Investigation of Cost Effective Truck Weight Enforcement

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By

Chris C. Ramseyer
Assistant Professor

Andrew X. Nghiem
David P. Swyden
Research Assistants

Civil Engineering and Environmental Science
University of Oklahoma
Norman, Oklahoma

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16 . ABSTRACT

This research investigates the best way to enforce the truck size and weight limits and by doing so decrease the damage that is being done to Oklahoma's roads and bridges. In the process a survey of all state DOT's was conducted to help determine the state of the art for cost effective and the most efficiente mix of fixed weigh stations, mobile enforcement, weight in motion (WIM), virtual enforcement, and possible other technology to provide optimum monitoring of Oversize/Overweight vehicles to reduce damage to Oklahoma's roads and bridges.

Recommendations are offered concerning the construction of Point of Entry (POE) Facilities, mobile enforcement and virtual enforcement within the state of Oklahoma. A novel data collection system , the OU-BWIM is proposed to help determine the location of intrastate virtual and mobile enforcement locations. The proposed development of the OU-BWIM would help convert existing infrastructure assets, bridges, into weight in motion, real time, data collection points.

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SI (METRIC) CONVERSION FACTORS

Approximate Conversions to SI Units

Symbol	When you know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	25.40	millimeters	mm
ft	feet	0.3048	meters	m
yd	yards	0.9144	meters	m
mi	miles	1.609	kilometers	km
	AREA			
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.0929	square meters	m^2
yd^2	square yards	0.8361	square meters	m^2
ac	acres	0.4047	hectares	ha
mi^2	square miles	2.590	square kilometers	km^2
	VOLUME			
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.0283	cubic meters	m^3
yd^3	cubic yards	0.7645	cubic meters	m^3
	MASS			
oz	ounces	28.35	grams	g
lb	pounds	0.4536	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams	Mg
	TEMPERATURE (exact)			
°F	degrees Fahrenheit	(°F-32)/1.8	degrees Celsius	°C
	FORCE and PRESSURE or STRESS			
lbf	poundforce	4.448	Newtons	N
lbf/in^2	poundforce per square inch	6.895	kilopascals	kPa

Approximate Conversions from SI Units

Symbol	When you know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.0394	inches	in
m	meters	3.281	feet	ft
m	meters	1.094	yards	yd
km	kilometers	0.6214	miles	mi
	AREA			
mm^2	square millimeters	0.00155	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.196	square yards	yd^2
ha	hectares	2.471	acres	ac
km^2	square kilometers	0.3861	square miles	mi^2
	VOLUME			
mL	milliliters	0.0338	fluid ounces	fl oz
L	liters	0.2642	gallons	gal
m^3	cubic meters	35.315	cubic feet	ft^3
m^3	cubic meters	1.308	cubic yards	yd^3
	MASS			
g	grams	0.0353	ounces	oz
kg	kilograms	2.205	pounds	lb
Mg	megagrams	1.1023	short tons (2000 lb)	T
	TEMPERATURE (exact)			
°C	degrees Celsius	9/5+32	degrees Fahrenheit	°F
	FORCE and PRESSURE or STRESS			
N	Newtons	0.2248	poundforce	lbf
kPa	kilopascals	0.1450	poundforce per square inch	lbf/in^2

DONALD G. FEARS STRUCTURAL ENGINEERING LABORATORY

REPORT ON

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by

Andrew X. Nghiem
David P. Swyden

Christopher C. Ramseyer, Ph.D., P.E.
Assistant Professor
University of Oklahoma

for

The Oklahoma Transportation Center
Norman, Oklahoma
and
The Oklahoma Department of Transportation
Oklahoma City, Oklahoma

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School of Civil and Environmental Engineering
University of Oklahoma
Norman, Oklahoma 73019

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EXECUTIVE SUMMARY

This executive summary does not fully summarize findings and opinions. Findings and opinions are related through the full report only.

The Following are a Summary of the Recommendations:

1) **Build Three Incoming POE Facilities (High Priority at Sites 1, 2, 3 and 4)**
   - Build Stations at **Sites 1, 2 and 4**. Build Station at **Site 3** if OTA provides funding. Total Estimated Cost is approx. $6.0 million per Station totaling approx. $19.5 million.
   - Each Station to incorporate a Mainline WIM System with Load Cell Technology. Ramp WIM systems at stations are redundant and not recommended. WIM System to include state owned equipment to interface with electronic bypass systems. Estimated Cost of a fully operational, single lane, one direction Mainline WIM System is approx. $500,000.
   - Stations to include additional space for highway patrol and medical personnel.
   - Station pavement design and layout should be highly efficient to ensure reasonable construction and maintenance costs.

2) **Use OU-BWIM System to Select At-Risk Bridges and Intrastate "Hot Spots"**
   - Total Estimated Cost is approx. $200,000 for 20 Locations.
   - Time required to collect adequate data is approx. seven days per site.

3) **Using Data from Recommendation Two, Build Virtual WIM Stations at Pre-Selected Location from OU-BWIM System**
   - Total Estimated Cost is approx. $200,000 per station.
   - High Priority at Sites 5, 7 and 10 both directions.
   - Virtual WIM Stations monitor Intrastate (In-State) Traffic.

4) **Expand the Existing Commercial Vehicle Enforcement Unit designated Troop S**
   - Obtain 10 portable platform static scales. Total Estimated Cost is approx. $20,000 per 11 foot platform scale totaling approx. $200,000.
   - Increase personnel in Troop S by approx. four members per year as required to maintain a reasonable enforcement level. These new members should be granted legal authority to regulate Oklahoma's commercial vehicle laws only.
   - Adopt an increasing gradation system for citations with minimum approx. of $760

5) **Using Data from Recommendation Two, Install Low Cost, Strain Gage Data Collection Units on Deficient Bridges**
   - Total Estimated Cost is approx. $30,000 per unit. Units developed at OU.
   - Data to be collected and reported to Troop S weekly by OU.
   - Data Collection Units provide continuous, passive monitoring of vehicular loads.

6) **Using Data from Recommendation Two and Three, Build Six POE Facilities if Shown to be Cost Effective**
   - Same provisions and unit cost estimates apply as listed in Recommendation One.
   - Using Data from Recommendation Two, determine if POE stations would be cost effective at Sites 5, 6, 7 and 10.
   - Revenue collections at Sites 8 and 9 may not be sufficient to cover operational costs and therefore should be considered low priority.

1.0 INTRODUCTION

1.1 Background

In conjunction with the Oklahoma Transportation Center and the Oklahoma Department of Transportation, the Donald G. Fears Structural Engineering Laboratory (Fears Lab) at the University of Oklahoma has been commissioned to determine the best combination of weight enforcement systems and procedures to enforce the truck size and weight limits currently in Oklahoma Law, and by doing so, decrease the damage being done to the state's roads and bridges.

Federal Law regulates truck size and weight limits on forests, national parks, and other federal lands. Some exceptions include those standards by "grandfather" right and provision for special permits. The Surface Transportation Assistance Act (STAA) of 1982 requires U.S. states to allow larger trucks on the National Network, which is comprised of the Interstate system plus the non-Interstate Federal-aid Primary System. All Federal and state laws, directly or indirectly, affect the quality and performance of pavement on our nation's highways. In 1941, Congress directed the Interstate Commerce Commission (ICC) to consider federal regulation of the sizes and weights of freight-carrying motor vehicles that were involved in interstate or international commerce. In 1956, the Federal Government initiated a program to regulate truck size and weight limits in order to improve federal investments in the Interstate Highway System. According to the USDOT, "A maximum gross weight limit of 73,280 pounds was established along with maximum weights of 18,000 pounds on single axles and 32,000 pounds on tandem axles. Maximum vehicle width was set at 96 inches…. States having greater weight or width limits… were allowed to retain those limits under a grandfather clause." In 1975, a spike in fuel costs led the Congress to increase the allowable gross weight and axle weight limits. The U.S.,

through the STAA of 1982 (P.L. 97-424), adopted federal weight limits on Interstate Highways. Large trucks, such as 48-foot long semi-trailers, among others with prescribed minimum dimensions, were to be allowed on a National Network. A freeze on the expansion of operations on long combination vehicles followed in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) (P.L. 102-240). The USDOT's *Comprehensive Truck Size and Weight Study* thoroughly examines issues associated with potential modifications of the current Federal truck size and weight (TS&W) limits. These include a foundation for cost and benefit analyses. (Straus et al., 2006) The State of Oklahoma has additional laws for motor vehicles pertaining to size, weight and load found in 47 O.S., Chapter 14.

The design of pavement and bridge structures requires accurate predictions of vehicle axle loads and vehicle classifications. Vehicle gross weight and axle weight restrictions have been imposed in order to ensure that vehicles do not exceed the design criteria of these roadway and bridge infrastructures. (Al-Kaisy et al., 2003) An increase in loading means an exponential increase in the acceleration of road wear as shown in Figure 1.0. When maintenance activities are timed incorrectly due to inaccurate traffic loading estimates, it can mean the premature destruction of a roadway. (Kishore et al., 2000) A report for the Center of Transportation Research at the University of Texas at Austin found that the pavement damage from vehicle traffic depends mainly on the number of axle passes over the pavement and axle weights. An increase in axle weight generally causes a more than proportional increase in pavement damage. The relationship appears to approximate an exponential function, and various studies have assumed the power of the exponent to be about 4 as a rule. Estimates of the exponent's power vary substantially, however. (Luskin et al., 2001)

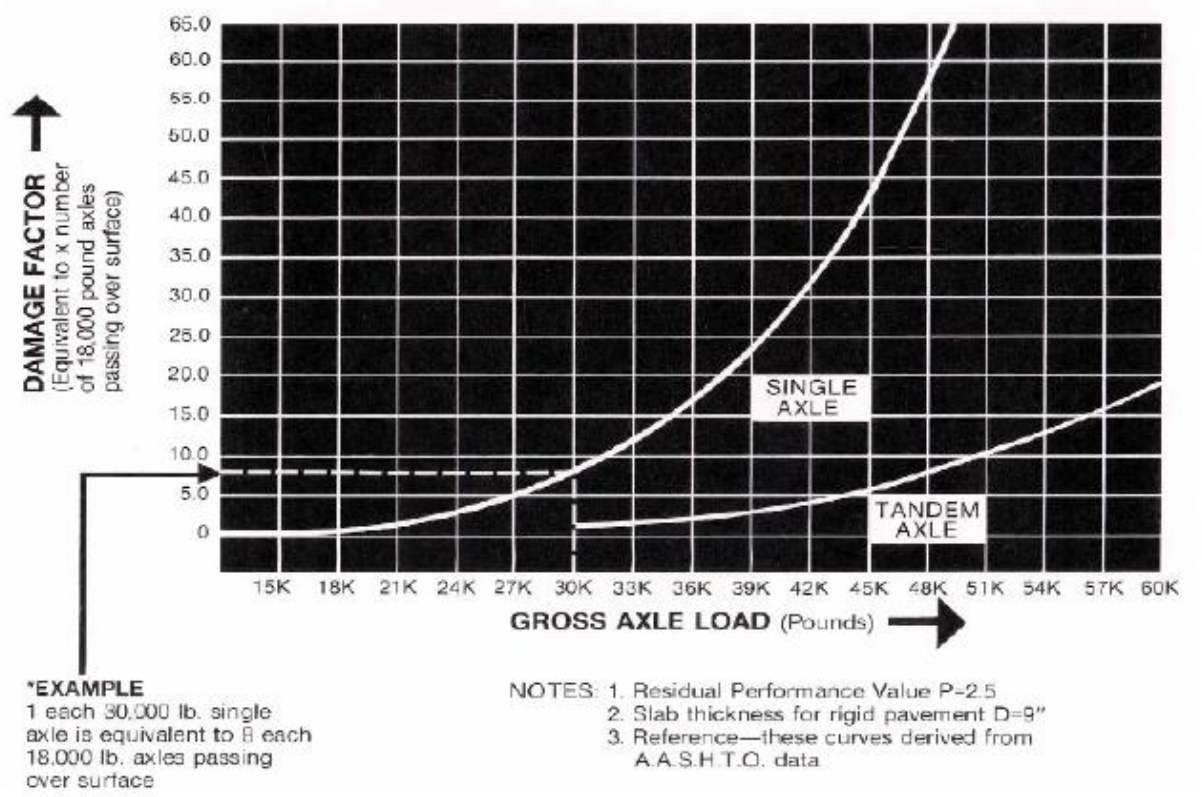

Figure 1.0 – Damage Factor versus Gross Axial Load (Bergan et al., 2002)

In order to ensure that truck weights are within allowable limits, numerous weigh stations have been constructed along major highways in the United States. (Al-Kaisy et al., 2003) The efficiency and effectiveness of traditional static weigh stations has been limited because of their lengthy weighing processes. Additionally, truck traffic volumes often exceed the capacity of static weigh stations, with the result that only a small portion of vehicles are weighed, which can lead to biased data. (Avis et al., 2002) A field study conducted at the Stephens City weigh station in the state of Virginia indicated that 30 percent of the trucks were not weighed simply because queues were too long and thus were allowed to bypass the static scales in order to prevent queue spillbacks. The study also demonstrated that in many instances trucks with legal

weights experienced unnecessary delays at the weigh station because they were requested to enter the static scales. (Al-Kaisy et al., 2003)

As a result, Weigh-in-Motion (WIM) systems are introduced to improve the operational efficiency of the traditional static weigh stations. As its name implies, WIM stations weigh trucks and their axles while these vehicles travel at either full highway speed or at a reduced speed on a weigh station entrance ramp. The typical vehicle presence sensors employed in the WIM system are piezoelectric sensors, bending plate scales, inductance loops, and pressure cell scales, also known as single load cell scales. These sensors are usually installed in a strip embedded in the pavement perpendicular to the traffic direction. WIM systems can continuously measure and store loads and axle spacing data for each truck that passes through the WIM station. Additionally, they also record supplementary data such as the date, time, speed, lane of travel, vehicle type, and station identification. With the information provided by WIM systems, it is possible to get detailed truck traffic data, such as axle load spectra, required in modern pavement design methods. The accuracy of these systems is primarily dependent on the vehicle dynamics (e.g. – the speed of the vehicle) and the inherent variance of the technology used within the WIM system (e.g. – the type of WIM sensor technology and the senor/roadway profile interaction). (Avis et al., 2002)

Radio Frequency Identification (RFID) or Automatic Vehicle Identification (AVI) technology is currently used in Commercial Vehicle Operations (CVO) to electronically identify a vehicle. The technology involves the installation of a transponder device in the vehicle and roadside reading/communications equipment. The transponder in the vehicle contains a unique identification number. The roadside readers can read this identification number as a unique identifier of the vehicle. As well, the devices in vehicle and roadside readers are capable of two

way communications, where the roadside reader can send a message to a specific transponder. In this way, the systems can be used to provide a red light/green light message in the vehicle. (Taylor, 2007)

The present systems used in commercial vehicle operations all follow a de facto standard called the ASTM Draft 6 specification. Although not an officially recognized specification by the ASTM organization, this specification has been adopted by the Federal Motor Carrier Safety Administration (FMCSA) as the standard that they will support for projects utilizing Federal Money in the area of identifying commercial vehicles. The standard calls for an active RFID device with two way communications between the vehicle and roadside, allowing for in-cab messaging, as opposed to a passive device where the transponders are simply a passive RFID identifier with no capabilities of two way communications. (Taylor, 2007)

The present ASTM Draft 6 standard came about following the use of these devices in the Advantage 75 Pre-clearance program. The technology was originally developed by Hughes Corporation, and the patent for the communications technology called TDMA was released to the public domain as part of the project. Previous systems used in commercial trucks used an in-road antenna and bumper mounted technology. Following the Advantage 75 acceptance of the systems, other programs followed in the adoption of the same technology, to alleviate concerns in the industry of multiple standards and transponders being required. The HELP Inc. group and later the PrePass commercial offering of HELP Inc. adopted the ASTM Draft 6 standard. The Oregon Greenlight program [and the NORPASS (North American Preclearance and Safety System) program] likewise moved to use the same technical standard. Initial developments in the Commercial Vehicle Information Systems and Networks (CVISN) program adopted the same

standard, as well as North Carolina in the TransExpressSystem CVO program, and the PIC PreClearance program in Alberta, Canada. (Taylor, 2007)

1.2 Literature Review

In addition to documenting the "state of the art", several WIM technologies and systems will be discussed in this section. Each of the technologies works differently to produce weight measurements. All of the systems use factors which change the reading of the sensor (e.g., strain in metal plate or electric charge) into a weight. A factor for weight is a number that is multiplied by the sensor reading to produce the corresponding weight in pounds or other meaningful units. These factors may be adjusted to calibrate the WIM systems and vary depending on the manufacturer and the technology used. (Schultz et al., 2006)

The three commonly used WIM sensor technologies are 1) piezoelectric, 2) bending plate, and 3) single load cell sensors. There are also three promising sensor technologies that are currently being tested but have not been widely used: 1) quartz, 1) fiber optic, and 3) seismic. The following subsections provide a brief summary of each of these six technologies. (Schultz et al., 2006). There are also three commonly used WIM systems. They are 1) Mainline, 2) Ramp, and 3) Virtual. Some of the system information is also listed in section 3.2 of this report.

1.2.1 Piezoelectric Sensors

The piezoelectric WIM sensor is the most commonly used for data collection purposes. It is made up of a copper strand encircled by a piezoelectric material all encased in a copper sheath. When pressure is applied to the piezoelectric material an electrical charge is produced and in turn

measured and analyzed to determine the dynamic load of the axle or wheel. The dynamic load is then used to estimate the static load of the axle or wheel. (Schultz et al., 2006)

Inductive loops and two piezoelectric sensors (for classification) are usually installed in the lane with the WIM piezoelectric sensors. The loops and sensors gather additional information about vehicles as they pass over the system as shown in Figure 2.0. Installation of the WIM piezoelectric sensor is relatively simple and quick. A small cut is made in the pavement about 1 to 2 inches wide by 1 to 2 inches deep. The sensor is placed in the cut and secured with a fast curing grout. Installation of the entire system can generally be completed in one day. (Schultz et al., 2006)

Piezoelectric WIM systems are expected to accurately estimate the vehicle weight within 10 to 15 percent of the actual vehicle weight for 95 percent of the vehicles measured. (Schultz et al., 2006) This level of accuracy is defined as a Type II WIM according to ASTM E 1318-02. (American, 2002) The estimated average cost per lane per year over a 12 year period for a fully installed piezoelectric WIM system is approximately $4,224 to $4,750. (Schultz et al., 2006)

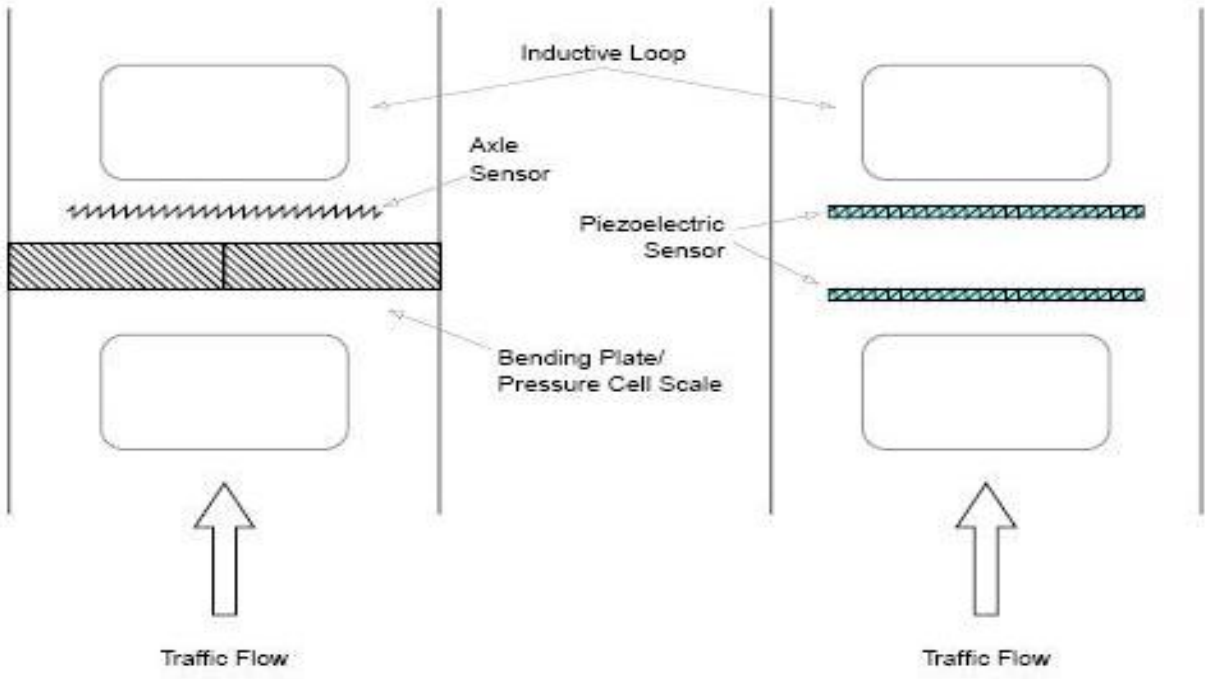

Figure 1.1 – Three Common WIM Technologies (Avis et al., 2002)

1.2.2 Bending Plate

Bending plate sensors consist of two steel plates placed adjacent to each other in the lane each covering one half the width of the lane as shown in Figure 2.0. The plates have strain sensors placed strategically on the undersides of the plates. By measuring and analyzing the strain as a vehicle passes over, the dynamic load of the wheel or axle is determined and the static load of the wheel or axle is subsequently determined. Like the piezoelectric sensor, the bending plate is usually installed in a lane with two inductive loops and an axle sensor to provide additional information such as speed and axle spacing. (Schultz et al., 2006)

There are two basic methods for installing a bending plate scale depending on the pavement type. In concrete roads, a cut and excavation is made. The frame of the scale is anchored to the existing concrete roadway using epoxy and anchoring bars. This is called the

quick installation. In asphalt roads it is necessary to create a concrete foundation for the scale. A cut and excavation is made in the road 2 feet 6 inches deep by 4 feet 10 inches wide by 13 feet 10 inches long. The foundation is poured and once cured provides a solid foundation for the scale. This installation is referred to a vault installation. Installing a complete lane of scales, loops, and axle sensor can generally be accomplished in a day using the shallow quick method and in three days using the concrete vault installation. (Schultz et al., 2006)

Bending Plate WIM systems are expected to accurately estimate the vehicle weight within 5 to 10 percent of the actual vehicle weight for 95 per cent of the vehicles measured. (Schultz et al., 2006) This level of accuracy is defined as a Type I WIM according to ASTM E 1318-02. (American, 2002) The estimated average cost per lane per year over a 12 year period for a fully installed bending plate WIM system is approximately $4,990 to $6,400. (Schultz et al., 2006)

1.2.3 Load Cells

The load cell systems consist of weighing platforms with hydraulic cylinders placed beneath them. A section diagram is shown in Figure 3.0. The dynamic force of the wheel or axle on the scale is measured by analyzing the change in hydraulic pressure. Through the calibration process the static weight of the wheel or axle is subsequently determined. This system has two platforms, each 6 feet long, placed adjacent to each other in order to cross a 12 foot lane. Single load cell systems have only one hydraulic cylinder under the center of each platform. Multiple load cell systems have up to four hydraulic cylinders in an effort to improve accuracy. (Schultz et al., 2006)

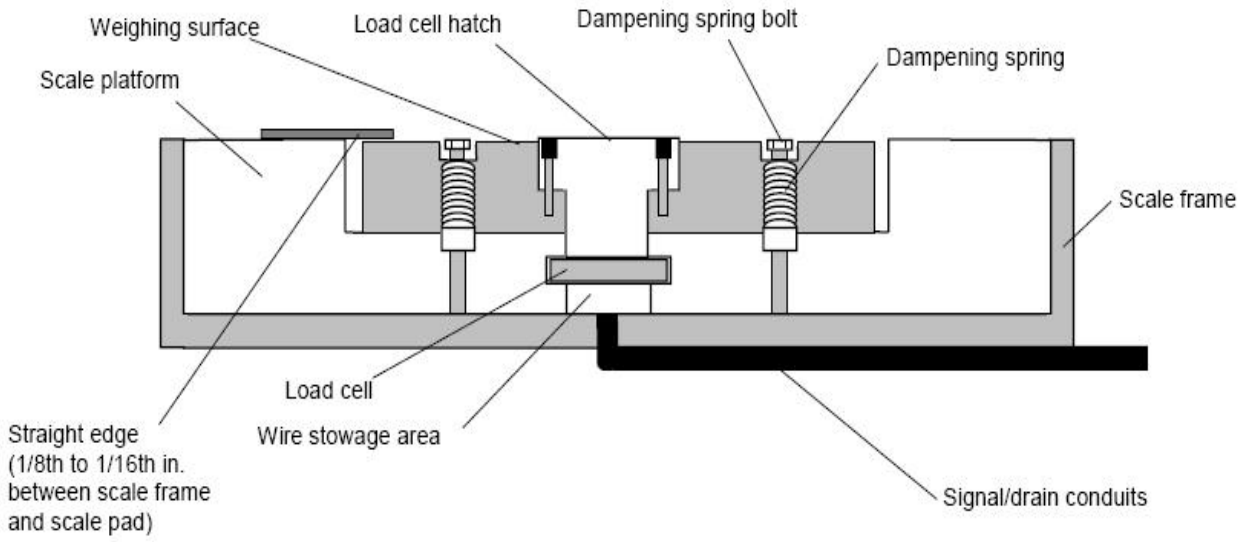

Figure 1.2 – Section Diagram of a Load Cell System (International, Single, 2006)

Similar to the bending plate, the single load cell scale requires a concrete vault as shown in Figure 2.0. Vault installation requires the road to be cut and excavated. The vault is poured with the final dimensions at 3 feet 2 inches deep by 4 feet 10 inches wide and 13 feet 9 inches long. Like the other scales the single load cell scale is usually installed with inductive loops and an axle sensor to obtain additional information about the vehicle such as speed and axle spacing. This complete installation including scales, inductive loops, and axle sensor can generally be done in three days. (Schultz et al., 2006)

Single load cell WIM systems are expected to accurately estimate the vehicle weight within 3 to 6 percent of the actual vehicle weight for 95 percent of the vehicles measured. (Schultz et al., 2006) This level of accuracy is defined as a Type III WIM according to ASTM E 1318-02. (American, 2002). The estimated average cost per lane per year over a 12 year period for a fully installed single load cell WIM system is approximately $7,296 to $8,300. (Schultz et al., 2006)

1.2.4 Quartz Sensor

The quartz (Kistler) sensor works on the same principle as the piezoelectric sensor. Quartz disks are fitted in the middle of a light metal profile. When force is applied to the sensor and electric charge is produced. This charge is analyzed and measured to determine the dynamic force of the wheel or axle on the scale. This force is subsequently used to determine the static weight, where the charge is proportional to the force acting on the scale. This sensor has been observed to be less temperature sensitive then piezoelectric sensors. (Schultz et al., 2006)

Like the other sensors, installation of other recording devices is common to collect additional information about the vehicles. The quartz sensors are easy to install. Each sensor is about 3 feet 3inches long. Typically, four of these sensors are used to cover a 12 foot lane. Again similar to the piezoelectric a simple saw cut in made in the roadway about 2 inches deep and 3 inches wide depending on the particular sensor. The sensor is placed in the saw cut and secured with a fast curing grout. Complete installation consisting of eight sensors (double coverage of a 12 foot lane) and two loops can generally be accomplished in less than a day. (Schultz et al., 2006)

Quartz WIM systems are expected to accurately estimate the vehicle weight within 10 percent of the actual vehicle weight for 95 percent of the vehicles measured. The estimated average cost per lane per year over a 12 year period for a fully installed quartz WIM system is approximately $7,500. (Schultz et al., 2006)

1.2.5 Fiber Optic

Several types of fiber-optic sensors are also in development although not yet in use commercially. The sensor is constructed of two metal plates welded around an optical fiber. An

applied force causes a change in the properties of the fiber which can be detected in the light passing through. This change is proportional to the force applied. Fiber-optic sensors have lower power requirements and are less sensitive to harsh environments than traditional sensors. As a result, fiber-optics has the potential to create a highly accurate sensor for about the same cost as a traditional piezoelectric sensor. (Schultz et al., 2006)

1.2.6 Seismic WIM

Seismic WIM (SWIM) is a relatively new concept. The system consists of geophones installed on the side of the roadway in connection with a speed monitoring system. By measuring the speed and the seismic signal of a passing vehicle the weight of that vehicle can be derived. The SWIM concept was initially developed by VorTek LLC a company that primarily works on detecting and warning systems for tornados. The system is still in development and tests are being performed by the Florida Department of Transportation, the National Center for Asphalt Technology, and Kentucky Department of Transportation. There are several considerations to be made concerning these systems. For instance, SWIM cannot collect data for individual lanes; they are dependent on truck, pavement, and soil properties; and they are sensitive to temperature, moisture, and wind. (Schultz et al., 2006)

Table 2.1 provides summary of the WIM technologies in use and technologies still undergoing research. The table includes information on the performance and estimated average cost, which is averaged over a 12 year period. This information is provided as far as it is available. (Schultz et al., 2006)

Table 1.0: Summary Table for WIM Technologies (Schultz et al., 2006)

WIM System	Performance (Percent Error on GVW at Highway Speeds)	Estimated Average Cost per Lane (12-Year Life Span)
Piezoelectric	±10 to15%	$4,224 to $4,750
Bending Plate	±5 to10%	$4,990 to $6,400
Load Cell	±3 to 6%	$7,296 to $8,300
Quartz	±10%	$7,500
Fiber Optic	Highly accurate	$4,224 to $4,750
Seismic	Unknown	Unknown

In addition to WIM technologies, integrated WIM systems are being successfully used across the United States. The most common systems are discussed below.

1.2.7 Mainline WIM System

The Mainline Sorting System is utilized at a weight enforcement station to pre-weigh vehicles and provides direction to vehicles in motion as they approach at full speed along the mainline towards the Weigh Station. A typical Mainline Sorter is shown in Figure 3.0. Changeable Message Signs (CMS) can be utilized along the mainline to direct vehicles to report or bypass the weigh station based on their perceived level of compliance as determined from the mainline pre-screening WIM system. The system will also include Open/Closed Signs and Weigh Station Changeable Message Signs (CMS). The sort decisions are based on compliance of speed, side to side balance, height limit, axle weights, axle group weights, and gross vehicle weights with the pre-set tolerances. The Mainline WIM System shall include various components that interact together. The components include the following: (International, Mainline, 2007)

- Weigh-In-Motion (WIM) Scales
- Side-fire videocapture
- WIM Computer System

- Axle and Loop detection
- Overheight detector
- Printer
- Weigh Station Changeable Message Signs
- Open/Closed Sign
- On-site Communication System
- AVI with Electronic Bypass Interface

Commercial vehicles approaching the weigh station shall be directed into the right hand lane by means of static signing as provided by the Oklahoma Department of Transportation. A vehicle approaching the weigh station will pass over the Mainline Weigh-In-Motion (WIM) system, which is embedded in the highway approximately 3000' prior to the weigh station exit ramp. The right lane can be equipped with WIM Scales that meet ASTM E 1318-02 Type III accuracy and reliability. (International, Mainline, 2007) Type III WIM Scales are defined as having a functional performance of ± 6% tolerance for 95% probability of conformity. (American, 2002) WIM electronics will be located at the roadside adjacent to the WIM scales and sensors, and will process the information collected by the in-road equipment. (International, Mainline, 2007)

Station entrance ramp lengths can range up to one mile for a traditional fixed weigh station without the use of WIM systems. Using a Mainline WIM system, typical station entrance ramps can be reduced to approximately 400 feet, according to a conversation with Mr. Rich Quinley of WIM TECH in June of 2007.

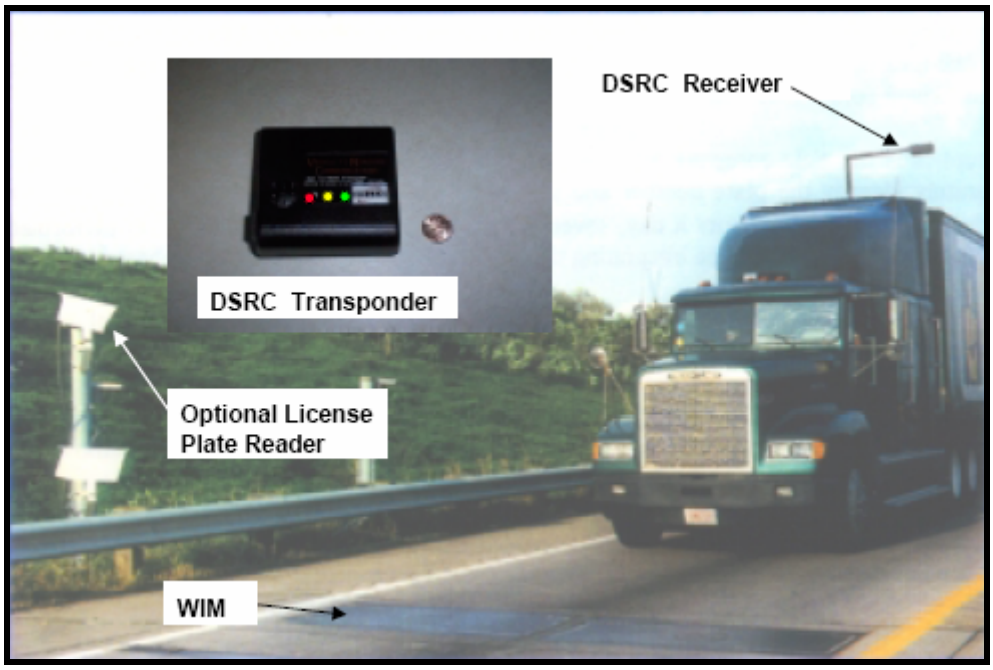

Figure 1.3 – Mainline WIM Sorter (Richeson, 2000)
*Dedicated Short Range Communication (DSRC)

The WIM system will collect axle weight and spacing, vehicle speed, classification and other relevant data to create a vehicle record. An overview image of the passing vehicle will be combined with the vehicle record. Based on a comparison of the vehicle record to the parameters set by the station operator, the WIM system will make a sort decision and advise the driver to either exit or bypass the weigh station via the changeable message signs (CMS) located on the side of the road. However, the actual sorting operation can be overridden by the operator using the manual console control in the weigh station. Non-violating vehicles may be randomly selected from the mainline for visual inspection at the scale house. A vehicle classification system shall be installed in the left lane in order to detect commercial vehicles bypassing the scales in the right lane. (International, Mainline, 2007) Because of the critical function of the mainline system, it is recommended to use equipment with the highest accuracy possible.

1.2.8 Ramp WIM System

The Ramp Sorting System is also utilized at a weight enforcement station to pre-weigh vehicles and provides direction to vehicles that have been directed to enter the weigh station ramp. A diagram of a Mainline WIM and Ramp WIM system is shown in Figure 5.0. Based on the results of this screening, automatic directional signals shall direct the vehicle to either bypass or report to the scale house for further inspection. The sort decisions are based on compliance of speed, side to side balance, height limit, axle weights, axle group weights, and gross vehicle weights with the pre-set tolerances. The Ramp WIM System shall include various components that interact together. The components include the following:

(International, Ramp, 2007)

- Weigh-In-Motion (WIM) Scales
- Overview image videocapture
- Lane Directional Signals Ramp System
- WIM Computer System
- Axle and Loop detection
- Overheight detector
- Printer
- Open/Closed Sign
- On-site Communication System

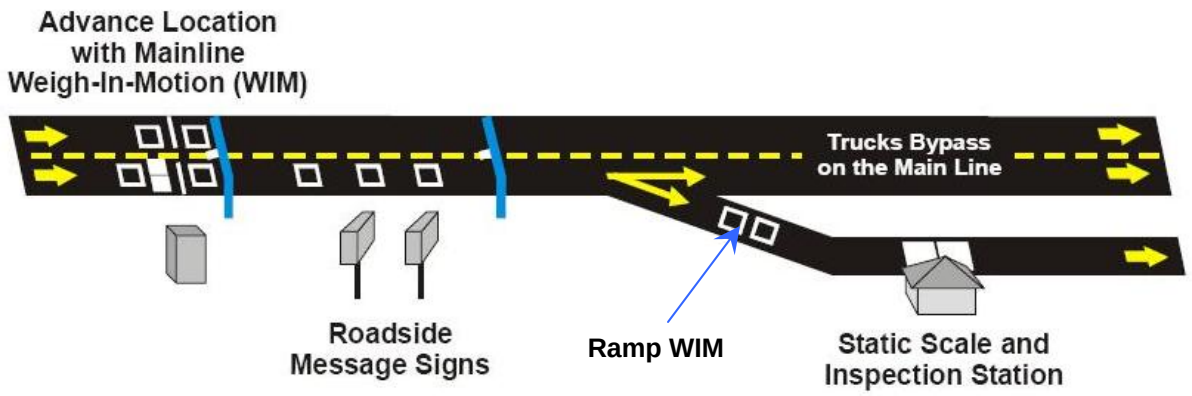

Figure 1.4 –Mainline WIM with Ramp WIM System (Kishore et al., 2000)
(NOTE: Figure shows a Two-Lane Mainline WIM System)

The accuracy of the Ramp WIM system can conform to ASTM E 1318-02 Type III "Standard Specifications for Highway Weigh-in-Motion (WIM) Systems with user Requirements and Test Methods" performance requirements for a Type III system. Calibration and accuracy tests shall be performed as specified below. The contractor shall ensure the roadway meets the requirements of Section 6 of ASTM E 1318-02. The WIM system shall be provided with a roadside cabinet to house the WIM electronics and/or the WIM computer and its peripherals. The WIM computer and its peripherals may optionally be installed inside the Scale Building. As commercial vehicles enter the weigh station exit ramp at low to medium speeds (10 to 40 mph), the sorter system will continuously and automatically collect truck information including overheight, speed, gross vehicle weights, axle weights, axle spacing, axle groups, and axle imbalances. From this data, the WIM System will determine whether the vehicle is compliant. (International, Ramp, 2007)

All vehicle information, including violation information, will be determined in real time and shall be displayed on the scale house operator console. The system will function under either manual or automatic control. Under automatic control, the compliance system will automatically

direct a suspected violator to the static weigh scales and compliant violators to exit the station. A manual console may be used to override the system and will allow the operator to direct all vehicles to either the scale or bypass lanes. The WIM computer will not be able to direct vehicles according to vehicle information collected in this mode, but will continue to display vehicle information to the operator. The system will have the ability to track the suspect violators using in-road inductive loops while on route to the static scales. (International, Ramp, 2007)

The manual Console will provide manual control to the Weigh Station for the operation of the Changeable Message Signs, Open/Closed Signs, and the Control Gate. The system should be able to collect continuous data on the vehicles entering the station for statistical analysis. The data collection system should save vehicle information in a compressed format complete with a date and time stamp. As a result, the information can be downloaded and, with the aid of commercially available software, the user will be able to generate reports based on user inputs. (International, Ramp, 2007)

1.2.9 Virtual WIM Station

The system as proposed consists of a Weigh in Motion (WIM) truck monitoring system and an image capture system in one (1) or two (2) lanes. A one lane station is shown in Figure 5.0. The WIM system includes integrated side firing video capture systems (and optionally a License Plate Reader System). These systems will communicate truck data to a secure web address where this information can be easily accessed by authorized personnel. The web based system makes it possible to perform real time monitoring of passing vehicles. It will provide visual records in order to plan and enact additional law enforcement activities targeting overloaded vehicles. (International, Virtual, 2007)

Figure 1.5 – One Lane Virtual Weigh Station (International, Virtual, 2007)

International Road Dynamics, Inc. (IRD) proposes its Bending Plate Weigh-In-Motion Scales. These highly reliable and accurate scales have been used throughout the world and are one of IRD's leading WIM Scales. An advantage of the Bending-Plate scales is that they are mounted in a frame (not directly into the road), and therefore, they are not as affected by the condition of the roadway. Accuracy of the Bending-Plate scales meets ASTM 1318-02 Type I accuracy. (International, Virtual, 2007) Type I WIM Scales are defined as having a functional performance of ± 10% tolerance for 95% probability of conformity. (American, 2002) Alternately, IRD can provide systems using Single-Load Cell (SLC) scales. SLC scales are the most accurate WIM scales available and meet ASTM 1318-02 Type III accuracy. A third option

for in-road technologies is Quartz sensors which typically meet ASTM 1318-02 Type I accuracy similar to Bending-Plate scales. (International, Virtual, 2007)

1.2.10 Additional Literature

In December of 1997, the Federal Highway Administration (FHWA) published a handbook of practical advice for users of weigh-in-motion (WIM) technology entitled State's Successful Practices Weigh-In-Motion Handbook. States with successful WIM systems were selected using information from the Long Term Pavement Performance (LTPP) Program. The states selected for each WIM system discussed in the Handbook are: California for bending plate, Missouri for piezoelectric sensors, and Oregon for load cell. The discussion was not limited to the three states and, where applicable, successful practices and procedures from other states were introduced. (McCall et al., 1997)

In February of 1987, the Federal Highway Administration (FHWA) published a report concerning a WIM bridge study in the State of Washington. The report documents Washington State's experience with the FHWA's bridge weigh-in-motion system. The system was tested on four concrete bridges (one arched slab, one box girder and two pre-tensioned concrete girders) with moderate to heavy traffic volumes. The system gave reasonable axle gross vehicle weights under idea conditions, but showed major limitations under high volumes. Over the life of the project, mean gross vehicle weight errors for individual trucks ranged between 11 and 18 percent with tandem and single axle weights having high mean errors. Errors for mean population gross vehicle weight estimates averaged two percent. (Hallenbeck, 1987)

1.3 Ongoing Research

While conducting the literature review, several ongoing research projects were found in areas of enforcement screening and bridge weigh-in-motion (BWIM) technology. Although these projects have not yet been completed, the expected results could impact the research documented in this paper and are worth noting.

As part of the National Cooperative Highway Research Program (NCHRP), the Transportation Research Board (TRB) has commissioned a comprehensive survey of all fifty U.S. states to document their traffic data and enforcement screening capabilities. This survey overlaps one of the tasks of this project, essentially collecting data on what type of enforcement systems are in use and what states are using them. The expected documentation of state's traffic enforcement capabilities in the TRB survey would greatly supplement the survey portion of this project. This information was graciously provided by Mr. Rich Quinley, a highly experienced WIM consultant from the state of California (Quinley, About, 2007). Mr. Quinley personally worked on the TRB survey and indicated that additional, detailed information could be found in the final report which is expected to be published next year.

Another project is currently underway in the area of bridge weigh-in-motion (BWIM) systems. Previous studies have been conducted using simulations. (Leming et al., 2002) However, the continued advancement in European BWIM technology has established an interest for field demonstrations of this technology and potential applications in the United States. In this project, a multi-campus team of researchers from the University of Alabama at Birmingham (UAB), the University of Alabama at Tuscaloosa (UA), and the University of Alabama in Huntsville (UAH) intends to evaluate the potential use of BWIM systems in Alabama. During the eighteen month project the Team will work in close collaboration with ALDOT

representatives, worldwide technology experts, the AASHTO/FHWA/TRB WIM task force members, equipment vendors, trucking industry representatives and other identified stakeholders. The BWIM technology will be fully evaluated (limitations, requirements and benefits), a field demonstration of a commercially available BWIM system will be performed, and an international BWIM technology symposium will be conducted. (Research, 2007)

2.0 SURVEY PROCEEDURE

The project began by conducting an initial literature review of overweight truck enforcement and weigh-in-motion systems. General information about the topic as well as standard practices was researched. Using this information, a survey questionnaire was created. Next, a database was created with contact information for the 48 states of the continental United States. From this list, more specific entries were added for each state which participated in the survey. This list of contact information can be found in Appendix C. The participants of the survey questionnaire consisted primarily of law enforcement personnel. Each survey lasted approximately 15 minutes.

After conducting some of the survey questionnaires, it was observed that certain questions were not effective or the answers were unknown by the personnel interviewed. A revised survey was then issued which added some additional questions and removed those previously observed as not effective. The revised survey questionnaire was used for the reminder of the surveys and can be found in Appendix A.

3.0 PRESENTATION AND DISCUSSION OF RESULTS

3.1 Survey Results

A complete list of questions and answers for each available state can be found in Appendix B. The results presented in this section have been sorted by question and the percentages of each answer listed when possible. Answers to questions which were not in comparable terms are listed within the discussion. Trends and patterns of the weight enforcement procedures and technology are discussed with each corresponding question. All questions are listed in order according to the revised survey questionnaire.

Question 1: **Do you use fixed weigh stations?**

38 of 38 States Responded:

- **95% Said Yes**
- **5% Said No**

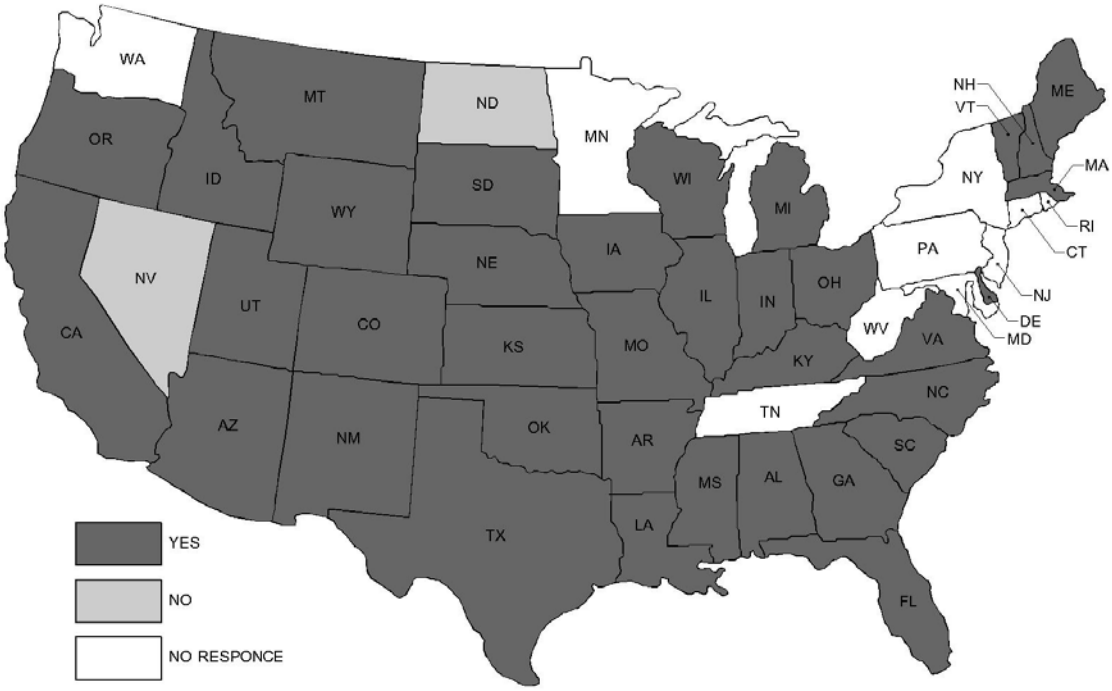

Figure 3.0 – Question 1: Do you use fixed weigh stations?

Most of the states surveyed utilize some type of fixed weigh station, including Points of Entry (POE). Many states commented that traditional weigh stations (i. e. – those without WIM systems) were not highly effective for weight enforcement. The states which did not utilize fixed weigh stations also did not utilized WIM systems.

Question 1a: **How many weigh stations do you have?**

35 of 38 States Responded:

- **40% Said Less than 10**
- **40% Said 10 to 20**
- **20% Said Greater than 20**

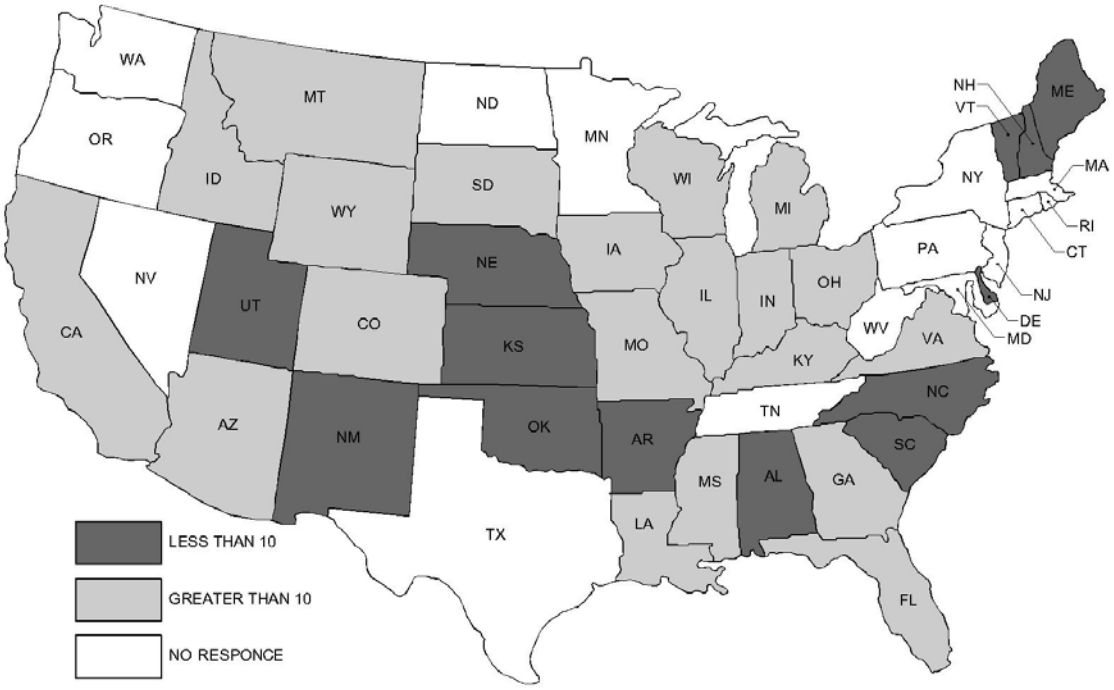

Figure 3.1 – Question 1a: How many weigh stations do you have?

Officers from the Oklahoma Department of Public Safety have reported that the state has five fixed weigh stations which operate from 8:00am to 4:30pm. From personal observations, some of these stations are consistently not open during these listed hours. In the case of Oklahoma, stations are operated by the Oklahoma Corporation Commission (OCC) and law enforcement

officers may not necessarily be familiar with current operational policies. As previously stated, most of the survey participants were law enforcement personnel and therefore the information provided may not be an accurate assessment of the states actual capabilities. Also, these percentages refer only to the quantity of fixed weigh stations and do not take into account land area or miles of highway per state.

Question 1b: **How many trucks pass through each weigh station?**

Responses could not be expressed in comparable terms. Refer to Appendix B for original data.

Question 1c: **What percentage of trucks weighed at weigh stations are overloaded?**

12 of 38 States Responded:

- **41% Said 0% to 5% of Trucks Weighed were Overloaded**
- **25% Said 5% to 10% of Trucks Weighed were Overloaded**
- **17% Said 10% to 15% of Trucks Weighed were Overloaded**
- **0% Said 15% to 20% of Trucks Weighed were Overloaded**
- **17% Said 20% to 25% of Trucks Weighed were Overloaded**

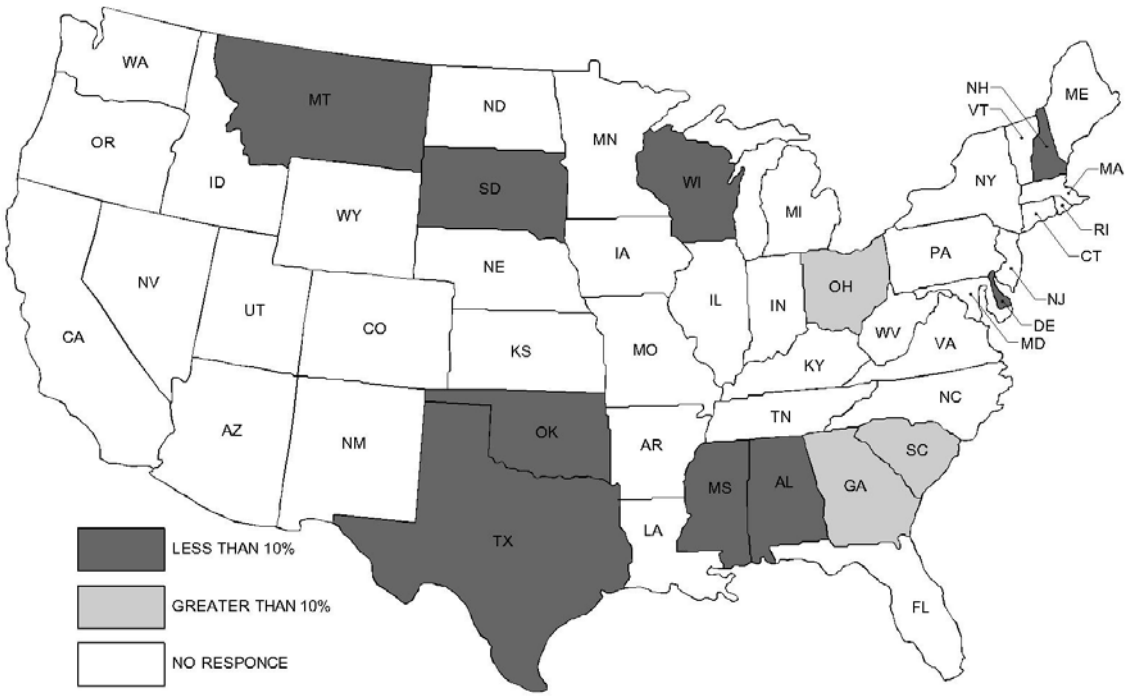

Figure 3.2 – Question 1c: What percentage of trucks weighed at weigh stations are overloaded?

These percentages do not distinguish between traditional fixed weigh stations (i.e. – stations without WIM systems) and those which incorporate WIM systems (i.e. – Mainline or Ramp WIM systems). Stations which incorporate WIM Systems logically tend to have higher percentage of overloaded trucks per truck weighed.

Question 1d: **What percentage of overloaded trucks received citations?**

10 of 38 States Responded:

- **10% Said 0% to 5% of Overloaded Trucks received Citations**
- **20% Said 50% to 55% of Overloaded Trucks received Citations**
- **70% Said 95% to 100% of Overloaded Trucks received Citations**

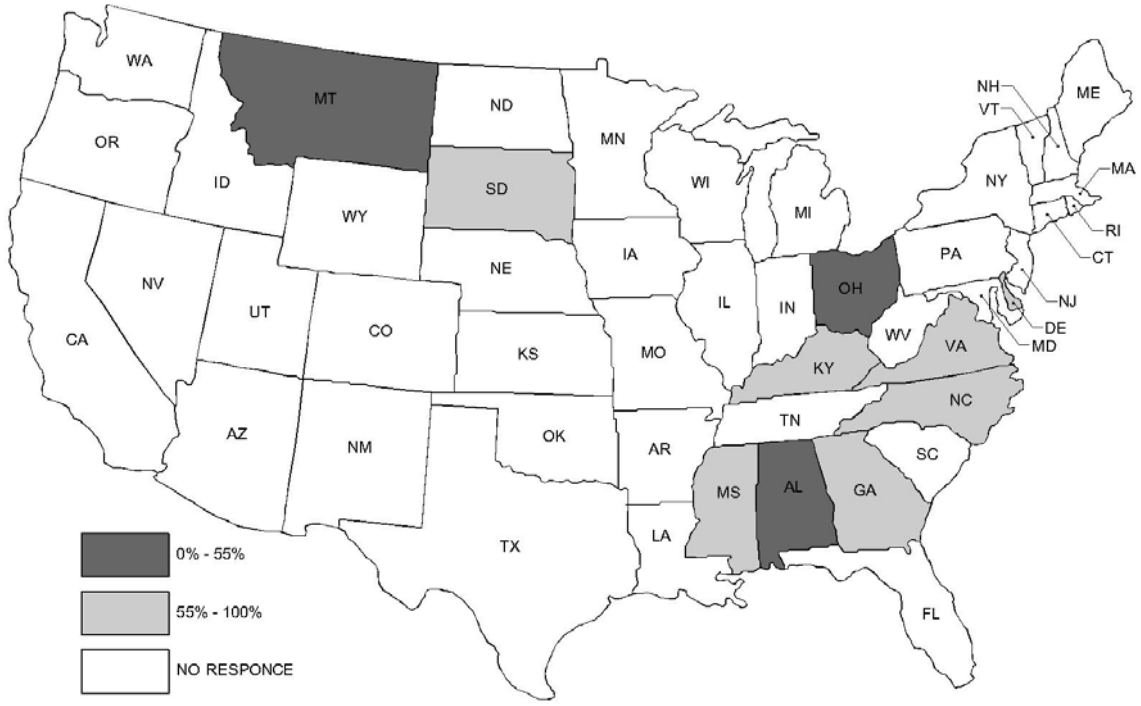

Figure 3.3 – Question 1d: What percentage of overloaded trucks received citations?

These are the percentage of total, known overloaded trucks which receive citations, not the percentage of overloaded trucks which receive citations from fixed weigh stations.

Question 1e: **Do you perform Motor Carrier Safety Assistance Program (MCSAP) inspections at your weigh stations?**

19 of 38 States Responded:

- **100% Said Yes**
- **0% Said No**

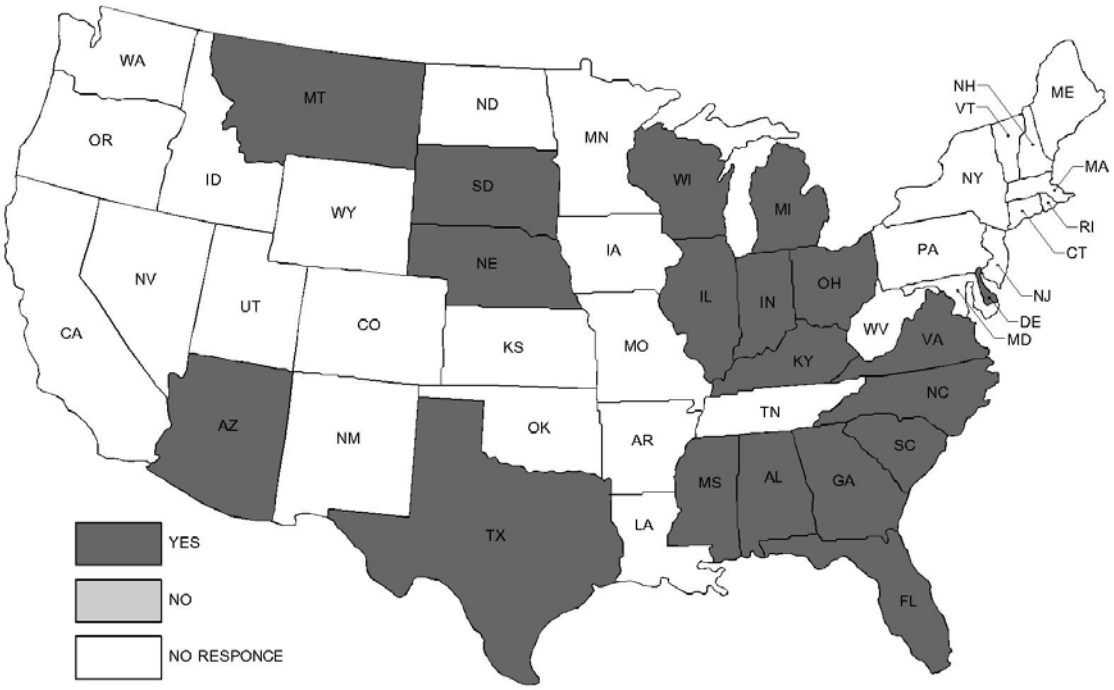

Figure 3.4 – Question 1e: Do you perform MCSAP Inspections?

The MCSAP is a Federal grant program that provides financial assistance to States to reduce the number and severity of crashes and hazardous materials incidents involving commercial motor vehicles (CMV). The goal of the MCSAP is to reduce CMV-involved crashes, fatalities, and injuries through consistent, uniform, and effective CMV safety programs. (Federal, Motor, 2007)

Question 2: **Do you use mobile enforcement?**

38 of 38 States Responded:

- **100% Said Yes**
- **0% Said No**

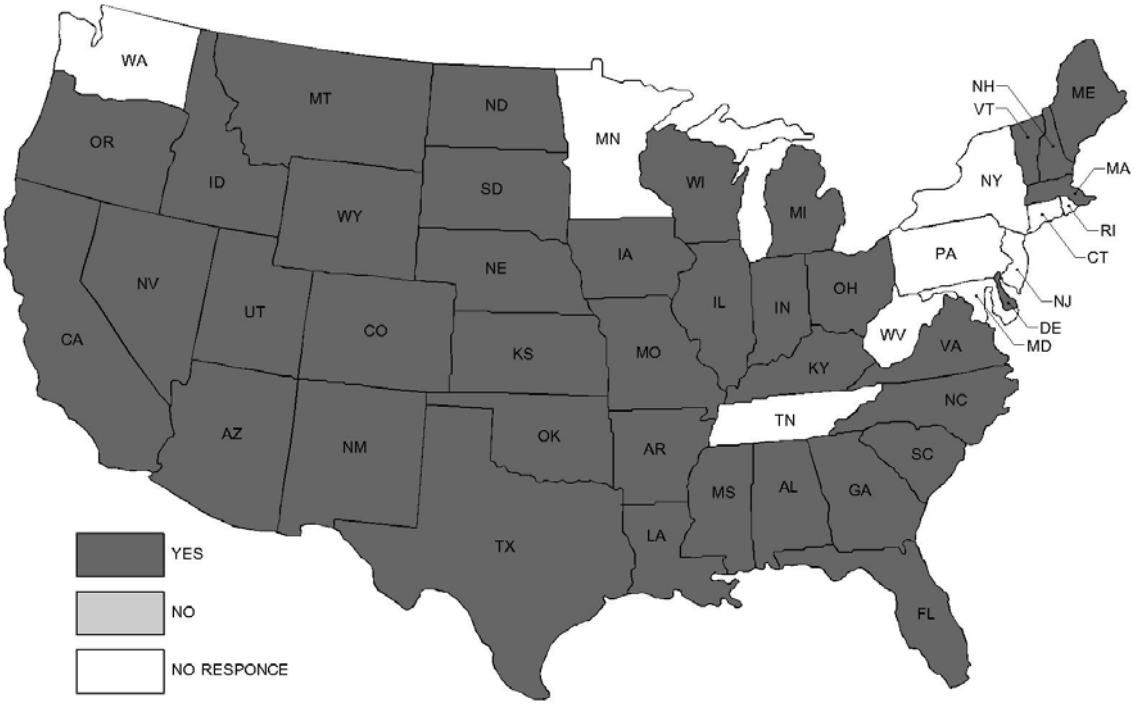

Figure 3.5 – Question 2: Do you use mobile enforcement?

All states surveyed commented that mobile enforcement was one of the most effective methods for weight enforcement.

Question 2a: **How many patrol units are equipped with portable scales?**

Responses could not be expressed in comparable terms. Refer to Appendix B for original data.

Question 2b: **What percentage of trucks weighed with mobile scales are overloaded?**

12 of 38 States Responded:

- **25% Said 0% to 25% of Trucks Weighed were Overloaded**
- **25% Said 25% to 50% of Trucks Weighed were Overloaded**
- **33% Said 50% to 75% of Trucks Weighed were Overloaded**
- **17% Said 75% to 100% of Trucks Weighed were Overloaded**

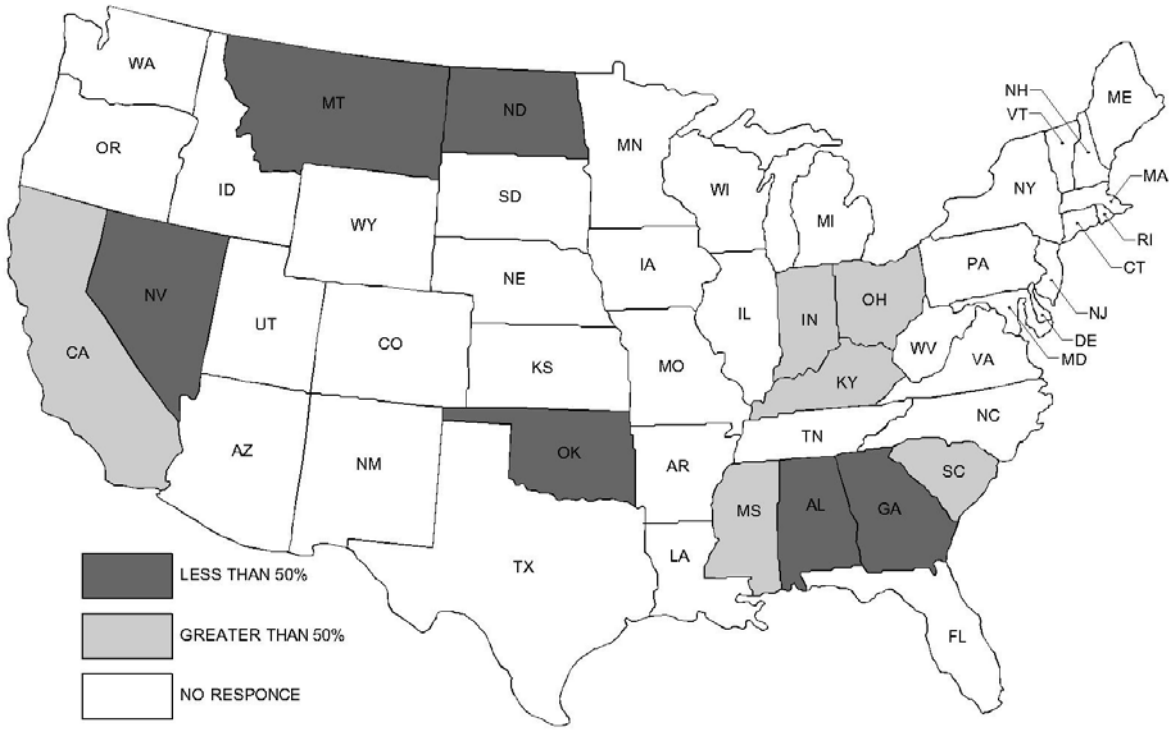

Figure 3.6 – Question 2b: What percentage of trucks weighed with are overloaded?

These percentages can be affected by the level of establishment on the enforcement system. Over time, systems known to catch a large percentage of overweight vehicles tend to act more as a deterrent.

Question 2c: **Does your state have a designated truck enforcement unit?**

Responses could not be expressed in comparable terms. Refer to Appendix B for original data.

Question 2d: **Is more than one agency involved in mobile enforcement?**

19 of 38 States Responded:

- **16% Said Yes**
- **84% Said No**

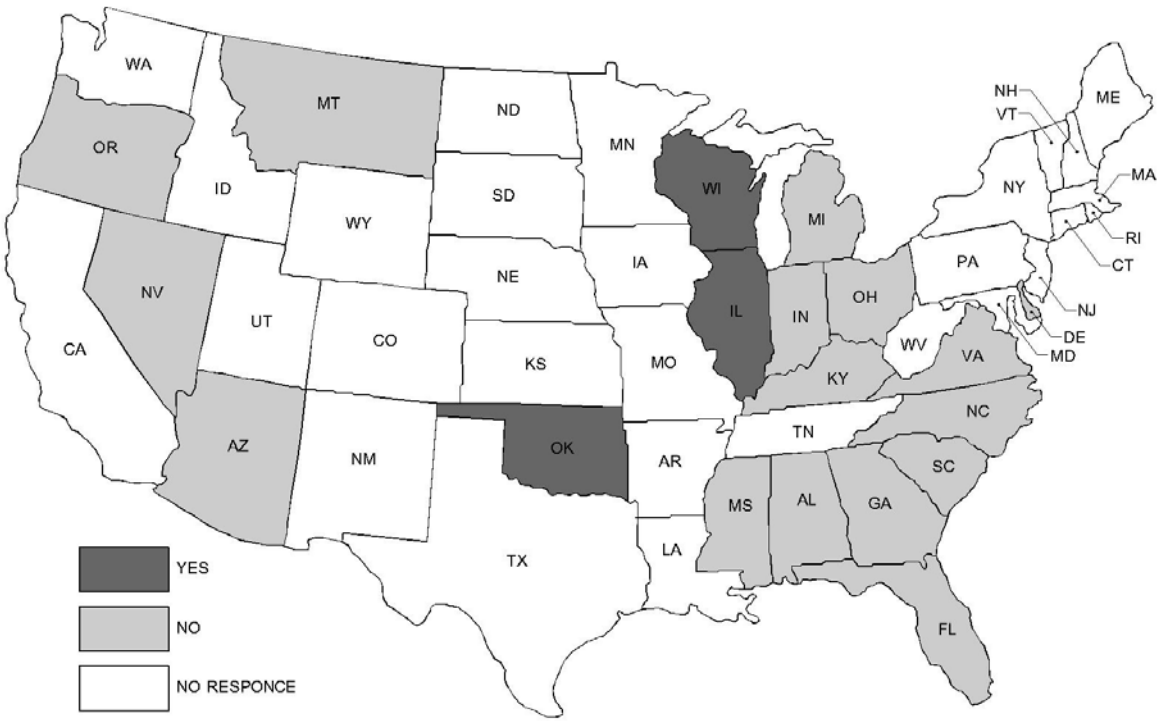

Figure 3.7 – Question 2d: Is more than one agency involved in mobile enforcement?

Some states enforce their commercial vehicle limit laws with both state troopers in the Department of Public Safety and patrol units within the Department of Transportation.

Question 2 e: **Is the same agency that operates weigh stations responsible for mobile enforcement?**

20 of 38 States Responded:

- **95% Said Yes**
- **5% Said No**

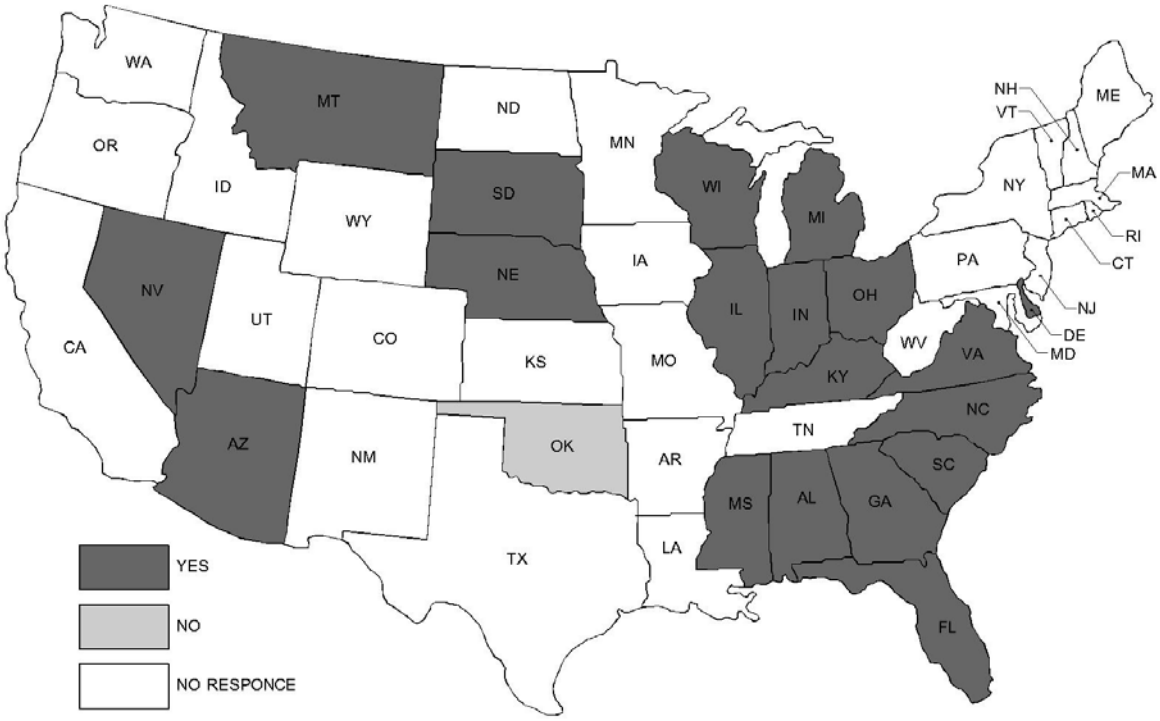

Figure 3.8 – Question 2e: Is the same agency that operates weigh stations responsible for mobile enforcement?

For example, the Oklahoma Department of Transportation owns the fixed weigh stations but they are operated by the Oklahoma Corporation Commission.

Question 3: **Does your state have weigh-in-motion (WIM) systems?**

31 of 38 States Responded:

- **90% Said Yes**
- **10% Said No**

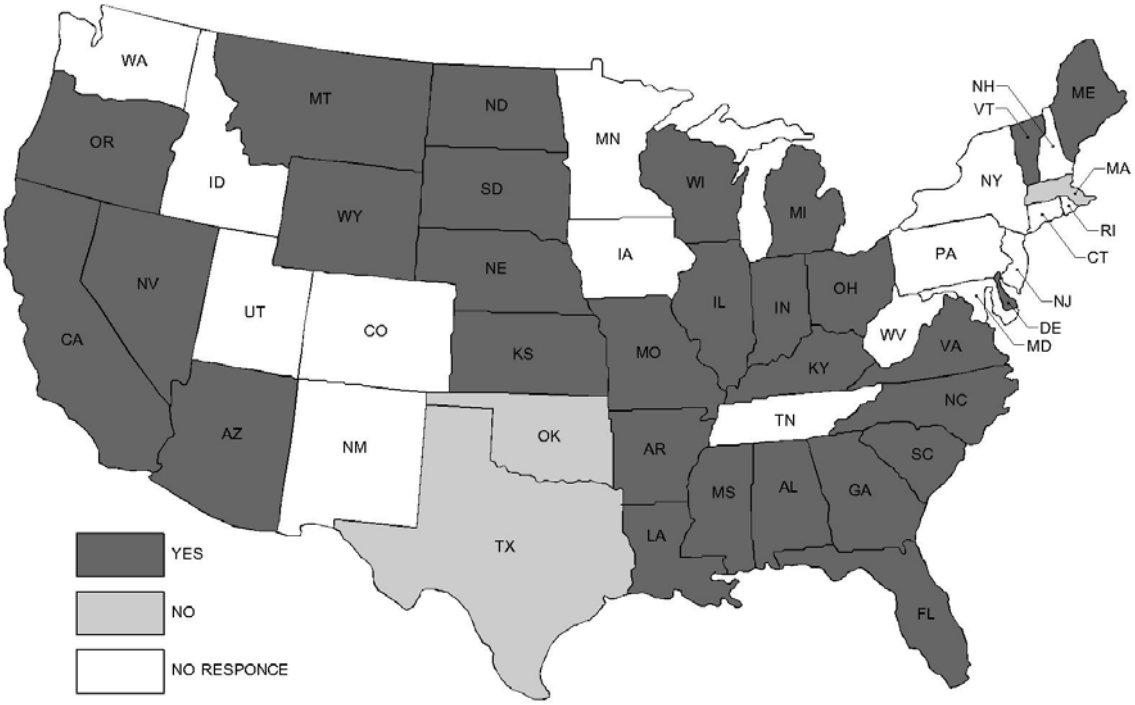

Figure 3.9 – Question 3: Does your state have weigh-in-motion (WIM) systems?

These percentages include Mainline WIM, Ramp WIM and Virtual WIM Station systems.

Question 3a: **Does your weigh station use mainline WIM's?**

21 of 38 States Responded:

- **71% Said Yes**
- **29% Said No**

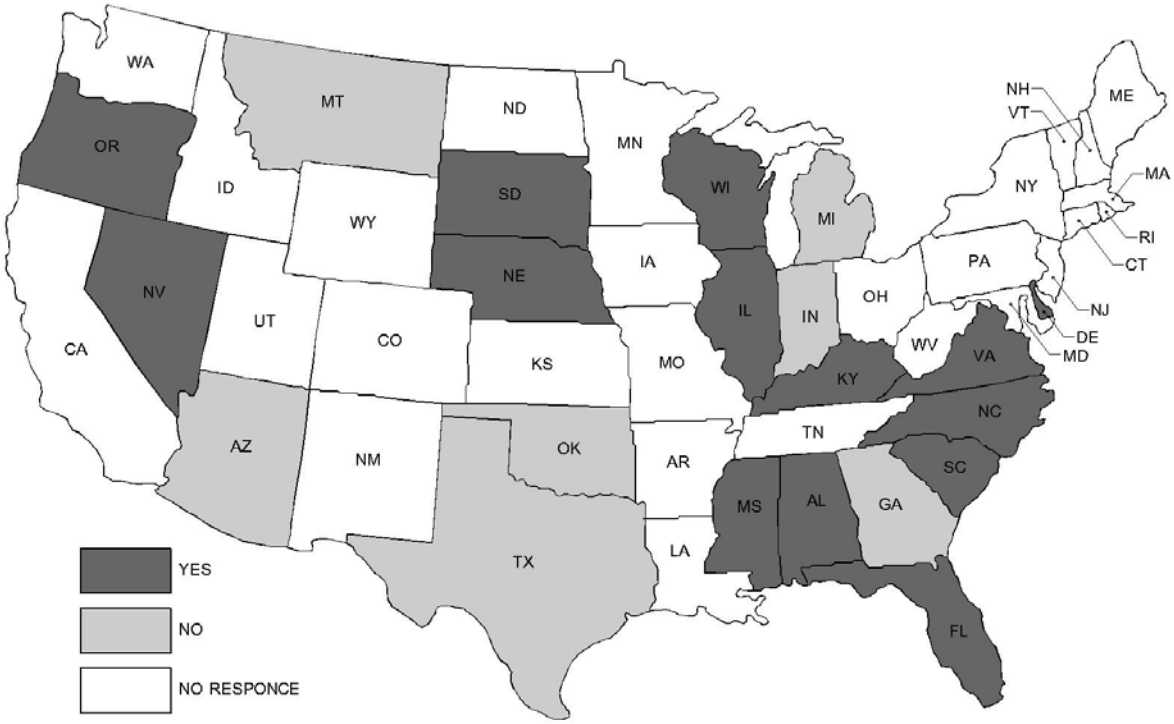

Figure 3.10 – Question 3a: Does your weigh station use mainline WIM's?

These percentages do not account for the am ount of stations equipped with m ainline W IM systems. A description of mainline WIM systems can be found in Section 1.2.7 of this report.

Question 3b: **Does your weight station use ramp WIM's?**

21 of 38 States Responded:

- **71% Said Yes**
- **29% Said No**

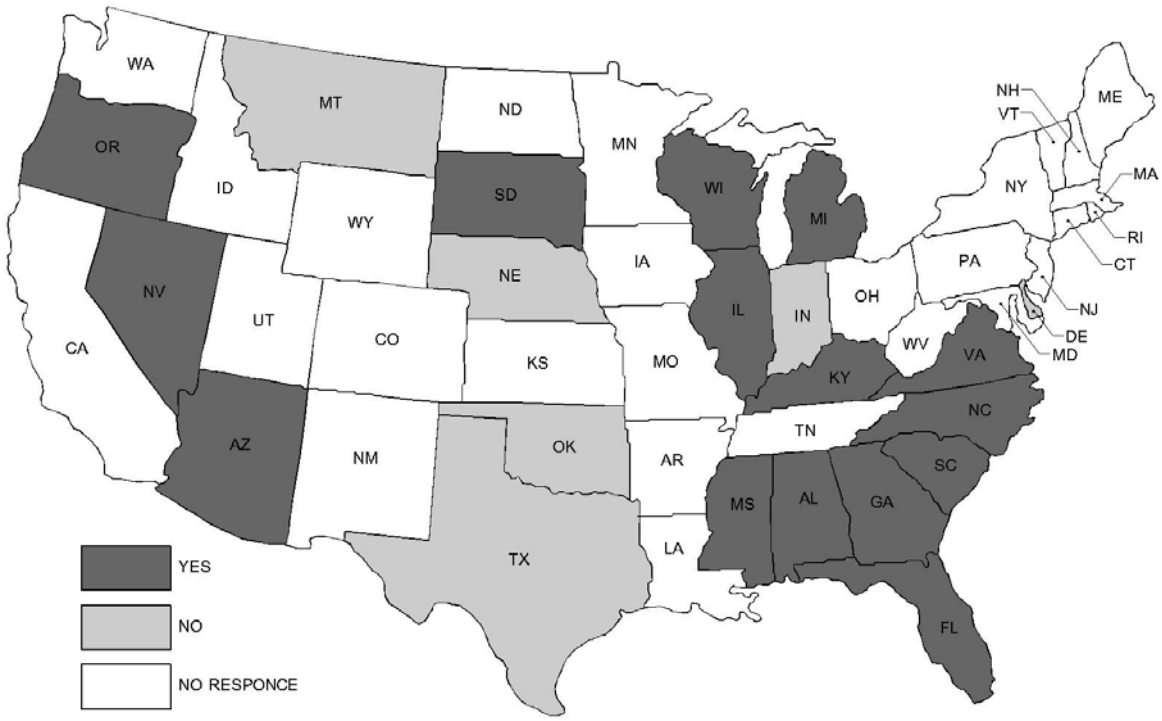

Figure 3.11 – Question 3b: Does your weight station use ramp WIM's?

These percentages do not account for the amount of stations equipped with ramp WIM systems. A description of ramp WIM systems can be found in Section 1.2.8 of this report. These Ramp WIM systems were used before Mainline WIM technology was developed. During the survey, most states indicated that new systems would incorporate only Mainline WIM technology.

Question 3c: **Does your state use virtual enforcement?**

29 of 38 States Responded:

- **55% Said Yes**
- **45% Said No**

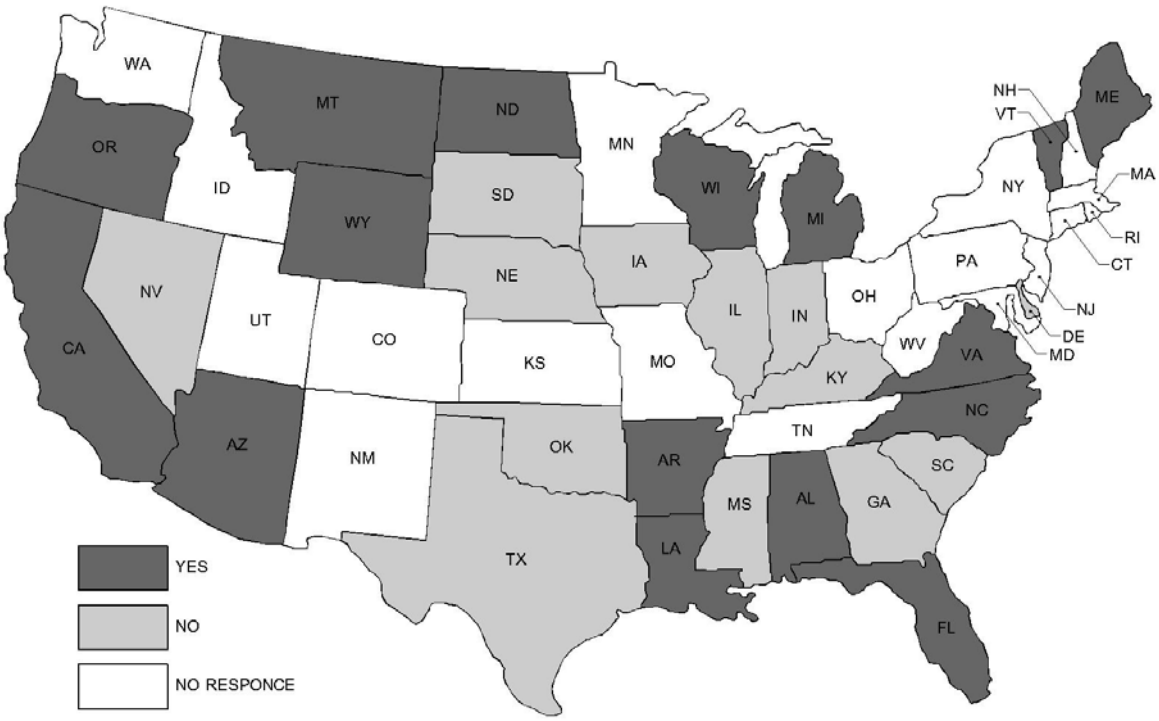

Figure 3.12 – Question 3c: Does your state use virtual enforcement?

These percentages include stations used only for screening in addition to full, virtual enforcement stations. A description of virtual WIM systems can be found in Section 1.2.9 of this report.

Question 4: **Does your state use an electronic bypass system?**

26 of 38 States Responded:

- **81% Said Yes**
- **19% Said No**

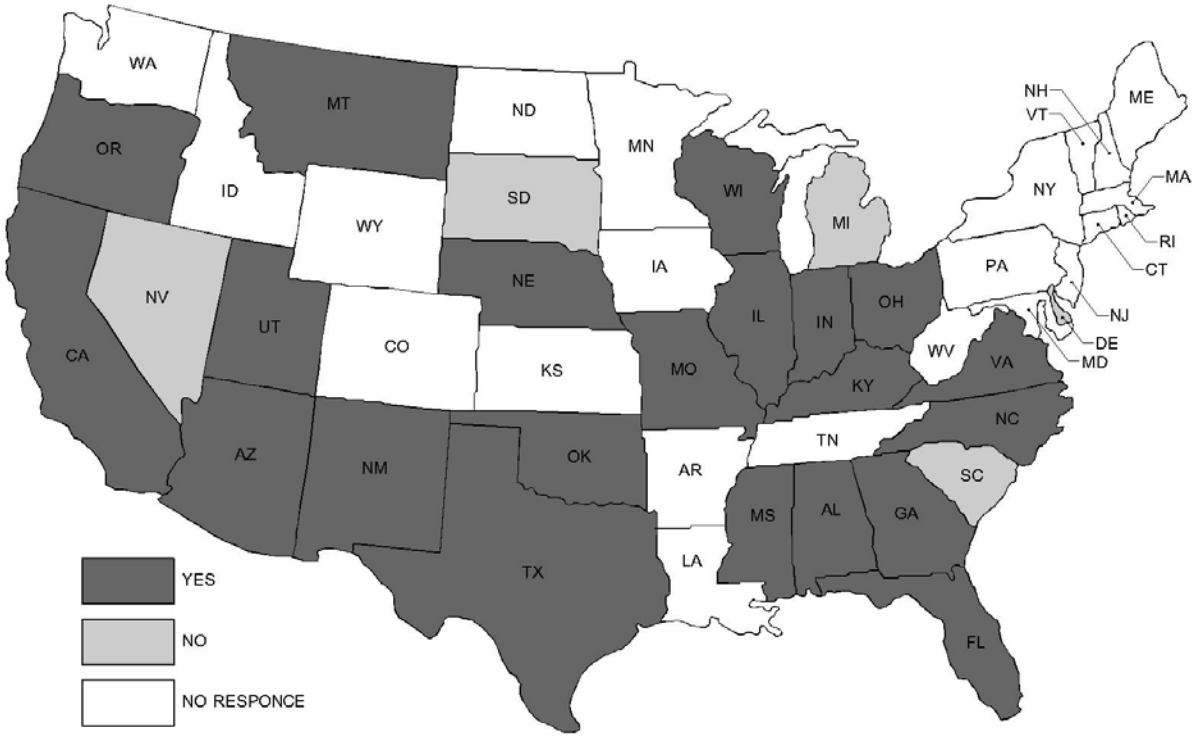

Figure 3.13 – Question 4: Does your state use an electronic bypass system?

Major electronic bypass systems in the United States include Help Inc.'s PrePass, NORPASS, and Oregon's Green Light system. From a technical interoperability perspective, all CVO programs in the US and Canada utilize RFID equipment that is equivalent in function and use. However, there are business operational differences between programs that can limit the cross

use of the technology between programs. The main issue at hand is one of ownership of the transponder portion of the system, and rights to read and use the technology. Presently, under the PrePass program, PrePass owns the transponders giving a right to use of the systems to the carrier partners. This right to use prohibits the carrier from using the transponder in any other programs other than PrePass. Technically, if a PrePass transponder is read in another program, that program must ignore the device and cannot use the device in a two way communications fashion by sending it a message. A previous court case between the PrePass organization and the State of Oregon's Greenlight program did not resolve the issue and ended up undecided. (Taylor, 2007)

However, many States are deploying the technology under a State owned and run program operating under the CVISN program. These States operate under two business premises, namely that the State owns the roadside reading equipment (under PrePass, the PrePass organization owns all roadside equipment, and restricts the State's use of this equipment for the PrePass program only). Second, any transponders issued by the State under a clearance program have data rights residing with the carrier using the transponder, which means that the carrier has the right to decide on what programs the transponder will be used in and can enroll in as many programs as he chooses. (Taylor, 2007) An example of this type of system is utilized by the state of Virginia. Refer to Section 3.3 of this report for more information.

Question 5: **Does your state currently use or plan to use CVIEW?**

16 of 38 States Responded:

- **50% Said Yes**
- **50% Said No**

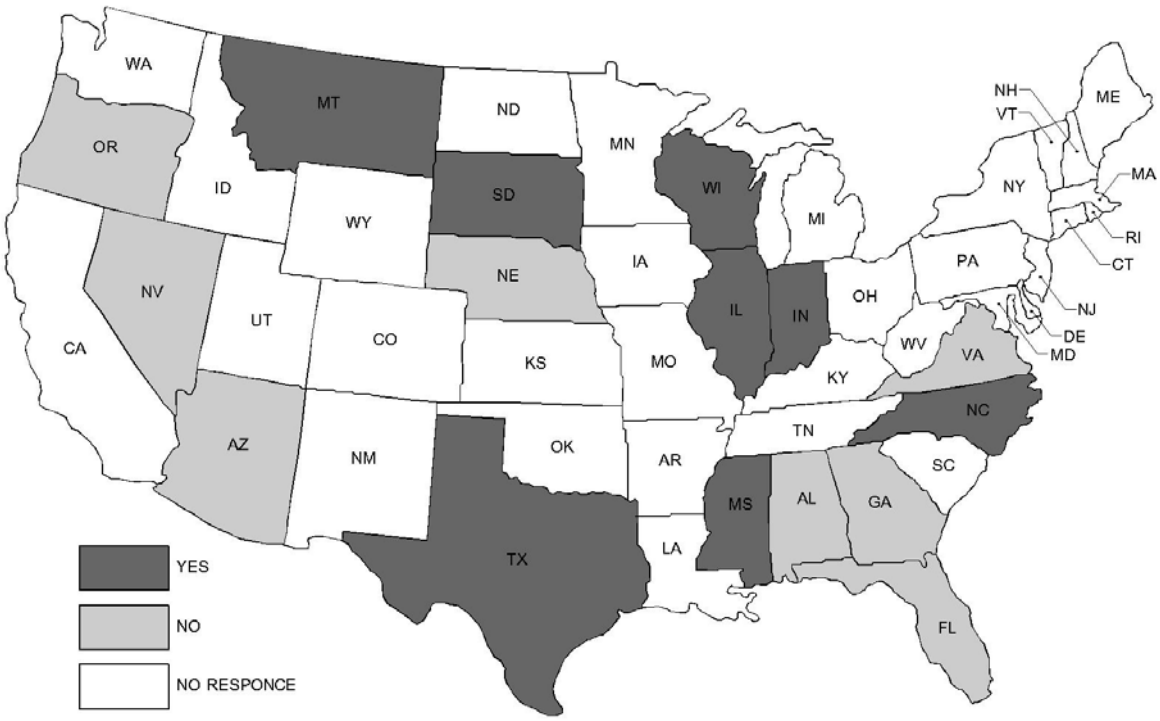

Figure 3.14 – Question 5: Does your state currently use or plan to use CVIEW?

Commercial Vehicle Information Exchange Window (CVIEW) is a state-based electronic data exchange system that provides carrier, vehicle, and driver safety and credential information to fixed and mobile roadside inspection stations, state agencies, and other third party users. (Federal, ITS, 2007) CVIEW is discussed in Section 1.1 of this report.

Question 6: **Does you state currently use or plan to use CVISN?**

16 of 38 States Responded:

- **56% Said Yes**
- **44% Said No**

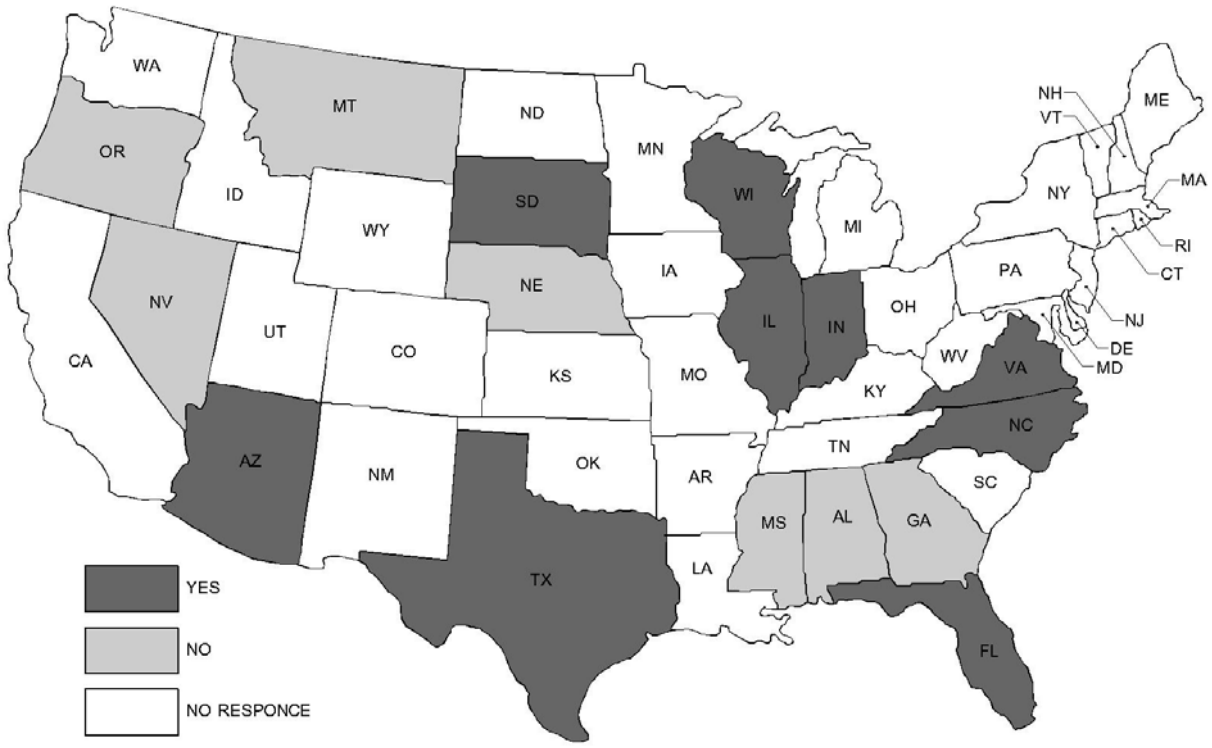

Figure 3.15 – Question 6: Does you state currently use or plan to use CVISN?

The term commercial vehicle information systems and networks (CVISN, pronounced see' vision) refers to the Intelligent Transportation Systems (ITS) information system elements that support Commercial Vehicle Operations (CVO). CVISN includes information systems owned and operated by governments, carriers, and other stakeholders. (Federal, Introduction, 2007)

Question 7: **Has weight enforcement compliancy increased due to these enforcement procedures?**

35 of 38 States Responded:

- **43% Said Yes**
- **11% Said No**
- **46% Were Undecided**

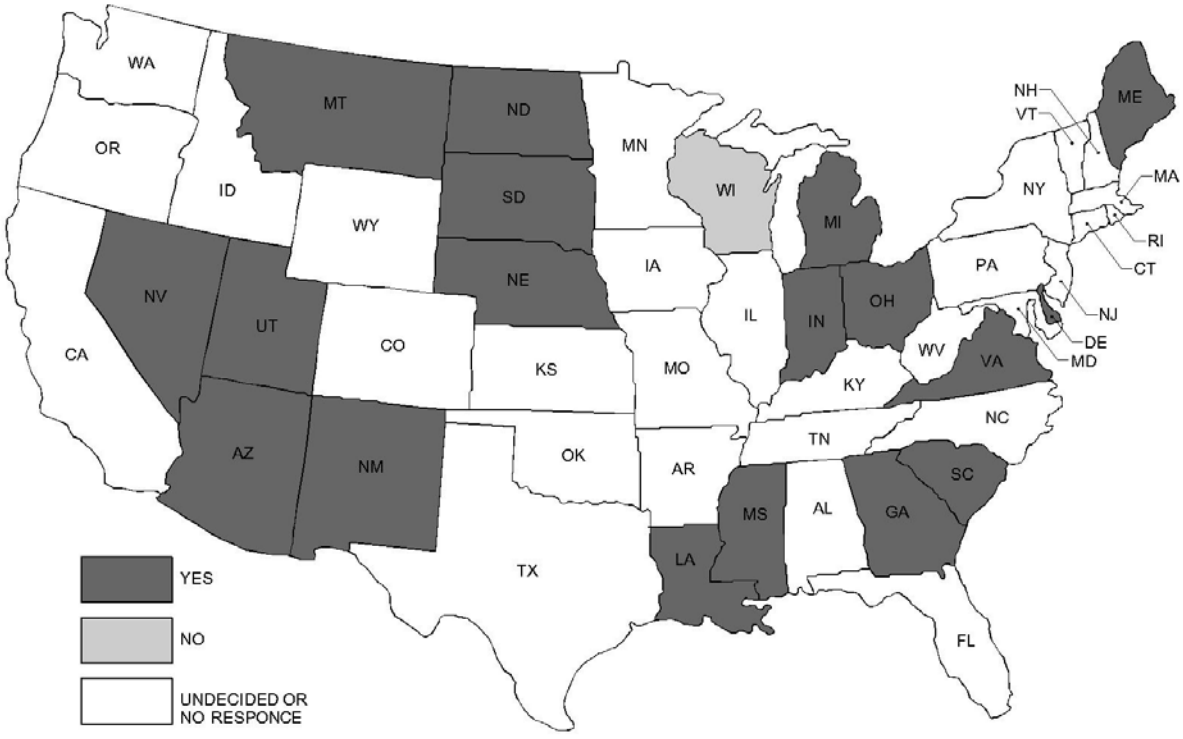

Figure 3.16 – Question 7: Has weight enforcement compliancy increased due to these enforcement procedures?

Some states had not im plemented new enforcem ent procedures for m any years and therefore compared the current, out-dated systems with the previous systems.

Question 8: **What is the percentage of overloaded trucks in-state (intrastate) versus out-of-state (interstate)?**

28 of 38 States Responded:

- **82% Said Overloaded Trucks In-State are Greater than Out-Of-State**
- **7% Said Overloaded Trucks In-State are Equal to Out-Of-State**
- **11% Said Overloaded Trucks In-State are Less than Out-Of-State**

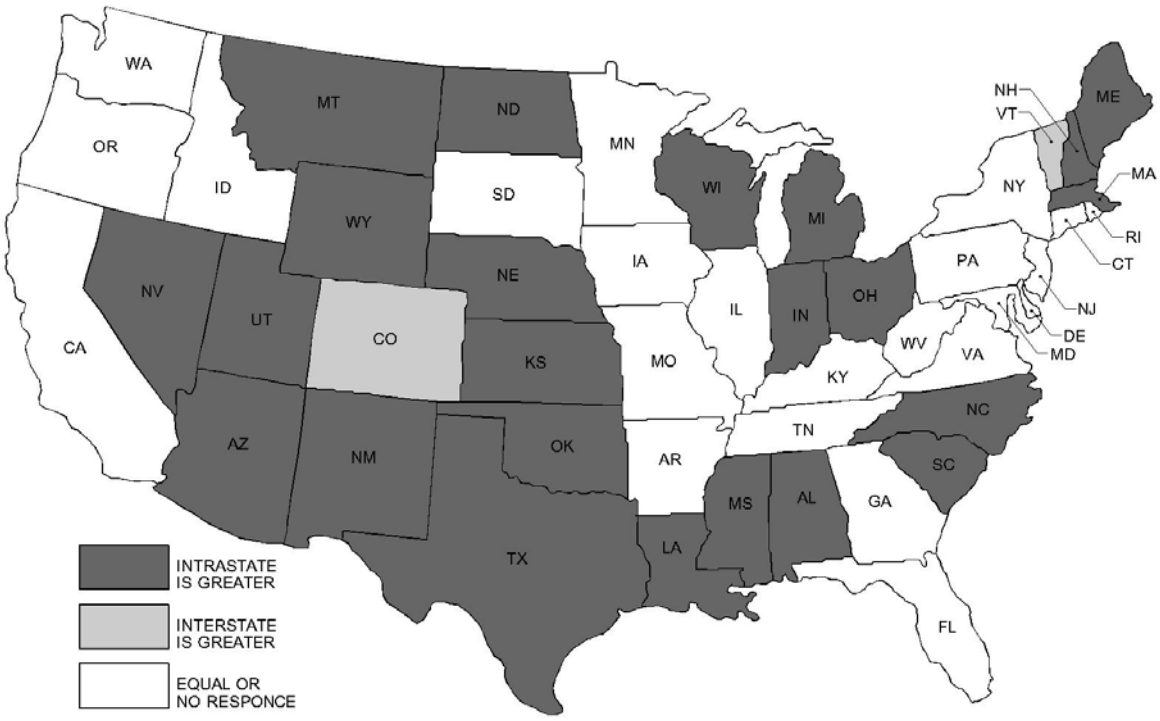

Figure 3.17 – Question 8: What is the percentage of overloaded trucks in-state (intrastate) versus out-of-state (interstate)?

Fixed weigh stations are typically located along state borders which monitor interstate traffic. Intrastate traffic is typically monitored by mobile enforcement units.

The amount of overloaded trucks traveling in-state was reported to be much greater than the amount traveling out-of-state. Here are two current examples of this phenomenon, one causing significant roadway damage. The first example was reported by Dr. Ramseyer concerning the recent bridge deck failure at the bridge on mile marker 14.4 on the Oklahoma Turner Turnpike. The bridge deck was two years old when failure occurred in the right lane of the east bound side as shown in Figure 11.0. The one million dollar, emergency re-design of the bridge deck was just completed during the summer of 2007. The official cause of the failure has not yet been determined however, from preliminary observations at the site, overweight trucks are the most likely cause according to Dr. Ramseyer.

Figure 3.18 – Turner Turnpike Bridge 14.4 Deck Failure

The Second example was also reported by Dr. Ramseyer from the University of Oklahoma concerning a fellow researcher in Louisiana in the spring of 2007. The researcher had been periodically monitoring a bridge with a series of strain gages. At one point in the study, he noticed that his data indicated much larger strains than usual and that they had occurred during hours of 2am and 4am. The next night, he went to the bridge to observe what was causing the unexplained data. To his surprise, a large convoy of trucks carrying construction material passed over the bridge. The next morning, the data from the night before were identical to the previous unexplained data indicating the cause of the unusually large strains.

Question 9: **What types of trucks are most frequently overloaded?**

26 of 38 States Responded:

- **54% Said Trucks with Bulk Material (such as Grain, Sand or Timber)**
- **15% Said Trucks with Construction or Commercial Material**
- **31% Said All Types were Equal**

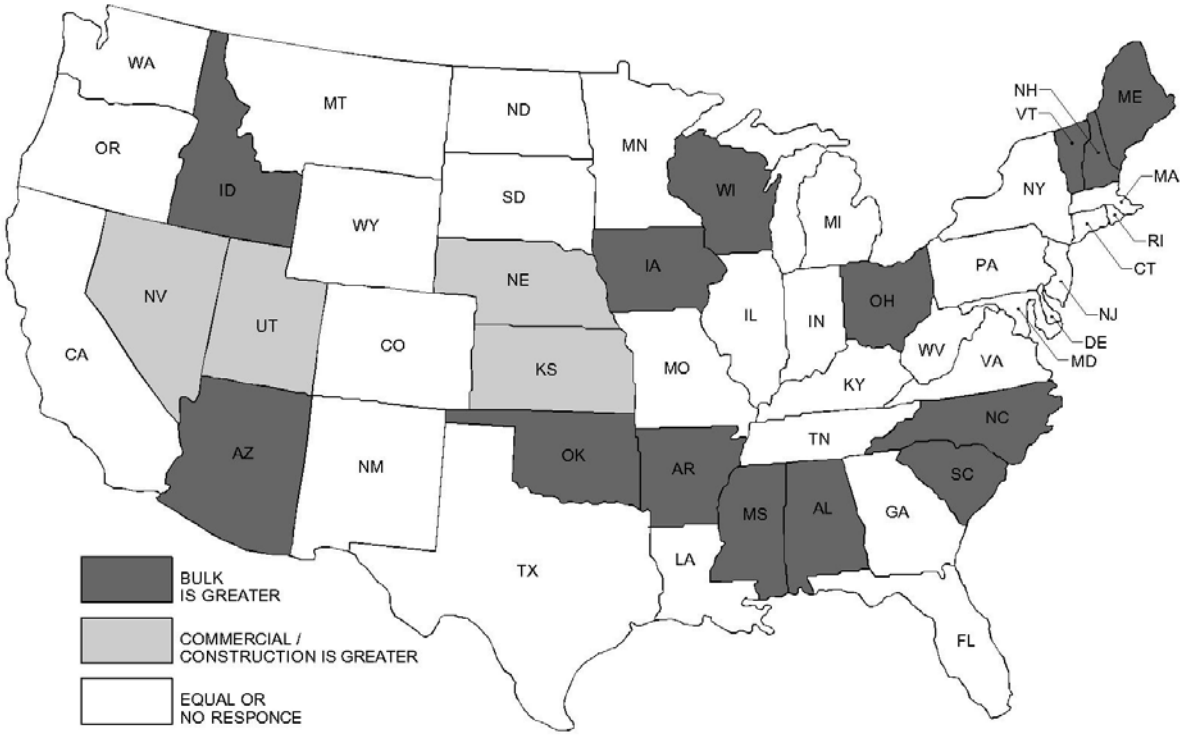

Figure 3.19 – Question 9: What types of trucks are most frequently overloaded?

Of the 24 respondents, 8% said agriculture tr ucks are never issued citations because of political influences.

Addition comments from the survey participants are included in the survey questionnaire data and can be found in Appendix B. Some comments were expressed by multiple participants and will now be discussed. Some states have low intrastate violations because of strict civil liability statutes in their state law. The penalty for an overweight truck involved in an accident is severe enough to cause businesses to keep their trucks within the legal limits. In other states, agricultural trucks, which carry bulk material and which are the easiest to overload, have powerful lobbying influence and are not issued citations by enforcement units. Lastly, most participants agree that no single enforcement system is very efficient alone. Combining three or four systems produce the highest success.

3.2 Vendor Materials

During the literature review, it became apparent that the implementation of WIM technology only made sense as an integrated system. Therefore, vendors were contacted to determine common systems and standard budgetary prices. It was quickly noticed that International Road Dynamics, Inc. (IRD) was a leader in WIM systems, claiming to have supplied 90% of the sites deployed throughout the United States. They were extremely knowledgeable and helpful in explaining standard WIM practices, current budgetary prices, and specific installation requirements necessary for a successful system. IRD typically supplies equipment and supervision as a subcontractor to a local electrical contractor or general contractor. The electrical or general contractor is responsible for physically installing the IRD supplied components. IRD can provide software for existing equipment and interfaces with all major static scales. Currently, they have data collection sites located throughout Oklahoma which are used by our state DOT for traffic information. These sites could easily be integrated

into an enforcement system. Budgetary prices provided by IRD, which are subject to change as the requirements become further defined, are as follows. Budgetary prices include all equipment required for a complete, operational system and IRD on-site supervision, but do not include the physical installation or any roadway construction.

- Mainline WIM Sorter: $350,000
- Ramp WIM Sorter: $300,000
- Virtual Weigh Station (with License Plate Reader option): $150,000

All IRD information was gathered from the company website or provided by IRD representatives Mr. Joe Madek, Mr. Craig Lindsey and Mr. Brian Taylor. Additional information about IRD systems and contact information can be found in Appendix D.

The prices above refer to integrated WIM systems. Individual components may also be purchased and have been referenced in a number of journal papers. (Schultz et al., 2006) For example, in a paper presented at the North American Travel Monitoring Exhibition & Conference (NATMEC) in May of 1998, three basic types of weigh-in-motion technology were considered on the basis of accuracy and cost. The accuracies assumed according to ASTM standards for each technology are outlined below. In addition, some of the key figures regarding the cost of the system are also included. Costs show the direct costs of the inroad equipment only and do not include related conduit work, system electronics, time delays, etc. (Bushman et al., 1998)

Table 2.0 – Summary Table for WIM Technology (Bushman et al., 1998)

Item Piezoelectric	Sensors	Bending Plate	Single Load Cell
Accuracy (95% confidence)	+/- 15%	+/-10%	+/-6%
Expected Life	4 years	6 years	12 years
Initial Installation Cost	$9,000	$12,500	$48,700
Annual Life Cycle Cost	$4,750	$6,400	$8,300

The paper goes on to discuss that there are some of the factors that should be considered and planned for when installing a data collection or WIM system. There is no single system that is right for every application. A careful consideration of the accuracy required, the anticipated road usage, and the convenience of maintenance should be taken into consideration. In addition factors such as lane closure costs, pavement life, and traffic delay costs should also be considered. (Bushman et al., 1998)

3.3 Telephone Interviews

In addition to the survey questionnaire, telephone interviews were conducted in September 2007. Contact information for five state officials who work, or had worked, directly on their state's WIM programs were provided by our main vendor contact, IRD, Inc. These contacts can be found in Appendix C. This information was shared with the University of Oklahoma so that inquiries could be made to state's that are currently using WIM systems provided by IRD. Arizona, Oregon, South Dakota and Virginia were contacted from the provided list. The conversations were used to identify enforcement methodology, discuss WIM system successes and pitfalls, verify actual WIM system accuracies and verify initial and maintenance costs of WIM systems.

Oregon and Virginia currently use Mainline WIM and Ramp WIM together at a few of their fixed weigh stations. Both states agree that there is no reason to group these systems in order to obtain greater accuracy; the accuracy of a system is based on the WIM technology used in the system and the configuration of the system. In each case, Ramp WIM systems had been implemented before Mainline WIM systems were successfully developed. As yearly traffic volumes increased and new WIM systems became available, Mainline WIM systems were retrofitted to the existing facilities and installed alone at new facilities. In Oregon, the weight threshold, or the maximum weight of a vehicle allowed to pass a station, of the Mainline WIM is adjusted by the state DOT. The weight threshold of the Ramp WIM can be adjusted by station operators based on traffic volume. This adjustment by the station operators is critical during high volume times because it allows the heaviest violators to be weighed and prevents the entrance ramp from closing due to back-up. Virginia allows the Mainline WIM systems to be adjusted by station operators to account for traffic fluctuations and only uses the Ramp WIM system for special situations.

All of the states that were interviewed reported that their Mainline WIM systems were using load cell WIM technology. They also reported that the system accuracy was greater than ASTM E 1318-02 Type III WIM, which has a functional performance of $\pm$6% tolerance for 95% probability of conformity (American, 2002). In fact, Oregon stated that their Mainline WIM systems are accurate to 3% - 5% with 100% confidence. According to Virginia, it is also important for law enforcement personnel to trust the WIM system. This is accomplished by consistent, highly accurate systems, such as their Mainline WIM system.

All states were asked about the initial cost and the annual maintenance costs for their WIM systems. Arizona stated they budget approximately $300,000 to $500,000 for new

Mainline WIM systems. Oregon stated that they budget approximately $375,000 for new Mainline WIM systems. These are consistent with the general estimate of $350,000 provided by IRD, Inc. (Refer Section 3.2) All of the states reported that they have some type of maintenance agreement with IRD which is based on either an annual fee or on a per job fee. These agreements usually cover all repairs and updates to the systems. South Dakota stated that their annual maintenance could cost approximately $4,000 to $24,000. Arizona stated that their annual maintenance could cost approximately $20,000 per site.

Each state was also asked about their electronic bypass system. The three major systems in the United States are Help Inc.'s Prepass, NORPASS, and Oregon's Green Light system. As previously stated (Refer Question 4 discussion in Section 3.1 on this report), Prepass retains ownership of their carrier's transponders while NORPASS and Oregon's Green Light system requires their carriers to purchase their own transponders. Because the function and use of all transponders are standard across the United States and Canada, these systems send and receive information in the same way. The difference lies in the proprietary nature of the information provided through the Prepass system. Currently, Arizona uses the Prepass system and their transponder readers were provided by Prepass meaning they only recognize Prepass carriers. Arizona voiced strong frustration, as did many states during the survey questionnaire, with the Prepass system because it restricts access to their carrier information by the state. Virginia, in comparison, also uses the Prepass system but has the capability to add other systems, such as NORPASS, in future because it the state owns the transponder readers. Virginia's reader system keeps each electronic bypass system's information separate and uses the federal CVISN program for vehicle verification. Oregon's Green Light system also uses the federal CVISN program for vehicle verification, but requires all carriers to register with their state for a nominal fee.

Oregon's system was developed over a six year period at Oregon State University in conjunction with Oregon DOT. They highly encourage states to develop their own electronic bypass system and are willing to offer technical assistance based on their experience.

This aforementioned information was taken into consideration when drawing conclusions and making recommendations.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this study, the following combination of technology and procedures are recommended to increase the enforcement of Oklahoma's size and weight limits currently in Oklahoma Law. These recommendations are listed in order of priority and intended to be implemented sequentially as funding allows. Recommendations are given with the conclusion that Oklahoma should update their overweight vehicle compliance program based on a vehicle weight criterion. This means that vehicles whose weight, either gross or axel, exceeds a defined threshold should enter a weigh station to be legally weighed on a static stale. Stations should have the ability to adjust the weight threshold and periodically direct vehicles into the station who have not exceeded the threshold for the purposes of random screenings and WIM accuracy validation. Over time, as the system develops, the program can be modified to include both vehicle weight and vehicle safety criteria. A vehicle safety criterion is used to direct vehicles into the weigh stations whose credentials could not be verified or that do not have transponders. Law enforcement personnel and/or weigh station staff would be able to personally review the vehicle credentials as well as visually and manually inspect the vehicle itself.

The Oklahoma Department of Transportation has established ten Port of Entry (POE) facilities as priorities for construction based on an initial review of a POE Study conducted by

Cobb Engineering Company. (Fuller, 2007) This report, which was released in August 2007, will hereafter be called the Cobb Report. Table 3.0 lists information for each location including the servicing highway, the direction of traffic to be monitored, the county of the facility, a nearby town to the facility, the 2006 truck count data and the projected 2031 truck count data. Figure 4.0 shows the approximate location of the proposed POE facilities.

Table 3.0 – Information for the Proposed POE Facilities (Fuller, 2007)

Site	Highway	Direction*	County	Nearby Town	Truck Count 2006	Truck Count 2031 (projected)
1	I-40	EB	Beckham	Texola / Scyre	6,223	13,034
2 I-3	5	NB	Love	Thackerville	5,850	12,258
3	I-44	WB (OTA)	Ottawa	Miami	6,210	13,020
4 I-4	0	WB	Sequoyah	Sallisaw	5,680	11,920
5	I-69 / I-75	NB B	ryan	Durant	4,818	10,098
6	I-35	SB	Kay	Blackwell	3,650	7,344
7	US-271	NB	Choctaw	Hugo	2,205	4,620
8	US-54	SB	Texas	Guymon	1,485	3,132
9	US-287	SB	Cimarron	Boise	1,612	3,440
10	I-44	EB	Cotton	Lawton	1,017	2,133
*Abbr.: North Bound (NB), East Bound (EB), South Bound (SB), West Bound (WB)						

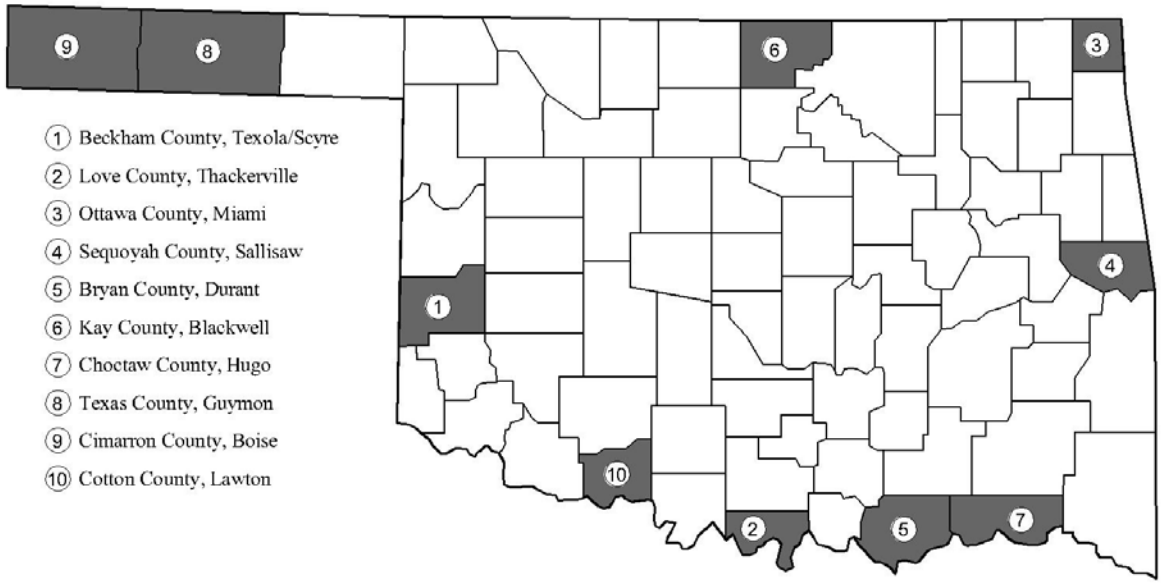

Figure 4.0 – Approximate Location of the Proposed POE Facilities

The Cobb Report contains preliminary, detailed cost estimates for each of the proposed POE facilities. These estimates range from approximately $6.1 million to $7.2 million. Some details of the estimates have been evaluated by The University of Oklahoma (OU) to verify the costs proposed by the Cobb Report. OU has prepared an estimate based on the Cobb Report estimates for the purposes of comparison. The complete, detailed estimates can be found in Appendix G. The estimate provided by OU is based on an average of the Cobb Report estimates for the three recommended sites listed in Recommendation One below. The average of the Cobb Report estimates was approximately $6.4 million. A summary of the estimates from the Cobb Report and OU can be found in Table 4.0.

Table 4.0 – Summary of POE Facility Cost Estimates

Division	Average Cost Estimate (Cobb Report)	Percent of Total Estimate (Cobb Report)	Cost Estimate (OU)	Percent of Total Estimate (OU)
1) RIGHT-OF-WAY	$ 90,000.00	1.6%	$ 90,000.00	2.0%
2) SITE PREPARATION	$ 2,960,000.00	53.5%	$ 2,400,000.00	53.5%
3) UTILITIES AND DRAINAGE	$ 30,000.00	0.5%	$ 30,000.00	0.7%
4) FACILITIES	$ 1,690,000.00	30.6%	$ 930,000.00	20.7%
5) LIGHTING AND SIGNAGE	$ 380,000.00	6.9%	$ 130,000.00	2.9%
6) COMMUNICATIONS AND SECURITY	$ 20,000.00	0.4%	$ 20,000.00	0.4%
7) SCALES AND EQUIPMENT	$ 130,000.00	2.4%	$ 660,000.00	14.7%
8) MISCELLANEOUS	$ 230,000.00	4.2%	$ 230,000.00	5.1%
TOTAL	**$ 5,530,000.00**	100.0%	**$ 4,490,000.00**	100.0%
TOTAL WITH 15% CONTINGENCY	**$ 6,360,000.00**		**$ 5,160,000.00**	

Discrepancies in each division will now be discussed. Equivalent costs between divisions indicate that the division was not evaluated by OU. As expected, Division Two accounted for the greatest percentage of the total cost. However, after reviewing the typical POE layout included in the Cobb Report, it was determined that the pavement area of the site and the length of the entrance ramps were larger than necessary, therefore significantly raised the total cost of the site. Two common POE layouts were provided by IRD, both of which offer a more efficient use of pavement at the site than the layout included in the Cobb Report. These plans can be found in Appendix F. It is recommended to use a site layout similar to the plan from Madison, Wisconsin utilizing lane paths rather than pavement areas. The second plan included in Appendix F mixes lane paths and pavement areas. The layout included in the Cobb Report uses only pavement area, requires approximately 25% more pavement, and is not recommended. The Cobb Report estimate also included a Mainline WIM system and a Ramp WIM system. The Ramp WIM system is a duplicate system which does not provide additional benefit to the site according to many states and industry professionals and it not recommended. When utilizing a

Mainline WIM system only, the length of a typical station entrance ramp can be reduced to approximately 400 feet, thereby reducing the pavement required and thus the cost of the entrance ramps. Division Four was modified to include additional space for highway patrol and medical personnel and to adjust the 2-bay inspection area. Division Five was modified to eliminate the component cost of signage for the WIM system. Division Six lists the static scales and WIM systems as components. It was overwhelmingly clear after conducting the literature review and discussing WIM technology with various states and industry professionals that WIM systems were only successful if designed and operated as an integrated system. As a result, it only made sense to price and purchase these WIM systems as such. The Cobb Report priced the WIM systems as components instead of as a system and therefore, was found to be grossly under budgeted. In addition, the Ramp WIM system was eliminated for reasons previously given.

Recommendation One: It is recommended to construct three POE facilities at Site 1, Site 2 and Site 4. Facilities at these sites are recommended based on traffic count data and should be considered a high priority. Based on the traffic data, it is also highly recommended that a POE facility be constructed at Site 3, but only if it is funded by the Oklahoma Turnpike Authority (OTA). Table 5.0 details the present traffic count at each location and its impact on estimated future revenue, at the present average overweight citation fee of $180. Table 5.0 points out that at the present average overweight citation the revenue generated by the first five possible locations will barely cover yearly operational costs. This recommendation is due to the fact that the site is located on the Turner Turnpike and therefore should not require monies allocated by the Department of Transportation. The POE sites should be similar to the layout shown in Appendix F of Madison, Wisconsin. The facility should contain 3,000 square feet of

additional space for highway patrol and medical personnel. The total cost of each POE facility is approximately $6.0 million.

Table 5.0 – Revenue Summary

Site	Highway	County	Truck Count 2006	Estimated Citations per Year (~15%)	Estimated Revinue per Citation (~$180)	Estimated Capital Cost per Site (~$6.5million)	Percentage of Revinue to Cost
1	I-40	Beckham	6,223	933.45	$168,021	$6,000,000	2.8%
2	I-35	Love	5,850	877.5	$157,950	$6,000,000	2.6%
3	I-44	Ottawa	6,210	931.5	$167,670	$6,000,000	2.8%
4	I-40	Sequoyah	5,680	852	$153,360	$6,000,000	2.6%
5	I-69 / I-75	Brian	4,818	722.7	$130,086	$6,000,000	2.2%
6	I-35	Kay	3,650	547.5	$98,550	$6,000,000	1.6%
7	US-271	Choctaw	2,205	330.75	$59,535	$6,000,000	1.0%
8	US-54	Texas	1,485	222.75	$40,095	$6,000,000	0.7%
9	US-287	Cimarron	1,612	241.8	$43,524	$6,000,000	0.7%
10	I-44	Cotton	1,017	152.55	$27,459	$6,000,000	0.5%

These facilities should only monitor traffic entering the state and should include single lane Mainline WIM systems with load cell technology, which provides an ASTM E1318-02 Type III system and is the highest accuracy currently available. The WIM system should be provided by a single entity to ensure the coordination and integration of the WIM components. A fully operational Mainline WIM system for a single lane of traffic in one direction is approximately $500,000.

The Mainline WIM system should be used as a type of Virtual WIM system and a data collection system during non-operational hours. As a type of Virtual WIM system, mobile enforcement units would be able to monitor the traffic passing the POEs via electronic notification. As a data collection system, POE staff would be able to review overweight vehicle patterns and adjust operational hours accordingly.

The Mainline WIM system should include changeable message signs which can direct vehicles into the station whether or not the vehicle is equipped with a transponder. This would eliminate the need for an electronic bypass system for purposes of vehicle weight verification. The software provided to operate the Mainline WIM system should have the capability to interface with all of the majority of electronic bypass systems operating under the FMCSA Standard protocol. To have this capability, the state would be required to purchase transponder readers which many states have reported to be of nominal cost compared to the Mainline WIM system.

Recommendation Two: Like many states, a large percentage of Oklahoma's overweight vehicle violations are due to intrastate traffic i. e. in state traffic. Because POEs monitor state incoming traffic only, overweight vehicles which originate inside the state would not be screened whether the vehicle remains inside the state or whether the vehicle is exiting the state. It is recommended that data be collected using a bridge WIM system (OU-BWIM) developed at The Donald G. Fears Structural Engineering Laboratory at The University of Oklahoma to identify locations within the state where overweight vehicles most often travel. This data, collected with modular, mobile sensor units attached to a bridge structure, can be used to quickly detect overweight vehicles, locate at-risk bridges and determine the level of required enforcement to prevent or deter such violations. The total estimated cost for a OU-BWIM system is approximately $200,000 for 20 locations, multiple systems will decrease the time to gather data. Approximately seven days are required to gather adequate data for each site.

Recommendation Three: Using the data collected from Recommendation Two, it is recommended to build Virtual WIM stations at critical locations across the state. Virtual WIM stations should be immediately constructed at Site 5, Site 7 and Site 10 and monitor both

directions of traffic. Virtual WIM stations should have a minimum accuracy requirement complying with an ASTM E1318-02 Type I system. A fully operation Virtual WIM station is approximately $200,000. Additional cost may be necessary if repairs to the roadway profile are required at the station location. Virtual WIM stations will provide screening of intrastate traffic and should be used in conjunction with mobile enforcement units.

Recommendation Four: Every state that participated in the surveyed reported that they use law enforcement personnel to monitor overweight vehicles in addition to fixed weigh stations. Mobile enforcement units have the inherent ability to adapt to the changing traffic patterns of overweight vehicles. Currently, Oklahoma has a Commercial Vehicle Enforcement Unit within the Oklahoma Department of Public Safety called Troop S. Troop S has 56 troopers that cover all 77 counties and most of whom are equipped with portable axle scales. Although their primary function is to enforce the Oklahoma's commercial vehicle laws, these troopers have full law enforcement authority and can also be utilized to regulate the speed of highway traffic, including passenger vehicles, assist highway patrol with nearby vehicle accidents, etc.

It is recommended to expand the existing Commercial Vehicle Enforcement Unit in the following ways. First, update the existing trooper's ability to work in conjunction with the Virtual WIM stations. Ensure that all units have at least two sets of portable wheel load scales. These scales can be stored in the truck of a patrol car and are approximately $3,500 per scale. Second, obtain at least 10 portable platform static scales to be used at various "hot spots" across the state in conjunction with OU-BWIM. A single, 11 foot scale is approximately $20,000 per scale. Additional cost may be necessary to mount scales to a trailer, pickup truck, or van. Next, increase the personnel in Troop S by approximately four members per year as required to maintain a reasonable level of enforcement. The new members should not have full law

enforcement authority, but only authority to enforce Oklahoma's commercial vehicle laws. Next, according to an Oklahoma trooper, the state has a straight fee for all overweight vehicles regardless of the amount it was overloaded. He said that the fee is approximately $180, however, county judges can adjust these fees for each county. It is recommended that an increasing gradation system for citations be adopted with a minimum citation value of approximately $760. Table 6.0 provides an estimate of the revenue at this citation value. At this minimum citation value the cost to operate the first four POE locations becomes sustainable.

Table 6.0 – Revenue Summary

Site	Highway	County	Truck Count 2006	Estimated Citations per Year (~15%)	Estimated Revinue per Citation (~$760)	Estimated Capital Cost per Site (~$6.5million)	Percentage of Revinue to Cost
1	I-40	Beckham	6,223	933.45	$709,422	$6,000,000	11.8%
2	I-35	Love	5,850	877.5	$666,900	$6,000,000	11.1%
3	I-44	Ottawa	6,210	931.5	$707,940	$6,000,000	11.8%
4	I-40	Sequoyah	5,680	852	$647,520	$6,000,000	10.8%
5	I-69 / I-75	Brian	4,818	722.7	$549,252	$6,000,000	9.2%
6	I-35	Kay	3,650	547.5	$416,100	$6,000,000	6.9%
7	US-271	Choctaw	2,205	330.75	$251,370	$6,000,000	4.2%
8	US-54	Texas	1,485	222.75	$169,290	$6,000,000	2.8%
9	US-287	Cimarron	1,612	241.8	$183,768	$6,000,000	3.1%
10	I-44	Cotton	1,017	152.55	$115,938	$6,000,000	1.9%

Recommendation Five: Many of Oklahoma's bridges have been declared deficient by federal standards, in fact, Oklahoma has the highest number of deficient bridges in the nation. (Federal Highway, 2004) Deficient bridges are at a greater risk of failure if used by overweight vehicles and overweight trucks have the highest negative impact on bridge conditions. It is recommended that passive monitoring systems developed at The Donald G. Fears Structural Engineering Laboratory at The University of Oklahoma be placed on deficient bridges in the state to provide continuous data of the health of the bridge and of the patterns of overloaded vehicles at that location. The total estimated cost of these strain gage data collection units are

approximately $30,000 per unit. The data collected by these units should be retrieved and reported weekly to Troop S by OU. This information should be used by Troop S to determine where to deploy mobile enforcement units, particularly the portable platform static scales.

Recommendation Six: Using the data collected from Recommendation Two and Three, it is recommended to construct POE facilities at the remaining six proposed sites if they are determined to be cost effective. The sites most likely to be cost effective are Site 5, Site 6, Site 7 and Site 10. Site 8 and Site 9 should be considered a low priority due to the location of the sites and their associated truck counts. The area around Site 8 and Site 9 have many paths which a vehicle can bypass the location easily. Also, the low truck counts may prevent these stations from collecting sufficient revenue to cover operational costs. All six stations should include the same provisions and unit cost estimates as in Recommendation One.

5.0 SUMMARY OF RECOMMENDATIONS

7) **Build Three Incoming POE Facilities (High Priority at Sites 1, 2, 3 and 4)**
   - Build Stations at **Sites 1, 2 and 4**. Build Station at **Site 3** if OTA provides funding. Total Estimated Cost is approx. $6.0 million per Station totaling approx. $19.5 million.
   - Each Station to incorporate a Mainline WIM System with Load Cell Technology. Ramp WIM systems at stations are redundant and not recommended. WIM System to include state owned equipment to interface with electronic bypass systems. Estimated Cost of a fully operational, single lane, one direction Mainline WIM System is approx. $500,000.
   - Stations to include additional space for highway patrol and medical personnel.
   - Station pavement design and layout should be highly efficient to ensure reasonable construction and maintenance costs.

8) **Use OU-BWIM System to Select At-Risk Bridges and Intrastate "Hot Spots"**
   - Total Estimated Cost is approx. $200,000 for 20 Locations.
   - Time required to collect adequate data is approx. seven days per site.

9) **Using Data from Recommendation Two, Build Virtual WIM Stations at Pre-Selected Location from OU-BWIM System**
   - Total Estimated Cost is approx. $200,000 per station.
   - High Priority at Sites 5, 7 and 10 both directions.
   - Virtual WIM Stations monitor Intrastate (In-State) Traffic.

10) **Expand the Existing Commercial Vehicle Enforcement Unit designated Troop S**
   - Obtain 10 portable platform static scales. Total Estimated Cost is approx. $20,000 per 11 foot platform scale totaling approx. $200,000.
   - Increase personnel in Troop S by approx. four members per year as required to maintain a reasonable enforcement level. These new members should be granted legal authority to regulate Oklahoma's commercial vehicle laws only.
   - Adopt an increasing gradation system for citations with minimum approx. of $760

11) **Using Data from Recommendation Two, Install Low Cost, Strain Gage Data Collection Units on Deficient Bridges**
   - Total Estimated Cost is approx. $30,000 per unit. Units developed at OU.
   - Data to be collected and reported to Troop S weekly by OU.
   - Data Collection Units provide continuous, passive monitoring of vehicular loads.

12) **Using Data from Recommendation Two and Three, Build Six POE Facilities if Shown to be Cost Effective**
   - Same provisions and unit cost estimates apply as listed in Recommendation One.
   - Using Data from Recommendation Two, determine if POE stations would be cost effective at Sites 5, 6, 7 and 10.
   - Revenue collections at Sites 8 and 9 may not be sufficient to cover operational costs and therefore should be considered low priority.

6.0 REFERENCES

Al-Kaisy, A., Katz, B., and Rakha, H., "Field Evaluations of Weigh-In-Motion Screenings on Truck Weigh Station Operations.", Proceedings of the IEEE IV2003 Intelligent Vehicles Symposium, Columbus, Ohio, June 74-79.

American Society for Testing and Materials, "Standard Specification for Highway Weigh-In-Motion (WIM) Systems with User Requirements and Test Methods.", Annual Book of ASTM Standards, E 1318-02, West Conshohocken, Pennsylvania.

Avis, J., Harvey, J., Le, T., Lea, R. Lu, Q., Quinley, R., and Redo, D., "Truck Traffic Analysis using Weigh-In-Motion (WIM) Data in California." Institute of Transportation Studies, Pavement Research Center, University of California, Berkeley, Draft June 2002.

Bergan, T., Berthelot, C., and Gardiner, A., "Role of Weigh-in-Motion in Performance-Based Contracts.", International Conference on Weigh in Motion (ICWIM), Orlando, Florida, May 2002.

Bushman, R., and Pratt, A.J., "Weigh-In-Motion Technology – Economics and Performance.", Presented at the North American Travel Monitoring Exhibition & Conference (NATMEC), Charlotte, North Carolina, May 1998.

Federal Highway Administration, "Deficient Bridges by State and Highway System.", United States Department of Transportation, December 2004, http://www.fhwa.dot.gov/bridge/defbr04.htm .

Federal Motor Carrier Safety Administration, "Introduction.", United States Department of Transportation, 2007, http://cvisn.fmcsa.dot.gov/.

Federal Motor Carrier Safety Administration, "ITS/CVO CVISN Glossary.", United States Department of Transportation, December 2007, http://cvisn.fmcsa.dot.gov/default.aspx?PageID=glossv20>.

Federal Motor Carrier Safety Administration, "Motor Carrier Safety Assistance Program.", United States Department of Transportation, 2007, http://www.fmcsa.dot.gov/safety-security/safety-initiatives/mcsap/mcsap.htm.

Hallenbeck, M.E., "Truck Weight Using the FHWA Bridge Weigh-in-Motion (WIM) System.", US Department of Transportation, Federal Highway Administration, February 1987.

International Road Dynamics, Inc., "Single Load Cell Scale.", Installation Manual, 2006.

International Road Dynamics, Inc., "Weigh-in-Motion Mainline Sorting System Specifications.", Draft Specifications, 2007.

International Road Dynamics, Inc., "Weigh-in-Motion Ramp Sorting System Specifications.", Draft Specifications, 2007.

International Road Dynamics, Inc., "Weigh-in-Motion Virtual Weigh Station System Specifications.", Draft Specifications, 2007.

Kishore, A., and Klahinsky, R., "Damage Though Commercial Vehicle Weight Enforcement.", Annual Indian Road (IRC) Session, Calcutta, India, November 2000.

Leming, S.K., and Stalford, H.L., "Bridge Weigh-in-Motion System Development Using Static Truck/Bridge Models.", Proceedings of the 2002 American Control Conference, Anchorage, Alaska, May.

Luskin, D.M., and Walton, C.M, "Effects of Truck Size and Weights on Highway Infrastructure and Operations: A Synthesis Report.", Center for Transportation Research, The University of Texas at Austin, Austin, Texas, March 2001.

McCall, B., and Vodrazka Jr., W. C., "State's Successful Practices Weigh-In-Motion Handbook.", US Department of Transportation, Federal Highway Administration, Travel Monitoring Division, December 1997.

Fuller, John. "Priority Construction of Port of Entry Facilities.", Memorandum to ODOT Director Gary Ridley, Oklahoma Department of Transportation, August 7, 2007.

Quinley, R., "About WIM TECH.", WIM TECH: Weigh-In-Motion Consulting Services, WIM TECH Download Directory, http://wimtech.home.comcast.net/index_files/Page385.htm , Accessed in June 2007.

Quinley, R., "WIM Installation Presentation.", WIM TECH: Weigh-In-Motion Consulting Services, WIM TECH Download Directory, July 2004, http://wimtech.home.comcast.net/index_files/Page992.htm .

Research in Progress, "Bridge Weigh-in-Motion (B-WIM) System Testing and Evaluation.", Transportation Research Board of the National Academies, April 5, 2007, http://rip.trb.org/browse/dproject.asp?n=13137 .

Richeson, K.E., "Introductory Guide to CVISN.", United Station Department of Transportation, Preliminary Version P.2, February 2000.

Schultz, G.G., and Seemiller, L.W., "Utah Commercial Motor Vehicle Weigh-in-Motion Data Analysis and Calibration Methodology.", Submitted to the Utah Department of Transportation Research and Development Division/Planning Division, Report No. UT-06.10, June 2006.

Straus, S.H., and Semmens, J., "Estimating the Cost of Overweight Vehicle Travel on Arizona Highways.", Arizona Department of Transportation, Phoenix, Arizona, January 2006.

Taylor, B., "Summary of RFID/Automatic Vehicle Identification Technologies for CVO.", International Road Dynamics, Inc., October 2007.

APPENDIX A

OTC Truck Weight Enforcement

DOT Questionnaire

STATE DOT: _____

Contact Information:

(This information is for our records only and will not be published without prior written consent.)

Name: _____

Title: _____

Phone: _____

Email: _____

Web: _____

Name: _____

Title: _____

Phone: _____

Email: _____

Web: _____

Name: _____

Title: _____

Phone: _____

Email: _____

Web: _____

Name: _____

Title: _____

Phone: _____

Email: _____

Web: _____

Name: _____

Title: _____

Phone: _____

Email: _____

Web: _____

Name: _____

Title: _____

Phone: _____

Email: _____

Web: _____

Name: _____

Title: _____

Phone: _____

Email: _____

Web: _____

WHO ARE WE:

We are Civil Engineering students at the University of Oklahoma.

WHAT ARE WE DOING:

We are performing research in conjunction with the State of Oklahoma DOT and the Oklahoma Transportation Authority to find the best way to enforce the size and weight limitations currently governing vehicles passing through our state and therefore decrease the damage they are doing to Oklahoma's roads and bridges.

WHAT WE WANT:

We are in the preliminary stages of the project and are calling all of the state DOT's to survey what systems are being used and how successful they are.

1) Do you use fixed weigh stations? YES/NO

a) How many weigh stations do you have and what are their hours of operation?

_____

_____

_____

b) What is the approximate number of trucks passing through each weigh station?

_____

_____

_____

Attention: Chris Ramseyer
303 East Chesapeake
Norman, OK 73019

Donald G. Fears Structural Engineering Laboratory
Phone: (405) 325-1415
Email: ramseyer@ou.edu W

University of Oklahoma
Fax: (405) 325-6826
eb: www.fears.ou.edu

c) What percentage of trucks weighed are overweight at these weigh stations?

_____

_____

_____

d) What percentage of overweight trucks at these weigh stations receive citations?

_____

_____

_____

e) Do you perform MCSAP inspections at weigh stations?

_____

_____

_____

2) Do you use mobile enforcement? YES/NO

a) How many patrol units are equipped with portable scales and what are the typical hours of operations?

_____

_____

_____

b) What percentages of weighed trucks are overweight?

_____

_____

_____

c) Does your state have a designated size and weights enforcement unit?

_____

_____

_____

d) Is more than one agency involved in mobile enforcement?

_____

_____

_____

e) Is the same agency that operates the weigh stations responsible for mobile enforcement?

_____

_____

_____

3) Does your state have weigh in motion systems?_____ YES/NO

a) Does your weigh station employ mainline WIM's?_____ YES/NO

b) Does your weight station have ramp WIM's?_____ YES/NO

c) Does you state use this for any virtual enforcement?_____ YES/NO

4) Does your state employ an electronic bypass system such as PrePass or Norpass?___ YES/NO

5) Does your state currently or plan to use CVIEW? YES/NO

6) Does you state currently use of plan to use CVISN?_____ YES/NO

7) Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?_____ YES/NO

8) What is the percentage of overloaded trucks traveling out of state vs instate?

_____

_____

_____

9) What are the general uses of these overloaded trucks?

_____

_____

_____

APPENDIX B

State	Alabama
Contact	C Cush
Title	Division Traffic Engineer
Phone #	256-234-8495
Email	cushk@dot.state.al.us
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*we only have 1 weigh station on I-20 near the Georgia line that runs 2 shifts 16 hours*
What is the approximate number of trucks passing through each weigh station?	*it varies, it's not very consistent, this morning(7/6) we had approximately 1000 trucks come through*
What percentage of trucks weighed are overweight at these weigh stations?	*10%*
What percentage of overweight trucks at these weigh stations receive citations?	*5%*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*we have 20 men on patrol of which 6 have scales and the run two 10 hour shifts a day*
What percentages of weighed trucks are overweight?	*5%, they all receive citations*
Does your state have a designated size and weights enforcement unit?	*no, the state*
Is more than one agency involved in mobile enforcement?	*No*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*Yes*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes, we use Prepass*
Does your state use or plan to use CVIEW?	*no*
Does your state use or plan to use CVISN?	*no*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*N/A*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*More instate overweight trucks*
What are the general uses of the overloaded trucks?	*Logging and coal*
Additional Comments	*No one method works best, but a combination of the three: static, WIM, and roaming*

State	Arizona
Contact	Lori Elzy
Title	Enforcement Unit
Phone #	(602) 712-8837
Email	Elzy@azdot.gov
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*22 fixed port of entry facilities which run 24/7. Secondary run 8 a.m. to 5 p.m. Some on the southern border have varying hours due to customs*
What is the approximate number of trucks passing through each weigh station?	*see report*
What percentage of trucks weighed are overweight at these weigh stations?	*see report*
What percentage of overweight trucks at these weigh stations receive citations?	*see report*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*12 mobile patrol units, each fixed station can do mobile, approximately 450*
What percentages of weighed trucks are overweight?	*see report*
Does your state have a designated size and weights enforcement unit?	*Yes*
Is more than one agency involved in mobile enforcement?	*no*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes, we use have portable WIM systems which we use for screening*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*Yes*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes, we use Prepass*
Does your state use or plan to use CVIEW?	*No*
Does your state use or plan to use CVISN?	*Yes*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*Yes*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*Instate overloaded trucks are traveling out of state so we are increasing our mobile patrol units*
What are the general uses of the overloaded trucks?	*Dump trucks, cement trucks*
Additional Comments	*You have to really pay attention to the safety of the trucks, because you'll sometimes find a lot of other stuff.*

State	Arkansas
Contact	Mike Cash
Title	Investigator
Phone #	(501) 569-2000
Email	
How many overloaded trucks does your state document annually	*N/A*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*4 stations that operate 24/7, one in Alma near Fort Smith, West Memphis, I-55 W. Memphis, and in Hope*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*24/7 in 8 hour rotating shifts*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*Yes*
What type of virtual enforcement are you using, where are they and located and how many are there?	*Free pass at the weight station*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*N/A*
How long has your state been using these systems?	*Over 10 years*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*N/A*
How has the state revenue been affected by these systems?	*N/A*
Has the number of overloaded trucks been affected by these systems	*N/A*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*N/A*
What were the uses of the overloaded trucks?	*Logging and farming*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*
If so, please elaborate/provide contact information.	*N/A*

State	California
Contact	
Title	
Phone #	
Email	(916) 654-5266
How many overloaded trucks does your state document annually	*N/A*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*50, interstate 24/7, intrastate work 2 shifts*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*1000 patrol units: daytime shifts is (6 a.m. - 2 p.m.) and nighttime shift is (2 p.m. - 10 p.m.)*
What percentage of screening cases result in overloaded trucks?	*50%*
Do you have any type of virtual enforcement system?	*Yes*
What type of virtual enforcement are you using, where are they and located and how many are there?	*Prepass*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*N/A*
How long has your state been using these systems?	*WIM has been in operation since the MID 80's*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*N/A*
How has the state revenue been affected by these systems?	*N/A*
Has the number of overloaded trucks been affected by these systems	*N/A*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*N/A*
What were the uses of the overloaded trucks?	*N/A*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*no*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*no*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*
If so, please elaborate/provide contact information.	*N/A*

State	Colorado
Contact	Hamit Kyllom
Title	Bridge Engineer
Phone #	(303) 757-9484
Email	
How many overloaded trucks does your state document annually	*during 2006 we had 900 overloaded trucks, during 2007 we had 600 overloaded trucks*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*10*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*N/A*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*No*
What type of virtual enforcement are you using, where are they and located and how many are there?	*N/A*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*N/A*
How long has your state been using these systems?	*We have been using the fixed weight station for more than 20 years*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*N/A*
How has the state revenue been affected by these systems?	*Not that much*
Has the number of overloaded trucks been affected by these systems	*N/A*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*70% is interstate and 30% is intrastate*
What were the uses of the overloaded trucks?	*mostly construction*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*
If so, please elaborate/provide contact information.	*N/A*

State	Delaware
Contact	William Bullen
Title	sergeant
Phone #	(302) 378-5230
Email	William.bullen@state.de.us
Do you use fixed weigh stations?	
How many weigh stations do you have and what are the hours of operation?	*Yes*
What is the approximate number of trucks passing through each weigh station?	*6 Fixed weight stations, with one police operated that runs from 7a.m to 3 p.m*
What percentage of trucks weighed are overweight at these weigh stations?	*During the fiscal year (10/1-6/2) 2006 there were a total of 24,766 trucks passing through the weigh stations*
What percentage of overweight trucks at these weigh stations receive citations?	*During the fiscal year of 2006:* *173 overweight according to axel weight,* *199 overweight according to gross weight,* *166 overweight according to bridge weight,* *72 overweight registered vehicles*
Do you perform MCSAP inspections at these weigh stations?	*100%*
Do you use mobile enforcement?	*Yes, every truck stopped receives level 2 inspection*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*Yes*
What percentages of weighed trucks are overweight?	*we have 2 vans with 8 portable scales*
Does your state have a designated size and weights enforcement unit?	*Refer to 1c for overloaded truck information; overloaded truck information is not categorized for fixed weigh stations and mobile units.*
Is more than one agency involved in mobile enforcement?	*Yes*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*No*
Does your state have weigh in motion systems?	*Yes, we are the state police*
Does your state employ mainline WIM's?	*Yes, but we don't use them for enforcement*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*yes*
Does your state employ an electronic bypass such as PrePass or Norpass?	*No*
Does your state use or plan to use CVIEW?	*No*
Does your state use or plan to use CVISN?	*N/A*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*N/A*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*Yes*
What are the general uses of the overloaded trucks?	*N/A*
	N/A

State	Florida
Contact	Jeff Frost
Title	Commercial Vehicle Enforcement
Phone #	(850) 245-7900
Email	Jeff.frost@dot.state.fl.us
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*We have 9 which are located on the interstate and run 24/7 and 14 on secondary roads*
What is the approximate number of trucks passing through each weigh station?	*16 million total during 2006*
What percentage of trucks weighed are overweight at these weigh stations?	*N/A*
What percentage of overweight trucks at these weigh stations receive citations?	*N/A*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*250 officers in the department, 215 with scales*
What percentages of weighed trucks are overweight?	*refer to statistics sheet*
Does your state have a designated size and weights enforcement unit?	*Yes, CME does everything*
Is more than one agency involved in mobile enforcement?	*no*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*no*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*Yes*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes, we are currently developing one*
Does your state use or plan to use CVIEW?	*No*
Does your state use or plan to use CVISN?	*Yes*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*unknown, overweight citations have increased which could be because of an increase in technology but unsure about the compliancy*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*N/A*
What are the general uses of the overloaded trucks?	*Everything*
Additional Comments	*a mixture of fixed and mobile enforcement would be the most efficient method*

State	Georgia
Contact	Theresa Cooper
Title	Lt.
Phone #	(404) 624-7207
Email	Tcooper@sisp.net
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*we have 19 on the interstate with varying hours*
What is the approximate number of trucks passing through each weigh station?	*varies*
What percentage of trucks weighed are overweight at these weigh stations?	*25%*
What percentage of overweight trucks at these weigh stations receive citations?	*100%*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*all 82 of our patrol units have mobile scales and usually run about 20 hours a day*
What percentages of weighed trucks are overweight?	*5-10%*
Does your state have a designated size and weights enforcement unit?	*Yes*
Is more than one agency involved in mobile enforcement?	
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*No*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*No*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes*
Does your state use or plan to use CVIEW?	*no*
Does your state use or plan to use CVISN?	*no*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*Yes*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*N/A*
What are the general uses of the overloaded trucks?	*general*

State	Idaho
Contact	Reymundo Rodrigez
Title	Commercial Vehicle Services Manager
Phone #	(208) 334-8699
Email	
How many overloaded trucks does your state document annually	*During 2005: 5,242 with citations, 6,411 with shifted loads*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*14 stations open 18-20 hours a day. 5 satellite stations*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*12, which operate on 10 hr. shifts 40 hrs a week*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*No*
What type of virtual enforcement are you using, where are they and located and how many are there?	*Currently in process*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*N/A*
How long has your state been using these systems?	*We have been using the currently system since the mid 70's*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*N/A*
How has the state revenue been affected by these systems?	*The more citations we give the more money we have for highway construction*
Has the number of overloaded trucks been affected by these systems	*N/A*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*50/50 30% of intrastate are overloaded and 30% of interstate are overloaded*
What were the uses of the overloaded trucks?	*Agriculture is a little higher than commercial, agriculture=60% commercial=40%*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*currently researching Virtual WIM systems*
If so, please elaborate/provide contact information.	

State	Illinois
Contact	Beasley
Title	Master Sergeant
Phone #	(217) 558-4060
Email	David_beasley@isp.state.IL.US
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*35 weigh stations total*
What is the approximate number of trucks passing through each weigh station?	*somewhere around 5,000 a day*
What percentage of trucks weighed are overweight at these weigh stations?	*N/A*
What percentage of overweight trucks at these weigh stations receive citations?	*N/A*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*Dedicated 96 portable scales, 5 have weighers, 15 portable static scales*
What percentages of weighed trucks are overweight?	*N/A*
Does your state have a designated size and weights enforcement unit?	*No*
Is more than one agency involved in mobile enforcement?	*Yes, state police and DOT*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*NO*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes*
Does your state use or plan to use CVIEW?	*Yes*
Does your state use or plan to use CVISN?	*Yes*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*N/A*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*N/A*
What are the general uses of the overloaded trucks?	*Varies, we are a very large agriculture state*
Additional Comments	*Our biggest problem is not having enough personal to run the fixed facilities, but portable units are our strongest in catching overloaded trucks*

State	Indiana
Contact	Wayne Andrews
Title	Lt.
Phone #	(317) 615-7373
Email	wandrews@isd.in.gov
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*Currently have 14 fixed weight stations*
What is the approximate number of trucks passing through each weigh station?	*N/A*
What percentage of trucks weighed are overweight at these weigh stations?	*N/A*
What percentage of overweight trucks at these weigh stations receive citations?	*N/A*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*we have 84 patrol units with mobile enforcement that run 24/7*
What percentages of weighed trucks are overweight?	*~75% mobile enforcement usually have a higher percentage of weighed trucks because of visual inspections*
Does your state have a designated size and weights enforcement unit?	*Yes, the Indiana State Police*
Is more than one agency involved in mobile enforcement?	*No*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes, used for gathering information*
Does your state employ mainline WIM's?	*No*
Does your state employ ramp WIM's?	*No*
Does your state use for this virtual enforcement?	*No*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes, we use Prepass*
Does your state use or plan to use CVIEW?	*Yes*
Does your state use or plan to use CVISN?	*Yes*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*Yes*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*Instate is typically higher than out of state*
What are the general uses of the overloaded trucks?	*N/A*

State	Iowa
Contact	Rodney Rhiner
Title	SGT.
Phone #	1-800-925-6469
Email	
How many overloaded trucks does your state document annually	*N/A*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*15 the hours vary, located at the major interstates*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*85 units*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*no*
What type of virtual enforcement are you using, where are they and located and how many are there?	*N/A*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*N/A*
How long has your state been using these systems?	*since the 70's*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*N/A*
How has the state revenue been affected by these systems?	*Yes*
Has the number of overloaded trucks been affected by these systems	*Yes*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*N/A*
What were the uses of the overloaded trucks?	*more agriculture than construction*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*Yes*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*
If so, please elaborate/provide contact information.	*N/A*

State	Kansas
Contact	John Culbertson
Title	Bridge Evaluation Engineer
Phone #	(785) 296-4434
Email	
How many overloaded trucks does your state document annually	*2005=1200 and in 2006=1500, the increase in overloaded vehicles was because of the construction of wind farms*
Do you have fixed weight stations?	*yes*
How many stations do you have and what are the hours of operations?	*7stations: hours vary*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*N/A*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*No*
What type of virtual enforcement are you using, where are they and located and how many are there?	*No*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*We have a WIM system but do not use it for enforcement, it is used to keep track of the weights going through*
How long has your state been using these systems?	*N/A*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*N/A*
How has the state revenue been affected by these systems?	*N/A*
Has the number of overloaded trucks been affected by these systems	*N/A*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*80%-85% are intrastate*
What were the uses of the overloaded trucks?	*Usually commercial*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*

State	Kentucky
Contact	Mike Boyer
Title	Technical Officer
Phone #	(502) 564-3276
Email	
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*we have 10 fixed weight stations with 6 on the interstate that run 24/7 and 4 which run about 16 hours a day*
What is the approximate number of trucks passing through each weigh station?	*varies ~200 a day*
What percentage of trucks weighed are overweight at these weigh stations?	*N/A*
What percentage of overweight trucks at these weigh stations receive citations?	*100%*
Do you perform MCSAP inspections at these weigh stations?	*We perform Federal Motor Carrier Safety inspections*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*all 200 of our patrol units carry scales and run 24/7*
What percentages of weighed trucks are overweight?	*80%*
Does your state have a designated size and weights enforcement unit?	*Yes*
Is more than one agency involved in mobile enforcement?	*No*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*No*
Does your state employ an electronic bypass such as PrePass or Norpass?	*yes*
Does your state use or plan to use CVIEW?	*N/A*
Does your state use or plan to use CVISN?	*N/A*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*N/A*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*50/50*
What are the general uses of the overloaded trucks?	*everything*

State	Louisiana
Contact	Ronny Randall
Title	Weight and Standards Weight Captain
Phone #	(225) 337-7100
Email	
How many overloaded trucks does your state document annually	*N/A*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*We have 11 total, the ones on the interstate are 24/7, the ones intrastate are not*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*~34*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*Yes, we use WIM systems as a screening device*
What type of virtual enforcement are you using, where are they and located and how many are there?	*High speed WIM system*
What percentage or virtual enforcement cases result in overloaded trucks?	*90%*
Do you use any other type of enforcement?	*N/A*
How long has your state been using these systems?	*We have been using the virtual enforcement system for ten years*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*yes, the virtual WIM systems are easier on enforcement, it's a good screening device that helps keep traffic flowing*
How has the state revenue been affected by these systems?	*Big impact on revenue because of the WIM screening*
Has the number of overloaded trucks been affected by these systems	*Yes*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*refer to response 6*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*intrastate is greater than interstate*
What were the uses of the overloaded trucks?	*generally agriculture but agriculture gets special permission*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*
If so, please elaborate/provide contact information.	*N/A*

State	Maine
Contact	Tim Bolten
Title	DOT Overweight Truck Division
Phone #	207-624-3559
Email	
How many overloaded trucks does your state document annually	*N/A*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*1 on I-95 south bound and in the process of building 1 on the north bound lane.*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*21 full time troopers*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*Yes*
What type of virtual enforcement are you using, where are they and located and how many are there?	*Currently using WIMs on highway ramps (about 1 year old) and planning to install about 12 more.*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*N/A*
How long has your state been using these systems?	*Been using WIMs for 6-7 years.*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*Yes*
How has the state revenue been affected by these systems?	*N/A*
Has the number of overloaded trucks been affected by these systems	*N/A*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*Intrastate*
What were the uses of the overloaded trucks?	*Logging, Pulp, Solid Waste.*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*
If so, please elaborate/provide contact information.	*N/A*

Additional Comments	*Currently in FMCS C-Vision compliance and am working toward C-View incentive program. Warns that WIMs are highly susceptible to vandalism once locations are known.*
Additional Contacts	*Lt. Thomas Kelly at the Maine State Police Department's Overweight Truck Enforcement Unit. Contact at 207-624-8932. Ron Cote (pronounced "coat-ay"), WIM electronics, 207-624-3602. Dan Robins, WIM leader, 207-624-3631. Call CT DOT and ask for Rudy Sapena who runs the CT WIM program.*

State	Massachusetts
Contact	Thomas Fitzgerald
Title	Police Officer, State Police Department
Phone #	978-369-1005
How many overloaded trucks does your state document annually	*N/A*
Do you have fixed weight stations?	*N/A*
How many stations do you have and what are the hours of operations?	*N/A*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*Currently use low deck trailer mounted scales. All 41 troopers are equipped with mobile scales.*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*Do not use any WIM*
What type of virtual enforcement are you using, where are they and located and how many are there?	*N/A*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*N/A*
How long has your state been using these systems?	*N/A*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*N/A*
How has the state revenue been affected by these systems?	*N/A*
Has the number of overloaded trucks been affected by these systems	*N/A*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*Intrastate*
What were the uses of the overloaded trucks?	*Politically, no one issues citations to farm trucks. Construction equipment, bulk material, and petroleum products (oil).*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*
Additional Comments	*Can issue special, state permits for overweight trucks. C-Vision will never happen.*
Additional Contacts	*Mike Lions, State DOT Transportation Division (bridge area), 508-473-4755*

State	Mississippi
Contact	Willie Huff
Title	Office of enforcement
Phone #	(601) 359-1707
Email	Whuff@mdot.state.ms.us
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*27 total fixed weight stations of which 10~12 run 24/7. Ones intrastate run 16 hr shifts 5 A.M. to 10 P.M.*
What is the approximate number of trucks passing through each weigh station?	*approximately 8 1/2~9 million a year, 2 a.m to 2 p.m is when we see the most trucks*
What percentage of trucks weighed are overweight at these weigh stations?	*2%*
What percentage of overweight trucks at these weigh stations receive citations?	*99%*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*all of 105 of them*
What percentages of weighed trucks are overweight?	*70%*
Does your state have a designated size and weights enforcement unit?	*Yes*
Is more than one agency involved in mobile enforcement?	*No*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes, but we do not use them for enforcement*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*No*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes*
Does your state use or plan to use CVIEW?	*Yes*
Does your state use or plan to use CVISN?	*No*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*Yes*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*We see a lot more overweight intrastate vehicles than out of state. About 20% of all intrastate vehicles are overweight*
What are the general uses of the overloaded trucks?	*Logging, forest products, gravel, sand, dirt*
Additional Comments	*The most important thing for weight enforcement is to have dedicated weight enforcement personal. Fixed weight stations are effective but only catch 2%*

State	Michagan
Contact	Dave Ford
Title	Lt.
Phone #	(501) 336-6195
Email	Forddw@michagan.got
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*12 sites with 4 on port of entry, hours vary*
What is the approximate number of trucks passing through each weigh station?	*N/a*
What percentage of trucks weighed are overweight at these weigh stations?	*N/a*
What percentage of overweight trucks at these weigh stations receive citations?	*N/a*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*All are equipped*
What percentages of weighed trucks are overweight?	*N;a*
Does your state have a designated size and weights enforcement unit?	*No, everyone does size and wieght*
Is more than one agency involved in mobile enforcement?	*no, just traffic safety*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*No*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*Yes*
Does your state employ an electronic bypass such as PrePass or Norpass?	*No*
Does your state use or plan to use CVIEW?	*No*
Does your state use or plan to use CVISN?	*No*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*No*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*Instate is greater*
What are the general uses of the overloaded trucks?	*Gravel, steal, agriculture*

State	Missouri
Contact	Mager
Title	Commercial Vehicle Officer
Phone #	(866) 831-6277
Email	
How many overloaded trucks does your state document annually	*N/A*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*24 stations with varying hours*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*27 patrol units*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*Yes*
What type of virtual enforcement are you using, where are they and located and how many are there?	*we use WIM as a screening device*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*Yes, we use Prepass*
How long has your state been using these systems?	*We have been using WIM for 5 years*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*No*
How has the state revenue been affected by these systems?	*N/A*
Has the number of overloaded trucks been affected by these systems	*No*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*N/A*
What were the uses of the overloaded trucks?	*Varies by the industry*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*
If so, please elaborate/provide contact information.	*N/A*

State	Montana
Contact	Dan Moore
Title	
Phone #	(406) 444-0454
Email	Dmoore@mt.gov
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*21, which are currently active that run from 8 hrs. to 24 hrs. a day. 6 are 24/7*
What is the approximate number of trucks passing through each weigh station?	*N/A*
What percentage of trucks weighed are overweight at these weigh stations?	*1%*
What percentage of overweight trucks at these weigh stations receive citations?	*50%*
Do you perform MCSAP inspections at these weigh stations?	*We perform Commercial Vehicle Safety and North American Safety inspections*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*16 which run 8-24 hours*
What percentages of weighed trucks are overweight?	*50%*
Does your state have a designated size and weights enforcement unit?	*Yes*
Is more than one agency involved in mobile enforcement?	*No*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes, we use WIM for screening*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*No*
Does your state use for this virtual enforcement?	*No*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes*
Does your state use or plan to use CVIEW?	*Yes, we use preview*
Does your state use or plan to use CVISN?	*Yes*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*No*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*Yes, the number of overweight trucks traveling in state is greater than out of state*
What are the general uses of the overloaded trucks?	*N/A*
Additional Comments	*Mainline WIM with the addition of Prepass would be the most efficient in terms of overloaded trucks*
Additional Contacts	*Mark Mobealy (406) 444-6139*

State	Nevada
Contact	Tony Rivera
Title	Enforcement
Phone #	(775) 888-7444
Email	Trivera@dot.state.dot.us
Do you use fixed weigh stations?	*No, it was not cost effective for permanent weigh stations*
How many weigh stations do you have and what are the hours of operation?	*N/a*
What is the approximate number of trucks passing through each weigh station?	*N/a*
What percentage of trucks weighed are overweight at these weigh stations?	*N/a*
What percentage of overweight trucks at these weigh stations receive citations?	*N/a*
Do you perform MCSAP inspections at these weigh stations?	*N/a*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*we have 45 units, 4 scales per unit*
What percentages of weighed trucks are overweight?	*N/a*
Does your state have a designated size and weights enforcement unit?	*Yes, NHP*
Is more than one agency involved in mobile enforcement?	*No*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes, NHP*
Does your state have weigh in motion systems?	*Yes, used for screening*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*No*
Does your state employ an electronic bypass such as PrePass or Norpass?	*No*
Does your state use or plan to use CVIEW?	*No*
Does your state use or plan to use CVISN?	*No*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*Yes*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*Instate is greater*
What are the general uses of the overloaded trucks?	*Constructing, mining*

State	Nevada
Contact	Brad Smith
Title	Sergeant
Phone #	Bsmith@dps.state.nv.us
Email	
How many overloaded trucks does your state document annually	*N/A*
Do you have fixed weight stations?	*No*
How many stations do you have and what are the hours of operations?	*N/A*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*approximately 50*
What percentage of screening cases result in overloaded trucks?	*1/10th of 1%*
Do you have any type of virtual enforcement system?	*Yes*
What type of virtual enforcement are you using, where are they and located and how many are there?	*We have 36 WIM that run 24/7 and portable WIM which we use for screening*
What percentage or virtual enforcement cases result in overloaded trucks?	*1/100th of 1%*
Do you use any other type of enforcement?	*N/A*
How long has your state been using these systems?	*we have been using the portable WIM for 3 years*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*No*
How has the state revenue been affected by these systems?	*Weight enforcement is part of all general funds*
Has the number of overloaded trucks been affected by these systems	*No*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*Intrastate is greater*
What were the uses of the overloaded trucks?	*Construction*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*Yes, but not as a direct effect of weight enforcement*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*No*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*Yes, we are revamping our training procedure, looking into CVISN for electronic screening*
If so, please elaborate/provide contact information.	

State	New Mexico
Contact	Chris Mandrant
Title	Lt.
Phone #	(505) 827-0569
Email	
How many overloaded trucks does your state document annually	*5,000~7,000*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*5 located on the interstate which run 24/7, and 7 on the secondary road with varying hours*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*10~15 units with varying hours*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*No, but we are currently in the process of researching one*
What type of virtual enforcement are you using, where are they and located and how many are there?	*N/A*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*Yes, Prepass*
How long has your state been using these systems?	*Prepass has been used for 3 years*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*Yes, if carriers know that they are going to be screened with WIM they are more reluctant to overload their trucks*
How has the state revenue been affected by these systems?	*No, but we are currently in the process of researching one*
Has the number of overloaded trucks been affected by these systems	*Yes, Prepass has helped reduce the number of trucks*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*There is more instate overloaded vehicles, instate are not exposed to scales as much as out of state*
What were the uses of the overloaded trucks?	*Depends on the geography*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*
If so, please elaborate/provide contact information.	*N/A*

State	New Hampshire
Contact	Kyle Aspinwall
Title	Police Officer, State Police Department
Phone #	603-271-3339
Email	
How many overloaded trucks does your state document annually	*Approximately 1000-1500 trucks per day are inspected by one of the systems which result in approximately 20-30 citations.*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*2 stations on the MA border (North and South bound) and 1 on the Vermont border (East or West bound). Only pays to be open M-F from 9am to 6pm.*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*2 semi-portable scales usually at specific rest stops. 1 team of officers dedicated to overweight truck enforcement (1 supervisor and 6 officers) equipped with Hammy MD400 scales. 30 regular officers have scales and the entire police department are trained to use them.*
What percentage of screening cases result in overloaded trucks?	*No*
Do you have any type of virtual enforcement system?	*No*
What type of virtual enforcement are you using, where are they and located and how many are there?	*N/A*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*No*
How long has your state been using these systems?	*N/A*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*N/A*
How has the state revenue been affected by these systems?	*N/A*
Has the number of overloaded trucks been affected by these systems	*N/A*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*About 70% is intrastate and 30% interstate*
What were the uses of the overloaded trucks?	*Politically, no one issues citations to farm trucks. Timber, logging, mineral extraction (mainly going to MA, and petroleum fuel trucks receive the largest amount of citations.*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*

Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*
If so, please elaborate/provide contact information.	*N/A*
Additional Comments	*Officer like the current system but suggested that fines should be raised to national standards and additional patrol units should be added to the dedicated overweight truck enforcement unit. The biggest deterrent for overweight trucks is civil liability (local business does not want to get sued if there truck is overweight and in an accident). Can issue special, state permits for overweight trucks.*

State	North Carolina
Contact	William Nichols
Title	
Phone #	(919) 715-8683
Email	wmnichols@ncsap.org
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*we have 2 on each side of the interstate, 8 total*
What is the approximate number of trucks passing through each weigh station?	*N/a*
What percentage of trucks weighed are overweight at these weigh stations?	*small, no relative pattern*
What percentage of overweight trucks at these weigh stations receive citations?	*All*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*364 with scales*
What percentages of weighed trucks are overweight?	*Varies, higher than fixed*
Does your state have a designated size and weights enforcement unit?	*Yes, MCE*
Is more than one agency involved in mobile enforcement?	*No*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*Yes*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes*
Does your state use or plan to use CVIEW?	*Yes*
Does your state use or plan to use CVISN?	*Yes*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*N/a*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*insate is greater than out of state*
What are the general uses of the overloaded trucks?	*Dirt, Rock*
Additional Comments	

State	North Dakota
Contact	Doyle Schultz
Title	Director of Motor Carrier Operations
Phone #	(701) 328-2500
Email	
How many overloaded trucks does your state document annually	*340 during 2006*
Do you have fixed weight stations?	*Currently no operating fixed weight stations due to budget cuts*
How many stations do you have and what are the hours of operations?	*N/A*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*21 in operation, hours vary*
What percentage of screening cases result in overloaded trucks?	*30%*
Do you have any type of virtual enforcement system?	*Yes*
What type of virtual enforcement are you using, where are they and located and how many are there?	*12 locations of WIM systems which we use for DATA and screening*
What percentage or virtual enforcement cases result in overloaded trucks?	*High percentage because we usually don't stop unless the weight is with 10% of the legal limit*
Do you use any other type of enforcement?	*N/A*
How long has your state been using these systems?	*Virtual WIM system has been in use for 3 years*
What were the initial installation and maintenance costs for the systems?	*100 thousand a site for Virtual WIM system*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*Yes*
How has the state revenue been affected by these systems?	*not a major impact*
Has the number of overloaded trucks been affected by these systems	*With the closing of our fixed weight stations the number of overloaded trucks we saw went down dramatically, but with the Virtual WIM system the number of overloaded trucks we saw with portable scales went up*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*Intrastate is greater than interstate*
What were the uses of the overloaded trucks?	*local farmers construction*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*No*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*No*
If so, please elaborate/provide contact information.	*N/A*

State	Ohio
Contact	Mike Sanders
Title	Lt
Phone #	(937) 655-9189
Email	Msanders@ops.state.oh.us
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*we have a total of 15 platform scales, 10 of which are on the interstate and run 24/7*
What is the approximate number of trucks passing through each weigh station?	*Truck traffic varies sometimes we get 600-750 per day depending on the time*
What percentage of trucks weighed are overweight at these weigh stations?	*approximately 10-12%*
What percentage of overweight trucks at these weigh stations receive citations?	*Depending if we have enough staff 50-60%. We have a tolerance of 1,000 lbs which receive a warning*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*10 district=10 portable, 88 counties, all sheriff a portable scale, scales on 10 county*
What percentages of weighed trucks are overweight?	*It's usually a higher percentage than fixed weigh stations around 85%*
Does your state have a designated size and weights enforcement unit?	*Yes*
Is more than one agency involved in mobile enforcement?	*No*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*part of it, we have 2 units Highway patrol which deal with crashes, licensing equipment and PCEO which deal with hazmats, load, proper route.*
Does your state have weigh in motion systems?	*Yes, we have one we have one it I-77 belongs to the DOT, we do not use it as enforcement*
Does your state employ mainline WIM's?	*N/A*
Does your state employ ramp WIM's?	*N/A*
Does your state use for this virtual enforcement?	*N/A*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes, we use Prepass*
Does your state use or plan to use CVIEW?	*N/A*
Does your state use or plan to use CVISN?	*N/A*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*Yes*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*trucks traveling through the state are usually in compliance because of the locations and regularity of the platform scales*
What are the general uses of the overloaded trucks?	*On the platform we usually see generic freight, but on the portable we see a lot of dump buckers, timber, gravel, stone, ect.*
Additional Comments	*Overloaded truck information during 2006: on the platforms there were 3,092,897 trucks passing through of which 10,649 were overloaded. From the portable scales: 7,285 were weighed of which 6,228 were overweight*
Additional Contacts	*Weakly Knuaff (614) 752-4859 Staff Sergeant*

State	Oklahoma
Contact	Craig Medcalf
Title	Captain
Phone #	(405) 521-6105
Email	cmedcalf@dps.state.ok.us
Do you see overloaded trucks as a big problem or threat to Oklahoma highways?	Yes, the heavier the trucks the more damge done to the roads and bridges and the life expectancy of these roads do to the weight is shortened from 30 years to 19years.The weight contributes to mechanical failure and accidents.
Are you using fixed weigh stations?	Not that much, as they are manned buy OCC and our duties are mainly mobile weighings.
Where are they located and what are the hours of operations?	I-35both North/Southbound at Davis and Tonkawa, I-40 both East/Westbound at El Reno, US 69hwy both North/Southbound at Colbert, US 287 hwy 1 facilityfor both North/Southbound,UShwy271 both North/Southbound at Hugo.Hours are from 0800-1630.
What percentage of overloaded trucks are overloaded at these weigh stations?	10%
Are you using mobile enforcement?	Yes
How many patrol units are equipped with mobile scales (compared to the whole) and what are their hours of operations?	60 mobile units equipped with a minimum of 4 scales and the hours are from 0600 to 2300 7 days a week. Each unit works at least 2 evening shifts and 3 day shifts a week.
What percentage of trucks weighed from mobile enforcement are overloaded?	A minimum of 25% of all trucks contacted are over weight.
Do you see more overloaded trucks instate or traveling through the state (intrastate vs. interstate)?	Yes
What are the general uses of the overloaded trucks?	Dirt/sand, rock, oilfield equipment and byproducts,coal and timber.
Do you see any need for advanced weight enforcement technology (such as weigh in motion or electronic bypass systems) in Oklahoma?	Yes, these can be used for probable cause/screening for Troopers to check a trucks weight in more volume to ensure compliance.
Additional Comments	Any new technology into the screening of weight compliance that would help the Oklahoma HIghway Patrol, OCC, and ODOT would garner bettter compliance, making better use of time and adding longivity to our roads in Oklahoma and increase public safety.

State	Oklahoma
Contact	Lambdin
Title	Luitenant
Phone #	
Email	glambdin@dps.state.ok.us
Please describe the methods and procedures involving overloaded commercial vehicles with in the state of Oklahoma.	This is accomplished by mobile and stationary random inspections. If the trooper feels enforcement is necessary to gain compliance then a ticket is written or the truck is off loaded.
How many fixed weigh stations does the Oklahoma have located at ports of entry	Oklahoma does not have ports of entry but we do have 5 fixed scale sites around the state.
How many troopers are equipped with scales for weighing overloaded vehicles compared to the total number of troopers?	Approximately 50 troopers weigh trucks compared to approximately 700 employed.
What technology (that your are aware of) is being used by Oklahoma fixed weigh stations and Highway patrol for Commercial Vehicle Enforcement?	Technology used is the standard mechanical fixed scale and mechanical portable scale.

State	Oregon
Contact	David Fifer
Title	
Phone #	(503) 379-6054
Email	
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*21 Mainline, 3 with ramp for high volumes*
What is the approximate number of trucks passing through each weigh station?	*N/A*
What percentage of trucks weighed are overweight at these weigh stations?	*N/A*
What percentage of overweight trucks at these weigh stations receive citations?	*3%*
Do you perform MCSAP inspections at these weigh stations?	*N/A*
Do you use mobile enforcement?	
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*N/A*
What percentages of weighed trucks are overweight?	*N/A*
Does your state have a designated size and weights enforcement unit?	*N/A*
Is more than one agency involved in mobile enforcement?	*N/A*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*N/A*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*Yes*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes*
Does your state use or plan to use CVIEW?	*No*
Does your state use or plan to use CVISN?	*No*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*N/a*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*N/A*
What are the general uses of the overloaded trucks?	*N/A*

State	South Carolina
Contact	Bailey
Title	Lt.
Phone #	(803) 896-4742
Email	Lbailey@sc.stp.org
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*5 fixed weight stations with varying hours*
What is the approximate number of trucks passing through each weigh station?	*general truck count is about 12,000 statewide*
What percentage of trucks weighed are overweight at these weigh stations?	*25-30%*
What percentage of overweight trucks at these weigh stations receive citations?	*there's a 10% tolerance*
Do you perform MCSAP inspections at these weigh stations?	*We do North American Safety Standards*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*we have 110 mobile enforcement of which 86 are equipped with patrol units*
What percentages of weighed trucks are overweight?	*High percentage about 60%*
Does your state have a designated size and weights enforcement unit?	*Yes*
Is more than one agency involved in mobile enforcement?	*No*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*No*
Does your state use for this virtual enforcement?	*No*
Does your state employ an electronic bypass such as PrePass or Norpass?	*No*
Does your state use or plan to use CVIEW?	*No*
Does your state use or plan to use CVISN?	*No*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*Yes*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*More instate overweight trucks than out of state*
What are the general uses of the overloaded trucks?	*Timber Logging, dump trucks*
Additional Comments	*South Carolina is currently behind in technology, but the best way to deal with overweight trucks in state is through the use of mobile enforcement*

State	South Carolina
Contact	Lt. Bailey
Title	Lt
Phone #	(803) 896-4742
Email	lbailey@sc.stp.org
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*5 with varying hours*
What is the approximate number of trucks passing through each weigh station?	*General truck count is approximately 12000 a day statewide*
What percentage of trucks weighed are overweight at these weigh stations?	*25-30%*
What percentage of overweight trucks at these weigh stations receive citations?	*N/A there is a 10% tolerance*
Do you perform MCSAP inspections at these weigh stations?	*We perform North American safetly standards*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*86 out of 110 units are equiped*
What percentages of weighed trucks are overweight?	*60%*
Does your state have a designated size and weights enforcement unit?	*Yes*
Is more than one agency involved in mobile enforcement?	*No*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*No*
Does your state use for this virtual enforcement?	*No*
Does your state employ an electronic bypass such as PrePass or Norpass?	*No*
Does your state use or plan to use CVIEW?	*No*
Does your state use or plan to use CVISN?	*NO*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*Yes*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*More instate overweight trucks than out of state*
What are the general uses of the overloaded trucks?	*Timber, logging, dumptrucks*
Additional Comments	*Portable scales are the best for instate weight enforcement, South Carolina is currently behind in technology*

State	South Dakota
Contact	Noel Gabriel
Title	Sergant
Phone #	(605) 773-4578
Email	_
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*4 on the interstate which run 24/7*
What is the approximate number of trucks passing through each weigh station?	*N/A*
What percentage of trucks weighed are overweight at these weigh stations?	*N/A*
What percentage of overweight trucks at these weigh stations receive citations?	*N/A*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	Yes
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*13 with scales but 150 have weighing capabilities 24/7*
What percentages of weighed trucks are overweight?	*N/A*
Does your state have a designated size and weights enforcement unit?	*Yes*
Is more than one agency involved in mobile enforcement?	*N/A*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes, Highway patrol*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*No*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes*
Does your state use or plan to use CVIEW?	*Yes*
Does your state use or plan to use CVISN?	*Yes*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*No*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*Pretty Even*
What are the general uses of the overloaded trucks?	*N/a*

State	South Dakota
Contact	Captain Fahay
Title	Captain
Phone #	(605) 773-4578
Email	
How many overloaded trucks does your state document annually	N/A
Do you have fixed weight stations?	Yes
How many stations do you have and what are the hours of operations?	4 at the ports of entry which operate 24/7 and 7 interstate with hours that vary
Do you have mobile enforcement?	Yes
How many patrol units are equipped with overweight scales and what are their hours of operation?	6 single unit cars, 8 two man mobile teams, and additional troopers on infrequent basis, hours vary
What percentage of screening cases result in overloaded trucks?	N/A
Do you have any type of virtual enforcement system?	No, but we do have WIM systems which help in scheduling our hours of operations
What type of virtual enforcement are you using, where are they and located and how many are there?	N/A
What percentage or virtual enforcement cases result in overloaded trucks?	N/A
Do you use any other type of enforcement?	N/A
How long has your state been using these systems?	N/A
What were the initial installation and maintenance costs for the systems?	N/A
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	N/A
How has the state revenue been affected by these systems?	N/A
Has the number of overloaded trucks been affected by these systems	N/A
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	N/A
How does this compare prior to your current system?	N/A
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	N/A
What were the uses of the overloaded trucks?	Fairly amount of agriculture but varies with construction
How much revenue is returned because of weight enforcement?	N/A
Has there been a change in passenger motor safety since implementing the current system?	N/A
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	N/A
Is your state currently performing any research for new methods, techniques and/or technology in this area?	N/A
If so, please elaborate/provide contact information.	N/A

State	Texas
Contact	Captain David Palmer
Title	Department of Public Safety
Phone #	512-424-2053
Email	
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*Only one weigh station which is a POE on the Mexico Border*
What is the approximate number of trucks passing through each weigh station?	
What percentage of trucks weighed are overweight at these weigh stations?	*~15%*
What percentage of overweight trucks at these weigh stations receive citations?	
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*2200 Troopers and 400 Commercial Vehicle Units*
What percentages of weighed trucks are overweight?	
Does your state have a designated size and weights enforcement unit?	
Is more than one agency involved in mobile enforcement?	
Is the same agency that operates the weigh stations responsible for mobile enforcement?	
Does your state have weigh in motion systems?	*No*
Does your state employ mainline WIM's?	*No*
Does your state employ ramp WIM's?	*No*
Does your state use for this virtual enforcement?	*No*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Only at the POE*
Does your state use or plan to use CVIEW?	*Yes*
Does your state use or plan to use CVISN?	*Yes – Called TEX VIEW*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*In State is Greatest*
What are the general uses of the overloaded trucks?	*~Equal*
Additional Comments	*The department has 4 portable semi-trailer scales which have both good and bad qualities. Good in that they are mobile; Bad in that they are time consuming to get from location to location. The scales are by Haenni Scales*

State	Utah
Contact	Ron Butler
Title	Motor Carrier Manager
Phone #	(801) 965-4522
Email	
How many overloaded trucks does your state document annually	*during 2006: overweight encompassing all violations=4,885*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*9, hours vary*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*20 units, 40 hours a week*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*No*
What type of virtual enforcement are you using, where are they and located and how many are there?	*N/A*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*Electric Bypass*
How long has your state been using these systems?	*Electric Bypass has been in use for ten years*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*Yes, there has been an overall decrease in the number of overloaded trucks due to compliancy*
How has the state revenue been affected by these systems?	*Yes, but not a significant difference*
Has the number of overloaded trucks been affected by these systems	*Yes*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*Intrastate is greater than interstate*
What were the uses of the overloaded trucks?	*commercial construction*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*
If so, please elaborate/provide contact information.	*N/A*

State	Virginia
Contact	Ralph Wigton
Title	Enforcement
Phone #	
Email	_
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*13, hours vary, 3 on the interstate which are 24/7*
What is the approximate number of trucks passing through each weigh station?	*each day varies*
What percentage of trucks weighed are overweight at these weigh stations?	*N/A*
What percentage of overweight trucks at these weigh stations receive citations?	*N/A*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*11 Mobile Crews*
What percentages of weighed trucks are overweight?	*approximately between 80% and 90%*
Does your state have a designated size and weights enforcement unit?	*N/A*
Is more than one agency involved in mobile enforcement?	*Yes, DMV and State Police, DMW doest he weightand state police does the enforcement*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*No, see above*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*Yes*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes*
Does your state use or plan to use CVIEW?	*No*
Does your state use or plan to use CVISN?	*Yes*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*No*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*N/A*
What are the general uses of the overloaded trucks?	*N/A*
Additional Comments	*Virtual WIM are the best, we can work with the Virgina DOT. Put n radio with stant alone WIM mobile crew and drive with a 1 to 2 mile radius and see in realtime overloaded vehicles*

State	Virginia
Contact	William Childress
Title	Deputy Director
Phone #	(804) 367-6745
Email	william.childress@dmv.virginia.gov
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*We have 13 weigh stations with varying hours. 3 of those run 24/7 while the others run 24/5 or 16/5*
What is the approximate number of trucks passing through each weigh station?	*During 2006 we had a total of 20 million overloaded trucks*
What percentage of trucks weighed are overweight at these weigh stations?	*N/A*
What percentage of overweight trucks at these weigh stations receive citations?	*100%*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*12 with hours running from 6:30-3:00*
What percentages of weighed trucks are overweight?	*N/A*
Does your state have a designated size and weights enforcement unit?	*CVE officers*
Is more than one agency involved in mobile enforcement?	*No*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes, used for screening*
Does your state use for this virtual enforcement?	*Yes, virtual enforcement is part of the state police*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes*
Does your state use or plan to use CVIEW?	*No*
Does your state use or plan to use CVISN?	*Yes*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*Yes, because of increased weight enforcement technology*
What is the percentage or overloaded trucks traveling out of state vs. instate or is one greater than the other?	*N/A*
What are the general uses of the overloaded trucks?	*N/A*
Additional Comments	*Parallel to the highway system we have a green light/red-light system which help a lot, the WIM maintain a steady traffic flow. We are very proactive in working with businesses and letting them know what we look for in overloaded trucks.*

State	Vermont
Contact	John Bliss
Title	Police Officer, State Police Department
Phone #	207-624-3559
How many overloaded trucks does your state document annually	*About 20,000.*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*Have 1 old station on the NY-VT Border.*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*State Police has 2 units. Dept of Motor Vehicles has 2 units which are about 25 people.*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*Yes*
What type of virtual enforcement are you using, where are they and located and how many are there?	*Currently using WIM stations and cameras which email officers a real-time photograph of the They are only used for screening vehicles because they are not accurate enough for citations.*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*Used Mobile scale mounted on trailers which run in 12 hour shifts.*
How long has your state been using these systems?	*N/A*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*N/A*
How has the state revenue been affected by these systems?	*N/A*
Has the number of overloaded trucks been affected by these systems	*N/A*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*Millions are spent on road and bridge maintenance however; it takes 9-10 years before anything is implemented.*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*Interstate*
What were the uses of the overloaded trucks?	*Logging, rock/minerals carriers, and milk trucks.*
How much revenue is returned because of weight enforcement?	*Most goes into the state's general fund; however a small portion is returned directly to the transportation division but not to overweight truck enforcement directly.*
Has there been a change in passenger motor safety since implementing the current system?	*State won an award, Maine State Troopers Administration (MSTA)*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*Unknown, University of Alabama installed the current, e-citation system.*
Additional Contacts	*DOT Secretary (very helpful) is Dorothy 207-828-0278*

State	Wisconsin
Contact	Greg Teasdale

Title	Enforcement
Phone #	(608) 266-0305
Email	
Do you use fixed weigh stations?	*Yes*
How many weigh stations do you have and what are the hours of operation?	*13 with varying hours*
What is the approximate number of trucks passing through each weigh station?	*12~13 thousand a day*
What percentage of trucks weighed are overweight at these weigh stations?	*1%*
What percentage of overweight trucks at these weigh stations receive citations?	*N/A*
Do you perform MCSAP inspections at these weigh stations?	*Yes*
Do you use mobile enforcement?	*Yes*
How many patrol units are equipped with portable scales and what are the typical hours of operations?	*23 with varying hours*
What percentages of weighed trucks are overweight?	*High percentage, because we specifically weigh trucks we suspect are overweight*
Does your state have a designated size and weights enforcement unit?	*No*
Is more than one agency involved in mobile enforcement?	*Yes, there are local law enforcement which also weigh overloaded trucks*
Is the same agency that operates the weigh stations responsible for mobile enforcement?	*Yes*
Does your state have weigh in motion systems?	*Yes*
Does your state employ mainline WIM's?	*Yes*
Does your state employ ramp WIM's?	*Yes*
Does your state use for this virtual enforcement?	*Yes*
Does your state employ an electronic bypass such as PrePass or Norpass?	*Yes*
Does your state use or plan to use CVIEW?	*Yes*
Does your state use or plan to use CVISN?	*Yes*
Has there been an increase in weight enforcement compliancy because of increased weight enforcement procedures?	*No*
What is the percentage or overloaded trucks traveling out of state versus instate or is one greater than the other?	*intrastate is greater than interstate because the interstate is exposed to the fixed weight stations*
What are the general uses of the overloaded trucks?	*Timber, raw forest products*
Additional Comments	*We have recently built 2 new facilities with Prepass and WIM systems. The percentage of violations is so low you need a screening tool in place of fixed weight stations. So far it has been a huge success*

State	Wyoming

Contact	Captain Poage
Title	Captain
Phone #	*(307) 777-4312*
Email	
How many overloaded trucks does your state document annually	*N/A*
Do you have fixed weight stations?	*Yes*
How many stations do you have and what are the hours of operations?	*14, the locations vary, the ones on the interstate are 24/7, the ones intrastate vary according to traffic*
Do you have mobile enforcement?	*Yes*
How many patrol units are equipped with overweight scales and what are their hours of operation?	*5 units, hours vary according to traffic*
What percentage of screening cases result in overloaded trucks?	*N/A*
Do you have any type of virtual enforcement system?	*Yes*
What type of virtual enforcement are you using, where are they and located and how many are there?	*4 WIM stations and portable WIM which are deployed randomly*
What percentage or virtual enforcement cases result in overloaded trucks?	*N/A*
Do you use any other type of enforcement?	*N/A*
How long has your state been using these systems?	*N/A*
What were the initial installation and maintenance costs for the systems?	*N/A*
Has there been an increase in weight enforcement compliancy because of the introduction of these systems?	*N/A*
How has the state revenue been affected by these systems?	*The use of these weight enforcement systems has helped cut the amount of money spend on damage costs*
Has the number of overloaded trucks been affected by these systems	*Yes, we see more overloaded trucks*
What is the average amount of revenue spent on roadway and bridge repair under the current systems?	*N/A*
How does this compare prior to your current system?	*N/A*
What is the percentage or overloaded trucks traveling out of state versus instate or do you see one as being greater than the other?	*Intrastate is greater than interstate*
What were the uses of the overloaded trucks?	*N/A*
How much revenue is returned because of weight enforcement?	*N/A*
Has there been a change in passenger motor safety since implementing the current system?	*N/A*
Has the enforcement of weight regulations aided in monitoring hazardous materials in your area?	*N/A*
Is your state currently performing any research for new methods, techniques and/or technology in this area?	*N/A*

APPENDIX C

State	Contact / personal	Position	Email	Phone
AK	Mike Cash	Investigator	N/A	(501) 569-2000
AL	Ken Cush	Division Traffic Engineer	cushk@dot.state.al.us	N/A
AL	Randy Braden	Enforcement	Bradenr@dot.state.al.us	(334) 242-6474
AZ	Steve Abney	Enforcement	Sabney@azdot.gov	(602) 712-7181
AZ	Charles Blundell	Sgt.	N/A	(602) 773-3613
AZ	Lori Elzy	Enforcement Unit	Elzy@azdot.gov	(602) 712-8837
CA	CalTrans	N/A	N/A	(916) 654-5266
CA	Stan Norikane	CalTrans	Enforcement	(916) 654-5651
CO	Hamit Kyllom	Bridge Engineer	N/A	(303) 757-9484
CT	Delbert Cornell	Enforcement	Delbert.cornell@dmvct.org	(860) 263-5457
DE	William Bullen	Sergeant	William.bullen@state.de.us	(302) 378-5230
Fl	Jeff Frost	Commercial Vehicle Enforcement	Jeff.frost@dot.state.fl.us	(850) 245-7900
FL	Rick Reel	Enforcement	Richard.reel@dot.state.fl.us	(850) 414-4878
GA	Theresa Cooper	Lieutenant	Tcooper@sisp.net	(404) 624-7207
ID	Alan Frew	N/A		(208) 334-8694
ID	Raymund Rodrigez	Commercial Vehicle Services Manager	N/A	(208) 334-8699
IL	David Beasley	Master Sergeant	David_beasley@isp.state.il.us	(217) 558-4060
IN	Wayne Andrews	Lieutenant	Wandrews@isd.in.gov	(317) 615-7373
IN	Guy Boruff	Enfocement	Gboruff@indot.un.got	(317) 899-8605
IA	Rodney Rhiner	Sergeant	N/A	1-800-925-6469
KS	Dacid McKee	Sergeant	N/A	(913) 296-7903
KS	John Culbertson	Bridge Evaluation Engineer	N/A	(785) 296-4434
KT	Mike Boyer	Technical Officer	N/A	(502) 564-3276
LA	Chief Maclinton	Enfocement	Maclinton@dotd.la.gov	(225) 377-7100
LA	Ronny Randall	Weight and Standards Weight Captain	N/A	(225) 337-7100

State	Contact / personal	Position	Email	Phone
MA	Thomas Fitzgerald	Police Officer, State Police Department	N/A	(978) 369-1005
MA	Mike Liions	State DOT Transportation Division	N/A	(508) 473-4755
MD	Manoj Pansare	Motor Carrier Division	Mpansare@sha.state.md.us	(410) 582-5730
ME	Tim Bolten	DOT Overweight Truck Division	N/A	(207) 624-3559
ME	Thomas Kelley	Overweight Truck Enforcement Unit	N/A	(207) 624-8932
ME	Ron Cote	WIM electronics	N/A	(207) 624-3206
ME	Dan Robins	WIM leader	N/A	(207) 624-3631
MI	Jim Charles	Lieutenant	N/A	(616) 784-8362
MS	Willie Huff	Office of Enforcement	Whuff@mdot.state.ms.us	(601) 359-1707
MO	Mager	Commercial Vehicle Officer	N/A	(866) 831-6277
MT	Dennis Hult	Enforcement	Dhult@mt.gov	(406) 444-9237
MT	Dan Moore	Weight Enforcement Officer	Dmoore@mt.gov	(406) 444-0454
MT	Gary Marten	N/A	N/A	(406) 444-6130
MT	Mark Mobealy	Weight Enforcement Officer	N/A	(406) 444-6139
NC	William Nichols	Enforcement, Captain	Wmnichols@ncshp.org	(919) 715-8683
ND	Doyle Schultz	Director of Motor Carrier Operations	N/A	(701) 328-2500
NE	Jim Doggtt	Lieutenant	N/A	(402) 471-0105
NE	James Brokaw	Enforcement	jdrokaw@nsp.state.ne.us	N/A
NH	Wayne Peasley	Sergeant	N/A	(603) 271-3339
NH	Kyle Aspinwall	Police Officer, State Police Department	N/A	(603) 271-3339
NM	Chris Mandrant	Lieutenant	N/A	(505) 827-0569
NV	Brad Smith	Sergeant	Bsmith@dps.state.nv.us	N/A
NV	Tony Rivera	Enforcement	Trivera@dot.state.nv.us	(775) 888-7444
OH	Tony Manch	Traffic Data and Enforcement	N/A	(614) 466-3075
OH	Mike Sanders	Lieutenant	Msanders@ops.state.oh.us	(937) 655-9189

State	Contact / personal	Position	Email	Phone
OH	Weakly Knuaff	Staff Sergeant	N/A	(614) 752-4859
OK	Craig Medcalf	Trooper S	cmedcalf@dps.state.ok.us	(405) 521-6105
OK	Lambdin		glambdin@dps.state.ok.us	N/A
OR	David Fifer	Dot Enforcement	David.a.fifer@dot.state.or.us	N/A
PA	Lance McFee	N/A	N/A	(717) 783-8776
SC	Bailey	Lieutenant	Lbailey@sc.stp.org	(803) 896-4742
SD	Fahay	Captain	N/A	(605) 773-4578
SD	Noel Gabriel	First Sergeant	N/A	(605) 773-4578
TX	David Palmer	Captain; Dept Public Safety	N/A	(512) 424-2053
UT	Ron Butler	Motor Carrier Manager	N/A	(801) 965-4522
UT	Stephanie Johnson	Motor Carrier Enforcement Division	Stepheniejohnson@utah.gov	(801) 965-4261
VA	Ralph Wigton	Enfocement	Raph.wigton@dmv.virginia.gov	(804) 367-6609
VA	William Childress	Deputy Director	William.childress@dmv.virginia.gov	(804) 367-6745
VT	John Bliss	Police Officer, State Police Department	N/A	(207) 624-3559
VT	Dorothy	DOT secretary (very helpful)	N/A	(207) 828-0278
VT	Carl Parton	Enforcement	Carl.parton@state.vt.us	(802) 828-6584
VT	Ron Macie	DOT	N/A	(805) 828-2067
WA	Douglas Deckert	Enforcement	Deckerd@wsdot.wa.gov	(360) 705-7364
WI	Greg Teasdale	Enforcement	N/A	(608) 266-0305
WV	Jeff Davis	Dot	N/A	(304) 558-3723
WY	Jerry Downs	Enforcement	Jerry.downs@dot.state.wy.us	(307) 777-4355
WY	Vince Garcia	N/A	vgarcia@dot.state.wy.us	(307) 777-4312

APPENDIX D

IRD Contact Information:

Representatives:

Mr. Joe Madek
Vice President U.S. Sales
Ph: 480-443-4711
Fax: 480-609-1642
joe.madek@irdinc.com

Mr. Brian Taylor
Vice President of Technical Systems and Business Development
Ph: 306-653-6611
Fax: 306-242-5599
brian.taylor@irdinc.com

Mr. Craig Lindsay
Systems Specialist
Ph: 306-653-9669
Fax: 306-242-5599
craig.lindsay@irdinc.com

Official Website:
< www.irdinc.com >

WEIGH-IN-MOTION MAINLINE SORTING SYSTEM SPECIFICATIONS

All to conform to latest version ASTM -1318-02 specifications

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1 System Introduction

The Mainline Sorting System is to be utilized at a weight enforcement station to pre-weigh vehicles and provide direction to vehicles in motion as they approach along the mainline towards the Weigh Station. Changeable Message Signs (CMS) will be utilized along the mainline to direct vehicles to report or bypass the weigh station based on their perceived level of compliance as determined from the mainline pre-screening WIM system. The system will also include Open/Closed Signs and Weigh Station Changeable Message Signs (CMS).

The sort decisions will be based on compliance of speed, side to side balance, height limit, axle weights, axle group weights, and gross vehicle weights with the pre-set tolerances.

The Mainline WIM System shall include various components that interact together. The components shall include the following:

- Weigh-In-Motion (WIM) Scales
- Side-fire videocapture
- WIM Computer System
- Axle and Loop detection
- Overheight detector
- Printer
- Weigh Station Changeable Message Signs
- Open/Closed Sign
- On-site Communication System
- AVI with Pre-pass Interface

The scope of work is to supply and install the following:

- WIM Scales, axle sensors, loops, and cabinet.
- Overheight detection installation.
- Overview image camera installation.
- Tracking loops
- New communications conduit and wiring for all new equipment.
- Power wiring and conduit.
- Weigh Station Changeable Message Signs.
- Open/Closed Sign
- On-site Communication System

The objective is to have a fully operational Mainline Sorting System capable of accurately and automatically pre-screening vehicles in motion for enforcement purposes. Based on the weights obtained from the WIM screening, the system shall automatically direct the selected vehicles to the enforcement scales, as illustrated in the attached plans and these specifications.

The purpose of this project is not for the research and development of a system which might perform the objectives as described above. Therefore the Contractor shall be required to furnish documentation which demonstrates to the satisfaction of the Department that all equipment proposed for use in the Mainline WIM Sorting is of standard manufacture; that the manufacturer has had similar equipment available for purchase for not less than ten years; and has a proven acceptable performance history while in use under conditions similar to those for the intended use.

As a minimum, the equipment documentations provided by the Contractor shall include the following:

1. Detailed description of how the system requirements will be met.

2. Drawings showing control and display panels with descriptions.

3. Manufacturer's name and model number, supported by descriptive material for (but not limited to) the standard package components with all accessories identified under "Description." Submittals shall be supported by descriptive material, such as catalog cuts, diagrams, and other data published by the manufacturer, to show conformance to specifications and plan requirements.

4. Document successful interface with Prepass E-Screening System. A list of five (5) references with names, addresses, and persons to contact for similar installations.

5. A list five (5) owners with names, addresses, person to contact, and telephone number for similar installations (Mainline WIM enforcement) which have been in

regular use for a period of not less than five years. The Department reserves the right to request the owner's evaluation of in-service equipment.

2 Mainline WIM Operational Overview

The Mainline WIM Sorting System shall consist of the following subsystems:

1. Mainline WIM System
2. Mainline Lane Control System
3. Mainline Compliance System
4. Enforcement Camera System
5. Station Computer system
6. Data Collection System

2.1 Mainline WIM System

Commercial vehicles approaching the weigh station shall be directed into the right hand lane by means of static signing as provided by the Oklahoma Department of Transportation. A vehicle approaching the weigh station will pass over the Mainline Weigh-In-Motion (WIM) system, which is embedded in the highway approximately 3000' prior to the weigh station exit ramp. The right lane will be equipped with WIM Scales that meet ASTM E 1318-02 Type III accuracy and reliability. WIM electronics will be located at the roadside adjacent to the WIM scales and sensors, and will process the information collected by the in-road equipment.

The WIM system will collect axle weight and spacing, vehicle speed, classification and other relevant data to create a vehicle record. An overview image of the passing vehicle will be combined with the vehicle record. Based on a comparison of the vehicle record to the parameters set by the station operator, the WIM system will make a sort decision and advise the driver to either exit or bypass the weigh station via the changeable message signs (CMS) located on the side of the road. However, the actual sorting operation can be overridden by the operator using the manual console control in the weigh station. Non-violating vehicles may be randomly selected from the mainline for visual inspection at the scale house.

A vehicle classification system shall be installed in the left lane in order to detect commercial vehicles bypassing the scales in the right lane.

2.2 Mainline Lane Control System

Changeable Message Signs (CMS) shall be used to communicate with the driver after a mainline vehicle analysis has been completed. The Lane Control System (LCS) shall consist of two changeable message signs and three inductive loops, which is installed along the side of the roadway approximately 1200' from the advance WIM system. The LCS system shall be controlled by the roadside WIM electronics, which receives the sort decision from the Station Computer. The LCS system ensures that the sign ON/OFF switching is synchronized according to the detection and tracking of a vehicle passing

over strategically placed loops. In this way, only the vehicle for which the message is intended will see the illuminated sign.

Typical roadside sign messages are as follows:

Message 1: TRUCK MUST EXIT
TO WEIGH STATION

OR **Message 2:** TRUCK BYPASS
WEIGH STATION

2.3 Mainline Compliance System

A compliance system shall be located on both lanes of the mainline downstream of the ramp exit. The system shall consist of two sets of piezoelectric vehicle classification configurations to track the commercial vehicles that bypass the weigh station. A piezoelectric tracking system shall also be located on the ramp in order complete the vehicle tracking system.

2.4 Enforcement Camera System

The enforcement camera system will consist of an overview image camera mounted alongside the roadway on the Mainline. This camera will capture an image of passing commercial vehicles to be linked with the vehicle record as an identifier. The camera will be capable of full color photos during daytime operation, and black-and white near-infrared images during nighttime operation. The camera system electronics, which will be located with the other System Electronics, will store the image and will link it with the correct vehicle record.

2.5 Station Computer System and Operator Interface

Using the Station Computer, the operator may set the sorting threshold and allow for random sorting. The sorting threshold determines at what percentage of legal weight a vehicle must be measured to be required to report. In this way, the operator may set the WIM to bring in the maximum number of trucks that the station can process, without exceeding the station capacity. Random sorting allows the operator to require a set percentage of compliant trucks to report. This allows the enforcement officials to perform random safety checks on otherwise compliant trucks.

The computer system will receive the WIM record from the roadside WIM electronics. The sorter computer contains electronic files that will be used to ascertain weight compliance. After the sorter computer creates the WIM record, it will immediately begin to analyze the data contained in the record in order to determine whether the vehicle weights and dimensions are within local compliance regulations. If the measured vehicle weight is within the allowable limits, the driver will be given a bypass message. If the vehicle is not compliant or if it is randomly selected for inspection, the driver will receive a message to report to the weigh station.

2.6 Data Collection System

Vehicle information is to be collected continuously by the roadside WIM electronics at the Mainline WIM locations. This information shall be made available to the user and a variety of reports summarizing the data can be generated. This data can be shared between departments if the agency responsible for weight enforcement is separate from the roadway maintenance, planning and/or design departments.

2.6.1 Capabilities

An operator at the site may download the vehicle data directly from the roadside WIM System Electronics, or the data may be transferred to a remote location via modem.

Manufacturer host software can be used to automatically call one or several WIM systems to obtain traffic data from the site. The user configures the frequency of the calls and the information to be obtained. Once the data has been obtained, office analysis software capable of computing various classification schemes shall be used to provide various report capabilities based on the data collected. This system shall store a least 60 days of vehicle records (over 2 million vehicle records) in a compressed format.

2.6.2 Information Available

The following information shall be made available from the data collection feature of the Mainline system:

- Reports over any selected time period in hourly increments, daily, weekly, or monthly.
- Summary of vehicle speeds.
- Summary of vehicle classification counts.
- Equivalent Single Axle Load (ESAL) count.
- Reports on the number of violating and non-violating axles, axle groups and gross vehicle weights.
- User selected reports based on adjustable parameters such as periods and vehicle types.
- Customization for generating reports for specific needs that are not available using basic parameters.

3 WIM System Functional Requirements

3.1 Mainline

3.1.1 WIM Scales

The accuracy of the WIM system will be in conformance with ASTM E 1318 -02 “Standard Specifications for Highway Weigh-in-Motion (WIM) Systems with User Requirements and Test Method” performance requirements for a Type III system.

The Contractor shall grind the concrete roadway beginning 200 feet prior to the scale location and ending 100 feet after the scale location, for a total of 300 feet, with a minimum 36 inch blanket grinder to ensure the roadway meets the requirements of Section 6 of ASTM E 1318-02.

The WIM scales shall be constructed of two independent weighing platforms placed across a roadway. The WIM scales shall measure approximately 144" x 38" including frame. Each scale module shall be a self-contained weighing unit. Each scale module shall measure approximately 72" x 38" including frame.

The WIM scales shall operate properly in a temperature range of -40°F to +160°F. The WIM scales shall be weather-sealed. The WIM scales and their frames shall be rust proofed. All installation hardware shall be either stainless steel or rust proofed.

There shall be two scale frames into which the two scale modules are mounted. The WIM scale shall be installed flush with the road surface.

The WIM scales and frames shall be grounded with ground rods. per manufacturers recommendations. The signal processing electronic components/modules shall be protected against lightning.

3.1.2 Axle Sensors

The Mainline WIM system shall use axle sensors in each lane for WIM or classification operation. The axle sensors shall be Class I piezoelectric and approximately 12 feet in length.

The axle sensors shall be installed below the road surface. The axle sensors and their electrical wiring connector shall be completely water tight and sealed.

3.1.3 Detector Loops (to be per Oklahoma specification standards)

The Mainline WIM system shall use detector loops to detect the presence, entry or exit of a vehicle in support of WIM and classifier operations.

For the Mainline WIM operation, the sensor configuration shall be:

"loop -- WIM scale -- axle sensor -- loop".

For classifier operation, the sensor configuration shall be:

"loop -- axle sensor – axle sensor -- loop".

Each detector loop shall have a minimum loop area of 1.83 m x 1.83 m with 45° angle cut at the corners.

Loop wire must be 1 conductor, 14 AWG, IMSA 51-5. Loop leads must be 2 conductor, 14 gauge, IMSA 50-2 cable.

All saw-cut loops shall be sealed with 3M loop sealant.

For each CMS there shall be a detector loop. Loop detectors shall be provided for interface to these detector loops. Loop detectors shall be installed in the WIM system electronics of the Mainline WIM system. The Mainline WIM system shall use the signals from these detector loops to switch the message of each CMS. CMS signs shall be switched in a tracking sequence to direct a sorted vehicle to enter the weigh station.

3.1.4 Compliance System

The compliance system shall consist of vehicle detection loops and axle sensors in the following configuration:

"loop -- axle sensor – axle sensor -- loop".

The compliance system shall monitor vehicles signalled to bypass or report the Weigh Station. It will be interfaced to the WIM Computer.

An alarm will be sounded on the manual console in the event that a commercial vehicle does not take the lane as directed by the Lane Control Signals.

3.1.5 WIM Electronics

The System Electronics shall be capable of receiving and analyzing the data gathered from the Mainline WIM Sorting System locations. The Electronics shall also be responsible for communicating and transmitting vehicle weight data from the WIM site to the Scale House.

The System Electronics shall be capable of receiving inputs from the WIM scales, loops and piezoelectric sensors, as well as serial and digital devices. Output control options shall be included for a variety of serial, digital and AC power devices, such as CMS, LCS and printers.

The system shall be compatible with automatic vehicle identification (AVI) equipment, including communications ports and software.

All sensor modules shall be field replaceable and every module shall feature self-testing and built-in fault diagnosis. The interface modules shall be mounted in a sub-chassis.

The Mainline WIM system shall be provided with a roadside cabinet to house the System Electronics, the WIM computer and its peripherals and the overview image freeze frame camera equipment. The Overheight unit electronics located at the WIM location shall be housed in the WIM cabinet, as well as the other system peripherals at the location. The electronics for the AVI reader located on the Mainline WIM section shall be supplied by others.

The roadside cabinet shall be lined and insulated and shall be installed with a fan. All cutouts and openings shall be vermin proofed.

All wires from scales, offscale sensors, axle sensors, loops, sign control lines, shall be terminated on terminal strips, or screw terminal connectors. The terminal strips shall be identified by terminal strip number and screw connection number. These terminal strips shall be readily accessible. All cables shall be long enough to easily reach these terminal strips. Terminal strips, splices, or other type of connections prior to these standard terminal strips shall not be allowed except for splicing of a loop to a shielded twisted loop lead.

All AC power connections shall be shielded to prevent electrical shock.

The System Electronics shall abide by the following requirements:

Communications	CAN Bus environment for very extensive sensor and control configuration. On-board Ethernet interface (wireless or fibre) One RS-232 serial interface dedicated to external interface. One RS-232 serial interface dedicated to remote administration facilities (modem dial-in). Local user interface for system configuration and fault diagnosis. Remote administration via Telnet or Windows remote desktop. Remote file download via FTP.
Peripherals	• Non-volatile storage for vehicle information to prevent data loss during power outages: Compact Flash cards from a minimum of 32 MB up to 4 GB. • Sensor inputs from WIM Scale, loop and Piezo. • Output control for CMS and LCS.
Software	• Records data logs on operational status, power supply condition and safety system activity. • Weight Compliance and Classification with user-defined classification scheme. • Serial output compatible with Help, I75 and others. • Automated Mainline and Ramp Weigh Stations • Data Analysis and Reporting.
User Interface	• Local through handheld keypad or laptop PC in terminal mode. • Remote through a dial-up modem to a PC in terminal mode. • Telnet over the Ethernet Interface
Digital I/O Module	• Report on rising edge, falling edge or both • Adjustable input debounce • Control output state, single pulse, or square wave • Adjustable timeout on inputs

3.1.6 Video

The Camera System shall consist of the following system components:

1. Color and Black/White video camera
2. Illuminator system
3. Video capture system

The video system shall monitor traffic flow on the mainline. It shall capture still images of trucks having violations for identification and enforcement purposes. The images shall be displayed on an operator interface located in the scale house. Each vehicle record number shall be displayed with the vehicle image.

One camera shall be provided and installed on a pole located near the Mainline WIM location. The camera shall provide overview images of the passing commercial vehicles, detailing their cab and side. Color images shall be provided for daylight use, and black/white images shall be provided for night use.

The video capture system shall be located in one of the System Electronics. The video capture system shall provide control and display facility to display video outputs from one source to one monitor.

3.1.7 CMS

The Mainline Lane Control System (LCS) shall consist of the following system components:

a. 2 x Changeable Message Signs (CMSs)
b. Detector loops as needed to track vehicle compliance.

The LCS shall direct vehicles to enter the weigh station or bypass the station, based on the results of the mainline sort decision.

The LCS shall consist of two CMS which are sequentially switched by the Mainline WIM system. The LCS, under control of the Mainline WIM system, shall synchronize the sign switching upon detection of the tracked vehicle passing over or through strategically located detector loops.

Each CMS shall be capable of displaying the following two (2) messages:

Message 1:

TRUCK MUST EXIT
TO WEIGH STATION

Message 2:

TRUCK BYPASS
WEIGH STATION

Each message character shall be 5.5 inches high. The sign shall have a viewing angle of 90 degrees horizontally, and 40 degrees vertically.

The CMS shall be mounted on a breakaway steel sign support which meets crash requirements as set forth by NCHRP 350 and approved by an engineer licensed in the state of Oklahoma.

The messages must be clear and legible under any lighting conditions. When not energized, the sign shall completely blank out without any ghost images. Scale House

3.1.8 Operator Display

The system shall provide an operator display at the scale house. The operator can monitor vehicle movements, view and print reports and adjust system parameters (i.e. alter message signs, adjust random sorting %, adjust overweight %, etc.) using the operator console and the operator display. The operator display contains the following windows:

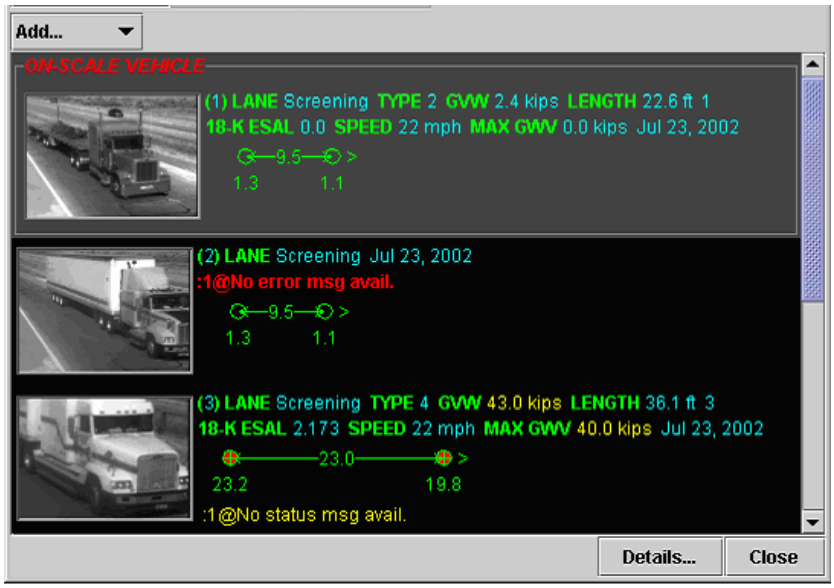
- Vehicle Display Window (displays will vary by manufacturer)
- Station Controls
- Manual Override Controls

The Vehicle Display Window shall display:

- ESALS,
- speed,
- gross vehicle weight,
- time and date,
- individual axle weights,
- spacing, and
- tandem weights as measured by the WIM Computer.

This display shall also provide control over the system sorting parameters. Using this screen, the operator shall be able to control the changeable message signs located on the mainline.

Each vehicle record shall contain a digital image of all vehicles and shall be similar to the following examples.

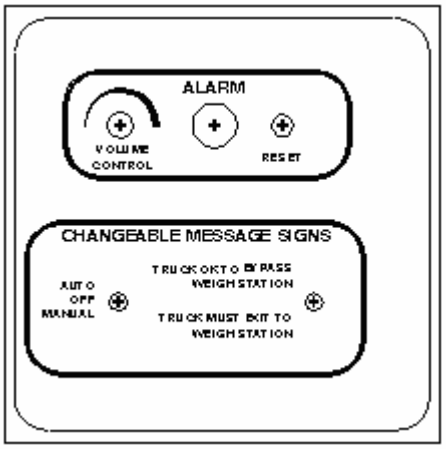


3.1.9 Station Controls

A Station Controls Window shall be provided to set the system parameters which control the sorting boundaries used when directing vehicles. The control window shall offer control options similar to those illustrated below.

3.1.10 Manual Override Console

A Manual Override Console shall be provided as an interface that allows the operator to override the Mainline WIM System in order to gain control of various system components. The Manual Override Console shall be similar to the one illustrated on the following page with additional switches installed to control the changeable message signs downstream of the scale house.



3.2 Station Computer

The Station Computer shall provide the following functions:

1. Perform single-lane WIM operation. (WIM Computer only)
2. Weigh all vehicles travelling on the right lane. (WIM Computer only)
3. Classify all vehicles travelling on all instrumented lanes of the highway.
4. Perform weight compliance analysis on vehicles in accordance with Oklahoma DOT regulations. (WIM Computer only)
5. Perform sorter operation in accordance with decisions based on weight compliance analysis, other violations (speeding, improper manoeuvre, sudden speed change, etc.), Station Control Console selection/override, and operator selected action.
6. Insert sequence numbers for vehicle records for tracking purposes.
7. Track vehicle movement in the execution of sorter operation.
8. Control message display of the CMS/LCS of the LCS to synchronize with the movement of a vehicle being tracked.
9. Perform data collection, data storage, file management and report generation functions for collected vehicle information.

3.3 WIM Computers

The combination of the Station Computer and Operator Display (WIM Computer) shall have client applications to:

1. Display operation status and control of the Mainline Sorter System.
2. Display vehicle records of the Mainline WIM system.
3. Print display screen of the Mainline Sorter System.
4. Generate reports from vehicle records.
5. Display and print generated reports.
6. Set up and configure the operation of the Mainline WIM system.
7. Set up and configure the operation of the Mainline Sorter System.
8. Initiate and reset traffic counting operation of the Mainline WIM Sorter System.
9. Perform maintenance functions of the WIM systems.
10. Set up and control the operation of the CMS.

The system status window shall display the following information:

1. Time and date
2. Overweight violation threshold setting
3. CMS control selections: automatic (by WIM operation) or manual (by operator action)

The WIM Computer shall insert sequence numbers to vehicle records to correspond to the sequence of arrivals at the WIM location. A vehicle record shall consist of the following information for display:

1. Vehicle record number
2. Vehicle lane
3. Vehicle weights; GVW and individual axles
4. Vehicle speed
5. Number and spacing of axles
6. Total vehicle length
7. A side-fire image of the vehicle cab
8. 1-line error message to indicate either type of violation or other information

A vehicle record shall be displayable in either graphic form or in text form, as per manufacturers discretion, and as indicated examples below:

GRAPHICAL DISPLAY FORM

```
256) LANE #1     TYPE 12       GVW 57.1 kips        LENGTH 67 ft
   18-K ESAL 1.60   SPEED 62 mph   Sat Jul 1 15:30:45, 1992
   MAX GVW 80 kips

 |<------------------67 ft------------------>|
 o   o               o   o       o
11.8 11.9             11.7 11.5     10.2
```

```
            Real Time View                                11:23:17 PM

02528   2:24p   4-Mar-1992   Lane:1   Cls:9   ESAL:2.15   Spd:54
Grs:68880


1...........2.....3.................4.....5
|----12.8----|-4.4-|--------28.9-------|-4.4-|
|-------17.2-------|
             |--------------37.7-------------|
|--------------------50.5--------------------|

Axle    1      2      3      4      5
Rght  4960   8220   8580   5300   5360
Left  5480   9580   7860   5920   7920

Totl 10440  17500  16440  11220  13280
Tandem             33940        24500

InBr 1-3 44380  2-5 58440
```

The length from axle to axle shall be shown on a linear scale with axle spacings plotted below the scale line. An asterisk or red text shown at the axle spacing shall indicate the location of an overweight axle or axle group. The report operates in a scroll mode.

When a vehicle passes over the WIM scale, its corresponding vehicle information consisting of vehicle configuration (i.e. number of axles and their groupings) and axle spacings are displayed at the top window.

An alternate to the first format, graphical as above, is a tabular presentation as below OR, as designed by the manufacturer and approved by the state.

TEXT DISPLAY FORM

256) LANE #1 TYPE 12 GVW 57.1 kips LENGTH 67 ft
18-K ESAL 1.60 SPEED 62 mph Sat Jul 1 15:30:45, 1992
MAX GVW 80 kips

	UNIT SEPARATION (in)	WEIGHT (lb)	ALLOWABLE (lb)
1		10,221	20,001
2	116	11,501	17,001
3	54	11,694	17,001
4	450	11,892	17,001
5	56	11,826	17,001

The WIM Computer must display weighing operation advisory information as follows:

- Missed Scale - A vehicle has missed the scales i.e.: loops triggered but no axle counts)
- Offscale - One or more of the offscale detectors was triggered during the weighing operation
- Traffic is backing up close to the WIM scale. A traffic backup has cleared
- Vehicle Speeding
- Vehicle missed tracking loop detector
- Vehicle entered wrong lane
- Vehicle changed speed over scale

The WIM Computers shall support button functions to bring up menus or to toggle to:

1. Select control mode for the LCS.
2. Advance to next page of vehicle record display
3. Select main menu for other computer operation.

Violations shall be highlighted in the vehicle record display.

The WIM Computer shall buffer vehicle records for display purposes. The buffer shall represent multiple pages of windowing display.

The WIM Computer shall have application programs to detect prolonged power failure conditions to initiate orderly shut down operation of the Mainline Sorter System.

The WIM Computer shall have application programs to generate the following reports:

1. Number of vehicles per lane by class and by hour for a selected period.
2. Number of vehicles per lane by speed range for a class for a selected period.
3. Number of vehicles per lane by speed range and by hour for a selected period.
4. Axle and GVW weights by class for a selected period.
5. Number of vehicles per lane by weights, by class and by hour for a selected period.

A selected period for report generation shall include starting date and time and ending date and time. Reports shall be generated manually by operator action.

The WIM Computer shall have utility programs to list vehicle record files, transfer vehicle record files, sort vehicle record files and purge vehicle record files. Vehicle record files may be purged manually by operator action or automatically upon expiration of a preset archival period. Only those expired records shall be automatically purged.

The WIM Computer shall provide a manual console. The manual console shall provide the facility for an operator in a weigh station to select the control operation of the Mainline LCS manually. The manual console shall provide two switch selectable functions:

a. Select automatic control of the LCS by the mainline WIM system or the manual control of the LCS by the operator.
b. In manual control mode of the LCS by an operator, set the LCS to direct all mainline traffic to enter or bypass the weigh station.

The manual console shall have visual indicators to identify the mode of control of the LCS.

The override signal control console will be located adjacent to the scale house display. It will provide the ability for the operator to manually override the directional signals. Vehicle movement information will be displayed using LED indicators on a graphical panel representing the overhead layout of the station. The LEDs will activate when the appropriate sensor is activated. In addition, the layout display will have LEDs representing the color and status of the directional signals. The LEDs will continuously display the status of the overhead signals.

The Override Signal Control Console must be operational independent of the weigh in motion interface electronics, to control all directional lights (i.e. the override console shall remain operational even if the sorter computer is not functioning).

4 Conduits and Pull Boxes

All cables shall be in conduits unless specifically approved by the Engineer. All pull boxes are to meet Oklahoma DOT specifications.

All materials shall comply with the "National Electrical Code" and the current State Standard Specifications for Highway Construction, "Highway Division Standard Drawings for design and Construction", and special requirements by State weigh in motion and automatic vehicle identification system specifications. Duct seal shall be used to seal all conduits in the cabinets and in all junction boxes. All conduits shall have a polyethylene pull string with at least 210 pound break strength left in place at completion of construction.

Separate conduits shall be used for AC/DC power and low voltage signal cables. Low voltage signal cables shall include video, digital communication, sensor signal cable, and sensor excitation cables where voltage is under +/- 20 volts DC. Conduits for video and RF cables shall be of a large enough size to accommodate the maximum bend radius using factory 90 degree “bends”.

All cables shall be in conduits unless specifically approved by the State.

5 System Acceptance

The Mainline, WIM System shall be accepted subject to fulfilling the following conditions:

1. System review
2. Acceptance tests (meeting WIM accuracy on a weekly basis).
3. Training

5.1 System Review

The WIM Vendor shall submit six (6) copies of a system layout for each individual site. These layouts shall be submitted to the State for review. Approval shall be either an official from the State or a designate.

A preliminary on-site meeting shall be held for each site to discuss contractors' plans for the routing of conduits, cables, and placement of equipment.

5.2 Acceptance Tests

The Mainline WIM System, all inclusive as contracted, shall be designed, built and tested by the Vendor, and as proof of operation, the systems, overall and singularly, shall be tested at various times according to the test specifications. All field tests shall be performed by the WIM Vendor and observed by the State with all reports submitted to the State.

5.2.1 Factory Acceptance Tests

Prior to shipment of any equipment, Factory Acceptance Tests shall be performed for each system to verify the equipment operating as described in the contract documents and

in accordance with the test specifications approved by the State. The Factory Acceptance Tests shall include at minimum the following:

1. A physical inspection to verify that the quality of material and workmanship satisfy specified requirements and standards and that the equipment and software under test are complete and ready for delivery.

2. A functional test to verify that the equipment and software operate as described in the contract documents.

3. A performance test to verify that the equipment satisfies performance and operation criteria.

For the purpose of these tests the equipment and software shall be configured as nearly as possible to the final configuration. Any field inputs not available at the factory test site shall be simulated to provide a close approximation to actual site conditions.

5.2.2 Site Acceptance Test

After all the equipment and software have been installed at the site, the Vendor shall run tests to ensure that all equipment shall operate as specified therein contract documents. These tests shall be witnessed or conducted by the State within one week of the manufacturer notifying the State that the system is ready for testing.

5.2.3 Continuous Operating Test

Following successful completion of the Site Acceptance Test, a Continuous Operating Test shall be conducted for a period of fifty six (56) calendar days. During this period the weigh station and its Weight Sorter System shall operate under normal conditions and attain a Level of Service of 98.0% or better of the total station operating hours within any period of 56 consecutive days.

The Weight Sorter System shall be considered unavailable when:

1. A major system component completely fails which significantly degrade the performance or operation of the weigh station. This situation is said to have prevailed if either the WIM system or the communication system has failed.

2. More than one system component fails to operate or respond to operator commands and/or system automation for more than thirty minutes.

3. Weekly WIM accuracy is not met.

During the continuous operating test, the entire Mainline WIM System shall be fully operational under normal traffic conditions and operate trouble free for 56 consecutive days. During the continuous operating test the WIM accuracy test/database shall be

printed by State personnel and met weekly as previously specified for the Mainline System.

In the event the one of the above mentioned conditions persists and the specified availability cannot be achieved, the WIM Vendor will be informed and problem(s) shall be corrected and the continuous operating test shall start over until 56 continuous days of trouble free operation are experienced. This re-start can only occur three times. In order for this test to be valid, the static scale must be fully operational for the 56-day period. The WIM Vendor must leave the site prior to the start of the continuous test and may only return if a problem is encountered or accompanied by the engineer.

The State shall issue a Certificate of Final Acceptance upon successful completion of the Continuous Operating Test and training program.

This calibration/acceptance procedure follows latest version ASTM E1318 Standards. Calibration is to be performed by the running of one (1) calibration truck. The five (5) axle, test vehicle should be of a tractor/trailer combination (3S2), complete with air ride suspension and a non-shifting static load. The truck will be loaded to within 90 to 100% of allowable Gross Vehicle Weight for the road under test. The truck will be in excellent mechanical condition.

The calibration procedure is as follows:

1. The vehicle will be weighed at a government certified static weigh scale. The weight information on the front (single axle), drive (tandem axle group), and trailer (tandem axle group), should be recorded. The Gross Vehicle Weight (GVW) of the vehicle will be calculated by adding the three weights together

2. The distance between the five (5) individual axles on the truck will be measured and recorded.

3.The test vehicle will make three (3) test passes over the system under test at a selected speed which is indicative of the truck traffic at the site. Adjustments will be made by vendor personnel on site during this time to fine tune the axle spacing, and weight output of the WIM system.

4.Once all initial adjustments have been made, the test vehicle will make an additional two (2) test passes to confirm the accuracy of the adjustments. If all the readings fall within the latest version ASTM ranges for the WIM Type under test, and vendor personnel do not feel that additional adjustments are required, the tests will continue. If this is not the case, additional adjustments will be performed and two (2) more confirming passes will be made by the test truck.

5.The test truck should then make an additional ten (10) passes at a selected speed that is indicative of the truck traffic at the test site.

6.All of the data should be recorded and placed into a spreadsheet.

7.The mean error and standard deviation for all recorded measurements will be calculated at the end of the ten (10) test passes. The calculations will be as follows:

A. For weight measurements, the percent error for each test pass will be calculated using the following formula:
[(WIM Weight - Static Weight)/Static Weight] x 100 = % error

B. The mean error for each weight type (single, group, GVW) will be calculated as follows:
% errors for single, group or GVW/# of samples = Mean error
(Each weight type calculated individually)

C. The error for individual axle spacings will be calculated using the following formula:
10 of [(WIM Axle Spacings - Actual Axle Spacing)]/10 = Mean Axle Spacing Error
(Each of the four axle spacings calculated individually)

8.All of the calculated errors will also be entered into the spreadsheet.

9.A check will be made of the calculated result against the acceptable range for the latest version ASTM WIM Type under test. There will be one of two results:

A. If 95% of all recorded test results, (single axles, axle groups, GVW, axle spacing) fall within the specified tolerance for the latest version ASTM WIM Type under test then the system will have passed the requirements.

B. If less than 95% of the calculated differences fall within the specified tolerance for the latest version ASTM WIM Type under test then the system will be readjusted and an additional ten (10) test passes will be required to retest the system.

10.The testing will continue until the system passes all criteria according to latest version ASTM E1318 Standards.

6 Training

The Vendor shall set up and conduct formal training programs for state personnel on the operation, maintenance and installation of the system components of the Mainline WIM System. The training shall include the following:

4. Two half-day operator training sessions providing an introduction to the operation and installation of the Mainline WIM System, and to the functions performed by the

major system components. A class size of up to eight individuals per session can be expected.

5. Two one-day "hands-on" guidance sessions for operators in the operation of the systems. A class size of up to four individuals per session can be expected. This training will occur during the first two days of the Continuous Operating Test.

The training program will be scheduled the week following the completion of the operations test.

The cost for the first training sessions shall be included in the contract price. Oklahoma DOT shall, from time to time review any future training requirements. The WIM Vendor shall agree to provide future and additional training sessions upon receipt of requests from Oklahoma DOT. Oklahoma DOT shall reimburse the WIM Vendor the cost of providing additional training sessions on a per diem basis and at a rate agreed upon by Oklahoma DOT at the time of the request. Oklahoma DOT shall provide classroom space for training session.

7 Warranty

The WIM Vendor shall warrant all subsystems and system components as supplied for ten (X) years from the date of issuance of the Certificate of Final Acceptance of the Mainline WIM System by the Engineer.

The warranty shall cover all system components, hardware and software, included in the contract for any defects in material and workmanship. This shall include:

- All loops, WIM Scales, off scale sensors and piezoelectric sensors on site,
- Interface operations, system electronics and housing cabinet,
- WIM cables, connectors, terminal strips and back-up batteries,
- Notification signs.
- Structures,
- Communication systems, and
- Camera and video equipment and technology.

The warranty agreement shall include:

- Routine maintenance service scheduled at 6 month intervals,
- Emergency repair service, and
- Operator refresher courses.

The weight sorter equipment shall be warranted by the WIM Vendor, in writing, against defects in or from material, workmanship, lightning, and to perform as required by these technical special provisions, giving proper and continuous service under all conditions required and specified, or which may reasonably be inferred, for a period of (X) years from the date of acceptance. The written Vendor's warranty shall be furnished to the

State by the Vendor at the time the equipment performance supporting data is submitted. The equipment weighing instruments, load cells, weigh bridge, hardware, and software shall be warranted by the manufacturer, in writing, against defects in or from material, workmanship, lightning, and perform as required by these technical special provisions for the period of (X) years or as described above from the date of final acceptance of the project.

7.1 Scheduled Maintenance Service

The Vendor's routine maintenance on all major systems, system components and ancillary equipment shall be scheduled at 6 month intervals. A semi-annual maintenance report shall be submitted to the State upon completion of the scheduled maintenance service. Scheduled maintenance, Emergency maintenance and refresher training (as required) shall be included as part of the (X) year warranty.

The scheduled maintenance service shall include the following:

1. Visual inspection, signal checks and testing measures on all loops,
2. Cleaning, repair and testing measures on all WIM Scales,
3. Visual inspection and testing measures on all offscale sensors,
4. Visual inspection, testing measures and signal checks on all piezoelectric sensors,
5. Visual inspection and cleaning of cabinet and system electronics,
6. Maintenance of WIM cables, connectors, terminal strips and back-up batteries,
7. Electrical inspection,
8. Cabinet mechanical condition inspection,
9. Heating, ventilation and air conditioning maintenance,
10. Interface card operation inspection, testing measures and maintenance,
11. Notification sign inspection, testing and maintenance,
12. Structural integrity check of all poles and mast arms,
13. Inspection and verification of computer communication systems, and
14. Camera and Video inspection, testing and maintenance.

A report shall accompany the scheduled maintenance service and shall be submitted to the State. The report shall include:

1. Pass/Fail grading of all loops, scales, offscale sensors and piezoelectric sensors,
2. A checklist of all components checked as listed above, as well as the location of the components and comments on their general state, and
3. A checklist and commentary detailing whether each component (as listed above) met standards or required repairs.

7.2 Emergency Repair Services

Emergency repair services shall be completed on an as-required basis. The maximum response time for emergency repair services shall not exceed 72 hours after written receipt of notice by fax. The Vendor shall initiate on-site repairs within 7 days of notification.

7.3 Operator Refresher Courses

In conjunction with the scheduled maintenance services, the Vendor shall provide Operator Refresher Courses on the operation of the entire Mainline WIM system. The courses shall have a maximum duration of four (4) hours and shall be scheduled before or after the semi-annual maintenance service. The course attendees shall be decided by the State.

8 Material

Material used in the construction of this equipment shall be of good commercial quality entirely suitable for the intended purpose. Material shall be free from all defects and imperfections that might affect serviceability of the finished product.

9 Standard Products

The equipment shall be constructed of standard material, so that the prompt and continuing service and delivery of spare parts may be assured. The component parts need not be products of the same manufacturer.

10 Lightning Protection

Ground rod (s) and lightning protection shall be provided as per manufacturers requirements, and installed at all outdoor equipment cabinet locations, scale vault (s), pits, and equipment mounting pole (s) and structure (s). All system components and equipment shall be properly grounded.

Lightning protection devices shall be provided for signal input/output and power connections at any separately packaged electronic signal processing device/equipment.
Lightning protection devices shall be either in the form of terminal boxes equipped with terminal blocks and lightning/transient suppressors or modular lightning protectors. Lightning protection shall be provided.

WEIGH-IN-MOTION RAMP SORTING SYSTEM SPECIFICATIONS

All to conform to latest version ASTM -1318-02 specifications

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1 System Introduction

The WIM Sorting System is to be utilized at a weight enforcement station to pre-weigh vehicles and provide direction to vehicle that has been directed to enter the weigh station ramp. Based on the results of this screening, automatic directional signals shall direct the vehicle to either bypass or report to the scale house for further inspection. The sort decisions will be based on compliance of speed, side to side balance, height limit, axles weights, axle group weights, and gross vehicle weights with the pre-set tolerances.

The Ramp WIM System shall include various components that interact together. The components shall include the following:

- Weigh-In-Motion (WIM) Scales
- Overview image videocapture
- Lane Directional Signals Ramp System
- WIM Computer System
- Axle and Loop detection
- Overheight detector
- Printer
- Open/Closed Sign
- On-site Communication System

The scope of work is to supply and install the following:

- WIM Scales, axle sensing, loops, and cabinet.
- Lane directional signals including support structures.
- Overheight detection installation.
- Overview image camera installation.
- Tracking loops to activate lane directional signals and monitor traffic flow downstream of lane directional signals.
- New communications conduit and wiring for all new equipment.
- Power wiring and conduit.
- Open/Closed Sign
- On-site Communication System

The objective of the Department is to have a fully operational Ramp Sorting System capable of accurately and automatically pre-screening vehicles in motion for enforcement purposes. Based on the weights obtained from the WIM screening, the system shall automatically direct the selected vehicles to the enforcement scales, as illustrated in the attached plans and these specifications.

The purpose of this project is not for the research and development of a system which might perform the objectives as described above. Therefore the Contractor shall be required to furnish documentation which demonstrates to the satisfaction of the Department that all equipment proposed for use in the Ramp WIM Sorting System is of standard manufacture; that the manufacturer has had similar equipment available for purchase for not less than ten years; and has a proven acceptable performance history while in use under conditions similar to those for the intended use.

As a minimum, the equipment documentations provided by the Contractor shall include the following for the Ramp WIM System:

1. Detailed description of how the system requirements will be met.

2. Drawings showing control and display panels with descriptions.

3. Manufacturer's name and model number, supported by descriptive material for (but not limited to) the standard package components with all accessories identified under "Description." Submittals shall be supported by descriptive material, such as catalog cuts, diagrams, and other data published by the manufacturer, to show conformance to specifications and plan requirements.

2 Ramp WIM Operational Overview

The Ramp WIM Sorting System shall consist of the following subsystems:

1. Enforcement Camera System
2. Ramp WIM system

3. Ramp Lane Control System
4. Station Computer system
5. Data Collection System

2.1 Enforcement Camera System

The enforcement camera system will consist of an overview image camera mounted alongside the roadway at the ramp. This camera will capture an image of passing commercial vehicles to be linked with the vehicle record as an identifier. The camera will be capable of full color photos during daytime operation, and black-and white near-infrared images during nighttime operation. The camera system electronics, which will be located with the other System Electronics, will store the image and will link it with the correct vehicle record.

2.2 Ramp WIM System

The accuracy of the WIM system conform with ASTM E 1318-02 Type III "Standard Specifications for Highway Weigh-in-Motion (WIM) Systems with user Requirements and Test Methods" performance requirements for a Type III system. Calibration and accuracy tests shall be performed as specified below. The contractor shall ensure the roadway meets the requirements of Section 6 of ASTM E 1318-02.

The WIM system shall be provided with a roadside cabinet to house the WIM electronics and/or the WIM computer and its peripherals. The WIM computer and its peripherals may optionally be installed inside the Scale Building.

As commercial vehicles enter the weigh station exit ramp at low to medium speeds (10 to 40 mph), the sorter system will continuously and automatically collect truck information including overheight, speed, gross vehicle weights, axle weights, axle spacing, axle groups, and axle imbalances. From this data, the WIM System will determine whether the vehicle is compliant. All vehicle information, including violation information, will be determined in real time and shall be displayed on the scale house operator console.

The system will function under either manual or automatic control. Under automatic control, the compliance system will automatically direct a suspected violator to the static weigh scales and compliant violators to exit the station. A manual console may be used to override the system and will allow the operator to direct all vehicles to either the scale or bypass lanes. The WIM computer will not be able to direct vehicles according to vehicle information collected in this mode, but will continue to display vehicle information to the operator.

The system will have the ability to track the suspect violators using in-road inductive loops while on route to the static scales.

The manual Console will provide manual control to the Weigh Station for the operation of the Changeable Message Signs, Open/Closed Signs, and the Control Gate.

The system should be able to collect continuous data on the vehicles entering the station for statistical analysis. The data collection system should save vehicle information in a

compressed format complete with a date and time stamp. As a result, the information can be downloaded and, with the aid of commercially available software, the user will be able to generate reports based on user inputs. The stored data must be remotely accessible by telephone modem communications.

2.3 Ramp Lane Control System

The ramp lane control system shall consist of an overhead LED CMS system that is linked to the Ramp WIM system. This sign will display a green arrow to an oncoming truck if it is cleared to bypass the static scale; otherwise it will display a red X as a signal to report. The sign will be supported on a pole/mast arm structure.

2.4 Station Computer System and Operator Interface

Using the Station Computer, the operator may set the sorting threshold and allow for random sorting. The sorting threshold determines at what percentage of legal weight a vehicle must be measured to be required to report. In this way, the operator may set the WIM to bring in the maximum number of trucks that the station can process, without exceeding the station capacity. Random sorting allows the operator to require a set percentage of compliant trucks to report. This allows the enforcement officials to perform random safety checks on otherwise compliant trucks.

The computer system will receive the WIM record from the roadside WIM electronics at the ramp location. The sorter computer contains electronic files that will be used to ascertain weight compliance. After the sorter computer creates the WIM record, it will immediately begin to analyze the data contained in the record in order to determine whether the vehicle weights and dimensions are within local compliance regulations. If the measured vehicle weight is within the allowable limits, the driver will be given a bypass message through the ramp lane control system. If the vehicle is not compliant or if it is randomly selected for inspection, the driver will receive a message to report to the weigh station.

2.5 Data Collection System

Vehicle information is to be collected continuously by the roadside WIM electronics at the Ramp WIM location. This information shall be made available to the user and a variety of reports summarizing the data can be generated. This data can be shared between departments if the agency responsible for weight enforcement is separate from the roadway maintenance, planning and/or design departments.

2.5.1 Capabilities

An operator at the site may download the vehicle data directly from the roadside WIM System Electronics, or the data may be transferred to a remote location via modem.

Manufacturer host software can be used to automatically call one or several WIM systems to obtain traffic data from the site. The user configures the frequency of the calls and the information to be obtained. Once the data has been obtained, office analysis software capable of computing various classification schemes shall be used to provide various report capabilities based on the data collected. This system shall store a least 60 days of vehicle records (over 2 million vehicle records) in a compressed format.

2.5.2 Information Available

The following information shall be made available from the data collection feature of the Ramp WIM system:

- Reports over any selected time period in hourly increments, daily, weekly, or monthly.
- Summary of vehicle speeds.
- Summary of vehicle classification counts.
- Equivalent Single Axle Load (ESAL) count.
- Reports on the number of violating and non-violating axles, axle groups and gross vehicle weights.
- User selected reports based on adjustable parameters such as periods and vehicle types.
- Customization for generating reports for specific needs that are not available using basic parameters.

3 WIM System Functional Requirements

3.1 Ramp

3.1.1 WIM Scales

The accuracy of the WIM system will be in conformance with Type III ASTM E 1318 - 02 “Standard Specifications for Highway Weigh-in-Motion (WIM) Systems with User Requirements and Test Method” performance requirements for a Type III system.

The Contractor shall grind the concrete roadway beginning 200 feet prior to the scale location and ending 100 feet after the scale location, for a total of 300 feet, with a minimum 36 inch blanket grinder to ensure that the roadway meets the requirements of Section 6 of ASTM E 1318-02.

The WIM scales shall be constructed of two independent weighing platforms placed across a roadway. The WIM scales shall measure approximately 144" x 38" including frame.

Each scale module shall be a self-contained weighing unit. Each scale module shall measure approximately 72" x 38" including frame.

The WIM scales shall operate properly in a temperature range of -40°F to +160°F.

There shall be two scale frames into which the two scale modules are mounted. The WIM scale shall be installed flush with the road surface.

The WIM scales shall be weather-sealed and water tight. There shall be no intrusion of water, ice, snow, salt, debris, dirt, moisture, or sand into the scales.

The WIM scales and frames shall be grounded with ground rods. The signal processing electronic components/modules shall be protected against lightning.

The WIM scales and their frames shall be rust proofed. All installation hardware shall be either stainless steel or rust proofed. All surface mounting bolt and service holes shall be sealed.

3.1.2 Axle Sensors

The Ramp WIM system shall use axle sensors in the ramp exit lane for WIM operation prior to the point where the roadway splits into two lanes. The axle sensors shall be Class I piezoelectric and approximately 12 feet in length.

The axle sensors shall be installed below the road surface. The axle sensors and their electrical wiring connector shall be completely water tight and sealed.

3.1.3 Detector Loops (per Oklahoma specification standards)

The Ramp WIM system shall use detector loops to detect the presence, entry or exit of a vehicle in support of WIM and classifier operations.

For the WIM operation, the sensor configuration shall be:

"loop -- WIM scale -- axle sensor -- loop".

Each detector loop shall have a minimum loop area of 1.83 m (6ft) x 1.83 m (6 ft) with 45° angle cut at the corners.

Loop wire must be 1 conductor, 14 AWG, IMSA 51-5. Loop leads must be 2 conductor, 14 gauge, IMSA 50-2 cable.

All saw-cut loops shall be sealed with State approved loop sealant.

All loops shall be sealed with State approved sealant.

Loops shall be spliced to the shielded twisted lead in cable in a junction box prior to the equipment cabinet. Loops shall not be spliced, buried, or epoxied in the road or shoulder.

The Ramp LCS shall use detector loops to detect the presence, entry or exit of a vehicle in support of the LCS operation.

Loop detectors shall be installed in the WIM system electronics of the Ramp WIM Sorting System.

The Ramp system shall use signals from these loops to switch the lane directional signals and the CMS located downstream of the Static Scale.

3.1.4 Overheight Detection

An overheight vehicle detection system shall be installed at the Ramp WIM system location. The overheight system shall be designed such that an alarm will sound for objects that are at least two (2) inches in diameter and one (1) inch above the line of detection.

3.1.5 Electronics

The Weigh-In-Motion (WIM) Interface Electronics shall be located next to the weigh in motion scales in a roadside cabinet. The weigh in motion electronics will be responsible for retrieving truck data and communicating it to the sorter computer in the scale house.

The electronics should include interfaces to the following components:

1. Weigh in Motion Scales
2. Axle Sensors
3. Loops
4. Overheight detector
5. Offscale Detectors
6. Operator Display
7. Lane Directional Signals

The roadside electronics must provide a facility for viewing vehicle records and sensor diagnostics directly, without any ancillary equipment.

The electronic system must be of a modular design to aid in system maintenance, troubleshooting and in-field servicing.

All components of the electronic system, including inductive loop detectors, must contain necessary electrical protection to prevent damage from electrical surges, spikes and the effects of lightning.

The system must be of a durable, industrial design and construction and enable continuous operation, with automated startup in the event of a power outage.

All sensor and ancillary equipment connections must be conveniently located on the system front panel. All connections, where possible, should be a plug-in, quick-connect style.

Where possible, all printed circuit boards and components should be of a commercially available design. This includes, but is not limited to; the system central processing unit (motherboard) and CPU related interfaces such as digital input/output interfaces.

All cutouts and openings in the electronics housing cabinet shall be vermin proofed.

All wires from scales, offscale sensors, axle sensors, loops, sign control lines, shall be terminated on terminal strips or screw terminal connections. The terminal strips shall be identified by terminal strip number and screw connection number. These terminal strips shall be readily accessible. All cables shall be long enough to easily reach these terminal strips. Terminal strips, splices, or other type of connections prior to these standard terminal strips shall not be allowed except for splicing of a loop to a shielded twisted loop lead. All AC power connections shall be shielded to prevent electrical shock.

3.1.6 LCS

A Lane Control System (LCS) shall be located on the ramp prior to the sorting point. The Lane Control System consists of the following components:

a) Two (2) Directional Signals with Red "X", Green "🡻" graphics.
b) One (1) Directional Signal with Green "🡼", Green "🡽" graphics.
c) Support Structures and base to suspend the signals (as listed in a) above the lanes of travel.
d) A pole and base will provide support for signals.

The LCS CMS shall abide by the same requirements as specified in section 4.1.7 (CMS Specifications).

The support structure and base will be designed to meet State requirements.

Two (2) message signs shall be located downstream of the static scale and mounted on an overhead pole. All CMSs shall be constructed using the same technology.

The CMS mounted over the left lane shall display a static "LEFT LANE" sign above the CMS and shall have the following message options:

Message 1:

STOP

Message 2:

OK
GO AHEAD

The CMS mounted over the right lane shall display a static "RIGHT LANE" sign above the CMS and shall have the following message options:

Message 1:

TURN INTO LOT

Message 2:

OK
GO AHEAD

A message shall be displayed for every commercial vehicle.

3.2 Scale House

3.2.1 Operator Display

The system shall provide an operator display at the scale house. The operator can monitor vehicle movements, view and print reports and adjust system parameters (i.e. alter message signs, adjust random sorting %, adjust overweight %, etc.) using the operator console and the operator display. The operator display contains the following windows:

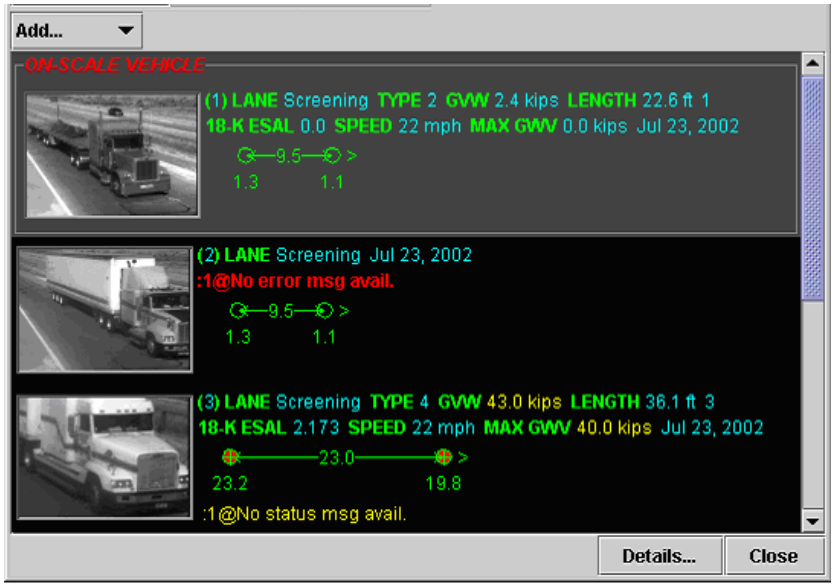
- Vehicle Display Window (displays will vary by manufacturer)
- Station Controls
- Manual Override Controls

The Vehicle Display Window shall display:

- ESALS,
- speed,
- gross vehicle weight,
- time and date,
- individual axle weights,
- spacing, and
- tandem weights as measured by the WIM Computer.

This display shall also provide control over the system sorting parameters.

Each vehicle record shall contain a digital image of all vehicles and shall be similar to the following examples.

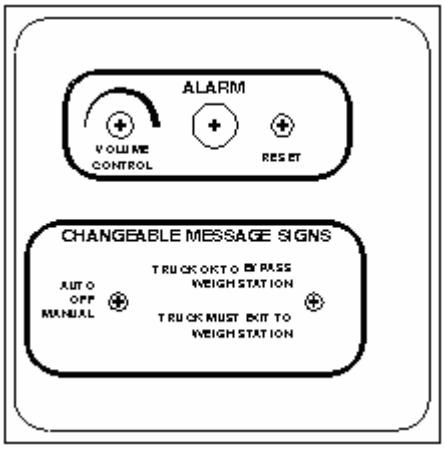


3.2.2 Station Controls

A Station Controls Window shall be provided to set the system parameters which control the sorting boundaries used when directing vehicles. The control window shall offer control options similar to those illustrated below.

3.2.3 Manual Override Console

A Manual Override Console shall be provided as an interface that allows the operator to override the Ramp WIM System in order to gain control of various system components. The Manual Override Console shall be similar to the one illustrated on the following page with additional switches installed to control the changeable message signs downstream of the scale house.



3.3 Station Computer

The Station Computer shall provide the following functions:

1. Perform single-lane WIM operation. (WIM Computer only)
2. Weigh all vehicles travelling on the right lane. (WIM Computer only)
3. Classify all vehicles travelling on all instrumented lanes of the highway.
4. Perform weight compliance analysis on vehicles in accordance with Oklahoma DOT regulations. (WIM Computer only)
5. Perform sorter operation in accordance with decisions based on weight compliance analysis, other violations (speeding, improper manoeuvre, sudden speed change, etc.), Station Control Console selection/override, and operator selected action.
6. Insert sequence numbers for vehicle records for tracking purposes.
7. Track vehicle movement in the execution of sorter operation.
8. Control message display of the LCS to synchronize with the movement of a vehicle being tracked.

9. Perform data collection, data storage, file management and report generation functions for collected vehicle information.

3.4 WIM Computers

The combination of the Station Computer and Operator Display (WIM Computer) shall have client applications to:

1. Display operation status and control of the Ramp Sorter System.
2. Display vehicle records of the Ramp WIM system.
3. Print display screen of the Ramp Sorter System.
4. Generate reports from vehicle records.
5. Display and print generated reports.
6. Set up and configure the operation of the Ramp WIM system.
7. Set up and configure the operation of the Ramp Sorter System.
8. Initiate and reset traffic counting operation of the Ramp WIM Sorter System.
9. Perform maintenance functions of the WIM system.
10. Set up and control the operation of the LCS.

The system status window shall display the following information:

1. Time and date
2. Overweight violation threshold setting
3. LCS control selections: automatic (by WIM operation) or manual (by operator action)

The WIM Computer shall insert sequence numbers to vehicle records to correspond to the sequence of arrivals at the WIM location. A vehicle record shall consist of the following information for display:

1. Vehicle record number
2. Vehicle lane
3. Vehicle weights; GVW and individual axles
4. Vehicle speed
5. Number and spacing of axles
6. Total vehicle length
7. A side-fire image of the vehicle cab
8. 1-line error message to indicate either type of violation or other information

A vehicle record shall be displayable in either graphic form or in text form, as per manufacturers discretion, and as indicated examples below:

GRAPHICAL DISPLAY FORM

```
256) LANE #1     TYPE 12       GVW 57.1 kips        LENGTH 67 ft
   18-K ESAL 1.60   SPEED 62 mph   Sat Jul 1 15:30:45, 1992
   MAX GVW 80 kips

 |<-------------------67 ft------------------->|
 o   o               o   o       o
11.8 11.9             11.7 11.5      10.2
```

```
            Real Time View                                  11:23:17 PM

02528   2:24p   4-Mar-1992   Lane:1   Cls:9   ESAL:2.15   Spd:54
Grs:68880


1............2.....3...................4.....5
|----12.8----|-4.4-|--------28.9-------|-4.4-|
|-------17.2-------|
              |--------------37.7-------------|
|--------------------50.5--------------------|

Axle     1       2       3       4       5
Rght   4960    8220    8580    5300    5360
Left   5480    9580    7860    5920    7920

Totl  10440   17500   16440   11220   13280
Tandem              33940         24500

InBr 1-3 44380  2-5 58440
```

The length from axle to axle shall be shown on a linear scale with axle spacings plotted below the scale line. An asterisk or red text shown at the axle spacing shall indicate the location of an overweight axle or axle group. The report operates in a scroll mode.

When a vehicle passes over the WIM scale, its corresponding vehicle information consisting of vehicle configuration (i.e. number of axles and their groupings) and axle spacings are displayed at the top window.

An alternate to the first format, graphical as above, is a tabular presentation as below OR, as designed by the manufacturer and approved by the state.

TEXT DISPLAY FORM

256) LANE #1 TYPE 12 GVW 57.1 kips LENGTH 67 ft
18-K ESAL 1.60 SPEED 62 mph Sat Jul 1 15:30:45, 1992
MAX GVW 80 kips

	UNIT SEPARATION (in)	WEIGHT (lb)	ALLOWABLE (lb)
1		10,221	20,001
2	116	11,501	17,001
3	54	11,694	17,001
4	450	11,892	17,001
5	56	11,826	17,001

The WIM Computer must display weighing operation advisory information as follows:

- Missed Scale - A vehicle has missed the scales i.e.: loops triggered but no axle counts)
- Offscale - One or more of the offscale detectors was triggered during the weighing operation
- Traffic is backing up close to the WIM scale. A traffic backup has cleared
- Vehicle Speeding
- Vehicle missed tracking loop detector
- Vehicle entered wrong lane
- Vehicle changed speed over scale

The WIM Computers shall support button functions to bring up menus or to toggle to:

1. Select control mode for the LCS.
2. Advance to next page of vehicle record display
3. Select main menu for other computer operation.

Violations shall be highlighted in the vehicle record display.

The WIM Computer shall buffer vehicle records for display purposes. The buffer shall represent multiple pages of windowing display.

The WIM Computer shall have application programs to detect prolonged power failure conditions to initiate orderly shut down operation of the system.

The WIM Computer shall have application programs to generate the following reports:

1. Number of vehicles per lane by class and by hour for a selected period.
2. Number of vehicles per lane by speed range for a class for a selected period.
3. Number of vehicles per lane by speed range and by hour for a selected period.
4. Axle and GVW weights by class for a selected period.
5. Number of vehicles per lane by weights, by class and by hour for a selected period.

A selected period for report generation shall include starting date and time and ending date and time. Reports shall be generated manually by operator action.

The WIM Computer shall have utility programs to list vehicle record files, transfer vehicle record files, sort vehicle record files and purge vehicle record files. Vehicle record files may be purged manually by operator action or automatically upon expiration of a preset archival period. Only those expired records shall be automatically purged.

The WIM Computer shall provide a manual console. The manual console shall provide the facility for an operator in a weigh station to select the control operation of the Ramp LCS manually. The manual console shall provide a switch selectable function:

a. Select automatic control of the LCS by the ramp WIM system or the manual control of the LCS by the operator.

The manual console shall have visual indicators to identify the mode of control of the LCS.

The override signal control console will be located adjacent to the scale house display. It will provide the ability for the operator to manually override the directional signals. Vehicle movement information will be displayed using LED indicators on a graphical panel representing the overhead layout of the station. The LEDs will activate when the appropriate sensor is activated. In addition, the layout display will have LEDs representing the color and status of the directional signals. The LEDs will continuously display the status of the overhead signals.

The Override Signal Control Console must be operational independent of the weigh in motion interface electronics, to control all directional lights (i.e. the override console shall remain operational even if the sorter computer is not functioning).

4 Conduits and Pull Boxes

All cables shall be in conduits unless specifically approved by the Engineer. All pull boxes are to meet Oklahoma DOT specifications.

All materials shall comply with the "National Electrical Code" and the current State Standard Specifications for Highway Construction, "Highway Division Standard Drawings for design and Construction", and special requirements by State weigh in

motion and automatic vehicle identification system specifications. Duct seal shall be used to seal all conduits in the cabinets and in all junction boxes. All conduits shall have a polyethylene pull string with at least 210 pound break strength left in place at completion of construction.

Separate conduits shall be used for AC/DC power and low voltage signal cables. Low voltage signal cables shall include video, digital communication, sensor signal cable, and sensor excitation cables where voltage is under +/- 20 volts DC. Conduits for video and RF cables shall be of a large enough size to accommodate the maximum bend radius using factory 90 degree "bends".

All cables shall be in conduits unless specifically approved by the State.

8 System Acceptance

The Ramp WIM System shall be accepted subject to fulfilling the following conditions:

1. System review
2. Acceptance tests (meeting WIM accuracy on a weekly basis).
3. Training

8.1 System Review

The WIM Vendor shall submit six (6) copies of a system layout for each individual site. These layouts shall be submitted to the State for review. Approval shall be either an official from the State or a designate.

A preliminary on-site meeting shall be held for each site to discuss contractors' plans for the routing of conduits, cables, and placement of equipment.

8.2 Acceptance Tests

The Ramp WIM System, all inclusive as contracted, shall be designed, built and tested by the Vendor, and as proof of operation, the systems, overall and singularly, shall be tested at various times according to the test specifications. All field tests shall be performed by the WIM Vendor and observed by the State with all reports submitted to the State.

8.2.1 Factory Acceptance Tests

Prior to shipment of any equipment, Factory Acceptance Tests shall be performed for each system to verify the equipment operating as described in the contract documents and in accordance with the test specifications approved by the State. The Factory Acceptance Tests shall include at minimum the following:

1. A physical inspection to verify that the quality of material and workmanship satisfy specified requirements and standards and that the equipment and software under test are complete and ready for delivery.

2. A functional test to verify that the equipment and software operate as described in the contract documents.

3. A performance test to verify that the equipment satisfies performance and operation criteria.

For the purpose of these tests the equipment and software shall be configured as nearly as possible to the final configuration. Any field inputs not available at the factory test site shall be simulated to provide a close approximation to actual site conditions.

8.2.2 Site Acceptance Test

After all the equipment and software have been installed at the site, the Vendor shall run tests to ensure that all equipment shall operate as specified therein contract documents. These tests shall be witnessed or conducted by the State within one week of the manufacturer notifying the State that the system is ready for testing.

8.2.3 Continuous Operating Test

Following successful completion of the Site Acceptance Test, a Continuous Operating Test shall be conducted for a period of fifty six (56) calendar days. During this period the weigh station and its Weight Sorter System shall operate under normal conditions and attain a Level of Service of 98.0% or better of the total station operating hours within any period of 56 consecutive days.

The Weight Sorter System shall be considered unavailable when:

1. A major system component completely fails which significantly degrade the performance or operation of the weigh station. This situation is said to have prevailed if either the WIM system or the communication system has failed.

2. More than one system component fails to operate or respond to operator commands and/or system automation for more than thirty minutes.

3. Weekly WIM accuracy is not met.

During the continuous operating test, the entire Ramp WIM System shall be fully operational under normal traffic conditions and operate trouble free for 56 consecutive days. During the continuous operating test the WIM accuracy test/database shall be printed by State personnel and met weekly as previously specified for the Ramp WIM System.

In the event the one of the above mentioned conditions persists and the specified availability cannot be achieved, the WIM Vendor will be informed and problem(s) shall be corrected and the continuous operating test shall start over until 56 continuous days of trouble free operation are experienced. This re-start can only occur three times. In order for this test to be valid, the static scale must be fully operational for the 56-day period.

The WIM Vendor must leave the site prior to the start of the continuous test and may only return if a problem is encountered or accompanied by the engineer.

The continuous operating test will be the basis for acceptance or rejection of the system as a result of demonstrated performance.

If the SYSTEM is rejected and there have been more than three strikes and re-starts of the APT, the parties will negotiate, in good faith, an acceptable resolution. Following such negotiations, if the same are unsuccessful, the Department may execute the performance bond. Notwithstanding the foregoing, the Contractor will retain/be entitled to receive all amounts paid or payable to the Contractor in accordance with the above payment schedule, agreed-to by the parties:

The State shall issue a Certificate of Final Acceptance upon successful completion of the Continuous Operating Test and training program.

This calibration/acceptance procedure follows latest version ASTM E1318 Standards. Calibration is to be performed by the running of one (1) calibration truck. The five (5) axle, test vehicle should be of a tractor/trailer combination (3S2), complete with air ride suspension and a non-shifting static load. The truck will be loaded to within 90 to 100% of allowable Gross Vehicle Weight for the road under test. The truck will be in excellent mechanical condition.

The calibration procedure is as follows:

1. The vehicle will be weighed at a government certified static weigh scale. The weight information on the front (single axle), drive (tandem axle group), and trailer (tandem axle group), should be recorded. The Gross Vehicle Weight (GVW) of the vehicle will be calculated by adding the three weights together

2. The distance between the five (5) individual axles on the truck will be measured and recorded.

3.The test vehicle will make three (3) test passes over the system under test at a selected speed which is indicative of the truck traffic at the site. Adjustments will be made by vendor personnel on site during this time to fine tune the axle spacing, and weight output of the WIM system.

4.Once all initial adjustments have been made, the test vehicle will make an additional two (2) test passes to confirm the accuracy of the adjustments. If all the readings fall within the latest version ASTM ranges for the WIM Type under test, and vendor personnel do not feel that additional adjustments are required, the tests will continue. If this is not the case, additional adjustments will be performed and two (2) more confirming passes will be made by the test truck.

5.The test truck should then make an additional ten (10) passes at a selected speed that is indicative of the truck traffic at the test site.

6.All of the data should be recorded and placed into a spreadsheet.

7.The mean error and standard deviation for all recorded measurements will be calculated at the end of the ten (10) test passes. The calculations will be as follows:

A. For weight measurements, the percent error for each test pass will be calculated using the following formula:
[(WIM Weight - Static Weight)/Static Weight] x 100 = % error

B. The mean error for each weight type (single, group, GVW) will be calculated as follows:
% errors for single, group or GVW/# of samples = Mean error
(Each weight type calculated individually)

C. The error for individual axle spacings will be calculated using the following formula:
10 of [(WIM Axle Spacings - Actual Axle Spacing)]/10 = Mean Axle Spacing Error
(Each of the four axle spacings calculated individually)

8.All of the calculated errors will also be entered into the spreadsheet.

9.A check will be made of the calculated result against the acceptable range for the latest version ASTM WIM Type under test. There will be one of two results:

A. If 95% of all recorded test results, (single axles, axle groups, GVW, axle spacing) fall within the specified tolerance for the latest version ASTM WIM Type under test then the system will have passed the requirements.

B. If less than 95% of the calculated differences fall within the specified tolerance for the latest version ASTM WIM Type under test then the system will be readjusted and an additional ten (10) test passes will be required to retest the system.

10.The testing will continue until the system passes all criteria according to latest version ASTM E1318 Standards.

5 Training

The Vendor shall set up and conduct formal training programs for the state personnel on the operation, maintenance and installation of the system components of the Ramp WIM System. The training shall include the following:

4. Two half-day operator training sessions providing an introduction to the operation and installation of the Ramp WIM System, and to the functions performed by the major system components. A class size of up to eight individuals per session can be expected.

5. Two one-day "hands-on" guidance sessions for operators in the operation of the systems. A class size of up to four individuals per session can be expected. This training will occur during the first two days of the Continuous Operating Test.

The training program will be scheduled the week following the completion of the operations test.

The cost for the first training sessions shall be included in the contract price. Oklahoma DOT shall, from time to time review any future training requirements. The WIM Vendor shall agree to provide future and additional training sessions upon receipt of requests from Oklahoma DOT. Oklahoma DOT shall reimburse the WIM Vendor the cost of providing additional training sessions on a per diem basis and at a rate agreed upon by Oklahoma DOT at the time of the request. Oklahoma DOT shall provide classroom space for training session.

6 Warranty

The WIM Vendor shall warrant all subsystems and system components as supplied for (X) years from the date of issuance of the Certificate of Final Acceptance of the Ramp WIM System by the Engineer.

The warranty shall cover all system components, hardware and software, included in the contract for any defects in material and workmanship. This shall include:

- All loops, WIM Scales, off scale sensors and piezoelectric sensors on site,
- Interface operations, system electronics and housing cabinet,
- WIM cables, connectors, terminal strips and back-up batteries,
- Notification signs.
- Structures,
- Communication systems, and
- Camera and video equipment and technology.

The warranty agreement shall include:

- Routine maintenance service scheduled at 6 month intervals,
- Emergency repair service, and
- Operator refresher courses.

The weight sorter equipment shall be warranted by the WIM Vendor, in writing, against defects in or from material, workmanship, lightning, and to perform as required by these technical special provisions, giving proper and continuous service under all conditions required and specified, or which may reasonably be inferred, for a period of (X) years from the date of acceptance. The written Vendor's warranty shall be furnished to the State by the Vendor at the time the equipment performance supporting data is submitted. The ramp sorter equipment weighing instruments, load cells, weigh bridge, hardware, and software shall be warranted by the manufacturer, in writing, against defects in or from material, workmanship, lightning, and perform as required by these technical special provisions for the period of (X) years or as described above from the date of final acceptance of the project.

6.1 Scheduled Maintenance Service

The Vendor's routine maintenance on all major systems, system components and ancillary equipment shall be scheduled at 6 month intervals. A semi-annual maintenance report shall be submitted to the State upon completion of the scheduled maintenance service. Scheduled maintenance, Emergency maintenance and refresher training (as required) shall be included as part of the (X) year warranty.

The scheduled maintenance service shall include the following:

1. Visual inspection, signal checks and testing measures on all loops,
2. Cleaning, repair and testing measures on all WIM Scales (Ramp), Visual inspection and testing measures on all offscale sensors,
3. Visual inspection, testing measures and signal checks on all piezoelectric sensors,
4. Visual inspection and cleaning of cabinet and system electronics,
5. Maintenance of WIM cables, connectors, terminal strips and back-up batteries,

6. Electrical inspection,
7. Cabinet mechanical condition inspection,
8. Heating, ventilation and air conditioning maintenance,
9. Interface card operation inspection, testing measures and maintenance,
10. Notification sign inspection, testing and maintenance,
11. Structural integrity check of all poles and mast arms,
12. Inspection and verification of computer communication systems, and
13. Camera and Video inspection, testing and maintenance.

A report shall accompany the scheduled maintenance service and shall be submitted to the State. The report shall include:

1. Pass/Fail grading of all loops, scales, offscale sensors and piezoelectric sensors,
2. A checklist of all components checked as listed above, as well as the location of the components and comments on their general state, and
3. A checklist and commentary detailing whether each component (as listed above) met standards or required repairs.

6.2 Emergency Repair Services

Emergency repair services shall be completed on an as-required basis. The maximum response time for emergency repair services shall not exceed 72 hours after written receipt of notice by fax. The Vendor shall initiate on-site repairs within 7 days of notification.

6.3 Operator Refresher Courses

In conjunction with the scheduled maintenance services, the Vendor shall provide Operator Refresher Courses on the operation of the entire Ramp WIM system. The courses shall have a maximum duration of four (4) hours and shall be scheduled before or after the semi-annual maintenance service. The course attendees shall be decided by the State.

7 Material

Material used in the construction of this equipment shall be of good commercial quality entirely suitable for the intended purpose. Material shall be free from all defects and imperfections that might affect serviceability of the finished product.

8 Standard Products

The equipment shall be constructed of standard material, so that the prompt and continuing service and delivery of spare parts may be assured. The component parts need not be products of the same manufacturer.

9 Lightning Protection

Ground rod (s) and lightning protection shall be provided as per manufacturers requirements, and installed at all outdoor equipment cabinet locations, scale vault (s),

pits, and equipment mounting pole (s) and structure (s). All system components and equipment shall be properly grounded.

Lightning protection devices shall be provided for signal input/output and power connections at any separately packaged electronic signal processing device/equipment. Lightning protection devices shall be either in the form of terminal boxes equipped with terminal blocks and lightning/transient suppressors or modular lightning protectors. Lightning protection shall be provided.

WEIGH-IN-MOTION VIRTUAL WEIGH STATION SYSTEM SPECIFICATIONS

All to conform to latest version ASTM -1318-02 specifications

1. SYSTEM SPECIFICATIONS FOR THE VIRTUAL WEIGH STATION SYSTEM

INTRODUCTION

The system as proposed consists of a Weigh in Motion (WIM) truck monitoring system and an image capture system in one (1) or two (2) lanes. The WIM system includes integrated side firing video capture systems (and optionally a License Plate Reader System). These systems will communicate truck data to a secure web address where this information can be easily accessed by authorized personnel.

The web based system makes it possible to perform real time monitoring of passing vehicles. It will provide visual records in order to plan and enact additional law enforcement activities targeting overloaded vehicles.

WIM and Video Capture Systems

IRD has commercially deployed these types of monitoring systems in North America, and has systems in operation in Saskatchewan (4), Washington, D.C.(2), California (1), and Alaska (1). Additionally, several Virtual Weigh Station installations are planned for 2007 at various locations throughout North America.

The systems are based on technologies that IRD has successfully deployed at numerous other sites in North America. IRD's WIM technology has been used worldwide with over a thousand installed systems, comprised of over 2000 lanes of equipment. The video capture technology was pioneered by IRD for use at mainline WIM screening sites, and has been installed at nearly 100 sites.

The following notes present details of the system components and operation:

WIM – IRD proposes its Bending Plate Weigh-In-Motion Scales. These highly reliable and accurate scales have been used throughout the world and are one of IRD's leading WIM Scales. An advantage of the Bending-Plate scales is that they are mounted in a frame (not directly into the road), and therefore, they are not as affected by the condition of the roadway. Accuracy of the Bending-Plate scales meets ASTM 1318-02 Type I accuracy.

Alternately, IRD can provide systems using Single-Load Cell (SLC) scales. SLC scales are the most accurate WIM scales available and meet ASTM 1318-02 Type III accuracy.

A third option for in-road technologies is Quartz sensors which typically meet ASTM 1318-02 Type I accuracy similar to Bending-Plate scales.

Side Fire Cameras - The side fire camera system is comprised of a digital camera that includes the ability for day and night operation. In the day, the camera operates in a colour image capture mode, allowing full colour images. At night, the camera operation is supplemented using an Infrared Illumination system that provides black and white near-infrared spectrum images. The images are captured internally in the IRD WIM system, with an integral image capture sub-system. This ensures that the WIM system links the images to the weigh record, reducing the communications requirements between the system components. The system utilizes automatic light sensing and control to ensure the proper operation of the system in given lighting conditions.

Integrated System and Communications – The IRD system integrates all of the collected information, including side-fire, matching data and weight data into a single data record. Communications between the roadside system and the internet location will occur over the public telephone network.

The roadside systems will be set up to operate as Web Hosts, to enable login to these systems, and monitoring from any Internet browser HTML capable system. A high speed internet connection is required with the Virtual Weigh Station System. This will ensure that the systems can be used to the maximum extent for detecting and monitoring trucks and for targeting trucks which are suspected of being overweight. The system will include the ability to password protect access to the various levels of setup and operation.

Installation

IRD can supervise the installation including set up, calibration, testing, and training. IRD can work with a local contractor to install the system components, including traffic control and physical installation of the systems, roadside cabinets and infrastructure, poles and civil work. All work will be carried out in accordance with state and local standards.

VIRTUAL WEIGH STATION SYSTEM OVERVIEW

It is the intent of this document is to describe the details and operation of the ***IRD Virtual Weigh Station System***. The IRD Virtual Weigh Station System is utilized at a Weigh-In-Motion (WIM) site to pre-weigh vehicles and transmits an image along with the vehicle's weights and dimensions to an enforcement officer downstream of the WIM or to a central office computer/monitor where the passing vehicles can be viewed. Based on vehicle information received by the enforcement officer, officers are able to focus their efforts on vehicles that are potentially overweight and allow legal trucks to proceed unimpeded.

Figure 1: Saskatoon Virtual Weigh Station

The Virtual Weigh Station System collects continuous data on the vehicles passing the WIM site for statistical analysis. The system saves vehicle information in a compressed format complete with the date and time. As a result, the data (not including the images) can be downloaded and analyzed by client personnel using IRD's Office Windows Software.

The IRD Virtual Weigh Station System utilizes Bending-Plate WIM Technology in conjunction with a camera system to obtain vehicle data. The WIM scales are site repairable, allowing for repairs and parts replacement in the field. The system operates on a continuous basis, collecting data on axle weights, vehicle classification (based on the number and spacing of axles), and vehicle speed.

SYSTEM OPERATION OVERVIEW

As the vehicle travels along the roadway, it passes an array of sensors: a WIM scale/sensor and inductive loops. All vehicles approaching the Virtual Weigh Station System are weighed and classified, and the Virtual Weigh Station System determines if each vehicle is weight compliant based on its allowable weights.

The system triggers the camera sub-system to capture an image of each vehicle as it passes over the WIM Scales and links each image with the appropriate WIM record. Based on the parameters set forth by the user, images of commercial vehicles can be collected and stored by the System Electronics for all commercial vehicles or for only violating commercial vehicles. The combined data (image and vehicle record) will be transferred to the web host where it can be accessed remotely by an enforcement officer.

The Virtual Weigh Station System will operate reliably in all weather conditions. The system will utilize WIM sensors that are installed in the traveled lanes of the highway.

The system will incorporate the following operational features:

- Flexible and expandable System Electronics to handle future eScreening CVO initiatives, such as Automatic Vehicle Identification (AVI), etc.
- Integrated frame-grabbing card to provide increased functionality, security and expandability of the Virtual Weigh Station System Electronics.
- Saved WIM records as part of the image, which provides for increased reliability of traffic data.
- Flexible communications to facilitate the requirements of the user – i.e. car to site, office to site, etc.
- The WIM data collection will operate such that RAW data is collected for certain selected vehicle classifications. For vehicle classes not selected, summary data will be stored showing the number of vehicles in each unselected class per lane. The RAW records and tables will be stored on a fixed on-site storage system in daily files. The storage system will be nonvolatile (ie: no data is lost in the event the system shuts down due to a low power state).
- The data collection system will allow at least 60 days of continuous RAW data storage with a four lane installation. The data will be stored in a compressed format, to facilitate efficient data transfer.

- The site data collection system will be accessible via a telephone modem communication link with an office computer. The user will be able to operate the WIM system remotely via this link, including data transfer and analysis. The system will contain at least 3 levels of password protection.

- The system will support the creation or modification of classification schemes based on the number and spacing of axles. The system will allow at least 24 vehicle types (classifications) to be defined. The system will store up to 20 different classification schemes, and allow the user to select a particular classification scheme. The FHWA classification scheme "F" will be provided as default.

Scope

International Road Dynamics Inc. (IRD) has the capability to design, construct and integrate the sub-systems to meet the functional requirements as specified in these specifications.

The Virtual Weigh Station System will include the following sub-systems:

a) Virtual Weigh Station System
b) Communications System
c) Lightning Protection

Design and construction will include both hardware and software. Installation will include civil and electrical work. Integration will include testing and commissioning of the entire Virtual Weigh Station System and all of its specified sub-systems, in accordance with the acceptance requirements as specified in this system specification.

IRD will also provide training and warranty on the entire Virtual Weigh Station System and all of its specified IRD sub-systems, in accordance with the customer's training and warranty requirements.

IRD Virtual Weigh Station System

The IRD Virtual Weigh Station System will consist of the following system components:

a) Bending-Plate WIM Scales
b) Camera System
c) System Electronics
d) Operator Interface
e) Electronic Cabinet

The Virtual Weigh Station System will have hardware and software interfaces to control the operation of the WIM sensors and camera system.

The Virtual Weigh Station System will be provided with a roadside cabinet to house the WIM electronics, the WIM Computer and its peripherals, and the uninterruptible power supply (UPS).

Bending-Plate WIM Scales

The IRD Bending Plate WIM Scale measures wheel loads of vehicles driving on a road and has proven its value worldwide in numerous applications:

- Statistical traffic load recording
- Overloaded vehicle detection and sorting
- Secure area freight management

Figure 2: Bending Plate Scale

The weighpad (or scale plate) is made of a high-strength steel plate. There are five, seven-wire strain gauges installed in slots on the bottom of the scale, along with supplementary temperature compensation resistors. The strain gauges and supplementary resistors are wired to form a Wheatstone bridge.

The supply voltage and the output signal are carried in a shielded four-conductor cable. The cable is inserted through a hole with waterproof fitting, at the edge of the weighpad. The entire weighpad is covered with hot vulcanized neoprene rubber. Along the two long edges, there is additional rubber on the lower edge. This is used as the load bearing surface.

Each weighpad is installed into a foundation frame. The frame is secured firmly into the road surface, according to the installation instructions. The weighpad is beveled on the edges, slightly smaller on the top. The foundation frame clamps onto the beveled area, securing the weighpad to the road.

The weighpad operates by measuring the strain in the steel plate as it bends. As the applied weight increases, the plate bends down more in the middle. The amount of bending is slight, about 2.3mm for 10 tons.

The strain in the steel plate concentrates at the two milled slots and each strain gauge changes its electrical resistivity as the strain increases. The electrical resistance of the weighpad indicates the applied load.

Figure 3: Bending Plate Scale

Bending-Plate Scales will typically provide the following performance in a good installation based on the calibration procedure as noted:

SPEED Mph (km/h)	***FUNCTION***	***ACCURACY (% of applied)***		***ASTM@95% Confidence Level Type I Tolerance for 95% probability of conformity***
		1σ	***2σ***	
10-25 (16-40)	*Wheel Load*	*6*	*12*	*N/A*
	Axle Load	*4*	*8*	*N/A*
	Axle Group Load	*4*	*8*	*N/A*
	GVW	*3*	*6*	*N/A*
26-45 (41-73)	*Wheel Load*	*9*	*18*	*N/A*
	Axle Load	*6*	*12*	*N/A*
	Axle Group Load	*6*	*12*	*N/A*
	GVW	*4*	*8*	*N/A*
46+ (74+)	*Wheel Load*	*10*	*20*	*±25*
	Axle Load	*8*	*16*	*±20*
	Axle Group Load	*7*	*14*	*±15*
	GVW	*5*	*10*	*±10*

**Note: Normally, the WIM will be calibrated according to one of the specified average speed ranges listed above for maximum accuracy. However, if the site conditions involve more than one of the above speed ranges, the system will be calibrated according to the speed ranges that are agreed upon by the vendor and the user prior to installation. The speed ranges above reflect low speed/slow roll just prior to static scales (2-10 mph), low speed ramp (11-25 mph), medium speed ramp (26-45 mph)or high speed ramp/mainline (46+ mph) conditions.*

The above accuracy specifications are based on a minimum sample of 50 vehicles, loaded to within 75% of the legal allowable limit. Vehicles that traverse the scale with more than a 10% speed variation, live loads, or liquid loads shall not be considered.

The above accuracies are contingent upon specific site conditions. The site conditions must, as a minimum, meet the roads specification identified in ASTM E1318-02.

Camera System

The Camera System will utilize video technology which monitors traffic flow adjacent to the WIM System. It will capture still images of trucks with violations for identification and enforcement purposes.

The Camera System will store video images linked to the vehicle record in the System Electronics, where they can be accessed through the MCCO system. The vehicle record number will be displayed with the vehicle image. WIM records will be saved as part of the image file.

Video cameras will be provided and installed near the WIM sensor location to capture an image of the vehicle. (The License Plate Reader System is an option)

Figure 6: Side-fire Capture Camera

Figure 7: Day-light Video Capture Image

Figure 8: Night-time Video Capture Image

Optional License Plate Reader

Optional License Plate Reader camera(s) can be provided and installed near the WIM scale location to capture an image of the vehicle license plate number.

FIGURE 7: Side-fire Capture Camera

FIGURE 8: Day-time License Plate Image

FIGURE 9: Night-time License Plate Image

The quoted License Plate Reader System is an image system only and does not include OCR (Optical Character Recognition). OCR allows a user to maintain a database of license plate numbers combined with the vehicle records. IRD can provide the OCR option is desired.

System Electronics

The System Electronics will be located next to the WIM sensors in a roadside cabinet. The System Electronics are responsible for creating truck data and formatting the truck data for a web server to enable an enforcement officer to remotely view the vehicle records.

The roadside electronics provide a facility for viewing vehicle records and sensor diagnostics directly, without any ancillary equipment.

The electronics system is of a modular design to aid in system maintenance, troubleshooting and in-field servicing.

All components of the electronics system, including inductive loop detectors, contain electrical protection to prevent damage from electrical surges, spikes and lightning.

The system is of a durable, industrial design and construction, and enables continuous operation, with automated start-up in the event of a power outage.

The System Electronics will provide the following functions:

a) Perform WIM operation.
b) Match all violators bypassing the WIM.
c) Weigh all vehicles traveling over WIM sensors.
d) Classify all vehicles traveling on all instrumented lanes of the highway.
e) Perform weight compliance analysis on vehicles in accordance with department or agency regulations.

f) Perform sorter operation in accordance with decisions based on weight compliance analysis, other violations (speeding, improper maneuver, sudden speed change, etc.).
g) Insert sequence numbers for vehicle records for tracking purposes.
h) Capture images for all vehicles.
i) Filter out all non-target images and format for Web server.
j) Perform data collection, data storage, file management and report generation functions for collected vehicle information (Note: This data does not include images).

The electronics will include interfaces to the following components:

a) Bending-Plate Scales
b) Loops
c) Camera System

The System Electronics have client applications to:

a) Display operation status and control of the Virtual Weigh Station System.
b) Display vehicle records of the WIM system.
c) Office software.
d) Set up and configure the operation of the WIM system.
e) Set up and configure the operation of the Virtual Weigh Station System.
f) Perform maintenance functions of the Virtual Weigh Station System.
g) Set up and control the operation of the Camera System.

The System Electronics will insert sequence numbers into vehicle records to correspond to the sequence of arrivals at the WIM location. A vehicle record will consist of the following information for display:

a) Vehicle record number
b) Vehicle lane
c) Vehicle weights; GVW and individual axles
d) Vehicle speed
e) Number of axles
f) Total vehicle length
g) Axle spacings
h) 1-line error message to indicate either type of violation or other information

A vehicle record will be displayed in either graphic or text form.

In graphic form, a vehicle record will be displayed in 4 lines with one of the lines graphically representing the location of the axles. If an axle is under the legal limit, it will be shown by an "o". If an axle is overweight, it will be shown by an "*".

In text form, a vehicle record will be displayed in multiple lines with each line showing the axle spacing and axle weight for each individual axle and each axle group combination. These lines are in addition to those showing vehicle record number, vehicle lane, GVW, overall length, speed, and violation message.

Violations are highlighted in the vehicle record display.

The WIM Computer has utility programs to list vehicle record files, transfer vehicle record files, sort vehicle record files and purge vehicle record files. Vehicle record files may be purged manually by operator action or automatically upon expiration of a preset archival period. Only those expired records will be automatically purged.

Operator Interface

An enforcement officer will interface with the System Electronics through a web-based system, accessible on the internet or department/agency network. The user will select a vehicle record in one of two ways:

a) The first column shows the most recent vehicle to pass over the WIM system. The following columns display the most recent violators, with the latest violator shown for the detailed display.

b) Select images by most recently arrived images. This display is similar to the violation vehicle display, except that last 5 vehicles are displayed regardless of weather they are violators or not. With the most recent vehicle shown in the detailed display.

The summary (thumbnail) and detail vehicle record have next and previous buttons allowing the user to move to newer or older images as required. The displays can be updated by selecting the refresh button on the browser or automatically updated frequently.

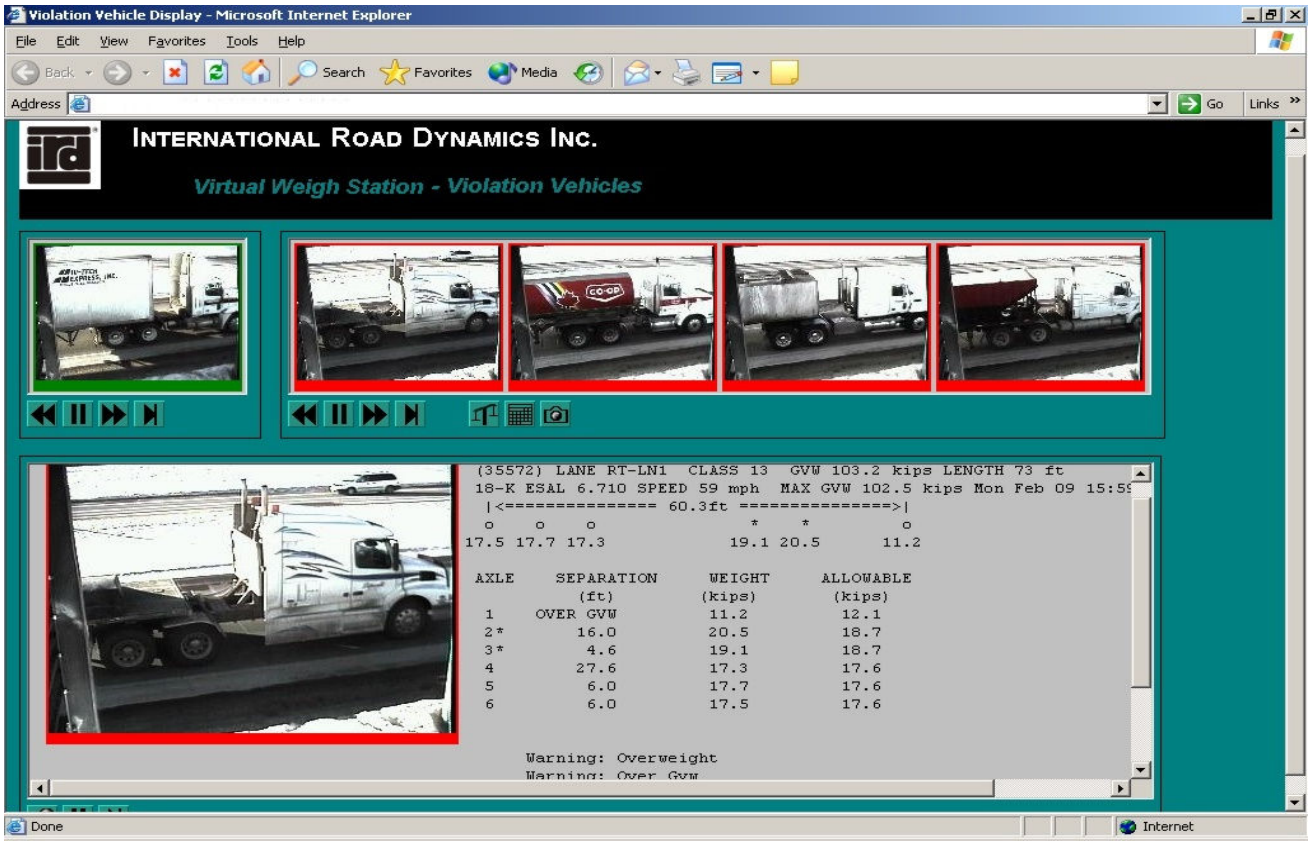


Figure 9: Violation Vehicle Display

Information Available:

The following information is available through the data collection feature:

- Reports over any selected time period in hourly increments, daily, weekly, or monthly.
- Summary of vehicle speeds.
- Summary of vehicle classification counts.
- Equivalent Single Axle Load (ESAL) count.
- Reports on the number of violating and non-violating axles, axle groups and gross vehicle weights.
- User selected reports based on adjustable parameters such as periods and vehicle types.
- Customization for generating reports for specific needs that are not available using basic parameters.

Value of Information:

Applications of the data required to sort vehicles may extend well beyond enforcement activities. The following are some potential uses of the data, aside from enhancing enforcement capabilities:

- Loading information can be used to evaluate pavement performance. Knowing the ESAL count allows for an accurate comparison of various designs.
- Loading information allows for future planning and budgeting for maintenance, rehabilitation, and reconstruction of the pavement.
- Loading information can be used to provide the design parameters for strength requirements for new construction or rehabilitation.
- Traffic volume and classification information can be used to analyze existing requirements and plan for future capacity requirements including number of lanes, type of access, and speed limits.
- Violation information can be used to determine requirements for enforcement in terms of location and time. The data collected while the station is closed could be used to determine the most effective times for operation of a WIM facility.
- Report customization allows investigation into specific user defined issues related to vehicle types, axle configurations, and loading.

Reports:

Two types of reports are provided: count reports, and special reports. The following reports are provided:

Class by Hour	FHWA TMG Card Reports
Speed by Hour	Autocalibration
Lane by Hour	Site Summary
Lane by Class	IRD ASCII Vehicle Records
Error Vehicle by Hour	Single Axles
Class by Day of Month	Tandem Axles
Truck Count by Day of Month	Tridem Axles
Class by Front Axle Weight	Quadrem Axles
Class by Gross Vehicle Weight	Axle Count by Axle Weight
Class by Overweight Vehicles	Site History
Weight Violations by Hour	Power Log
ESALs by Hour	Calibration Log

Operating Software:

The system is supplied with operational software which includes software for data communication and data analysis. The communication software will provide user friendly communication with the site system and feature autodialing, and user menus. The office

analysis software will provide reports to be generated on collected raw vehicle record files. The software will be similar in operation to the report generation feature on the site system.

The overall system operational software will interpret the signals from the WIM sensors and sensors, and generate the vehicle record. The algorithm used to interpret the signals directly compensates the determined weights based on vehicle speed.

Raw vehicle records include the following data:

- Site Identification
- Time and Date of Passage
- Lane Number
- Vehicle Sequence Number
- Axle spacings
- Weight of all Axles
- Code for Invalid Measurement
- Vehicle Speed

While connected to the site system via a telephone link, the user is able to perform as a minimum the following tasks:

- Real time vehicle viewing selectable by lane (with optional graphical output).
- Resetting of the system clock (including date).
- Monitor system memory in terms of storage remaining.
- Setup and initiate the generation of summary reports on data previously collected by the system.
- View generated summary reports.
- Generate and view error reports including time down, system access, auto-calibration and improperly completed records.
- Transfer selected raw data files or generated reports from the site system to the office host computer.
- Purge old data files from the system.

The real time viewing option provides both graphical or tabular display formats as follows:

Graphical Format

NORMAL DISPLAY FORMAT WITH GRAPHICAL DISPLAY MODE (Metric):

4) LANE #1 TYPE 12 GVW 39.1 tonnes LENGTH 2284 cm
18-K ESAL 1.681 SPEED 104 kph Sat Jul 1 15:45:40 1989

```
<---------------------------- 21.3 ---------------------->
o          o       o  o         o  o       o
5.9        5.4     5.6 5.7      5.1 6.3     5.1
```

The length of the vehicle is shown with axle weights plotted below the scale line. The report operates in a scroll mode.

Tabular Format

NORMAL DISPLAY FORMAT WITH TEXT DISPLAY MODE (Metric):

4) LANE #1 TYPE 12 GVW 39.1 tonnes LENGTH 2284 cm
18-K ESAL 1.681 SPEED 104 kph Sat Jul 1 15:45:40 1989

UNIT	SEPARATION (cm)	WEIGHT (kg)
1		5082
2	438	6325
3	169	5133
4	552	5713
5	185	5562
6	323	5408
7	460	5905

The system is capable of generating output in the FHWA's TMG Card Format. The operator is provided with capability to define and generate a wide range of user-defined reports and tables.

The site system and the office computer running the office analysis software are able to perform as a minimum the following report generation options:

Summary reports based on user input values of:

Daily, Weekly, Monthly, or Continuous Summaries in hourly increments by:

- Vehicle Speed (Minimum 16 User Defined Bins)
- Classification (Minimum 24 User Defined Classes)
- Equivalent Single Axle Load (ESAL) Value by table or formula
- Daily, Weekly, Monthly, or Continuous Weight Summaries (both violating and non-violating) per vehicle class for:
    - Steering Axles
    - Single Axles
    - Tandem Axles
    - Tridem Axles
    - Quad Axles
    - Gross Vehicle Weights
    - ERROR Reports
    - Autocalibration Report
    - Site History Report
    - Calibration History Report

Electronics Cabinet

All wires from sensors, loops and camera system will be terminated on terminal strips before connecting to the System Electronics. The terminal strips will be identified by terminal strip number and screw connection number. These terminal strips will be readily accessible. All cables will be long enough to easily reach these terminal strips.

Terminal strips, splices, or other type of connections prior to these standard terminal strips will not be allowed, except for splicing of a loop to a shielded twisted loop lead.

All AC power connections will be shielded to prevent electrical shock.

Communication System

The communication system for the Virtual Weigh Station System consists of the following data communication and video signal transmission segments:

The Virtual Weigh Station System has a least two RS-232 serial ports and one 10/100BaseT Ethernet port available for supporting connection into the communications system.

The Virtual Weigh Station System is capable of interfacing with the following options:

- ADSL
- SDSL
- cable modem
- Satellite
- T1
- Dialup Modem
- Direct Connection to Serial Port
- Wireless LAN (802.11b or 802.11a)

IRD can provide the client with a wireless connection to a Portable Operator Interface (to be supplied by the client or IRD) to communicate with the System Electronics to view vehicle records. For example, a patrol officer situated 1/2 km downstream of the Virtual Weigh Station can receive the weight records and video images of vehicles which pass over the WIM Scales, and target suspected overweight vehicles as they approach.

IRD can provide a Radio Modem (transmitter) and antenna at the WIM location. IRD can also provide an antenna, radio modem and the USB-RS232 adaptor for the laptop. Virtual Weigh Station Display Software provided by IRD will allow the operator to receive the vehicle image and record remotely.

The range of this sub-system is typically limited to “line-of-site” (no obstructions such as hills or walls between the devices).

The typical RF Range is 244 meters at 11Mbps and the time required for data transmission is 2 seconds after the vehicle crosses the downstream loop of the WIM configuration.

Lightning Protection

Ground rod(s) will be provided and installed at all outdoor equipment cabinet locations and equipment mounting pole(s) and structure(s).

Ground resistance of earth ground is not to be greater than 25 ohms using a ground rod checker, except as approved by the Department or Agency. Earth ground resistance will

meet specifications prior to installation of the electronic systems.

All ground rods will be checked for acceptance by the Department or Agency prior to pouring concrete and installing electronic systems.

For grounding requirements, a ground wire through a PVC conduit will be used. Metal conduit is not an acceptable replacement of the ground wire even though it is acceptable per the NEC.

Lightning protection devices will be provided for signal input/output and power connections at any separately packaged electronic signal processing device/equipment.

Lightning protection devices will be either in the form of terminal boxes equipped with terminal blocks and lightning/transient suppressers or modular lightning protectors.

The system is capable of sustaining its operations for one hour at full load during AC power failures.

OVERALL SITE LOCATION

a) The WIM site should be located on a straight section of road, of uniform horizontal and vertical alignment. Sites located on curves, or on hills will not perform as well as sites on straight flat stretches. The traveled lanes should not have any super-elevation, and the cross slope should be no more than 3% from the lane centre line to the lane shoulder (ideally, less than 2%). The horizontal elevation should not vary by more than 2% for 300 feet up and down stream of the sensors.

b) The WIM site should not be located immediately adjacent to areas where vehicles are changing speeds (accelerating, or decelerating). Areas to avoid are those within 1.5 miles of traffic control lights, or major intersection entrance or exit lanes. System performance will suffer if individual vehicles change speed by more than 1% over the site sensors.

c) For multiple lane systems where vehicles are being weighed in both traveled directions, the site should be selected where the median between the traveled ways is as short as possible. This distance should be less than 200 feet, and ideally less than 100 feet.

d) The site should be easily accessible for electrical power, and telephone services. Most WIM systems will require regular line service power, and remotely operated systems require telephone.

PAVEMENT CONDITIONS

All WIM sensors will be installed in either asphalt concrete, or continuously reinforced concrete pavements. The pavements should ideally be relatively new and smooth. One of the major sources of variation in a WIM system is due to pavement roughness. At a minimum the pavement should meet the requirements as laid out in ASTM E138-02. Additionally, IRD recommends that pavement conditions at the site meet the following criteria;

a) Asphalt concrete pavements should not be shoving, raveling, heaving, spalling, or in a major distressed condition (ie: heavily fatigue cracked or have severe compressional rutting). Portland concrete pavements should not have heaved or open joints.

b) The pavement structure should not exhibit excessive deflection during vehicle passage. The maximum deflection of the pavement using Benkelman Beam Deflection apparatus should be less than 0.030 inches.

c) A grid of the site should be established for an area of at least 145 feet before, and 80 feet after the sensor locations. The grid will be at 3 foot intervals both longitudinally, and laterally (longitudinal meaning in the direction of vehicle travel, and lateral meaning perpendicular to vehicle travel). The following tolerances should be observed:

- Within 60 feet upstream, and 40 feet downstream of the sensors, the deviation (either lateral or longitudinal) over any 3 foot interval should be less that 3/16 inch. Over any 9 foot interval, the variation in the surface profile should be less than 3/8 inch.

- From 60 to 145 foot upstream, and 40 to 80 feet downstream of the sensors, the deviation (either lateral or longitudinal) over any 3 foot interval should be less that 1/4 inch. Over any 9 foot interval, the variation in the surface profile should be less than 9/16 inch.

SITE ACCEPTANCE TEST

After all the equipment and software has been installed at a site, IRD will run tests to ensure that all equipment operates as specified in the contract documents. These tests will be witnessed or conducted by customer within one week of IRD notifying the customer that the system is ready for testing (or unless alternate arrangements are mutually agreed to).

TRAINING

IRD will set up and conduct formal training programs for customer personnel on the operation, maintenance and installation of the Virtual Weigh Station System components.

WARRANTY

IRD will warrant all subsystems and system components as supplied for 1 year from the date of issuance of the Certificate of Final Acceptance of the Virtual Weigh Station System by the customer.

The warranty will cover all system components, hardware and software, included in the contract for any defects in material and workmanship.

APPENDIX E

TECHNICAL SPECIFICATIONS
FOR THE MAINLINE SORTING SYSTEM

GENERAL REQUIREMENTS

Scope of Work: The contractor shall furnish all equipment, materials, and perform all work necessary to construct a complete and operational Mainline Sorting System in accordance with the plan details and as specified herein.

The work described herein shall establish a system for sorting trucks on the mainline. This sorting shall be accomplished through the use of Weigh-In-Motion (WIM) technologies so that legally weighted trucks shall be allowed to by-pass the static weigh scale stations. There shall be two identical systems required for each location, one each for the existing weigh stations on opposite sides of the interstate.

Coincident with establishing the sorting system other benefits shall be included, specifically: automation of some static scale reports; generation of and access to vehicle classification data; and identification of violators.

A. Plans and Specifications: The work of the project can be considered to fall under three general divisions: one, a section of roadway rehabilitation necessary to provide a smooth and solid platform at the weighing devices; two, the static signing required to inform and direct traffic relative to the Mainline Sorting System; and three, all other work as required for a complete and functional Mainline Sorting System. The first two divisions shall be as shown on the plans and specified by items in the Standard Specifications. All other work shall be as shown on the plans and specified in these Supplemental Specifications.

The specifications and plans do not necessarily include or define everything required for a complete, operating and safe Mainline Sorting System. The contractor is expected to possess sufficient experience and technical knowledge to construct complete, safe and operational systems and to perform the work in a safe manner.

B. Supplier: The equipment, materials, and software required to perform the sorting functions shall be supplied from one source pre-designed to operate as one integrated system and capable of performing all tasks in the manner described herein. The selected source shall have provided other systems of equal scope and capacity now operating successfully on interstate highways. Where evidence of previous experience is specified as a requirement, the selected source shall supply at least three references, including project name and contact name and phone number, from States where their equipment has met the specified requirement. The selected source shall also provide at least three references of having supplied systems that have operated for a minimum of two years to perform mainline sorting using WIM, and where their equipment has been integrated with the Help Inc./Pre-Pass Automatic Vehicle Identification (AVI) technology. The source shall be designated the "Supplier" for purposes of these supplemental specifications. In addition to providing the integrated equipment, materials and software the Supplier shall perform the construction support as required elsewhere herein.

C. Equipment and Materials: Equipment and material shall be suitable for the intended use and shall be furnished with all necessary hardware and components. The contractor shall be responsible for all modifications or fabrications necessary for proper installation and operation of the equipment. All equipment and material shall be new unless specified otherwise. Descriptive specifications, plans and system compatibility shall govern over specified manufacturer's names, model numbers or catalog numbers. The contractor shall check all equipment catalog numbers and availability with suppliers and coordinate with all other sub-contractors.

D. Existing Conditions: The contractor shall visit the construction site to determine existing conditions and shall allow for such conditions in computing his bid. The contractor shall be responsible for all modifications necessary to fit and/or locate the equipment.

E. Coordination: The contractor shall coordinate the work to avoid interference and conflicts.

F. Verification: The contractor shall verify mounting space, equipment dimensions and installation requirements before ordering equipment.

The contractor shall verify the location of all equipment to be installed along the roadway and shall determine the type of installation required consistent with the specifications and codes listed in Paragraph K below. The contractor shall provide all equipment and materials necessary to make the installation of equipment comply with the codes including the addition of breakaway bases or Oklahoma State approved standard guardrails. All such work shall be included in the contractor's bid.

The contractor shall verify the electrical circuit requirements of all equipment to be served before ordering material. Where circuits are to serve specific components, equipment or feeders, the contractor shall verify the electrical requirements and the exact location of connection before installing the service to the equipment.

G. Warranties and Guaranties: The contractor guaranties, by his signing of this contract, all equipment, apparatus, materials and workmanship for a period of one (1) year after the date of final acceptance of this project.

A. Prior to final acceptance of the project, the contractor shall furnish in addition to its written warrantee above the manufacturer's standard written warranties on all equipment furnished on the project.

B. The contractor shall furnish the following warrantee from the Supplier on their equipment, and materials covering a period of one year after final acceptance of the project.

1. That all equipment shall be new and unused, and that Oklahoma DOT is acquiring good and clear title thereto, free and clear of all liens and encumbrances.
2. That the equipment is free from defects in materials and workmanship, will remain in good order, and will function in accordance with the requirements of these specifications and the Supplier's published performance specifications
3. That the Supplier has all of the necessary rights, authorizations and licenses to provide all of the materials and services proposed or furnished.
4. That each of those persons who will perform the warranty work shall have the proper skill, training and background so as to be able to perform in a competent and professional manner and that the work shall be so performed.
5. That spare parts are readily available and will be made available to the Oklahoma DOT to purchases at their prevailing prices then in effect at the time of purchase.

C. The contractor shall furnish the following warrantee from the Supplier on their software covering a period of three years from the final acceptance of the project:

1. That OKLAHOMA DOT acquires a perpetual license right to use any software provided under this contract.
2. That such software will be delivered to OKLAHOMA DOT in a compiled format on CD-ROM or floppy disc media including all updates, corrections and enhancements, as of the date of acceptance.
3. That OKLAHOMA DOT is acquiring a 'right to use' license right to the supplied software without violating any rights of any third party.
4. That OKLAHOMA DOT will receive all updates, enhancements and corrections to all previously developed software used on the project.
5. That the software will satisfy the requirements of Executive Order MJF 96-50, that all information systems be 2000 compliant and shall not end abnormally or give incorrect results during operations prior to, during, or after the year 2000 as a result of processing, storing, or displaying any date information.

D. The contractor shall furnish the following Supplier warrantee on their equipment, materials and software for remedial obligations covering the periods stated above:

1. Should any device or system fail to perform as proposed, the Supplier shall replace in kind or repair the equipment, system, or workmanship in question. Material and labor costs resulting from the replacement or repair or equipment or correction of poor workmanship shall be borne by the Supplier. The Supplier shall promptly repair or replace at its sole cost and expense, including the cost of removal of a unit, part or component, which proves to be defective or proves to have failed to comply with the requirements. The Supplier shall respond with a planned solution within 24 hours OKLAHOMA DOT’s notification to the Supplier of a failure.
2. The Supplier shall, in the event the software does not satisfy the conditions of performance stated in this document promptly repair or replace such software at its cost and expense, or provide different equipment, software and services required to attain the performance requirements contractually agreed upon.

H. Submittals: The contractor shall submit shop drawings, equipment submittals, descriptive data and brochures as soon as possible after award of the contract and before beginning work. The name of the project, project number, fabricator or manufacturer's name and the parish in which the project is located shall be shown on each sheet of every submittal if not bound. Bound submittals need only have the project information on the cover sheet; however, bound submittals will be considered as unitary and any error found on any sheet will cause all to be returned for correction. Shop drawings and equipment submittals shall measure either 8 1/2" x 11", 22" x 36", or "B" size. Equipment submittals shall be clearly marked as to the specific size and/or model being submitted and for what purpose it is to be used on the project.

The contractor shall submit seven (7) copies of each and every item requested for submittal, marked as previously described, to the Bridge Design Engineer. Each submittal will be returned with the required revisions noted thereon or it will be distributed The contractor shall make the required revisions and/or send seven (7) copies of each submittal to the Bridge Design Engineer for final approval and distribution. Two (2) copies of each submittal given final approval will be returned to the contractor. Brochures shall be originals where colors or patterns are shown, otherwise originals or copies equal to originals shall be acceptable. No material, equipment or apparatus shall be ordered or work started until final distribution is made.

Corrections and/or comments made on submittals are not intended to relieve the contractor from compliance with the contract documents.

Approval of the submittals and drawings does not imply that the equipment or materials described is complete, can be constructed or installed, will operate successfully or will coordinate with existing or other equipment specified. The contractor shall remain responsible for confirming and correlating all quantities and dimensions, for selecting fabrication processes and techniques of construction, for coordination of the work, for performing the work in a safe and satisfactory manner and for satisfactory installation and operation of equipment.

The manufacturer's published installation procedures shall be submitted for each piece of equipment to be furnished on the project. These procedures when approved shall serve as the basis for the installation inspection of these items. The contractor shall make available on site a copy of the approved installation procedures for the piece of equipment that is being installed. No installation of equipment shall take place without an approved installation procedure being on hand.

Shop Drawings, certified dimensional drawings, product description brochures, installation procedures, samples and color patterns shall be submitted for the following as indicated (O). The submittals shall be transmitted in no more than four submittal packages containing the items as shown and in the order indicated. Packages must be complete for review to begin.

SUBMITTALS

Item	Sub pckg	Shop Drawings	Dimension Drawing	Product Description	Installation Procedures
Weigh-in-Motion Scales	2		O	O	O
WIM Installation	2	O		O	
Loop Detectors	2		O	O	O
Loop Detector Installation	2	O		O	
Axle Sensors	2		O	O	O
Axle Sensor Installation	2	O			
Over Height Detectors and Support	3		O	O	O
Over Height Detector Installation	3	O			
Message Signs	3		O	O	O
Message Sign Installation	3	O			
Cameras and Supports	3		O	O	O
Camera Installation	3	O			
Roadside Processor and Cabinet	1		O	O	O
Roadside Cabinet Installation	1	O			
PC, Monitors and Peripherals	1		O	O	O
In House Furniture	4		O	O	
UPS	4		O	O	O
Electrical Materials	1		O	O	O

In addition to the shop drawings required above the contractor shall provide the following system drawings and/or descriptive data for approval.

1. Equipment Site Plan: The equipment site plan shall locate the system components along the interstate. Distances from some known and easily distinguishable feature shall be given for parallel to centerline distances and the perpendicular distances locating the equipment off the edge of shoulder of the roadway shall also be included. Any additional work to installing the equipment such as guard rail or fill shall be included and detailed. The equipment site plan shall be included in submittal package #1.

2. Electrical Site Plan: The electrical site plan shall locate system components, transformers, and points of service. The service drop shall be detailed. Sizes of equipment shall be shown. The electrical site plan shall show the routes and sizes of all conduits and the conductors carried in each. It shall give a typical conduit burial detail and any special details due to installation on or under obstructions, such as roadway, bridges, or culverts. The Electrical Site Plan shall be included in submittal package #1.

3. Scale House Equipment Layout: The scale house equipment layout shall show location of computing equipment, UPS, furniture, and cable racks, and the arrangement of the equipment within the furniture. The Scale House Layout shall be included in submittal package #4.

4. Scale House Electrical Layout: The scale house electrical layout shall show the location and size of the point of tie-in to the existing house distribution. It shall show any modifications required to the existing distribution in order to provide service to the in-house computing equipment. The scale house electrical layout shall also show routing and location of receptacles, wire, cable and conduit. The Scale House Layout shall be included in submittal package #4.

5. Electrical Grounding Plan (package #4)

6. Test Plan (package #4)

Software Drawings/ data (package #1)

7. Data Flow Diagrams
8. Signal Interface diagrams
9. Screen Layouts
10. Reports Layouts

11. Enter/ By-pass Decision Logic
12. System Violation/Compliance Logic

I. Maintenance and Operation Manuals: The contractor shall submit to the Bridge Design Engineer for approval five (5) copies of Operations and Maintenance Manuals. Manuals shall be submitted in ring binders and shall include the following:

1. Manufacturer's published operation, maintenance, and parts list manual and trouble shooting guide for each piece of equipment furnished on the project.
2. Supplier's systems trouble shooting guide and operational description.
3. Manufacturer's standard written warrantees for each piece of equipment furnished on the project.
4. Electrical: equipment and apparatus brochures.
5. Copy of the As Built Drawings.
6. Copy of test data

J. As-Built Drawings: The contractor shall submit to the Bridge Design Engineer two (2) blue line prints of "As-Built" drawings showing the location of all underground utilities and the electrical power connection and integration with existing service.

K. Codes and Fees: All material furnished and all work performed shall be in accordance with all state laws, codes, rules and regulations. The contractor shall specifically comply with the following:

National Electric code
FHWA Manual on Uniform Traffic Control Devices
AASHTO Roadside Design Guide

L. Testing, Adjusting and Start-Up: The contractor shall perform all tests and adjustments described elsewhere herein in the presence of the engineer and to his satisfaction. Each test required by these specifications shall be recorded and attested to by the contractor and the project engineer or their representatives.

There shall be a start-up period for the system whereby they will be operated under normal conditions for a period of two continuous weeks and show no defects. This start-up period shall not begin until all unit and system testing is complete. During this time the contractor shall keep technicians available to make repairs or adjustments as required. Any serious problems shall cause the start-up period to be restarted from the beginning.

M. System Geometry: The contractor is referred to the plan drawings that show the proposed system layout and component locations.

1. The distances are to be interpreted as close approximations. Deviations to the extent of 50 feet either way to facilitate installation or operation is acceptable. The contractor is required to furnish a system that is capable of accomplishing all of the checks and calculations, beginning at the point at which the vehicles are classified and weighed, in the time it takes a vehicle to transverse a maximum distance of 1,050 feet.

2. Whenever it is possible to install the component and still maintain its functionality, the system components shall be located a minimum of 30 feet from the edge of the travel lane of the highway. This requirement is to be followed even if it requires the bringing in of fill or other like measures to alleviate slopes or other natural obstructions. When this is not possible components shall be mounted on approved breakaway devices and/or protected by standard OKLAHOMA DOT guardrail systems. Details of the component installations including any additional work to comply with the above shall be shown on the installation drawings required under paragraph G elsewhere herein.

N. AVI Integration Provisions: An installation of AVI equipment is required as part of this project. The system will incorporate advance, notification and compliance locations as well as a station computer. The transponders will be of the in-cab type. The AVI system will be provided by HELP Inc./Pre-Pass.

1. The system shall be able to incorporate the PrePass system without any additional costs to the OKLAHOMA DOT.

2. To integrate with the AVI system it shall be assumed that for every truck passing the technology gauntlet that carries a transponder the AVI system will provide the Mainline Sorting system with the transponder ID number and a corresponding credential decision. The supplier shall develop and provide under this contract the required integration software and hardware so that a complete credential and weight sorting decision can be made for transponded trucks. The decision shall be based upon the combined information of the Mainline Sorting system and the AVI system. A negative determination in either shall require the transponded truck to "pull-in". For non-transponded trucks the system shall operate as previously described.

To insure confidentiality of information for Pre-pass trucks, the transponder ID number and the resulting decision data that is transferred to the new system will be discarded once the truck is processed.

3. The supplier shall insure that the message signs and the in-cab transponders can give no other than the same message to the driver of a transponded truck.

5. The system shall have the hardware and software capability to be integrated with other screening data-bases that OKLAHOMA DOT may choose to implement, including but not limited to, Washington X-View, SAFER, and State level CVIEW (Commercial Vehicle Information Exchange Window).

Electronic Clearance System
System Specification

FUNCTIONAL REQUIREMENTS, EQUIPMENT, AND MATERIALS

Scope: The functional components of the Mainline Sorting System are as listed:

A. Automatic Vehicle Classification
B. Weigh-in-Motion
C. Instructions to Drivers
D. Sorting
E. Tracking and Violation Detection
F. Operator Interface
G. Commercial Vehicle Information Systems and Networks (CVISN)

The functions of each component, the equipment, materials, and appurtenances needed to complete the functions, and the manner of integration into the overall Mainline Sorting System shall be as specified below.

A. Automatic Vehicle Classification: Automatic vehicle classification shall be provided in both the left and right hand lanes of the technology gauntlet as shown on the plans and described herein.

1.Data Generation and Access: The automatic vehicle classification (AVC) system shall minimally provide the 13 classifications typically described as the FHWA's Scheme F plus two additional categories and shall make available this information on a real time basis and in the form of reports. In addition, the system shall provide the capability to define and store custom classification and compliance schemes, with up to 24 class definitions. The AVC system shall give the following information on every vehicle that goes through the technology gauntlet:

Classification
Speed
Number of Axles
Axle Spacing
Over height
Time of Passage
Vehicle Length

The information shall be capable of being accessed by modem or displayed on a monitor.
Data for reports and real time display shall be integrated with the data from the weigh in motion system to provide a total profile on the right lane vehicles. The data format for all generated information shall be compatible with the department's existing roadway information gathering systems (TMG). Classification data shall be downloaded as number of vehicles by class and by hour for a selected period (continuous) and by axle weight and gross vehicular weight by class for a selected period (continuous right lane). Data shall be capable of being held for one month without downloading.

2.Functions Relating to the Sorting System: The AVC system shall contribute to the sorting system by determining which vehicles crossing the technology gauntlet are trucks, if a truck transiting the technology gauntlet is over height; and if a truck transiting the technology gauntlet is over speed or acceleration/deceleration. This information will be communicated to the Sorting System for use in computing the enter/bypass decision.

3.Equipment and Materials: The AVC equipment shall consist of loop detectors, axle sensors, over height detectors and their supports, and all controllers, boards, devices, interfaces modems, cables, wires, and operating software required to provide the system operations described.

Loop Detectors: The detector loops shall consist of a number of turns of No. 18 wire AWG sheathed with detectaduct. The number shall be according to the size and shall be as scheduled on the plans. Loop leads shall be No. 14 AWG single shielded twisted wire. Connections between the loops and leads shall be made in a junction box. Loops shall not be spliced in the road or shoulder. The loops shall be embedded in

a 1/4-inch by 1 1/2-inch saw cut and sealed with an approved hot-melt rubberized asphalt sealant. Loops shall be of the sizes detailed on the plans with 45-degree angle cuts at the corners. All loops used in the ECS shall follow this specification.

Axle Sensors: The axle sensors shall consist of a coaxial sensor element with a center core of 16 gauge flat braided wire covered with the piezoelectric polymer. All compressed within a flexible brass outer jacket. The axle sensors shall be directly installed in the roadway in a diamond saw cut filled with epoxy resin. The end installation shall be flush with the roadway. All sensors used in the AVC system shall be Class II. Axle sensors shall come complete with polyethylene jacketed RG 58 passive signal cable, 3/16" OD. Axle sensors shall be MSI Roadtrax BL or approved equal. All axle sensors shall be installed in a redundant configuration in strict accordance with the manufacturer's recommendations and the plan details.

Over Height Detector: The detector and light source shall be of the solid state printed circuit board type, using infrared pulsed light emitting diodes. The detector and light source shall be pole mounted. The height of the pole shall be determined from the field conditions and the criteria that it must provide for an adjustment of plus or minus one foot of the legal over height point. The poles shall be made of 6063 aluminum, minimum 6-inch diameter tapered by 1/8 inch thick. The poles shall be mounted on breakaway transformer bases equipped with hinged access. Cables shall be run within the pole to near the top and supported here leaving the pole by stress relief connectors. Cable shall be connected to the detecting devices using weatherproof flexible conduit of sufficient length to allow for the adjustment required above. Any reset devises shall be mounted in the base. A six-foot diameter by four-inch thick mowing apron shall be provided poured integrally with a reinforced footing. The footing shall be a minimum four feet deep by two feet in diameter.

System Electronics: The system electronics must provide a facility for viewing vehicle records and sensor diagnostics directly at the roadside, without any ancillary equipment. The system electronics must be of a modular design to aid in system maintenance, troubleshooting and in-field servicing. All components of the electronic system, including inductive loop detectors, must contain necessary electrical protection to prevent damage from electrical surges, spikes and the effects of lightning. The system must be of a durable, industrial design and construction and enable continuous operation, with automated startup in the event of a power outage. All sensor and ancillary equipment connections must be conveniently located on the system front panel.

The minimum specifications for the System Electronics are as follows:

Communication:

- CAN Bus for limitless sensor and control configuration
- On-board Ethernet interface
- One RS-232 serial interface dedicated to external system interface
- One RS-232 serial interface dedicated to remote administration facilities (modem dial-in)
- Local user interface for system configuration and fault diagnosis
- Wireless connection capabilities for configuration and maintenance
- Remote administration via Telnet, PPP
- Remote file download via FTP

Peripherals:

- Non-volatile storage for vehicle information to prevent data loss during power outages
    - Compact Flash, 32 MB minimum
- Sensor modules for WIM devices, Video, AVI, Temperature, Serial and Digital inputs

	- Control modules for Serial and Digital devices (AVI, CMS, VMS,OCS, LCS, DMS)
Software:	- Built-in Test capabilities on every module - Fault diagnosis features on every module - Processes up to eight lanes of traffic - Records data logs on operational status, power supply condition, battery and cabinet temperature, and safety system activity - Data Collection compatible with NTCIP 1206 - Weight Compliance and Classification with user-definable classification scheme -
Enclosure	- Accommodates up to 15 modules in single enclosure - Multiple enclosures may be connected together for expansion - Shelf or 19" rack mount - Powder painted aluminum panels - Shelf dimensions: 25 cm high x 48.4 cm wide x 25 cm deep (10 in. x 19 in. x 10 in.)
Power Supply	- 25 W supply - 90 to 264 VAC, 47 to 63 Hz operation - Standard 12 VDC battery for backup or extended operation - Integral charge controller for battery conditioning - Measures cabinet, battery and road temperatures
Video Capture Module	- NTSC video capture input - Ethernet output - triggered from WIM Bus or external digital signal

The signal processing electronics and software shall provide the following functions:

a) Weigh all vehicles entering the weigh station.
b) Transmit vehicle weight information to the Station Computer in the scale house.
c) Perform data collection, data storage, and file management functions for collected vehicle information.
d) Connect over fiber optic LAN to the scale house station computer.
e) Operate the Lane Control Signals under the direction of the Station Computer in the scale house.

B. Weigh-in-Motion: A weigh-in-motion system shall be provided in the right lane of the technology gauntlet as shown on the plans and described herein.

1. Data Generation: The weigh in motion system shall provide the following data on every vehicle transiting the technology gantlet in the right lane. This information shall be made available on a real time basis and in the form of reports. The information shall be capable of being accessed by modem.

Gross weight
Weight per axle
Bridge formula violation (on trucks only)

2.Functions Relating to the Sorting System: The weight information gathered through the WIM equipment shall be compared to the legally allowable weights and formulas (or predetermined threshold values) and the results used by the Sorting System in determining the enter/ by-pass decision. The WIM scales shall also detect, with an independent positive sensor activation, trucks driving partially in the right lane in an attempt to confuse the system. The WIM shall communicate that information to the Sorting System as a violation.

3. Equipment and Materials**:** The weigh in motion scales shall use hydraulic load cells modularly configured into a rustproof weighing platform. There shall be one load cell per weighing platform and two platforms per travel lane. Each scale platform shall be a self-contained weighing unit. The platforms shall be so configured as to cover one lane of traffic. Each cell shall be serviceable and removable from the scale platform without the need to remove the scale mechanism from the roadway. Each scale platform shall incorporate two off scale detectors. The scale platforms shall be frame mounted in concrete vaults so that they are flush to the roadway surface. The WIM scale shall be weather sealed and water tight. Drain piping shall be incorporated, run to an unpaved area and the outfall provided with a rock filled dry well. The accuracy of the WIM scales shall be in conformance with ASTM E 1318-00, Type III system. WIM scales shall be IRD Single Load Cell.

The WIM system shall be complete with all loop detectors, controllers, boards, devices, interfaces modems, cables, wires, and operating software required to provide the system operation described.

The Weigh-in-Motion (WIM) scale shall be constructed of two independent weighing platforms placed side-by-side across a roadway. The weighing platforms shall not be staggered in the direction of travel since that may increase construction costs of the pit and required boring under the roadway, and decrease system performance due to vibration. Each weighing platform shall form a scale module complete with load cell and offscale detectors. The WIM scale shall measure approximately 144" x 38" including frame.

Each scale module shall be a self-contained weighing unit, with a single hydraulic load cell making up the weighing element. Each scale module shall measure approximately 72" x 38" including frame. The scale mechanism shall incorporate load transfer torque tubes to transfer all loading on the weighing surface to the single hydraulic load cell so that the scale accuracy is not affected by the location of the truck's tires on the platform.

Each load cell shall be serviceable and removable from the scale module without the need to remove the scale mechanism. The load cell removal shall require only one person with normal tools and shall be accomplished within 30 minutes.

Each scale module shall incorporate two offscale detectors at the outside edges of the weighing surface. The offscale detectors shall be field replaceable. The offscales shall be integrated into the scale assembly to sense any vehicle missing the weighing surface of the scale.

The WIM scale shall operate properly in a temperature range of -40^{o}F to $+160^{o}$F.

There shall be two scale frames into which the two scale modules are mounted. The WIM scale shall be installed flush with the road surface in a minimum 34 inch deep concrete vault to provide a solid foundation for long life, and a reliable installation.

The WIM scale shall be weather-sealed and water tight. There shall be no intrusion of water, ice, snow, salt,

debris, dirt, moisture, or sand into the load cell, the load cell wiring compartment, the weighing mechanism and the entire WIM scale in general.

The WIM scale and frame shall be grounded with ground rods. The load cell and its signal processing electronic components/modules shall be protected against lightning.

The WIM scale and its frame shall be rust proofed. All installation hardware shall be either stainless steel or rust proofed. All surface mounting bolt and service holes shall be sealed with drive-in frost plugs.

Only one single cable shall be connected (spliced) to another single cable in the scale. The ground wire shall not be spliced into another cable. Cables shall be continuous (without splices or connectors) between the scale pit splices and the terminal strips in the electronic equipment cabinet.

The following cables shall be used:

a) An individual cable for each load cell using twisted shielded pairs. Each pair shall be individually shielded. All unused pairs and all shields shall be connected to earth ground at the cabinet end.
b) An individual ground wire shall be used for each scale cell and grounded at the equipment cabinet earth ground. The ground wire shall be bonded at one of the transducers bolts using a soldered crimp lug and sealed with permatex blue rtv silicone gasket material. The seal shall cover all of the bond point, lug, and any bare wire. All paint, rust, grease, etc. at the bond point shall be removed.
c) A single twisted pair of wire shall be provided for each offscale.

Individual cable wires shall be sealed using individual in line self sealing shrink tubing with internally applied sealant. This tubing shall overlap the individual wire's outer insulation by a minimum of one quarter of an inch. Sealant shall be visible coming out the ends of the tubing after shrinking.

Hydraulic scale cells shall be installed so the transducer is on the upper side. The transducer cable shall be installed as received from the manufacturer and not cut. The scale cell bolts holding the transducer in the scale cell shall be stainless steel.

The vendor shall supply a list of at least five installations where the scale has been installed in similar environmental conditions and the same or higher traffic speed and traffic volume for a minimum of ten years.

The scales must be capable of being re-installed on the main highway in advance of the weigh station to facilitate weight screening for future preclearance of trucks on the main highway. The system accuracy for the scales installed on the main highway lanes must also conform to ASTM E 1318-02 “Standard Specifications for Highway Weigh-in-Motion (WIM) Systems with user Requirements and Test Method” performance requirements for a Type III system.

C. Instructions to Drivers: Instructions to drivers for the sorting system shall be accomplished by the dynamic message signs.

1. Message Signs: There shall be two message signs each providing the same message acting in a redundant manner. The signs shall be so configured so the message can only be observed by that truck to which it is intended to be given. The supplier shall provide evidence of experience with positioning and activation of signs for selective messaging at highway speeds and under similar traffic conditions. Each sign

shall be capable of being blanked and of displaying the following two messages. 'OK TO BY-PASS' shall be in green letters all other shall be in white.

TRUCK MUST EXIT TO WEIGH STATION	TRUCK OK TO BYPASS WEIGH STATION

The message signs shall be integrated into the Sorting System to provide to the driver the message appropriate to his vehicle based upon the results of the enter/ by-pass computations done as the vehicle transited the technology gauntlet. The sign message shall be displayed on a freeze frame image of the truck if the truck is directed to exit to the weigh station (see paragraph 'E').

2. Equipment and materials: The message signs shall be of the fiber optic type. They shall use an industry standard fiber optic harness with 24-degree cone of vision lenses and a four-lamp configuration, two of which are redundant. Three levels of dimming shall be provided which shall be controlled by two photosensors. These shall be for day, night and over bright conditions. The lamps shall be soft started by means of a constantly supplied low voltage, that is not enough to allow the messages to be seen at night. Power requirements shall be 120 volts 2.5 amps and the sign shall be integrally protected by a circuit breaker. The enclosures shall be watertight, painted matte black with a matte black finish polycarbonate face. The messages shall be displayed in eight-inch characters. The message signs shall be complete with all loop detectors, controllers, boards, devices, interfaces, modems, cables, wires, and operating software required to provide the system operation described. Message signs shall be Tassimco Fiber Optic Blank Out Sign or approved equal. Signs shall not be equipped with automatic dimming.

The message signs shall be pole mounted. Message sign supports shall be constructed of Schedule 40 galvanized seamless steel pipe, ASTM A-53, in accordance with the 2003 AASHTO Specifications for the Design and Construction of Structural Supports for Highway Signs, Luminaires and Traffic Signals, 100 mile per hour wind zone. Poles shall be installed on a six-foot diameter mowing apron poured integral with a reinforced footing. The height of the pole shall be determined in the field and based upon the required height of the signs as specified by the system provider. The sign poles shall be located a minimum of 34 feet off the travel lane. Connections between the signs and the poles shall allow for adjustment of the sign angle to the roadway.

D. Sorting (The Enter/By-pass Decision): The population of trucks traveling on the mainline shall be sorted into those required to enter the static weigh station and those allowed to by-pass the static weigh station. The enter/ by-pass decision shall be computed on each truck transiting the technology gauntlet in the right lane.

1.Operation: The enter/ by-pass decision shall be based upon the data generated by the AVC, and the WIM systems and shall conform to the following:

-If the truck is found to be over height, overweight in gross or axle, in violation of the bridge formula, in excess of the system speed limit or allowable acceleration/deceleration rate, to have improper lane usage, then it shall be required to pull into the static weigh station.

-If the AVC or WIM record no violations then the truck shall be allowed to by-pass the static weigh station.

-The system shall provide ability to set a weight factor to be applied to the allowable vehicle weight. The factor shall be a percentage of the allowable that adjusts the threshold used to determine compliance or non-compliance. A user adjustable random sorting factor shall also be available to randomly select the specified percentage of otherwise compliant vehicles for reporting.

-The sorting system shall compute the enter/ by-pass decision and send the appropriate signal to the message signs.

2. Equipment and Material: The sorting system shall be complete with all, controllers, boards, devices, interfaces, modems, cables, wires, and operating software required to provide the system operation described.

E. Compliance Verification (Tracking) and Violation Detection: The tracking system shall provide information both data and visual on vehicle location within the Sorting System. The violation detection system shall work in conjunction with the tracking system and the WIM to visually record and display, and flag and display data records, of those trucks that violate the "Instructions to Drivers" or the static signs.

1. Operation: The tracking and violation detection systems can be considered one integrated system operating in the following way.

The "tracking system" shall be defined as pertaining to those trucks that transit the technology gauntlet in the right lane and are required to report to the static weigh station. These trucks shall have their images captured by a video camera and projected on a monitor. An identification number connecting the truck to the WIM data record shall be shown on the monitor image. A reporting truck shall also have its real time WIM and AVC data being displayed on the screen in such a way as to make it easy for the operator to determine the data that is associated with a reporting truck and the reason the truck is being brought in. When a reporting truck enters the ramp it shall be confirmed as complying with instructions by matching the in ramp's tracking system's weight and classification data with the WIM data generated at he technology gauntlet.

The system shall have the capability of determining if a truck instructed to pull into the weigh station has illegally by-passed by verifying its presence past the gore of the entry ramp in either the right or left lane. This shall be defined as the "violation detection". The verification shall be accomplished by matching the WIM data generated at the technology gauntlet with the in road violation detection system's weight and classification data. The image of the illegally bypassing truck shall be captured in either the right or left hand lane and displayed on the monitors. The image shall have superimposed upon it the message relayed to the violating truck from the message sign and a unique vehicle number that shall correspond to the number given the vehicle on the WIM data record.

At the technology gauntlet where all trucks should be in the right lane any vehicles classified as trucks in the left lane are in violation of the instructions and these shall have their images captured and displayed. The display shall have the AVC data corresponding to the violating truck superimposed.

The display system shall be capable of retaining twelve images with scrolling and selection capability and of printing out the image as displayed for use in demonstrating the basis of ticketing to the truck driver. The captured images of violating trucks shall be of such quality so to uniquely identify the truck whether taken in darkness or in light.

2. Equipment and Materials: The classification equipment required for the tracking and violation detection at the gore of the entry ramp for tracking and for violation detection shall be the same as that specified for the AVC system above. The camera systems shall consist of camera, infrared illuminator, monitor, and all loop detectors, boards, controllers, devices, interfaces, modems, cables, wires, and operating software required to provide the system operation described.

The video system shall use both monochrome and color high resolution, high sensitivity, CCD cameras for use on highway systems environments. The cameras shall be pole mounted as described under "Over Height Detectors" or they may utilize poles required for other equipment if they are appropriately located.

Cameras shall be Pelco Series ES30PCBW18 or approved equal. Cameras shall be equipped with an infrared illuminator for nighttime surveillance. The infrared illuminator shall have a photocell controlled on/off operation with a time delay feature. It shall be enclosed in a weather proof housing with sun visor, quick release latches, power ventilation, and covert filter. Infrared illuminator shall be Pelco Series

LL27 or approved equal. Cameras and illuminators shall be configured for 115 and 220 volt operation depending upon the length of electrical service run required.

F Mainline Sorting Operation (Operator Interface): The operator shall interface with the Mainline Sorting System through an on-line, interactive, menu-driven computing system. Four major sub-systems shall be able to be selected from the menu.

1. Accessing the System
2. Weigh Station Paperwork Automation
3. Sorting System Operations
4. Reports

Typical user log-on procedures shall be provided. Management log-on procedures shall include the ability to execute diagnostics. Users of the system shall not have to possess any specialized computer knowledge to fully utilize the system.

1. Accessing the System**:** This sub-system shall allow the scale officers to select and initialize other sub-systems from a menu, to access the Help function, and to employ diagnostics.

The Help function shall enable the user to access at any point in a process to obtain information about that process. Upon exiting Help the user shall be returned to the point in the process at which the Help function was called.

The system and each sub-system shall be able to perform basic self-diagnostics in order to ascertain that each component is functioning properly.

2. Weigh Station Paperwork Automation: This sub-system shall provide for the preparation and printing of the daily scale activity reports. This program shall bring-up the standard OKLAHOMA DOT form(s) and allow it (them) to be filled out by keyboard access. The form(s) shall then be printed out.

3. Sorting System Operations: This sub-system shall link the scale officers to the roadside system components. Access shall be by password entry. Through this interface system the scale officers shall be able to perform the following:

Set the threshold weight
Set the threshold speed
Blank out the message signs
Override the message signs to permanently display either message
Bring in trucks on a random basis

4. Statistics and Transaction Reports: This sub-system shall generate and print statistical reports on the raw classification data. These reports shall cover a range of dates entered by the user:

Over gross and over axle weight by hour
Vehicle class by hour

And shall generate and print transaction reports on scale operations. These reports shall cover a range of dates entered by the user:

Number of trucks that reported
Number of trucks that by-passed
Number of trucks running the scale (left lane)
Number of trucks running the scale (right lane)
Number of trucks reporting when not directed
Number of suspected violating trucks by-passing the station when closed

5. Equipment and Materials: The computing systems shall operate under an industry standard, multi-user, real time multi-tasking operating system. The computing systems shall include all of the devices needed to perform the functions described to them in this document. These shall include: processor, memory, hard disk, floppy disk, keyboards, video displays, printers, interface boards and devices, modems, cables, wires,

operating system software, and all other required to provide a complete operating system as described. The operating system shall support interrupts, foreground and background programs execution, graphics and window-based applications. The computers shall have a battery powered time/date clock, hardware interrupts, and power fail/auto restart.

The printer shall be a minimum 600 dpi, 8ppm laser printer, HP Laser Jet 3700 or approved equal.

The electronic equipment installed in the field shall be housed in a standard traffic cabinet of stainless steel construction. The cabinet shall be lined and insulated and installed with thermostatically controlled heater and fan units to maintain acceptable ambient temperatures. All cutouts and openings shall be vermin proof. All wires shall be terminated on terminal strips before going to the electronics. The terminal strips shall be identified by terminal number and screw connection number. The terminal strips shall be readily accessible. The cabinet shall be installed on a concrete pad that raises the bottom of the cabinet to 18 inches above natural ground. The pad shall be placed within a 4-inch thick mowing apron of sufficient area to extend three feet on any side of the pad.

G. Commercial Vehicle Information Systems and Networks (CVISN): The system shall coordinate operation of the signing system with the Pre-Pass system and shall provide station operators with access to driver, vehicle and carrier specific information.

1. Operation: The system operation shall be controlled by a Roadside Operations Computer (ROC). When implemented, the ROC shall deal with two types of trucks as described below:

- Non-transponded trucks: The ROC shall provide function controls to determine how non-transponded trucks will be processed. The operator shall have the choice to have trucks sorted for enter/by-pass as described herein, using changeable message signs, or to have all non-transponded trucks be directed to enter. The station operator shall be provided with an entry window on the operator terminal where the vehicle license plate can be entered. As a vehicle approached the static scale or at any other time as needed, the station operator shall be able to enter the license plate of a truck of interest and receive a record of available information.
- Pre-Pass Equipped Trucks: For every truck passing the technology gauntlet that carries a Pre-Pass transponder the ROC shall communicate with the Pre-Pass system to transfer weight information and bypass decision status. Roadside signing shall be coordinated so as not to conflict with in cab notification provided by Pre-Pass system. To insure confidentiality of information for Pre-pass trucks, any vehicle identity information and resulting decision data that may be transferred to the ROC system will be discarded once the truck is processed. Any information generated by PrePass that is required for their administrative use shall be returned to them. The supplier shall insure that the message signs and the in-cab transponders can give no other than the same message to the driver of a transponded truck.

If a commercial vehicle continues down the mainline, bypassing the weigh station exit ramp, the vehicle will pass by a sensor configuration of loop-axle sensor-axle sensor-loop. This sensor configuration is used for the purpose of vehicle tracking and data collection. An alarm will sound on the scale house manual console in the event that a commercial vehicle bypasses an "open" station.

The ROC system shall consist of three major components:

1) snapshot database containing a local copy of CVIEW and SAFER data, as provided from Washington DOT X-View system.
2) credential processing and screening software algorithms

3) Windows-based graphical user interface (GUI) for accessing the snapshots and credential screening components

The specific major functions fulfilled by the baseline ROC software are:

a. record all vehicle characteristics in a database
b. produce reports of recorded vehicle characteristics
c. screen vehicles for credential violations (based on manual identification entry)
d. screen vehicles for safety violations (based on manual identification entry)
e. screen vehicles using operator defined hotlists (based on manual identification entry)
f. allow duly authorized operators to adjust screening criteria
g. allow the operator to view vehicle screening results and CVIEW snapshot information

The software must maintain a configurable number of months, minimum of 3 months, maximum of 12 months, of historical vehicle data for analysis and reporting. This data shall be purged from the system on a weekly basis. i.e. once per week the software will examine all of the vehicle records to determine which are older than the specified expiry period and delete them from the database. The day and time at which this purging takes place shall configurable by a system administrator. Normally, it shall be set to occur during Saturday or Sunday or during some other time when the weigh station is not busy.

The ROC software is used to check weight and safety credentials of vehicles approaching the scale house. As the vehicle approaches, the scale house operator manually enters the license plate ID into the database. The vehicle's credentials are then checked with the national CVISN database.

Roadside Operations Requirements:

The ROC System shall provide the following functions:

a. vehicle screening
b. vehicle display
c. vehicle reporting
d. CVIEW interface

The ROC System shall produce printed reports detailing vehicle activity at the weigh station. This function is known as vehicle reporting.

The ROC System shall provide an interface to the state **CVIEW** system to update the local credential and safety database. This function is known as the **CVIEW** interface.

The ROC System shall maintain a vehicle record for each vehicle entered into the system.

The ROC System vehicle record shall contain the following information about each vehicle (when available):

a. Unique vehicle identifier
b. Vehicle number
c. Time and date stamp
d. Lane

e. Axle counts
f. Vehicle classification
g. overall vehicle weight
h. maximum gross vehicle weight
i. vehicle length
j. error code
k. vehicle speed
l. axle record type
m. ESAL value
n. Screening decision
o. Transponder ID from **DSRC** transponder
p. vehicle identification number from **DSRC** transponder
q. Carrier ID from **DSRC** transponder
r. Driver ID from **DSRC** transponder
s. license plate number from **LPR**
t. license plate jurisdiction
u. Carrier ID (**USDOT** number) from **CVIEW** data
v. axle weights
w. axle spacing

The ROC System shall retain a configurable number of months, minimum 3 months, and maximum 12 months, of historical vehicle records.

The ROC System shall interface to the CVIEW system (which may include State level CVIEW, Washington X-**CVIEW** database and SAFER) for receiving commercial vehicle data to be used in screening and providing snapshots.

The station computer shall utilize the SCO UNIX operating system.

The ROC System shall maintain an operator-defined **hot list** of carriers that are required to report to the scale house regardless of their weight or safety credential status.

The carrier **hot list** shall include an active date range for each entry defining the period in which the entry is valid.

The carrier **hot list** shall include the following information:

a. Carrier ID
b. Comments – the user can enter what action to take when the vehicle reports or any other information that would be useful
c. Start date – when the **hot list** status starts
d. End date – when the **hot list** status ends

The ROC System shall maintain an operator-defined **hot list** of vehicles that are required to report to the scale house regardless of their weight or safety credential status.

The vehicle **hot list** shall include an active date range for each entry defining the period in which the entry is valid.

Electronic Clearance System
System Specification

The vehicle **hot list** shall include the following information:

a. Vehicle ID (which could be the VIN or license plate number)
b. Comments – the user can enter what action to take when the vehicle reports or any other information that would be useful
c. Start date – when the **hot list** status starts
d. End date – when the **hot list** status ends
e. Jurisdiction – identifies registering jurisdiction

The ROC System shall maintain an operator-defined **hot list** of drivers that are required to report to the scale house regardless of their weight or safety credential status.

The driver **hot list** shall include an active date range for each entry defining the period in which the entry is valid.

The driver **hot list** shall include the following information:

a. Driver ID
b. Comments – the user can enter what action to take when the vehicle reports or any other information that would be useful
c. Start date – when the **hot list** status starts
d. End date – when the **hot list** status ends

The ROC System shall maintain a local database of carrier **snapshot** data received from **CVIEW**.

The ROC System shall maintain a local database of vehicle **snapshot** data received from **CVIEW**.

The ROC System shall maintain a local database of driver **snapshot** data received from **CVIEW**.

The ROC System shall permit the operator to override each specific credential/safety screening check on a carrier by carrier basis. Any credential or safety item that is overridden is not checked as part of the screening process for the designated carrier.

The ROC System shall permit the operator to override each specific credential/safety screening check on a vehicle by vehicle basis. Any credential or safety item that is overridden is not checked as part of the screening process for the designated vehicle.

The ROC System shall provide a Screening Results Display screen that permits the operator to do the following:

a. view the credentials and safety scores that were used in screening a particular vehicle
b. display which credentials and safety scores failed
c. display which credentials and safety scores a vehicle is currently failing (if the operator requested updated snapshot data from CVIEW, the screening results may no longer be accurate)
d. display whether the vehicle was directed to report as a result of appearing on a particular hot list

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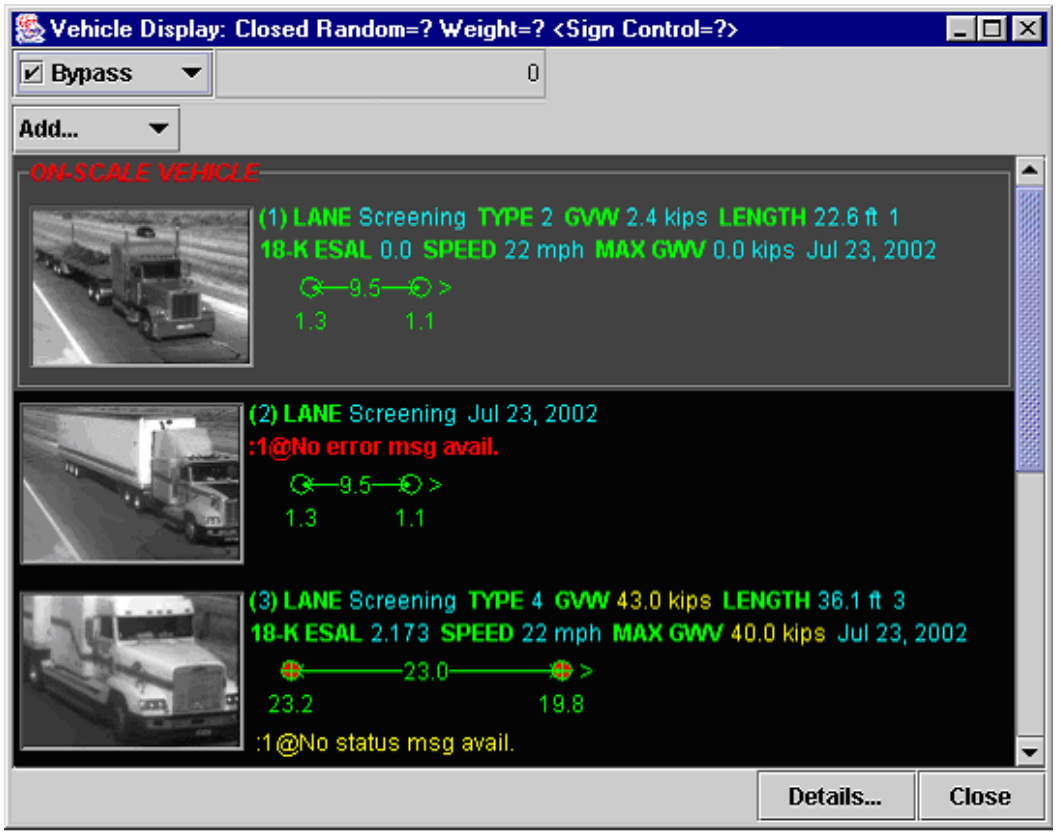
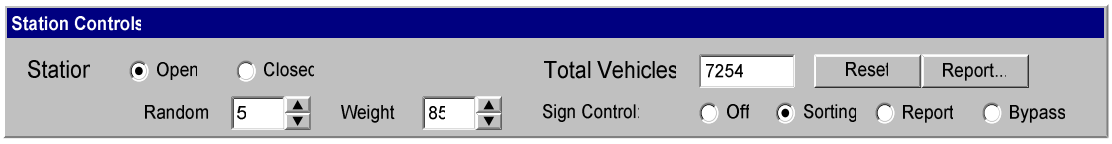
The vehicle display shall provide a combined image of each truck and its associated WIM weighing record on the operator terminal.

The vehicle display shall be similar to the following:



The station controls display shall be similar to the following:



The ROC System shall provide a user interface to permit an operator to specify which credentials and safety items shall be used to screen vehicles.

The ROC System shall permit an operator with the proper authority to enable or disable each individual screening criteria.

The ROC System shall permit the operator to enter a minimum/maximum allowable value to be used for each safety item while screening vehicles.

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The ROC System shall permit the operator to save a default configuration of screening criteria to be recalled at some point in the future.

The ROC System shall permit the operator to quickly and easily return all credential and safety score screening criteria to their default values.

The ROC System shall provide a user interface to permit the operator to retrieve current vehicle, carrier, and driver **snapshot** data from **CVIEW** and store it in the local database.

The ROC System shall provide a user interface to permit the operator to view **snapshot** data retrieved from **CVIEW** for any requested vehicle, carrier, or driver.

The ROC System shall provide a method for restricting access to system functions with a user identification and password scheme. The adjustment of screening criteria in particular must be restricted to only personnel with the required privileges.

The ROC System shall provide a user interface that allows the operator to produce reports on vehicle data as defined in section 0 below.

The ROC System shall provide a user interface to permit the operator to view all historical, vehicle data for any vehicle that has passed through the station in the last three months.

The ROC System shall provide a means for the operator to edit each of the hot lists.

The ROC System shall provide a Screening Results Display screen that permits the operator to do the following:

a. view the credentials and safety scores that were used in screening a particular vehicle
b. display which credentials and safety scores failed
c. display which credentials and safety scores a vehicle is currently failing (if the operator requested updated snapshot data from CVIEW, the screening results may no longer be accurate)
d. display whether the vehicle was directed to report as a result of appearing on a particular hot list

The ROC System shall provide a user interface to permit an operator to specify which credentials and safety items shall be used to screen vehicles.

The ROC System shall permit an operator with the proper authority to enable or disable each individual screening criteria.

The ROC System shall permit the operator to enter a minimum/maximum allowable value to be used for each safety item while screening vehicles.

The ROC System shall permit the operator to save a default configuration of screening criteria to be recalled at some point in the future.

Electronic Clearance System
System Specification

The ROC System shall permit the operator to quickly and easily return all credential and safety score screening criteria to their default values.

The ROC System shall provide a user interface to permit the operator to retrieve current vehicle, carrier, and driver **snapshot** data from **CVIEW** and store it in the local database.

The ROC System shall provide a user interface to permit the operator to view **snapshot** data retrieved from **CVIEW** for any requested vehicle, carrier, or driver.

The ROC System shall provide a method for restricting access to system functions with a user identification and password scheme. The adjustment of screening criteria in particular must be restricted to only personnel with the required privileges.

The ROC System shall provide a user interface that allows the operator to produce reports on vehicle data as defined in section 0 below.

The ROC System shall provide a user interface to permit the operator to view all historical, vehicle data for any vehicle that has passed through the station in the last three months.

The ROC System shall provide a means for the operator to edit each of the hot list

Any of the credential screening items identified below as optional shall be enabled/disabled by the operator in the screening setup screen or the vehicle display screen. "Report" will result in the vehicle being identified on the operator terminal as not meeting the screening criteria when a search is made by a user based on the manually entered identification. No signal or direction is provided to the driver without further operator action.

The ROC System shall optionally direct a vehicle to report if the vehicle's Intra-state vehicle registration expired prior to a user-definable number of days ago.

The ROC System shall optionally direct a vehicle to report if the vehicle's measured **GVW** is greater than the vehicle's registered **GVW** plus 1000 lbs.

The ROC System shall optionally direct a vehicle to report if the vehicle is registered to use six axles and the WIM detects fewer than six axles and the vehicle's measured **GVW** is greater than 73,280 lbs.

The ROC System shall optionally direct a vehicle to report if the Intra-state enforcement registration is suspended. The status codes defining registration status are **TBD** from State.

The ROC System shall display the registered weight of the vehicle at the operator workstation.

The ROC System shall optionally direct a vehicle to report if the carrier has an MC (**ICC**) number in **CVIEW** and does not have an **SSRS** credential in State. When the MC or **ICC** numbers are eliminated, the same rule will apply with the **USDOT** number.

The ROC System shall optionally direct a vehicle to report if the **SSRS** credential is suspended.

The ROC System shall display the **HazMat** status in **SSRS** at the operator workstation to aid in operator inspections.

The ROC System shall optionally direct a vehicle to report if the vehicle's **Exempt** credential is revoked.

The ROC System shall optionally direct a vehicle to report if the vehicle's **Exempt** credential is cancelled.

The ROC System shall optionally direct a vehicle to report if the vehicle's **HazMat** credential is revoked.

The ROC System shall optionally direct a vehicle to report if the vehicle's **HazMat** credential is suspended.

The ROC System shall optionally direct a vehicle to report if the vehicle's **HazMat** status is expired.

The ROC System shall use a separate random screening adjustment to decide whether to direct vehicles with **HazMat** credentials to report. This random screening is used to direct a percentage of vehicles to report when no other screening rule results in an inspection.

The ROC System shall display the **HazMat** permit number and type at the operator workstation to aid in operator inspections.

Any of the credential screening items identified below as optional shall be enabled/disabled by the operator in the screening setup screen or the vehicle display screen. **IRP** enforcement only applies to inter-state carriers.

The ROC System shall optionally direct a vehicle to report if the vehicle's **IRP** credential expired prior to a user-definable number of days ago.

The ROC System shall optionally direct a vehicle to report if the vehicle's **IRP** credential is suspended.

The ROC System shall optionally direct a vehicle to report if it is an out-of-state vehicle, the measured **GVW** is greater than 26,000 lbs. and it does not have an **IRP** credential.

The ROC System shall optionally direct a vehicle to report if the **GVW** measured by the **WIM** is greater than the **IRP** registered **GVW** plus 1000 lbs.

The ROC System shall optionally direct a vehicle to report if the vehicle is registered to use six axles and the **WIM** detects fewer than six axles and the **WIM** measures a **GVW** greater than 73,280 lbs.

The ROC System shall optionally direct a vehicle to report if the **HVUT** status is unsatisfactory.

Any of the credential screening items identified below as optional shall be enabled/disabled by the

operator in the screening setup screen or the vehicle display screen. **IFTA** enforcement only applies to inter-state carriers.

The ROC System shall optionally direct a vehicle to report if the **IFTA** credential is suspended for the carrier.

The ROC System shall display the reason for suspension of a carrier's **IFTA** credential at the operator workstation.

The ROC System shall optionally direct a vehicle to report if the **IFTA** credential for the carrier expired prior to a user-definable number of days ago.

The ROC System shall optionally direct a vehicle to report if the carrier is an out-of-state carrier and no **IFTA** credentials are found for the carrier.

Safety Enforcement Screening

Any of the safety screening items identified below as optional shall be enabled/disabled by the operator in the screening setup screen or the vehicle display screen.

The ROC System shall optionally direct a vehicle to report if the **SCE/ISS** safety score is greater than an operator defined threshold for screening.

The ROC System shall display the vehicle **SAFESTAT** score at the operator workstation.

The ROC System shall exclude a vehicle from the random pull-in process if the vehicle has a current **CVSA** decal in the vehicle snapshot and the vehicle does not have a current **HazMat** credential.

The ROC System shall optionally direct a vehicle to report if the carrier is designated as currently **OOS**.

The ROC System shall optionally direct a vehicle to report if the driver has been designated as **OOS** within the last user-definable number of days. The driver **OOS** flag is currently not implemented.

The ROC System shall optionally direct a vehicle to report if the vehicle has been designated as **OOS** within the last user-definable number of days.

Oversize/Overweight Enforcement Screening

Any of the screening items identified below as optional shall be enabled/disabled by the operator in the screening setup screen or the vehicle display screen.

The ROC System shall optionally direct a vehicle to report if the vehicle has a current over-width permit and the **WIM** measured **GVW** is greater than the empty weight on the permit plus a user settable tolerance.

The ROC System shall optionally direct a vehicle to report if the **WIM** measures a vehicle length greater than the length allowed in any current over-length permit for the vehicle.

Electronic Clearance System
System Specification

The ROC System shall optionally direct a vehicle to report if the over-height detection feature of the **WIM** is disabled and the vehicle has a current over-height permit and the WIM measured GVW is greater than the empty weight on the permit plus a user settable tolerance.

The ROC System shall optionally direct a vehicle to report, regardless of any current over-height permits issued for the vehicle, if the **WIM** makes an over-height determination.

The ROC System shall optionally direct a vehicle to report if the **WIM** measures a **GVW** that is equal to or greater than the **GVW** permitted in any current over-weight permits for the vehicle.

The ROC System shall direct a vehicle to report if the vehicle fails the bridge formula for legal sized loads and does not have a current oversize/overweight or overweight permit.

The ROC System shall treat vehicles with a current single trip or annual permit that have a **WIM** measured **GVW** less than the empty vehicle permit weight plus a user settable tolerance as if the vehicle does not have a permit. i.e. the vehicle will be checked using "legal" height, weight, and length settings and will be directed to report if any legal settings are violated.

The ROC System shall optionally direct a vehicle to report if the vehicle does not have a current single trip permit and it has a current annual permit with a height, width, length or weight Category greater than the user specified maximums for reduced restrictions and a current route approval does not exist and the empty permit weight has been exceeded by more than a user settable tolerance

The ROC System shall optionally direct a vehicle to report if the vehicle has a current annual permit and no current single trip permit and the vehicle violates any of the following:

a. the WIM measured distance between any 2 axles is less than the minimum allowed for annual permits where the minimum is user settable
b. the WIM measured distance between the steering axle and the next axle is less than the minimum allowed for annual permits where the minimum is user settable
c. the WIM measured distance from the front axle to the rearmost axle is greater than the maximum allowed for annual permits where the maximum is user settable
d. the WIM measured spacing on any tridem is greater than the maximum allowed for annual permits where the maximum is user settable
e. the WIM measured spacing on any quadrem is greater than the maximum allowed for annual permits where the maximum is user settable
f. the WIM measured spacing on any tandem is greater than the maximum allowed for annual permits where the maximum is user settable
g. the permit is an "overweight" or "oversize/overweight" permit and the number of axles detected by the WIM is less than the minimum number allowed for annual permits where the minimum is user settable
h. the permit is an "overweight" or "oversize/overweight" permit and the number of axles detected by the WIM is greater than the maximum number allowed for annual permits where the maximum is user settable

Electronic Clearance System
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The ROC System shall optionally direct a vehicle to report if the vehicle has a current single trip permit or a current annual permit with an approved route that required actual axle spacings and axle group weights to be specified and the vehicle violates any of the following:

a. axle spacing detected by the WIM is greater than the axle spacing on the permit plus a user specified tolerance.
b. axle spacing detected by the WIM is less than the axle spacing on the permit minus a user specified tolerance.
c. axle group weights detected by the WIM are greater than the axle group weights specified on the permit.

The ROC System shall allow the weight tolerance for permits to be adjusted in a way similar to how the weight tolerance for non-permitted vehicles is adjusted in the existing system.

The ROC System shall optionally direct a vehicle to report if the vehicle has a current single trip permit or a current annual permit and the weight distribution on the axles within any axle group is uneven and it is uneven by more than a user specified tolerance.

The ROC System shall allow a user to enter the maximum single axle weight that is allowed for each axle group (single, tandem, tridem, quadrem) in each of the annual permit axle load weight categories (A, B, C).

The ROC System shall optionally direct a vehicle to report if the vehicle has a current annual permit and no current single trip permit and the WIM detected axle group weights exceed the maximum for the annual permit axle load weight category specified in the route approval or in the annual permit, if no route approval exists.

The ROC System shall allow a user to enter the maximum **GVW** that is allowed for a vehicle in each of the annual permit axle load weight categories (A, B, C) when the vehicle has 5 axles, 6 axles, 7 axles with 2 tridem groups, 7 axles with tandem and quad groups, or 8 axles.

The ROC System shall optionally direct a vehicle to report if the vehicle has a current annual permit and no current single trip permit and the **WIM** detected **GVW** exceeds the maximum allowed for the vehicle's axle configuration in the annual permit axle load weight category specified in the route approval or in the annual permit, if no route approval exists.

State CVIEW Interface

The ROC System shall support the receipt of carrier, vehicle and driver snapshot data from the state CVIEW system using XML. The ROC system shall also support the receipt of carrier, vehicle and driver snapshot data from the Washington X-CVIEW and SAFER.

The ROC System shall include an FTP server for receipt of XML files from the state CVIEW system.

The ROC System shall continue normal operation while receiving and processing XML files from the state CVIEW system. The ROC shall support the processing of XML data at a rate to be determined but which may be as often as an update every 15 minutes.

2. Equipment and Materials: A single computer running a Windows operating system shall be used for the snapshot database and the credential processing algorithms – the IROC Computer.

The ROC System shall include one Windows based workstation for use as operator interface and display terminal.

Each ROC System workstation shall include a minimum 19-inch monitor, English keyboard, and a two-button mouse.

The ROC System shall include one laser printer that is accessible from the operator terminal.

The ROC System shall interface to the CVIEW system for receiving commercial vehicle data as described below.

Electronic Clearance System
System Specification

ELECTRICAL AND COMMUNICATIONS

Scope: The electrical power for the field computer cabinet shall be obtained from service drops at the OKLAHOMA DOT R/W as shown on the plans. The contractor shall furnish and install all necessary equipment required for a complete service in accordance with power company requirements. The contractor shall make all arrangements with the power company for temporary and permanent electrical service and shall verify location and points of attachment before installation. The contractor shall pay all charges for temporary electrical service, including power and installation. The owner will pay for power company line extension charges where the charges are not a result of contractor's errors or failure to verify or coordinate with the Power Company.

Service for the scale house equipment and devices located at the ramp gore shall be provided from spare circuits in the scale house. The contractor shall determine the number and sizes of the circuits required and make any modifications or additions to the existing power distribution that are needed to accommodate the system. The contractor shall provide all wiring and cable, conduit, transformers, junction boxes, receptacles, switches and all other electrical devices as required to complete the circuits in accordance with the system requirements, these specifications, and the National Electric Code.

The Provision of additional telephone and/or communications circuits for the operation of the mainline sorting system will be the responsibility of the OKLAHOMA DOT. The contractor shall inform the OKLAHOMA DOT of any required telecommunication needs as soon after the award of contract as possible so that they can be installed in a manner timely to the completion of the project.

The contractor shall verify with the Supplier the electrical services shown on the plans and shall provide as soon as possible after award of the contract fully developed service and distribution layouts and details (see "Site Plans" General Requirements paragraph G). These drawings shall incorporate any modifications required by the Supplier to accommodate his equipment.

A. Electrical Circuits: Electrical circuits within the scale house shall be run over the suspended ceiling to a point close to the components and thence run exposed attached to walls, columns, or floor to the component location or receptacle. The contractor shall replace any ceiling tiles damaged during the installation. Wire and cable inside the scale house shall be installed in flexible metal conduit shall conforming to ANSI C33.92 or in shielded cable. Flexible conduit connectors shall be compression type. Thread-on connectors will not be acceptable. When flexible conduits are installed on circuits not having separate continuous grounding conductors, external bonding jumpers shall be installed. No wire molding attached to the floor shall be run where traffic would be expected. Wire shall be stranded copper. Conductor insulation shall be rated 600 volts and shall conform to UL type THWN-2. Circuits outside the scale house shall be wire in conduit.

Receptacles shall not be located on wall spaces that are obstructed by open doors, and permanently installed counters, cabinets or equipment. The contractor shall verify the exact location of all equipment, cabinets, counters and door swings before installing. Receptacles shall be grounding type and shall have standard configurations except where installed to serve specific equipment that is provided with other configuration plugs.

The contractor shall furnish and install the type and size circuit breakers as required to complete the work. All breakers shall be bolt-on type, rated 10000 amps RMS sym. (minimum) at the rated system voltage unless specified otherwise on the plans. Where breakers serve new or existing equipment, the contractor shall verify the requirements of the equipment and submit for approval, the type, and size breakers required. Where breakers serve existing feeders, the contractor shall field verify all feeder conductor sizes and shall submit for approval the breakers sized according to the NEC.

Wire and cable outside the scale house shall be Non metallic under ground and rigid steel above ground. Rigid steel tubing shall conforming to ANSI C80.1 and shall be installed where conduits enter the

ground or slab and where shown on the plans. Fittings shall be threaded type with cast or malleable iron bodies and covers having zinc finish, solid neoprene gaskets and stainless steel screws. Non metallic conduit shall be schedule 40 PVC or schedule 40 high density polyethylene and shall be buried 3'-0" underground. NM conduit will not be permitted above ground or slab. All NM conduit shall contain an equipment grounding conductor. Where empty conduits are required, the conduits shall be capped on each end. Underground stub-outs shall extend 2'-0" from the slab at a depth of 3'-0" unless otherwise noted. A galvanized marker pipe shall be driven 6" above grade on the edge of the slab at the point of stub-out. Underground conduits shall be installed 3'-0" below grade unless specified otherwise.

Underground boxes shall be formed from carbon filled high density polyethylene, or from fiberglass reinforced polymer concrete. Polyethylene boxes shall have ribbed walls, minimum outside dimensions of 10"x12" top, 14"x17" bottom, and 15" high. Top opening shall be 8"x10" (min.) and shall be fitted with 3/16" thick hot-dip galvanized steel cover with grounding lug, 3/8" stainless steel threaded plate. Box shall be furnished with riveted, galvanized steel frame for flush installation in concrete. Cut-outs in box shall be as required for conduit entrance (equal to Formed Plastics 4121). Polymer concrete boxes shall have minimum inside dimensions of 10.5"w x 10.5"l x12"h, heavy duty covers for service loads of 150 psi, and stainless steel penta-head cover bolts (equal to Quazite PC1212GA). Boxes shall be installed in 4" thick concrete pads unless otherwise shown on the plans. Metal covers shall be grounded to the equipment grounding conductor.

Electronic communications between the areas of the Mainline Sorting System (technology gauntlet, message signs, and compliance, and scale house) shall be fibre optic cable in conformance with the recommendations of the Supplier. Separate conduits shall be used for AC/DC power and low voltage signal cables. All AC power connections shall be shielded to prevent electric shock. All relays used to turn power on or off shall be solid state relays that switch at zero ac current.

B. Grounding: The contractor shall provide and install ground rods at all outdoor equipment cabinet locations, scale vaults, equipment mounting poles, and structures. Protection shall be provided for signal input/output and power connections at separately packaged signal processing equipment. The contractor shall establish at each weigh station house a common grounding conductor connected between all equipment, equipment racks, cable racks, and metallic structural members installed for the Mainline Sorting System. This common grounding conductor shall then be connected to an adequate ground system. Grounding and bonding shall be of the size and material sufficient to meet applicable codes.

C. UPS: The Mainline Sorting System shall be provided with an Uninterruptable Power Supply (UPS) with sufficient power to allow the system to safely shut itself down in the event of a power outage. The UPS shall allow the attached processors to systematically close their files and applications and eventually shut-off the UPS.

Electronic Clearance System
System Specification

PROJECT SUPPORT:

Scope: The contractor shall provide all labor, equipment and materials necessary to perform the project support functions described herein.

A. Installation and Construction Support: The supplier shall install all computing components of the Mainline Sorting System and shall provide on-site support in the form of qualified and experienced technicians for the installation by the contractor of all other components of the Mainline Sorting System.

B. Testing and Training: The components and the overall operation of the Mainline Sorting System shall be tested according to the following. All testing shall be done by the Supplier's qualified and experienced technicians in the presence of the Project Engineer or his representative. The testing shall be on three levels.

1. Unit Testing: The individual components of the Mainline Sorting System shall be tested according to the manufacturer's published test plans and shown to meet the expected results. The test plans shall accompany the components to the field. The test plans shall be executed in the presence of the Project Coordinator or his representative. A list of the component tests shall be made and each component signed off against by a technical representative of the Supplier and a representative of the Project Engineer. The list shall include but not be limited to:

Over height emitter and transmitter
F/O transmitter
F/O receiver
Keyboard
Mouse
Modem
Monitors
Printer
Cameras
Illuminators
Signal Strobe
UPS
Alarm
Isobar

The weigh in motion scales shall be calibrated and tested according to ASTM-1318-02. The statistical calculations as determined by the Project Engineer shall be performed by the Project Engineer or they shall be performed by the contractor and then checked by the Project Engineer.

2. System Testing: Once unit testing is satisfactorily completed, the integrated Mainline Sorting System shall be shall be tested for successful performance of all the functional requirements specified under "FUNTIONAL REQUIREMENTS, EQUIPMENT, AND MATERIALS" elsewhere herein. All tests shall be performed by qualified and experienced technicians of the Supplier in the in the presence of the Project Engineer or his representative.

The system testing shall be accomplished in three ways:

a. Through controlled operations
b. Through observation of normal operations
c. Through demonstration

Controlled Operations: shall be used to verify the sorting, tracking, and violation detection functions. The contractor shall provide two test trucks and all equipment required to perform the tests. One of the trucks shall be loaded in excess of the allowable weights and the other to be unloaded or loaded far below the allowable weights. The unloaded truck shall be equipped with a removable device that will trip the over-

height detector. The trucks shall make as many passes of the system as are required to verify the following system functions:

Lane @ WIM	**Truck Type**	**Cam #1**	**Mess-age Sign #1**	**Cam #2**	**Mess-age Sign #2**	**Truck's Action@ Gore**	**Cam #3**	**Operator Display**	**Pass/ Fail**
Right	under weight	no image	by pass	no image	by pass	by passes	no image	None	
Right	under weight	no image	by pass	no image	by pass	reports	no image	wrong lane	
Right	under weight & over height	no image	report	image	report	by passes	image	Truck running scale	
Right	under weight & over height	no image	report	image	report	reports	no image	over height	
Right	over weight	no image	report	image	report	by passes	image	Truck running scale	
Right	over weight	no image	report	image	report	reports	no image	over weight	
Left	under weight or over weight	image	none	no image	none	by pass	no image	Truck not in WIM lane	

A chart similar to the one above shall be made and the test results recorded thereon. The controlled operations portion of the system testing shall be considered successfully completed when each test has been verified as passed by the Project Engineer or his representative. A copy of the completed and attested form shall be submitted to the Bridge Design Engineer and included in the maintenance manuals.

Observation of Normal Operations: The following functions shall be verified by observations made on the system's response to the normal traffic flow. In each it shall be observed that the system was able to detect the violation and give the correct messages and operator displays. During the observation of normal operations the functional requirements of the real time display enhancement and image saving and printing requirements of paragraph E shall also be verified.

Violation	**message**	**display**	**pass/fail**
over speed	report	over speed	
bridge formula	report	bridge formula violation	
decel/accel rate or avoiding the scale	report	improper lane use	
Function	**xxxxxxxxxxxxxxx**	**xxxxxxxxxxxxxx**	**Pass/fail**
enhances Display data and indicates type of violation for trucks			

suspected in violation			
Images of trucks in violation (12 max) Saved and printable with information as required by the specifications thereon			

The observation of normal operations portion of the system testing shall be considered successfully completed when each test has been verified as passed by the Project Engineer or his representative. A copy of the completed and attested form shall submitted to the Bridge Design Engineer and included in the maintenance manuals.

Electronic Clearance System
System Specification

Demonstration: The operator interface functions shall be demonstrated to perform in full accordance with the requirements of the specifications (paragraph F Mainline Sorting Operation (Operator Interface)).

Function	Pass/fail
The operator can access the sub-systems from a menu	
The operator can obtain a short explanations of how to operate a sub-system by accessing the HELP function from within the sub-system	
Self diagnostics and notifications are available	
The operator can type in his/her daily scale activity report by pulling up the form and entering the data from the keyboard	
The operator can	
set the threshold weight	
set the threshold speed	
blank out the message signs	
override the message signs to permanently display either message	
bring in trucks on a random basis	
A report software tool allows the operator to generate (print out) for an entered range of dates the following statistical reports	
Over gross and over axle weight by hour	
Vehicle class per hour	
A report software tool allows the operator to generate (print out) for an entered range of dates the following transaction reports	
Number of trucks directed to report	
Number of trucks directed to by-pass	
Number of trucks running the scale (left lane)	
Number of trucks running the scale (right lane)	
Number of trucks reporting when not directed	

The demonstration portion of the system testing shall be considered successfully completed when each test has been verified as passed by the Project Engineer or his representative. A copy of the completed and attested form shall submitted to the Bridge Design Engineer and included in the maintenance manuals.

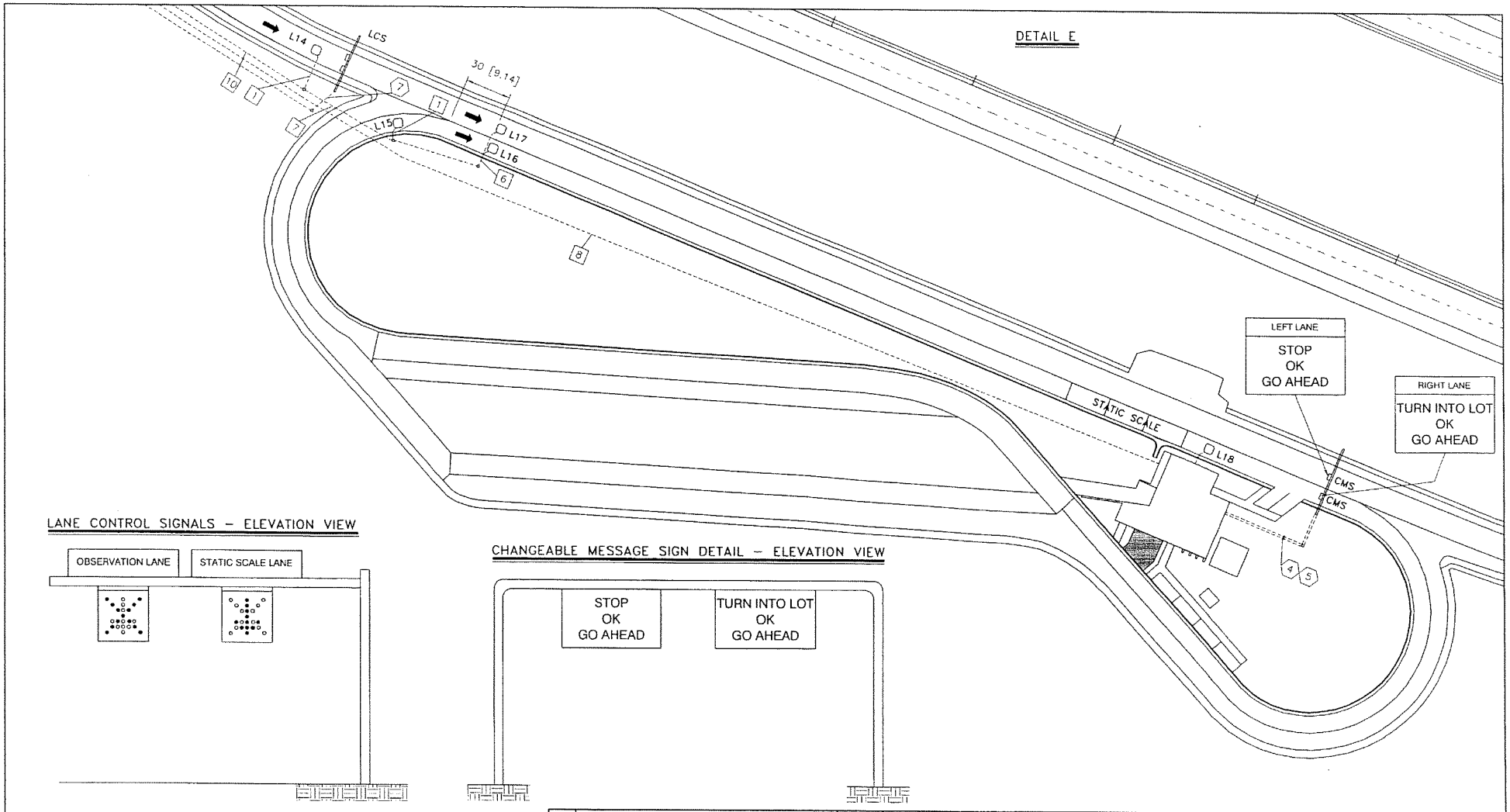
3. Acceptance Testing: and Training: Having successfully completed system testing, the Contractor and Oklahoma DOT shall place the system into operation at the weigh station. Acceptance testing shall begin at a time mutually agreed upon and shall run for a period of 14 consecutive days following the test plan and meeting of the expected results. The contractor shall keep at least one fully qualified employee on site who is able to perform diagnostics, and make adjustments and fixes as required. Acceptance testing periods may be rerun as necessary and reasonable in the option of and with the approval of the Project Engineer.

Concurrent with the acceptance test the operators of the scales shall be given on the job training. At the end of the acceptance test/training period each shift officer shall be able to perform the operating functions listed and shall be understanding of the sorting operation.

Function	Can do/understands
Sorting Operation	
The operator can access the sub-systems from a menu	
The operator can obtain a short explanations of how to operated a sub-system by accessing the help function from within the sub-system	
Self diagnostics and notifications are available	
The operator can type in his/her daily scale activity report by pulling up the form and entering the data from the keyboard	
The operator can	
set the threshold weight	
set the threshold speed	
blank out the message signs	
override the message signs to permanently display either message	
bring in trucks on a random basis	
The operator can use the report software tool to generate (print out) for an entered range of dates the following statistical reports	
Over gross and over axle weight by hour	
Vehicle class per hour	
The operator can use the report software tool to generate (print out) for an entered range of dates the following transaction reports	
Number of trucks directed to report	
Number of trucks directed to by-pass	
Number of trucks running the scale (left lane)	
Number of trucks running the scale (right lane)	
Number of trucks reporting when not directed	

The Oklahoma DOT Project Engineer shall be notified 10 working days before the beginning of the system testing so that arrangements may be made for interested parties to attend.

APPENDIX F



LANE CONTROL SIGNALS – ELEVATION VIEW

CHANGEABLE MESSAGE SIGN DETAIL – ELEVATION VIEW

REV.	DESCRIPTION	DWN/DSN	APPR.	APPR.	DATE
1	PRELIMINARY RELEASE	JGI/LTh	DBo	TDe	AUG 8/05
2	UPDATE DRAWINGS.	JGI/RCz	RCz	DPr	JAN 17/06
3	ADD STICK DRAWING & VIRTUAL WIM DETAIL.	JGI/RCz			

NOT TO SCALE

SIZE: B

DIMENSIONS IN: FEET [m]

INTERNATIONAL ROAD DYNAMICS INC.
SASKATOON SASKATCHEWAN CANADA

DWG. TITLE:
SITE LAYOUT
WIM/PRE-PASS/STATIC SCALE SYSTEM
MADISON, WISCONSIN

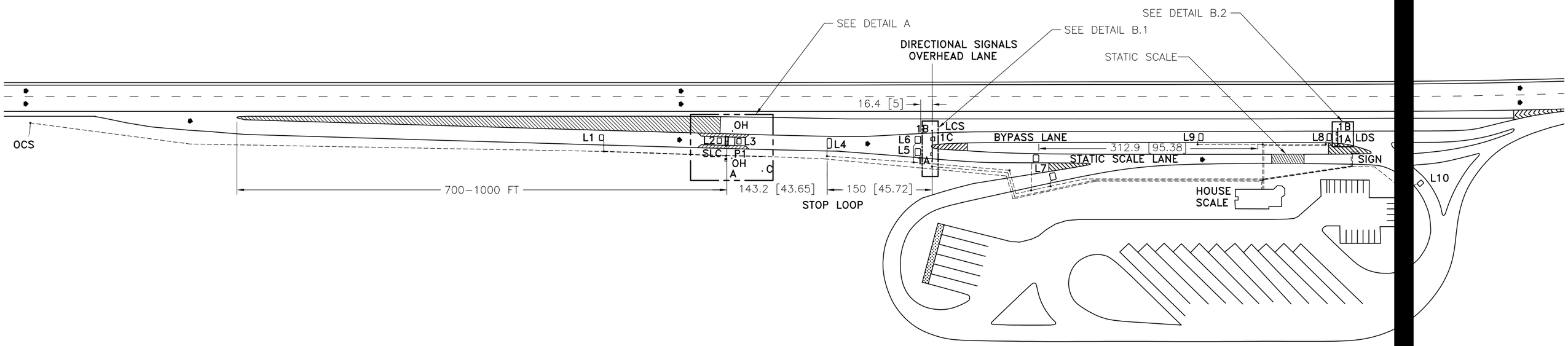
DWG. No. **MWIMLS05**

REV.: 3

CAD FILE: MWIMLS05.DWG

SHEET 8 OF 9

STATE PROJECT NUMBER: 1002-02-72



1	PRELIMINARY RELEASE	JGi/CWi				

NOT TO SCALE

SIZE: B

DIMENSIONS IN: FEET [m]

ROAD DYNAMICS INC.
SASKATOON SASKATCHEWAN CANADA

DWG. TITLE:
SITE LAYOUT
TYPICAL RAMP SORTER SYSTEM

DWG. No. **MTYRSS06**

REV.: 1

CAD FILE: MTYRSS06.DWG

SHEET 1 OF 3

APPENDIX G

PRELIMINARY ESTIMATE OF A TYPICAL POE FACILITY

BY THE UNIVERSITY OF OKLAHOMA
FOR THE PURPOSES OF COMPARISION WITH
THE ESTIMATE PROVIDED BY COBB ENGINEERING COMPANY

RIGHT-OF-WAY

Item	Unit	Planned Quantity	Unit Price	Planned Quantity Amount
RIGHT-OF-WAY	AC	8.60	$ 10,000.00	$ 86,000.00
		DIVISION TOTAL		**$ 86,000.00**

SITE PREPARATION

Item	Unit	Planned Quantity	Unit Price	Planned Quantity Amount
REMOVAL OF CONCRETE PAVEMENT	SY	0.00	$ 2.78	$ -
UNCLASSIFIED EXCAVATION	CY	28,948.33	$ 6.50	$ 188,164.17
UNCLASSIFIED BORROW	CY	23,246.00	$ 9.00	$ 209,214.00
CLEARING AND GRUBBING	LSUM	1.00	$ 10,000.00	$ 10,000.00
SOLID SLAB SODDING	SY	7,600.00	$ 1.25	$ 9,500.00
FERTILIZING (10-20-10)	TON	1.00	$ 350.00	$ 350.00
MOWING	AC	8.00	$ 25.00	$ 200.00
11" CONCRETE	SY	16,166.50	$ 26.00	$ 420,329.00
9" CONCRETE	SY	10,875.00	$ 21.25	$ 231,093.75
6" CONCRETE	SY	330.00	$ 14.25	$ 4,702.50
OPEN GRADED BIT. BASE	TON	4,846.67	$ 61.00	$ 295,646.67
TACK COAT	GAL	1,832.62	$ 1.00	$ 1,832.62
PRIME COAT	GAL	5,474.52	$ 1.20	$ 6,569.42
12" AGGREGATE BASE	CY	5,391.75	$ 28.00	$ 150,969.00
6" AGGREGATE BASE	CY	1,875.00	$ 14.00	$ 26,250.00
4" DRAINABLE BASE	TON	6,133.38	$ 25.00	$ 153,334.38
8" SUBGRADE MODIFICATION	TON	12,266.75	$ 55.00	$ 674,671.25
CONCRETE SIDEWALK	SY	29.00	$ 15.00	$ 435.00
TRAFFIC STRIPE	LF	15,470.00	$ 0.50	$ 7,735.00
6" CONCRETE MEDIAN BARRIER	LF	407.25	$ 25.00	$ 10,181.25
CONCRETE DIVIDER WALL	LF	100.00	$ 30.00	$ 3,000.00
		DIVISION TOTAL		**$ 2,404,178.00**

UTILITIES AND DRAINAGE

Item	Unit	Planned Quantity	Unit Price	Planned Quantity Amount
ELECTRIC	LSUM	1.00	$ 3,500.00	$ 3,500.00
WATER	LSUM	1.00	$ 3,500.00	$ 3,500.00
SEWER (SEPTIC SYSTEM)	LSUM	1.00	$ 3,500.00	$ 3,500.00
8" CURB AND GUTTER	LF	3,500.00	$ 2.00	$ 7,000.00
HAZ-MAT SEDIMENT BASIN	LSUM	1.00	$ 10,000.00	$ 10,000.00
		DIVISION TOTAL		**$ 27,500.00**

FACILITIES

Item	Unit	Planned Quantity	Unit Price	Planned Quantity Amount
ADMINISTRATION BUILDING	SF	6,000.00	$ 150.00	$ 900,000.00
3-INSPECTION FACILITY	SF	0.00	$ 170.00	$ -
CREDENTIALS CHECK BOOTH	SF	100.00	$ 120.00	$ 12,000.00
AMMENITY ALLOWANCE	LSUM	1.00	$ 10,000.00	$ 10,000.00
FURNITURE ALLOWANCE	LSUM	1.00	$ 10,000.00	$ 10,000.00
		DIVISION TOTAL		**$ 932,000.00**

LIGHTING AND SIGNAGE

Item	Unit	Planned Quantity	Unit Price	Planned Quantity Amount
TYPICAL HIGHWAY LIGHT POLE	EA	38.33	$ 3,000.00	$ 115,000.00
TYPICAL HIGHWAY LUMINAIRE	EA	38.33	$ 500.00	$ 19,166.67
MAINLINE SIGNAGE	LSUM	0.00	$ 10,000.00	$ -
VARIABLE MESSAGE SIGN	EA	0.00	$ 120,000.00	$ -
		DIVISION TOTAL		**$ 134,166.67**

COMMUNICATIONS AND SECURITY

Item	Unit	Planned Quantity	Unit Price	Planned Quantity Amount
INTERCOM SYSTEM	LSUM	1.00	$ 1,500.00	$ 1,500.00
FIBER OPTIC CABLE	LF	1,000.00	$ 5.00	$ 5,000.00
CLOSED CIRCUIT CAMERA SYSTEM	LSUM	1.00	$ 10,000.00	$ 10,000.00
SCALE LANE GATES	EA	2.00	$ 175.00	$ 350.00
		DIVISION TOTAL		**$ 16,850.00**

SCALES AND EQUIPMENT

Item	Unit	Planned Quantity	Unit Price	Planned Quantity Amount
MAINLINE WIM WITH PREPASS	LSUM	1.00	$ 500,000.00	$ 500,000.00
MAINLINE WIM INSTALLATION	LSUM	0.00	$ 2,500.00	$ -
SECONDARY WIM	LSUM	0.00	$ 2,100.00	$ -
SECONDARY WIM INSTALLATION	LSUM	0.00	$ 2,500.00	$ -
10'x10' HYDRAULIC STATIC SCALE	LSUM	1.00	$ 12,400.00	$ 12,400.00
10'x24' HYDRAULIC STATIC SCALE	LSUM	1.00	$ 14,960.00	$ 14,960.00
10'x80' HYDRAULIC STATIC SCALE	LSUM	1.00	$ 29,200.00	$ 29,200.00
HYDRAULIC SCALE INSTALLATION	LSUM	1.00	$ 5,000.00	$ 5,000.00
LOOP DETECTOR WIRE	LF	0.00	$ 6.00	$ -
AVI READER AND EQUIPMENT	LSUM	1.00	$ 100,000.00	$ 100,000.00
SUPPORT SOFTWARE	LSUM	0.00	$ 5,000.00	$ -
		DIVISION TOTAL		**$ 661,560.00**

MISCELLANEOUS

Item	Unit	Planned Quantity	Unit Price	Planned Quantity Amount
MOBILIZATION	LSUM	1.00	$ 176,544.72	$ 176,544.72
CONTRACTOR QUALITY CONTROL	LSUM	1.00	$ 25,000.00	$ 25,000.00
STAKING	LSUM	1.00	$ 20,000.00	$ 20,000.00
TRAFFIC CONTROLS	LSUM	1.00	$ 10,000.00	$ 10,000.00
		DIVISION TOTAL		**$ 231,544.72**

TOTAL	**$ 4,493,799.38**
15% CONTINGENCY	**$ 674,069.91**
TOTAL WITH CONTINGENCY	**$ 5,167,869.29**

APPENDIX H

ENFORCEMENT SVC
STATISTICAL RECAP
FY 2006/2007

LOCATION	HOURS OF OPERATION			CREDENTIALS CHECKED			PRE-CLEARED				WAVED-THRU		
	HRS OPEN INBOUND	HRS OPEN OUTBOUND	TOTAL TRAFFIC	INBOUND	OUTBOUND	TOTAL	INBOUND	OUTBOUND	TOTAL	PREPASS ONLY	INBND	OUTBND	TOTAL
CENTRAL PERMITS	2,468	0	7,913	4,499	0	4,499	3,414	0	3,414		0	0	0
DOUGLAS FEDERAL	2,293	172	23,273	19,820	3,453	23,273	0	0	0		0	0	0
DOUGLAS STATE	2,051	166	13,788	6,512	7,276	13,788	0	0	0		0	0	0
DUNCAN	2,498	0	24,361	7,212	4,975	12,187	5,864	4,939	10,803		671	700	1,371
EHRENBERG	7,932	58	1,593,504	307,185	0	307,185	1,273,157	0	1,273,157	602,265	13,162	0	13,162
FREDONIA	1,543	94	19,383	5,726	6,103	11,829	3,830	3,724	7,554		0	0	0
KINGMAN	2,488	0	42,743	11,399	0	11,399	31,344	0	31,344	64,200	0	0	0
LUKEVILLE	1,616	0	180	176	0	176	1	0	1		3	0	3
NACO	2,075	160	5,887	3,690	2,197	5,887	0	0	0		0	0	0
NOGALES	3,615	0	230,240	119,817	0	119,817	109,530	0	109,530		893	0	893
PAGE	2,256	142	45,452	13,816	12,922	26,738	10,067	8,626	18,693		11	10	21
PARKER	3,403	0	65,963	62,562	0	62,562	3,080	0	3,080		321	0	321
SAN LUIS	2,715	0	39,591	39,112	479	39,591	0	0	0		0	0	0
SAN SIMON	7,291	0	925,330	505,988	0	505,988	411,816	0	411,816	478,515	7,526	0	7,526
SANDERS	6,775	120	1,912,900	377,034	236,998	614,032	1,296,782	0	1,296,782	573,615	2,086	0	2,086
SASABE	2,064	0	204	198	0	198	3	0	3		3	0	3
SPRINGERVILLE	2,139	0	23,837	12,174	11,663	23,837	0	0	0		0	0	0
ST. GEORGE	7,255	7,087	1,005,885	192,947	202,907	395,854	298,254	311,777	610,031	266,926	0	0	0
TEEC NOS POS	4,071	0	26,902	11,554	7,895	19,449	1,862	5,591	7,453		0	0	0
TOPOCK	5,886	0	627,981	295,819	0	295,819	330,548	0	330,548	408,922	1,614	0	1,614
YUMA B-8	2,270	0	25,971	21,893	0	21,893	4,078	0	4,078		0	0	0
YUMA I-8	8,654	60	420,520	232,545	2,211	234,756	185,676	28	185,704	152,795	60	0	60
PORTS SUB-TOTAL	83,358	8,059	7,081,808	2,251,678	499,079	2,750,757	3,969,306	334,685	4,303,991	2,547,238	26,350	710	27,060
	Total Staff Hrs.	**Total Details**											
MOBILE - CENTRAL	212	29	2,153	1,755	0	1,755	0	0	0		398	0	398
MOBILE - NORTH	2,342	25	4,521	2,672	0	2,672	0	0	0		1,849	0	1,849
MOBILE - SOUTH	4,161	90	5,078	4,055	0	4,055	0	0	0		1,023	0	1,023
MOBILE SUB-TOTAL	6,715	144	11,752	8,482	0	8,482	0	0	0		3,270	0	3,270
TOTAL	**83,358**	**8,059**	**7,093,560**	**2,260,160**	**499,079**	**2,759,239**	**3,969,306**	**334,685**	**4,303,991**		**29,620**	**710**	**30,330**

ENFORCEMENT SVC
STATISTICAL RECAP
FY 2006/2007

LOCATION	LEVEL I					
	ABANDONED VEHICLES					
	OFFCR HRS AV ONLY	TOW YARDS	PRIVATE PROPERTY	TOTAL LEVEL I AV	OTHER VEHICLES	TOTAL LEVEL I
CENTRAL PERMITS	0.0	0	0	0	0	0
DOUGLAS FEDERAL	0.0	0	0	0	2,485	2,485
DOUGLAS STATE	0.0	0	0	0	37	37
DUNCAN	2.5	0	2	2	29	31
EHRENBERG	0.0	0	0	0	159	159
FREDONIA	0.0	0	0	0	28	28
KINGMAN	0.2	0	1	1	26	27
LUKEVILLE	0.0	0	0	0	1,101	1,101
NACO	0.0	0	0	0	2,755	2,755
NOGALES	37.1	182	31	213	772	985
PAGE	4.5	0	7	7	68	75
PARKER	0.0	0	0	0	1	1
SAN LUIS	15.0	20	7	27	493	520
SAN SIMON	0.0	0	0	0	11	11
SANDERS	0.0	0	0	0	59	59
SASABE	1.5	5	0	5	0	5
SPRINGERVILLE	0.0	0	0	0	156	156
ST. GEORGE	54.8	18	31	49	131	180
TEEC NOS POS	0.0	0	0	0	654	654
TOPOCK	0.0	0	0	0	3	3
YUMA B-8	0.0	0	0	0	0	0
YUMA I-8	0.0	0	0	0	0	0
PORTS SUB-TOTAL	115.6	225	79	304	8,968	9,272
MOBILE - CENTRAL	0.5	0	2	2	0	2
MOBILE - NORTH	0.0	0	0	0	3	3
MOBILE - SOUTH	0.0	0	0	0	0	0
MOBILE SUB-TOTAL	0.5	0	2	2	3	5
ABANDONED VEH TEAM	3,869.7	8,268	1,950	10,218	379	10,597
BULLHEAD	262.2	735	104	839	181	1,020
CASA GRANDE	213.9	382	128	510	253	763
CLAYPOOL	118.0	206	114	320	420	740
FLAGSTAFF	532.2	425	256	681	142	823
GLENDALE	452.3	331	422	753	230	983
HOLBROOK	482.8	1,273	305	1,578	768	2,346
KINGMAN	507.0	456	347	803	419	1,222
MESA	1,284.6	1,700	967	2,667	830	3,497
NOGALES	176.1	475	91	566	354	920
PARKER	439.0	899	267	1,166	322	1,488
PAYSON	130.9	26	123	149	212	361
PRESCOTT	289.0	211	194	405	195	600
SAFFORD	103.9	113	196	309	916	1,225
SANDERS	296.4	904	129	1,033	480	1,513
SCOTTSDALE	961.1	1,319	658	1,977	299	2,276
SIERRA VISTA	693.5	508	302	810	135	945
SOUTH MESA	114.5	402	0	402	28	430
TEMPE	231.2	343	121	464	199	663
TUBA CITY	487.5	521	122	643	95	738
TUCSON	1,528.5	2,430	1,376	3,806	821	4,627
VERDE VALLEY	270.1	227	108	335	120	455
WILLCOX	130.1	603	90	693	485	1,178
YUMA	244.2	804	243	1,047	1,520	2,567
ENFORCE SUB-TOTAL	13,818.7	23,561	8,613	32,174	9,803	41,977
TOTAL	**13,934.8**	**23,786**	**8,694**	**32,480**	**18,774**	**51,254**

ENFORCEMENT SVC
STATISTICAL RECAP
FY 2006/2007

VIN VERIFICATIONS

LEVEL II

ABANDONED VEHICLES

TOW YARD

LOCATION	OFFICER HRS AV ONLY	INSPECT	REVENUE	NO FEE INSPECTIONS GOV'T	NO FEE INSPECTIONS OTHER
CENTRAL PERMITS	0.0	0	$ -	0	0
DOUGLAS FEDERAL	0.0	0	$ -	0	0
DOUGLAS STATE	0.0	0	$ -	0	0
DUNCAN	0.0	0	$ -	0	0
EHRENBERG	0.0	0	$ -	0	0
FREDONIA	0.0	0	$ -	0	0
KINGMAN	0.0	0	$ -	0	0
LUKEVILLE	0.0	0	$ -	0	0
NACO	0.0	0	$ -	0	0
NOGALES	0.5	0	$ -	0	0
PAGE	0.0	0	$ -	0	0
PARKER	0.0	0	$ -	0	0
SAN LUIS	0.0	0	$ -	0	0
SAN SIMON	0.0	0	$ -	0	0
SANDERS	0.0	0	$ -	0	0
SASABE	0.0	0	$ -	0	0
SPRINGERVILLE	0.0	0	$ -	0	0
ST. GEORGE	0.0	0	$ -	0	0
TEEC NOS POS	0.5	1	$ 20.00	0	0
TOPOCK	0.0	0	$ -	0	0
YUMA B-8	0.0	0	$ -	0	0
YUMA I-8	0.0	0	$ -	0	0
PORTS SUB-TOTAL	1.0	1	$ 20.00	0	0
MOBILE - CENTRAL	0.0	0	$ -	0	0
MOBILE - NORTH	0.0	0	$ -	0	0
MOBILE - SOUTH	0.0	0	$ -	0	0
MOBILE SUB-TOTAL	0.0	0	$ -	0	0
ABANDONED VEH TEAM	2,201.5	3,695	$ 73,900.00	66	0
BULLHEAD	32.8	65	$ 1,300.00	0	0
CASA GRANDE	51.8	62	$ 1,240.00	3	0
CLAYPOOL	6.2	11	$ 220.00	4	0
FLAGSTAFF	6.8	5	$ 100.00	0	0
GLENDALE	274.0	585	$ 11,700.00	1	0
HOLBROOK	11.5	13	$ 260.00	0	0
KINGMAN	37.6	19	$ 380.00	0	0
MESA	305.6	572	$ 11,440.00	13	0
NOGALES	3.5	4	$ 80.00	0	0
PARKER	3.3	2	$ 40.00	0	0
PAYSON	19.3	4	$ 80.00	0	0
PRESCOTT	19.3	12	$ 240.00	0	0
SAFFORD	2.0	3	$ 60.00	0	0
SANDERS	23.1	30	$ 600.00	0	0
SCOTTSDALE	685.7	640	$ 12,800.00	9	0
SIERRA VISTA	2.3	3	$ 60.00	0	0
SOUTH MESA	91.6	81	$ 1,620.00	0	0
TEMPE	46.0	44	$ 880.00	5	0
TUBA CITY	3.9	5	$ 100.00	6	0
TUCSON	99.8	44	$ 880.00	5	0
VERDE VALLEY	2.0	3	$ 60.00	0	0
WILLCOX	11.4	24	$ 480.00	0	0
YUMA	0.0	0	$ -	0	0
ENFORCE SUB-TOTAL	3,941.0	5,926	$ 118,520	112	0
TOTAL	**3,942.0**	**5,927**	**$ 118,540**	**112**	**0**

PRIVATE PROPERTY

INSPECT	REVENUE	NO FEE INSPECTIONS GOV'T	NO FEE INSPECTIONS OTHER	TOTAL LEVEL II AV
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
1	$ 20.00	0	0	1
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
1	$ 20.00	0	0	2
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
180	$ 3,600.00	0	0	3,941
3	$ 60.00	0	0	68
43	$ 860.00	0	0	108
3	$ 60.00	0	0	18
9	$ 180.00	0	0	14
40	$ 800.00	0	0	626
4	$ 80.00	0	0	17
19	$ 380.00	0	0	38
96	$ 1,920.00	0	0	681
2	$ 40.00	0	0	6
2	$ 40.00	0	0	4
17	$ 340.00	0	0	21
4	$ 80.00	0	0	16
1	$ 20.00	0	0	4
4	$ 80.00	0	0	34
67	$ 1,340.00	0	0	716
1	$ 20.00	0	0	4
0	$ -	0	0	81
14	$ 280.00	0	0	63
0	$ -	0	0	11
53	$ 1,060.00	0	0	102
1	$ 20.00	0	0	4
6	$ 120.00	0	0	30
0	$ -	0	0	0
569	$ 11,380	0	0	6,607
570	**$ 11,400**	**0**	**0**	**6,609**

NON-ABANDONED VEHICLES

OTHER VEHICLES	REVENUE	NO FEE GOVERNMENT	NO FEE OTHER	TOTAL LEVEL II
0	$ -	0	0	0
1	$ 20.00	0	0	1
12	$ 240.00	0	0	12
3	$ 60.00	0	0	3
0	$ -	0	0	0
3	$ 60.00	0	0	3
1	$ 20.00	0	0	1
0	$ -	0	0	0
2	$ 40.00	0	0	2
91	$ 1,820.00	0	0	92
11	$ 220.00	0	1	12
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
12	$ 240.00	0	0	12
95	$ 1,900.00	0	2	98
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
231	$ 4,620.00	0	3	236
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
0	$ -	0	0	0
800	$ 16,000.00	0	0	4,741
12	$ 240.00	0	0	80
162	$ 3,240.00	0	0	270
61	$ 1,220.00	0	0	79
135	$ 2,700.00	0	0	149
1472	$ 29,440.00	0	0	2,098
128	$ 2,560.00	0	0	145
309	$ 6,180.00	0	0	347
1184	$ 23,680.00	0	0	1,865
87	$ 1,740.00	0	0	93
573	$ 11,460.00	0	0	577
40	$ 800.00	0	0	61
251	$ 5,020.00	0	1	268
54	$ 1,080.00	1	0	59
77	$ 1,540.00	0	0	111
487	$ 9,740.00	0	0	1,203
145	$ 2,900.00	0	2	151
3	$ 60.00	0	0	84
863	$ 17,260.00	0	0	926
46	$ 920.00	0	0	57
928	$ 18,560.00	0	0	1,030
149	$ 2,980.00	0	0	153
39	$ 780.00	0	0	69
413	$ 8,260.00	57	0	470
8418	$ 168,360.00	58	3	15,086
8,649	**$ 172,980.00**	**58**	**6**	**15,322**

LEVEL III

LEVEL III	REVENUE	NO FEE GOVERNMENT	NO FEE OTHER
1	$ 50.00	0	0
0	$ -	0	0
2	$ 100.00	0	0
1	$ 50.00	0	0
0	$ -	0	0
4	$ 200.00	0	0
0	$ -	0	0
0	$ -	0	0
0	$ -	0	0
142	$ 7,100.00	0	0
14	$ 700.00	0	0
0	$ -	0	0
0	$ -	0	0
0	$ -	0	0
0	$ -	0	0
0	$ -	0	0
0	$ -	0	0
34	$ 1,700.00	0	0
11	$ 550.00	0	0
1	$ 50.00	0	0
0	$ -	0	0
0	$ -	0	0
210	$ 10,500.00	0	0
0	$ -	0	0
0	$ -	0	0
0	$ -	0	0
0	$ -	0	0
3,400	$ 170,000.00	15	0
8	$ 400.00	0	0
201	$ 10,050.00	1	0
251	$ 12,550.00	0	0
164	$ 8,200.00	0	0
5,541	$ 277,050.00	2	0
171	$ 8,550.00	0	0
153	$ 7,650.00	0	0
6,292	$ 314,600.00	5	0
196	$ 9,800.00	0	0
259	$ 12,950.00	0	0
54	$ 2,700.00	0	0
270	$ 13,500.00	0	0
68	$ 3,400.00	0	0
62	$ 3,100.00	0	0
1,884	$ 94,200.00	3	0
427	$ 21,350.00	0	0
22	$ 1,100.00	0	0
4,231	$ 211,550.00	2	0
24	$ 1,200.00	0	0
4,219	$ 210,950.00	5	0
153	$ 7,650.00	0	0
79	$ 3,950.00	0	0
1,427	$ 71,350.00	18	0
29,556	$ 1,477,800.00	51	0
29,766	**$ 1,488,300.00**	**51**	**0**

ENFORCEMENT SVC
STATISTICAL RECAP
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LOCATION	TOTAL LEVEL III
CENTRAL PERMITS	1
DOUGLAS FEDERAL	0
DOUGLAS STATE	2
DUNCAN	1
EHRENBERG	0
FREDONIA	4
KINGMAN	0
LUKEVILLE	0
NACO	0
NOGALES	142
PAGE	14
PARKER	0
SAN LUIS	0
SAN SIMON	0
SANDERS	0
SASABE	0
SPRINGERVILLE	0
ST. GEORGE	34
TEEC NOS POS	11
TOPOCK	1
YUMA B-8	0
YUMA I-8	0
PORTS SUB-TOTAL	210
MOBILE - CENTRAL	0
MOBILE - NORTH	0
MOBILE - SOUTH	0
MOBILE SUB-TOTAL	0
ABANDONED VEH TEAM	3,415
BULLHEAD	8
CASA GRANDE	202
CLAYPOOL	251
FLAGSTAFF	164
GLENDALE	5,543
HOLBROOK	171
KINGMAN	153
MESA	6,297
NOGALES	196
PARKER	259
PAYSON	54
PRESCOTT	270
SAFFORD	68
SANDERS	62
SCOTTSDALE	1,887
SIERRA VISTA	427
SOUTH MESA	22
TEMPE	4,233
TUBA CITY	24
TUCSON	4,224
VERDE VALLEY	153
WILLCOX	79
YUMA	1,445
ENFORCE SUB-TOTAL	29,607
TOTAL	**29,817**

ENFORCEMENT SVC
STATISTICAL RECAP
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LOCATION	TOTALS						
	ABAND VEH OFFICER HOURS	ABAND VEHICLE VERIF	LEVEL I VERIF	LEVEL II VERIF	LEVEL III VERIF	VIN VERIF	VERIFICATION REVENUE
CENTRAL PERMITS	0.0	0	0	0	1	1	$ 50.00
DOUGLAS FEDERAL	0.0	0	2485	1	0	2486	$ 20.00
DOUGLAS STATE	0.0	0	37	12	2	51	$ 340.00
DUNCAN	2.5	2	31	3	1	35	$ 110.00
EHRENBERG	0.0	0	159	0	0	159	$ -
FREDONIA	0.0	0	28	3	4	35	$ 260.00
KINGMAN	0.2	1	27	1	0	28	$ 20.00
LUKEVILLE	0.0	0	1101	0	0	1101	$ -
NACO	0.0	0	2755	2	0	2757	$ 40.00
NOGALES	37.6	214	985	92	142	1219	$ 8,940.00
PAGE	4.5	7	75	12	14	101	$ 920.00
PARKER	0.0	0	1	0	0	1	$ -
SAN LUIS	15.0	27	520	0	0	520	$ -
SAN SIMON	0.0	0	11	0	0	11	$ -
SANDERS	0.0	0	59	0	0	59	$ -
SASABE	1.5	5	5	0	0	5	$ -
SPRINGERVILLE	0.0	0	156	0	0	156	$ -
ST. GEORGE	54.8	49	180	12	34	226	$ 1,940.00
TEEC NOS POS	0.5	1	654	98	11	763	$ 2,470.00
TOPOCK	0.0	0	3	0	1	4	$ 50.00
YUMA B-8	0.0	0	0	0	0	0	$ -
YUMA I-8	0.0	0	0	0	0	0	$ -
PORTS SUB-TOTAL	116.6	306	9,272	236	210	9,718	$ 15,160.00
MOBILE - CENTRAL	0.5	2	2	0	0	2	$ -
MOBILE - NORTH	0.0	0	3	0	0	3	$ -
MOBILE - SOUTH	0.0	0	0	0	0	0	$ -
MOBILE SUB-TOTAL	0.5	2	5	0	0	5	$ -
ABANDONED VEH TEAM	6071.2	14159	10,597	4,741	3,415	18,753	$ 263,500.00
BULLHEAD	295.0	907	1,020	80	8	1,108	$ 2,000.00
CASA GRANDE	265.7	618	763	270	202	1,235	$ 15,390.00
CLAYPOOL	124.2	338	740	79	251	1,070	$ 14,050.00
FLAGSTAFF	539.0	695	823	149	164	1,136	$ 11,180.00
GLENDALE	726.3	1379	983	2,098	5,543	8,624	$ 318,990.00
HOLBROOK	494.3	1595	2,346	145	171	2,662	$ 11,450.00
KINGMAN	544.6	841	1,222	347	153	1,722	$ 14,590.00
MESA	1590.2	3348	3,497	1,865	6,297	11,659	$ 351,640.00
NOGALES	179.6	572	920	93	196	1,209	$ 11,660.00
PARKER	442.3	1170	1,488	577	259	2,324	$ 24,490.00
PAYSON	150.2	170	361	61	54	476	$ 3,920.00
PRESCOTT	308.3	421	600	268	270	1,138	$ 18,840.00
SAFFORD	105.9	313	1,225	59	68	1,352	$ 4,560.00
SANDERS	319.5	1067	1,513	111	62	1,686	$ 5,320.00
SCOTTSDALE	1646.8	2693	2,276	1,203	1,887	5,366	$ 118,080.00
SIERRA VISTA	695.8	814	945	151	427	1,523	$ 24,330.00
SOUTH MESA	206.1	483	430	84	22	536	$ 2,780.00
TEMPE	277.2	527	663	926	4,233	5,822	$ 229,970.00
TUBA CITY	491.4	654	738	57	24	819	$ 2,220.00
TUCSON	1628.3	3908	4,627	1,030	4,224	9,881	$ 231,450.00
VERDE VALLEY	272.1	339	455	153	153	761	$ 10,710.00
WILLCOX	141.5	723	1,178	69	79	1,326	$ 5,330.00
YUMA	244.2	1047	2,567	470	1,445	4,482	$ 79,610.00
ENFORCE SUB-TOTAL	17759.7	38,781	41,977	15,086	29,607	86,670	$ 1,776,060.00
TOTAL	**17,876.8**	**39,089**	**51,254**	**15,322**	**29,817**	**96,393**	**$ 1,791,220.00**

ENFORCEMENT SVC
STATISTICAL RECAP
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LOCATION	STOLEN VEHICLES				AZ NUMBERS	
	STOLEN VEHICLES IDENTIFIED	RECOVERY VALUE	STOLEN PARTS IDENTIFIED	RECOVERY VALUE	AZ NUMBERS / DUPLICATES	AZ NUMBERS / DUPS REVENUE
CENTRAL PERMITS	0	$ -	0	$ -	0	$ -
DOUGLAS FEDERAL	0	$ -	0	$ -	1	$ 5.00
DOUGLAS STATE	0	$ -	0	$ -	28	$ 140.00
DUNCAN	0	$ -	0	$ -	0	$ -
EHRENBERG	0	$ -	0	$ -	0	$ -
FREDONIA	0	$ -	0	$ -	1	$ 5.00
KINGMAN	0	$ -	0	$ -	0	$ -
LUKEVILLE	0	$ -	0	$ -	0	$ -
NACO	0	$ -	0	$ -	0	$ -
NOGALES	0	$ -	0	$ -	35	$ 175.00
PAGE	0	$ -	0	$ -	4	$ 20.00
PARKER	0	$ -	0	$ -	0	$ -
SAN LUIS	0	$ -	0	$ -	16	$ 80.00
SAN SIMON	0	$ -	0	$ -	0	$ -
SANDERS	0	$ -	0	$ -	1	$ 5.00
SASABE	0	$ -	0	$ -	0	$ -
SPRINGERVILLE	0	$ -	0	$ -	0	$ -
ST. GEORGE	0	$ -	0	$ -	3	$ 15.00
TEEC NOS POS	0	$ -	0	$ -	3	$ 15.00
TOPOCK	0	$ -	0	$ -	0	$ -
YUMA B-8	0	$ -	0	$ -	0	$ -
YUMA I-8	0	$ -	0	$ -	0	$ -
PORTS SUB-TOTAL	0	$ -	0	$ -	92	$ 460.00
MOBILE - CENTRAL	0	$ -	0	$ -	0	$ -
MOBILE - NORTH	0	$ -	0	$ -	0	$ -
MOBILE - SOUTH	0	$ -	0	$ -	0	$ -
MOBILE SUB-TOTAL	0	$ -	0	$ -	0	$ -
ABANDONED VEH TEAM	167	$ 2,257,839.00	2	$ 3,000.00	1,457	$ 7,285.00
BULLHEAD	4	$ 5,400.00	0	$ -	14	$ 70.00
CASA GRANDE	20	$ 179,495.00	0	$ -	89	$ 445.00
CLAYPOOL	2	$ 5,000.00	0	$ -	24	$ 120.00
FLAGSTAFF	4	$ 48,875.00	0	$ -	32	$ 160.00
GLENDALE	63	$ 230,983.00	8	$ 6,700.00	649	$ 3,245.00
HOLBROOK	11	$ 66,265.00	1	$ 300.00	74	$ 370.00
KINGMAN	5	$ 11,550.00	0	$ -	125	$ 625.00
MESA	36	$ 234,415.00	0	$ -	484	$ 2,420.00
NOGALES	22	$ 487,098.00	2	$ -	57	$ 285.00
PARKER	2	$ 5,500.00	0	$ -	221	$ 1,105.00
PAYSON	3	$ 600.00	0	$ -	39	$ 195.00
PRESCOTT	1	$ 1,800.00	0	$ -	57	$ 285.00
SAFFORD	1	$ 1,500.00	0	$ -	58	$ 290.00
SANDERS	11	$ 60,621.00	0	$ -	74	$ 370.00
SCOTTSDALE	43	$ 294,298.00	1	$ 1,000.00	321	$ 1,605.00
SIERRA VISTA	0	$ -	0	$ -	174	$ 870.00
SOUTH MESA	3	$ 8,625.00	0	$ -	1	$ 5.00
TEMPE	28	$ 166,785.00	1,009	$ 4,900.00	303	$ 1,515.00
TUBA CITY	2	$ 18,761.00	0	$ -	21	$ 105.00
TUCSON	49	$ 339,855.00	3	$ 2,600.00	411	$ 2,055.00
VERDE VALLEY	2	$ 18,000.00	0	$ -	19	$ 95.00
WILLCOX	4	$ 30,695.00	1	$ 2,500.00	79	$ 395.00
YUMA	11	$ 56,015.00	0	$ -	56	$ 280.00
ENFORCE SUB-TOTAL	494	$ 4,529,975.00	1027	$ 21,000.00	4,839	$ 24,195.00
TOTAL	**494**	**$ 4,529,975.00**	**1,027**	**$ 21,000.00**	**4,931**	**$ 24,655.00**

ENFORCEMENT SVC
STATISTICAL RECAP
FY 2006/2007

LOCATION	COMMERCIAL VEHICLE SAFETY INSPE										
	NON-NAFTA			NAFTA				NON-NAFTA DRIVERS			NA
	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 1	LEVEL 2	LEVEL 3	TOTAL	VIOLATIONS	OUT OF SVC	CITATIONS	VIOLATIONS
CENTRAL PERMITS	0	0	0	0	0	0	0	0	0	0	0
DOUGLAS FEDERAL	17	0	0	517	0	0	534	0	0	0	12
DOUGLAS STATE	3	0	0	852	1	0	856	0	0	0	103
DUNCAN	9	0	15	0	0	0	24	20	0	0	0
EHRENBERG	459	413	945	0	0	0	1,817	5,807	1,049	2,082	0
FREDONIA	104	25	91	0	0	0	220	12	1	0	0
KINGMAN	113	6	5	0	0	0	124	54	19	6	0
LUKEVILLE	8	0	0	24	0	0	32	3	0	0	2
NACO	1	0	0	2	0	0	3	0	0	0	1
NOGALES	132	0	0	2,509	1	0	2,642	2	1	0	100
PAGE	60	0	0	31	0	0	91	50	6	3	12
PARKER	32	41	60	0	0	0	133	191	26	170	0
SAN LUIS	95	4	8	1,551	0	0	1,658	3	0	0	62
SAN SIMON	478	33	69	0	0	0	580	1,104	108	29	0
SANDERS	328	26	31	0	0	0	385	748	158	119	0
SASABE	22	4	9	6	0	0	41	0	0	1	0
SPRINGERVILLE	130	10	2	0	0	0	142	228	24	27	0
ST. GEORGE	362	38	151	0	0	0	551	707	154	17	0
TEEC NOS POS	96	4	24	0	0	0	124	75	12	0	0
TOPOCK	163	1	7	0	0	0	171	59	15	3	0
YUMA B-8	68	1	0	135	0	0	204	9	0	0	135
YUMA I-8	291	0	0	853	0	1	1,145	306	26	0	840
PORTS SUB-TOTAL	2,971	606	1,417	6,480	2	1	11,477	9,378	1,599	2,457	1,267
MOBILE - CENTRAL	841	6	0	211	0	0	1,058	317	38	23	64
MOBILE - NORTH	326	10	0	1	1	0	338	200	54	31	5
MOBILE - SOUTH	87	0	0	2,651	0	0	2,738	14	1	0	366
MOBILE SUB-TOTAL	1,254	16	0	2,863	1	0	4,134	531	93	54	435
TOTAL	**4,225**	**622**	**1,417**	**9,343**	**3**	**1**	**15,611**	**9,909**	**1,692**	**2,511**	**1,702**

ENFORCEMENT SVC
STATISTICAL RECAP
FY 2006/2007

LOCATION	ECTIONS							
	AFTA DRIVERS		NON-NAFTA VEHICLES			NAFTA VEHICLES		
	OUT OF SVC	CITATIONS	VIOLATIONS	OUT OF SVC	CITATIONS	VIOLATIONS	OUT OF SVC	CITATIONS
CENTRAL PERMITS	0	0	0	0	0	0	0	0
DOUGLAS FEDERAL	0	2	0	0	0	552	73	0
DOUGLAS STATE	24	13	3	1	0	1,701	252	12
DUNCAN	0	0	36	4	0	0	0	0
EHRENBERG	0	1	2,856	292	488	0	0	0
FREDONIA	0	0	197	13	0	0	0	0
KINGMAN	0	0	263	17	2	0	0	0
LUKEVILLE	0	0	15	1	0	31	0	0
NACO	0	0	0	0	0	7	1	0
NOGALES	33	0	343	26	0	8,780	696	0
PAGE	2	0	244	24	0	92	14	0
PARKER	0	0	172	9	4	0	0	0
SAN LUIS	10	0	338	30	0	4,292	368	0
SAN SIMON	0	0	3,001	231	2	0	0	0
SANDERS	0	0	1,325	272	15	0	0	0
SASABE	0	0	0	0	0	4	0	0
SPRINGERVILLE	0	0	621	68	4	0	0	0
ST. GEORGE	0	0	1,341	180	4	0	0	0
TEEC NOS POS	0	0	178	9	0	0	0	0
TOPOCK	0	0	394	38	1	0	0	0
YUMA B-8	20	5	68	7	0	403	42	0
YUMA I-8	107	20	897	64	2	2,739	201	1
PORTS SUB-TOTAL	196	41	12,292	1,286	522	18,601	1,647	13
MOBILE - CENTRAL	7	5	2,187	257	15	562	32	0
MOBILE - NORTH	2	0	1,077	112	10	10	1	0
MOBILE - SOUTH	37	18	194	9	0	4,571	447	12
MOBILE SUB-TOTAL	46	23	3,458	378	25	5,143	480	12
TOTAL	**242**	**64**	**15,750**	**1,664**	**547**	**23,744**	**2,127**	**25**

ENFORCEMENT SVC
STATISTICAL RECAP
FY 2006/2007

LOCATION	VEHICLES WEIGHED											
	FIXED		PORTABLE RAMP		WHEEL WEIGHER		WEIGH IN MOTION		CHECKED BY MANIFEST			
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	SUB-TOTAL IN	SUB-TOTAL OUT
CENTRAL PERMITS	0	0	0	0	0	0	0	0	0	0	0	0
DOUGLAS FEDERAL	0	0	0	0	2	0	510	0	5,945	605	6,457	605
DOUGLAS STATE	0	0	88	0	0	0	0	0	2,184	2,428	2,272	2,428
DUNCAN	11,233	8,223	0	0	0	0	0	0	0	0	11,233	8,223
EHRENBERG	304,776	0	0	0	4,557	0	1,281,628	0	0	0	1,590,961	0
FREDONIA	0	0	0	0	0	0	0	0	6	0	6	0
KINGMAN	11,342	0	0	0	0	0	97,162	0	0	0	108,504	0
LUKEVILLE	0	0	0	0	0	0	0	0	0	0	0	0
NACO	0	0	0	0	0	0	0	0	1,098	408	1,098	408
NOGALES	33,763	0	1,027	0	7	0	104,764	0	875	0	140,436	0
PAGE	23,908	25	0	0	4	0	0	0	0	0	23,912	25
PARKER	65,174	0	0	0	0	0	0	0	0	0	65,174	0
SAN LUIS	0	0	10,864	53	0	0	0	0	0	0	10,864	53
SAN SIMON	468,811	0	0	0	6	0	3,129	0	0	0	471,946	0
SANDERS	327,188	0	0	0	39	0	0	0	0	0	327,227	0
SASABE	0	0	0	0	0	0	0	0	0	0	0	0
SPRINGERVILLE	0	0	949	0	3	0	0	0	0	0	952	0
ST. GEORGE	3,511	2,863	0	0	0	0	484,859	508,468	0	0	488,370	511,331
TEEC NOS POS	0	0	2,420	9	10	0	0	0	1,031	0	3,461	9
TOPOCK	293,528	0	0	0	0	0	818,199	0	0	0	1,111,727	0
YUMA B-8	25,811	0	0	0	0	0	0	0	0	0	25,811	0
YUMA I-8	272,285	1,214	0	0	0	0	0	0	0	0	272,285	1,214
PORTS SUB-TOTAL	1,841,330	12,325	15,348	62	4,628	0	2,790,251	508,468	11,139	3,441	4,662,696	524,296
MOBILE - CENTRAL	0	0	465	0	10	0	0	0	0	0	475	0
MOBILE - NORTH	0	0	716	0	3	0	0	0	0	0	719	0
MOBILE - SOUTH	0	0	1,291	0	1	0	0	0	203	0	1,495	0
MOBILE SUB-TOTAL	0	0	2,472	0	14	0	0	0	203	0	2,689	0
TOTAL	**1,841,330**	**12,325**	**17,820**	**62**	**4,642**	**0**	**2,790,251**	**508,468**	**11,342**	**3,441**	**4,665,385**	**524,296**

ENFORCEMENT SVC
STATISTICAL RECAP
FY 2006/2007

LOCATION	TOTAL WEIGHINGS	TOTAL VEH WEIGHED
CENTRAL PERMITS	0	0
DOUGLAS FEDERAL	7,062	7,062
DOUGLAS STATE	4,700	4,700
DUNCAN	19,456	19,456
EHRENBERG	1,590,961	1,286,185
FREDONIA	6	6
KINGMAN	108,504	108,504
LUKEVILLE	0	0
NACO	1,506	1,506
NOGALES	140,436	140,436
PAGE	23,937	23,937
PARKER	65,174	65,174
SAN LUIS	10,917	10,917
SAN SIMON	471,946	471,946
SANDERS	327,227	327,227
SASABE	0	0
SPRINGERVILLE	952	952
ST. GEORGE	999,701	993,327
TEEC NOS POS	3,470	3,470
TOPOCK	1,111,727	818,199
YUMA B-8	25,811	25,811
YUMA I-8	273,499	273,499
PORTS SUB-TOTAL	5,186,992	4,582,314
MOBILE - CENTRAL	475	475
MOBILE - NORTH	719	719
MOBILE - SOUTH	1,495	1,495
MOBILE SUB-TOTAL	2,689	2,689
TOTAL	**5,189,681**	**4,585,003**

ENFORCEMENT SVC
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LOCATION	VEHICLES MEASURED		LOADS REDUCED		LOADS SHIFTED	
	IN	OUT	IN	OUT	IN	OUT
CENTRAL PERMITS	0	0	0	0	0	0
DOUGLAS FEDERAL	1	0	0	0	0	0
DOUGLAS STATE	0	0	0	0	1	0
DUNCAN	1,371	559	24	5	273	103
EHRENBERG	1,387	0	595	0	7,588	0
FREDONIA	53	55	0	0	0	0
KINGMAN	88,038	0	67	0	682	0
LUKEVILLE	0	0	0	0	0	0
NACO	0	0	0	0	0	0
NOGALES	0	0	147	0	937	0
PAGE	47	16	12	0	33	0
PARKER	368	0	19	0	433	0
SAN LUIS	31	3	7	0	26	0
SAN SIMON	1,226	0	70	0	994	0
SANDERS	2,877	0	57	0	2,267	0
SASABE	0	0	0	0	0	0
SPRINGERVILLE	409	1	2	0	17	0
ST. GEORGE	448,300	471,214	80	67	404	399
TEEC NOS POS	89	44	11	0	28	0
TOPOCK	726,068	0	51	0	2,598	0
YUMA B-8	37	0	17	0	132	0
YUMA I-8	202	0	33	0	1,101	0
PORTS SUB-TOTAL	1,270,504	471,892	1,192	72	17,514	502
MOBILE - CENTRAL	2	0	19	0	22	0
MOBILE - NORTH	99	0	3	0	14	0
MOBILE - SOUTH	6	0	2	0	32	0
MOBILE SUB-TOTAL	107	0	24	0	68	0
TOTAL	**1,270,611**	**471,892**	**1,216**	**72**	**17,582**	**502**

ENFORCEMENT SVC
STATISTICAL RECAP
FY 2006/2007

LOCATION	TOTAL VEH WEIGHED	# VEHICLES OVERWGT	RESULTS CITED	LOADS REDUCED	LOADS SHIFTED
CENTRAL PERMITS	0	0	0	0	0
DOUGLAS FEDERAL	7,062	0	0	0	0
DOUGLAS STATE	4,700	1	2,173	0	1
DUNCAN	19,456	417	8	29	376
EHRENBERG	1,286,185	9,025	2,173	595	7,588
FREDONIA	6	0	0	0	0
KINGMAN	108,504	778	64	67	682
LUKEVILLE	0	0	0	0	0
NACO	1,506	4	0	0	0
NOGALES	140,436	1,071	11	147	937
PAGE	23,937	58	38	12	33
PARKER	65,174	505	30	19	433
SAN LUIS	10,917	31	16	7	26
SAN SIMON	471,946	1,202	249	70	994
SANDERS	327,227	5,897	0	57	2,267
SASABE	0	0	0	0	0
SPRINGERVILLE	952	60	14	2	17
ST. GEORGE	993,327	1,028	150	147	803
TEEC NOS POS	3,470	46	14	11	28
TOPOCK	818,199	2,844	277	51	2,598
YUMA B-8	25,811	151	15	17	132
YUMA I-8	273,499	1,223	40	33	1,101
PORTS SUB-TOTAL	4,582,314	24,341	5,272	1,264	18,016
MOBILE - CENTRAL	475	40	12	19	22
MOBILE - NORTH	719	52	3	3	14
MOBILE - SOUTH	1,495	33	14	2	32
MOBILE SUB-TOTAL	2,689	125	29	24	68
TOTAL	**4,585,003**	**24,466**	**5,301**	**1,288**	**18,084**

ENFORCEMENT SVC
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LOCATION	CITATIONS ISSUED - WEIGHT													REGIST
	OVERSIZE		AXLE		GROSS		BRIDGE FORMULA		MANIFEST		TOTAL CITATIONS	TOTAL CITATIONS	TOTAL WEIGHT	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	CITATIONS	IN
CENTRAL PERMITS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DOUGLAS FEDERAL	0	0	0	0	0	0	0	0	0	0	0	0	0	11
DOUGLAS STATE	0	0	1	0	2	0	0	0	0	0	3	0	3	14
DUNCAN	0	0	2	2	2	2	0	0	0	0	4	4	8	0
EHRENBERG	5	0	1,487	0	686	0	30	0	0	0	2,208	0	2,208	1,046
FREDONIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KINGMAN	1	0	36	0	28	0	2	0	0	0	67	0	67	27
LUKEVILLE	0	0	0	0	0	0	0	0	0	0	0	0	0	3
NACO	0	0	0	0	0	0	0	0	0	0	0	0	0	3
NOGALES	0	0	2	0	9	0	0	0	0	0	11	0	11	7
PAGE	0	0	21	3	13	1	0	0	0	0	34	4	38	10
PARKER	0	0	11	0	19	0	0	0	0	0	30	0	30	67
SAN LUIS	1	0	10	0	6	0	0	0	0	0	17	0	17	44
SAN SIMON	1	0	201	0	48	0	0	0	0	0	250	0	250	222
SANDERS	15	0	362	0	236	0	2	0	0	0	615	0	615	463
SASABE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPRINGERVILLE	1	0	9	0	5	0	1	0	0	0	16	0	16	11
ST. GEORGE	0	36	0	136	0	14	0	10	0	0	0	196	196	6
TEEC NOS POS	0	0	7	0	7	0	0	0	0	0	14	0	14	5
TOPOCK	0	0	85	0	192	0	1	0	0	0	278	0	278	43
YUMA B-8	4	0	6	0	9	0	0	0	0	0	19	0	19	23
YUMA I-8	8	0	14	0	26	0	0	0	0	0	48	0	48	109
PORTS SUB-TOTAL	36	36	2,254	141	1,288	17	36	10	0	0	3,614	204	3,818	2,114
MOBILE - CENTRAL	0	0	7	0	5	0	0	0	0	0	12	0	12	40
MOBILE - NORTH	3	0	2	0	1	0	0	0	0	0	6	0	6	25
MOBILE - SOUTH	0	0	7	0	7	0	0	0	0	0	14	0	14	6
MOBILE SUB-TOTAL	3	0	16	0	13	0	0	0	0	0	32	0	32	71
TOTAL	**39**	**36**	**2,270**	**141**	**1,301**	**17**	**36**	**10**	**0**	**0**	**3,646**	**204**	**3,850**	**2,185**

ENFORCEMENT SVC
STATISTICAL RECAP
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LOCATION	CITATIONS ISSUED - RATION	USE FUEL		MOTOR CARRIER	
	OUT	IN	OUT	IN	OUT
CENTRAL PERMITS	0	0	0	0	0
DOUGLAS FEDERAL	0	0	0	0	0
DOUGLAS STATE	0	0	0	0	0
DUNCAN	0	0	0	0	0
EHRENBERG	8	19	4	0	0
FREDONIA	1	0	0	0	0
KINGMAN	0	1	0	1	0
LUKEVILLE	0	0	0	0	0
NACO	0	0	0	0	0
NOGALES	0	1	0	0	0
PAGE	10	0	0	0	0
PARKER	0	0	0	0	0
SAN LUIS	0	1	0	1	0
SAN SIMON	0	0	0	7	0
SANDERS	0	0	0	0	0
SASABE	0	0	0	0	0
SPRINGERVILLE	0	0	0	0	0
ST. GEORGE	34	0	0	0	0
TEEC NOS POS	1	0	0	0	0
TOPOCK	0	0	0	0	0
YUMA B-8	0	2	0	0	0
YUMA I-8	1	5	1	0	0
PORTS SUB-TOTAL	55	29	5	9	0
MOBILE - CENTRAL	0	0	0	0	0
MOBILE - NORTH	0	0	0	0	0
MOBILE - SOUTH	0	0	0	0	0
MOBILE SUB-TOTAL	0	0	0	0	0
TOTAL	**55**	**29**	**5**	**9**	**0**

ENFORCEMENT SVC
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LOCATION	CREDENTIALS				
	OTHER		TOTAL CITATIONS IN	TOTAL CITATIONS OUT	TOTAL CREDENTIAL CITATIONS
	IN	OUT			
CENTRAL PERMITS	0	0	0	0	0
DOUGLAS FEDERAL	26	0	37	0	37
DOUGLAS STATE	29	0	43	0	43
DUNCAN	2	4	2	4	6
EHRENBERG	2,533	5	3,598	17	3,615
FREDONIA	0	0	0	1	1
KINGMAN	23	0	52	0	52
LUKEVILLE	69	0	72	0	72
NACO	17	0	20	0	20
NOGALES	61	0	69	0	69
PAGE	3	13	13	23	36
PARKER	271	0	338	0	338
SAN LUIS	114	0	160	0	160
SAN SIMON	89	0	318	0	318
SANDERS	246	0	709	0	709
SASABE	6	0	6	0	6
SPRINGERVILLE	27	0	38	0	38
ST. GEORGE	14	222	20	256	276
TEEC NOS POS	11	4	16	5	21
TOPOCK	8	0	51	0	51
YUMA B-8	57	0	82	0	82
YUMA I-8	88	5	202	7	209
PORTS SUB-TOTAL	3,694	253	5,846	313	6,159
MOBILE - CENTRAL	86	0	126	0	126
MOBILE - NORTH	53	0	78	0	78
MOBILE - SOUTH	38	0	44	0	44
MOBILE SUB-TOTAL	177	0	248	0	248
TOTAL	**3,871**	**253**	**6,094**	**313**	**6,407**

ENFORCEMENT SVC
STATISTICAL RECAP
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LOCATION	TOTAL WEIGHT CITATIONS	TOTAL CIVIL PENALTIES
CENTRAL PERMITS	0	$ -
DOUGLAS FEDERAL	0	$ -
DOUGLAS STATE	3	$ 3,920.00
DUNCAN	8	$ 5,880.00
EHRENBERG	2,173	$ 1,708,835.00
FREDONIA	0	$ -
KINGMAN	64	$ 80,906.00
LUKEVILLE	0	$ -
NACO	0	$ -
NOGALES	11	$ 8,696.00
PAGE	38	$ 17,184.00
PARKER	30	$ 18,380.00
SAN LUIS	16	$ 4,840.00
SAN SIMON	249	$ 215,610.00
SANDERS	598	$ 339,093.00
SASABE	0	$ -
SPRINGERVILLE	14	$ 12,020.00
ST. GEORGE	150	$ 161,660.00
TEEC NOS POS	14	$ 5,723.00
TOPOCK	277	$ 194,416.00
YUMA B-8	15	$ 12,260.00
YUMA I-8	40	$ 26,380.00
PORTS SUB-TOTAL	3,700	$ 2,815,803.00
MOBILE - CENTRAL	12	$ 10,021.00
MOBILE - NORTH	3	$ 2,820.00
MOBILE - SOUTH	14	$ 12,440.00
MOBILE SUB-TOTAL	29	$ 25,281.00
TOTAL	**3,729**	**$ 3,729.00**

ENFORCEMENT SVC
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LOCATION	SINGLE TRIP PERMITS								SINGLE TRIP PERMITS					
	REGISTRATION				USE FUEL				MOTOR CARRIER					
	IN		OUT		IN		OUT		IN		OUT		TOTAL	
	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE
CENTRAL PERMITS	2,366	$ 67,600.00	0	$ -	1,763	$ 96,661.00	0	$ -	2,316	$ 93,276.00	0	$ -	6,445	$ 257,537.00
DOUGLAS FEDERAL	20	$ 349.00	17	$ 248.00	16	$ 942.00	0	$ -	17	$ 744.00	0	$ -	70	$ 2,283.00
DOUGLAS STATE	34	$ 453.00	0	$ -	16	$ 991.00	0	$ -	25	$ 1,128.00	0	$ -	75	$ 2,572.00
DUNCAN	75	$ 1,170.00	3	$ 28.00	85	$ 5,280.00	5	$ 325.00	95	$ 4,092.00	3	$ 144.00	266	$ 11,039.00
EHRENBERG	7,872	$ 234,004.80	7	$ 192.00	5,290	$ 339,979.00	6	$ 390.00	8,107	$ 383,268.00	7	$ 336.00	21,289	$ 958,169.80
FREDONIA	290	$ 1,667.00	1	$ 2.00	56	$ 1,337.00	0	$ -	291	$ 4,536.00	1	$ 12.00	639	$ 7,554.00
KINGMAN	313	$ 8,593.00	4	$ 120.00	186	$ 11,878.00	2	$ 130.00	327	$ 15,576.00	4	$ 192.00	836	$ 36,489.00
LUKEVILLE	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
NACO	2	$ 18.00	7	$ 25.00	2	$ 81.00	0	$ -	2	$ 60.00	0	$ -	13	$ 184.00
NOGALES	78,558	$ 387,046.00	2	$ 10.00	77,013	$ 1,235,540.00	2	$ 32.00	76,783	$ 923,772.00	2	$ 24.00	232,360	$ 2,546,424.00
PAGE	205	$ 7,577.00	14	$ 518.00	130	$ 6,311.00	4	$ 260.00	206	$ 9,252.00	14	$ 672.00	573	$ 24,590.00
PARKER	725	$ 15,155.00	0	$ -	444	$ 23,748.00	0	$ -	729	$ 24,360.00	0	$ -	1,898	$ 63,263.00
SAN LUIS	1,550	$ 7,982.00	0	$ -	1,073	$ 18,295.00	0	$ -	1,528	$ 21,864.00	0	$ -	4,151	$ 48,141.00
SAN SIMON	6,355	$ 227,220.00	0	$ -	5,520	$ 350,091.00	0	$ -	7,864	$ 370,752.00	0	$ -	19,739	$ 948,063.00
SANDERS	4,068	$ 122,460.00	13	$ 442.00	2,447	$ 158,565.00	5	$ 195.00	7,259	$ 348,204.00	13	$ 560.00	13,805	$ 630,426.00
SASABE	10	$ 45.00	0	$ -	1	$ 16.00	0	$ -	2	$ 24.00	0	$ -	13	$ 85.00
SPRINGERVILLE	146	$ 2,734.00	0	$ -	59	$ 3,443.00	0	$ -	158	$ 6,576.00	0	$ -	363	$ 12,753.00
ST. GEORGE	8,235	$ 26,914.00	2,048	$ 5,981.00	3,712	$ 61,009.00	192	$ 3,170.00	9,617	$ 118,536.00	2,059	$ 25,068.00	25,863	$ 240,678.00
TEEC NOS POS	511	$ 6,357.00	3	$ 108.00	201	$ 8,116.00	1	$ 65.00	470	$ 13,524.00	3	$ 108.00	1,189	$ 28,278.00
TOPOCK	2,819	$ 75,222.00	0	$ -	1,423	$ 88,168.00	0	$ -	3,064	$ 138,012.00	0	$ -	7,306	$ 301,402.00
YUMA B-8	965	$ 4,419.00	0	$ -	586	$ 10,846.00	0	$ -	896	$ 11,868.00	0	$ -	2,447	$ 27,133.00
YUMA I-8	15,838	$ 189,618.00	34	$ 688.00	7,608	$ 227,568.00	12	$ 437.00	16,082	$ 339,540.00	34	$ 1,056.00	39,608	$ 758,907.00
PORTS SUB-TOTAL	130,957	$ 1,386,603.80	2,153	$ 8,362.00	107,631	$ 2,648,865.00	229	$ 5,004.00	135,838	$ 2,828,964.00	2,140	$ 28,172.00	378,948	$ 6,905,970.80
MOBILE - CENTRAL	1	$ 21.00	0	$ -	2	$ 130.00	0	$ -	1	$ 48.00	0	$ -	4	$ 199.00
MOBILE - NORTH	79	$ 2,470.00	0	$ -	23	$ 1,495.00	0	$ -	154	$ 7,680.00	0	$ -	256	$ 11,645.00
MOBILE - SOUTH	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
MOBILE SUB-TOTAL	80	$ 2,491.00	0	$ -	25	$ 1,625.00	0	$ -	155	$ 7,728.00	0	$ -	260	$ 11,844.00
ABANDONED VEH TEAM	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
BULLHEAD	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
CASA GRANDE	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
CLAYPOOL	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
FLAGSTAFF	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
GLENDALE	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
HOLBROOK	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
KINGMAN	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
MESA	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
NOGALES	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
PARKER	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
PAYSON	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
PRESCOTT	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
SAFFORD	7	$ 138.00	0	$ -	4	$ 96.00	0	$ -	5	$ 132.00	0	$ -	16	$ 366.00
SANDERS	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
SCOTTSDALE	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
SIERRA VISTA	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
SOUTH MESA	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
TEMPE	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
TUBA CITY	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
TUCSON	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
VERDE VALLEY	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
WILLCOX	1	$ 60.00	0	$ -	1	$ 65.00	0	$ -	1	$ 48.00	0	$ -	3	$ 173.00
YUMA	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
ENFORCE SUB-TOTAL	8	$ 198.00	0	$ -	5	$ 161.00	0	$ -	6	$ 180.00	0	$ -	19	$ 539.00
TOTAL	**131,045**	**$ 1,386,603.80**	**2,153**	**$ 8,362.00**	**107,631**	**$ 2,648,865.00**	**229**	**$ 5,004.00**	**135,838**	**$ 2,828,964.00**	**2,140**	**$ 28,172.00**	**378,948**	**$ 6,905,970.80**

ENFORCEMENT SVC
STATISTICAL RECAP
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LOCATION	OVERDIMENSIONAL PERMITS							
	OVERWEIGHT - SINGLE TRIP				OVERWEIGHT - 30 DAY			
	IN		OUT		IN		OUT	
	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE
CENTRAL PERMITS	6,181	$ 467,090.00	0	$ -	2,614	$ 192,375.00	0	$ -
DOUGLAS FEDERAL	14	$ 1,050.00	0	$ -	1	$ 75.00	0	$ -
DOUGLAS STATE	15	$ 1,185.00	0	$ -	7	$ 525.00	0	$ -
DUNCAN	44	$ 3,460.00	0	$ -	27	$ 2,025.00	0	$ -
EHRENBERG	1,460	$ 108,895.00	18	$ 1,350.00	663	$ 48,525.00	3	$ 225.00
FREDONIA	10	$ 810.00	0	$ -	53	$ 3,825.00	0	$ -
KINGMAN	112	$ 8,200.00	0	$ -	268	$ 19,320.00	0	$ -
LUKEVILLE	0	$ -	0	$ -	0	$ -	0	$ -
NACO	13	$ 990.00	3	$ 225.00	0	$ -	0	$ -
NOGALES	73	$ 5,475.00	32	$ 2,415.00	0	$ -	0	$ -
PAGE	90	$ 7,390.00	0	$ -	54	$ 3,750.00	0	$ -
PARKER	6	$ 300.00	0	$ -	13	$ 975.00	0	$ -
SAN LUIS	20	$ 1,500.00	0	$ -	0	$ -	0	$ -
SAN SIMON	1,332	$ 100,770.00	0	$ -	527	$ 39,375.00	0	$ -
SANDERS	733	$ 55,365.00	0	$ -	125	$ 9,225.00	0	$ -
SASABE	0	$ -	0	$ -	0	$ -	0	$ -
SPRINGERVILLE	43	$ 3,240.00	0	$ -	11	$ 825.00	0	$ -
ST. GEORGE	1,154	$ 86,935.00	33	$ 2,500.00	1,510	$ 111,120.00	47	$ 3,525.00
TEEC NOS POS	96	$ 7,895.00	0	$ -	94	$ 6,825.00	0	$ -
TOPOCK	104	$ 7,665.00	0	$ -	123	$ 9,000.00	0	$ -
YUMA B-8	4	$ 300.00	0	$ -	39	$ 2,475.00	0	$ -
YUMA I-8	135	$ 10,075.00	0	$ -	529	$ 39,375.00	0	$ -
PORTS SUB-TOTAL	11,639	$ 878,590.00	86	$ 6,490.00	6,658	$ 489,615.00	50	$ 3,750.00
MOBILE - CENTRAL	0	$ -	0	$ -	0	$ -	0	$ -
MOBILE - NORTH	17	$ 1,290.00	0	$ -	3	$ 225.00	0	$ -
MOBILE - SOUTH	1	$ 75.00	0	$ -	0	$ -	0	$ -
MOBILE SUB-TOTAL	18	$ 1,365.00	0	$ -	3	$ 225.00	0	$ -
ABANDONED VEH TEAM	0	$ -	0	$ -	0	$ -	0	$ -
BULLHEAD	0	$ -	0	$ -	0	$ -	0	$ -
CASA GRANDE	0	$ -	0	$ -	0	$ -	0	$ -
CLAYPOOL	0	$ -	0	$ -	0	$ -	0	$ -
FLAGSTAFF	0	$ -	0	$ -	9	$ 675.00	0	$ -
GLENDALE	0	$ -	0	$ -	0	$ -	0	$ -
HOLBROOK	0	$ -	0	$ -	1	$ 75.00	0	$ -
KINGMAN	0	$ -	0	$ -	0	$ -	0	$ -
MESA	0	$ -	0	$ -	0	$ -	0	$ -
NOGALES	0	$ -	0	$ -	0	$ -	0	$ -
PARKER	0	$ -	0	$ -	0	$ -	0	$ -
PAYSON	0	$ -	0	$ -	0	$ -	0	$ -
PRESCOTT	0	$ -	0	$ -	0	$ -	0	$ -
SAFFORD	5	$ 115.00	0	$ -	6	$ 450.00	0	$ -
SANDERS	0	$ -	0	$ -	0	$ -	0	$ -
SCOTTSDALE	0	$ -	0	$ -	0	$ -	0	$ -
SIERRA VISTA	5	$ 75.00	0	$ -	0	$ -	0	$ -
SOUTH MESA	0	$ -	0	$ -	0	$ -	0	$ -
TEMPE	0	$ -	0	$ -	0	$ -	0	$ -
TUBA CITY	0	$ -	0	$ -	0	$ -	0	$ -
TUCSON	0	$ -	0	$ -	0	$ -	0	$ -
VERDE VALLEY	0	$ -	0	$ -	0	$ -	0	$ -
WILLCOX	0	$ -	1	$ 15.00	0	$ -	0	$ -
YUMA	0	$ -	0	$ -	0	$ -	0	$ -
ENFORCE SUB-TOTAL	10	$ 190.00	1	$ 15.00	16	$ 1,200.00	0	$ -
TOTAL	**11,667**	**$ 880,145.00**	**87**	**$ 6,505.00**	**6,677**	**$ 491,040.00**	**50**	**$ 3,750.00**

ENFORCEMENT SVC
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LOCATION	OVERDIMENSIONAL PERMITS							
	OVERWEIGHT - ANNUAL				OVERSIZE - SINGLE TRIP			
	IN		OUT		IN		OUT	
	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE
CENTRAL PERMITS	274	$ 152,400.00	0	$ -	19,284	$ 295,678.00	0	$ -
DOUGLAS FEDERAL	0	$ -	0	$ -	24	$ 360.00	172	$ 2,580.00
DOUGLAS STATE	0	$ -	0	$ -	69	$ 1,065.00	2	$ 30.00
DUNCAN	0	$ -	0	$ -	110	$ 1,650.00	10	$ 150.00
EHRENBERG	0	$ -	0	$ -	3,901	$ 58,945.00	52	$ 780.00
FREDONIA	0	$ -	0	$ -	97	$ 1,500.00	2	$ 30.00
KINGMAN	8	$ 4,800.00	0	$ -	459	$ 6,760.00	0	$ -
LUKEVILLE	0	$ -	0	$ -	15	$ 225.00	0	$ -
NACO	0	$ -	0	$ -	23	$ 330.00	120	$ 1,770.00
NOGALES	1	$ 600.00	0	$ -	337	$ 5,070.00	140	$ 2,100.00
PAGE	1	$ 600.00	0	$ -	1,582	$ 54,940.00	164	$ 6,310.00
PARKER	0	$ -	0	$ -	372	$ 5,580.00	0	$ -
SAN LUIS	0	$ -	0	$ -	318	$ 4,770.00	0	$ -
SAN SIMON	0	$ -	0	$ -	3,985	$ 61,090.00	0	$ -
SANDERS	5	$ -	0	$ -	2,447	$ 37,065.00	0	$ -
SASABE	0	$ -	0	$ -	0	$ -	0	$ -
SPRINGERVILLE	2	$ 1,200.00	0	$ -	141	$ 2,170.00	0	$ -
ST. GEORGE	1	$ -	0	$ -	5,283	$ 80,215.00	1,301	$ 19,485.00
TEEC NOS POS	0	$ -	0	$ -	129	$ 1,950.00	2	$ 30.00
TOPOCK	3	$ 1,800.00	0	$ -	1,072	$ 16,110.00	0	$ -
YUMA B-8	0	$ -	0	$ -	50	$ 750.00	1	$ 15.00
YUMA I-8	3	$ 1,800.00	0	$ -	992	$ 15,465.00	1	$ 15.00
PORTS SUB-TOTAL	298	$ 163,200.00	0	$ -	40,690	$ 651,688.00	1,967	$ 33,295.00
MOBILE - CENTRAL	0	$ -	0	$ -	1	$ 15.00	0	$ -
MOBILE - NORTH	0	$ -	0	$ -	66	$ 1,050.00	0	$ -
MOBILE - SOUTH	0	$ -	0	$ -	0	$ -	0	$ -
MOBILE SUB-TOTAL	0	$ -	0	$ -	67	$ 1,065.00	0	$ -
ABANDONED VEH TEAM	0	$ -	0	$ -	0	$ -	0	$ -
BULLHEAD	0	$ -	0	$ -	0	$ -	0	$ -
CASA GRANDE	0	$ -	0	$ -	0	$ -	0	$ -
CLAYPOOL	0	$ -	0	$ -	0	$ -	0	$ -
FLAGSTAFF	1	$ 360.00	0	$ -	7	$ 105.00	0	$ -
GLENDALE	0	$ -	0	$ -	0	$ -	0	$ -
HOLBROOK	0	$ -	0	$ -	3	$ 45.00	0	$ -
KINGMAN	0	$ -	0	$ -	0	$ -	0	$ -
MESA	0	$ -	0	$ -	0	$ -	0	$ -
NOGALES	0	$ -	0	$ -	0	$ -	0	$ -
PARKER	0	$ -	0	$ -	0	$ -	0	$ -
PAYSON	1	$ 360.00	0	$ -	6	$ 90.00	0	$ -
PRESCOTT	0	$ -	0	$ -	4	$ 60.00	0	$ -
SAFFORD	0	$ -	0	$ -	19	$ 240.00	0	$ -
SANDERS	0	$ -	0	$ -	0	$ -	0	$ -
SCOTTSDALE	0	$ -	0	$ -	0	$ -	0	$ -
SIERRA VISTA	1	$ 600.00	0	$ -	26	$ 375.00	0	$ -
SOUTH MESA	0	$ -	0	$ -	0	$ -	0	$ -
TEMPE	0	$ -	0	$ -	0	$ -	0	$ -
TUBA CITY	0	$ -	0	$ -	3	$ 45.00	0	$ -
TUCSON	0	$ -	0	$ -	0	$ -	0	$ -
VERDE VALLEY	0	$ -	0	$ -	0	$ -	0	$ -
WILLCOX	6	$ 3,600.00	0	$ -	11	$ 165.00	0	$ -
YUMA	0	$ -	0	$ -	0	$ -	0	$ -
ENFORCE SUB-TOTAL	9	$ 4,920.00	0	$ -	79	$ 1,125.00	0	$ -
TOTAL	**307**	**$ 168,120.00**	**0**	**$ -**	**40,836**	**$ 653,878.00**	**1,967**	**$ 33,295.00**

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LOCATION	OVERDIMENSIONAL PERMITS							
	OVERSIZE - 30 DAY				OVERSIZE - ANNUAL			
	IN		OUT		IN		OUT	
	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE
CENTRAL PERMITS	2,256	$ 66,960.00	0	$ -	86	$ 24,840.00	0	$ -
DOUGLAS FEDERAL	3	$ 90.00	0	$ -	0	$ -	0	$ -
DOUGLAS STATE	21	$ 630.00	0	$ -	0	$ -	0	$ -
DUNCAN	34	$ 1,020.00	0	$ -	0	$ -	0	$ -
EHRENBERG	334	$ 9,900.00	1	$ 30.00	1	$ 360.00	0	$ -
FREDONIA	31	$ 900.00	0	$ -	1	$ -	0	$ -
KINGMAN	42	$ 1,170.00	0	$ -	1	$ 360.00	0	$ -
LUKEVILLE	0	$ -	0	$ -	0	$ -	0	$ -
NACO	38	$ 1,140.00	4	$ 120.00	0	$ -	0	$ -
NOGALES	0	$ -	0	$ -	2	$ 720.00	0	$ -
PAGE	89	$ 2,610.00	0	$ -	1	$ -	0	$ -
PARKER	66	$ 1,980.00	0	$ -	0	$ -	0	$ -
SAN LUIS	0	$ -	0	$ -	0	$ -	0	$ -
SAN SIMON	464	$ 13,920.00	0	$ -	5	$ 1,800.00	0	$ -
SANDERS	44	$ 1,320.00	0	$ -	95	$ 31,320.00	0	$ -
SASABE	0	$ -	0	$ -	0	$ -	0	$ -
SPRINGERVILLE	35	$ 1,020.00	0	$ -	1	$ 360.00	0	$ -
ST. GEORGE	374	$ 11,085.00	15	$ 450.00	77	$ 27,720.00	2	$ 720.00
TEEC NOS POS	14	$ 390.00	0	$ -	0	$ -	0	$ -
TOPOCK	45	$ 1,350.00	0	$ -	2	$ 720.00	0	$ -
YUMA B-8	15	$ 450.00	0	$ -	2	$ 720.00	0	$ -
YUMA I-8	312	$ 9,330.00	0	$ -	6	$ 2,160.00	0	$ -
PORTS SUB-TOTAL	4,217	$ 125,265.00	20	$ 600.00	280	$ 91,080.00	2	$ 720.00
MOBILE - CENTRAL	0	$ -	0	$ -	0	$ -	0	$ -
MOBILE - NORTH	0	$ -	0	$ -	4	$ 1,440.00	0	$ -
MOBILE - SOUTH	0	$ -	0	$ -	0	$ -	0	$ -
MOBILE SUB-TOTAL	0	$ -	0	$ -	4	$ 1,440.00	0	$ -
ABANDONED VEH TEAM	0	$ -	0	$ -	0	$ -	0	$ -
BULLHEAD	0	$ -	0	$ -	0	$ -	0	$ -
CASA GRANDE	0	$ -	0	$ -	0	$ -	0	$ -
CLAYPOOL	0	$ -	0	$ -	0	$ -	0	$ -
FLAGSTAFF	3	$ 90.00	0	$ -	0	$ -	0	$ -
GLENDALE	0	$ -	0	$ -	0	$ -	0	$ -
HOLBROOK	2	$ 60.00	0	$ -	0	$ -	0	$ -
KINGMAN	0	$ -	0	$ -	0	$ -	0	$ -
MESA	0	$ -	0	$ -	0	$ -	0	$ -
NOGALES	0	$ -	0	$ -	0	$ -	0	$ -
PARKER	0	$ -	0	$ -	0	$ -	0	$ -
PAYSON	1	$ 30.00	0	$ -	0	$ -	0	$ -
PRESCOTT	5	$ 150.00	0	$ -	0	$ -	0	$ -
SAFFORD	7	$ 210.00	0	$ -	1	$ 360.00	0	$ -
SANDERS	0	$ -	0	$ -	0	$ -	0	$ -
SCOTTSDALE	0	$ -	0	$ -	0	$ -	0	$ -
SIERRA VISTA	2	$ 60.00	0	$ -	0	$ -	0	$ -
SOUTH MESA	0	$ -	0	$ -	0	$ -	0	$ -
TEMPE	0	$ -	0	$ -	0	$ -	0	$ -
TUBA CITY	0	$ -	0	$ -	0	$ -	0	$ -
TUCSON	0	$ -	0	$ -	0	$ -	0	$ -
VERDE VALLEY	0	$ -	0	$ -	0	$ -	0	$ -
WILLCOX	0	$ -	0	$ -	2	$ 1,200.00	0	$ -
YUMA	0	$ -	0	$ -	0	$ -	0	$ -
ENFORCE SUB-TOTAL	20	$ 600.00	0	$ -	3	$ 1,560.00	0	$ -
TOTAL	**4,237**	**$ 125,865.00**	**20**	**$ 600.00**	**287**	**$ 94,080.00**	**2**	**$ 720.00**

ENFORCEMENT SVC
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LOCATION	OVERDIMENSIONAL PERMITS							
	LONGER COMBINATION VEHICLES				ANNUAL WATERCRAFT			
	IN		OUT		IN		OUT	
	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE
CENTRAL PERMITS	1	$ 360.00	0	$ -	23	$ 1,035.00	0	$ -
DOUGLAS FEDERAL	0	$ -	0	$ -	0	$ -	0	$ -
DOUGLAS STATE	0	$ -	0	$ -	0	$ -	0	$ -
DUNCAN	0	$ -	0	$ -	0	$ -	0	$ -
EHRENBERG	0	$ -	0	$ -	0	$ -	0	$ -
FREDONIA	106	$ 24,345.00	0	$ -	8	$ 360.00	0	$ -
KINGMAN	1	$ 360.00	2	$ 720.00	1	$ 45.00	0	$ -
LUKEVILLE	0	$ -	0	$ -	0	$ -	0	$ -
NACO	0	$ -	0	$ -	0	$ -	0	$ -
NOGALES	0	$ -	0	$ -	1	$ 45.00	0	$ -
PAGE	50	$ 15,240.00	0	$ -	13	$ 585.00	0	$ -
PARKER	0	$ -	0	$ -	0	$ -	0	$ -
SAN LUIS	0	$ -	0	$ -	0	$ -	0	$ -
SAN SIMON	0	$ -	0	$ -	1	$ 45.00	0	$ -
SANDERS	0	$ -	0	$ -	0	$ -	0	$ -
SASABE	0	$ -	0	$ -	0	$ -	0	$ -
SPRINGERVILLE	0	$ -	0	$ -	0	$ -	0	$ -
ST. GEORGE	3,213	$ 826,845.00	85	$ 23,865.00	5	$ 225.00	1	$ 45.00
TEEC NOS POS	6	$ 1,800.00	0	$ -	0	$ -	0	$ -
TOPOCK	0	$ -	0	$ -	1	$ 45.00	0	$ -
YUMA B-8	0	$ -	0	$ -	0	$ -	0	$ -
YUMA I-8	0	$ -	0	$ -	1	$ 45.00	0	$ -
PORTS SUB-TOTAL	3,377	$ 868,950.00	87	$ 24,585.00	54	$ 2,430.00	1	$ 45.00
MOBILE - CENTRAL	0	$ -	0	$ -	0	$ -	0	$ -
MOBILE - NORTH	0	$ -	0	$ -	0	$ -	0	$ -
MOBILE - SOUTH	0	$ -	0	$ -	0	$ -	0	$ -
MOBILE SUB-TOTAL	0	$ -	0	$ -	0	$ -	0	$ -
ABANDONED VEH TEAM	0	$ -	0	$ -	0	$ -	0	$ -
BULLHEAD	0	$ -	0	$ -	0	$ -	0	$ -
CASA GRANDE	0	$ -	0	$ -	0	$ -	0	$ -
CLAYPOOL	0	$ -	0	$ -	0	$ -	0	$ -
FLAGSTAFF	0	$ -	0	$ -	4	$ 180.00	0	$ -
GLENDALE	0	$ -	0	$ -	0	$ -	0	$ -
HOLBROOK	0	$ -	0	$ -	0	$ -	0	$ -
KINGMAN	0	$ -	0	$ -	0	$ -	0	$ -
MESA	0	$ -	0	$ -	0	$ -	0	$ -
NOGALES	0	$ -	0	$ -	0	$ -	0	$ -
PARKER	0	$ -	0	$ -	0	$ -	0	$ -
PAYSON	0	$ -	0	$ -	0	$ -	0	$ -
PRESCOTT	0	$ -	0	$ -	0	$ -	0	$ -
SAFFORD	0	$ -	0	$ -	0	$ -	0	$ -
SANDERS	0	$ -	0	$ -	0	$ -	0	$ -
SCOTTSDALE	0	$ -	0	$ -	0	$ -	0	$ -
SIERRA VISTA	0	$ -	0	$ -	0	$ -	0	$ -
SOUTH MESA	0	$ -	0	$ -	0	$ -	0	$ -
TEMPE	0	$ -	0	$ -	0	$ -	0	$ -
TUBA CITY	0	$ -	0	$ -	0	$ -	0	$ -
TUCSON	0	$ -	0	$ -	0	$ -	0	$ -
VERDE VALLEY	0	$ -	0	$ -	0	$ -	0	$ -
WILLCOX	0	$ -	0	$ -	0	$ -	0	$ -
YUMA	0	$ -	0	$ -	0	$ -	0	$ -
ENFORCE SUB-TOTAL	0	$ -	0	$ -	4	$ 180.00	0	$ -
TOTAL	**3,377**	**$ 868,950.00**	**87**	**$ 24,585.00**	**58**	**$ 2,610.00**	**1**	**$ 45.00**

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LOCATION	OVERDIMENSIONAL PERMITS MOBILE HOMES					
	IN		OUT		TOTAL	
	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE
CENTRAL PERMITS	8,596	$ 146,990.00	1	$ 15.00	39,316	$ 1,347,743.00
DOUGLAS FEDERAL	7	$ 105.00	0	$ -	221	$ 4,260.00
DOUGLAS STATE	29	$ 630.00	0	$ -	143	$ 4,065.00
DUNCAN	46	$ 855.00	0	$ -	271	$ 9,160.00
EHRENBERG	643	$ 11,415.00	148	$ 2,505.00	7,224	$ 242,930.00
FREDONIA	10	$ 165.00	0	$ -	318	$ 31,935.00
KINGMAN	580	$ 11,235.00	0	$ -	1,474	$ 52,970.00
LUKEVILLE	0	$ -	0	$ -	15	$ 225.00
NACO	11	$ 165.00	1	$ 15.00	213	$ 4,755.00
NOGALES	0	$ -	1	$ 15.00	587	$ 16,440.00
PAGE	34	$ 690.00	0	$ -	2,078	$ 92,115.00
PARKER	92	$ 1,575.00	0	$ -	549	$ 10,410.00
SAN LUIS	97	$ 1,455.00	0	$ -	435	$ 7,725.00
SAN SIMON	387	$ 8,040.00	0	$ -	6,701	$ 225,040.00
SANDERS	269	$ 5,895.00	1	$ 30.00	3,719	$ 140,220.00
SASABE	0	$ -	0	$ -	0	$ -
SPRINGERVILLE	39	$ 690.00	0	$ -	272	$ 9,505.00
ST. GEORGE	128	$ 2,025.00	4	$ 60.00	13,233	$ 1,196,820.00
TEEC NOS POS	109	$ 2,160.00	0	$ -	450	$ 21,050.00
TOPOCK	47	$ 705.00	0	$ -	1,397	$ 37,395.00
YUMA B-8	27	$ 420.00	0	$ -	138	$ 5,130.00
YUMA I-8	430	$ 7,215.00	0	$ -	2,409	$ 85,480.00
PORTS SUB-TOTAL	11,581	$ 202,430.00	156	$ 2,640.00	81,163	$ 3,545,373.00
MOBILE - CENTRAL	0	$ -	0	$ -	1	$ 15.00
MOBILE - NORTH	15	$ 270.00	0	$ -	105	$ 4,275.00
MOBILE - SOUTH	0	$ -	0	$ -	1	$ 75.00
MOBILE SUB-TOTAL	15	$ 270.00	0	$ -	107	$ 4,365.00
ABANDONED VEH TEAM	0	$ -	0	$ -	0	$ -
BULLHEAD	0	$ -	0	$ -	0	$ -
CASA GRANDE	0	$ -	0	$ -	0	$ -
CLAYPOOL	0	$ -	0	$ -	0	$ -
FLAGSTAFF	1	$ 15.00	0	$ -	25	$ 1,425.00
GLENDALE	0	$ -	0	$ -	0	$ -
HOLBROOK	1	$ 15.00	0	$ -	7	$ 195.00
KINGMAN	0	$ -	0	$ -	0	$ -
MESA	0	$ -	0	$ -	0	$ -
NOGALES	0	$ -	0	$ -	0	$ -
PARKER	0	$ -	0	$ -	0	$ -
PAYSON	0	$ -	0	$ -	8	$ 480.00
PRESCOTT	10	$ 120.00	0	$ -	19	$ 330.00
SAFFORD	109	$ 1,890.00	0	$ -	147	$ 3,265.00
SANDERS	1	$ 15.00	0	$ -	1	$ 15.00
SCOTTSDALE	0	$ -	0	$ -	0	$ -
SIERRA VISTA	3	$ 45.00	0	$ -	37	$ 1,155.00
SOUTH MESA	0	$ -	0	$ -	0	$ -
TEMPE	0	$ -	0	$ -	0	$ -
TUBA CITY	5	$ 75.00	0	$ -	8	$ 120.00
TUCSON	0	$ -	0	$ -	0	$ -
VERDE VALLEY	2	$ 30.00	0	$ -	2	$ 30.00
WILLCOX	3	$ 60.00	0	$ -	23	$ 5,040.00
YUMA	0	$ -	0	$ -	0	$ -
ENFORCE SUB-TOTAL	135	$ 2,265.00	0	$ -	277	$ 12,055.00
TOTAL	**11,731**	**$ 204,965.00**	**156**	**$ 2,640.00**	**81,547**	**$ 3,561,793.00**

ENFORCEMENT SVC
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LOCATION	ENVELOPE PERMITS													
	OVERWGT - 30 DAY		OVERWGT - ANNUAL		OVERSZ - 30 DAY		OVERSZ - ANNUAL		WESTERN REGIONAL		OTHER STATES		TOTAL	
	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE
CENTRAL PERMITS	1	$ 50.00	705	$ 776,650.00	114	$ 108,650.00	400	$ 255,800.00	44	$ 22,555.00	5	$ 315.00	1,269	$ 1,164,020.00
TOTAL	**1**	**$ 50.00**	**705**	**$ 776,650.00**	**114**	**$ 108,650.00**	**400**	**$ 255,800.00**	**44**	**$ 22,555.00**	**5**	**$ 315.00**	**1,269**	**$ 1,164,020.00**

ENFORCEMENT SVC
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LOCATION	ALL OTHER PERMITS					
	IN		OUT		TOTAL	
	PERMITS	REVENUE	PERMITS	REVENUE	PERMITS	REVENUE
CENTRAL PERMITS	955	$ 157,445.80	0	$ -	955	$ 157,445.80
DOUGLAS FEDERAL	55	$ 3,851.83	1,516	$ 49,989.54	1,571	$ 53,841.37
DOUGLAS STATE	52	$ 4,501.75	10	$ 150.00	62	$ 4,651.75
DUNCAN	333	$ 8,685.40	3	$ 203.20	336	$ 8,888.60
EHRENBERG	6,652	$ 440,553.45	8	$ 640.40	6,660	$ 441,193.85
FREDONIA	105	$ 11,512.30	0	$ -	105	$ 11,512.30
KINGMAN	627	$ 39,139.13	9	$ 222.80	636	$ 39,361.93
LUKEVILLE	93	$ 2,466.20	872	$ 13,080.00	965	$ 15,546.20
NACO	26	$ 1,120.00	2,310	$ 34,650.00	2,336	$ 35,770.00
NOGALES	3,619	$ 652,554.02	215	$ 3,225.00	3,834	$ 655,779.02
PAGE	292	$ 14,910.40	5	$ 65.00	297	$ 14,975.40
PARKER	303	$ 27,346.00	0	$ -	303	$ 27,346.00
SAN LUIS	703	$ 56,703.70	0	$ -	703	$ 56,703.70
SAN SIMON	8,703	$ 399,886.66	0	$ -	8,703	$ 399,886.66
SANDERS	21,075	$ 560,918.85	0	$ -	21,075	$ 560,918.85
SASABE	5	$ 358.60	2	$ 30.00	7	$ 388.60
SPRINGERVILLE	336	$ 9,591.15	0	$ -	336	$ 9,591.15
ST. GEORGE	9,358	$ 175,443.39	345	$ 13,294.35	9,703	$ 188,737.74
TEEC NOS POS	497	$ 21,214.35	1	$ 15.00	498	$ 21,229.35
TOPOCK	3,204	$ 148,352.33	4	$ 532.00	3,208	$ 148,884.33
YUMA B-8	276	$ 36,116.99	1	$ 15.00	277	$ 36,131.99
YUMA I-8	4,090	$ 641,433.70	15	$ 1,796.50	4,105	$ 643,230.20
PORTS SUB-TOTAL	61,359	$ 3,414,106.00	5,316	$ 117,908.79	66,675	$ 3,532,014.79
MOBILE - CENTRAL	4	$ 248.40	0	$ -	4	$ 248.40
MOBILE - NORTH	319	$ 12,554.90	0	$ -	319	$ 12,554.90
MOBILE - SOUTH	0	$ -	0	$ -	0	$ -
MOBILE SUB-TOTAL	323	$ 12,803.30	0	$ -	323	$ 12,803.30
ABANDONED VEH TEAM	0	$ -	0	$ -	0	$ -
BULLHEAD	0	$ -	0	$ -	0	$ -
CASA GRANDE	0	$ -	0	$ -	0	$ -
CLAYPOOL	0	$ -	0	$ -	0	$ -
FLAGSTAFF	2	$ 122.00	0	$ -	2	$ 122.00
GLENDALE	0	$ -	0	$ -	0	$ -
HOLBROOK	0	$ -	0	$ -	0	$ -
KINGMAN	0	$ -	0	$ -	0	$ -
MESA	0	$ -	0	$ -	0	$ -
NOGALES	0	$ -	0	$ -	0	$ -
PARKER	0	$ -	0	$ -	0	$ -
PAYSON	1	$ 128.20	0	$ -	1	$ 128.20
PRESCOTT	0	$ -	0	$ -	0	$ -
SAFFORD	22	$ 2,366.75	0	$ -	22	$ 2,366.75
SANDERS	0	$ -	0	$ -	0	$ -
SCOTTSDALE	0	$ -	0	$ -	0	$ -
SIERRA VISTA	1	$ 1.00	0	$ -	1	$ 1.00
SOUTH MESA	0	$ -	0	$ -	0	$ -
TEMPE	0	$ -	0	$ -	0	$ -
TUBA CITY	0	$ -	0	$ -	0	$ -
TUCSON	0	$ -	0	$ -	0	$ -
VERDE VALLEY	0	$ -	0	$ -	0	$ -
WILLCOX	36	$ 789.00	0	$ -	36	$ 789.00
YUMA	0	$ -	0	$ -	0	$ -
ENFORCE SUB-TOTAL	62	$ 3,406.95	0	$ -	62	$ 3,406.95
TOTAL	**61,744**	**$ 3,430,316.25**	**5,316**	**$ 117,908.79**	**67,060**	**$ 3,548,225.04**

ENFORCEMENT SVC
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LOCATION	REVENUE				
	COMMERCIAL	NON-COMMERCIAL			
	PERMITS	VIN VERIF	REG COMPL	OTHER	TOTAL
CENTRAL PERMITS	$ 1,762,725.80	$ 50.00	$ -	$ -	$ 1,762,775.80
DOUGLAS FEDERAL	$ 60,384.37	$ 20.00	$ -	$ 5.00	$ 60,409.37
DOUGLAS STATE	$ 11,288.75	$ 340.00	$ -	$ 140.00	$ 11,768.75
DUNCAN	$ 29,087.60	$ 110.00	$ -	$ -	$ 29,197.60
EHRENBERG	$ 1,642,293.65	$ -	$ -	$ -	$ 1,642,293.65
FREDONIA	$ 51,001.30	$ 260.00	$ -	$ 5.00	$ 51,266.30
KINGMAN	$ 128,820.93	$ 20.00	$ -	$ -	$ 128,840.93
LUKEVILLE	$ 15,771.20	$ -	$ -	$ -	$ 15,771.20
NACO	$ 40,709.00	$ 40.00	$ -	$ -	$ 40,749.00
NOGALES	$ 3,218,643.02	$ 8,940.00	$ -	$ 175.00	$ 3,227,758.02
PAGE	$ 131,680.40	$ 920.00	$ -	$ 20.00	$ 132,620.40
PARKER	$ 101,019.00	$ -	$ -	$ -	$ 101,019.00
SAN LUIS	$ 112,569.70	$ -	$ -	$ 80.00	$ 112,649.70
SAN SIMON	$ 1,572,989.66	$ -	$ -	$ -	$ 1,572,989.66
SANDERS	$ 1,331,564.85	$ -	$ -	$ 5.00	$ 1,331,569.85
SASABE	$ 473.60	$ -	$ -	$ -	$ 473.60
SPRINGERVILLE	$ 31,849.15	$ -	$ -	$ -	$ 31,849.15
ST. GEORGE	$ 1,626,235.74	$ 1,940.00	$ -	$ 15.00	$ 1,628,190.74
TEEC NOS POS	$ 70,557.35	$ 2,470.00	$ -	$ 15.00	$ 73,042.35
TOPOCK	$ 487,681.33	$ 50.00	$ -	$ -	$ 487,731.33
YUMA B-8	$ 68,394.99	$ -	$ -	$ -	$ 68,394.99
YUMA I-8	$ 1,487,617.20	$ -	$ -	$ -	$ 1,487,617.20
PORTS SUB-TOTAL	$ 13,983,358.59	$ 15,160.00	$ -	$ 460.00	$ 13,998,978.59
MOBILE - CENTRAL	$ 462.40	$ -	$ -	$ -	$ 462.40
MOBILE - NORTH	$ 28,474.90	$ -	$ -	$ -	$ 28,474.90
MOBILE - SOUTH	$ 75.00	$ -	$ -	$ -	$ 75.00
MOBILE SUB-TOTAL	$ 29,012.30	$ -	$ -	$ -	$ 29,012.30
ABANDONED VEH TEAM	$ -	$ 263,500.00	$ 176,093.76	$ 7,285.00	$ 446,878.76
BULLHEAD	$ -	$ 2,000.00	$ 74.67	$ 70.00	$ 2,144.67
CASA GRANDE	$ -	$ 15,390.00	$ -	$ 445.00	$ 15,835.00
CLAYPOOL	$ -	$ 14,050.00	$ -	$ 120.00	$ 14,170.00
FLAGSTAFF	$ 1,547.00	$ 11,180.00	$ -	$ 160.00	$ 12,887.00
GLENDALE	$ -	$ 318,990.00	$ 264,750.44	$ 3,245.00	$ 586,985.44
HOLBROOK	$ 195.00	$ 11,450.00	$ -	$ 370.00	$ 12,015.00
KINGMAN	$ -	$ 14,590.00	$ -	$ 625.00	$ 15,215.00
MESA	$ -	$ 351,640.00	$ 4,437.41	$ 2,420.00	$ 358,497.41
NOGALES	$ -	$ 11,660.00	$ -	$ 285.00	$ 11,945.00
PARKER	$ -	$ 24,490.00	$ -	$ 1,105.00	$ 25,595.00
PAYSON	$ 608.20	$ 3,920.00	$ -	$ 195.00	$ 4,723.20
PRESCOTT	$ 330.00	$ 18,840.00	$ -	$ 285.00	$ 19,455.00
SAFFORD	$ 5,997.75	$ 4,560.00	$ 9,101.00	$ 290.00	$ 19,948.75
SANDERS	$ 15.00	$ 5,320.00	$ -	$ 370.00	$ 5,705.00
SCOTTSDALE	$ -	$ 118,080.00	$ 832,603.95	$ 1,605.00	$ 952,288.95
SIERRA VISTA	$ 1,156.00	$ 24,330.00	$ -	$ 870.00	$ 26,356.00
SOUTH MESA	$ -	$ 2,780.00	$ 457,880.09	$ 5.00	$ 460,665.09
TEMPE	$ -	$ 229,970.00	$ 667.05	$ 1,515.00	$ 232,152.05
TUBA CITY	$ 120.00	$ 2,220.00	$ -	$ 105.00	$ 2,445.00
TUCSON	$ -	$ 231,450.00	$ 132,850.49	$ 2,055.00	$ 366,355.49
VERDE VALLEY	$ 30.00	$ 10,710.00	$ -	$ 95.00	$ 10,835.00
WILLCOX	$ 6,002.00	$ 5,330.00	$ 15,568.36	$ 395.00	$ 27,295.36
YUMA	$ -	$ 79,610.00	$ -	$ 280.00	$ 79,890.00
ENFORCE SUB-TOTAL	$ 16,000.95	$ 1,776,060.00	$ 1,894,027.22	$ 24,195.00	$ 3,710,283.17
TOTAL	**$ 14,028,371.84**	**$ 1,791,220.00**	**$ 1,894,027.22**	**$ 24,655.00**	**$ 17,738,274.06**

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PORT	MILEAGE TAX	ARIZONA CARAVAN FEES	NEW MEXICO POLICE ESCORTS	DAILY TEMP. FUEL PERMIT	REPORT SPECIAL FUEL TAX	OVERSIZE PERMITS	PERMITS ISSUED	REVENUE TOTAL
SANDERS	$15,416.99	$1,724.50	$0.00	$154.50	$322.30	$150.00	7719	$17,768.29
SAN SIMON	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	0	$0.00
TOTAL	**$15,416.99**	**$1,724.50**	**$0.00**	**$154.50**	**$322.30**	**$150.00**	**7,719**	**$17,768.29**

ENFORCEMENT SVC
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LOCATION	OFFICE OF SPECIAL INVESTIGATIONS					
	LOT INSPECTIONS	EMPLOYEE BACKGROUNDS	DEALER BACKGROUNDS	INTERNAL AFFAIRS	DEALER INVESTIGATIONS	TITLE COMPLAINTS
ABANDONED VEH TEAM	0	0	0	0	0	0
BULLHEAD	0	0	0	0	0	0
CASA GRANDE	0	0	0	0	0	0
CLAYPOOL	0	0	0	0	0	0
FLAGSTAFF	0	0	0	0	0	0
GLENDALE	0	0	0	0	0	0
HOLBROOK	0	0	0	0	0	0
KINGMAN	0	0	0	0	0	0
MESA	0	0	0	0	0	0
NOGALES	0	0	0	0	0	0
PARKER	0	0	0	0	0	0
PAYSON	0	0	0	0	0	0
PRESCOTT	0	0	0	0	0	0
REG COMPLIANCE	0	0	0	0	0	0
SAFFORD	1	0	0	0	17	1
SANDERS	0	0	0	0	0	0
SCOTTSDALE	0	0	0	0	0	0
SIERRA VISTA	0	0	0	0	0	0
SOUTH MESA	0	0	0	0	0	0
TEMPE	0	0	0	0	0	0
TUBA CITY	0	0	0	0	0	0
TUCSON	0	0	0	0	0	0
VERDE VALLEY	0	0	0	0	0	0
WILLCOX	0	0	1	0	13	0
YUMA	6	0	0	0	3	0
ENFORCE SUB-TOTAL	7	0	1	0	33	1
TOTAL	**7**	**0**	**1**	**0**	**33**	**1**

ENFORCEMENT SVC
STATISTICAL RECAP
FY 2006/2007

LOCATION	REGISTRATION COMPLIANCE					
	LEADS	CASES OPENED	CASES CLOSED	REVENUE	WARNINGS	CITATIONS
ABANDONED VEH TEAM	918	1,971	1,361	$ 176,093.76	914	25
BULLHEAD	0	0	0	$ 74.67	0	0
CASA GRANDE	1	1	1	$ -	0	0
CLAYPOOL	0	0	0	$ -	0	0
FLAGSTAFF	0	0	0	$ -	0	0
GLENDALE	4,784	4,800	3,290	$ 264,750.44	4,721	49
HOLBROOK	0	0	0	$ -	0	0
KINGMAN	0	0	0	$ -	0	0
MESA	77	111	102	$ 4,437.41	51	1
NOGALES	0	0	0	$ -	0	0
PARKER	0	0	0	$ -	0	0
PAYSON	0	0	0	$ -	0	0
PRESCOTT	0	0	0	$ -	0	0
SAFFORD	98	78	55	$ 9,101.00	22	0
SANDERS	0	0	0	$ -	0	0
SCOTTSDALE	31,323	6,457	56,467	$ 832,603.95	6,738	2
SIERRA VISTA	0	0	0	$ -	0	0
SOUTH MESA	26,491	6,940	5,234	$ 457,880.09	11,305	21
TEMPE	43	12	6	$ 667.05	36	0
TUBA CITY	0	0	0	$ -	0	0
TUCSON	2,177	1,956	1,989	$ 132,850.49	2,249	8
VERDE VALLEY	0	0	0	$ -	0	0
WILLCOX	153	170	118	$ 15,568.36	220	22
YUMA	10	25	10	$ -	9	0
ENFORCE SUB-TOTAL	66,075	22,521	68,633	$ 1,894,027.22	26,265	128
TOTAL	**66,075**	**22,521**	**68,633**	**$ 1,894,027.22**	**26,265**	**128**