ALEXANDRIA SMART MOBILITY

WE ARE

T&ES

Department of Transportation & Environmental Services

Transportation Engineering Division

ABOUT SMART MOBILITY

Smart Mobility exists at the intersection of technology and transportation. This program brings in new technologies and organizes data to better orchestrate city-wide traffic patterns to improve trip reliability and increase travel options. It also strives to provide individual travelers with information they need to take safer and more enjoyable trips. This can look like traffic signals that respond to real-time conditions, moving buses through their routes quicker, and understanding where pedestrians and cyclists are at a higher risk. Alexandria is committed to being a leader in this space so the City can take advantage of future transportation infrastructure advancements, such as autonomous vehicles and real-time traffic management.

FY 2024 MAJOR ACCOMPLISHMENTS

- **Standardized vendor assessment** process for consistent evaluation of functionality across tools. Use the template for 6 vendors addressing various pillars
- **Updated public-facing maps**, webpages, and reference documents to tell the team's story
- **Designed 6 smart intersection tests**
- Completed **Citywide Signal Inventory**
- Initiated **asset management processes**
- Completed design of **Adaptive 1 and ITS Phase 3**

FY 2024 MAJOR ACCOMPLISHMENTS

IDC Smart Cities Awards

Alexandria was honored as a winner in IDC Government Insights' Smart Cities North America Awards for its innovative Smart Intersections project in the Transportation category. This recognition highlights Alexandria's commitment to advancing smart city initiatives, leveraging technology to enhance traffic management and safety at intersections. Representatives from the city attended the 2024 Smart Cities Conference to accept the award and present on the project, sharing insights and best practices with other leaders in the field.

The City is continues to highlight its innovative Smart Intersections project through conferences, presentations, and peer networking. The collaboration with the Virginia Tech Transportation Institute will be a central focus, illustrating how research institutions, private companies, and local governments can work together to advance cutting-edge technologies in urban environments. This partnership not only enhances the project but also serves as an exemplary model for successful cooperation in the field of smart transportation.

FY 2024 MAJOR ACCOMPLISHMENTS

Intelligent Transportation Systems (ITS) Integration - Phase III

Construction on Phase 3 of the ITS Integration project began, marking a significant milestone in enhancing our transportation infrastructure. This phase continues to lay the groundwork for connected signals and infrastructure by applying fiber optic cable to the City's traffic signal system. This will ultimately improve traffic management, safety, and efficiency across the network.

Secured future funding for Smart and Connected Vehicle Infrastructure
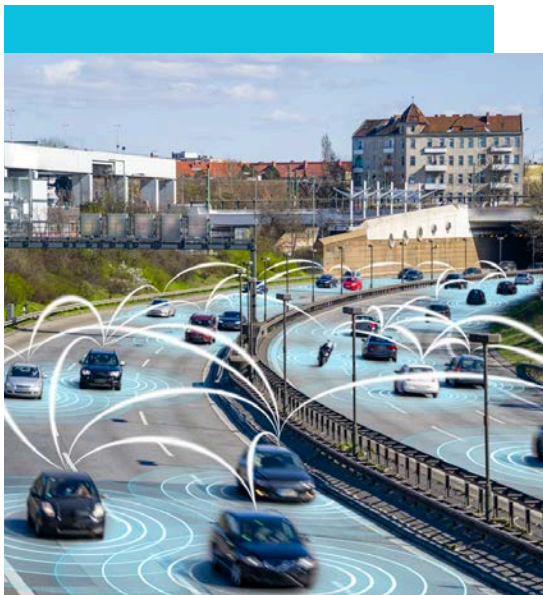
The City was awarded $5 million from the Northern Virginia Transportation Authority (NVTA) grant for its Smart & Connected Vehicle Infrastructure project in Potomac Yard. This project will deploy an advanced network of sensors, edge servers, and a micro-cloud environment to enhance multimodal transportation integration. Key features include real-time communication between traffic signals and vehicles, optimized Signal Phase and Timing data to reduce congestion, and detection systems for vulnerable road users. Funding is available in FY 2027, and the Smart Mobility team will conduct a study in 2025 to better understand current technology that can be utilized with these funds.

FY 2025 MAJOR WORK OBJECTIVES

Traffic Data Governance

As the City of Alexandria advances its efforts to establish a central data repository, the Smart Mobility Team is strategically planning to transition away from our current dependence on the DataPoint platform. While DataPoint has been instrumental in enabling us to integrate historical traffic count data with real-time data obtained from AI-powered tools, the City recognizes the need for a solution that fully aligns with a long-term vision for traffic data management. Given the variety of data that is available through various platforms, the City aims to develop a central repository. Central to this initiative is the creation of a comprehensive framework that ensures seamless data integration, robust data governance, and adaptability to future technological advancements. The Smart Mobility team plans to initiate discussions with internal stakeholders and potential external partners to develop strategies, scope, intention, and implementation plan.
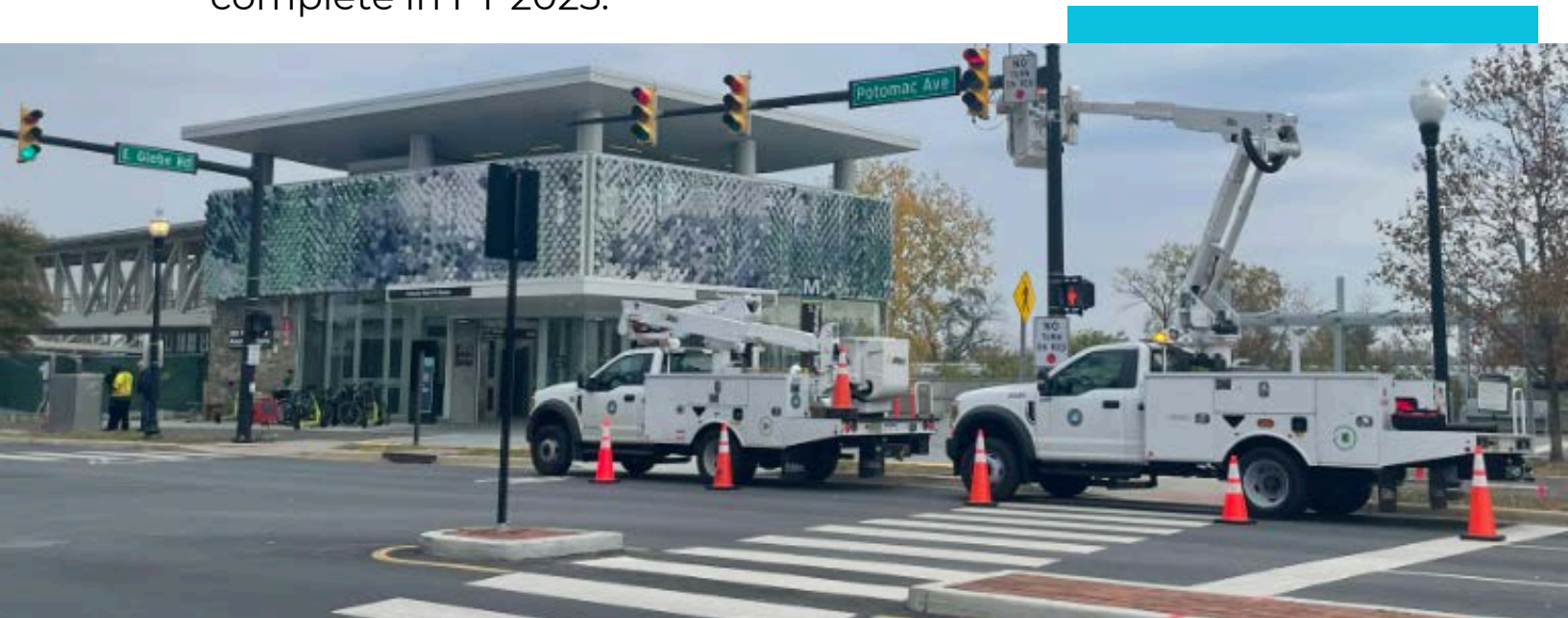
FY 2025 MAJOR WORK OBJECTIVES

📹 **Smart Intersections - Potomac Avenue & Glebe Raod**

This pilot project began in FY 2024 and aims to understand and leverage data insights from modern machine learning models, which can differentiate between cars, buses, pedestrians, and cyclists. These tools not only classify various road users but also detect near misses, analyze traffic patterns, and actuate changes based on their observations. In collaboration with the Virginia Tech Transportation Institute (VTTI), the City deployed several of these advanced tools to assess their capabilities and apply their insights to optimize the design and safety of our intersections. The insights from this pilot will inform decision-making processes and, with the support of the future VTTI Smart Mobility Lab, enable us to replicate and scale successful strategies across the city and the region. The project will be complete in FY 2025.

FY 2025 MAJOR WORK OBJECTIVES

📷 Smart Intersections - Duke Street & South Pickett Street

The City initiated a pilot deployment of a device from VivaCity at the intersection of Duke and South Pickett Streets. The VivaCity system employs advanced video analytics to collect data on traffic patterns, including the detection of near-miss incidents and vehicle turn counts. This data is comparable to the insights generated by the VTTI pilot project, which is being conducted at a separate location. Over the course of one year, the team will analyze and compare the results from both initiatives to assess their effectiveness to help determine future applications.

FY 2025 MAJOR WORK OBJECTIVES

US DOT SMART GRANT

The City of Alexandria, Virginia, will apply to the US DOT SMART grant program, to seek planning funding for "Smart Detection" technology. This initiative aims to address the need for more frequent and accurate assessments of roadway assets, as the region prepares for the increased demands of connected and autonomous vehicles. By evaluating cameras and sensors, the project will create a real-time digital inventory of pavement, sidewalks, traffic signs, and painted lines. This will bring greater accountability, consistency, and equity to infrastructure maintenance, ensuring that all areas of the city are managed based on current conditions rather than outdated schedules. The planning phase will focus on evaluating various technology solutions and determining their compatibility with City Operations teams, laying the groundwork for a comprehensive, data-driven approach to infrastructure management.

FY 2025 MAJOR WORK OBJECTIVES

Asset Management

Maintenance of Alexandria's transportation infrastructure can be optimized if we know when a component was installed, how heavily it has been used, and any issues that have been observed. Many future technologies will also require minimum hardware or software specifications to operate. The team is leveraging CityWorks StoreRoom this year to implement processes that track changes to our inventory, starting with our traffic signals and controllers.

FY 2025 MAJOR WORK OBJECTIVES

🚙 Connected Vehicle Infrastructure

All vehicles built after 2020 are equipped with components that send and receive safety information. The Team will launch a study to inform the NVTA Funded Smart & Connected Vehicle Infrastructure project in Potomac Yard.

🚗 Autonomous Vehicle Preparedness

Autonomous Vehicles are being deployed in cities across the country, including nearby DC. The team is advocating for policy that empowers the City to permit and enforce AV operation and is collaborating at a national level on this topic. The collection of safety, incident, and trip data from AV companies is essential to integrating this new and uncertain technology into our transportation network.

⚖️ Legislation for Autonomous Vehicles

The City recognizes the transformative potential of autonomous vehicles (AVs) in enhancing mobility and reducing traffic-related incidents. To safely integrate this technology into our transportation network, the City will work through the Virginia Municipal League to advocate for legislation that defines autonomous vehicles in state code and permits localities the authority to regulate them. This legislation will pave the way for a future where AVs contribute to a safer, more efficient, and accessible transportation system for all.

FY 2025 MAJOR WORK OBJECTIVES

🔌 Intelligent Transportation Systems Phase III & IV

ITS Phase III and IV involve the installation of fiber optic infrastructure and signal connections. Phase III focuses on connecting signals to existing fiber along key corridors, including Duke Street and Van Dorn Street and will be completed in FY 2025. This project aims to enhance communication and traffic management within the city. Phase IV will begin construction in FY 2025 to further extend the fiber optic network and signal connections along Route 1 and will support the upgrade to the Traffic Management Center.

🚦 Adaptive Traffic Signal Control

The Adaptive Traffic Signal project was developed several years ago in response to the evolving traffic patterns caused by dynamic navigation apps. The City secured over $14.5 million in funding for a two-phase implementation of the project. Phase 1 involves equipping traffic signals on Van Dorn Street and Duke Street with adaptive traffic control systems. Phase 2 will broaden the scope by increasing the number of adaptive signals and aligning signal control with navigation apps and autonomous vehicles, potentially incorporating artificial intelligence to forecast short-term traffic conditions. In FY 2025, Phase I will begin construction and Phase II will enter into design.

ONGOING PROGRAM MANAGEMENT

Smart Parking Management

As part of the VDOT parking technologies grant, the City will proactively seek technology applications to enable data-driven decision-making in support of the City's policies. Using grant funding, the City will implement technologies such as license plate readers (LPRs) and curb data mapping systems (CDS) to support real-time parking management and inventory mapping. These technologies will enhance dynamic parking pricing and transparent parking availability, significantly impacting our transportation system. Our current parking technology, Smarking, helps the City manage parking availability, and our team is focused on maximizing its value while planning for future innovations that improve curb management.
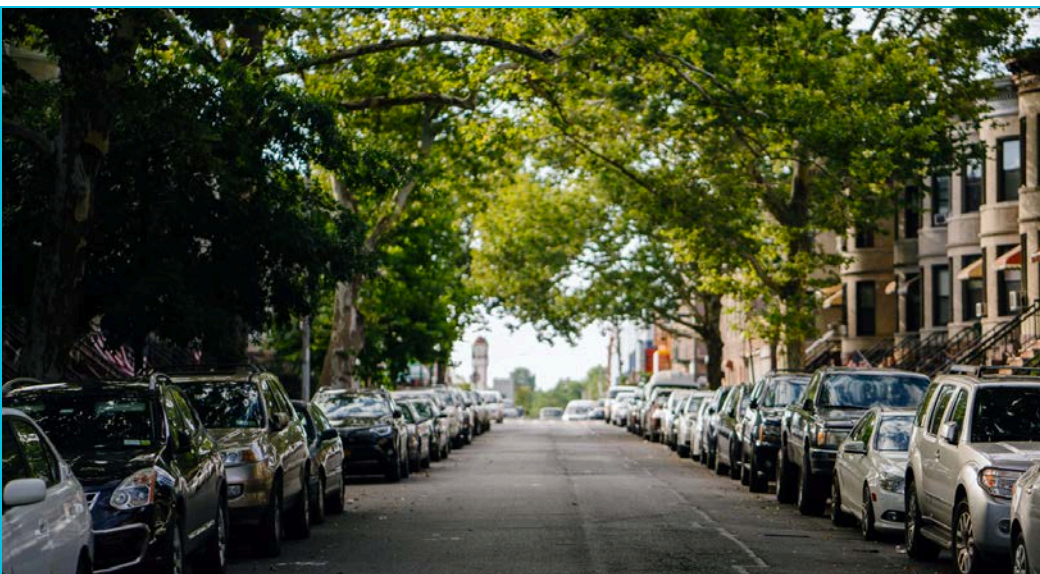
ONGOING PROGRAM MANAGEMENT

💰 Securing Future Funding

The City continually seeks funding to further the goals of the Smart Mobility Program. The team identifies opportunities to offset or leverage City funding to plan, design, and implement Smart Mobility initiatives that are in line with the Smart Mobility Framework goals and guiding principals.

🚌 Transit Signal Priority (TSP)

TSP allows buses to receive longer green lights and shorter red lights to stay on schedule, increasing reliability and route speed. WMATA and DASH use different technologies to implement TSP, and the team supports both agencies in improving their services with minimal disruption to traffic flows.

ONGOING PROGRAM MANAGEMENT

Standardized Vendor Assessment

Starting with Smart Intersection technologies, the Smart Mobility team standardized a process for evaluating vendors against shared functionality. The team tracks each interaction with vendors logs an index of which tools can solve key problem areas. This process is scalable to other program areas like parking and asset management technologies. This year, the team met with 6 total vendors addressing objectives within the Smart Mobility pillars.

Smart Mobility Working Group

The Smart Mobility team organized cross-disciplinary committees to manage and standardize projects. Committees report their progress quarterly using an easy form that feeds a central dashboard. Budget information, timelines, and standard documents like the vendor assessment will be included here. The Smart Mobility Working Group meets quarterly to align technology efforts across T&ES. It is comprised of committees that represent the core pillars outlined in the Smart Mobility Framework, and includes representatives from Traffic Ops, Transportation Engineering, DASH, Mobility Services, and Transportation Planning. This year, the team will expand to include staff from ITS and APD.

KEY PARTNERSHIPS

The City partnered with VTTI to test 5 smart intersection tools at the intersection of Potomac Ave. and East Glebe Rd. This academic partner will conduct deep analysis of the data collected by these tools, resulting in both new information about mobility behavior at the intersection and the capabilities of the vendors. This relationship also represents an opportunity to partner with VTTI on future projects in a time when civic-academic partnerships are highly valued by national funders.

Regional Multi-Modal Mobility Program

The RM3P is a collaborative and data-driven program to improve safety, reliability, and mobility for travelers in Northern Virginia. Led by VDOT, NVTA, and DRPT, the program focuses on standardizing transportation data to promote data exchange across the region. As the City tests and deploys new technologies, we are working to align reporting systems to the RM3P to maximize compatibility with nearby areas and future opportunities.

NACTO Emerging Technologies Work Group

The National Association of City Transportation Officials (NACTO) supports an autonomous future that enhances all aspects of cities' transportation systems, from improving safety for all road users, re-balancing the use of the right-of-way, and expanding mobility for all. The City participate on their work group to stay abreast of emerging topics. Alexandria will participate in the NACTO annual conference hosted in Washington, D.C. in 2025.

KEY
PARTNERSHIPS

The City partnered with CivStart, a nonprofit dedicated to sparking innovation in local governments and nurturing emerging government technology startups. As part of this collaboration, the City participated on the Content Committee for the State of GovTech conference and curated and participated on panels. This partnership underscores the City's commitment to leveraging innovative solutions for the benefit of its residents and working with new companies to better understand how to navigate government problem solving.

The City is partnering with MetroLab Network, a nonprofit that connects local governments with universities to integrate cutting-edge research into city management. This collaboration empowers us to address complex challenges with innovative, scalable solutions, drawing on the expertise of leading researchers and local leaders. By working with MetroLab, we enhance our city's capacity for innovation and contribute to shaping national policy, reinforcing our commitment to a future where science and civic governance collaborate to make our communities better.

PROGRAM BUDGET

PROJECTS	PRIOR YEAR	FY 2025	FY 2026-2031
ITS Fiber and Traffic Management Center	$19.3M	$2.55M	$720K
Transit	$1.6M	$150K	$3.8m
Smart Mobility Implementation	$1.8M	$281K	$6.6M
Parking Technology	$2.1M	$0	$0
Smart & Connected Signals	$8M	$2M	$5M
Unsecured grants*			$2M*

Total Prior Year Funding	FY 2025 Funding	FY 2026-2031 Funding
$33M	$5M	$18M*

KEY RESOURCES

Smart Mobility Home Page

This is the landing page for all Smart Mobility efforts. Come here for information on existing and planned projects, maps tracking current work, and high level vision documents like the Smart Mobility Framework

Smart Mobility Framework

This annually published document tracks updates to our major projects and outlines the nine pillars under which we organize our work.

Smart Mobility Viewer

This GIS map tracks our ongoing efforts, including fiber deployment, TSP intersections, and pedestrian safety measures.