

## Urban Planning for Connected and Automated Vehicles

By Philip Barnes, Brett Swan, July 2018

Connected and automated vehicles (CAVs) will require Delaware municipalities to rethink urban planning. As CAVs become common, action is needed on parking, land use and design practices, and suburban sprawl.

### Go Park Yourself

CAVs are expected to decrease parking demand in urban areas. On average, vehicles spend 95% of their lifetime parked. But vehicle owners will be less willing to pay for parking when they can be dropped off at their destination and simply send their vehicle to a free spot outside of the paid parking area and summon it back when needed.<sup>1</sup> A CAV could also return to the owner's home after the passenger reaches their destination, or it can service the next family member in need, thus reducing the amount of multi-vehicle households and parking demand.

When CAVs are put into shared-use (like Uber or Lyft) they can move from passenger to passenger while staying in the flow of traffic.<sup>2, 3</sup> This will further reduce demand for parking.

Self-parking CAVs need less space between vehicles to accommodate opening doors, so parking lot and garage designs will change to increase capacity. A well-designed lot for CAVs can accommodate 62% more vehicles than a conventional lot.<sup>4</sup> The combined effect of these impacts will lead to a smaller parking footprint, particularly in areas with existing higher density.

### Un-Pave Paradise

A smaller parking footprint will allow municipalities to reclaim valuable real estate in central districts and use it for shared community



spaces, green space, and pedestrian and cycle infrastructure.<sup>5</sup> Alternatively, municipalities could decide to re- and up-zone land for higher density or mixed-use development. This latter option could become viable as shared-use CAVs facilitate urban living without having to own a vehicle. For instance, traditional parking garages could be converted into multi-use structures.

In terms of infrastructure redesign, CAVs could require the development of dedicated passenger pick-up and drop-off stations to prevent back-ups and congestion. These zones can be integrated into mobility hubs that transfer riders to public transportation, or they can be constructed in front of office and high-density apartment buildings.<sup>6</sup>

### Suburban Sprawl 2.0

CAVs change the value of travel time by transforming an hour of attentive driving into an hour of productive work, play, or rest. People may be willing to travel more and commute longer distances, and households with a CAV may relocate to areas with lower housing prices.<sup>7, 8</sup> It is therefore anticipated that CAV

adoption will initiate another round of suburban sprawl and the growth of decentralized edge communities, loss of open space, and fragmentation of environmentally sensitive areas.<sup>9</sup>



## Policy Recommendations

Delaware's state and local governments have policy and planning tools to proactively facilitate CAV deployment in ways that enhance the benefits while mitigating the negative impacts related to parking, land use, and sprawl.

Given the expected decrease in parking demand, particularly in denser urban areas, Delaware's local governments should reject parking formulas and ratios from the Institute for Transportation Engineers and eliminate parking minimums.<sup>10</sup> Instead, municipalities should work with developers to reduce parking supply and incorporate shared-use infrastructure into new projects. Zoning codes could also be amended to reflect parking maximums.<sup>11</sup>

Whenever Delaware's cities and towns update their Comprehensive Development Plans, they

should take the opportunity to reclassify land currently utilized for parking and indicate an alternative use in the future land use map. This will be particularly easy to do with municipally-owned parking lots and structures. Options for future land uses include green space, public buildings, or residential/commercial development. On-street parking can also be eliminated and replaced with bicycle and pedestrian infrastructure.

To limit sprawl, Delaware should continue to explore, pilot, and expand a mileage-based user fee (MBUF) system as a replacement for federal and state fuel taxes.<sup>12</sup> An MBUF will disincentivize long commutes, superfluous trips, and zero occupancy travel. It will also ensure that all roadway users, including electric vehicle owners who currently pay no gas tax, are fairly funding transportation infrastructure. The revenue generated from an MBUF can be used by the state to fund road construction and maintenance, as well as address concerns in transportation equity. Implementation of an MBUF system dovetails nicely with CAV technology because of the vehicle's connected nature and ability to transmit travel data.

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<sup>1</sup> Kockelman et. al., 2017

<sup>2</sup> Shoup, 2011

<sup>3</sup> Heinrichs, 2016

<sup>4</sup> Nourinejad, Bahrami, & Roorda, 2018

<sup>5</sup> Skinner & Bidwell, 2016

<sup>6</sup> Heinrichs, 2016

<sup>7</sup> Litman, 2018

<sup>8</sup> McDonald, 2016

<sup>9</sup> Saiz & Salazar, 2017

<sup>10</sup> Anderson & Larco, 2017

<sup>11</sup> Shoup, 2018

<sup>12</sup> Smith, 2018

Aerial photo of suburban residential neighborhood courtesy of James Pernol, DelDOT

For the full work cited visit: [www.sppa.udel.edu/ipa/serving-delaware/transportation/cav](http://www.sppa.udel.edu/ipa/serving-delaware/transportation/cav)