PROPOSAL FOR DESIGNATION OF AUTOMATED VEHICLE PROVING GROUNDS PILOT

SUBMITTED TO U.S. DEPARTMENT OF TRANSPORTATION

SUBMITTED BY

OHIO TURNPIKE AND INFRASTRUCTURE COMMISSION

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1) EXECUTIVE SUMMARY

The Ohio Turnpike and Infrastructure Commission (Commission) is pleased to submit this proposal to be designated as a USDOT Automated Vehicle Proving Ground. The Commission is committed to becoming a USDOT designated proving ground to advance the public interest in maintaining a safe method for developing Connected and Autonomous Vehicle (CAV) technology and Autonomous Vehicle (AV) technology. The physical characteristics and features of the 241 mile Turnpike and the Commission's collaboration with various stakeholders make the Ohio Turnpike a unique location for promoting CAV and AV technology testing. See Exhibit 1 attached hereto for a map of the Ohio Turnpike.

The Commission has reviewed the Ohio Revised Code, our rules and policies, as well as our physical and technology infrastructure in preparation for connected and autonomous vehicles. The Ohio Turnpike possesses features in both of these areas that well-position us for testing and deployment of connected and autonomous vehicles for both commercial vehicles and passenger cars.

The Ohio Turnpike is a limited access highway, has 160 miles of contiguous three-lane traffic in both east/west directions and facilities to serve the traveling public. The Commission maintains Long Combination Vehicle (LCV) lots at seven of the eight interchanges that allow for staging LCV operations. The Ohio Turnpike has seven sets of service plazas, allowing for refueling without leaving our right of way. We continue to leverage and upgrade our 241 miles of fiber optic cable, which provides a unique asset that other corridors are only beginning to make. Our highway and interchanges have high quality and easily visible pavement markings that are fully re-striped each year. As part of our continued investment in technology to improve the safety of the Commission workers and the traveling public, we have begun installing Automatic Vehicle Locator equipment in our fleet, and in 2017 will invest in roadside dedicated short range communications (DSRC) technology.

The Commission is eligible for designation as a USDOT Automated Vehicle Proving Ground because the Commission is an independent body both corporate and politic of the State of Ohio (State). The Commission was created in 1949 through the Ohio Turnpike Act, Ohio Revised Code Chapter 5537 (the Act) and thereunder, has the power to construct, operate and maintain the Ohio Turnpike System. Even though the Commission receives no federal funding, all of the 241 mile Turnpike has been incorporated by the Federal Highway Administration into the Interstate Highway System. Various sections of the Ohio Turnpike are designated as Interstate Routes 76, 80 and 90. The Ohio Turnpike links the East and Midwest by virtue of its strategic position along the system that directly connects highways leading to Indiana, Michigan, Pennsylvania, West Virginia and Kentucky. The Ohio Turnpike also links toll roads between Boston, New York City and Chicago, consisting of the Massachusetts Turnpike, New York Thruway, New Jersey Turnpike, Pennsylvania Turnpike, Ohio Turnpike, Indiana Toll Road and Chicago Skyway. Specifically, the Ohio Turnpike is linked directly with Interstate Route 75, Interstate Route 280, Interstate Route 480, Interstate Route 71, Interstate Route 77 and Interstate Route 680. The Ohio Turnpike includes 31 interchanges, 26 of which are accessible to and from U.S., Ohio and Interstate routes and two of which are terminals connecting, respectively, with the Pennsylvania Turnpike in the east and the Indiana Toll Road in the west.

2) MANDATORY CRITERIA

The Commission has appointed Anthony Yacobucci as the Designated Safety Officer for the Ohio Turnpike. Mr. Yacobucci currently serves as the Commission's Chief Engineer, and is a registered Professional Engineer with more than 25 years of experience in the transportation industry. In his role as Chief Engineer, Mr. Yacobucci is responsible for all matters concerning the planning, design, construction and maintenance of the mainline Turnpike, including all aspects of workers' safety as well as customers' safety.

As the Designated Safety Officer, Mr. Yacobucci is responsible for the Commission's safety management plan. Mr. Yacobucci will also participate in the Community of Practice's regular quarterly meeting of Safety Officers, wherever those meetings are determined to be held. As part of the Commission's commitment to this program, Mr. Yacobucci is willing to host a meeting of the Community of Practice if such group determines that such meeting locations will rotate to allow the members of the Community of Practice to see first-hand the different facilities and proving grounds.

The Commission and Mr. Yacobucci will commit the appropriate resources to share lessons learned, approaches to safety, and safety data generated through Turnpike operations. Additionally, the Commission and Mr. Yacobucci fully support all collaborative efforts between industry leaders, experts in the field, State government, the traveling public, and safety advocates to ensure public safety when using autonomous vehicles. The Commission has already committed (and will continue to) to support resource sharing venues, such as the Ohio Smart Mobility Initiative (OSMI), Transportation Research Center, Inc. (TRC) and Smart Belt Coalition (SBC) and other informal event collaboration activity.

- The OSMI is a collaborative effort between The Ohio State University and its College of Engineering and Center for Automotive Research, Smart Columbus, the Ohio Department of Transportation (ODOT), the Ohio Department of Public Safety (ODPS), the Transportation Research Center, JobsOhio and the Commission. OSMI's vision is for Ohio to lead the nation and world in the development of smart mobility and smart city technologies that have a major impact on Ohio's transportation industry and creates thousands of new jobs that leverage Ohio's outstanding facilities and history of excellence in the sector.
- TRC is an independent automotive proving ground providing research and development, and compliance and certification testing for vehicles and components, for crash testing, emissions testing, dynamic testing and durability testing.
- The SBC is another collaborative group that meets on a regular basis to share information regarding autonomous vehicle safety development. The SBC's mission is to create a mechanism for transportation agencies, academic institutions and others to collaborate on connected and automated vehicle initiatives. The coalition is working to foster collaboration involving research, testing, policy, standards development, deployments, outreach, and funding pursuits for connected and automated vehicle technology as well as other innovations in the transportation industry to improve safety and foster economic benefit of the region. The members of the SBC are: Michigan Department of Transportation, University of Michigan, American Center for Mobility, Kettering University, Ohio Department of Transportation, the Commission, The Ohio State University, Transportation Research Center, Pennsylvania Department of Transportation, Pennsylvania Turnpike Commission, Carnegie Mellon University. The role of transportation agencies as infrastructure owners is to guide research, deployment, and policy development that support their respective missions. The role of academic institutions is to jointly work with members to identify and develop potential research topics in connected and automated vehicles as well as other emerging technologies.

3) PROPOSED CONTRIBUTIONS

Commission's Established Automated Vehicle Program

The Commission has a Highly Automated and Connected Vehicle Program, which is being implemented by Mr. Yacobucci in connection with the Commission seeking to strategically deploy innovated technology for highly automated and connected vehicles for the safety, health and welfare of the traveling public. The Commission's Highly Automated and Connected Vehicle Program seeks to create a collaborative relationship with other stakeholders, including government entities, academia, research institutes and industry partners.

Testing and Deploying Automated Vehicle Technology

The Commission is a one-stop shop that has under its control. All aspects necessary to be a certified proving ground, and the ability through the Point of Contact and the Designated Safety Officer the ability to secure commitment through the Commission to meet all of the USDOT requirements of the certified proving ground. Currently, the Commission's facilities include an already installed the fiber optic network with bandwidth available for AV and CAVs to connect.

A. Fiber Optic Network. The Commission allows CenturyLink (formerly Litel), under written contract to maintain a single-mode fiber-optic cable from milepost 40 to milepost 233. As part of that agreement, CenturyLink reserved 24 fiber strands for the Commission to utilize for its private telecommunications network. The Commission has its own 24-strand single-mode fiber optic cable from milepost 40 to the Indiana state line and from milepost 233 to the Pennsylvania state line.

The Commission owns a SONET fiber optic communications system (FOCS) to provide voice and data transport to each of its 8 maintenance buildings, 31 toll plazas, 14 service plazas, three Ohio State Highway Patrol posts and the Administration Complex. In the event of catastrophic failure at the hub site, all SONET traffic is configured to automatically switch to the disaster recovery site.

The SONET fiber optic communications system configuration is based on a ring topology design, but is considered a 'collapsed ring' since all fiber strands are located within a single cable. The west leg of the network comprises five OC-48 capacity inner rings; one of the five inner rings directly connects to the technology hub and traffic for the remaining four OC-48 rings are transported to the hub via a single OC-192 outer ring. The east leg comprises three OC-48 rings, which connect directly to the hub.

The SONET system utilizes Cisco optical switches, which are equipped with 8-port Ethernet cards that are currently configured to provide primary and secondary 100 Mb Ethernet paths. Multiple Ethernet paths (10 Mb, 100 Mb, etc.) may be provisioned at each site provided the overall capacity of the SONET ring is not exceeded. Therefore, the Commission is prepared for the introduction of dedicated short range communications (DSRC) technology. In addition to the fiber optic network already installed and bandwidth capabilities, the construction, operation and maintenance of the Ohio Turnpike make it the optimal facility for designation of automated vehicle proving grounds because it has the following characteristics and features:

B. 24/7 OPERATION. The Ohio Turnpike is a 24-hour and 365-day each year operation since October 1, 1955.

C. 70 MPH. The Ohio Turnpike is a limited access highway with posted speed limits of 70 mph. Daily customers enter and exit through toll plazas. The Ohio Turnpike operates 31 toll plazas. Additionally, the Ohio Turnpike also maintains (i) 58 emergency pull off locations and (ii) 56 emergency access drives, which are strategically located to allow emergency vehicles immediate, toll-free access to the Ohio Turnpike for responding to incidents and accidents.

D. 3 LANES. The 241 mile Ohio Turnpike mainline consists of 160 miles with three (3) lanes of travel in both the eastbound and westbound travel lanes. The approximately 160 miles three lanes of travel are flanked by paved shoulders 14 feet, 3 inches wide on the inside and 10 feet wide on the outside of the mainline roadway. Ascending grades are kept to a maximum of 2.00 percent and descending grades to a maximum of 3.14 percent. Horizontal and vertical curves are of sufficient radius to provide the best sight distance, as well as ease of travel.

E. 2 LANES. The approximately 82 miles with two travel lanes in each the eastbound and westbound travel direction are flanked by paved shoulders 8 feet wide on the inside and 10 feet wide on the outside.

F. UNINTERRUPTED TRAFFIC FLOW. The Ohio Turnpike offers approximately 241 miles of uninterrupted traffic flow. All of the roads and railroads intersected by the Turnpike cross under or over the Turnpike's roadways by means of bridges. There are no crossings at grade. To preserve the minimum separation between roadways, twin bridges carry the roadways whenever the Turnpike crosses over other highways, railroads or rivers.

G. LANE STRIPING/PAVEMENT CLEANING. The Commission spends approximately $341,000 annually on pavement cleaning and approximately $774,000 annually to re-stripe the entire length of the Turnpike with a fast-dry water based paint. This includes all long-line marking (center line, lane line, edge line, etc.) and auxiliary markings (stop bars, arrows, transverse marking, channelizing lines, etc.). The annual striping contract includes the mainline as well as interchanges, toll plazas and service plazas. Raised pavement markers are also installed between lane lines along the mainline of the Ohio Turnpike. The raised pavement markers are currently installed at 80-foot interval to increase lane visibility and thereby, making the highway safer for all travelers during inclement weather.

H. LCV LOTS. The Commission maintains eights lots for long combination vehicles (LCVs) which lots can be used for AV staging grounds as needed. See Exhibit 1 attached hereto for a map of the locations of the LCV lots. Each LCV lot is approximately 3.5 acres in size. The Ohio Turnpike is the only road in the State of Ohio that permits LCVs, including long-double and triple-trailer combinations. LCVs cannot legally travel in the State, except on the Ohio Turnpike. To promote the use of LCVs, the Commission maintains eight (8) LCV lots situated across the Ohio Turnpike for companies to make-up or breakdown their trailers or loads. The LCVs allow truckers to move more goods through the region more efficiently than single trailer trucks. The Commission requires the LCV driver to apply and pay a nominal fee for a permit before taking the LCV across the State via the Ohio Turnpike. The permit process is designed to assure the traveling public that the LCV driver is experienced and certified to drive LCVs. Additionally, the LCVs are periodically inspected by the Commission or the Ohio State Highway Patrol to confirm compliance with all applicable laws, as well as the PCV provisions mandated by the Commission.

I. TOLL PLAZAS. The traveling public enters and exits the Ohio Turnpike via one or more of the 31 toll plazas spanning the 241 mile limited access highway. At each toll plaza, the Commission collects a toll from each exiting vehicle, depending the class of vehicle and distance traveled.

The Ohio Turnpike is a limited access highway and the Commission maintains 31 Toll Plazas across the 241 mile highway for entering and exiting to connection highways and roads. The Commission maintains both full interchanges (meaning, the interchanges are staffed with toll collectors 24/7) and partial interchanges where traffic volumes are typically lower than other interchanges across the Ohio Turnpike. The two terminals connecting the Ohio Turnpike to their counterparts at either end of the highway, respectively, with the Pennsylvania Turnpike in the east and the Indiana Toll Road in the west, are in addition to the five (5) partial interchanges and twenty-four (24) full interchanges.

J. SERVICE PLAZAS. The Commission maintains seven sets (one on the north side of the mainline and one on the south sound of the mainline) service plazas along the Ohio Turnpike, each conveniently located approximately every 30-50 miles on the mainline and offer travelers a chance to take a needed break from their road trip. See Exhibit 1 for a map of the locations of the service plazas. Service plazas are easily accessible because travelers do not have to exit the Turnpike or pay an extra fare to visit them.

Each service plaza has separate fueling stations for passenger vehicles and commercial vehicles. The passenger vehicle fueling stations have 14 to 16 gasoline fueling points and two diesel fueling points, and the commercial vehicle fueling stations have eight to ten diesel fueling points and two to four gasoline fueling points. The commercial vehicle fueling station includes master and satellite dispensers.

K. TRUCK PARKING. The service plazas provide ample customer parking for passengers and commercial vehicles, as well as separate parking areas for busses and RV's. Each service plaza can accommodate about 150 passenger vehicles, 100 commercial vehicles, 10 RV's, and 4 busses. The parking areas provide ample room for staging LCV operations and access for support forces. In addition, the Commission maintains a separate parking area for service plaza employees which allows for about 50 parking spaces.

L. LAW ENFORCEMENT. A special unit of the Ohio State Highway Patrol (OSHP) polices the Ohio Turnpike. The OSHP operates patrol cars and airplanes to enforce the Commission's traffic regulations, as well as to perform service to ill, stranded or otherwise distressed travelers. Under a contract between the Commission and the OSHP, OSHP has 82 dedicated troopers and ten (10) dispatchers on the Ohio Turnpike and in exchange, the Commission reimburses the patrol for all costs of OSHP's operations on the Ohio Turnpike.

As part of its continued commitment to safety, the Commission has funded the implementation of Multi-Agency Radio Communications System (MARCS) for OSHP on the Ohio Turnpike. This radio system enables OSHP troopers and law enforcement personnel serving communities adjacent to the Turnpike to effectively communicate with each other, thus providing an additional level of safety and support for both Ohio Turnpike motorists and for communities near the Ohio Turnpike corridor. By using the MARCS radio system, Ohio Turnpike employees achieve radio interoperability with the OSHP and other emergency service providers that assist with first response to incidents on the Ohio Turnpike.

M. COMMUNICATION CENTER. The Commission's operations include 24-hours/7-days each week vigilance over the traffic on the Ohio Turnpike. The Communications Center (Comm Center) operates traffic management and traveler information systems for the Ohio Turnpike. The mission is to increase transportation safety, reduce congestion, and increase efficiency on the Ohio Turnpike.

The Comm Center is staffed 24 hours each day, seven days each week, all 365 days every year. The operators can dispatch OSHP, Commission's maintenance staff, Incident Responder Vehicles (discussed below) or Disabled Vehicle Service Operators (discussed below) to an incident on the Ohio Turnpike. The operators in the Comm Center are stationed in Berea, but can post advisories to any of the 55 portable changeable message boards (PCMB) stationed along the Ohio Turnpike, as well as, update the Ohio Turnpike website with traffic/road conditions.

The Commission is partnering with the Ohio Department of Transportation (ODOT) to place Ohio Turnpike traffic information on ODOT's OHGO on-line app. These traffic updates are performed by the Commission's Comm Center operators.

Through partnership with ODOT, we are working to integrated with ODOT's Buckeye Traffic System and their OHGO application.

The Ohio Turnpike has partnered with Waze, the real-time crowd-sourced navigation app powered by the Waze Connected Citizens Program, one of the world's largest communities of drivers. Designed as a two-way data share of publicly available traffic information, the Connected Citizens Program will promote greater efficiency and safer travel on the Ohio Turnpike. The mobile app provides travelers using the Ohio Turnpike, across its 241 miles, with real time information such as incident reports, construction

locations, as well as weather and road conditions. The information supplied in real time by Ohio Turnpike customers alongside the Turnpike staff already out on the road and at our facilities enhances the Commission's ability to provide the most current and accurate traffic data to travelers.

N. INCIDENT RESPONSE. The Commission maintains eight maintenance sections, each staffed and operated by trained maintenance workers. The Commission dedicates one Incident Response Vehicle (IRV) for every two maintenance sections and the IRVs are on-call 24 hours a day, 7 days a week. The IRVs assist with incidents along the Ohio Turnpike. They provide traffic control and assist disabled motorists; however, they do not provide vehicle repair services. The Comm Center dispatches IRVs immediately upon receiving a call for help.

The Commission enters into contracts with companies in each of the eight maintenance zones to provide the traveling public with disabled vehicle services on the Ohio Turnpike. These Disabled vehicle services (DVS) are available to assist temporarily stranded drivers on the Ohio Turnpike. On-the-spot DVS includes changing tires, supplying emergency gasoline, replacing broken fan belts and other minor repairs. Additionally, towing service is also available for vehicles requiring garage work off the Ohio Turnpike.

The Commission maintains a Traffic Incident Management (TIM) Playbook to provide guidance during incident management occurring on the Ohio Turnpike. The primary goal in creating a TIM Playbook is to foresee potential situations and make contingency plans while acknowledging that it is impossible to plan for every scenario.

The TIM Playbook's success depends on communication between the responsible personnel responding to the emergency (e.g., in incident reporting, response dispatch, and traffic management). Experience gained from each incident provides opportunities to improve the Commission's TIM Playbook performance. Both communication and learning from experience are being enhanced by new technology and management practices, such as Google Maps Traffic, geo-located device inventory (GIS), incident communication procedures (e.g., standardization of terminology and adoption of shared radio frequencies), and communication with travelers (Facebook, Twitter, Instagram etc.)

O. CONSTRUCTION ZONE SAFETY. In connection with the Commission's obligations to maintain the Ohio Turnpike and its commitment to make safety a priority, the Chief Engineer publishes a schedule of construction zones during the prime construction season, which spans from April to November. During that time, the Chief Engineer will identify and set up a variety of long-term, intermediate-term and short-term temporary traffic control (TTC) zones to accommodate the various maintenance work that is needed on the mainline, as well as, short-duration and mobile TTC zones. The number and location of zones varies throughout the year and time of day. Additionally, the Chief Engineer also establishes from time to time rolling road blocks to close the mainline for removal and/or placement of structural steel, overhead sign structures, overhead utility crossings, etc. The duration of closures do not typically exceed 20 minutes. If additional closures are necessary, the Chief Engineer will require that the traffic be allowed to return to normal flow before the next closure begins. All travel lanes are then available again to traffic upon opening the rolling road block, unless otherwise determined by the Chief Engineer.

In furtherance of the commitment to safety, the Chief Engineer requires that all contractors designate a Zone Person(s) (ZP) to be responsible for the TTC zone. The ZP supervises the set-up and removal of the traffic control devices as well as the maintenance, on a continual basis (24 hours per day, 7 days per week), while they are in place. The ZP is responsible for immediately repairing or replacing any damaged or missing traffic control device. In addition, the ZP continually checks the reflective surfaces of all the traffic control devices to insure that the devices are clean and are performing its intended function.

The ZP immediately responds to any incidents within the construction project limits or close proximity thereto and communicate the details of the incident to the Commission's Comm Center. During traffic backups on the mainline, the ZP protects the back of the traffic queue by positioning the Zone Vehicle approximately 1,000 feet behind the rear of stopped traffic, while moving forward or backward as needed to maintain the proper distance. The ZP uses all necessary emergency lighting and remain off the roadway when possible.

4) CONTRIBUTIONS TO THE COMMUNITY OF PRACTICE

The Commission will continue to work as an active member of USDOT's envisioned Community of Practice by continuing to engage in the following:

- established safety management plans and as available, post them to the Commission's website;
- access to testing data and as available, post them to the Commission's website;
- engagement with stakeholders, both industry and state/local government outreach;
- generate results that have broad applicability to both urban and rural areas, as well as national regions.

The Commission's engineering staff actively participates in various industry groups such as the International Bridge, Tunnel and Turnpike Association (IBTTA) and the American Traffic Safety Services Association (ATSSA) as well as events such as ODOT's Ohio Transportation Engineering Conference (OTEC) and the Strategic Highway Safety Plan (SHSP).

The International Bridge, Tunnel and Turnpike Association (IBTTA) is the worldwide association representing toll facility owners and operators and the businesses that serve them. Anthony Yacobucci serves as a member of IBTTA's Board of Directors since 2015. Additionally, Mr. Yacobucci serves on the Finance Committee of the Board. In his role, Mr. Yacobucci participates in IBTTA's role of setting various industry standards in the tolling industry. Mr. Yacobucci attended IBTTA's Annual Meeting and Conference in Denver, CO in the fall of 2016. Some of the sessions he attended include Putting Big Data to work; Sustainability of Connected Vehicles; Driving Sustainability through Technology; Chaos Unleashed-How can the Toll Industry Take Advantage of Autonomous Vehicles?; Optimizing Enterprise Road Infrastructure with Data Analytics; Uber, AV's, Mobile Payments and Other Industry Disruptors; and Preparing for Progress – What's on the Map Ahead?

ATSSA is an international trade association which brings together members, road safety experts, and public agencies to identify and solve road safety issues. Ohio Turnpike Traffic Engineer Travis Bonnett, P.E and Safety Services Manager Cory Skoczen are actively engaged by attending quarterly chapter meetings.

ODOT's Transportation Engineering Conference is an annual conference where industry leaders meet to discuss various transportation topics. The Commission regularly participates in this annual conference in both attendance and presenting new trends, ideas and/or solutions. Specifically, Ohio Turnpike Traffic Engineer Travis Bonnett, P.E, Assistant Chief Engineer Dennis Albrecht, Anthony Yacobucci, Mike Brookbank, Julius Szahlender and Andy Cooksey all attended ODOT's OTEC and Executive Director Randy Cole was a presenter.

The Ohio Departments of Transportation and Public Safety coordinate a statewide SHSP Steering Committee, which meets quarterly to 1) discuss implementation of key strategies to reduce traffic crashes, fatalities, and serious injuries and 2) review crash trends.

The SHSP Steering Committee includes representatives from local, state and federal safety agencies. These agencies share information with hundreds of other safety organizations throughout Ohio. Combined, the plan, statewide committee and regional safety partnerships create a network of thousands of people focused on common safety goals. In addition, these agencies routinely share resources and data that make Ohio's transportation system safer while maximizing limited funds. The Commission's Traffic Engineer Travis Bonnett, P.E, Marketing Director Adam Greenslade and Public Information Officer Brian Newbacher all serve on the SHSP Steering Committee.

Each of the 12 ODOT Districts have a District Work Zone Traffic Manager (DWZTM), which meets regularly to discuss all issues related to temporary traffic control. The DWZTM Committee meets quarterly to 1) discuss implementation of key strategies to reduce congestion and traffic crashes in work zones 2) review new technology and 3) propose changes to specifications and/or standards. ODOT's DWZTM Committee members including the Commission's Traffic Engineer Travis Bonnett, P.E. and Safety Services Manager Cory Skoczen.

5) WORKING WITH THE USDOT PROGRAM OFFICES

The Commission and the Designated Safety Officer understand and have worked with various levels of the AV technology community, including the research/industry and the government. The Commission's involvement in the USDOT Community of Practice's meetings regarding AV technology tests and deployments for industry and government, and continuing to back OSMI's and SBC's AV research for USDOT are the most effective ways for the Commission to support the fast pace of AV technology/product advancement.

6) COMMITMENT TO SAFETY

The Commission has established safety plans for all aspects of maintaining and operating the Ohio Turnpike with the goal of protecting its workers and the travelling public. The Designated Safety Officer is charged with overseeing the implementation of all safety plans. The Designated Safety Officer will use the same process of adapting and improving the Commission's current safety plans as he will for new implementing safety plans when using new technology, such as AVs. The process as described below in Section 7 "Safety Management Plan," and make any necessary modifications to the safety plan for the use of AVs.

7) SAFETY MANAGEMENT PLAN

The Commission has a multi-step process for developing, amending and implementing the Commission's Safety Management Plan, which process takes into consideration the safety of the Commission's employees, contractors and the traveling public. The Commission's Designated Safety Officer (Mr. Yacobucci) leads the team and seeks multiple sources for input and maintaining cutting-edge, industry practices for both on and off the road planning. The Designated Safety Officer seeks input from the Commission's management staff, including the Safety Services Manager, as well as representatives on the proposed project, to identify safety concerns before the proposed project commences. The team works together to address all aspects of safety before the proposed project plans can be finalized. Seeking multiple levels of input prior to project construction leads to an effective safety plan, thereby allowing clear communication to everyone involved in the project for instructions on implementing the necessary and desirable safety precautions.

- The same thorough approach for safety planning on Turnpike construction projects will be continued to allow the introduction of new technologies into the planning and implementing stage.

- This same careful planning process also allows the Commission to identify the safety risks for AV tests, and provide ample opportunity to implement the best safety precautions already in use for the Ohio Turnpike.
- The already established planning process, which includes using new technology on the Ohio Turnpike, can allow for the opportunity to reduce risks when AV tests are run on the Ohio Turnpike.
- The potential risks associated with the pavement and roadway conditions are significantly mitigated by the Ohio Turnpike's superior maintenance of the physical roadway.
- The potential risks of operating an AV on the Ohio Turnpike is further mitigated through collaboration with the test partners by including the test partners as a team member for planning purposes from the beginning, to implementing, and through completion.
- The Designated Safety Officer would welcome any opportunity to collaborate further with other test facilities, such as TRC, to further the Commission's goals and assisting in maintaining safety standards across the AV industry.
- The Commission continually seeks to improve its safety program and desires to share both lessons learned and successes with the AV industry – regardless of whether such AV industry partner is in the public or private sector. As a public body, the Commission operates for the benefit of the public and serves the traveling public. In such role, the Commission's projects, and the safety plans that accompany each aspect, are available to the public.
- The Commission's safety team has a process in place whereby any and all incidences which compromise the safety of either the workers or the public is documented. Such documentation is available to the public for any reason. Furthermore, the Safety Services Manager is responsible for analyzing such data and determining where the plan has to be changed based on that new experiences. The Safety Services Manager would cease on-going projects where the circumstances require until new safety protocols are in place.

8) OPERATIONS SAFETY

Safety Services Manager's role – training program

The mission of the Commission's Safety Services Department is to ensure the safety, health and well-being of all personnel, contractors and visitors related to the Ohio Turnpike. Safety Services has an obligation to uphold its commitment to providing a workplace free of recognized hazards for all persons associated with the Commission.

The Safety Services Manager is responsible for ensuring that all personnel that performs work on the Commission's property has the necessary training to reduce the chances of injuries or accidents while performing their job. All Commission personnel receive the mandatory annual training that is required by PERRP/OSHA along with the job specific training they receive depending on their line of work (Maintenance, Tolls, Trades, Admin.). The primary function of the Safety Services Manager is to seek *all* potential hazards and develop a mitigation plan to reduce the number of injuries and accidents that occur on the Ohio Turnpike.

Training offered or required by vendors

Safety Services utilizes outside venders for training when it is appropriate. This training can occur in multitude of different areas. Specific topics and equipment may be trained by an expert in that field or of that product.

LCV's

The Commission's Long Combination Vehicle (LCV) Program supports the efficient movement of goods across the State of Ohio and beyond. The Commission developed policies to ensure the capability of the equipment, the competency of the driver and the safety of the traveling public.

Companies wishing to join the LCV program are required to have their equipment checked by the Ohio State Highway Patrol for compliance with the Commission's policies. A Tractor I.D. number and LCV Certified decal is issued by the Commission for each approved tractor. The Tractor I.D. number and LCV Certified decal are required to be displayed on the tractor. Application for equipment certification is required on an annual basis.

Once a company is accepted into the LCV program, their drivers must also be certified. The driver's application is submitted by the permitted company. Permission is granted to the driver only for the operation of tractors owned by the permitted company. Certification must be renewed at the same time the individual's commercial driver's license is renewed. If the Commission becomes aware that the driver of an LCV does not meet the requirements, it may suspend the driver for a period of time or permanently.

The safety and well-being of the traveling public is of primary importance to the Commission.

Construction zones

All Commission construction zones are implemented in accordance with Commission Standard Drawings, which meet or exceed the safety requirements dictated by the Ohio Manual of Uniform Traffic Control Devices (MUTCD). The MUTCD is patterned after the national MUTCD and meets or exceeds all its requirements. Each construction zone on the Turnpike is continually monitored by a Zone Person that has received proper training and certifications. The Zone Person assures the zone and all temporary traffic control (TTC) devices are in compliance with the approved design plans and that all TTC devices are performing as intended. The Zone Person is in direct contact with the Commission Communications Center (Radio Room) at all times via a portable MARCS radio. The Communications Center has the ability to contact local emergency responders and the Ohio State Highway Patrol as necessary.

Prior to the start of each construction project the Commission Safety Services Department administers project-specific training sessions for each project, which must be attended by all Zone Persons and contractor's supervisors. Each active construction zone is inspected several times each day by contractor personnel, the Zone Person, Construction Inspection staff and Commission personnel.

The Commission's maintenance workers are provided with structured safety and training programs for various operations (*i.e.*, snow and ice control, traffic control, and night work operations.)

Snow and Ice Control

New and existing employees are provided snow and ice control training to make sure they are capable, safe, and efficient in performing this critical infrastructure task. In addition to knowing and understanding the equipment and chemicals used, employees are trained on the logistics, traffic and geographic features of the stretch of roadway they are responsible for. Annual 136 point inspections are performed on the Commission's fleet of snow and ice equipment. The crew size, equipment number and type, chemicals chosen, and crew shifts all are determined to provide not only safe travel for our customers but also a safe work environment for the workers. The crews cover a 15 mile stretch and when required work no longer than 12 hour shifts with 12 hours off.

Traffic Control

Turnpike employees set daily and overnight traffic control zones for work to be completed in-house and when necessary for consultants and contractors. New employees are trained on proper traffic control procedures and annually a spring Maintenance of Traffic training session is provided to Commission

employees by the Safety Services Department. This training encompasses proper zone setup, maintenance, and removal, as well as proper flagging techniques, entering and exiting work zones, etc.

Night Work Operations

To provide safe and efficient travel for our customers, road maintenance and repair are often required to be performed at night to prevent traffic backups. Commission maintenance personnel have gone through an extensive night work training session to ensure they can safely do the maintenance and repairs. In addition to the operational training, worker apparel, personal protective equipment, and other equipment has been researched, tested, and utilized to successfully perform the night work. Additionally, OSHP is used for the setup, during, and removal of the night work operation.

9) RESEARCH, APPLICATION, AND DATA SHARING

State and Local Solutions

More vehicles traveled on the Ohio Turnpike in 2015 than any other year in its 60-year history. The total of 53.4 million vehicles in 2015 eclipses the previous record total from 2006, which was 51.8 million. In 2015, the Ohio Turnpike also recorded the second most number of vehicle miles traveled in its history with over 3 billion vehicle miles traveled. This was 39 million fewer miles traveled than in 2006. Vehicle miles traveled in both of those years topped 3 billion miles, which has only happened twice in 60 years.

10) RESEARCH AND EXTENSION RESOURCES

The Commission is an active member of various community groups as described in Section 2 above. Additionally, the State of Ohio has recently announced a $15 million investment (with USDOT funds) in a connected vehicle test highway corridor (Ohio State Route 33) which connects the Columbus beltway to Marysville, Ohio (TRC location). This project defines the state's investment to advance connected vehicle technologies and automated vehicle technologies. These investments by the region (Columbus) and the State of Ohio offer current and future opportunities for AV testing, deployment, and operations.

The Columbus region and the State of Ohio have recently focused on AV technology advancement. The City of Columbus recently won and is implementing its Smart Columbus project (Smart City Challenge). This project includes several AV projects and focuses on mobility challenges (last mile and health care mobility). Additionally, the City of Columbus and its regional partners are committed to sustainment of the Smart Columbus project past the USDOT grant, which offers continued AV deployments.

11) EDUCATION PROGRAM

The Commission has established relationships with a number of stakeholders by maintaining regular communication with them – everyone from the daily customers on the Ohio Turnpike to the American Trucking Association. The Commission makes efforts to remain active in the industry associations (as described in Section 4 above) as well as to reach its customers via emailed monthly newsletters. The Commission's Customer Connection is emailed out to approximately 185,000 customers each month. Additional customer information is also posted on the Commission's website at www.ohioturnpike.org.

12) COMMITMENT TO OPEN DATA AND SHARING

The Commission has worked with OSMI and the Smart Belt Coalition members to draft a consistent data sharing agreement. In addition to committing data from testing and data collected from the

Commission fleet, this agreement will ensure consistency across platforms by individual tests in our region and access to a much larger volume of data. We are also working with private sector consultants and the The International Bridge, Tunnel and Turnpike Association (IBTTA) to expand access to data across the Tolling Industry. We respect the intellectual property rights and confidentiality of private entities involved in testing, to but the extent the data is public or may be made anonymous to protect confidentiality or competitive advantage, it is the Commission's philosophy to share data that will aid in the development of these emerging technologies.

13) DEMONSTRATED INVESTMENTS

In addition to working with self-driving technology innovators such as Otto and Peleton, in 2017 the Commission will begin to deploy dedicated short range communications (DSRC) technology. Installation of 15 Road Side Units will be directly tied to the Turnpike's existing 241 mile SONET fiber optic system at already established switches. The Road Side Units will be placed on the Ohio Turnpike mainline in its Boston and Amherst Maintenance Sections between mileposts 126.4 in Erie County (Berlin Township) and 187.5 in Portage County (Streetsboro). In addition, 40 Commission maintenance vehicles in the same 60 mile section of the Turnpike will be equipped with onboard units that will gather and supply data to managers monitoring their usage.

14) READINESS

The Commission is already open to the public. The Commission does not anticipate any material closures or interruptions in traffic flow except for (i) unforeseen traffic incidents and (ii) temporary, routine maintenance projects. All correspondence regarding this application should be directed to the Commission's primary point of contact:

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General Counsel
Ohio Turnpike and Infrastructure Commission
682 Prospect Street
Berea, Ohio 44017
Direct Dial: 440.971.2003
Email: jennifer.stueber@ohioturnpike.org

15) ADHERENCE TO LAWS, REGULATIONS, AND FEDERAL POLICY

The Commission is vested with the authority to make any and all rules necessary for the safety and efficiency of the Turnpike. The Ohio legislature created the Commission in 1949 and the Commission is governed by the Ohio Turnpike Act, Ohio Revised Code Chapter 5537 (the Act). The Act charges the Commission with the responsibility to construct, reconstruct, operate and maintain the 241 mile highway which links the east coast to the Midwest. The Act legally transfer power to the Commission to perform an essential government function of operating a highway. The Commission's powers include (but certainly not limited to), making decisions regarding all aspects of maintaining the Ohio Turnpike, including identifying new construction projects, financing those projects and most importantly, setting policies on the Ohio Turnpike which impact commerce in the entire four-state region.

As a commission of the State of Ohio governed by Ohio Revised Code 5537, the Commission has rule making authority and has promulgated rules that govern the Ohio Turnpike, which rules are codified under the Ohio Administrative Code Chapter 5537, which are divided into ten separate chapters covering

all aspects of operating a vehicle on the Ohio Turnpike. The Commission's rules are solely within the jurisdiction of the Commission. If any rules are in any way supplemented or revised, the Commission follows each step of rulemaking as set forth under Ohio law, including holding public hearings. Any rules for the Ohio Turnpike that needed to be implemented to address any safety concerns regarding CAVs would be within the sole authority of the Commission.

16) ADHERENCE TO NHTSA'S POLICY FOR AUTOMATED VEHICLES

The Commission and Mr. Yacobucci will commit the appropriate resources to share lessons learned, approaches to safety and safety data generated through Turnpike operations. Additionally, the Commission and Mr. Yacobucci fully support all collaborative efforts between industry leaders, experts in the field, State government, the traveling public and safety advocates to ensure public safety when using autonomous vehicles. The Commission has already committed (and will continue to) to support resource sharing venues, such as the Ohio Smart Mobility Initiative (OSMI) and Smart Belt Coalition (SBC) and other informal event collaboration activity.

Under the leadership of the Designated Safety Officer, the Commission will adhere to NHTSA's policies for AVs and comply with State law, rules and regulations. The Commission's Designated Safety Officer needs to better understand NHTSA's guidance and prepare protocols. The Commission's already established procedures will follow the same process for AVs in test situations.

When testing, all AVs will be performed in compliance with NHTSA's Federal Automated Vehicles Policy: Accelerating the Next Revolution in Roadway Safety. However, all vehicles tested will be performed on the property of the Commission, in a controlled testing environment and with the involvement of the Commission's collaborators.

The following elements of NHTSA's Policy will be adhered to for all tests:

- The vehicle used in testing will be operated solely by persons designated by the manufacturer or other entity, who have received training and instruction concerning the capabilities and limitations of the vehicle. The training provided to the persons designated by the manufacturer or other entity must be summarized and submitted to Designated Safety Officer.
- The operators testing the vehicles will hold a valid State driver's license.
- Before being allowed to operate a test vehicle, the persons designated by the manufacturer or other entity as operators of the test vehicles, may be subjected to a background check including, but not limited to, a driver history review and a criminal history check.
- The test operators are responsible for following all Commission rules and traffic laws.
- All crashes involving test vehicles will be reported in accordance with the State laws.

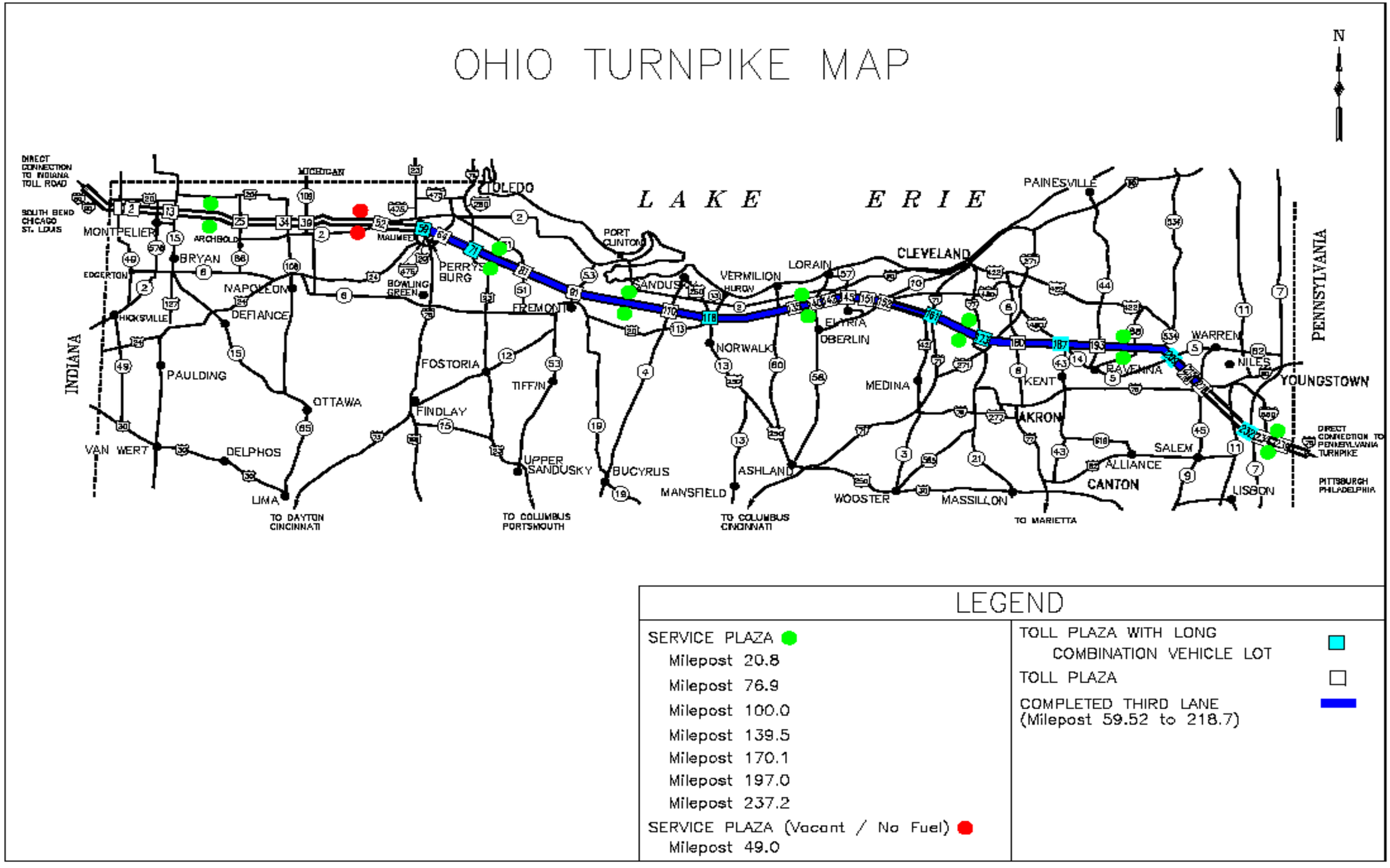
OHIO TURNPIKE MAP
N
LAKE ERIE
INDIANA
PENNSYLVANIA
DIRECT CONNECTION TO INDIANA TOLL ROAD
SOUTH BEND CHICAGO ST. LOUIS
MICHIGAN
TOLEDO
MONTPELIER
ARCHBOLD
BRYAN
EDGERTON
NAPOLEON
HICKSVILLE
DEFIANCE
PAULDING
VAN WERT
DELPHOS
LIMA
OTTAWA
FOSTORIA
FINDLAY
TIFFIN
FREMONT
PERRYSBURG
BOWLING GREEN
MAUMEE
PORT CLINTON
SANDUSKY
UPPER SANDUSKY
BUCYRUS
MANSFIELD
ASHLAND
NORWALK
VERMILION
HURON
LORAIN
ELYRIA
OBERLIN
CLEVELAND
MEDINA
WOOSTER
MASSILLON
AKRON
KENT
RAVENNA
ALLIANCE
CANTON
SALEM
PAINESVILLE
WARREN
NILES
YOUNGSTOWN
LISBON
TO DAYTON CINCINNATI
TO COLUMBUS PORTSMOUTH
TO COLUMBUS CINCINNATI
TO MARIETTA
DIRECT CONNECTION TO PENNSYLVANIA TURNPIKE
PITTSBURGH PHILADELPHIA
LEGEND
SERVICE PLAZA
Milepost 20.8
Milepost 76.9
Milepost 100.0
Milepost 139.5
Milepost 170.1
Milepost 197.0
Milepost 237.2
SERVICE PLAZA (Vacant / No Fuel)
Milepost 49.0
TOLL PLAZA WITH LONG COMBINATION VEHICLE LOT
TOLL PLAZA
COMPLETED THIRD LANE (Milepost 59.52 to 218.7)

EXHIBIT 1