MEMORANDUM

To: Task Force on Autonomous Vehicles, Subcommittee on Road and Infrastructure Design
From: ODOT Staff
Date: March 28, 2019
Re: National Guidance on Infrastructure for Connected and Automated Vehicles

Introduction
During the February 25, 2019 meeting, the Subcommittee on Road and Infrastructure Design requested information on national guidance relating to infrastructure for connected and automated vehicles to inform policymakers when making recommendations for regulation in this area. The following list is a starting place to be considered in discussions of needed infrastructure updates to accommodate new transportation technologies.

Results

- **SAE:** The Society of Automotive Engineers is convening an Infrastructure Needs Related to Automated Driving Task Force. This will serve as a forum for manufacturers and infrastructure operators to exchange information.
  - **Timing:** The task force is developing a survey to distribute in the summer of 2019 to OEMs and automotive industry suppliers to gain clearer insight into the critical automated driving system needs related to road striping.

- **MUTCD:** The Manual on Uniform Traffic Control Devices, is the national standard for traffic signs, signals and pavement markings will be undergoing an update to accommodate “technologies necessary to support highway connectivity, automation and innovations that improve safety and efficiency.”
  - **Timing:** This update is set to be released for comment spring of 2019, and the national committee will meet in June 2019 to discuss the updates.

- **AASHTO Green Book:** The Policy on Geometric Design of Highways and Streets” manual – commonly referred to as the “Green Book” – which is considered by many to be the pre-eminent industry guide to current highway and street design research and practices. It was most recently updated in September 2018. Discussions about the next edition, version 8, are in preliminary stages.

- **AASHTO Coalition on National Strategy for Highway Automation:** A group of states led by Colorado have joined together in an informal pooled fund effort to develop a National Strategy for Highway Automation. The plans are to develop a strategy document covering the following eleven components: Vision, Business Case, Industry Analysis, Phased Deployment Plan, Implementation, Readiness Parameters, Return on Investment Analysis, Financial Plan, Communications Plan, and Research and Development Roadmap. The project has an
accelerated schedule with each state taking on one of the topics with the goal of producing the strategy by the end of 2019.

- **Cooperative Automated Transportation Coalition**: CAT serves as a collaborative focal point for federal, state and local government officials, academia, industry and their related associations to address critical program and technical issues associated with the nationwide deployment of connected and automated vehicles on streets and highways.
  
  ⇒ **Timing**: The CAT Coalition is currently working on an update to the Infrastructure Owner Operator Guidelines for Supporting Cooperative Automated Transportation. The draft update is expected to be available spring 2019.

- **NCHRP**: The National Cooperative Highway Research Project has several projects related to connected and automated vehicles:
  
  - **03-127: Cybersecurity of Traffic Management Systems**
    - Seeks to develop guidance for state and local transportation agencies to mitigate cyber-attacks on traffic systems.
    - ⇒ **Timing**: Literature review available now, project expected to conclude August 2019.
  
  - **20-102: Impacts of CAVs on State and Local Agencies**
    - Umbrella project for much of NCHRP’s connected and automated vehicle research. $6.5 million in funding for research allocated with 24 projects announced to date.
    - ⇒ **Timing**: Several projects completed, some underway, others early in development.
  
  - **20-102(06): Road Markings for Machine Vision**
    - Research into how marking condition and weather affect machine vision. Preliminary results suggest daytime wet conditions most challenging; nighttime conditions easier, little lighting impact
    - ⇒ **Timing**: Final report was due August 2018, still not released (as of the date of this memo).
  
  - **20-102(15): Impacts of CAVs to Highway Infrastructure**
    - Will produce guidance on adapting roadway and ITS designs for connected and automated vehicles. Scenario analysis based on limitations of physical infrastructure and gaps in design, operations, maintenance, technology.
    - ⇒ **Timing**: Final report due February 2020
  
  - **20-102(21): Infrastructure Modifications to Improve Operational Domain of AVs**
    - Will investigate strategies for state and local agencies to improve the operational domain of automated vehicles. Strategies include I2V communications, signage, curbs and barriers, uniform and well-maintained traffic control devices.
    - ⇒ **Timing**: Project currently under development, timeframe pending.
  
  - **20-102(24): Infrastructure Enablers for CAVs and Shared Mobility – Near-Term and Mid-Term**
    - Will develop near-term and mid-term recommendations for infrastructure changes to enable AVs.
Timing: Final scope and timeframe pending

- **03-126: Operational Standards for Highway Infrastructure**
  - Will standardize best practices for operating highway infrastructure and aims to produce a new AASHTO guidebook similar to the AASHTO Green Book, but focused on highway design elements related to Transportation System Management and Operations.
  - Timing: Initial project panel meeting and finalization of project scope is expected March 2019. The schedule for the final product development is not yet known.

- **NACTO**: The National Association of City Transportation Officials is an association of 68 major North American cities and 11 transit agencies formed to exchange transportation ideas, insights, and practices and cooperatively approach national transportation issues. They released the Blueprint for Autonomous Urbanism in the Fall of 2017 to be a resource for cities as they begin to think about transportation technology changing the urban infrastructure.

- **ITE**: The Institute of Transportation Engineers recently published a new Curbside Management Practitioners Guide. The publication provides recommendations to help inventory, assess, enhance and prioritize the use of curb space to meet the various demands for curb space in an efficient way. The guide includes new curbside needs related to ride-hail services (TNCs) and electric vehicle charging.

- **FHWA**: In 2018, the Federal Highway Administration conducted a series of listening sessions around the country called the National Dialogue on Highway Automation. The intent was to gather industry input to inform FHWA on the work needed to support automated driving. The five listening session covered the following topics: Policy and Planning, Digital Infrastructure and Data, Freight, Operations, and Infrastructure Design and Safety. The presentations and handout materials from the sessions are available on the FHWA website, but conclusions from the sessions are not yet available.