



# Vermont Speed Safety Cameras in Work Zones Report

**PREPARED FOR:**

Vermont Legislature per Act 55 Section 40 of 2021

**PREPARED BY:**

Vermont Agency of Transportation with support by VHB

**REPORT DATE:**

January 14, 2022

# Acknowledgements

## PROJECT WORKING GROUP

### Agency of Transportation (VTrans)

*Zoe Neaderland .....VTrans Project Manager, Planning Coordinator*  
*Costa Pappis .....Policy and Planning Manager*  
*Jon Kaplan .....Operations and Safety Project Manager*  
*Ian Degutis .....Traffic Operations Engineer*  
*Nancy Avery .....Work Zone Engineer*  
*Jesse Devlin .....Highway Safety and Design Manager*  
*Paul White .....Law Enforcement Liaison, Northern VT*  
*Bill Jenkins .....Law Enforcement Liaison, Southern VT*  
*Lance Duquette.....Maintenance and Fleet, District 7 Manager*  
*Jenny Ronis .....Assistant Attorney General*

### Office of Racial Equity

*Xusana Davis .....Director of Equity*

### Department of Public Safety

*Paul Ravelin .....Special Operations Executive Officer*

### Agency of Digital Services

*David Ladouceur .....Chief Information Security Officer*  
*Michael Dente .....IT Manager*

### Department of Motor Vehicles

*Kevin Andrews .....Motor Vehicle Safety Chief*

### Associated General Contractors of Vermont

*Richard Wobby.....Executive Vice President*  
*Matt Musgrave .....Deputy Executive Vice President*

**Other Members**

*Jason Charest ..... CCRPC, Transportation Planning Engineer*  
*Mark Anderson.....Windham County Sheriff*  
*Matt Shagam .....Rich Cassidy Law*

**CONSULTANT TEAM**

*Jenn Conley .....VHB, Consultant Project Manager*  
*Karen Sentoff.....VHB*  
*Kristin Kersavage.....VHB*  
*Evan Haugh.....VHB*

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# List of Acronyms

VTrans	Vermont Agency of Transportation
AGC	Associated General Contractors of Vermont
ALPR	Automated License Plate Recognition
AOT	Vermont Agency of Transportation
ASE	Automated Speed Enforcement
DPPA	Driver Privacy Protection Act
DPS	Vermont Department of Public Safety
FHWA	Federal Highway Administration
MPH	Miles Per Hour
MUTCD	Manual on Uniform Traffic Control Devices
NHTSA	National Highway Traffic Safety Administration
NLETS	National Law Enforcement Telecommunications System
SHSO	State Highway Safety Office
SHSP	Strategic Highway Safety Plan
USDOT	United States Department of Transportation
UTO	Uniformed Traffic Officers
VHSA	Vermont Highway Safety Alliance
VSP	Vermont State Police

# EXECUTIVE SUMMARY

Speed safety cameras are proposed to improve safety in work zones in Vermont, however, questions have been raised about privacy, data security, and other matters. The Vermont Work Zone Speed Safety Camera Study (the Study) was prepared on behalf of the Vermont Agency of Transportation (AOT) as directed by the Vermont Legislature in Act 55 Section 40 of 2021. As directed, the Study evaluated the feasibility of this strategy and makes recommendations on program management, data handling, procurement, and cost. The Study recommends a pilot program focused on education and behavior changes rather than enforcement.

## WHAT ARE SPEED SAFETY CAMERAS?

Speed safety cameras are devices that measure vehicular speeds and automatically photograph vehicles that are exceeding the speed limit by a pre-set amount, such as 10 MPH. Speed safety cameras are being used in jurisdictions in 16 states plus the District of Columbia as well as Ontario and Quebec. Six state transportation agencies either have statewide work zone speed safety cameras programs in place or are in the process of launching them. The use of these cameras in work zones in other jurisdictions has resulted in reductions of the mean speed by 4 to 8 miles per hour. Vehicles exceeding 10 miles per hour over the speed limit are reduced by 39 to 94 percent in US jurisdictions where data is available

## STUDY ORGANIZATION

This report summarizes the best practices research, stakeholder and working group input, and system recommendations, organized as follows:

**Chapter 1.** Introduction and overview of the collaboration among AOT, the working group, and stakeholders.

**Chapter 2.** Vermont context, including a pilot that was proposed to the Legislature in 2020/2021. Establishes the need for a program to complement traditional methods to improve work zone safety and precedent in Vermont for speed camera system authorization.

**Chapter 3.** Highlights evidence from other states and municipalities demonstrating effective speed and crash reductions from such programs.

**Chapter 4.** Explores potential issues and how Vermont can learn from how other programs have successfully managed them, including equity, privacy, and security/confidentiality.

**Chapter 5.** Explains the basic elements of a program right sized for Vermont, including how to achieve the goals of education and behavior change.

**Chapter 6.** Summary of devices and services from vendors in support of programs in other jurisdictions nationwide.

**Chapter 7.** Recommendations for consideration by the Vermont Legislature.

**Chapter 8.** Study conclusions and next steps.

## KEY FINDINGS

The study's key findings from conversations and best practices in other jurisdictions, include:

- › Speeding in work zones exacerbates safety risks to highway workers and the traveling public in these constrained environments. Based on reported crash data in Vermont, 30.1% of work zone crashes involved speeding and/or reckless driving compared to 23.4% of total crashes statewide (see Needs Assessment, Chapter 2).
- › Traditional enforcement in work zones can be limited by site constraints and limited available staffing.
- › Establishing program parameters, procedures, and protocols in advance of deployment and consistently implementing them provides transparency and credibility, calming concerns about privacy, equity, and confidentiality (see Chapter 4 for a discussion of these concerns).
- › All the peer programs identified through Best Practice research result in enforcement actions, however they all had a soft start of warnings, and one continues to issue only a warning for first offenses.
- › Even with turnkey vendor solutions for system administration, administering such a program is personnel intensive.
- › Although participating representatives of law enforcement in Vermont are generally supportive of the program, they do not see a formal role for enforcement in the educational approach put forth by the pilot proposal (see Law Enforcement discussion in Chapter 4).
- › Authorization of a speed safety camera program in Vermont would in no way preclude traditional engineering, education, and enforcement approaches in work zones, but rather complement other methods to improve safety outcomes.

## RECOMMENDATIONS

As the Legislature determines whether to embark on a speed safety camera pilot program in Vermont work zones, the principles that follow should be considered.

**Establish Program Administration Roles and Responsibilities.** Based on best practices, program administration should fall to Vermont Agency of Transportation (VTrans), while the system administration would be supported by a turnkey vendor agreement. A multi-agency Work Zone Speed Safety Camera Implementation Team (Implementation Team) would help guide various matters such as site selection and program evaluation.



**Build in Lead Time, the Pilot and then Evaluation Period.** Based on feedback from other programs, plan for a year lead time, then the active year of the pilot, followed by up to a year to prepare the evaluation. Significant lead time is required to:

- › Enact transparent and well-considered legislation with guiding principles.
- › Establish administrative procedures and protocols.
- › Procure the right vendor, devices, and services to support system deployment.
- › Select the initial set of up to three work zones with guidance by the Implementation Team and consideration of various factors including need, feasibility, equity, and potential to compare to similar work zones for evaluation purposes.

**Support a Substantial Public Information Campaign.** Without the motivation of fines for noncompliance, a substantial public information campaign will be critical to raise awareness about the speed safety camera program and encourage motorists to obey speed limits within work zones. It will set expectations for motorists to anticipate the technology in these environments and consider the impacts of speeding in work zones.

**Establish Deployment Standards.** Prominent signs advising motorists of the deployment well in advance of the work zone will be integral to safety in selected locations. Standards dictating the sign appearance, placement of signage, and placement of equipment within the work zone should be developed in conjunction with current standards for typical work zone setups. For the pilot, these details should be developed on a site-specific basis.

**Establish Data Handling and Event Processing Parameters.** Set clear standards and protocols for data collection, storage, access, use, and disposal, with these general principles (details in Chapter 5):

- › **Data Collection.** Protect privacy and ensure equity with proper and emphatic quality control to establish program credibility. Limit the data collected by the device to only that information essential to document an excessive speed event and nothing about the driver. Limit the data added during processing to vehicle owner name and address. All personally identifiable information should be encrypted and secured to the standards set by Vermont Agency of Digital Services.
- › **Data Processing.** Limit processing time to a maximum of 14 days from the documented speeding event until issuance of notice after which time data will be destroyed if not used.
- › **Data Storage.** Clear controls on data storage should be part of procurement agreements. In line with other programs, vendors will be responsible for the secure transfer of data from the devices deployed in the field to back-end processes. Data security best practices as required by National Institute of Standards and Technology (NIST) will be required by responding vendors. Vendors will also be responsible for storing data on secure servers within the United States.
- › **Data Use.** In line with other programs, data use should be limited to only that needed to carry out this program. Vehicle owner names and addresses will be destroyed upon issuance of the warning. Anonymized summarized data trends for program evaluation should be defined in procurement agreements and only stored until completion of the evaluation (or one year after completion of pilot program).

- › **Data Access.** Only those authorized and trained staff involved in the program or systems administration processes should have access to personally identifiable data. Access level would be matched to the program task.
- › **Data Disposal.** Vehicle owner name and address information in the database should be disposed of upon mailing of the notice within 14 days. The camera vendor should adhere to a written retention policy and provide evidence of data disposal to the program administrator. All data will be disposed of at the completion of pilot program evaluation.

**Engage in a Robust Procurement Process.** Enlist a broad group, including law enforcement, to participate in procurement-related demonstrations of processes including speed collection, data handling, quality control, and mailing preparation before evaluating vendors. Procurement agreements should draw heavily on best practices from other states.

**Secure an Attended Mobile System with Full Back End Support.** Based on feedback from other states, Vermont should procure mobile attended systems that would provide maximum flexibility, allowing systems to be moved with workers in long work zones and make best use of limited Vermont staff resources (see Chapter 6 for equipment information).

**Carefully Develop the Educational Material that Gets Mailed to Owners of Speeding Vehicles.** The system will send a notice directly to the owner of a vehicle that was documented operating over the speed threshold. That notice will inform the vehicle owner – and any drivers of the vehicle – that speeding through work zones increases risk to workers and the traveling public. Persuasive materials, including personal highway worker stories and documentation from the carefully calibrated equipment, should be developed in consultation with professionals from other successful public awareness campaigns.

**Conduct Regular Program Evaluations.** The Implementation Team and other staff should monitor and evaluate the program during the active pilot period as well as after it. This will require aggregate speed data in various locations, crash data—recognizing that for the short time periods involved it may be less conclusive, and qualitative data such as surveys of work crews and resident engineers.

**Identify Funding to Support Cost.** The cost of the program will depend on the requirements specified during procurement and the scope of the vendor agreement. Based on other state programs and discussions with vendors, a pilot is anticipated to cost approximately \$1,500 per attended location per shift (measuring speeds in multiple lanes in one direction) or approximately \$1.1 million for the one-year, three-location pilot. This cost should include a flat fee for each work zone direction regardless of the number of notices sent. In addition to vendor costs, the expense of administering the program at the agency level should be considered. Research indicates that administration costs run from 15 to 25% of vendor costs, or \$165,000 to \$275,000, however may be higher based on additional efforts required for initial procurement. Identifying program funding will be critical for an education-focused program that does not generate fines. Beyond meeting the goal of lowering speeds in work zones, many of the enforcement-based programs reviewed were self-sustaining with revenue from fine collections covering the cost for program and systems administration.

**Table ES-1 Anticipated Vermont Speed Safety Camera Costs**

<b>Working Days Per Month</b>	<b>Months</b>	<b># of Locations</b>	<b># of Cameras</b>	<b># of Shifts</b>
20	6	3	6	720
Cost Per Shift				\$1,500.00
Expected External Cost				\$1,100,000.00
Anticipated Internal Cost				\$275,000.00
Total Pilot Cost Estimate				\$1,375,000.00

This Study found that Speed Safety Cameras will lower speeds in work zones and that through careful process and procurement the challenges associated with privacy and equity can be addressed. These findings will be further reviewed and discussed by the Legislature prior to continuing to consider a Work Zone Speed Safety Camera Pilot Program here in Vermont.

# 1

## INTRODUCTION

The Federal Highway Administration (FHWA) recognizes automated speed safety camera programs as a proven safety countermeasure, and jurisdictions across the U.S. have implemented programs deploying speed safety cameras to complement engineering, enforcement, and educational approaches to reducing speeds. In Vermont, traditional methods of improving safety for highway workers and the traveling public in work zones continues to be a challenge. In 2020 a proposal was brought from the AOT to the Vermont Legislature for authorization to implement an automated speed safety camera pilot program in work zones. Following committee hearings, the Legislature issued Act 55 (2021) Section 40, which directed AOT to study the feasibility of an automated speed safety camera program and recommend whether the state pursue the countermeasure for Vermont work zones. The Legislature requested receipt of the Study findings by January 15, 2022.

Findings in the Legislature’s directive acknowledged that traditional work zone enforcement can be challenging due to insufficient staffing or onsite difficulties. Automated speed safety programs implemented in this environment are intended to complement other engineering and enforcement efforts. The findings also noted that implementing automated speed safety camera systems in these constrained environments is intended to improve worker and motorist safety through increased traffic law compliance, with a focus on influencing behavior change. Through the lens of these legislative findings, the directive specified the study to:

- › Define the system components required of an automated speed safety camera program.
- › Research and recommend image data collection, storage, access, use, disposal, timeline, and authorization protocols.
- › Research the cost to procure equipment and services required to implement a program in Vermont work zones.

In line with the Section 40 requirements, representatives from AOT, Vermont Department of Public Safety (DPS), and the Associated General Contractors of Vermont (AGC) engaged a Working Group with diverse perspectives to shepherd the study. The study team gathered best practices from other programs across the country, including targeted outreach to program managers and personnel in other states as well as vendors that provide custom equipment and service agreements to programs nationwide. This information was gathered and shared with the

working group and a broader stakeholder group to solicit viewpoints on the program parameters and the feasibility of such a program in Vermont work zones. This study report summarizes the research, findings, and recommendations, fully addressing the requirements outlined in the Act 55 (2021) Section 40 legislation.

## WORKING GROUP AND STAKEHOLDER ENGAGEMENT

As discussed, the study team engaged a diverse working group that included:

- › Members of law enforcement
- › Equity perspectives
- › Privacy and legal perspectives
- › Data security experts
- › Contractors
- › Traffic safety experts
- › Engineers
- › Regional Planning Commission staff
- › Maintenance personnel

The working group explored the various aspects of a potential speed safety camera program through productive and respectful discussions, informing the content of this report. The summaries of those discussions are included in the appendices.

The working group discussed additional viewpoints that might help round out the study and address the concerns raised by the Legislature. As a result, it invited a focused selection of stakeholders to bring in viewpoints of driver educators, traffic safety advocates, privacy advocates, automobile and trucking associations, and others to review and discuss the highlights of a potential program at two key points.

In addition to formal meetings with the working group and stakeholders, the study team pursued targeted outreach with some of the participants to better understand perspectives and gather further insights on certain topic areas. Some study team members also met with program administrators for the Maryland SafeZones<sup>1</sup> program and the Pennsylvania Automated Work Zone Speed Enforcement<sup>2</sup> program. These are established programs with demonstrated success.

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1 [Automated Speed Enforcement in Work Zones \(maryland.gov\)](https://www.maryland.gov/automated-speed-enforcement-in-work-zones)

2 [Pennsylvania Automated Work Zone Speed Enforcement \(penndot.gov\)](https://www.penndot.gov/automated-work-zone-speed-enforcement)

# 2

## BACKGROUND FOR THIS STUDY

### VTRANS PILOT PROPOSAL

Speed safety cameras have been proposed before in Vermont. In February 2021, the Agency of Transportation, with support from Associated General Contractors, sought the Legislature’s authorization for a one-year pilot program. The initiative proposed deploying automated speed safety camera systems in work zones with the intended purpose of “improving work crew safety and reducing driver speeds and traffic crashes resulting from improved adherence to traffic laws.” Focusing on locations where staffing capacity or site layout hindered law enforcement in and around the work zone, the initiative proposed piloting the program in up to three work zones across the state. Highlights of the pilot included:

- › An emphasis on education, with a public information campaign to educate travelers about the program.
- › A plan to target excessive speeding behavior by sending notices, without a fine attached, to those traveling above a speed threshold of greater than 10 mph over the speed limit. The pilot locations would serve to study the deployment of such technology and measure its potential effectiveness.

The full language of the proposal is included in the appendices.

The Legislature responded to this 2021 proposal with a directive to further study the feasibility of implementing automated speed safety camera systems in Vermont work zones. This charge was enacted in June 2021 as Act 55 Section 40, which directs the AOT, in consultation with the DPS and AGC, to collaboratively evaluate the potential implementation of automated speed safety camera systems in Vermont work zones, with the intent of changing driver behavior. The Legislature directed that the study assess the program’s feasibility, directing it to:

- › Define the system components of the program.
- › Research the cost to procure equipment and services.
- › Research and recommend data protocols including collection, storage, access, use, disposal, authorized users, and timeframe.

This report was prepared for the Legislature and fully meets the requirements set forth in Section 40. The U.S. Department of Transportation (USDOT) has expressed support for wider use of these technologies and is preparing guidance on the use of speed safety cameras. Staff from the consultant supporting the Section 40 study (VHB) also supported the development of the USDOT guide and recommend using the terminology that is anticipated to become standard. This preferred terminology is “speed safety cameras.”

## NEEDS ASSESSMENT

Work zones are designed to the standards set forth in the Manual on Uniform Traffic Control Devices (MUTCD). Primarily Part 6 of the MUTCD on Temporary Traffic Control addresses the principles required to facilitate construction, maintenance, utility, incident, and emergency activities while maintaining traffic and keeping road users and highway workers safe. These standards are typically supplemented state-by-state with guidance. In Vermont this is the VTrans Work Zone Safety and Mobility Policy and Guidance prepared in 2021. These temporary conditions often entail changes to traffic patterns, narrowed lane widths, lane closures, or other measures to provide protection for workers and traffic during activities within the right-of-way. Although engineers, contractors, and other workers go to great lengths to create uniform and predictable conditions, road users must use heightened awareness in these constrained environments to stay safe. Operating at excessive speeds through these areas can heighten risk and limit ability to reaction to surroundings.

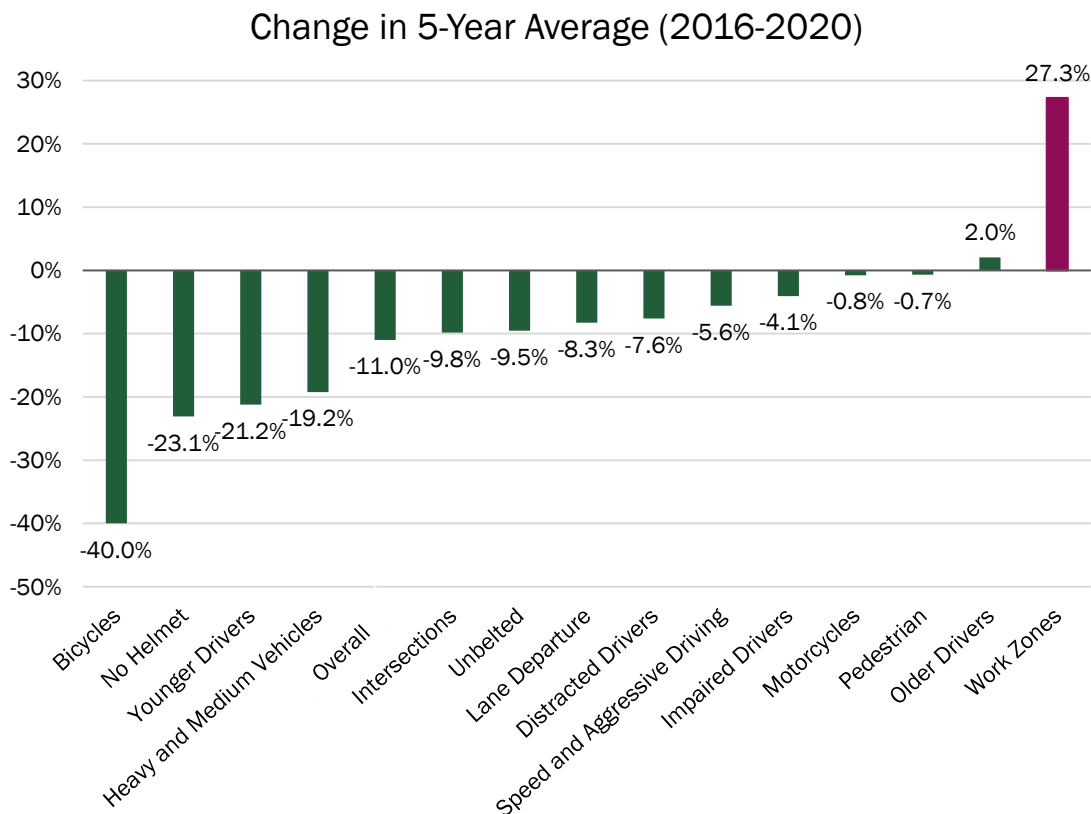
A review of Vermont crash data revealed that there were 209 reported work zone crashes over the most recent five years of data available ([Crash Query Tool | Vermont Agency of Transportation](#)). Of those reported work zone crashes, a greater percentage involved speeding and/or reckless driving at 30.1%, compared to total crashes statewide at 23.4%. Across all crashes regardless of location, 28% of speeding and/or reckless driving related crashes resulted in fatality or injury, compared to 18.7% of those crashes not related to speed or reckless driving. Consistent with that ratio, 28.7% of crashes in work zones involved fatality or injury—compared to 20.8% of all crashes involving fatality or injury statewide.

The Vermont Strategic Highway Safety Plan (SHSP) identifies leading causes of serious injuries and fatalities in Vermont crash data and proposes mitigation strategies. The SHSP is updated every five years by the State Highway Safety Office (SHSO) and Vermont Highway Safety Alliance (VHSA). For the last ten years it has listed work zone safety as a significant emphasis area<sup>3</sup>.

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3 2012-2016 SHSP; 2017-2021 SHSP [VTrans SHSP 2017-2021](#).

Figure 1 Change in Five-Year Running Average of Fatalities and Serious Injuries from Major Crashes by Crash Type



Source: Vermont Agency of Transportation Strategic Highway Safety Plan 2021.

Although the number of fatalities and serious injuries in work zones is low, they are increasing faster than any other crash category in the SHSP. In fact, work zones are one of only two categories whose five-year rolling average fatality and serious injury count is increasing. Figure 1 compares the five-year average for 2016-2020 to that for 2012-2016. The increase in work zones fatalities and serious injuries (+27%) is especially stark when compared to the overall rate, which declined by 11%.

There are a number of strategies used to improve safety in work zones in Vermont. These are deployed by VTrans, AGC, Vermont State Police (VSP), county sheriffs, VHSA, driver educators, and others.

In Vermont, it has been demonstrated that radar speed feedback signs and presence of uniformed traffic officers are effective deterrents to excessive speeding through work zones. VTrans contracts with the Vermont State Police for UTO services, where an officer is stationed at the beginning of a work zone. These “flashing blue lights” are a visual deterrent, and do not leave their location although other officers may separately perform enforcement in the work zone. These two strategies (UTOs with radar feedback signs) were the focus of a 2014 analysis. It found that when used together, traffic exceeding the speed limit was reduced by over 35% and



the number of drivers exceeding the limit by more than 5 mph was reduced by 6%<sup>4</sup>. There is also a mechanism for Resident Engineers on work zone sites to request additional law enforcement personnel to engage in enforcement duties at work zones.

While an effective speeding deterrent, law enforcement has finite capacity to devote to work zone details. State police, county sheriffs, and town police departments face growing demand for their limited overtime availability and thus have little appetite to expand their traffic obligations beyond current contracted uniformed traffic officer (UTO) services. Speed safety cameras multiply the effects of in-person speed enforcement by officers as traditional traffic stops are time and officer intensive. In addition, enforcement in work zones can be challenging based on site constraints associated with work zones. Speed safety cameras could be a tool for design engineers, resident engineers, contractors, or enforcement officers to reduce speeds and encourage safe operation through work zones.

## LEGAL PRECEDENT AND POLICY LANDSCAPE

The federal and state policy landscape should be considered when evaluating an automated speed camera system in Vermont. The intention of such a system is to not only maintain safety on roadways for the traveling public and highway workers, but also to ensure that the system meets or exceeds legal precedents, particularly around the issue of privacy. In 21 states and Washington, D.C., specific laws permit the use of speed camera systems at the state and/or local level. In eight states, the use of speed cameras is prohibited, and in other states, including Vermont, there are no state laws or local ordinances specifically permitting or prohibiting the use of this technology. There are, however, laws and other agreements worth noting in understanding the legal landscape for this technology in Vermont.

- › **Act 55.** As previously outlined, Act 55 was passed by the Vermont Legislature in 2021 and required completion of this Study in Section 40. This feasibility study was to include research and recommendations on the necessary system components required of such a program, the cost to procure equipment and services to support such a program, and the process by which image data documenting excessive speeding events would be collected, stored, accessed, used, and disposed of.
- › **The Driver Privacy Protection Act (DPPA).** A federal law enacted in 1994 that requires motor vehicle offices to limit the release of personal information on motor vehicle records. Vermont complies with the DPPA. The act states that personal information (including photographs, social security numbers, personal identification numbers, name, address, telephone number, medical or disability information, etc.) is considered private unless a person agrees to make that information public, or a requester proves they are eligible to access the information under DPPA. The Act imposes criminal fines for noncompliance and grants individuals a private right of action, including actual and punitive damages, as well as attorneys' fees. States may give third parties access to this information as long they meet one of fourteen permissible uses. Third parties are required to register and are liable for damages if a data breach results in identify theft or other damages.

<sup>4</sup> Lee, B.H.Y., Azaria, D., Neely, S. (2014). Work Zones and Travel Speeds: The Effects of Uniform Traffic Officers & Other Speed Management Measures, TRC Report 14-004.

- › **Automated License Plate Recognition (ALPR).** Because they photograph license plates, speed safety cameras are sometimes compared to ALPR systems. Unlike ALPR, speed safety cameras have little surveillance value as they only photograph a small subset of passing plates and do not automatically interpret the license plate number and jurisdiction. Even so, boundaries and safeguards imposed on ALPR systems to protect identifying information from misuse should set precedent for similar protections for speed safety cameras. In Vermont, ALPR systems have specific legislation enacted in 2018 dictating the use of that technology by law enforcement. The law specifies permitted uses of the systems and requires the data captured by the system be held by the Vermont Intelligence Center. The legislation also frames specifics on the handling, access, use, and disposal of the data, including an 18-month retention period. Metrics to summarize in the annual review of the program are also enumerated as part of the legislation, making the processes for the handling of sensitive data and programmatic review transparent. *The full language of 23 V.S.A. § 1607 is included in the appendices.*
- › **The Standard Specifications for Construction.** Outlines the standard procedures, protocols, requirements, and duties for uniformed traffic officers in work zones. These duties can be fulfilled as part of the Contract, by the contractor with authorization from the engineer, or by the contractor without authorization where the costs are not direct and are considered incidental.

# 3

## **EFFECTIVE SPEED AND CRASH REDUCTION WITH SPEED SAFETY CAMERAS**

### **EVIDENCE FROM OTHER JURISDICTIONS**

Automated camera enforcement is used widely across the U.S. and internationally, in both speed and red-light enforcement configurations. Jurisdictions in 16 states, the District of Columbia, and the provinces of Ontario and Quebec operate speed cameras (Figure 2). State transportation agencies in Maryland, Pennsylvania, and Illinois currently run stateside work zone speed camera programs with an enforcement component, and New York authorized a state program in September 2021. Connecticut is about to begin a work zone speed camera program modeled after Pennsylvania and Maryland. A proposed program is also pending in Delaware.



**Table 1 Effects of Camera Programs on Speeding**

Agency	Location	Fine	Reduction in Vehicles Exceeding Speed Limit	Reduction in Vehicles Exceeding Speed Limit by 10+ mph	Other Results
<b>City of Portland, OR</b>	Urban Streets	\$170	71%	94%	
<b>Montgomery County, MD</b>	Urban Streets	\$40		62%	
<b>City of New York</b>	School Zones	\$50	63%		
<b>City of Scottsdale, AZ</b>	Urban Freeway	\$162		77%	
<b>Oregon DOT</b>	Active Work Zones	\$320			23.7% reduction in vehicles 5+ mph over speed limit
<b>Illinois DOT</b>	Active Work Zones	\$300 (1 <sup>st</sup> offense), \$1000 (2 <sup>nd</sup> )			Reduced mean speed by 4-8 mph, bringing it just below speed limit
<b>Washington State DOT</b>	Active Work Zones	\$137		39%	
<b>Pennsylvania DOT</b>	Active Work Zones	1 <sup>st</sup> - Warning 2 <sup>nd</sup> - \$75 3 <sup>rd</sup> - \$150	16.60%	43.6%* (11+ mph, not 10)	

Unlike red light camera enforcement systems, where the outcomes have been more varied, studies of the effectiveness of speed cameras generally show reductions in demonstrated crash frequency and severity. Red light cameras have been shown to sometimes increase crashes, particularly rear-end type collisions.<sup>6</sup> For speed camera systems, the research indicates the expected outcomes are less ambivalent. In 99 out of 101 crash-reduction factors available for automated speed enforcement programs, where the study was rated 3 stars or higher by the Crash Modification Factor Clearinghouse, automated speed enforcement reduced crash frequency. It is important to note that speed-related crashes were reduced by a range of 4.5% to 30.5% based on the data available through the Crash Modification Factor Clearinghouse<sup>7</sup>.

6 37% Increase in Rear End Crashes with Red Light Camera System, Ko et al

7 CMF Clearinghouse <http://www.cmfclearinghouse.org/>

Speed safety camera programs that use fixed sites or move cameras along a corridor, have been in-place for 3+ years, and have multiple devices and locations are in the best position to evaluate their effect on crashes.

**Table 2 Effects of Camera Programs on Crash Rates**

Agency	Location	Details
Montgomery County, MD	Urban Streets	39% reduction in likelihood of a crash producing a severe injury or fatality
New York City	School Zones	15% decrease in total crashes, 14% decrease in injury crashes, 21% decrease in severe/fatal crashes
Winnipeg, Manitoba	Urban Streets	24% decrease in injury crashes
Edmonton, Alberta	Urban Streets	15.5% reduction in all crashes, 19.7% for injury crashes, and 15.6% for PDO crashes (averages from 40 sites)
Norway	Rural	12% to 61% reduction in fatal or severe injury crashes for segments 100 meters upstream and 1 km downstream of camera installations

In many jurisdictions that employ automated camera enforcement systems, evidence has demonstrated behavior change across both space and time. After passing speed cameras, drivers tend to moderate their speeds for some distance beyond the camera zone.

Statistics on repeat offenders offer insight into how effectively speed cameras change drivers' behavior. For example, in a June 2017 evaluation of the City of New York's school speed camera program reviewed the number of times each vehicle owner received a fine. In that assessment, only 19 percent of citations were issued to repeat offenders. This shows most drivers change their behavior to avoid repeated citations.

A speed camera pilot on a freeway in Scottsdale, Arizona, measured vehicle speeds at the cameras and 25 miles downstream in Glendale. Camera enforcement in Scottsdale was associated with a **78%** decrease in the rate of drivers speeding by **11+ mph** at the downstream location.

Across the jurisdictions that use these systems, public outreach and advance warning signage are used to generate awareness and educate the traveling public on the importance of safe vehicle operation and compliance with traffic safety laws. Much like the intended effects of UTOs to promote voluntary compliance, these jurisdictions have developed campaigns to raise awareness and set up camera deployments to be highly visible. These campaigns have focused on changing behavior, resorting to penalties through enforcement only as a last resort. Summarized in Table 3, some locations have deployed surveys to understand the impact of these public outreach campaigns and level of public support for the technology as a tool in promoting

safety. These survey tools have revealed that automated speed enforcement programs enjoy public support. In the survey results reviewed, the majority of respondents were aware of and in favor of the automated speed enforcement (ASE) program.

**Table 3 Public Perception of Camera Programs**

Agency	% Aware of ASE	% in Favor
Montgomery County, MD <sup>8</sup>	95%	62%
Portland, OR <sup>9</sup>	66%	75%
Scottsdale, AZ <sup>10</sup>	90%	77%

## OTHER WORK ZONE PROGRAMS

Speeding has elevated risks in work zone environments where traditional law enforcement can be challenging. For these reasons, work zones are often recognized as ideal environments for automated speed enforcement. States including Arizona, Washington, Oregon, Maryland, Illinois, and Pennsylvania have run automated work zone speed enforcement programs. New York State recently authorized a work zone pilot that will launch in 2022. Programs in Connecticut and Delaware are also anticipated in the near term.

In the United States, work zone enforcement programs are well publicized, and their placement is overt. At least one advance warning sign, set upstream some distance from the camera, is always used. Speed feedback signs are commonly collocated with speed cameras to give drivers a last chance to decelerate.

Peer programs typically involve a warning period of some kind. Often, programs issue warning letters in lieu of fines for the 30-90 days after installation. Some programs, like Pennsylvania's, send warning letters for any first offense.

Program parameters such as penalties, allowable locations, types of photos that can be taken, evaluation data collected, and required warning signs must be defined early on in either legislation or procurement. A comparison of several parameters in the three currently active work zone speed camera programs appears in Table 4.

<sup>8</sup> [Effects of automated speed enforcement in Montgomery County, Maryland, on vehicle speeds, public opinion, and crashes - PubMed \(nih.gov\)](#)

<sup>9</sup> [Fixed Photo Radar System Portland 2019-20\\_FINAL.pdf \(oregonlegislature.gov\)](#)

<sup>10</sup> [Scottsdale AZ Speed Cameras.pdf \(dot.gov\)](#)

**Table 4 Peer Program Parameters**

<b>Parameter</b>	<b>Maryland</b>	<b>Illinois</b>	<b>Pennsylvania</b>
<b>Did program start as a pilot?</b>	Yes, 8 months	No	Yes, currently in 3rd year of a 5-year pilot
<b>Year program started</b>	2009	2006	2018 (legislation)
<b>Limited to active work zones?</b>	No, cameras can operate even when workers are absent	Yes, workers must be present	Yes, workers must be present
<b>Warning signs used</b>	One static sign and one speed feedback sign	One static sign, one speed feedback sign, and plaques on speed limit signs	Two static signs; speed feedback signs used occasionally
<b>Site selection criteria</b>	Perceived risk and viability of in-person enforcement		Crash history and speed studies
<b>Types of photos taken</b>	Two time-stamped photos of rear vehicle that include a stationary object	Front of vehicle, driver face, and rear license plate	Front and rear license plate
<b>Penalties</b>	\$40 civil fine; no warnings	Criminal penalties identical to traditional enforcement \$375 fine for first offense; \$1000 fine for second	Warning for first offense; \$75 for second offense; \$150 for subsequent offenses
<b>Notification timeframe</b>	14 days	14 days	30 days



# 4

## ISSUES WITH SPEED SAFETY CAMERAS

### ISSUES

In jurisdictions with speed safety camera programs, certain issues routinely provoke extended debate. These include equity, privacy, data security, confidentiality, and law enforcement. The study team researched these issues to find best practices that can mitigate or avoid problems. If Vermont goes forward with implementation, the recommendations presented in this section will help manage these issues through carefully considered authorizing legislation, rigorous procurement processes, and detailed agreements with third parties.

### LAW ENFORCEMENT

From the start of the study, the law enforcement participants on the working group expressed both their support and their concerns regarding speed safety cameras. They expressed discomfort if the currently proposed educational program were to involve participation by enforcement staff. The study team held two focused meetings with them to better understand their concerns. In addition, based on a meeting with PennDOT at which the initial skepticism and ultimate support of Pennsylvania law enforcement partners for the program was discussed, a meeting was scheduled with Pennsylvania State Police for Vermont enforcement staff to directly discuss the Pennsylvania automated speed enforcement program.

The initial concerns outlined by working group law enforcement participants, as summarized in Figure 3 included a concern regarding speed data collection. In traditional enforcement, trained law enforcement visually note the traveling speed of a vehicle in addition to confirming it with equipment. There is a concern that without the trained officer determination, that equipment-based speed determinations, especially if associated with a fine, would be appealed and not prevail when challenged. Figure 3 includes each of the initial concerns raised by Vermont law enforcement and the information obtained from vendors and Pennsylvania that addressed some of those concerns under the currently proposed program. Some law enforcement members expressed that some of these concerns would remain if enforcement were a part of the program.

**Figure 3 Initial Concerns Outlined by Project Law Enforcement Participants**

### **Initial Vermont Law Enforcement Concerns**

- » Concern that Automated Speed System does not have highly trained officer input/independent assessment of speeds/violation.
- » Concern regarding officer time required if enforcement included.
- » Concern with judicial process and burden of proof with this method of speed measurement.

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### **Vendor Input**

- » Methods of validating speed measurements onboard like distance over time with two cameras and lidar/radar speed measurement within allowable variance.
- » Radar/lidar determines location to take image, no passive image taking or license plate reading.
- » Agency confirmation of each letter prior to issuance.

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### **Pennsylvania State Police (PSP) Input**

- » PSP affirms calibration criteria, self tests of equipment, plate number matches photo and documentation is in order for infractions resulting in a fine.
- » Enforcement of civil fine requires only preponderance of evidence, not beyond a reasonable doubt threshold required for traditional speed enforcement.
- » PSP conducts unannounced audits on the deployments. 170 audits to date have always met statutes.

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### **Resulting Vermont Recommendations**

- » Duplication of speed measurements
- » Frequency of calibration
- » No enforcement at this time

## EQUITY

Equity is a concern in implementing speed enforcement programs. In other enforcement-based, large-scale programs, three areas are of particular concern:

- › The site-selection process
- › Documentation and/or validation of the excessive speed event
- › Payment system for programs that result in enforcement action

Equity concerns remain valid, if perhaps less impactful, when a speed safety camera program does not result in an enforcement action. Any program should aim to be transparent in its efforts to mitigate any disproportionate impact—especially on marginalized populations. This includes providing transparency in the site selection process, like Toronto’s Community Safety Zones program does for site selection and other program details on their website<sup>11</sup>. All programs should address unforeseen concerns or issues through use of regular program evaluation and adjustments. It may be helpful for the program administrator to request a program review by equity and social justice advocates as part of the evaluation process.

Figure 4 Transparency in site selection as provided on Toronto’s website.

Fines & Penalties	Locations	Site Selection	Education Campaign	Pilot & Warning Letter Period	History & Statistics
<p>In selecting ASE sites, a two-staged process was used that was developed based on best practices and provincial guidelines.</p> <p>Stage 1: First, an initial screening of all Community Safety Zones near schools were identified and prioritized based on the following data:</p> <ul style="list-style-type: none"> <li>• Collisions involving children</li> <li>• Collisions where a vulnerable road user was killed or seriously injured</li> <li>• Vehicle speed data</li> <li>• 24-hour traffic volume</li> <li>• Percent of students within walking distance</li> <li>• Requests from Police and the public</li> </ul> <p>Stage 2: Once the sites were prioritized, a manual review of the site was conducted which included the following considerations:</p> <ul style="list-style-type: none"> <li>• Necessary regulatory and advisory signage (Community Safety Zone, Speed Limit, and ASE);</li> <li>• No obstructions or impediments to the equipment;</li> <li>• Adequate boulevard space to accommodate the equipment;</li> <li>• No planned road work;</li> <li>• No sharp curves or extreme grading changes;</li> <li>• No speed limit reductions planned;</li> <li>• Adequate distance from speed limit transitions; and</li> <li>• Cannot have the presence of a flashing 40km/h speed limit reduction sign.</li> </ul> <p>Once sites are assessed, operational considerations may result in minor adjustments to site prioritizations.</p> <p>To submit a request for ASE, please fill in the online form<sup>12</sup>.</p>					

Lessons learned from red-light camera deployments in other jurisdictions indicate that site selection could disproportionately impact marginalized populations. One mitigation strategy would be to ensure that sites are geographically distributed. The site selection process for work zone deployments is narrowed to eligible construction projects, which are likely to be geographically distributed randomly, leading to an inherently more equitable program. In Vermont, there are relatively few construction projects that would likely be strong candidates for a pilot program, and the pilot locations should be chosen such that they can be compared with similar projects where speed cameras are not deployed. A pilot period of greater than one year might also be a way to support use of this equity strategy in Vermont.

With speed camera systems, the speed measurement technology and camera system operate in combination to capture the excessive speed event without human discretion and potential biases being introduced. This could make for a more equitable approach. The one step in the process

11 [Automated Speed Enforcement – City of Toronto](#)

where bias may be introduced is in the validation of a documented speeding event, where the warning or citation is authorized to be sent to the vehicle owner. Having only documentation of the vehicle itself and not the driver's age, race, or gender, should reduce equity concerns. In this step, it is critical to provide just enough information to the authorizing agent to verify the documented infraction and proper training of the authorizing agent to diminish any potential bias. This approach would be emphasized in a potential Vermont program. Additional equity has been reached in peer programs by including a geographical analysis into the site selection process.

#### Equity Recommendations:

- Pilot Program Evaluation to include Equity Review of Site Impact
- Legislative direction that photos do not include driver

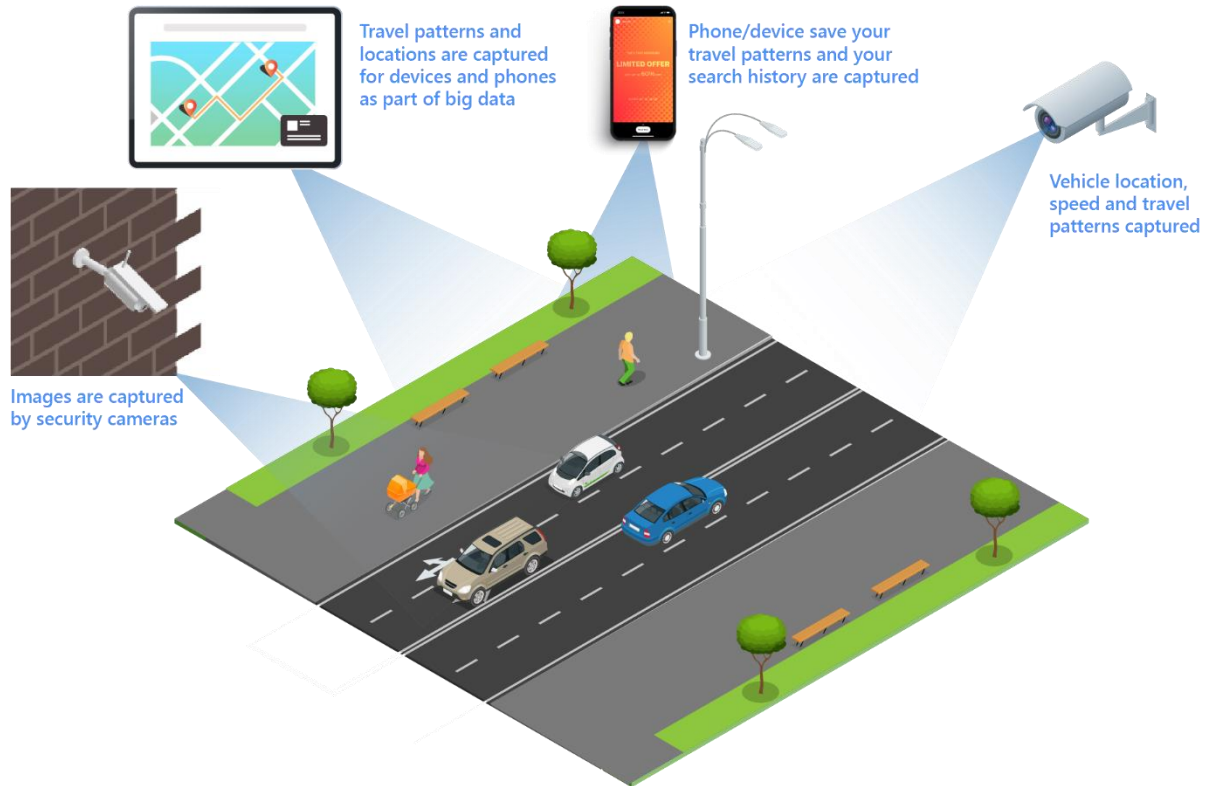
Some programs have made efforts to reduce potential disproportionate economic impact by making payment plans or sliding-scale payments available to those not able to pay citations. In the case of the education-only approach proposed, such adjustments would not be necessary, but should be considered if penalties for infractions are contemplated in the future.

## PRIVACY

Privacy—or the idea of “big brother” watching—is the concern most frequently raised in regard to speed camera systems. There are a few points to emphasize in this discussion:

- › Placing the personally identifiable information from a speed safety camera program in context of how minimal it is compared to other parts of common Vermont activities.
- › Exercising prudence by limiting the data collected by the program.
- › Handling personally identifiable information appropriately to maintain security and confidentiality.

Figure 5 Examples of passive collection of personal data in our lives.



Speed safety cameras do not present a general privacy or surveillance intrusion. The cameras only capture enough data to identify vehicles (not drivers) operating at excessive speeds. The technology used to document an excessive speeding event does not passively collect identifying information for all vehicles passing the site; instead, they are designed to gather an “evidence package” for only those vehicles operating in excess of the set speed threshold. Further, for programs that hold the vehicle owner liable, the evidence package is limited to just enough information to identify and validate the license plate information. In most states with active programs, vehicle owner liability is the preferred approach to protect privacy as it limits the information captured during an excessive speed event and does not require a driver photograph. The cameras, in conjunction with the other technology onboard, are adjusted to capture the license plate in all lighting conditions and, in many cases, just enough of the vehicle to validate make/model/color when associated with registration records.

**To Protect Privacy, Recommendations:**

- Owner, not driver liability
- No passive camera use, only speed event triggered
- Photos of vehicle only, not driver

**ACCURACY**

Accuracy concerns were raised by a number of stakeholders, outlined in the best practices research, discussed with other administrators, and confirmed with vendors. The radar or lidar

sensors used in these speed safety cameras track objects (vehicles) as they move through their range. They can simultaneously track as many as 32 vehicles' position and speed. They have two sensors whose measurements must match as a quality check. The cameras and radar are integrated so that a position mapped by radar is translated to a location in the camera's frame.

During set up, the operator sets a trigger speed above which an event is flagged. When the two radar detectors confirm a vehicle exceeding the trigger value, the camera takes a photograph. The position information from the radar sensor is used to locate the speeding vehicle within the frame ensuring the correct vehicle is photographed. Vendors universally claim  $\pm 1$  mph or better of accuracy.

Both vendors and other jurisdictions indicated that with regular calibration, the speed safety camera devices have been shown to be accurate in a variety of settings, including by unannounced audits. The methodology of collecting two speed samples to confirm the speeding event reduces the potential for false events being recorded, even in cases of multiple lanes, hills, and curves.

Credible speed measurements are crucial to a speed safety camera program and programs throughout the country have confirmed that their speed safety cameras are accurately measuring speeds. Pennsylvania State Police has conducted 170 audits of speed camera locations and found each location to be collecting data accurately. These measurements depend on proper setup, quality assurance and quality control protocols, calibration, and other operating standards. As a baseline, the National Highway Traffic Safety Administration (NHTSA)<sup>12</sup> standards for the technology set the minimum specifications for the equipment deployed. Ensuring proper protocols are followed through standard setup and test procedures, field manual development, daily logs, deployment audits, and documented calibration practices is essential to the integrity of the data collected. Accurate speed measurements are required to identify an excessive speed event and trigger collection of photos and personal information, but on their own are not sensitive or personal identifying information.

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<sup>12</sup> NHTSA LIDAR Speed-Measuring Device Performance Specifications <https://www.nhtsa.gov/staticfiles/nti/pdf/809811-LIDARSpeedMeasuringDevice.pdf>

NHTSA Across the Road Radar Specifications:  
<https://www.nhtsa.gov/DOT/NHTSA/Traffic%20Injury%20Control/Articles/Associated%20Files/810845.pdf>

## SECURITY AND CONFIDENTIALITY

The evidence packages gathered by safety camera systems are secured through encryption protocols and, most often, transferred to the back-end post-processing via secure cellular communications. Much like those processes in place for passive electronic tolling, the back-end post-processing system associates license plate information with registration records to identify vehicle owner, validate vehicle and plate match to the registration records, associate owner name and address with the documentation, and communicate with the vehicle owner. Strict procedures are established to secure this

sensitive information, maintain confidentiality, ensure that the data is accessed for this specific purpose, ensure those accessing the data have the authority to do so, and dispose of the information in a timely manner. In some states, these procedures are outlined in legislation; in others they are dictated in the procurement requests and agreements.



**To protect the security and confidentiality of personal information used in speed safety cameras, Vermont Agency of Digital Services will define the methodology and security protocols required for any vendor:**

- For only authorized staff to collect vehicle owner information
- That information is stored, transferred, and encrypted using data security best practices as defined by National Institute of Standards and Technology
- That only trained personnel have access to the data
- Require that vendor generates and mails warning within 14 days
- The vehicle owner information data is destroyed at 14 days/issuance of the warning

# 5

## PROGRAM COMPONENTS

### ADMINISTRATION/COORDINATION

Speed safety camera systems require ongoing administrative, programmatic, and operational work. Administrative and programmatic responsibilities often fall to entities with appropriate authority over the roadways on which the system is used. For statewide programs, this may include collaboration among multiple agencies, like facility owners, operators, and law enforcement. The operational responsibilities generally fall to turnkey vendor solutions with close coordination with the administrative organizations.

In Pennsylvania, for example, program responsibilities are split between several agencies, with an interagency agreement spelling out the roles of PennDOT, Pennsylvania Turnpike Commission (PTC), and Pennsylvania State Police.

- › PennDOT and PTC are responsible for scheduling and monitoring on their respective roadways and development of standards for their respective agencies.
- › PennDOT handles the financial processes, regulations, and informal hearing officer provision.
- › PTC handles auditing processes and contract compliance.
- › Pennsylvania State Police are responsible for violation review, verification, and in-field deployment audits.

In the Pennsylvania program, a consultant team was hired as the program administrator and the vendor is considered the system administrator. The consultant supports the administration through program development, process updates, quality assurance, site selection, scheduling, public outreach, monitoring, and evaluation. The vendor handles deployments, violation processing and review, citation mailing, fine collection, customer service, record keeping, and informal hearing support. As outlined later in the report, a similar approach is recommended in Vermont, but because the recommendations for Vermont do not include an enforcement component, the agency staff time requirements would be lower. However, VTrans may perform the program administrator tasks in-house for which Pennsylvania uses a consultant.



## COMMUNICATIONS/PUBLICITY

The compelling need for speed safety camera systems is rooted in the opportunity to educate the public on the importance of cautious driving through work zones for the safety of workers and the traveling public. Section 40 legislation specifically identifies the need for a public outreach campaign ahead of the implementation of a such a system.

Most jurisdictions using speed safety camera technology have multifaceted education campaigns. These include postings of messaging and videos on social media, website information, a first offense warning program prior to enforcement, and, in some cases, an opportunity to take a course to reduce the impact of the penalty. As Vermont is not participating in enforcement in its effort, some of these educational components are not available.

Similar to other VTrans safety campaigns, publicity efforts should use multiple channels to reach the full range of demographics in Vermont. Outreach should include press releases, a web site, and social media posts at a minimum.

Paid digital and radio advertising should also be considered. These efforts should follow a coordinated messaging strategy, emphasizing both the need for the program and how it will work. Basic facts about the program—such as the types of sites used, the nonpunitive notices, how the program protects privacy, and the speed thresholds used—should be prominent so that misinformation does not shape public perception. These communications should make it clear that traditional law enforcement will continue and is not precluded by the use of speed cameras at a location.

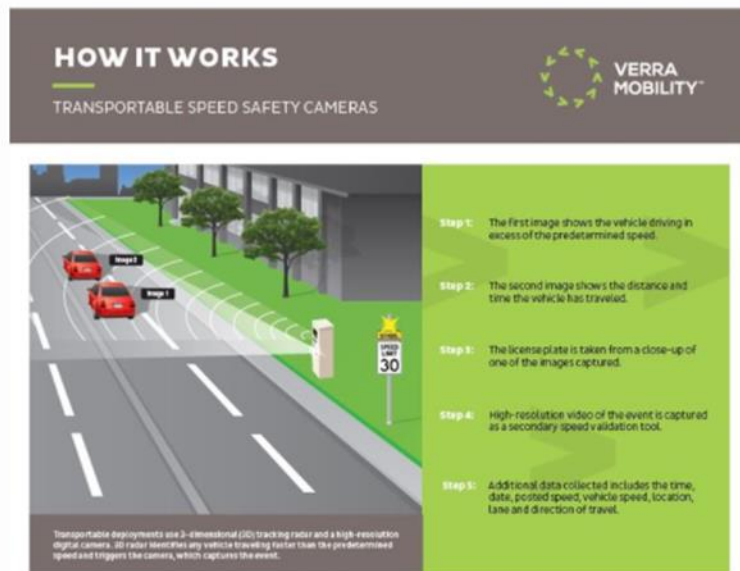
The warning letters themselves are also an important messaging opportunity. Their language should strike an educational tone and convey the dangers of excessive speed. The letters may also include the fines the driver would have received had an officer cited them. An option that would reduce tendency to protest is to include the image taken with the time stamp, speed documented, and posted speed. The letter could ask recipients to log in to a website to watch a

**Figure 6** University Park, Maryland’s website provides clear information on how their program works.

### How it Works

The Town of University Park utilizes transportable and handheld speed safety cameras. The technology for the cameras is shown in the illustrations below.

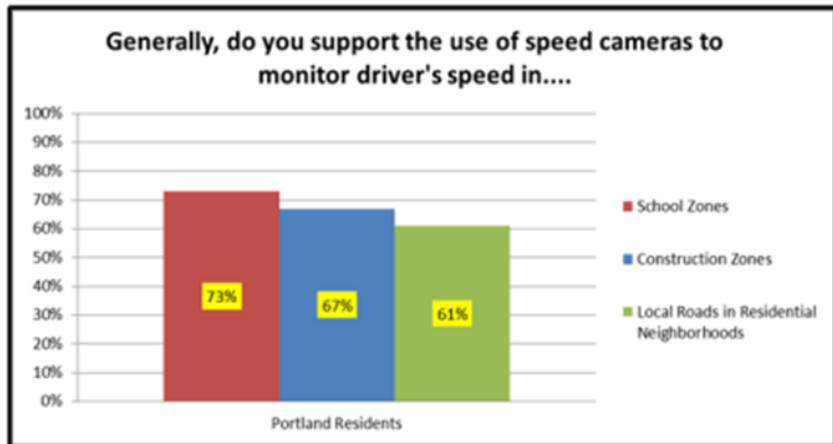
Violations are mailed to the registered owner of the vehicle after review and approval of the data and recorded images by a member of the Police Department. The speed safety camera installations represent state-of-the-art technology that is precise and unbiased in its ability to identify vehicles speeding.



safety video. There is interest in further exploring potential incentives for viewing safety messages or changing driving behavior.

Positive public perception is important for a successful pilot program. There should be ongoing efforts to monitor and respond to this perception to the extent practical. Low-cost options such as digital surveys or asking warning recipients to complete a survey could offer insight into public concerns and level of support. Other states have used polling to determine public awareness, opinion

Figure 7 Example of Public Opinion Survey in Portland Oregon’s Photo Enforcement Report 2017-2018



of, and misunderstandings of speed camera programs. Portland, Oregon for example, has conducted public opinion surveys regarding support of speed cameras in school zones, work zones and on local roads in residential neighborhoods and the public’s feelings regarding their use for enforcement versus traditional enforcement since before implementing their program.

## PROCEDURES AND PROGRAM PARAMETERS

Even with turnkey third-party technology and services, setting the program parameters with input from stakeholders and providing transparency through well-documented policies and procedures prior to procurement are critical to success. Review of best practices from other jurisdictions and discussions with stakeholders are summarized below, with recommendations on the program parameters for a system rightsized to Vermont work zones.

### SITE SELECTION

The original proposal to the Legislature indicated the technology be deployed only in active work zones, and where site-specific constraints or staffing may present challenges to traditional law enforcement. The working group looked to other programs for clarity on the definition of active work zones, which has been defined as either having workers present or workers present and/or significant changes to the typical traffic patterns. Following a discussion, the working group defined active work zone in the context of speed safety cameras to mean the presence of workers and construction activity during that day, within reason. For the purposes of identifying when it is appropriate to deploy speed safety cameras in work zones, the conclusion of the working group addressed two hypothetical situations:

- › The hypothetical situation of everyone on site going on lunch break at the same time was used to illustrate situations where the work zone was still considered active during the lunch break and the speed safety camera would continue to collect data through that lunch break.
- › The hypothetical situation where traffic control devices are in place with a change to the typical traffic pattern, but without the presence of workers or construction activity for an extended period (i.e., days) was used to illustrate the distinction of an inactive work zone for the purposes of speed safety camera deployment.

The active work zone should be defined as a work zone that has highway workers present that day, even if those workers are on a short break.

With the program being exclusive to active work zones with various characteristics, there will be a small number of possible locations to screen during one construction season. For a longer-term pilot program, candidate projects may be identified through close coordination with the project development process and transportation management planning process; this process is similar to that used to determine other appropriate work zone safety and mobility strategies. Criteria can include metrics such as project duration, posted speed limit reduction, traffic speed profile, work zone layout, potential worker vulnerability, traditional law enforcement opportunity, and others.

In some states, like Maryland, speed safety cameras are reserved for limited-access highways, while other states deploy them in work zones along different types of facilities, including two-lane highways. Given the opportunity to test the technology for different types of deployments and the desire to understand the effectiveness of such technology to reduce speeds across the types of work zones typical to Vermont, the working group recommended allowing for site selection on limited-access and state highway routes, where VTrans has jurisdiction.

In the Pennsylvania program, a consultant serving as the program administrator manages the selection process. For a pilot program in Vermont, site selection responsibility should be left to an Implementation Team made up of representatives from project delivery, traffic safety, construction, contractors, and law enforcement. As the program progresses, the process for selection and criteria should be reviewed to evaluate and refine the selection process.

**In Pennsylvania, a request for deployment in a work zone can be made by the design or resident engineer to the program administrator. The site is then vetted against the project selection criteria, determining if it is a viable candidate for deployment.**

#### **Location Selection Recommendations:**

- Chosen by a multiagency Implementation Team
- Difficult for Traditional Enforcement
- High Speed or Crash Data Trends
- Active Work Zones with Workers Present
- Available Comparable Location for Evaluation

## SPEED THRESHOLD

One consideration for establishing a program is setting the appropriate speed threshold for vehicles operating at an excessive speed through the work zone. The preliminary proposal identified a threshold of greater than 10 MPH over the speed limit. In typical law enforcement activities, this threshold would be set at the discretion of the officer; in existing statewide speed safety camera programs deployed in work zones, the threshold is generally set between 10 and 12 mph over the speed limit.

A preliminary review of data from weigh-in-motion stations on interstates in Vermont during typical operation (i.e. not in work zones) indicates that approximately 10-20% of traffic is operating at greater than 10 MPH over the speed limit. A before study of operating speeds in candidate work zones on Vermont highways could serve the dual purpose of capturing baseline information to assess the effectiveness of program and informing the appropriate speed threshold for issuance of a notice to the vehicle owner.

During working group meetings and targeted outreach, it was noted that consideration should be taken in both setting the speed threshold and communicating the threshold with the public to ensure that the program is encouraging the desired behavior change. Provided the same speed distribution through a work zone, a lower speed threshold would generate more exceedance events and therefore the need to send more notices via mail. In practical terms, balancing the sought behavior change with the administrative obligations of the program will need to be considered and monitored.

A speed threshold for the program should be preliminarily set at greater than 10 mph over the speed limit, consistent with the initial pilot proposal. The threshold for issuing notices should be revisited as part of the program evaluation and adjusted if the desired behavior change is not deemed acceptable.

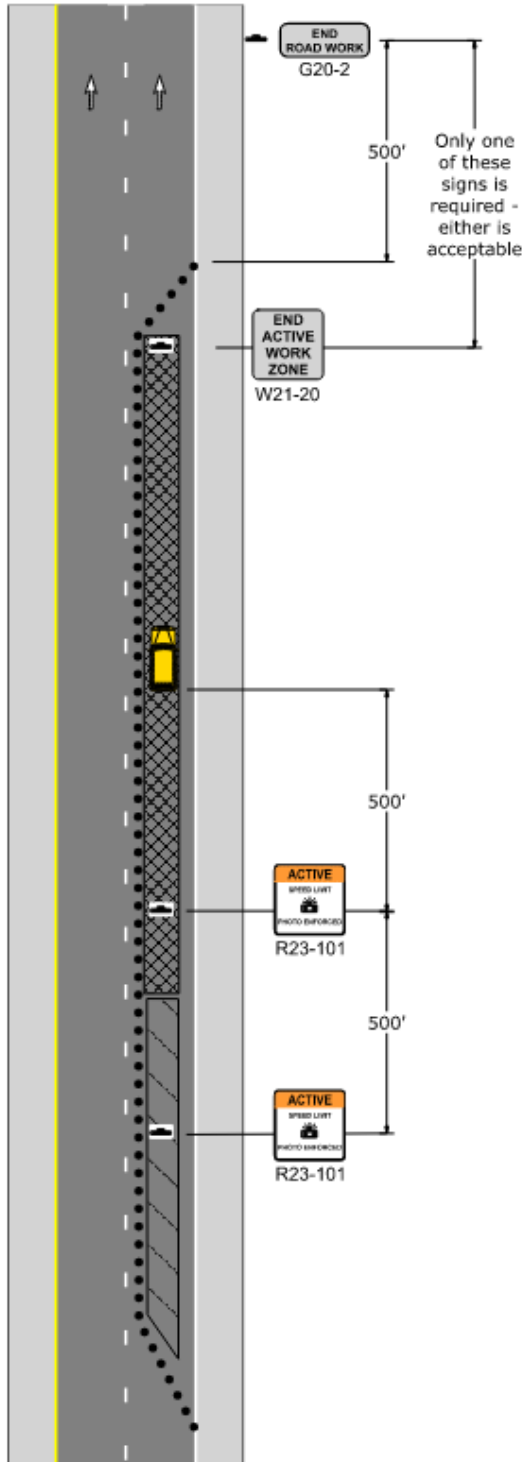
## EQUIPMENT AND PHYSICAL INFRASTRUCTURE

The equipment required in speed safety camera systems includes camera(s) and radar or lidar speed measurement technology. The hardware is typically packaged with power supply, onboard data storage, communications devices, processing unit, and software. Configuration and operation of the package varies across devices, vendors, and applications; various configurations available from vendors are discussed in more detail in Chapter 6 and can be customized based on the program needs.

It is important to give roadway users proper warning that they are entering an area where speed cameras are in use. Other programs have requirements in statute, agreements, or state standards that dictate at least one to two advanced warning signs are required upstream of the camera. Care needs to be taken to locate warning signage such that a driver can modify behavior safely in advance of the speed safety camera. Although the Manual for Uniform Traffic Control Devices includes signage associated with Photo Enforcement, the Vermont program will not include enforcement, and as a result need to develop appropriate signage. One of the standards developed for a typical work zone configuration and speed safety camera deployment with required signage is included in Figure 8. Much like the presence of law enforcement or a radar

speed feedback sign, providing signage that the system is in place may help to compel behavior change through deterrence.

Figure 8 Right Lane Closure Standard for Pennsylvania Automated Work Zone Speed Enforcement Program



## DATA HANDLING

The primary data collected in a speed safety camera program is a speed measurement and a photograph. The speed measurement is used to identify a vehicle operating in excess of the set threshold, and an image or images of that vehicle are captured. The camera system is only triggered to capture a photograph by an excessive speed measurement, eliminating passive collection of information that may be considered sensitive. The software is also capable of blurring or masking extraneous information as the photograph is taken, so only information required by the program is recorded.

Programs vary in the required photo documentation of an excessive speed event: photographs of just the license plate (Ontario), front and rear plates (Pennsylvania), license plate and vehicle (Quebec), two photographs of the vehicle and a stationary object (Maryland), front of vehicle, driver's face, and rear license plate (Illinois). The possible photo requirements depends on whether the driver or the owner of the vehicle is anticipated to receive the notice. For instance, in Ontario, Pennsylvania, Quebec, and Maryland, the liability for the excessive speed event falls to the owner of the vehicle. The information on the license plate is sufficient to identify the owner's name and address to issue the citation. In Illinois, the driver is the liable party, making a photograph of the driver necessary to meet the requirements of the program, but also requiring more identifying information to be captured. For the owner-liable programs noted, variations of required photographs have all included the license plate at a minimum. The other information might help to validate that the license plate matches the registered vehicle—like in the case of Quebec where the vehicle image could help verify the vehicle make, model, and/or color on record.



In Pennsylvania, front plates are not issued to personal vehicles, but the program was interested in better identifying commercial vehicle infractions. On commercial vehicles, tractors often have front plates associated with the owner and likely operator while the trailer typically has a different plate affiliated with the commercial entity responsible for the product being shipped. For comparable programs, the documentation is included in an evidence package used to issue an enforcement action such as a warning or citation associated with a fine. In an educational program, the goal should be to minimize the information captured while ensuring the documented speeding event is credible. As such, two photographs—one of just the front plate and one of the rear plate with

### Data Recommendations:

- Speed triggered photography only
- Image of Plates and Vehicle only
- Encrypted Data Transfer

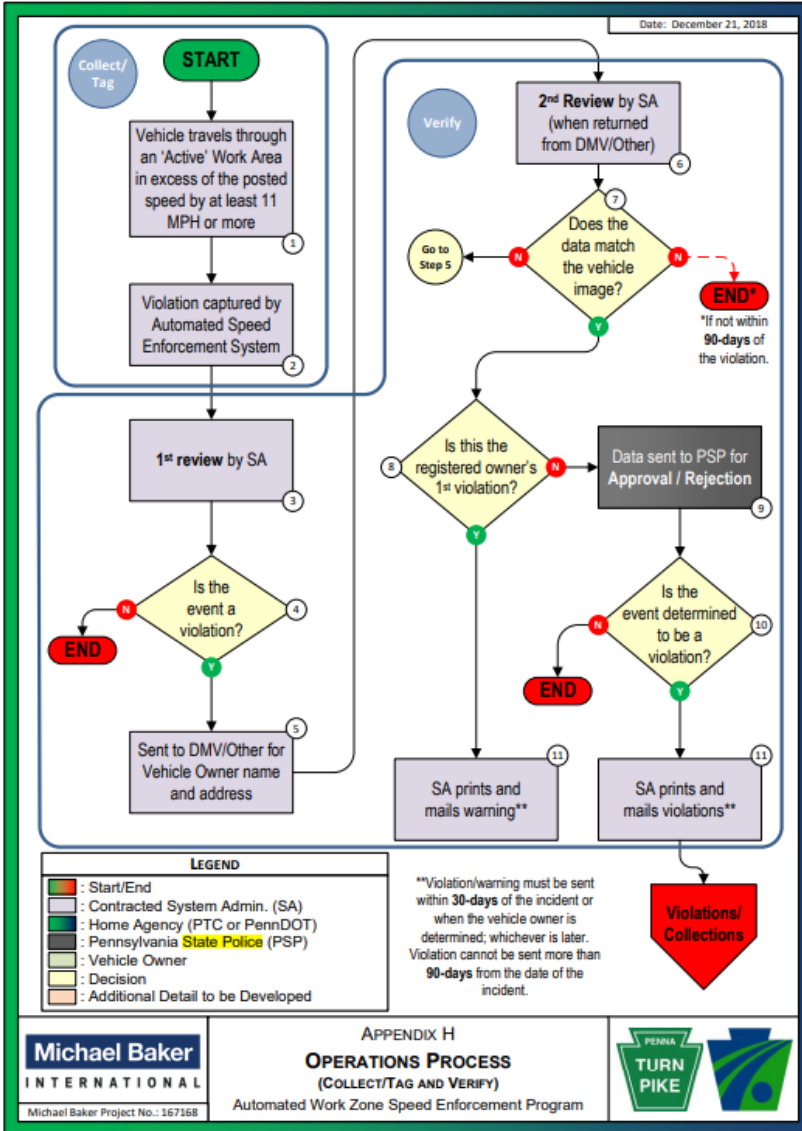
some vehicle information—would limit the imagery data captured but provide a means of validating the registered vehicle and a mechanism for identifying commercial vehicle events.

Once the speed measurement and image data are captured, the event information is assembled and encrypted. Data may be handled in a number of ways, including:

- › The photograph is stamped with the other documentation of the excessive speed event (i.e., date, time, location, speed measurement).
- › The information is packaged into a single evidence package and the encrypted information either gets transmitted via secure cellular connection or housed on the unit and transferred following the deployment.
- › A physical transfer of the data entails transport of an encrypted hard drive from the field in a lock box to a location with a secure server connection to upload the data to the back-end processing; this process is used in Ontario.
- › Only authorized law enforcement personnel can handle and access the data, with no vendor handling or access allowed, like in Quebec.
- › In many turnkey vendor programs, the data is encrypted, transferred, and stored by the vendor under strict protocols dictated by the administering agency. The encrypted information cannot be interpreted without the back-end software the vendors have developed for these purposes.

Typically, the data is transferred to the vendor servers. Some states have strict policies on how and where these data can be housed, like the clause for Pennsylvania’s program that the data must remain within the U.S. for storage and processing. The back-end processing begins by placing the encrypted data package in the queue for the first data review. Access to the information is typically conducted by trained vendor personnel who review the package within the review portal for validity and interpret the license plate information to key in the number and jurisdiction. The license plate information is used to either query the third-party registered owner databases or state motor vehicle data through agreements. The lead time from the return of information from these data resources to the vendor for inclusion with the event documentation varies and depends on the method of query and the state. In-state queries may be turned around in just a few based on interagency agreements, but out-of-state queries may take multiple weeks. Some programs put limitations on how long this matching process can take, and after 30 days the event is dropped from processing. A more stringent 14-day policy is in place in Maryland.

Figure 9 Example Event Processing Procedure from Pennsylvania Concept of Operations



Once the event documentation and owner information are combined, the information is typically placed in the queue for a second review and approval. For many programs, this review is done by an enforcement entity because it results in an enforcement action. From discussions with other programs and vendors, in enforcement programs, the second review and approval by the jurisdictional authority (i.e. highway owner or enforcement entity) provides credibility to the program that the authority is approving some action. Given program administration time capacity limitations and the lack of enforcement component in Vermont, it seems reasonable for the quality-controlled vendor to conduct the second review.

Once the notice is sent, some form of the data will need to be stored in order to effectively evaluate the results over the course of the program. If data is retained with some identifying information intact (e.g. plate number), evaluation of the change in behavior will be possible by



assessing the frequency of repeat infractions. If only anonymized data are retained, the disposal of the personally identifying information from the data packages will limit the privacy liability of the data in storage.

Close collaboration with the information technology specialists within the administrating agency to determine the appropriate protocols to request will be essential to this process.

Pennsylvania's request for vendor proposals, which clearly dictated the requirements on data and personal information in a 26-page appendix, could be used as a guide for employing similar data policies and procedures for a program in Vermont. This would be developed in close coordination with the Vermont Agency of Digital Services.

## **SCHEDULE AND COORDINATION**

Careful coordination among program administrators, resident engineers, contractors, and technicians will be required to ensure deployments are executed appropriately. Other states have developed field manuals that describe the deployment process, with clear expectations on communication, roles, and responsibilities. For a small pilot with few deployments, the coordination and deployment protocols should be spelled out clearly using such existing field manuals as a guide. For a longer-term program, development of a field manual to set the standard operating protocols across all projects and teams should be considered.

Scheduling deployments will depend on the type of configuration employed for the program. With attended systems, like those in Pennsylvania and Maryland, the deployments are facilitated through 8-hour vendor technician shifts. The vehicle-mounted systems are driven into the work zone through close coordination with the resident engineer and contractor, and the vendor technician is responsible for setting up and running the system. For unattended systems, daily technician scheduling and coordination will still be required as setup, quality assurance, and battery swapping procedures are essential to system operations.

Scheduling will also be an important consideration in assessing the efficacy of the program. Sites for a small pilot program must be scheduled for longer-duration deployments to allow monitoring of the site before, during, and after cameras are present. Further, allowing adequate time for the sites to produce notices to owners will help to determine whether notices have an impact on behavior in work zones. With turnaround times of 14 to 30 days for notices to go out in other programs, this means having consistent active deployment locations for at least three to four weeks or more. In larger, longer-term programs, it is anticipated that the ubiquity of more deployments across more sites allows for flexibility in moving the deployments from site to site for shorter durations while still benefitting from the program's intended impacts. In these programs, the drivers begin to expect that work zones across the jurisdiction will have deployments and moderate their behavior to meet those expectations.

## **MONITORING AND EVALUATION**

Monitoring deployments will be critical to measuring the program's effectiveness. Ideally, over long-term programs, data collected from the field would help to demonstrate improved safety outcomes like reduced speeds, crashes, and crash severity. For short-term pilots, programs monitor deployments to demonstrate effective reduction of speeds—particularly excessive

speeds—where the deployments are present. Given the random nature of crash data makes it difficult to model and draw conclusions about the effectiveness of countermeasures without a significant number of crashes to begin to extract trends. The crash data for these sites before, during, and after camera deployments should still be assembled to inform the program should trends emerge or should the program continue beyond the pilot to reveal longer-term trends.

Monitoring should start with speed safety camera system data outputs, which includes the number of vehicles operating at an excessive speed. Additionally, the camera systems can passively provide summary counts and speed measurements for the full traffic stream. Camera presence data should be delineated into active and inactive camera data. For instance, some programs place the inactive camera in the field for several weeks as a warning period leading up to active camera operation. Although these warning periods are employed with enforcement approaches, where motorists would be liable for a fine once the cameras are active, having data from an inactive camera presence would indicate whether presence of the system provides measurable deterrence to speeding. This present, but not active, camera period may not be possible depending on the configuration of the system and vendor agreement.

Anonymized count and speed data collected during camera presence should also be gathered before and after deployments for evaluation purposes. This will likely require other data collection devices deployed in the field to collect baseline counts and speed measurements for comparison.

## SPEEDING EVENT PROCESSING FOR EDUCATIONAL AND BEHAVIOR CHANGE

Procedures involved in post-processing an excessive speeding event, whether an enforcement or educational program, look similar across programs. The assembled documentation of event is transmitted to the vendor for processing, the license plate image is reviewed, and the plate number and jurisdiction are recorded. Automated image processing to extract the plate information—like that employed in ALPR units—exists, however in the vendor systems reviewed for this study, license plate photos are processed by person review and keyed in manually.

The license plate and jurisdiction information are then used to find the registered owner. This can be through agreements with state motor vehicle agencies (e.g., Vermont Department of Motor Vehicles) on a state-by-state basis, or by purchasing registration information from third parties like NLETS, Lexis Nexis, or Experian. The owner's name, address, and registration tag information are packaged with the event documentation and queued for review and approval by the program administrator. In states where vehicle make, model, and/or color are used to validate the match, that information is also included in the review. In some states, like Pennsylvania and Maryland, statute or agreement dictate that this review and approval must be conducted by law enforcement. In these jurisdictions,

### Event Processing Recommendations:

- Vendor Confirmation of Plate
- Create Strict Guidelines for Vendor Owner Research
- 14-Day Window for Event Processing

law enforcement approval adds additional confidence to the enforcement action. This is not necessary for an educational program.

Once approved, the vendor prints the documentation of the speeding event into a template letter for mailing. The letter typically includes date, time, location, license plate information, posted speed limit, speed measurement, equipment identification, calibration information, and a photograph of the license plate. In most jurisdictions, the letter is a citation that also includes information about the fine amount, payment instructions, response deadlines, and appeal hearing request options. For an educational program without financial implications, other materials may need to be included to help motorists choose to slow down.

#### Other Recommendations:

- Significant Advance Safety Campaign critical to success of program
- Personal messaging on letter to offender

In identifying the information that should be included in an educational letter, the study group suggested treating speed measurement reporting like the operation of radar speed feedback signs. Radar speed feedback signs can be set to limit at a maximum speed. This is to avoid motorists trying to achieve a “high score” in this case, dangerously high speeds. Discussion recommended capping the reported speed on the letter to a ceiling above the posted speed limit.

Discussions with the working group and stakeholder group provided other ideas for encouraging motorists to obey speed limits through work zones in lieu of a more traditional enforcement approach. Borrowing from other safety campaigns, the notice could include a letter from a highway worker or worker’s family member reminding motorists that their vehicle operation could put those working in the work zone environment at risk. The notice and message of deterrence might also include the fine amount that would have resulted if the infraction was the subject of typical enforcement. Other ideas to encourage compliance included:

- › Requesting follow up action, like following a link to a short video on speed safety.
- › Incentivizing follow up action, like providing trainings in exchange for gas cards or other small positive reinforcements.
- › Educational pamphlets with information about safety in work zones.
- › Coordination with public outreach and engagement experts on the contents of the communication.

# 6

## DEVICE AND SERVICE VENDORS

In a typical procurement scenario, agencies will lease speed cameras and contract with the vendor for some operating tasks. Vendors are generally quite flexible, offering a range of equipment and services that can be packaged to their customers' specifications. The elements of a camera system package may include:

- › Lease or purchase of physical hardware
- › Software to operate speed cameras
- › Set up and removal of camera systems
- › Processing and verification of speed events
- › Printing and mailing services
- › Payment processing and collection services

Each element is discussed in the following sections, excluding payment and collection services (which are not relevant to the proposed Vermont program).

### SPEED CAMERA HARDWARE

The basic components of a camera system are standard across models. These systems include:

- › One or more cameras
- › 1-2 radar or lidar sensors
- › Low-intensity flash, infrared flash, or another illumination device
- › Computer or tablet to store data and control the system
- › Marine batteries or other power source

Most systems have cellular modems, enabling recorded data to be retrieved remotely. Others save data to a hard drive that must be visited in-person. Battery life is typically 16-48 hours.

During set up, the operator sets a trigger speed above which an event is flagged. When the radar detects a vehicle exceeding the trigger value, the camera takes a photograph or saves video. The

position information from the radar sensor is used to locate the speeding vehicle within the frame ensuring the correct vehicle is photographed.

Hardware designs are similar among vendors. The most powerful devices can capture many lanes or two directions of travel at once. Radar and cameras are typically oriented to measure receding vehicles (i.e., after they drive past the camera, not as they approach it).

Beyond the fundamental hardware components of camera(s) and speed-measurement devices, there are many considerations in identifying the appropriate configuration, including:

- › Fixed or stationary applications of these systems where permanent, wired power supply and communications connections can be made to equipment mounted in the field. The number of work zones in Vermont with the power and communications may be few.
- › The flexibility of mobile applications lends itself to the more dynamic and temporary environment. Other statewide work zone programs have adopted mobile units for speed safety camera deployments. Mobile or portable platform configurations can be vehicle, trailer, or box enclosure mounted systems and are depicted in more detail in Chapter 6. Typically, these mobile systems include batteries for power and cellular devices for communications, with onboard data storage to house data temporarily. They may also have an interface for conducting set-up procedures and quality control checks in the field. In vehicle-mounted configurations, power supplies can be supplemented by auxiliary vehicle power.

In states like Maryland and Pennsylvania, the mobile units consist of a vehicle-mounted system for a variety of reasons. Vehicle-mounted systems:

- › **Allow for an equipment mounting height above obstructions common to work zones like barriers and channelizing devices.** This mounting height advantage is not afforded with trailer or box enclosure systems, which are mounted lower to the ground.
- › **Allow equipment to be moved more readily within a dynamic work zone environment.** For programs like in Pennsylvania, where the deployments must be within active work zones and proximate to the present workers, vehicle-mounted systems can be moved and redeployed as the activity within the work zone dictates.
- › **Provide a place for a technician to be during an attended deployment.** In unattended deployments, a technician or trained entity would be responsible for set up, battery exchanges, quality assurance, addressing technical issues, and other deployment logistics on a daily basis. Although it is possible to deploy these systems in an unattended manner, the preference of the Pennsylvania and Maryland programs has been to deploy attended systems within work zones. This is viewed as limiting the administrative burden of deployment set up and quality assurance procedures by having a dedicated technician within the work zone focused on the speed safety camera. This attended configuration limits

#### Vendor Recommendations:

- Prior to procurement develop detailed specifications for system, software, and process requirements
- Vehicle mounted system
- Speed event confirmation by two devices that triggers photos
- Cameras to capture front and rear plates

downtime due to technical or invalidating issues by having someone on hand to address any problems in real-time.

**Figure 10 Vehicle-Mounted Speed Camera**



Camera systems can also be provided in box enclosures, as shown below. These enclosures are also very portable. They have a small footprint and do not require a dedicated vehicle. They are often used in urban areas where the cabinet's weight is thought to be a theft deterrent. If a lighter alternative is wanted, camera equipment can be mounted on a tripod instead.

Figure 11 Camera System with Box Enclosure



Figure 12 Trailer Camera System



Speed cameras can also be configured as a trailer. Speed feedback signs can be installed on the back to remind approaching drivers of their speed before they enter the camera zone.

## OPERATING SOFTWARE

Speed camera systems—the cameras that take the image and then the subsequent work done elsewhere with the images—employ various encryption technologies to protect data. Any contract should establish strong requirements that the vendor will protect this information from theft or improper disclosure. One way to do this is with a contract provision requiring vendors to pass an independent information security audit. Standard certifications, such as SOC 2 or ISO 27001, can be specified and are often already maintained by vendors.

Another function of camera software is to optimize image quality. For the sake of credibility, it is important that software not alter images or videos. Instead, software automatically adjusts camera settings (e.g., brightness, exposure, saturation) for ambient conditions so that photos are sharper and more legible. Software may also automatically locate the license plate and provide an enlarged view.

## SUPPORT SERVICES

Vendors offer a variety of support services that can relieve some administrative burden on agencies. While the package of support services is customizable, contracts can be categorized into three models:

1. **Basic Support.** Some agencies self-perform routine tasks like placing and moving cameras, turning them on and off, and retrieving hard drives. Agency staff must be available to regularly perform these simple tasks. These tasks are not time-intensive but may be needed frequently. In this model, the vendor configures settings, runs checks, and provides troubleshooting.
2. **On Call Support.** Instead of a lump sum contract, agencies can negotiate a fee schedule for some routine, infrequent tasks. This is most common in camera programs with installations of a week or longer as they require less support. The agency may retain responsibility for routine matters like changing batteries but pay the vendor to move and set up the camera. This can also offer agencies the flexibility to self-perform fewer tasks when they have limited staff availability.
3. **Full Time Support.** The vendor is responsible for all aspects of day-to-day camera operation. The vendor visits cameras daily or even has its staff attend them. The vendor maintains physical custody of the camera system and sets it up at each site, moving as often as needed. Agency involvement is administrative and may not involve any field tasks. This type of contract is the most common for state-run programs.

## PROCESSING SERVICES

Most, but not all, agencies contract with vendors to identify and notify vehicle owners of speeding events. Most agencies rely on vendors to review photographs and key in license plates. Vendors often have two employees independently perform this step, catching errors if their entries do not match.

After license plates have been keyed in, the remaining processing tasks are to identify the vehicle owner and notify them. These can be done by either vendors or the agency. Multiple vendors have access to motor vehicle records in NLETS, a network used by law enforcement in all 50 states and Canada. Due to the cost of querying NLETS, vendors sometimes use commercial services (e.g., LexisNexis, Experian) instead. To further reduce their costs, vendors sometimes request that agencies agree to identify vehicles with in-state registrations. Once a vendor has an agreement in place with a state to provide registration data, it will typically request that data for enforcement actions in other states. When the vendor's cameras in other states photograph a Vermont-plated vehicle, they may expect to use their access to Vermont's registration database to identify the owner. This practice should be specifically prohibited so that AOT staff time is not spent looking up vehicle registrations for Vermont cars photographed in other states.

Vendors also offer printing and mailing services for warning letters (or citations) issued. Most speed camera contracts grant the vendor a generous window of 14-30 days (depending on whether the vehicle is in-state or out-of-state) from the event date to mail letters. The basis for the late deadline is to allow the agency time to review and approve enforcement events and to



return registration information to the vendor. Vendors universally claimed that other steps—including the initial license plate key-in and mailing—could be completed within one business day. Further, registration information can be accessed instantaneously through NLETS.

Because the Vermont pilot program as proposed would not include enforcement, the step of review by State staff is not critical. From the perspective of the vendors, a mailing deadline of three to five business days from the event is viable if State staff is not required to review speeding events.

## APPROXIMATE COSTS

State-run speed camera programs generally choose fixed-fee contracts, although other structures are available. Most often, fees are set as a fixed monthly lump sum, but can also be structured as a per-site deployment cost or a base charge plus fees for specific services (such as moving cameras) or a fee per letter mailed.

Vendors do not publish price lists. Quotes are unique to each client. Costs are driven by the number of systems, the volume of speeding events expected, and the level of vendor support requested. For full-time support, including operators to attend cameras, processing, owner identification, printing, and mailing, vendors estimated a cost of \$1,500 per attended camera per shift (which covers one direction for eight hours). Over a six-month pilot, the direct cost would be approximately \$1.1 million. This does not include the internal administrative costs that range from 20 to 25 percent of vendor costs. The assumptions behind this estimate are detailed in **Table 5**.

**Table 5 Approximate Direct Costs**

Assumptions	
Working days per month	20
Months	6
Number of Locations	3
Number of Cameras	6
Number of Shifts	720
Cost Per Shift	\$1,500
<b>Estimated Total Vendor Costs</b>	<b>\$1,100,000</b>

# 7

## SUMMARY OF RECOMMENDATIONS

To complement existing efforts on Vermont highways to improve safety in work zones through engineering, enforcement, and education, a speed safety camera program would improve safety in Vermont work zones. Outlined below and based on best practices research and stakeholder engagement, are recommendations for program components, including image data handling and vendor procurement.

### Program Administration

Based on best practices, program administration would fall under VTrans. This would include development of detailed system requirements. Evaluation of sites where speed safety should be incorporated would be determined through coordination within the Implementation Team.

### Pilot Schedule

Significant lead time is required to:

- › Enact legislation with guiding principles for the program.
- › Establish the administrative procedures and protocols necessary to manage the system.
- › Engage in the procurement process to secure the right vendor, devices, and services to support the system deployment.

A year should be allotted to prepare the pilot program for deployment. This would be followed by at least a full year of deployment. That deployment would include initial iterative monitoring, with the option to extend deployment if additional data is required for assessment of program effectiveness. Time needs to then be allowed for thoughtful analysis and summary of the results of the pilot, which might be up to one year for final reporting.

### Public Information Campaign

Without the motivation of potential fines for speeding, a public information campaign to raise awareness about the speed safety camera program (i.e., what it is and how it works) and encourage motorists to engage in the sought behavior (obey speed limits within work zones) will

be critical. Spillover effects from the presence of cameras as a deterrence should be maximized by widespread publicity.

### Work Zone Safety Camera Implementation Team

An interagency Implementation Team should be created to review the candidate projects. Candidate projects should include work zones where workers will be present for most of the deployment period, where traditional enforcement is difficult and additional criteria including a geographical review to ensure equity.

### Speed Threshold

Consistent with the original proposal, the speed threshold for which a notice is sent to the vehicle owner should be set at greater than 10 MPH above the speed limit. Based on deployment monitoring and interim evaluation, the threshold may be adjusted.

### Advance Warning Signage

Temporary traffic control and advance warning signs at speed camera locations should be designed for maximum visibility. Standards dictating the sign appearance, placement of signage, and placement of equipment within the work zone should be developed in conjunction with existing standards for typical work zone setups and considered during the Transportation Management Plan process, if possible.

### Data Handling and Event Processing—Incorporating and Protecting Privacy

Agency of Digital Services should work with AOT to set clear standards and protocols for data collection, storage, access, use, and disposal, as follows:

- › **Data Collection.** Implement the program as an owner-liability program with proper quality assurances to establish program credibility. Limit the data collected by the device to only that information essential to document an excessive speed event and not the driver of the vehicle to protect privacy. Data would include front image of plate only, rear image of vehicle and plate, speed measurement, location, date, time, and relevant deployment and device log information. Limit the data added during processing to vehicle owner's name and address. All personally identifiable information should be encrypted and secured to the standards set by Vermont Agency of Digital Services in accordance with NIST.
- › **Data Storage.** Clear limitations on data storage should be outlined in procurement agreements. In line with other programs, vendors will be responsible for the secure transfer of data from the devices deployed in the field to back-end processes. The vendors will be responsible for secure servers within the United States on which to store the data.
- › **Data Use.** In line with other programs, limitations on the use of the data should be defined in procurement agreements. Limiting the personally identifiable information to only that needed to carry out this program should be clearly stated. Anonymized data trends from the program for the purposes of program evaluation should be allowable and defined in procurement agreements.

- › **Data Access.** Access to data with personally identifiable information should be limited to only those with authorization and trained to serve a specific role in the program or systems administration processes. Access to anonymized data will be allowable to a broader group of authorized personnel to support program evaluations.
- › **Data Disposal.** Personally identifiable information of the vehicle owner in the database should be disposed of by the vendor upon mailing of the notice or within 14 days of the speeding event to minimize the private information stored. The timeline for non-vehicle owner information disposal will be dependent on the program evaluation timeline. All data should be disposed of properly with evidence of disposal provided to the program administrator at completion of the evaluation.

### Robust Procurement Process

Engage in a robust procurement process, including demonstrations of processes from speed collection, photography, data transfer, data input, driver research, warning creation, data confirmation, and issuance before evaluating vendors. Representatives from various agencies should be invited to see this demonstration to allow full range of questioning and confidence building. Procurement agreements should rely heavily on best practices from other states. The scope defined for the procurement process should be thorough and reflect the recommendations of this study, guidance from the Legislature, and input from the Implementation Team in defining the program's parameters.

### Platform

Based on feedback from other states, Vermont should consider mobile attended systems that would provide the maximum flexibility, allowing systems to be kept near workers in lengthy work zones. Full vendor support for back-end processing will reduce state staffing needs. For an educational program it is less important for state staff to review each notice as is the standard in enforcement programs; having the vendor provide additional quality assurance and complete this step will again reduce the need for state staff hours.

### Educational Approach

Educational opportunities should be fully leveraged to maximize effectiveness of speed safety cameras in work zones and beyond as has been found in other states. The system will send a notice to the owner of any vehicle that operates over the speed threshold in an active camera work zone. The notice should include material that will inform the vehicle owner and, vicariously, any drivers of the vehicle, that speeding through work zones increases risk to workers and the traveling public. Materials could include safety statistics, fines that would result if the infraction was subject to traditional law enforcement, letters from highway workers or their family members, links to educational materials on safety, and other materials that would encourage the recipient(s) to change their behavior. Persuasive materials should be developed in consultation with professionals from other successful public awareness campaigns.

## Program Evaluation

During the pilot period, anonymized speed data in work zones with speed safety cameras should be compared with trends at relatively similar locations without the cameras. This will require planning for speed data collection from work zones with and without speed safety camera deployments. In addition, crash data should be evaluated in each of these work zones (although due to low occurrences, crash data may be less conclusive). Finally, surveys of highway workers and resident engineers will provide additional perspective. This data should be reviewed by the Implementation Team.

## Cost

The exact cost will depend on the final program design and would not be known until proposals are received through an RFP process. However, vendors estimated pricing between \$1,000-\$1,500 per shift for each attended mobile camera was likely. At that price point, camera and vendor support would cost the state approximately \$1.1 million for a six-month, three location pilot. The procurement process should require flat fee proposals so that costs do not depend on the number of notices sent. In addition to invoiced costs, the state will incur expenses for program administration and public outreach. Based on other programs, this cost could be approximately \$275,000. Identifying adequate program funding will be an essential consideration, especially since costs will not be offset by fine revenue.

# 8

## CONCLUSIONS

This Study found that speed safety cameras will lower speeds in work zones and that, through careful process and procurement, the challenges associated with privacy and equity can be minimized. The system components needed to implement a speed safety camera system were identified based on best practice research, peer interviews and vendor-supplied information. The equipment, methodologies and associated costs of speed safety cameras have been identified, resulting in the recommendations in this Study.

Efforts for the Study particularly focused on how data (including images and vehicle owner data) is collected, stored, accessed, used, and disposed of and the associated timelines. The Study makes a range of recommendations based on best practices and vendor information as well as the understanding that the Vermont program would not be enforcement-based.

The next step will be for the findings in this Study to be reviewed and discussed by the Vermont Legislature.

# APPENDICES

## Appendix # Description

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- 1 February 2021 VTrans Speed Safety Camera Proposal
- 2 Working Group and Stakeholder Group Meeting Summaries
- 3 23 V.S.A. § 1607 (Vermont ALPR Law)
- 4 18 US Code § 2721 - Motor Vehicle Records Release Law
- 5 Illinois Speed Camera Signing Layout
- 6 Maryland Speed Camera Signing Layout
- 7 Pennsylvania Speed Camera Field Manual
- 8 Pennsylvania Speed Camera Security Requirements

# Appendix 1

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## **February 2021 VTrans Speed Safety Camera Proposal**



## PROTECTING THE VULNERABLE

Proposed Initiative - Automated Speed Enforcement in Work Zones One-Year Pilot



**WHAT:** Legislative authorization for a one-year Automated Speed Enforcement (ASE) in Work Zones pilot. The pilot will allow for study and measuring the effectiveness of ASE in work zones for the purposes of improving work crew safety and reducing driver speeds and traffic crashes resulting from improved adherence to traffic laws.

Up to three work zone sites will be selected for this pilot, with the focus on sites where on-site traffic law enforcement personnel cannot be utilized, either because of insufficient manpower or inherent on-site difficulties with enforcement by police officers. The pilot will run for one year, encompassing one full construction season, after the completion of necessary planning and a public information campaigns to educate travelers about ASE in work zones. The focus will be on education, with warnings (rather than citations or tickets) issued.

The pilot will include the following components:

- Speeding only, >10 mph over
- Clear signage that ASE is in use in that area
- Used only when work zones are active
- Warnings issued to registered owner of car (no fines or points)
- Manual verification of image before sending warning
- Administration of the pilot will be limited to state law enforcement officials
- Managed by a third-party vendor

**WHY:** Enforcement of speed limits, including in work zones, is currently performed by Vermont State Police, Department of Motor Vehicles Enforcement & Safety officers, County Sheriffs, and local law enforcement. Due to staffing limitations and practical restrictions (i.e. safe places to pull cars over), it is not always feasible to enforce work zone speed limits effectively. ASE would help to address these concerns.

**WHO:** Agency of Transportation

**HOW:** Authorizing legislation to enable the ASE in Work Zones pilot.

**FUNDING:** Agency of Transportation budget.

###

# Appendix 2

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## **Working Group and Stakeholder Group Meeting Summaries**

# Meeting Notes

Date: September 1, 2021

Notes Taken By: Karen Sentoff

Place: Teams Meeting

Project No.: 58600.04

Re: *Automated Speed Enforcement in Work Zones*  
Working Group Meeting #1

## Participants

Richard Wobby – AGC of Vermont, Executive Vice President  
 Matt Musgrave – AGC of Vermont, Deputy Executive Vice President  
 \*Sgt Paul Ravelin – Dept of Public Safety, Special Operations Executive Officer  
 Capt. Mark Anderson – Windham County Sheriff Office, Sheriff  
 Capt. Kevin Andrews – Department of Motor Vehicles, Motor Vehicle Safety Chief  
 Xusana Davis – Agency of Administration, Director of Equity  
 Jason Charest – CCRPC, Transportation Planning Engineer  
 Mike Dente – Agency of Digital Services, IT Manager  
 David Ladouceur – Agency of Digital Services, Chief Information Security Office  
 Paul White – AOT Operations and Safety Bureau Law Enforcement, Liaison for northern half of Vermont  
 Bill Jenkins – AOT Operations and Safety Bureau Law Enforcement, Liaison for southern half of Vermont  
 Jesse Devlin – AOT Highway Safety and Design Section, Program Manager  
 Nancy Avery – AOT Work Zone Engineer  
 Lance Duquette – AOT Maintenance and Fleet, District 7 General Manager  
 Zoe Neaderland – AOT Policy and Planning, Planning Coordinator/VTrans Project Manager  
 Jon Kaplan – AOT Operations and Safety Bureau, Project Manager  
 Costa Pappis – AOT Policy and Planning, Policy and Planning Manager  
 Ian Degutis – AOT Operations and Safety Bureau, Traffic Operations Engineer  
 Jenn Conley – VHB, Consultant Team Project Manager  
 Kristin Kersavage – VHB, Federal Perspective Safety Engineer  
 Karen Sentoff – VHB, Transportation Consultant Research  
 Annabelle Dally – VHB, Engineering Outreach Professional

*\*will be participating but not present today*

## Meeting Summary

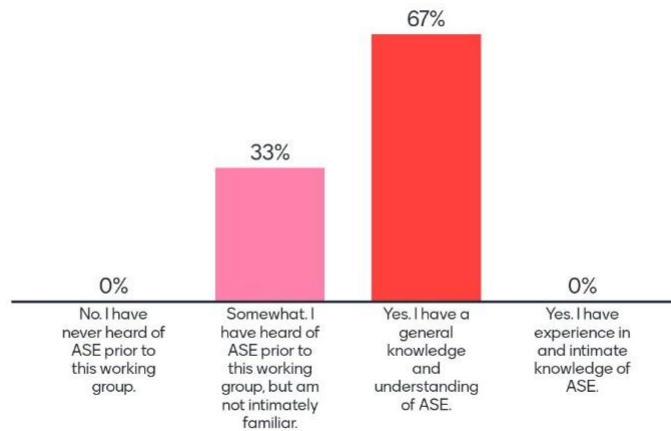
Introductions were made, see the working group participants above. Ground rules for the discussion were laid out. The fundamental idea of the working group is to facilitate an open conversation about the issues around automated speed cameras and their use in Vermont. We will try to keep anonymity so that folks can speak freely on the issue including conducting anonymous polling throughout the discussion.

There was an initial poll question posted to participants to gage the baseline understanding of Automated Speed Enforcement among the group. Poll questions were administered through Menti and the anonymous results are included below.

Place: Teams Meeting  
Date: September 1, 2021  
Ref: 58600.04  
Page 2

## Are you familiar with Automated Speed Enforcement (ASE)?

Mentimeter



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A brief background was provided on the general definition of Automated Speed Enforcement and its uses.

A question was raised whether reducing speed through work zones would encourage distraction. As folks slow down, they may be more prone to be distracted by checking cell phones or other things. This was to highlight that there are benefits to the reducing speed in work zones but we want to also understand drawbacks.

The project team offered that this would be investigated as part of the best practices and literature review. The benefits and drawbacks to instituting speed cameras will be documented for review by this group and the legislature.

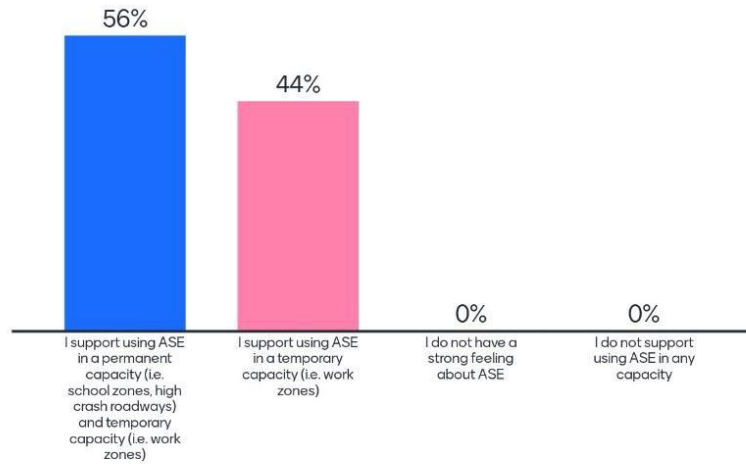
The locations where automated camera enforcement in the US was shared with the group. The use of this technology is more widespread than some initially thought.

A poll was administered to take the temperature in the room on how folks feel about Automated Speed Enforcement going into the discussion.

Place: Teams Meeting  
Date: September 1, 2021  
Ref: 58600.04  
Page 3

## How do you (personally) feel about ASE?

Mentimeter



16

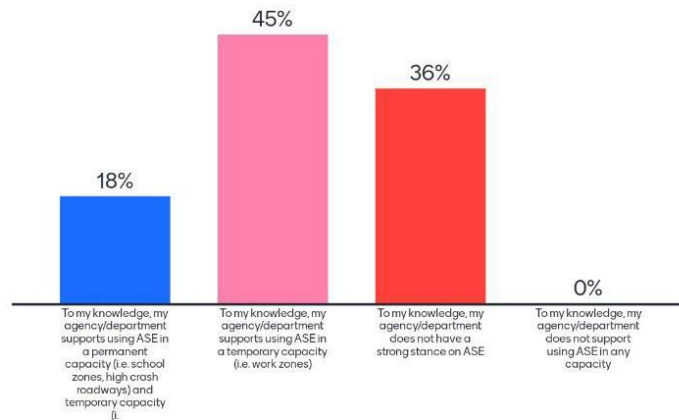
A participant said there's a time and a place to use automated speed enforcement. This due to technical considerations regarding the capabilities of the doppler technologies and certain case law. These technical and legal matters support use of ASE for education rather than enforcement. Others voiced support of similar more nuanced positions than were clear from the poll results.

Another poll was administered to understand if the agency, department, or organization each individual represented held a position on Automated Speed Enforcement.

Place: Teams Meeting  
Date: September 1, 2021  
Ref: 58600.04  
Page 4

## To your knowledge, how does your agency/department feel about ASE?

Mentimeter



The origin of this ASE-WZ study was a proposed initiative taken by AOT staff and others to the Legislature seeking authorization to conduct a one-year pilot. The proposal is a pilot in up to three work zones and would only involve warning letters. Legislators had questions, particularly regarding privacy and equity matters of ASE-WZ. The result was the Sec. 40 study request, which has broader language than the pilot. These two different elements can be confusing.

A question was posed of how effectiveness of ASE-WZ sites would be evaluated. One way is to compare two similar sites, one that had ASE and one that didn't. Several characteristics would need to match up between the sites for a reasonable comparison. [Another idea for exploring effectiveness was proposed just before the meeting started. That idea is to conduct a poll of law enforcement and/or drivers about how they felt the pilot went.]

Evaluation could come from before and after studies based on crash reduction or speed reduction, or both. It may be more difficult to demonstrate a statistically significant difference for crash reduction because the number of crashes that occur in Vermont is low, and the number of crashes in work zones is even smaller. Before and after speed studies may be a more useful means of evaluation.

It was noted that sometime different definitions are used to code which crashes count as in a work zone. It was offered that the geolocation of crashes should help in deducing whether a crash was within the designated work zone or on an approach to a work zone at any given time.

A clearer distinction between education and enforcement was requested. It was shared that the pilot was intended to be educational – an individual would receive a warning letter in the mail informing them that a vehicle registered in their name was speeding in a work zone. The intention was not to send tickets to violators enforcing the speed limit.

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There are significant limitations to what an officer can do who is working under contract to provide "blue lights" presence at a work zone. These officers cannot leave the work zone area to pull someone over.

AOT can contract with State Police or local law enforcement to provide additional officers who can do work zone enforcement. The project's resident engineer can request either or both "blue lights" or additional enforcement. An underlying issue is that the assignments are at the mercy of the law enforcement agencies having the resources to send someone on an overtime basis to fill those roles. Given the capacity issues, that is difficult. The AOT contract with Vermont State Police for work zone enforcement will expire in April 2022 and may be revised at that time.

Sheriff's offices can offer grants funded through the AOT Office of Highway Safety to help with the cost of additional work zone enforcement. Sometimes law enforcement identifies an issue where targeted enforcement may be helpful in a work zone environment (i.e. persistent issues that law enforcement could help with) and would offer that to the resident engineer and not get a call back.

While the Highway Safety Office offers this grant opportunity not all the 14 offices around the state have the same staffing capacities to use it. The example was provided that if that additional enforcement was requested in Windham County, they likely can provide the support, but in Orleans County, they may or may not be able to help as that support is subject to staffing availability and grant underwriting. It was noted that this AOT grant program has recently been made simpler and more flexible.

It was also raised that these are situations in which adding enforcement vehicles trying to pull over a speeding vehicle could make a work zone more dangerous.

A participant said that in the current set up most people speeding in work zones are not even getting the educational reminder of a warning letter, so even that would be an improvement.

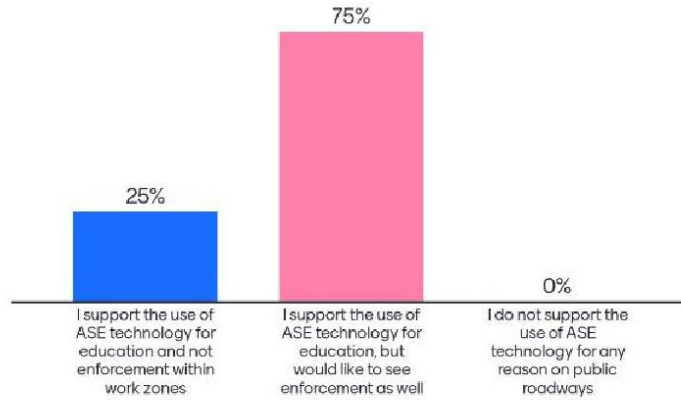
The proposed pilot included automated speed enforcement only in active work zones. During discussion the interpretation from the team was that an active work zone is when workers are present, not just when temporary traffic control measures are in place. Brief comments suggest that this "intermittent speed enforcement" may have implications different than traffic controls in place for the duration of the project.

In wrapping up the background on ASE from the national perspective and the proposed use of automated speed cameras in Vermont, another set of poll questions were administered.

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## What is your initial (personal) reaction to the pilot program?

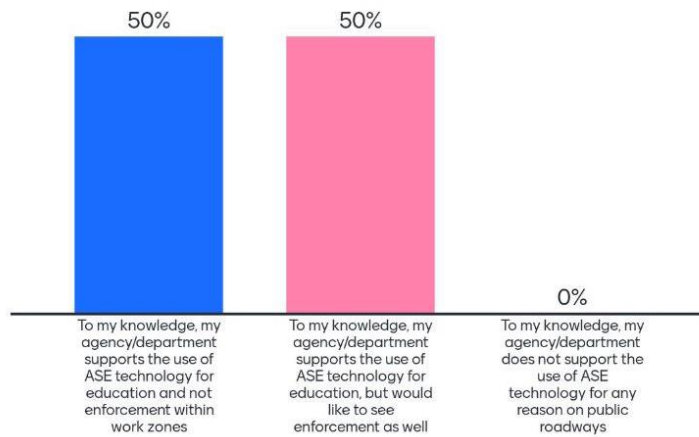
Mentimeter



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## To your knowledge, how does your agency/department feel about the pilot program?

Mentimeter



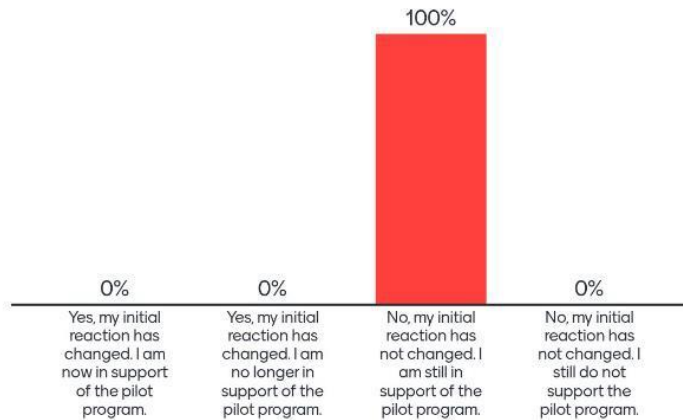
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## Has your (personal) reaction to the pilot program changed since the discussion?

Mentimeter



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Several participants were familiar with the discussions held with legislators about the proposed pilot initiative. They reported deep concern from some legislators about use of cameras, artificial intelligence, machine learning, big internet and law enforcement. There are no clear solutions, but this process needs to be mindful of these concerns. This study needs to provide a lock-tight approach on how data will be treated. Participants also discussed counter points to the privacy argument. It seems your picture is taken in many contexts these days – sidewalks, entering buildings, using EZ-pass. It was noted that our cell phones provide information on our locations as well.

It was noted that care needs to be taken when law enforcement is involved in any way. There is a moratorium in Vermont on law enforcement using this type of technology. [Act 166 Sec. 14 places a moratorium on use of facial recognition technology by law enforcement without authorization by the General Assembly. Automated license plate recognition systems in Vermont are governed by the statutes outlined in 23 V.S.A. § 1607 that are set to sunset, with repeal effective July 1, 2022.]

Equity was raised as a major topic of discussion around the use of automated speed cameras. From an equity standpoint, the three major components of safety (i.e. engineering, education, enforcement) should be pursued in that order, where enforcement is used as a last resort. That is because for the BIPOC community, outcomes of enforcement are historically and statistically worse. Don't forget people who may be near the work zone using modes of transportation other than driving. Provide alternative ways for people to walk and roll so they don't need to be in the work zone. When drivers feel work zones are safer, they may drive faster in them.

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Anything we can do to reduce bias in traffic stops is considered a positive from an equity perspective. ASE still has human reviewers who can have biases. It was noted by another participant that in researching options for the initial proposal there is a firm that only provides an Excel table of the license plates that went through the work zone and the vehicle's speed.

The locations to use ASE is an issue that should be considered from an equity lens. If we are siting traffic cameras in places with higher concentrations of historically marginalized people, we may be disproportionately targeting certain populations. It was noted that even for evaluating a pilot program Vermont would want to start with work zones in a range of types of locations.

There was an echoing of the two main themes that were touched on, equity and privacy. Questions surrounding these two themes were the ones that the Agency did not have clear answers to when they presented the proposal for the pilot to the Legislature. These are the concerns that will need to be addressed through this study.

The name of the study was discussed. If there is no enforcement component, then enforcement should be dropped from the name. This was not yet clear from the materials being shared and further confused by the name of the study. The upcoming USDOT guide on this subject is using "Speed Safety Cameras." The response was anything with the word "cameras" would be a red flag to people already concerned about privacy. [Another suggestion raised after the meeting was Automated Speed Safety Education.]

One viewpoint was raised that law enforcement has a hard enough time proving infractions with allowable substantiated evidence before judges as it is; having photo documentation and device readouts of speeding would be more difficult.

It was brought to the attention of the group that, from experience sitting in a work zone on I-89, setting the threshold at 10 mph over the speed limit is likely to result in nearly all operators being flagged and sending each of them a warning. This brings up the point of who bears the responsibility of connecting the information to the registration on the DMV databases, and then sending out the mailings to those registered owners. Does that fall to a vendor or the agency? Law enforcement does not have the capacity for that. Section 40 language should be reviewed for any implications in this discussion.

Another follow-on question would be what we want a warning letter to say. We want the warning to effect behavior. It was recommended to look for any locations that used only warning letters.

If we are issuing just warnings, what happens when speeding in the work zone is habitual or someone is speeding dangerously over the limit, say 50 mph over the speed limit? There is no real recourse for following up with a habitual or egregious offender. The thought that we expect so many folks to speed through work zones is frightening, especially on some of these work zones that are off the interstate system and can be very dangerous to the users if they are going that fast.

The suggestion was made that there be a basic or remedial level work zone presentation to the Working Group so that everyone has a baseline understanding of the fundamental elements of a work zone. The person continued that work zones are sited where they are sited to construct or reconstruct the infrastructure, they are not more or less likely in disadvantaged communities. It was offered that the question of siting is more about which among the many work zones would have the few applications of automated speed devices. Further questions included

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which type of roadways would we want to use the devices on – interstate or limited access highways or state highways which traverse villages throughout Vermont. There was further discussion about this technology being focused on interstate or highways where traditional work zone approaches are difficult to employ for their desired safety effect.

What happens if the warnings get thrown in the trash? For each instance where the warning is dismissed there are likely others where the parent of a driver or the employer of a driver committing the infraction gets the notice as the registered owner. Then you are getting through to folks that take an active interest and vicariously may be able to enact some change in behavior. That is when you might expect to get some impactful results.

Following up on previous discussion, it was noted that these conversations have been ongoing prior to the pilot program proposal to the legislature. In ASE the third-party vendor would get paid with a cut from the fines that are collected through enforcement. If you don't have enforcement there's no income. There are two likely agencies that would carry out ASE in Vermont: state police or DMV, both of which do not have the capacity to take this on. So, without enforcement and fines, how does this get paid for?

It was noted that there is nothing in the pilot that changes what law enforcement does. There needs to be clear messaging that just because there are speed cameras doesn't mean that a law enforcement officer may be enforcing safe driving, whether speeding or otherwise.

One perspective was that the data collected may highlight general need for additional enforcement in a given work zone, for example if speeds in a specific work zone are on average far more than 10 mph over the limit. It was noted that none of the data collected through the program would be admissible if there was an issue, the data could only be looked at after the fact. There may be opportunity for two types of speed analysis, averaged daily summaries of the data flowing in to identify if there is need for more enforcement staff and longer-term review of the speeds and trends in a corridor over time.

A concern was raised about sharing data for enforcement purposes. The person said that at the onset, it was understood that the intention was to keep this program and law enforcement completely separate. Now we are talking about sharing information with law enforcement, which entangles things. The person continued to say the utmost priority is the safety of work zone workers. When we make the connection between law enforcement and the data collection and educational purposes in this program, we will have trouble getting buy in from the Legislature. Concerns of what might be shared will be raised. Others reiterated this point. The educational pilot was purposeful in leaving other agencies out. Entangling other agencies will rouse suspicion that is unwanted. An education-only initiative is what was presented by AOT representatives in the Legislative committees.

It is important to note that we need to be talking about specifics in this study report. What data is generated, what happens to it, etc. For example, we have a third party helping us write warnings. We need to spell out what that contract will be, we are the point where we are talking to third parties that would carry out the process.

The schedule for the project and scope of the work was shared and the Working Group was asked for any feedback or input. A poll regarding the best time of day and day of week to hold the working group meetings going forward was administered. Given some people had to leave early to attend other meetings, it was agreed that a follow up poll for preferred times would be sent following the meeting.

## Meeting Notes

Date: September 27, 2021

Notes Taken By: Annabelle Dally

Place: Teams Meeting

Project No.: 58600.04

Re: *Automated Speed Enforcement in Work Zones*  
Working Group Meeting #2 – DRAFT Meeting Summary**Participants**

Richard Wobby – AGC of Vermont, Executive Vice President

Matt Musgrave – AGC of Vermont, Deputy Executive Vice President

Sgt. Paul Ravelin – Dept of Public Safety, Special Operations Executive Officer

Capt. Kevin Andrews – Department of Motor Vehicles, Motor Vehicle Safety Chief

Xusana Davis – Agency of Administration, Director of Equity

Mike Dente – Agency of Digital Services, IT Manager

Paul White – AOT Operations and Safety Bureau Law Enforcement, Liaison for northern half of Vermont

Bill Jenkins – AOT Operations and Safety Bureau Law Enforcement, Liaison for southern half of Vermont

Jenny Ronis – Agency of Transportation, Assistant Attorney General

Matt Shagam – Rich Cassidy Law, Civil Litigator

Nancy Avery – AOT Work Zone Engineer

Lance Duquette – AOT Maintenance and Fleet, District 7 General Manager

Zoe Neaderland – AOT Policy and Planning, Planning Coordinator, VTrans Project Manager

Jon Kaplan – AOT Operations and Safety Bureau, AOT Project Manager

Ian Degutis – AOT Operations and Safety Bureau, Traffic Operations Engineer

Jenn Conley – VHB, Consultant Team Project Manager

Kristin Kersavage – VHB, Federal Perspective Safety Engineer

Karen Sentoff – VHB, Transportation Consultant Research

Annabelle Dally – VHB, Engineering Outreach Professional

*\*Capt. Mark Anderson – Windham County Sheriff Office, Sheriff**\*Jason Charest – CCRPC, Transportation Planning Engineer**\*David Ladouceur – Agency of Digital Services, Chief Information Security Office**\*Jesse Devlin – AOT Highway Safety and Design Section, Program Manager**\*Costa Pappis – AOT Policy and Planning, Policy and Planning Manager**\*will be participating, but not present today***Meeting Summary**

Everyone introduced himself or herself. General housekeeping items were discussed including finalizing the Meeting Summary of the first Working Group Meeting and any additional reflections. An open discussion of the renaming of the study was held. The existing study name from Section 40 of “Work Zone Highway Safety Automated Traffic Law Enforcement Study and Report” was described as long and indicative of an approach that could trigger undue anxiety. The suggestion to rename the study “Automated Speed Safety in Work Zones” was introduced as a more straight-forward study name. The suggested name would remove the enforcement component which is not under consideration in this study and highlight one of the key components of safety in work zones. It will be used at least for now.

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A brief refresher was provided on the project purpose. The project purpose is to determine the feasibility of implementing automated speed safety camera systems in work zones, with a specific focus on affecting driver behavior. The charge included defining system components, conducting research and making recommendations on image collection, storage, access, use and disposal, and the cost to procure equipment and services to assist the implementation.

Background information was provided defining work zones and statistical data on work zone safety provided by the Vermont Highway Safety Alliance. A point was made that the risk of death being seven times higher for highway workers than the average worker was based on national data. The rate in work zones throughout Vermont is relatively low compared to other places on a national scale. The point was made that automated speed safety cameras in Vermont have the potential to slow traffic down and make work zones safer but are not necessarily expected to result in a large reduction in crash occurrence or severity due to the low number of existing work zone incidents.

The consultants provided an overview on effectiveness of speed cameras in reducing speeds, crashes, and crash severities. In the literature review of four state DOTs using Automated Speed Enforcement (ASE) in Work Zones, speed reductions were observed. Similarly, literature review of ASE in urban and rural areas and school zones in the US, Canada, and Norway reported reductions in total crashes and crash severity.

Opportunities for education and behavior changes include alerting drivers to speed camera programs using publicity, information campaigns, outreach, warning periods, signage, speed feedback signs, and written warnings. The literature review provided evidence that the warning period included at the beginning of some pilots and longer-term installations indicated a change in driver behavior. Some states including Maryland provided a 30-day warning period as part of their pilot project. States like Pennsylvania provide warnings to all first-time offenders.

A question was raised regarding the effectiveness of radar speed feedback signs which are currently used in Vermont. UVM completed a study on the efficacy of radar speed feedback signs. The data supports the use of radar speed feedback signs to reduce speeds. The study completed by UVM will be posted by the project team on the Teams site.

A question was raised regarding how this process would work for projects that last less than 30 days, as many construction projects, especially paving, have a shorter duration. The speaker's impression was these paving projects are often the sites where speeding is observed. The pilot and long-term projects being referenced in the literature review have durations of longer than 30 days. For the process of a pilot project, potential work zone candidates would need to have a longer duration.

Concerns were raised regarding additional signage. Many work zones are already crowded with signage and there is concern additional signage regarding speed cameras could lead to sign fatigue. The existing law for enforcing reduced speeds in work zones requires signage. Additionally, concern was raised regarding the messaging both with signage and warnings. While there will be no enforcement based on the speeds detected from the automated speed camera that doesn't mean law enforcement cannot enforce the speed limit separately within the work zone.

While a person who receives a letter in an educational approach would not be fined, there could be a benefit to including what the fine would have been if the driver's speed had been observed directly by law enforcement. A suggestion was made to deliver additional information within the warning letter including information on the potential dangers of speeding in works zones and driver's education materials.

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The permission to use license plate readers in Vermont will sunset in 2022. More information will be provided on how this relates to the matters being explored and will be discussed at the following working group meeting.

It was raised that we should check into whether the Vermont Transportation Board should be included. This could be to interact with their knowledge or to find out if they would want public hearings on this subject.

The consultant introduced best practices research and issues to consider for each of the following topics: site selection, equipment & physical infrastructure, data handling and processing, monitoring, behavior change and educational approach, and feasibility.

The project team reviewed the best practices research regarding site selection which included speed and crash history, worker vulnerability, and requests due to safety concerns. The study indicates automated speed safety cameras should be considered where enforcement is difficult due to steep grades, poor sight lines, etc. Other considerations include worker vulnerability in the work zone or historic speed and crash data.

A suggestion was made to define the type and duration of the speed enforcements (full-time, intermittent) as this will dictate the type of signage and equipment.

The working group was asked to contemplate equity considerations within site selection. One speaker said it's a technical question whether work zones meet criteria and that it is unclear how equity plays a role in this. Others gave examples.

- If more densely populated areas, which tend to be areas with higher minority populations, are where more speed data is gathered, then site selection based on this data poses an equity concern.
- Historically and even today, it was stated, citation analysis shows disproportionate percent of members of minority populations suggesting this data could also lead to selection of sites that would further impact these populations.
- In addition to consideration of racial or ethnic equity issues there could be consideration of geographic spread which would also provide more diverse data. There was also discussion of focusing on similar projects along the interstate including roadway characteristics (number of lanes, lane width, speed) for comparison and to make it easier to extrapolate the data to other locations.
- State and town highways introduce additional equity questions including the potential to overrepresent people who live nearby and need to use that road. More generally, if half a town received the warning letters that could generate pushback.

Clarification was requested for the statistic that 227 crashes had occurred in work zones in Vermont between 2013-2017 and whether the crashes were all a result of speeding. The project team indicated that the crashes were all instances within a work zone, but not solely due to speeding and more detail will be provided from work underway. It was noted there are additional contributing factors to crashes than speeding that may bear consideration. A concern was raised regarding speeding of vehicles prior to the work zone especially at the entrance to the work zone itself. A suggestion was made to clearly define the limits of the work zone. A question was raised of whether the work zone crash data could be broken down further to determine more specifics including occurrence on interstates versus state/local highways. A suggestion was made to analyze on what class of road has the highest rate of crashes and injuries.

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The project team reviewed the best practices regarding equipment and infrastructure and the practice of covert versus conspicuous automated speed camera installations and concerns with privacy. Comments of support were made of signage indicating the use of speed safety cameras. The location of these signs would bear further discussion in the context of an educational approach. A suggestion was made for additional signage at points of entry to Vermont indicating the use of speed safety cameras similar to ones about care using cell phones when driving in Vermont. A question was raised whether the signage used by Pennsylvania DOT (PennDOT) had been accepted by FHWA. The project team indicated that they would follow up with PennDOT. A question was raised whether the speed data collected by the equipment was capturing an instance in time or point to point. The project team indicated that within the US the use of speed safety cameras has been mostly limited to collecting speed data at a single point in time, however, global applications include speed over a distance. In response to the concern that a person could then be photographed while passing it was clarified that passing in a work zone is a finable offense. A statement was made that the crash data in work zones only includes death, injury, and property damage, but not near misses. People working in these locations and their managers report high numbers of close calls. It was agreed the group wants to bring this perspective into the discussion.

Due to time constraints, the remaining topics and issues to consider for the following topics will be covered in the third Working Group Meeting including data handling and processing, monitoring, behavior change and educational approach, and feasibility. Information regarding the remaining topics will be posted on Teams for comment prior to the third Working Group Meeting.

For homework, the Working Group was requested to review and comment on the report outline and consider other organizations that should be included at the Engaging Viewpoints meeting (i.e. larger Stakeholder Meeting). Suggestions to include front line workers, AARP representatives, driver's education instructors, AAA, insurance carriers, and emergency services were made.

### **Supporting Documents**

[UVM TRC Work Zones and Travel Speeds](#)

[VTrans 2017 Strategic Highway Safety Plan 2017-2021](#)

[Vermont Public Crash Data Query Tool](#)

Date: October 7, 2021

Notes Taken By: Annabelle Dally

Place: Teams Meeting

Project No.: 58600.04

Re: *Automated Speed Enforcement in Work Zones*  
Working Group Meeting #3 – DRAFT Meeting Summary**Participants**

Richard Wobby – AGC of Vermont, Executive Vice President  
 Matt Musgrave – AGC of Vermont, Deputy Executive Vice President  
 Capt. Mark Anderson – Windham County Sheriff Office, Sheriff  
 Xusana Davis – Agency of Administration, Director of Equity  
 Jason Charest – CCRPC, Transportation Planning Engineer  
 Mike Dente – Agency of Digital Services, IT Manager  
 David Ladouceur – Agency of Digital Services, Chief Information Security Office  
 Paul White – AOT Operations and Safety Bureau Law Enforcement, Liaison for northern half of Vermont  
 Bill Jenkins – AOT Operations and Safety Bureau Law Enforcement, Liaison for southern half of Vermont  
 Jesse Devlin – AOT Highway Safety and Design Section, Program Manager  
 Jenny Ronis – Agency of Transportation, Assistant Attorney General  
 Matt Shagam – Rich Cassidy Law, Civil Litigator  
 Nancy Avery – AOT Work Zone Engineer  
 Zoe Neaderland – AOT Policy and Planning, Planning Coordinator, VTrans Project Manager  
 Ian Degutis – AOT Operations and Safety Bureau, Traffic Operations Engineer  
 Jenn Conley – VHB, Consultant Team Project Manager  
 Kristin Kersavage – VHB, Federal Perspective Safety Engineer  
 Annabelle Dally – VHB, Engineering Outreach Professional  
 \*Sgt. Paul Ravelin – Dept of Public Safety, Special Operations Executive Officer  
 \*Capt. Kevin Andrews – Department of Motor Vehicles, Motor Vehicle Safety Chief  
 \*Lance Duquette – AOT Maintenance and Fleet, District 7 General Manager  
 \*Jon Kaplan – AOT Operations and Safety Bureau, AOT Project Manager  
 \*Costa Pappis – AOT Policy and Planning, Policy and Planning Manager  
 \*Karen Sentoff – VHB, Transportation Consultant Research  
 \*will be participating, but not present today

**Meeting Summary**

Brief introductions were made by the project team. General housekeeping items were discussed including a reminder of the working study name “Automated Speed Safety in Work Zones,” modified from the name of Section 40 to reduce confusion. No further modifications were suggested for the study name.

A refresher was provided on the discussion topics covered in the previous Working Group Meeting including Site Selection and Equipment and Infrastructure.

The discussion on Equipment and Infrastructure continued, focusing mainly on how to use signage in work zones containing automated speed cameras. A point was made in favor of potentially not including signage due to the

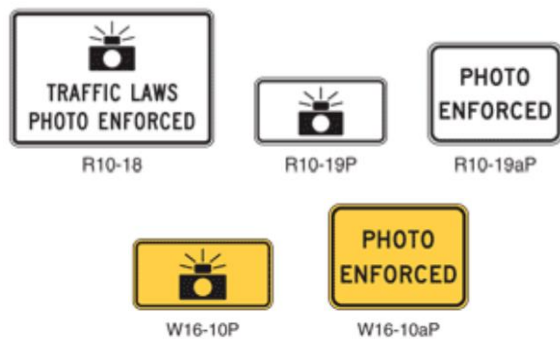


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concern that drivers unfamiliar with the educational limitations of the pilot project might rapidly decelerate causing increased risk of an incident. A counterpoint was made that the signage is an additional educational component and that this pilot and any subsequent use of this technology should be accompanied by additional education and outreach. It was agreed that the signs could be useful well in advance of the work zone. The intent is a Statewide education effort well beyond people receiving letters.

A suggestion was made to replace the language on the sample signage from the MUTCD as shown in the PowerPoint slide from "photo enforced" to "speed enforced" as is currently done in some other states like New Jersey. *\*A post meeting suggestion on this topic included the use of the language "photo speed surveillance" or "speed camera in use" for this pilot.\**

Presented:



*\*Proposed:\**



The group discussed where within a work zone the cameras and signage would be placed. A comment was made that the placement is defined in the MUTCD. The argument was made that depending on the intended purpose (i.e. either monitoring speed or reducing speed) would play a role in where the equipment was placed. A comment was made that the location of the cameras within the work zone might depend on terrain as radar equipment tends to become inaccurate if the area has hills or utilities. These matters will be further researched.

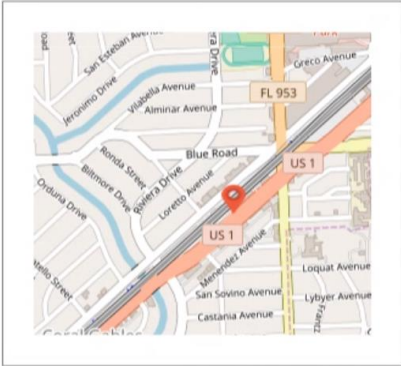
The discussion on Data Handling began with the statement that photos captured by the speed safety cameras should not include images of drivers, but only of license plates with no objection. A statement was made that despite the pilot being for educational purposes only, drivers are likely to still complain about the letter and the photo of the license plate will be important for validating identification. An argument was made that unlike a red-light violation where the photo documents the vehicle committing the violation, the photo in this case would verify the vehicle had been in the location of the camera at a set time, but a still image cannot verify vehicle speed. Current technology supports including the time and the speed reading as part of the photo which provides some credibility and makes the educational component more impactful.

An example of the type of information that is offered by one company was shared by a member of the working group (shown below). The vendor only supplies the specific items purchased by the client.

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**Ticket Details - SafePace Enforcer Camera**

Ticket ID	Status	Note
1067696	verified	Rectangular Sign



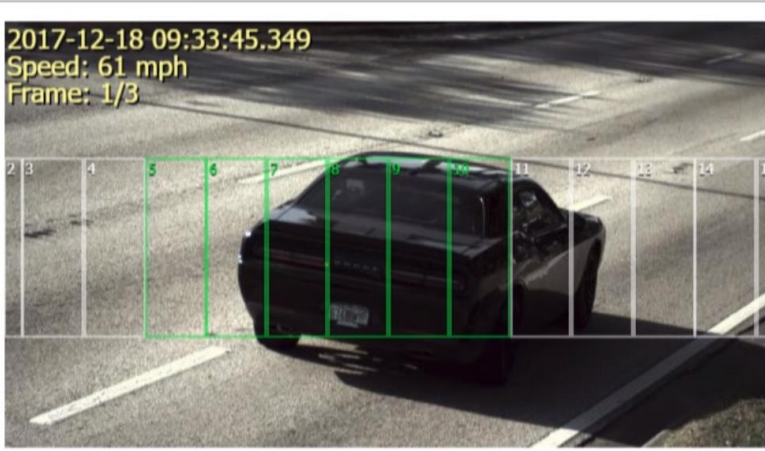
Data CC-BY-SA by [OpenStreetMap](#)


Location	Enforcer 16
Speed Limit	45 mph
Speed	61 mph
Date	2017-12-18 09:33:47
Licence Plate	674WYP

2017-12-18 09:33:45.349

Speed: 61 mph

Frame: 1/3





Display Image	
<input checked="" type="checkbox"/>	Image info
<input checked="" type="checkbox"/>	Beams
<input type="checkbox"/>	Lat/Long

Animation

<<
Export
Validate
Download
>>

Privacy concerns were raised. The argument was made that there should be no expectation of privacy in regards to license plate information as license plates are owned by the State and in essence leased by vehicle owners. An additional argument was made that this type of data gathering is common already, for example by Montpelier parking meter checkers and photo enforcement electronic tolling in surrounding states.

There was discussion of several related laws in Vermont. It was noted that ADS has experience preparing appropriate text and using these laws in other projects. ADS has requirements that all data must stay in the US and they would be involved in privacy matters if the pilot were to go forward.

An example of why privacy protection is important is when rogue Department of Motor Vehicle employees illegally shared information with U.S. Immigration and Customs Enforcement's (ICE). These are real and relevant concerns. Language will need to be included in the mailer indicating any implications related to immigration status.

A concern was raised on how mailers will be disseminated to drivers of rental cars. It was raised that they have a system to convey tickets to renters already but that representatives from rental car companies be invited to the Engaging Viewpoints meeting.

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There was discussion about privacy concerns in the QA/QC review of photos. Who would do it? If there are incentives built in for the people doing the work, in what direction might that lead them? It would be important for that process to be adequately staffed and supplied.

The discussion shifted to data handling, particularly disposal. There are at least two types of data to consider, the initial data from the system that would make up a singular event including a license plate photo and vehicle operating speed and the aggregated data that may be analyzed for trends.

Another angle is to consider a situation in which a driver is documented speeding in a single work zone multiple times over a lengthy period of time and is later involved in an incident there, would the state be liable or complicit due to the documented evidence of the driver's speeding? What could happen if the media were to get ahold of this type of information?

There was some discussion about what data might be subject to public information requests. Further, for whatever data is accessible, is that helpful in terms of educating people—there was some discussion of the difference of during a pilot project--or would it make more people upset? This will need further consideration. Some contents would be needed as part of evaluating the pilot.

A suggestion was made to potentially retain an anonymized set of data from which trends could be observed such as overall speed trends by days of the week or times of day without any context on specific drivers or vehicles. This would be similar to the data already collected and available from continuous counting and [Road Weather Information Stations \(RWIS\)](#) throughout the state. Another person said maybe as part of a pilot maybe media attention on the anonymized data would serve the educational larger purpose. The discussion returned to a previously raised matter about sharing the anonymized trends such as work zones with, for example 90% of vehicles traveling over the posted speed during a certain hour, with law enforcement or with engineers. The group thought this could be useful for safety and design however consultants will follow up conversation regarding this topic at a previous meeting with the person who had been concerned but was unable to attend this working group meeting.

The contents of the warning letter will need to be persuasively and well written. A working group member volunteered to help work on a sample to discuss. A concern was raised about the effectiveness of education as people are taught to obey roadway signage when they learn to drive and are actively not complying. However, the argument can be made that speeding is culturally accepted and education and outreach can help shift that.

The working group discussed the monitoring and evaluation of effectiveness raising the following ideas.

- Compare the average free flowing speed centered on the posted speed in similar work zones with and without cameras taking into account differences in locations and other factors such as weather.
- Analyze change in free-flow speed in the work zone before, during, and after cameras
- Crashes along with causal factors (if any), citations not related to the cameras (if any)
- Flagger and worker reports of property damage, near misses, other reports, and impressions
- How is this evaluated in other states or in national literature?
- Survey people who received warning letters to ask if the experience reduced the likelihood they would speed in work zones

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- Other surveying or social media approaches, including summary of media coverage

A participant reemphasized his support for an educational program and opposition to use of speed cameras for enforcement. The argument was made that a trained officer is needed to ensure the speed data is accurate. Inaccuracy in the data can be overlooked for educational purposes.

The working group discussed feasibility in terms of costs and administrative burden. One question is how to obtain approximate costs without a RFP. A idea was raised that if the pilot goes forward the RFP could call for the vendor to cover the cost of the pilot since conducting it would advertise their services and pre-position them for future projects. Speed enforcement is an existing line item in construction contracts, so another idea is private contractors might be interested in implementing the concepts in the study themselves as part of the construction costs.

Due to the fact that the mailer is educational only and has no sort of enforcement attached to it, one participant felt strongly that law enforcement should not be considered for handling and verifying the data. Further, it was proposed that even referring to the letter as a warning is not appropriate.

The remainder of the meeting was used to go over some remaining housekeeping items including any additions to the stakeholders to be invited to the Engaging Viewpoints meeting. In addition to front line workers, AARP, driver's instructors, AAA, and EMS, the working group suggested rental car agencies, professional/commercial drivers (the Vermont Truck and Bus Association), and flagger firms should be included. Another recommendation received after that meeting including the addition of a private trucking company Bellavance Trucking. In addition, the project team included representatives from Vermont Safe Driver Program, Vermont Driver and Traffic Safety Education Association, Youth Safety Council of Vermont, insurance companies, and regional planning commissions.

PennDOT staff involved with implementing their ASE-WZ program have offered an online meeting with Vermont. The working group started the following list of potential questions that will be discussed next meeting:

- Can they provide a copy of their legislative language? [Vermont team already has this]
- What obstacles did they encounter with privacy and how did they overcome them?
- How did they evaluate effectiveness and cost (if not already documented)?

The consultant team will research various matters raised and provide results to the Working Group in person or through the Teams site.

## Meeting Notes

Date: October 21, 2021

Notes Taken By: Evan Haugh

Place: Teams Meeting

Project No.: 58600.04

Re: *Automated Speed Enforcement in Work Zones*  
Working Group Meeting #4 – DRAFT Meeting Summary**Participants**

Matt Musgrave – AGC of Vermont, Deputy Executive Vice President

Sgt. Paul Ravelin – Dept of Public Safety, Special Operations Executive Officer

Mike Dente – Agency of Digital Services, IT Manager

Paul White – AOT Operations and Safety Bureau Law Enforcement, Liaison for northern half of Vermont

Bill Jenkins – AOT Operations and Safety Bureau Law Enforcement, Liaison for southern half of Vermont

Matt Shagam – Rich Cassidy Law, Civil Litigator

Jesse Devlin – AOT Highway Safety and Design Section, Program Manager

Nancy Avery – AOT Work Zone Engineer

Zoe Neaderland – AOT Policy and Planning, Planning Coordinator, VTrans Project Manager

Jon Kaplan – AOT Operations and Safety Bureau

Ian Degutis – AOT Operations and Safety Bureau, Traffic Operations Engineer

Costa Pappis – AOT Policy and Planning, Policy and Planning Manager

Jenn Conley – VHB, Consultant Team Project Manager

Karen Sentoff – VHB, Transportation Consultant Research

Evan Haugh – VHB, Transportation Consultant

*\*Richard Wobby – AGC of Vermont, Executive Vice President**\*Capt. Mark Anderson – Windham County Sheriff Office, Sheriff**\*Capt. Kevin Andrews – Department of Motor Vehicles, Motor Vehicle Safety Chief**\*Xusana Davis – Agency of Administration, Director of Equity**\*Jason Charest – CCRPC, Transportation Planning Engineer**\*David Ladouceur – Agency of Digital Services, Chief Information Security Office**\*Jenny Ronis – Agency of Transportation, Assistant Attorney General**\*Lance Duquette – AOT Maintenance and Fleet, District 7 General Manager**\*Kristin Kersavage – VHB, Federal Perspective Safety Engineer**\*Annabelle Dally – VHB, Engineering Outreach Professional**\*will be participating, but not present today***Meeting Summary**

Attendees gave brief introductions. A refresher was provided on the project's purpose statement followed by discussion of the consultant's preliminary recommendations for the pilot program.

The group discussed which State office could be responsible for administering the speed safety camera program. The point was made that the program is educational in nature and so the program administration, especially data

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collection, should be purposefully kept separate from law enforcement. The group at large did not come to a consensus on the appropriate office to manage the program.

The group briefly discussed how the potential pilot would be publicized. Suggestions were to use existing channels like press releases and social media. Another suggestion was to coordinate a publicity strategy with VHSA. Next, the group moved on to a discussion of site selection. The first topic was the definition of active work zones. It was pointed out that there is no common definition and the phrase does not appear in VTrans specifications. The point was made that work zones are dangerous places to speed whether or not workers are present, but that risks to workers are especially resonant and that restricting use to times when workers are on site may be necessary to win public support. Comments were made that the definition should not be written so rigidly that the cameras must be turned off every time workers take a break or have lunch. One suggestion was for the definition to hinge on “worker activity” rather than “workers present” to allow the cameras to stay on during brief (up to a few hours) worker absences.

The next question posed to the group was whether a committee should be formed to select sites for speed safety cameras. There was broad agreement with this approach, with comments that committee membership could be addressed later. The discussion continued to the topic of including two-lane state highways in the pilot program. There was general agreement that state highways are reasonable candidates for automated enforcement, but some argued there are practical reasons not to include them in a pilot. A comment was made that two-lane highways may introduce too much complexity at first. A counterpoint was made that the pilot will greatly influence how any future program would be set up, and parameters set for site selection now may endure. Another point was made that the site selection committee should be free to select the best sites based on crash and traffic data, whether it leads them to limited-access highways only or a mix of both. Another comment in agreement was made that high-speed areas of two-lane highways are valid sites, with traffic volume being an important consideration.

The group was presented with the recommendation that warnings only be mailed to drivers exceeding the speed limit by over 10 mph, consistent with Sec. 40. No objections were raised.

Next, the group was presented with this suggested schedule for a camera site:

- 2 weeks no camera or signage
- 2 weeks camera and signage in place, camera not active
- 4 weeks camera and signage in place, camera active and letters sent
- 2 weeks no camera or signage

Attendees did not express concern that these times were too short. A comment was made that a four-week minimum camera deployment would rule out most interstate work (which is over too quickly). There was a concern that this would leave few options for the pilot sites, and that these minimums should be flexible.

One group member asked whether the number of letters one person can receive should be capped. The point was made that you could send one commuter ten letters in a week, and at that point it would be counterproductive – people would stop taking it seriously or post pictures of their stack of letters online. The group wanted more information about processing and mailing times before making decisions on this issue. It was suggested to ask PennDOT about their processing times in an upcoming meeting.

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There was a brief discussion about what content should be included in the letters. There was agreement that an image of the license plate, the measured speed, speed limit, and timestamp should be included. The group was asked whether the letters should include the cost of the fine they would have received in a formal citation. Comments were in favor, and one member suggested adding other educational information such as crash or fatality statistics.

Next, the group was shown a proposed layout of advance warning signing for speed cameras. There were no criticisms of the signs or their placement. There was a strong consensus against placing any warnings at the state line, with the point made that those would not provide useful information to a driver at the appropriate time. The group was also in support of using speed feedback signs, with a comment made that advance feedback signs fit the educational goal of the program and gives drivers time to slow down in a controlled way (avoiding sudden braking) before the camera.

Next, the group discussed image data and retention policies. The group identified this as a key concern that would need more discussion. There was a comment not to focus only on the retention timeline but also handling, access, and security. There was agreement that legal parameters must be structured to strictly limit data transfer to other parties. There was also a comment that privacy is a top legislative concern with this program, and that we can't afford to make mistakes that expose private information.

The last topic presented was preliminary information the research consultants had found on costs and a reminder of next steps. A closing comment was made that people at the upcoming stakeholder meeting will likely be passionate, and that the group should take care to explain the problem and program intentions and get ahead of objections. The Working Group was also asked if any viewpoints seem to be missing from the invitee list.

The consultant team will continue research various matters raised and provide more information to the Working Group in person or through the Teams site.

# Meeting Notes

Date: November 9, 2021

Notes Taken By: Annabelle Dally

Place: Teams Meeting

Project No.: 58600.04

Re: *Automated Speed Enforcement in Work Zones*  
Working Group Meeting #5 – DRAFT Meeting Summary

## Participants

Matt Musgrave – AGC of Vermont, Deputy Executive Vice President  
 Capt. Mark Anderson – Windham County Sheriff Office, Sheriff  
 Capt. Kevin Andrews – Department of Motor Vehicles, Motor Vehicle Safety Chief  
 Xusana Davis – Agency of Administration, Director of Equity  
 Jason Charest – CCRPC, Transportation Planning Engineer  
 David Ladouceur – Agency of Digital Services, Chief Information Security Office  
 Jenny Ronis – Agency of Transportation, Assistant Attorney General  
 Mike Dente – Agency of Digital Services, IT Manager  
 Paul White – AOT Operations and Safety Bureau Law Enforcement, Liaison for northern half of Vermont  
 Bill Jenkins – AOT Operations and Safety Bureau Law Enforcement, Liaison for southern half of Vermont  
 Matt Shagam – Rich Cassidy Law, Civil Litigator  
 Nancy Avery – AOT Work Zone Engineer  
 Zoe Neaderland – AOT Policy and Planning, Planning Coordinator, VTrans Project Manager  
 Jon Kaplan – AOT Operations and Safety Bureau  
 Ian Degutis – AOT Operations and Safety Bureau, Traffic Operations Engineer  
 Jenn Conley – VHB, Consultant Team Project Manager  
 Karen Sentoff – VHB, Transportation Consultant Research  
 Annabelle Dally – VHB, Engineering Outreach Professional  
 \*Richard Wobby – AGC of Vermont, Executive Vice President  
 \*Sgt. Paul Ravelin – Dept of Public Safety, Special Operations Executive Officer  
 \*Jesse Devlin – AOT Highway Safety and Design Section, Program Manager  
 \*Lance Duquette – AOT Maintenance and Fleet, District 7 General Manager  
 \*Costa Pappis – AOT Policy and Planning, Policy and Planning Manager  
 \*Kristin Kersavage – VHB, Federal Perspective Safety Engineer  
 \*will be participating, but not present today

## Meeting Summary

The consultant team reviewed the key takeaways and themes from the Engaging Viewpoints (Stakeholder) Meeting and core team discussions with Vermont law enforcement personnel, the PennDOT ASE manager, and various automated speed camera vendors with the intended purpose of using this information to refine recommendations made at the previous working group meeting.

### Key themes from the Engaging Viewpoints (Stakeholder) Meeting included:

- Potential to perform some action as a result of receiving the letter (e.g. follow link to safety awareness video)
- Opportunity to incentivize follow-up action through point reduction or other incentives



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- Balance legislative appetite for program with demonstrated behavior change methods

A suggestion to include a personal letter from a work zone worker or the child of a work zone worker as part of the educational mailer. There was some support of this idea and discussion of the effectiveness of former campaigns with children of road crews asking drivers to slow down. There was support amongst members of the working group for there being some action to the letter. Some members of the working group voiced concern over the effectiveness of the educational aspect and that without a tangible incentive or a monetary penalty this pilot is unlikely to have a significant impact on driver behavior. Concerns were raised about the cost of the program versus the benefits without the use of enforcement.

#### **Takeaways from Discussion with PennDOT ASE-WZ Program Manager**

- Advocacy for a longer pilot program to have ample time to get the initial program off the ground
- Present clear messaging for legislative and public buy in to show compelling need and comfort with technology and process
- Prescriptive and transparent approach with clear descriptions of data access/disposal/security and auditing processes
- Advocacy for the inclusion of front and rear plate images to identify commercial vehicle operators
- Public opposition to citations focused more on signage than gaps/shortcomings in technology
- Recommendation for VSP to connect with law enforcement in other states with active programs and vendor demonstrations
- Personnel Intensity is significant: 15-20% each of two program managers (one PennDOT and one Turnpike Commission) and 3-5 consultants despite turnkey vendor solution

Some members of the working group were in support of extending the duration of the pilot not only for the reasons provided by PennDOT, but also to allow opportunity to fine tune and modify based on lessons learned during the process and to gather a larger pool of data to better determine the effectiveness of the program. Some members of the working group supported the creation of a factsheet for consistent and cohesive messaging and vendor demonstrations.

#### **Key topics from the Law Enforcement Discussions**

- Discussion of how radar/lidar is currently used and initial impression of automated vendor devices
- Discussion of setting speed threshold for safety
- Law enforcement maintains authority to conduct enforcement activities regardless of program
- Prescriptive approach to sharing anonymized programmatic data trends (break glass if danger clause)
- Law enforcement does not want to hinder public and legislative buy in for the program due to their involvement

The consultant team mentioned a point raised during the law enforcement meeting that even one mph over the speed limit is technically an offense. A member of the working group argued that one to three mph is the margin of error of a speedometer and sending warnings at or below that threshold would cause the program to lose

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credibility. Other members of the working group suggested five mph as the minimum threshold with 11 mph being more appropriate for the goal of this program.

There was discussion of if and when law enforcement should receive anonymized programmatic data trends. This would be aggregated data for situations where speeding is frequent and significant. A statement was made that this would describe every work zone. A member asked for clarification if this pilot is intended for use only in work zones with speed reductions and reminded the group that MUTCD guidance states that speed limits should only be reduced due to restrictive conditions or features and should not be blanketed on all work zones along the interstate. The consultant team confirmed that the pilot is not intended to be used exclusively on work zones with speed reductions. A question was raised whether this system would only be deployed in work zones where active construction is occurring as the travelling public adapts quickly to inactivity in work zones and adjusts behavior accordingly. The program is proposed only for active work zones. A member suggested that a work zone should be considered active anytime traffic is being manipulated even if workers are not present on site. The point was made that the anonymized programmatic data that could potentially be shared with law enforcement already exists so there is not reason to include data sharing as part of the pilot.

A concern was raised regarding the sunseting of the plate reader statute (Title 23 VAS 1607 & 1608) and how that would affect the pilot. The point was made that this technology is different than the license plate reader statute as this system only captures an image of the license plate and only if there is a speeding event.

A question was raised regarding data retention policies because at minimum data will be retained from the time the speeding incident is captured to when the letter is mailed. The consultant team stated that PennDOT holds data for one year unless there is a legal reason to hold onto for an extension period of time the report will need to be prescriptive regarding how long data will be retained.

A member of the working group raised that concern that this system is likely to run into similar limitations and issues as lidar or radar that leads to inaccuracies in speed measurements for example doppler shift or the inability to distinguish between multiple moving vehicles. Based on these issues with existing technology, concerns were raised with using this system for enforcement. It was noted that these are issues that have been explored and dealt with in other states and this information would be shared.

*PennDOT agreed to share documents with the working group including PennDOTs guidance on work zone speed reductions, the PennDOTs ASE factsheet, and PennDOTs field guide the use of ASE in work zones.*

The consultants reviewed devices and services from vendor meetings including hardware, software, deployment/set up, event processing and verification, owner notification, reporting/evaluation, and costs of services.

Recommendations for hardware, software, and deployment set up include a vehicle mounted system versus a trailer mounted to allow for the system to work within the work zone and be able to adapt to changes within the work zone.

A concern was raised in procuring vehicles to use for the pilot and a question was raised as to whether they would need to be supplied by the Agency of Transportation. Vendors will provide the vehicles as part of their service package. Members supported the use of vendor supplied and operated vehicles as it would prevent the need to hire or train someone for the pilot and the adaptability would help to make the system cause less interruption on the work zone. A question was raised about a static system potential post or sign mounted. Concerns that static

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systems would have to meet MASH requirements for crashworthiness if within the highway ROW. The consultant team agreed to investigate the potential for static systems, but pointed out that the vendors had suggested either vehicle mounted or trailer mounted based on the provided parameters of this pilot.

Recommendations for event processing was just rear license plate image with the rest of the capture masked out. PennDOT staff had explained the benefit of capturing the front license plates to include commercial vehicles. There was discussion of capturing the car make, model, and color for additional verification were discussed. There was support for capturing both front and rear license plates. In previous discussions there had been agreement to include a photo of the vehicle along with its speed in the letter to minimize questioning. There was some support in capturing additional information such as make, model, and color, however, there was concern that this is unnecessary for the pilot as there is no penalty associated with the letter, and that extra data could increase costs.

*Ran out of time to discuss topics related to driver notification and costs. Information to be shared with the working group via email.*

The consulting team will prepare the draft report which will be circulated to the working group for review and comment. There is potential for an additional working group meeting which should be decided soon. A final Engaging Viewpoints (Stakeholder) Meeting will be held to introduce the draft report.

## Meeting Notes

Date: December 22, 2021

Notes Taken By: Evan Haugh

Place: Teams Meeting

Project No.: 58600.04

Re: *Automated Speed Enforcement in Work Zones*  
Working Group Meeting #6 – DRAFT Meeting Summary**Participants****(Core Team)**

1. Zoe Neaderland – Policy & Planning, Project Manager
2. Ian Degutis – Operations and Safety Bureau, Traffic Operations Engineer
3. Jon Kaplan – Operations and Safety Bureau

**(VTrans)**

4. Bill Jenkins – Operations and Safety Bureau, Law Enforcement Liaison
5. Nancy Avery – Work Zone Engineer
6. Jenny Ronis – Assistant Attorney General
7. Jesse Devlin – Highway Safety and Design Section, Program Manager
8. Xusana Davis, Director of Equity

**(Others)**

9. Richard Wobby – Associated General Contractors – Executive Vice President
10. Matt Musgrave – Associated General Contractors – Deputy Executive Vice President
11. Michael Dente – Agency of Digital Services, IT Manager
12. David Ladouceur – Agency of Digital Services, Chief Information Security Officer
13. Jason Charest – CCRPC, Transportation Planning Engineer
14. Paul Ravelin – Department of Public Safety, Special Operations Executive Officer
15. Jenn Conley – VHB
16. Evan Haugh – VHB
17. Karen Sentoff – VHB

**Meeting Summary**

The meeting started with a discussion of the executive summary. A suggestion was made to add a brief definition of speed cameras to the executive summary. The group agreed. Another attendee suggested that the executive summary highlight the fact that these systems are used in other states. The attendee noted that imitating the successful aspects of other programs lends credibility to the program design. The possibility of including more statistics in the executive summary was also discussed. It was brought up that there are very compelling numbers later in the report that should be brought to the forefront.

After this discussion, the group was asked if they had any questions. One member asked whether there was supporting data from Vermont specifically showing that speed cameras would be effective. The consultant team

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answered that since speed safety cameras have not been tried in Vermont yet, Vermont-specific data does not exist but could be generated as part of the pilot. The team explained that data from nearby states would not be a perfect comparison as they have all enforced fines with their cameras. Another member pointed out that, as an example, two years ago he could see that the bridge between Winooski and Colchester saw 10,000 cars per day with an average speed of 68 in a 55 zone. This member suggested including evidence of this kind to demonstrate the scale of the problem and need for new solutions, saying it would be compelling to show that even in a 55 zone, in high-enforcement Chittenden County, the problem was this severe. They had multiple violations over 100 mph, highest was 112 mph. Another member countered that this pilot would only be active at times when workers are present, and we wouldn't want to present general speed data if all the speeding is happening at 1 am. Another member brought up a report on work zones in St Albans that showed speeding with/without UTO, with/without speed feedback sign, suggesting this could be a useful source.

The discussion moved on to privacy and civil liberty concerns. One group member said these privacy concerns are somewhat irrational, since other state government activities are even more intrusive. The member's position was that the group needs to separate legitimate and frivolous privacy concerns.

Another member agreed with the sentiment but says privacy comes up constantly. The member distinguished many of the other examples of common invasions of privacy as functionally voluntary, saying concerns are real and will have to be addressed.

Another member spoke up to disagree with the notion that intrusions of privacy elsewhere negate concerns about further encroachments on privacy. The member agreed that privacy doesn't outweigh any saved lives, and that drivers are tracked in equally or more intrusive ways already, but said most privacy intrusions are relatively recent, and shouldn't be trivialized.

The discussion moved to how recommendations were presented. One member reiterated that the legislature expects specifics on the feasibility and pilot structure. This member suggested recommendations be more direct and definitive. Another member asked how much the legislature should be asked to define vs bringing them firm principles for a proposed pilot. The group agreed that the report should give the legislature as much as possible.

The next topic was whether to include any potential alternative methods of reducing speeding. One member asked whether the cost estimate should be contrasted with the cost of a comparable level of live enforcement. Another member pointed out that UTOs (blue lights) don't move during their shift. A comparable level of live enforcement would involve two officers. A member pointed out that it would be possible to create such an estimate using figures from VSP contracts with towns, and that patrol hours cost the same regardless of activity. Another member countered that it's not comparable since a camera enforces continuously, while officers spend significant time stopped with drivers. Another member agreed that a cost comparison would offer a useful perspective, and could be accompanied by information on the cost of crashes. Another member added that VSP officers do work zone shifts on overtime, so an estimate should account for the higher costs. Lastly, a member pointed out that VSP has 40+ vacancies and is now using overtime for regular patrol.

The group was asked their opinion on offering incentives to people who watch a video or take a survey. Little progress was made on that topic, but the group discussed what the contents of those videos should include. One member proposed using testimony from relatives of workers killed in crashes. Another member agreed that using stories from children whose parents died in work zones is impactful and personal. Another member suggested

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including a photo or video of the work crew saying thanks for driving safe, or even offering tours of work zones (maybe by raffle) for watching the whole video.

The group ended discussion there and was told to expect a revised executive summary the next day.

## Meeting Notes

Date: November 1, 2021 Notes Taken By: Annabelle Dally

Place: Teams Meeting

Project No.: 58600.04 Re: *Automated Speed Enforcement in Work Zones*  
Engaging Viewpoints – DRAFT Meeting Summary**Participants****Stakeholders**

Barbara Brody – Driver and Traffic Safety Field, Curriculum Developer for National Drivers Education Materials

James Lockridge – Youth Safety Council Vermont, Distracted Driving Education and Awareness

Daniel Goodman – AAA Northern New England, Public Affairs

Mark Anders – Bennington Regional Planning Commission, Regional Planner/Transportation Program Manager

Otis Munroe – Mount Ascutney Regional Commission, Planner

Rita Seto – Two Rivers-Ottawaquechee Regional Commission, Senior Planner

Sai Sarepalli – CCRPC, Senior Transportation Planning Engineering

**Working Group**

Matt Musgrave – AGC of Vermont, Deputy Executive Vice President

Sgt. Paul Ravelin – Dept of Public Safety, Special Operations Executive Officer

Capt. Kevin Andrews – Department of Motor Vehicles, Motor Vehicle Safety Chief

Xusana Davis – Agency of Administration, Director of Equity

Jason Charest – CCRPC, Senior Transportation Planning Engineer

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Paul White – AOT Operations and Safety Bureau Law Enforcement, Liaison for northern half of Vermont

Matt Shagam – Rich Cassidy Law, Civil Litigator

Jesse Devlin – AOT Highway Safety and Design Section, Program Manager

Nancy Avery – AOT Work Zone Engineer

*\*Richard Wobby – AGC of Vermont, Executive Vice President**\*Capt. Mark Anderson – Windham County Sheriff Office, Sheriff**\*Bill Jenkins – AOT Operations and Safety Bureau Law Enforcement, Liaison for southern half of Vermont**\*Jenny Ronis – Agency of Transportation, Assistant Attorney General**\*Lance Duquette – AOT Maintenance and Fleet, District 7 General Manager**\*will be participating, but not present today***Core Team**

Zoe Neaderland – AOT Policy and Planning, Planning Coordinator, VTrans Project Manager

Jon Kaplan – AOT Operations and Safety Bureau

Ian Degutis – AOT Operations and Safety Bureau, Traffic Operations Engineer

Costa Pappis – AOT Policy and Planning, Policy and Planning Manager

Jenn Conley – VHB, Consultant Team Project Manager

Karen Sentoff – VHB, Transportation Consultant Research

Annabelle Dally – VHB, Engineering Outreach Professional

*\*Kristin Kersavage – VHB, Federal Perspective Safety Engineer**\*will be participating, but not present today*

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## Meeting Summary

Attendees gave brief introductions. The consultant team provided background on how and where speed safety cameras are being used both nationally and internationally and the benefits of using this technology as demonstrated by some of these existing programs. The consultant team described the project's purpose statement followed by discussion of the consultant's preliminary recommendations for the pilot program.

Attendees were asked to provide initial thoughts and reactions. A question was raised if the cost effectiveness of performing the data processing in-house versus outsourcing the work through a third-party vendor was weighed. A suggestion was made that verification during post processing requires basic skills which could be performed by newer/younger drivers allowing for the additional benefit of educating newer/younger drivers and helping to change speeding cultural early on. An initial reaction to the program is concern that the educational letter will not be enough to make real change and enforcement is needed. A counter point was made that other less serious violations such as parking tickets also are tied to the registered owner and not the driver. The point was made that a majority of town representatives and residents of Vermont are fed up with speeding and would likely be supportive in the use of this technology and if the State took a stronger stance with enforcement. A counter point was made that based on feedback from the legislature and the executive branch there currently is not support for automated speed enforcement. Other initial concerns were raised regarding using automated speed enforcement as the ticket is attached to the registered owner and not the driver committing the infraction leaving it open to appeal. A comment was made that starting with the educational pilot would at least bring public awareness to the issue.

The consultant team provided a background on how work zones are defined and why work zones were specifically identified for the potential use of this technology. The consultant team provided a list of potential opportunities for education to constitute behavior change through this program.

Attendees were asked to discuss these opportunities and identify other potential opportunities to bring about this desired change in driver behavior. The core team reminded attendees that the educational material will be sent to the registered owner of the vehicle and not the driver to better inform this discussion. An attendee asked if there was any additional thought to how repeat offenders would be handled through an educational approach as the materials cannot be escalated as fines can for repeated infractions. The working group has been discussing this issue and while no official determination has been made suggestions include the possibility to share anonymized speed trend data with law enforcement to help inform more traditional enforcement methods where safety in relation to speeding continues to be an on-going issue. The core team explained that while enforcement would not be part of the pilot program itself the use of speed safety cameras would be prohibit traditional law enforcement methods from occurring during its use. A suggestion was made to consider a reward-based system instead of a punishment-based system such as enforcement to increase credibility. The educational materials could include an action and an incentive for example watch an educational video or complete an educational course to receive a points deduction from your license. A question was raised regarding how long it takes from when a driver is captured by a speed safety camera and receives the notice. A concern was raised regarding signage and education materials and Vermont's population where English is a second language. Additional concerns were raised regarding the hesitancy with including enforcement. Questions were raised regarding public opposition to the use of enforcement with this technology. Does data show an overwhelming majority of the public is against it? Has



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feedback been or will public feedback be solicited? An attendee stressed the need for balance when bringing the pilot to the legislature between what would be successful and what the legislature will be willing to approve. A concern was made that without a monetary element or at minimum a reactionary component that a letter is likely to be unsuccessful. A suggestion was made to include a fee similar to a parking ticket or an automated toll. Concern was raised that the monetary element might not be well received by the legislature, but there was support among attendees to including an action or acknowledgement.

The consultant team provided an overview of best practices in regard to privacy and security that could be applied to the pilot. An attendee pointed out that similar technology in terms of privacy is used all over New England including automatic tolling and EZPass. Another attendee mentioned it was worth noting that there was resistance and push back when EZPass was first implemented.

The consultant team discussed ways in which the Vermont Pilot could be evaluated for effectiveness. An attendee noted it would be beneficial for driver's education and driver's safety education to be able to see the additional trends in this speed data including geography or age to determine where current education might be falling short. Due to the way the data would be collected these demographics wouldn't be captured. Others suggested that due to the short duration data is captured it could be difficult to get any useable trend or demographic data. A question was raised whether other DOTs are running similar work zone specific studies using this technology and what types of evaluation criteria are they using? Based on best practices research other DOTs are evaluating efficacy based on the percentage of drivers exceeding a certain set threshold 10-15 mph over the speed limit, most of these DOTs are also looking into enforcement so the programs are slightly different than what is being proposed here.

The consultant team discussed next steps and opened the meeting to any additional feedback. A concern was raised that including the speed of the vehicle in the letter could encourage people to speed to see how fast they can be captured by the camera. A suggestion was made to cap the reading at a certain speed threshold such that the letter would only include a + for any mileage over a cap of a certain speed over. Attendees acknowledged both the effectiveness of enforcement on behavior change and the need to strike a balance between enforcement and the legislature's appetite. The core team noted that the legislature is looking for a successful outcome to address speeding and safety while there is reservation about privacy and equity there is a real need to change speed culture. A suggestion was made to ease the technology in slowly to start with education, measure the effectiveness, and build from there. An attendee notes that this is all part of a larger group of projects/programs with a common outcome to make work zones safer.

A discussion was held regarding actions and responsibilities of "blue lights" in work zones. An attendee mentioned that "blue lights" cannot perform enforcement as they are not contractually permitted to do so. Another attendee explained that typically "blue lights" have nothing legally preventing them from enforcing speeds and other violations their contractual obligation is to remain at their post to protect the workers. It is less that "blue lights" cannot provide enforcement it is just a judgement call, doing so will leave the workers more vulnerable. There is the option to add a second blue light to handle enforcement unfortunately staffing shortages and competing overtime opportunities make this difficult.

# Appendix 3

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**23 V.S.A. § 1607 – Vermont ALPR  
Law**

# The Vermont Statutes Online

## Title 23 : Motor Vehicles

### Chapter 015 : Powers Of Enforcement Officers

(Cite as: 23 V.S.A. § 1607)

[Section 1607 repealed effective July 1, 2022.]

#### § 1607. Automated license plate recognition systems

(a) Definitions. As used in this section:

(1) "Active data" is distinct from historical data as defined in subdivision (3) of this subsection and means data uploaded to individual automated license plate recognition system units before operation as well as data gathered during the operation of an ALPR system. Any data collected by an ALPR system in accordance with this section shall be considered collected for a legitimate law enforcement purpose.

(2) "Automated license plate recognition system" or "ALPR system" means a system of one or more mobile or fixed high-speed cameras combined with computer algorithms to convert images of registration plates into computer-readable data.

(3) "Historical data" means any data collected by an ALPR system and stored on the statewide ALPR server operated by the Vermont Justice Information Sharing System of the Department of Public Safety. Any data collected by an ALPR system in accordance with this section shall be considered collected for a legitimate law enforcement purpose.

(4) "Law enforcement officer" means a State Police officer, municipal police officer, motor vehicle inspector, Capitol Police officer, constable, sheriff, or deputy sheriff certified by the Vermont Criminal Justice Council as a level II or level III law enforcement officer under 20 V.S.A. § 2358.

(5) "Legitimate law enforcement purpose" applies to access to active or historical data, and means investigation, detection, analysis, or enforcement of a crime or of a commercial motor vehicle violation or a person's defense against a charge of a crime or commercial motor vehicle violation, or operation of AMBER alerts or missing or endangered person searches.

(6) "Vermont Intelligence Center analyst" means any sworn or civilian employee who through his or her employment with the Vermont Intelligence Center (VIC) has access to secure databases that support law enforcement investigations.

(b) Operation. A Vermont law enforcement officer shall be certified in ALPR operation by the Vermont Criminal Justice Council in order to operate an ALPR system.

(c) ALPR use and data access; confidentiality.

(1)(A) Deployment of ALPR equipment by Vermont law enforcement agencies is intended to provide access to law enforcement reports of wanted or stolen vehicles and wanted persons and to further other legitimate law enforcement purposes. Use of ALPR systems by law enforcement officers and access to active data are restricted to legitimate law enforcement purposes.

(B) Active data may be accessed by a law enforcement officer operating the ALPR system only if he or she has a legitimate law enforcement purpose for the data. Entry of any data into the system other than data collected by the ALPR system itself must be approved by a supervisor and shall have a legitimate law enforcement purpose.

(C)(i) Requests to access active data shall be in writing and include the name of the requester, the law enforcement agency the requester is employed by, if any, and the law enforcement agency's Originating Agency Identifier (ORI) number. To be approved, the request must provide specific and articulable facts showing that there are reasonable grounds to believe that the data are relevant and material to an ongoing criminal, missing person, or commercial motor vehicle investigation or enforcement action. The written request and the outcome of the request shall be transmitted to VIC and retained by VIC for not less than three years.

(ii) In each department operating an ALPR system, access to active data shall be limited to designated personnel who have been provided account access by the department to conduct authorized ALPR stored data queries. Access to active data shall be restricted to data collected within the past seven days.

(2)(A) A VIC analyst shall transmit historical data only to a Vermont or out-of-state law enforcement officer or person who has a legitimate law enforcement purpose for the data. A law enforcement officer or other person to whom historical data are transmitted may use such data only for a legitimate law enforcement purpose. Entry of any data onto the statewide ALPR server other than data collected by an ALPR system itself must be approved by a supervisor and shall have a legitimate law enforcement purpose.

(B) Requests for historical data within six months of the date of the data's creation, whether from Vermont or out-of-state law enforcement officers or other persons, shall be made in writing to a VIC analyst. The request shall include the name of the requester, the law enforcement agency the requester is employed by, if any, and the law enforcement agency's ORI number. To be approved, the request must provide specific and articulable facts showing that there are reasonable grounds to believe that the data are relevant and material to an ongoing criminal, missing person, or commercial motor vehicle investigation or enforcement action. VIC shall retain all requests and shall record in writing the outcome of the request and any information that was provided to the requester or, if applicable, why a request was denied or not fulfilled. VIC shall retain the information described in this subdivision (c)(2)(B) for no fewer than three years.

(C) After six months from the date of its creation, VIC may only disclose historical data:

(i) pursuant to a warrant if the data are not sought in connection with a pending criminal charge; or

(ii) to the prosecution or the defense in connection with a pending criminal charge and pursuant to a court order issued upon a finding that the data are reasonably likely to be relevant to the criminal matter.

(3) Active data and historical data shall not be subject to subpoena or discovery, or be admissible in evidence, in any private civil action.

(4) Notwithstanding any contrary provisions of subdivision (2) of this subsection, in connection with commercial motor vehicle screening, inspection, and compliance activities to enforce the Federal Motor Carrier Safety Regulations, the Department of Motor Vehicles (DMV):

(A) may maintain or designate a server for the storage of historical data that is separate from the statewide server;

(B) may designate a DMV employee to carry out the same responsibilities as a VIC analyst and a supervisor as specified in subdivision (2) of this subsection; and

(C) shall have the same duties as the VIC with respect to the retention of requests for historical data.

(d) Retention.

(1) Any ALPR information gathered by a Vermont law enforcement agency shall be sent to the Department of Public Safety to be retained pursuant to the requirements of subdivision (2) of this subsection. The Department of Public Safety shall maintain the ALPR storage system for Vermont law enforcement agencies.

(2) Except as provided in this subsection and section 1608 of this title, information gathered by a law enforcement officer through use of an ALPR system shall only be retained for 18 months after the date it was obtained. When the permitted 18-month period for retention of the information has expired, the Department of Public Safety and any local law enforcement agency with custody of the information shall destroy it and cause to have destroyed any copies or backups made of the original data. Data may be retained beyond the 18-month period pursuant to a preservation request made or disclosure order issued under section 1608 of this title or pursuant to a warrant issued under Rule 41 of the Vermont or Federal Rules of Criminal Procedure.

(e) Oversight; rulemaking.

(1) The Department of Public Safety, in consultation with the Department of Motor Vehicles, shall establish a review process to ensure that information obtained through use of ALPR systems is used only for the purposes permitted by this section. The Department

## APPENDIX 3

of Public Safety shall report the results of this review annually on or before January 15 to the Senate and House Committees on Judiciary and on Transportation. The report shall contain the following information based on prior calendar year data:

(A) the total number of ALPR units being operated by government agencies in the State, the number of such units that are stationary, and the number of units submitting data to the statewide ALPR database;

(B) the number of ALPR readings each agency submitted, and the total number of all such readings submitted, to the statewide ALPR database;

(C) the 18-month cumulative number of ALPR readings being housed on the statewide ALPR database as of the end of the calendar year;

(D) the total number of requests made to VIC for historical data, the average age of the data requested, and the number of these requests that resulted in release of information from the statewide ALPR database;

(E) the total number of out-of-state requests to VIC for historical data, the average age of the data requested, and the number of out-of-state requests that resulted in release of information from the statewide ALPR database;

(F) the total number of alerts generated on ALPR systems operated by law enforcement officers in the State by a match between an ALPR reading and a plate number on an alert database and the number of these alerts that resulted in an enforcement action;

(G) the total number of criminal, missing person, and commercial motor vehicle investigations and enforcement actions to which active data contributed, and a summary of the nature of these investigations and enforcement actions;

(H) the total number of criminal, missing person, and commercial motor vehicle investigations and enforcement actions to which historical data contributed, and a summary of the nature of these investigations and enforcement actions; and

(I) the total annualized fixed and variable costs associated with all ALPR systems used by Vermont law enforcement agencies and an estimate of the total of such costs per unit.

(2) Before January 1, 2018, the Department of Public Safety shall adopt rules to implement this section. (Added 2013, No. 69, § 1; amended 2015, No. 169 (Adj. Sess.), § 8; 2017, No. 175 (Adj. Sess.), § 3, eff. May 25, 2018; repealed on July 1, 2022 by 2019, No. 134 (Adj. Sess.), § 3 and 2019, No. 149 (Adj. Sess.), § 41, eff. July 13, 2020.)

# Appendix 4

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## **18 U.S. Code § 2721 – Motor Vehicle Records Release Law**

## 18 U.S. Code § 2721

### § 2721. PROHIBITION ON RELEASE AND USE OF CERTAIN PERSONAL INFORMATION FROM STATE MOTOR VEHICLE RECORDS

**(a) IN GENERAL.**—A State department of motor vehicles, and any officer, employee, or contractor thereof, shall not knowingly disclose or otherwise make available to any [person](#) or entity:

**(1)** [personal information](#), as defined in [18 U.S.C. 2725\(3\)](#), about any individual obtained by the department in connection with a [motor vehicle record](#), except as provided in subsection (b) of this section; or

**(2)** [highly restricted personal information](#), as defined in [18 U.S.C. 2725\(4\)](#), about any individual obtained by the department in connection with a [motor vehicle record](#), without the [express consent](#) of the [person](#) to whom such information applies, except uses permitted in subsections (b)(1), (b)(4), (b)(6), and (b)(9): Provided, That subsection (a)(2) shall not in any way affect the use of organ donation information on an individual's driver's license or affect the administration of organ donation initiatives in the States.

**(b) PERMISSIBLE USES.**—Personal information referred to in subsection (a) shall be disclosed for use in connection with matters of motor vehicle or driver safety and theft, motor vehicle emissions, motor vehicle product alterations, recalls, or advisories, performance monitoring of motor vehicles and dealers by motor vehicle manufacturers, and removal of non-owner records from the original owner records of motor vehicle manufacturers to carry out the purposes of titles I and IV of the [Anti Car Theft Act of 1992](#), the [Automobile Information Disclosure Act](#) ([15 U.S.C. 1231](#) et seq.), the [Clean Air Act](#) ([42 U.S.C. 7401](#) et seq.), and chapters 301, 305, and 321-331 of title 49, and, subject to subsection (a)(2), may be disclosed as follows:

**(1)** For use by any government agency, including any court or law enforcement agency, in carrying out its functions, or any private [person](#) or entity acting on behalf of a Federal, State, or local agency in carrying out its functions.

**(2)** For use in connection with matters of motor vehicle or driver safety and theft; motor vehicle emissions; motor vehicle product alterations, recalls, or advisories; performance monitoring of motor vehicles, motor vehicle parts and dealers; motor vehicle market research activities, including survey research; and removal of non-owner records from the original owner records of motor vehicle manufacturers.



#### APPENDIX 4

- (3)** For use in the normal course of business by a legitimate business or its agents, employees, or contractors, but only—
- (A)** to verify the accuracy of [personal information](#) submitted by the individual to the business or its agents, employees, or contractors; and
  - (B)** if such information as so submitted is not correct or is no longer correct, to obtain the correct information, but only for the purposes of preventing fraud by, pursuing legal remedies against, or recovering on a debt or security interest against, the individual.
- (4)** For use in connection with any civil, criminal, administrative, or arbitral proceeding in any Federal, State, or local court or agency or before any self-regulatory body, including the service of process, investigation in anticipation of litigation, and the execution or enforcement of judgments and orders, or pursuant to an order of a Federal, State, or local court.
- (5)** For use in research activities, and for use in producing statistical reports, so long as the [personal information](#) is not published, redisclosed, or used to contact individuals.
- (6)** For use by any insurer or insurance support organization, or by a self-insured entity, or its agents, employees, or contractors, in connection with claims investigation activities, antifraud activities, rating or underwriting.
- (7)** For use in providing notice to the owners of towed or impounded vehicles.
- (8)** For use by any licensed private investigative agency or licensed security service for any purpose permitted under this subsection.
- (9)** For use by an employer or its agent or insurer to obtain or verify information relating to a holder of a commercial driver's license that is required under chapter 313 of title 49.
- (10)** For use in connection with the operation of private toll transportation facilities.
- (11)** For any other use in response to requests for individual [motor vehicle records](#) if the State has obtained the [express consent](#) of the [person](#) to whom such [personal information](#) pertains.
- (12)** For bulk distribution for surveys, marketing or solicitations if the State has obtained the [express consent](#) of the [person](#) to whom such [personal information](#) pertains.
- (13)** For use by any requester, if the requester demonstrates it has obtained the written consent of the individual to whom the information pertains.

**(14)** For any other use specifically authorized under the law of the State that holds the record, if such use is related to the operation of a motor vehicle or public safety.

**(c) RESALE OR REDISCLOSURE.—**

An authorized recipient of [personal information](#) (except a recipient under subsection (b)(11) or (12)) may resell or redisclose the information only for a use permitted under subsection (b) (but not for uses under subsection (b)(11) or (12)). An authorized recipient under subsection (b)(11) may resell or redisclose [personal information](#) for any purpose. An authorized recipient under subsection (b)(12) may resell or redisclose [personal information](#) pursuant to subsection (b)(12). Any authorized recipient (except a recipient under subsection (b)(11)) that resells or rediscloses [personal information](#) covered by this chapter must keep for a period of 5 years records identifying each [person](#) or entity that receives information and the permitted purpose for which the information will be used and must make such records available to the motor vehicle department upon request.

**(d) WAIVER PROCEDURES.—**

A State motor vehicle department may establish and carry out procedures under which the department or its agents, upon receiving a request for [personal information](#) that does not fall within one of the exceptions in subsection (b), may mail a copy of the request to the individual about whom the information was requested, informing such individual of the request, together with a statement to the effect that the information will not be released unless the individual waives such individual's right to privacy under this section.

**(e) PROHIBITION ON CONDITIONS.—**

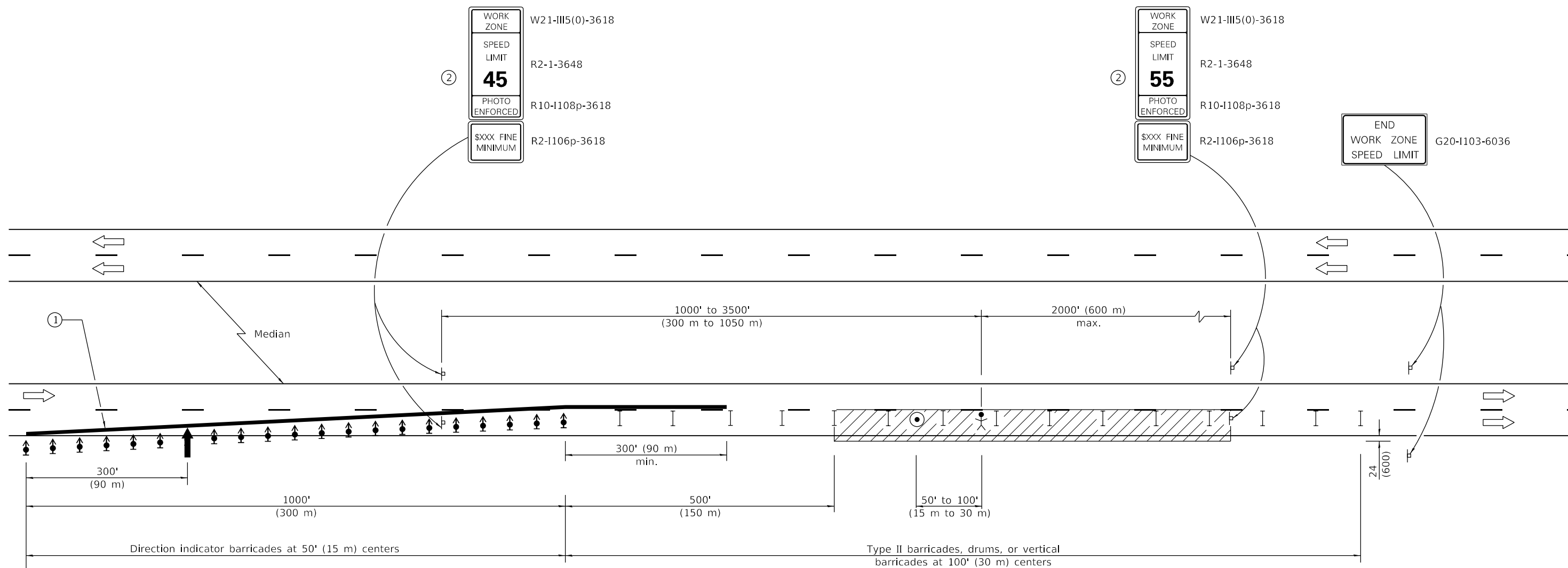
No State may condition or burden in any way the issuance of an individual's [motor vehicle record](#) as defined in [18 U.S.C. 2725\(1\)](#) to obtain [express consent](#). Nothing in this paragraph shall be construed to prohibit a State from charging an administrative fee for issuance of a [motor vehicle record](#).

(Added [Pub. L. 103-322, title XXX, § 300002\(a\)](#), Sept. 13, 1994, [108 Stat. 2099](#); amended [Pub. L. 104-287, § 1](#), Oct. 11, 1996, [110 Stat. 3388](#); [Pub. L. 104-294, title VI, § 604\(b\)\(46\)](#), Oct. 11, 1996, [110 Stat. 3509](#); [Pub. L. 106-69, title III, § 350\(c\)](#), (d), Oct. 9, 1999, [113 Stat. 1025](#); [Pub. L. 106-346, § 101\(a\) \[title III, § 309\(c\)-\(e\)\]](#), Oct. 23, 2000, [114 Stat. 1356](#), 1356A-24.)

# Appendix 5

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## **Illinois Speed Camera Signing Layout**



WORK ZONE W21-III5(0)-3618  
 SPEED LIMIT R2-1-3648  
 PHOTO ENFORCED R10-1108p-3618  
 \$XXX FINE MINIMUM R2-1106p-3618

WORK ZONE W21-III5(0)-3618  
 SPEED LIMIT R2-1-3648  
 PHOTO ENFORCED R10-1108p-3618  
 \$XXX FINE MINIMUM R2-1106p-3618

END WORK ZONE SPEED LIMIT G20-1103-6036

See Standard 701400 for approach Start of lane closure taper

**SYMBOLS**

- Arrow board
- Work area
- Worker
- Sign
- Direction indicator barricade with steady burn monodirectional light
- Type II barricade, drum, or vertical barricade
- Spotter

- ① ReflectORIZED temporary pavement marking tape shall be placed throughout the taper and for 300' (90 m) along-side the work area when the closure time is greater than fourteen days. The edge line shall be white for right lane closure and yellow for left lane closures.
- ② Work Zone speed limit signs shall be moved as necessary to maintain the required spacing between the signs and the workers in each separate work activity. Work Zone Speed Limit 55 Photo Enforced sign shall be omitted when the work area dictates placement of the sign array within 500' (150 m) of the End Work Zone Speed Limit Sign.

**GENERAL NOTES**

This Standard is used where at any time any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement.

This Standard must always be used in combination with Standard 701400.

This Standard also applies when work is being performed in the left lane. Under these conditions, the setup would be a mirror image to what is shown.

A check barricade shall be placed in the middle of the closed lane and at the shoulder at 1000' (300 m) centers.

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation

APPROVED January 1, 2022  
  
 ENGINEER OF SAFETY PROG. AND ENGINEERING

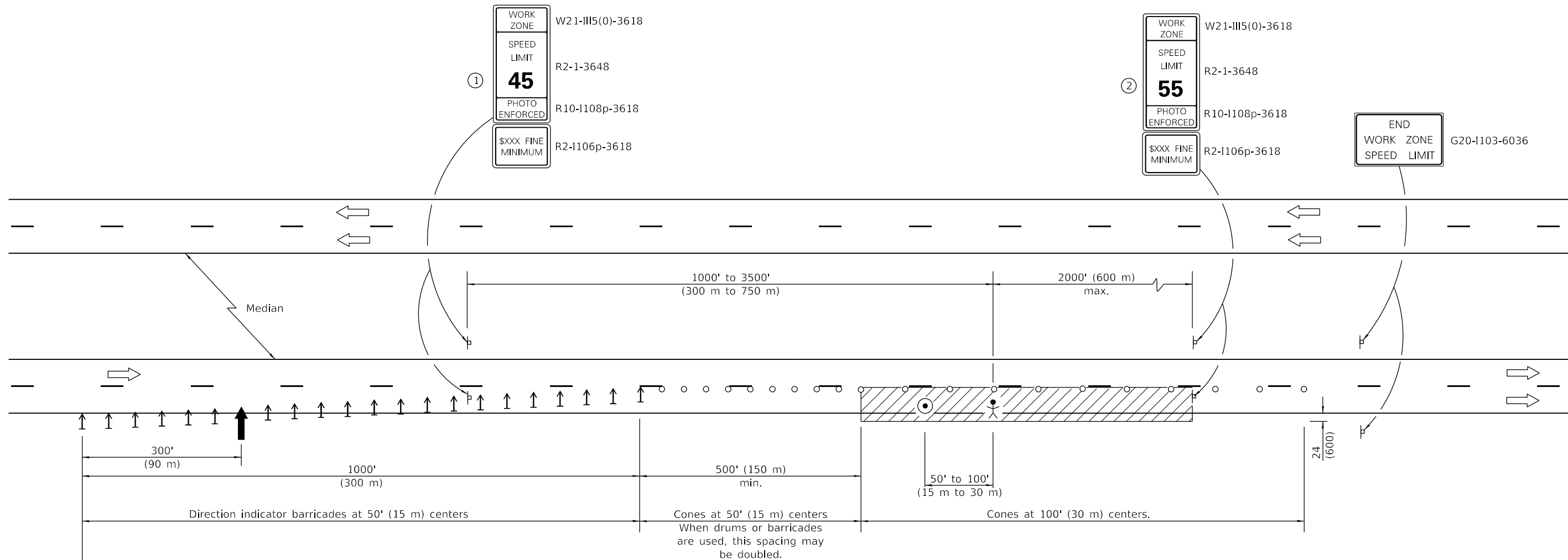
APPROVED January 1, 2022  
  
 ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

DATE	REVISIONS
1-1-22	Corrected work zone speed limit sign numbers.
1-1-19	Replaced flagger with spotter.
1-1-18	Omitted lights in tangent.

**LANE CLOSURE,  
 FREEWAY/EXPRESSWAY**

**STANDARD 701401-13**



See Standard 701400 for approach  
Start of lane closure taper

**TYPICAL APPLICATIONS**

- Pavement patch
- Utility operations
- Bituminous resurfacing

**SYMBOLS**

- ↑ Arrow board
- ▨ Work area
- ⚙ Worker
- ⚓ Sign
- ↑ Direction indicator barricade
- Cone, drum or barricade
- ⊙ Spotter

- ① Work zone speed limit signs shall be moved as necessary to maintain the required spacing between the signs and the workers in each separate work activity.
- ② Work Zone Speed Limit 55 Photo Enforced sign shall be omitted when the work area dictates placement of the sign array within 500' (150 m) of the End Work Zone Speed Limit sign.

**GENERAL NOTES**

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement for daylight operation.

This Standard must always be used in combination with Standard 701400.

This Standard also applies when work is being performed in the left lane. Under these conditions, the set up would be a mirror image to what is shown.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-22	Corrected work zone speed limit sign numbers.
1-1-19	Replaced flagger with spotter.
1-1-17	Revised END WORK ZONE SPEED LIMIT sign from orange to white background.

**LANE CLOSURE,  
FREEWAY/EXPRESSWAY,  
DAY OPERATIONS ONLY**

**STANDARD 701406-13**

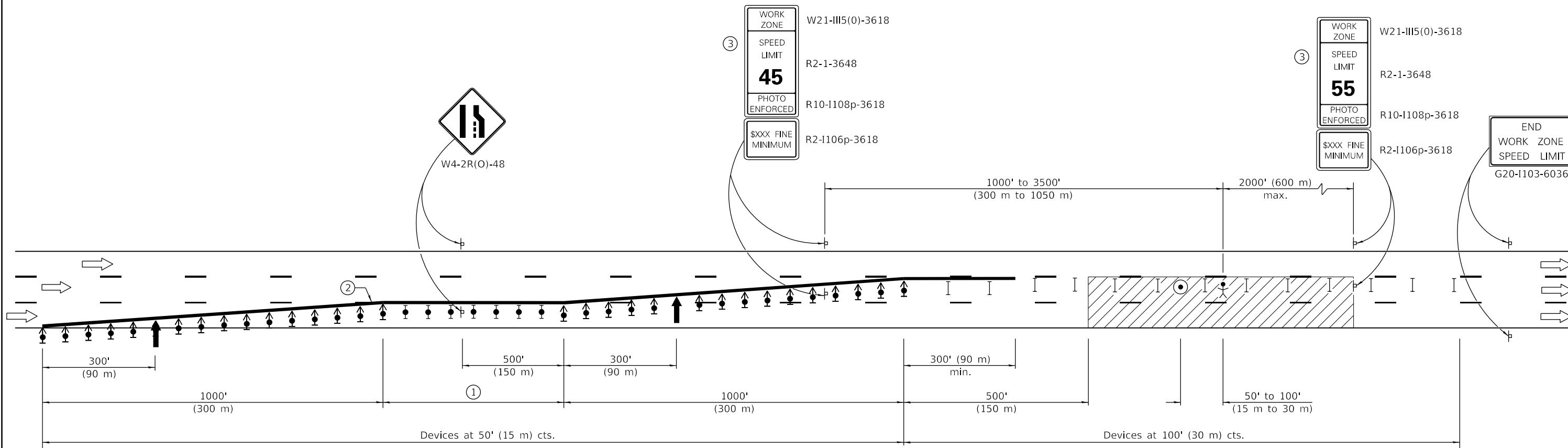
Illinois Department of Transportation

APPROVED January 1, 2022  
*Cynthia Datt*  
ENGINEER OF SAFETY PROG. AND ENGINEERING

APPROVED January 1, 2022  
*J. E. Egan*  
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

APPENDIX 5



See Standard 701400 for approach  
Start of lane closure taper

**SYMBOLS**

- Arrow board
- Work area
- Worker
- Sign
- Direction indicator barricade with steady burn monodirectional light
- Type II barricade, drum, or vertical barricade with steady burn monodirectional light
- Spotter
- Type II barricade, drum, or vertical barricade

① The length of the tangent section shall be:

Duration of Closure	Length of Tangent Section
< 14 Days	1000' (300 m)
≥ 14 Days	2000' (600 m)

② ReflectORIZED temporary pavement marking tape shall be placed throughout the tapers and for 300' (90 m) along-side the work area when the closure time is greater than fourteen days. The edge line shall be white for right lane closures and yellow for left lane closures.

③ Work zone speed limits signs shall be moved as necessary to maintain the required spacing between the signs and the workers in each separate work activity. Work Zone Speed Limit 55 Photo Enforced sign shall be omitted when the work area dictates that placement of the sign array within 500' (150 m) of the End Work Zone Speed Limit sign.

**GENERAL NOTES**

This Standard is used where at any time any vehicle, equipment, workers or their activities will encroach on two lanes of a freeway/expressway.

This Standard must always be used in combination with Standard 701400.

This Standard also applies when work is being performed in the left lanes. Under these conditions, the set up would be a mirror image to what is shown.

Check barricades shall be placed in the middle of the closed lanes at 1000' (300 m) centers.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-21	Corrected symbol for type II barricade with steady burn monodirectional light and altered device spacing callout.
1-1-20	Replaced flagger with spotter.

**TWO LANE CLOSURE,  
FREEWAY/EXPRESSWAY**

**STANDARD 701446-11**

Illinois Department of Transportation

PASSED January 1, 2021  
*Cynthia A. [Signature]*  
ENGINEER OF SAFETY PROG. AND ENGINEERING

APPROVED January 1, 2021  
*[Signature]*  
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-05











# Appendix 6

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## **Maryland Speed Camera Signing Layout**

## TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION PLACEMENT OF AUTOMATED SPEED ENFORCEMENT SIGNS AND EQUIPMENT

**KEY:**

-  CHANNELIZING DEVICES
-  SIGN SUPPORT
-  FACE OF SIGN
-  DIRECTION OF TRAFFIC
-  WORK SITE
-  ARROW PANEL
-  SPEED MONITORING VEHICLE
-  SPEED DISPLAY TRAILER
-  APPROVED BARRIER
-  CRASH CUSHION

NOTE: THERE SHALL BE A MINIMUM OF 2 SETS OF 2 (4 TOTAL) ASE SIGNS DISPLAYED IN ADVANCE OF THE SPEED MONITORING VEHICLE

THERE SHALL BE A MINIMUM OF SEVEN CHANNELIZING DEVICES IN THE SHOULDER TAPER.

\*\* UPPER PANEL OF SIGN SHALL HAVE FLUORESCENT ORANGE BACKGROUND WITH BLACK LEGEND AND LOWER PANEL OF SIGN SHALL HAVE WHITE BACKGROUND WITH BLACK LEGEND

\*\*\* UPPER PANEL OF SIGN SHALL HAVE FLUORESCENT YELLOW BACKGROUND WITH BLACK LEGEND, MIDDLE PANEL SHALL HAVE WHITE BACKGROUND WITH BLACK LEGEND AND LOWER PANEL OF SIGN SHALL HAVE FLUORESCENT ORANGE BACKGROUND WITH BLACK LEGEND

\* MAINTAIN MINIMUM 300' SPACING BETWEEN SIGNS

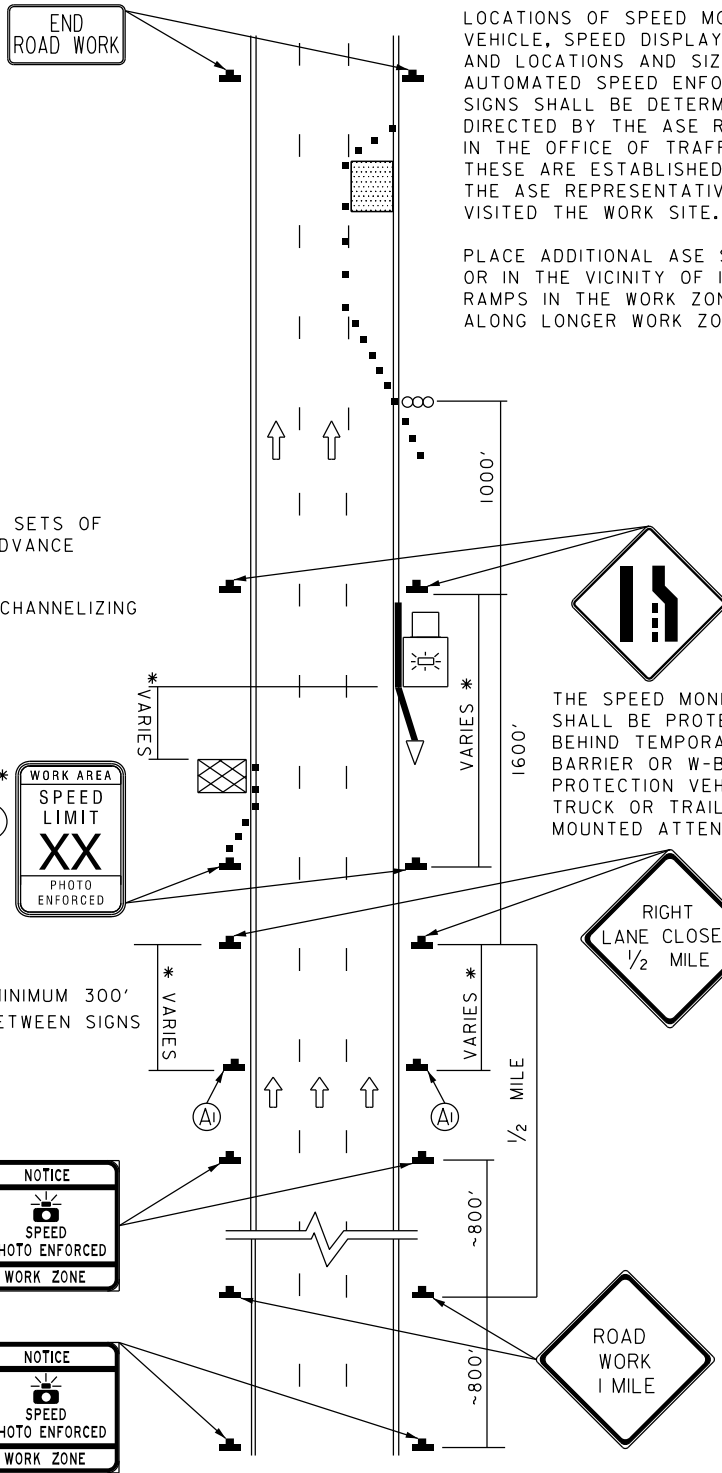


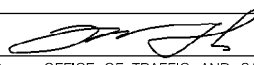

**NOTES:**

LOCATIONS OF SPEED MONITORING VEHICLE, SPEED DISPLAY TRAILER AND LOCATIONS AND SIZES OF ALL AUTOMATED SPEED ENFORCEMENT SIGNS SHALL BE DETERMINED AS DIRECTED BY THE ASE REPRESENTATIVE IN THE OFFICE OF TRAFFIC AND SAFETY. THESE ARE ESTABLISHED AFTER THE ASE REPRESENTATIVE HAS VISITED THE WORK SITE.

PLACE ADDITIONAL ASE SIGNS ON OR IN THE VICINITY OF INTERCHANGE RAMP IN THE WORK ZONE AND ALONG LONGER WORK ZONES.

THE SPEED MONITORING VEHICLE SHALL BE PROTECTED EITHER BEHIND TEMPORARY CONCRETE BARRIER OR W-BEAM, OR BY A PROTECTION VEHICLE WITH TRUCK OR TRAILER MOUNTED ATTENUATOR.



SPECIFICATION	CATEGORY CODE ITEMS <b>SECTION 100</b>		
APPROVED			
DIRECTOR - OFFICE OF TRAFFIC AND SAFETY			
	APPROVAL • SHA REVISIONS	APPROVAL • FEDERAL HIGHWAY ADMINISTRATION	
	APPROVAL <b>3-7-12</b>	APPROVAL <b>3-7-12</b>	
	REVISED	REVISED	
	REVISED	REVISED	

**Maryland Department of Transportation**  
**STATE HIGHWAY ADMINISTRATION**  
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

### AUTOMATED SPEED ENFORCEMENT TYPICAL LAYOUT

STANDARD NO.

MD 104.06-26



# Appendix 7

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## **Pennsylvania Speed Camera Field Manual**



APPENDIX 7

**pennsylvania**

DEPARTMENT OF TRANSPORTATION

# Automated Work Zone Speed Enforcement (AWZSE)



## Field Deployment Guide

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## Section I — AWZSE Program Overview

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### A. Introduction

[Act 86 of 2018 signed on October 19, 2018](#), created [Title 75 \(Vehicle Code\) Section 3369](#) authorizing a five-year pilot program utilizing Automated Speed Enforcement Systems in active work zones. This pilot program is a joint program between the Pennsylvania Department of Transportation (PennDOT) and the Pennsylvania Turnpike Commission (PTC). The goals of the Automated Work Zone Speed Enforcement (AWZSE) Program are to:

- Reduce motorist speeds in work zones to the appropriate posted speed limit,
- Improve driver behavior in work zones by ensuring they are more accountable for their speeds,
- Improve the safety of workers and motorists traveling through the work zone,
- Complement existing enforcement efforts that Pennsylvania State Police performs, and
- Continue to promote work zone safety.

The purpose of this Field Deployment Guide is to provide general information about the program, describe the guidelines and criteria for project identification and scheduling, and to establish the protocols and procedures for AWZSE unit deployment operations. For additional information or questions regarding the program, please visit the program website at <https://workzonecameras.penndot.gov/>.

### B. Legislative Deployment Requirements

[Title 75 \(Vehicle Code\) Section 3369](#) established the requirements for program development. The following are key highlights from the legislation that relate to field deployment activities.

Program Element	Legislative Requirement
<b>Roadway Eligibility (§3369.b)</b>	<b>PennDOT</b> - All federal-aid highways with an active work zone <b>Turnpike</b> – All Turnpike highways with an active work zone
<b>Police Validation (§3369.d.1)</b>	Pennsylvania State Police (PSP) Automated Enforcement Unit within the Bureau of Patrol reviews all fine carrying violations
<b>Sign Requirements (§3369.b)</b>	<ul style="list-style-type: none"> <li>• Two “Active Speed Limit Photo Enforced” signs shall be placed prior to the enforcement location (<i>AWZSE Vendor Responsibility</i>)</li> <li>• One “Active Enforcement Vehicle” sign on Vehicle (<i>AWZSE Vendor Responsibility</i>)</li> <li>• One “End Road Work” or “End Active Work Zone” sign (<i>Construction or Maintenance Responsibility</i>)</li> <li>• Any regulatory speed limit reduction signs need to be placed in conformance with the approved Traffic Control Plan</li> </ul>
<b>Violation (§3369.c)</b>	11 mph or more over the work zone regulatory speed limit
<b>Active Work Zone Requirement (§3369.a)</b>	Workers must be present while AWZSE is active. AWZSE enforcement will occur in the activity area of the work zone. ( <i>AWZSE Vendor will be Responsible for documenting this requirement</i> )
<b>Location Identification (§3369.b)</b>	Department will identify potential AWZSE locations on its website ( <a href="https://workzonecameras.penndot.gov/locations/">https://workzonecameras.penndot.gov/locations/</a> ). The website will be updated weekly.

## C. Additional Legislative Requirements

While not directly related with this Field Deployment Guide, the following legislative requirements clarify the overall program.

Program Element	Legislative Requirement
<b>Responsible Party</b> (§3369.c, e.)	<ul style="list-style-type: none"> <li>• Violations are the responsibility of the Registered Vehicle Owner.</li> <li>• Violations are civil in nature, not criminal.</li> <li>• Violations do not carry driver’s license points or impact merit rating for insurance purposes.</li> <li>• Violation tiering will be tracked by Registered Vehicle Owner and Vehicle Plate.</li> </ul>
<b>Issuing of Violations</b> (§3369.d)	<ul style="list-style-type: none"> <li>• Once the Registered Vehicle Owner is identified through state Driver Vehicle Records, the program has 30 days from identification to mail the violation to the Registered Vehicle Owner.</li> <li>• Violations must be mailed within 90 days from the date the violation occurred.</li> </ul>
<b>Defenses</b> (§3369.g)	<ul style="list-style-type: none"> <li>• The vehicle was reported stolen at the time the violation occurred.</li> <li>• The person receiving the Notice of Violation was not the Registered Vehicle Owner when the violation occurred.</li> <li>• Device being used for enforcement was not operating correctly at the time the violation was captured.</li> </ul>
<b>Contest Process</b> (§3369.j)	<ul style="list-style-type: none"> <li>• Registered Vehicle Owner has 30 days from the mail date to request a hearing.</li> <li>• 1st Level Appeals are heard through an Informal Hearing Officer which is a Law Clerk in PennDOT’s Office of Chief Counsel. If the Registered Vehicle Owner wants to contest the finding of liability ruling of the Informal Hearing Officer, the appeal then goes to a 2<sup>nd</sup> Level Appeal through the District Court System.</li> <li>• 2<sup>nd</sup> Level Appeals are heard by the District Justice where the violation occurred, and their finding of liability ruling is considered final.</li> </ul>
<b>Penalty Structure</b> (§3369.e)	<ul style="list-style-type: none"> <li>• <b>1st Violation</b> – Written Warning, No Monetary Fine</li> <li>• <b>2nd Violation</b> – \$75 fine</li> <li>• <b>3rd and subsequent Violations</b> – \$150 fine per occurrence</li> <li>• Fines identified are flat fees except for credit card convenience fees and/or late fees.</li> <li>• Court costs are applied if a violation is appealed to the District Court system.</li> </ul>
<b>Annual Reporting</b> (§3369.h.4)	Annual report to the PA Legislature Transportation Committee chairpersons are due April 1st each year. First report will be provided in 2020.

Additional details about the program are defined by the legislation, including applicability of the legislation, violation structure, requirements for enforcement, and the appeals process, for example. Where applicable, these specific legislative requirements are discussed within this document.

## D. Partner Roles and Responsibilities

### Government Agencies



### Program Administrator



### AWZSE Vendor



Agency / Partner	Responsibilities
<b>PennDOT</b>	<ul style="list-style-type: none"> <li>• Scheduling and Monitoring of units on PennDOT roadways</li> <li>• Development, Implementation, and Operation of Financial Processes</li> <li>• Promulgation of Temporary Regulations</li> <li>• Development of Standards for Department operations</li> <li>• Procurement and Provision of Informal Hearing Officers</li> </ul>
<b>Pennsylvania Turnpike Commission</b>	<ul style="list-style-type: none"> <li>• Scheduling and Monitoring of units on Commission roadways</li> <li>• Implementation and Operation of Auditing Processes</li> <li>• Vendor Contract Compliance</li> <li>• Development of Standards for Commission operations</li> </ul>
<b>Pennsylvania State Police</b>	<ul style="list-style-type: none"> <li>• Violation Review and Affirmation</li> <li>• Field Speed and Quality Control Checks</li> </ul>
<b>Program Administrator</b>	<ul style="list-style-type: none"> <li>• Program Development</li> <li>• Project Selection and Scheduling</li> <li>• Field and Back Office QA/QC</li> <li>• Operational Compliance and Process Updates</li> <li>• Program Outreach</li> <li>• Performance Monitoring and Reporting</li> <li>• Additional support as necessary</li> </ul>
<b>System Administrator</b>	<ul style="list-style-type: none"> <li>• Field Unit Deployment</li> <li>• Violation Review and Mailing</li> <li>• Fine Collection and Backend Disbursement</li> <li>• Customer Service and Record Keeping</li> <li>• Supporting Informal Hearings</li> </ul>

**Appendix A** provides contact information for key personnel for the program and an overview of the Program Administrator and System Administrator program approach.

## E. Automated Enforcement Technology

The AWZSE program utilizes many different components to perform its enforcement, detailed information regarding the components is identified below:

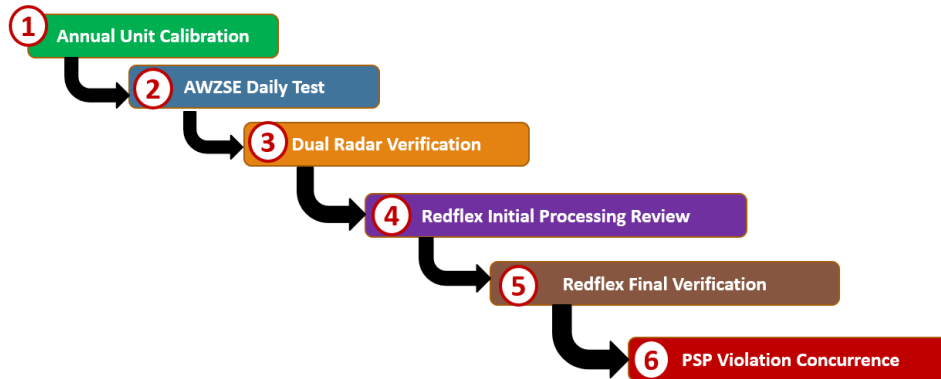


Program Element	Technology Description
<b>Vehicle</b>	<ul style="list-style-type: none"> <li>• White Jeep Grand Cherokee will be the standard vehicle for the Pilot program</li> <li>• All equipment is self-contained in vehicle</li> </ul>
<b>Mounting</b>	<ul style="list-style-type: none"> <li>• Vehicles come to the job site with radar and camera equipment already mounted</li> <li>• Units can enforce from either side of roadway</li> <li>• Minor adjustments to the components by AWZSE operator when changing enforcement side</li> <li>• Units set-up to perform enforcement over 54-inch high barrier with glare screen</li> </ul>
<b>Speed Timing Device</b>	<ul style="list-style-type: none"> <li>• Dual Radar System utilized where both radar readings must agree for violation                             <ul style="list-style-type: none"> <li>- <u>Speed Radar</u> – Similar to PSP radar handheld unit</li> <li>- <u>Tracking Radar</u> – “Doppler Radar” validating movement in lane</li> </ul> </li> <li>• System calibrated and certified annually by a third-party testing lab</li> <li>• AWZSE operator performs pre- and post-enforcement daily tuning fork self-tests on-site</li> </ul>
<b>Camera System</b>	<ul style="list-style-type: none"> <li>• Two advancing (front) and receding (rear) plate photos are taken of vehicles going 11 mph or greater than the established regulatory speed limit</li> <li>• System calibrated and certified annually by a third-party testing lab</li> <li>• AWZSE operator performs pre-enforcement camera verification test</li> </ul>
<b>Enforcement Records</b>	<ul style="list-style-type: none"> <li>• Enforcement records are immediately encrypted and can only be opened by back-office software</li> <li>• If remote field uploading capabilities - records are transmitted several times a day</li> <li>• If no-remote field uploading capabilities - records are transmitted at the AWZSE depot location each night</li> <li>• AWZSE operator cannot access or adjust enforcement records</li> </ul>
<b>AWZSE Operator Daily Log</b>	<ul style="list-style-type: none"> <li>• AWZSE operator required to provide daily log of various enforcement activities</li> <li>• Activity log is the responsibility of the AWZSE operator and becomes part of the enforcement package that PSP reviews</li> </ul>

## F. Violation Verification

To ensure that the automated speed enforcement equipment operates as intended during operation and that all violations collected during a deployment are valid, a six-layer process of equipment certification and testing and violation verification has been established. If any of these steps is found to have failed during the violation review process, the violation will no longer be valid.

### MULTIPLE LAYER VIOLATION VERIFICATION



Tier	Violation Verification Description
(1) Annual Unit Calibration	<ul style="list-style-type: none"> <li>Each enforcement unit is calibrated annually by a third-party testing lab approved by PennDOT.</li> <li>The calibration certificate is made available to State Police during their violation verification activities and to violators for review upon receiving a Violation.</li> </ul>
(2) AWZSE Daily Test	<ul style="list-style-type: none"> <li>Each enforcement unit undergoes a self-test at the start and end of each enforcement period.</li> <li>If one of these self-tests fail, the enforcement cannot begin until the self-test is passed, or if at the end of the deployment, all violations collected during that enforcement are null and void.</li> </ul>
(3) Dual Radar Verification	<ul style="list-style-type: none"> <li>The technology within the automated speed enforcement units contains two radar units.</li> <li>For a violation to be recorded, the speed detected by each radar must approximate each other to a high confidence level. If the speeds detected do not, a violation is not recorded.</li> </ul>
(4) Redflex Initial Processing Review	<ul style="list-style-type: none"> <li>Redflex manually reviews each violation recorded and uploaded to the back-office database.</li> <li>This initial review confirms that all documentation is in order including records of the start and end self-tests, ensures that the image quality is high enough to issue a Notice of Violation, and initiates the DMV lookup process to identify the registered owner.</li> </ul>
(5) Redflex Final Verification	<ul style="list-style-type: none"> <li>Redflex confirms that the registered owner information returned from the DMV lookup matches up with the vehicle captured in the images. For example, a registered owner lookup tied to a blue sedan matches a blue sedan in the images.</li> <li>Another check of the documentation is completed, and the Notice of Violation is prepared at this point.</li> </ul>
(6) PSP Violation Concurrence	<ul style="list-style-type: none"> <li>For all appealed and fine-carrying notices, PSP will be reviewing and affirming the notices.</li> <li>PSP will be reviewing that the plate shown in the images matches the plate key-in for the DMV lookup.</li> <li>They will also be reviewing that the unit certification is current and that the unit passed the self-tests at the start and end of the enforcement period.</li> </ul>
Additional QA/QC	<ul style="list-style-type: none"> <li>In addition to the violation verification processes outlined above, the Program Administrator will be performing quality control checks to ensure that deployments are established and set up in accordance with the standards for each agency's roadways.</li> <li>Pennsylvania State Police will also be doing field quality control checks confirming that the equipment being used in the field matches the approved certificate and all statutory requirements are being fulfilled.</li> </ul>



## Section II — Deployment Approach

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### A. Program Structure

The statewide AWZSE program is being managed and operated as a joint PennDOT and PTC program, with both agencies operating the program as a single entity. The Department and PTC have established several operating protocols for operating the program.

Program Element	Technology Description
<b># of Deployment Units</b>	<ul style="list-style-type: none"> <li>• Up to 17 units are anticipated</li> <li>- 10 units are identified for PennDOT federal-aid highways</li> <li>- 7 units are identified for PTC highways</li> </ul>
<b>Enforcement Time Frames</b>	<ul style="list-style-type: none"> <li>• Enforcement can only occur when workers are present and active in the work zone</li> <li>• Up to an 8-hour deployment shift (System Administrator to be provided a starting enforcement time by the Program Administrator)</li> <li>• System Administrator will begin enforcement at the identified start time unless delayed by work zone setup</li> <li>• System Administrator is responsible for vehicle preparation time and travel to and from project location</li> <li>• Each Vehicle can perform up to 2 shifts daily (Day shift and Night shift)</li> <li>• No restrictions on when enforcement can occur, so weekday and weekend activities can be supported</li> </ul>
<b>Project Identification</b>	<ul style="list-style-type: none"> <li>• The enforcement unit will be located within the activity area of the work zone</li> <li>• See Section III – Project Request to request a project that may be a good AWZSE candidate</li> <li>• See Section IV – Project Selection to identify the data-driven project selection criteria</li> <li>• Field Project Contact is identified who has daily knowledge of the project schedule</li> </ul>
<b>Project Scheduling</b>	<ul style="list-style-type: none"> <li>• See Section V – Project Scheduling to identify how projects are included on the Monthly Menu and Weekly Deployment Schedules</li> <li>• All projects go through the project identification process                             <ul style="list-style-type: none"> <li>- All long-term projects require a project coordination meeting and field visit prior to being added to the deployment schedules</li> <li>- All short-term projects are reviewed and where possible, project coordination meeting and/or field visit with the crew is conducted</li> </ul> </li> <li>• All project scheduling coordination is conducted between the Program Administrator and Field Project Contact</li> </ul>
<b>Field Considerations and/or Lessons Learned</b>	<ul style="list-style-type: none"> <li>• System Administrator will not begin deployment into a work zone until it is fully established</li> <li>• Contractor/Maintenance crew responsible for providing “End Roadwork” sign</li> <li>• Contractor/Maintenance crew responsible for any regulatory speed limit reduction signs placed in conformance with the approved Traffic Control Plan</li> <li>• Unit to remain stationary during enforcement for minimum of 1 ½ hours at a time to minimize the amount non-enforcement time while relocations are occurring (Typically 15-min per relocation time)</li> </ul>

## B. AWZSE Standard Drawings

PennDOT and PTC have developed new Pennsylvania Typical Applications or “PATA” and Pennsylvania Turnpike Commission Maintenance and Protection of Traffic Standard or “PTS” drawings for the AWZSE program. These drawings have been provided in **Appendix B** of this document. The drawings are intended to provide clear guidance to the AWZSE operator for proper sign setup required for deployment. Liability of the AWZSE deployment, documentation, and deployment compliance to the legislation are the sole responsibility of System Administrator. Coordination between System Administrator and the Contractor/Maintenance field staff shall occur as identified within PennDOT Publication 408, Section 105.07. To further clarify the signing requirements and responsibilities identified in Section I, Part B - Legislative Deployment Requirements, the following chart has been developed.:

Sign	Deployment Description
	<ul style="list-style-type: none"> <li>• <b>Contractor and/or Maintenance crew is responsible for providing, installing, maintaining and documenting</b> the Work Zone in accordance with their approved Traffic Control Plan or Publication 213 PATA figure.</li> <li>• System Administrator will not be setting up work zones and they have been instructed to not enter the work zone until it has been fully established.</li> <li>• If Work Zone Speed Limit regulatory signs are provided, the Contractor and/or Maintenance crew is responsible for covering and uncovering of signs as per the approved Traffic Control Plan or Publication 213 PATA figure.</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>System Administrator is responsible for providing, installing, maintaining and documenting</b> the placement of the 2 required “Active Speed Limit Photo Enforced” signs.</li> <li>• System Administrator is responsible for ensuring conformance with the PATA or PTS figures provided within <b>Appendix B</b>.</li> <li>• System Administrator will bring the 4-foot by 4-foot roll-up sign, appropriate sign stand, and all required ballasting of the signs.</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>System Administrator is responsible for providing</b> the “Enforcement Vehicle” sign on the vehicle in accordance with the legislative requirements</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Contractor and/or Maintenance crew is responsible for providing, installing, maintaining and documenting</b> the “End Road Work” or “End Active Work Zone” sign in accordance with their approved Traffic Control Plan or Publication 213 PATA figure.</li> <li>• AWZSE legislation requires a sign to identify the end of the enforcement area.</li> <li>• Maintenance set-ups with AWZSE are required to place the “End Road Work” or “End Active Work Zone” sign.</li> <li>• System Administrator will be documenting that the “End Road Work” sign is present and will be reporting any issues to the Project Contact.</li> </ul>

## C. Work Zone Speed Limit Policy

The Department has developed and implemented a Work Zone Speed Limit Policy (SOL 494-20-02). The purpose of the policy is to ensure consistency when speed limit reductions are being considered and necessary. AWZSE work zones should be to the posted regulatory speed limit unless a completed [TE-162 \(Temporary Traffic Control Zone Regulatory Speed Limit Reduction Evaluation\)](#) that is approved by the appropriate District Traffic Engineer and Highway Safety and Traffic Operations Division Chief. The TE form is only required when a speed limit reduction is proposed.

## **D. Field Deployment Lessons Learned**

The AWZSE Program Team, including PennDOT, PTC, PSP and the Program Administrator, will be tracking and documenting lessons learned from AWZSE deployments that can be applied to further deployments statewide. These lessons learned will be shared with requestors and updates can be made available to District staff and designers upon request. Some of these lessons learned include:

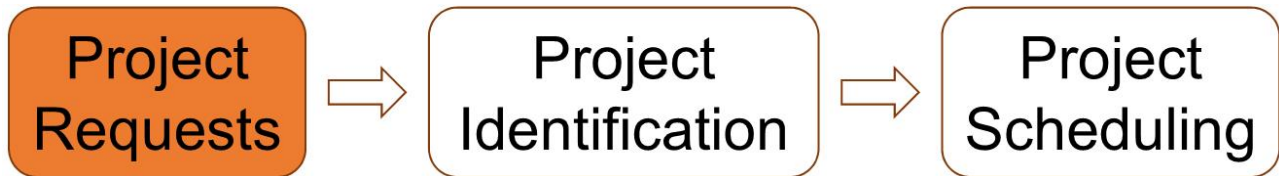
- Be cognizant of large metal objects that may be within range of radar
- Radar cannot be located near sharp horizontal or vertical curves
- Vehicle cannot be located significantly higher or lower than adjacent traffic (generally needs to be within +/- 1-foot).

## Section III — Project Request

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### A. Introduction

The next three sections of this document outline how a project goes from an initial request, through the identification and prioritization process, and finally onto monthly and weekly schedules.



### B. Requesting AWZSE in a Work Zone

Project requests can be sent to the resource account email address for the program ([RA-PD-AWZSE@pa.gov](mailto:RA-PD-AWZSE@pa.gov)). Project requests should be sent by either Department or PTC staff. Contractors, utilities, or highway occupancy permit application should work directly with their project contact. The minimum primary information that should accompany the request is as follows:

- Project Number (ECMS Number or PTC Contract Number)
- Location of Work
- Type of Work
- Type of Work Zone (Long-Term/Short-Term)
- Type of Worker Protection (Barrier/Channelizing Devices)
- Project Contact

An overview of the information that will be included on the request form can be found in **Appendix C**.

It is important that the information from the original request be reevaluated and updated as necessary throughout the design process. It should be completed initially during Preliminary Design and revised as necessary at Final Traffic Control Plan Approval. A formal request form is currently under development and when completed, it will be available at the program website at [www.workzonecameras.penndot.gov](http://www.workzonecameras.penndot.gov).

## Section IV — Project Identification

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### A. Project Evaluation Criteria

The Project Evaluation Criteria (PEC) is a list of qualitative and quantitative metrics used to prioritize specific work zones for potential AWZSE deployments. These criteria are used to prioritize deployment locations from the list of available projects where an AWZSE deployment will most meet the primary goals of the program: To reduce speeds and increase safety in active work zones.

The PEC is divided into three separate categories with each category having several specific metrics. The three categories are as follows:

- Project and Work Zone Information – Includes general project information for project identification purposes
- Geometrics and Roadway Restrictions – Includes information about site features and geometric considerations of the work zone
- Operational Considerations – Includes information about speeds and volumes of the roadway where the project is located

The Geometrics and Roadway Restrictions and Operational Considerations categories contain criteria that impact the prioritization of work zones selected for AWZSE deployments.

**Appendix D** contains a list of the information and metrics utilized to perform a detailed project evaluation.

## B. Project Identification Responsibilities

Project Phase	Group	Responsibilities
<b>Project Identification</b>	<b>PennDOT/PTC – General</b>	<ul style="list-style-type: none"> <li>Request projects through the online request form or through the program resource account (RA-PD-AWZSE@pa.gov) until the request form is operational.</li> <li>Agencies are encouraged to establish a single point of contact for requesting projects, and the AWZSE team will reach out to that contact person to identify the appropriate project specific contact</li> </ul>
	<b>PennDOT/PTC – Designers/ Project Delivery</b>	<ul style="list-style-type: none"> <li>Identify locations within a work zone that the AWZSE unit and advance signing can be located appropriately within the work zone.</li> <li>Ensure that sign spacing on Traffic Control Plans allows for AWZSE advance signing placement in accordance with the appropriate PATA or PTS figures.</li> <li>Ensure that access points are available in the work zone for the AWZSE unit to enter and exit the zone.</li> <li>To function properly, the AWZSE unit should be deployed at the same or similar elevation as the passing traffic (to within roughly plus/minus one foot). Additionally, no signs or other obstruction should be placed within 200 feet behind or ahead of the unit. The unit may be placed behind channelizing devices or barrier.</li> <li>If the work zone speed limit is being reduced as identified within Section II, Part C, the appropriate TE-162 form must be completed in accordance with the Department’s Work Zone Speed Limit Policy and concurrence must be received from the appropriate District Traffic Engineer and Highway Safety and Traffic Operations Division Chief.</li> </ul>
	<b>PennDOT/PTC – Construction/ Maintenance</b>	<ul style="list-style-type: none"> <li>Coordinate with AWZSE team on work schedules and setting up project site visits to confirm suitability for deployments.</li> </ul>
	<b>AWZSE Team</b>	<ul style="list-style-type: none"> <li>Collect potential projects from lists of active construction and maintenance projects.</li> <li>Receive and review project recommendations from completed request forms or the resource account.</li> <li>Confirm a project is eligible to receive an AWZSE deployment; specifically, confirm that the work zone is on a PennDOT federal-aid or Turnpike roadway and that the AWZSE unit and advance warning signage can fit within the work zone.</li> <li>Review Traffic Control Plans (if available).</li> <li>Coordinate with project contacts to confirm work schedules and set up a site visit to confirm project suitability for a deployment.</li> </ul>

## Section V — Project Scheduling

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### A. Reviewing and Updating Project Request Forms

Once a project is on the prioritization list, the request form submitted for the project should be reviewed and updated with any new or updated information since the form was originally filled out in the Project Identification phase. The data from the updated forms is then used to update the PEC for each project and move forward with the prioritization and scheduling process.

### B. Monthly Project Listing (Monthly “Menu”)

As the required information is gathered for each project from either the statewide team or the request form, the projects are prioritized based on the considerations for each project. The work zone data gathered (identified in **Appendix D**) will be used to assess the level of automated speed enforcement needs, focusing on four general categories: roadway geometrics and restrictions, historic speeds and excessive speeding history, safety considerations including crash history, and worker vulnerability. Each of the four areas will be scored, and the projects will be prioritized for deployment by these metrics.

Once the projects are scored, the Program Administrator will develop a monthly project listing, or monthly “menu” of available projects, which will be used as the base list of projects from which the weekly project schedule will be developed. This list will include project information, location, work shift (day/night), workdays (weekday/weekend), and other pertinent information such as construction phase or other key information required for developing a schedule. Each project will also have an assigned contact from the statewide AWZSE team as part of that listing. The assigned contact person will be responsible for coordination between the statewide AWZSE team, the local construction / maintenance contact, and the field supervisor for the System Administrator.

The monthly project listing will be developed and finalized by the statewide AWZSE team and confirmed by the Highway Safety and Traffic Operations Division, Bureau of Maintenance and Operations. Once confirmed, the monthly project listing will be distributed to the identified project contacts, including work zone managers and appropriate Construction and Maintenance Unit contacts. The monthly project list is expected to be available at least two weeks prior to the start of month. For example, the monthly project list for May would be expected to be available and distributed by early to mid-April. Monthly project lists will also be available on the P/PennDOT Shared drive on the Commonwealth network

### C. Weekly Project Schedule

The weekly deployment schedule will be developed based on projects identified on the monthly menu and the project prioritization process. This weekly schedule will define deployment locations by date, location within the work zone (milepost or segment) if known, location description, and scheduled shift time (anticipated enforcement hours).

The development of the weekly deployment schedule will incorporate work schedules and activities for each

project. The identified statewide AWZSE team contact will reach out to the identified project contact to identify upcoming work schedules, activities, confirmation of construction phases, and discussion on any upcoming pertinent activities. This contact will occur at least two weeks prior to the week of enforcement. The statewide AWZSE team will use the local input provided for each project and review the System Administrator’s available daily resources to develop a weekly deployment schedule.

The prioritization scores developed during the Project Identification phase will be used and refined to aid in scheduling deployment shifts. The effectiveness of the units in these work zones will be monitored and will also be a factor in the assignment of deployment shifts. The statewide AWZSE team will be accounting for work zone intensity and specific construction operations as well. Additionally, the AWZSE team will incorporate field logistics such that the units are scheduled appropriately to minimize the distance between scheduled deployments in a 24-hour period.

Prior to initial scheduling, the statewide AWZSE team and the System Administrator will be performing a field view of the project to confirm the suitability of the project during its current construction phase. Similarly, field views will be completed for any long-term projects with any major construction phase changes. Construction personnel should notify the AWZSE team if work zone site conditions change and a re-evaluation or field view is required.

## D. Project Prioritization and Scheduling Responsibilities

<b>Project Phase</b>	<b>Group</b>	<b>Responsibilities</b>
<b>Scheduling – Update Project Information</b>	<b>PennDOT/PTC</b>	<ul style="list-style-type: none"> <li>Ensure that project information is up-to-date from initial project request submitted during Project Identification Phase.</li> </ul>
	<b>AWZSE Team</b>	<ul style="list-style-type: none"> <li>Ensure that updated information provided by District is reflected in Project Prioritization Matrix.</li> </ul>
<b>Scheduling – Monthly Project List (“Monthly Menu”)</b>	<b>PennDOT/PTC</b>	<ul style="list-style-type: none"> <li>Coordinate with AWZSE Team on projects suitable for deployments in the next month.</li> </ul>
	<b>AWZSE Team</b>	<ul style="list-style-type: none"> <li>Coordinate with District on projects suitable for deployments in the next month.</li> <li>Develop overall monthly menu based on coordination with each District.</li> <li>Distributes Monthly Menu to project contacts and distribution list.</li> </ul>
<b>Scheduling – Weekly Project Schedule</b>	<b>PennDOT/PTC</b>	<ul style="list-style-type: none"> <li>Project contact coordinates with AWZSE team on specific schedules.</li> </ul>
	<b>AWZSE Team</b>	<ul style="list-style-type: none"> <li>Coordinate with project contacts to establish active working schedule for the week.</li> <li>Develop weekly schedule based on each project’s working availability.</li> <li>Distributes Monthly Menu to project contacts and distribution list.</li> </ul>



## Section VI — Deployment Coordination

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Deployment Coordination outlines the mobilization and operations for each AWZSE unit deployment.

### A. Pre-Deployment Communication

At least one week in advance of a scheduled deployment, the deployment will be shown on a weekly deployment schedule, where the Program Administrator has preliminarily identified that the unit can be located within the work zone and that work is tentatively scheduled during the deployment window. When these schedules are set, the Program Administrator will provide the Transportation Agency Representative with when the unit is scheduled for their work zone either as a primary or backup deployment location. The Program Administrator will also provide the weekly schedules to the System Administrator. The Program Administrator will communicate with the Transportation Agency Representative at least one day before the scheduled deployment to confirm the project is still capable of hosting the AWZSE System Administrator and that workers will be present. If the work zone is no longer feasible as a deployment location, the Program Administrator will notify the System Administrator, confirm with the Transportation Agency Representative that the backup deployment location can host the unit, and direct the System Administrator to the previously identified backup location.

### B. Day-of Deployment Communication

The Transportation Agency Representative is to communicate with the Program Administrator if System Administrator is not able to deploy the AWZSE equipment. The Program Administrator will then notify System Administrator in accordance with the notification tree shown in **Appendix E**.

System Administrator will communicate with the Program Administrator if they are not able to deploy the AWZSE equipment. The Program Administrator would notify the Transportation Agency Representative in accordance with the notification tree shown in **Appendix E**.

Events such as weather, equipment failures, or contractor preparedness could require the deployment to be cancelled or rescheduled. The notification processes for these events are included in **Appendix E**.

System Administrator is to notify the PennDOT's STMC or PTC's TMC when entering or exiting enforcement mode.

**Appendix F** contains the System Administrator operator checklist with specific work zone considerations included at certain steps of the checklist.

Construction and maintenance personnel should not interfere with the advance warning signs placed by the System Administrator or interfere with the operation of the unit. This includes passing between the enforcement unit and live traffic or standing too close to the unit.

## Appendix A – Program Contacts

<b>General Program Information</b>	
<b>Item</b>	<b>Information</b>
Program Website	<a href="https://workzonecameras.penndot.gov/">https://workzonecameras.penndot.gov/</a>
Program Resource Account	<a href="mailto:RA-PD-AWZSE@pa.gov">RA-PD-AWZSE@pa.gov</a>

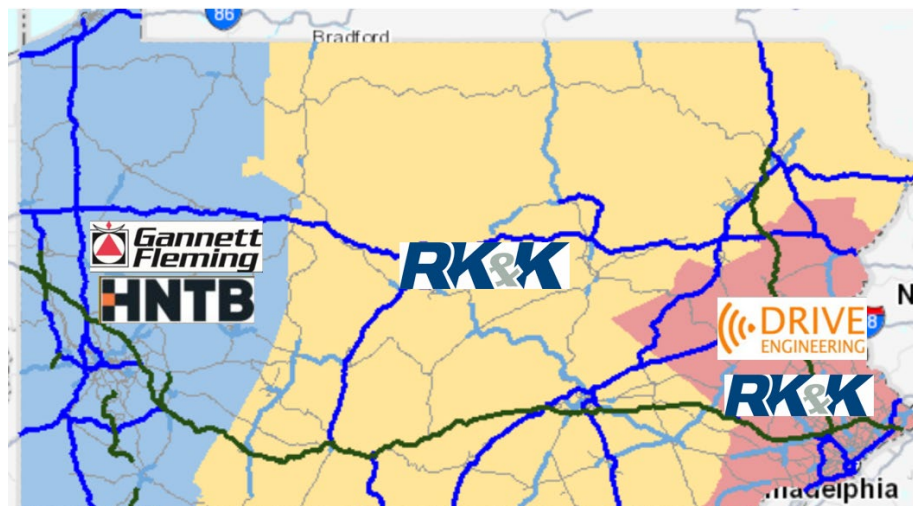
<b>Overall Program Management Team</b>			
<b>Name</b>	<b>Role</b>	<b>Phone</b>	<b>Email</b>
Dan Farley	PennDOT Project Manager	(717) 783-0333	<a href="mailto:dfarley@pa.gov">dfarley@pa.gov</a>
Brian Crossley	Manager Temporary Traffic Control Unit – BOMO	(717) 265-7562	<a href="mailto:bcrossley@pa.gov">bcrossley@pa.gov</a>
Chad Smith	Turnpike Commission Project Manager	(717) 831-7287	<a href="mailto:chsmith@paturndpike.com">chsmith@paturndpike.com</a>
Mahmood Shehata	Program Administrator Project Manager	(484) 322-2812	<a href="mailto:c-mshehata@pa.gov">c-mshehata@pa.gov</a>
Ben Snyder	Program Administrator Deputy PM	(717) 216-5284	<a href="mailto:c-bensnyde@pa.gov">c-bensnyde@pa.gov</a>
Ryan Dill	Program Administrator Scheduling Lead	(717) 216-5289	<a href="mailto:rdill@rkk.com">rdill@rkk.com</a>

<b>Eastern Region</b>			
PennDOT Districts 5 and 6 Turnpike Mainline (I-76/I-276) from Lebanon-Lancaster (266) to Delaware River Bridge (359) Turnpike Northeast Extension (I-476) from Mid-County (A20) to Mahoning Valley (A74) Turnpike I-95 Connector			
<b>Name</b>	<b>Role</b>	<b>Phone</b>	<b>Email</b>
John Claudy	Program Administrator Eastern Region Lead and Eastern Regional Scheduling	(484) 748-1399	<a href="mailto:john@driveengineering.com">john@driveengineering.com</a>

<b>Central Region</b>			
PennDOT Districts 2, 3, 4, 5, 8, and 9 Turnpike Mainline (I-70/I-76) from Somerset (110) to Morgantown (298) Turnpike Northeast Extension (I-476) from Lehigh Valley (A56) to Clarks Summit (A131)			
<b>Name</b>	<b>Role</b>	<b>Phone</b>	<b>Email</b>
Hannah Landvater	Program Administrator Central Region Lead	(717) 216-5296	<a href="mailto:c-hlandvat@pa.gov">c-hlandvat@pa.gov</a>
Ryan Dill	Program Administrator Central Region Scheduling	(717) 216-5289	<a href="mailto:rdill@rkk.com">rdill@rkk.com</a>

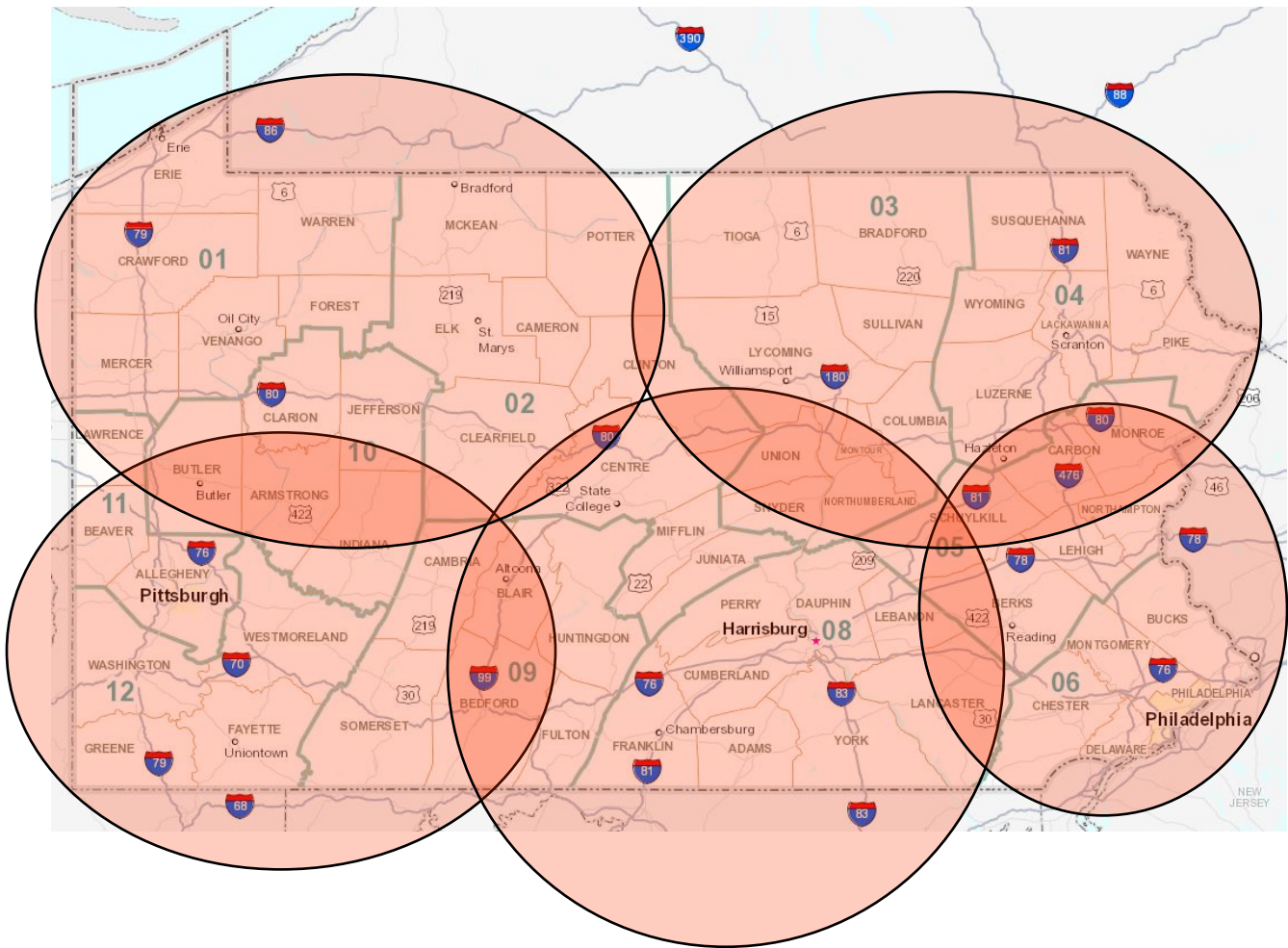
<b>Western Region</b>			
PennDOT Districts 1, 2, 10, 11, 12 Turnpike Mainline (I-70/I-76) from Ohio Gateway (2) to Bedford (146) All Turnpike Western Extensions (Beaver Valley I-376, Mon-Fayette TPK 43, Greensburg Bypass TPK 66, Southern Beltway TPK 576)			
<b>Name</b>	<b>Role</b>	<b>Phone</b>	<b>Email</b>
Denise Bologa	Program Administrator Western Region Lead	(717) 886-5294	<a href="mailto:dbologa@gfnet.com">dbologa@gfnet.com</a>
Abby Rodgers	Program Administrator Western Scheduling	(412) 258-9622	<a href="mailto:arodgers@hntb.com">arodgers@hntb.com</a>
Ada Peng	Program Administrator Western Scheduling	(267) 881-5235	<a href="mailto:yipeng@hntb.com">yipeng@hntb.com</a>

Some Districts may be shown in more than one region. These Districts are split between those regions.



<b>Redflex Depot Locations</b>	
<b>Location</b>	<b>Approximate Coverage Area (by PennDOT District/PTC Roadway)</b>
Pittsburgh	PennDOT Districts: 9 (west and central), 10 (south), 11 (south), 12 PTC Roadways: Mainline 2-161, I-376, TPK 43, TPK 66, TPK 576
Harrisburg	PennDOT Districts: 2 (central and southeast), 3 (south), 5 (west), 8, 9 (central and east) PTC Roadways: Mainline 146-298
Philadelphia	PennDOT Districts: 5, 6 PTC Roadways: Mainline 266-359, NE Ext. A20-A74, 95 Connector
Northeast (Scranton)	PennDOT Districts: 2 (east), 3, 4, 5 (north and west) PTC Roadways: NE Ext. A56-A131
Northwest (TBD)	PennDOT Districts: 1, 2 (except southeast), 10 (north), 11 (north) PTC Roadways: Mainline 2-28, I-376 15-26

**Redflex Depot and Coverage Map**



# Appendix B – Standard Drawings









## PennDOT PATA Figures

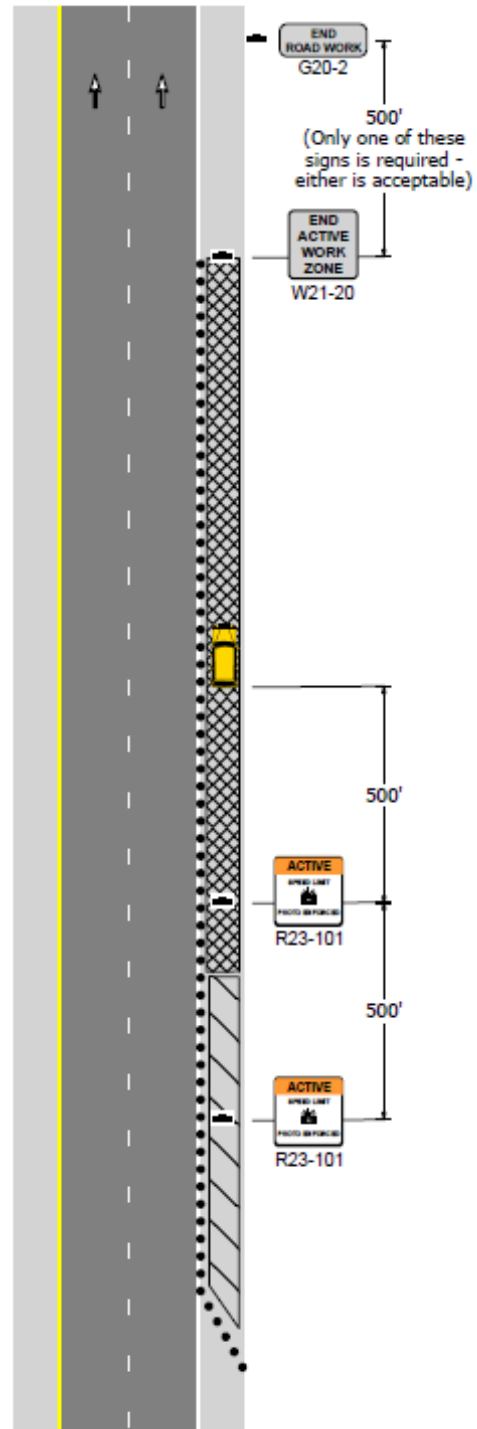
### Automated Speed Enforcement Systems In Active Work Zones Work Space On Shoulder - Freeways and Expressways

**Notes:**

1. This standard applies only to the Automated Work Zone Speed Enforcement (AWZSE) vendor once an active work zone has been established. This standard applies only for the placement of signing required for the AWZSE vendor operator. All signs shown as "greyscale" are provided by the Department or the Department's contractor and are included in a pre-selected Publication 213 PATA figure, a Department's approved Traffic Control Plan (TCP) or, additional signing installed at the direction of the Department. The AWZSE vendor operator will verify any reduced work zone speed limit signing along with the required signing signifying the end of the active work zone are in place prior to beginning automated speed enforcement.
2. Distances shown for placement of AWZSE signing are minimum requirements and may be adjusted to fit field condition. The AWZSE vendor operator will coordinate with the Department's representative or the Department's contractor as indicated in Section 105.07 of Publication 408.
3. Prior to beginning or ending any automated speed enforcement, the AWZSE vendor operator will contact the State Traffic Management Center (STMC) at 717.346.4400 to provide notification that automated speed enforcement will be commencing.
4. The AWZSE vendor operator will complete the field deployment field verification prior to beginning any automated speed enforcement.
5. Prior to and during automated speed enforcement, the AWZSE vendor's operator will maintain communication with the Department representative and/or with the Department's contractor representative to communicate worker presence, work area activities and all arrival and departure times of the vendor's operator during automated speed enforcement.
6. The Speed Enforcement Device/Vehicle will be placed within or adjacent to the active work zone and at a location where the minimum roll-ahead distance for the shadow vehicle with a TMA will not be obstructed. AWZSE signing will be placed so that they are not obstructed by a Shadow Vehicle with TMA and not placed within the roll-ahead space as defined in Publication 213. Shadow vehicles with TMAs are furnished by the Department or the Department's contractor.

*Legend*

Item	Description
	Signing required to be provided and installed by AWZSE Vendor
 or 	Signing required to be provided and installed by Primary Contractor or PennDOT Maintenance
	Channelizing Devices
	Sign support
	Speed Enforcement Device/Vehicle with identifying sign provided and installed by AWZSE Vendor
	Active Work Zone
	Transition Area, Buffer Space, Shadow Vehicle with TMA and Roll Ahead Space


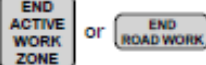







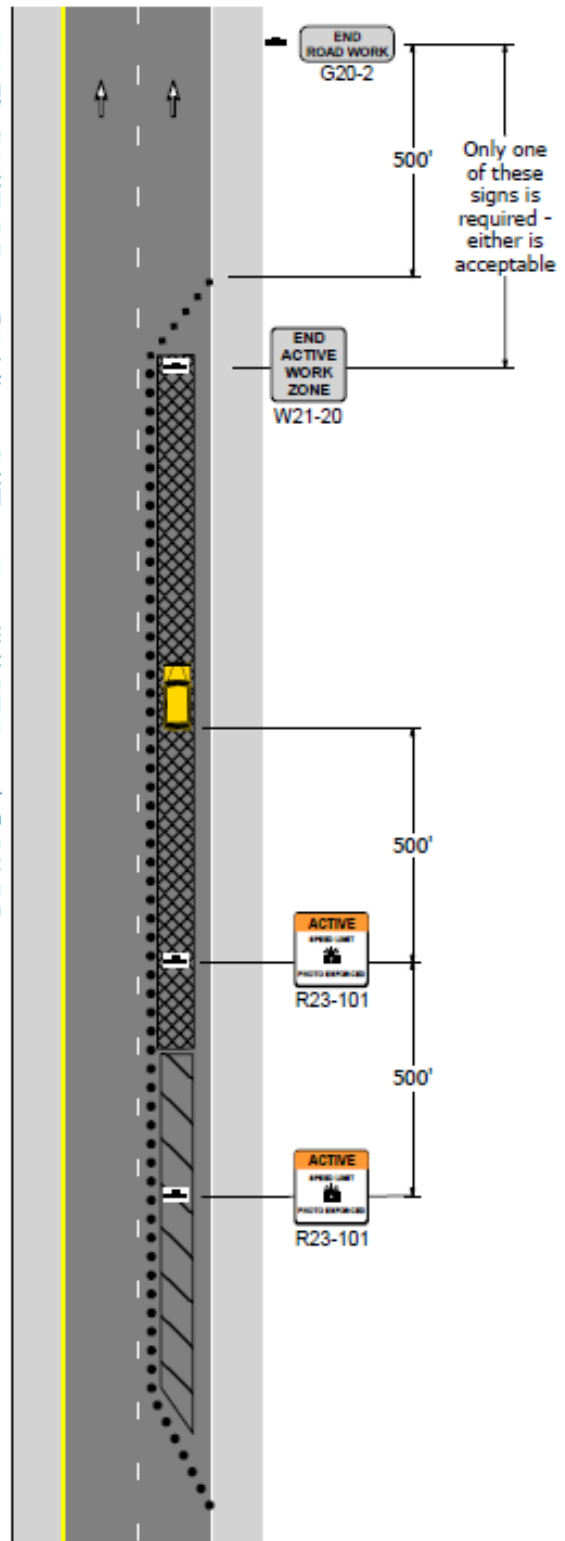
## Automated Speed Enforcement Systems In Active Work Zones Work Space In Right Lane - Freeways and Expressways

**Notes:**

1. This standard applies only to the Automated Work Zone Speed Enforcement (AWZSE) vendor once an active work zone has been established. This standard applies only for the placement of signing required for the AWZSE vendor operator. All signs shown as "greyscale" are provided by the Department or the Department's contractor and are included in a pre-selected Publication 213 PATA figure, a Department's approved Traffic Control Plan (TCP) or, additional signing installed at the direction of the Department. The AWZSE vendor operator will verify any reduced work zone speed limit signing along with the required signing signifying the end of the active work zone are in place prior to beginning automated speed enforcement.
2. Distances shown for placement of AWZSE signing are minimum requirements and may be adjusted to fit field condition. The AWZSE vendor operator will coordinate with the Department's representative or the Department's contractor as indicated in Section 105.07 of Publication 408.
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6. The Speed Enforcement Device/Vehicle will be placed within or adjacent to the active work zone and at a location where the minimum roll-ahead distance for the shadow vehicle with a TMA will not be obstructed. AWZSE signing will be placed so that they are not obstructed by a Shadow Vehicle with TMA and not placed within the roll-ahead space as defined in Publication 213. Shadow vehicles with TMAs are furnished by the Department or the Department's contractor.

*Legend*

Item	Description
	Signing required to be provided and installed by AWZSE Vendor
	Signing required to be provided and installed by Primary Contractor or PennDOT Maintenance
	Channelizing Devices
	Sign support
	Speed Enforcement Device/Vehicle with identifying sign provided and installed by AWZSE Vendor
	Active Work Zone
	Transition Area, Buffer Space, Shadow Vehicle with TMA and Roll Ahead Space









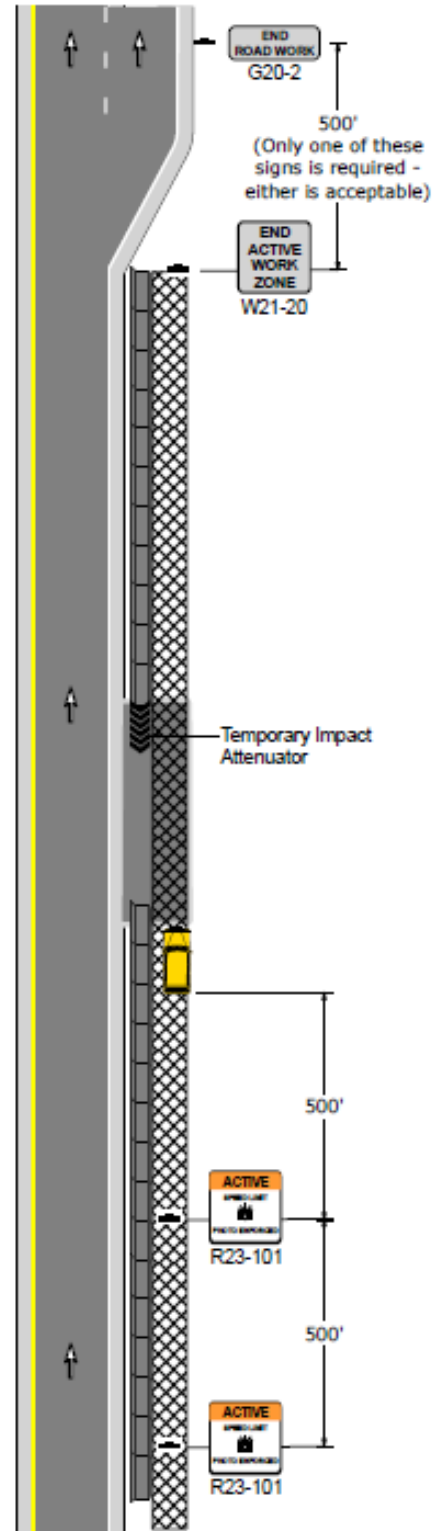
### AWZSE Long-Term Lane/Shoulder Closure with Barrier near Construction Vehicle Access Point

**Notes:**

1. This standard applies only to the Automated Work Zone Speed Enforcement (AWZSE) vendor once an active work zone has been established. This standard applies only for the placement of signing required for the AWZSE vendor operator. All signs shown as "greyscale" are provided by the Department or the Department's contractor and are included in a pre-selected Publication 213 PATA figure, a Department's approved Traffic Control Plan (TCP) or, additional signing installed at the direction of the Department. The AWZSE vendor operator will verify any reduced work zone speed limit signing along with the required signing signifying the end of the active work zone are in place prior to beginning automated speed enforcement.
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4. The AWZSE vendor operator will complete the field deployment field verification prior to beginning any automated speed enforcement.
5. Prior to and during automated speed enforcement, the AWZSE vendor's operator will maintain communication with the Department representative and/or with the Department's contractor representative to communicate worker presence, work area activities and all arrival and departure times of the vendor's operator during automated speed enforcement.
6. Signing placed for AWZSE will be installed on temporary sign supports that ensure they will be visible to approaching road users. Signs must be placed at a sufficient height so that they will not be obstructed by temporary barrier and/or temporary glare screen.
7. For projects that include emergency pull-offs or temporary construction entrances, the AWZSE vendor will coordinate placement of the speed enforcement device/vehicle and the required signing for AWZSE with the Department's representative and/or the Department's contractor representative prior to deployment.

*Legend*

Item	Description
	Signing required to be provided and installed by AWZSE Vendor
	Signing required to be provided and installed by Primary Contractor or PennDOT Maintenance
	Temporary Barrier
	Sign support
	Speed Enforcement Device/Vehicle with identifying sign provided and installed by AWZSE Vendor
	Active Work Zone










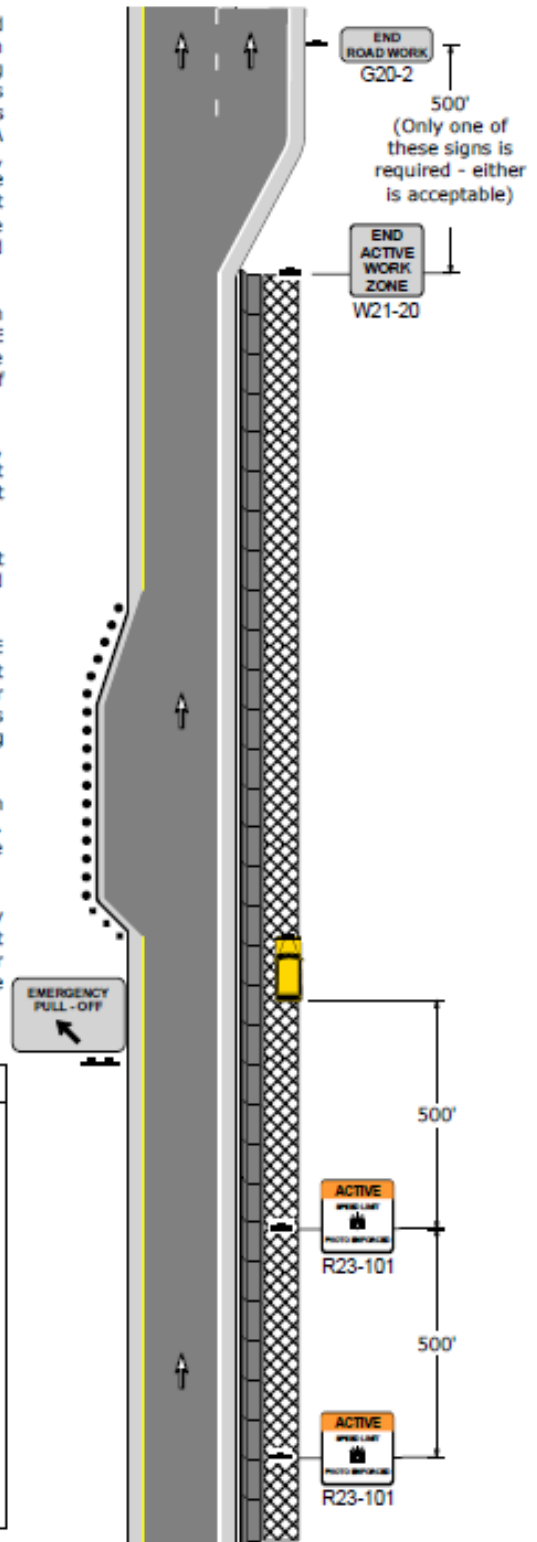
### AWZSE Long-Term Lane/Shoulder Closure with Barrier near Emergency Pull-Off

**Notes:**

1. This standard applies only to the Automated Work Zone Speed Enforcement (AWZSE) vendor once an active work zone has been established. This standard applies only for the placement of signing required for the AWZSE vendor operator. All signs shown as "greyscale" are provided by the Department or the Department's contractor and are included in a pre-selected Publication 213 PATA figure, a Department's approved Traffic Control Plan (TCP) or, additional signing installed at the direction of the Department. The AWZSE vendor operator will verify any reduced work zone speed limit signing along with the required signing signifying the end of the active work zone are in place prior to beginning automated speed enforcement.
2. Distances shown for placement of AWZSE signing are minimum requirements and may be adjusted to fit field condition. The AWZSE vendor operator will coordinate with the Department's representative or the Department's contractor as indicated in Section 105.07 of Publication 408.
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7. For projects that include emergency pull-offs or temporary construction entrances, the AWZSE vendor will coordinate placement of the speed enforcement device/vehicle and the required signing for AWZSE with the Department's representative and/or the Department's contractor representative prior to deployment.

*Legend*

Item	Description
	Signing required to be provided and installed by AWZSE Vendor
 or 	Signing required to be provided and installed by Primary Contractor or PennDOT Maintenance
	Temporary Barrier
	Sign support
	Speed Enforcement Device/Vehicle with identifying sign provided and installed by AWZSE Vendor
	Active Work Zone










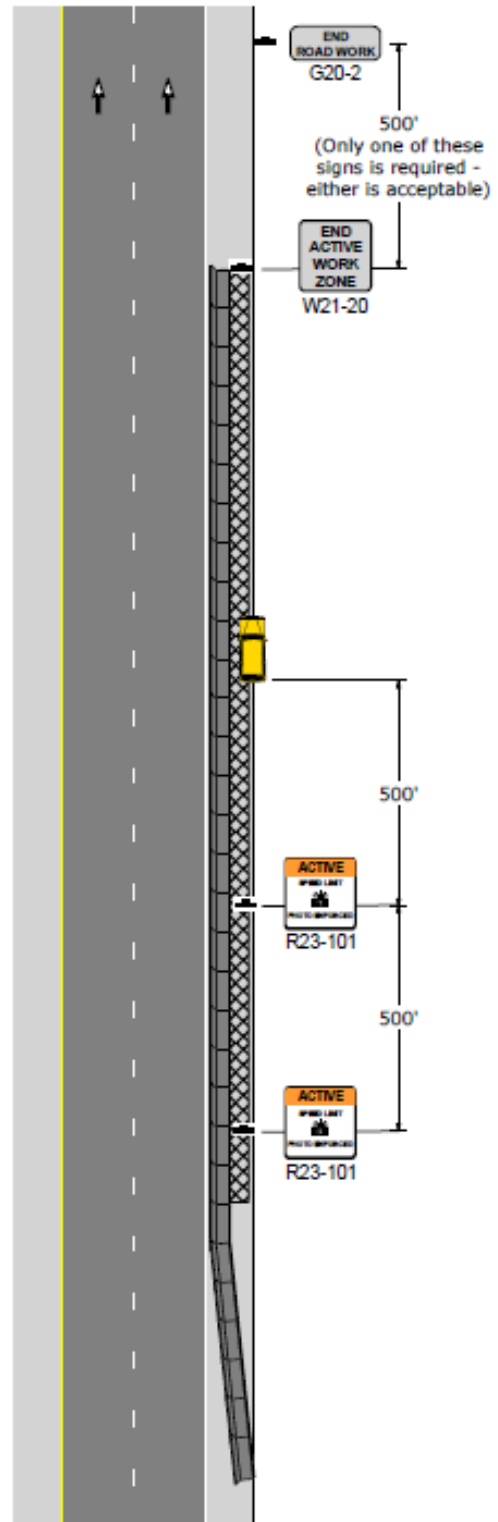
**Automated Speed Enforcement Systems In Active Work Zones**  
**Shoulder Closure - All Work Behind Traffic Barrier - Freeways and Expressways**

Notes:

1. This standard applies only to the Automated Work Zone Speed Enforcement (AWZSE) vendor once an active work zone has been established. This standard applies only for the placement of signing required for the AWZSE vendor operator. All signs shown as "greyscale" are provided by the Department or the Department's contractor and are included in a pre-selected Publication 213 PATA figure, a Department's approved Traffic Control Plan (TCP) or, additional signing installed at the direction of the Department. The AWZSE vendor operator will verify any reduced work zone speed limit signing along with the required signing signifying the end of the active work zone are in place prior to beginning automated speed enforcement.
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7. For projects that include emergency pull-offs or temporary construction entrances, the AWZSE vendor will coordinate placement of the speed enforcement device/vehicle and the required signing for AWZSE with the Department's representative and/or the Department's contractor representative prior to deployment.

Legend

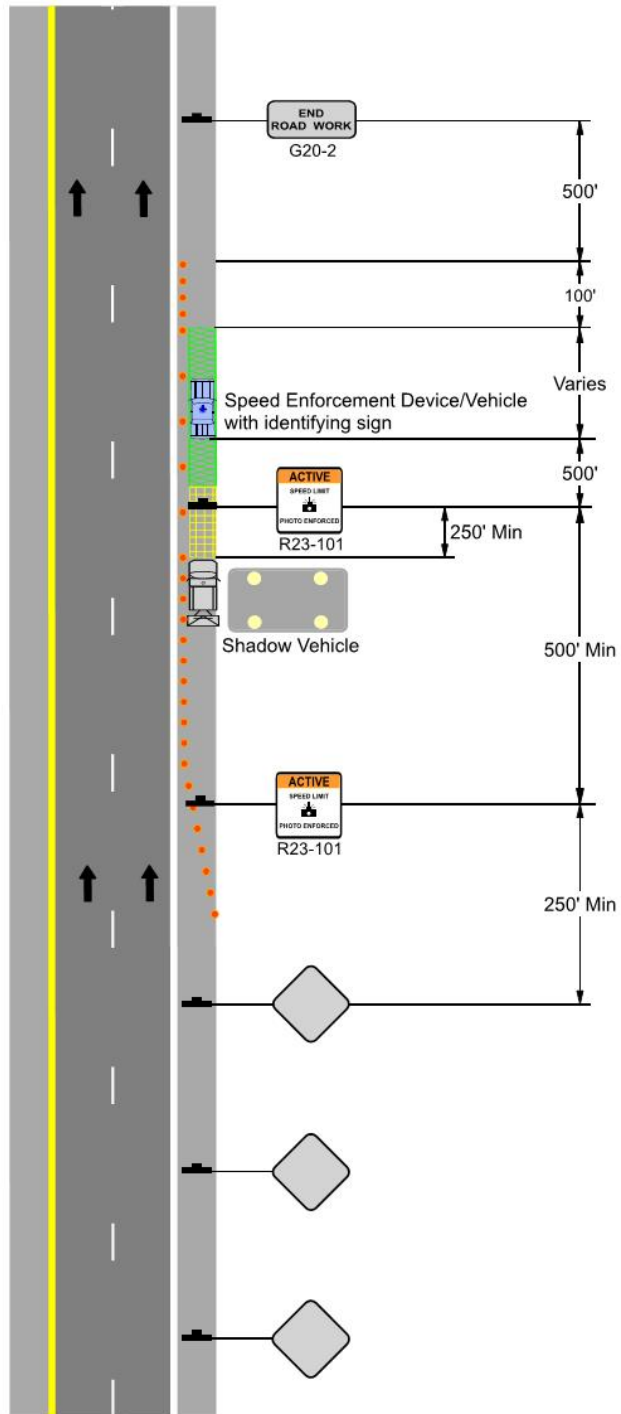
Item	Description
	Signing required to be provided and installed by AWZSE Vendor
 or 	Signing required to be provided and installed by Primary Contractor or PennDOT Maintenance
	Temporary Barrier
	Sign support
	Speed Enforcement Device/Vehicle with identifying sign provided and installed by AWZSE Vendor
	Active Work Zone





PTC PTS Figures

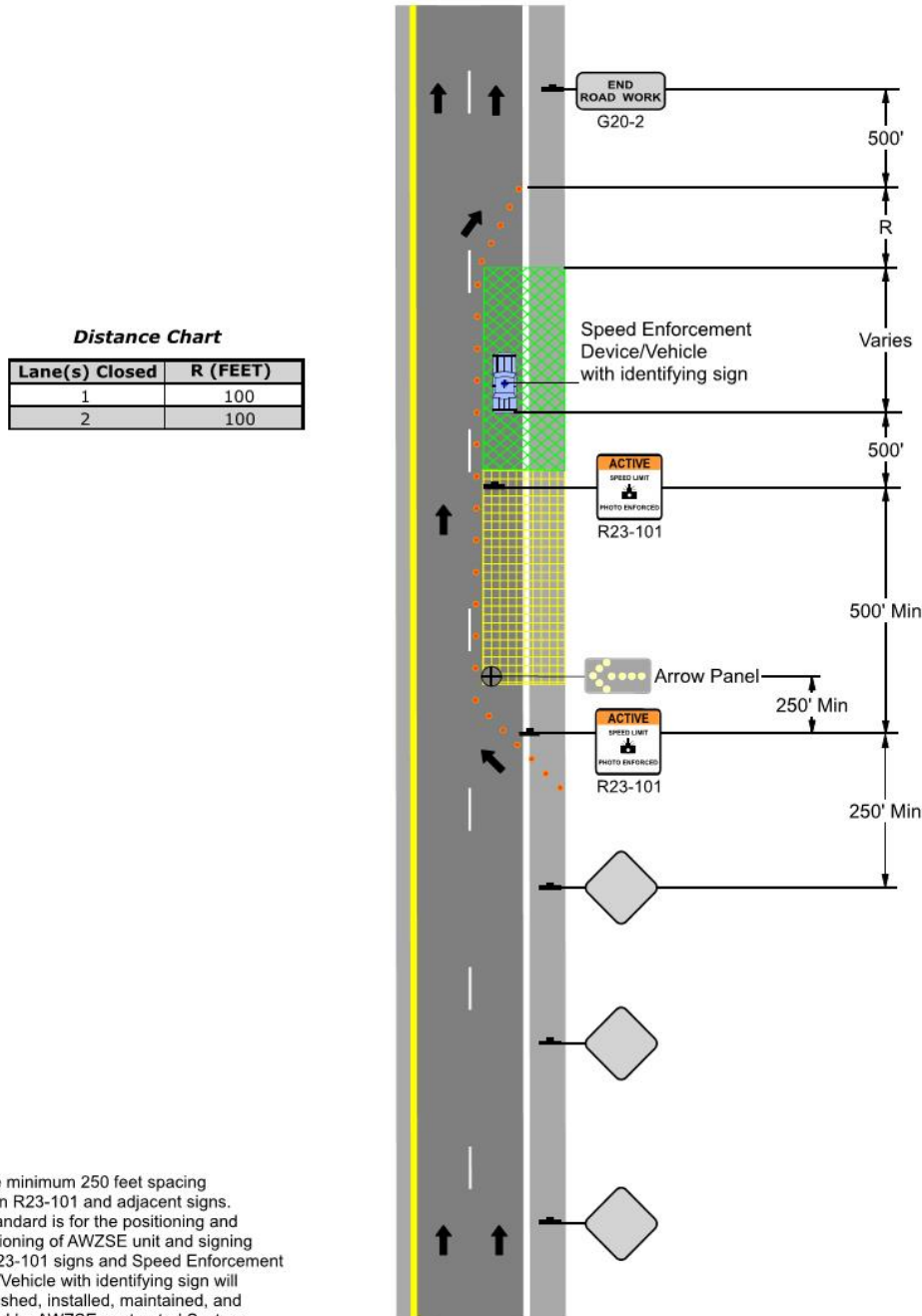
**PTS 011**  
**AWZSE Shoulder Closure with Channelizing Devices**



NOTE:  
 Provide minimum 250 feet spacing between R23-101 and adjacent signs. This standard is for the positioning and dimensioning of AWZSE unit and signing only. R23-101 signs and Speed Enforcement Device/Vehicle with identifying sign will be furnished, installed, maintained, and removed by AWZSE contracted System Administrator. R23-101 sign is not required to be located within the buffer zone, but minimum distance from Speed Enforcement Device/Vehicle must be maintained. All other traffic control will be per the appropriate standard.

DECEMBER 2019

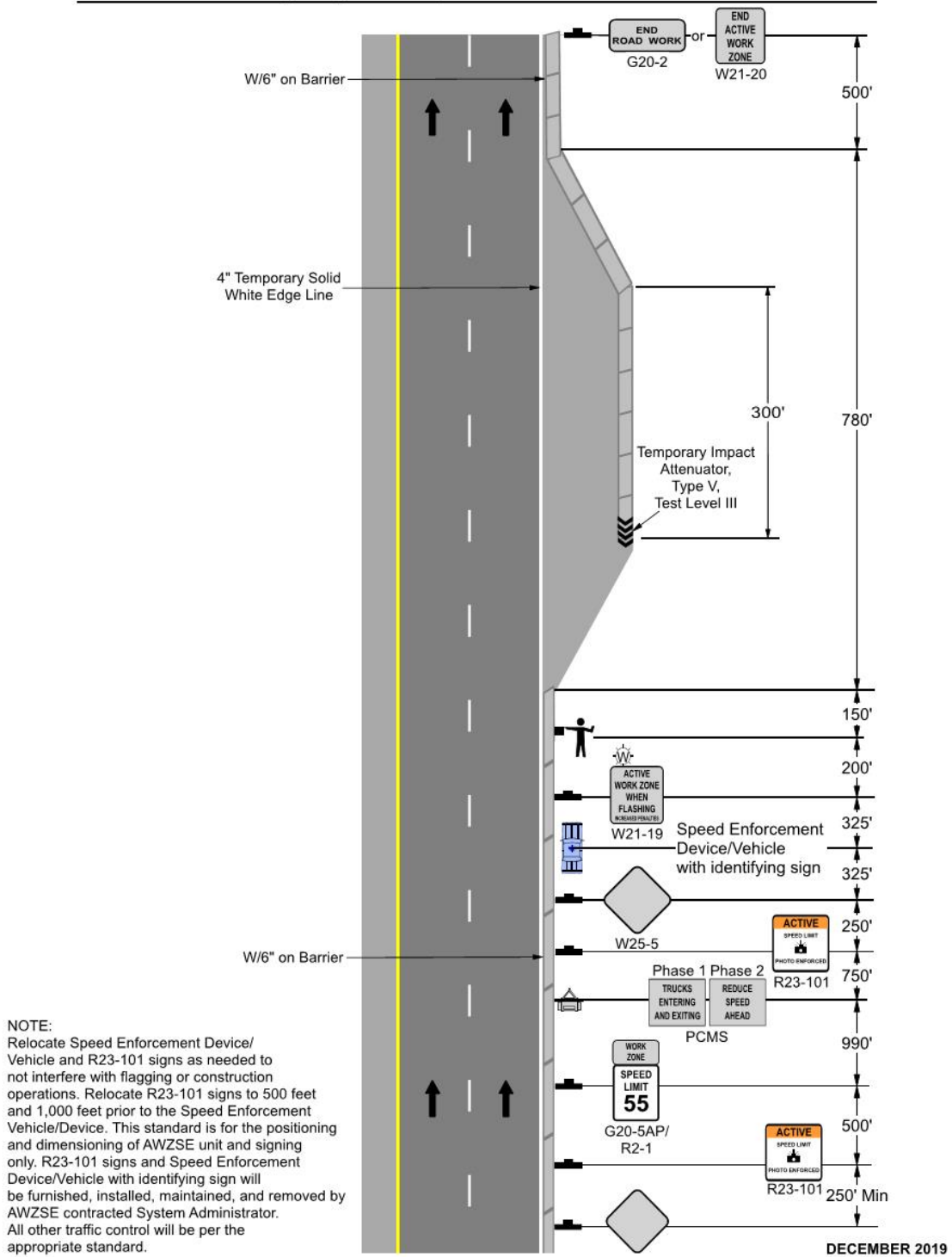
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**AWZSE Lane Closure(s) with Channelizing Devices**



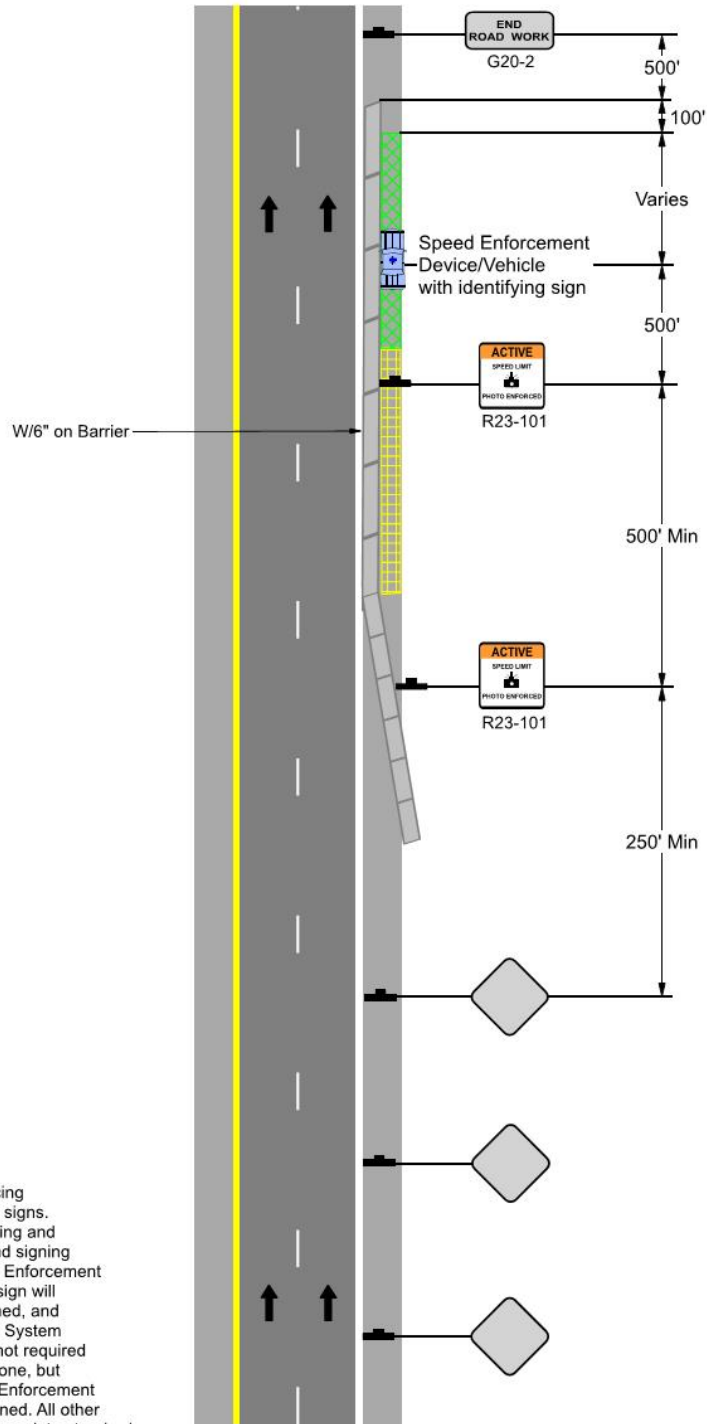
NOTE:  
 Provide minimum 250 feet spacing between R23-101 and adjacent signs. This standard is for the positioning and dimensioning of AWZSE unit and signing only. R23-101 signs and Speed Enforcement Device/Vehicle with identifying sign will be furnished, installed, maintained, and removed by AWZSE contracted System Administrator. R23-101 sign is not required to be located within the buffer zone, but minimum distance from Speed Enforcement Device/Vehicle must be maintained. All other traffic control will be per the appropriate standard.

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**PTS 013**  
**AWZSE Long-Term Shoulder Closure with Barrier near**  
**Emergency Pull-Off/Construction Access Point**



**PTS 014**  
**AWZSE Long-Term Shoulder Closure with Barrier**



NOTE:  
 Provide minimum 250 feet spacing between R23-101 and adjacent signs. This standard is for the positioning and dimensioning of AWZSE unit and signing only. R23-101 signs and Speed Enforcement Device/Vehicle with identifying sign will be furnished, installed, maintained, and removed by AWZSE contracted System Administrator. R23-101 sign is not required to be located within the buffer zone, but minimum distance from Speed Enforcement Device/Vehicle must be maintained. All other traffic control will be per the appropriate standard.

DECEMBER 2019

## Appendix C – Project Request Information

<i>Category/Metric</i>	<i>Subcategories and/or Selections (if applicable)</i>
<b>Requestor Information</b>	
Name	
Address	
Telephone	
E-Mail	
Department/Group/Office	
Title/Role	
<b>Location Information</b>	
MPMS/ECMS/PTC Project Number	
PennDOT/PTC District	
County	
Municipality	
Route Number	
From Segment/Offset or Milepost	
To Segment/Offset or Milepost	
Other Location Information	
<b>Attachments</b>	
Project Location Map	
Work Zone Regulatory Speed Limit Reduction Approval (PennDOT Projects Only)	
Traffic Control Plan or Applicable PATA Figures	
Transportation Management Plan	
Traffic Volumes	
Traffic Engineering and Safety Study	
Current Project Schedule	
Other	
<b>Work Zone Information</b>	
Entity Performing Work	PennDOT/PTC, Contractor, Utility, Other
Type of Work Zone	Long-Term, Short-Term, Other
Type of Work Being Done	New Construction, Total Reconstruction, Resurfacing, Maintenance, Utility, Drainage, Other (please describe)
List Particularly Dangerous, Risky, or Unusual Activities	
Duration of Work Zone	
Proposed Work Zone Speed Limit	
Location of Work Zone	Median, Travel Lane(s), Shoulder(s), Off-Roadway
Type of Proposed Traffic Control Devices	Temporary Barrier, Channelizing Devices, TMA Only, None, Other (please describe)
Night Work?	Yes/No
Travel Lane Width Restrictions?	Yes/No
Lane Shifts?	Yes/No
Lane Splits/Crossovers?	Yes/No
Reduced Accel/Decel Lanes?	Yes/No
Closure or Detour of Ramps?	Yes/No
<b>Site Data</b>	
Regular (non-Work Zone) Speed Limit	
ADT	
Peak Hourly Volume	
Truck Percentage	

## Appendix D – Data-Driven Prioritization Categories

<i>Category/Metric</i>	<i>Description of Metric</i>
<b>Project and Work Zone Information</b>	
Roadway Owner	PennDOT or PTC
District	PennDOT Engineering District or PTC District
County	County where the work area is located
Route	Route where the work area is active
Section	Additional project identifier
ECMS/MPMS Number	Unique project identification number
Direction	Direction of traffic passing the work zone
Project Start	Start of work by Segment/Offset or Milepost
Project End	End of work by Segment/Offset or Milepost
Entity Performing Work	Responsible party doing work within the work zone
Description of Work	General description of work being done
Let Date	Let Date for the working entity
NTP Date	Notice-to-Proceed date for the working entity
Duration of Work Zone (Construction Seasons/Years)	How long the work zone pattern will be in place
Work Zone Speed Limit	Speed limit when the work zone is in place and active
Speed Limit Reduction	Difference between the standard and the work zone speed limits
Activity	Primary activity within the work zone
Contract Value (\$ Million)	Contract value
Standard (non-WZ) Speed Limit	Normal speed limit when work zone is not in place
<b>Geometrics and Roadway Restrictions</b>	
Working Days	Number of days per week workers are anticipated to be present
Working Hours	Anticipated hours of work per day
Standard (non-Work Zone) # of lanes	Number of lanes provided on the roadway when the work zone is not in place
# of Lanes during Active Work	Number of lanes provided on the roadway when the work zone is in place and active
Narrowed Lanes	Lane widths provided within the work zone are narrower than the non-Work Zone condition
Lanes Split	Travel lanes in the same direction split from one another within the work zone
Lanes Shift	Travel lanes shift from their normal alignment through the work zone
Crossover/Contraflow	One or more travel lanes cross the median and utilize the opposing direction of travel roadway
Shoulder Closure	Work zone includes shoulder closure or restriction
Lane(s) Closure	Work zone include lane closures or restrictions
Reduced Acceleration/Deceleration Lane	Has an acceleration or deceleration lane been shortened or eliminated within the work zone?
Other Lateral Clearance Restriction	Some other condition present within the work zone that restricts lateral mobility
Ramp Closure/Ramp Detour	Ramp closures, detours, or other ramp restrictions are present within the work zone
Type of Worker Protection	Type of worker protection within the work zone
Worker Vulnerability	Vulnerability of workers based on other metrics

<b>Category/Metric</b>	<b>Description of Metric</b>
<b>Operational Considerations</b>	
Traffic Volume/ADT	Traffic volume on the roadway at the work zone location
Peak Hourly Volume	Peak Hourly Volume at the work zone location
Truck %	Truck percentage on the roadway at the work zone location
DAY 25 <sup>th</sup> percentile speed without Work Zone	Data pulled from RITIS
DAY 50 <sup>th</sup> percentile speed without Work Zone	Data pulled from RITIS
DAY 85 <sup>th</sup> percentile speed without Work Zone	Data pulled from RITIS
DAY 95 <sup>th</sup> percentile speed without Work Zone	Data pulled from RITIS
DAY difference between 85 <sup>th</sup> and 50 <sup>th</sup> % speeds w/o Work Zone	Calculation with data pulled from RITIS
DAY difference between 95 <sup>th</sup> and 25 <sup>th</sup> % speeds w/o Work Zone	Calculation with data pulled from RITIS
DAY difference between 95 <sup>th</sup> and 50 <sup>th</sup> % speeds w/o Work Zone	Calculation with data pulled from RITIS
DAY difference between 25 <sup>th</sup> % speed and Standard Speed Limit	Calculation with data pulled from RITIS
DAY difference between 50 <sup>th</sup> % speed and Standard Speed Limit	Calculation with data pulled from RITIS
DAY difference between 95 <sup>th</sup> % speed and Standard Speed Limit	Calculation with data pulled from RITIS
NIGHT 25 <sup>th</sup> percentile speed without Work Zone	Data pulled from RITIS
NIGHT 50 <sup>th</sup> percentile speed without Work Zone	Data pulled from RITIS
NIGHT 85 <sup>th</sup> percentile speed without Work Zone	Data pulled from RITIS
NIGHT 95 <sup>th</sup> percentile speed without Work Zone	Data pulled from RITIS
NIGHT difference between 85 <sup>th</sup> and 50 <sup>th</sup> % speeds w/o Work Zone	Calculation with data pulled from RITIS
NIGHT difference between 95 <sup>th</sup> and 25 <sup>th</sup> % speeds w/o Work Zone	Calculation with data pulled from RITIS
NIGHT difference between 95 <sup>th</sup> and 50 <sup>th</sup> % speeds w/o Work Zone	Calculation with data pulled from RITIS
NIGHT difference between 25 <sup>th</sup> % speed and Standard Speed Limit	Calculation with data pulled from RITIS
NIGHT difference between 50 <sup>th</sup> % speed and Standard Speed Limit	Calculation with data pulled from RITIS
NIGHT difference between 95 <sup>th</sup> % speed and Standard Speed Limit	Calculation with data pulled from RITIS
DAY 25 <sup>th</sup> percentile speed with Work Zone	Data pulled from RITIS
DAY 50 <sup>th</sup> percentile speed with Work Zone	Data pulled from RITIS
DAY 85 <sup>th</sup> percentile speed with Work Zone	Data pulled from RITIS
DAY 95 <sup>th</sup> percentile speed with Work Zone	Data pulled from RITIS
DAY difference between 85 <sup>th</sup> and 50 <sup>th</sup> % speeds w/ Work Zone	Calculation with data pulled from RITIS
DAY difference between 95 <sup>th</sup> and 25 <sup>th</sup> % speeds w/ Work Zone	Calculation with data pulled from RITIS
DAY difference between 95 <sup>th</sup> and 50 <sup>th</sup> % speeds w/ Work Zone	Calculation with data pulled from RITIS
DAY difference between 25 <sup>th</sup> % speed and Work Zone Speed Limit	Calculation with data pulled from RITIS
DAY difference between 50 <sup>th</sup> % speed and Work Zone Speed Limit	Calculation with data pulled from RITIS
DAY difference between 95 <sup>th</sup> % speed and Work Zone Speed Limit	Calculation with data pulled from RITIS
NIGHT 25 <sup>th</sup> percentile speed with Work Zone	Data pulled from RITIS

<b>Category/Metric</b>	<b>Description of Metric</b>
NIGHT 50 <sup>th</sup> percentile speed with Work Zone	Data pulled from RITIS
NIGHT 85 <sup>th</sup> percentile speed with Work Zone	Data pulled from RITIS
NIGHT 95 <sup>th</sup> percentile speed with Work Zone	Data pulled from RITIS
NIGHT difference between 85 <sup>th</sup> and 50 <sup>th</sup> % speeds w/ Work Zone	Calculation with data pulled from RITIS
NIGHT difference between 95 <sup>th</sup> and 25 <sup>th</sup> % speeds w/ Work Zone	Calculation with data pulled from RITIS
NIGHT difference between 95 <sup>th</sup> and 50 <sup>th</sup> % speeds w/ Work Zone	Calculation with data pulled from RITIS
NIGHT difference between 25 <sup>th</sup> % speed and Work Zone Speed Limit	Calculation with data pulled from RITIS
NIGHT difference between 50 <sup>th</sup> % speed and Work Zone Speed Limit	Calculation with data pulled from RITIS
NIGHT difference between 95 <sup>th</sup> % speed and Work Zone Speed Limit	Calculation with data pulled from RITIS
Fatal and Serious Injury Crashes	Number of fatal and serious injury crashes while the work zone has been in place
Monthly Number of Crashes (Crashes/mo)	Total number of crashes divided by the number of months that the work zone has been in place
# of Crashes with Speed or Work Zone Geometry as a Factor	Number of crashes where speed or work zone geometry was explicitly stated as a contributing factor
Has AWZSE been deployed here previously?	Has the AWZSE unit been deployed to this work zone previously?



## Appendix E – Notification Tree

<b>Pre-Deployment</b>
<b>Normal Operation</b>
PDN1 – Redflex Operator calls and confirms work is occurring with project representative.
<b>Modified Operation</b>
PDM1 – If project representative states work is not occurring, Redflex Operator to contact Redflex Manager who will contact PA for Alternative Deployment Location. PA to notify owning agency.
PDM2 – If contractor changes work schedule that impacts a deployment, contractor will contact project representative, and notification will then follow PDM1.
PDM3 – If owning agency changes planned work schedule around, owning agency will contact PA, PA will contact Redflex Manager, Redflex Manager will contact Redflex Operator.
<b>Cancelled Operation</b>
PDC1 – If project is unable to be enforced due to issues beyond Redflex control and no Alternative Location can be provided per PDM1, deployment will be cancelled.
PDC2 – If project is unable to be enforced due to errors within Redflex control, Redflex Operator to contact Redflex Manager, Redflex Manager will contact PA, PA will contact owning agency.
<b>Entering Enforcement</b>
<b>Normal Operation</b>
EEN1 – Redflex Operator calls and notifies the owning agency TMC when entering enforcement.
<b>Modified Operation</b>
EEM1 – If Redflex Operator is in area without cellular service, <b>TBD</b>
<b>Cancelled Operation</b>
None
<b>During Enforcement</b>
<b>Normal Operation</b>
DEN1 – Redflex Operator will confirm advance warning signs are still in place and visible at regular intervals during enforcement, not to exceed two hours between confirmation checks. If sign is not in place or visible, the Redflex Operator should effort to rectify the situation in the field. If the Redflex Operator cannot rectify the situation in the field, the Redflex Operator will follow DEM1.
<b>Modified Operation</b>
DEM1 – If enforcement must stop for any reason, the Redflex Operator must notify the owning agency TMC. The Redflex Operator will contact the Redflex Manager, Redflex manager will contact PA, PA will contact owning agency.
DEM2 – If enforcement must stop due to contractor causation (ceasing work, lack of worker presence, etc.), the contractor or project representative will contact the Redflex Operator. Notification will then follow DEM1.
<b>Cancelled Operation</b>
None
<b>Post-Enforcement</b>
<b>Normal Operation</b>
PEN1 – Redflex Operator calls and notifies the owning agency TMC when ending enforcement.
<b>Modified Operation</b>
PEM1 – If Redflex Operator is in area without cellular service, <b>TBD</b>
PEM2 – If AWZSE device does not pass end of enforcement self-test, Redflex Operator will contact the Redflex Manager, Redflex Manager will contact PA, PA will contact owning agency.
<b>Cancelled Operation</b>
None

## Appendix F – AWZSE Operator Checklist with Work Zone Considerations

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*Note: AWZSE Operator Checklist is in black while Work Zone considerations are identified in blue.*

### **AWZSE Operator Checklist**

- (1) Prior to departing the Depot complete Deployment Pre-Arrival Checklist
  - **Worker Attire**
    - **Hard Hat to be worn when outside of the vehicle.**
    - **High-Visibility Apparel – ANSI Class 3 to be worn when outside the vehicle. ANSI Class E reflective leggings or chaps may be worn in combination with an ANSI Class 2 vest to meet requirements. Safety apparel must meet the current requirements of ANSI/ISEA 107 publication.**
    - **Shirts must have unaltered sleeves that are 6 inches or longer from the seam. See through clothing is prohibited.**
    - **Full length trousers are required (sweatpants and capris are prohibited).**
    - **Work shoes shall be of above the ankle design and have good tread to help prevent slips, trips, and falls. Athletic footwear, such as sneakers and tennis shoes, are prohibited.**
    - **Flashlight and/or other employee light apparel is required for night time activities.**
    - **Other safety apparel such as glasses**
  - **Ensure two “Active Speed Limit Photo Enforced” advance warning signs are in the vehicle.**
  - **Ensure two approved sign stands are in the vehicle.**
  - **Ensure an adequate number of sandbags are in the vehicle to ballast the two advance warning sign stands.**
  - **Verify that the “Photo Enforcement Vehicle” sign is either attached to the vehicle or provided to be placed onto the vehicle for checklist number (19).**
  - **Verify that flashing amber beacon(s) on the vehicle are working properly.**
  - **Verify that back-up alarm is working properly.**
  - **Verify Deployment Contact Information and meeting location is established prior to departure.**
- (2) Send 10-7 Email to [#nocmobilemonitoring@redflex.com](mailto:#nocmobilemonitoring@redflex.com)
- (3) Start Travel
- (4) End Travel
- (5) Confirm posted speed limit and End of work zone sign.
  - **Ensure regulatory speed limit is posted and document posted speed limit.**
  - **Ensure that there are no conflicting regulatory speed limits present in the work zone.**
  - **If “End Road Work” or “End Active Work Zone” sign isn’t visible or present, notify project contact immediately. Enforcement cannot begin until this has been resolved.**
  - **Ensure proper driving patterns while within the work zone:**
    - **Do not use median crossovers.**
    - **Do not utilize construction access points unless authorized by the Project Contact.**
    - **Do not travel in the opposite direction of travel.**
    - **Do not back up more than 100 feet unless otherwise authorized by field staff to get into a safe enforcement location. If greater distances are needed please utilize appropriate ramps to get vehicle into position.**
    - **Workers are not permitted to cross live traffic lanes.**
    - **U-Turns and crossing live travel lanes with vehicles and equipment are prohibited.**

- **U-Turns at interchanges are prohibited.**
  - **In no case will workers be permitted to ride on the outside of any vehicle.**
  - **Flashing amber beacon(s) shall be operated when approaching, entering, and departing from the work zone.**
  - **Ensure that all equipment or vehicles approaches, enters, and departs from the work zone in the direction of the adjacent traffic flow.**
- (6) Proceed to work zone site entry point
- (7) Check in with site manager and verify deployment site, worker presence and work schedule.
- **Verify the deployment location. Ensure placement is not within any work zone buffer space and/or roll ahead space.**
  - **Verify type of protection and determine where vehicle location should be used (Placement on shoulder may need to occur for situations where channelizing devices are protecting the work zone.)**
  - **Understand Work Operation and potential conflicts with the enforcement vehicle. If repositioning during the enforcement cycle, verify if signs need to be adjusted and readjust accordingly before going into enforcement again in the repositioned location.**
  - **Understand Work Schedule and whether any worker stoppages are anticipated.**
- (8) Determine where to deploy the 2 warning signs and ASES in the work zone.
- (9) Conspicuously deploy the active speed limit photo enforced warning sign B per established procedure and record the distance from the ASES (Minimum of 1,000ft)
- **Verify that placement of the sign isn't within 250 ft of any other work zone signs. If a conflict exists, then the "Active Speed Limit Photo Enforced" sign should be adjusted beyond the minimums.**
  - **Properly install the sign stand per the manufacturer specifications.**
  - **Properly open the "Active Speed Limit Photo Enforced" sign.**
  - **Properly install the "Active Speed Limit Photo Enforced" sign to the sign stand.**
  - **Verify and adjust height of the sign to ensure that it can be clearly seen above positive protection. If behind channelizing devices, please place to a height of 5 ft from the ground to the bottom of the sign.**
  - **Verify and Adjust lateral placement related to positive protection – 2 ft minimum, but 4 ft desirable.**
  - **Place sandbags onto the sign stand to ensure proper ballasting of the sign.**
  - **Take a photo of the sign and document the exact location within the work zone. Additional use of marking paint may be utilized to ensure that the sign hasn't moved from your original placement and to confirm sign spacing is accurate.**
  - **Confirm that sign deployment is within conformance of AWZSE Standard Drawings.**
- (10) Attach Photograph of Sign B
- **Verify that the sign is properly placed each hour with documentation on the log along with the photo.**
- (11) Conspicuously deploy the active speed limit photo enforced warning sign A per established procedure and record the distance from the ASES (Minimum of 500ft)
- **Verify that placement of the sign isn't within 250 ft of any other work zone signs. If a conflict exists, then the "Active Speed Limit Photo Enforced" sign should be adjusted beyond the minimums while maintaining a minimum 500 ft distance to Sign B in accordance with the AWZSE Standard Drawings.**
  - **Properly install the sign stand per the manufacturer specifications.**
  - **Properly open the "Active Speed Limit Photo Enforced" sign.**

- Properly install the “Active Speed Limit Photo Enforced” sign to the sign stand.
  - Verify and adjust height of the sign to ensure that it can be clearly seen above positive protection. If behind channelizing devices, please place to a height of 5 ft from the ground to the bottom of the sign.
  - Verify and Adjust lateral placement related to positive protection – 2 ft minimum, but 4 ft desirable.
  - Place sandbags onto the sign stand to ensure proper ballasting of the sign.
  - Take a photo of the sign and document the exact location within the work zone. Additional use of marking paint may be utilized to ensure that the sign hasn’t moved from your original placement and to confirm sign spacing is accurate.
  - Confirm that sign deployment is within conformance of AWZSE Standard Drawing.
- (12) Attach Photograph of Sign A
- Verify that the sign is properly placed each hour with documentation on the log along with the photo.
- (13) Are two warning signs conspicuously placed before the active work zone?
- Confirm that sign deployment is within conformance of AWZSE Standard Drawings.
- (14) Does at least one of the warning signs indicate the ASES is active?
- (15) Park and align vehicle parallel to traffic
- Ensure that vehicle is minimum two feet away from barrier and at least 4 ft away from channelizers. Note: Placement of vehicle on shoulder should be considered especially when channelizers are used.
  - Verify that vehicle is in the deployment location as discussed within checklist number (7).
- (16) Measure front and rear wheels to identified road marking to establish parallel orientation to the roadway.
- (17) Notate mile marker, segment or notes on where the ASES is deployed in the work zone.
- (18) Deploy the notice identifying the location of the ASES posted at the active work zone
- Ensure that the sign is visible and can be seen above any barrier or channelizing devices.
- (19) Attach Photograph of the Enforcement Vehicle notification
- (20) Is there a notice identifying the location of the ASES posted at the active work zone?
- (21) Are workers present in the Automated Speed Enforcement Work Area as defined in 75 PA Code Â§102?
- (22) Attach photo of workers present in the work zone
- (23) Access the Speedvan software and setup the ASES per the deployment checklist
- (24) Is the ASES set-up in accordance with the deployment checklist?
- (25) Initiate and Confirm the Manufacturer self-test passed
- (26) Did you initiate the manufacturer specified self-test of the ASES?
- (27) Contact Traffic management Center (PTC 866-332-5889 or PennDOT 717-346-4400) to advise of the start of deployment.
- Provide TMC with work zone location, hours of operation, and the start of AWZSE deployment.
- (28) Select Start enforcement
- (29) Add the Work Order number at the prompt
- (30) Perform pre-deployment tuning fork test.
- (31) Did you perform a pre-deployment check of the ASES using the radar target simulator?

- (32) Send 10-8 Email to [#nocmobilemonitoring@redflex.com](mailto:#nocmobilemonitoring@redflex.com).
- (33) Select Stop enforcement
- (34) Did you perform a post-deployment check of the ASES using the radar target simulator?
- (35) Were workers present in the Automated Speed Enforcement Work Area as defined in 75 PA Code Â§102 for the duration of the deployment?
- (36) Notate any disruptions to deployment. i.e. system paused, workers not present, system issues etc.
- (37) Contact Traffic management Center (PTC 866-332-5889 or PennDOT 717-346-4400) to advise of end of deployment.
  - **Provide TMC with work zone location and the completion of AWZSE deployment.**
- (38) Prior to departing the work zone complete the Site Departure Checklist
  - **Contact Project Contact to notify that enforcement has ended and that deployment teardown will occur shortly.**
  - **Properly remove and collapse the “Active Speed Limit Photo Enforced” signs and place into vehicle.**
  - **Properly collapse and remove sign stands and place into vehicle.**
  - **Properly remove sandbags and place into vehicle.**
- (39) Check out with site manager and notify them of the end of deployment
  - **Remove your vehicle safely from the work zone.**
- (40) Return to depot
  - **Re-evaluate materials needed for checklist number (1).**
- (41) Sign and finish the work order and Log-out of Alcyon Field Service

# Appendix 8

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## **Pennsylvania Speed Camera Security Requirements**

**APPENDIX C: DATA SECURITY PROVISIONS**

1. **Scope.** This exhibit outlines the terms and conditions with which the Contractor must comply under any applicable Agreement it forms with the Department and/or Commission, together the Transportation Agencies, that involves Personal Information (“PI,” as defined in this exhibit), or if the Contractor has access to PI during its performance under an Agreement. The requirements of this exhibit are in addition to and not in lieu of other requirements of the Agreement, its exhibits, appendices, attachments, modifications, and supplements. In the event of a conflict between the Agreement and this exhibit, the terms that best protect the Transportation Agencies and the Commonwealth of Pennsylvania will apply.
2. **Definitions.** The following terms shall have the meanings set forth below.

**Applicable Laws** means the federal and state laws and regulations, local ordinances, and Commonwealth policies applicable to release and use of vehicle record information, including 75 Pa. C.S. 6114 (Limitation on sale, publication and disclosure of records); 67 Pa. Code, Chapter 95 (Sale, Publication, or Disclosure of Driver, Vehicle, and Accident Records and Information); 18 U.S.C. §§ 2721-2725 (Federal Driver’s Privacy Protection Act); 15 U.S.C. §§ 1681-1681x (Federal Fair Credit Reporting Act); and 73 P.S. § 2301 et seq (the Breach of Personal Information Notification Act).

**Business Partner** means an individual or company involved with the Contractor's business dealings, including owning or managing the Contractor's business, or having a cooperative alliance, whether by contract or not. A business partner can be a subcontractor, supplier, intermediary (like an agent or reseller), or a vendor of complimentary offerings. The Contractor’s customers are End Users (defined below), not Business Partners.

**Business Partner Agreement** means a written agreement with a Business Partner specifying the purpose for which vehicle record information (“PI”) is provided, and prohibiting the Business Partner from selling, assigning, viewing, or otherwise transferring PI to a third party for another purpose.

**End Users** means people using the Contractor’s products and services, the Contractor’s customers, potential customers, and other users of and visitors to the Contractor’s physical and electronic properties (including users of applications that use PI-related data, like users of an Internet connected device, visitors to a website, users of a mobile app, users of an IoT device, and visitors on an advertisement, landing page, or campaign). End Users shall not be considered Business Partners, and Business Partners shall not be considered End Users.

**Permitted Uses** means use of PI for obligations to the Transportation Agencies per this Agreement, as required by law, or as otherwise authorized by the Transportation Agencies, for programs determined by the Transportation Agencies to be in the public interest, per the Transportation Agencies written approval.

**Personal Information ("PI")** means an individual's name, address, license plate number, or a combination of that information, or any of those items with other PI, as per 18 U.S.C. § 2725(3), the Breach of Personal Information Notification Act, 73 P.S. § 2301, et seq., Commonwealth IT Policy ITP-SEC019 (Policy and Procedures for Protecting Commonwealth Electronic Data), and the applicable OPD documents publicly available at: <https://www.oa.pa.gov/Policies/Pages/itp.aspx>

3. **No Representations or Warranties.** The Transportation Agencies have made their best efforts to ensure the accuracy and completeness of the shared data. The Transportation Agencies make no warranties with respect to the accuracy of the shared data and assumes no responsibility for its use or reliability.
4. **DISCLAIMERS.** DATA IS PROVIDED "AS IS" AND ON AN "AS AVAILABLE" BASIS. NEITHER OF THE TRANSPORTATION AGENCIES NOR THEIR EMPLOYEES OR AGENTS MAKE ANY WARRANTIES, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, INCLUDING WARRANTIES OF MERCHANTABILITY, TITLE, FITNESS FOR A PARTICULAR PURPOSE, OR NONINFRINGEMENT. THE TRANSPORTATION AGENCIES MAKE NO REPRESENTATION, WARRANTY, OR GUARANTEE THAT THE TRANSPORTATION AGENCIES TECHNOLOGY WILL MEET THE CONTRACTOR'S REQUIREMENTS OR EXPECTATIONS, THAT PI WILL BE ACCURATE, COMPLETE, OR PRESERVED WITHOUT LOSS, OR THAT THE TRANSPORTATION AGENCIES TECHNOLOGY WILL BE TIMELY, UNINTERRUPTED, OR ERROR-FREE. THE TRANSPORTATION AGENCIES DO NOT GUARANTEE THAT SECURITY MEASURES WILL BE ERROR-FREE AND SHALL NOT BE RESPONSIBLE OR LIABLE FOR UNAUTHORIZED ACCESS BEYOND ITS REASONABLE CONTROL. THE TRANSPORTATION AGENCIES SHALL NOT BE RESPONSIBLE OR LIABLE FOR CONTRACTOR PROPERTIES, THIRD-PARTY PRODUCTS, THIRD-PARTY CONTENT, OR NON- THE TRANSPORTATION AGENCIES SERVICES (INCLUDING FOR DELAYS, INTERRUPTIONS, TRANSMISSION ERRORS, SECURITY FAILURES, AND OTHER PROBLEMS CAUSED BY THESE ITEMS), FOR DATA RECEIVED FROM CONTRACTOR IN BREACH OF THIS AGREEMENT, FOR THE COLLECTION, USE AND DISCLOSURE OF DATA AUTHORIZED BY THIS AGREEMENT, OR FOR DECISIONS OR ACTIONS TAKEN (OR NOT TAKEN) BY THE CONTRACTOR BASED UPON THE TRANSPORTATION AGENCIES' DATA, TECHNOLOGY, OR THE TRANSPORTATION AGENCIES' RELATED SERVICES (INCLUDING



CHANGES TO THE CONTRACTOR'S PROPERTIES). THE DISCLAIMERS IN THIS SECTION SHALL APPLY TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, NOTWITHSTANDING ANYTHING TO THE CONTRARY IN THIS AGREEMENT. THE CONTRACTOR MAY HAVE OTHER STATUTORY RIGHTS. HOWEVER, STATUTORILY REQUIRED WARRANTIES UNDER APPLICABLE LAW, IF ANY, SHALL BE LIMITED TO THE SHORTEST PERIOD AND MAXIMUM EXTENT PERMITTED BY LAW.

## 5. **Intended Use.**

- a. **Business Partner Agreements.** The Contractor shall execute a Business Partner Agreement with each Business Partner before providing PI. The Business Partner Agreement shall ensure Business Partners meet the requirements of this Agreement. Business Partner Agreements shall not restrict a Business Partner's ability to provide information necessary to meet legal obligations arising from an authorized transaction. Upon request, the Contractor shall provide copies of its Business Partner Agreements to the Transportation Agencies.
- b. **Business Partner Information.** The Contractor shall maintain a record of the Business Partner (including the name, address, and telephone number) for each request for PI. The Contractor shall provide the record to the Transportation Agencies upon request.
- c. **Compliance with Laws.** The Contractor shall comply, and shall require its Business Partners to comply, with the Applicable Laws, and the federal, state, and local laws, regulations, and policies applicable to its services. The Contractor shall procure at its expense necessary licenses and permits. If an existing law, regulation, or policy is changed, or if a new law, regulation, or policy is enacted affecting this Agreement, the parties shall modify this Agreement to the extent necessary to ensure compliance. Any ambiguity in this Agreement shall be resolved to permit the Transportation Agencies to comply with the Applicable Laws.
- d. **End User Approval.** The Contractor may make limited information available to End Users who will not have direct access to PI. The Contractor shall disclose the type of information to be released, manner of release, estimated number of End Users, and data sharing policies before receiving a notice to proceed. The Transportation Agencies' approval shall be approval to provide access to End Users to the extent disclosed in the End User submission. If limited information disclosure is approved by the Transportation Agencies, the Contractor may make the information available to End Users without following the requirements in this Agreement intended for Business Partners. The Contractor may request waivers from individual requirements of this Agreement for specific End Users or classes

of End Users; waivers may be granted, in writing, at the Transportation Agencies' sole discretion. If the Contractor fails to disclose its intended End Users, the Transportation Agencies may refuse to issue a notice to proceed until the submission is made.

- e. **End User Access.** The Contractor's data sharing policies shall determine the product sharing settings applicable to the Contractor's End Users for specific purposes. The Contractor shall implement End User responsibility controls. End Users shall first contact the Contractor with a request to stop access, storage, or use of personal information.
- f. **Order of Precedence for Compliance with Laws.** The Contractor's obligations pursuant to this Agreement may be stricter than those in an applicable law, rule, or regulation. If a law, rule, or regulation is more protective than those obligations set out in this Agreement, Contractor shall comply with the law, rule or regulation (in addition to complying with its obligations under this Agreement). If Contractor's obligations under this Agreement are more protective than those obligations set out in an applicable law, rule, or regulation, than Contractor shall comply with its obligations under this Agreement (in addition to complying with the applicable law, rule or regulation).
- g. **Incorporation of Changes, Amendments, and Interpretations.** If any of the Applicable Laws are superseded by new or modified Applicable Laws (including decisions or interpretations by a relevant court or governmental authority), the new or modified Applicable Laws shall be deemed to be incorporated into this Agreement, and the Contractor shall promptly begin complying with the Applicable Laws.

#### 6. **The Transportation Agencies Business Partner Approval.**

- a. **Business Partner Approval is Needed for Access to PI.** The Contractor's Business Partners may be subcontractors, and Business Partners shall comply with the requirements for approval of intended uses in Section 3 of this Agreement whether they are classified as subcontractors, independent contractors, consultants, agents, or otherwise. Subcontractors shall be approved in writing by the Transportation Agencies before receiving PI; approval shall not be unreasonably withheld. In its Business Partner Agreements with subcontractors, the Contractor shall require its Business Partner subcontractors to notify the Contractor of a change of the Business Partner subcontractor's ownership within five calendar days of the change (where, in the case of a publicly traded or held subcontractor, a change in ownership means a transfer, exchange, sale or acquisition of ten percent or more of the voting securities or stock of the approved subcontractor). The Contractor shall then notify the

Transportation Agencies within ten calendar days of becoming aware of an approved Business Partner subcontractor's ownership change. The Contractor shall be the single point of contact for the Transportation Agencies. The Contractor shall not provide Personal Information to a Business Partner who has been denied or disapproved, or whose approval has been rescinded by the Transportation Agencies.

- b. **Guidance to Business Partners.** The Contractor shall have a documented security program and policies providing guidance to its Business Partners to ensure the security, confidentiality, integrity, and availability of PI and systems maintained or processed by the Business Partners and providing express instructions regarding the steps to take in the event of a compromise or other anomalous event.
- c. **Business Partner Approval Requirements.** Before seeking the Transportation Agencies' approval, the Contractor shall provide the Transportation Agencies with details of the proposed Business Partner's involvement (including the identity of the Business Partner, its data security record, the location of its processing facilities, a description of the access to PI proposed, and other information the Transportation Agencies may reasonably request to assess the risks involved in allowing a subcontractor to process PI).
- d. **Business Partner Data Security.** The Contractor's Business Partner Agreement with an approved Business Partner shall contain equivalent terms to this Agreement (including data destruction). The Contractor shall not be entitled to permit a Business Partner to further sub-contract or otherwise delegate the Contractor's services. The Business Partner Agreement shall provide the Transportation Agencies with third-party beneficiary rights to enforce the terms; or shall require the Business Partner to enter into a data security agreement with the Transportation Agencies directly if privity of contract is required by law (or at the Transportation Agencies' sole discretion).
- e. **Contractor to Remain Responsible.** The Contractor shall be responsible and accountable for the acts or omissions of its Business Partners to the same extent it is responsible and accountable for its own actions or omissions under this Agreement (including data destruction).
- f. **Termination of Business Partners and Employees.**
  - i. **Reasons for Termination.** If the Contractor terminates a Business Partner or employee, the Contractor shall immediately terminate access to PI. The Contractor shall document the termination (including the basis for termination and confirmation of termination). Upon request, the Contractor

shall provide proof of termination in a manner satisfactory to the Transportation Agencies. If a Business Partner is terminated, the Business Partner shall no longer be an approved Business Partner. Previously terminated Business Partners shall be approved by the Transportation Agencies before receiving PI.

- ii. **Data Destruction.** The Contractor shall ensure terminated Business Partners and employees immediately destroy data in their possession or control, whether electronic or otherwise, per this Agreement.

## 7. Data and Information Ownership and Property Rights

- a. **The Transportation Agencies Own the Data.** As between the parties, PI is the sole and exclusive property of the Transportation Agencies. If the Contractor generates data based on the PI, the data is also the Transportation Agencies' sole and exclusive property. Proprietary rights (including patent rights, trademarks, and proprietary rights, in and to PI) shall be and remain in the Transportation Agencies, subject to the rights granted in this Agreement. PI may only be re-disclosed by Contractor according to the Transportation Agencies' written approvals.
- b. **The Contractor's Rights.** To the extent consistent with the Applicable Laws, the Transportation Agencies grant the Contractor a non-exclusive, non-transferable, revocable, limited license during the term or a renewal term of this Agreement to access and use PI for the Permitted Uses and for no other purpose.
- c. **Data Sharing is Limited.** Transfer and use of PI shall not obligate or entitle either party to enter into arrangements or agreements other than those stated in this Agreement. No right, title, or interest in or copyrights, trademarks, or other proprietary information is being transferred from the Transportation Agencies to the Contractor. No other right, license, or authorization, express or implied, to use or disclose PI is granted. The parties shall enter separate terms governing the release of PI for other purposes.
- d. **Acknowledgement and Preservation of Rights.** The Contractor shall not remove, alter, cover, or obfuscate acknowledgements, copyright notices, trademarks, or other proprietary right notices placed by the Transportation Agencies on the data. The Contractor shall comply with directions given by the Transportation Agencies regarding the form and placement of proprietary rights notices on products generated by the Contractor using PI.
- e. **Infringement.** Unauthorized use or distribution of the shared data may subject the Contractor to claims and penalties for intellectual property infringement.

- f. **Internal Re-Use.** Shared data shall not be distributed, repurposed, or shared across the Contractor's other applications, environments, or business units. PI shall not be transmitted, exchanged or otherwise passed to other vendors or interested parties except on a case-by-case basis as specifically agreed to in writing by the Transportation Agencies.
- g. **No Transformational Use.** PI shall not be used to create or update a file to be used by the Contractor or its Business Partners to develop their own source of PI.
- h. **Secondary Products are not Contemplated.** PI has been provided for sole use by the Contractor to perform the work defined in this Agreement and shall not be used to create derivative works or other forms of data. PI and tangible expressions of the data shared, in any media, shall remain the Transportation Agencies' property.
- i. **Contractor Requests to Use or Create Secondary Products.** The Transportation Agencies may agree to Contractor ownership of intellectual property derived from or combined with PI and other shared data as follows:
  - i. **Contractor's Existing Intellectual Property.** The Contractor shall notify the Transportation Agencies, as soon as possible but no later than the issuance date of the notice to proceed, of data, discoveries, developments, inventions (whether patentable or not), improvements, methods of use or delivery, processes, know-how, or trade secrets in use by the Contractor, and which the Contractor intends to use or combine with PI provided per this Agreement (the "Existing Intellectual Property").
  - ii. **Contractor's New Intellectual Property.** The Contractor shall notify the Transportation Agencies, promptly and in writing, of data, discoveries, developments, inventions (whether patentable or not), improvements, methods of use or delivery, processes, know-how, or trade secrets made by the Contractor as a result of the use of data provided per this Agreement (the "New Intellectual Property").
  - iii. **Review and Approval.** The Transportation Agencies shall undertake a comprehensive appraisal of the Existing Intellectual Property and the New Intellectual Property to determine its components and evaluate its conformance to this Agreement (including the data confidentiality and security provisions). The Transportation Agencies shall have the right to review all aspects of the Contractors Existing Intellectual Property and the New Intellectual Property necessary to assess overall condition, compliance

or non-compliance with the Applicable Laws and Commonwealth information technology policies, and other matters the Transportation Agencies deems relevant. The Contractor shall not use Existing Intellectual Property or New Intellectual Property to perform under this Agreement without the Transportation Agencies' written consent.

- iv. **Inventorship.** Inventorship of Inventions (including processes) shall be determined by application of United States laws pertaining to inventorship. "Invention" means a useful discovery or invention, (whether patentable or not), and the intellectual property rights (including related patents and patent applications), solely or jointly invented or otherwise made by the Contractor with use of or reference to PI. For avoidance of doubt, for purposes of this Agreement the term "Invention" does not include discoveries or inventions made solely by the Transportation Agencies.
- v. **Sole Contractor Inventions.** All rights, title and interests in and to intellectual property invented or otherwise made solely by the Contractor ("Sole Contractor Inventions") shall be assigned to the Contractor.
- vi. **Ownership of the Transportation Agencies' Intellectual Property and Derivative Works.** The Contractor shall acquire no ownership rights in PI or derivative works based on PI, or intellectual property deemed to be owned by the Transportation Agencies because of this Agreement. The Contractor shall, when requested by the Transportation Agencies (whether during or after the term of this Agreement), disclaim in writing property interests and ownership in PI.
- vii. **Notice.** The Contractor shall include the following language in secondary products developed from PI: This [product] was developed using data provided by the Commonwealth of Pennsylvania. This is a secondary product and has not been verified or authorized by the Commonwealth of Pennsylvania.
- viii. **The Transportation Agencies License to Use Secondary Products.** The Contractor grants to the Transportation Agencies a perpetual, non-exclusive, fully-paid up, royalty-free, irrevocable, worldwide, unrestricted license to New Intellectual Property and Sole Contractor Inventions for the Transportation Agencies use, with the right to sublicense through multiple tiers. If additional assistance from the Contractor is requested beyond the rights supplied by the non-exclusive license, the Contractor shall provide reasonable assistance to the Transportation Agencies, upon commercially reasonable terms at least as favorable to the Transportation Agencies as the terms agreed with another licensee for the assistance, to allow the

Transportation Agencies to use the New Intellectual Property and Sole Contractor Inventions. If required to comply with this Section, and at no cost to the Transportation Agencies, the Contractor shall obtain written agreements with Business Partners assigning, without additional consideration, appropriate rights and interests in New Intellectual Property and Sole Contractor Inventions to the Contractor for subsequent licensing to the Transportation Agencies.

## 8. Constraints on Use.

- a. **Consents.** The Contractor shall ensure neither the Contractor nor its Business Partners avoid a provision of this Agreement requiring the Transportation Agencies approval or consent by obtaining waivers or consents from individuals whose data resides in PI or other shared data (whether for marketing purposes or otherwise). When required by this Agreement, the Transportation Agencies' approval or consent shall be considered cumulative.
- b. **Required Disclosure.** If the Contractor is required to disclose PI by law, the Contractor shall promptly notify the Transportation Agencies to provide the Transportation Agencies an opportunity to seek a protective order or other relief. If the Transportation Agencies does not elect to seek, or is unable to obtain, a protective order or other relief, the Contractor may disclose the required PI, after first giving the Transportation Agencies written notice of the specific PI to be disclosed as far in advance of its disclosure as practicable. The Contractor shall use reasonable efforts to obtain assurances the entity receiving PI uses at least the same degree of care in safeguarding the disclosed PI as the Contractor is obligated to use pursuant to this Agreement (including appropriate confidentiality agreements and court orders).
- c. **No Direct Mailing or Advertising.** Except as approved by the Transportation Agencies, the Contractor shall not use or permit others to use PI (including for direct mail advertising, marketing, survey research, or other types of mailings (including electronic transmittals)).
- d. **Online Publication.** The Contractor shall provide the Transportation Agencies with website addresses, web services, and other places PI is placed online by the Contractor and its Business Partners. The website address, web service, or online location shall be given when first used, and a comprehensive list of online publications providing PI shall be given to the Transportation Agencies by January 31st each year. The Contractor shall ensure its Business Partners comply with the Applicable Laws and Commonwealth information technology policies for online publications.

- e. **Sharing Requests to be Referred to the Transportation Agencies.** If the Contractor receives a request to make available information owned or the primary responsibility of the Transportation Agencies, the Contractor shall refer the request to the Transportation Agencies.

## 9. Data Storage.

- a. **Data Storage Standard of Care.** PI shall be uniquely stored so it can be destroyed within 24 hours. The Contractor shall destroy PI when it is no longer needed by Contractor for meeting its performance obligations under this Agreement within 24 hours if no alternative period is requested or approved by the Transportation Agencies. The Contractor's Business Partners are not permitted to retain PI unless required by Federal law or regulation, or when permitted by the Transportation Agencies, in writing.
- b. **Data Encryption.** The Contractor shall ensure neither it nor its Business Partners transfer PI through an electronic, nonvoice transmission to a person outside of the Contractor's secure system unless the Contractor uses encryption to ensure the security of electronic transmission; or move a data storage device containing PI beyond the logical or physical controls of the Contractor or its data storage contractor unless the Contractor uses encryption to ensure the security of the information. Data shall be encrypted in transit and at rest per Commonwealth information technology policies.
- c. **Data Residency.** PI processed and stored in an information technology system shall remain within the United States of America's borders (physically or logically stored). The Contractor shall ensure PI is not moved outside of the United States of America.

10. **Contractor Warranty.** The Contractor: warrants its operations shall be in substantial conformity with the information and representations upon which the Transportation Agencies' approval was sought and obtained; agrees to inform the Transportation Agencies promptly of a material variation in operations; and agrees a material deficiency in operations shall be deemed a material breach of this Agreement. The Contractor certifies and warrants it is and shall remain compliant with applicable state and federal laws, regulations, and policies regarding the PI's protection (including the Applicable Laws and Commonwealth information technology policies).

## 11. Data Confidentiality Standard of Care.

- a. **Permissions.** The Contractor may: keep and update the PI for the Permitted Uses only for as long as required and approved by the Transportation Agencies and disclose PI for Permitted Uses on a need-to-know basis to employees, Business



Partners bound by Business Partner Agreements, and End Users.

- b. **Requirements.** The Contractor shall: ensure Business Partners receiving PI do not use PI for a purpose other than the Permitted Uses; ensure no one obtains, transfers, uses, or stores PI in facilities not owned or operated by the Contractor or its approved Business Partners; and keep records of data disclosures (including the names of the parties to which Contractor may have disclosed shared data and the legitimate interests under this Agreement or the Applicable Laws, if any). If this Agreement does not specifically address a data security or privacy standard or obligation, the Contractor shall use appropriate, generally accepted privacy practices to protect the confidentiality, security, privacy, integrity, availability, and accuracy of PI.
- c. **Prohibitions.** The Contractor shall not: use or otherwise disclose PI in a manner conflicting with the Transportation Agencies' interests; use or disclose PI for a purpose other than the Permitted Uses; publish PI or allow it to be published without the Transportation Agencies' prior written approval; sell, distribute, reproduce, send, or otherwise disclose PI to a party not a signatory to this Agreement without the Transportation Agencies' prior written approval; use PI to provide information to another entity or person without the Transportation Agencies' prior written approval; transfer, copy, replicate, or otherwise distribute PI to the public, or make it available on the Internet without the Transportation Agencies' prior written approval; attempt to identify the vehicle owners from whom PI was generated or combine PI with data from other sources leading to identification of an individual; or contact individuals whose data is contained in PI (unless instructed by the Transportation Agencies); or retain, store, combine, save, or link PI with other data by the Contractor or its Business Partners without the Transportation Agencies' prior written approval.
- d. **Personal Identification Prohibited.** The Contractor shall collect, access, and use shared data in a manner that does not permit personal identification of information deemed confidential per the Applicable Laws by individuals other than Contractor's employees and subcontractors who have necessary and legitimate interests in Personal Information for meeting Contractor's performance obligations under this Agreement. The Contractor shall notify the Transportation Agencies within 24 hours if PI is re-identified, intentionally or inadvertently, or aggregated, anonymized, or de-identified data is used in publicly-available documents.
- e. **End User Data Processing.** The Contractor shall only handle PI per this Agreement and the Transportation Agencies' documented instructions for: (i) Processing initiated by End Users in their use of the Contractor's services for the Permitted Uses; (ii) Processing to comply with other documented, reasonable

instructions provided by End Users (including via email) where those instructions are consistent with this Agreement. The Contractor shall not be required to comply with or observe an End User's instructions if those instructions would violate applicable data privacy laws.

- f. **Anonymizing Data.** For personal information that can reasonably be aggregated or anonymized, or both, the Contractor shall do so before sharing with Business Partners and End Users. The Contractor shall alter the personal information, so it cannot reasonably be used to identify a person or relate the information back to a person. The Contractor shall also contractually require the recipients to not attempt to re-identify the data. For personal information that cannot be completely aggregated or anonymized, the Contractor shall de-identify the information before sharing it with Business Partners and End Users. This means the information can no longer reference or be linked directly to a person by name, driver license number, address, or unique vehicle identifier (or other information restricted by the Applicable Laws). Before sharing de-identified information with Business Partners and End Users, the Contractor shall contractually require they may not identify a person, relate de-identified personal information back to a person, and strictly limit the purposes for which they can use the de-identified information. The Contractor may share aggregated, anonymized, or de-identified information with Business Partners and End Users so they may provide a product or service, develop new products and services, perform data analysis, store or process information for us, or otherwise help the Contractor operate its business.
- g. **Required Disclosures.** Nothing in this Agreement prevents the Contractor from disclosing PI to the extent required by law, subpoenas, or court orders. The Contractor may share Personal Information under exigent circumstances, to protect its rights, property, or legal interests, including to enforce the Contractor's and its Business Partner's End User agreements, or as part of a merger, acquisition, divestiture, or other corporate reorganization. Other than to Business Partners and End Users approved per this Agreement, the Contractor shall not share PI with unaffiliated third parties without aggregating, anonymizing, and de-identifying it first (to the extent possible), unless the Contractor obtains the Transportation Agencies' prior written consent. If the Contractor combines PI with other information the Contractor collects, the combined information shall be treated as PI for as long as it remains combined. The Contractor shall use commercially reasonable efforts to first notify the Transportation Agencies and obtain the Transportation Agencies' consent before making a required disclosure, unless prohibited by law from doing so, and shall notify the Transportation Agencies within 24 hours after a required disclosure is made, if prior disclosure cannot be made.
- h. **Security Awareness Training.**

- i. **Training Standards.** The Contractor shall educate and hold its Business Partners, agents, employees, contractors, and subcontractors to standards at least as stringent as those contained in this Agreement.
  - ii. **Training.** The Contractor shall conduct formal security awareness training, with a testing component, for Business Partners, agents, employees, contractors, and subcontractors as soon as practicable after execution of this Agreement and then annually. The Contractor shall retain documentation of security awareness training, confirming the training and subsequent annual recertification process have been completed, and make the documentation available for review by the Transportation Agencies upon request.
  - iii. **Confidentiality and Disclosure.** The Contractor shall ensure work performed by it and its Business Partners shall be under the supervision of the Contractor's responsible employees. Each officer or employee of the Contractor to whom PI may be made available or disclosed shall be notified in writing by the Contractor that information disclosed can be used only to the extent authorized by this Agreement. Further disclosure, by any means, for a purpose or to an extent unauthorized by this Agreement, may subject the offender to criminal sanctions per the Applicable Laws.
- i. **Confidentiality of Safeguards.** The Contractor shall not publish or disclose, without the Transportation Agencies' written consent, the details of safeguards designed or developed by the Contractor under this Agreement or otherwise supplied by the Transportation Agencies.

## 12. Data Security.

- a. **Information to be Secure.** The Contractor shall ensure its Business Partners, agents, employees, contractors, subcontractors, and others receiving or using PI obtained or derived from the Contractor have ensured the security and protection of PI and have taken necessary steps to prevent the release or use of PI in a manner not expressly permitted by this Agreement. Business Partner Agreements shall require Business Partners keep PI in a controlled access area (physical and electronic, as applicable). Storage arrangements shall be subject to inspection or audit by the Transportation Agencies.
- b. **Data Security Standard of Care.** The Contractor shall: implement appropriate measures to protect against the unauthorized release of PI; protect PI according to industry standard security best practices (including Commonwealth information technology policies); have appropriate technical and organizational security measures with regard to the risks inherent in the processing and to the nature of

PI; prevent unauthorized reading, copying, alteration, or removal of storage media; prevent unauthorized input; prevent unauthorized disclosure, alteration, or erasure of stored PI; prevent unauthorized using of data-processing systems by means of data transmission facilities; ensure authorized users of a data-processing system can access only the PI to which their access right refers; record which PI has been communicated, when, and to whom; design its organizational structure to meet data protection requirements; ensure no one is able to download, save, edit, photograph, print, or transfer all or a portion of PI for an unauthorized purpose, or remove, bypass, circumvent, neutralize, or modify technological protection measures, or share a username, password, or other account details with a third party or otherwise provide a third party with PI.

- c. **Minimum Security Safeguards.** The Contractor shall not transmit unencrypted PI over the Internet or a wireless network and shall not store PI on a mobile computing device (like a laptop computer, USB drive, or portable data device), except where a business necessity exists, and then only if the mobile computing device is protected by industry-standard encryption software approved by the Transportation Agencies. At a minimum, the Contractor's safeguards for protection of PI shall include: limiting access to employees and other persons to the Permitted Uses; securing business facilities, data centers, paper files, servers, back-up systems, and computing equipment (including mobile devices and other equipment with information storage capability); implementing network, device application, database, and platform security; securing information transmission, storage, and disposal; implementing authentication and access controls within media, applications, operating systems, and equipment; encrypting PI stored on mobile media; encrypting PI transmitted over public or wireless networks; strictly segregating PI from information of the Contractor or its Business Partners so PI is not commingled with other types of information; implementing appropriate personnel security and integrity procedures and practices (including conducting background checks consistent with applicable law); and providing appropriate privacy and information security training to the Contractor's employees.

d. **Compliance with Information Technology Management Standards.**

- i. **Commonwealth Information Technology Policies ("ITPs").** The Contractor shall comply with the information technology standards and policies issued by the Governor's Office of Administration, Office for Information Technology (located at <http://www.oa.pa.gov/Policies/Pages/itp.aspx>), including the accessibility standards set out in ITP ACC001, Accessibility Policy. If so required, the Contractor shall ensure its services comply with the applicable standards. The Contractor may request a waiver from an ITP by providing detailed written justification as to why the ITP cannot be met. The Transportation Agencies may waive the ITP in whole, in part, or conditionally,

or require the Contractor provide an acceptable alternative. The Transportation Agencies waiver shall be in writing.

- ii. **Information Technology Industry Standards.** Unless the Transportation Agencies have specified an alternative standard in this Agreement, the Contractor shall implement administrative, physical, and technical safeguards to protect PI no less rigorous than accepted industry best practices (including the International Organization for Standardization's standards: ISO/IEC 27001:2005 - Information Security Management Systems - Requirements and ISO-IEC 27002:2005 - Code of Practice for International Security Management, and other applicable industry standards for information security), and shall ensure the safeguards (including the manner in which PI is collected, accessed, used, stored, processed, disposed of, and disclosed), comply with applicable data protection and privacy laws, and this Agreement.
  
- e. **Data Destruction.** If PI is required to be permanently deleted from magnetic, electronic, or optical media (or other type of storage method) owned, operated, or used by the Contractor, the media shall be purged (sanitized to protect the confidentiality of information against a laboratory attack) or destroyed (by a method, including disintegration, incineration, pulverizing, shredding, or melting, after which the media cannot be reused as originally intended), or both, in accordance with the NIST SP800-88 Guidelines for Media Sanitization. The Contractor shall maintain documented evidence of data destruction and shall provide written and signed proof of destruction within 24 hours of destruction (including certification the destruction was per the NIST standards).
  
- f. **Physical Security.** Backup and archival media containing PI shall be contained in secure, environmentally-controlled storage areas owned, operated, or contracted for by the Contractor, and backup and archival media containing PI shall be encrypted.
  
- g. **Information Security Audits.** Before receiving a notice to proceed, the Contractor shall deliver to the Transportation Agencies copies of certifications it maintains (along with relevant supporting documentation) applying to the systems, policies, and procedures that govern PI handling. The Contractor shall promptly notify the Transportation Agencies if the Contractor has failed or no longer intends to adhere to those certifications or successor frameworks. Examples of potentially relevant certifications include: SSAE 16 - SOC1, SOC2, SOC3; ISO 27001:2013; ISO 27018:2014, EU Binding Corporate Rules; APEC Cross Border Privacy Rules System; EU-US and Swiss-US Privacy Shields; and Federal Information Security Management Act (FISMA) Compliance Certification. The Contractor shall have an independent service auditor annually perform an examination in accordance with attestation standards established by the American Institute of Certified Public

Accountants (“AICPA”) (Attestation Engagements AT Section 101) in the form of a SOC 2 Type 2 report. This report, unless otherwise determined by the Transportation Agencies in writing, shall provide:

- i. **Description of System.** A description of the Contractor’s system and an opinion on the fairness of the presentation of the description of the system;
  - ii. **Controls.** The suitability of the design of the controls and the operating effectiveness of the controls to meet the criteria for the principles set forth in TSP Section 100, Trust Services Principles, Criteria, and Illustrations for Security, Confidentiality, Privacy, Processing Integrity, and Availability (AICPA, Technical Practice Aids) (applicable trust services principles); and,
  - iii. **Results.** A description of the tests of controls and test results.
- h. **Relevant Principles.** The examination shall cover the following relevant principles: Security, Confidentiality, Privacy, Processing Integrity, and Availability throughout the related 12-month period. If a control within a principle is not applicable, as determined by the auditor, the report shall include the auditor’s determination and the basis for the determination.
- i. **Scope of Audit.** SOC 2 Type 2 reports shall include the Contractor and Business Partners who handle PI, host or assist with a related implemented system, and assist the Contractor in the critical functions of the Agreement.
- j. **Audit Period.** The Contractor shall complete one SOC 2 Type 2 audit per calendar year. The Contractor and Business Partners shall provide a complete copy of the final SOC 2 Type 2 reports to the Transportation Agencies within 30 calendar days of the date the report is received from the auditor. This reporting requirement shall continue until the expiration date or until the termination of this Agreement. The Contractor shall provide to the Transportation Agencies, within 60 calendar days of the issuance of each report, a documented corrective action plan addressing each exception contained in a report. The corrective action plan shall identify in detail the remedial action to be taken by the Contractor or Business Partners (or both) along with the dates when each remedial action is to be implemented.
- k. **Exception for Cloud Service Providers.** The Contractor’s Business Partner may satisfy the audit requirement by providing an appropriate SOC 3 report if the Business Partner is a cloud-based (network-accessed) data center and is not providing other services per this Agreement. Business Partners engaged in other services shall complete the SOC 2 Type 2 report. The Transportation Agencies may accept a SOC 3 report posted on a cloud service provider’s website with a seal indicating compliance. SOC 3 reports may be accepted for the hosted

infrastructure only. SOC 2 Type 2 reports are required for applications, data, and processes residing on the hosted infrastructure.

1. **Penetration Testing.** During the term of this Agreement, the Contractor shall engage, at its own expense and at least one time per year, a third-party vendor reasonably acceptable to the Transportation Agencies to perform penetration tests and vulnerability assessments with respect to the Contractor's systems. The objective of the penetration tests and vulnerability assessments is to identify design or functionality issues in infrastructure of the Contractor's systems that could expose PI and its computer and network equipment and systems to risks from malicious activities. Penetration tests and vulnerability assessments shall probe for weaknesses in network perimeters or other infrastructure elements as well as weaknesses in process or technical countermeasures relating to the Contractor's systems that could be exploited by a malicious party. Penetration tests shall identify, at a minimum: OWASP Best Practices; insecure storage; denial of service; insecure configuration management; proper use of updated encryption technology (TLS 1.2 or latest); and commodity anti-virus protection, malware, ransomware, and advanced persistent threats. Within a reasonable period after the annual penetration test has been performed, the Transportation Agencies may request from the Contractor a report of the highest two security risk categories (i.e., critical, severe, high, medium) revealed during the penetration test. The Transportation Agencies may request certification in writing that the highest revealed categorical issues have been remediated. If security issues were revealed during a penetration test, the Contractor shall subsequently perform, at its own expense, an additional penetration test within a reasonable period to ensure continued resolution of identified security issues.
- m. **Information Risk Management.** Risk assessment is the process of assessing potential business impact, evaluating threats and vulnerabilities, and selecting appropriate controls to meet the business requirements for information security. The Contractor shall have a risk management framework certified in a SOC 2 Type 2 report and conduct a yearly risk assessment of its environment and systems to understand its risks and apply appropriate controls to manage and mitigate those risks. Threat and vulnerability assessment shall be periodically reviewed, and remediation actions taken where material weaknesses are found. The Contractor shall provide the Transportation Agencies with the reports and analysis upon written request, to the extent disclosure would not violate the Contractor's own information security policies, or applicable law.
- n. **Notice.** If new or unanticipated threats or hazards are discovered by the Transportation Agencies or the Contractor, or if existing safeguards have ceased to function, the discoverer shall immediately bring the situation to the attention of the other party.

- o. **End User Software.** Software and applications available for online use or downloading from the Contractor shall be subject to this Agreement and to any End User license agreement accompanying the software, as applicable. Software and applications designed for End Users shall run in the standard user context without elevated system administration privileges.

### 13. Compliance Review and Audit.

- a. **Security Review.** The Transportation Agencies shall have the right to review the Contractor's and Business Partners information security before providing PI, and from time to time during the term of this Agreement. During the term of this Agreement, the Contractor or Business Partner may be asked to complete a security survey or attestation document designed to assist the Transportation Agencies in understanding and documenting the Contractor's security procedures and compliance with the requirements contained in this Agreement. The Contractor's failure to complete either of these documents within the reasonable timeframe specified by the Transportation Agencies shall constitute a material breach of this Agreement. The Contractor shall provide the Transportation Agencies with information concerning the Contractor's security practices as they pertain to the protection of PI, as the Transportation Agencies may from time to time request. Failure of the Contractor to complete or to respond to the Transportation Agencies' request for information within the reasonable timeframe specified by the Transportation Agencies shall constitute a material breach of this Agreement.
- b. **Right to Audit.** The Transportation Agencies or an appointed audit firm (the "Auditors") has the right to audit the Contractor. The Contractor's Business Partner Agreements shall provide the Transportation Agencies with a right to audit Business Partners to the same extent as the audit requirements in this Section. The degree, conduct, and frequency of the audits shall be at the Transportation Agencies' sole discretion, except the Transportation Agencies shall not conduct more than one audit per fiscal year (July-June). The Contractor shall afford the Transportation Agencies access to the Contractor's facilities, installations, technical capabilities, operations, documentation, records, and databases. The Contractor shall cooperate with the Transportation Agencies' auditors and shall ensure cooperation by its Business Partners (including insurance company agents). If a Business Partner refuses to cooperate with the Auditors, the Contractor shall stop providing them PI.
- c. **Conduct of Audit.** The Transportation Agencies shall announce their intent to audit the Contractor by providing at a minimum ten calendar days' notice to the Contractor. A scope document along with a request for deliverables shall be



provided at the time of notification of an audit. If the documentation requested cannot be removed from the Contractor's premises, the Contractor shall allow the Auditors access to the site. Where necessary, the Contractor shall provide a personal site guide for the Auditors while on site. The Contractor shall provide a private accommodation on site for data analysis and meetings; the accommodation shall allow for a reasonable workspace, with appropriate lighting, electrical, a printer, and Internet connectivity. The Contractor shall make necessary employees or contractors available for interviews in person or on the phone during the time frame of the audit. In lieu of the Transportation Agencies or its appointed audit firm performing their own audit, if the Contractor has an external audit firm perform a certified SOC 2 Type 2 audit, the Transportation Agencies may review the controls tested and the results, and may request additional controls to be added to the certified SOC 2 Type 2 review for testing the controls having an impact on PI.

#### 14. Data Breach or Loss.

- a. **Data Breach Notification Requirements.** The Contractor shall comply with applicable data protection, data security, data privacy and data breach notification laws (including the Breach of Personal Information Notification Act, Act of December 22, 2005, P.L. 474, No. 94, as amended, 73 P.S. §§ 2301–2329). The Contractor shall also comply with applicable Commonwealth information technology policies.
- b. **Incidents.** For PI in the possession, custody, and control of the Contractor or its Business Partners, employees, or agents, an "Incident" means a suspected, successful, or imminent threat of unauthorized access, use, disclosure, breach, modification, theft, loss, corruption, or destruction of information; interference with information technology operations; or interference with system operations.
- c. **Notice to the Transportation Agencies.** The Contractor shall report an Incident to the Transportation Agencies within two hours of when the Contractor knows of or reasonably suspects an Incident, and the Contractor shall immediately take reasonable steps to mitigate the potential harm or further access, use, release, loss, destruction, or disclosure of PI.
- d. **Notice to Affected Individuals; Credit Monitoring.** The Contractor shall provide timely notice to individuals that may require notice under an applicable law or regulation because of an Incident. The notice shall be pre-approved by the Transportation Agencies. At the Transportation Agencies' request, the Contractor shall, at its sole expense, provide credit monitoring services to individuals that may be impacted by an Incident requiring notice.

- e. **Contractor Responsible for Damages.** The Contractor shall be solely responsible for costs, losses, fines, or damages incurred by the Commonwealth due to Incidents.
- f. **Immediate Response Required.** As to PI fully or partially in the possession, custody, or control of the Contractor and the Transportation Agencies, the Contractor shall immediately perform the duties required in this Agreement in cooperation with the Transportation Agencies, until the time at which a determination of responsibility for the Incident, and for subsequent action regarding the Incident, is made final.
- g. **Post-Incident.** The Contractor shall cooperate with the Transportation Agencies in post-incident investigation, remediation, and communication efforts. The Contractor shall conduct a forensic and security review and audit in connection with an Incident and, if appropriate to the nature and scope of the Incident, retain an independent third-party auditor to perform an audit or assessment of the Contractor's information security procedures, systems, and network (including testing the system of controls, appropriate systems implementation, vulnerability analysis, and penetration testing). If a material security-related risk is identified by the Contractor or auditor, the Contractor shall take timely remedial action based on industry best practices and the results of the assessment, audit, or risk identification.
- h. **Default.** The Contractor shall not, and shall not permit another to, interfere with system operations; or access, use, disclose, breach, modify, steal, lose, corrupt, or destroy PI, in a manner not authorized by the Transportation Agencies. The Transportation Agencies may consider each of these acts or failures to act an event of default. The Transportation Agencies may terminate this Agreement for cause upon a default.

#### 15. Contractor Data Sharing Costs.

- a. **Contractor to Bear All Costs.** The Contractor shall bear the cost of providing PI to Business Partners and End Users, at no cost to the Transportation Agencies (including costs of computer hardware, software, services, personnel, networks, licenses, transportation, insurance, bonds, or installation). The Contractor may charge fees to its Business Partners and End Users. The Transportation Agencies does not guarantee the Contractor can recover the costs it incurs under this Agreement.
- b. **Information Security Audit Costs.** SOC 2 Type 2 reports, including by the

Contractor and relevant Business Partners, shall be provided at no expense to the Transportation Agencies.

- c. **Compliance Audit Costs.** The Contractor shall pay the costs of financial and performance audits. Payment for each audit shall be submitted within 45 calendar days of receipt of an invoice from the Transportation Agencies or the Transportation Agencies' designated auditor.
  - d. **Normal Delays and Downtime.** The Transportation Agencies shall not be responsible for loss of work or income resulting from system downtime due to hardware or software malfunction, extended power failure, communications line failures, and other normal and usual consequences of operation of a computer network.
16. **Notification Requirements.** Unless prohibited by law enforcement or court order, the Contractor shall notify the Transportation Agencies by telephone within 24 hours when the Contractor has reason to believe it or a Business Partner may have violated this Agreement. Written confirmation shall be submitted to the Transportation Agencies within five calendar days of initial notification. The Contractor shall notify the Transportation Agencies within 24 hours if the Contractor is under investigation and shall provide the Transportation Agencies with the name of the investigating entity and the reason for the investigation, if known. The Contractor shall provide follow-up documentation requested by the Transportation Agencies and cooperate in the Transportation Agencies' investigations.
17. **Confidentiality of Contractor Information and Communications.** The Transportation Agencies shall not treat the contents of the Contractor's communications, information, data, or reports (including those related to the Contractor's data security and certifications) as confidential unless marked by the Contractor as confidential per the Pennsylvania Right to Know Law, which requires an agency to notify a third party when a request meets both of the following conditions: (a) The third party provided the records to the agency; and (b) The third party included a written statement signed by a representative of the third party stating that the record contains a trade secret or confidential proprietary information (See 65 P.S. § 67.707(b)).
18. **Indemnification.**
- a. **Data Breach or Loss.** The Contractor shall indemnify, defend, and hold the Transportation Agencies harmless from and against claims, actions, suits, and proceedings resulting from the cost of notification of affected persons, third-party

credit monitoring services (which shall be provided for at least one year to affected parties), establishing and maintaining a call center in the event of a data breach or loss, and costs of an investigation (including computer forensic work) to assess and mitigate the effects of a data breach or loss. Indemnification shall include:

- i. **Legal Breaches.** Breach of security and privacy laws, rules, or regulations globally, as presently constituted or amended.
  - ii. **Hacking and Theft.** Data theft, damage, unauthorized disclosure, destruction, or corruption, including unauthorized access, unauthorized use, identity theft, theft of personally identifiable information or confidential corporate information in whatever form, transmission of a computer virus or other type of malicious code, and participation in a denial of service attack on third-party computer systems.
  - iii. **Denial of Service.** Loss or denial of service.
  - iv. **Breach of Contract.** Breach of contract, privacy and security liability, privacy regulatory defense and payment of civil fines, payment of credit card provider penalties, and breach response costs (including notification costs, forensics, credit protection services, call center services, identity theft protection services, and crisis management/public relations services).
  - v. **Employees and Business Partners.** Indemnification without limitation if caused by a Business Partner, employee of the Contractor, independent contractor working on behalf of the Contractor in performing services under this Agreement, or End User.
  - vi. **Negligence.** Indemnification for wrongful acts, claims, and lawsuits anywhere in the world.
- b. **The Transportation Agencies' Duty to Notify.** The Transportation Agencies shall notify the Contractor promptly when the Transportation Agencies knows of a claim for a loss the Contractor might be obligated to pay. The Transportation Agencies' failure to give timely notice does not terminate the Contractor's obligation, except to the extent the failure prejudices the Contractor's ability to defend the claim or mitigate losses.
- c. **Legal Defense of a Claim.** The Transportation Agencies have control over defending a claim for a loss (including settling it), unless the Contractor elects to control the defense as described below, or the Transportation Agencies direct the Contractor to control the defense. Upon receiving notice of a claim for a loss, the Contractor may take control of the defense by notifying the Transportation

Agencies. If the Contractor takes control, the Contractor may retain legal counsel, and the Transportation Agencies may retain their own legal counsel. The Contractor shall not settle litigation without the Transportation Agencies' written consent if the settlement imposes a penalty, non-monetary obligation, imposes limits on the Transportation Agencies program or project, admits the Transportation Agencies' fault, or does not fully release the Transportation Agencies from liability.

- d. **Legal Costs and Insurance.** Except as otherwise agreed to by the parties, and regardless of who has control over the defense, the Contractor shall pay the Transportation Agencies' costs of litigation or other disputes brought by third parties related to this Agreement (including reasonable attorney's fees incurred by the Transportation Agencies in asserting claims or defenses), except the Transportation Agencies shall bear its own costs of litigation or disputes (including attorney's fees) for liability solely caused by the Transportation Agencies' negligence or intentional acts, and for litigation or other disputes between the parties. If the Contractor purchases general liability or cyber liability insurance (or both) to satisfy this obligation, the Transportation Agencies shall be named an additional insured on the policy and the Contractor shall deliver a certificate of insurance to the Transportation Agencies before the effective date of the notice to proceed. Policies shall be occurrence-based and provide for 30 days' notice to the Transportation Agencies before cancellation (15 days for non-payment of premium).
- e. **No Limitations.** The indemnification obligations in this Section (including Business Partner indemnification), shall apply without regard to a limitation in insurance coverage. The Transportation Agencies' rights under this Section do not affect other rights the Transportation Agencies might have.

## 19. Termination or Expiration.

- a. **Termination for Convenience.** A termination for convenience shall automatically convert to termination for cause if an ongoing data breach is discovered after the termination, upon notice to the Contractor.
- b. **Termination for Changes in the Law.** This Agreement may be terminated immediately, upon written notice, should changes in governing state or federal laws or regulations render performance illegal, impracticable, or impossible. Should this Agreement be terminated for changes in the law, the Contractor shall remain liable for the payment of charges accrued up to and including the date of termination.
- c. **Termination for Cause.** The Contractor's failure to comply with this Agreement

shall be grounds for immediate termination.

- d. **Termination for Cause - Gratuities.** The Transportation Agencies may, by written notice to the Contractor, terminate if the Secretary of Transportation or the Secretary's duly authorized representative finds, after notice and hearing, gratuities in the form of entertainment, gifts, or other incentives were offered or given by the Contractor (or an agent or representative of the Contractor) to an officer or employee of the Transportation Agencies with a view to the awarding or amending of this Agreement, or the making of determinations with respect to its performance. The existence of the facts upon which the Secretary or the Secretary's duly authorized representative makes shall be in issue and may be reviewed in a competent court. The Transportation Agencies shall be entitled to pursue the same remedies against the Contractor as it could pursue for a breach of contract and, in addition to other damages to which it may be entitled by law and this Agreement, shall be entitled to exemplary damages in an amount determined by the Secretary or the Secretary's duly authorized representative, which shall not be less than three nor more than ten times the costs incurred by the Contractor in providing gratuities to an officer or employee.
- e. **Post-Termination and Post-Expiration Obligations.** Upon termination or expiration of this Agreement, the Transportation Agencies' intellectual property licenses granted in this Agreement shall be deemed revoked, and the Contractor shall transfer and deliver to the Transportation Agencies reports and other documentation in the Contractor's possession (including those in the possession of its Business Partners) pertaining to PI, subject to Contractor's obligation to retain a record of its service. The Contractor shall no longer purchase or receive PI. The Contractor's duty to return PI includes written, electronic, and other forms of media in which PI is embodied along with copies and extracts. Memoranda, notes, reports, designs, plans, schedules, lists, and other writings prepared by Contractor based on PI shall either be immediately delivered to the Transportation Agencies or destroyed, as the Transportation Agencies request. Contractor shall promptly certify compliance with the requirements of this Section to the Transportation Agencies in writing. Contractor shall comply with its obligations pursuant to this Section within 30 calendar days of termination or expiration of this Agreement, or within another time as the parties mutually agree.
- f. **End of Agreement Data Handling.** The Contractor shall maintain timely communication with the Transportation Agencies, and document its communication activities, to avoid unduly impairing business operations by hasty destruction or return of component data files. No PI shall be retained when files are returned or destroyed unless authorized in writing by the Transportation Agencies.

- g. **Accrued Rights and Obligations.** Termination or expiration of this Agreement shall not release either party from liability already accrued to the other party or attributable to a period before termination or expiration, nor preclude either party from pursuing rights and remedies it may have with respect to a breach of this Agreement.
- h. **Survival Sections.** The confidentiality, nondisclosure, data ownership and property rights, and indemnification provisions of this Agreement shall survive termination or expiration indefinitely.
20. **Remedies for Default; Cure Period.** The remedies in this Agreement shall not be construed to limit the parties' remedies if the other party fails to perform its obligations, or if representations or warranties in this Agreement are found to be materially inaccurate or untrue. At the Transportation Agencies' discretion, the Contractor may be offered the opportunity to cure a breach within 30 calendar days of a cure period notice.
21. **Equitable Remedies.** In the event of a breach of this Agreement, neither the Transportation Agencies nor an affected Pennsylvania citizen will have an adequate remedy in damages and therefore either the Transportation Agencies or an affected citizen shall be entitled to seek injunctive or equitable relief to immediately cease or prevent the use or disclosure of PI not contemplated by the Agreement, to enforce the terms of this Agreement, or ensure compliance with Applicable Laws.
22. **Amendment for System Security Updates.** The Transportation Agencies may determine, in their sole discretion, this Agreement requires amendment to immediately implement additional system security measures. System security update amendments may be made by letter or other notice issued by the Transportation Agencies. System security update amendments shall be effective immediately upon receipt and Contractor shall immediately take reasonable measures to implement those security updates. If Contractor cannot take reasonable measures to immediately implement the security updates it shall contact the appropriate the Transportation Agencies representative as soon as possible to discuss and resolve the concerns. If the Contractor fails to implement a system security update within 24 hours of receipt, or within an alternative period set by the Transportation Agencies, the Transportation Agencies may consider continued use of PI without the update an unauthorized use and an event of default per Section 12 of this Agreement.
23. **Construction.**
- a. **Words and Phrases.** Where a word or phrase is defined, its other grammatical forms and tenses have a corresponding meaning. The words "or" and "and" shall

be construed either disjunctively or conjunctively to effectuate the intent of the parties.

- b. **Use of "Including."** The words "including," "includes," or "include" are to be read as listing non-exclusive examples of the matters referred to, whether words like "without limitation" or "but not limited to" are used in each instance.

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## End of Report

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### Vermont Speed Safety Cameras in Work Zones

PREPARED FOR:

Vermont Legislature per Act 55 Section 40 of 2021

PREPARED BY:

Vermont Agency of Transportation with support by VHB

REPORT DATE:

January 14, 2022