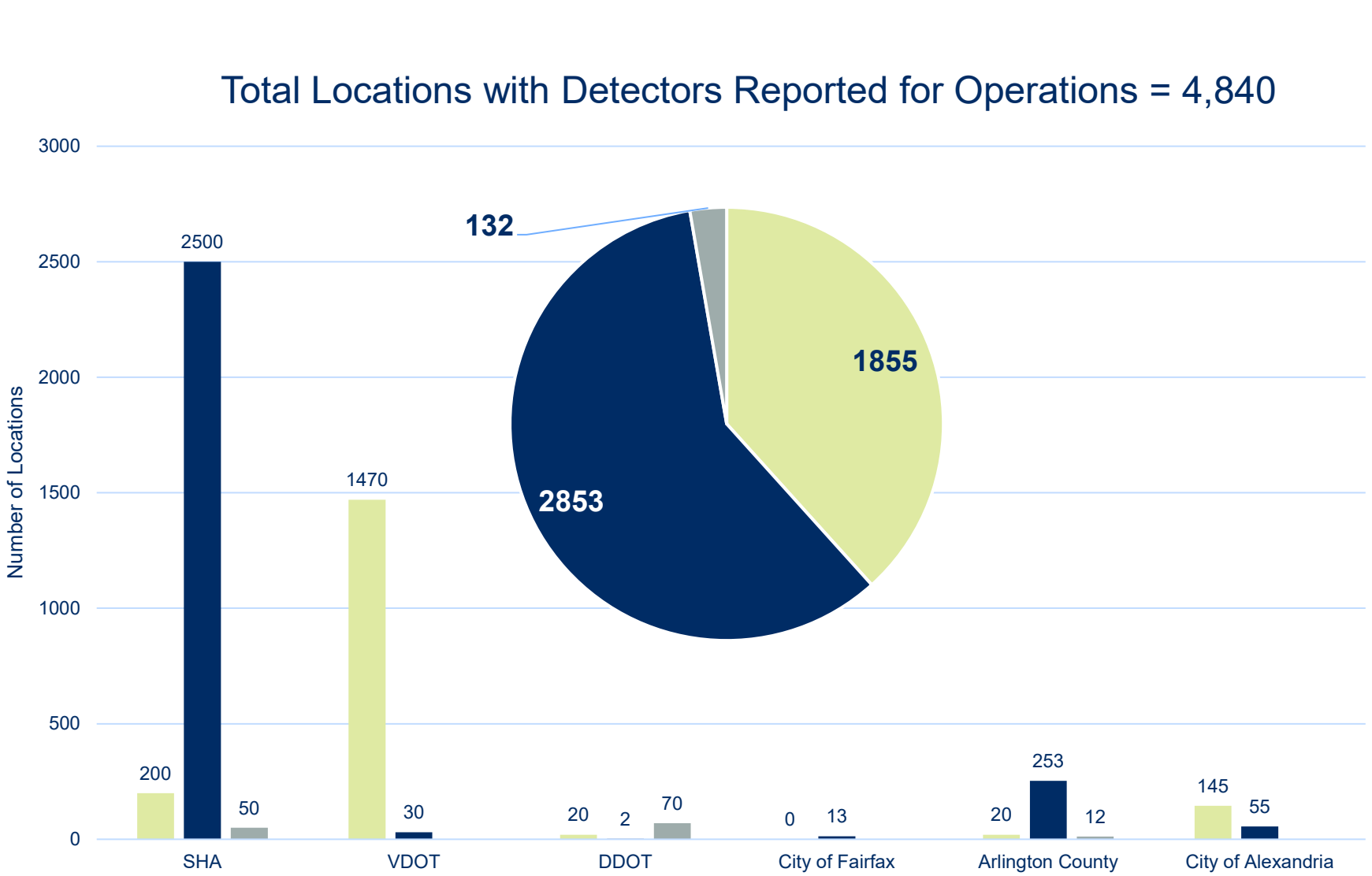
Traffic Signal Operations - Controllers

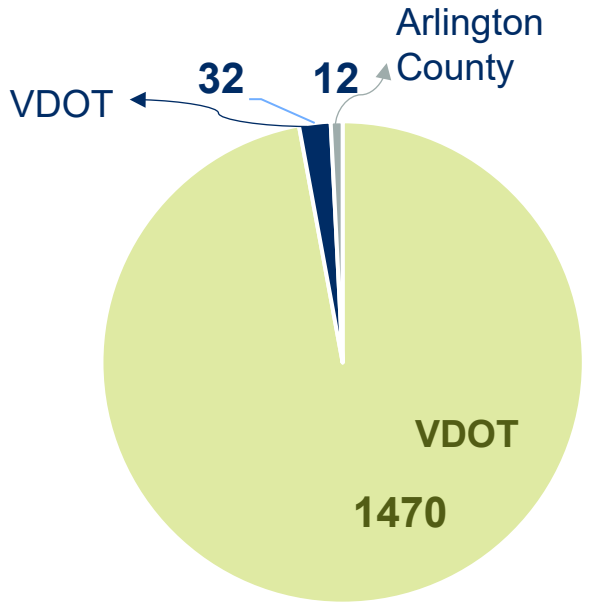


Traffic Signal Operations – Communication



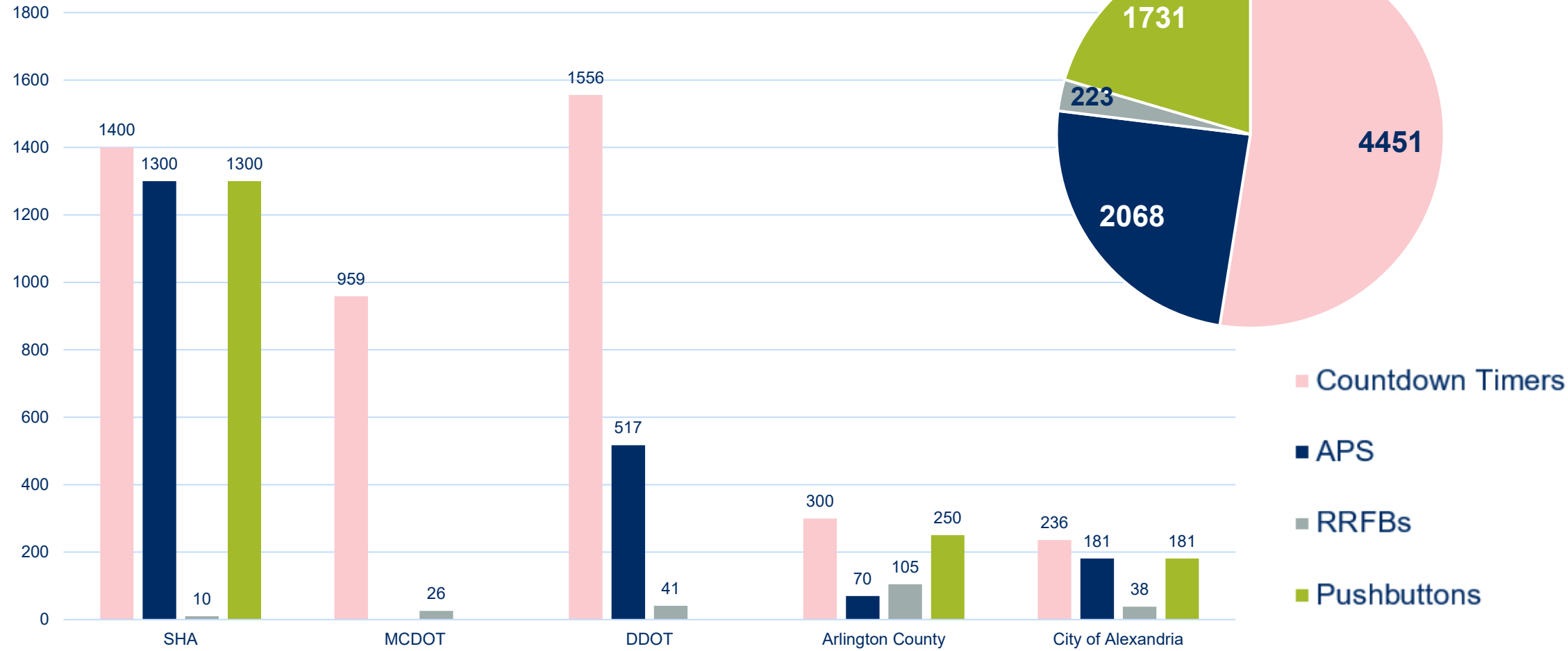
Traffic Signal Operations – Detectors





Total Locations with Detectors Reported for Data Collection = 1,514

Traffic Signal Operations – Pedestrian/Bike



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TSMO Survey Results:

Connected and Automated Vehicle (CAV) Deployment

Connected and Automated Vehicle (CAV) Deployment

Strategies

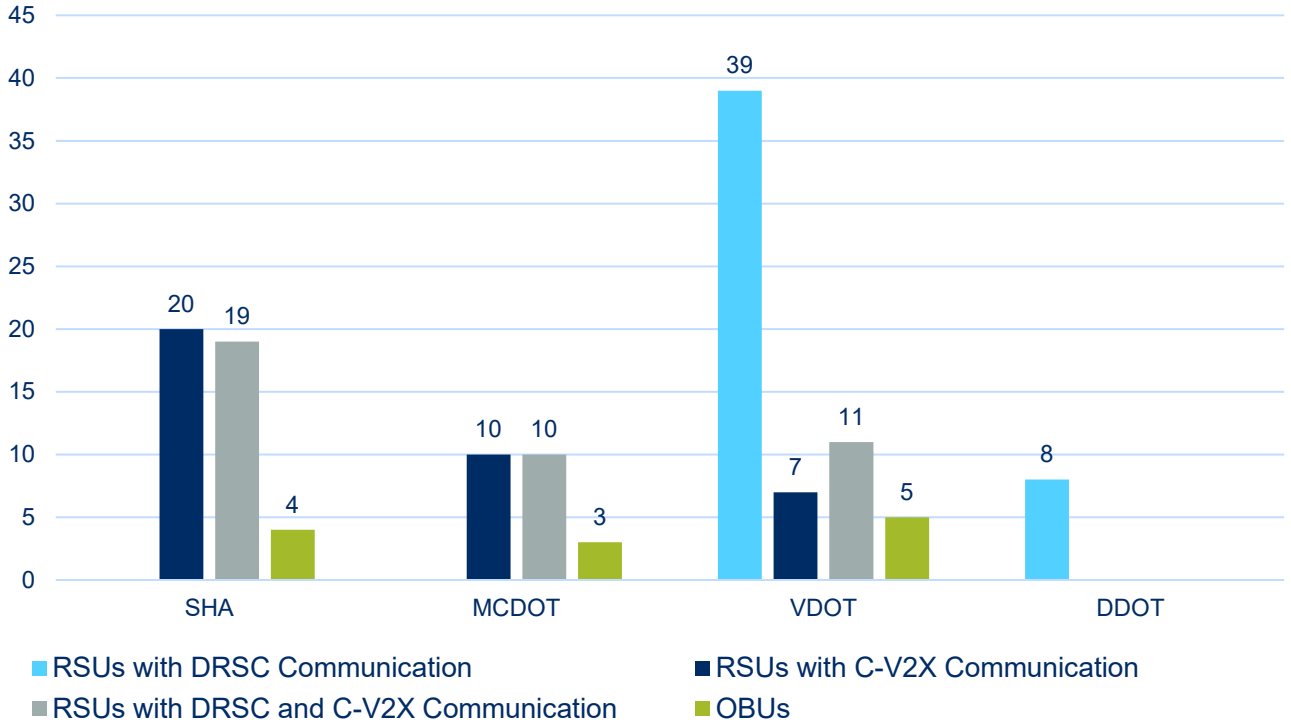
- Safety Applications
- Mobility/Environmental Applications
- Traffic Advisories and Warnings Applications

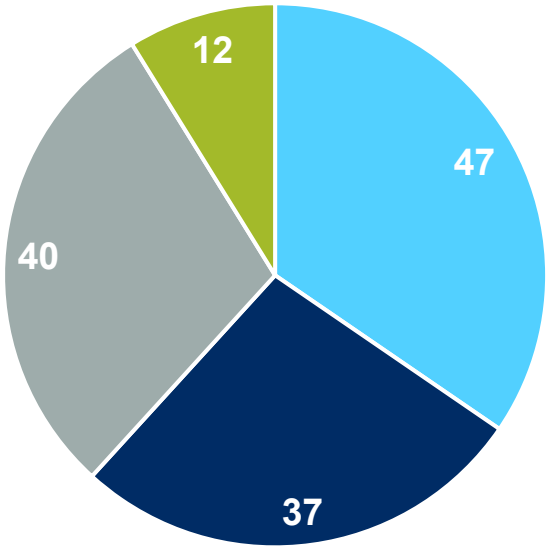
Agencies

- SHA
- VDOT
- MCDOT
- DDOT
- City of Alexandria

Connected and Automated Vehicle (CAV) Deployment

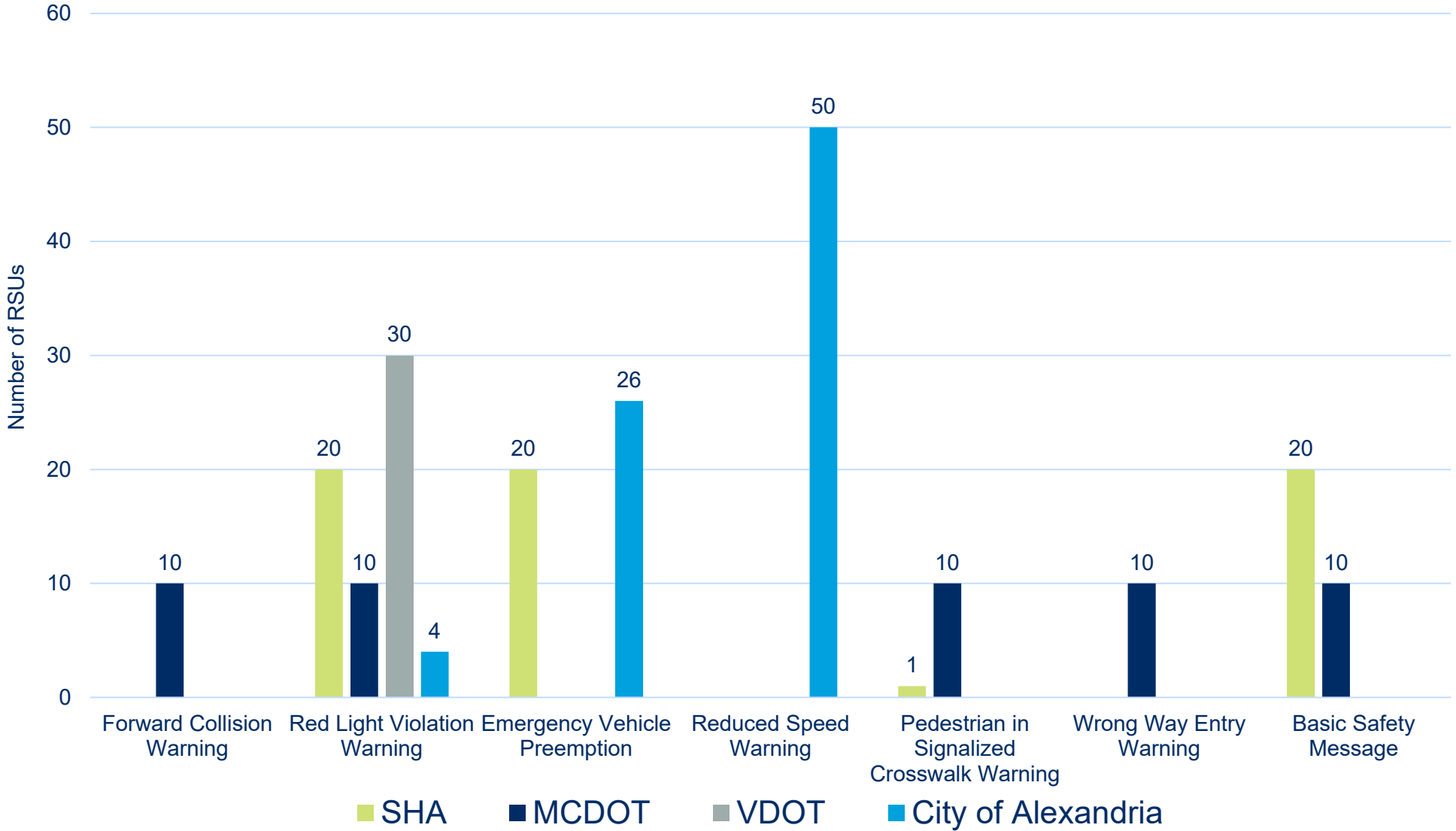
RSUs & OBUs





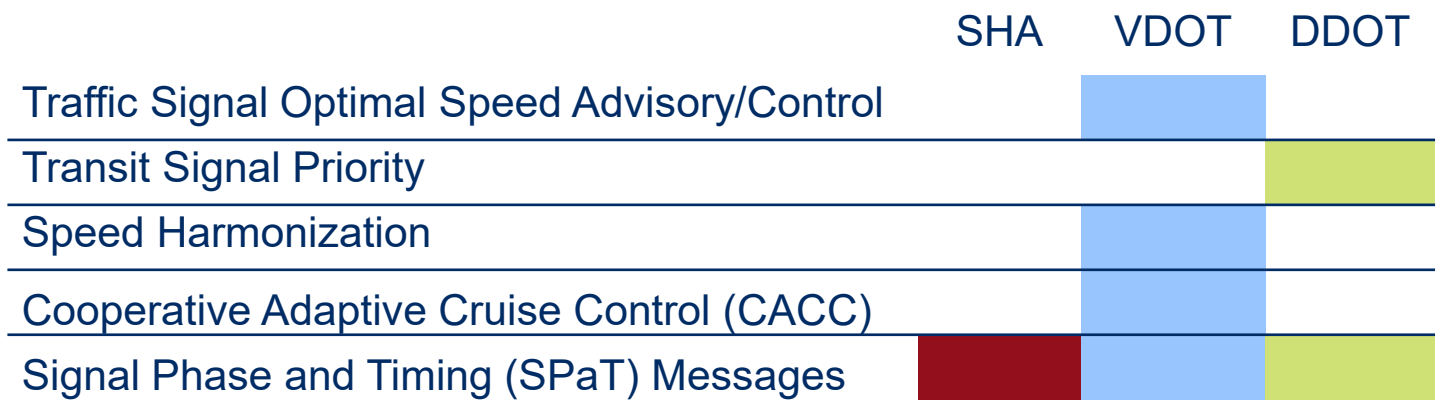
Connected and Automated Vehicle (CAV) Deployment

Safety Applications – Existing RSUs



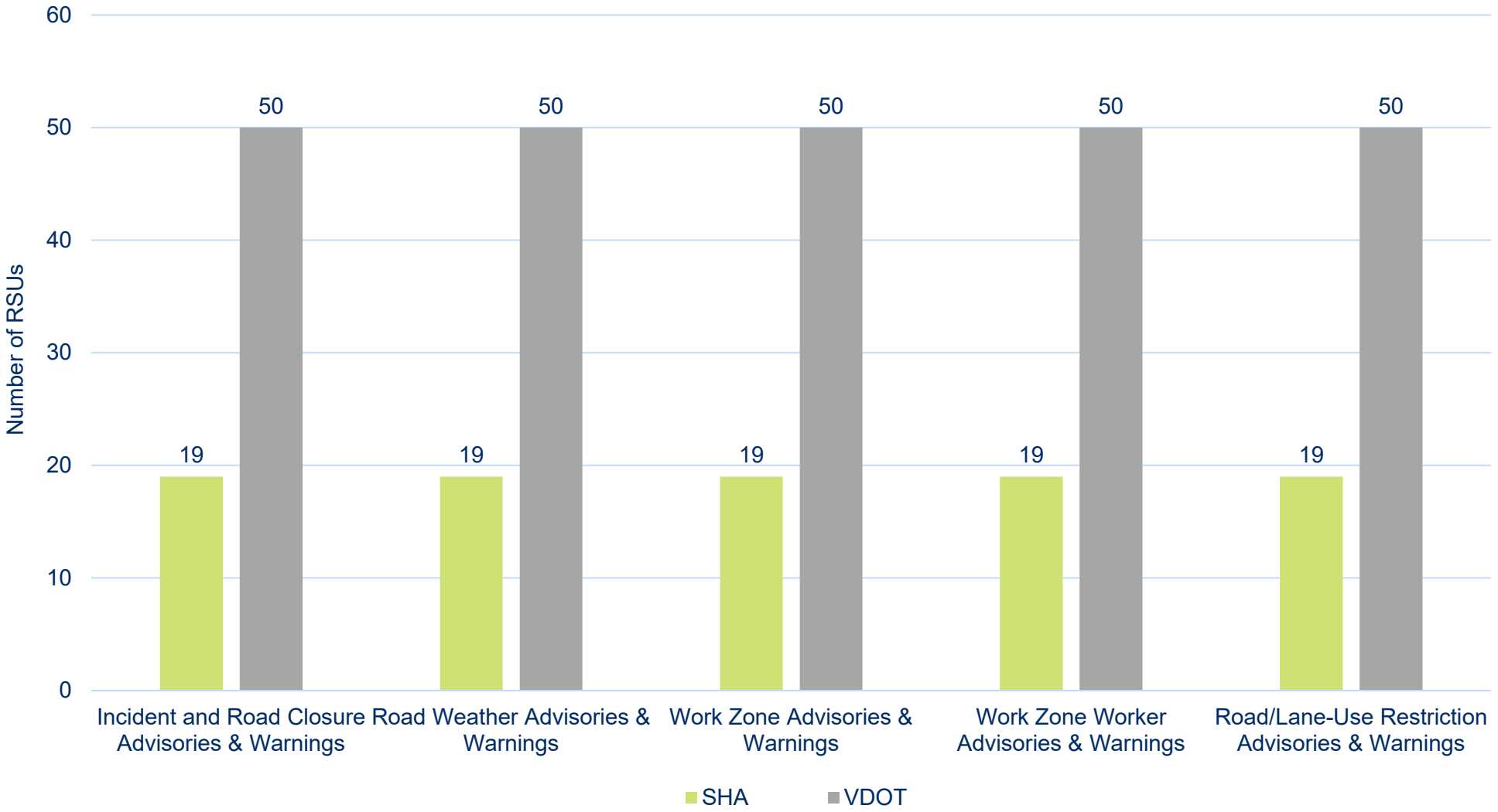
Connected and Automated Vehicle (CAV) Deployment

Mobility/Environmental Applications



Connected and Automated Vehicle (CAV) Deployment

Traffic Advisories and Warnings Applications – Planned RSUs



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TSMO Survey Results:

Integrated Corridor Management (ICM)

Integrated Corridor Management (ICM)

Strategies

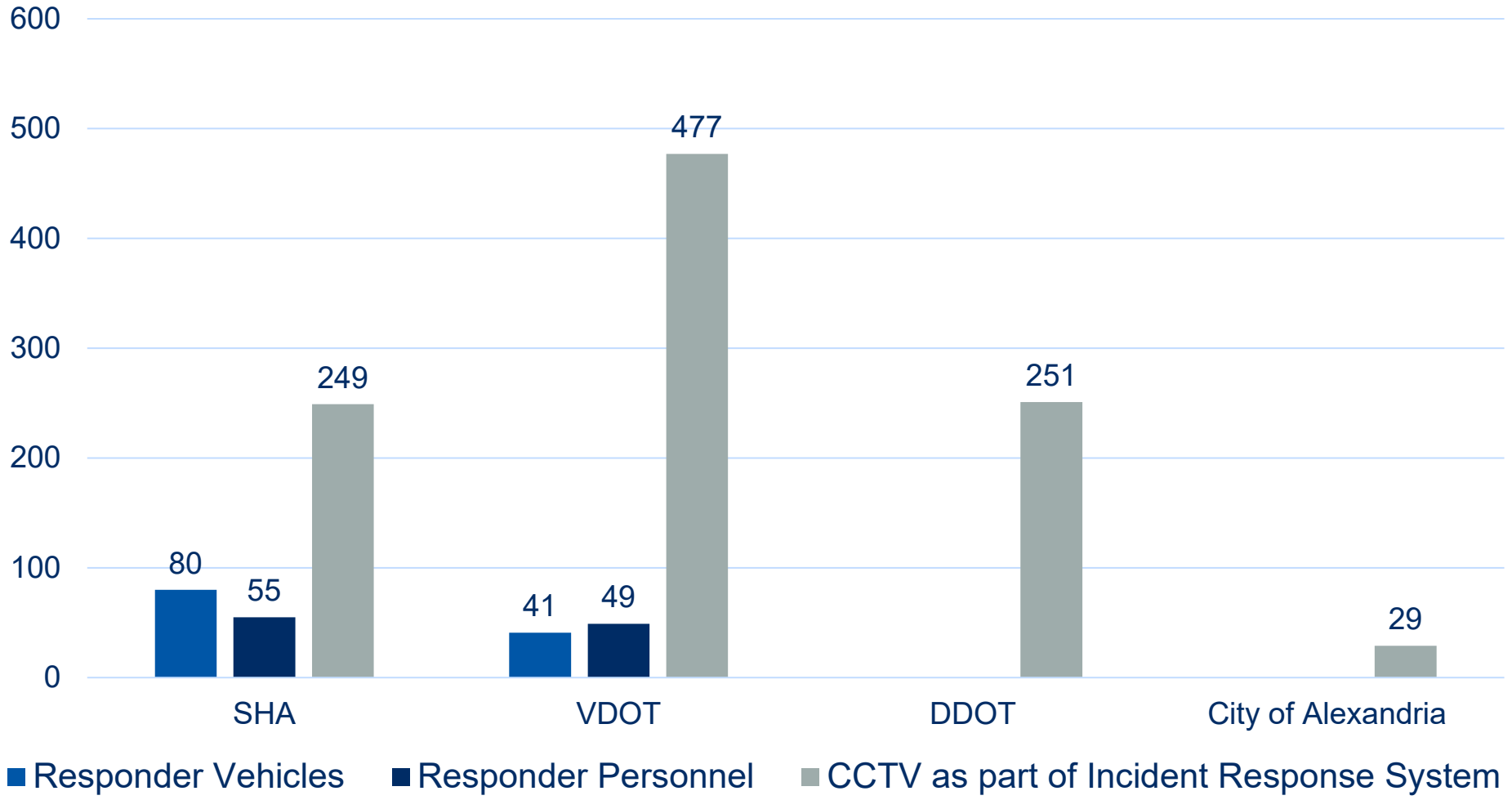
- Responder Vehicles, Personnel, CCTV cameras
- Police CAD
- Event Management Capabilities (software or personnel)
- Decision Support System for Arterial Traffic Signals
- Integrated Software, Third-Party Data Sources and Data Lakes

Agencies

- SHA
- VDOT
- MCDOT
- DDOT
- City of Alexandria

Integrated Corridor Management (ICM)

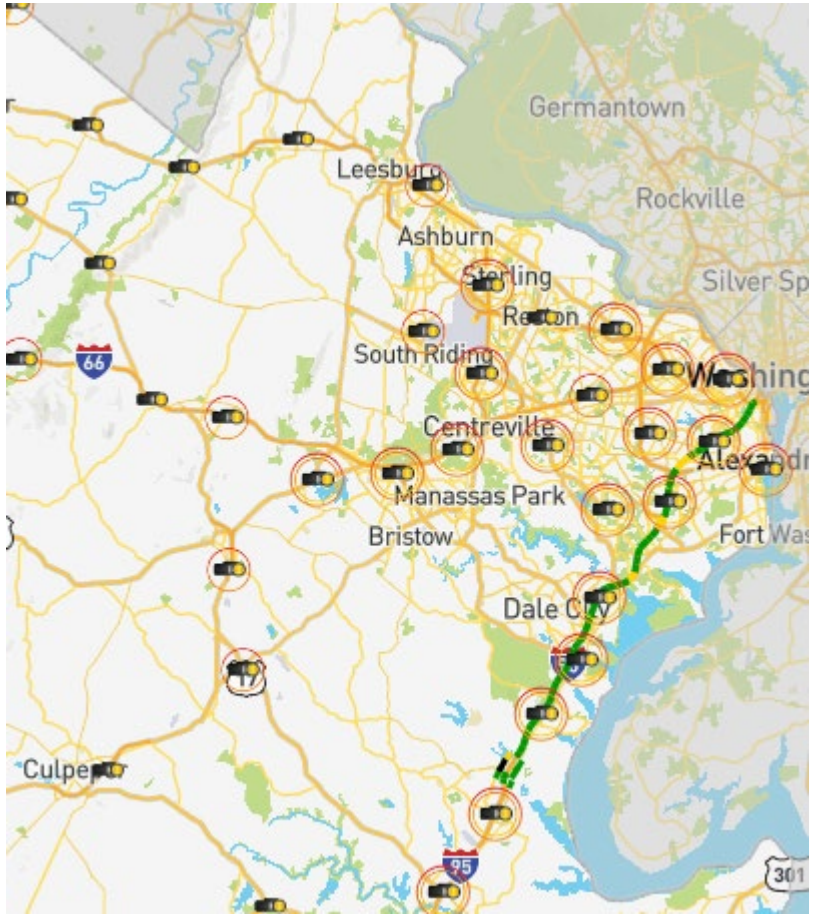
Incident Response System



Integrated Corridor Management (ICM)

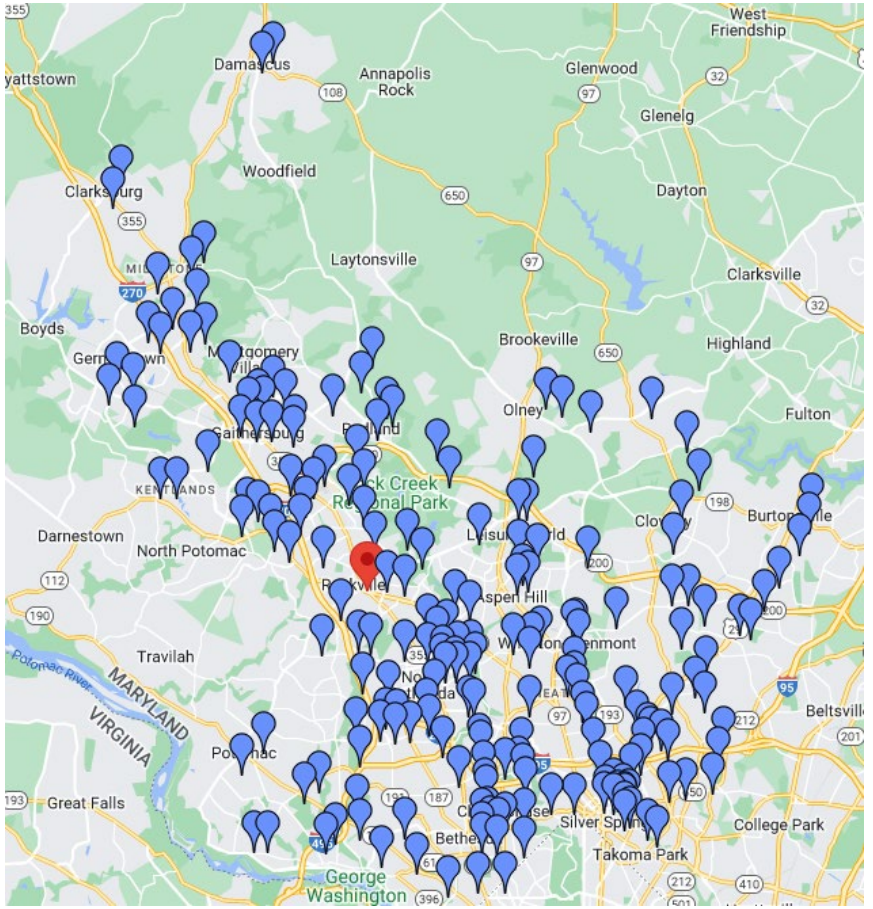
CCTV Cameras

VDOT



Map Source: VDOT, TSMO Inventory Survey

MCDOT

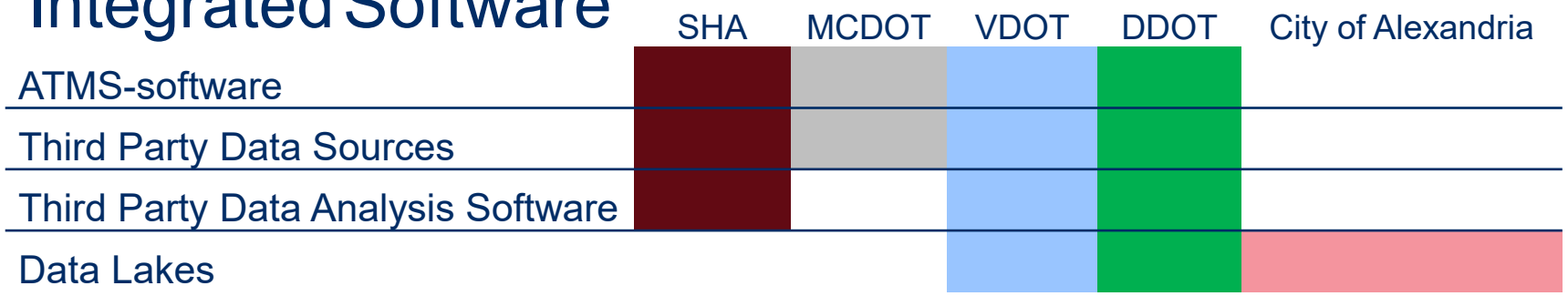


Map Source: MCDOT Website

Integrated Corridor Management (ICM)

Strategies

Integrated Software



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TSMO Survey Results:

Emergency Transportation Operations

Emergency Transportation Operations

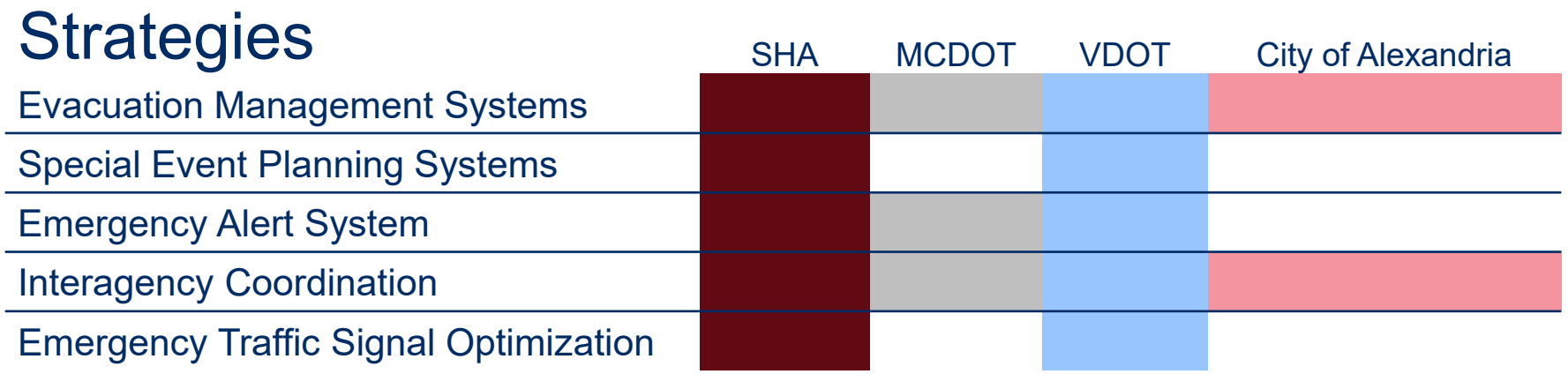
Strategies

- Evacuation Management Systems
- Special Event Planning Systems
- Emergency Alert System
- Interagency Coordination
- Emergency Traffic Signal Optimization

Agencies

- SHA
- MCDOT
- VDOT
- City of Alexandria

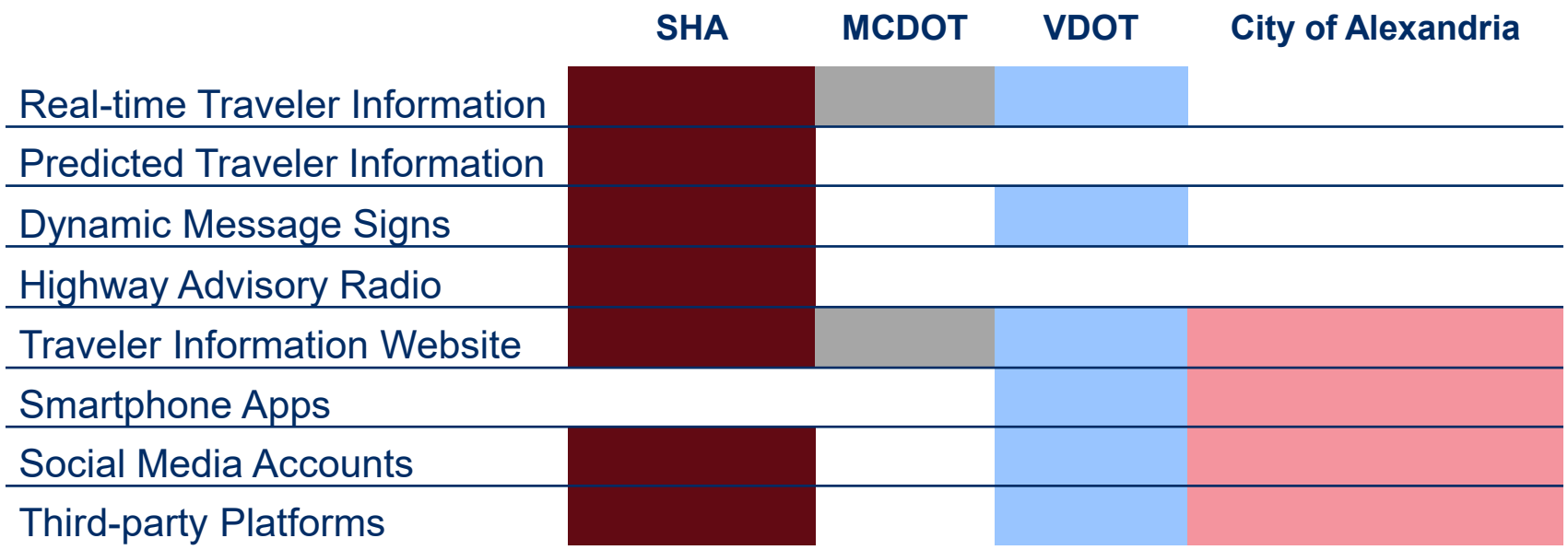
Emergency Transportation Operations



TSMO Survey Results:

Traveler Information

Traveler Information



Mead & Hunt

TSMO Survey Results:

Work Zone Operations

Work Zone Operations

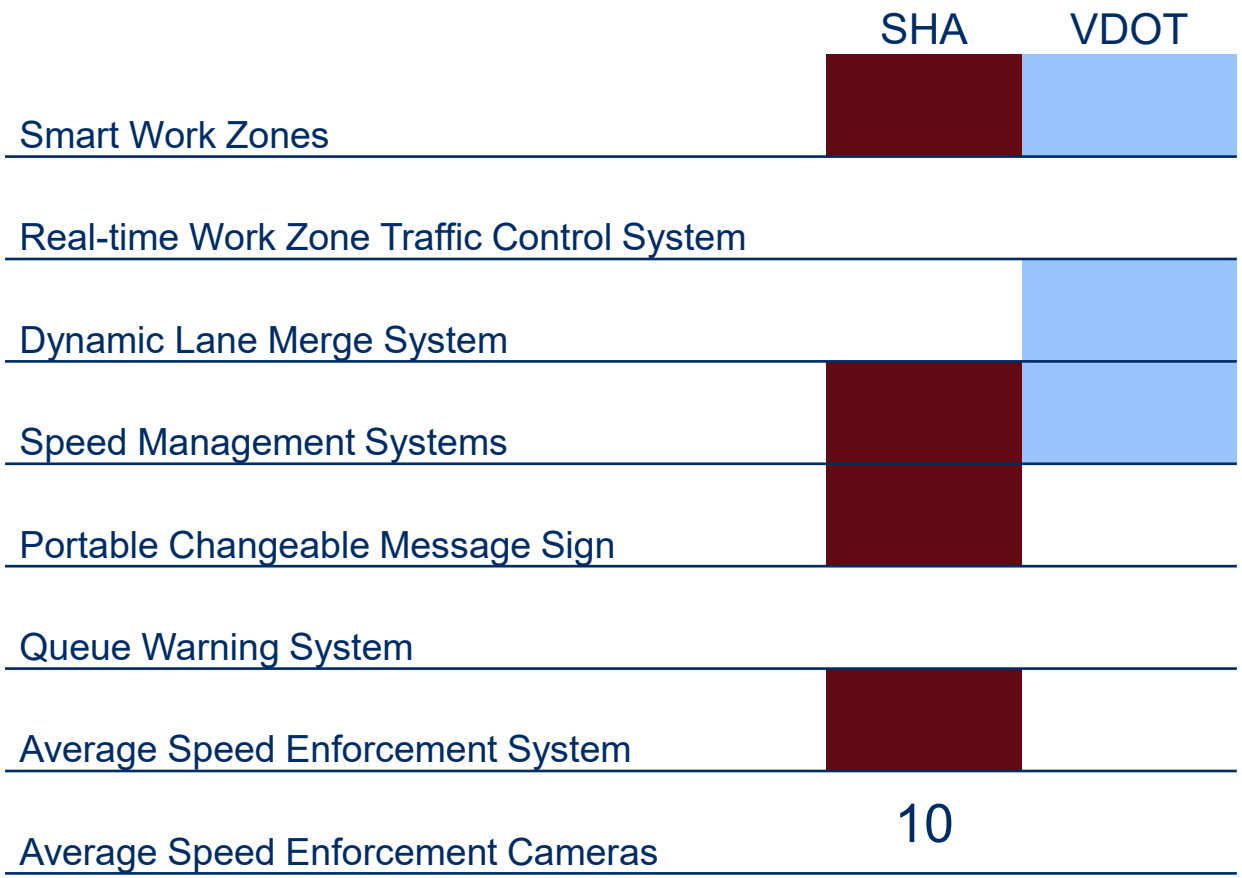
Strategies

- Smart Work Zones
- Real-time Work Zone Traffic Control System
- Dynamic Lane Merge System
- Speed Management Systems
- Portable Changeable Message Sign
- Queue Warning System
- Average Speed Enforcement System

Agencies

- SHA
- VDOT

Work Zone Operations



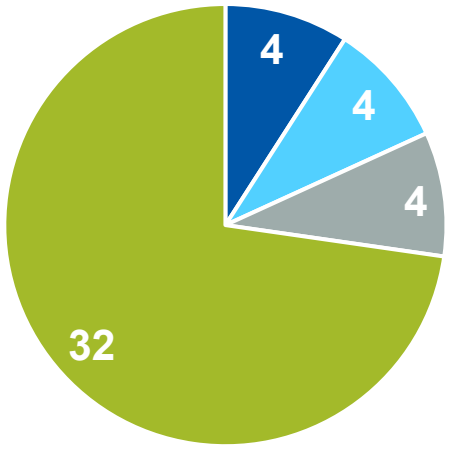
Mead & Hunt

TSMO Survey Results:

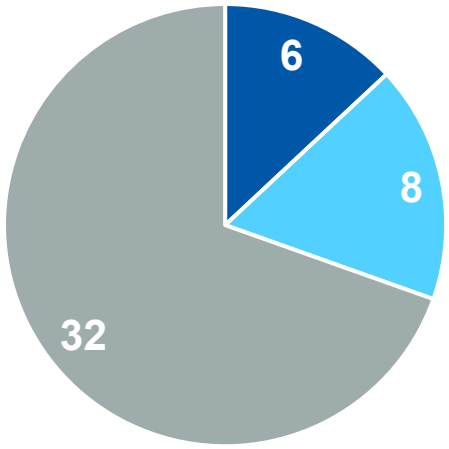
Traffic Management Centers (TMC)

Traffic Management Centers (TMC)

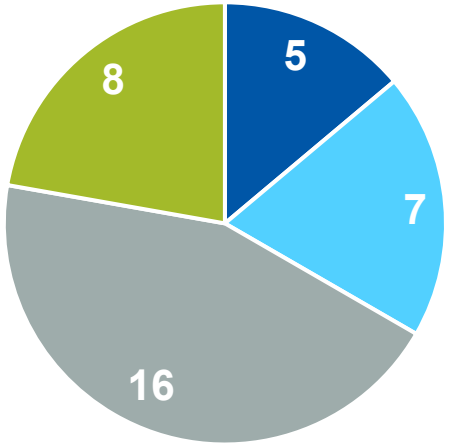
SHA



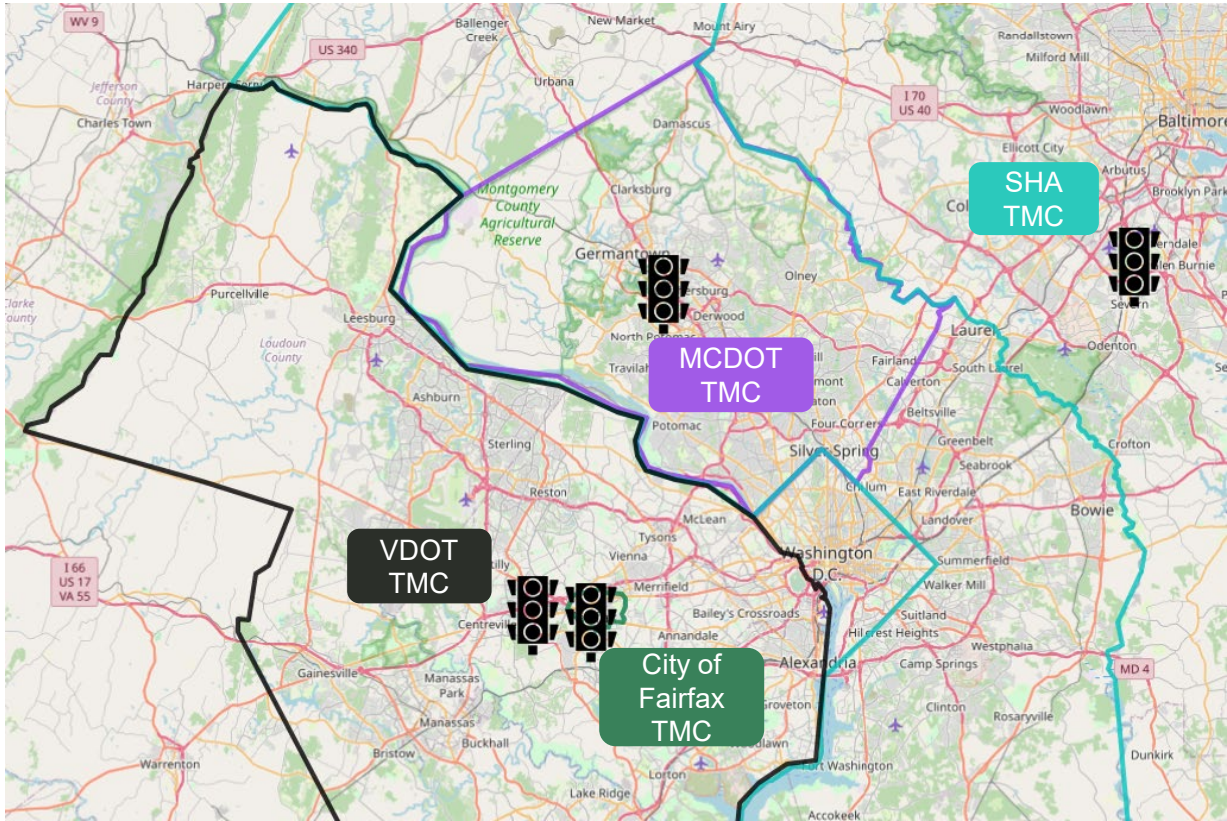
VDOT



MCDOT

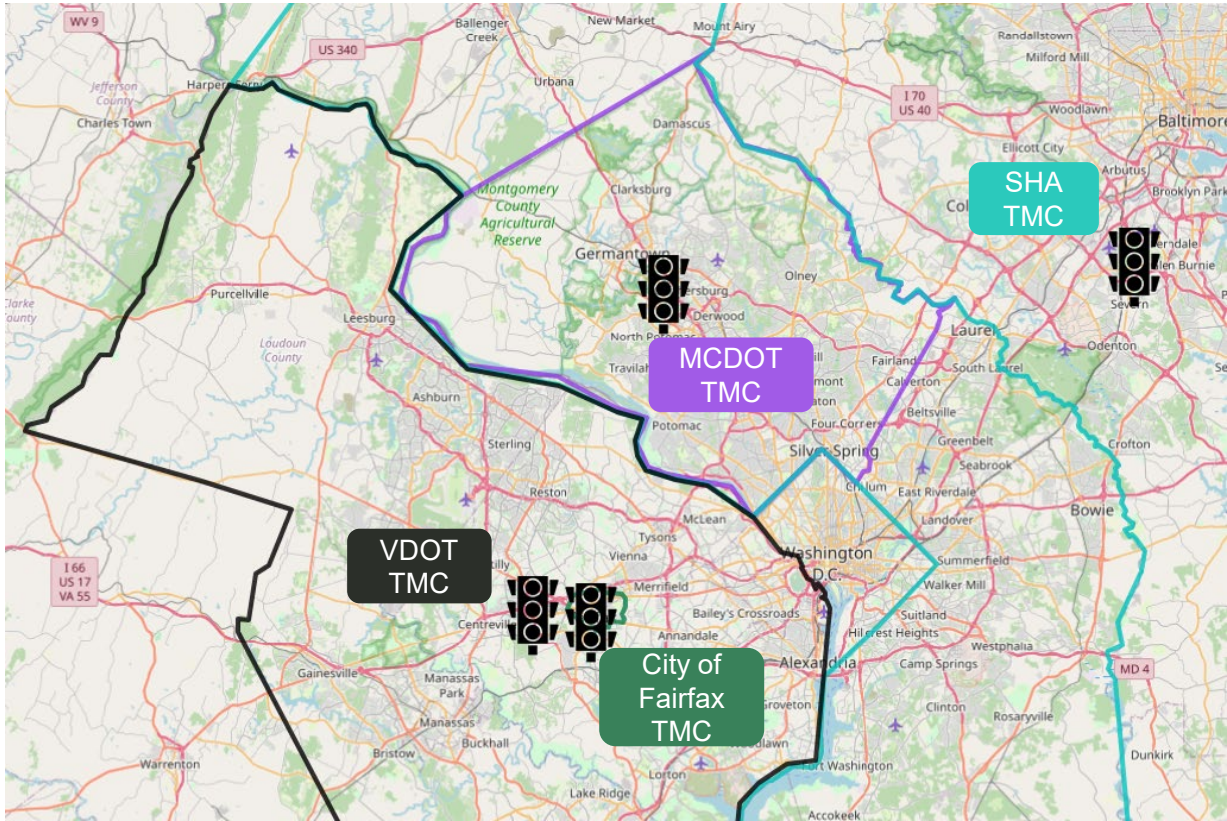


- Managers
- Traffic Engineers
- Technicians
- TMC Operator Staff



Traffic Management Centers (TMC)

	SHA	MCDOT	VDOT
24-hour operation		for a third of the year for weather events, construction, accidents, malfunctions	
Number of Shifts		4	2
SOP			
Real-time traffic management			



GIS Component

- Received the following GIS datasets:
  - DDOT Traffic Signals & Cabinets
  - VDOT truck restrictions
  - Arlington County Traffic Signals
  - City of Alexandria Traffic Signals

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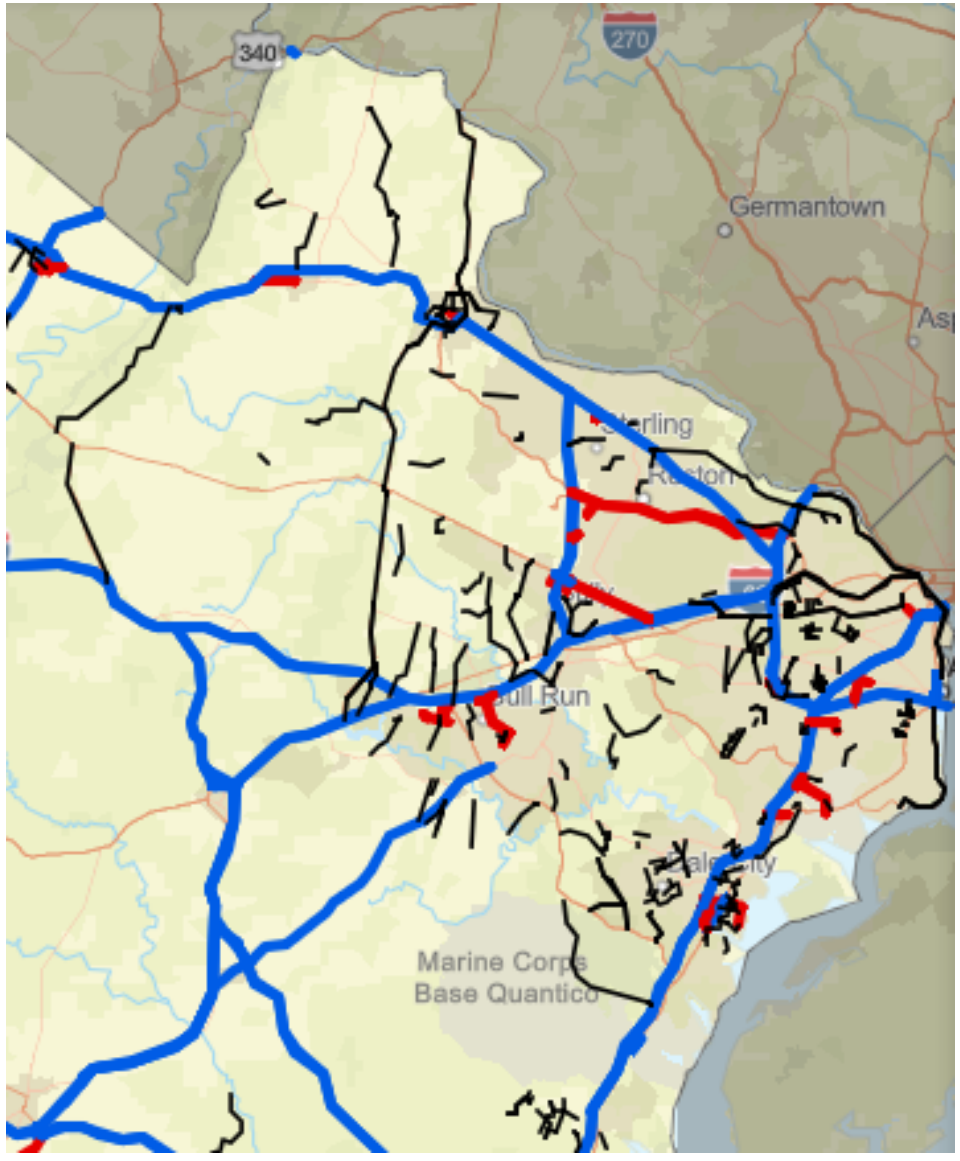
GIS Component

VDOT truck restrictions



Highways with Restrictions on Vehicle Type or Length

Zone Type Number

Restricted Highway

Not Recommended

Virginia Designated Highways for STAA Vehicles

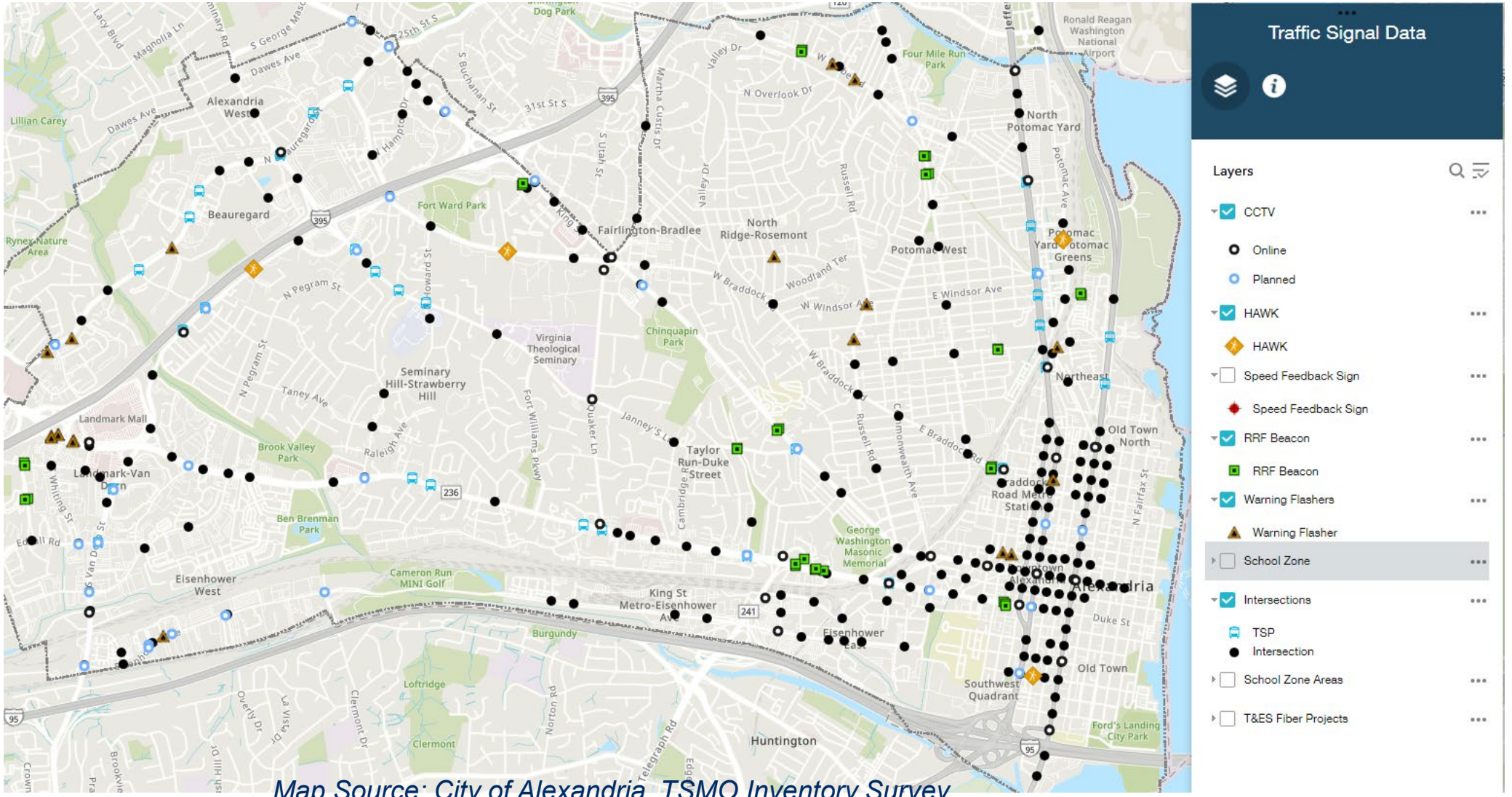
National Network + Virginia Qualifying Highways

Virginia Access Highways

Map Source: VDOT, TSMO Inventory Survey

GIS Component

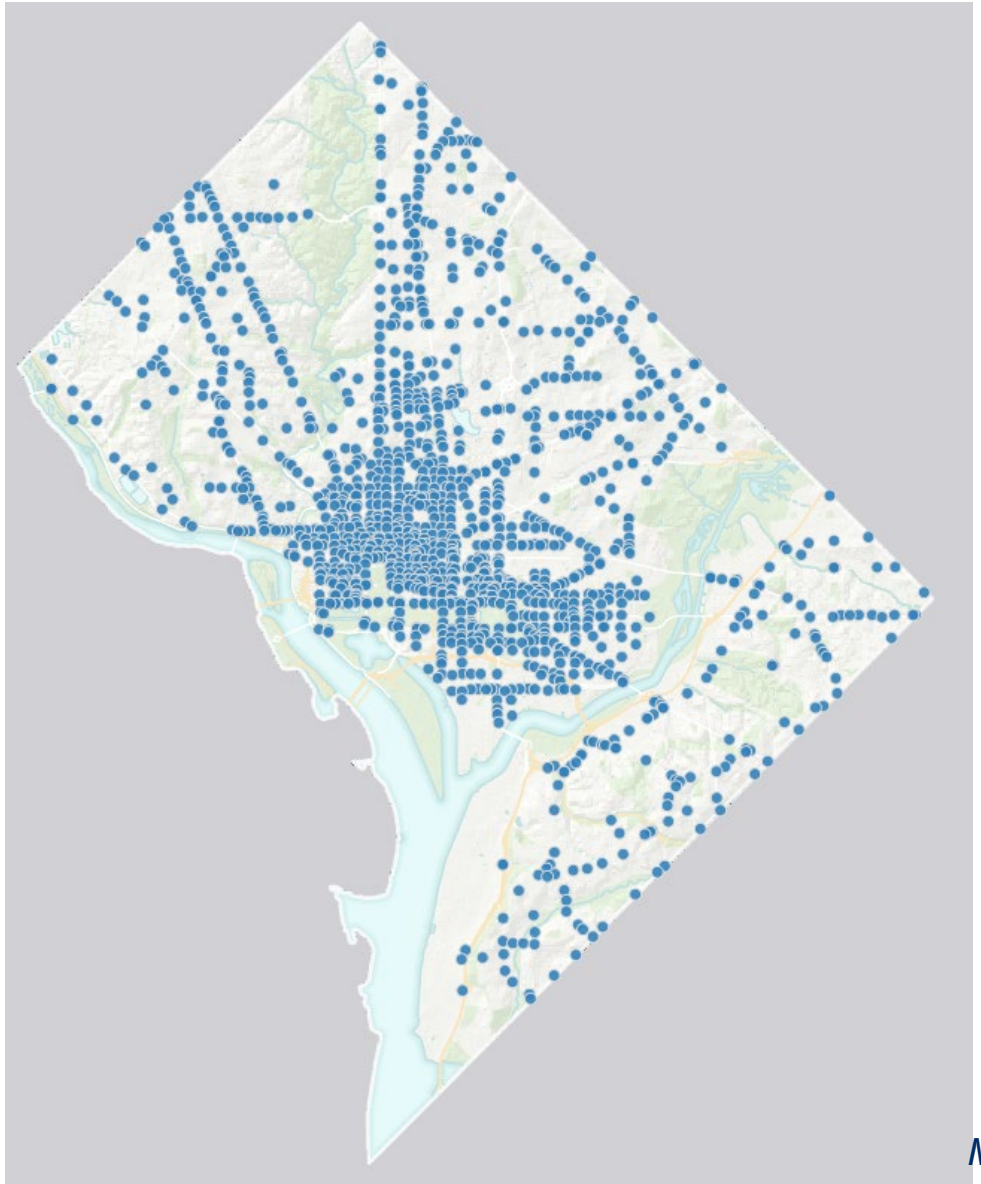
City of Alexandria Traffic Signals



Map Source: City of Alexandria, TSMO Inventory Survey

GIS Component

DDOT Traffic Signals & Cabinets



Map Source: DDOT, TSMO Inventory Survey

Conclusions & Recommended Next Steps

- Gaps:
  - Unspecified/unknown numbers
  - Contradictions in some numbers
  - Inaccuracies due to estimates
  - Missing responses from member agencies
  - Unavailable/limited GIS datasets

Conclusions & Recommended Next Steps

- Recommendations:
  - Encourage all TPB members to provide input.
  - Explore more modern asset management system strategies → opportunity to base inventory survey on documented plan sets.
  - Encourage TPB members to improve their GIS representation → opportunity for MWCOG to create regional maps of TSMO assets/programs.
  - Generate a living document/webpage where agencies can update fields in the survey and share lessons learned.
  - Support enhanced TSMO strategic planning that will help TPB agencies in their advancement of TSMO and TSMO prioritization as well as encourage collaboration → increase reliability, efficiency, mobility and safety of the transportation network

Thank You!

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