EXECUTIVE SUMMARY

PAS Report 592, Planning for Autonomous Mobility, serves as a call to action for professional planners, especially those working in the public sector in the transportation and land-use arenas. Autonomous vehicles (AVs) will transform the built environment in the coming decades, and communities must begin planning for AVs now to ensure that this new technology is harnessed in beneficial ways. The primary goals of this PAS Report are to (1) provide planners and policy makers with the foundational knowledge necessary to anticipate potential impacts of AVs on communities, and (2) support and spur development of policy solutions and infrastructure investments that ensure attractive, people-friendly, equitable, and safe urban environments.

This PAS Report explores the many benefits that AVs may provide, but also looks at the challenges that AVs will bring to communities. The many potential impacts of AVs include the following:

- altering the design of rights-of-way
- changing access management practices
- influencing the form and function of traffic signage and signalization
- bringing massive changes to pedestrian and bicycle networks
- reducing the demand and altering the design and location of parking
- creating redevelopment opportunities in urban and suburban locales

It is imperative for planners to begin considering how AVs will affect our built environment and how this technology can contribute to community livability, efficient transportation systems, and vibrant public spaces.

WHAT ARE AVS AND WHEN WILL THEY GET HERE?

Autonomous vehicles encompass a wide range of emerging technologies that had previously been the stuff of science fiction. Already, advanced driver assistance systems are improving safety by controlling specific driving functions; fully autonomous vehicles will be capable of driving without human operation. Connected vehicle technologies will enable these vehicles to communicate and coordinate amongst themselves and the surrounding infrastructure, further improving travel safety and efficiency. Advancements in electric vehicle and traffic management systems will complement the emergence of AVs and magnify the benefits they promise to provide.

However, this transformative potential does not come solely from AV technology. The convergence of technological advances with the rise of the shared economy and ride-sharing services like Lyft and Uber could transform the predominant mobility paradigm from privately owned to shared vehicles. A transition to shared mobility would have significant implications for the size of the vehicle fleet, traffic congestion, parking, and urban design. Ultimately, shared AVs could lead to a much smaller vehicle fleet as each vehicle completes more trips.

The timeline for AVs’ arrival will help determine how planners need to respond, but predicting AV adoption rates is a difficult task. The technology is advancing rapidly and several companies anticipate having AVs available for sale in the early 2020s. The novelty and convenience of autonomous driving could speed adoption, and highly, if not fully, autonomous vehicles could easily represent at least a quarter of the vehicles on the road in less than 15 years. However, vehicle prices, regulatory delays, and uncertainties surrounding insurance, legal liability, testing and validation procedures, and cybersecurity could delay AVs’ market availability.

As AVs take on a greater share of the vehicle fleet over time, there will be a complex and messy transition period where autonomous and human-driven vehicles share the road. Regardless of the exact timeline, AVs are coming, and they will irrevocably change transportation systems, the built environment, and our communities.

HOW WILL AVS CHANGE TRANSPORTATION AND THE BUILT ENVIRONMENT?

Like the changes to society already brought by shared mobility and digital ride-hailing services, AVs will disrupt the way that citizens travel and businesses operate. The technology brings both promise and peril.
This PAS Report explains how AVs have the potential to improve the safety and efficiency of transportation systems, reduce vehicle emissions, and improve the mobility of transportation-disadvantaged populations. However, AVs will not solve all planning problems and will create new ones, such as the need for drop-off zones, vehicle storage or circulators for vehicles as they await users, and expensive new transportation infrastructure to maximize the benefits of the technology. AVs may also reinforce urban sprawl by reducing the monetary and perceived costs of travel, further decreasing the friction of distance for households and businesses. In addition, AVs will have important ramifications on several other key planning areas, including transit, public health, and social equity. In each of these areas, proactive steps will be required for planners and policy makers to capitalize on the opportunities while mitigating the challenges.

Two of the most significant areas this report identifies in the planning realm are (1) parking and (2) the curb. Planners and policy makers have seen significant changes in recent years in parking inventory and curbside management. These shifts to reduced parking demands and ride sharing with curbside pick-up and drop-off will only become more pronounced with the rise of AVs.

AVs will also affect the built environment in a myriad of ways, including new right-of-way designs, changes to access management practices, reconsideration of signage and signalization, new models for pedestrian and bicycle networks, and reductions in demand and changes to the location of parking. The report also forecasts redevelopment opportunities in urban and suburban locales from former auto-serving uses, while narrower rights-of-way, enhanced bicycle and pedestrian facilities, and redevelopment may create excellent opportunities to revitalize urban centers.

However, by making travel easier and more convenient, AVs could undermine these opportunities by encouraging sprawl, expanding the already voracious metropolitan development that exists in the United States. Careful planning and policy will be required to shape these built environment impacts to ensure the creation of vibrant, sustainable, and resilient communities.

**WHAT CAN PLANNERS DO NOW?**

The key takeaway from this PAS Report is this: There is no substitute for quality, comprehensive, long-term oriented planning. It is imperative that the profession remain committed to its foundational principles of protecting sensitive land and productive landscapes, encouraging a diversity of housing types and densities, promoting a range of travel modes, and serving the built environment with quality infrastructure in core urban and suburban areas. Planners must prepare their communities for the wide range of possible impacts that AV technology may have on transportation and the built environment, integrating AV considerations into community planning practices through techniques such as visioning and scenario planning.

This report offers important recommendations for action. First, parking standards and requirements require immediate attention, as parking demand and need is changing with each passing day. While this has been the case for a long while, it is of heightened importance in an autonomous future. Second, cities must bolster transportation demand management efforts and link those more overtly to a shared and autonomous mobility future. These efforts can be enhanced by curbside pick-up and drop-off policies, with this report illustrating some visions for how that can occur.

Third, planners must rethink the right-of-way for alternative modes, recognizing that AVs offer an opportunity to “right-size” roads at the human scale. Building upon the complete streets movement, in the longer run AVs offer the potential for aggressive road diets that reallocate space previously used for automobiles back to human-powered and active travel modes. Communities should prioritize these modes in their comprehensive and general plans and begin to experiment with new roadway typologies that provide accommodation to these modes. Right-of-way reallocation also holds the potential to provide new space for green infrastructure, public gathering places, and other features that can help achieve various community goals.

Finally, communities should pursue the opportunities that AVs bring to improving transit service. Transit planners must welcome this change and seek opportunities to pilot transit-specific applications of AV technology. Numerous jurisdictions are piloting or implementing fully autonomous transit routes on public roads across the country. These efforts showcase the power of AV technology to provide transit services that provide accessibility to underserved portions of communities.

**CONCLUSION**

The private automobile has played a major role in shaping the built form of cities and suburbs. In almost all communities, development and land-use patterns during the 20th...
century reflect policies and planning that prioritized it over alternative means of transportation. Although the automobile was originally seen as a technological advance that would improve society as a whole, market conditions and policies yielded a sprawling development pattern with negative environmental, social, and economic impacts—issues that planners still wrestle with every day.

Today, AVs are poised to disrupt the built environment and planning practices in ways that may be hard to imagine and will be difficult to immediately determine. While the private automobile yielded a 20th century dominated by suburban expansion, this report makes the case that AV technology has the potential to support and promote urban (re)development for the next century. With planners leading the way, a sustainable AV future can be made possible through thoughtful visioning, quality planning, and smart investment. Now is the time to begin embracing the transformative power of autonomous vehicle technology to change our communities for the better.