

EFFICIENCY AND EFFECTIVENESS OF WEIGH STATION MANAGEMENT IN WASHINGTON STATE

Executive Summary

prepared for

Washington State Joint Transportation Committee

prepared by

Cambridge Systematics, Inc.

BGM Consulting, LLC.

December 16, 2015

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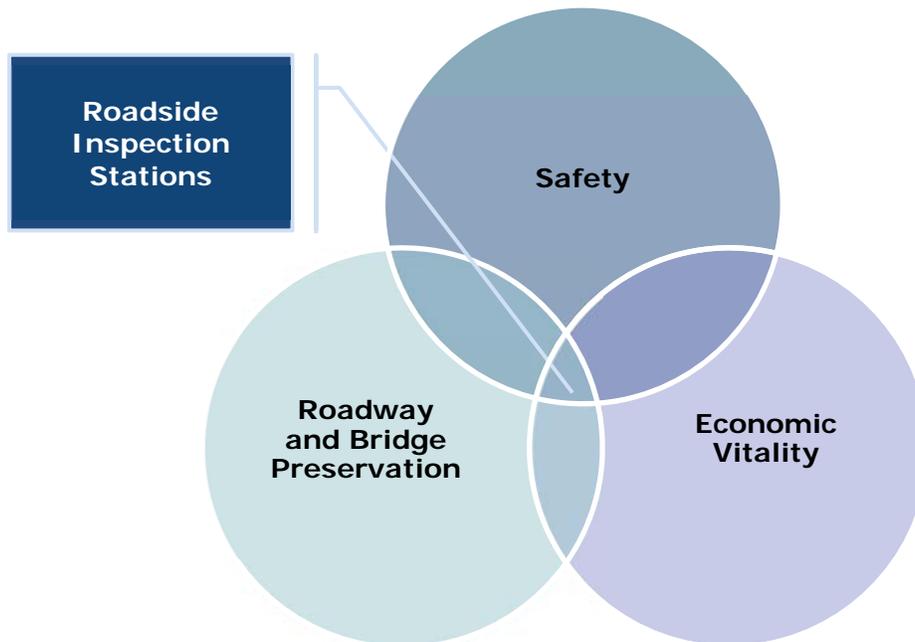
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Introduction

About the Study

The Washington State Joint Transportation Committee hired Cambridge Systematics to undertake a study to examine the effectiveness and efficiency of the Washington State inspection station (or “weigh station”) system. Ensuring the safety of commercial and passenger vehicles, preserving the State’s highway infrastructure, and supporting economic vitality through maintaining mobility for freight are three key priorities of the State of Washington. The Washington State Patrol (WSP) and Washington State Department of Transportation (WSDOT) share similar goals and missions that support these overarching goals. Roadside inspections and inspection stations are the nexus of where these priorities come together. Figure ES.1 shows where the inspection station system fits in the context of WSP and WSDOT goals.

Figure ES.1 Washington State Inspection Station Goals



The 2010 closure of the Federal Way southbound inspection station, 2011 closure of the Everett southbound inspection station, and potential impacts of numerous DOT projects on other inspection sites created concern about the lack of a strategic approach to the management of the system. The Washington State Joint Transportation Committee (JTC) established four main goals for the study:

- Provide educational material for use by Members and staff of the Legislature and the public about the planning, placement, and operations of the system of weigh stations in Washington;
- Evaluate the system’s efficiency in managing its capital assets and operations;

- Evaluate the system's effectiveness at achieving outcomes relating to road preservation and traffic safety, while balancing the state goal of freight mobility; and
- Make recommendations regarding a more strategic approach to managing the system

To address the above goals, the study team gathered and synthesized data, undertook technical analyses, examined best practices, and interviewed those directly responsible for the inspection station system and relevant stakeholders. Draft technical reports were submitted to JTC with data gleaned from the above steps, and a draft of the findings and recommendations was presented at the Joint Transportation Committee meeting on November 17, 2015. This Executive Summary serves as an accompanying document to the *Efficiency and effectiveness of Weigh Station Management in Washington State Final Report*, which contains additional details from the study. Both documents incorporate feedback received from JTC at that meeting and from previous comments and suggestions received on the draft technical reports.

Overview of Inspection Stations

Inspection stations, also referred to as “weigh stations” in Washington State, are locations where commercial vehicle enforcement activities such as weighing vehicles and safety inspections occur. Historically, these sites focused on weight inspections. However, recent emphasis on driver and vehicle safety at both the state and Federal level has expanded the role of these sites beyond weight enforcement alone. For this reason, the term “inspection stations” or “inspection sites” more accurately depicts current practices. Some inspection stations are also called “Ports of Entry,” and serve as gateways into a state for interstate or international traffic.

Inspection operations in the U.S. typically utilize one or more of three basic configurations: 1) fixed inspection stations, 2) virtual inspection stations, or 3) mobile roadside enforcement. Fixed inspection stations and mobile roadside enforcement are currently in use in Washington State; virtual inspection stations are currently under consideration at two locations. The primary purpose of all three configurations is to enforce truck weight regulations in order to protect infrastructure from excessive wear and tear caused by overweight trucks. Depending on the state, they are also used to screen trucks for safety, credentials, and logbook violations as well as to issue permits, collect registration and fuel taxes, and conduct other activities associated with commercial vehicles.

Inspection stations often result in interaction between a State's Department of Transportation, and State Patrol or other enforcement agency. Typically, inspection stations are staffed with sworn officers of State Patrol, but some states allow other types of personnel to perform inspection functions. In Washington, inspection stations serve both weight and safety inspection purposes, and are staffed with a mixture of specially trained commercial vehicle officers from the Washington State Patrol and Washington State Patrol Troopers.

The vast majority of states, including Washington, currently support *electronic screening*, at some or all inspection locations.¹ Electronic screening is the automated screening of vehicles to distinguish between known or likely safe and legal vehicles and potential violators *before* they stop at an inspection facility. The intent of electronic screening is to allow safe and legal trucks to bypass the station while enforcement resources are focused on higher-risk carriers and vehicles. Mainline weigh-in-motion (WIM), which measures a truck's weight on the main roadway at highway speeds, is frequently used as part of an electronic screening system.



Example Electronic Screening Infrastructure

Source: Cambridge Systematics

Types of Inspection Stations

There are three main types of inspection sites nationwide: fixed, virtual, and mobile. These categories are described below.

Fixed Inspection Stations

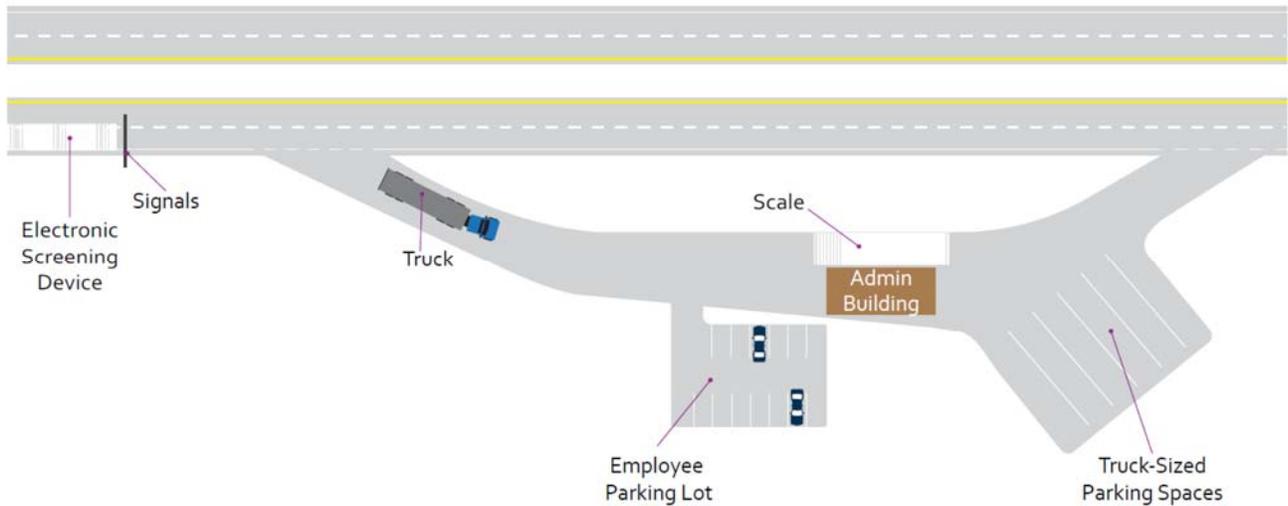
Fixed inspection stations are the most common setup currently in use in the U.S. Most fixed inspection stations include a pull-off ramp from the main roadway and a combination of fixed infrastructure, such as a static scale, and an administration building or scale house. Sites may or may not incorporate electronic screening. Washington has 52 fixed inspection sites. Figure ES.2 shows an example layout of a fixed inspection station.

The vast majority of fixed sites in the U.S. are located on the right side of the highway right-of-way. Some states, including Florida and Idaho, have also sited fixed stations in the center median of a divided highway. Inspection stations located in a median allow trucks to enter one station from two directions of travel on the same segment of roadway. This approach can be an efficient and effective means of truck evaluation and enforcement by staff, and offers potentially significant cost savings during construction and operation of the site. These types of sites can be effective in strategically situated, non-interstate locations with moderate traffic volumes. However, siting and placement of this type of inspection station configuration can be challenging, as safety considerations dictate the need for certain configurations of traffic lanes and median space. Examining locations in Washington for the possible placement of a median site should be considered during development of the joint statewide inspection state plan (Recommendation 8).²

¹ Washington State utilizes an electronic screening system call NORPASS. For further information, see the Washington State Department of Transportation Commercial Vehicle Information Systems Network web site at: <http://www.wsdot.wa.gov/CommercialVehicle/CVISN/apply.htm>.

² A more detailed evaluation of median siting can be found in the Final Report for this study.

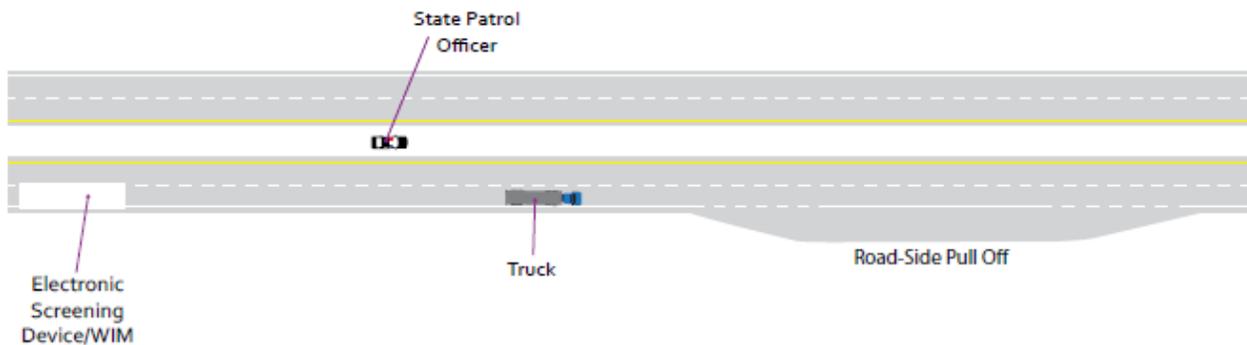
Figure ES.2 Example Fixed Inspection Station



Virtual Inspection Stations

An alternative to a fixed inspection station is a virtual inspection site. Although these sites are built at a “fixed” location, they lack the physical infrastructure found at fixed sites and are based on the concept of electronic screening using integrated software systems to capture information about vehicles as they travel down the mainline. Virtual sites can have the option of stationing a mobile officer to undertake inspection or enforcement activities; when an officer is present then the station operates similar to a fixed site. However, a virtual station has the advantage that it still collects data even when an officer is not on-site. Washington does not have any virtual inspection stations. Figure ES.3 shows an example layout of a virtual inspection station with an officer present.

Figure ES.3 Example Virtual Inspection Station
With Officer Present



Mobile Roadside Enforcement

Mobile enforcement, which is used in Washington, consists of enforcement activities that do not take place at fixed stations. This type of enforcement can be combined with virtual inspection stations in order to provide citation capabilities without the cost of building and maintaining a full fixed site.

States' mobile enforcement programs usually encompass temporary roadside locations (e.g., rest areas, modified shoulders, abandoned inspection stations), roving patrols, or both. During mobile enforcement details, commercial vehicles are stopped and weighed on portable scales and may be subject to a safety inspection. Note that in some states, probable cause is required to stop a vehicle. Washington State does not have this requirement – State Troopers can stop a vehicle for any reason.



Portable Scales in use on U.S. 23 in Floyd County, KY

Source: <http://migration.kentucky.gov/Newsroom/kve/010506.htm>.

Federal Programs Supporting Inspection Stations

The Federal Motor Carrier Safety Administration (FMCSA) and Federal Highway Administration (FHWA) are the two agencies within the U.S. Department of Transportation (U.S. DOT) that have programs related to inspection stations.

The Federal Motor Carrier Safety Administration (FMCSA)'s mission is to prevent commercial motor vehicle-related fatalities and injuries. Commercial Vehicle Information Systems and Networks (CVISN)³ and Motor Carrier Safety Assistance Program (MCSAP) grant programs are FMCSA funded, state-administered programs that provide financial assistance to states to implement projects, systems, and activities that improve commercial motor vehicle safety thereby reducing the number and severity of accidents and hazardous materials incidents involving commercial motor vehicles.

The FHWA Federal-aid Highway Program (FAHP) supports state highway systems by providing financial and technical assistance for the construction, maintenance and operations of the Nation's 3.9 million-mile highway network, including activities related to inspection stations.

³ Under the Fixing America's Surface Transportation Act (FAST) of 2015, the CVISN program will be considered as part of the Motor Carrier Safety Assistance Program

Washington's Inspection Station System

Infrastructure

Washington's inspection station network contains a total of 63 sites. Fifty-two of the sites are fixed locations and 11 are mobile enforcement locations that are commonly used by the Washington State Patrol. The State does not currently operate any virtual inspection stations. Further classification based on Washington State specific infrastructure results in three groups of sites (2 fixed, 1 mobile):

- **Electronic Screening (Fixed) Sites** – The first group, with the highest level of functionality when fully operational, are the 12 locations that are fixed sites equipped with electronic screening technology through the CVISN program, including mainline WIM, automated license plate readers, the software to automatically run safety screening checks, and at Fort Lewis a brake inspection system which measure the heat produced when trucks brake to determine if brakes are functioning properly. These sites are also commonly referred to as "CVISN-equipped sites"
- **Fixed Sites** – The second group of sites are 40 fixed inspection stations with a fixed scale for weighing commercial vehicles. Five of these sites are "plug and run" facilities, which are sites with permanent scales that do not have scale buildings or software/computers installed, requiring the use of Patrol cars as mobile "offices" with laptops by enforcement personnel when using the site. The remaining 35 sites in this category have an administration building used to run the site when open, and varying amounts of other physical infrastructure at the site, including truck parking. These sites lack any electronic screening capabilities.
- **Mobile Sites** – The third set of sites are mobile enforcement locations. This includes 11 locations where WSDOT has either slightly widened the road to specifically accommodate mobile weight/safety checks by WSP or where WSP uses infrastructure built for other purposes (such as a rest area for motorists) to conduct commercial vehicle operations.⁴

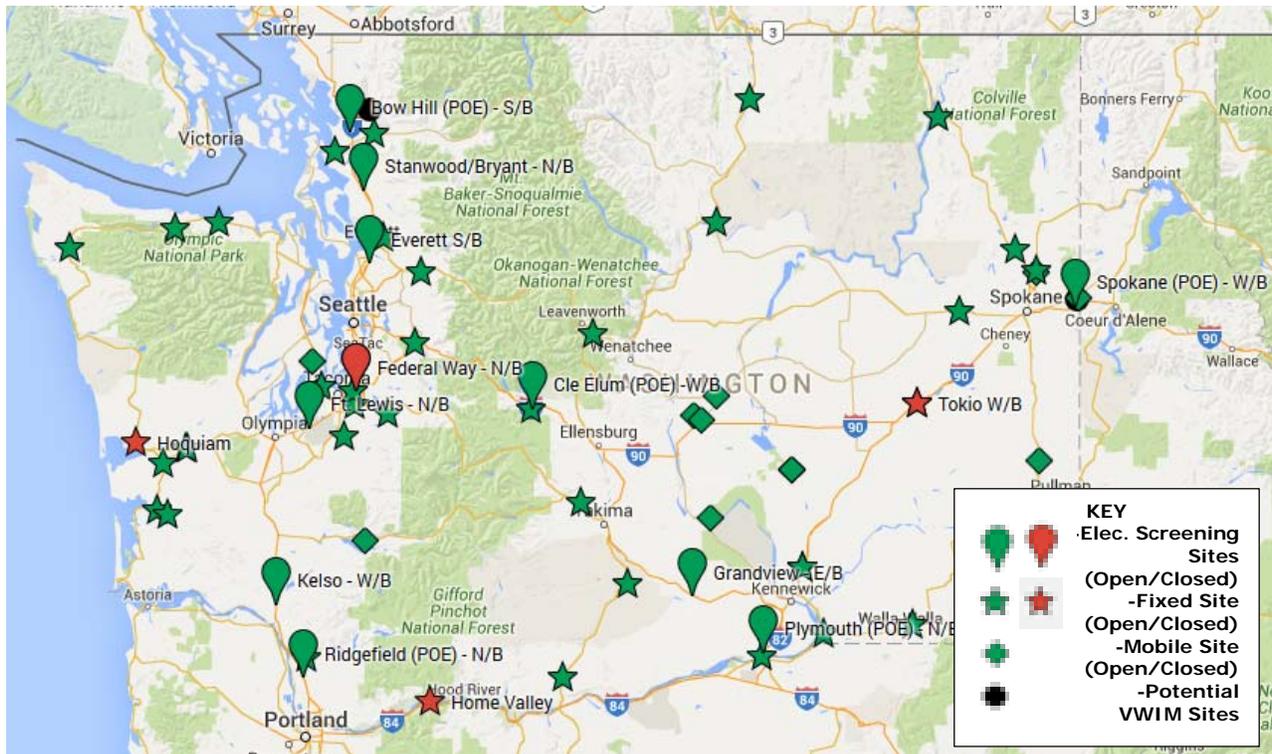
Figure ES.4 shows the Washington State inspection station system.⁵ Four sites are currently closed. In addition to Federal Way S/B, sites at Home Valley, Hoquiam, and Tokio W/B are currently inoperable due to scale certification being out of date.⁶

⁴ The WSP also operates mobile enforcement units in every county who utilize the roadside, parking lots, or other unimproved locations to enforce rules and regulations. Because the locations for this type of enforcement are random, they are not included in list of 63 sites in Washington State.

⁵ Figure 2.1 is a static versions of an electronic map that was developed as part of this study. The electronic map is available as a web-based google maps platform, and is expected to be maintained by the interagency working group identified in Recommendation 1. Further information can be found in the Appendix to the final report.

⁶ Scales must be certified annually to confirm their accuracy. If they are not, the weights obtained from them cannot be used to issue citations. Certification is performed by the Property Management Division of the WSP, part of the Commercial Vehicle Enforcement Bureau.

Figure ES.4 Washington State Inspection Station System



Source: Washington State Patrol, WSDOT, Cambridge Systematics.

Operations

The Washington State Patrol is responsible for commercial vehicle enforcement in the State. The approximately 130 personnel that conduct enforcement are divided between Washington State Troopers who have full police authority but focus their activities on commercial vehicles, and commercial vehicle enforcement officers (CVEO) whose authority is limited to commercial vehicle issues. In 2014, these enforcement personnel conducted nearly 82,000 inspections, including physically weighing approximately 57,000 vehicles, and found more than 113,000 weight and safety violations. Table ES.1 provides a brief summary of the Washington State Inspection System.

Table ES.2 shows aggregated statistics for the inspection station system.⁷ The vast majority of inspection and weighing activity took place at sites with electronic screening (which are generally located at locations of higher traffic volumes), accounting for more than 82 percent of the trucks physically weighed, 60 percent of the total fines issued, 58 percent of the inspections conducted, and 53 percent of the violations discovered in 2014.⁸ Mobile

⁷ Additionally, this data could be incorporated into the development of future performance measures such as the rate of violations vs. inspections at the different site categories.

⁸ Electronic screening technology is currently funded by the CVISN program, thus electronic screening equipped sites are also referred to as CVISN sites.

enforcement also led to a high number of violations and weight fines. Mobile enforcement allows for flexible, targeted operations at known problem locations, which in part explains the high rate of violations and fines. Another possible factor is that trucks with known weight or safety issues may try to bypass the fixed sites, reducing the total number of violations that can be found at the fixed locations.

Table ES.1 Washington State Inspection Station System Overview

Criteria	Status (2014)
Number of Sites	52 fixed sites, 12 with WIM; 11 commonly used mobile sites
Number of Additional Scales	434 mobile scales
Personnel	169 total positions, average of 127 filled in 2014. Split between 81 commercial vehicle enforcement officers (CVEO) and 46 Troopers
Annual Site Traffic Volume	40 million trucks annually on adjacent roads
Number of Screenings (Mainline WIM)	1.9 million (2014)
Number of Inspections	82,400 (2014)
Total Annual Vehicles Weighed	57,000 (fixed scales)
Total Annual Citations	113,000 (weight and safety violations), \$1.9 million in weight fines
Permits/Credentials Issued	No Data

Source: WSDOT. Washington State Enforcement Plan (2016). Interview with Captain Mike Dahl, September 17, 2015.

Table ES.2 Washington State Aggregate Inspection System Statistics, 2014

Type of Site	Trucks Physically Weighed	Weight Fines	Number of Inspections	Number of Violations
Electronic Screening (11 open sites)	47,083	\$1,126,010	48,097	59,558
No Screening, Fixed (37 open sites)	7,002	\$184,887	7,984	10,237
Mobile (11 open sites) ^a	3,214	\$578,763	26,363	43,214
Total	57,299	\$1,889,763	82,444	113,009

Source: WSP. Note that data for Everett S/B is from 2013. Data from Federal Way S/B, Home Valley, Hoquiam, and Tokio W/B excluded due to being out of service or lack of scale certification.

Note: ^a Mobile sites also include statistics from variable sites in each county.

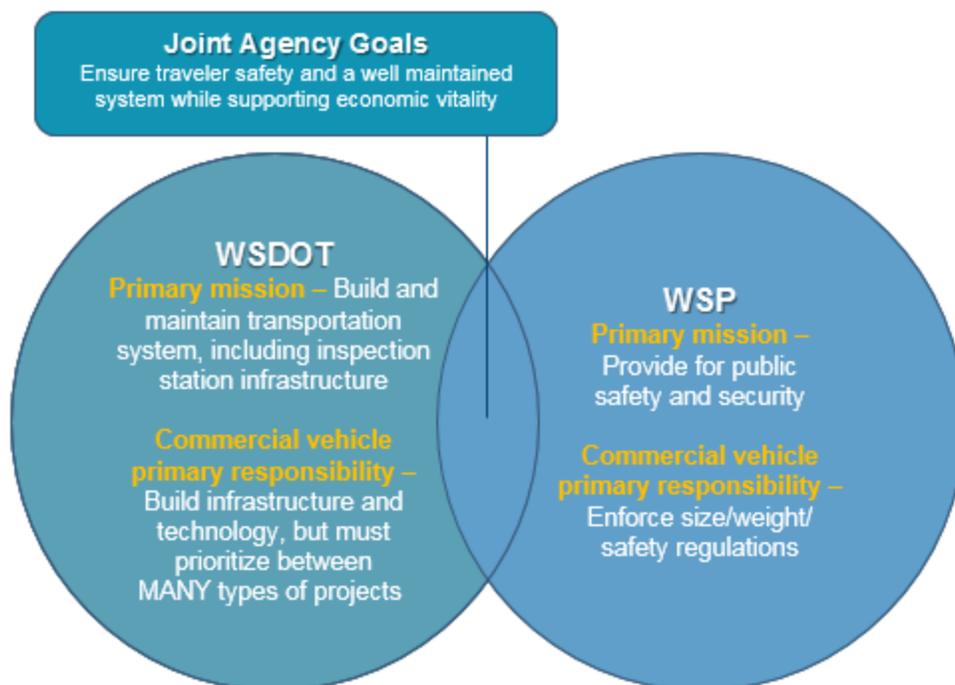
Agency Roles and Responsibilities

Both WSDOT and WSP are invested in the creation and efficient use of the inspection station system to ensure the safety of the motoring public and the preservation of roads and bridges in the State. The Washington Transportation Plan 2035⁹ states that, “Preservation of the capital assets of the statewide transportation network is the most critical transportation challenge facing the State.”

As in many states, in Washington responsibility for commercial vehicle inspection stations is shared between multiple agencies. Below is a description of the roles for WSDOT and WSP in roadside inspection stations, as well as the extent to which these responsibilities overlap.

A major finding of this study is that such a joint enterprise requires effective communication procedures and the current communication procedures between WSP and WSDOT, and within WSDOT, do not effectively incorporate the needs of the inspection station system. An example of this communication problem is illustrated in the Federal Way case study, summarized in the *Case Study – Federal Way* Section. Figure ES.5 summarizes the goals and responsibilities of WSDOT and WSP as related to the statewide roadside inspection station system.

Figure ES.5 Agency Responsibilities Related to Inspection Stations in Washington



Source: Cambridge Systematics.

⁹ Washington State DOT. Washington Transportation Plan, 2035. January 2015. On-line at: https://wtp2035.files.wordpress.com/2015/01/wtp2035_final_21-jan-2015.pdf.

Case Study – Federal Way

As part of this study, a case study of the Federal Way S/B inspection station was conducted to understand the causes of and lessons learned from the closure of the station in 2010.

The Federal Way S/B inspection station located on I-5 between Seattle and Tacoma was constructed in the 1960s. This inspection station has provided a location to conduct weight and safety enforcement for approximately 50 years. Since August 2010, the inspection station has been closed, creating a gap in the statewide inspection station network from the Everett southbound inspection station to the Kelso southbound inspection station – approximately 150 miles. This segment of I-5 is a major freight corridor, acting as the major north-south route through western Washington and serving important ports, airports, interconnecting highways, and thousands of freight generators and receivers. This gap in the statewide inspection station network allows commercial vehicle to operate in this area with minimal oversight.

Since the 1960s, with increasing traffic volumes, the site has been upgraded to better handle the increased weight and safety enforcement needs on Interstate 5. In 2001, a mainline weigh-in-motion (WIM) system was added to the site to help screen truck traffic and reduce the number of legal trucks that had to enter the site.

Due to rising traffic volumes (of all types) on Interstate 5, a decision was made to improve the interchange at I-5/SR 18/SR 161 near Federal Way, Washington. Also known as the Triangle Interchange Project, this work necessitated the closure of the Federal Way S/B inspection station in August 2010.¹⁰ The building of a new weigh-in-motion station to capture southbound traffic on Interstate 5 was supposed to be part of the project.¹¹ However, the site remains closed as of October 2015. The following is an evaluation of this interchange improvement and its impacts on the Federal Way S/B inspection station.¹²

Case Study Findings

- The design of the I-5, SR 18, SR 161 Triangle Project led to the closure of a major inspection station at Federal Way. The closure resulted from inadequate consideration of the effects of the interchange project to the Federal Way inspection station. A contributing factor was ineffective communication between WSDOT (responsible for infrastructure projects), and WSP (responsible for inspection station operations).
- None of the technical reports prepared by WSDOT as part of the NEPA process to understand impacts to the roadway and surrounding area adequately addressed the impacts on the Federal Way station.

¹⁰ <http://wsdot.wa.gov/publications/fulltext/graynotebook/Mar12.pdf#page=53>.

¹¹ <http://www.Federalwaymirror.com/news/161596895.html#>.

¹² Further details on the Federal Way case study can be found in the Final Report of this study.

- The Triangle Project created a multilane weave with commercial vehicles and passenger vehicles. State Patrol deemed that operating the inspection station under the new configuration created a public safety hazard.
- By integrating the Federal Way inspection station into the evaluation and mitigation process in 2004 when the Interchange improvement project was conceived, it may have been possible to avoid closing the station in 2010.
- WSDOT's current \$16 to \$20 million design for a replacement Federal Way inspection station is not sufficient to meet future needs. This is due to the fact that the process for designing new facilities is based on past traffic patterns and infrastructure design; it does not adequately consider future needs or technology.

Study Findings and Recommendations

Ensuring the safety of commercial and passenger vehicles, preserving the State’s highway infrastructure, and supporting economic vitality through maintaining mobility for freight are three key priorities of the State of Washington. This section presents four sets of findings and recommendations from the study to guide Washington (primarily WSDOT and WSP) towards better aligning actions and policies related to the State’s inspection station system to these key State priorities. The recommendations provide a roadmap for WSDOT and WSP to work jointly at the strategic level and includes a brief set of near-term, long-term, and ongoing implementation steps.

Four sections each present a project finding and the accompanying recommendations. These are summarized in Table ES.3.

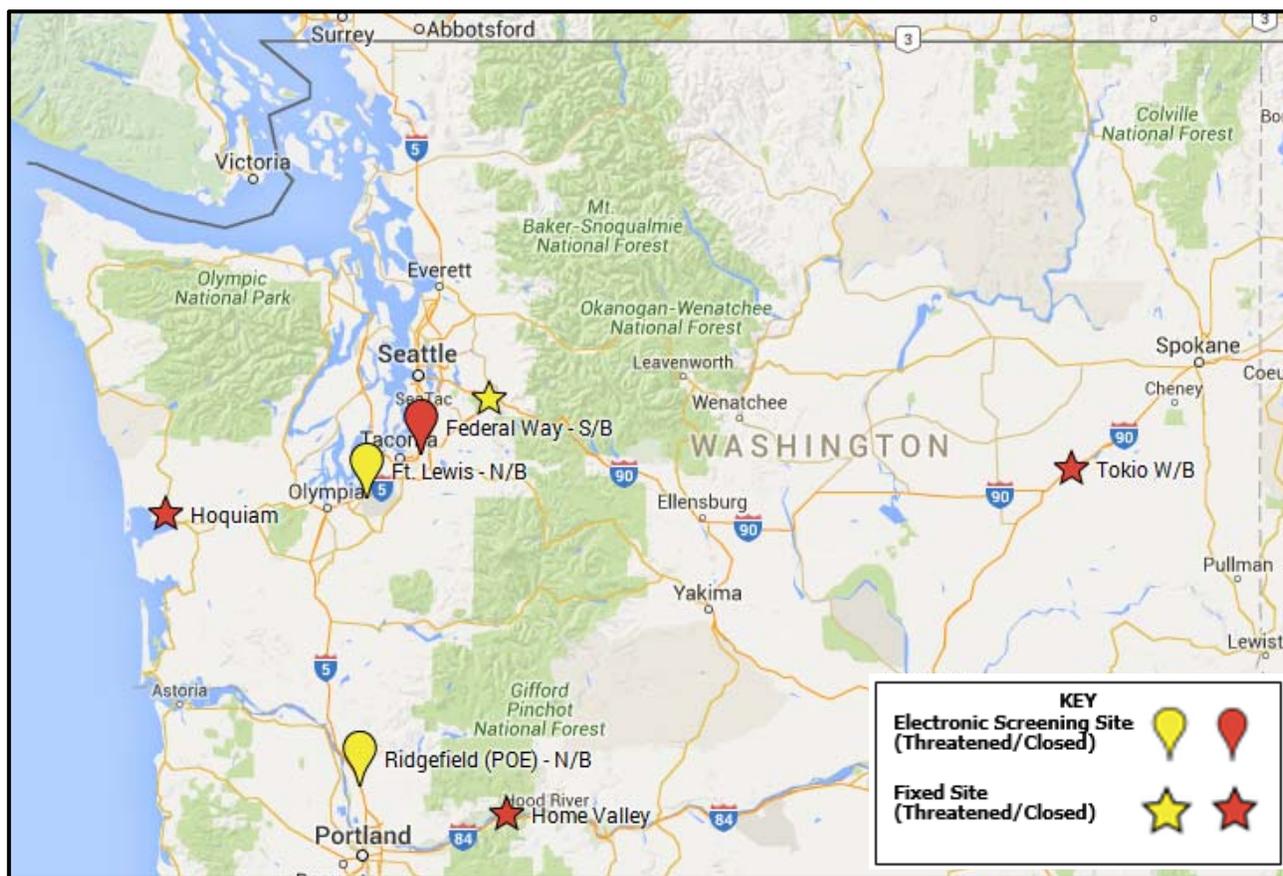
Table ES.3 Summary of Washington State Inspection System Findings and Recommendations

Finding	Recommendations
<p>Communication – The Washington State Department of Transportation (WSDOT) and Washington State Patrol (WSP) do not communicate well about inspection stations.</p>	<ul style="list-style-type: none"> • Formalize protocols for ownership and communication within and between agencies • Develop joint agency commercial vehicle-related outcomes and objectives • Revisit agencies roles and update documentation such as the Memorandum of Understanding (MOU) • Update the WSDOT Design Manual
<p>Asset Management – Inspection stations, regardless of size or technologies, should be managed like any other type of asset.</p>	<ul style="list-style-type: none"> • Create joint agency outcome-based performance measures • Apply an asset management framework to truck inspection stations • Maintain and publish a biennial needs list
<p>System Planning – The inspection station system is not adequately accounted for in WSDOT planning.</p>	<ul style="list-style-type: none"> • Develop a Joint Statewide Inspection Station System Plan
<p>Data – WSDOT and WSP have insufficient data or data-sharing arrangements to make strategic decisions regarding the inspection station system.</p>	<ul style="list-style-type: none"> • Develop a data sharing agreement between WSDOT and WSP • Collect and maintain shared data

Finding 1 – WSDOT and WSP do not communicate well about inspection stations

On a number of occasions documented through this study, it was found that a lack of effective communication between WSDOT and WSP has led to outcomes that negatively affect the ability of the State to enforce commercial vehicle regulations. For example, WSDOT has not engaged WSP effectively as part of roadway project developments that impact inspection stations, (see Figure ES.6), especially along the I-5 and I-90 corridors. Conversely, WSP does not identify enforcement needs associated with the weigh stations in a way that fits within the WSDOT project programming process, leading to inspection station capital projects not being included in the overall WSDOT capital planning process.

Figure ES.6 Closed or Potentially Threatened Inspection Stations



Source: WSDOT, WSP, Cambridge Systematics.

The following recommendations are designed to improve communication:

Recommendation 1 – Formalize protocols for ownership and communication within and between agencies

WSDOT and WSP need to formalize protocols for ownership and communication within and between agencies. An interagency working group should be developed, with leaders from each agency that would both provide strategic guidance on matters related to inspection stations, as

well as manage and oversee day-to-day activities related to inspection stations. Many of the working group's objectives could be implemented by existing staff, however additional staff may be needed to fulfill the responsibilities discussed below.

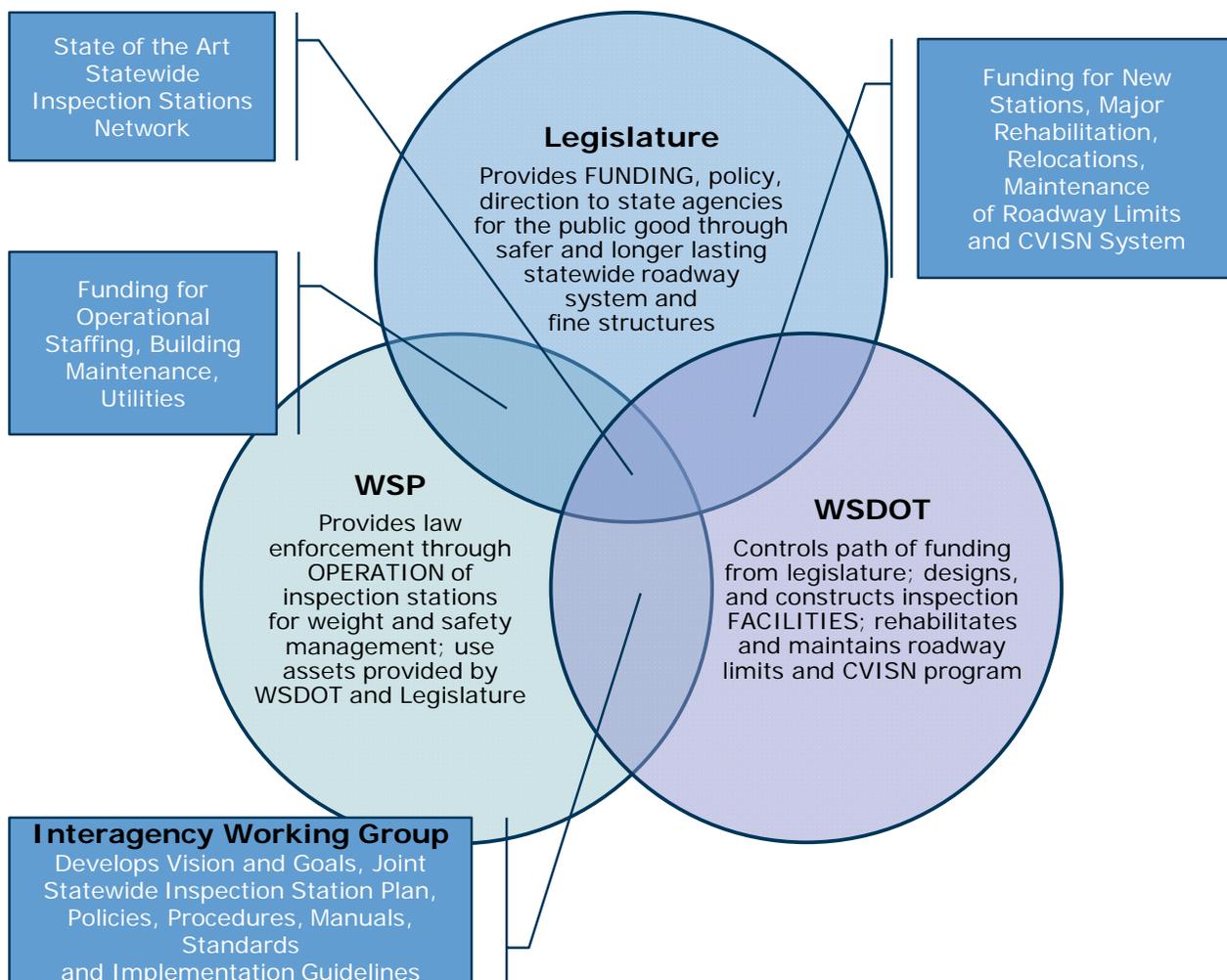
The responsibilities of the working group would encompass both ongoing activities related to inspection stations (e.g., maintenance of existing facilities) as well as new activities (e.g., joint strategic planning). Areas of emphasis would include:

- Managing and coordinating with staff in both agencies involved in data gathering related to truck enforcement (Recommendation 10);
- Designing and supervising data sharing activities between the two agencies (Recommendation 9);
- Supervising ongoing maintenance and enhancement of Washington's Commercial Vehicle Information Systems and Networks (CVISN) system (Recommendation 10);
- Owning the processes for upkeep of roadway elements and buildings within fixed sites (Recommendation 6);
- Assessing agency and industry reports of major long and short range changes to the transportation system and considering their impacts on truck enforcement (Recommendation 8);
- Integrating truck enforcement strategies into broader state government strategies for infrastructure preservation, goods movement effectiveness, and highway fatality reduction (Recommendations 6 and 8);
- Assessing statewide inspection station network infrastructure and staffing needs on a regular basis (Recommendation 8);
- Confirming and reporting outcomes of statewide inspection station network program to both agencies (Recommendations 1 and 7); and
- Working with industry to improve behavior and compliance on commercial vehicle regulations (Recommendations 2 and 5).

Executive leadership participation on strategic inspection station activities is also critical. The executives of both agencies should consider how to effectively provide strategic guidance to these truck enforcement leaders. Both WSDOT and WSP should strongly consider an organizational change that creates a central leadership staff position for Commercial Vehicle Enforcement which can provide leadership for and continuity to the enforcement program; essentially a division director within each agency. In WSDOT, the truck enforcement leader must be integrated into freight planning, transportation operations and technologies, major project design, performance management, capital investment analysis, determining funding priorities, and asset management decisions. In WSP, the truck enforcement leader must be integrated into information technology, patrol staff allocation, performance management, asset management, determining project funding priorities, and Federal reporting.

The Washington State Legislature may also play a role in developing a comprehensive approach to commercial vehicle enforcement, in particular directing WSDOT and WSP to take action on these recommendations, making funding decisions, and setting truck violation fines and fees. The current roles of the Legislature, WSP, and WSDOT are shown in Figure ES.7. In this scheme, the interagency working group would lead the coordination efforts between WSDOT and WSP in developing the recommendations identified below.

Figure ES.7 Washington State Inspection Station Agency Roles and Responsibilities



Source: Cambridge Systematics.

Recommendation 2 – Develop joint agency commercial vehicle-related outcomes and objectives

WSDOT and WSP will need to hold discussions to determine which outcomes are important to both agencies and to the State as a whole. “Outcomes” (as opposed to “outputs”) are what drive needs, performance and funding, and both WSP and WSDOT need to think in terms of outcome measures when discussing truck enforcement and inspection stations, both within and

between their agencies. Some of these outcomes and related measures will align with those currently tracked by WSDOT/WSP (especially in terms of safety); some will be different.

It is important that the outcomes and outcome measures related to truck enforcement and roadside inspections be developed *jointly*, and that the competing needs within or between each agency not trump those of the other during this process. Once these outcome objectives, e.g., reducing truck crashes, and related measures to track progress are developed, they should be articulated clearly by both agencies and used to determine the needs and steps required to set goals and make positive progress towards these outcomes. These jointly agreed upon outcomes will drive the development of performance measures and data which are described in Recommendations 5 and 10, and should also be used to determine the budget recommendations and project priorities to be presented to the Washington State Legislature. Initially a third party facilitator could help WSDOT and WSP guide discussions and processes toward a complimentary approach for both agencies.

Recommendation 3 – Revisit agencies roles and update documentation

The primary source for detailing agency responsibilities regarding inspection stations in Washington State is a Memorandum of Understanding (MOU), signed by WSDOT and WSP on April 1, 2011, that detailed each agency's responsibilities regarding the day-to-day operations and long-term funding and planning for the system of inspection stations. It was very limited in its scope and did not sufficiently anticipate long-term evolution of either truck enforcement strategies or the broader transportation network. The MOU must be revisited and revised to not only serve as a strategic and financial guide for both agencies, but also as a baseline for setting the State's vision for truck enforcement. It should also establish processes for review and evolution of the MOU (as well as other documentation related to inspection stations such as the Joint Operations Policy Statement) on a periodic basis, and processes for updates of underlying reference documents on a frequent basis.

The key objectives in this revision of the MOU must be:

- Defining the expected outcomes, relevant priorities, and specific performance measures which both agencies will agree on as constituting effective truck enforcement;
- Clarifying organizational structure and defining leadership roles for managing the truck enforcement program (as per the Finding 1);
- Thoroughly defining truck enforcement activities and each agency's role in supporting these activities;
- Identifying and standardizing the process for how truck enforcement leaders interact and influence other parts of both agencies as well as other entities such as the Washington Traffic Safety Commission; and
- Setting a framework for how the two truck enforcement leaders will report to executive leadership of both agencies and recommend future MOU updates.

It is important that the MOU explicitly outline how the truck enforcement leaders are expected to report progress, system performance, challenges, and strategy requests to the leadership of both agencies, as well as reporting to the Legislature.

Recommendation 4 – Update the WSDOT Design Manual

WSDOT's Design Manual,¹³ most recently updated in November 2015, details policies, procedures, and methods to develop and document the design of infrastructure for the transportation network in Washington State. The final section of the manual, Chapter 1720, deals with design and placement of new weigh stations. However, the Design Manual only discusses the need for new facilities. It does not address how existing facilities should be considered in the planning or design of other highway infrastructure projects. This gap and its implications for both agencies is illustrated by the closure of the Federal Way station due to safety concerns from a highway interchange project in 2010. More stations will be potentially threatened by upcoming infrastructure projects (see Figure ES.6), such as the widening of Interstate 5 at Joint Base Lewis McChord.

The Design Manual should also be updated to include a “check” for impacts on inspection stations or commercial vehicle operations during projects such as highway design, paving, or interchanges where these impacts are most likely to occur. As an example, the following types of questions could be included in a checklist or decision tree:

- Is the project within 1 mile of an inspection station or enforcement-related technology (e.g. a Weigh-in-Motion scale or electronic screening system)?
- Will the project require re-routing of commercial vehicles, or changes to weight or length restrictions?

If the answer to either of these questions is “yes” then the project manager would be required to contact Commercial Vehicle Staff in WSDOT and WSP (this function can be served by the interagency working group described in Recommendation 1). The purpose of this dialogue is to communicate clearly that the project may have potential impacts on the inspection station system or commercial vehicle enforcement. This does not mean that a project will be required to include mitigation measures or alleviate impacts, only that communication is established between the proper channels to ensure awareness of potential impacts. This inclusion of a “check” during the planning process will help avoid a breakdown in communication, such as occurred during the I-5, SR 18, SR 161 Triangle Project as documented in the Federal Way Case Study, above. A similar checklist could also be included early in the project identification process to ensure that the appropriate parties are aware of a new project and are able to contribute to the planning process.

¹³ Washington State DOT. *Design Manual M 22-01. 12*. November 2015. On-line at: <http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/M22-01.12Complete.pdf>.

Finding 2 – Inspection stations, regardless of size or technologies, should be managed like any other type of asset

There is no Asset Management Plan currently in place for the inspection station system. This leads to a number of issues, including not having a protocol for what to do when a station or technology reaches the end of its life. WSDOT and WSP do not currently track the performance of the system in the way that is necessary to make asset management decisions.

The following recommendations are related to asset management:

Recommendation 5 – Create joint agency outcome-based performance measures

Ideal performance measures would reflect how truck enforcement strategies affect carrier and driver behavior, and how changes in that behavior affect the goals of improving infrastructure preservation, highway safety, and freight mobility. To get to those long-term measures, however, WSP and WSDOT will need to develop some intermediate measures to gain a sense of how enforcement output translates into improved preservation, safety and freight mobility outcomes. The following initial performance measures will inform the Legislature while enabling both agencies to review their underlying data and process and consider approaches for innovating additional outcome-based measures.

- Exposure of truck traffic to truck enforcement strategies.
- Carrier and driver behavior at stations.
- Infrastructure degradation change.
- Truck-related fatality change.
- Truck-related, accident-related, road delay.
- Time spent per truck delayed due to enforcement, for trucks not found in violation.
- Cost of enforcement.

These performance measures may need to change in order to reflect the outcomes and objectives formalized in Recommendation 3.

Recommendation 6 – Apply an asset management framework to truck inspection stations

WSDOT is already very familiar with the use of asset management strategies and practices. WSDOT regularly assesses many statewide assets such as bridges and pavement. The pavement asset management program at WSDOT has recently been recognized as a national leader. The program is defined as, “A coordinated set of activities, all directed toward achieving the best value possible for the available public funds in providing and operating

smooth, safe, and economical pavements.”¹⁴ Slightly modified, this statement defines the reason for implementing an asset management program for the inspection system. The Washington State Patrol is less conversant in these strategies, yet WSP adoption of asset management strategies will enable the agency to better manage the system and interact with WSDOT to make capital decisions.

There are two core questions which an asset management strategy should address:

- Why should funds be made available to the truck inspection station network, as opposed to other WSP, WSDOT, or legislative priorities?
- When funds or other resources are available to maintain, improve, or expand the truck inspection station network, what investments should be made?

An asset management framework for the inspection station system would include developing and implementing a number of recommendations found throughout this document, including:

- A common language and understanding of the system goals and priorities between the agencies (Recommendation 1)
- A detailed accounting of the assets of the system (Recommendation 6)
- Measurements of how system assets are achieving statewide goals through *outcome-based* performance measures as opposed to the output-based measures found in the annual Statewide Enforcement Plan submitted to FHWA (Recommendations 3 and 5),
- Investment needs (Recommendation 7) and priorities for a planning horizon consistent with other legislative transportation funding planning horizons (Recommendation 8), and
- A feedback loop (data) to allow for refinement based on execution of the above (Recommendation 10).

Examples of Questions to Consider in an Asset Management Strategy

Question 1 – When should stations be built? What type of station should be built? What criteria should be used to make these decisions?

Data and performance measures should be used to determine *where* new inspection stations should be located throughout the State. *Safety* and *infrastructure preservation* should be the main criteria, but others can be considered as well, such as the need for data collection. The primary consideration in type of station to be built should be the tradeoffs between safety, infrastructure preservation, and freight mobility. Depending on the needs in a particular location, one or another aspects of the station could be emphasized. Characteristics of the surrounding area, cost, and available staffing should also impact what type of station is built. In rural areas with a low volume of traffic, a station with a lot of infrastructure may not be

¹⁴ <http://www.wsdot.wa.gov/Business/MaterialsLab/Pavements/PavementManagement.htm>.

necessary, and a simple setup with static scales and an inspection area may suffice. In urban areas and on heavily used corridors, traffic management becomes a primary concern and the station should be designed to balance traffic flow with safety and weight inspection activities.

Question 2 – Once a station is built (or conceptualized), how will the agencies ensure the station is kept both functional and in good condition? What criteria determine functionality and condition? Who is responsible for each of these criteria?

Once a station is built, WSDOT and WSP have joint responsibility to keep the station in good working order. The criteria for determining whether a station is in good working order, both functionally and conditionally, will depend on the station type. For example, a CVISN-equipped station would be considered nonfunctional if its electronic screening equipment was not working, whereas a roadside pull-off does not have this technology and so it does not need to be considered.

Table ES.4 shows some example questions to determine functional or conditional deficiency at a fixed site equipped with electronic screening. WSP and WSDOT should jointly explore and expand these questions as part of the asset management process. In general, functional deficiency is caused by a lack of or nonfunctioning technology, inadequate physical layout, or life expectancy of the station infrastructure. Conditional deficiency is caused by the need for maintenance and upkeep, and other operational issues such as staffing and utilities.

Table ES.4 Example Questions to Determine Site Condition and Functionality
Washington State Inspection System

Determining Functional Deficiency	Determining Conditional Deficiency
Is the site design, ramp length, and inspection areas sufficient to process truck volumes?	What year was the administration building constructed? Is it in good physical condition?
Is the infrastructure and hardware at the right level for the station type? E.g., are the scales installed and functional? Is the electronic screening equipment installed and functional?	What year were any ancillary buildings (inspection buildings) constructed or undergo substantive maintenance work? Are they in good physical condition?
Is the technology (software, fiber optics, e-screening) sufficient to process truck volumes and in good working condition?	Are the utilities (heat, electricity, water, plumbing) sufficient and in good condition?
Is the available technology within its life expectancy and performing according to design?	Is the building properly set up for optimal work flow (Computers facing the scale, signage controls easy to reach and operational?)
Is the physical infrastructure of the station (e.g., buildings) within its life expectancy?	Is there adequate staffing to operate the site?

Using Fort Lewis as an example, the site is located on a high-volume roadway and uses electronic screening and advanced technology. However, some aspects of the technology do not perform according to design, and the ramp length leading to the site is too short for the

volume of trucks on the roadway. These aspects are functional deficiencies of the station. The administration building at Fort Lewis is in generally good condition, but has a conditional deficiency due to the fact that the station is generally staffed by a single officer, which is not sufficient given the traffic volumes at the site.

Example Applied Asset Management Matrix Framework

These two aspects – functionality and condition – can be shown on a matrix framework, illustrated by Figure ES.8. The intention of this framework is to visually identify the type of need at individual stations, and can also be used to see the system needs as a whole. Sites that fully meet the functional requirements for that location are at the top of the matrix, while sites that are unable to perform efficiently due to poor site design, insufficient technology, or other lack of infrastructure would fall to the bottom of the matrix. Similarly, sites that are maintained in good condition and operated efficiently will appear on the right of the matrix, while sites in poor condition or operated inefficiently will be at the left. For example, a site that can process current traffic volumes and has sufficient technology but has a dilapidated building and is only open one day a week due to insufficient staffing would appear in Quadrant 2. Fort Lewis, referenced above, would appear near the middle of Quadrant 4.

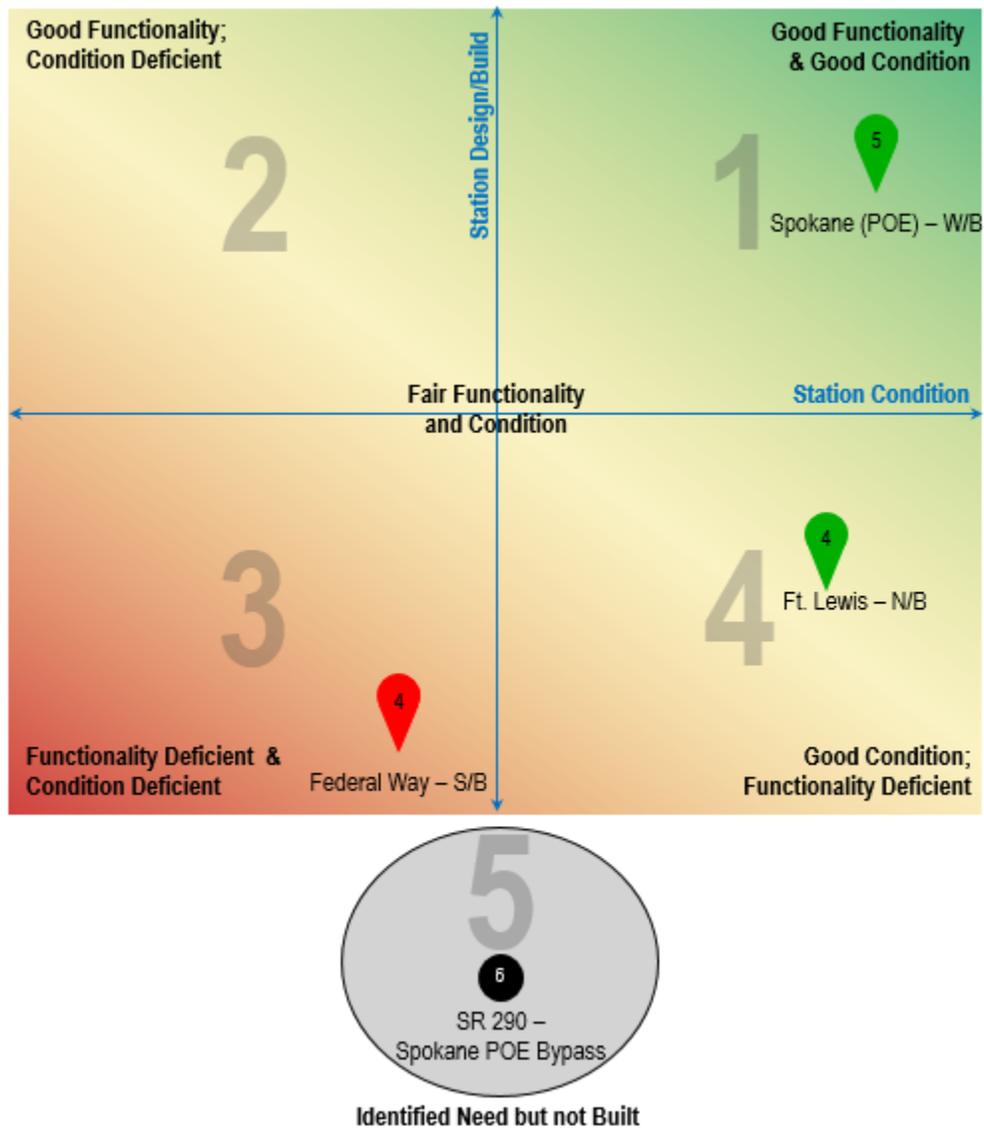
A fifth “quadrant” appears below the matrix indicating locations where there is an identified need for a site but a facility has not been built (SR 290 Spokane POE Bypass). Because there is no site, the functionality does not exist and the site condition is neutral. Including identified needs in the matrix helps to frame a discussion of the tradeoffs associated with investments in the system.

Two other sites are included in Figure ES.8 for illustrative purposes. WSDOT and WSP should replicate this analysis for all sites as part of an initial task to implement an asset management program. The color and shape of each symbol matches the condition (open or closed) and classification.

Examples:

- Federal Way is both functionally and conditionally deficient. The site is currently not operable due to safety concerns that arose during the construction of the I-5/SR 18/SR 161 Triangle Interchange Project. There are safety and operational concerns due to the proximity of the site entrance ramp (where trucks need to slow down to enter the facility) and the on-ramp to Interstate 5 (where vehicles need to speed up to merge with traffic), as well as the location of the WIM.
- The Spokane Port of Entry is new and the technology and infrastructure are in good working order. The site includes mainline WIM technology, dual scales, extended truck parking, a return loop for reweighings, and an inspection building for conducting safety inspections. The functionality rating is below the maximum due to the location of the site; although it is on one of the highest volume routes in the State (Interstate 90), there is a convenient bypass route available. This has led to the need to consider a virtual inspection station on SR 290 to detect trucks bypassing Spokane.

Figure ES.8 Asset Management Matrix



Source: WSDOT, WSP, Cambridge Systematics.

Recommendation 7 – Maintain and publish a biennial needs list

The framework discussed above can be used to develop a set of inspection station needs (which will also feed into the System Plan in Recommendation 8) and to prioritize which investments need to be made. We recommend that this list be updated biennially as part of the budget process, and done so jointly by both agencies, and made publically available on a web site.

In order for this approach to be effective, the responsible parties (WSP and WSDOT) need to “buy in” to the process and agree on a number of criteria for making joint decisions, including:

- Agree on definitions of functional and conditional deficiency. The concepts identified in the above table and matrix are examples; the two agencies must agree on definitions that fit their particular vision and goals for the system. These definitions need to incorporate the life expectancy of a site – for example, at some point in time, deficiencies at a station may switch from being a maintenance concern (condition) to an operational concern (functionality), leading to a shift in responsibility between the agencies.¹⁵
- Determine basic cost assumptions for moving sites between quadrants on the matrix.¹⁶
- Develop criteria for deciding when a station should be decommissioned. Determine what happens when this occurs. Does the site return to quadrant 5 (identified need but not built)?
- Agree on a process and metrics to identify the need for building a new station or changing the station type of an existing station. This also includes determining what station type is needed. A new station can be placed in the matrix in Quadrant 5.

Quadrant 5 is critical to this process. Identifying new needs increases the exposure of the industry to truck enforcement strategies, directly impacting the performance measures identified in Recommendation 5. The needs list should be developed at a level of detail that is manageable for both agencies, considers both short- and long-term needs, aligns with existing WSDOT, WSP, and the Legislative capital planning processes, and allows for prioritization of projects based on funding availability and state priorities.

¹⁵ A similar type of example is a highway interchange. At some point as traffic volumes increase, the design of the interchange is no longer adequate, regardless of the condition of the infrastructure.

¹⁶ For example, the latest State Enforcement Plan (2016) estimates that the cost of replacing the administrative/scale building (improving both condition and functionality) at Plymouth POE and building a new inspection building (improving functionality) is \$11.3 million. Installing modern scale pads (increased functionality and condition) costs approximately \$175,000 per scale.

Finding 3 – The inspection station system is not adequately accounted for in WSDOT planning

WSDOT produces a number of long-range plans that guide the development of the State's transportation modes and assets. This type of document is missing for the inspection system. There is no long-term vision, goals, or principles for the inspection station system. Stations are built or replaced on ad hoc basis, based on short-term or locally identified needs. Future system needs and use are not considered; instead planning is focused on building and rebuilding a system that is more than 50 years old.

The following recommendations are related to planning needs:

Recommendation 8 – Develop a joint statewide inspection station system plan

Along the lines of other planning documents developed by WSDOT for its other modal systems (e.g., Ferry, Aviation, Freight), this planning document would:

- Contain a vision and goals for the inspection station system;
- Identify system assets;
- Create or include performance measures; and
- Facilitate future scenario planning.

A plan for the Inspection Station System could be developed as a stand-alone plan, or it could be incorporated into existing planning efforts, such as the Freight Mobility Plan.¹⁷ The "Minnesota Statewide Commercial Vehicle Weight Compliance Strategic Program," developed by Minnesota DOT and Minnesota State Police in 2005,¹⁸ is an example of an effective, jointly developed stand-alone plan. WSDOT and WSP should be co-authors of this plan, as the plan will guide the actions of both agencies. It may be that a third party will be necessary to guide the development of the plan and ensure that each agency's needs and goals are being accounted for. Local enforcement agencies can also play a key role in providing data, identifying needs, and understanding local and long term development. Private sector involvement, especially of truckers, is also critical. For example, stakeholders may be able to identify locations in the system that unfairly target certain types of industries, creating an uneven playing field in the trucking industry.

There is also a need for the Plan to be a "living document" that is updated at a regular intervals. This requirement will foster communication between the agencies and help mitigate the impact of institutional turnover. It will also ensure that the agencies are considering new developments in the commercial vehicle enforcement field that could change how the inspection system is designed and operated. The System Plan needs to conceptualize how the commercial vehicle industry will operate 20 years in the future and determine how best to

¹⁷ On-line at: <http://www.wsdot.wa.gov/freight/freightmobilityplan.htm>.

¹⁸ On-line at: http://www.dot.state.mn.us/ofrw/PDF/cvePlan051004_1.pdf.

achieve system goals under that scenario. Planning for a system to handle current conditions will leave Washington State with an inspection system that is unable to meet future challenges. Understanding future needs will inform the asset management program by driving the inclusion of new inspection sites in Quadrant 5 of the asset management matrix.

Finding 4 – WSDOT and WSP have insufficient data or data-sharing arrangements to make strategic decisions regarding the inspection station system

Data has been compartmentalized and is not shared on a regular basis within or between WSP and WSDOT agencies. In a number of cases, data provided by the agencies during the course of this study was inaccurate or out of date. For example, records of station closures were not included in documentation provided. Station IDs and naming conventions were not reliable between agencies – for example the “Federal Way” station is listed as “SeaTac” in some documents. Furthermore, each agency currently only collects or uses partial data relating to the inspection station system, e.g., WSDOT collects truck volumes, but does not have a record of station locations.

The following recommendations are designed to improve inspection station data:

Recommendation 9 – Develop a data sharing agreement between WSDOT and WSP

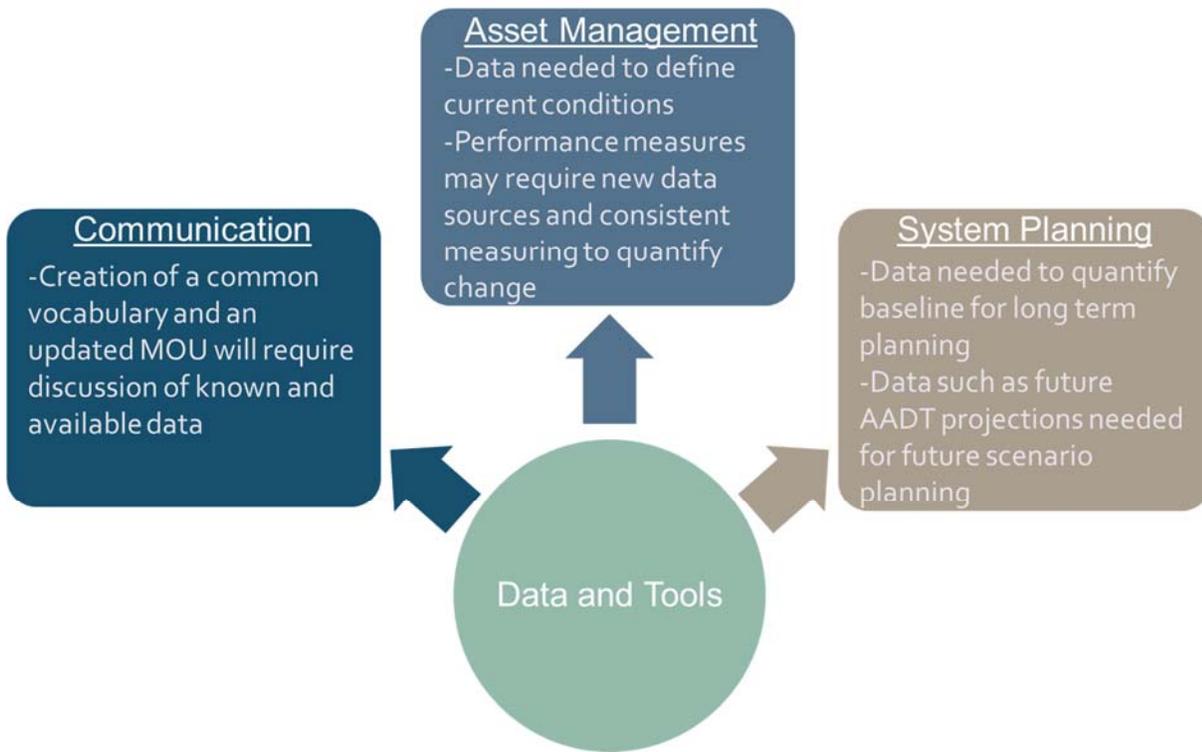
A new approach to collecting and utilizing data is an essential element to implementing each of the previous recommendations in Findings 1 through 3. As part of formalized communication procedures between WSDOT and WSP, a data sharing agreement should be developed. The agreement should address data collection, sharing, and distribution procedures. The interagency working group discussed in Recommendation 1 should be charged with designing and supervising data sharing activities. A summary of data needs and uses relating to the recommendations in this study are summarized in Figure ES.9.

Recommendation 10 – Collect and maintain shared data

Data from a number of sources is required to develop outcome-based performance measures, make capital programming decisions, and implement many of the recommendations described in previous sections. The data should be maintained in a single location, in a format that is easily understandable and updatable. As part of this project, an electronic map was developed that contains data from a number of sources. This map and the underlying data should be maintained by the interagency working group, and available for decision-makers in WSDOT, WSP, the Legislature, and other interested parties.

Finally, the ability to share data between inspection sites and with neighboring states is a key consideration for the future. As data sharing arrangements are formalized between WSP and WSDOT, data collection, storage, and dissemination techniques utilized by neighboring states should be examined to determine if there is a potential for future integration with Washington’s system.

Figure ES.9 Data Required to Implement Recommendations



Moving Forward

To implement the findings and recommendations of this study, a four-stage approach should be taken as summarized in Table ES.5. Each implementation step may address one or more of the above recommendations.

Through implementation with the above schedule, we anticipate the following positive outcomes for the State of Washington by the end of the 12 month period:

- Consensus between agencies as to the vision and objectives of investing in truck inspection stations;
- An accurate estimate of project backlog and long-term funding needs;
- A definition of current performance of the truck inspection system, and expected performance based on anticipated future funding;
- Initial integration of truck inspection station considerations into WSDOT project selection and design; and
- Guidance for WSP to make investment decisions between truck inspection stations and other agency initiatives.

With these outcomes in place, both WSP and WSDOT can then move forward more effectively on the longer term goals of leveraging truck inspection stations to reduce infrastructure damage, reduce truck-related fatalities, and improve freight mobility for the citizens of Washington.

Table ES.5 Recommended Implementation Approach for Washington State Inspection System Recommendations

Stage	Implementation Steps	Recommendation Addressed	Timeline
1	<ul style="list-style-type: none"> Agencies identify truck enforcement leaders (if in house) or outline approach for acquisition. Agencies form a working group to revise documentation such as the MOU. WSDOT to formulate a plan to inform WSP on WSDOT asset management practices for other assets. Identify all WSDOT projects under construction with potential impacts to truck enforcement sites. 	<ul style="list-style-type: none"> Recommendation 1 Recommendation 3 Recommendations 1 and 6 Recommendations 1, 8, and 10 	3 months
2	<ul style="list-style-type: none"> Draft revision of the MOU presented to the Legislature, with outstanding issues to be resolved. Recommendation for how the Joint Statewide Inspection Station Plan should be either incorporated into existing agency documents or developed as a standalone plan. Agency update of the electronic map developed earlier in this project. Initial estimate of current industry exposure to truck inspection stations. Draft needs inventory of new sites (Quadrant 5). Assessment checklist for Quadrants 1-4. Combined data definition for current inventory. Develop a schedule for updating the WSDOT Design Manual once the MOU is finalized, plus develop appropriate intermediate guidance to designers for the interim period. 	<ul style="list-style-type: none"> Recommendation 3 Recommendation 8 Recommendation 10 Recommendation 10 Recommendation 6 Recommendation 6 Recommendation 10 Recommendation 4 	6 months
	<ul style="list-style-type: none"> Report to the 2017 Legislature on Stages 1 and 2 deliverables. 		December 2016

Stage	Implementation Steps	Recommendation Addressed	Timeline
3	<ul style="list-style-type: none"> • Final MOU executed, and process for its annual review. • Completed System Inventory Plan, including: <ul style="list-style-type: none"> – Initial presentation of all performance measures and current values; – Asset management assessment of all current and needed sites; – Data management implementation, including memorandum on any internal initiatives needed; and – Revised schedule for open items (Design Manual changes, information technology/data initiatives, etc.). 	<ul style="list-style-type: none"> • Recommendation 3 • Recommendations 2, 5, 8, and 9 	12 months, then ongoing upkeep
	<ul style="list-style-type: none"> • Report to 2018 Legislature on Stage 3 deliverables. 		December 2017
4	<ul style="list-style-type: none"> • Priority list of investments for consideration in the 2018 budget process for the 2019-2021 biennium. • Proposals for funding which reflects an analysis of: <ul style="list-style-type: none"> – Current costs of the system (both agencies, operating and capital); and – Current revenues and avoided costs generated by the system. 	<ul style="list-style-type: none"> • Recommendation 7 • Recommendations 8 and 10 	August/September 2018