



OFFICE OF THE DEPUTY MAYOR FOR
OPERATIONS AND INFRASTRUCTURE

Government of the District of Columbia | Executive Office of Mayor Muriel Bowser

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November 9, 2021

Mayor Muriel Bowser
1350 Pennsylvania Avenue NW
Washington, DC 20004

RE: Autonomous Vehicles Working Group Recommendations

Dear Mayor Bowser:

As per Mayor's Order 2018-018, I am pleased to submit the attached recommendations on behalf of the Autonomous Vehicles (AV) Working Group.

The Order provides that the Working Group shall provide advice and recommendations to the Mayor on ways to address the challenges and opportunities presented by autonomous vehicle technologies in the areas of transportation, safety, environment, land use, education, equity, and inclusivity.

The recommendations offer guidance on how District's regulatory agencies can facilitate AV operations in a way that fosters safety, equity, and sustainability as the industry matures and expands in the District. The key recommendations provide that AVs being tested can detect and safely interact with pedestrians of all demographics and capabilities in a complex urban environment; AV testers use the technology to improve access in mobility challenged neighborhoods; the District should encourage the electrification of AVs vehicles in fleets; and regulations should prioritize multimodal connectivity and access in the District.

Please feel free to contact me at lucinda.babers@dc.gov to discuss any questions you have regarding these recommendations.

Sincerely,

Lucinda Babers, Deputy Mayor
Operations and Infrastructure



Recommendations for the Implementation of the Autonomous Vehicles Testing Program and Near-Term General Deployment and Operations

BACKGROUND

History of the Working Group on Autonomous Vehicles (AV Working Group):

In February of 2018, Mayor Muriel Bowser established the Working Group on Autonomous Vehicles to proactively prepare the District for the likely transformative effects of advances in autonomous vehicle technologies, to ensure that autonomous vehicle technology deployment benefits the District, its environment, and all its residents and visitors, in alignment with District policies and priorities.ⁱ The first goal of the Working Group is to provide advice and recommendations to the Mayor on ways to address the challenges and opportunities presented by autonomous vehicle technologies in the areas of transportation, safety, environment, land use, education, equity, and inclusivity.

Regarding the Working Group's recommendations specifically for the Autonomous Vehicles Testing Program, the group seeks to only offer guidance that is consistent with the parameters established by the Autonomous Vehicles Testing Program Amendment Act of 2020.

Membership:

The Working Group was initially chaired by the Office of the Deputy Mayor for Planning and Economic Development (DMPED) but following the creation of the Office of the Deputy Mayor for Operations and Infrastructure (DMOI), DMOI assumed the chairperson function in February of 2020.ⁱⁱ The official working group members are representatives from:

- The Office of the Deputy Mayor for Operations and Infrastructure
- The Office of the Deputy Mayor for Planning and Economic Development
- The Office of the City Administrator
- Office of the Chief of Staff
- The District Department of Transportation
- The Homeland Security and Emergency Management Agency
- The Metropolitan Police Department
- The Fire and Emergency Medical Services Department
- Department of Motor Vehicles
- The Office of the Chief Technology Officer
- The Department of Energy and the Environment



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- The Department of General Services
- The Office of Planning
- The Department of For-Hire Vehicles
- The Department of Aging and Community Living (formerly known as the Office on Aging)
- The Office of Disability Rights

In addition to the formal membership above, the Working Group is required to engage external stakeholders including residents of the District, nonprofit organizations, academics and researchers, and private sector organizations which are developing and piloting autonomous vehicle technologies. As such, the working group's activities, convenings, and these recommendations reflect input from District residents, various advocacy groups in the transportation and accessibility fields, academia, and industry stakeholders. Parties that explicitly suggested recommendations for this memorandum are listed at the end of the document.

Principles Statement:

Early on, the Working Group on Autonomous Vehicles developed a principles statement specific to the District's needs and opportunities.ⁱⁱⁱ In doing so, the working group recognized the need for a flexible approach in preparing for the opportunities and challenges of autonomous vehicles. The principles statement embraces innovation when it benefits residents and visitors and highlights the importance of adaptability and learning from governmental peers. The Working Group's recommendations to the Mayor are intended to expand upon and operationalize the Working Group principles summarized below:

Safety - Reduce driver, passenger, and pedestrian injuries and fatalities, and protect consumer data.

Equity - Improve access across geographies and populations, improve accessibility.

Efficiency - Reduce the inefficiencies and negative externalities of congestion, reduce costs, reduce pollution, and improve movement.

Sustainability - Improve environmental impacts, be financially sustainable, adapt to changes.

To demonstrate these principles, the District Government's implementation of autonomous vehicle testing should embody adaptability, transparency and privacy, comprehensiveness and alignment.

Prior Study:

The Fiscal Year 2019 Budget Support Act of 2018 required the District Department of Transportation to commission the DC Autonomous Vehicle Study and Report. DDOT contracted DC Sustainable Transportation, who subcontracted consultants AECOM to perform the technical analysis and prepare the report.^{iv} While the report takes a long-view of autonomous vehicle deployment, its findings are



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relevant to the working group's recommendations, and reaffirm the importance of the working group's aforementioned principles.

The study and report used a scenario-planning approach to develop and analyze the range of potential effects that autonomous vehicles will have on the District and the region in the future. Among many things, the results show the potential to advance the District's economic growth and aid housing affordability issues and mobility challenges for vulnerable populations. However, the study found that under all plausible scenarios of autonomous vehicle adoption and deployment, vehicle miles traveled in the District will increase, creating more congestion. The study forecasts that the additional vehicle miles traveled (VMT) will be generated by individuals who were previously traveling by other modes switching to autonomous vehicle and by empty vehicles relocating themselves. To mitigate this rise in VMT and increased congestion, the study recommends interventions and incentives to support shared rides and alternative modes of transportation.

District of Columbia Comprehensive Plan – Transportation Element:

The working group recommendations align with the Transportation Element of the Comprehensive Plan, adopted by Council on May 18, 2021.^v The Plan asserts that autonomous vehicles have the potential to significantly impact transportation and land use patterns over the next 10 to 30 years. These impacts need to be understood to ensure they are well managed, to avoid unintended disruptions, and to provide benefits for District residents, visitors, and workers. Autonomous vehicles have the potential to improve safety, efficiency, and mobility and to potentially reduce the need for on- and off-street parking. Autonomous vehicles raise several important issues about the future of transportation, including:

- Potential impact on VMT;
- Future demand for curbside access;
- Distance and frequency of trips made;
- Character of future transit ridership; and
- Nature of future mobility, including for persons with disabilities.

The degree to which AVs are personally owned or are operated as fleet vehicles will have major ramifications for the transportation system. Sharing AVs for trips has the potential to increase the efficiency of the transportation network, while a system that allows increases in vehicle trips that serve only one—or zero—passengers could greatly exacerbate congestion. As the proliferation of autonomous vehicles increases and the underlying technology becomes more sophisticated, understanding the intended and unintended impacts of automation on land use, transportation patterns, safety, environmental sustainability, cybersecurity, and the regional and national economy will be critical to avoiding negative impacts to District residents. The District also has an opportunity to



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harness the potential positive impacts of autonomous vehicles through a transparent, adaptable, and comprehensive policy approach.

Below are the Comprehensive Plan’s recommendations, captured within the Transportation Element, surrounding vehicle automation.

Recommended Policies:

- **Safety:** Autonomous vehicles operating within the District should account for human error and unpredictability to support the Vision Zero goal of reducing, and ultimately eliminating, serious injuries and fatalities. Use street design principles and speed limitations to promote the safety of all roadway users, with a particular focus on the most vulnerable users.
- **Shared-use:** Incentivize the shared use of AVs. The District currently hosts many shared-use services, such as public transit, informal carpooling, carsharing, ride hailing, and bikeshare. Shared AVs should complement and integrate with these existing services.
- **Traffic Congestion and VMT:** Minimize future increases in VMT and congestion created by AVs.
- **Equitable Access:** Adoption of autonomous vehicles in the District should be equitable. Autonomous vehicle fleet services should be made accessible and available to all users throughout the District.
- **Person Throughput:** Continue to monitor the person-carrying capacity of vehicle lanes and prioritize modes that carry the most people per lane mile. As AVs begin to operate on District roadways, travel lanes may face increased pressure. AVs should complement and not displace other sustainable and healthy modes of transportation, such as walking and cycling.
- **AV Impacts:** Monitor, evaluate, and address, as appropriate, the short- and long-term effects that AVs may have on mobility and transportation networks; infrastructure, including the electrical grid, roadways, and data networks; goods movement; economic development; the design of the built environment; and configuration of land uses.

Recommended Actions:

- **AV Working Group:** The Working Group on Autonomous Vehicles—an interagency working group composed of agencies focused on transportation, rights of persons with disabilities, environmental issues, and public safety—should continue to meet and monitor AVs and their impact on the District. The group should work to develop policy and regulatory guidance to ensure AVs enhance the District by improving safety, efficiency, equity, and sustainability while minimizing negative impacts on residents, workers, and visitors.



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- Continued Research: Examine and monitor the latest research on AVs to inform policy development. Review publications from universities, think tanks, foundations, and other jurisdictions to better understand the potential implications in the District. Research should be comprehensive and focus on direct impacts on the transportation network and the indirect impacts on land use, as well as economic and job market disruption, public revenue, environmental sustainability, and social equity.
- Data Sharing: Encourage AV manufacturers and operators to share data to support responsive research efforts and inform public policy making. Data sharing will need to have a level of accuracy and detail for specific research needs and respect the privacy of individuals.
- Enhance Access to Transit: Explore strategies to make autonomous vehicles complement rather than replace existing transit service, such as through dedicated curbside access, transit alternatives for seniors and people with disabilities, and shared mobility solutions to provide first-mile/last-mile connections
- Parking and Curbside Access: Monitor the shifts that AVs will create in the use of parking facilities and curbside lanes. Explore regulatory and technological tools for dynamically adapting to these shifts in usage, to allow for and incentivize more efficient and productive uses of these urban spaces.

The Autonomous Vehicles Testing Program Amendment Act of 2020:^{vi}

On December 3, 2020, the Autonomous Vehicles Testing Program Amendment Act of 2020 became effective law. The law establishes an Autonomous Vehicles Testing Program to be administered by the District Department of Transportation (DDOT). The Office of the Chief Financial Officer (OCFO) projects the cost of the program to be approximately \$1.2 million in its first year of implementation and \$3.6 million over the four-year financial plan period.^{vii} The Mayor's proposed Fiscal Year 2022 budget, approved by the D.C. Council in early August of 2021, includes the necessary funding to support the Autonomous Vehicles Testing Program. As such, the working group is moving forward with its recommendations to the Mayor to ensure that the testing program offers the greatest benefit possible to the District.

Broadly, the law authorizes DDOT to administer the testing program consistent with the parameters established under the statute for granting test permits, set the term for which a testing entity's permit shall last before requiring renewal, set the fees associated with testing, and create an application process for testing entities. As part of the application process, testing entities must submit to DDOT a safety and risk mitigation assessment, the entity's operational design domain including remote operation. There are certification of requirements, including the National Highway Traffic Safety Administration (NHTSA) certifications, proof the entity can follow District traffic laws, requirements that the test vehicle has an in-person operator or a remote operator and can achieve minimal risk



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conditions with in-person or remote operators when the vehicle operates outside of the operational design domain. Entities must test vehicles with in-person operators before using remote operators, capture sensor data before a crash, and conduct test operator training that meets or exceeds certain minimum criteria as specified by DDOT. The testing entity must have at least \$5 million in insurance and liability coverage, and a certificate of self-insurance issued or approved by the District Department of Insurance, Securities and Banking (DISB). An AV testing entity will be considered the vehicle's operator during testing. A testing entity will not be able to modify the following in its permit without DDOT approval: scope of the Operational Design Domain (ODD), test locations, in-person to remote operations, changing the make/type of vehicle, or a change of 50 percent in fleet size. DDOT will have 10 days to approve or deny such changes. Testing entities will have to provide DDOT with a quarterly inventory report.

DDOT's rules and regulations can require the temporary restriction of testing on certain roadways (or District-wide) for certain circumstances, such as emergencies, special events, unsafe conditions, etc. For data reporting, on a semi-annual basis, entities will have to provide DDOT with the number of vehicles miles traveled in aggregate, the number of crashes, nonproprietary efforts that they are considering to improve safety, description of testing locations, description of ODD, and reports of where manual control was usually necessary during testing. Crash reports must be provided to DDOT within 12 hours, and include certain basic details. A more detailed report within is required within five business days and the Metropolitan Police Department (MPD) and DDOT are able to request further information if necessary to investigate the incident.

DDOT is explicitly authorized to require any other information the department may need; provided, that the information is necessary to evaluate the safety of autonomous vehicles on public roadways or to evaluate the feasibility or the full deployment of autonomous vehicles in the District. DDOT shall publish these reports upon receipt. Regarding enforcing the rules and regulations of the program, and the terms and conditions of permits with testing entities, DDOT may fine up to \$1,000 per violation by AV testing entity (each day of a violation constitutes a new offense). DDOT may suspend, revoke, modify or deny a permit for any violation of the Autonomous Vehicle Testing Program Amendment Act of 2020 after providing notice and an opportunity for an appeals hearing with the Office of Administrative Hearings (OAH).

Within one year after the applicability date of the Autonomous Vehicles Testing Program Amendment Act of 2020, DDOT must transmit to the Council a report that provides recommendations to safely accommodate the deployment of autonomous vehicles on public roadways for commercial, personal, and any other use the Department determines. The report may include draft legislation or regulations. This document is providing a different set of recommendations to the Mayor, which are intended to guide the development of the testing program such that, within the contours established by the Autonomous Vehicles Testing Program Amendment Act of 2020, the testing program provides an



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opportunity to safely learn how further autonomous vehicle deployment can benefit the District and minimize harm.

As required by the law, and pursuant to Title I of the District of Columbia Administrative Procedure Act, approved October 21, 1968 (82 Stat. 1204; D.C. Official Code § 2-501 et seq.), DDOT will issue rules to implement the provisions of the Autonomous Vehicles Testing Program Amendment Act of 2020.

WORKING GROUP RECOMMENDATIONS

The following summary reflects the deliberations of the Working Group on Autonomous Vehicles to date, including suggested recommendations from public and private stakeholders regarding the implementation of the Autonomous Vehicles Testing Program and then near-term general deployment and operations of Autonomous Vehicles. Administration of a successful testing program for autonomous vehicles requires the support of multiple District government agencies towards these shared goals. The organization and categorization of recommendations, below, should not preclude other agencies from advancing these recommendations to the extent that they are capable.

Guiding Principles for the Program

- A critical goal of this testing program is to inform the larger deployment of Autonomous Vehicles.
- The testing program should reflect flexibility and encourage adaptability.
- The program’s framework should evolve and improve as operators share experiences with the District.
- Policy makers must understand that as technology advances, operators must test new features that may not have been enumerated in original permit terms
- AV testing use cases should avoid duplicating public transit service.

Safety:

- Require that Autonomous Vehicles being tested can detect and safely interact with pedestrians of all demographics and capabilities in a complex urban environment, including those who use wheelchairs or mobility devices and those who have visual or hearing impairments.
- Require Autonomous Vehicles to be clearly marked and include operator’s contact information so pedestrian, cyclists and other drivers are aware of their presence on the road and can provide feedback on their operations.
- The Autonomous Vehicle testing program and its regulations should address accountability for dangerous vehicle maneuvers and require that permit holder maintain an open line of communication with traffic enforcement officers



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Equity and Accessibility:

- The testing program and future programs should include input from people with disabilities at all levels, i.e. planning, implementation, testing, regulatory work, and evaluation of safety in public space.
- Ensure equitable testing by requiring roughly equal distribution of testing geographically throughout the District.
- AV testing entities should prioritize use cases for AV's to improve access to mobility and/or services for mobility challenged neighborhoods and/or populations.
- Ensure people with disabilities are not subject to discrimination or screened out of participation based on their disability
- Prioritize accessible vehicles and pick-up/drop-off areas, kiosks, and wayfinding systems that are easily located and accessible to people with disabilities
- Require vehicles with physical layouts that incorporate the principles of Universal Design to accommodate physical, cognitive, sensory, developmental, etc. disabilities (wheelchair and scooter friendly, or assistive technology for people who are blind, low vision, deaf and/or hard of hearing)
- Testing permits should require community engagement, and a plan and timeline illustrating when the entity will provide fully accessible and equitable service
- Testing entities should perform public education, specifically with disability community
- To the extent testing entities' vehicles are serving the public, they should be required to prioritize their vehicles' safety, access, and equity elements including features such as:
 - Human Machine Interface Features,
 - Vehicle Hardware Features, and
 - Equity Features (payment options, community engagement).

Recommendations for the District Department of Transportation

- Incorporate lessons learned from leading jurisdictions and coordinate on an ongoing basis.
- To the extent possible, regulations should prioritize multimodal connectivity and access in the District.
- Acknowledge that operators may need to test their product and their technology in numerous ways – not only as one kind of vehicle, in one environment.
- DDOT should not establish an overly prescriptive approach for test operator training, and should, in establishing minimum criteria, appreciate that tester training programs will significantly vary from each other, due to significant tester-specific differences in testing plans, vehicles, technology types, and other factors. Each testing entity is best suited to develop



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training for their operators to ensure safety based on each company's unique technological capabilities.

Operational Considerations:

- **Fleet size:** Testing may become more difficult if minimum/maximum fleet requirements prevent flexibility needed for evolving needs. Drastic limits on the fleet size of testing vehicles would create difficulty for operators trying to build toward commercial deployment and meet milestones.
- **Fleet type:** Provide a clear path to operate low speed shuttles, which are not explicitly called out in the legislation, and encourage the incorporation of accessible vehicles into the fleet.
- **Fuel type:** Encourage the electrification of autonomous vehicles in fleets. Carefully consider requirements for electrification and acknowledge that the limited availability of charging infrastructure imposes a sever burden on operators.

Data Sharing:

- DDOT should collaborate with Council staff and testing entities to ensure that the semi-annual reporting requirement and crash reporting requirements align with the provisions of the Autonomous Vehicles Testing Program Amendment Act of 2020 and are meaningful and attainable.
- DDOT should securely share crash data with law enforcement or government investigative entities if there is a necessary use case and plan for immediate use. Any data shared should be subject to confidential business information protections.
- The working group should hold future sessions on this topic.

Recommendations on For-Hire Operations

- DFHV must be active in in the regulation and enforcement of AV- testing especially given the need to resolve conflicts and unsafe interactions that may occur between AVs, transportation network companies (TNCs), and taxis as they share curb space and use pick up and drop off zones (PUDOs) in the testing stage
- To the extent that early AV testing available to customers is commercial, e.g. vehicles-for-hire, the Department of For-Hire Vehicles (DFHV) is responsible for protecting consumers and must prevent discrimination.
- The testing program's framework should recognize the authority of DFHV to jointly regulate with DDOT the testing of AVs hired for the commercial purpose of transporting passengers or parcels.



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- DFHV shall review testing plans for AVs transporting passengers or goods regardless of whether a fee for the service is charged.
- DFHV shall regulate the provision of passenger and delivery services, regardless of whether a fee for the service is charged, by AVs operating in a for-hire capacity,
- AVs for-hire should be required to provide accessibility to people with disabilities, particularly those in wheelchairs, and services to the unbanked.
- Incentivize shared-rides over single passenger trips for-hire.

Recommendations for the Working Group

- Maintain the AV working group to continuously seek feedback from all stakeholders, including testing and prospective testing entities.
- Encourage the principles of the working group to evolve and keep pace with developing technology.

LIST OF CONTRIBUTORS IN ADDITION TO AGENCY MEMBERSHIP

- Argo AI, LLC
- DC Autonomous Vehicles Association
- Self-Driving Coalition for Safer Streets
- Ford Motor Company
- DMV Disability and Senior Community Group
- DC Department of Insurance, Securities, and Banking
- DC Developmental Disabilities Council



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ⁱ 2018-018: Establishment – Interagency Working Group on Autonomous Vehicles. District of Columbia Municipal Regulations and District of Columbia Register. DCR Issue: Vol.65 - No.7 - February 16, 2018:

<https://dcregs.dc.gov/Common/NoticeDetail.aspx?NoticeId=N0067688>

ⁱⁱ 2020-024: Amendment – Establishment of the Interagency Working Group on Autonomous Vehicles. District of Columbia Municipal Regulations and District of Columbia Register. DCR Issue: Vol.67 - No.8 - February 21, 2020:

<https://dcregs.dc.gov/Common/NoticeDetail.aspx?NoticeId=N0090578>

ⁱⁱⁱ Working Group on Autonomous Vehicles. “Autonomous Vehicles Principles Statement.” 2018:

https://dmoi.dc.gov/sites/default/files/dc/sites/dmped/publication/attachments/Autonomous%20Vehicles%20Principles%20Statement_0.pdf

^{iv} AECOM. “DC Autonomous Vehicles Study Report.” April 7, 2020:

<https://lms.dccouncil.us/downloads/LIMS/44545/Introduction/RC23-0172-Introduction.pdf>

^v “Comprehensive Plan – Transportation Element.” May, 28, 2021:

<https://lms.dccouncil.us/downloads/LIMS/46201/Meeting1/Engrossment/B24-0001-Engrossment3.pdf>

^{vi} The Autonomous Vehicles Testing Program Amendment Act of 2020. “B23-0232 - Autonomous Vehicles Testing Program Amendment Act of 2019.” Council of the District of Columbia. Committee on Transportation and Environment. December 23, 2020:

https://lms.dccouncil.us/downloads/LIMS/42211/Signed_Act/B23-0232-Signed_Act.pdf

^{vii} Jeffery S. DeWitt, Chief Financial Officer, District of Columbia. “Fiscal Impact Statement – Autonomous Vehicles Testing Program Amendment Act of 2020.” July 10, 2020:

https://lms.dccouncil.us/downloads/LIMS/42211/Committee_Report/B23-0232-Committee_Report.pdf

