IDAHO TRANSPORTATION DEPARTMENT

RESEARCH REPORT

RP 248

State of Idaho Port of Entry Study

By

Brandon Rivenburg

Brian Stewart

Aldo Rivadeneyra

Nicholas Vlahos

Mark Jensen

Cambridge Systematics, Inc.

Barry Mason

BGM Consulting LLC.

Prepared for

Idaho Transportation Department

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16. Abstract

The purpose of this study was to evaluate Idaho's Ports of Entry (POE) Program to identify its strengths and weaknesses, and provide recommendations for future program development and operations. As part of the study, current Idaho POE business processes were reviewed and compared to industry best practices. In addition, input was gathered from program stakeholders to assess satisfaction with POE services and to better understand customer needs. New and emerging technologies relevant to the POE function were also examined and costs and benefits of these technologies were compared to those of existing technology used by ITD for POE operations. Researchers developed a multi-tiered Concept of Operations for Idaho's POE System to assist management in future program planning. In order to provide flexibility, account for the existing fixed facilities and rover sites, and take into consideration available financial and personnel resources, three tiers were developed for fixed facilities and two tiers were developed for rover sites. For each tier, researchers identified the operations, infrastructure, and technology necessary to fully realize the Concept of Operations as well as providing estimated development costs.

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METRIC (SI*) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS					APPROXIMATE CONVERSIONS FROM SI UNITS				
Symbol	When You Know	Multiply By	To Find	Symbol	Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH					LENGTH		
in	inches	25.4		mm	mm	millimeters	0.039	inches	in
ft	feet	0.3048		m	m	meters	3.28	feet	ft
yd	yards	0.914		m	m	meters	1.09	yards	yd
mi	Miles (statute)	1.61		km	km	kilometers	0.621	Miles (statute)	mi
		AREA					AREA		
in^2	square inches	645.2	millimeters squared	cm^2	mm^2	millimeters squared	0.0016	square inches	in^2
ft^2	square feet	0.0929	meters squared	m^2	m^2	meters squared	10.764	square feet	ft^2
yd^2	square yards	0.836	meters squared	m^2	km^2	kilometers squared	0.39	square miles	mi^2
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ac	acres	0.4046	hectares	ha					
		MASS (weight)					MASS (weight)		
oz	Ounces (avdp)	28.35	grams	g	g	grams	0.0353	Ounces (avdp)	oz
lb	Pounds (avdp)	0.454	kilograms	kg	kg	kilograms	2.205	Pounds (avdp)	lb
T	Short tons (2000 lb)	0.907	megagrams	mg	mg	megagrams (1000 kg)	1.103	short tons	T
		VOLUME					VOLUME		
fl oz	fluid ounces (U.S.)	29.57	milliliters	mL	mL	milliliters	0.034	fluid ounces (U.S.)	fl oz
gal	Gallons (liq)	3.785	liters	liters	liters	liters	0.264	Gallons (liq)	gal
ft^3	cubic feet	0.0283	meters cubed	m^3	m^3	meters cubed	35.315	cubic feet	ft^3
yd^3	cubic yards	0.765	meters cubed	m^3	m^3	meters cubed	1.308	cubic yards	yd^3
Note: Volumes greater than 1000 L shall be shown in m^3									
		TEMPERATURE (exact)					TEMPERATURE (exact)		
^{o}F	Fahrenheit temperature	5/9 (^{o}F-32)	Celsius temperature	^{o}C	^{o}C	Celsius temperature	9/5 ^{o}C+32	Fahrenheit temperature	^{o}F
		ILLUMINATION					ILLUMINATION		
fc	Foot-candles	10.76	lux	lx	lx	lux	0.0929	foot-candles	fc
fl	foot-lamberts	3.426	candela/m^2	cd/cm^2	cd/cm^2	candela/m^2	0.2919	foot-lamberts	fl
		FORCE and PRESSURE or STRESS					FORCE and PRESSURE or STRESS		
lbf	pound-force	4.45	newtons	N	N	newtons	0.225	pound-force	lbf
psi	pound-force per square inch	6.89	kilopascals	kPa	kPa	kilopascals	0.145	pound-force per square inch	psi

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List of Acronyms

AADT—Annual Average Daily Trips

API—Application Program Interfaces

ASTM—American Society for Testing Materials

AVI—Automatic Vehicle Identification

CAADT—Commercial Annual Average Daily Trips

CFR—Code of Federal Regulations

CV—Connected Vehicle

CVEO—Commercial Vehicle Enforcement Officers

CVISN—Commercial Vehicle Information Systems and Networks

CVSA—Commercial Vehicle Safety Enforcement

ConOps—Concept of Operations

DMV—Department of Motor Vehicles

DOT—Department of Transportation

DSRC—Dedicated Short-Range Communications

FAST—Fixing America's Surface Transportation

FDOT—Florida Department of Transportation

FFY—Federal Fiscal Year

FHP—Florida Highway Patrol

FHWA—Federal Highway Administration

FTE—Full-time Equivalent

GPS—Global Positioning System

ILETS—Idaho Law Enforcement Telecommunications System

ISP—Idaho State Police

ISS—Inspection Selection System

ITD—Idaho Transportation Department

ITIP—Idaho Transportation Investment Program

ITS—Intelligent Transportation System

LPR—License Plate Recognition

MCSAP—Motor Carrier Safety Assistance Program

MCTD—Motor Carrier Transportation Division

MDOT—Montana Department of Transportation

MOU—Memorandum of Understanding

NDOT—Nevada Department of Transportation

NHP—Nevada Highway Patrol

OSOW—Oversize and Overweight

POE—Port of Entry

RCWS—Remotely Controlled Weigh Stations

ROW—Right-of-way

SH—State Highway

SR—State Route

STAA—Surface Transportation Assistance Act

TRS—Technical Record Specialists

UTC—University Transportation Center

VIS—Vehicle Information Systems

VMS—Variable Message Sign

VWIM—Virtual Weigh in Motion

VWS—Virtual Weight Stations

WIM—Weigh in Motion

WSDOT—Washington State Department of Transportation

WSP—Washington State Patrol

Executive Summary

Study Purpose

In 2014, more than 3 million trucks entered Port of Entry (POE) sites in Idaho. Of these commercial vehicles, about 2.4 million trucks were weighed, 8,200 citations were written (for weight and safety violations), and 55,000 credentials and 28,000 permits were issued. The mission of the Idaho Transportation Department (ITD) POE system is to ensure that all commercial vehicles entering the state are safe and legal, while providing efficient, fair, and professional service to POE customers and Idaho citizens. The Federal Highway Administration (FHWA) forecasts that the number of trucks on the road will increase significantly in the coming decades. In 2012, trucks carried approximately 124 million tons of goods with origins or destinations in Idaho. By 2040, that amount is projected to rise to more than 217 million tons.[1] The expected increase in truck traffic to carry the additional tonnage will make the ITD POE mission even more critical in the years to come.

ITD has established three performance objectives for the department as identified in "Idaho on the Move," the Long-Range Transportation Plan for ITD. These objectives are: 1) Enhanced Safety, 2) Increased Mobility, and 3) Economic Vitality. The state's POE system sits at the nexus of these three objectives as shown in Figure 1 below. POEs ensure the safety of both the commercial vehicle operators and the public by conducting weight and safety inspections on commercial vehicles. POEs improve mobility in the state by protecting infrastructure from damage caused by illegally operating commercial vehicles, and POEs enhance economic vitality by protecting the flow of goods throughout the state, and ensuring a level playing field for business. When operating efficiently, POEs help ensure these objectives are met with minimal impact on the ability of trucks to carry out commerce in and through the state.

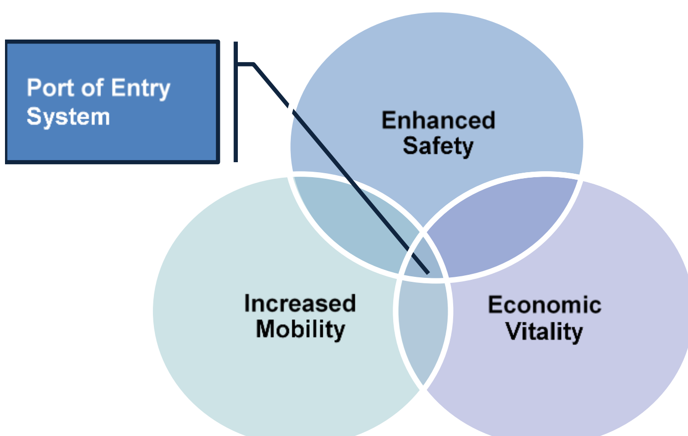


Figure 1. Port of Entry System Role in Achieving ITD Performance Objectives

[1] FHWA Freight Analysis Framework (FAF) v3.

With the forecasted growth in truck tonnage carried and associated rise in truck trips in and through Idaho expected to outpace the growth in available resources, it will be necessary for ITD to maximize their resources and make strategic investments that increase the efficiency of enforcement operations at fixed POE facilities and throughout the state, this will allow ITD to continue to achieve its POE objectives in the coming decades.

Current Conditions

The Idaho POE network consists of:

- Seventeen separate POE facilities with 22 permanent static scales.
- Approximately 200 rover sites.
- Three virtual weigh-in-motion (VWIM) sites.[2]

VWIM sites do not have fixed pull-off areas; instead each truck that needs to be examined further is escorted to a predefined temporary location where enforcement activities can be conducted when equipped staff is located in the vicinity.

As of July 2015, ITD employed 93 personnel to support the operation of the statewide POE system, including fixed facility and rover site personnel, administrative/permitting staff, and technical support. POEs are staffed by inspectors with limited inspector authority employed by ITD. These inspectors are not official law enforcement officers like their counterpart Idaho State Police (ISP) and they have a lesser level of authority than ISP. ITD officers can conduct weight and limited safety inspections and can issue warnings, citations, or contact/park for repair forms for violations found during these checks. However, more detailed inspection activity such as a Level I or Level II Commercial Vehicle Safety Enforcement (CVSA) inspection[3] can only be performed by ISP personnel.

In addition to the 93 ITD POE staff referenced above, East Boise, Inkom, Sage Junction, and Lewiston also utilize Technical Record Specialists (TRS) who conduct many of the administrative tasks associated with POE operations such as searching for information in the computer system, issuing registrations and permits, and other non-inspection-related tasks. This allows the POE ITD staff at those facilities to focus on the vehicles and drivers.

Figure 2 shows all of the POE facilities and rover sites operated by ITD. The map makes a distinction between the 12 primary and 5 satellite POEs. Satellite locations are fixed POE facilities but they are staffed and open less frequently than the primary fixed POE facilities. The map also shows the Haugan POE located on Interstate 90 in Montana, 16 miles east of the Idaho border. The facility is jointly operated by ITD and the Montana Department of Transportation (DOT), and processes traffic moving both eastbound (acting as a POE for Montana) and westbound (acting as a POE for Idaho).

[2] Note that for this study, locations with scale facilities on both sides of a divided highway at the same mile marker (such as Cotterel POE) were counted as a single Port of Entry.

[3] As defined at: http://www.cvsa.org/programs/nas_levels.php.

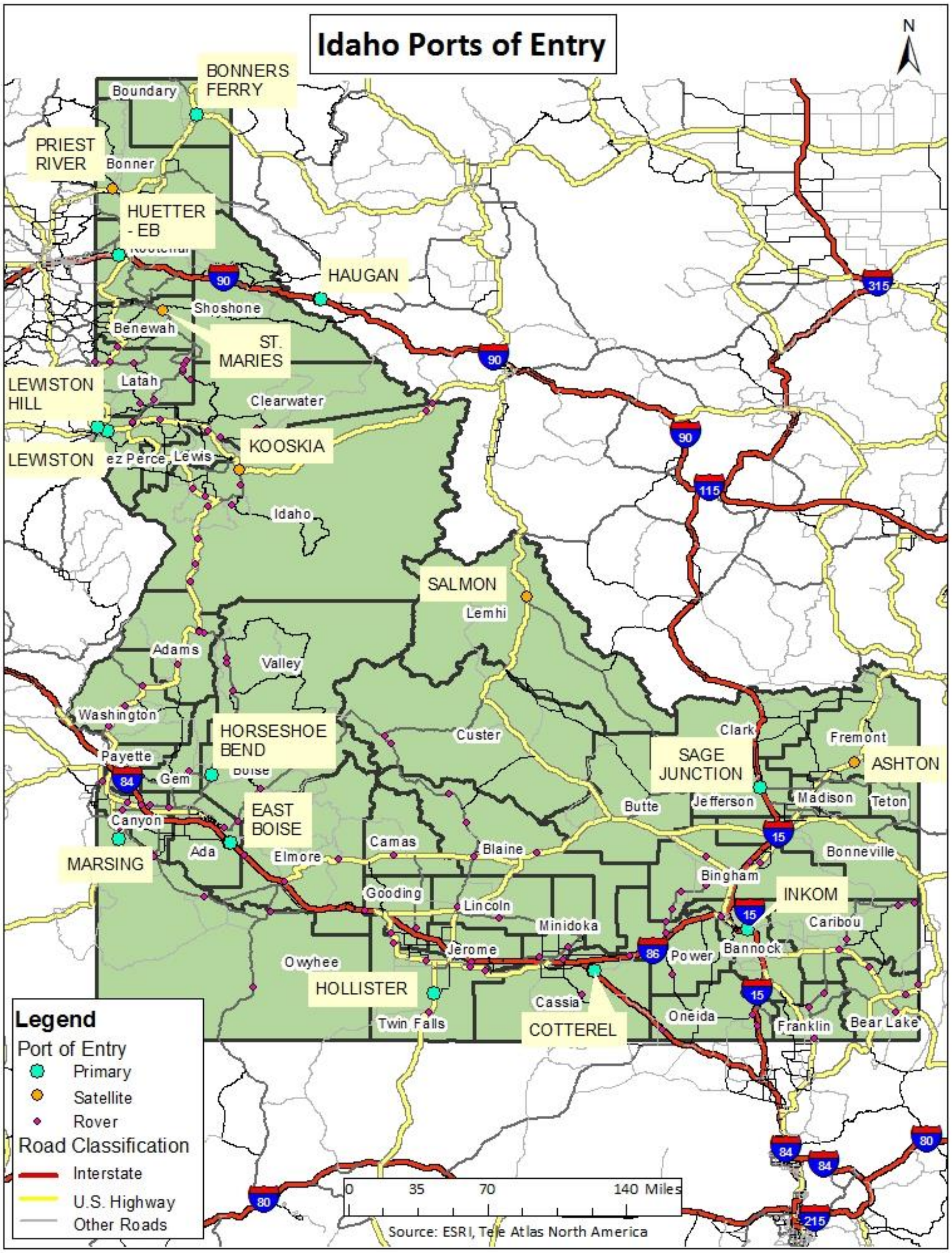


Figure 2. Map of Idaho Port of Entry Facilities and Rover Sites Network
Source: ITD, Cambridge Systematics, Inc.

Needs and Issues

According to ITD staff and our initial observations, nearly all of ITD's POE facilities are located well within the context of inter and intrastate traffic flows. There are two potential gaps. The first occurs on Interstate 86/84 (I-86/I-84) between Interstate 15 (I-15) near Pocatello and the East Boise POE. Cotterel POE, located in Cassia County, currently operates a scale and complex on both the northbound (NB) and southbound (SB) sides of Interstate 84 (I-84) which interchanges with I-84/I-86 in this gap, but the facility does not interdict traffic traveling east/west on Interstate 86 (I-86).[4] Relocating Cotterel to a location on Interstate 84 west of the interchange would allow ITD to monitor trucks traveling across the state, as opposed to only those exiting and entering the state on I-84. Moving the Cotterel site to Declo would address this concern. The second is a 57-mile gap on I-84 between the Oregon border and East Boise POE. Trucks entering Idaho on this route do not encounter a POE until passing through the Boise region—the largest population center in the state. There is also easy access to U.S. 95 for trucks going north by using U.S. 30 to exit I-84 before leaving Oregon with no POE until Lewiston. Although no new permanent POE is planned, this stretch of I-84 and the interchange of U.S. 30 and U.S. 95 should be targets for increased data collection and potentially mobile enforcement.

The POE system in Idaho operates effectively from an hours of operation standpoint as most facilities are open during peak travel times. With the exception of Lewiston Hill, Horseshoe Bend, and Marsing which operate approximately 10 hours a day, the remaining primary POE facilities operate approximately 20 hours a day, with Haugan open 24 hours a day.[5] The number of operating days a week varies considerably, from 3 days a week at Hollister and Bonners Ferry to 7 days a week at multiple locations.

Operational efficiency can be improved with the use of technology and infrastructure enhancements such as:

- **Administrative Buildings**: Structures that house the computer systems used to run the facility, provide space to conduct paperwork, and give enforcement personnel some degree of protection from the elements.
- **Weigh-in-Motion (WIM)/Automatic Vehicle Identification (AVI) Systems**: A type of electronic screening, WIM systems weigh vehicles as they pass over a scale at highway speed. This WIM data is used to determine if a truck is above or close to the tire, axle, or gross weight limit.[6] If so, the truck is signaled to pull into the POE for a weighing on a static scale.[7] If the truck is below the threshold it is signaled to bypass the site. AVI systems identify a truck as it passes a reading

[4] Interstate 86 starts at the interchange with Interstate 84 and runs east to an interchange with Interstate 15 in Pocatello.
[5] Hours of Operation were not available for Priest River, St. Maries, and Ashton.
[6] The tolerance level used to determine if a truck must report for a physical weighing can vary.
[7] Current technology is not accurate enough not allow for a citation to be issued using only the weight obtained from WIM. WIM is used only as a screening tool in the U.S. A certain percentage of trucks with transponders (typically around 5 percent) are also signaled to pull in for random checks even if they pass the weight and safety screening.

device and automatically queries the relevant safety and registration databases to confirm the truck is operating legally. WIM and AVI are often paired together.

- **Reweigh Loop**: This feature allows a truck that has passed the static scale and needs to adjust the load to return to the static scale without leaving the facility.
- **Truck Parking**: Truck parking provides a place for drivers to safely leave their vehicle to present credentials or other paperwork to enforcement personnel inside an administrative building and reduces confusion at the site by allocating space for trucks to park out of the flow of traffic. The most advanced version includes a hazardous material pit which provides trucks carrying hazardous material a safe place to park where any spills are contained within the parking space.
- **Internal Bypass-Lane**: This feature allows a truck on the entrance ramp to a site to bypass the static scale. If a queue forms, trucks that are obviously not overweight or have no visible safety defects could be directed to bypass the static scale even if they have already entered the facility.
- **Inspection Garage**: Covered facilities that provide a safe place for ISP or ITD personnel to conduct checks of commercial vehicles. The most advanced and effective include a pit which allows inspectors easy access to the underside of a truck, saving time.
- **Wireless Internet (Wi-Fi)**: Wireless Internet for public use at a site would allow drivers to use their personal devices to apply for permits or other credentials from their commercial vehicle. No Idaho site currently has this technology.

Most POE facilities in Idaho lack these options. Only East Boise, Lewiston, Huetter, and Haugan currently utilize WIM. The only inspection garage in the POE system is located on the eastbound side of East Boise POE. Only 7 of the 17 facilities have reweigh loops and/or internal bypass lanes and the availability of sufficient truck parking is highly variable between these facilities.

The limited availability of technology and the largely manual component of many of the business practices conducted at the Ports of Entry creates delays for commercial vehicles. For example, waiting in line to enter facilities was cited by survey respondents as the most time consuming part of the inspection process. Fixed facilities without WIM must process every vehicle that passes the location, leading to a long queue of vehicles, some of which could bypass the facility if WIM was installed. In addition, a typical Level III paperwork-check can take approximately 15 minutes. Issuing violations or warnings can take another 10 to 15 minutes. At a rover site, weighing a vehicle using portable scales can often take 15 minutes or more. These tasks and associated paperwork must be performed by inspectors (or ISP if a detailed safety inspection is done) at all rover sites and most of the fixed facilities due to the limited number of POE employing TRS personnel. Also, unlike many states that use a centralized on-line process, individual POEs in Idaho are authorized to issue permits and registrations and collect fees. This process can take between 30 and 90 minutes depending on the specific customer. Finally, if serious safety issues are suspected, ITD’s lack of authority to perform detailed safety inspections requires commercial vehicles to wait while ISP assistance is requested.

Concept of Operations

In order to address future system needs, this study developed a Concept of Operations (ConOp) for the Idaho POE System with five tiers. In order to provide flexibility, account for the existing fixed facilities and rover sits, and take into consideration available financial and personnel resources, three tiers were developed for the state's fixed facilities and two tiers were developed for rover sites. Each tier description below identifies the operations, infrastructure, and technology necessary to fully realize the Concept of Operations and provides cost estimates and a sample layout or design for each tier. It is important to note that while sites in Idaho currently incorporate many of the ideas and technology discussed below, none fully match the Tier 1, Tier 2, or Tier 3 Concept.

Tier 1: High-Volume Fixed Facility

The Tier 1 ConOp was developed for higher volume routes, such as interstates, where ITD data indicates that both existing commercial vehicle traffic as well expected growth was highest. It is intended to be a completely staffed, full-service facility with ITD personnel, administrative staff (TRS), and a part-time ISP presence. These sites include the full range of technology and infrastructure identified above, including: WIM/AVI, a reweigh loop, truck parking area with a hazardous material pit, a large administrative building, an internal bypass lanes, an inspection garage, multiple fixed static scales to allow for efficient axle- and gross-weighings, and publically secured Wi-Fi to provide drivers the opportunity to apply for credentials and permits from their own vehicle with their own devices. Figure 3 below shows a suggested layout for a Tier 1 ConOp facilities.

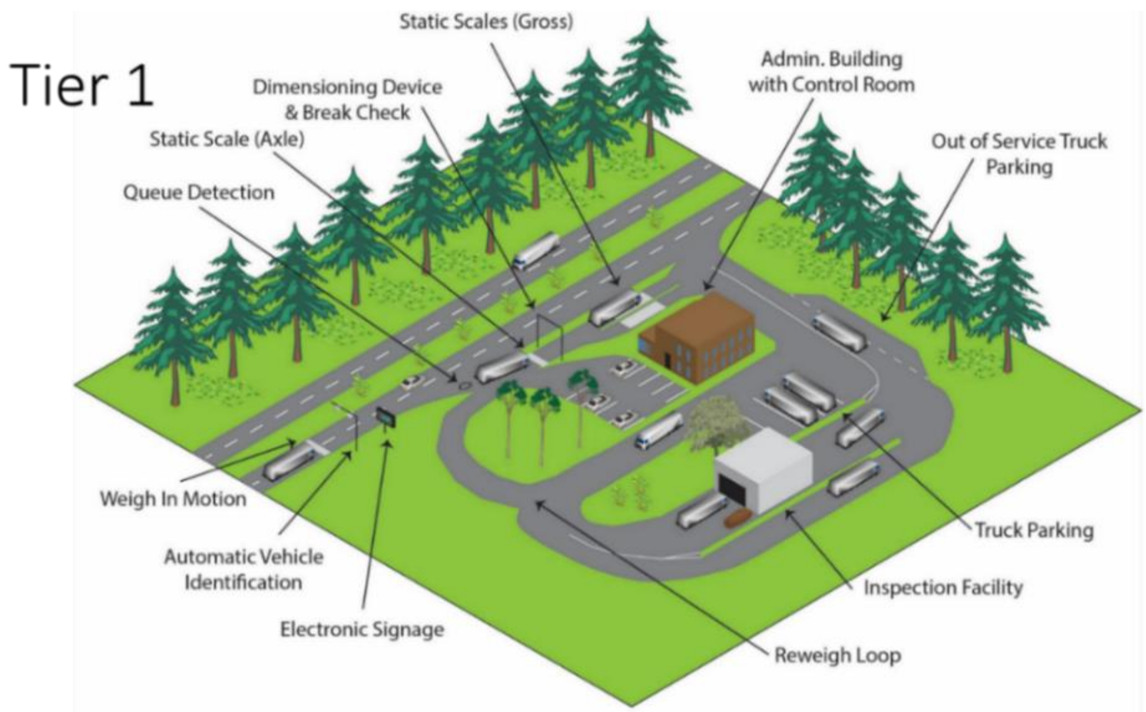


Figure 3. Illustration of ITD Tier 1 ConOp Layout

Tier 2: Lesser Volume Major Roadways Fixed Facility

The Tier 2 ConOp was developed for locations along major U.S. and state highways where volumes are not as significant as interstate, but are still moderate relative to the other site locations in Idaho. The Tier 2 ConOp is intended to be a scaled down version of the Tier 1 sites. Sites would be staffed with full-time ITD personnel with administrative staff as needed. Infrastructure needs include a smaller administrative building, reweigh loop and internal bypass lane, and a smaller truck parking area. Technology requirements are very similar to Tier 1 facilities as data collection to ensure enforcement resources are focused on vehicles with the highest potential for violation is still a priority. Figure 4 below shows a suggested layout for Tier 2 facilities.

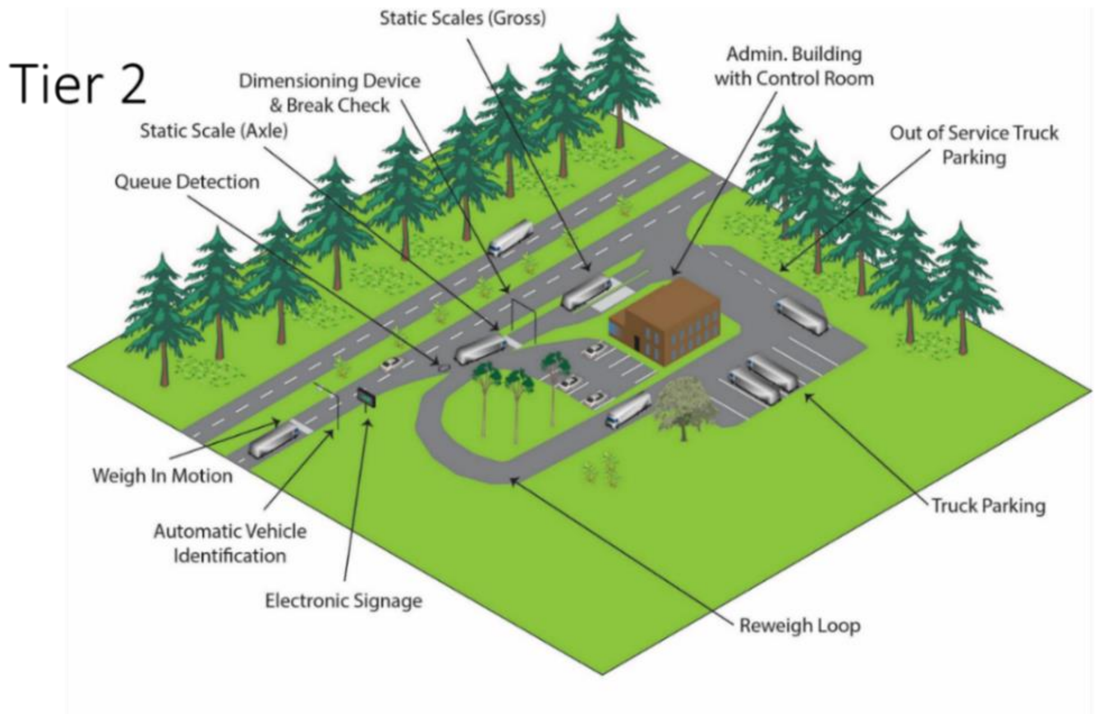


Figure 4. Illustration of ITD Tier 2 ConOp Layout

Tier 3: Periodic Virtual Operation Fixed Facility

The Tier 3 ConOp was developed for existing fixed facilities located along low-volume state highways or secondary roadways. This ConOp can be operated by a small staff located at the facility or virtually by staff at a centralized location. Staffing decisions (on-site versus virtual) will likely be driven by data collected by technology at roadside upstream of the facilities as well as staff availability. Staffing on-site would consist solely of ITD enforcement personnel. When the facility is being operated remotely, commercial vehicle drivers will interact with remote staff using a virtual terminal located alongside the static scale to allow the driver to communicate with remote staff while being weighed. Infrastructure requirements are minimal. Tier 3 facilities will only need a static scale and a small administrative building big enough to provide a location for staff to monitor data collected by technology located at roadside upstream and on-site. Technology requirements are similar to Tier 1 and 2 concepts with the addition of the virtual terminal for drivers to interact with remote staff when the facility is operating in virtual mode. Figure 5 below shows a possible site design for Tier 3 ConOp facilities.

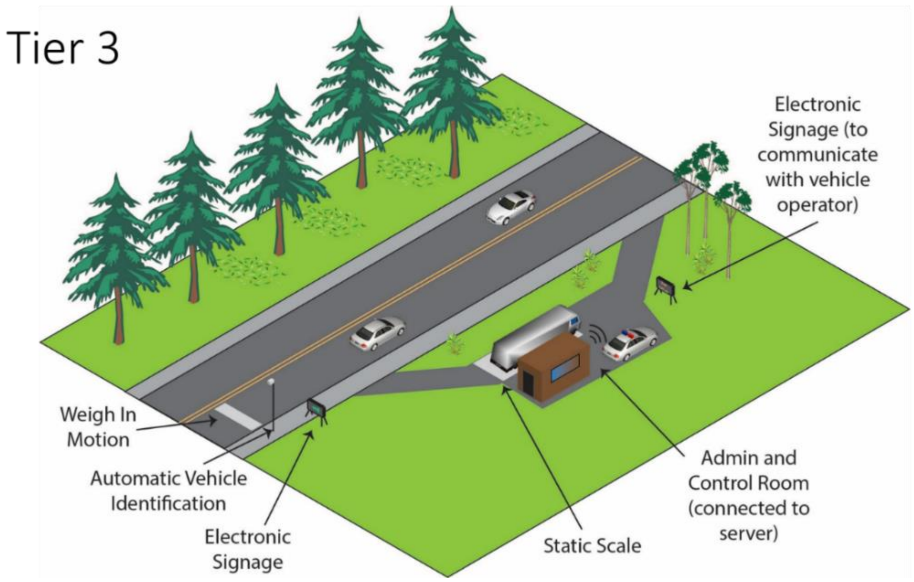
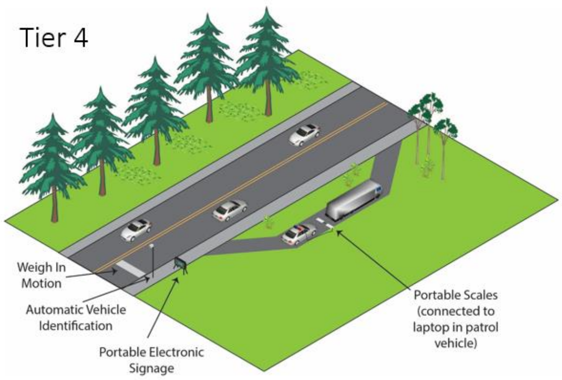


Figure 5. Illustration ITD Tier 3 ConOp Layout

Tier 4 and 5: Rover Sites

The Tier 4 and 5 ConOp are slight variations of the same concept. While both are intended to be utilized at rover locations across the state, Tier 4 sites are better suited for secondary roads with higher volumes of truck traffic or in moderate volume areas where seasonal truck volumes justify the inclusion of additional technology to help screen vehicles. Tier 5 is intended to be utilized on secondary road segments with low truck volumes that require occasional monitoring or more urban settings where roadside space may not be as readily available. No permanent infrastructure is required. The Tier 4 ConOp should have both a mainline WIM as well as a portable low-speed WIM, and portable static scales, for ITD personnel to use once a vehicle has pulled into the site. The Tier 5 ConOp does not require the mainline WIM. Both the Tier 4 and 5 ConOp should have portable AVI technology as well as portable electronic signage that can be controlled from the site. Figure 6 below shows recommended layouts for Type IV and V sites.



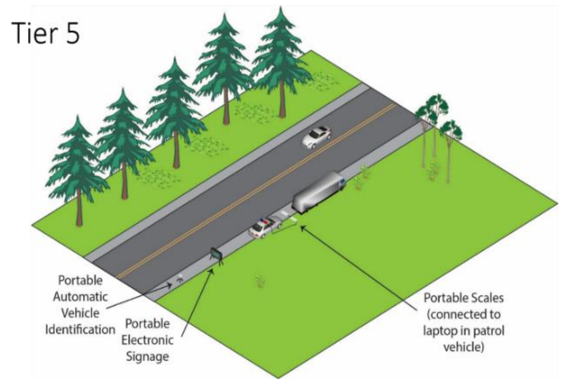


Figure 6. Illustration of ITD Tier 4 and 5 ConOp Layout

The recommended sites and approximate costs for each ConOps tier are identified in Table 1 below. The cost listed is per facility and does not factor in any Right-of-way (ROW) or other land acquisition purchases. It also does not take into account any costs associated with demolition or annual operations and maintenance costs, cost savings that may come from repurposing of existing infrastructure, or technology.

Table 1. ITD ConOps Layouts, Suggested Sites, and Costs

Table Tier	Recommended Sites	Approximate Cost per Facility[a]
1	East Boise; Cotterel/Declo; Huetter; Inkom; Sage Junction	$12.5 million
2	Haugan; Hollister; Lewiston	$10.0 million
3	Ashton; Bonners Ferry; Horseshoe Bend; Kooskia; Lewiston Hill; Marsing; Priest River; Salmon; St. Maries	$2.5 million
4	Boise Rover 2; Idaho Falls Rover 2; Lewiston Rover 1; Mini-Cassia (Burley) Rover; Pocatello (Inkom) Rover 1	$1.5 million
5	All other rover sites	$0.25 million

[a] Cost does not include any land acquisition, annual operating costs, or costs associated with demolition or repurposing of existing infrastructure.

Findings and Recommendations

This Concept of Operations provides 15 recommendations organized into three categories to guide ITD in managing and improving its POE system for the coming decades:

- Technology findings and recommendations:
  - Maintain Fixed Facility and Mobile Enforcement Approach.
  - Implement Five-Tier Concept of Operations.
  - Invest in Software to Support Roadside Technology:
    - This software includes an updated on-line permit system, integrated enforcement interface, and improved data integration software.

    - Integrate ITD Traffic Operations Weigh-in-Motion Data with Truck Enforcement Data:
        - ITD operates WIM sensors for traffic operations and congestion management that produce data that could be used to augment scoring methodology and could potentially be used in an enforcement capacity.
    - Lease Commercially Available In-Vehicle Heavy Truck Location Data to Aid Tier 1 to 5 Site Planning.
- Funding and Capital Investment findings and recommendations:
    - Explore Relocation of Cotterel POE.
    - Conduct a Cost-Benefit Analysis of the Haugan POE.
    - Sequence Truck Enforcement Investment as a Consistent Annual Line Item.
    - Determine the Portion of Annual Investment Suitable for Capture from Fees and Fines.
- Process, Performance and People findings and recommendations:
    - Refine or Develop Outcome-Based and Tier-Based Performance Measures for Truck Enforcement.
        - Performance measures such as those reported to FHWA in the State Enforcement Plan are based on workload targets. Instead, performance should be measured based on the three main metrics of why agencies conduct truck enforcement: improve safety, protect infrastructure, and facilitate the movement of goods.
    - Integrate Truck Enforcement Workforce Development Initiatives Across ITD and ISP.
        - Better integration between ITD and ISP workforces would aid in the attraction, development, and retention of talent.
    - Consider Examining Legislation to Identify Technological Barriers.
        - Legislation has sometimes been unable to keep pace with technological changes, leading to inefficiencies. A common example is the requirement that oversize and overweight (OSOW) permits be kept in the truck in paper form instead of allowing permits to be kept on electronic devices.

Chapter 1
Introduction and Work Performed

The mission of the Idaho Transportation Department (ITD) Port of Entry (POE) system is to ensure that all commercial vehicles entering the state are safe and legal while providing efficient, fair, and professional service to POE customers and Idaho citizens. Idaho's POEs are part of a set of integrated activities administered by ITD across six districts throughout the state that focus on enforcing the following regulations:

- Commercial vehicle size.
- Commercial vehicle weight.
- Commercial vehicle safety.
- Commercial vehicle credentials.

In 2014, more than 3 million trucks entered Port of Entry (POE) sites in Idaho. Of these commercial vehicles, about 2.4 million trucks were weighed, 8,200 citations were written (for weight and safety violations), and 55,000 credentials and 28,000 permits were issued. The Federal Highway Administration (FHWA) forecasts that the number of trucks on the road will increase significantly in the coming decades. In 2012, trucks carried approximately 124 million tons of goods with origins or destinations in Idaho. By 2040, that amount is projected to rise to more than 217 million tons.[1] The expected increase in truck traffic to carry the additional tonnage will make the ITD POE mission even more critical in the years to come. As technologies evolve and state agency staffing becomes more complicated, ITD is looking to establish a robust methodology for identifying and evaluating future investments in these areas.

To achieve this, ITD commissioned this study to provide information and recommendation to assist in planning for the long-term development and operation of its POE program. The study included the following tasks which are included as sections in this final Report:

- Establish Current Conditions and Identify Needs (Chapter 2).
- Section Document Best Practices and Emerging Technology (Chapter 3).
- Develop and Apply Concepts of Operation (Chapter 4).
- Provide Recommendations (Chapter 5).
- Produce One-Page Site Profiles (Appendix A).
- Conduct Interviews of State Department of Transportation (DOT) and Police Personnel (Appendix B).
- Conduct Interviews and an On-line Survey (Appendix C).

1 FHWA Freight Analysis Framework (FAF) v3.

Chapter 2
Current Conditions and Needs

Current Conditions and Needs

This section accomplishes two main goals. First, it provides an overview of current conditions at both a system-level and at each of the 17 fixed POE facilities, and documents the processes and operations of the ITD civilian staff members, 11 rover teams, and 3 mobile virtual weigh-in-motion (VWIM) sites. The project team used a combination of data collection, literature review, and interviews to gather information on ITD's POE network. This section summarizes the current operating environment of Idaho's POE system. The current conditions inventory was a critical first step in this study as it provided the technical team with a thorough understanding of the Idaho Transportation Department's POE operations. Full reports for each site are available in Appendix A.

Second, this section identifies needs and issues relevant to the POE system. These fall into a number of categories including technology, infrastructure, site location, and staffing needs. The findings from these two tasks drove the development of recommendations that appear in Chapters 4 and 5. The last part of this section includes results from an on-line survey that was a major input for the analyses.

The project kickoff meeting was held in Boise, Idaho on June 7, 2015 and June 8, 2015. During this time interviews with the Technical Advisory Committee and other stakeholders were conducted in both individual and group settings. Table 2 contains a list of the stakeholders interviewed during the kickoff trip.

Table 2. Stakeholders Interviewed

Name	Organization	Title
Alan Frew	Idaho Transportation Department	Department of Motor Vehicles Administrator
Patricia Carr	Idaho Transportation Department	POE Program Manager
Caleb Forrey	Idaho Transportation Department	District 3 Senior Inspector
Ned Parrish	Idaho Transportation Department	Research Program Manager
Renee Becker	Idaho Transportation Department	Technical Records Specialist
Ron Morgan	Idaho Transportation Department	District 1 and 2 POE Area Supervisor
Greg Deveraux	Idaho Transportation Department	District 3 POE Area Supervisor
Dennis Black	Idaho Transportation Department	District 4 POE Area Supervisor
David Hankla	Idaho Transportation Department	District 5 and 6 POE Area Supervisor
Matthew Bezayiff	Idaho Transportation Department	IT System Integration Analyst
Randi Bristol	Idaho Transportation Department	Automated System Manager
Reymundo Rodriguez	Idaho Transportation Department	Director of Motor Carrier Services

Table 2. Stakeholders Interviewed (continued)

Name	Organization	Title
Tom Marks	Idaho Transportation Department	Geographic Information Systems Analyst
Glenda Fuller	Idaho Transportation Department	Highway Data
Raelene Vista	Idaho Transportation Department	Highway Data
Jett Russo	Idaho Transportation Department	Rover Inspector
Pedro Melchor	Idaho Transportation Department	Rover Inspector
Randy Rhuman	Federal Highway Administration	Manager Federal Aid Grant Program
Julie Pipal	Idaho Trucking Association	President
Roy Czinku	International Road Dynamics	VP ITS Solutions and Maintenance Services
Jeff Wourms	International Road Dynamics	Regional Supervisor
Thad Hoffman	Iteris	Sales

Note: Bold indicates Technical Advisory Committee Member.

The project team also visited three different POE sites; Marsing, East Boise (eastbound), and the Highbridge (State Highway 21) rover site.

Current Conditions and Site Needs

This section contains an overview of the POE system including site locations, site layout and infrastructure, staffing and hours of operations, equipment and technology, and site volumes and business activities for each site across the POE network.

Sites and Locations

The Idaho POE network consists of 17 separate Ports of Entry[1] with 22 permanent static scales, approximately 200 rover sites, and 3 virtual weigh-in-motion (VWIM) sites. Two of the VWIM sites are near the Idaho/Canada border, one on U.S. 95, one on State Highway 1 (SH). The final site is on U.S. 20 in Ashton. These VWIM sites do not have fixed pull-off areas, instead each truck that needs to be examined further is escorted to a predefined temporary location where any necessary enforcement activities can be conducted when staff is located in the vicinity. The state also operates a portable enforcement trailer on U.S. 95 north of Riggins.

All of the fixed and rover sites are located within Idaho's borders except for Haugan POE, located 16 miles east of the Idaho/Montana border on Interstate 90 in Montana. Haugan is jointly operated by ITD and the Montana DOT and processes traffic moving both eastbound (acting as a POE for Montana) and westbound (acting as a POE for Idaho). Idaho provides funding for 4 full-time employees and pays half of the operating expenditures to help operate the location. Figure 7 shows all of the POE and rover sites

[1] For purposes of this report, sites such as Cotterel that have separate scales on both sides of the Right-of-way at the same milepost of a highway are counted as a single site.

operated by ITD. The map makes a distinction between the 12 *primary* and 5 *satellite* Ports of Entry. Satellite locations are fixed sites, but they are staffed and open less frequently than the primary fixed sites. This distinction will be further explained in the following sections.

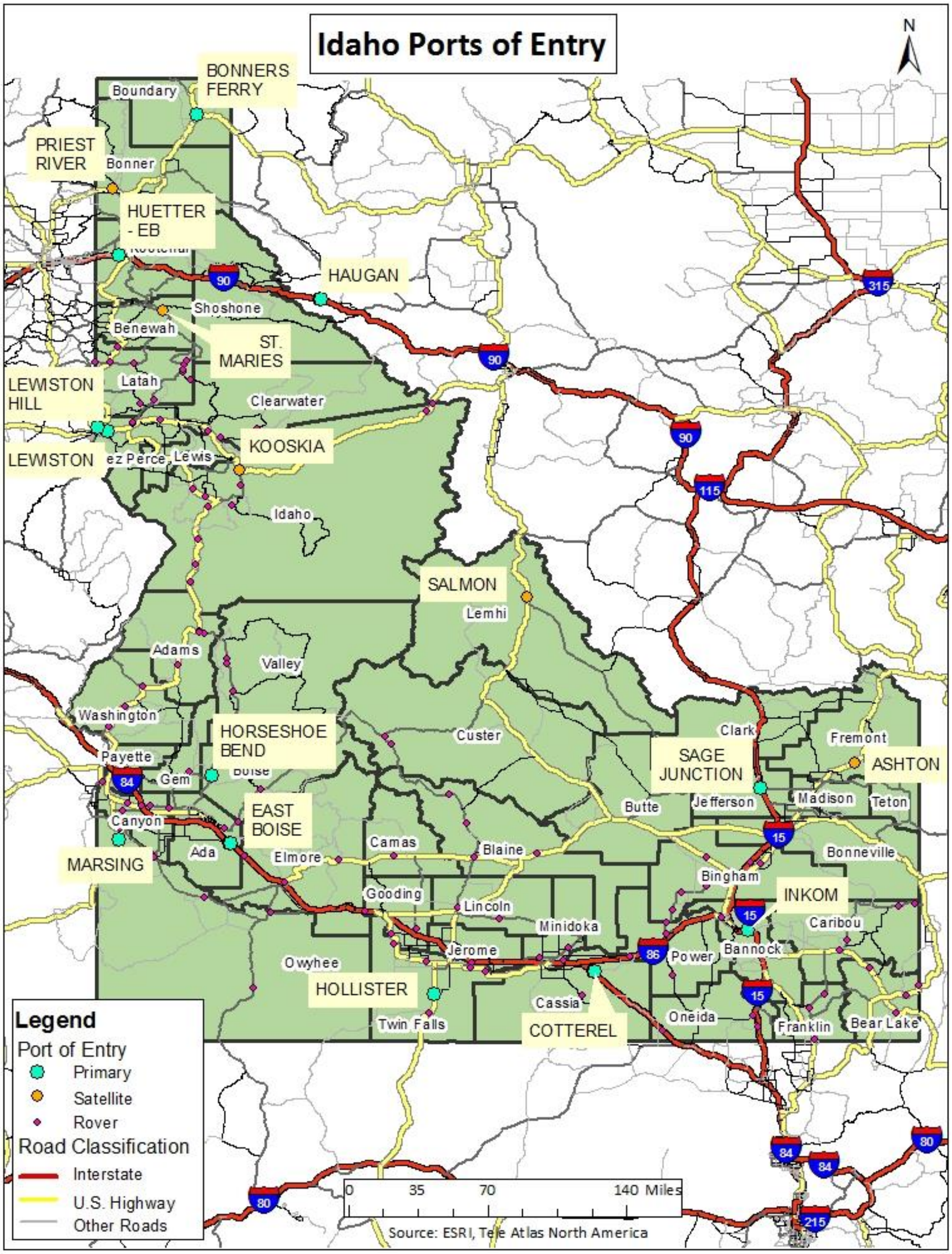


Figure 7. Map of Idaho Port of Entry Network
Source: ITD, Cambridge Systematics, Inc.

The 11 rover teams employed are able to conduct targeted enforcement and monitor fixed-site bypass routes which increases the reach of the system. The State Enforcement Plan for 2016 identifies short-term goals (during Federal Fiscal Year (FFY) 2016) of placing new fixed sites on U.S. 20 south of Ashton and U.S. 20/26 east of Arco to increase monitoring of non-Interstate routes. The Ashton fixed site, which has since been completed, upgraded an intermittently used facility already located on U.S. 20 near Ashton. There are also specific sections of highway, particularly I-15 and U.S. 91, which cannot be monitored because they are inside the Fort Hall Indian Reservation. Both routes have coverage from fixed or mobile sites outside of the Reservation.

According to ITD staff and our initial observations, nearly all of ITD's 17 Port of Entry sites are located well within the context of inter and intrastate traffic flows. However, there are two potential gaps in the system. The first is a 57-mile gap on I-84 between the Oregon border and East Boise POE. Trucks entering Idaho on this route do not encounter a POE until passing through the Boise region – the largest population center in the state. There is also easy access to U.S. 95 for trucks going north by using U.S. 30 to exit I-84 before leaving Oregon with no POE until Lewiston. Although no new permanent POE is planned, this stretch of I-84 and the interchange of U.S. 30 and U.S. 95 should be targets for increased data collection and potentially mobile enforcement.

The Cotterel POE, currently located on Interstate 84 approximately 6.5 miles southeast of the interchange with Interstate 86 is the other site that appears to have sufficient deficiencies to warrant relocation. The site currently operates a scale and complex on both the NB and SB sides of Interstate 84 but does not interdict traffic traveling east/west on nearby Interstate 86.[2] There are no fixed sites on Interstate 84/86 between East Boise and Interstate 15. Relocating Cotterel to a location on Interstate 84 west of the interchange would allow ITD to monitor trucks traveling across the state, as opposed to only those exiting and entering the state on Interstate 84, and address one of the obvious gaps in the current POE network's enforcement coverage. Figure 8 below shows the current location of the Cotterel POE.

[2] Interstate 86 starts at the interchange with Interstate 84 and runs east to an interchange with Interstate 15 in Pocatello. Interstate 84 continues west from the interchange.

Figure 8. Map of Current Cotterel POE Site, Idaho
Source: Google Maps.

The current Cotterel site has outdated facilities and a number of design features that are incompatible with current design guidelines, such as a shared deceleration-lane for trucks and other vehicles trying to access a rest area (which is adjacent to the POE). This creates operational issues including queuing of traffic on I-84 forcing the periodic closure of the site and safety concerns from the shared deceleration-lane and a short acceleration-lane that combined reduce the overall effectiveness and efficiency of the port. A 2005 study by Parsons Brinckeroff Quade Douglas[3] examined options for relocating operations from Cotterel to a new site somewhere between the I-84/I-86 interchange and the SH 77 interchange that could better monitor traffic on I-84/I-86, the main east/west corridor in the state. The study recommended a new site (Declo) to replace Cotterel, with separate weigh station infrastructure in both directions of travel. Truck traffic on this stretch of I-84 is approximately 63 percent higher than at the current site, increasing the number of commercial vehicles that can be monitored for weight and safety violations.[4] The addition of WIM/AVI to the site would further increase its efficiency. Figure 9 below illustrates the recommended design features.

[3] Parsons Brinckerhoff Quade Douglas. Declo Port of Entry Cassia County, Idaho Concept Report. February 2005.

[4] Declo POE Construction Benefits and Justifications White Paper. Email from Caleb Forrey, ITD on December 3, 2015.

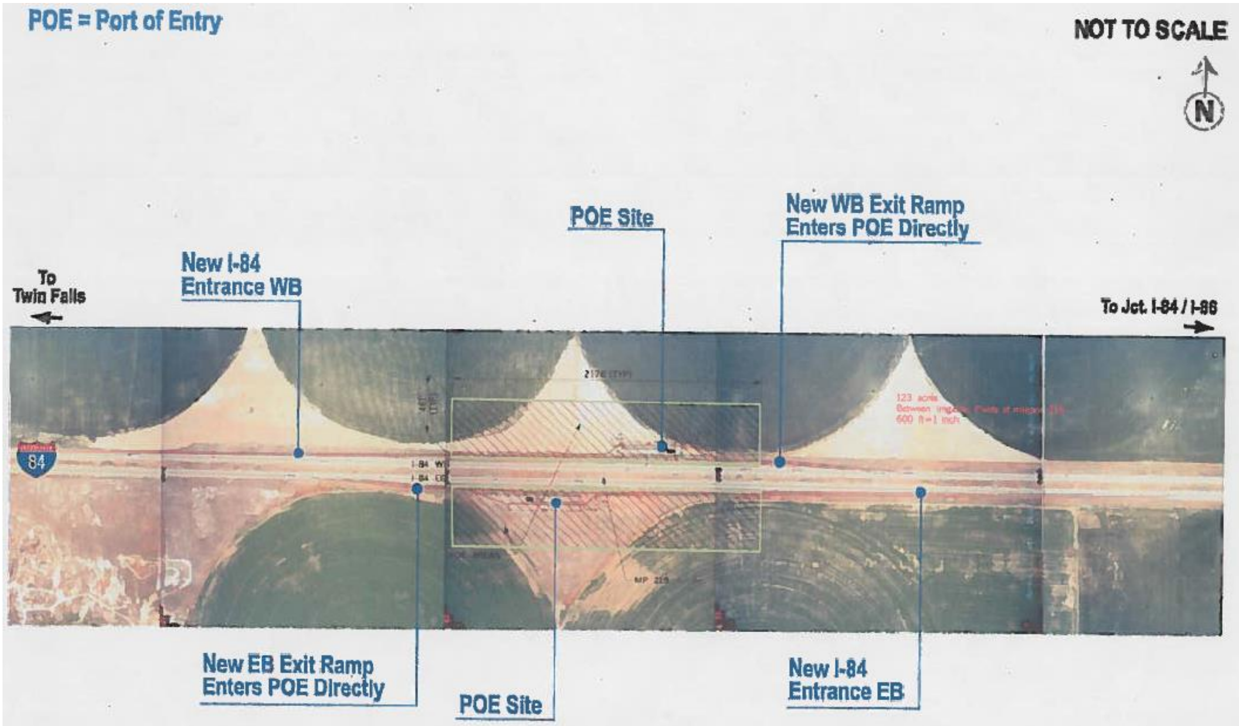


Figure 9. Map of Declo POE Site Recommended Design
Source: Parsons Brinckerhoff Quade Douglas. Declo POE Cassia County, Idaho Concept Report. February 2005.

The recommended site location and design would require ITD personnel to drive across the highway and median to access the separate eastbound and westbound facilities, a suboptimal situation, but one that the study felt was outweighed by the benefits of the new location (namely no Right-of-way (ROW) purchase required and lack of an interchange or local roads in the vicinity). The project continues to appear on the list of long-term goals (beyond October 1, 2019) in State Enforcement Plans, though it was not included in the Idaho Transportation Department's Strategic Plan in 2014.[5] The scale on the eastbound side of I-84 was rebuilt in July 2011, reducing the probability that the site will be relocated in the near term.

Another project listed in the 2016 State Enforcement Plan is a long-term goal of relocating the Hollister POE to Rogerson (Twin Falls County). Currently, the Hollister POE is located on U.S. 93, 21 miles south of Twin Falls. The facility is located on the northbound side of U.S. 93 in order to act as a POE for traffic entering Idaho from Nevada but is designed, signed, and striped to accommodate traffic in both directions. Consequently, vehicles coming south are forced to stop and cross traffic to enter the port even though the flow of traffic in this direction is a lower priority for the facility.

5 FFY 2014 Annual Certification of Size and Weight Enforcement Program.

Layout and Infrastructure

The layout of and infrastructure available at the fixed site locations in Idaho varies considerably. Truck circulation and flow within and around a site is determined in large part by the layout and infrastructure at each location. Understanding the layout and infrastructure present at each site allows for a better understanding of site operations and the potential or existing conflicts and needs. Also, by placing sites into categories, further comparisons between sites can be made. For example, if two sites are in different categories and one has a high processing rate for trucks, the site configuration might provide part of the reason for the difference. Distinguishing features include the following:

Number of Fixed Scale: Most fixed facilities have a single scale that serves traffic moving in one direction over it. A few locations, including Bonners Ferry, Hollister, and Horseshoe Bend operate a single bidirectional-scale which allows trucks to approach and leave the scale from either direction. The remaining facilities either have two scales on opposites sides of the road, one serving each direction of travel (such as at East Boise), or have two scales on either side of an administrative building in the median of a highway, such as at Lewiston and Haugan.

Presence of an Administrative Building: Administrative buildings are included at every facility except Kooskia and Ashton. These structures house the computer systems used to run the facility, provide space to conduct paperwork checks, and give enforcement personnel some degree of protection from the elements. Kooskia and Ashton are run by a laptop computer that enforcement personnel use to control the site when open. The size of administrative buildings varies widely, from small sheds at some of the satellite locations to large buildings at major POEs like Lewiston.

NORPASS Transponder

Weigh-in-Motion (WIM): Depending on the specific system, WIM technology can be placed either on the mainline of the highway ahead (upstream) of a POE or on the entrance ramp to a POE. Idaho utilizes WIM placed on the mainline of the highway upstream of a POE. The WIM system weighs vehicles as they pass over the scale at highway speed. This data is used to determine if a truck is above or close to the tire-, axle-, or gross-weight limit.[6] If so, the truck is signaled by transponder to pull into the POE for a physical weighing which is required to write a citation.[7] If the truck is below the threshold, it is signaled to bypass the site. Lewiston and East Boise operate mainline WIM and North American Preclearance and Safety System (NORPASS) transponders. Haugan operates WIM with PrePass transponders. Transponders are attached to the windshield of the truck; as the truck passes over the WIM, the serial number is read by

[6] The tolerance level used to determine if a truck must report for a physical weighing can vary.

[7] Current technology is not accurate enough not allow for a citation to be issued using only the weight obtained from WIM. WIM is used only as a screening tool in the U.S. A certain percentage of trucks with transponders (typically around 5 percent) are also signaled to pull in for random checks even if they pass the weight and safety screening.

the WIM system. This serial number is used to check safety information and credentials, and once weight is calculated, the system displays either a green light (bypass) or red light (pull in to POE). Huetter utilizes a mainline WIM and a LPR system in place of the transponder based systems. The LPR reads the license plate number off of the vehicle to perform the check of safety information and credentials. Roadside signage then alerts the vehicle operator whether they should enter the facility or bypass.

The way a POE location is designed or arranged along with the use or absence of some additional infrastructure discussed below are crucial to understanding how a site operates:

Direction of Entry/Exit: In Idaho, most of the Ports of Entry located on a divided highway require a truck to exit and reenter the highway from the right side of the road using an acceleration/deceleration ramp. Facilities on two-lane roads typically require a truck traveling in one direction to turn to enter or exit the site, which may include crossing the other travel lane. Two POEs, Lewiston and Haugan, require a truck to enter the POE from the left-lane of travel and merge back into traffic from the left due to their median siting on divided highways.

Location Compared to Right-of-Way: Most POEs in Idaho are located to the outside of the road Right-of-way. Two POEs, Lewiston and Haugan, are located in the center median of the highway, requiring the left-lane entrance/exit discussed above. Median sites allow a single administrative building to operate a scale in both directions, but typically limits the available space for truck parking or a reweigh loop.

Reweigh Loop: Internal to the facility, this feature allows a truck that has passed the scale to return to the static scale without leaving the site. For example, a truck might exceed the legal axle weight on the initial pass over the scale. Once the truck adjusts the load, the reweigh loop allows the vehicle to return to the scale for a reweigh without needing to exit the facility.

Truck Parking: Including truck parking at a facility provides a place for drivers to safely leave their vehicle to present credentials or other paperwork to enforcement personnel inside an administrative building. Having spaces clearly marked reduces confusion and helps prevent trucks from blocking the flow of traffic. The most advanced version includes a hazardous material pit which provides trucks carrying hazardous material a safe place to park where any spills are contained within the parking space.

Internal Bypass-Lane: This feature allows a truck on the entrance ramp to bypass the scale. This could be used if a queue forms – trucks that are obviously not overweight or have no visible safety defects could be directed to bypass the scale even if they have exited the roadway. Messages are relayed to drivers via a visual message sign or overhead signal. Vehicles that bypass the static scale could still be required to park at the facility for credentials or safety inspections. Note that this is a separate feature from trucks that bypass the entire facility due to receiving permission from the NORPASS or PrePass transponder system.

The location of the POE facility relative to the Right-of-way, direction of traffic monitored, and how traffic enters and exits the facility are three of the largest variables in Idaho’s system. These features greatly impact how trucks access the facility, influences safety at the site, and defines the space available to conduct enforcement activities. Idaho's 17 POE facilities can be divided into 7 main categories based on design and site flow.

1. **Divided Highway, Right Ramp, and Single Direction Monitored:** These facilities are located on the outside of the road Right-of-way and serve traffic moving in only a single direction. Trucks must exit and enter the highway from the right-lane of a divided highway using a deceleration/ acceleration lane (ramp). Huetter and Lewiston Hill fit this description. This design reduces safety risks associated with traffic moving at varying speeds. However, these sites do not capture any traffic moving in the opposite direction which could present challenges if future development or traffic patterns warrant expansion of the POE system in these locations.

2. **Divided Highway, Right Ramp, and Two Directions Monitored:** These facilities are very similar to the above category but include separate facilities on both sides of the highway at the same POE facility. They are located on the outside of the road Right-of-way and serve traffic moving in only one direction each. The Cotterel, East Boise, and Inkom Ports of Entry fit this description. Because they are located at the same highway milepost, the two facilities are counted as a single POE in this study. The same safety benefit of having trucks enter and exit the facility from the right lane of the highway apply here and the presence of a paired facility means that all traffic that passes the location is monitored. However, the separated facilities require additional personnel to function fully and costs associated with utilities, repair, and construction are doubled. Both Inkom and Cotterel have been identified as needing longer approach ramps to the facility to allow trucks more time to decelerate once they leave the mainline. This would allow the trucks to maintain highway speeds until they exit the mainline, reducing the difference in speed between the trucks and other vehicles which is a safety concern.

   The typical configuration at these facilities, as shown in Figure 10, is a straight lane that guides trucks to the static scale. The facilities in category 1 above have the same basic layout but are only located on one side of highway, not both as shown below.

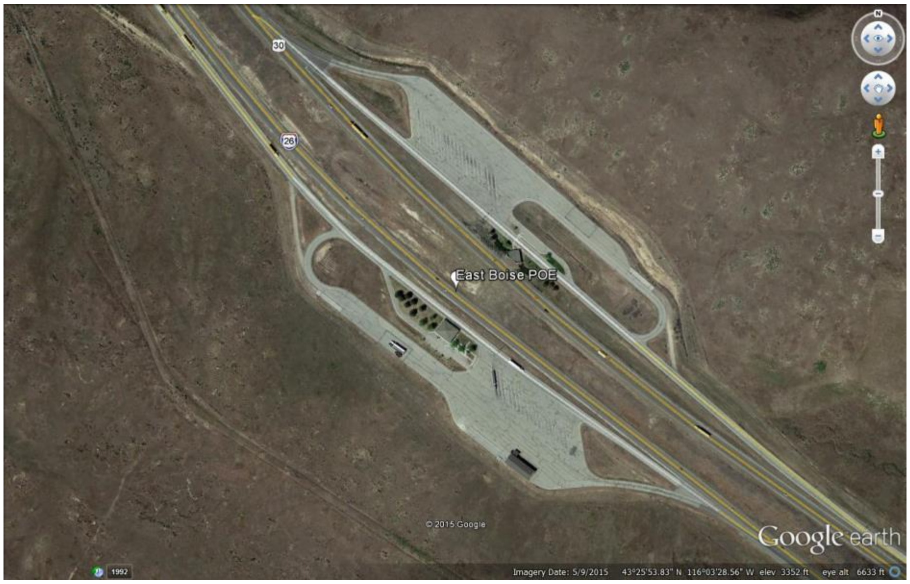


Figure 10. Example of POE with Separate Directional Facilities, East Boise POE, Idaho
Source: Google Maps.

3. **Divided Highway, Left Ramp, and Two Directions Monitored**: Lewiston POE and Haugan POE are located in the center median of U.S. 95 and I-90, respectively. Trucks entering the facility and returning to the mainline must do so from the left travel lane. A single administrative building sits in the middle of the facility with scales on both sides. Traffic stops on the scale on the side of the building corresponding to their direction of travel. The center median site allows the POE to monitor traffic in both directions using a single administrative building, reducing costs and increasing the efficiency of personnel at the site. However, the space available in the median can limit the amount of truck parking or ability to add a reweigh loop to the site. Lewiston lacks both of these features, Haugan has enough space to include both of these features in the current site design. Additionally, there are increased safety concerns due to the acceleration/deceleration lanes to enter and exit the facility being located on the left side of the highway. The left lane typically operates at a higher speed, meaning trucks exit the highway at a higher speed and must decelerate more rapidly when entering the facility, and return to a higher speed in order to merge with traffic when exiting the facility.

4. **Divided Highway, Right Ramp/Turn, and Two Directions Monitored**: Sage Junction has a unique layout Figure 11. Trucks entering the facility from the north exit I-15 from the right-lane using a ramp that leads directly to the facility. Trucks entering the facility from the south exit I-15 from the right lane using a ramp that leads to an intersection with SH 33. Trucks must turn left on this road then turn right into the facility. Trucks then proceed around an oval in order to approach the scale from the same direction as SB trucks. To return to the Interstate, all vehicles must make a left turn on to SH 33, then turn (right if SB, left if NB) onto an acceleration ramp to reenter the highway from the right side. In addition to monitoring highway traffic, Sage Junction also monitors trucks on SH 33. Trucks approaching Sage on this route must turn into the facility.

The numerous turns and starts/stops required by this layout creates delay and increases the number of potential truck-vehicle interactions at intersections and turns.

Figure 11. Map of Sage Junction Port of Entry, Idaho
Source: Google Maps.

5. **Non-divided Highway, Turn to Enter/Exit, One Direction Monitored**: Two facilities, Priest River and St. Maries, screen traffic in only one direction. These facilities are located on the right side of a non-divided highway and require trucks to pull off the side of the road to enter the scale. These sites are essentially additional pavement on the right side of the road that include a scale and administrative/scale building. The layout of these sites limits the availability of truck parking and leaves little area for trucks to queue. However, the limited infrastructure reduces costs needed to build and maintain the facilities which may be appropriate for the enforcement needs in the area. Figure 12 shows Priest River POE as an example.

Figure 12. Map of Priest River Port of Entry, Idaho
Source: Google Maps

6. **Non-divided Highway, Turn to Enter/Exit, Two Directions Monitored-Unidirectional Scale**: Marsing, Carmen/Salmon, and Kooskia are examples of this type of facility. Trucks need to turn off the roadway to enter and must make a turn to exit the facility. There are no entrance or exit ramps. Trucks traveling in either direction on the highway can be weighed, but vehicles must approach the scale from only one direction. The layout of these sites limits the availability of truck parking and leaves little area for trucks to queue. However, the limited infrastructure reduces costs needed to build and maintain the facilities which may be appropriate for the enforcement needs in the area.

7. **Non-divided Highway, Turn to Enter/Exit, Two Directions Monitored-Bidirectional Scale**: These facilities are similar to type 6 described above, but trucks can approach the scale from either direction. Bonners Ferry, Hollister, and Horseshoe Bend have bidirectional scales.

Figure 13 below shows Hollister POE with trucks entering the scale southbound. Markings are visible south of the scale showing trucks can enter the scale traveling northbound as well. This setup requires more operating room than scales which trucks can only enter from one side. Trucks cannot queue close to the scale as there must be enough space for a vehicle heading in the opposite direction to exit the scale safely. However, the ability to approach the scale from either side limits the amount of maneuvering needed to use the facility.

Figure 13. Map of Hollister POE with Bidirectional Scale, Idaho
Source: Google Maps. Scale is being used southbound in image.

Finally, a new satellite site was opened east of Arco on U.S. 20/26. This facility has a small building with a static scale and is operated and staffed by District 6 Rover teams a few times per week.

Table 3 below provides a high-level overview of the layout, infrastructure, and vehicle flow within and through each site. Further details and pictures for each location are provided in site profiles contained in Appendix A of this report.

Table 3. ITD POE Facility Types and Layouts

Port of Entry (Type)	ITD District	Route	Divided Highway	Direction Monitored	Facility Technology and Scale Infrastructure	Facility Layout and Operations		
						Entry/Exit	Site Flow	Truck Parking/ Reweigh Loop/ Internal Bypass
Ashton[a]	6	U.S. 20	N	EB/WB	Virtual WIM. No fixed scale, no Admin. Building. Fixed scale installation planned for 12/2015	Currently being operated as a virtual WIM. Trucks pulled over at roadside downstream of WIM system	Trucks weighed by WIM on roadway	N/N/N
Bonners Ferry (6)	1	U.S. 95	N	NB/SB/EB/ WB	Bidirectional-fixed-scale, Admin. Building	Turn entry/exit to scale from north (traffic on U.S. 95) and south (traffic on U.S. 2). SB on U.S. 95 and EB on U.S. 2 must cross traffic to enter	Trucks approach scale from both directions	Y/Y/N
Carmen/ Salmon[a] (6)	6	U.S. 93	N	NB/SB	Fixed-scale, Admin. Building	Located on SB side, NB trucks must cross SB traffic to enter/ exit	ND	N/N/N
Cotterel (2)	4	I-84	Y	EB/WB	1 fixed scale and 1 Admin. Building on both sides of highway	Right side highway ramp	Separate scale/ building for both directions of travel.	Limited/N/Y
East Boise (2)	3	I-84	Y	EB/WB	Mainline WIM in both directions. 1 fixed scale and 1 Admin. Building on both sides of highway	Right side highway ramp	Separate scale/ building for both directions of travel.	Y/Y/Y
Haugan (3)	1	I-90	Y	EB/WB	Mainline WIM for PREPASS, both directions. 2 fixed scales (one in each direction), 1 Admin. Building	Left side highway ramp	Separate scale for each direction of travel in median	Y/Y/N
Hollister (6)	4	U.S. 93	N	NB/SB	Bidirectional-fixed-scale, Admin. Building	Located on NB side. Turn for entry/exit. Trucks exiting SB cross path of NB traffic	Trucks approach scale from both directions	Limited/N/N
Horseshoe Bend (6)	3	SH 55	N	NB/SB	Bidirectional fixed scale, Admin. Building	Located on SB side. Turn for entry/exit	Trucks approach scale from both directions	N/N/N
Huetter (1)	1	I-90	Y	EB	Fixed scale, Admin. Building. WIM under construction	Right side highway ramp	Single scale for EB traffic only	Y/Y/Y

Table 3. ITD POE Facility Types and Layouts (continued)

Port of Entry (Type)	ITD District	Route	Divided Highway	Direction Monitored	Facility Technology and Scale Infrastructure	Facility Layout and Operations: Entry/Exit	Facility Layout and Operations: Site Flow	Facility Layout and Operations: Truck Parking/ Reweigh Loop/ Internal Bypass
Inkom (2)	5	I-15	Y	NB/SB	1 fixed scale and 1 Admin. Building on both sides of highway	Right side highway ramp	Separate scale/ Admin. Building for both directions of travel	Limited/N/N
Kooskia[a] (6)	2	U.S. 12	N	EB/WB	Fixed scale, no Admin. Building	Located on EB side, WB trucks must turn and cross EB traffic to enter. Exit onto SH 13, left turn to reach U.S. 12	Trucks approach scale from EB direction only	Limited/N/N
Lewiston (3)	2	U.S. 95	Y	NB/SB	Mainline WIM in both directions. 2 fixed scales (one in each direction), 1 Admin. Building	Left side highway ramp	Separate scale for each direction of travel in median	Limited/N/N
Lewiston Hill (1)	2	U.S. 95	Y	SB	Fixed scale, Admin. Building	Right side highway ramp	SB traffic only	N/N/N
Marsing (6)	3	U.S. 95	N	NB/SB	Fixed scale, Admin. Building	Scale on NB side, turn to enter/exit. SB must cross NB traffic. Left onto Summer Camp Road to U.S. 95 to exit	Single scale for all traffic	Limited/N/Y
Priest River[a] (5)	1	SH 57	N	SB	Fixed scale, Admin. Building	Right turn to enter. Located at roadside pull-off on SB side	SB traffic only	N/N/N
Sage Junction (4)	6	I-15	Y	NB/SB	Fixed scale, Admin. Building	Facility on SB side of highway. SB right side highway ramp goes directly to facility. NB trucks right side highway ramp to left turn on SH 33, turn right into facility. All trucks make left turn on SH 33 to exit and use interchange ramps to reenter highway on right	Single scale for both directions of traffic. Oval configuration	Y/Y/Y
St. Maries[a] (5)	1	SH 3	N	NB	Fixed scale, Admin. Building	Right turn to enter. Located at roadside pull-off on NB side	NB traffic only	N/N/N

Source: GIS Locations Spreadsheet, ITD. Google Maps.

[a] Satellite facility: indicates intermittent operation, defined as not being permanently staffed.

Although there are a number of different site layouts for the Idaho POE system, the processing and flow of trucks through each facility are generally the same.

At Lewiston, Haugan, and East Boise, company and vehicle information as well as a preliminary weighing is conducted by the WIM and associated Automatic Vehicle Identification (AVI) system as the truck passes the technology upstream of the POE. If an issue is detected, the driver is signaled via transponder to enter the facility. Trucks signaled to enter, trucks without a transponder, and trucks approaching any location without a WIM system must enter the facility and stop as directed by an officer with each axle on the scales or with multiple axles on a single scale, dependent on scale size available.[8] If there are any issues, the truck is required to pull into a parking area beyond the scale for additional screening, verification of driver credentials, load adjustment, or discussion with ITD staff. If no issues with the company, vehicle, or driver are detected, the driver is directed by staff to exit the POE. Some facilities, such as East Boise and Bonner’s Ferry, have additional infrastructure such as a reweigh loop that allows trucks to return directly to the scale entrance ramp for a second weighing after an initial weighing and/ or inspection. Another feature present at some facilities is an internal bypass-lane that allows trucks entering the POE to bypass the scale if signaled by a variable message sign or overhead signal, and still be able to park for additional documentation review and safety inspection.

Additional infrastructure could be included to upgrade the functionality of sites. Reweigh loops would allow trucks to return to the static scale after adjusting their load in the parking area. At some sites, such as those on a divided highway, a loop is the only feasible way to return a vehicle to the scales for a reweigh. A reweigh could be required for multiple reasons. For example, if a truck exceeded the allowable axle weight but not the gross vehicle weight, adjusting the load may allow the truck to become compliant without needing an overweight permit. Currently, only Bonners Ferry, Haugan, Huetter, East Boise, and Sage Junction have this type of infrastructure. Other sites, especially those on divided highways which tend to see heavier traffic volume, could consider including this design feature where feasible. Cotterel and Inkom W/B both appear to have enough space to accommodate a reweigh loop. It would simplify and expedite the reweigh process to the benefit of both the trucking industry and ITD.

Expanded truck parking is another piece of infrastructure that is helpful, especially at Ports of Entry in Idaho where commercial vehicle operators can park while obtaining permits or conducting other paperwork. Provided the facility has the space, designating parking spaces for trucks is a relatively simple and inexpensive improvement that could improve safety at the facility by reducing uncertainty as to where vehicles should or should not move.

A final piece of site infrastructure that is missing from all sites except the southbound side of East Boise are inspection garages. These covered facilities provide a safe place for ISP personnel to conduct checks of commercial vehicles. The most advanced include a pit which saves time during an inspection by allowing an inspector to get under a truck without needing to use a crawler to roll under. The inspection garage was built and is maintained by ITD. However, since ITD personnel cannot conduct full Level I or II

9 Lewiston for example has a 20’×100’ scale that can weigh an entire truck at one time.

inspections, the garage is of most use to the State Patrol officers who can conduct these more detailed inspections when they are in the area. Inspection garages could be considered at locations where there is a routine ISP presence, in areas prone to inclement weather, where trucks may need chains to travel, or if the authority of ITD personnel changes in the future.

Figure 14 shows the southbound side of the East Boise POE and its infrastructure at the site.

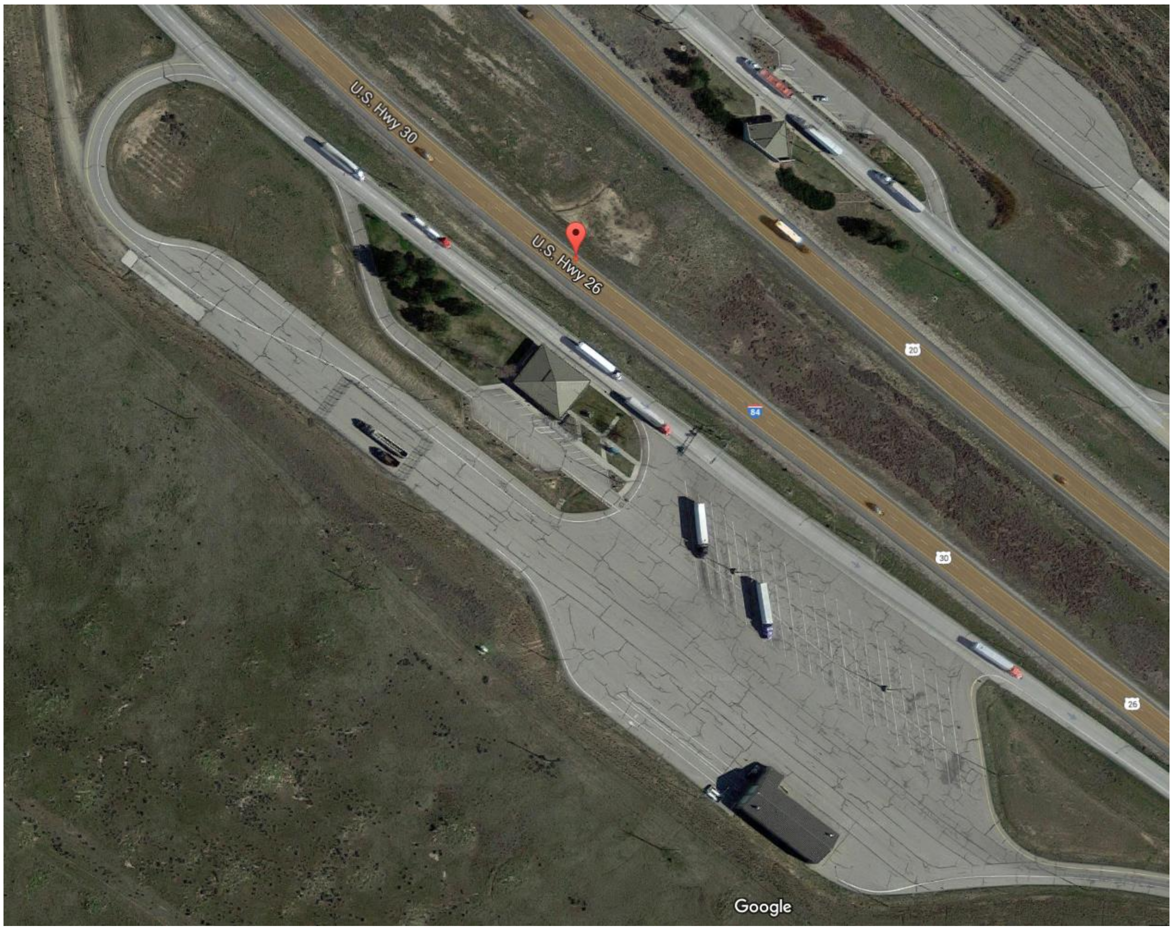


Figure 14. Map of Infrastructure at East Boise POE
Source: Google Maps, Cambridge Systematics.

Rover sites, which by their nature are not permanent, pull traffic off to the side of the road in an area with sufficient space. Trucks traveling on the opposite side of the road must stop and turn into the facility. Trucks are weighed by stopping on one pair of the portable scales for each axle, a repetitive and time consuming process for each truck. Specific truck movement at each rover site is dependent on the specific rover location and setup. A site such as Big Lost River in Butte County operates at the Big Lost River Rest Area, a location with truck parking spaces and a significant separation from traffic on U.S. 26. Separation from traffic affords additional protection to the commercial drivers and enforcement personnel. Other sites, such as Blanchard – a rover site in Bonner County, consist of only an expanded paved area on the SB side of SH 41. These smaller sites can very quickly be overwhelmed if multiple trucks arrive at the same time, causing rover teams to abandon their enforcement efforts in favor of controlling traffic flow in and around the site. A more effective approach to traffic management at these sites, such as remote controlled signage, could prove to be invaluable to the rover teams. The ITD Manual authorizes two POE traffic control plans for rover sites, shown in Figure 15 below.

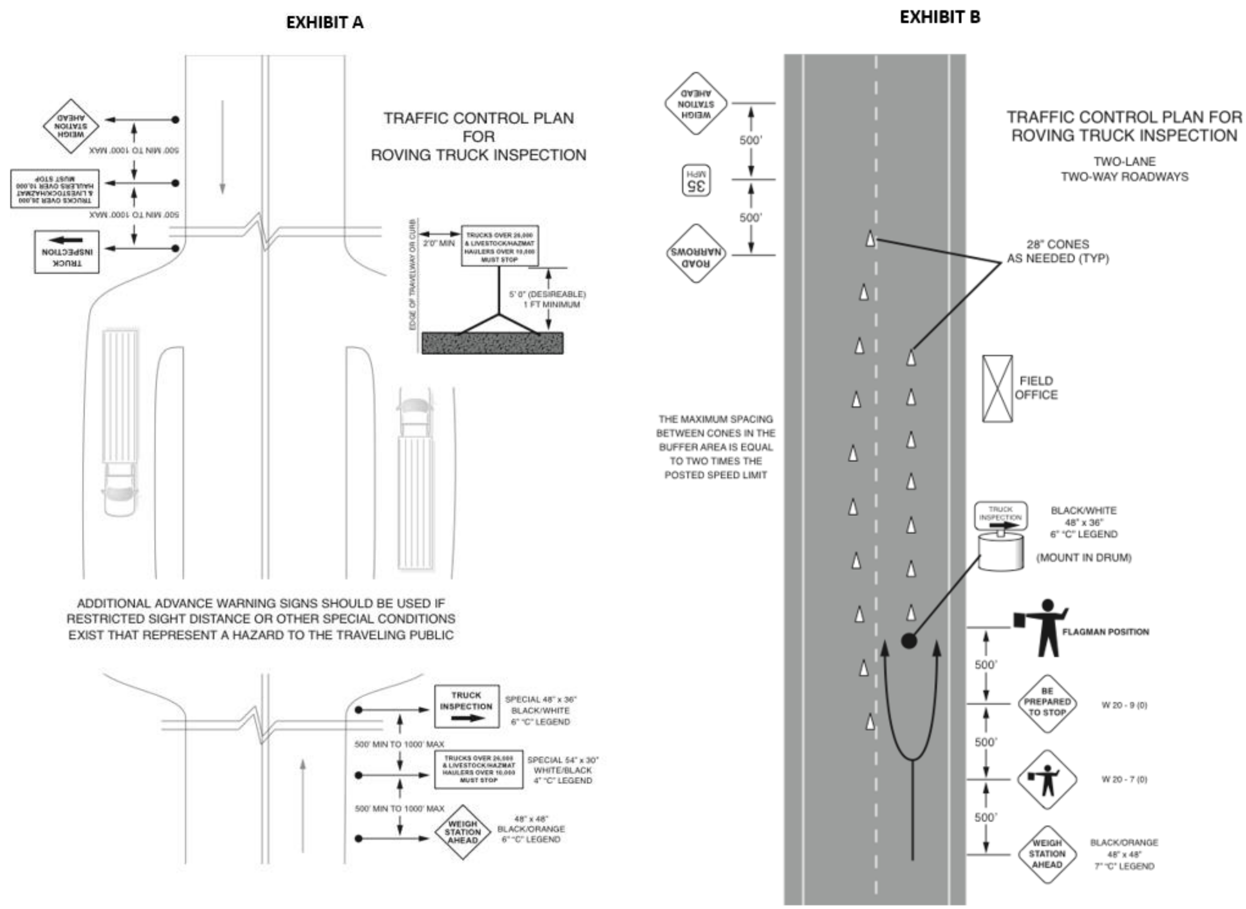


Figure 15. ITD Rover Site Traffic Control Plans
Source: ITD POE Procedure Manual, 2012.

Staffing and Hours of Operation

As of July 2015, ITD employs 93 personnel to support the operation of the statewide POE system. They are distributed as follows:

- Fifty-four personnel cover 16 Ports of Entry (all except Haugan).
- Four Idaho/Montana joint scale personnel located at Haugan.
- Twenty-two personnel in 11 rover teams cover 200 rover sites.
- Two headquarters enforcement administrative personnel.
- Four administrative full-time personnel.

- Six personnel in the Over Legal Permit unit in Motor Carrier Services Section that issue over legal permit credentials.
- One full-time maintenance technician.

This represents a slight decline from past years. In addition, a large portion of the staff is nearing or at retirement age. The possibility of quickly losing a large portion of senior staff and all of the institutional knowledge they provide poses a serious challenge for ITD. Training new staff takes time – new employees spend six months as Inspector Trainees after which they must pass exams, followed by an additional six months in a trainee capacity. The abundance of manual processes and lack of technology to aid in job functions also act as disincentives to joining ITD and slows the training process as well as increases turnover. The State Enforcement Plan projects a decrease in weighings and citations in FFY 2016 due in part to the high turnover rate and training needed for new recruits.

In addition to the 93 inspection personnel listed above, ITD also employs Technical Record Specialists (TRS) at East Boise, Inkom, Sage Junction, and Lewiston. These employees conduct many of the administrative tasks associated with POE operations, including querying databases for information, issuing registrations and permits, and any other non-inspection related tasks. This allows inspectors to focus on screening drivers and vehicles and conducting safety inspections. Increasing TRS staff at POE facilities – especially those that are upgraded with electronic screening capabilities could be a cost-effective approach to allow scale personnel to focus on non-administrative tasks. The most logical places to introduce TRS staff based on traffic volume is Cotterel, followed by Huetter.

ITD POEs are staffed solely by ITD civilian personnel with Idaho State Police (ISP) providing additional coverage when available and utilizing the facilities for blanket enforcement operations as ISP deems necessary. A Memorandum of Understanding (MOU) between the two agencies signed in 2012 provides details on procedures. ISP agreed to adopt ITD POE policies and procedures for vehicle weight, size, registration, and suspension tolerance, while ITD personnel accept ISP policies and procedures with regard to vehicle safety inspections.[9] However, ITD personnel have limited authority to conduct safety inspections compared to the ISP, a difference which is explained in more detail in the section "Traffic Volume and Business Practices". In January of 2016 an updated MOU between the two agencies was signed in an effort continue cooperation between the two agencies by promoting better communication and streamlining operational procedures.

Table 4 below show the number of personnel assigned to each facility, the hours-per-day and days-per-week the facilities are open, and the presence of TRS staff. An important distinction for the fixed facility locations is between a *primary* and *satellite* POE. Satellite Ports of Entry are fixed facilities, but they are staffed and open less frequently than the primary fixed facilities. Thirteen of the Ports of Entry are identified as primary facilities with the remaining 5 composing the satellite locations. Note that this table shows staffing levels as of 2014 when 57 staff were employed at POEs including Haugan versus 58 as of July 2015.

9 "Memorandum of Understanding between the Idaho State Police and the Idaho Transportation Department. ISP-12-55." January 2012.

Table 4. ITD Ports of Entry Staffing by Facility, 2014

Port of Entry	Primary/ Satellite	Personnel	Hours Per Day	Days per Week	TRS Personnel
Ashton[c]	Satellite	Rovers	—	—	—
Bonners Ferry	Primary	2	19.5	3	—
Carmen (Salmon)[c]	Satellite	Rovers	—	— [c]	—
Cotterel[b]	Primary	7	19.5	7	—
E Boise[b]	Primary	11	20	7	Yes
Haugan	Primary	4	24	7	—
Hollister	Primary	2	19.5	3	—
Horseshoe Bend	Primary	1	10	4	—
Huetter	Primary	6	19.5	6	—
Inkom[b]	Primary	8	20	7	Yes
Kooskia[c]	Satellite	Rovers	—	—	—
Lewiston	Primary	4	19.5	4	Yes
Lewiston Hill	Primary	1	10	5	—
Marsing	Primary	2	10	7	—
Priest River[c]	Satellite	Rovers	—	—	—
Sage Junction.	Primary	5	20	7	Yes
St. Maries[c]	Satellite	Rovers	—	—	—
Roving sites aggregate	ND	22	—	—	—

Source: FFY 2014 Size and Weight Cert.
[a] TRS Personnel is a Technical Record Specialist.
[b] Two physical facilities (scales on separate side of the road) at location. These POEs are still counted as a single Port of Entry.
[c] Intermittent operation, not permanently staffed.

The Port of Entry system in Idaho operates effectively from an hours of operation standpoint as most sites are open during peak travel times. With the exception of Lewiston Hill, Horseshoe Bend, and Marsing which operate approximately 10 hours a day, the remaining primary Ports of Entry operate approximately 20 hours a day (with Haugan open 24 hours a day).[10] The number of days a week they are operating varies considerably, from 3 days a week at Hollister and Bonners Ferry to 7 days a week at multiple locations.[11] In addition to the ITD staff operating the sites, ISP mobile rover units dedicate approximately 50 percent of their time to size and weight enforcement. Each team is assigned to cover bypass routes and assist the fixed sites in their area of operation. Teams operate on variable hours and schedules in order to avoid a pattern that commercial vehicles could evade. These regular patrols are

[10] Hours of Operation were not available for Priest River, St. Maries and Ashton.
[11] See Table 3 in Chapter 2 for a full list of shifts, hours per day, and days per week each facility is open

supplemented by special night and weekend assignments that target-specific trouble locations, as determined by VWIM data and observed trends in citations.

Facility Equipment and Technology

The following sections identify the technology available at primary and satellite Ports of Entry as well as the technology employed by roving units in Idaho. Overall, technology use at Idaho's fixed POEs is generally lacking. Not only does the lack of technology increase the amount of manual work that needs to be done, it also limits the availability of data. One of the primary reasons for utilizing technology to support commercial vehicle enforcement, aside from increased operational efficiency, is the ability to collect large amounts of data. This data can be used to help direct rover teams, inform POE investment decisions, provide insight into industry trends, and allows for the development of metrics to track the overall effectiveness of the POE program.

Primary and Satellite Locations

Enforcement Technology

The East Boise POE located on I-84 approximately nine miles east of Boise, the Lewiston POE located on U.S. 95 approximately one mile east of Lewiston, the Huetter POE located on I-90 approximately 8.5 miles east of the Oregon/Idaho border, and the Haugan POE, located 16 miles east of the Idaho/ Montana border, are equipped with mainline weigh-in-motion (WIM) and automatic vehicle identification (AVI) technology to screen and sort truck traffic as it approaches the port. This technology allows trucks that are registered and have an active transponder to bypass the POE when their vehicle's dimensions, weight, and credentials are confirmed. East Boise and Lewiston operate with NORPASS transponders, Haugan operates using PrePass transponders, and Huetter operates using license plate readers. These four facilities employ this technology in both directions. Lewiston and East Boise have also recently been enhanced with concrete control pavement through areas of the WIM sensors to improve accurate weighments and increase the longevity of the equipment. Additionally, the software used to control the WIM system and query data at these facilities has recently been updated. Currently if a transponder is in the vehicle, or if the vehicle is identified via license plate reader, it is screened using SAFER data, an ISS Score, and IRP registration data. It provides the identification of the vehicle, unit number, VIN, base state registration, and also cross-references with Idaho permit data if the vehicle is in excess of statutory limits on size and/or weight. If a vehicle does not have a transponder, or is not recognized by the license plate reader the AVI only provides a photograph of the vehicle to be matched to the WIM data for future reference. Staff must manually enter the DOT number to retrieve vehicle and company information.

The Ashton POE also operates WIM in a virtual setup with a LPR, cameras, and a small building on site. Enforcement personnel access the site through a webserver to monitor traffic volumes, vehicle weights, and credentials. In addition, the 2016 to 2020 Idaho Transportation Investment Program (ITIP) lists $20,000 in engineering and $1.98 million in construction funding for the installation of WIM at Inkom

POE in 2016.[12] ITD staff indicate that construction has begun as of April 2016. Additionally, installation of license plate recognition (LPR)/DOT readers at East Boise, Lewiston, and Huetter is also a short-term goal.

Scales

The size of the static scales deployed at ITD's POEs varies slightly but the majority of facilities utilize a single 12×20-scale platform to conduct vehicle weighments. Scales of this size are only capable of weighing a single axle or axle group at a time, making the process of weighing a complete set of axles on a commercial vehicle a time consuming process. Lewiston has a larger (12'×100') platform scale that allows most commercial vehicles to have their axles weighed all at once without the need to readjust the vehicle while a few of the satellite facilities have smaller (12'×10' or 10'×10') scales that weigh only single axle or axle group at a time. Hollister and Marsing are the two primary POEs with these smaller scales, slowing the weighing process in comparison to the larger scales available at the other POEs, especially Lewiston.

Signage

Commercial vehicles passing by a POE must be directed into the facility by regulatory signage along the mainline. If this signage is not present, or indicates that the facility is closed, vehicles may bypass the POE. The majority of primary and satellite POEs have electronic signage in place that can be controlled from inside the associated administrative building. If a facility needs to be shut down due to weather, congestion, or for any other reason, ITD staff can flip a switch to indicate to vehicles along the mainline that the POE is currently closed. The POE can then be reopened in the same manner when needed.

There are, however, a few locations that have signs that must be changed manually. If a POE is congested and truck traffic begins to back up onto the mainline, or the POE needs to be closed for another reason, ITD staff must leave the building and travel out to the sign on the mainline to manually change the sign from open to closed, or vice versa. This process presents a significant safety hazard to both the ITD staff member, as well as the commercial vehicles in station and passenger vehicles on mainline near the POE. It is also an inefficient process for opening and closing a facility as personnel need to devote time normally spent examining commercial vehicles to traveling to and from the sign to change it.

Facilities

All of the primary and satellite POEs except Ashton and Kooskia have buildings from which personnel operate the facility. These buildings include all the basic amenities staff need to perform their duties on a daily bases. In some locations, such as East Boise, there is additional space within the building where TRS staff conducts their work. While these facilities are adequate, the majority of them are aging could use additional maintenance or updates.

[12] Email from Jeff Marker, ITD. February 25, 2016.

The only POE location that has an inspection garage is the eastbound side of East Boise POE. This inspection garage is maintained by ITD. The inspection garage does not contain an inspection pit to allow ISP officers easy access to the underside of vehicles during Level I inspections.

Rover Operations

In conjunction with fixed facilities enforcement operations, ITD utilizes 11 rover teams to perform mobile commercial vehicle enforcement at varying locations throughout the state. These teams rotate among the 17 Ports of Entry and 200 different rover sites ITD has in place across the state.

Equipment for Rover Operations

Each of the rover teams operates out of a vehicle that is outfitted with the following equipment:

- Portable signage (manual operation).
- Set of at least 10 certified portable Haenni wheel-load weighers (radial read-outs) (can weigh up to 5 axles at one time).
- 100-foot tape measure and/or wheel measuring device.
- First aid kit.
- Fire extinguisher.
- Emergency flares.
- Two-way radio.
- Laptop computer and printer.
- Height-measuring device.
- Registration forms, 120-hour permits, and all other appropriate forms and supplies.
- Red or orange flags with wooden masts.
- Other equipment as assigned by immediate supervisor.
- Mobile or cellular telephones to increase communication capabilities.

Each roving team has everything they need to weigh vehicles, perform Level III inspections, issue permits, process full-fee registrations, and write citations at the roadside.

Data Access

While all fixed POE facilities have wireless Internet access for authorized personnel, rover teams are equipped with air cards (wireless technology) which allows ITD staff to access the ITD mainframe and other state/Federal databases when signal is available. ITD also utilizes a Blue Mesh technology at its High-Bridge Rover location to provide staff with Internet access. Given the geography of the state there are, however, a number of locations throughout Idaho where wireless signal is unavailable, even with an air card. If a rover team is in a location where they do not have access to wireless then they operate using manual processes. This lack of connectivity increases the possibility of making an error, reducing reliability, and adding more work.

One possible remedy to this issue could be to leverage the locations of ITD maintenance sheds to provide wireless signal to rover units. All ITD maintenance sheds (see Figure 16) have the ability to provide wireless connectivity to the Internet as they are used for snowplow trucks in the winter. ITD could consider leveraging this wireless coverage for locations with poor cell phone signals, especially at frequently used rover sites in each District (also included in Figure 16). Alternatively, ITD could consider exploring the use of satellite communications where maintenance shed locations are not a viable alternative.

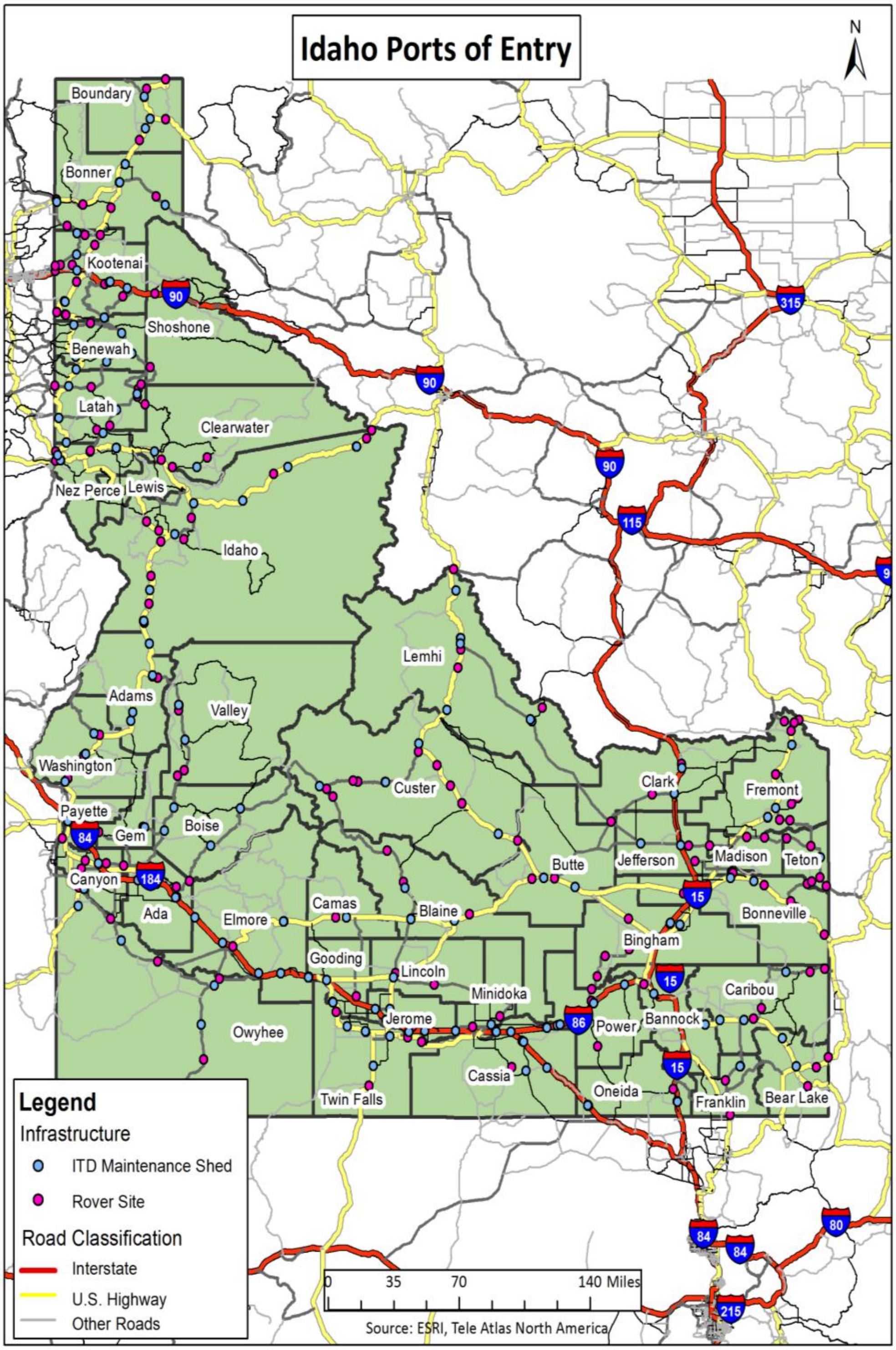


Figure 16. Map of ITD Maintenance Shed Locations
Source: ITD, Cambridge Systematics.

Traffic Volume and Business Practices

Site and Mainline Volume

East Boise is by far the busiest POE in the system in terms of facility volume with more than 1.2 million commercial vehicles entering the facility in 2014. Cotterel, Inkom, Sage Junction, and Huetter complete the top five and are the only locations with annual volumes above 200,000 vehicles. Figure 17 below shows the volume of traffic physically entering each of the Ports of Entry in 2013 and 2014.

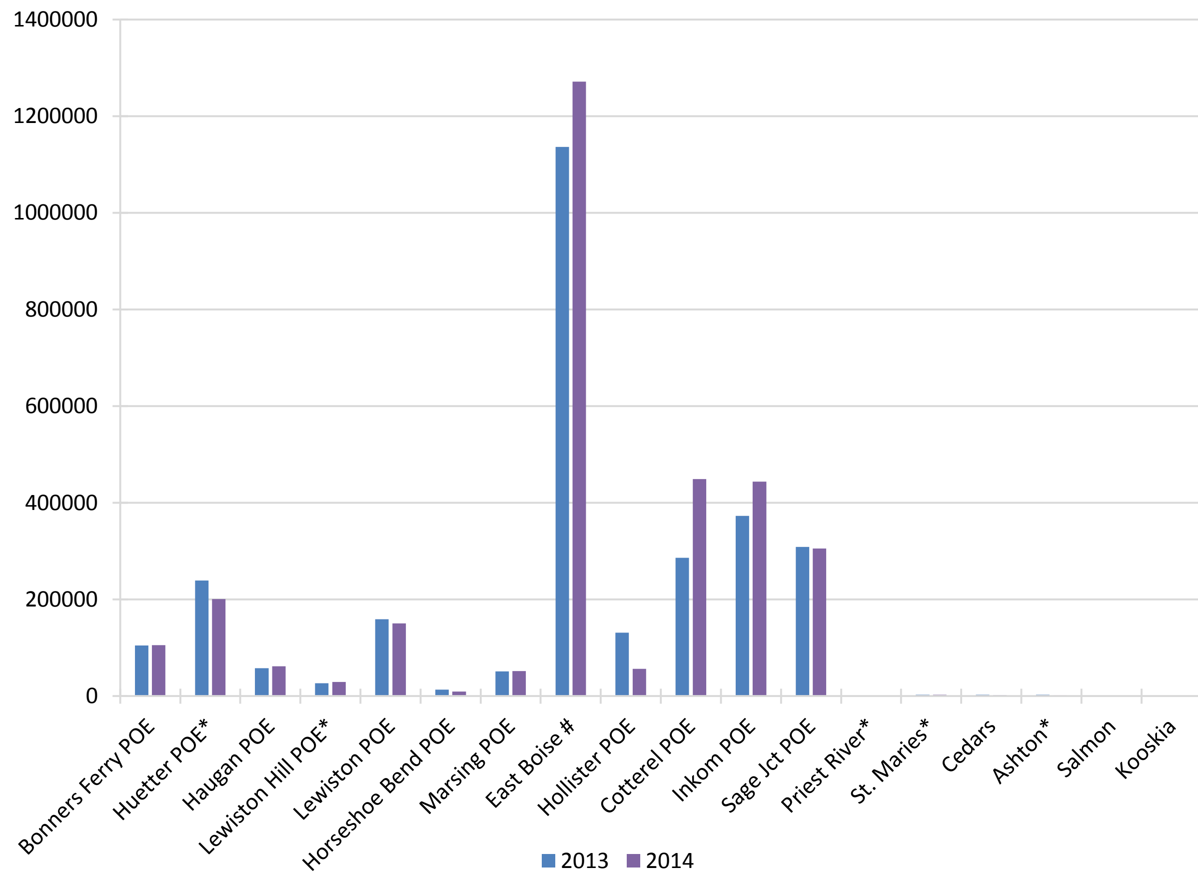


Figure 17. Chart of ITD Ports of Entry Site Volumes, 2013 to 2014
Source: ITD.

* Indicates facilities that monitor trucks traveling in one direction only. Site volumes for St. Maries, Cedars, Ashton, Salmon, and Kooskia all less than 3,000 annually in 2014.

Based on ITD data, future commercial vehicle traffic on the mainline is projected to grow for all locations. Currently, the top five facilities by mainline volume are East Boise, Cotterel, Huetter, Inkom, and Haugan. By 2035, these five POEs are projected remain the top five, though Inkom is projected to pass Huetter in mainline volume. These five will have the most trucks traveling on the mainline but may not have the highest facility volumes as this is dependent on technology deployed, staffing, and other factors that determine whether or not a truck physically enters the POE. The high facility volumes at East Boise that occur even with the use of electronic screening is an intriguing point from this analysis. Possible explanations include a large number of vehicles failing the electronic screening and being required to report, limited functionality of screening equipment such as the WIM not being active or being poorly calibrated, lack of transponder equipment in trucks passing the site, or some other factor. Additional examination of facility operations at East Boise could help determine if the POE is functioning at full efficiency or if there is a need for additional personnel or technology.

The lack of technology, including limited electronic screening, has led to a very low rate of citations issued per vehicles weighed. Priest River issued a weight citation to just over 3 percent of the vehicles physically weighed in 2014, the highest in the system. St. Maries issues the second highest ratio of citations/weighing at 2.48 percent, followed by Cedars (1.43 percent) and Hollister (1.41 percent). Even facilities with electronic screening issued a low number of citations per weighing (less than 1 percent at Lewiston POE). Again, further research is needed to determine if the low number of citations is due to POE personnel choosing to instead issue warnings or allowing drivers to offload or if the electronic screening is admitting large numbers of vehicles to the facilities that ultimately are within weight limits. Examining the rate of citations per weighing is a performance measure not in use in other states currently, though states are beginning to use similar methodology using different statistics to better understand system efficiency.[13]

Business Practices

The POE system in Idaho is staffed by inspectors employed by ITD. They are not full law enforcement officers and therefore have a lesser-level authority than the Idaho State Police (ISP) or other police officers. For example, POE personnel can only perform a Level III equivalent inspection based on the North American Standard Inspection Levels.[14] This authority is granted through an MOU between ITD and ISP. This type of inspection, also known as a Walk-Around Driver/Vehicle Inspection, focuses on examining paperwork and credentials such as a driver's record of duty status and hours of service and vehicle registration and licensing. POE ITD staff can also perform a visual walk-around check of the vehicle for obvious issues such as bad lights, improper restraints, or other safety issues. Personnel can issue warnings, citations, or contact/park for repair forms for violations found during these inspections. More detailed inspection activity, such as a Level I or Level II CVSA inspection, can only be performed by ISP personnel. In addition, only ISP conducted inspections qualify for inclusion in reporting CVSA inspections as part of the Motor Carrier Safety Assistance Program (MCSAP) Federal grant program.

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[13] See "Efficiency and Effectiveness of Weigh Station Management in Washington State" at: http://leg.wa.gov/JTC/Documents/Studies/Weigh%20Station_2015/FinalReportWeighStationStudy_January2016.pdf. This study looks at safety violations per inspection as a comparable statistic.

[14] North American Standard Inspection Levels. Commercial Vehicle Safety Alliance. On-line at: http://www.cvsa.org/programs/nas_levels.php

ITD's Procedure Manual lays out a prioritization of tasks that personnel should follow when operating a POE. These tasks include:

- Size and weight compliance.
- Vehicle measurement.
- Inspect vehicle equipment.
- Check driver qualifications.
- Check vehicle registrations.
- Check fuel tax status.
- Issue permits/endorsements.
- Provide information to the public.
- Inspect livestock papers.

ITD personnel are allowed to detain a vehicle or have a driver park for repair, but they are explicitly denied the authority to detain or arrest a driver. While ITD and State Patrol staff work closely with one another, this division of authority does present the possibility for gaps in enforcement.

Traffic stops by ITD personnel are only authorized when an inspector observes a vehicle bypass an open POE or checking station (rover site) that meets the criteria established for stopping.[15] According to the Procedure Manual, "A bypass **SHALL** be interpreted to mean those times when a vehicle is observed leaving the main highway **after encountering POE regulatory signing.**" ITD personnel may also stop trucks "presenting an imminent danger to the public in order to preserve safety" which can include situations involving flat tires or loads falling off a vehicle.

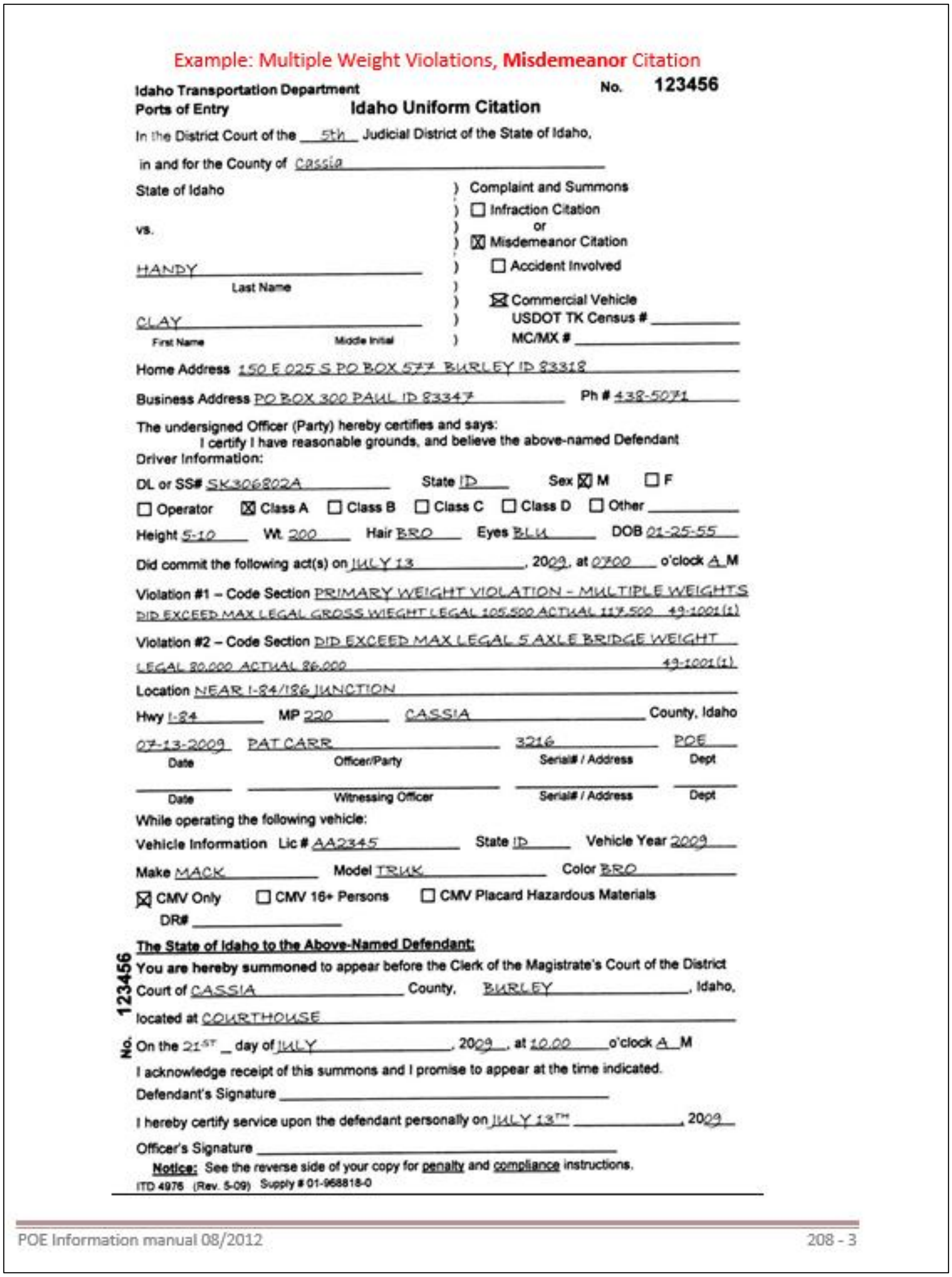
Many of the business practices conducted at the Ports of Entry include a large manual component. A typical Level III paperwork check can take approximately 15 minutes. If there are violations, warnings, or permits that must be issued, these can take another 10 to 15 minutes. The time needed to weigh a vehicle on a static scale at a fixed facility depends on the size of the scale and the size of the vehicle. At a rover site, weighing a vehicles using portable scales can often times take 15 minutes or more. Registration can also take between 30 minutes and 90 minutes depending on the specific customer. By contrast, we have observed states with greater automated processes surrounding their operations conduct these operations in half the time. It should be noted that the exact times will vary depending on individual state laws and procedures.

Data often must be entered multiple times into the system, and some roving sites still operate using paper (when operating in areas with weak cell phone reception). Although some of these duties can be accomplished by TRS personnel at the sites where they are stationed, at the majority of fixed sites and all mobile sites this paperwork must be performed by inspection personnel. Also, because Ports of Entry in Idaho are allowed to process and issue permits and registrations and collect fees, there is an

15 Section 40-511(1), Idaho Code. Vehicles with a maximum, registered, or operating gross weight of 26,001 pounds or more transporting merchandise, product, or commodity must stop. Vehicles or combinations of vehicles transporting livestock or placardable quantities of hazardous materials with a maximum gross weight of 10,000 pounds or more must stop.

increased probability that additional paperwork will be required compared to states where permits and registration can only be done on-line through a centralized process. Idaho has an on-line permitting system (Access Idaho) but does not require its use for all transactions. For example, Idaho's current systems for oversize/overweight permits lag the functionality of many other western states.

Rover sites are still largely reliant on paper for their work, especially if they operate in areas with weak cellular reception and no wireless Internet availability. Queries – such as checking if a driver's license is revoked or suspended – must be relayed by radio through a fixed port of entry if cell phone coverage is not available. Observation reports must be stored on a laptop for future download to the ITD mainframe. Even at the fixed facilities, citations are handwritten. The issuing Inspector must then enter the written version into the mainframe as this process cannot be done by TRS personnel. This dual entry increases the possibility of human error. Figure 18 is an example of an initial weight violation form that must be completed and then changed into code for entry into the ITD database. Additionally, fax machines are still relied on to transfer some confidential data (such as information from the Idaho Law Enforcement Telecommunications System – ILETS) as the state email system does not have the required encryption-level to transmit over the Internet.



Example: Multiple Weight Violations, **Misdemeanor** Citation

Idaho Transportation Department No. **123456**
Ports of Entry **Idaho Uniform Citation**

In the District Court of the 5th Judicial District of the State of Idaho,
in and for the County of Cassia

State of Idaho) Complaint and Summons
) ☐ Infraction Citation
vs.) or
) ☒ Misdemeanor Citation
HANDY) ☐ Accident Involved
Last Name)
) ☒ Commercial Vehicle
CLAY) USDOT TK Census # ______
First Name Middle Initial) MC/MX # ______

Home Address 150 E 025 S PO BOX 577 BURLEY ID 83318
Business Address PO BOX 300 PAUL ID 83347 Ph # 438-5071

The undersigned Officer (Party) hereby certifies and says:
I certify I have reasonable grounds, and believe the above-named Defendant
Driver Information:
DL or SS# SK306802A State ID Sex ☒ M ☐ F
☐ Operator ☒ Class A ☐ Class B ☐ Class C ☐ Class D ☐ Other ______
Height 5-10 Wt. 200 Hair BRO Eyes BLU DOB 01-25-55
Did commit the following act(s) on JULY 13, 2009, at 0700 o'clock A M
Violation #1 – Code Section PRIMARY WEIGHT VIOLATION – MULTIPLE WEIGHTS DID EXCEED MAX LEGAL GROSS WIEGHT LEGAL 105,500 ACTUAL 117,500 49-1001(1)
Violation #2 – Code Section DID EXCEED MAX LEGAL 5 AXLE BRIDGE WEIGHT LEGAL 80,000 ACTUAL 86,000 49-1001(1)
Location NEAR I-84/I86 JUNCTION
Hwy I-84 MP 220 CASSIA County, Idaho

07-13-2009 PAT CARR 3216 POE
Date Officer/Party Serial# / Address Dept

Date Witnessing Officer Serial# / Address Dept

While operating the following vehicle:
Vehicle Information Lic # AA2345 State ID Vehicle Year 2009
Make MACK Model TRUK Color BRO
☒ CMV Only ☐ CMV 16+ Persons ☐ CMV Placard Hazardous Materials
DR# ______

The State of Idaho to the Above-Named Defendant:
You are hereby summoned to appear before the Clerk of the Magistrate's Court of the District Court of CASSIA County, BURLEY, Idaho,
located at COURTHOUSE
On the 21ST day of JULY, 2009, at 10.00 o'clock A M
I acknowledge receipt of this summons and I promise to appear at the time indicated.
Defendant's Signature ______
I hereby certify service upon the defendant personally on JULY 13TH, 2009
Officer's Signature ______
Notice: See the reverse side of your copy for penalty and compliance instructions.
ITD 4976 (Rev. 5-09) Supply # 01-968818-0

No. 123456

POE Information manual 08/2012 208 - 3

Figure 18. Photo of ITD Example Misdemeanor Citation Form
Source: ITD POE Procedures Manual. August 2012.

The Port of Entry Procedure Manual outlines the steps that inspectors take as a vehicle approaches a fixed station. A number of the steps introduce the possibility of error and increase the time needed to process the vehicle. For example, Step 4 is the entering of a vehicle's license plate, U.S. DOT number, or carrier name and unit number into the ITD Observation Screen and Step 5 is receiving back the pertinent data. The inspector must enter this information manually once the information is close enough to be visible. If the station employed electronic screening such as a license plate reader on the mainline, this information would be collected electronically, and the database queried before the vehicle even entered the weigh station, reducing the time needed at the station. Huetter and Ashton are the only stations currently operating a license plate reader system.[16] If any issues are discovered in the paperwork or during the weighing, the truck must be parked and the driver must enter the scale house with paper copies of all relevant documents including permits, credentials, logbook, and bills of lading for the commodities carried. This information must be reviewed by the POE personnel by checking against relevant databases as necessary (CVIEW, ILETS).

Haugan's unique location and joint operation by ITD and the Montana DOT adds one further layer of complexity. ITD pays for half of the operating expenses at Haugan each year; totals for 2010 through 2014 are shown in Table 5 below. While the facility serves as a POE for both states, officers at the facility rarely issue citations for Idaho-bound traffic. Comparing traffic, citation, and revenue data with Montana DOT could help inform ITD of the effectiveness of this location. Note that the table does not include money spent to replace the scales at the facility.

Table 5. ITD Costs for Haugan POE

Calendar Year	2010	2011	2012	2013	2014
Monthly Charges	$185,800	$261,000	$229,800	$153,600	$248,700
Annual Scale Charges/Scale Purchases	$2,100	$27,300	$2,300	$700	$1,100
Total Paid to MDOT	**$187,900**	**$288,300**	**$232,100**	**$154,300**	**$249,800**

Source: ITD. Figures rounded to nearest hundred, errors due to rounding.

In Federal Fiscal Year 2014, Idaho's Ports of Entry weighed more than 1.5 million vehicles at the fixed and roving sites, issued nearly 14,000 warnings, and wrote 4,368 weight citations. Table 6 provides an overview of operations and enforcement data for ITD's primary and satellite POE locations as well as an aggregate of the rover teams in 2014.

In addition to obtaining credentials at the POEs, carriers may also purchase permits on-line through Access Idaho, in person at an ITD office, or via the mail. In addition to the credentials and permits issued at the POEs, an additional 14,489 Credentials and 18,833 Permits were issued through Access Idaho in 2014. In total, Access Idaho generated a total of $1,995,284 in revenue from the issuance of credentials and registrations in 2014. Revenue generated by the POE system is subject to the Highway Distribution Account formula.[17]

16 Inkom POE is scheduled to receive a LPR system in 2016.

17 For further information, see http://itd.idaho.gov/econ/UserRevenue.htm

Table 6. Idaho Ports of Entry Operations and Enforcement, *2014*

Port of Entry	Operating Costs ($)	Revenue ($)	Mainline Volume (2014)	Mainline CAADT (2014)	Percent Truck AADT	Personnel	Facility Volume	Vehicles Weighed	Citations Issued	Credentials Issued	Permits Issued
Ashton	ND	ND	5,000	780	15.6%	Rovers	1,695	817	ND	ND	ND
Bonners Ferry	131,000	12,315.75	4,600	850	18.4%	2	105,394	48,462	82	137	56
Carmen (Salmon)	ND	ND	1,700	150	8.8%	Rovers	182	112	ND	ND	ND
Cotterel	368,000	577,603.96	7,900	3,600	45.6%	7	449,272	231,270	1,423	6,517	1,978
E Boise	719,000	377,171.96	22,000	5,600	25.5%	11	1,271,309	1,270,077	1,994	4,561	1,610
Haugan	162,000	216,482.00	6,800	2,300	33.8%	4	61,801	40,564	0	3,342	220
Hollister	132,000	332,146.12	3,200	720	22.5%	2	56,686	27,809	391	2,820	416
Horseshoe Bend	113,000	7,986.39	4,700	550	11.7%	1	9,487	9,462	104	78	109
Huetter	387,000	520,524.88	54,000	3,500	6.5%	6	200,731	126,733	102	4,967	768
Inkom	555,000	917,926.20	16,000	3,000	18.8%	8	444,064	257,814	1,227	5,175	1,157
Kooskia	ND	ND	4,000	520	13.0%	Rovers	571	58	ND	ND	ND
Lewiston	312,000	908,481.14	15,000	1,400	9.3%	4	150,862	137,558	310	5,008	1,547
Lewiston Hill	59,000	9,466.25	9,600	800	8.3%	1	29,597	20,708	86	68	165
Marsing	81,000	21,954.00	1,600	500	31.3%	2	51,764	50,449	27	277	100
Priest River	ND	ND	3,300	780	23.6%	Rovers	683	425	13	ND	ND
Sage Junction.	400,000	1,241,268.79	4,650	1,260	27.1%	5	305,370	191,972	693	6,872	1,171
St. Maries	ND	ND	4,400	360	8.2%	Rovers	2,809	1,453	36	ND	ND
Roving sites	1,270,000	2,108,469.66	ND	ND	ND	22 total	62,507	15,702	1,766	1,106	422
POE PROGRAM TOTAL	**5,309,553**	**7,251,797.10**	**168,450**	**26,670**	**15.8%**	**75[a]**	**3,207,414**	**2,431,585**	**8,256**	**55,417**	**28,552**

ND: No Data. Credentials and Permits Issued are for at-site purchases only. Operating Costs include operating and staffing costs as well as capital outlay.

[a] Personnel does not include supervisors, employees in over legal Permit Unit, or TRS staff.

On-line Industry Survey Results

An important input for this study is the inclusion of thoughts, opinions, and insights from industry stakeholders. In order to capture industry feedback, a survey was designed to obtain information on Idaho's POE performance directly from the trucking industry. The survey consisted of 33 questions, designed to capture the opinions of truckers currently experiencing Idaho's commercial vehicle enforcement activities.

General Survey Characteristics

The survey was designed to be completed on-line and was also made available for traditional handwritten responses at an Idaho Loggers Association conference. In order to promote open and honest responses participants were allowed to respond anonymously. In total, the survey had 144 responses, and was sent to roughly 5000 different email addresses. The overall response rate (3 percent) was low and likely the result of the requested distribution method (e-mail from Cambridge Systematics staff) and outdated e-mail address information. ITD may wish to re-run this survey in a more formal manner in the future. The total number of responses were primarily on-line, as 134 surveys were filled on-line (93 percent of the total number of surveys) and 10 were received physically (7 percent of the total number of surveys). Out of the total number of survey responses, 75 on-line surveys were completed in full (56 percent of the total on-line surveys), and 7 physical surveys were completed in full (70 percent of the total number of physical surveys received). The remainder of the surveys were incomplete but had responses to many of the survey questions. As a result, the survey had a completion rate of 57 percent. These rates are helpful to account for the presence of response bias – a characteristic of surveys being responded only by proactive participants, influencing the results of the analysis – and understanding how engaged respondents were with the survey.

Respondent Characteristics

To facilitate truthful responses, the respondents are treated with anonymity. However, the first set of questions were targeted to obtain general information from the respondents, which aggregated could provide a useful description of the industry.

In general, most of the respondents (85 percent) have been driving commercially for over 10 years. Furthermore, more than half of the respondents (54 percent) operate a commercial vehicle daily in Idaho. Three out of four respondents stated that they operate a commercial vehicle in Idaho at least once a week. It can be observed that the most mentioned states were the neighboring states, starting with Washington State (mentioned 9 percent of the time), followed by Montana (mentioned 8 percent of the time), and followed by Oregon (mentioned 7 percent of the time).

Characterizing Port of Entry Operations

The next set of questions was targeted at understanding how the respondents were interacting with the Ports of Entry. According to the respondents, the most utilized POE is East Boise (mentioned 13 percent of the time), followed by Lewiston (mentioned 12 percent of the time) and Inkom (mentioned 12 percent of the time). These three POEs are identified as primary POEs. The most used Satellite POEs were Lewiston Hill (mentioned 9 percent of the time), Bonners Ferry (mentioned 5 percent of the time), and Horseshoe Bend (mentioned 5 percent of the time). Figure 19 shows the percentage of respondents that traveled through each of the POEs in the last year.

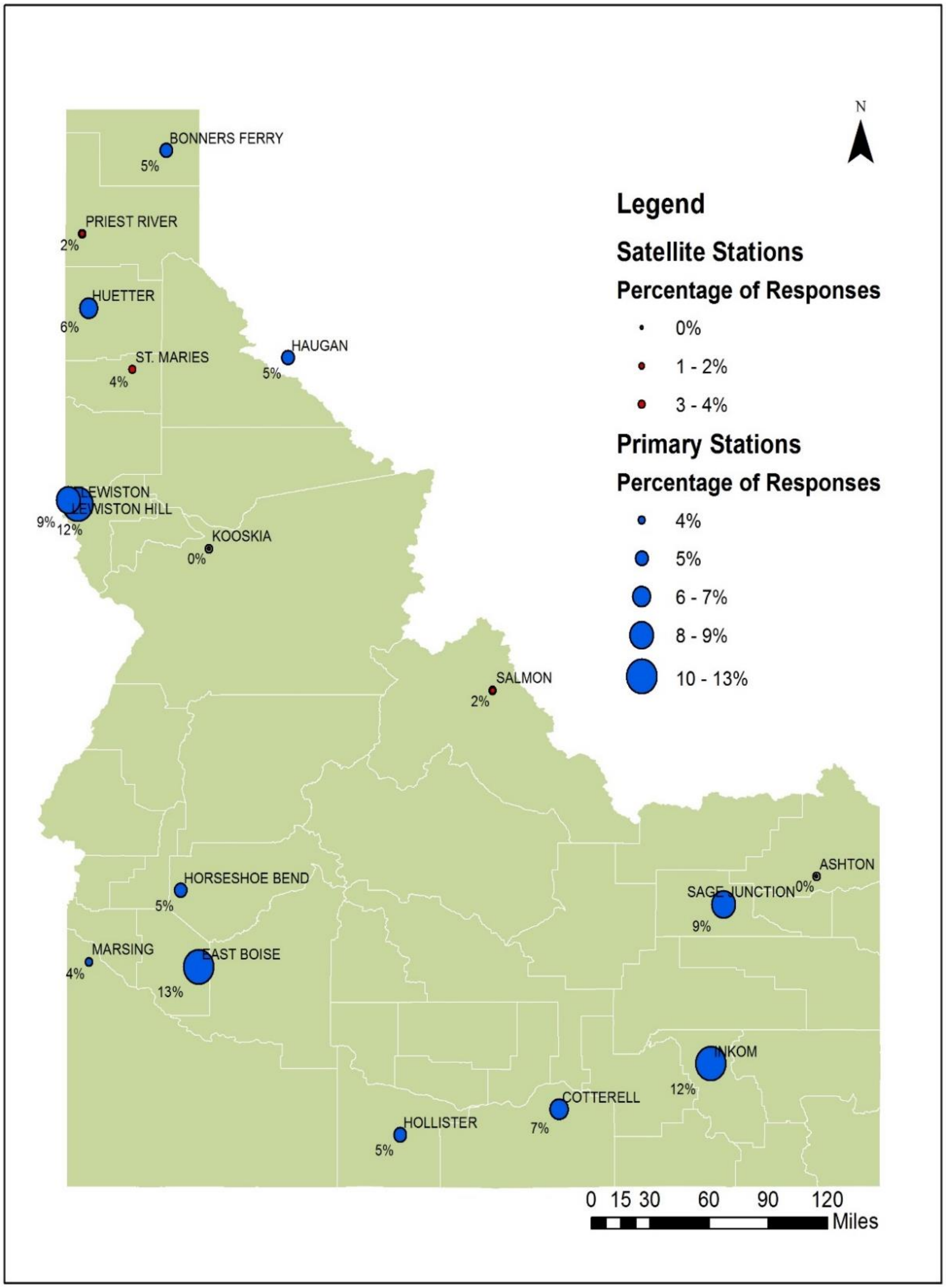


Figure 19. Map of Percentage of Respondents that Traveled Through ITD POEs
Source: Cambridge Systematics, Inc.

Regarding the POEs operation, the respondents stated that approximately 20 percent of the times they pass through a POE it is not open. Furthermore, the respondents stated that they are instructed to bypass the POE approximately 10 percent of the time. To be instructed to bypass, the respondents stated that the most commonly used strategy was through Changeable Electronic Message Signs and through the use of transponders. The least used strategy to instruct the driver to bypass the facility was via radio.

The participants were asked to identify the POEs that processed trucks the quickest. The respondents agreed that the POE that processes trucks the quickest is East Boise (with 31 percent of the responses). However, when asked which POE is the slowest to process trucks, the respondents also mentioned East Boise as being the slowest, showing that there is no general consensus on which POE is the slowest or fastest, or that the respondents may be influenced by their own travel patterns such as time of day or variable POE volume.

When asked what characteristics makes the POE more efficient, 72 percent of the respondents agreed that it was due to the use of technology (with 42 percent of the responses), followed by well-trained staff (with 34 percent of the responses). The characteristics that make a POE operate slowly were primarily the presence of large volumes of trucks (mentioned 38 percent of the time) and lack of technology (mentioned 21 percent of the time). As for the most time consuming processes during the inspection processes, respondents agreed that it is waiting in line to enter the station (mentioned 28 percent of the time) followed by the safety vehicle check (mentioned 27 percent of the time). Figure 20 shows the results obtained to describe the most time consuming functions taking place at fixed or satellite POEs. However, the majority of the respondents stated that the delays experienced during the performance of the various POE functions were not unreasonable.

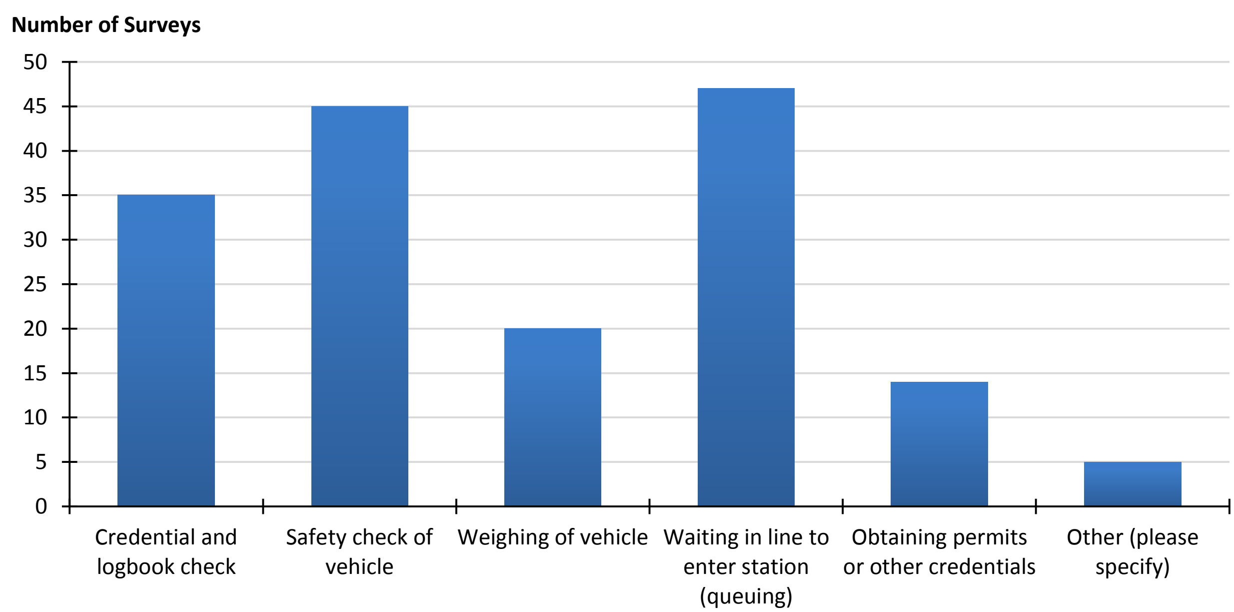


Figure 20. Chart of Most Time-Consuming POE Functions
Source: Cambridge Systematics, Inc.

Finally, the respondents were asked to identify if any of the POEs were located in a less than ideal location due to geography, traffic patterns, or other operational issues. The principal POEs most often mentioned were Huetter (mentioned five times) and Hollister (mentioned five times as well). As for satellite POEs, the most mentioned station was Horseshoe Bend (mentioned six times), followed by Bonners Ferry (mentioned five times). Regarding the possibility of bypassing a specific station, half of the respondents agreed that no POE is easy to bypass. However, the stations most often mentioned as easy to bypass were East Boise (mentioned eight times) and Huetter (mentioned five times).

Finally, the participants were asked to identify which of the fixed stations they consider to be dangerous due to site design issues, crossing traffic, and other operational conditions. The majority of the participants agreed that the station that could be considered most dangerous is Horseshoe Bend (mentioned eight times), followed by Hollister (mentioned seven times). When asked to provide further detail on their consideration, the majority of the responses focused on crossing traffic issues and merging back to the mainline.

Characterizing Rover Site Operations

The next set of questions was focused on understanding the operation of rover sites in the State of Idaho. Responders were first asked how many times they encountered a rover site in the past year. The majority of the respondents (45 percent) stated that they encountered less than 10 rover sites in the past year. An interesting finding was that the third largest group of respondents (14 percent of the respondents) have never encountered a rover site. When asked how often they were instructed to stop at a rover site, the median response was 7 percent, however, only 42 percent of the total surveys responded to this question.

The participants were then asked if rover sites were better at performing different processes of the commercial vehicle check procedure. In general, the respondents agreed that these stations perform similarly to fixed stations regarding the credential check-up process and the vehicle safety walk-around. However, the majority of the respondents agreed that rover sites were slower at quickly weighing vehicles, processing paper work, and maintaining traffic flows. The respondents had a divided opinion when asked to identify the most time consuming functions occurring at rover sites. Nearly 30 percent of the respondents stated weighing the vehicle and the safety vehicle check were the most time consuming. As with the primary and satellite sites, most of the respondents considered that the time spent in the commercial vehicle enforcement processes at rover sites was not unreasonable. Furthermore, participants were asked what type of violations they felt rover site personnel treated with the highest and lowest priority. The results show that respondents think that rover staff treat dimension violations with highest priority and vehicle safety (tires, brakes, and lights) as the least priority activity. Figure 21 shows the priority ranks for the violations considered.

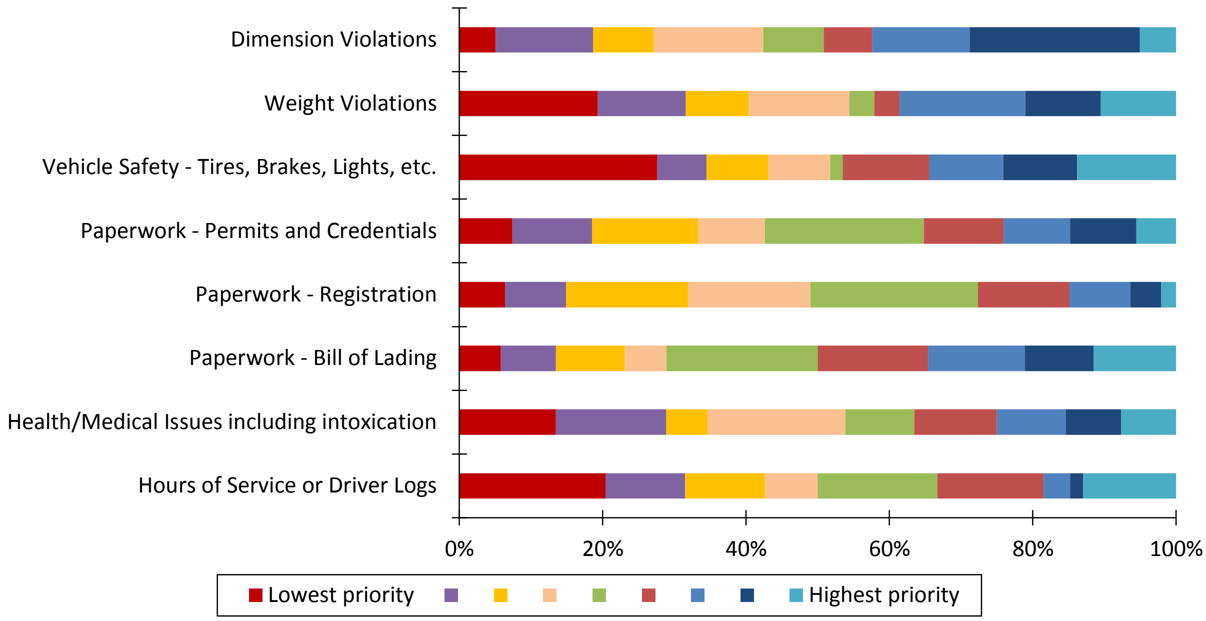


Figure 21. Chart of ITD Rover Site Violation Priority
Source: Cambridge Systematics, Inc.

The participants were then asked how often they are aware of roving sites. The majority of the respondents (69 percent) stated that they are occasionally aware of their presence, only 9 percent of the respondents stated that they are always aware of their presence.

General Operations of Idaho POEs

Finally, the last set of questions was focused on understanding the respondents' perception of current POE operations in Idaho, and identifying areas for improvement. The first question was focused on understanding the respondents' opinions on utilizing or expanding various technologies to support commercial vehicle enforcement. Participants showed a preference to expand or start using more mainline WIM, POE-WIM, NORPASS technology, and Changeable Message Signs. The technology participants preferred to decrease the use of most was thermal imaging. Figure 22 shows the responses obtained to determine the participants support, or opposition to, different technologies.

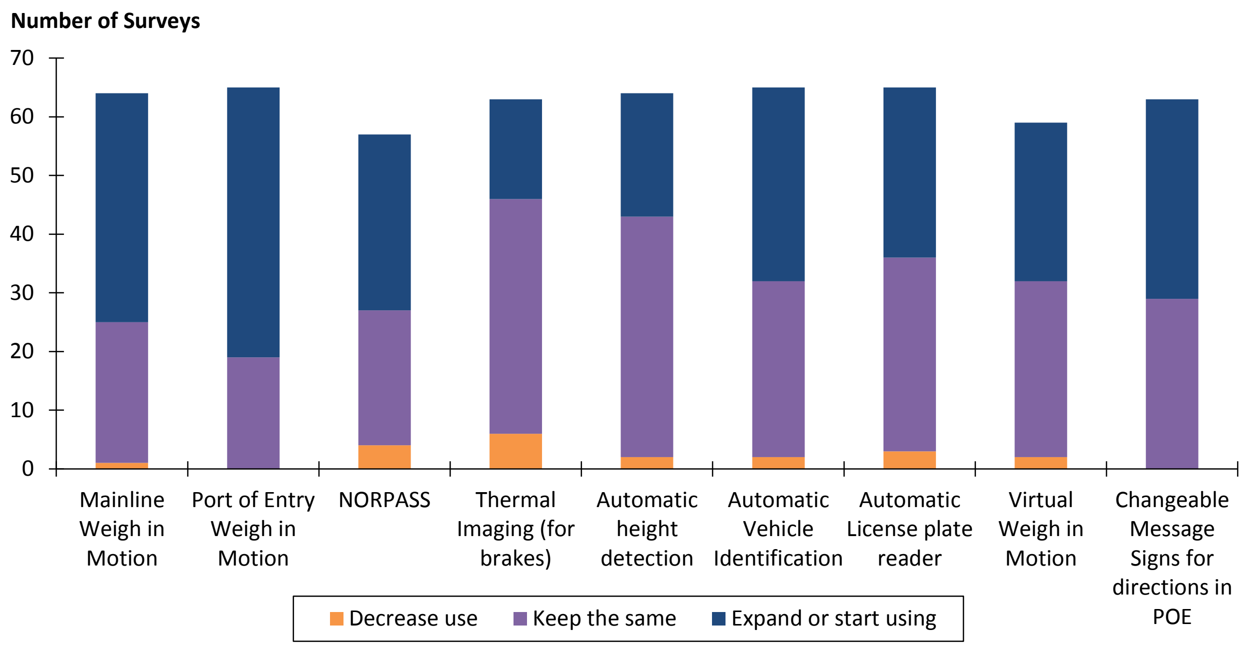


Figure 22. Chart of Support for Various POE Technology
Source: Cambridge Systematics, Inc.

The participants were then asked if they were willing to pay a fee to participate in the transponder program. The majority of the responses (64 percent of the respondents) stated that they were not willing to pay a fee. However, only 49 percent of the respondents answered this question. Furthermore, participants were asked if they prefer to perform different transactions on-line or in person at POE. In general, the majority of the responses stated a preference to do all of the transactions (registration renewal, hazardous material permits, oversize/overweight permits, temporary trip permits, and fuel/ IRP/IFTA Permits/Payment) on-line.

Comparing Idaho's POE performance with other states, the majority of the respondents (73 percent) agreed that ITD staff are as efficient as enforcement staff in other states at processing vehicles. Eighteen percent of the respondents stated that ITD staff perform better than other states. When asked which states performs best at weight and safety enforcement, the majority of the responses (64 percent) identified Illinois as the best state at commercial vehicle enforcement operations.

Participants were then asked what practices or technologies the State of Idaho should consider adopting. The majority of the comments given mentioned promoting the use of transponder systems. In general, the majority of participants (88 percent) agreed that the State of Idaho POE system is maintaining a level playing field in the industry. There is also a high satisfaction level across the survey participants. The majority of the responses (46 percent) stated that they are satisfied with the services provided by the State of Idaho, 18 percent stated being very satisfied. Only 7 percent stated being either dissatisfied or very dissatisfied (4 and 3 percent, respectively).

Chapter 3
Best Practices

Summary of Work Performed

This section presents a high-level overview of current commercial vehicle enforcement operations, and the technology used in support of these operations around the country. Size and weight enforcement of commercial vehicles is mandated by the Federal Government. In 1978, the Surface Transportation Assistance Act (STAA) provided the United States Department of Transportation (U.S. DOT) the ability to require States to enforce size and weight standards. This legislation allowed the Federal Highway Administration (FHWA) to withhold up to 10 percent of a state's Federal aid funding for failing to adequately enforce standards or failing to certify and report their activities. This policy is documented in 23 CFR (Code of Federal Regulations) Part 657.

The primary purpose of commercial vehicle enforcement is to improve the operations of the portion of commercial vehicle industry that exercises poor behavior in order promote safety on the roadways, preserve the state's infrastructure, and to create a level playing field for industry. The common and essential task for commercial vehicle enforcement at a state level is the gathering of data about each truck and driver to evaluate, confirm, and validate compliance with weight, safety, and credential regulations. While all states perform some level of commercial vehicle enforcement, each has developed their own strategy for doing so. These strategies include differing ways to both collect data on, and evaluate, commercial vehicles.

This section examines the different strategies used to conduct commercial vehicles enforcement in various states across the country in an effort to determine best practices applicable to the State of Idaho. This was done through a combination of on-line research, literature review, and a series of interviews with five other states. The states interviewed as part of this effort were Florida, Nevada, Oregon, Tennessee, and Washington. These states are considered leaders in the adoption of enforcement technology and offer a range of enforcement approaches.

The remainder of this section identifies operational and staffing strategies, currently deployed and potential future technology, and a brief summary of electronic screening alternatives and wireless inspection technology. Appendix B contains summaries of the state interviews conducted as part of this task.

Operational Strategies

There are two general strategies to commercial vehicle enforcement, fixed facility enforcement, and mobile enforcement. States that utilize the fixed facility strategies to commercial vehicle enforcement fall into one of two subcategories; port of entry states or weigh station states. Weigh station states locate facilities along high-volume corridors and do not offer any administrative services at the facility.

The sole focus of these facilities is commercial vehicle enforcement. Port of entry states typically locate their fixed facilities at, or within a short distance of, their state borders. The focus of these facilities is to screen commercial vehicle traffic entering their state and provide registration and permitting services as needed to the commercial vehicle operators. Idaho operates as a port of entry state.

States that utilize a mobile strategy to commercial vehicle enforcement will deploy teams of personnel to perform commercial vehicle enforcement at the roadside instead of at fixed facility locations. These teams of personnel select locations for conducting mobile enforcement through a combination of experience, anecdotal evidence, and data collected by technology at the roadside. Nevada utilizes this strategy.

Traditionally, states have elected to choose only one of these strategies and focus their resources in support it. Over time, in part due to increases in commercial vehicles volumes on the highway system and diminishing enforcement resources, states have begun blending the two strategies in an effort to improve their enforcement efficiency by strategically complementing one strategy with the other. Washington, Florida, Oregon, and Tennessee use this blended approach to commercial vehicle weight and safety enforcement. Idaho operates using a blended approach as well.

Fixed Facilities

Weigh Stations

Weigh stations are fixed facilities where commercial vehicles are inspected for safety and credential compliance, and evaluated to ensure they are operating within legal size and weight limitations. The facilities typically consist of a set of static scales, an administrative building, and sometimes a garage in which to conduct inspections. Normally, weigh stations are located on major corridors, with high mainline truck traffic volumes. These facilities can be strategically placed near a border crossing for evaluation of interstate trucks, and placed within the state for evaluation of intrastate trucks. This approach allows for the evaluation of both interstate and intrastate commercial vehicles as the state sees fit. Depending on the road and traffic characteristics, these stations can operate in one or both directions of travel.

The typical functions performed at a weigh stations include:

- **Commercial Vehicle Safety Enforcement –** Level I, II, and III Commercial Vehicle Safety Alliance (CVSA) inspections.
- **Commercial Vehicle Size and Weight Enforcement –** Width, height, length, inner bridge, external bridge, king-pin length, weights of axles, axle groups and gross vehicle weight.
- **Commercial Vehicle Credential Verification –** International Registration Plan, International Fuel Tax Agreement, Oversize, and Overweight, Unified Carrier Registration.

Weigh stations are normally staffed with enforcement personnel who determine which vehicles should be pulled into the facility for further evaluation and, potentially, inspection. Personnel often utilize mainline screening technology to assist in determining which vehicles need further evaluation, and which should be allowed to bypass the facility. Once a vehicle is pulled into the facility staff evaluates the vehicle's size, weight, credentials, and conducts a visual safety evaluation. If the vehicle lacks proper credentials, exceeds size or weight limitations, or fails to pass the visual inspection, the vehicle and driver may be given a formal inspection. If during this inspection, issues with the driver or vehicles are identified, the vehicle can potentially be placed out of service until these issues are resolved.

States utilizing weigh stations for commercial vehicle enforcement generally issue credentials through website or telephone services. Drivers or carriers would leverage these on-line or telephone services to address any credentialing issues identified during an inspection as there are no on-site personnel available to issue credentials.

Provided a weigh station facility is outfitted with adequate technology and it is utilized efficiently, this strategy can allow enforcement personnel to process a large number of vehicles by focusing on bringing into the facility only the vehicles with the highest chance for violation and allowing the others to bypass. The downside of this approach is that because the facility is placed in a static location, commercial vehicle operators will often times utilize alternative routes to bypass the facility and avoid evaluation.

Ports of Entry

Ports of Entry (POE) are fixed facilities very similar to weigh stations. The primary difference between the two are in the functions performed at the facility and the typical locations. Whereas weigh stations can be located all throughout a state, POEs tend to be located at or within a short distance of a border crossing. These facilities are often focused on evaluating inbound traffic, seeking to screen, evaluate, and inspect commercial vehicles entering the state. Depending on the location of the POE, and resources available, commercial vehicle traffic in both directions will sometimes be evaluated. The other difference between weigh stations and POEs is that POEs also generally provide some sort of credentialing and permitting services on-site. In addition to those functions performed at a weigh station, functions performed at a POE include the following:

- **Commercial Vehicle Credential Issuance –** International Registration Plan, International Fuel Tax Agreement, Oversize, and Overweight, Unified Carrier Registration.
- **Noncommercial Motor Vehicle Transactions –** Licensing, Vehicle Registration, VIN Verification.

To perform these activities, POEs will sometimes have a larger footprint, to provide room for conducting administrative functions within the on-site buildings.

One potential advantage to utilizing POEs is the increased focus on customer service, providing drivers with the ability to obtain credentials on-site, as needed. This can potentially be useful in rural areas where Internet is unavailable. A potential negative of this approach is that performing this function either requires additional staff or enforcement personnel to split their time between conducting commercial vehicle enforcement activities and conducting administrative activities, making them less efficient at both. Also, because part of their primary function is on providing credentials to carriers as they enter the state, POEs tend to be focused more on traffic entering the state and less on traffic traveling within the state. As with weigh stations, POEs are fixed facilities in a single location and are subject to the same bypass concerns.

Mobile Enforcement

At some level, all states perform mobile enforcement operations in their jurisdiction. Some states, however, rely on mobile enforcement as the primary approach for weight and safety enforcement as opposed to relying on fixed facilities.

The mobile enforcement strategy involves officers strategically moving around the state, identifying vehicles to provide evaluation of size, weight, or safety using some combination of on-board technology equipment, past experience, anecdotal evidence, their geographic location, data collected by roadside technology, or their professional judgment. Once a vehicle is identified for further evaluation, it is either pulled over to the side of the road, or escorted to a safe parking area nearby, where the officer will evaluate the vehicle's credentials, perform any appropriate CVSA inspection, or weigh the vehicle with portable scales. In some cases, mobile units set up temporary weigh stations at pull-offs or rest areas for enforcement purposes.

Nevada and New York are examples of states that utilize this strategy to conduct commercial vehicle enforcement in their jurisdiction. New York is a 'probable cause' state that is unable to use technology alone to target specific carriers for review. Vehicles must be selected through the use of officer judgment or random selection. Given this limitation, New York uses a combination of certified non-enforcement inspectors and enforcement personnel to perform commercial vehicle enforcement operations at various rest areas, and at the roadside, throughout the state. Other states, including many in the more urban Northeast, elect to use mobile enforcement as their primary means of enforcement when their fixed facilities are easily bypassed by numerous secondary routes.[1]

The primary advantage of the mobile enforcement strategy is its flexibility. This strategy allows officers to increase enforcement coverage and discourage carriers from avoiding fixed facilities through bypass routes. The flexibility afforded by this strategy also allows for states to conduct targeted enforcement efforts at locations, or along corridors, where they find violations to be overly frequent. The disadvantage of this strategy is the lack of equipment and infrastructure, such as fixed scales and inspection garages, to support inspections operations. This tends to make mobile enforcement less efficient than operations performed at fixed facilities.

Staffing Strategies

The staff composition of commercial vehicle enforcement personnel across the country is primarily sworn enforcement officers, such as state, county, and local police. Generally speaking, there is a specific subset of officers within these agencies that are focused solely on enforcing commercial vehicle regulations. Their authority outside of this particular area varies from state to state. An example of a

[1] Arizona Ports of Entry Study, Arizona department of Transportation, Cambridge Systematics, 2013.

state that utilizes this strategy is Arizona. Arizona is a POE state that staffs all of their facilities solely with sworn enforcement personnel. They perform all POE functions from vehicle evaluation and inspection to credential review and issuance. POE personnel work solely at the POEs and do not conduct other enforcement activities. As mentioned earlier, the inherent disadvantage of this is that enforcement personnel are forced to split their time between conducting enforcement and performing administrative functions, limiting the time they can spend identifying violations.

There are, however, states that utilize civilian staff to support commercial vehicle enforcement operations. The approach to this varies and is highly dependent on how the laws in a given state are written. Florida, for example, employs civilian personnel at their weigh stations to conduct weight and credential enforcement. These staff are only allowed to issue credential and weight violations, they are unable to issue any sort of safety violations. Sworn officers are staffed at the facilities and they focus entirely on identifying vehicles on which to conduct CVSA inspections. This split of responsibilities allows for each set of staff to focus on their specific area of concern. The advantage of this strategy is that it maximizes the amount of time trained personnel can spend evaluating vehicles for safety violations.

Currently Deployed Technology

This section presents a compilation of the most innovative technologies currently being used to gather data, evaluate data and share data for commercial vehicle enforcement. Transportation technology is currently evolving at an accelerated rate. Cost of technology is dropping as market size increases and improved connectivity across different devices and platforms is revolutionizing the transportation industry. Current truck enforcement processes by staff involve a large number of technologies in their everyday operations. Figure 23 shows a commonly deployed technological set up for conducting commercial vehicle enforcement.

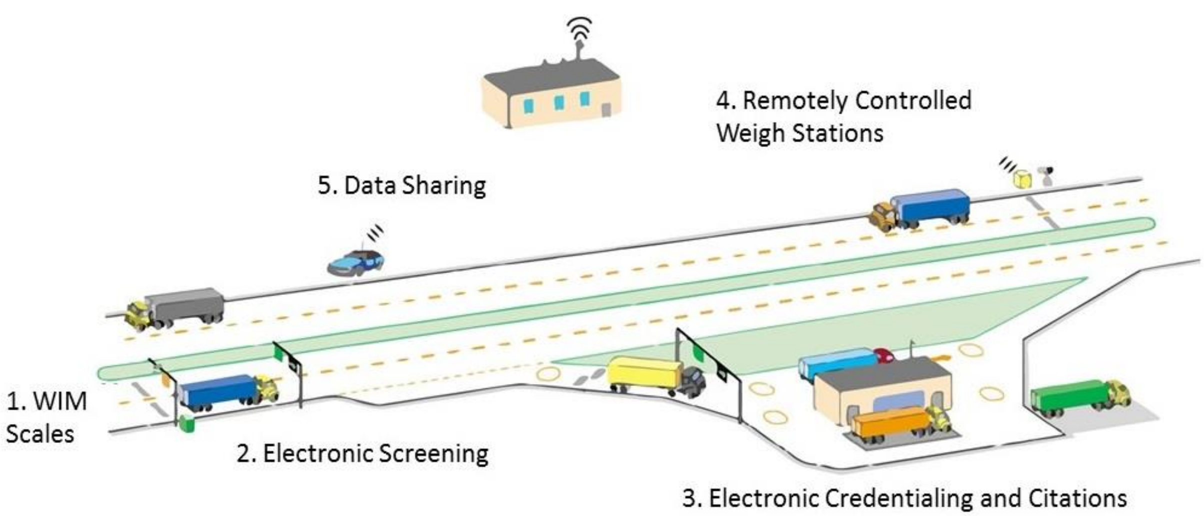


Figure 23. Illustration of Typical Commercial Vehicle Enforcement Deployment
Source: Mettler Toledo.

Scales

Scales for truck enforcement are typically divided into two major groups, dynamic and static scales. Each of these two types of scales can be used to support and assist truck enforcement operations. Dynamic scales are more commonly called Weigh-In-Motion (WIM), and are typically located on mainline or on entry ramp into station, and static scales are located in the station near a control room. WIM are used to screen trucks for potential violation, and static scales are used for direct enforcement, to evaluate and confirm if a truck is actually in violation. WIM are not currently used in U.S.A. for direct enforcement.

Weigh-in-Motion Scales

Weigh-in-motion scales are one of the tools commercial vehicle enforcement staff use to measure the distance between axles, determine axle group weights, and determine gross weights while the vehicle is traveling along the mainline. Some WIM are arranged to also measure speed at which each axle passes and extrapolate out the vehicles overall. All of this can be done at interstate speeds. WIM scales can be a vital tool to help enforcement staff preserve highway infrastructure. Thus, accuracy, reliability, and repeatability of these WIM scales are essential for operational effectiveness. Currently WIM scales cannot be used for direct enforcement here in the United States, but several countries in Europe are currently using WIMs for direct enforcement. This technology has two subsets: in-pavement WIM and portable WIM.

In-Pavement Weigh-in-Motion

Mainline WIM scales require an accurate measure of wheel weights for high-speed vehicles and adherence to a standard is typically desired by state officials. A common standard to achieve this needed accuracy is ASTM E 1318-2. An example of a mainline in-pavement WIM device, which in the last few years has been commonly deployed in the United States, is the quartz piezoelectric sensor. More recently, several states have installed quartz sensor WIM systems in their programs because of their level of accuracy, ease of installation, and minimal maintenance requirements. These devices are relatively inexpensive and not difficult to install but feature a shorter service life, especially on routes with high truck volumes. When a more rugged and reliable WIM is needed, the most commonly used technologies are bending plate and load cell systems. These WIM scale technologies are often more expensive but are also more accurate, with life-cycles four to five times longer than quartz sensors. The quartz sensor industry is working to close the gap between sensor life acceptance and the average resurfacing cycles for roadway pavement. This would allow the replacement of sensors to be a part of resurfacing projects as a standard practice. Figure 24 shows a standard quartz sensor and bending plate WIM.

Figure 24. Photo of Quartz Sensor (Left) and Bending Plate (Right)
Source: Cardinal Scale Manufacturing Co. (left), International Road Dynamics Inc. (right).

Portable WIM scales

The other type of WIM solution is the portable WIM. These scales are developed for quick installation and can be easily transported to other locations. These portable WIM scales can dynamically weigh axles similarly to an in pavement WIM. The dynamic wheel scale allows vehicles to be weighed at a low-speed, and requires a small footprint. Typically portable WIM scales are designed for lower volume use and similar to quartz sensors, portable WIM scale have a shorter life-cycle. Figure 25 shows an example of a portable WIM.

Figure 25. Photo of Portable WIM Scales
Source: TDC Systems (left), International Road Dynamics, Inc. (right).

Static Scales

Static scales are the primary tool used for weight enforcement. Depending on its size, the static scale can either weigh axles and axle groups in each weighment or weigh the entire truck in one weighment. Static scales are much more accurate than WIM scales. Most static scales are tuned to an accuracy of plus or minus 20 lbs. Also, many states meet the legal for trade requirements in the design and accuracy of their static scales. Thus, static scales can be used for direct weight enforcement. Static scales are broken into two groups, in-pavement static scales, and portable wheel scales.

In-Pavement Static Scales

Fixed facilities such as POEs and weigh stations almost always have an in-pavement static scale for direct weight enforcement. These scales are located in the ground near the control house where enforcement personnel can review the weight of the vehicle it is weighing. As the name implies they are not intended to be moved around and remain in the location where they are installed. Vehicles must come to a complete stop on these scales in order to get exact weighments. In pavement static scales can be very rugged and reliable even with the large number of trucks that typically cross these types of scales daily. In pavement static scale come in a number of sizes and allow states to select and install the one that most directly fits their needs.

Portable Wheel Scales

Mobile enforcement typically uses portable wheel scales to evaluate truck weights for direct enforcement. These wheel scales weigh only one group of wheels at a time. Thus, two wheel scales are needed to weigh one axle and weighing an entire truck with wheel scales can be time consuming for mobile staff and the truck driver. In order to function effectively areas for mobile enforcement need to have smooth pavement, with no more than of three percent cross slope and three percent longitudinal slope. Ideally, having a zero percent longitudinal slope allows trucks to roll up onto portable scales then release breaks for more accurate weighing. This is a vital tool for commercial vehicle enforcement in areas where fixed stations cannot be sited or lower truck volumes do not justify a fixed facility.

Electronic Screening Systems

Electronic screening systems evaluate commercial vehicles traveling along the mainline and direct trucks that are more likely to be in violation of weight and safety issues into the fixed facility. An optimized electronic screening system could allow about 75 to 85 percent of trucks to bypass stations, reducing delays and fuel consumption for those trucks that are allowed to remain on mainline. Percentage of trucks that are allowed to remain on mainline is dependent on configuration of screening system. This allows officers to focus their efforts only on vehicles that are likely to need further evaluation and inspection.

There are two major types of electronic screening systems, voluntary and involuntary. Voluntary screening systems are passive and members of the trucking industry initiate requests for membership into the electronic screening system program. Voluntary screening systems only evaluate enrolled trucks that are approved members of that program. The level of saturation of voluntary screening systems can vary widely from state to state. Involuntary screening systems are not passive and members of trucking industry do not need to seek membership for this type of electronic screening program. Involuntary screening systems evaluate all trucks that pass through it. Involuntary screening systems can have a much higher level of saturation and will increasingly be utilized as technology continues to improve in accuracy, reliability, and repeatability.

Electronic screening is now commonly used across many states in the U.S. This procedure has proven to be cost-effective as studies show a benefit-cost ratio from 2:1 to 7:1, depending on the scenario.[2] Furthermore, commercial vehicle carriers also benefit as studies show that 98 percent of carriers agreed that electronic screening improved their shipping times.[3] Electronic screening is currently possible through four different methods; transponders, license plate recognition (LPR), U.S. DOT recognition (U.S. DOT-R), and mobile phone application technology.

2 Intelligent Transportation Systems, Joint Program Office. *Evaluation of CVISN technologies in the United States.* On-line at: http://www.itsknowledgeresources.its.dot.gov/ITS/benecost.nsf/ID/B494C4686502728585257A5A006AE297 B494C4686502728585257A5A006AE297?OpenDocument&Query=BApp.

3 Intelligent Transportation Systems, Joint Program Office. *Evaluation of CVISN technologies in the United States.* On-line at: http://www.itsknowledgeresources.its.dot.gov/ITS/benecost.nsf/ID/45081BFBFD2BECA6852578D8006105EF 45081BFBFD2BECA6852578D8006105EF?OpenDocument&Query=BApp.

Transponders

Many states are seeking to reduce the number of vehicles needing to be processed through their fixed facilities by using of transponder technology. Examples of this technology include NORPASS[4], Oregon Green Light, Best Pass, EZ Pass, and PrePass. These technologies allow "participating transponder-equipped commercial vehicles" to bypass designated weigh stations, port-of-entry facilities, and agricultural interdiction facilities. Cleared vehicles may proceed at highway speed, eliminating the need to stop for further evaluation.[5] Transponders are an example of a voluntary electronic screening system.

The process for this electronic screening procedure starts with the enrollment of commercial vehicles in the electronic screening program, such as PrePass. Trucks enrolled are assigned a small wireless transponder that is designed to be mounted on the windshield. As one of these trucks approaches an equipped facility an electronic reader mounted over the roadway automatically scans the transponder and identifies the vehicle. A computer at a fixed station accesses the vehicle information associated with the transponder and validates it to ensure compliance with a set of requirements. As the commercial vehicle approaches the station on the mainline it can be weighed and measured with the use of WIM scales, dimensioning sensors, and/or cameras, to verify the truck's configuration and ensure axle and gross vehicle weights are within acceptable limits. Finally, as the truck passes beneath a second reader, a signal indicating whether the vehicle may bypass or not is transmitted back to the transponder in the cab of truck. If the vehicle's information cannot be validated or if it is selected for a random manual inspection, a red light on the transponder alerts the driver to stop at the approaching station. If the vehicle's credentials, safety, and weight configurations are all in order, a green light on the transponder will notify the driver to bypass the station.

Use of transponders as a mainline screening tool started in some states in the middle to late 1990s. Now, with 16 to 18 years of refinement, this approach has proven to be an effective method of screening vehicles. The electronic screening process through transponders has been implemented successfully through the past two decades across different states. In Idaho, NORPASS allows vehicles enrolled to use their transponder at the East Boise and Lewiston POEs. The primary weakness of this approach is that it depends on commercial carriers to opt in. If the penetration rate of transponder services among the commercial fleet passing Idaho's POEs is low, the effectiveness of this voluntary approach would be reduced significantly. PrePass is a system that is currently operating in half of Idaho's neighboring states (Montana, Wyoming, and Utah), while NORPASS is also in use by states within the region (Washington and Oregon), which could increase the likelihood of adoption as many trucks traveling from these states are already equipped with transponders.

License Plate Recognition

Another strategy for electronic screening is License Plate Recognition technology. LPR technology identifies the vehicle by taking a photograph of the license plate and using software to discern the

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4 http://www.norpass.com/.

5 http://www.PrePass.com/Pages/Home.aspx.

license plate number and state from the photograph. Huetter already has this technology installed; Inkom should have a LPR system by the end of 2016.

This electronic screening approach can identify any vehicle and requires no special equipment to be on the vehicle. The LPR system consists of a camera, strobe, and an interface board that communicates to enforcement computers. As the vehicle crosses the screening system the camera captures a photograph of the license plate and immediately processes the image to obtain the license plate information. Once the license has been identified, the information is sent to a computer at a weigh station, where it can look for this truck in a database and pull out the information records from previous crossings. If the vehicle's weight is collected with the use of WIM scales, as commercial vehicles approach the station the electronic screening system has the information needed to decide if the truck needs to stop at the station for further evaluation by enforcement staff, or if it can bypass the station. This notification to driver to report to station or remain on mainline is normally communicated through a Variable Message Sign (VMS), installed either along the mainline or on an internal bypass-lane, which would indicate to the driver whether to proceed on or stop for further evaluation.

The main component of this process is the effectiveness of LPR technology to correctly identify a vehicle. This technology is still being researched for accuracy and, "some states have reported LPR accuracy rates of 85 percent while others have reported rates as low as 30 to 50 percent."[6] The main limitation of this technology is that the license plate recognition relies on many factors. Quality of equipment (camera, strobe, controller, and communications) and environmental conditions (fog, snow, and rain) are important factors to consider for the implementation of this strategy. Furthermore, this strategy relies in having a reliable database of commercial vehicle license plates.

LPR is an involuntary screening system that can be used to evaluate all commercial vehicles that reside in the database it is querying. The strength of this strategy is in that ability to potentially evaluate every vehicle traveling down a highway without requiring a carrier to opt in. The weaknesses can be accessing a comprehensive database to query and the overall accuracy of the technology. While Commercial Vehicle Information Systems and Networks (CVISN) may serve as a potentially effective database for Idaho to use in support of this technology, CVISN does not contain intrastate carriers. These carrier vehicles are in a separate, unconnected database.

U.S. DOT Number Reader Recognition

A very similar technology used for electronic screening is the U.S. DOT Number reader or U.S. DOT-R. This technology is similar to LPR in that it gathers the truck identification by taking photographs of side of trucks and using software to collect the U.S. DOT number from photographs. The process for evaluating a vehicle and conveying the screening decision to a driver is the same as with LPRs. U.S. DOT-

[6] FHWA. *Concept of Operations for Virtual Weigh Station.* On-line at: http://ops.fhwa.dot.gov/publications/fhwahop09051/sec04.htm.

R and LPR technology are sometimes used in conjunction with one another as a second point of verification and occasionally to cross-reference data.

As with LPR technology U.S. DOT-R has the advantage of being able to potentially identify any vehicle without requiring a company to opt in but is limited to vehicles in the database they are querying.

Mobile Phone Application Technology

This strategy is based on services provided by mobile application providers. The only product currently on the market in this space is "DriveWyze."[7] As with transponders, this approach is a voluntary screening method that can only be used by those enrolled in the program.

The enrollment process starts with the driver downloading and installing the application on their mobile phone. When the driver starts their trip, they turn on the application and start driving. The application will alert the driver when they are approaching a weigh station, or other geofenced location[8] where DriveWyze is currently being utilized. At this time the vehicle and driver's credentials will be evaluated and the results will be combined with any other screening technology that is being utilized at that location (e.g., WIM, height lasers, etc.). Once a decision has been made the driver is notified to either continue driving or to pull into the upcoming facility or inspection location via an alert on their cell phone. The process is similar to transponder technology except that the technology in use is the mobile phone.

This strategy has a variety of strengths and weaknesses. One of the strengths is that it uses technology already available to get information from the driver and vehicle, reducing its implementation cost significantly. Most drives already own a smartphone and are familiar with their use, reducing the potential learning curve. There are a number of limitations too. This strategy relies heavily on the penetration rate of the application across the commercial vehicle fleet. If drivers do not download the application, the number of vehicles allowed to bypass a weigh station would be low. There also may be privacy concerns if drivers use their personal phone to bypass the sites. This strategy is currently being implemented at weigh stations and researched further, as the foundation of a new enforcement strategy called geofencing, which is mentioned in the 'Future Technologies' section of this report.

Electronic Credentialing and Citations

Technology is also being applied to increase the effectiveness of the credentialing and citation process. Electronic credentialing refers to the ability of commercial carriers to apply for the necessary credentials on-line. This expedites the evaluation process and allows vehicles to bypass the weigh stations.

The process of electronic credentialing starts with an on-line platform where carriers can apply for credentials (registration, size and weight permits, etc.), file tax returns, and make payments. The State Commercial Vehicle Administration System collects this credentialing information. The state can also

[7] http://drivewyze.com/.

[8] A "Geofence" is a virtual boundary for a geographic region, established as a series of coordinates expressed in latitude and longitude. This concept is discussed further in Chapter 4.

exchange credentials with other states if necessary and so desired. Being able to process credentials and fees on-line has expedited the evaluation process in many states across the United States. Furthermore, similar processes are being applied for citations. The State of Alabama uses wireless technology to fill out citation forms and print out tickets. With current wireless technologies, the ability to enforce commercial vehicle regulations has become more efficient and mobile. The main challenge of electronic credentialing is a lack of interfacing between new and archival databases and software systems. Electronic credentialing on an interstate level needs a single and clear architecture for effective implementation.

Remotely Controlled Weigh Stations

Remotely Controlled Weigh Stations (RCWS) allow an operator to control one or more weighing sites from a central location. "The RCWS is a web-based enforcement tool that can utilize existing personnel to monitor sites remotely. Through the voice and video link, commercial vehicle drivers are easily able to communicate with the operator and receive any information or directions on how to proceed at the weigh station."[9]

The benefits of RCWS include the ability to reduce labor for Commercial Vehicle enforcement tasks, leveraging resources at remote and low-volume locations, where personnel cannot always be located. The limitation of this technology is the equipment and infrastructure to enable reliable communication channels between operators and officers. Inspection of commercial vehicles is not normally performed at these locations. However mobile enforcement can, as needed, use these RCWS for full inspection of trucks. This approach is beneficial for moderate to low truck volume corridors, supporting a fixed station, in remote locations and where seasonal items are transported. Figure 26 shows an example of a remote controlled weigh station.

[9] International Road Dynamics, Inc. *Remote Control Weigh Station Implementation.* On-line at: http://www.irdinc.com/public/uploads/itssolution_document/12/1387815117_TAC2011_Hanson_Remote_Control_Weigh_Station.pdf.

Figure 26. Photo of Remotely Controlled Weigh Station

Virtual Weigh Station

A small number of states have used Virtual Weight Stations (VWS) for the past 14 to 15 years, Florida being a primary example. VWS are becoming more accepted as a technology and several states including Oregon and Washington are developing implementation plans to increase the volume of VWS in their state.[10]

VWS are "enforcement facilities that do not require continuous staffing and is monitored from another location."[11] This strategy allows States to customize their VWS deployments to meet their specific functional needs, operational environment, and communication infrastructure. A VWS concept of operation can be broadly described as follows:

1. As a commercial vehicle approaches the virtual weigh station, it is weighed while crossing a WIM.
2. A picture of the commercial vehicle is taken for identification purposes.
3. Screening technology integrates with data from a WIM and camera system.
4. A mobile enforcement officer, positioned downstream from the VWS, accesses the VWS data (e.g., photo of commercial vehicle, WIM data) and makes a screening decision.
5. Overweight commercial vehicle is intercepted for weighing/inspection as needed.

The benefits of VWS rely on the strategy's flexibility, as locations can be mobile, making the commercial vehicle enforcement process more effective and efficient. This strategy, however, depends on

[10] Federal Highway Administration. FHWA-JPO-14-130. *Smart Roadside Initiative Gap Analysis: State of the Practice.* March 2014.
[11] FHWA. *Concept of Operations for Virtual Weigh Station.* On-line at: http://ops.fhwa.dot.gov/publications/fhwahop09051/sec04.htm.

interaction with nearby enforcement stations to process credential and permit issues. Therefore, this strategy can be very effective when utilized in combination with fixed facilities. Strategic placement of VWS on bypass routes around fixed facilities increases the effectiveness of both the VWS and the fixed facility. VWS can typically be strategically placed within existing Right-of-way with no environmental impacts. The cost of each VWS can vary depending on functional needs; examples of optional elements besides the weigh-in-motion sensors and the overview camera include transponder reader, license plate reader, U.S. DOT number reader, nonvisible light strobes, geofence, brake check, off-WIM sensor, classification loops, and the system controller. Communications to server, Guardrail, utilities, and remoteness of location also play a role in overall costs.

Future Technology

Past and current innovations in data gathering and evaluation technology has drastically changed the way commercial vehicles are currently being processed. These enforcement functions and processes continue to evolve and allow states to verify commercial vehicle compliance in new ways while efficiently using their staff and personnel. Furthermore, the use of data gathering and evaluation technology has reduced travel time for commercial carriers, as carriers that follow regulations are being rewarded by being able to bypass enforcement sites, reducing their travel times. However, there are still opportunities for technology to evolve and areas where resources are being applied to develop technology for short-term future implementation.

Electronic Screening Alternatives

Electronic screening technology has significantly impacted how trucks are screened and processed. However, there are still gaps to address. Current technologies are struggling to precisely identify all commercial vehicles on the mainline due to technological challenges associated with LPR/U.S. DOT number readers and the voluntary nature of transponder technology. There is a need to improve existing identification detection systems and challenge industry for new solutions that effectively and efficiently identify all vehicles.

The following approaches are currently under investigation to determine their potential in this area.

Geofencing

A “Geofence” is a virtual boundary for a geographic region, established as a series of coordinates expressed in latitude and longitude. This perimeter could be used to detect objects that enter and exit this virtual boundary. In this case, a boundary surrounding enforcement facilities, or throughout the State of Idaho, can be defined. Vehicle information is collected when a vehicle crosses the boundary and can be accessed or sent to appropriate facilities or personnel.

The essential technology for this approach relies on being able to know the location of trucks when the geofence is operating. Every time a vehicle crosses a geofence, enforcement personnel could identify this vehicle and act accordingly, based on its characteristics. Research efforts are being addressed to determine the effectiveness of different technologies to determine vehicle location accurately. Some states are piloting a smartphone-based screening system that allows commercial trucks to bypass inspection stations.[12] Most pilot systems use Global Positioning System (GPS) technology to determine when a carrier is approaching an inspection station (e.g., geofence around an inspection site), and then connects to the state's inspection program software to determine whether the carrier can bypass the inspection station. The software function is similar to that of a transponder, without requiring additional hardware to be installed in the vehicle.

There are still unresolved issues with this strategy. There is the question of privacy and confidentiality. There are also data security issues that need to be addressed. However, the potential of being able to identify all commercial vehicles would significantly improve enforcement activities, reduce carriers travel times, and decrease the overall operational costs of the industry.

Connected/Automated Vehicles

Connected/Automated Vehicles (C/AV) are vehicles that are equipped with Dedicated Short-Range Communications (DSRC), allowing vehicles to communicate with other vehicles or infrastructure equipment. Autonomous vehicles take this technology a step further as the communication with other modes of transportation allows the vehicle to operate on its own. For commercial vehicle enforcement efforts, the premise relies on this type of vehicle being able to communicate with infrastructure, providing the necessary information to commercial vehicle enforcement offices. This technology has the potential to revolutionize not only the way commercial vehicle enforcement is carried out, but to revolutionize transportation in general.

Currently, the U.S. DOT is investigating the use of DSRC technology through different pilot projects across the country. The pilot project in Wyoming is particularly interesting for commercial vehicle operations, as it focuses entirely on commercial vehicle deployment.[13] The results from this pilot project could validate the use of this technology to enable communication between trucks and all other types of vehicles and infrastructure, including weighing stations. Furthermore, some truck manufacturers have taken an extra step and started testing autonomous trucks. In 2014, the first autonomous truck, the "Freightliner Inspiration Truck,"[14] was tested on top of the Hoover Dam in Nevada.

The possibility of C/AV technology are broad, and widespread adoption of commercial vehicles which are "self-aware" could fundamentally change the notion of commercial vehicle enforcement. As these new technologies enhance connectivity with infrastructure, location and identification of trucks could

[12] ITS America. *Geofencing for Heavy Goods Vehicle Control and Management*. On-line at: http://trid.trb.org/view/2009/C/908507.

[13] U.S Department of Transportation. *Wyoming DOT Connected Vehicle Pilot Deployment Program*. On-line at: http://www.its.dot.gov/pilots/pdf/04_CVPilots_Wyoming.pdf.

[14] "Freightliner Inspiration Truck Unveiled at Hoover Dam." May 5, 2015. On-line at: http://www.freightlinerinspiration.com/newsroom/press/inspiration-truck-unveiled/.

greatly reduce the issue of truck identification. There are many issues that remain unresolved with this technology but efforts are being made by both private and public agencies to steer transportation towards the implementation of Connected Vehicles in the near future.

Wireless Inspection

As commercial vehicle enforcement is becoming more ubiquitous the desire to build large and expensive fixed enforcement facilities has diminished. More and more states are trying to leverage technology to increase their mobile enforcement presence. Currently, with VWS and RCWS, states are able to operate weigh stations from a centralized office. With the upcoming technologies described, commercial vehicle enforcement could go one-step further and operate throughout the entire state without the need of stations at all.

Current research efforts are evaluating the possibility of wireless regulation enforcement. If vehicles are being identified, and their characteristics are known anywhere in the state, the need for fixed enforcement stations would disappear. The premise of this technology is that vehicles would be evaluated when they enter the state (using WIM scales, and geofencing or C/AV technology), and credentialing and citations could be done without requiring the vehicle to stop. Furthermore, enforcement officers could target specific vehicles that require further review.

These technologies are still under development and it will take time for them to be implemented. However, states seem to be moving towards commercial vehicle operations that would easily adapt to these technologies, such as electronic screening and remote enforcement. As new technologies arise, these enforcement strategies will be easier to implement and expand across different states.

Chapter 4
Concept of Operations

Summary of Work Performed

This section outlines the concepts of operation (ConOps) that have been developed by the project team, in collaboration with key ITD personnel, for implementation at the Idaho Transportation Department's (ITD) Port of Entry (POE) facilities. The ConOps were developed with a focus on addressing the needs of ITD's POE system, as identified in Chapter 3. The ConOps address these needs by leveraging technology outlined in Chapter 4. The process for developing the ConOps was as follows:

- Conduct a high-level analysis of current conditions, system needs, and best practices and technology to break sites into initial tiers.
- Develop a draft ConOps for presentation to ITD staff at an on-site workshop.
- Review the ConOps with ITD staff to identify gaps, necessary modifications, and verify the categories are appropriate.
- Finalize the ConOps.

Once the details of the ConOps were determined the project team next evaluated the data collected for each of the primary and satellite locations to group them into the identified tiers (explained in detail starting on page 69). Finally, the project team identified ancillary technological investments that ITD could explore to improve the overall efficiency of the technologically focused ConOps.

The ConOps is organized into three subsections; the section "Funding and Capital Investment Findings and Recommendations" contains a detailed overview of the ConOps, the section "'Process, Performance, and People' Findings and Recommendations" contains an explanation of our tier classification methodology, and the section "Moving Forward" contains the ancillary technology investment recommendations.

Concepts of Operation

In order to address future system needs, this study developed a ConOps for the Idaho Port of Entry System with five tiers. In order to provide flexibility, account for the existing fixed facilities and rover sits, and take into consideration available financial and personnel resources, three tiers were developed for the state's fixed facilities, and two tiers were developed for rover sites. Information on each ConOps is broken into the following categories; operations, infrastructure, and technology. Also included are cost estimates and a sample layout or design for each tier.

Tier 1: High-Volume Fixed Facility

The Tier 1 ConOp was developed for higher volume routes, such as interstates, where ITD data indicates that both existing commercial vehicle traffic as well as expected growth was highest. It is intended to be a completely staffed, full service facility that is capable of processing high volumes of vehicles at an efficient pace. Figure 27 provides an overview of the functionality as well as example technologies or solutions deployed at this ConOp.

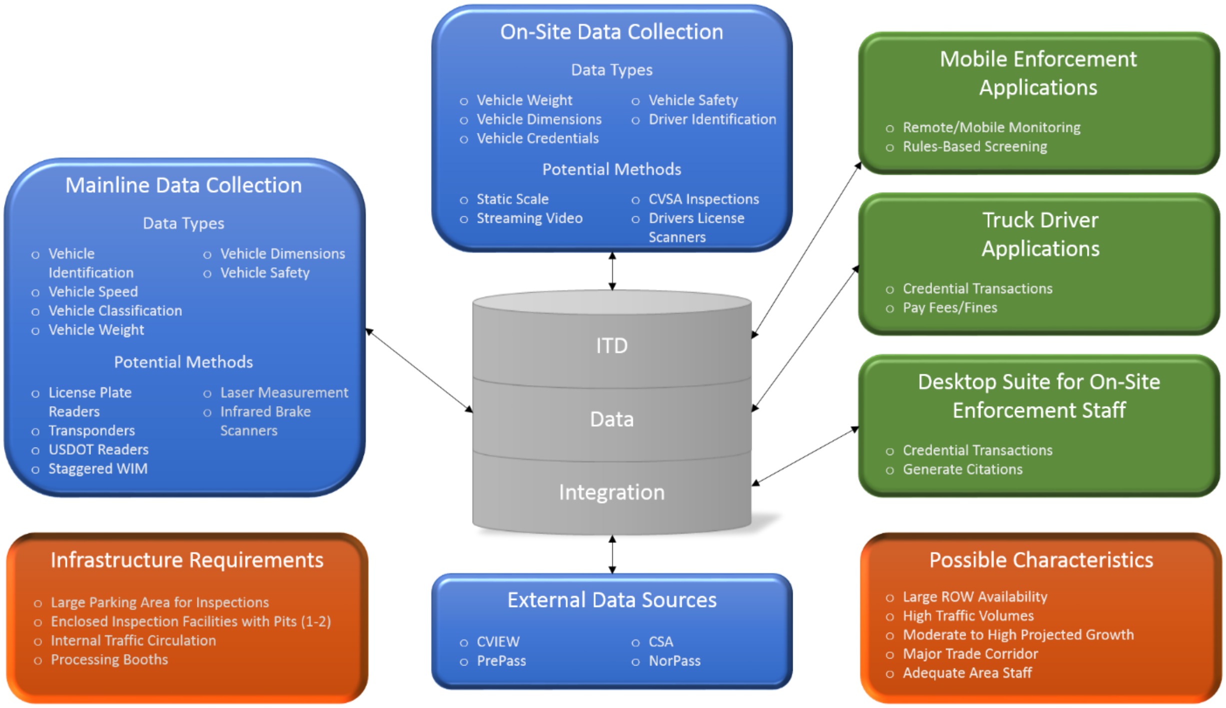


Figure 27. Tier 1 Concept of Operation

Operations

The Tier 1 ConOp is intended to be staffed with both ITD enforcement personnel as well as administrative personnel to support the issuance of credentials, permits, and other related administrative functions. This staffing arrangement will allow ITD staff to focus on performing their primary task of conducting commercial vehicle enforcement, as opposed to dividing their time and attention amongst various tasks. The ConOp would also support a part-time ISP presence to conduct CVSA Level I and Level II inspections.

Infrastructure

Tier 1 is designed for high-volume highways and it has the most extensive infrastructure requirements. The facility should have an administrative building with an area for both monitoring vehicles entering the facility and an area for supporting the performance of administrative functions such as the issuance of permits and credentials. The facility should have both an internal bypass-lane to allow vehicles multiple lanes of egress, as well as a reweigh loop to allow vehicles to be weighed multiples times. The reweigh loop will promote infrastructure preservation by ensuring vehicles meet Idaho's legal weight requirements prior to exiting the facility and returning to the highway system. A moderate to large sized parking area should be available within the facility to allow vehicles that are either acquiring credentials or placed out of service to park safely. The parking area should also have a hazardous materials pit area for vehicles hauling hazardous waste which would limit the spread of any leaking material. Finally, the facility should have an inspection garage with one or two bays with pits. This will allow ISP personnel to more efficiently inspect vehicles in less than ideal weather conditions.

Technology

The efficiency of the Tier 1 ConOp is largely driven by the technology deployed both on-site, and along the mainline preceding the facility. As such, it is the ConOp that requires the most investment in technology. In place along the mainline preceding the facility should be automated vehicle identification (AVI) technology, weigh-in-motion (WIM) technology, and electronic signage to direct commercial vehicle drivers to either enter the facility or continue along the mainline. AVI technology can be either a transponder system (voluntary screening) or a license plate recognition (LPR) or DOT Number Reader system (involuntary screening). Once a vehicle enters the facility, the ramp should utilize technology that gathers vehicle measurements, technology that scans the vehicle's brakes for potential issues, and a queue detection system that automatically alerts mainline drivers that the facility is closed should the amount of traffic entering the facility be in danger of backing up onto the mainline. The Tier 1 ConOp should be equipped with static scales for accurate and enforceable weighment of vehicles. The preferred setup for this ConOp would be a 12'×100' scale preceded by a 12'×20' scale. This would allow for ITD personnel to weigh single axles, groupings, and the overall vehicle in the most efficient manner. Finally, the facility should be equipped with publicly secured Wi-Fi to provide drivers with the opportunity to apply for credentials and permits from their own vehicle, on their own devices.

Cost and Sample Layout

The approximate cost for implementing a Tier 1 ConOp at a given location would be roughly $12,500,000 in 2016 dollars. It should be noted that this cost is an estimate to construct a complete Tier 1 ConOp from the ground up, provided land was available. This cost does not factor in any Right-of-way (ROW) or other land acquisition purchases. It also does not take into account any costs associated with demolition, or repurposing of, existing infrastructure located at a facility. Figure 28 provides a high-level overview of the proposed Tier 1 ConOp layout. The list of POEs identified as candidates for the Tier 1 ConOp are provided in the section "Clustering Methodology Overview" in this report.

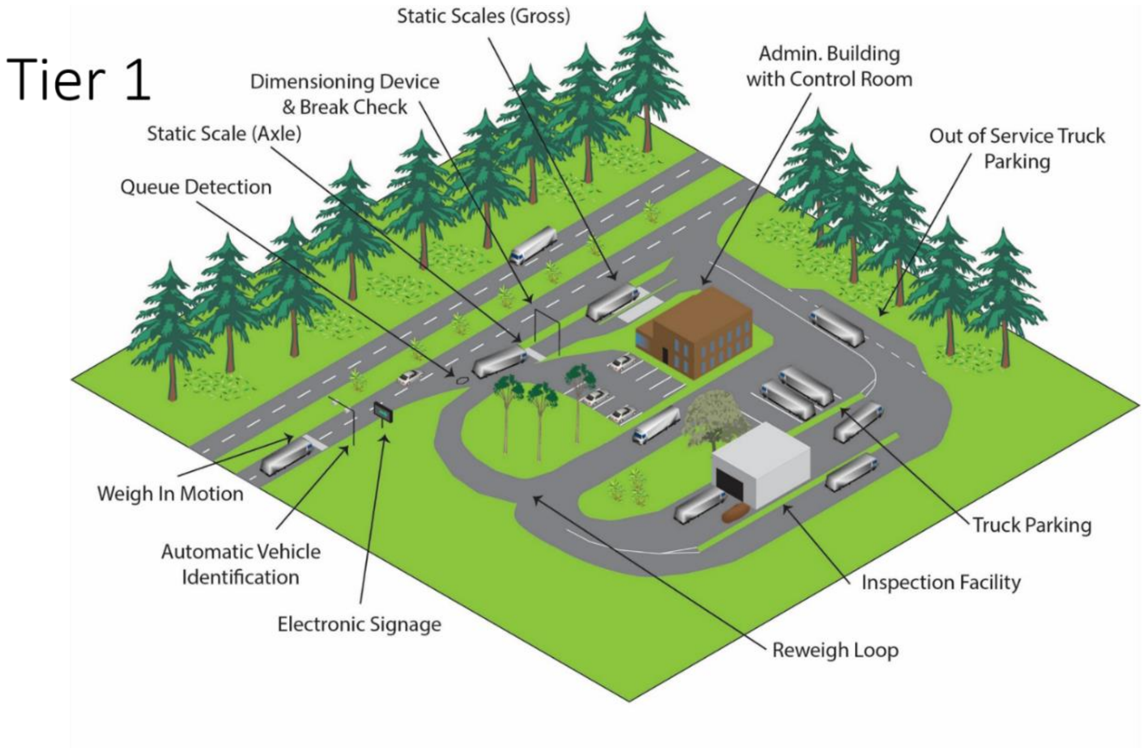


Figure 28. Illustration of Tier 1 ConOp Layout

Tier 2: Lesser Volume Major Roadways

The Tier 2 ConOp was developed for locations along major U.S. and state highways where volumes are not as significant as those on the interstate, but are still moderate relative to the other facility locations in Idaho. The Tier 2 ConOp is intended to be a scaled down version of the Tier 1, allowing ITD some flexibility in both spending and staffing, without sacrificing a lot of the functionality and efficiency afforded by the Tier 1 ConOp.

Operations

The Tier 2 ConOp should be staffed with full-time ITD enforcement personnel and, optionally, administrative personnel as needed. Given the overwhelming preference of survey respondents who indicated they would prefer to apply for permits and credentials on-line, as opposed to in person, the need for administrative staff to issue credentials at the Tier 2 facilities is less. At locations where credential issuance has been high, based on ITD data, administrative personnel can be staffed as there has been a proven desire by drivers passing through those locations to acquire permits at the facility. It should be noted that regardless of whether or not administrative staff is located at a Tier 2 facility, ITD enforcement personnel should not spend time performing administrative functions, except in emergencies.

Infrastructure

The Tier 2 ConOp has a set of infrastructure requirements that are a slightly reduced version of Tier 1, as the facility is designed for roadways with slightly less volume both now and in the future. The facility should have an administrative building, the size of which will vary based on the number of staff working on-site. Locations where administrative staff is desired should have a larger building than locations where administrative staff will not be present. Tier 2 facilities should also have a reweigh loop and an internal bypass lane. The facility should also have a parking area for commercial vehicles. The size of the parking area at a Tier 2 location can be much smaller than a Tier 1 location as there will be fewer vehicles parked for out-of-service violations, and fewer drivers acquiring credentials on-site.

Technology

The technology requirements of a Tier 2 facility are very similar to the Tier 1 as there is still a need to collect as much data about a vehicle on the mainline as possible to ensure that enforcement resources are focused on the vehicles with the highest potential for violation. A Tier 2 facility should be equipped with AVI and WIM technology along the mainline as well as signage to alert the driver as to whether or not they need to pull in or bypass the facility. Additional ramp screening technology to support vehicle measurement and/or brake scanning is optional and can be deployed as ITD deems appropriate. If, for example, ITD experiences a large number of brake violation at a Tier 2 facility it may elect to install brake scanning technology to enhance the facilities screening capabilities. For accurate weighment and enforcement, a static scale should be present. For this ConOp a 12’×20' static scale will suffice. A Tier 2 facility should also provide commercial vehicle drivers with Wi-Fi to facilitate the purchasing of credentials and permits when needed.

Cost and Sample Layout

The approximate cost to construct a Tier 2 facility is around $10,000,000. As with the Tier 1 facility, this price does not include any land acquisition or renovation costs associated with an existing facility. This is an approximation of the cost to construct a Tier 2 facility on an empty piece of land. Figure 29 provides a high-level overview of a sample Tier 2 ConOp layout. The list of facilities identified as candidates for the Tier 2 ConOp are provided in section “Clustering Methodology Overview” in this report.

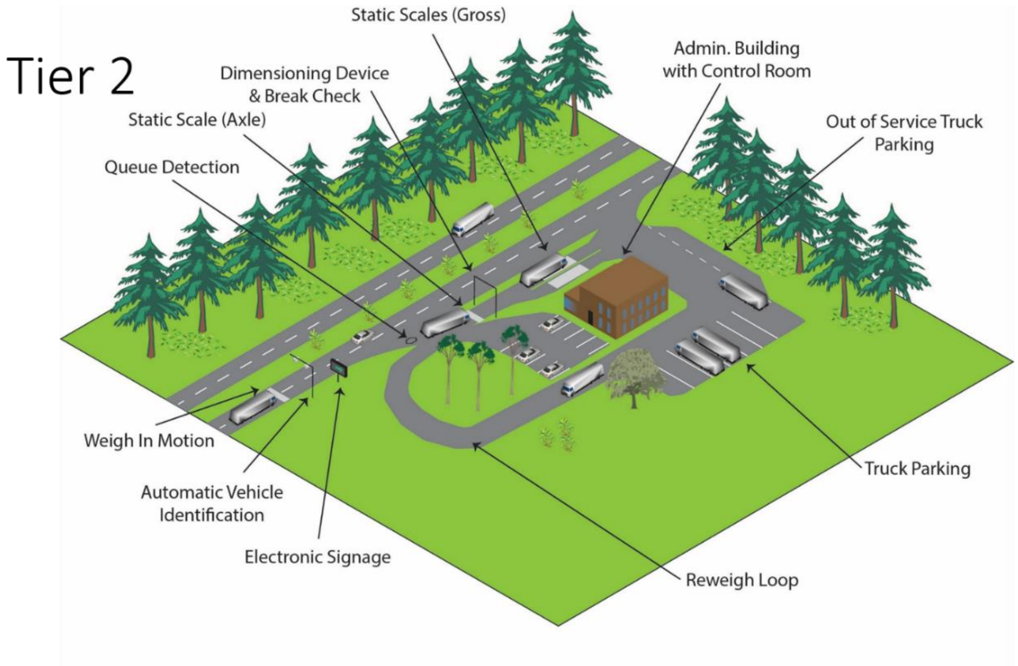


Figure 29. Illustration of Tier 2 ConOp Layout

Tier 3: Periodic Virtual Operation Facility

The Tier 3 ConOp was developed for existing fixed facilities located along low-volume state highways or secondary roadways. This ConOp can be operated by a small staff located at the facility, or virtually by staff at a centralized location. The ConOp infrastructure and technology allow it to seamlessly transition between the two methods of operations.

Operations

This ConOp is intended to be staffed periodically, as deemed appropriate by ITD. Staffing decisions will likely be driven by data collected by technology at the facility, as well as staff availability. Staffing on-site would consist solely of ITD enforcement personnel. No administrative support personnel would ever be staffed at this ConOp. Additionally, ITD enforcement staff would not be responsible for issuing credentials from these facilities.

Infrastructure

Given that this ConOp is intended for locations where commercial vehicle traffic is on the lower end of the spectrum, and it will not be staffed full-time, the infrastructure requirements are much less than the Tier 1 and 2 facilities. The Tier 3 ConOp will only need a static scale and a small administrative building big enough to provide a location for staff to monitor data collected by technology located on-site. The presence of on-site parking at a Tier 3 ConOp is completely optional.

Technology

The technology requirements for this ConOp are similar to those of the Tier 1 and 2 but with one added element. When the facility is being operated remotely, the commercial vehicle drivers will need a method of interacting with off-site staff. For this reason, a virtual terminal will be needed. The terminal should be located alongside the static scale so that the driver can communicate with virtual staff while being weighed. Along the mainline prior to the facility AVI and WIM technology should be in place, as well as electronic signage.

Cost and Sample Layout

The cost for a Tier 3 facility is significantly lower than the Tier 1 and 2, in large part because of the reduced infrastructure requirements. The approximate cost for a Tier 3 is around $2,500,000. Figure 30 provides a high-level overview of a sample layout for a Tier 3 ConOp. The list of facilities identified as candidates for the Tier 3 ConOp are provided in section "Clustering Methodology Overview" in this report.

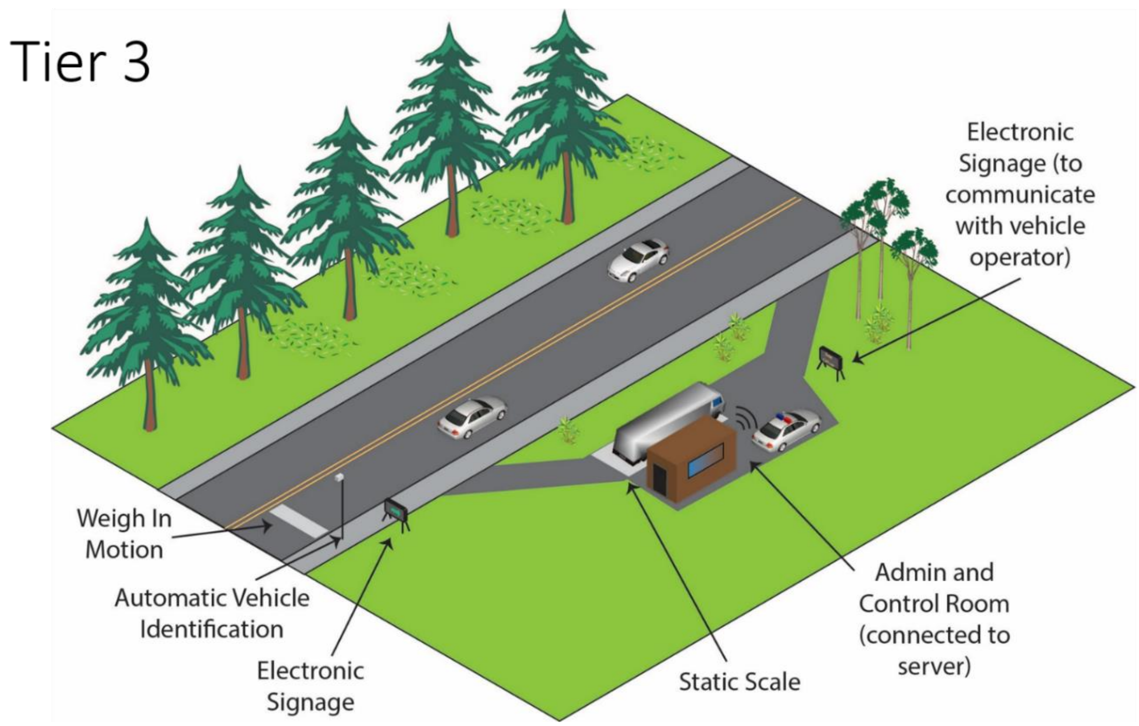


Figure 30. Illustration of Tier 3 ConOp Layout

Tier 4 and 5: Rover Sites

The Tier 4 and 5 ConOps are slight variations of the same concept. While both are intended to be utilized at rover locations across the state, Tier 4 sites are better suited for secondary roads with higher volumes of truck traffic where more weighings are currently occurring, or in moderate volume areas where seasonal truck volumes justify the inclusion of additional technology to help screen vehicles. Due to the higher volume, Tier 4 sites are better positioned in locations where there is sufficient space to pull trucks completely off the road into either a pull-off, parking lot, or similar area. Tier 5 is intended to be utilized on secondary road segments with low truck volumes that require occasional monitoring or in more urban settings where roadside space may not be as readily available.

Operations

The Tier 4 and 5 are intended to be staffed and operated in the same manner ITD currently operates them. The staffing will rotate on a periodic basis as determined by the POE supervisors.

Infrastructure

As with the existing rover sites, no permanent site infrastructure is required.

Technology

The focus of the Tier 4 and 5 ConOps is on the use of technology to increase efficiency of existing rover operations. As such, the technology selected is intended to quickly identify vehicles along the mainline and allow for roadside personnel to improve the efficiency in which they process vehicles. The ConOps also focuses on improving communication with drivers along the mainline to reduce the confusion and danger associated with existing operations.

The Tier 4 ConOp should have a mainline WIM as well as a portable low-speed WIM, and portable static scales for ITD personnel to use once a vehicle has pulled into the site. The mainline WIM system would be particularly helpful for roads that see moderate year-round traffic and a seasonal increase that would overwhelm a site that does not employ screening technology. Tier 4 sites should also have portable, tripod mounted, AVI technology, as well as portable electronic signage that can be controlled from the site. AVI can be used as a screening mechanism in combination with mainline WIM.

The Tier 5 ConOp does not require mainline WIM, though these sites should have portable, tripod mounted AVI technology and portable electronic signage. AVI would help automate information retrieval and enforcement activities at Tier 5 sites, though it would not be used as a screening mechanism as it is in Tier 1 through 4 sites.

Cost and Sample Layout

Given the lack of permanent site infrastructure required for these ConOps, the cost of deploying them is minimal. The approximate cost of the Tier 4 and 5 ConOps are $1,500,000 and $250,000 respectively. Figure 31 and Figure 32 provide high-level overviews of sample Tier 4 and 5 ConOps.

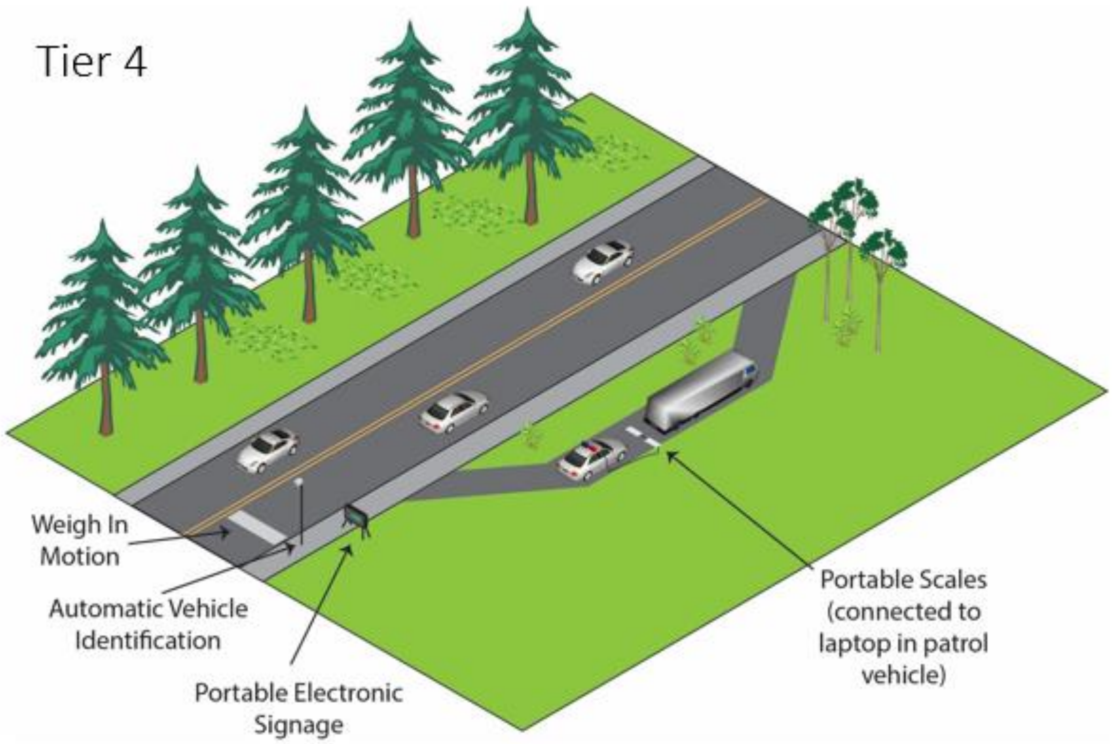


Figure 31. Illustration of Tier 4 ConOp Layout

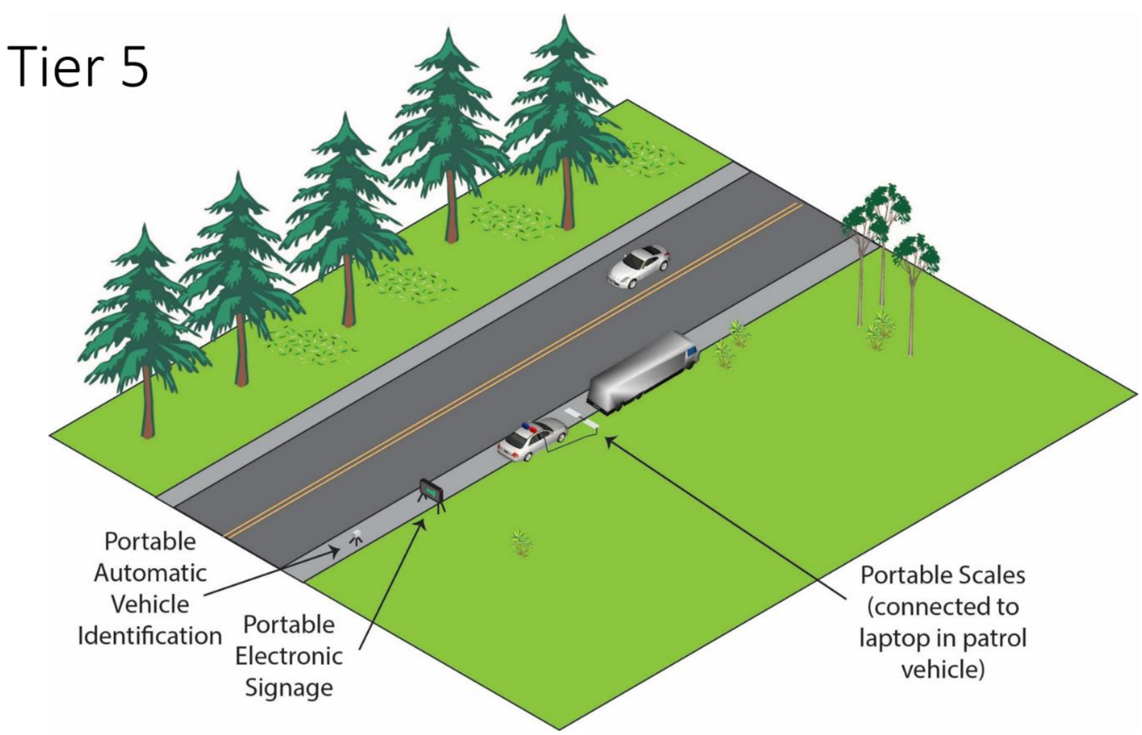


Figure 32. Tier 5 ConOp Layout

Clustering Methodology Overview

This section describes the methodology used to determine which POEs should be considered for the different types of commercial vehicle enforcement strategies proposed. Having identified and described the proposed different strategies for commercial vehicle enforcement, it is possible to analyze each facility, and determine which strategy would better fit its operations. The methodology proposed consists of a multi-criteria evaluation, using site-specific data provided by ITD. Furthermore, considering that there are two main types of strategies proposed – one encompassing fixed locations (Tiers 1, 2, and 3) and the other one encompassing rover locations (Tiers 4 and 5) – a separate evaluation was designed for each type of strategies.

Fixed Facility Evaluation

The first evaluation examines fixed facilities and determines which location would better fit Tier 1, 2, or 3 operations. For this purpose, the following criteria were considered for each facility:

- Mainline volumes.
- Commercial mainline volumes.
- Vehicles weighed.
- Current personnel.
- Credentials/citations/permits issued.
- Revenue/cost ratio.

Mainline Volumes

The first criteria considered was the total vehicular volume on the mainline adjacent to the facility evaluated. This criteria helps evaluate not only POEs in order of general importance – as facilities with higher volumes can be considered more important – but also the impact these stations could have on general traffic. The enforcement strategies proposed (as described through Tiers 1 to 3) have an impact on general traffic; Tier 1 and 2 are expected to have a lesser impact on general traffic as they have higher capacity than Tier 3 operations. It is possible to obtain a proxy score for each POE by considering the overall traffic volume on the adjacent mainline. In order to classify the different facilities, the equation in Figure 33 was used:

$$\frac{AADT_{2014} * Growth\ Rate_{2014-2035}}{Max(AADT_{2014} * Growth\ Rate_{2014-2035})}$$

Figure 33. Equation Comparing Mainline Volume at POEs

With this equation, the POEs evaluated can be quantitatively scored from ‘0’ to ‘1’; ‘1’ being the POE with the highest traffic volume and POEs closer to ‘0’ would have lower traffic volumes. To take in to consideration future traffic growth, the traffic growth rates predicted by ITD for the 2035 horizon were used. With this criteria, POEs with greater scores could be considered for Tiers 1 and 2, while POEs with lower scores could be considered for Tier 3 operations.

Commercial Mainline Volumes

Similar to mainline volumes, it is possible to score the facilities according to commercial vehicle volumes. This criteria helps define the magnitude of each facility according to the volume of commercial vehicles. Similarly to mainline volumes, the equation in Figure 34 was used:

$$\frac{CAADT_{2014} * Growth\ Rate_{2014-2035}}{Max(CAADT_{2014} * Growth\ Rate_{2014-2035})}$$

Figure 34. Equation Comparing Commercial Vehicle Mainline Volume at POEs

This criteria is helpful to quantitatively score each facility according to the commercial vehicle volume, '1' being the POE with largest commercial vehicle volumes, and POEs closer to '0' being locations with lesser commercial vehicle activity.

Vehicles Weighed

A third criteria used to classify the different POEs was the number of vehicles weighed, using the most recent data available (in this case, vehicles weighed in 2014). In general, the facilities with a larger amount of vehicles weighed could be considered for Tiers 1 and 2, while POEs with a smaller number of vehicles weighed could be considered for Tier 3 operations.

To obtain this score, the number of vehicles weighed was divided by the total number of vehicles weighed across all facilities, to obtain a ratio representative of how much each station weighs relative to the total number of vehicles weighed. To obtain a score from 0 to 1 (for comparison purposes) these scores where then normalized, dividing them by the largest score obtained. This way, the POE with a score of '1' represents the location with the largest number of vehicles weighed, while facilities closer to '0' represent POEs with lesser weighing activity.

Current Personnel

A fourth criteria used to evaluate POEs' performance is by considering current staffing levels. Given that some POEs already employ a certain number of staff, this information could help identify which facilities already have sufficient staffing to consider Tier 1 and 2 operations, while POEs with fewer personnel could be considered for Tier 3. The criteria used to score POEs was binary, facilities with 5 or more staff were scored with 1 point, while facilities with less than 5 staff personnel were scored with 0 points.

Credentials/Citations/Permits Issued

A fifth evaluation criteria used was to score commercial vehicle enforcement facilities according to their enforcement activities. In this case, POEs that issue more credentials, citations, and permits are considered better fits for Tier 1 and 2, while POEs with fewer activities would be a better fit for Tier 3 operations. To score each facility, the equation in Figure 35 was used:

$$\frac{\#\,Citations/Total\ Citations + \#\,Credentials/Total\ Credentials + \#\,Permits/Total\ Permits}{Max(\#\,Citations/Total\ Citations + \#\,Credentials/Total\ Credentials + \#\,Permits/Total\ Permits)}$$

Figure 35. Equation Comparing Credentials, Citations, and Permits Issued per POE

With this equation, facilities were scored from '0' to '1' according to their operational activities. POEs that issued a greater number of credentials, citations, and permits were scored closer to '1' than locations with fewer recorded activities.

Revenue/Cost Ratio

The last criteria considered was the revenue/cost ratio. This criteria is based on the consideration that facilities with a greater efficiency, with greater revenue/cost ratios, should be considered for Tiers 1 and 2, while stations with lower ratios should be considered for Tier 3 operations.

Results

The multi-criteria evaluation presents a robust performance evaluation. The methodology presented provides a way to aggregate scores and classify POEs according to their performance, based on available ITD data. Each criteria considered was weighed equally among facilities producing a final overall score for each POE evaluated. Table 7 shows the proposed criteria to classify each POE according to its overall score.

Table 7. Proposed Tier Selection Criteria for Fixed POE Facilities

Table Tier	Overall Score Range
1	>3
2	1-3
3	0-1

Table 8 applies this methodology to the fixed Ports of Entry in Idaho. Furthermore, this tool allows consideration of future facility configurations, such as the substitution of Cotterel with the new station "Declo." To take this change into consideration, the following assumptions were made:

- The current annual average daily trips (AADT) at Declo is 12,900 vehicles, obtained from, "Declo Port of Entry Cassia County, Idaho" Concept Report.
- Commercial vehicles will increase by 64 percent from current traffic at Cotterel, obtained from, "Declo POE Construction Benefits and Justifications" White Paper.
- Personnel, costs, and revenues at Declo were considered the same as in Cotterel.
- Vehicles weighed at Declo will increase by 64 percent from current Cotterel volumes, based on commercial vehicle volume increase.
- No changes were considered on Citations, Credentials or Permits, as Cotterel is the leading POE in this criteria.

Considering these assumptions, we can observe in Table 9 that scores for Declo increase, but not substantially to alter the scores of the rest of the POEs, maintaining the rest of the facility classification with the Tier selected for current facilities.

Table 8. Scores of Current Fixed POE Facilities (Primary and Satellite)

Facility Name	Mainline Volume (AADT)	Mainline Volumes (CAADT)	Vehicles Weighed	Personnel	Citation/ Credential/ Permits	Revenue/ Cost	Overall Score	Tier
East Boise POE	0.39	1.00	1.00	1.00	1.00	0.17	4.56	1
Cotterel POE	0.17	0.64	0.18	1.00	1.00	0.51	3.50	1
Huetter POE	1.00	0.53	0.10	1.00	0.37	0.43	3.44	1
Inkom POE	0.28	0.54	0.20	1.00	0.74	0.53	3.29	1
Sage Junction POE	0.08	0.22	0.15	1.00	0.68	1.00	3.14	1
Lewiston POE	0.23	0.21	0.11	—	0.57	0.94	2.06	2
Hollister POE	0.05	0.11	0.02	—	0.30	0.81	1.29	2
Haugan POE	0.14	0.39	0.03	—	0.18	0.43	1.17	2
Lewiston Hill POE	0.15	0.12	0.02	—	0.05	0.52	0.86	3
Bonners Ferry POE	0.07	0.13	0.04	—	0.04	0.03	0.31	3
Marsing POE	0.03	0.08	0.04	—	0.04	0.09	0.27	3
Horseshoe Bend POE	0.08	0.07	0.01	—	0.05	0.02	0.22	3
Ashton	0.08	0.12	—	—	—	—	0.20	3
Kooskia	0.06	0.08	—	—	—	—	0.14	3
Priest River	0.04	0.08	—	—	—	—	0.13	3
St. Maries	0.06	0.05	—	—	0.01	—	0.12	3
Salmon	0.03	0.02	—	—	—	—	0.05	3

Source: ITD, ISP.

Table 9. Scores Considering Substitution of Cotterel with Declo for Fixed POE Facilities (Primary and Satellite)

Facility Name	Mainline Volume (AADT)	Mainline Volumes (CAADT)	Vehicles Weighed	Personnel	Citation/ Credential/ Permits	Revenue/ Cost	Overall Score	Tier
East Boise POE	0.39	1.00	1.00	1.00	1.00	0.17	4.56	1
Declo POE	0.22	0.93	0.30	1.00	1.00	0.51	3.95	1
Huetter POE	1.00	0.53	0.10	1.00	0.37	0.43	3.44	1
Inkom POE	0.28	0.54	0.20	1.00	0.74	0.53	3.29	1
Sage Junction POE	0.08	0.22	0.15	1.00	0.68	1.00	3.14	1
Lewiston POE	0.23	0.21	0.11	—	0.57	0.94	2.06	2
Hollister POE	0.05	0.11	0.02	—	0.30	0.81	1.29	2
Haugan POE	0.14	0.39	0.03	—	0.18	0.43	1.17	2
Lewiston Hill POE	0.15	0.12	0.02	—	0.05	0.52	0.86	3
Bonners Ferry POE	0.07	0.13	0.04	—	0.04	0.03	0.31	3
Marsing POE	0.03	0.08	0.04	—	0.04	0.09	0.27	3
Horseshoe Bend POE	0.08	0.07	0.01	—	0.05	0.02	0.22	3
Ashton	0.08	0.12	—	—	—	—	0.20	3
Kooskia	0.06	0.08	—	—	—	—	0.14	3
Priest River	0.04	0.08	—	—	—	—	0.13	3
St. Maries	0.06	0.05	—	—	0.01	—	0.12	3
Salmon	0.03	0.02	—	—	0.00	—	0.05	3

Source: ITD, ISP.

Rover Stations Evaluation

The ConOps for Tiers 4 and 5 are designed for mobile rover sites which do not require the same space and infrastructure as Tiers 1, 2, and 3. Furthermore, data is scarcer for rover sites than for fixed or satellite stations. Recognizing these differences, a different evaluation was developed to classify rover sites:

- Vehicles weighed.
- Citations/credentials/permits issued.
- Revenue ratio.

Vehicles Weighed

The first criteria used to classify the different sites was the number of vehicles weighed. The most recent data available was from 2014.). In general, sites with a higher number of vehicles weighed should be considered for Tier 4 operations, while sites with a smaller number of vehicles weighed should be considered for Tier 5 operations.

To obtain this score, the number of vehicles weighed was divided by the total number of vehicles weighed across all rover sites, to obtain a ratio representative of how much each station weighs relative to the total number of vehicles weighed. To obtain a score from 0 to 1 (for comparison purposes) these scores where then normalized, dividing them by the largest score obtained. This way, the site with a score of ‘1’ represents the site with the largest number of vehicles weighed, while sites closer to ‘0’ represent sites with lesser weighing activity.

Credentials/Citations/Permits Issued

A second evaluation criteria used was enforcement activity. In this case, sites that issue more credentials, citations, and permits are considered a better fit for Tier 4 operations, while sites with fewer activities would be a better fit for Tier 5 operations. To score each site, the equation in

Figure 36 was used:

$$\frac{\#\ Citations/Total\ Citations + \#\ Credentials/Total\ Credentials + \#\ Permits/Total\ Permits}{Max(\#\ Citations/Total\ Citations + \#\ Credentials/Total\ Credentials + \#\ Permits/Total\ Permits)}$$

Figure 36. Equation Comparing Credentials, Citations, and Permits Issued at POEs

With this equation, sites were scored from ‘0’ to ‘1’ according to their operational activities. Sites that issued a greater number of credentials, citations, and permits were scored closer to ‘1’ than sites with fewer recorded activities.

Revenue Ratio

The last criteria used to determine which Tier would best fit current rover sites was the revenue ratio. Given that these sites have few costs associated with their operations, only revenue presented in ITD data was used for this purpose. This criteria is based on the consideration that sites with more activity, with greater revenue, should be considered for Tier 4 operations, while stations with less activity should be considered for Tier 5 operations. The ratio is a representation of the latest revenue associated to each site with respect to the overall revenue obtained by rover stations. To obtain a score between zero and one, these scores where normalized by the highest revenue ratio obtained.

Results

The multi-criteria evaluation presented shows a robust performance evaluation for rover sites. The methodology presented provides a way to aggregate scores and classify sites according to their performance based on available ITD data. Given that each criteria considered was weighed in comparison with the rest of the sites, and with equal weight, a final overall score can be obtained for each rover site. Table 10 shows the proposed criteria to classify rover site according to their overall score.

Table 10. Proposed Tier Selection Criteria for Rover Sites

Tier	Overall Score Range
4	>1
5	<1

Table 11 shows the scoring results for each site, and the Tier selection.

Table 11. Scores of Current Rover Sites

Site Name	Vehicles Weighed	Citation/ Credential/ Permits	Revenue Ratio	Total	Tier
Idaho Falls Rover 2	0.77	1.00	0.54	2.31	4
Mini-Cassia (Burley) Rover	1.00	0.59	0.22	1.81	4
Pocatello (Inkom) Rover 1	0.11	0.46	1.00	1.58	4
Lewiston Rover 1	0.32	0.89	0.26	1.47	4
Boise Rover 2	0.34	0.46	0.25	1.06	4
Idaho Falls Rover 1	0.23	0.38	0.29	0.91	5
Boise Rover 1	0.17	0.44	0.21	0.82	5
Twin Falls Rover	0.45	0.17	0.04	0.66	5
Coeur d' Alene Rover 2	0.29	0.20	0.09	0.58	5
Pocatello (Inkom) Rover 2	0.07	0.32	0.15	0.54	5
Coeur d' Alene Rover 1	0.21	0.24	0.03	0.47	5
Lewiston Rover 2	0.08	ND	ND	0.08	5
Bliss	0.01	ND	ND	0.01	5
Crow Inn	0.01	ND	ND	0.01	5
Idaho Falls Rover 3	ND	ND	ND	0.00	5

Source: ITD, ISP.

It is worth noting that while the project team did not have access to commercial vehicle crash data as part of this study, it could potentially be a useful addition to this analysis. ITD may wish to, in the future, rerun this analysis with commercial vehicle crash data as part of the scoring. Locations near areas with high crash rates could be given a 1, whereas locations near areas with lower crash rates could be given a lesser value.

Chapter 5
Findings and Recommendations

This section provides a summary of the project team's recommendations for the continued improvement of ITD's POE program. There are 15 recommendations organized into three categories:

- Technology findings and recommendations.
- Funding and capital investment findings and recommendations.
- Process, performance and people findings, and recommendations.

Technology Findings and Recommendations

Our key findings regarding the ability of technology to improve Idaho's truck enforcement are as follows:

- While the current approach to truck enforcement is yielding positive results, substantial improvement can be made by focusing technology in key areas.
- Standardization of technology around the five Concepts of Operation presented in Chapter 5 will allow ITD to improve focus and be more flexible with utilization of field resources.
- Fixed facilities should continue to play a substantial role in Idaho's truck enforcement methodology but technology should be tiered to meet enforcement demand.

Recommendation T1: Maintain Fixed Facility and Mobile Enforcement Approach

ITD's current POE operations utilize 17 fixed facilities and over 200 potential rover sites to conduct commercial vehicle enforcement. Fixed facilities are located strategically throughout the state to cover the major commercial vehicle routes. Fixed facility operations are supported by 11 rover teams that operate at the rover sites on a rotating basis and are focused on targeted enforcement. This is an approach that is being increasingly utilized by states across the country. Interviews with Washington, Tennessee, and other states conducted as part of this study indicated a strong preference for this approach with many enforcement officers considering it to be a best practice.

This approach to conducting commercial vehicle enforcement is viewed in a positive light both internal and external to ITD. Conducting enforcement in this manner allows ITD to focus their fixed facility operations on processing high commercial vehicle volumes, and providing credentialing and other related services to the commercial vehicle industry, while mobile enforcement remains flexible and focuses on strategic enforcement. Moving forward this approach should be maintained and enhanced through investments supporting technology to increase fixed facility throughput and allow for more data-driven scheduling of mobile enforcement units.

Recommendation T2: Implement Five-Tier Concept of Operations Methodology

While ITD's approach to commercial vehicle enforcement is considered by many to be a best practice, the tools being utilized to implement this approach have room for improvement. The lack of WIM, AVI, automated signage, and other technology creates a number of operational inefficiencies for the program and its staff, as well as delays for the commercial trucking industry. In many cases there are time-consuming manual processes in place to counteract the lack of technology available. These manual processes are a hindrance on the efficiency of enforcement activities, limiting the overall effectiveness of the POE program. Growth in commercial vehicle volumes will only serve to exacerbate this problem.

After conducting a thorough analysis of all data and information collected as part of this study, as well as a national review of best practices and technologies in commercial vehicle enforcement, the project team worked with ITD to develop a set of ConOps to be applied to the existing facility and site locations. These ConOps focus on leveraging technology to increase operational efficiency at the ports by focusing ITD effort on likely offenders and minimizing the amount of manual procedures required to review and process a vehicle. In total five different ConOps were developed with three 3) for the fixed facilities and two 2) for the rover sites. Table 12 summarizes each of the proposed ConOps and, while they all differ slightly in terms of required technology, infrastructure, and staffing, they all provide a higher level of data-collection and automation than is currently in use by ITD.

Table 12. Summary of ConOps Tiers

ConOps Tier	Applicable Traffic and Road Conditions	Operations	Infrastructure	Technology	Cost (2016 $)[a]
Tier 1	High volume, current fixed facility	• ITD Inspector (FT) • TRS (FT) • ISP (PT)	• Administrative Building • Internal Bypass • Reweigh Loop • Truck Parking with hazmat pit • Inspection Garage • Fixed Scale	• WIM/AVI • Changeable Message Sign • Brake Scanner • Over-Dimension Monitoring • Queue Detection • Public Wi-Fi	12,500,000
Tier 2	Lesser volume U.S. and state highways, current fixed facilities	• ITD Inspector (FT) • TRS (optional)	• Administrative Building • Internal Bypass • Reweigh Loop • Truck Parking • Fixed Scale	• WIM/AVI • Changeable Message Sign • Brake Scanner (optional) • Over-Dimension Monitoring (optional) • Public Wi-Fi	10,000,000
Tier 3	Low-volume roads, current fixed facilities	• ITD Inspector (PT at facility, PT remote)	• Small Administrative Building • Fixed Scale	• WIM/AVI • Changeable Message Sign • Public Wi-Fi • Terminal for communication with remote staff	2,500,000
Tier 4	High-volume roads, current rover sites	• ITD Inspector (rotating basis)	• None	• WIM/AVI • Changeable Message Sign • Portable Scales	1,500,000
Tier 5	Low-volume roads, current rover sites	• ITD Inspector (rotating basis)	• None	• Changeable Message Sign • Portable Scales	250,000

FT: Full-time, PT: Part-time.

[a] Cost does not include any land acquisition, annual operating costs, or costs associated with demolition or repurposing of existing infrastructure.

Based on our calculations (which can be reviewed in detail in Chapter 5 of this report) the ConOps assignments for ITD's POEs are outlined in Table 13.

Table 13. Current ITD POE Facilities and Rover Sites by Recommended ConOps Tier

ConOp Tier 1	ConOp Tier 2	ConOp Tier 3	ConOp Tier 4	ConOp Tier 5
Cotterel/Declo East Boise Huetter Inkom Sage Junction	Haugan Hollister Lewiston	Ashton Bonners Ferry Horseshoe Bend Kooskia Lewiston Hill Marsing Priest River Salmon St. Maries	Boise Rover 2 Idaho Falls Rover 2 Lewiston Rover 1 Mini-Cassia (Burley) Rover Pocatello (Inkom) Rover	All other rover sites

Recommendation T3: Invest in Software to Support Roadside Technology

While investing in the ConOps will provide ITD with improvements in operational efficiency, it should be noted that there are a number of related technological investments that would add further improvement. This section provides an overview of a few technological investments that would synergize well with implementation of the ConOps.

Recommendation T3A: Updated On-line Permit System

One of the substantial operational changes contained within the ConOps is a change in the way credentials are obtained by commercial vehicle operators. Today, every POE will issue credentials to commercial vehicle operators when they come to the facility. Based on an industry survey, drivers would prefer to order their credentials on-line. As a result, the ConOps were developed to remove the emphasis on the issuance of credentials on-site at the POEs. In support of that change, ITD should explore ways to invest in a new on-line credential issuance system similar to those utilized in the majority of states across the country. Ideally, the system would streamline the issuance of all credential types, including OSOW permits, by leveraging auto-issuance where possible. Having a system that supports multiple platforms would also be ideal as tablets and other mobile devices are becoming commonplace. Having a robust, user-friendly, credential issuance system will ensure that customers are better able to acquire credentials and minimize the impact of this process on ITD staffing resources. Providing wireless Internet access at the Tier 1, Tier 2, and Tier 3 facilities will allow commercial vehicle operators to easily connect to the permit system, reducing the workload of POE personnel. The costs associated with purchasing an upgraded permit system vary widely and can range anywhere from $500,000 to $2,000,000. These costs are heavily influenced by the complexity of a state's processes and legislation as well as the functionality required by the state.

Recommendation T3B: Integrated Enforcement Interface

Each of the ConOps calls for the addition of various technological applications to collect data to be analyzed by ITD personnel in facilities and at the roadside. It is of critical importance that this information be integrated into a simple, easy to understand interface. Frequently, enforcement personnel are required to glance at multiple screens, each containing information for a piece of technology, and visually inspect the incoming vehicle in order to make a decision on whether or not to take further action. Integrating all of the data streams into a single user interface will allow enforcement personnel to be able to more quickly process data about a vehicle and make faster, more informed, decision about what the next step for that vehicle should be. Washington is an example of a state with an integrated enforcement interface at their roadside facilities. The cost of this implementing this recommendation is difficult to narrow down as there is no off-the-shelf interface currently available.

Recommendation T3C: Data Integration

Much of the technology implemented as part of the ConOps requires an underlying data source in order to be most effective. AVI, for example, requires access to a database containing vehicle information in order to determine whether or not that vehicle is credentialed appropriately. ITD could benefit from the creation of a data warehouse that contains all necessary commercial vehicle information currently spread across multiple databases at the state and Federal level. The New York City Gateway project is an example of a robust, multi-agency data warehouse that has recently been developed to provide a centralized location from which data can be utilized. The ideal data warehouse could be updated in real time via the development of application program interfaces (API), or on a periodic basis via batch data uploads. The overall goal would be to provide the ConOps technology with a single, accurate data source from which to draw from.

Having a centralized data set could also help eliminate manual data entry and other related manual processes by providing opportunities for automatic data transference. Consider the following sequence of events:

- A commercial vehicle is identified and weighed by technology on the mainline.
- The vehicle is signaled to come into the POE as they are overweight and missing credentials.
- The driver is directed by ITD personnel to park his vehicle and come inside the administrative building.
- ITD enforcement personnel issues a citation to the driver.

With the current process and technology, ITD staff members have to hand write the citation, including the company and vehicle information. In an ideal scenario, the staff member would prepopulate the citation form with data collected by mainline technology and verify its accuracy, saving both the commercial vehicle operator and the ITD staff member time. With the availability of a centralized database, this concept can be applied to several processes to increase efficiency. Additional research would be needed to narrow down the costs associated with this recommendation.

Recommendation T4: Integrate ITD Traffic Operations Weigh-in-motion Data with Truck Enforcement Data

ITD currently operates 13 weigh-in-motion devices without vehicle identification to assist in traffic operations and congestion management.[1] At a minimum, ITD should utilize the volume and classification data, as well as the ability to broadly estimate percentages of overweight vehicles, to augment some of the site scoring methodology used in Chapter 5. If additional capital is available, it may be prudent to invest in vehicle identification at one site to pilot some alternative enforcement techniques. One such example could be sending informational documentation to carriers with vehicles which appear to be habitually overweight when crossing these sensors.

Recommendation T5: Lease Commercially Available In-Vehicle Heavy Truck Location Data to Aid Tier 1 to 5 Site Planning

Vehicle location and route data is becoming more sophisticated, due in part to the ability to leverage smartphone and in-vehicle device data to obtain information about location, and estimate potential

[1] See: http://itd.idaho.gov/highways/roadwaydata/.

options for the routes which were utilized. Heavy truck location data is primarily available from the latter source, although some smartphone data can also be utilized. These data are sample-based, as not all commercial vehicles will be utilizing systems or technologies which allow the capture of their location.

With the emergence of information, multiple third-party data products are available to help agencies understand travel flow. With some products, users are able to define zones interactively and develop origin-destination matrices. These approaches are generally used in travel demand modeling, either with or without microsimulation.

In truck enforcement, there is an opportunity to utilize this data to get broad categorizations of how well specific sites operate in terms of ease of avoidance. Consider the following scenario for the East Boise POE.

- Zone 1 is Boise and communities to the south and west such as Meridian and Kuna;
- Zone 2EB and 2WB are the stretches of I-84 immediately preceding the entrances to the POE;
- Zone 3 is a zone stretching along I-84 from Mountain Home through Twin Falls, and extending up to U.S. 20 to the north, and the Nevada border to the south.

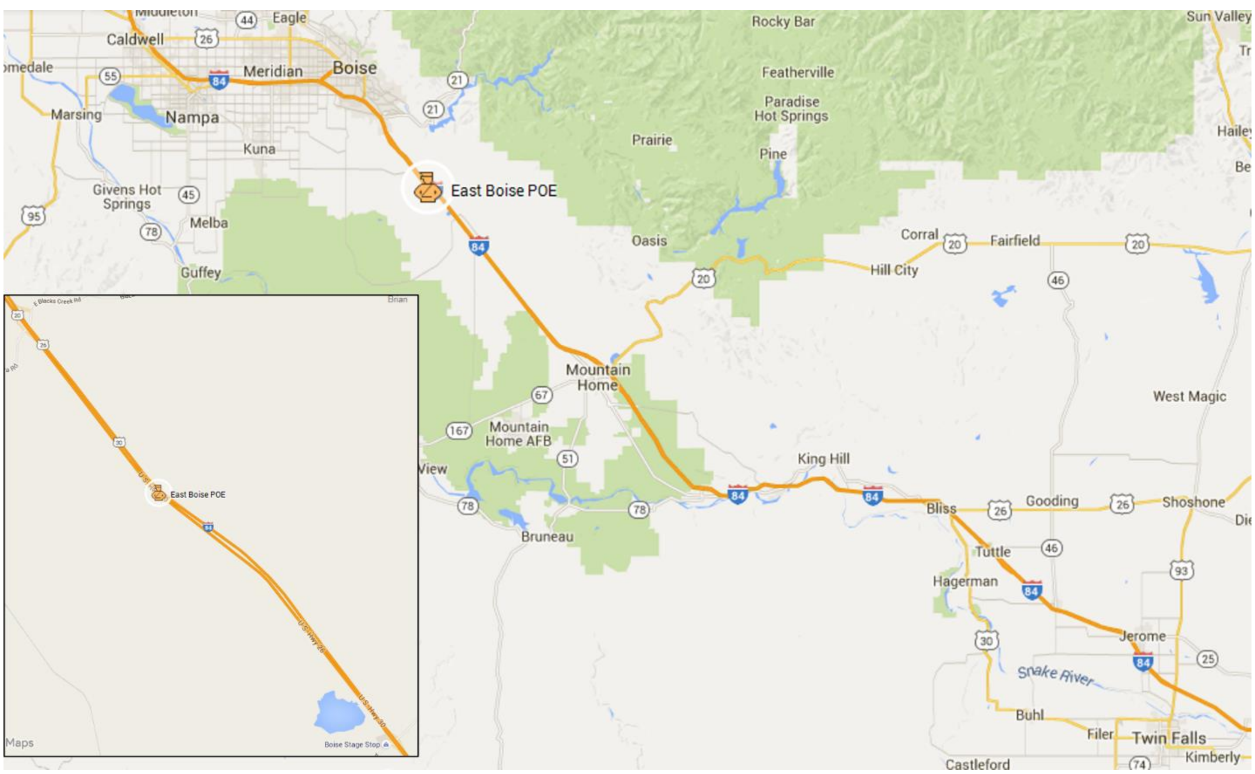


Figure 37. East Boise POE and Surrounding Area
Source: Google Maps.

Clearly not all truck traffic in zone 1 will travel to zone 3, nor from zone 3 to zone 1. We would expect, however, that the efficiency of the POE is affected by the percentage of the traffic that does flow between these zones that somehow manages to bypass zone 2.

By calculating these ratios using a year's worth of device and in-vehicle data, ITD can refine the methodology used in Chapter 5 and refine the locations for Tier 4 and Tier 5 sites. In addition, broader zones can be defined to match the largest freight flows as identified in Idaho's emerging Statewide Freight Plan, and an overall assessment of the POE system effectiveness can be made with respect to having commercial vehicles encounter one or more POEs during a trip.

Funding and Capital Investment Findings and Recommendations

Recommendation F1: Explore Relocation of Cotterel POE

According to ITD staff and our initial observations, nearly all of ITD's Port of Entry facilities are located well within the context of inter and intrastate traffic flows. There are two potential gaps in the system. The first is on I-84 west of the East Boise scale. This gap can be best addressed through the use of additional mobile enforcement, as building a new site at this location would render the current East Boise site redundant. The second occurs on Interstate 86 between Interstate 15 and the East Boise POE. Cotterel POE currently operates a scale and complex on both the NB and SB sides of I-84 which interchanges with I-84/I-86 in this gap, but the facility does not interdict traffic traveling east/west on Interstate 86.[2]

Based on the data collected as part of this study, the commercial vehicle volumes at the proposed Declo location, both now and in the future, are greater than those seen at the existing Cotterel location. Given the greater volumes at Declo, combined with the fact that traffic traveling west on I-86 can currently bypass fixed facilities for a significant portion of the state, is reason enough for ITD to further explore the feasibility of relocating this facility. Relocating Cotterel to a location on I-86 west of the I-84 interchange would allow ITD to monitor trucks traveling across the state, as opposed to only those exiting and entering the state on I-84, and address one of the gaps in the current POE network's enforcement coverage. Figure 38 highlights the current Cotterel location.

[2] Interstate 86 starts at the interchange with Interstate 84 and runs east to an interchange with Interstate 15 in Pocatello.

Figure 38. Map of Current Cotterel POE Location
Source: Google Maps.

Recommendation F2: Conduct a Cost-Benefit Analysis of the Haugan POE.

While ITD sets aside a portion of their annual POE operating costs to support enforcement activities at the Haugan POE, our research indicates that the value of the return on that investment is not clear. The primary focus of enforcement activities conducted at the Haugan POE occur on commercial vehicle traffic exiting the State of Idaho while minimal focus is placed on vehicles exiting the State of Montana. This means that vehicles that could negatively impact the safety and quality of Idaho's roadways may not be examined as closely as they would be at other POEs operated by ITD.

ITD should consider conducting a full cost-benefit analysis before investing any additional money in the Haugan POE to ensure that the value added to the agency is reflective of the money invested in this location. Table 14 below outlines ITD's expenses and the facility-related revenue for the Haugan POE.

Table 14. Haugan POE Expenses and Facility-Related Revenue 2010-2014

Calendar Year	2010	2011	2012	2013	2014
Revenue	$287,319	$223,653	$187,715	$132,501	$216,482
Monthly Charges	$185,800	$261,000	$229,800	$153,600	$248,700
Annual Scale charges/Scale purchases	$2,100	$27,300	$2,300	$700	$1,100
Total paid to MDOT	$188,900	$288,300	$232,100	$154,300	$249,800
TOTAL	**$94,419**	**- $64,647**	**- $44,385**	**- $21,799**	**- $33,318**

Source: Idaho Transportation Department. Revenue is combined total from Permits and Credentials.

The revenue generated does not cover the operating costs incurred by ITD, furthermore, ITD does not get 100 percent of the revenue generated as a result of enforcement activities conducted at the site. The primary goal of a cost-benefit analysis should be to determine the percentage of the revenue that is provided to ITD and determine if supporting this facility is a worthwhile investment going forward. It is recommended that this be done prior to investing money to deploy technology associated with the ConOps developed as part of this study.

Recommendation F3: Sequence Truck Enforcement Investment as a Consistent Annual Line Item

One of the potential implementation risks is that after an initial burst of funding, other pressing state priorities reduce the amount of funding for truck enforcement. Investment in truck enforcement is an investment in an asset which eventually depreciates over time. As such, investment in truck enforcement should be considered in a similar manner to investments in highway assets such as bridges and pavements.

We would recommend that within a particular year, investments be sequenced in the following priority:

- Statewide cross-site investments, such as development and maintenance of a new permitting system.
- Investments to Tier 1 sites, including associated Tier 4 and 5 investments for high-risk bypass routes.
- Investments to Tier 2 sites, including associated Tier 4 and 5 investments for high-risk bypass routes.
- Investments in Tier 3 to 5 sites.

We recommend considering a 15-year planning horizon. This horizon allows for sequencing physical updates, refreshing technologies, and putting in placeholder ‘blocks’ for emerging technologies such as truck enforcement of autonomous and connected vehicles.

Recommendation F4; Determine the Portion of Annual Investment Suitable for Capture from Fees and Fines

While the entire truck enforcement program should not be expected to be revenue-neutral or revenue-positive, it is appropriate for a portion of the annual investment portfolio at the lower priority levels to be considered revenue-neutral. The specific percentages and sources are policy issues beyond the scope of this research.

"Process, Performance and People" Findings and Recommendations.

Recommendation P1: Integrate Truck Enforcement into Idaho's Statewide Freight Plan

Idaho is currently developing a Statewide Freight Strategic Plan to meet requirements of the new Fixing America's Surface Transportation (FAST) Act legislation. This Plan, scheduled for completion in late summer 2016 consists of multiple tasks including:

- Identification of freight's relationship to the Idaho economy.
- Analysis of the Multimodal Freight Network in Idaho (including a discussion of the Port of Entry system).
- Examination of freight's impact on highway safety, identifies key priority locations and suggests projects and measures to improve safety.
- Evaluation of freight policy in Idaho.
- Drafting of a May 10, 2020 Year Infrastructure Improvement Plan.

Integration of truck enforcement and technology initiatives into the Statewide Freight Plan has an added benefit under the FAST Act that is directly applicable to the final task above. Recent presentations by the FHWA have indicated that weight enforcement strategies and technologies are now eligible for funding out of FAST Act funds.[3] While there is not a set-aside for truck enforcement and thus initiatives will have to compete with other statewide priorities, it is appropriate and prudent to link truck enforcement into a larger goods movement and freight management framework. In addition to freight-specific funding, money in the form of grants has also been dedicated to Intelligent Transportation System (ITS) research and deployment. Though Idaho projects would need to compete with other priorities both within the State and across the country, the need and potential benefits of enhancing the technological capabilities of Idaho's POE system may make these projects strong competitors for these funds.

[3] http://www.ops.fhwa.dot.gov/freight/pol_plng_finance/policy/fastact/s1116nhfpguidance/#eligibility.

Recommendation P2: Refine or Develop Outcome-Based and Tier-Based Performance Measures for Truck Enforcement

A related initiative would be to develop performance measurement and reporting that is outcome based, preferably by Tier. Outcome-based reporting should translate the truck enforcement efforts into three main metrics of why agencies conduct truck enforcement in the first place:

- Safety benefits including estimated numbers of unsafe trucks taken off the highway due to screening and inspection, and reductions in fatalities and injuries.
- Infrastructure benefits, including reductions in truck-related damage to bridges and pavements.
- Goods movement and mobility benefits, such as the effects of electronic screening and virtual weigh stations on congestion.

The more traditional output-based measures, such as those reported to the FHWA as part of the State Enforcement Plan, are still relevant, but should be used to feed these broader outcome-based levels. Outcome-based reporting allows for truck enforcement investments to be compared to other infrastructure, safety, and mobility investments across ITD program areas.

Recommendation P3: Integrate Truck Enforcement Workforce Development Initiatives across ITD and ISP

One of the challenges in this area is managing the attraction, development, and retention of personnel across agencies to ensure that experts in truck enforcement strategies, practices, and procedures continue to be employed by the State. Workforce development is by no means unique to this area, but it is clear that the mix of skills needed for roadside truck enforcement and supporting deskside activities has evolved over the past 20 years and will continue to evolve over the next decade. We recommend that both agencies work together to understand how to continue to foster a spirit of cooperation and build a joint workforce that enables the State to achieve its safety, infrastructure, and mobility goals.

Recommendation P4: Consider Examining Legislation to Identify Technological Barriers

One of the challenges many states are faced with as they invest in technology to improve their operational efficiency is the presence of outdated legislation that does not take technology evolution into consideration. As a result, states are often prevented from implementing a process or solution in a manner that maximizes its benefits to both the agency and industry. One common example is the requirement of a commercial vehicle operator to possess a physical copy of their OSOW permit in the vehicle. As technology has advanced, carriers are able to get their permits on tablets and cell phones which shows this particular regulation has become dated. This is just one example of a regulation that was written with terminology that made sense at the time but currently creates a barrier to operational efficiency. ITD should explore their existing regulations to identify any legislation viewed as prohibitive to the use of technology to support their operations moving forward.

Moving Forward

With 15 recommendations there are a significant number of moving parts and parallel activities. The realities of workforce levels within state government (Idaho or anywhere else) is that not all 15 can be accomplished at once. We suggest introducing the recommendations in a series of three expanding phases over the next 45 months, as shown in:

- Phase 1 encompasses activities for the remainder of calendar year 2016.
- Phase 2 encompasses activities for 2017 and the first half of 2018.
- Phase 3 encompasses activities for the second half of 2018, and all of 2019 and 2020.

The duration of each activity will primarily depend on the level of effort ITD can provide for the activity. Some of the activities can be done very quickly as they simply require management and executive discussion. Others require procurement, and still others require time to pass for data to become available. As a result, Phase 1 has a disproportionate number of recommendations for its timeframe.

Table 15. ITD POE System Recommended Implementation Steps

Table Stage	Begin Activities on These Recommendations	Timeline to Begin
1	Quick Activities (duration of 2 months or less) T1: Maintain Fixed Facility and Mobile Enforcement Approach T2: Implement Developed ConOps Five-Tier Concept of Operations Methodology (decision to do so) T5: Lease Commercially Available In-Vehicle Heavy Truck Location Data Longer-term Activities T3A: Updated On-line Permit System F2: Conduct a Cost-Benefit Analysis of the Haugan POE P1: Integrate Truck Enforcement into Idaho's Statewide Freight Plan	April 2016 through December 2016
2	T3B: Integrated Enforcement Interface T3C: Data Integration F1: Explore Relocation of Cotterel POE F3: Sequence Truck Enforcement Investment as a Consistent Annual Line Item P2: Refine or Develop Outcome-Based and Tier-Based Performance Measures for Truck Enforcement P4: Consider Examining Legislation to Identify Technological Barriers	January 2017 through June 2018
3	T4: Integrate ITD Traffic Operations Weigh-in-Motion Data with Truck Enforcement Data F4; Determine the Portion of Annual Investment Suitable for Capture from Fees and Fines P3: Integrate Truck Enforcement Workforce Development Initiatives Across ITD and ISP	July 2018 through December 2020

Appendix A
Port of Entry Facility Profiles

This section contains individual profiles for each of ITD's Primary and Satellite POE facilities as well as a profile that provides a high-level overview of ITD's supporting rover operations. The facilities are presented in alphabetical order by district.

Bonners Ferry Port-of-Entry

CAMBRIDGE SYSTEMATICS

Type: Fixed POE

Location: US-95 Milepost 510.6, Junction of US95 and US2

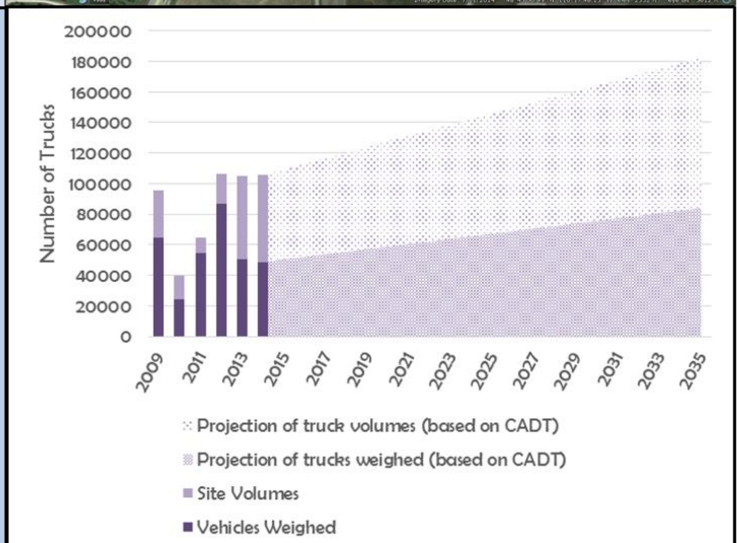
Coordinates: 48.7323587677, -116.29670294

Hours per day: 19.5

Days per Week: 3

 # Staff Support: 2

Key Attributes: Site handles traffic in all directions; internal loop to re-weigh



Scale Size: Platform scales 12x20

WIM: No

Key Needs: Mainline WIM

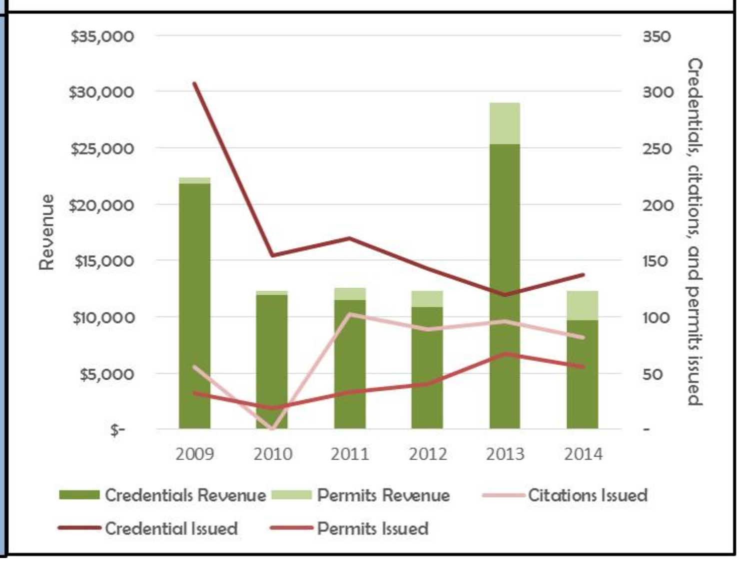


Figure 39. Bonners Ferry Port of Entry

Haugan Port-of-Entry

CAMBRIDGE SYSTEMATICS

Type: Fixed POE

Location: I-90 Milepost 15, 15 miles East of Idaho State Line

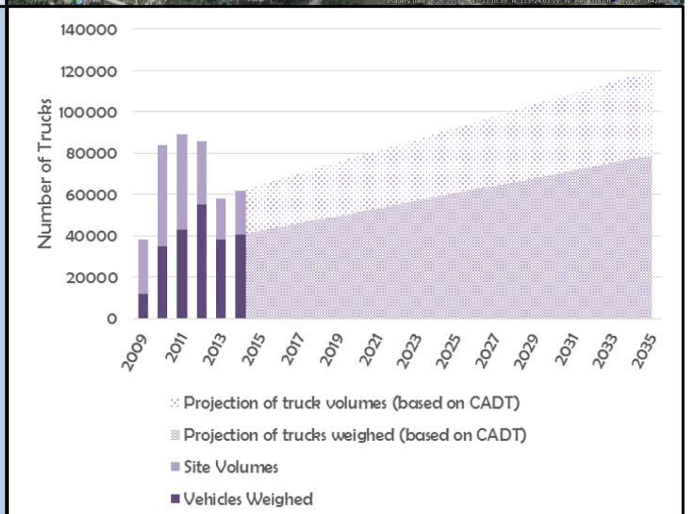
Coordinates: 47.3862088283, -115.400886108

Hours per day: 24

Days per Week: 7

 # Staff Support: 4

Key Attributes: Site handles EB and WB Traffic; One location on NB side. Traffic must exit Interstate onto frontage road (using on/off ramp)



Scale Size: Platform scales 12x20

WIM: No

Key Needs: Mainline WIM

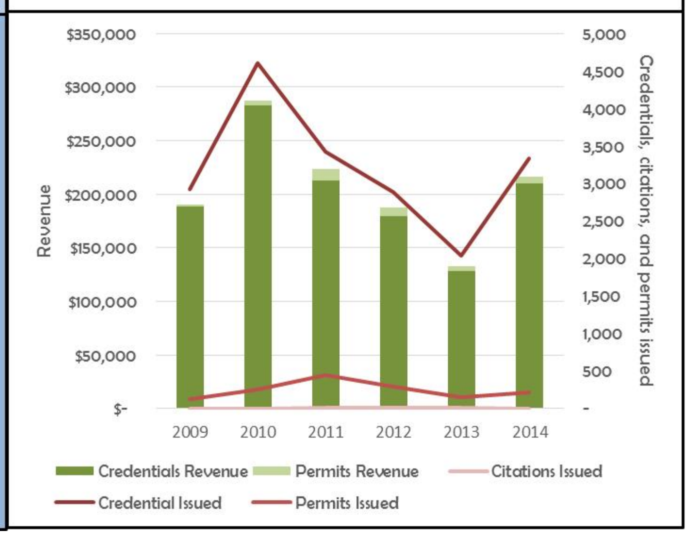


Figure 40. Haugan Port of Entry

Huetter Port-of-Entry

Type: Fixed POE

Location: I-90 Milepost 8.6, 2 miles West of Coeur d' Alene

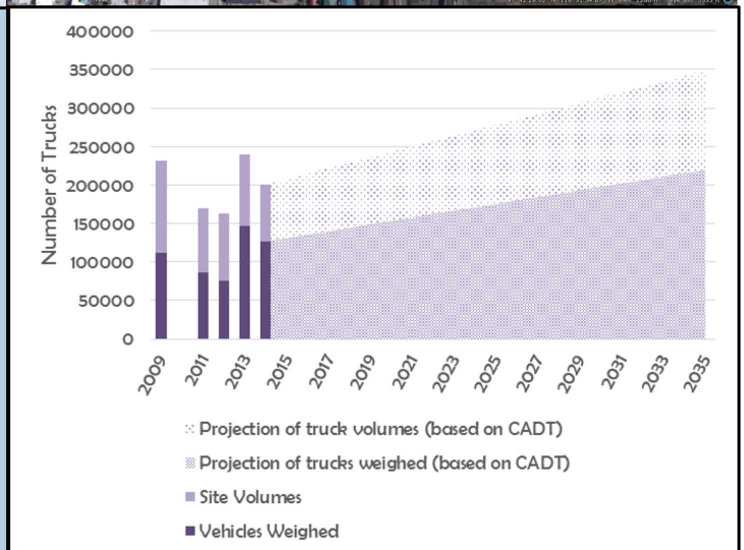
Coordinates: 47.7077829555, -116.865242182

Hours per day: 19.5

Days per Week: 6

 # Staff Support: 6

Key Attributes: Site handles EB Traffic; Off right side, straight pull through.



Scale Size: Platform scales 12x20

WIM: Yes

Other technology: License Plate Reader

Key Needs: WIM under construction

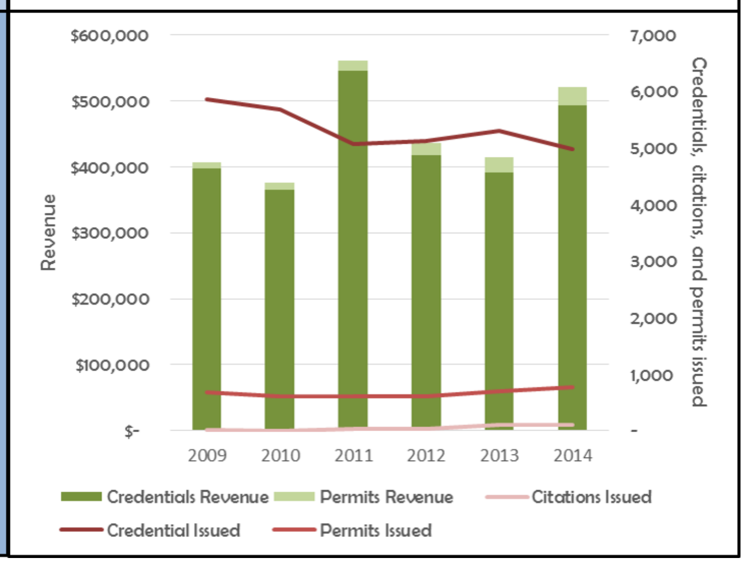


Figure 41. Huetter Port of Entry

Priest River Port-of-Entry

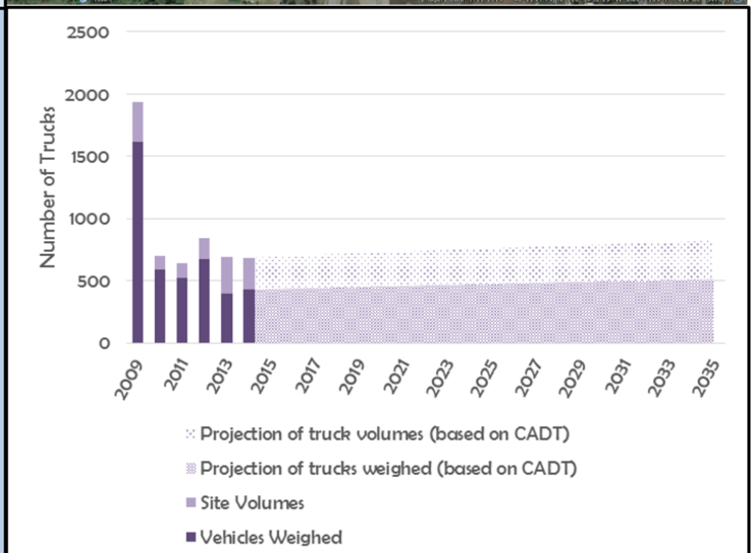
Type: Satellite POE

Location: SH-57 Milepost 0.675, 5 miles East of Priest River

Coordinates: 48.1910528182, -116.914524167

 # Shifts: 47

Key Attributes: Site handles SB Traffic; R side, SB only, scale platform only, no loop or bypass lanes



Scale Size: Platform scales 10x10

WIM: No

Key Needs: Mainline WIM

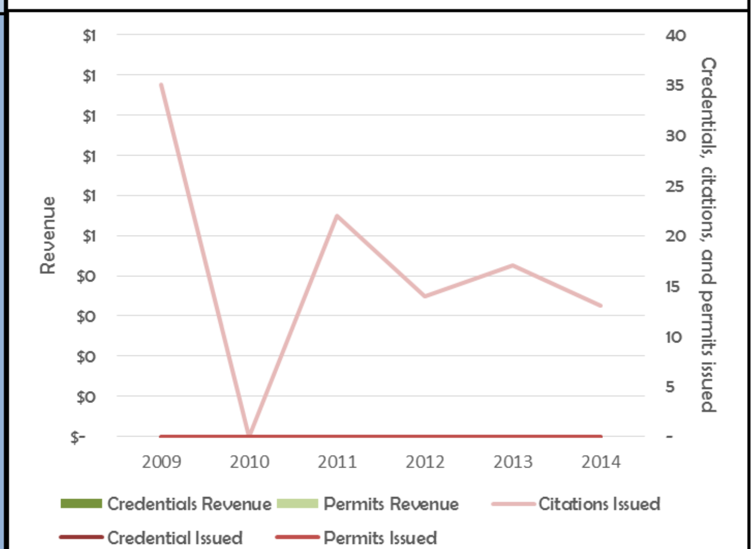


Figure 42. Priest River Port of Entry

St. Maries Port-of-Entry

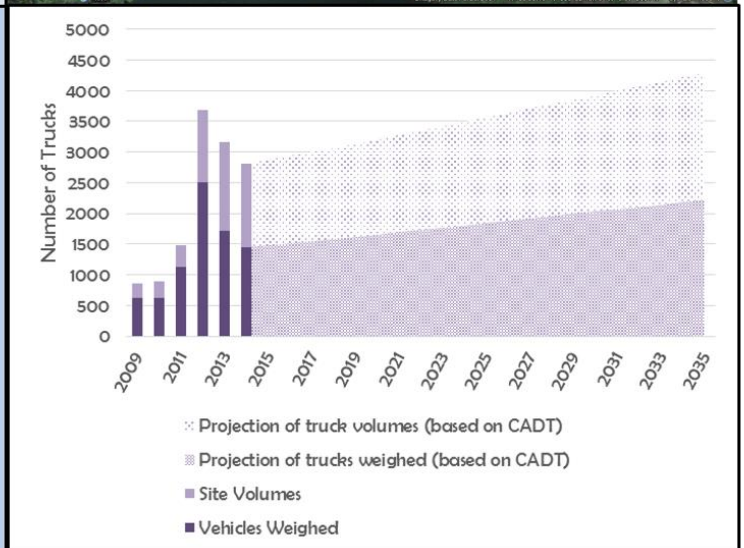
Type: Satellite POE

Location: SH-3 Milepost 83.61, 1 mile South of St. Maries

Coordinates: 47.3100206859, -116.546405337

 # Shifts: 70

Key Attributes: Site handles NB Traffic; R side, NB only, scale platform only, no loop or bypass lanes



Scale Size: Platform scales 10x10

WIM: No

Key Needs: Mainline WIM

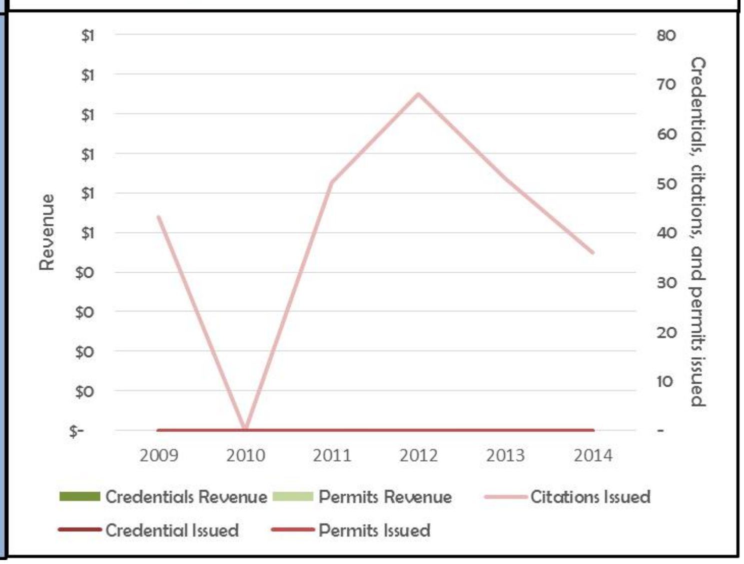


Figure 43. St. Maries Port of Entry

Lewiston Port-of-Entry

Type: Fixed POE

Location: US-95 Milepost 309.8, 1 mile East of Lewiston

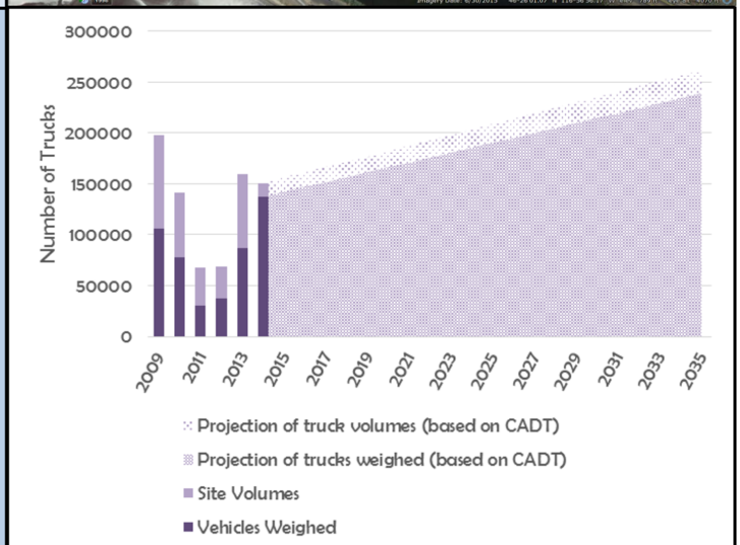
Coordinates: 46.4336312289, -116.948937094

Hours per day: 19.5

Days per Week: 4

 # Staff Support: 4

Key Attributes: Site handles NB and SB Traffic; L exit/entrance, Center location, 2 scales, single block house, no loop



Scale Size: Platform scales 12x20 and 12x100

WIM: Yes

Other technology: Transponder Reader

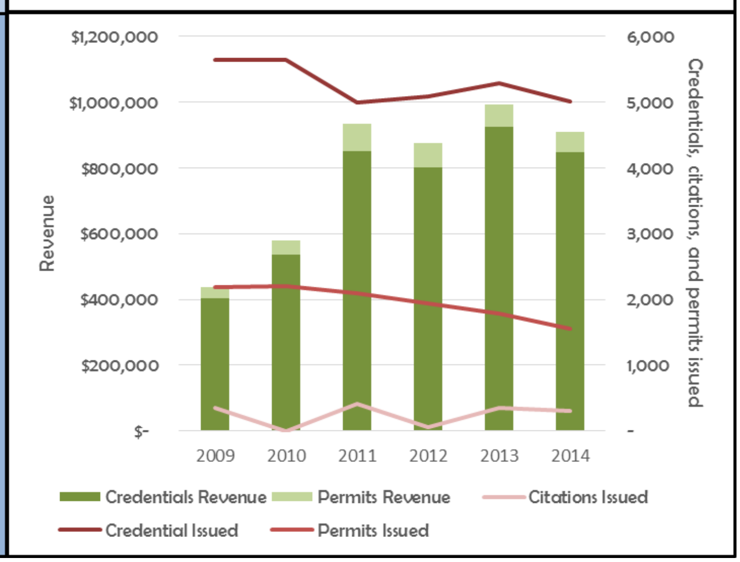


Figure 44. Lewiston Port of Entry

Lewiston Hill Port-of-Entry

Type: Fixed POE

Location: US-95 Milepost 317.9, 7 miles North of Lewiston

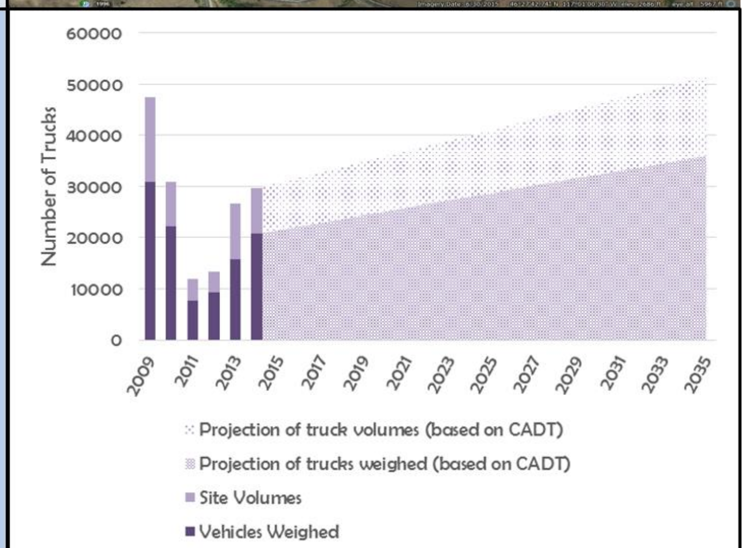
Coordinates: 46.4618723327, -117.0167498

Hours per day: 10

Days per Week: 5

 # Staff Support: 1

Key Attributes: Site handles SB Traffic; R exit, SB only, no loop, bypass lane



Scale Size: Platform scales 12x20 (2)

WIM: No

Key Needs: Mainline WIM

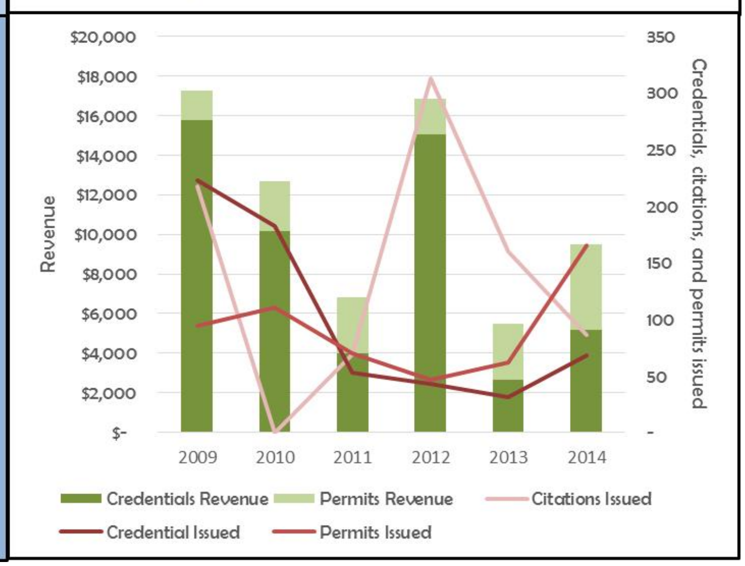


Figure 45. Lewiston Hill Port of Entry

Kooskia Port-of-Entry

CAMBRIDGE SYSTEMATICS

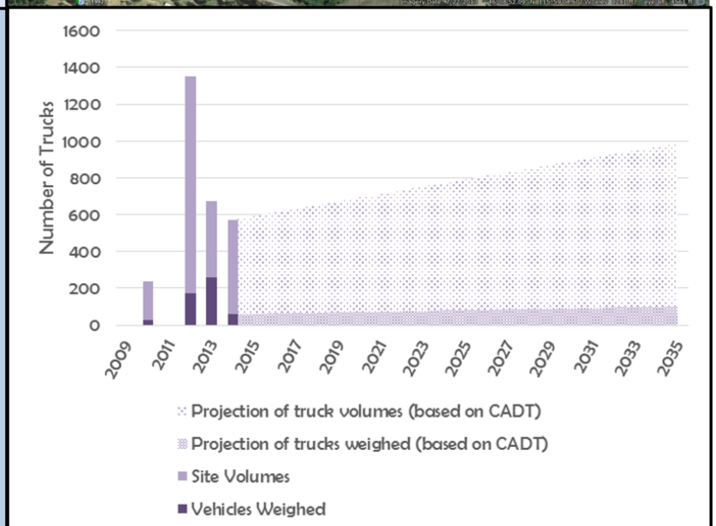
Type: Satellite POE

Location: US-12 Milepost 74

Coordinates: 46.1478021881, -115.984610434

 # Shifts: 15

Key Attributes: SB side, NB trucks must cross traffic to enter/exit. Exit onto SH 13, left turn to reach US 12, scale platform only



Scale Size: Platform scales 10x10

WIM: No

Key Needs: Mainline WIM

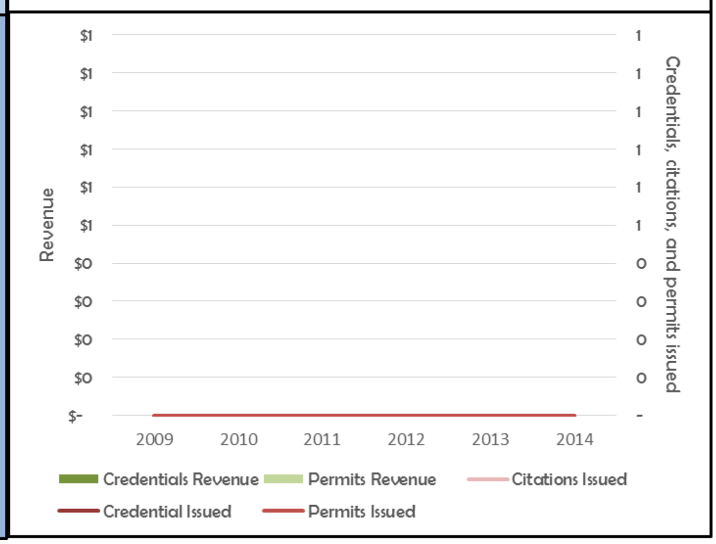


Figure 46. Kooskia Port of Entry

East Boise Port-of-Entry

CAMBRIDGE SYSTEMATICS

Type: Fixed POE

Location: I-84 Milepost 67, 11 miles East of Boise

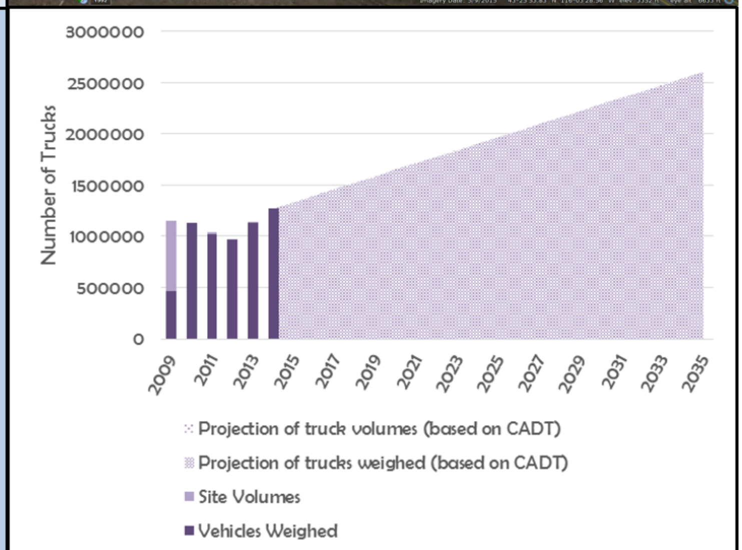
Coordinates: 43.4316203676, -116.057933417

Hours per day: 20

Days per Week: 7

 # Staff Support: 11

Key Attributes: Site handles EB and WB Traffic; Dual direction, R exit, loop to re-weigh



Scale Size: Platform scales 12x16

WIM: Yes

Other technology: Transponder Reader

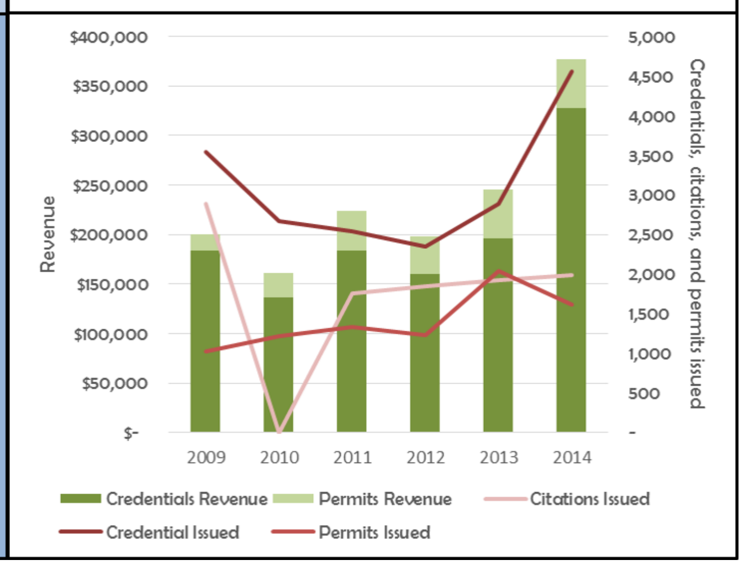


Figure 47. East Boise Port of Entry

Horseshoe Bend Port-of-Entry

CAMBRIDGE SYSTEMATICS

Type: Fixed POE

Location: SH-55 Milepost 65.4, 1/2 mile North of Horseshoe Bend

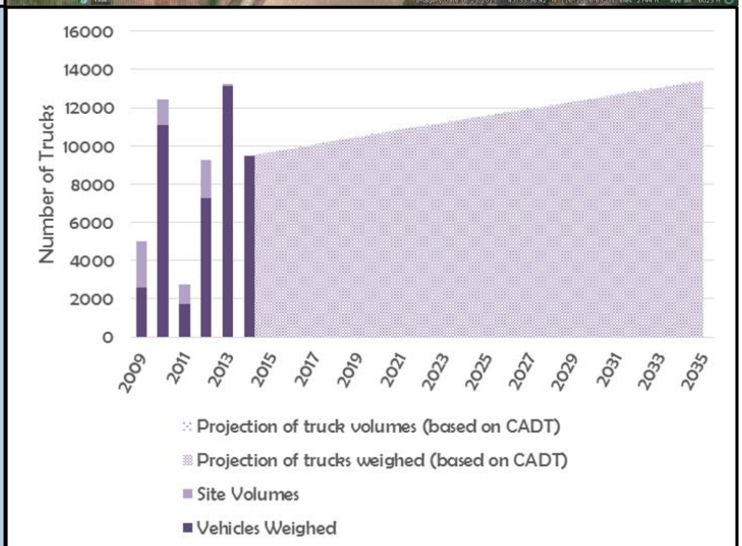
Coordinates: 43.9267827983, -116.190792455

Hours per day: 10

Days per Week: 4

 # Staff Support: 1

Key Attributes: Site handles NB and SB Traffic; SB side. Traffic enters/exits both NB and SB, single scale. No loop.



Scale Size: Platform scales 12x20

WIM: No

Key Needs: Mainline WIM

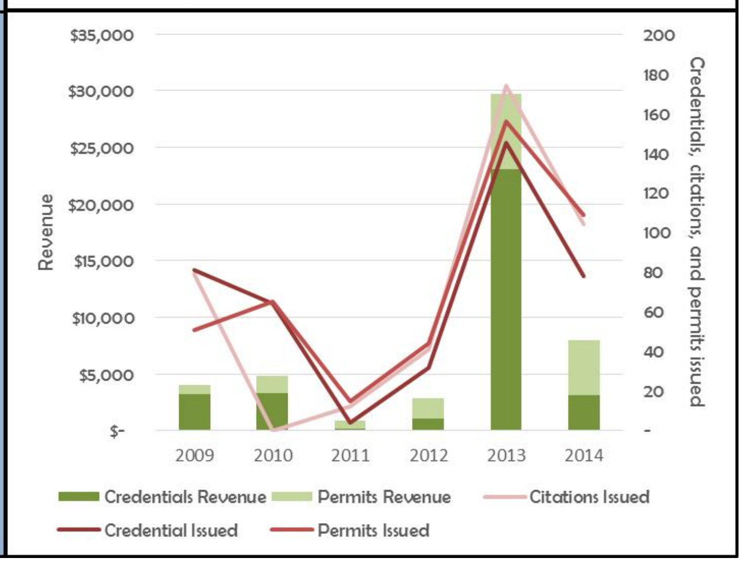


Figure 48. Horseshoe Bend Port of Entry

Marsing Port-of-Entry

Type: Fixed POE

Location: US-95 Milepost 18.3, 6 miles South of US55/US95

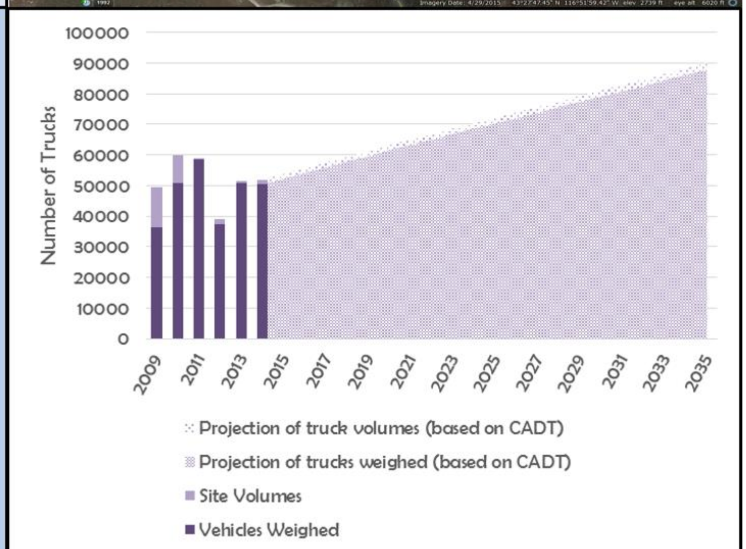
Coordinates: 43.4631794326, -116.866505844

Hours per day: 10

Days per Week: 7

 # Staff Support: 2

Key Attributes: Site handles NB, SB, and WB Traffic; NB side, SB must cross traffic. No loop, no bypass. L onto Summer Camp Rd. to U.S. 95, very close to intersection



Scale Size: Platform scale 12x12

WIM: No

Key Needs: Mainline WIM

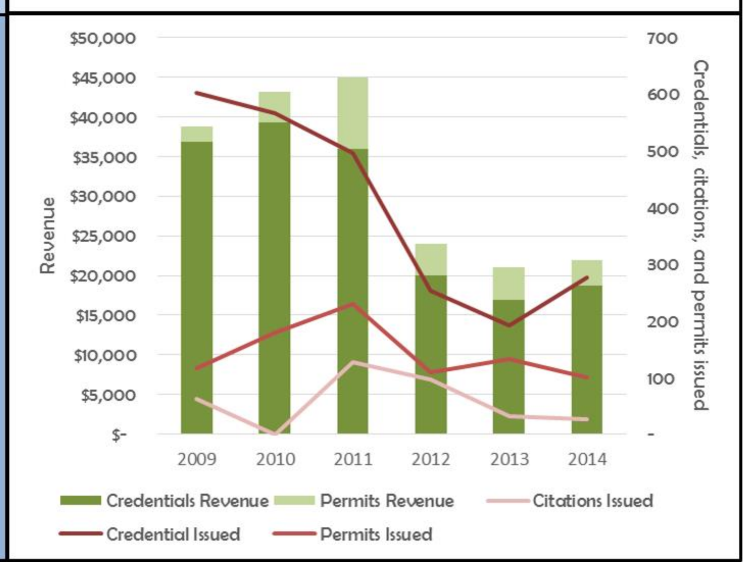


Figure 49. Marsing Port of Entry

Cotterel Port-of-Entry

CAMBRIDGE SYSTEMATICS

Type: Fixed POE

Location: I-84 Milepost 229, 8 miles South of the I84/I86 Interchange

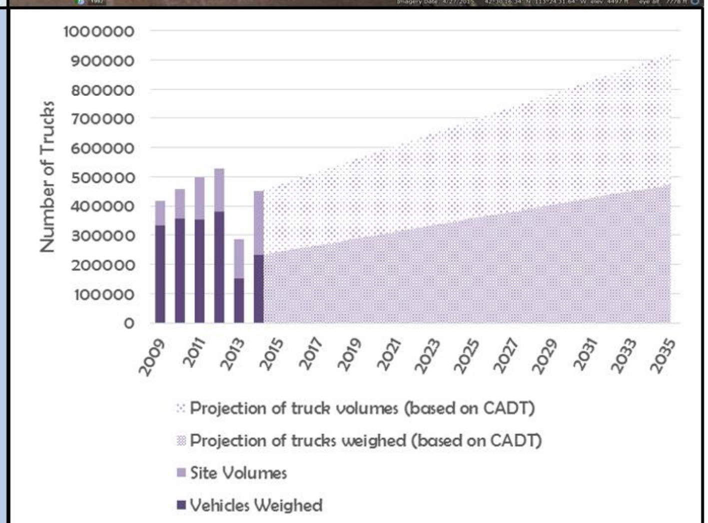
Coordinates: 42.5045377603, -113.408787893

Hours per day: 19.5

Days per Week: 7

 # Staff Support: 7

Key Attributes: Site handles EB and WB Traffic; Dual direction, R exit, no loop



Scale Size: Platform scales 12x20

WIM: No

Key Needs: Mainline WIM, extended acceleration/deceleration lanes

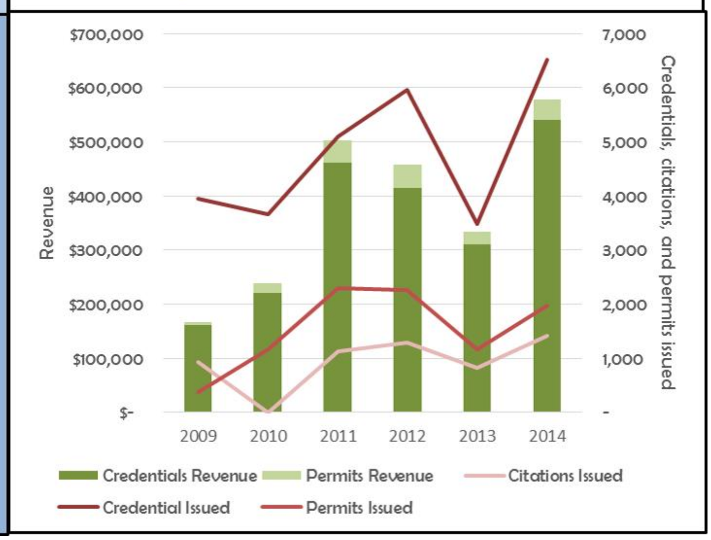


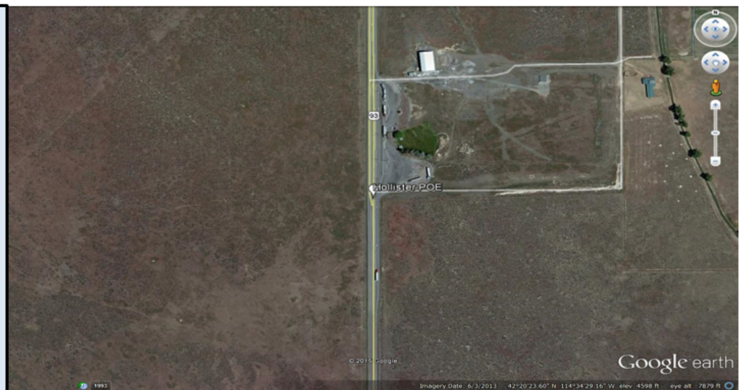
Figure 50. Cotterel Port of Entry

Hollister Port-of-Entry

Type: Fixed POE

Location: US-93 Milepost 26, 21 miles South of Twin Falls

Coordinates: 42.3398895067, -114.574765734

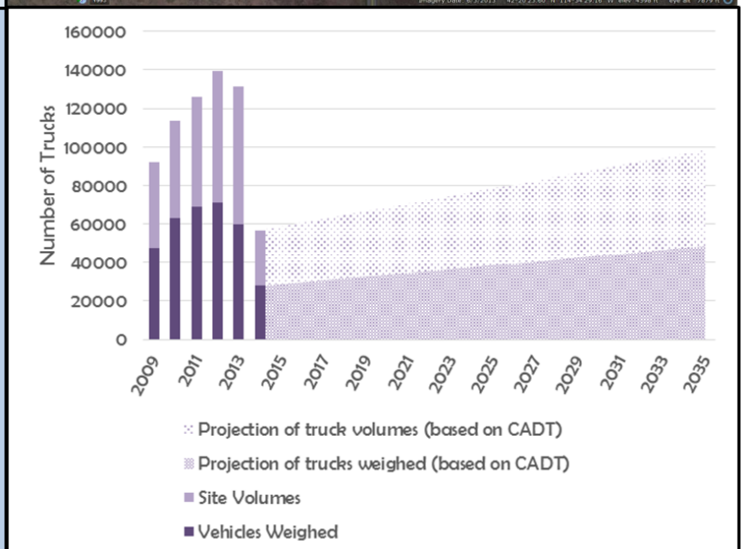


Hours per day: 19.5

Days per Week: 3

 # Staff Support: 2

Key Attributes: Site handles NB and SB Traffic; NB side. Traffic enters/exists both NB and SB, single scale. No loop. Trucks leaving SB cross path of NB entering



Scale Size: Platform scales 10x12

WIM: No

Key Needs: Mainline WIM

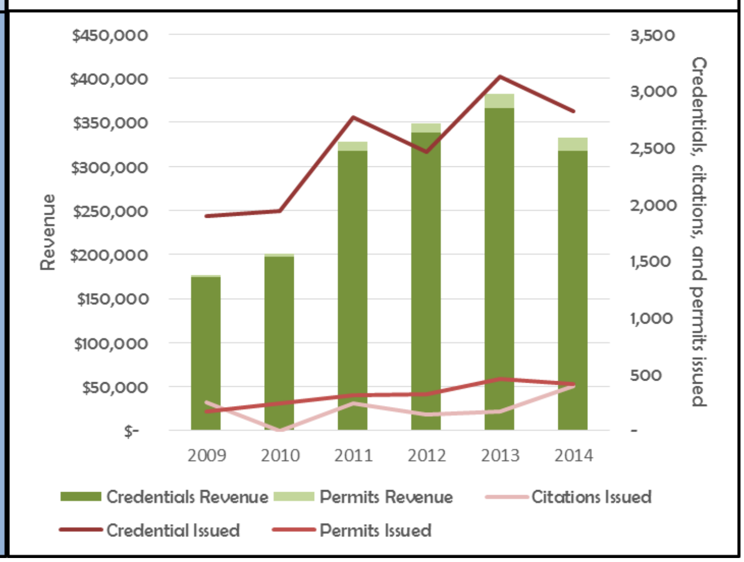


Figure 51. Hollister Port of Entry

Inkom Port-of-Entry

CAMBRIDGE SYSTEMATICS

Type: Fixed POE

Location: I-15 Milepost 59, 8 miles South of Pocatello

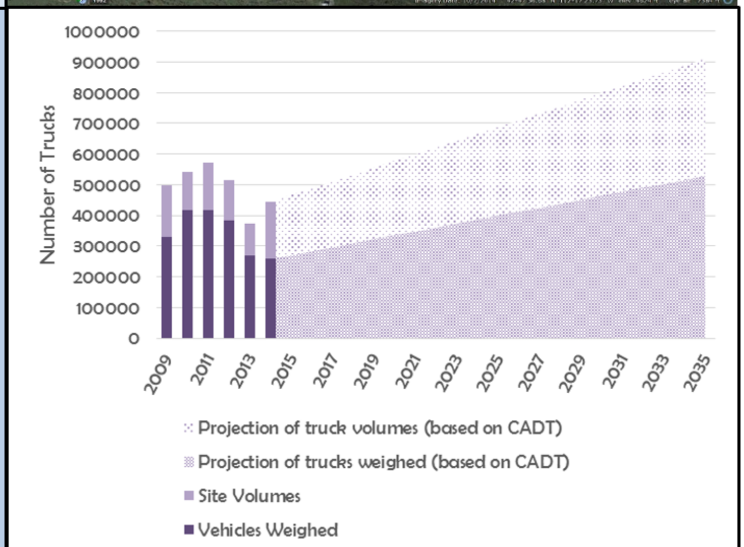
Coordinates: 42.800599995, -112.290309655

Hours per day: 20

Days per Week: 7

 # Staff Support: 8

Key Attributes: Site handles NB and SB Traffic; Limited Bypass routes; 5 parking spots SB, 4 NB; Bypass lane at station



Scale Size: Platform scales 12x20

WIM: No

Other technology: Portable Scales

Key Needs: Mainline WIM (Due to be installed at NB site in 2016 due to a Fed. Grant), extended acceleration/deceleration lanes

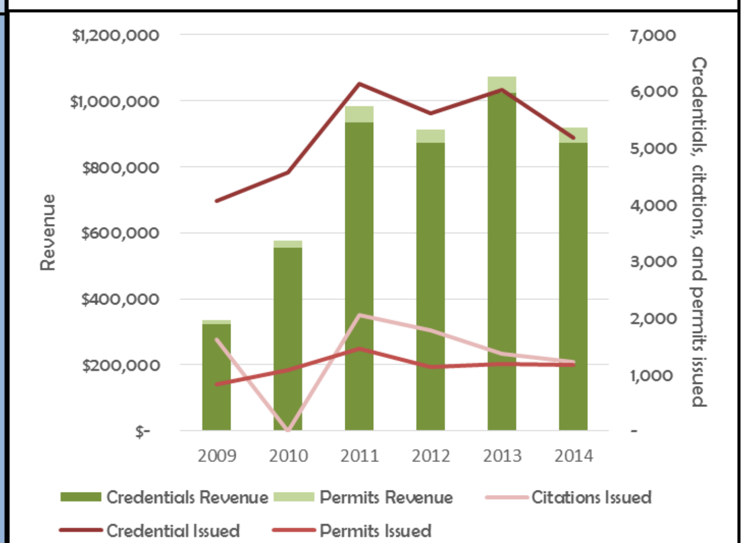


Figure 52. Inkom Port of Entry

Ashton Port-of-Entry

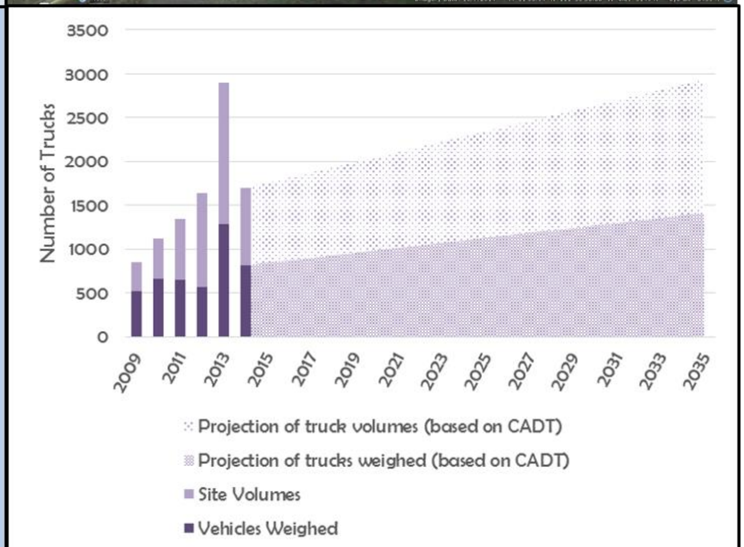
Type: Satellite POE

Location: US-20 Milepost 356, 5 miles South of Ashton

Coordinates: 44.018318, -111.51573915471

 # Shifts: 61

Key Attributes: Currently being operated as a VWIM



Scale Size: Platform scales 12x20

WIM: Yes

Other technology: License Plate Reader

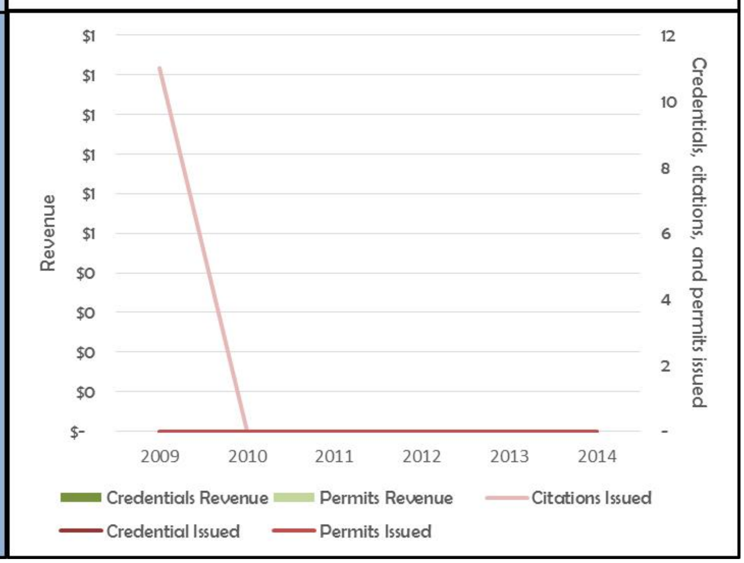


Figure 53. Ashton Port of Entry

Carmen (Salmon) Port-of-Entry

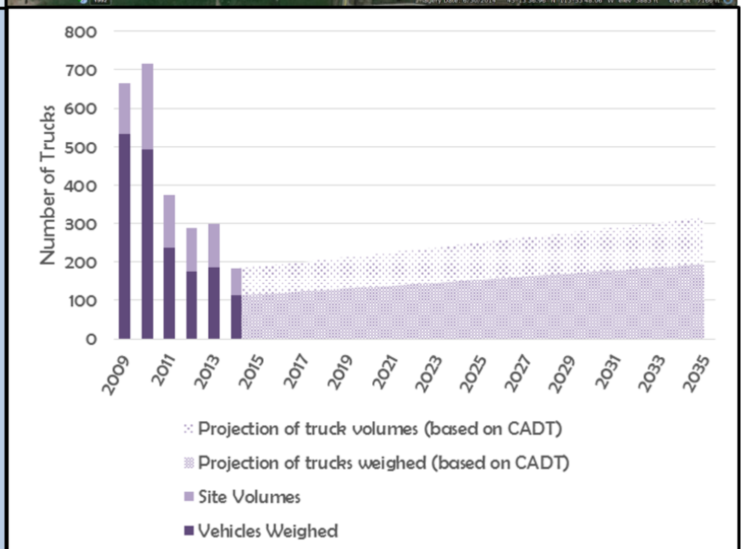
Type: Satellite POE

Location: US-93 Milepost 308.7

Coordinates: 45.2269336964, -113.896684455

 # Shifts: 14

Key Attributes: SB side, NB trucks must cross traffic to enter/exit



Scale Size: Platform scales 10x10

WIM: No

Key Needs: Mainline WIM

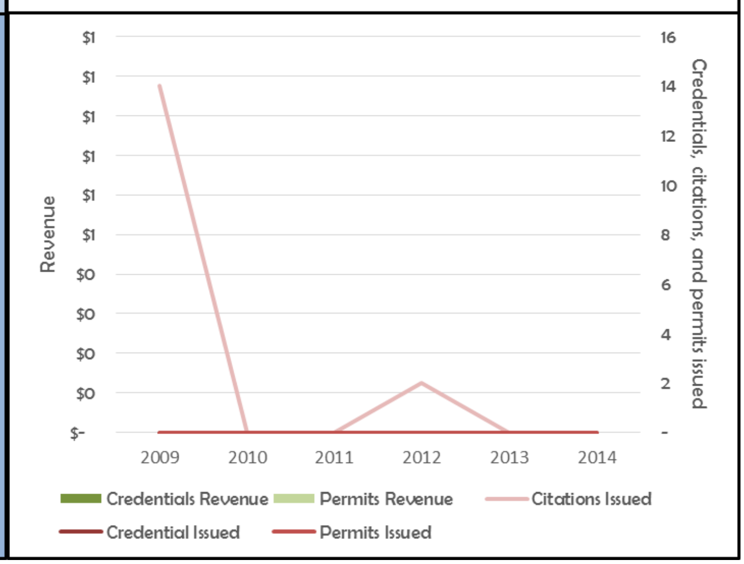


Figure 54. Carmen Port of Entry

Sage Junction Port-of-Entry

Type: Fixed POE

Location: I-15 Milepost 59, 8 miles South of Pocatello

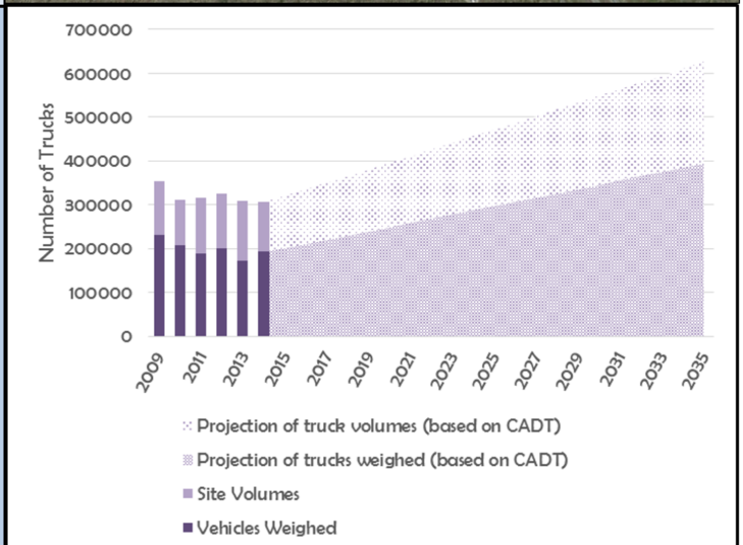
Coordinates: 43.83254500000, -112.20060300000

Hours per day: 20

Days per Week: 7

 # Staff Support: 5

Key Attributes: One location on SB side, exit to SH 28 (L turn), NB must exit highway on to SH 28 (L turn) to enter site (R turn), loop



Scale Size: Platform scales 12x20

WIM: No

Key Needs: Mainline WIM

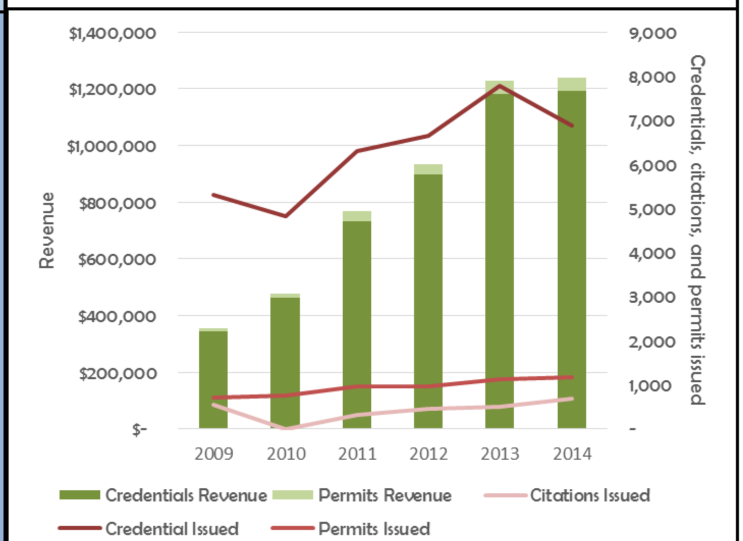


Figure 55. Sage Junction Port of Entry

Appendix B
State Interview Results

This section contains summary profiles for the states interviewed as part of this task. A questionnaire was used to guide the discussion and determine key elements of their operational and staffing strategies. The states interviewed as part of this task were Florida, Nevada, Oregon, Tennessee, and Washington.

Florida

Table 16. Florida State Inspection Station System

Criteria	Status (2014)
Number of Sites	32 Fixed Sites, 16 virtual WIM.
Number of Scales	Limited portable scales
Personnel	• 149 weight inspectors • 12 scale supervisors • 12 Management/Support/Tech
Sum of Mainline AADT/CAADT @ all fixed sites	No Data Available
Annual Site Volume (fixed sites/all sites)	No Data Available
Screening Number	No Data Available
Inspection Number	110,811 (2014)
Total Annual Vehicles Weighed: WIM and scale	Over 20 million annually
Total Annual Citations	66,807 (weight), 26,414 (safety), 25,903 (UTC)

Infrastructure: Heavy investment in 32 fixed inspection stations and 16 VWIM sites. Most all of highway inspection stations have WIM for screening upstream.

Technology: VWIM; ramp and mainline WIM; LPR and DOT readers. One site is currently being fitted for roadside brake scanner (Yulee WIM on I-95). Data is not shared with adjacent states.

Staffing: Weigh stations on interstate system operate approximately 90 to 95 percent of the time. Goal is to operate 24/7. Sites on secondary routes average 16 hours of operation, staffing is done every 2 weeks and is based on staff availability and data and local knowledge of high-volume times and locations.

Authority/Funding: DOT civilian staff conduct weight enforcement and safety enforcement. Staff do not have the ability to hold drivers for more than one hour, though they can ask trucks to park for obvious safety violations and out-of-service notices. Police are called in order to make arrests or detain drivers.

Police are also responsible for mobile enforcement and pay for acquiring and maintaining portable scales. All funding for construction, maintenance, and operation of the inspection system comes through the DOT. Siting for fixed locations is almost entirely dependent on AADT, truck percentage, and location of intermodal facilities.

Policy and Performance Measures:

- All commercial vehicles must stop if over 10,000 pounds.
- Weigh stations and their operations are under Florida Department of Transportation (FDOT).
- Motor Carrier Compliance moved from FDOT to Dept. of Highway Safety and Florida Highway Patrol (FHP) (2011) safety.

Nevada

Table 17. Nevada State Inspection Station System

Criteria	Status (2014)
Number of Sites	No fixed sites, rover and temporary sites only; 10 VWIM (SRI). 8 Improved Inspection sites, 16 total (FY 2015)
Number of Scales	302 portable, 11 semiportable
Personnel	57 officers
Sum of Mainline AADT/CAADT @ all fixed sites	No Data Available
Annual Site Volume (fixed sites/ all sites)	No Data Available
Screening #	No Data Available
Inspection #	21,358
Total Annual Vehicles Weighed: WIM and scale	21,358
Total Annual Citations	228

Infrastructure: No fixed infrastructure. All enforcement is undertaken my mobile units.

Technology: VWIM at 10 sites (Drivewyze) used by Nevada DOT to collect data and shared with enforcement to schedule patrols. Credentials are checked via laptop when cell service is available (SAFER). Limited data sharing with California and Utah, potentially Idaho in the future.

Staffing: Nevada Highway Patrol (NHP) commercial enforcement section has 57 officers. There are also 10 civilian inspectors who are authorized through the law enforcement agency they are part of; they can write tickets but cannot take enforcement action on inspections. Large priority of logbook checks and Level III inspections. Staffing is at a 10 to 20 percent vacancy rate. The Department of Motor Vehicles (DMV) Motor Carrier Division is responsible for permits.

Authority/Funding: The Nevada Highway Patrol is responsible for the majority of enforcement, and are the lead MCSAP agency. Nevada DOT uses highway funds to build and maintain sites as identified by the NHP. Currently there are 16 dedicated inspection sites. Special need in rural/secondary road areas for safe sites, interstate system there are normally safe areas. Nevada just received funding for a complete DMV modernization project that will include extensive funding for CVIEW and extended CVISN.

Policy and Performance Measures: Short-term: Screen 19,845 vehicles using slow-speed weigh-in-motion technology; expend 8,400 man-hours conducting roving weight enforcement; install two permanent "turn-key" WIM systems (Nevada DOT). Medium-term: Increase weight enforcement goals 5 percent over previous year. Install 4 permanent "turn-key" WIM systems (Nevada DOT). Long-term: Increase weight enforcement goals 5 percent over previous year and maintain 6 portable scales per officer.

Oregon

Table 18. Oregon State Inspection Station System

Criteria	Status (2014)
Number of Sites	93 fixed weigh stations including 6 POE, 22 WIM with Green Light; 199 portable scales, 3 ramp scales
Number of Scales	No Data
Personnel	87.5 FTE (down 28% over last 4 to 5 years). 96 including partner agencies
Sum of Mainline AADT/CAADT @ all fixed sites	3,475,406 (FY 2014)
Annual Site Volume (fixed sites/all sites)	No data available
Screening Number	3,475,406 (WIM scales, FY 2014)
Inspection Number	52,564 (2013)
Total Annual Vehicles Weighed: WIM and scale	5,502,342 (FY 2014)/ 5,507,012 (including mobile)
Total Annual Citations	19,259 (weight, FY 2014)

Infrastructure: Oregon has an extensive fixed scale system with AVI/LPR and mobile enforcement to cover gaps. The State employs a small number of U.S. DOT readers.

Technology: Oregon has 22 sites equipped with WIM preclearance systems. The State is heavily invested in the use of AVI/LPR including for bypass detection and deterrence through the issuance of warnings or fines based on electronic surveillance of the bypass route. There is a heavy reliance on data to set hours and decide which sites to open. Data sharing agreements are in place with Idaho and Washington for carrier/driver citation history, logbook data, and other information.

Staffing: Motor Carrier Transportation Division (MCTD) and law enforcement under MCSAP both carry out inspections. MCTD employs 87.5 Full-time equivalent (FTE) in FY 2015 with another 8 FTE from partner agencies.

Authority/Funding: DOT staff have authority to issue civil penalties against companies and officials for safety, weight, registration, and taxes. Repeat offences can lead to a shutdown order suspending the carrier's authority to operate in the state. Majority of funding for system drawn from DOT funding sources. MCSAP provided $2,593,256 in FY 2014 for inspector training, equipment, and safety-related expenses, as well as compensation for traffic enforcement work and truck safety inspections (Oregon matched 20 percent).

Policy and Performance Measures

Policy: Trucks more than 1,000 pounds over limit are issued citations. Under 1,000 is left to officer discretion based on driver/company history. Educate first, enforce if education fails" philosophy to effect compliance. Goals including in the State Enforcement Plan are workload related.

Tennessee

Table 19. Tennessee State Inspection Station System

Criteria	Status (2014)
Number of Sites	6 Permanent Sites, 2 VIS
Number of Scales	9 fixed, 269 portable, 2 ramp scales
Personnel	60 officers assigned to weigh stations; approximately 650 officers total who can conduct safety/weight inspections
Annual Site Traffic Volume	No Data
Screening Number	No Data
Inspection Number	No Data
Total Annual Vehicles Weighed	No Data
Total Annual Citations	35,045 (2012)

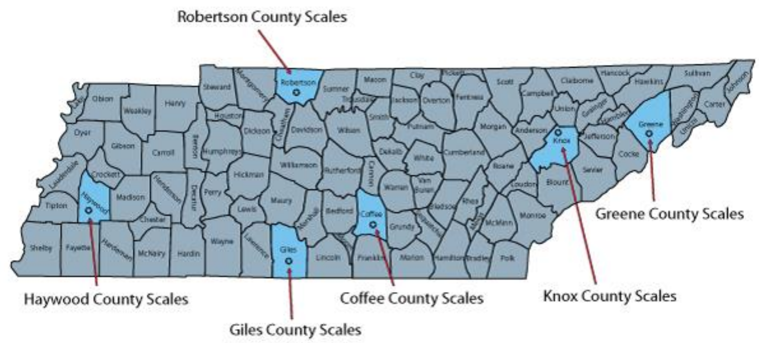
Infrastructure: Tennessee operates nine scales at six fixed sites all located on the Interstate Highway System. Three fixed sites cover traffic in both directions, three are POE (only cover inbound traffic). There are two vehicle information systems (VIS) in the State.

Technology: All fixed sites have WIM on the entrance ramps to the site; there is no mainline WIM in the State. All six fixed sites have license plate and U.S. DOT number readers. There are a limited number of thermal brake scanners in operation in the State. The State utilizes PrePass and DriveWyze as a screening tool for credentials only. Weight is only checked once the truck is on the entrance ramp to the site.

Staffing: All enforcement is done by Tennessee Highway Patrol officers. Fixed sites are open 5 days a week for two shifts and are scheduled according to District priorities with varying schedules. Approximately 60 officers are assigned to the inspection facilities, there are approximately 650 officers in the State that are trained to conduct weight and safety inspections through mobile roadside enforcement.

Authority: Highway Patrol officers have authority to conduct weight and safety inspections and detain vehicles or drivers.

Policy and Performance Measures: Tennessee DOT has stated a goal of keeping weigh stations open 24/7 (currently at 70 percent). Short-term enforcement goals include weighing 10 million trucks total using WIM, fixed scales, and portable scales. A long-term goal is to consider the increased use of virtual inspection sites. Interviews with officials confirmed the desire to see an increase in virtual inspection sites, especially in areas where geography or available land make a fixed site impracticable.



Washington

Table 20. Washington State Inspection Station System

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	153 total personnel made up of Troopers and Commercial Vehicle Enforcement Officers (CVEO)
Annual Site Traffic Volume	40 million trucks annually on adjacent roads
Number of Screenings (Mainline WIM)	1.9 million
Number of Safety Inspections	81,800
Total Annual Vehicles Weighed	57,000 (fixed), 5 million (WIM)
Total Annual Citations	113,217 (safety)
Permits Issued	No data available
Credentials Issued	No data available

Source: Washington State Department of Transportation (WSDOT), Washington State Patrol (WSP). Washington State Enforcement Plan (2015 and 2016). Interview with Mike Dahl, September 17, 2015.

Infrastructure: Washington uses a mixture of 52 fixed sites and 11 mobile enforcement locations. It also uses targeted mobile enforcement by roving officers that do not have a set location.

Technology: The State uses electronic screening including 12 sites with WIM and automatic vehicle identification systems. One location (Fort Lewis) has an active brake detection system that scans the thermal energy produced during braking and is a sign of poor brakes. The Washington State Patrol is also looking at incorporating data from 35 additional weigh-in-motion sensor data (operated by Washington State DOT Traffic Data Office) in order to help program mobile enforcement.

Staffing: Washington State Patrol has a total of 153 personnel with some weight and safety function. Personnel are a combination of Washington State Troopers with full law enforcement authority but who focus on commercial vehicles and Commercial Vehicle Enforcement Officers (CVEOs) whose authority is limited to commercial vehicle enforcement. Mobile operations are conducted by a combination of Washington State Troopers and CVEO personnel.

Authority/Funding: Washington State Patrol handles operation of the weigh station system and mobile enforcement. FFY 2016 funding includes $12 million for personnel and just under $900,000 for facilities (utilities, vehicles, maintenance of scales, and WIM). The Washington State DOT is responsible for building the system.

Policy and Performance Measures: The WSP tracks officer activity on a monthly basis to determine the effectiveness of the vehicles size and weight enforcement. The State Enforcement Plan, 2016 lays out a number of goals related to inspection station operation but does not include performance measures. In general, the focus is on workload measures which relate to operational goals and funding requirements.

- Short-Term Goals from the 2016 plan:
  - Decrease the number of vehicles weighed at fixed sites by leveraging technology.
  - Weigh 5,500 vehicles on mobile scales statewide.
  - Weigh 3,000,000 vehicles at WIM-equipped facilities.
  - Continue to hire and train new staff to address staffing shortfalls created through attrition. This includes a new testing process.
- Long-Term Goals from the 2016 plan:
  - Installation VWIM sites on State Route (SR) 9 (Sedro Woolley) and SR 290 at Idaho/ Washington Border to better detect trucks bypassing Bow Hill and Spokane, respectively.
  - Reopen/relocate Federal Way SB scale.

WSDOT's quarterly performance measure report, the "Gray Notebook," includes one performance measure that tracks the number of bypasses trucks receive in a year through the electronic screening program. Limited additional information on the CVISN program is included in Annual Reports.[1]

Interview Guide

1. Can you provide me with an overview of your state's commercial vehicle enforcement system?
   a. What do you feel are the strengths and weaknesses of the approach taken by your state?

[1] http://www.wsdot.wa.gov/Accountability/GrayNotebook/navigateGNB.htm.

2. Which state agency or agencies are responsible for activities related to inspection station/POE operations and management?
    a. What do you feel are the strengths and weaknesses of the approach taken by your state?
3. How are operations and improvements funded? Is there a dedicated funding source, or is it out of general funds?
4. What technology is currently deployed at your fixed facilities? Mobile facilities?
    a. Do you feel like your state's commercial vehicle sites/technology/operations are being utilized to their maximum potential? Why or Why not?
5. Could you tell me a little bit about how your state staffs your enforcement facilities?
    a. Are there any other business operations besides commercial vehicle enforcement that take place at your facility?
6. What qualifications are used by your state to determine when and where an inspection station/POE is justified? Who makes these decisions? What do you feel are the strengths and weaknesses of the approach taken by your state?
7. Does your state give any special consideration for inspection station/POEs during highway planning, design, construction, or maintenance of facilities that are near or will impact inspection station/POEs?
    a. Should this be done, i.e., consider an inspection station/POE in a manner similar to a roadway interchange in planning, design and construction phases?
    b. If your state doesn't give special consideration to inspection station/POEs, how does your state ensure that inspection station/POEs are integrated into planning and improving the highway system?
8. What do you see as the future of the CV enforcement/inspection station/POE system in 20 years, based on current trends?
9. Assume that you can start with a blank slate and design a CV enforcement program from the ground up – there are no budget limitations, no staffing limitations, and you have access to any technology and software programs – What does this program look like?

Appendix C
Internet Survey Results

Overall Survey Statistics

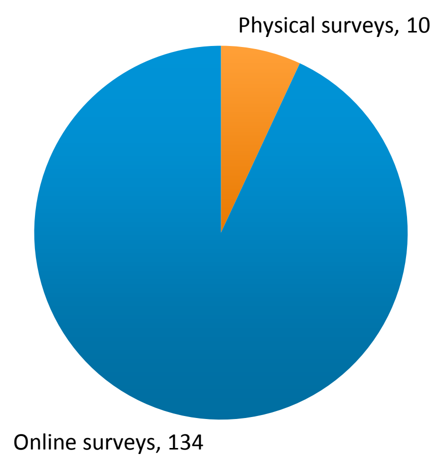


Figure 56. Chart of Total Number of Surveys

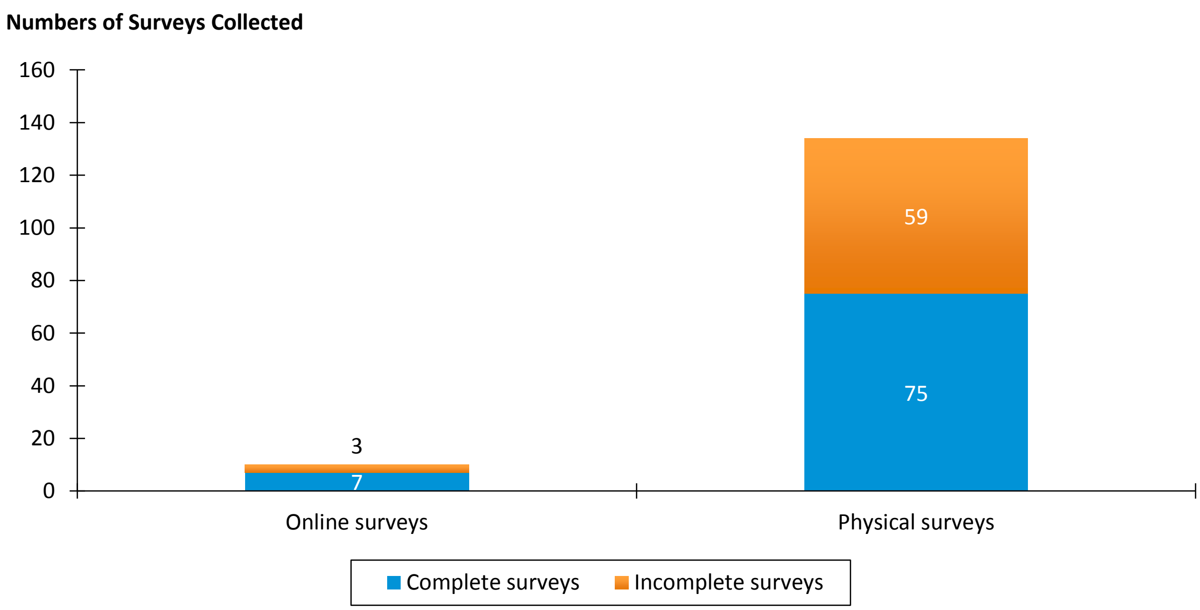


Figure 57. Chart of Complete and Incomplete Surveys Collected

1. How many years have you been driving commercially?

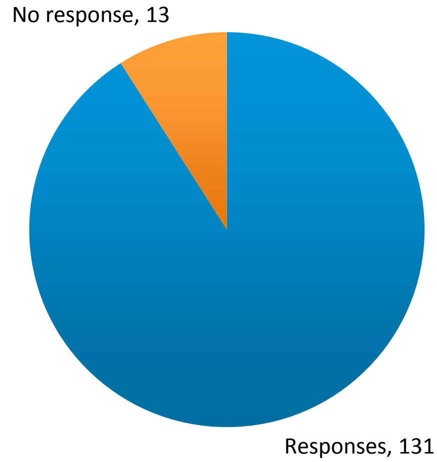


Figure 58. Chart of Response Rate

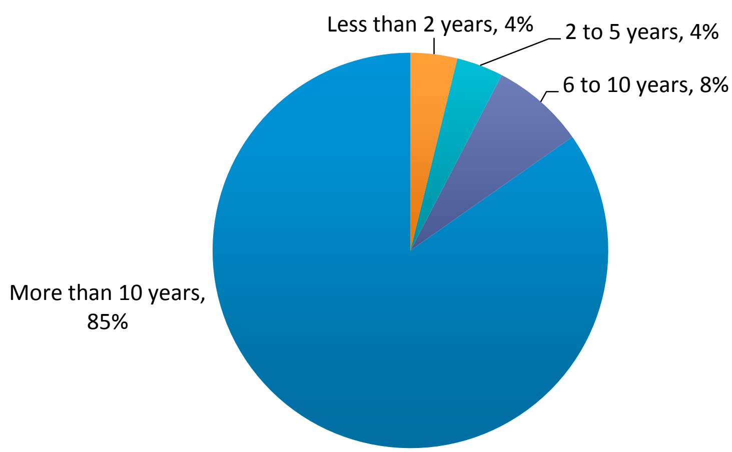


Figure 59. Chart of Survey Results

2. In the last year, how often did you operate a commercial vehicle in Idaho?

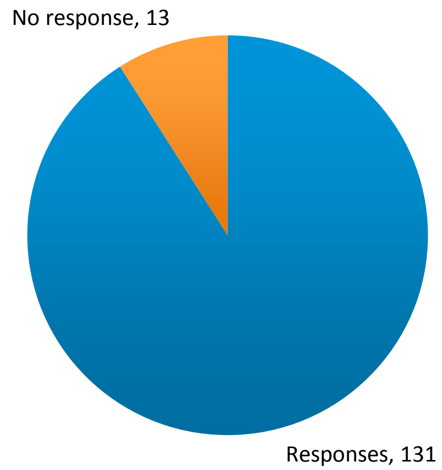


Figure 60. Chart of Response Rate

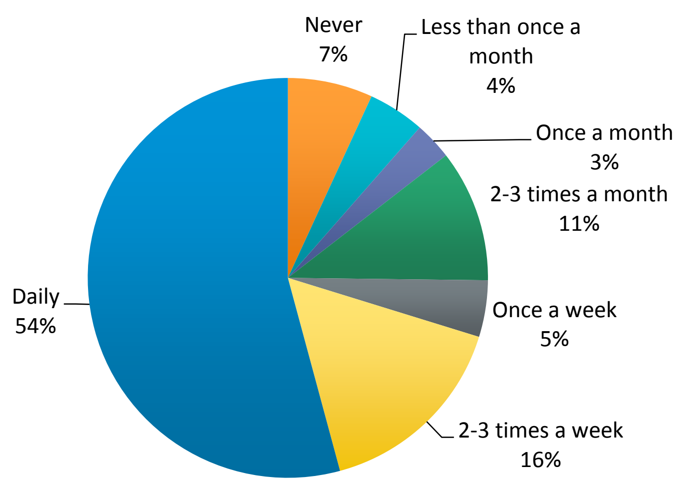


Figure 61. Chart of Survey Results

3. What states do you operate in other than Idaho?

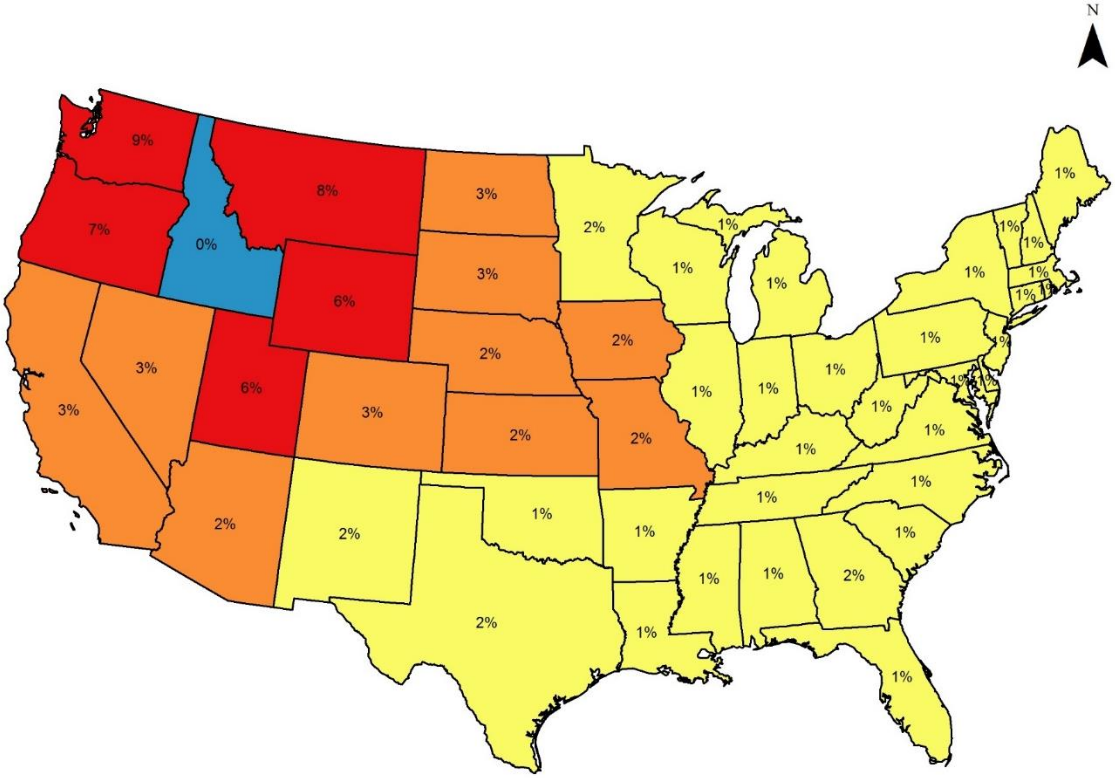


Figure 62. Map of Survey Results

Response count: 594

4. In the last year, which fixed Port of Entry (POE) sites have you used?

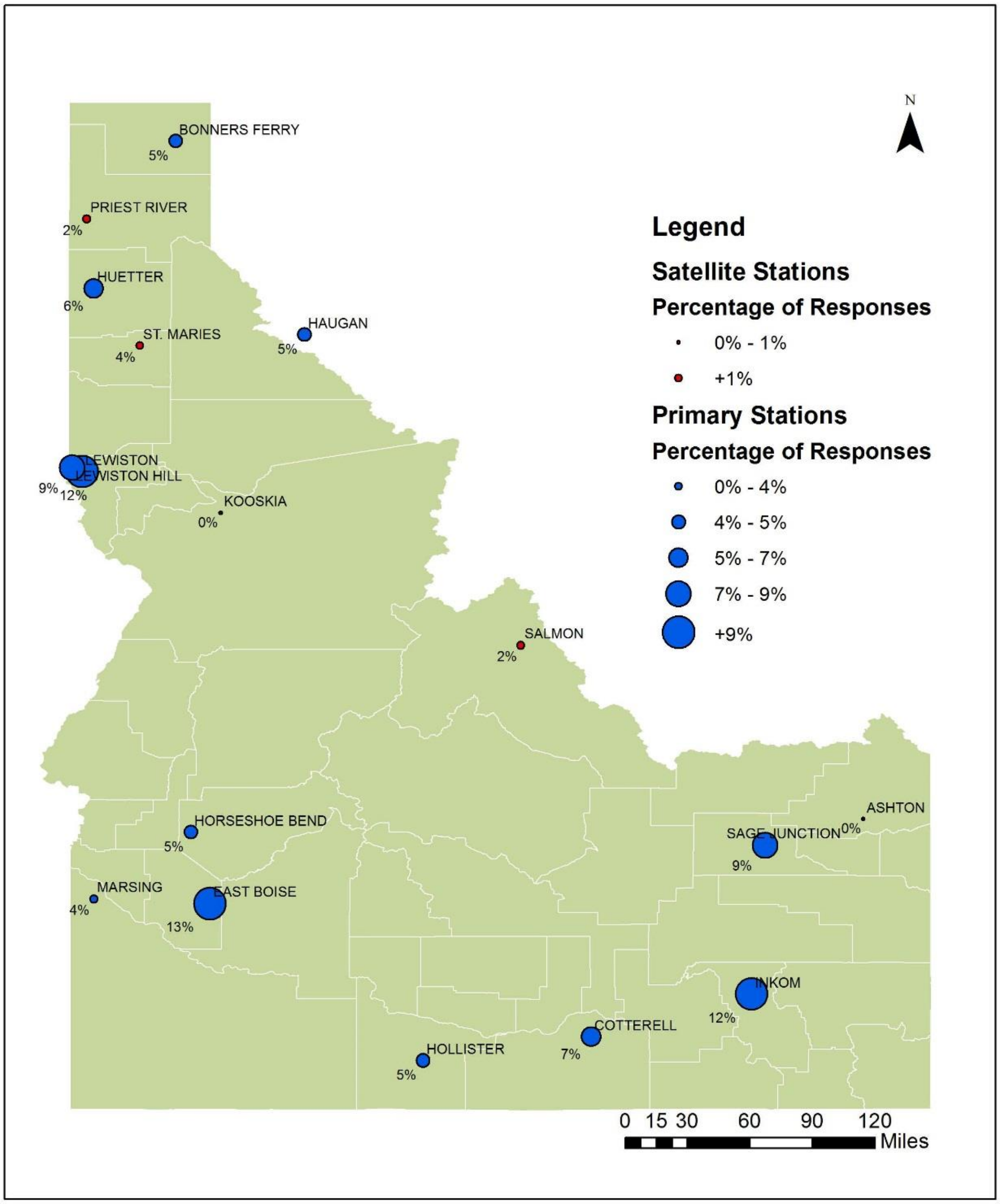


Figure 63. Map of Survey Results

Response count: 423

5. Approximately how often is a fixed POE not open when you pass it?

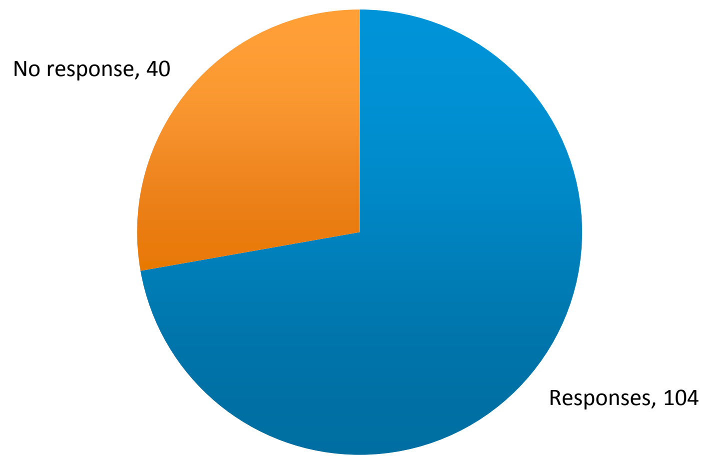


Figure 64. Chart of Response Rate

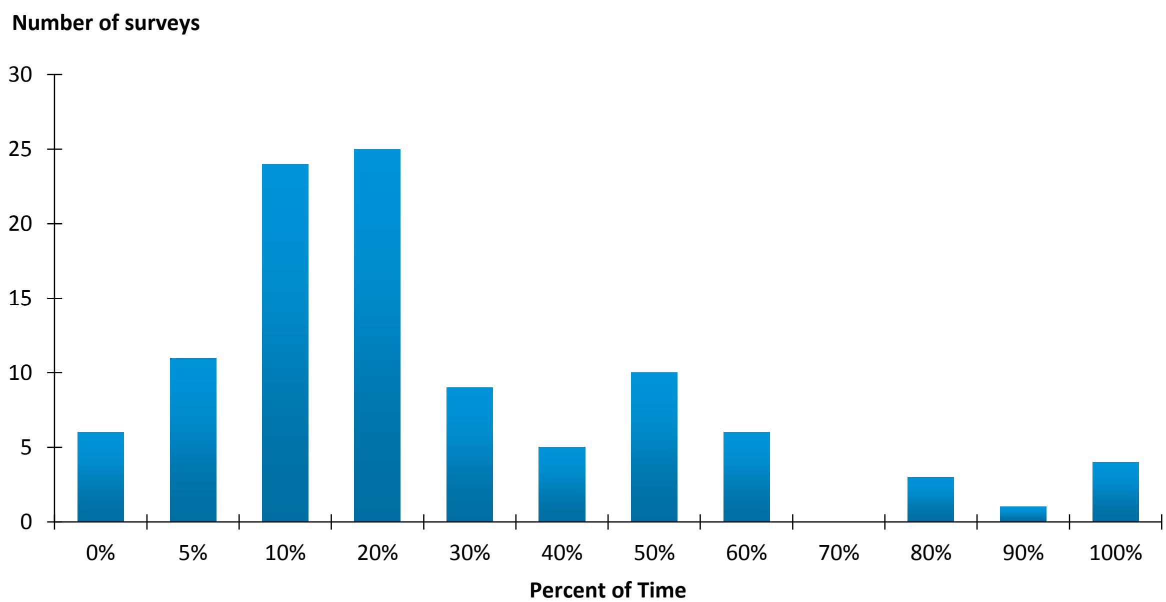


Figure 65. Chart of Survey Results

6. Approximately how often are you instructed to bypass an open fixed POE?

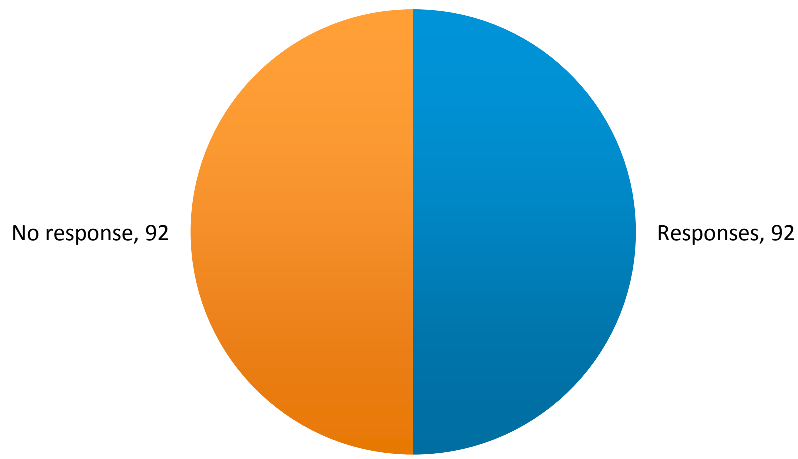


Figure 66. Chart of Response Rate

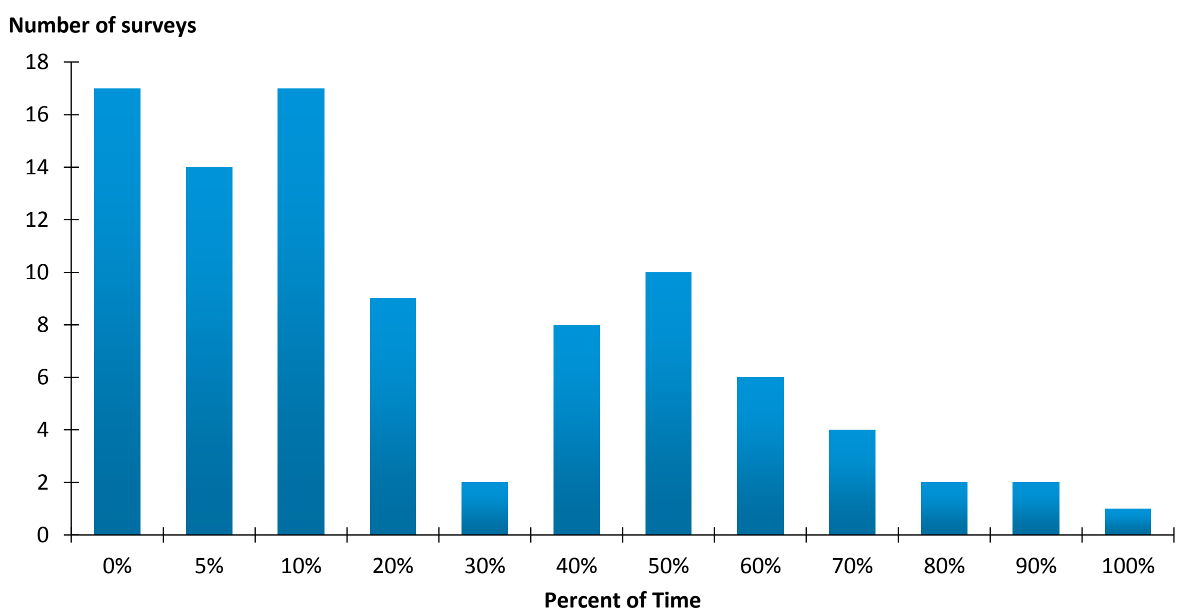


Figure 67. Chart of Survey Results

7. How are you instructed to bypass open fixed POE sites?

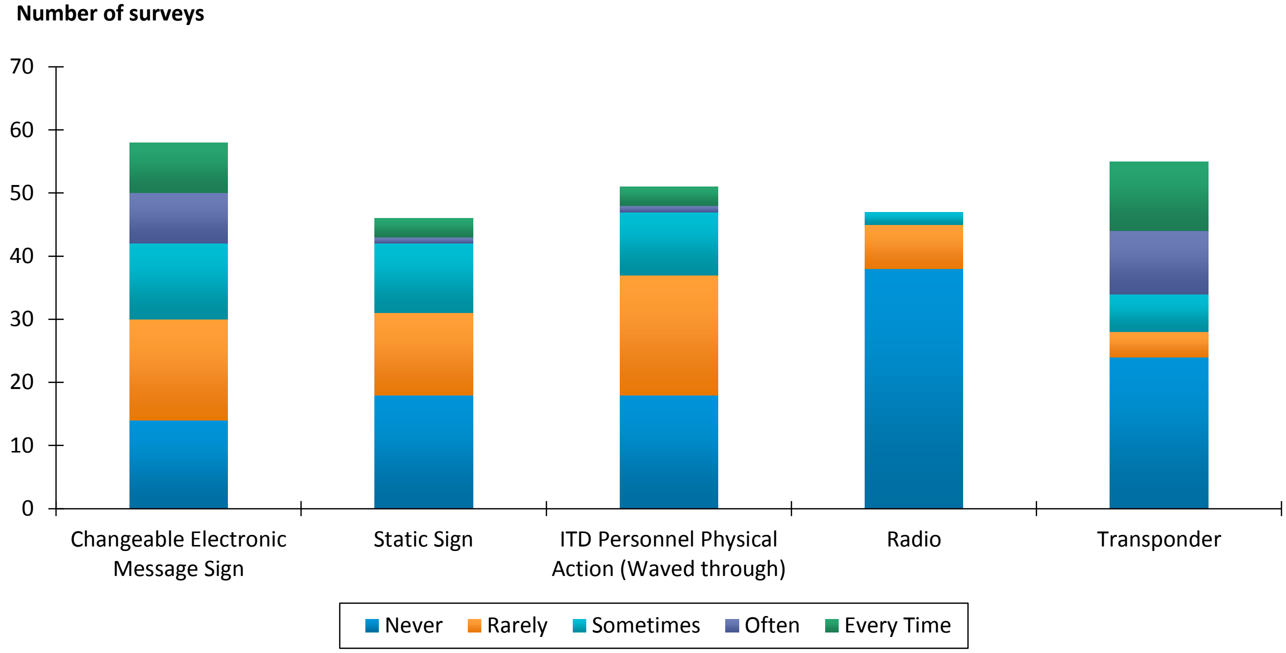


Figure 68. Chart of Survey Results

8. In your experience, which fixed or satellite POE processes trucks the quickest?

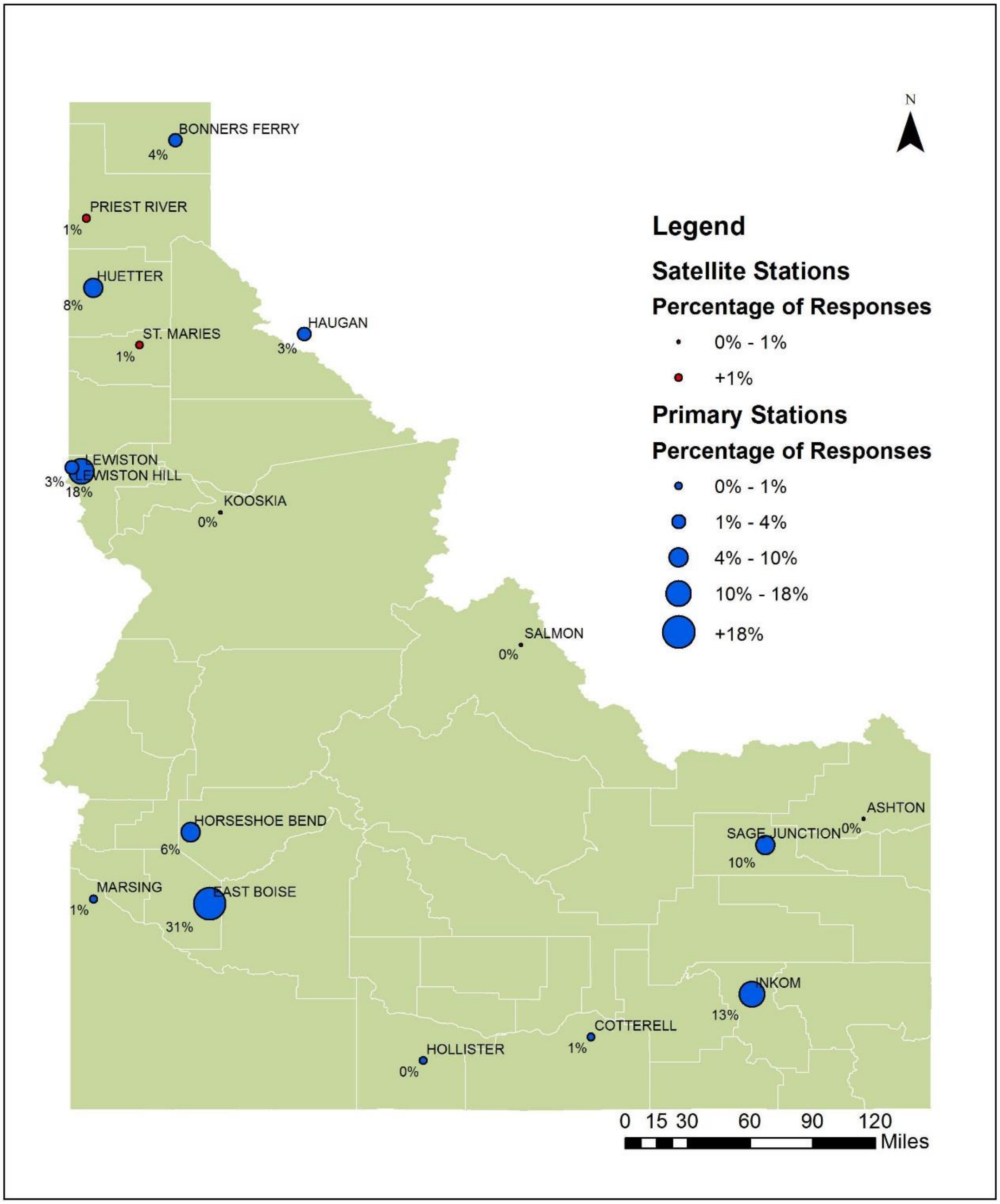


Figure 69. Map of Survey Results

Response Count: 72

9. In your opinion, why is this location able to process trucks so quickly?

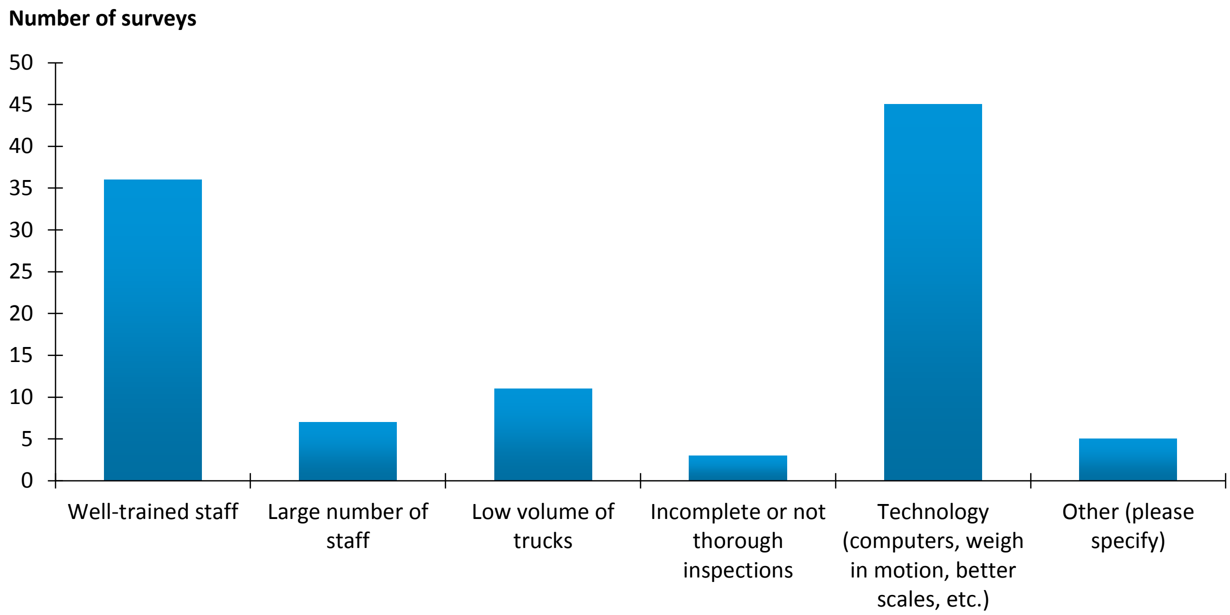


Figure 70. Chart of Survey Results

10. In your experience, which fixed or satellite POE processes trucks the slowest?

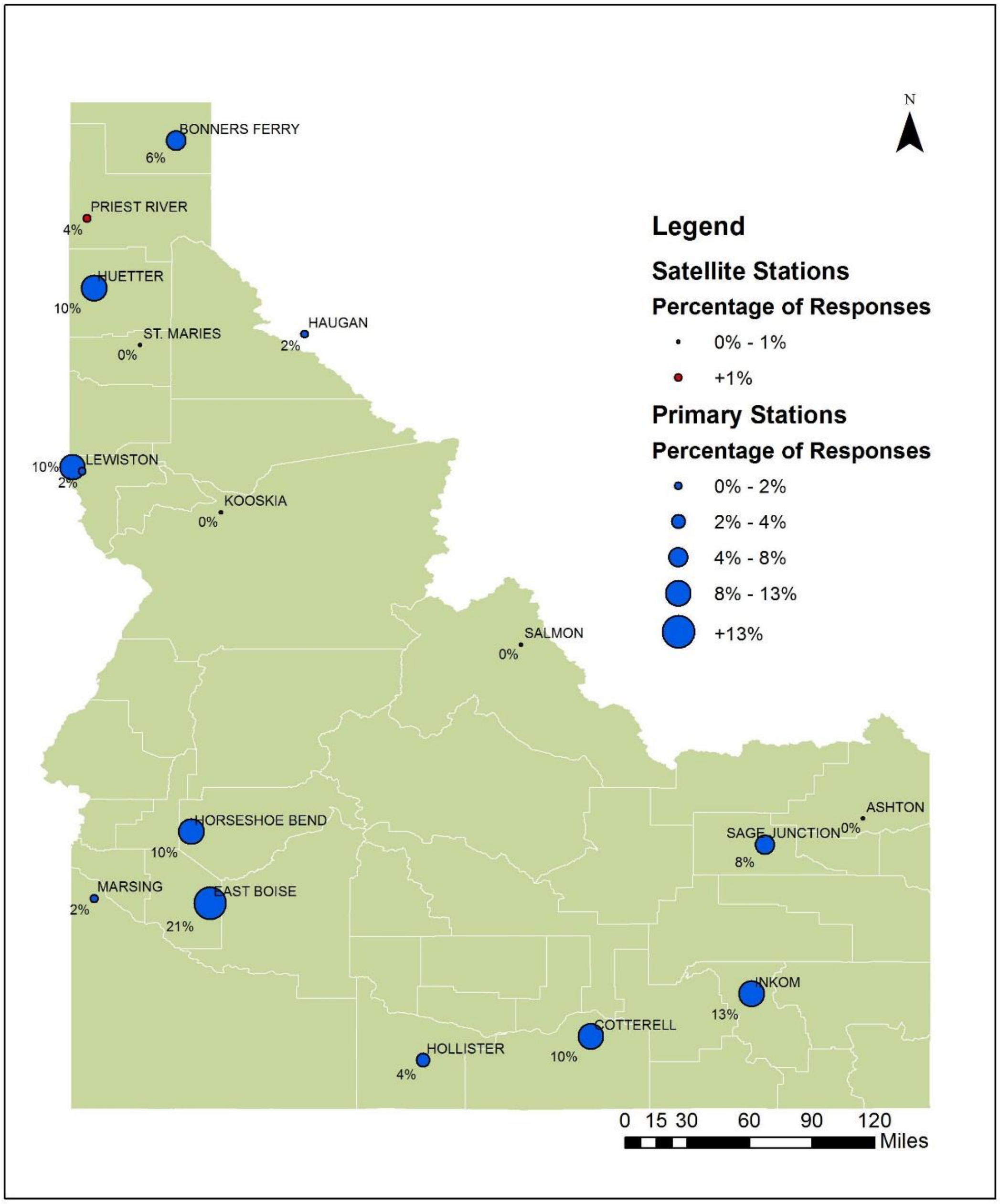


Figure 71. Map of Survey Results

Response count: 52

11. In your opinion, why is this location not able to process trucks quickly?

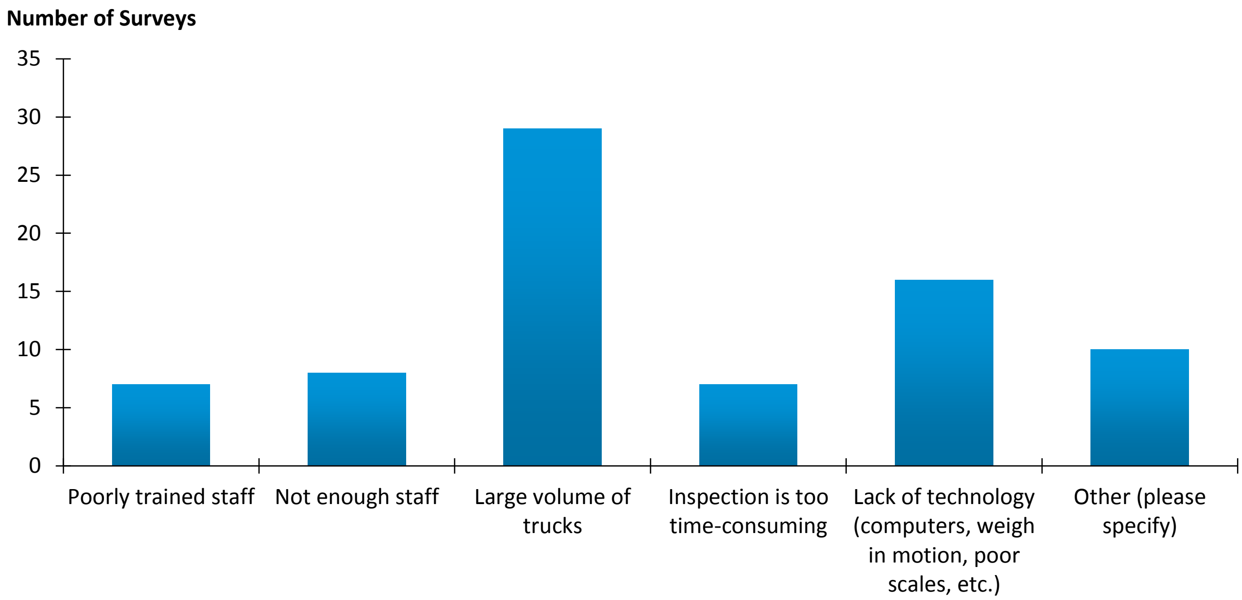


Figure 72. Chart of Survey Results

12. Which of the following are the most time consuming functions that occur at a fixed or satellite POE

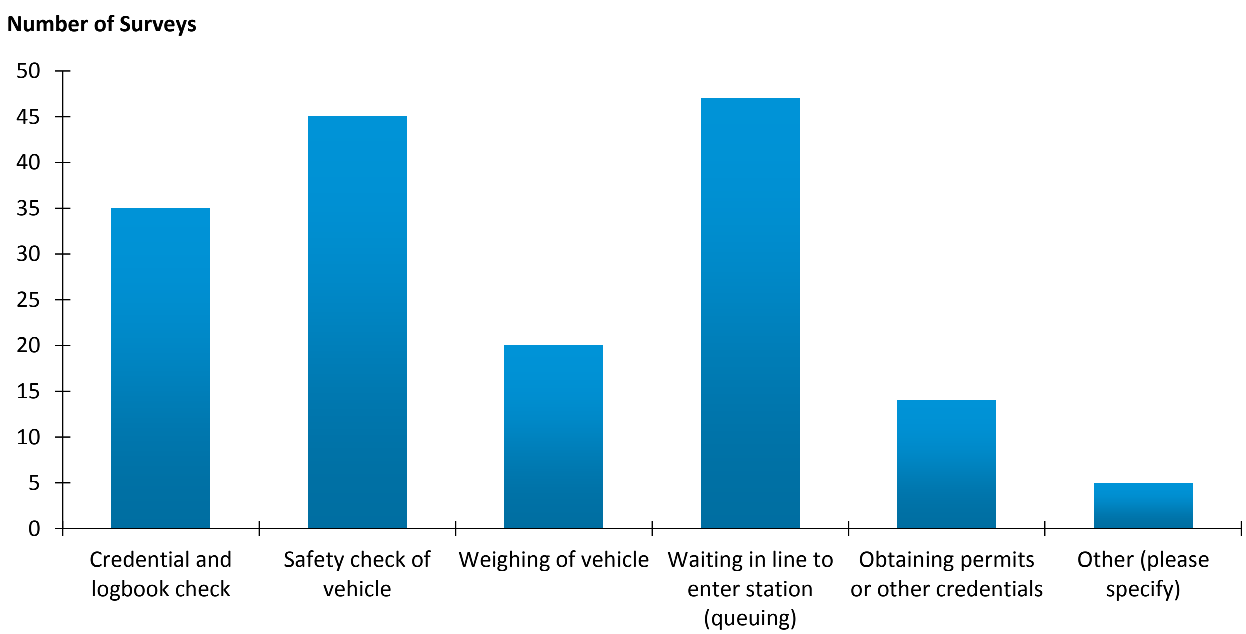


Figure 73. Chart of Survey Results

13. Do you feel the delay caused by these functions is unreasonable?

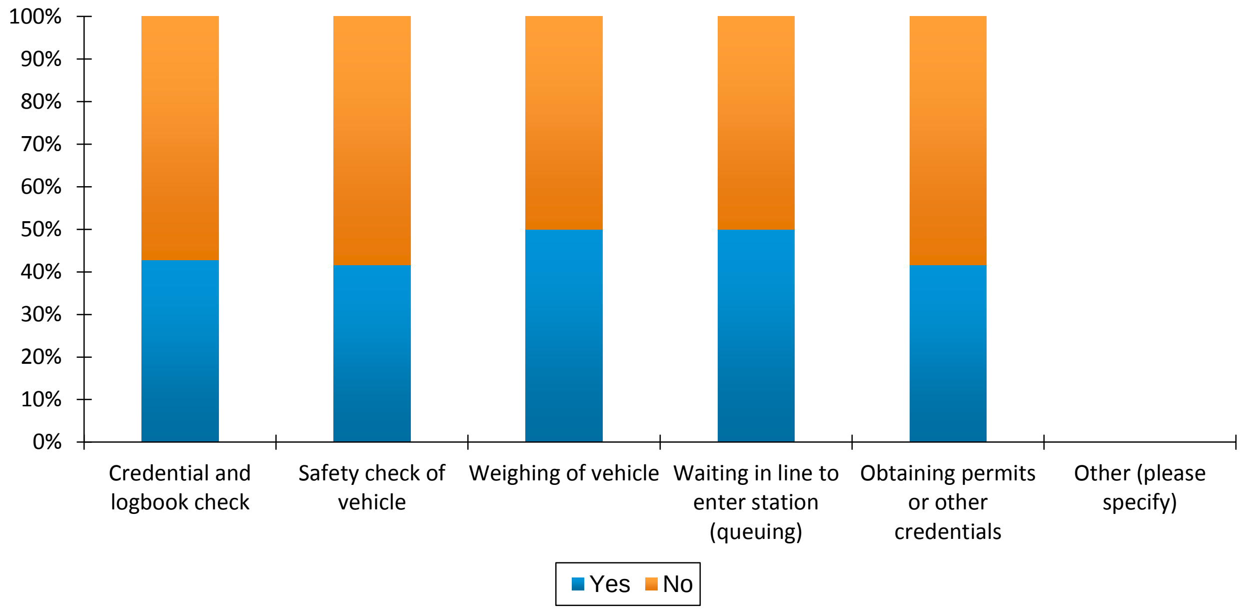


Figure 74. Chart of Survey Results

14. Are any of the fixed or satellite Port of Entry sites in a less than ideal location due to geography, traffic patterns, or other operational issues?

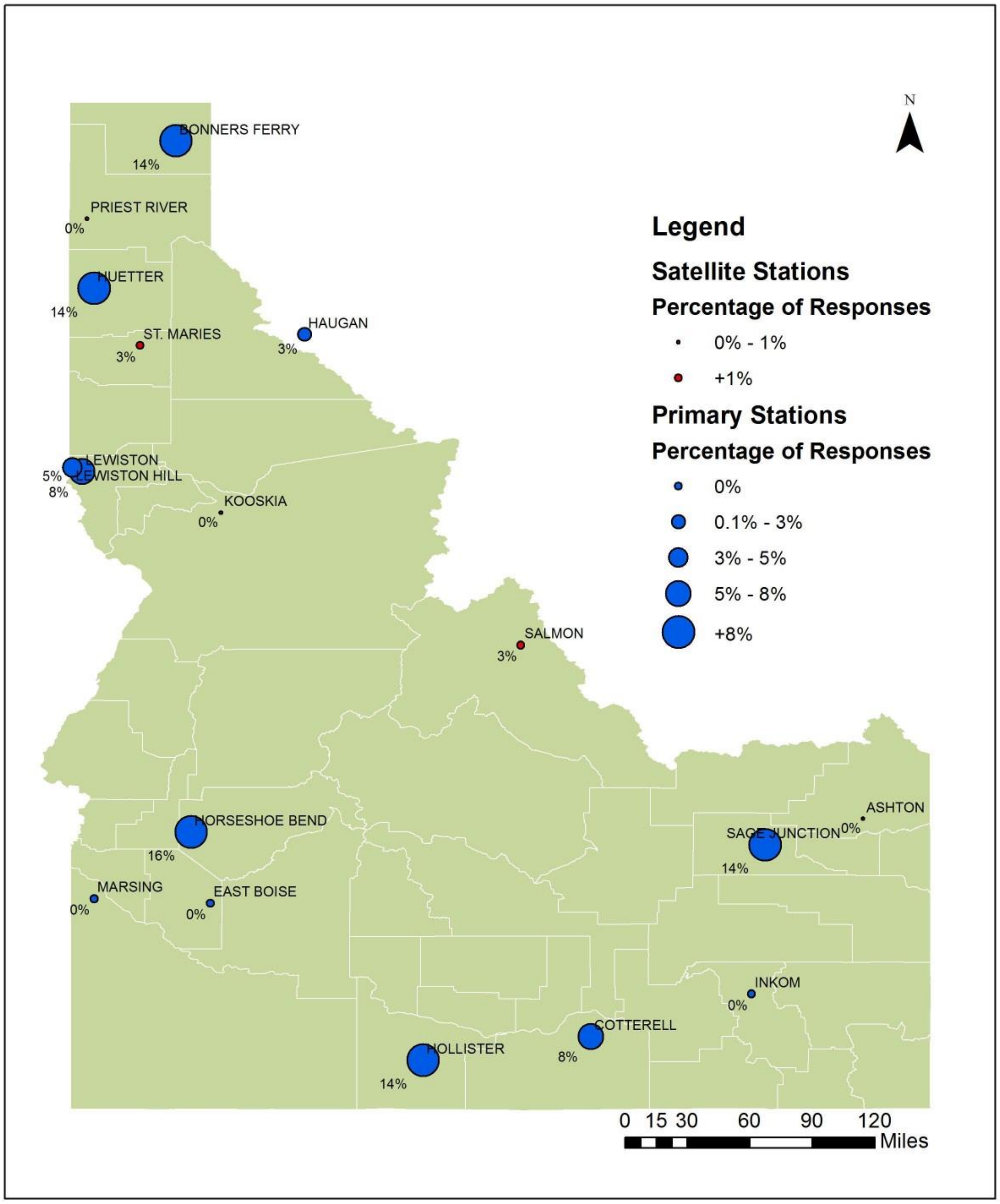


Figure 75. Map of Survey Results

Response count: 37

15. Are any of the fixed or satellite Port of Entry sites easy to bypass?

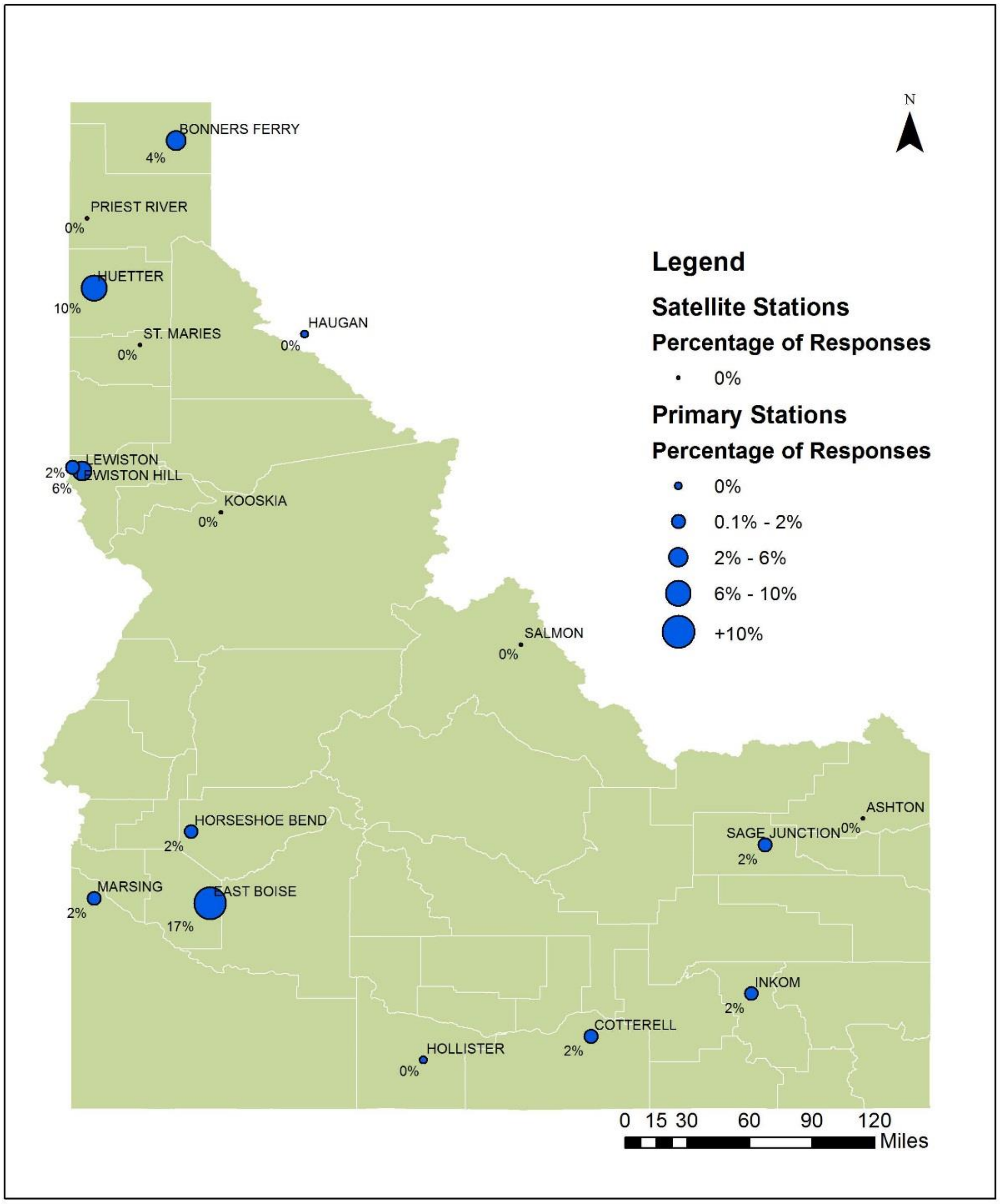


Figure 76. Map of Survey Results

Response count: 48

16. How many times in the past year did you encounter a roving Port of Entry location?

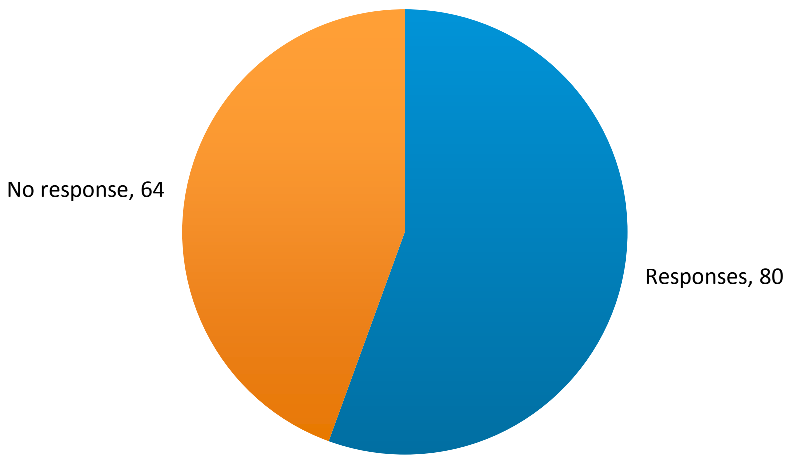


Figure 77. Chart of Response Rate

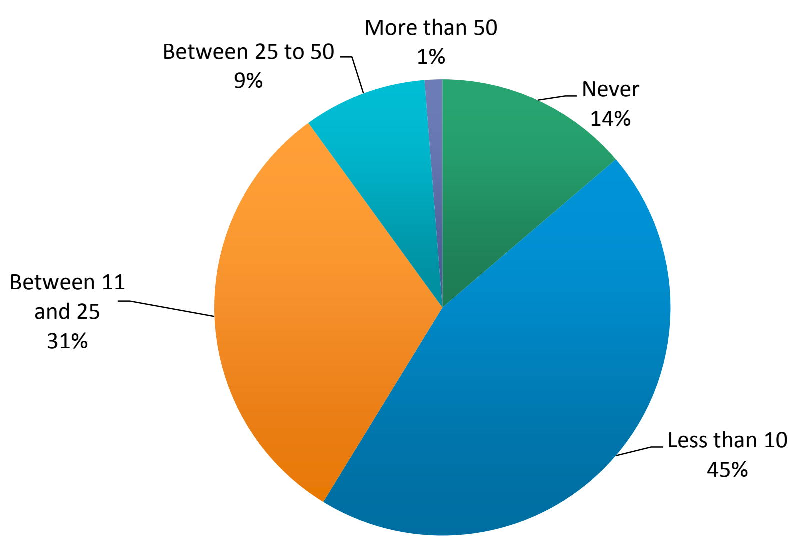


Figure 78. Chart of Survey Results

17. How often were you instructed not to stop at a roving Port of Entry location?

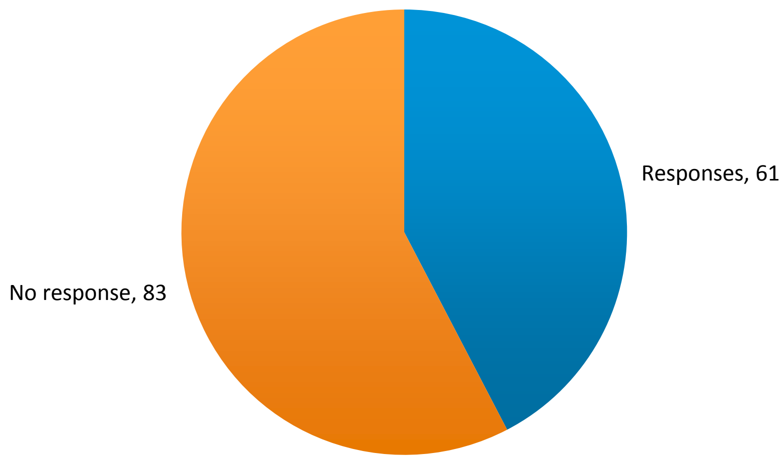


Figure 79. Chart of Response Rate

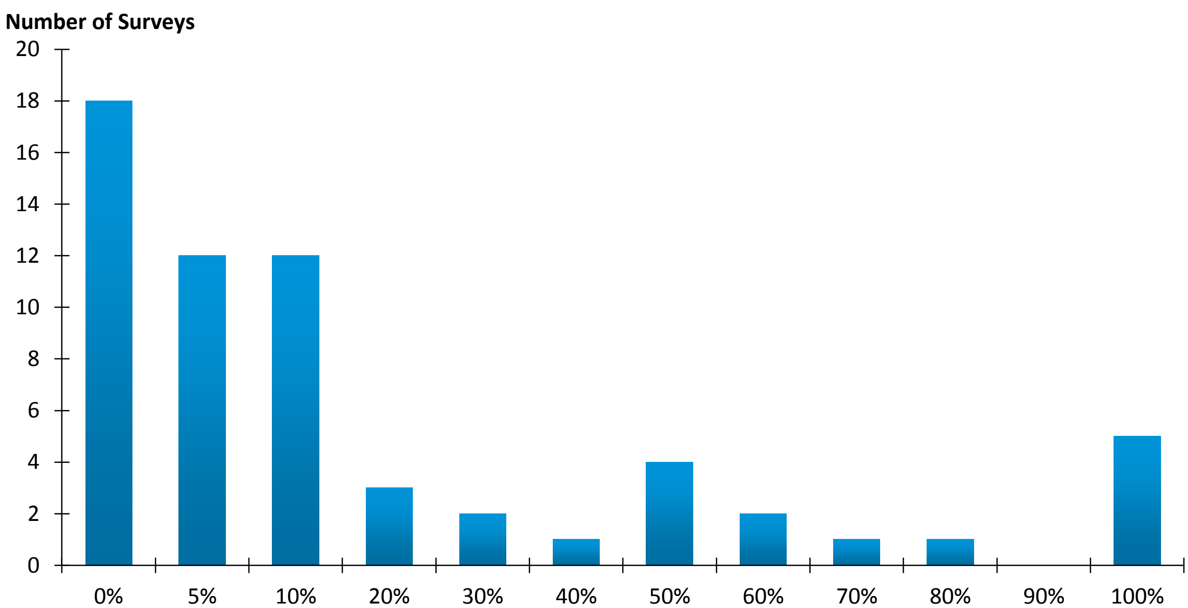


Figure 80. Chart of Survey Results

18. Do you feel that roving Port of Entry locations are better/same/worse than a fixed or satellite POE performing the following:

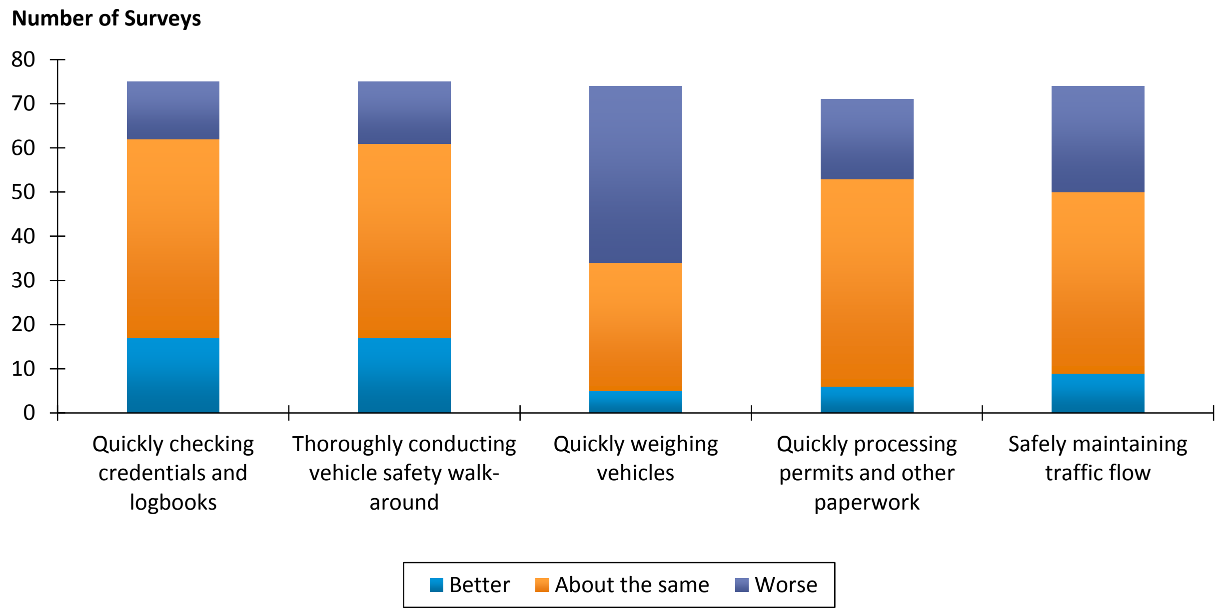


Figure 81. Chart of Survey Results

19. Which of the following are the most time consuming functions that occur at a roving POE site?

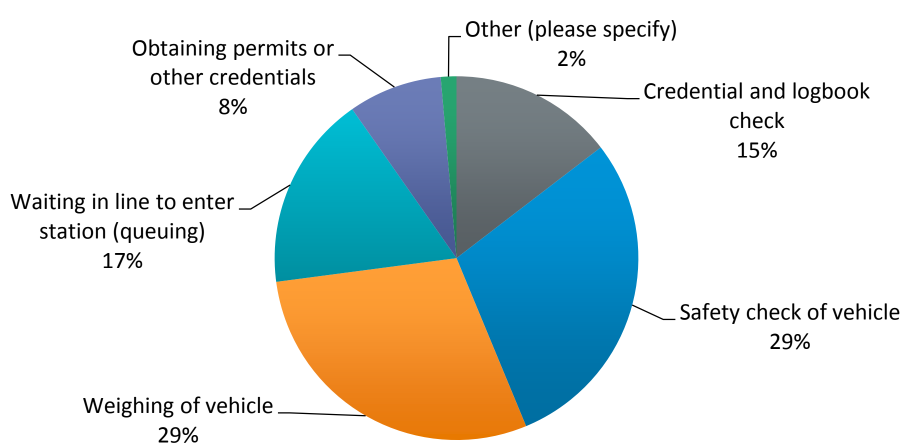


Figure 82. Chart of Survey Results

Response count: 144

20. Do you feel the delay caused by these functions is unreasonable?

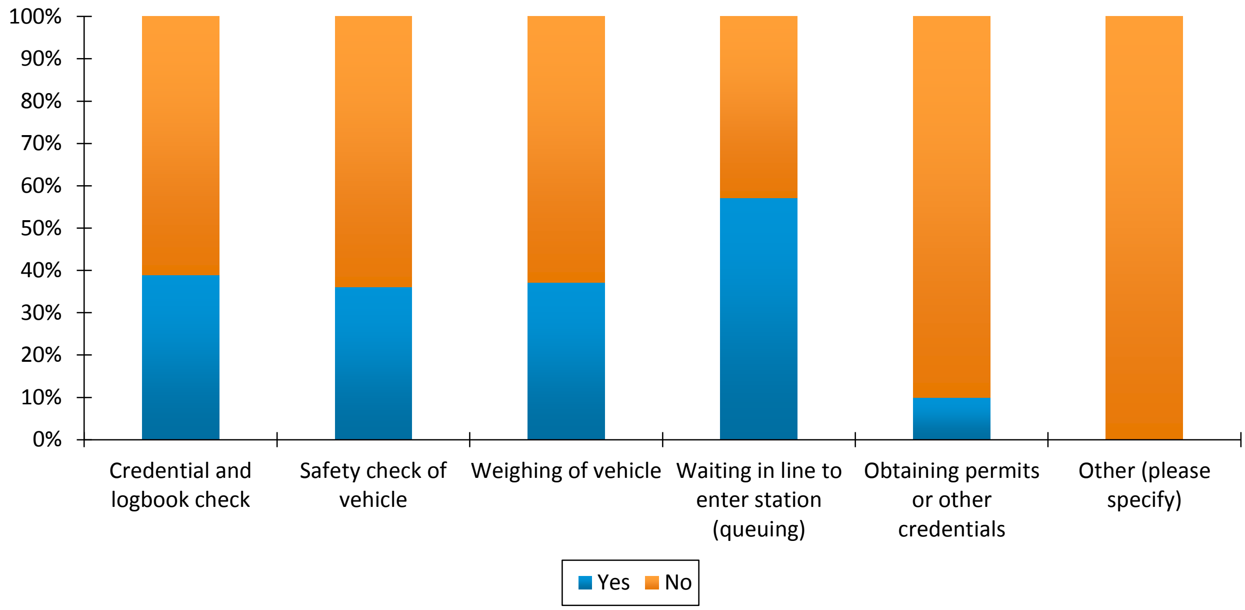


Figure 83. Chart of Survey Results

21. How often are you aware of the presence of a roving POE site before you arrive at one?

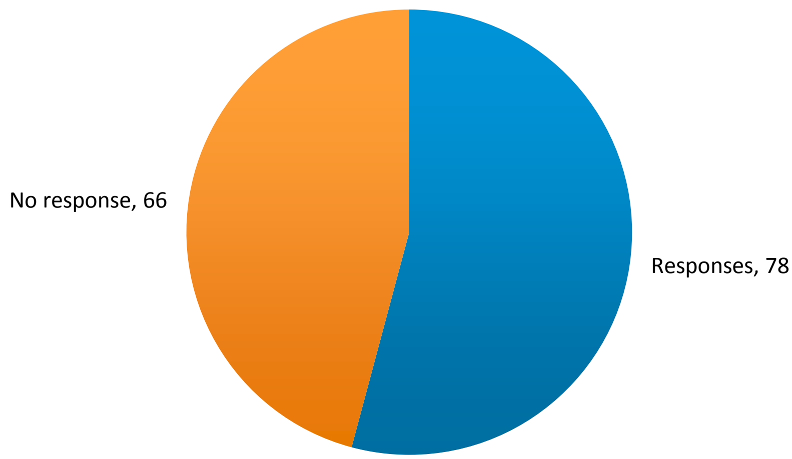


Figure 84. Chart of Response Rate

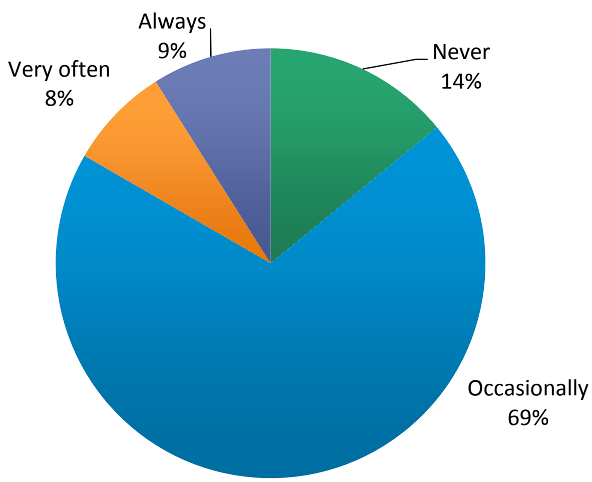


Figure 85. Chart of Survey Results

22. Which violation types do you feel are treated as the highest priority 1) to lowest priority 9) by POE/Rover staff?

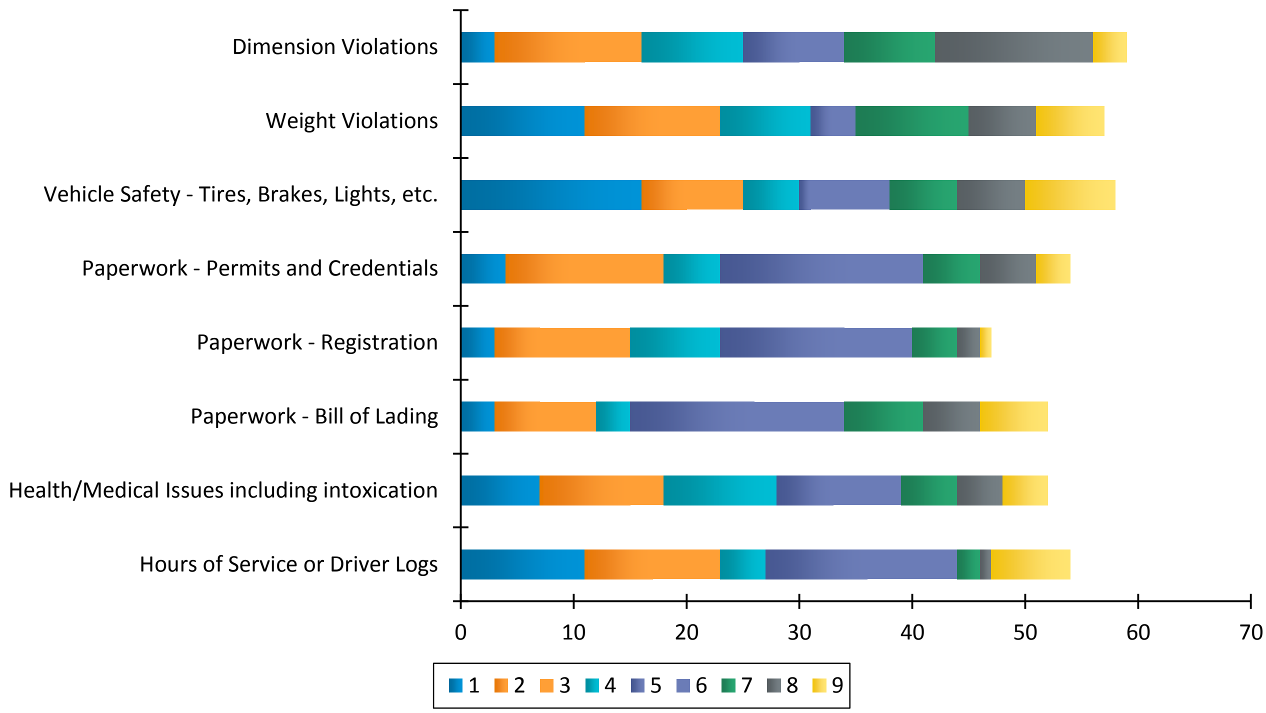


Figure 86. Chart of Survey Results

23. Do you consider any of the fixed or satellite Port of Entry sites dangerous due to site design issues such as crossing traffic to enter/exit, scale placement, short acceleration/deceleration lanes, or other problems?

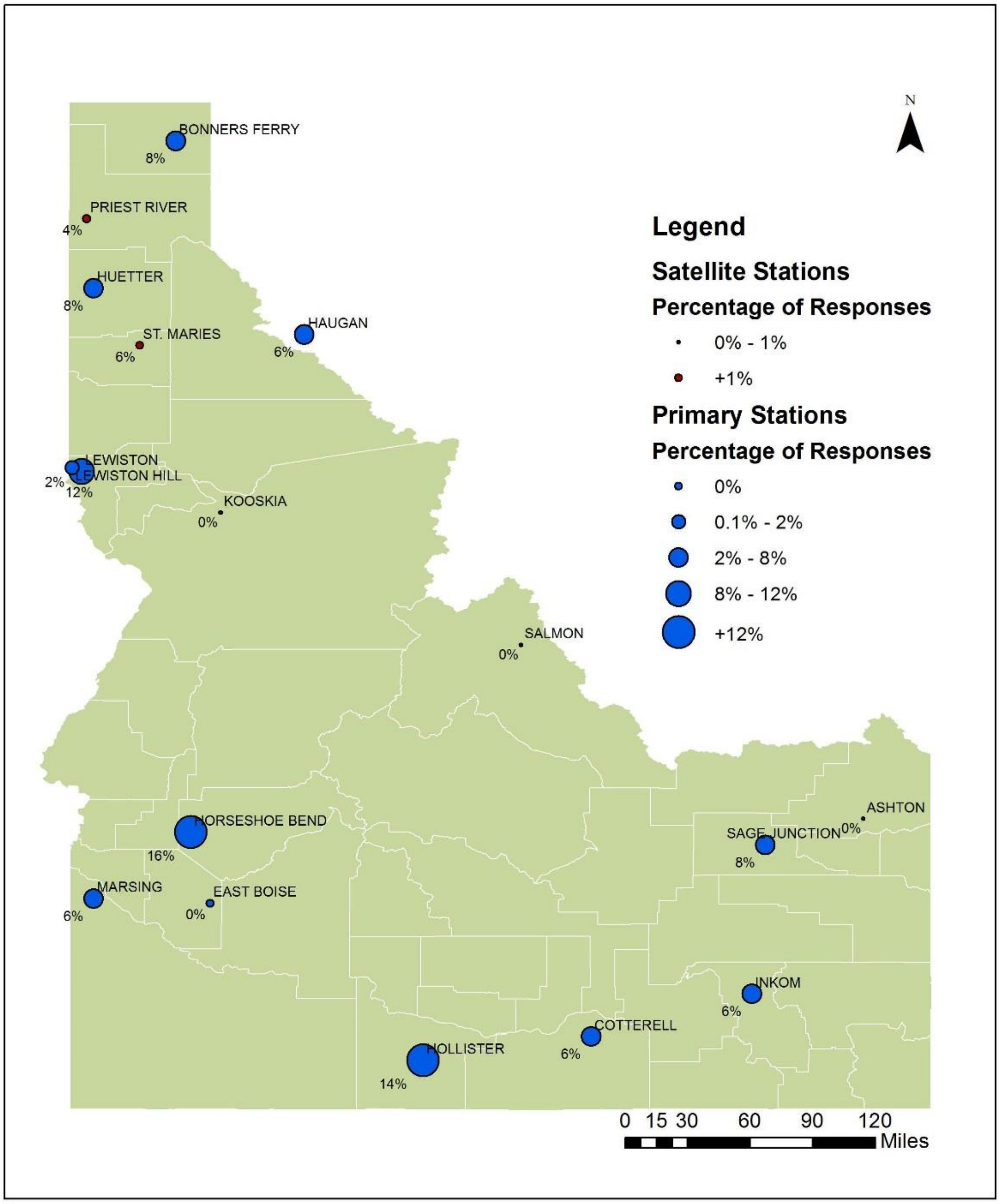


Figure 87. Map of Survey Results

Response count: 51

24. Please provide any details you can about why these sites are dangerous.

Comments:

- Lewiston scale located in center median, which requires drivers to slow down and speed up on the fast lane of the freeway. Would be better if there was a longer or separate accelerate- or decelerate-lane. Horseshoe Bend is a bare when scales are open for both directions, additionally it's hard to see what's coming from the same direction of travel as you are trying to get back into traffic. Need a larger scale area.
- Need to improve acceleration deceleration length.
- Crossing oncoming traffic.
- There is so much traffic. Entering sometimes truck back up on the exit. Exiting is hard because of traffic.
- Merging.
- Entering I-90 from Huetter.
- You are pulling into the right side which has a bad visibility.
- Sometimes the trucks are backed up to the freeway waiting to go across the scales, they get to many trucks coming into the port.
- Crossing through traffic patterns in the POE and on the highway adjacent to the POE.
- The way that you have to get to it when you are heading north on Highway 55.
- Cross traffic on U.S. 33.
- Both have off-ramps that are to short, Huetter off-ramp is on a downgrade with an on ramp less than a half-mile before the off-ramp making it congested for both cars trying to get onto I-90 from SH 41 and trucks trying to take the ramp to the scale. The on-ramp is not long enough and straight enough to get up to freeway speed to merge into traffic. Inkom has to short an off-ramp and the scale should be on the road side of the building so you can drive onto the scale straight forward, also the on ramp is way too short and on an incline, with the speed limit at 80-mph you cannot get a loaded truck up to a safe speed to merge into traffic safely.
- Having to cross traffic southbound. It may be rectified as I haven't seen should be open in sometime.
- It can get very congested at this site and hard to get off- and on-road when traffic is bad
- Sage Junction exiting northbound, across the bridge and around the loop dangerous. At least install a northbound nor pass device.
- Bad entry onto traffic.
- Short off-ramps and on-ramps.
- Marsing and Hollister both are unsafe because you have to cross oncoming traffic to enter and exit.
- Is at the top edge of the hill can't see very far north bound, not much room on site for more than two to three vehicles.
- Crossing lanes of traffic.
- Both kind of have blind spots when pulling out loaded can't get up to speed very fast.
- Cross traffic, NORPASS, or bypass.

25. Would you be in favor of utilizing or expanding the following technologies in Idaho?

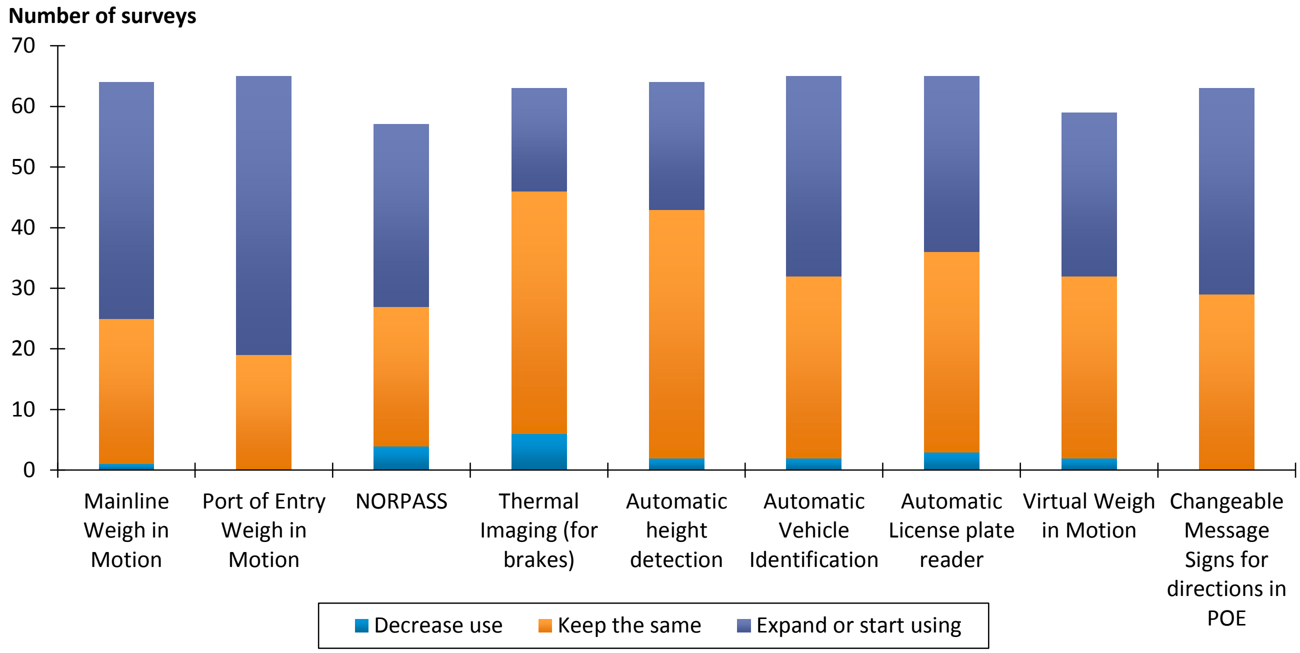


Figure 88. Chart of Survey Results

26. Would you be willing to pay a fee to participate in the transponder program?

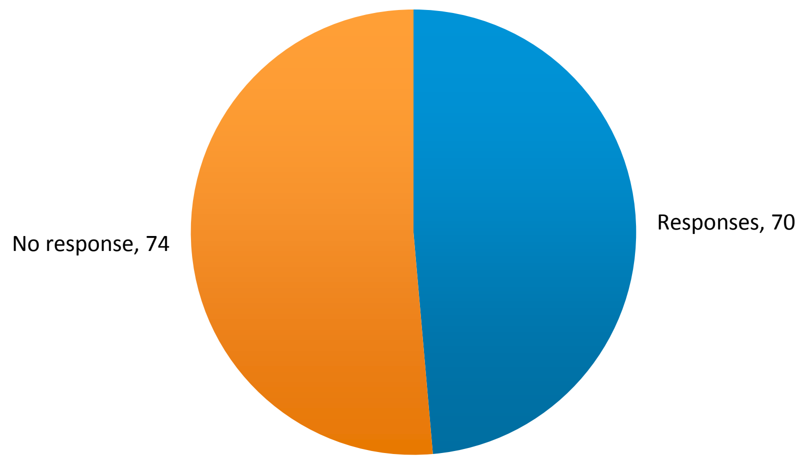


Figure 89. Chart of Response Rate

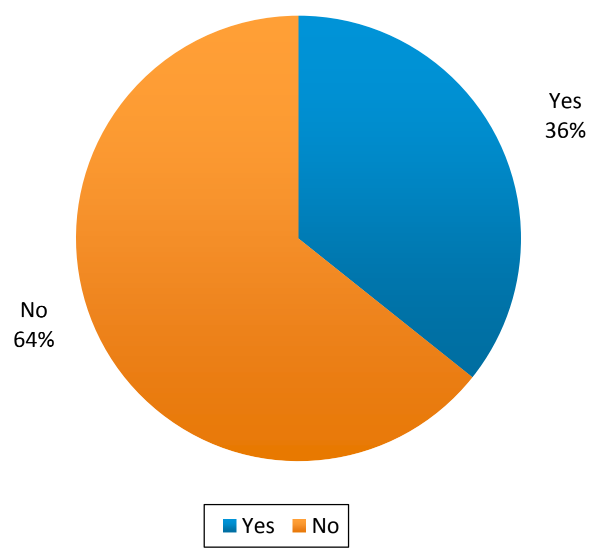


Figure 90. Chart of Survey Results

27. Do you prefer performing the following transaction on-line or in-person at a Port of Entry?

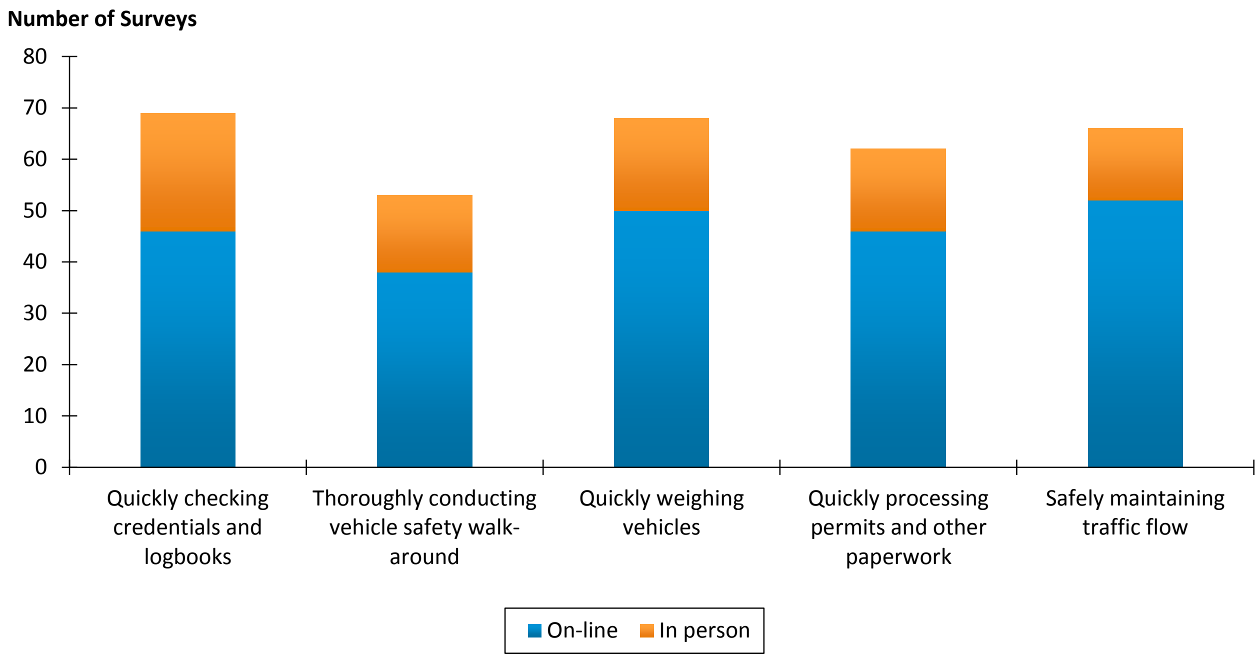


Figure 91. Chart of Survey Results

28. Do you feel that ITD staff are less/same/more efficient (in regards to speed of processing vehicles) than weight enforcement staff in other states?

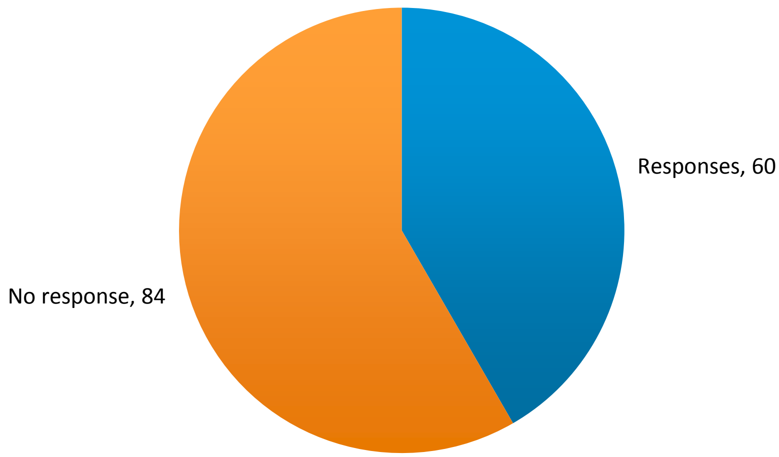


Figure 92. Chart of Response Rate

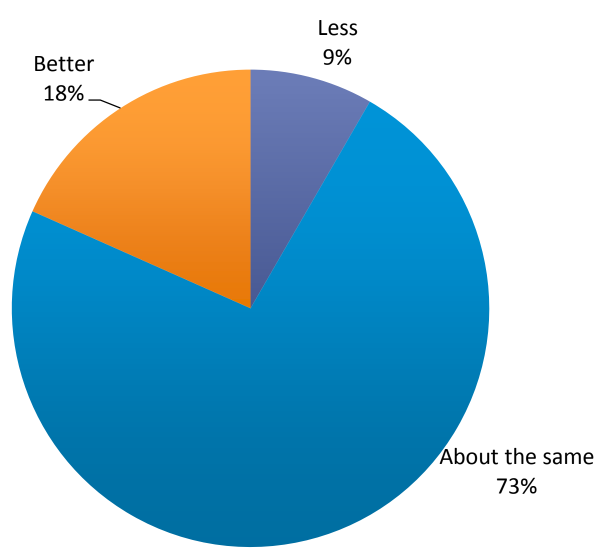


Figure 93. Chart of Survey Results

29. Which state that you operate in does the best job with POE/weight and safety enforcement?

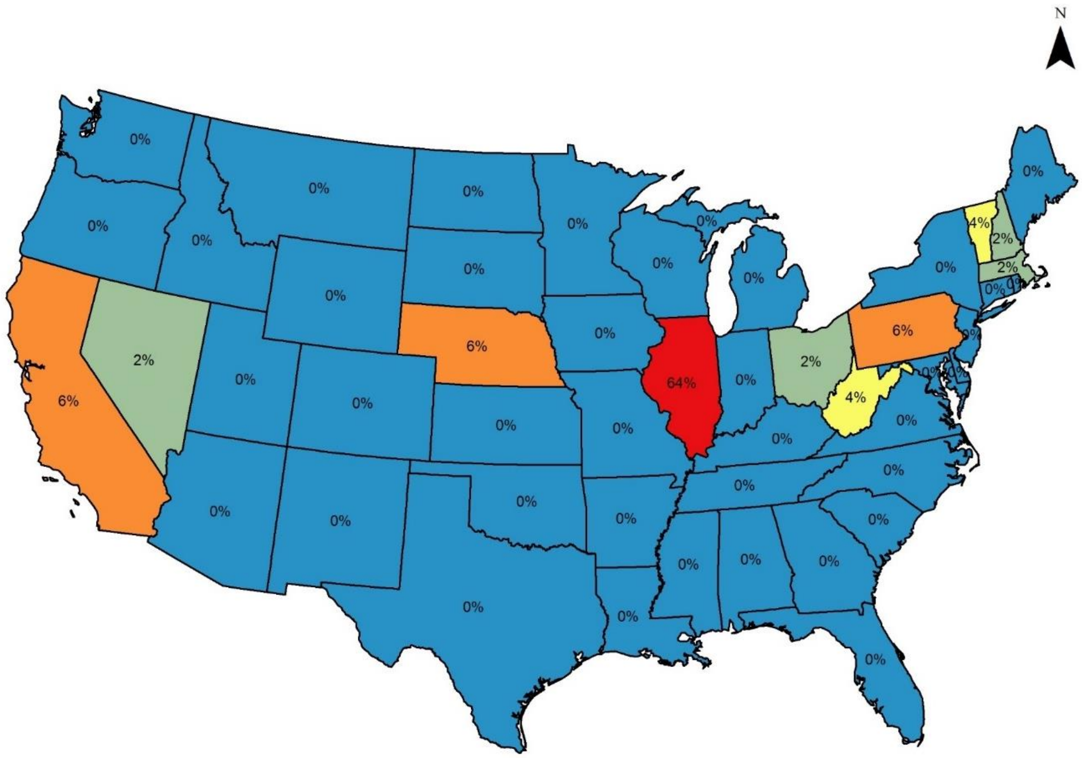


Figure 94. Map of Survey Results

Response count: 47

30. Are there any specific practices or technology used in this state that you think Idaho should adopt?

Comments:

- PrePass come into what everyone else is doing.
- The State of Oregon uses weigh-in-motion transponders at a large majority of their scales. Ever out of the way scales.
- PrePass and NORPASS.
- NORPASS or PrePass at all fixed scales.
- I would like to see every POE and State policemen have to obtain Commercial driver's licenses and medical certificates and have 180 hours of over the road training as truck drivers before they are able to administer Levels I, II or III or pullovers.
- Continue to improve.
- No.
- Patience, understanding, tolerance.
- More moving ports in north Idaho helps slow down over weight and poor maintenance on trucks and trailers.

31. Do you feel that Idaho's Port of Entry system is maintaining a level playing field for industry?

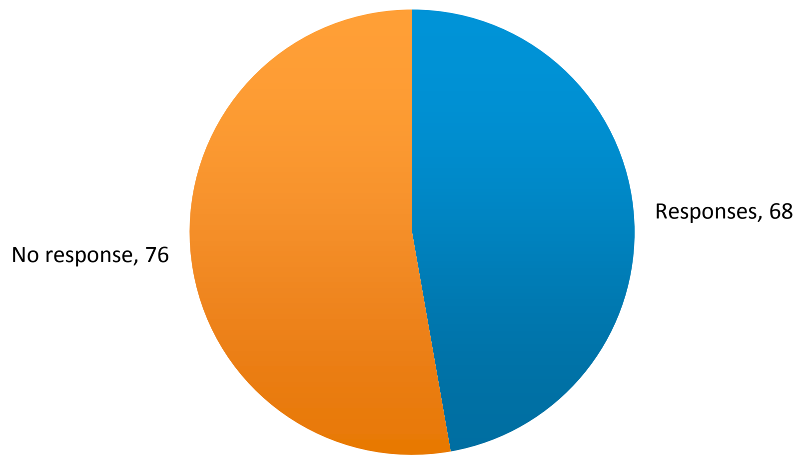


Figure 95. Chart of Response Rate

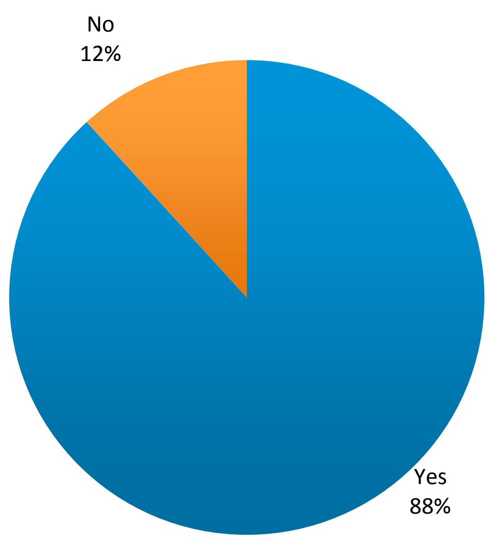


Figure 96. Chart of Survey Results

32. What could Idaho do better to maintain a level playing field for industry?

Comments:

- PREPASS.
- Make weigh-in-motion and transponder use available at all permanent locations.
- More transponder bypass.
- Allowing 2000 lbs. for agricultural products is unfair and equates to selective enforcement.
- Upgrading with new technology.
- Some scales are located specifically for lo6 trucks.
- More moving ports.
- Make sense that POE employees and state DOT personnel are schooled in common sense approach to regulations. IE Local trucks that are empty bypassing the Huetter Scale.
- A little common sense and discretion, not by the book all the time. Most are pretty good, some have an attitude. We are trying to make a living, sometimes light burn out.

33. Overall, how satisfied are you with Port of Entry services in Idaho?

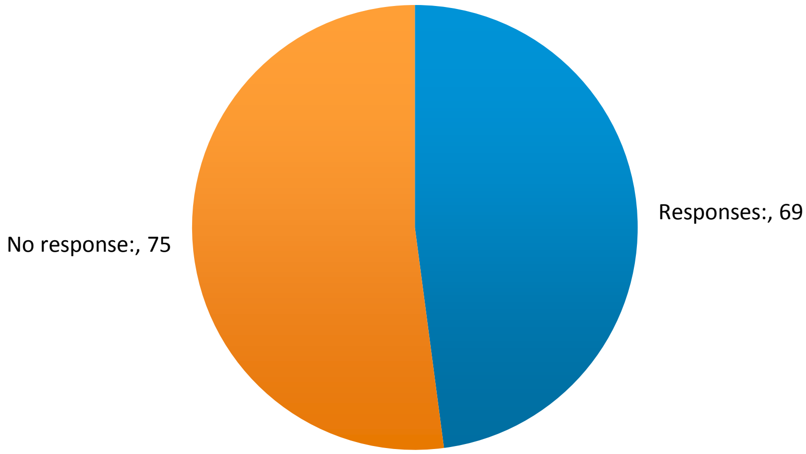


Figure 97. Chart of Response Rate

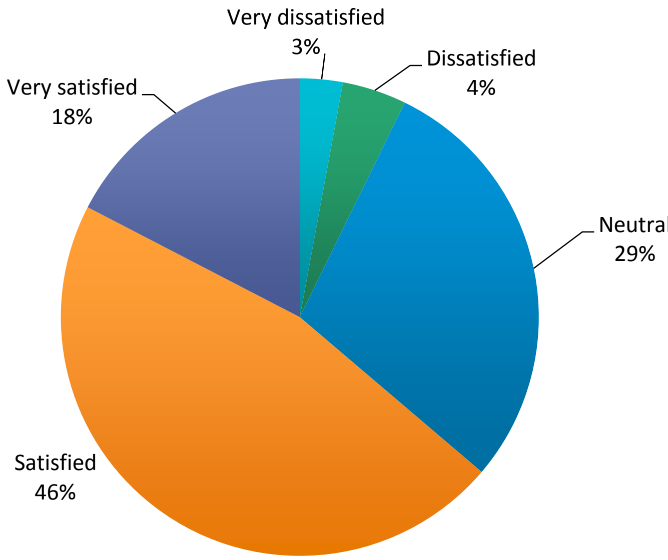


Figure 98. Chart of Survey Results