

WIM System Field Calibration and Validation Handout Guide

Washington, SPS-2
SHRP ID – 530200

Validation Date: June 18, 2013



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1 Site Information

Site ID:	530200	State:	Washington
LTPP Region:	Western	Configuration:	Loop – Quartz- Quartz- Loop
Controller Type:	IRD 1060	Sensor Type:	Quartz Piezo
Power:	AC	Communication:	Landline
Class Scheme:	LTPP MAR 06	CPU type/setup:	1060 series

2 Contact Information

Agency	Contact	Position	Phone	E-Mail
FHWA	Debbie Walker	COTR	202 493-3068	deborah.walker@dot.gov
FHWA	Anthony Sarhan	Division Office	360-753-9412	Anthony.Sarhan@dot.gov
RSC	Kevin Senn	Project Manager	775-329-4955	KSenn@ncenet.com
WA DOT	Jeff Uhlmeyer	LTPP Coordinator	360-709-5485	uhlmej@wsdot.wa.gov
WA DOT	Hoang Nguyen	Traffic	360-570-2389	nguyehv@wsdot.wa.gov
WADOT	Mark Finch	Traffic Coordinator	360-570-2369	finchm@wsdot.wa.gov
ARA	Dean Wolf	Task Leader	717-512-6638	dwolf@ara.com
ARA	Olga Selezneva	Project Manager	410-540-9949	oselezneva@ara.com

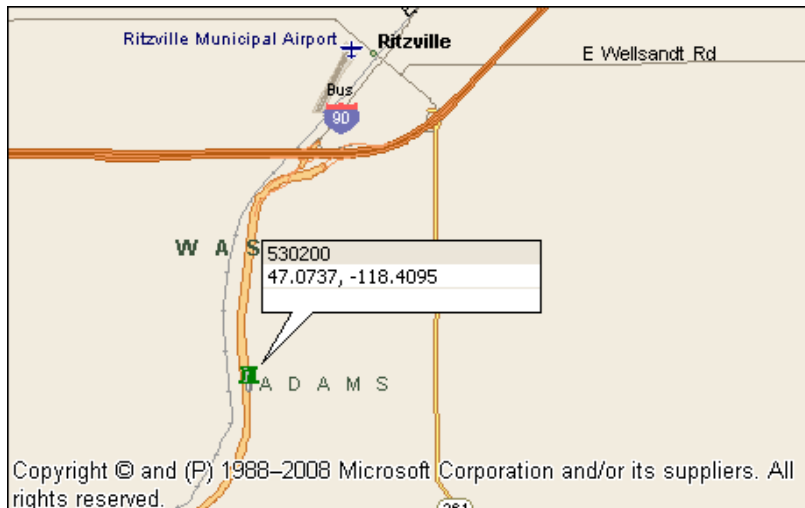
3 Schedule of Events

Date	Event	Location	Start Time
6/17/13	Travel	Ritzville, WA	TBD
6/18/13	Test Truck Weigh/Measure/Inspection	State Scales, I-90 WB Exit 231 Tokio	7:30 am
6/18/13	Equipment Assessment	WIM Site	8:30 am
6/18/13	Initial Performance Evaluation	WIM Site	8:30 am
6/18/13	System Test/Class and Speed Study	WIM Site	TBD
6/19/13	Test Truck Weigh	State Scales, I-90 WB Exit 231 Tokio	7:30 am
6/19/13	Calibration/Validation (if required)	WIM Site	8:30 am
6/20/13	Travel	Camp Hill, PA	TBD

4 Maps

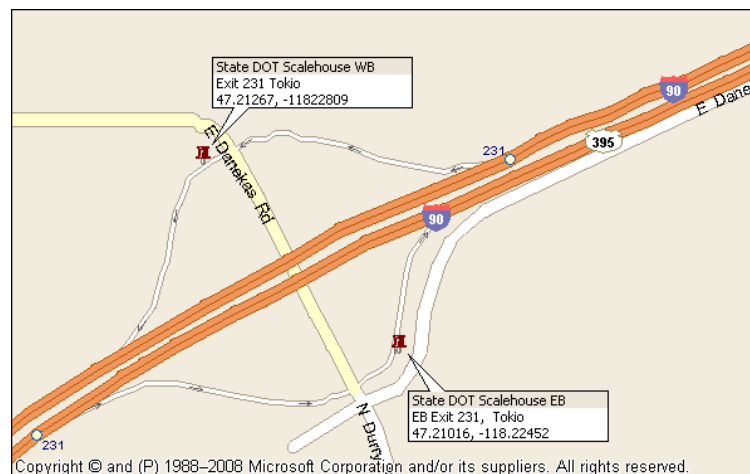
4.1 Site Location

Location:	US-395 at M.P. 93.01, 3.1 miles south of Interstate 90	Dir:	NB
Latitude:	47.0737°	Longitude:	-118.4095°



4.2 Truck Scale Location

Name:	State DOT Scale house #68	Location:	WB I-90 @ Exit 231 Tokio
Latitude:	47.21058°	Longitude:	-118.224203°



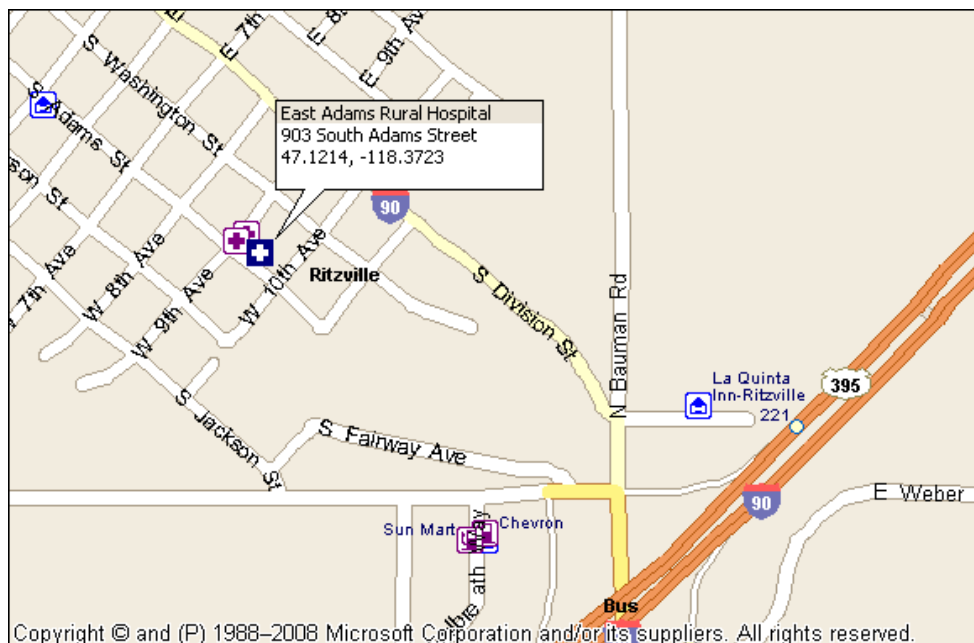
4.3 Airport Location

Name:	Spokane International Airport	Location:	Spokane, WA
Latitude:	47.625	Longitude:	-117.5738



4.4 Hospital Location

Name:	East Adams Rural Hospital-ER		
Phone:	509-659-1200	Location:	903 South Adams Street, Ritzville, WA



5 Occupational Health and Safety Plan

All fieldwork in the right-of-way will be carried out when the ground visibility is more than 3 km, and when there is no accumulation of water, snow, or ice is on the pavement.

To the extent possible, inspection work during extremely high and low temperatures will be avoided. If the work becomes necessary, workers will be reminded to make appropriate precautions (wear protective clothing, drink fluids, and avoid prolonged exposure to severe weather conditions).

All personnel present on the right-of-way will wear approved safety gear (boots, reflective safety vest, and helmet).

The following items will be available at the site: a standard first-aid kit, a cell phone, and the location of nearby hospital(s).

6 Contingency Plan

If inclement weather is forecasted prior to mobilizing to the site, the Project Manager will make the final decision to postpone the Validation visit. The Task Leader is responsible for contacting all parties involved to inform them of the postponement. He is also responsible for rearranging travel.

Once the Validation team is on-site, the On-Site Task Leader is responsible for making decisions to delay or postpone the Validation. He will contact the Project Manager to make recommendations for completing the Validation, and the Project Manager will make the final decision to cancel or postpone. The On-Site Task Leader is responsible for contacting the COTR and all other participating parties to inform them of the delay or postponement.

Traffic Sheet 17 LTPP MONITORED TRAFFIC DATA WIM SITE INVENTORY	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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1. ROUTE: US-395 MILEPOST: 93.01 LTPP DIRECTION: north

2. WIM SITE DESCRIPTION

Grade: 1 to 2% Sag Vertical: N
Nearest Upstream SPS Section: 205
Distance from sensors to SPS Section: 0 feet

3. LANE CONFIGURATION

Lanes in LTPP direction: 2 Median: 3 - grass
Lane width: 12' Shoulder: 2 - paved AC
Shoulder width: 10.5'

4. PAVEMENT TYPE PCC

5. PAVEMENT SURFACE CONDITION - Distress Survey

Date: 6/18/13 Photo Filename: 530200_downstream_6_17_13.jpg
Date: 6/18/13 Photo Filename: 530200_trailing_loop_6_17_13.jpg
Date: Photo Filename:

6. SENSOR SEQUENCE

Loop - Quartz - Quartz - Loop

7. REPLACEMENT AND/OR GRINDING

Date:
Date:
Date:

8. RAMPS OR INTERSECTIONS

Intersection within 300' upstream of site: N
Intersection within 300' downstream of site: N
Is shoulder routinely used for turning? N

9. DRAINAGE

Drainage (*bending plate and load cell*):
Clearance under plate (in.):
Clearance /access to flush fines from under system:

Traffic Sheet 17 LTPP MONITORED TRAFFIC DATA WIM SITE INVENTORY	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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10. CABINET LOCATION

Same side of road as LTPP lane: Y
Distance from edge of traveled lane: 83 ft
distance from system: 90 ft
type: M

Cabinet access controlled by: Agency
Contact name: Hoang Nguyen Phone # 360-570-2389
Alternate name: _____ Phone # _____

11. POWER

Distance to cabinet from drop: 160 ft
Type: AC
AC in cabinet? Y
Service provider: _____ Phone # _____

12. TELEPHONE

Distance to cabinet from drop: 160 ft
Type: landline
Service provider: _____ Phone # _____

13. SYSTEM

Software and version no. 1068
Computer connection: RS-232

14. TEST TRUCK TURNAROUND TIME

Duration: 21 minutes Distance: 19.2 miles

15. PHOTOS

	Filename
Power source:	<u>530200_power_box_6_17_13.jpg</u>
Phone source:	<u>530200_telephone_service_6_17_13.jpg</u>
Cabinet exterior:	<u>530200_cabinet_exterior_6_17_13.jpg</u>
Cabinet interior:	<u>530200_cabinet_interior_front_6_17_13.jpg</u>
Weight sensors:	<u>530200_leading_WIM_sensor_6_17_13.jpg</u>
	<u>530200_trailing_WIM_sensor_6_17_13.jpg</u>
Other sensors:	<u>530200_leading_loop_6_17_13.jpg</u>
	<u>530200_trailing_loop_6_17_13.jpg</u>
Downstream from sensors on LTPP lane:	<u>530200_downstream_6_17_13.jpg</u>
Upstream from sensors on LTPP lane:	<u>530200_upstream_6_17_13.jpg</u>

Traffic Sheet 18 LTPP MONITORED TRAFFIC DATA WIM SITE COORDINATION	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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1. DATA PROCESSING

- a. Download: LTPP only
- b. Data review: LTPP
If state, how often? _____
- c. Data submission LTPP
If state how often? _____

2. EQUIPMENT

- a. Purchase LTPP
- b. Installation Included with purchase
- c. Maintenance Contract with purchase
Expiration Date _____
- d. Calibration LTPP
- e. Manuals and software control: LTPP
- f. Power
i. Type Underground ii. Payment State
- g. Communication
i. Type Landline ii. Payment State

3. PAVEMENT

- a. Type Portland Concrete Cement
- b. Allowable Rehabilitation activities Maintenance only
- c. Profile Site Markings Temporary

Traffic Sheet 18 LTPP MONITORED TRAFFIC DATA WIM SITE COORDINATION	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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4. Onsite Activities

- a. WIM Validation Check advance notice required

_____ Days 2 Weeks

- b. Notice for straightedge and grinding check

_____ Days 2 Weeks

i. On site lead LTPP

ii. Accept grinding LTPP

- c. Authorization to calibrate site LTPP

- d. Calibration routine LTPP annually
Other: _____

- e. Test Vehicle Responsibilities

- i. Trucks

1st- Air suspension 3S2 LTPP

2nd- Air Suspension 3S2 LTPP

3rd- _____

4th- _____

ii. Loads LTPP

iii. Drivers LTPP

- f. Contractor(s) with prior experience in wim calibration in state:
IRD

- g. Access to cabinet Joint

- h. State personel required on site No

- i. Traffic control required No

- J. Enforcement coordination required No

Traffic Sheet 18 LTPP MONITORED TRAFFIC DATA WIM SITE COORDINATION	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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5. SITE SPECIFIC CONDITIONS

- a. Funds and accountability: _____
- b. Reports: _____
- c. Other: _____
- c. Special Conditions _____

6. CONTACTS

- a. Equipment (operational status, access, etc.)
Name Roy Czinku Phone # 306-270-9492
Agency IRD
- b. Maintenance (equipment)
Name Roy Czinku Phone # 306-270-9492
Agency IRD
- c. Data Processing and pre-visit data
Name Basel Abukhater Phone # 716-632-0804
Agency Stantec
- d. Construction schedule and verification
Name _____ Phone # _____
Agency _____
- e. Test Vehicles (trucks, loads, drivers)
Name Torrey Lanning Phone # 509-765-9531
Agency Zip Truck Lines
- f. Traffic control
Name _____ Phone # _____
Agency _____
- g. Enforcement coordination
Name _____ Phone # _____
Agency _____
- h. Nearest static scale
Name _____ Location: _____
Phone: _____

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 1	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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CALIBRATION TEST TRUCK - Primary

6. SUSPENSION

	a. Tire size	b.Suspension description (leaf, air # of leaves, taper or flat leaf, etc.)	c. photo
A	11R22.5	steel spring	☒
B	11R22.5	air	☒
C	11R22.5	air	☒
D	285/75R24.5	air	☒
E	285/75R24.5	air	☒
F			☐

d. Cold Tire Pressures (psi)- from right to left

Steering Axle	Axle B	Axle C	AxleD	AxleE	Axle F

PART B

Table 1 - Raw Measurements -Platform Scale

Axles	Meas.	Pre-test Weight	Instance	Instance	Post-test weight
A	I				
A+B	II				
A+B+C	III				
A+B+C+D	IV				
A+B+C+D+E(1)	V				
A+B+C+D+E+(F)(1)	VI				
B+C+D+E+(F)	VII				
C+D+E+(F)	VIII				
D+E+(F)	IX				
E+(F)	X				
(F)	XI				
A+B+C+D+E+(F)(2)	XII				

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 1	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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CALIBRATION TEST TRUCK - Primary

Table 2 - Axle and GVW Computations -Platform Scale Pre-test

	1		2		Avg.
Axle A	I	0	VI-VII	0	0
Axle B	II-I	0	VII-VIII	0	0
Axle C	III-II	0	VIII-IX	0	0
Axle D	IV-III	0	IX-X	0	0
Axle E	V-IV	0	X-XI	0	0
Axle F	VI-V		XI		
GVW	VI	0	XII	0	0

Table 3- Axle and GVW Computations - Platform Scale - Instance -

	1		2		Avg.
Axle A	I	0	VI-VII	0	0
Axle B	II-I	0	VII-VIII	0	0
Axle C	III-II	0	VIII-IX	0	0
Axle D	IV-III	0	IX-X	0	0
Axle E	V-IV	0	X-XI	0	0
Axle F	VI-V		XI		
GVW	VI	0	XII	0	0

Table 4- Axle and GVW Computations - Platform Scale - Instance -

	1		2		Avg.
Axle A	I	0	VI-VII	0	0
Axle B	II-I	0	VII-VIII	0	0
Axle C	III-II	0	VIII-IX	0	0
Axle D	IV-III	0	IX-X	0	0
Axle E	V-IV	0	X-XI	0	0
Axle F	VI-V		XI		
GVW	VI	0	XII	0	0

Table 5- Axle and GVW Computations - Platform Scale Post-Test

	1		2		Avg.
Axle A	I	0	VI-VII	0	0
Axle B	II-I	0	VII-VIII	0	0
Axle C	III-II	0	VIII-IX	0	0
Axle D	IV-III	0	IX-X	0	0
Axle E	V-IV	0	X-XI	0	0
Axle F	VI-V		XI		
GVW	VI	0	XII	0	0

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 1	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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CALIBRATION TEST TRUCK - Primary

Table 6 - Raw Data -Axle Scales - Pre-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	10860	15690	15690	17040	17040		76320
2	10880	15650	15650	17010	17010		76200
Avg.	10870	15670	15670	17025	17025		76260

Table 7- Raw Data- Axle scales -

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
Avg.							

Table 8- Raw Data- Axle scales -

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
Avg.							

Table 9 - Raw Data -Axle Scales - Post-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	10660	15520	15520	17040	17040		75780
2	10540	15530	15530	17030	17030		75660
Avg.	10600	15525	15525	17035	17035		75720

Validation Test Truck Run Set - Pre

Measured By: Geg Helman

Verified By: Kevin Trousdale

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 2	STATE CODE: 53
	SPS WIM ID: 530200
	DATE (mm/dd/yyyy) 6/18/2013

CALIBRATION TEST TRUCK - Secondary

PART A

1. FHWA CLASS: 10 2. Number of axles: 6

3. AXLE WEIGHTS (lbs)

	a. Empty Truck Avg. Axle Weight	b. Pre-test Average Axle Weight	c. Post-Test Avg. Axle Weight	d. Direct or Calculated?
A		9940	9180	Direct
B		9944	9957	Direct
C		9944	9957	Direct
D		9944	9957	Direct
E		13650	13615	Direct
F		13650	13615	Direct

4. GVW (same units as axles)

a. Empty GVW: _____
b. Average Pre-Test Loaded weight: 67070
c. Post Test Loaded Weight: 66280
d. Difference Post Test - Pre-Tests: -790

5. TRUCK DESCRIPTION

a. Tractor Cab Style: Conventional Sleeper Cab: Yes
photo: ☒

b. Make: Freightliner
c. Model: unknown

d. Trailer Load Distribution Description:

concrete blocks

photo: ☒

e. Tractor Tare weight - _____ - _____
f. Trailer Tare weight - _____ - _____
g. Axle Spacing - (feet and tenths)

A to B 13.8 B to C 4.3 C to D 4.3 D to E 28.8 E to F 4.2

h. Wheelbase - ☐ Measured _____ ☒ Computed 55.4
i. Kingpin offset from Axle B (units) -1'4" photo: ☐
j. Overall Length - ☒ Measured 62.0

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 2	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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CALIBRATION TEST TRUCK - Secondary

6. SUSPENSION

	a. Tire size	b.Suspension description (leaf, air # of leaves, taper or flat leaf, etc.)	c. photo
A	11R22.5	steel spring	☒
B	11R22.5	air	☒
C	11R22.5	air	☒
D	11R22.5	air	☒
E	285/75R24.5	air	☒
F	285/75R24.5	air	☐

d. Cold Tire Pressures (psi)- from right to left

Steering Axle	Axle B	Axle C	AxleD	AxleE	Axle F

PART B

Table 1 - Raw Measurements -Platform Scale

Axles	Meas.	Pre-test Weight	Instance	Instance	Post-test weight
A	I				
A+B	II				
A+B+C	III				
A+B+C+D	IV				
A+B+C+D+E(1)	V				
A+B+C+D+E+(F)(1)	VI				
B+C+D+E+(F)	VII				
C+D+E+(F)	VIII				
D+E+(F)	IX				
E+(F)	X				
(F)	XI				
A+B+C+D+E+(F)(2)	XII				

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 2	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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CALIBRATION TEST TRUCK - Secondary

Table 2 - Axle and GVW Computations -Platform Scale Pre-test

	1		2		Avg.
Axle A	I	0	VI-VII	0	0
Axle B	II-I	0	VII-VIII	0	0
Axle C	III-II	0	VIII-IX	0	0
Axle D	IV-III	0	IX-X	0	0
Axle E	V-IV	0	X-XI	0	0
Axle F	VI-V	0	XI	0	0
GVW	VI	0	XII	0	0

Table 3- Axle and GVW Computations - Platform Scale - Instance -

	1		2		Avg.
Axle A	I	0	VI-VII	0	0
Axle B	II-I	0	VII-VIII	0	0
Axle C	III-II	0	VIII-IX	0	0
Axle D	IV-III	0	IX-X	0	0
Axle E	V-IV	0	X-XI	0	0
Axle F	VI-V	0	XI	0	0
GVW	VI	0	XII	0	0

Table 4- Axle and GVW Computations - Platform Scale - Instance -

	1		2		Avg.
Axle A	I	0	VI-VII	0	0
Axle B	II-I	0	VII-VIII	0	0
Axle C	III-II	0	VIII-IX	0	0
Axle D	IV-III	0	IX-X	0	0
Axle E	V-IV	0	X-XI	0	0
Axle F	VI-V	0	XI	0	0
GVW	VI	0	XII	0	0

Table 5- Axle and GVW Computations - Platform Scale Post-Test

	1		2		Avg.
Axle A	I	0	VI-VII	0	0
Axle B	II-I	0	VII-VIII	0	0
Axle C	III-II	0	VIII-IX	0	0
Axle D	IV-III	0	IX-X	0	0
Axle E	V-IV	0	X-XI	0	0
Axle F	VI-V	0	XI		0
GVW	VI	0	XII	0	0

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 2	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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CALIBRATION TEST TRUCK - Secondary

Table 6 - Raw Data -Axle Scales - Pre-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	9880	9967	9967	9967	13650	13650	67080
2	10000	9920	9920	9920	13650	13650	67060
Avg.	9940	9944	9944	9944	13650	13650	67070

Table 7- Raw Data- Axle scales -

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
Avg.							

Table 8- Raw Data- Axle scales -

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
Avg.							

Table 9 - Raw Data -Axle Scales - Post-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	9240	9947	9947	9947	13600	13600	66280
2	9120	9967	9967	9967	13630	13630	66280
Avg.	9180	9957	9957	9957	13615	13615	66280

Validation Test Truck Run Set - Pre

Measured By: Geg Helman

Verified By: Kevin Trousdale

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 3	STATE CODE: 53
	SPS WIM ID: 530200
	DATE (mm/dd/yyyy) 6/18/2013

CALIBRATION TEST TRUCK - Third

PART A

1. FHWA CLASS: 9 2. Number of axles: 5

3. AXLE WEIGHTS (lbs)

	a. Empty Truck Avg. Axle Weight	b. Pre-test Average Axle Weight	c. Post-Test Avg. Axle Weight	d. Direct or Calculated?
A		13210	12680	Direct
B		12165	12110	Direct
C		12165	12110	Direct
D		12420	12420	Direct
E		12420	12420	Direct
F				

4. GVW (same units as axles)

a. Empty GVW: _____
b. Average Pre-Test Loaded weight: 62380
c. Post Test Loaded Weight: 61740
d. Difference Post Test - Pre-Tests: -640

5. TRUCK DESCRIPTION

a. Tractor Cab Style: Conventional Sleeper Cab: Yes
photo: ☒

b. Make: Freightliner
c. Model: unknown

d. Trailer Load Distribution Description:

bagged and palletized fertilizer

photo: ☒

e. Tractor Tare weight - _____ - _____
f. Trailer Tare weight - _____ - _____
g. Axle Spacing - (feet and tenths)

A to B 18.3 B to C 4.3 C to D 27.7 D to E 4.2 E to F _____

h. Wheelbase - ☐ Measured _____ ☐ Computed 54.5
i. Kingpin offset from Axle B (units) 0.2 photo: ☐
j. Overall Length - ☐ Measured 61.5

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 3	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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CALIBRATION TEST TRUCK - Third

6. SUSPENSION

	a. Tire size	b.Suspension description (leaf, air # of leaves, taper or flat leaf, etc.)	c. photo
A	11R22.5	steel spring	☒
B	11R22.5	air	☒
C	11R22.5	air	☒
D	11R22.5	air	☒
E	11R22.5	air	☒
F			☐

d. Cold Tire Pressures (psi)- from right to left

Steering Axle	Axle B	Axle C	AxleD	AxleE	Axle F

PART B

Table 1 - Raw Measurements -Platform Scale

Axles	Meas.	Pre-test Weight	Instance	Instance	Post-test weight
A	I				
A+B	II				
A+B+C	III				
A+B+C+D	IV				
A+B+C+D+E(1)	V				
A+B+C+D+E+(F)(1)	VI				
B+C+D+E+(F)	VII				
C+D+E+(F)	VIII				
D+E+(F)	IX				
E+(F)	X				
(F)	XI				
A+B+C+D+E+(F)(2)	XII				

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 3	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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CALIBRATION TEST TRUCK - Third

Table 2 - Axle and GVW Computations -Platform Scale Pre-test

	1		2		Avg.
Axle A	I	0	VI-VII	0	0
Axle B	II-I	0	VII-VIII	0	0
Axle C	III-II	0	VIII-IX	0	0
Axle D	IV-III	0	IX-X	0	0
Axle E	V-IV	0	X-XI	0	0
Axle F	VI-V		XI		
GVW	VI	0	XII	0	0

Table 3- Axle and GVW Computations - Platform Scale - Instance -

	1		2		Avg.
Axle A	I	0	VI-VII	0	0
Axle B	II-I	0	VII-VIII	0	0
Axle C	III-II	0	VIII-IX	0	0
Axle D	IV-III	0	IX-X	0	0
Axle E	V-IV	0	X-XI	0	0
Axle F	VI-V		XI		
GVW	VI	0	XII	0	0

Table 4- Axle and GVW Computations - Platform Scale - Instance -

	1		2		Avg.
Axle A	I	0	VI-VII	0	0
Axle B	II-I	0	VII-VIII	0	0
Axle C	III-II	0	VIII-IX	0	0
Axle D	IV-III	0	IX-X	0	0
Axle E	V-IV	0	X-XI	0	0
Axle F	VI-V		XI		
GVW	VI	0	XII	0	0

Table 5- Axle and GVW Computations - Platform Scale Post-Test

	1		2		Avg.
Axle A	I	0	VI-VII	0	0
Axle B	II-I	0	VII-VIII	0	0
Axle C	III-II	0	VIII-IX	0	0
Axle D	IV-III	0	IX-X	0	0
Axle E	V-IV	0	X-XI	0	0
Axle F	VI-V		XI		
GVW	VI	0	XII	0	0

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 3	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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CALIBRATION TEST TRUCK - Third

Table 6 - Raw Data -Axle Scales - Pre-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	13140	12170	12170	12420	12420		62320
2	13280	12160	12160	12420	12420		62440
Avg.	13210	12165	12165	12420	12420		62380

Table 7- Raw Data- Axle scales -

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
Avg.							

Table 8- Raw Data- Axle scales -

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
Avg.							

Table 9 - Raw Data -Axle Scales - Post-test

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	12680	12090	12090	12420	12420		61700
2	12680	12130	12130	12420	12420		61780
Avg.	12680	12110	12110	12420	12420		61740

Validation Test Truck Run Set - Pre

Measured By: Geg Helman

Verified By: Kevin Trousdale

Traffic Sheet 21 (Wheel Load) LTPP MONITORED TRAFFIC DATA WIM SYSTEM TRUCK RECORDS										STATE CODE: 53 SPS WIM ID: 530200 DATE: (mm/dd/yyyy): 6/18/2013									
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Pvmt Temp	Radar speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW	A-B space	B-C space	C-D space	D - E space	E - F space	Axle Length	Overall Length
68.1	54	3	1	10:14:05	1927	54.0	13.2	12.8	12.6	12.8	12.3		63.7	18.3	4.2	27.7	4.0		54.2	62.0
68.1	52	2	1	10:14:27	1930	52.0	10.0	6.5	12.7	11.8	15.7	14.5	71.2	13.9	4.2	4.3	29.3	4.1	55.8	62.0
68.1	50	1	1	10:14:51	1932	49.0	10.0	16.0	15.5	17.8	17.4		76.7	12.8	4.3	29.1	4.1		50.3	58.0
68.1	57	3	2	10:36:23	2131	58.0	12.2	12.6	12.5	12.8	12.5		62.6	18.3	4.2	27.7	4.0		54.2	62.0
68.1	57	2	2	10:36:50	2135	57.0	8.9	6.7	12.0	11.5	14.0	14.1	67.4	13.7	4.3	4.3	29.1	4.1	55.5	62.0
68.1	49	1	2	10:37:17	2139	50.0	10.7	16.5	15.7	17.6	18.0		78.4	12.9	4.4	29.1	4.0		50.4	59.0
66.3	49	3	3	10:58:31	2329	49.0	11.6	12.3	12.5	12.3	12.7		61.4	18.2	4.2	27.8	4.1		54.3	62.0
66.3	47	2	3	10:59:04	2335	47.0	9.8	6.6	12.4	12.3	15.1	14.2	70.4	13.9	4.3	4.3	29.2	4.1	55.8	62.0
66.3	49	1	3	10:59:25	2341	49.0	11.1	15.6	16.0	18.2	17.1		78.1	12.8	4.3	29.0	4.1		50.2	58.0
66.3	52	3	4	11:20:47	2532	53.0	13.6	12.2	12.0	12.3	12.4		62.4	18.3	4.2	27.8	4.0		54.3	62.0
66.3	52	2	4	11:21:09	2534	52.0	9.8	7.1	11.8	11.5	13.7	13.9	67.9	13.8	4.3	4.2	29.0	4.1	55.4	62.0
66.3	55	1	4	11:21:26	2538	55.0	11.2	15.8	16.1	17.8	17.3		78.2	12.9	4.3	29.1	4.1		50.4	58.0
67.5	58	3	5	11:42:56	2733	58.0	11.5	12.6	12.1	13.0	12.9		62.2	18.4	4.2	27.7	4.0		54.3	62.0
67.5	57	2	5	11:43:15	2738	57.0	10.5	8.2	10.8	10.8	13.3	12.9	66.5	13.9	4.3	4.2	29.3	4.1	55.8	62.0
67.5	54	1	5	11:43:26	2741	55.0	11.6	16.3	15.2	17.5	17.1		77.7	12.8	4.4	29.1	4.1		50.4	58.0
66.3	48	3	6	12:31:14	3202	48.0	11.4	12.6	12.4	12.5	12.4		61.3	18.3	4.2	27.8	4.1		54.4	62.0
66.3	47	2	6	12:32:01	3208	47.0	9.9	7.0	11.7	12.1	15.6	13.9	70.1	13.9	4.3	4.2	29.2	4.1	55.7	62.0
66.3	54	1	6	12:32:10	3211	54.0	10.6	16.0	16.2	17.2	17.6		77.7	12.8	4.3	29.1	4.1		50.3	58.0
67.5	54	3	7	12:53:18	3385	54.0	11.4	12.1	12.4	12.6	12.8		61.3	18.2	4.2	27.7	4.0		54.1	62.0
67.5	53	2	7	12:53:53	3392	52.0	10.7	7.6	11.5	11.0	13.3	14.4	68.6	13.9	4.3	4.3	29.1	4.1	55.7	62.0
67.5	49	1	7	12:54:23	3400	49.0	12.0	16.0	15.2	17.1	16.9		77.2	12.8	4.3	29.1	4.0		50.2	58.0
70.0	59	3	8	13:14:47	3627	58.0	11.9	12.8	12.4	13.1	12.9		63.1	18.3	4.2	27.7	4.0		54.2	61.0
70.0	57	2	8	13:15:30	3630	57.0	9.9	8.0	12.2	11.8	14.2	14.5	70.5	13.9	4.3	4.3	29.1	4.1	55.7	62.0
70.0	55	1	8	13:16:46	3640	55.0	10.0	15.1	15.8	17.4	17.5		75.8	12.8	4.3	29.0	4.0		50.1	58.0

Recorded By: <u>kt</u>										Verified By: <u>djw</u>										Run Set <u>Pre</u>									
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Traffic Sheet 21 (Wheel Load) LTPP MONITORED TRAFFIC DATA WIM SYSTEM TRUCK RECORDS										STATE CODE: 53 SPS WIM ID: 530200 DATE: (mm/dd/yyyy): 6/18/2013									
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Pvmt Temp	Radar speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW	A-B space	B-C space	C-D space	D - E space	E - F space	Axle Length	Overall Length
69.5	50	3	9	13:36:23	3830	49.0	13.6	11.8	11.6	11.6	11.7		60.3	18.1	4.2	27.6	4.0		53.9	62.0
69.5	49	2	9	13:37:15	3838	47.0	9.6	7.0	11.7	11.6	14.1	13.1	67.0	13.7	4.3	4.2	29.1	4.1	55.4	62.0
69.5	53	1	9	13:38:49	3849	54.0	10.2	16.2	16.0	17.7	17.8		77.9	12.8	4.3	29.1	4.1		50.3	58.0
71.6	52	3	10	14:05:00	4074	53.0	12.9	12.3	12.1	12.2	12.1		61.6	18.1	4.2	27.6	4.0		53.9	61.0
71.6	50	2	10	14:05:06	4075	53.0	9.7	6.9	12.3	11.5	13.8	14.7	68.9	13.9	4.3	4.2	29.2	4.1	55.7	62.0
71.6	53	1	10	14:05:08	4076	54.0	10.4	15.6	15.7	17.8	18.0		77.6	12.9	4.3	29.1	4.0		50.3	58.0
75.9	58	3	11	14:27:03	4231	58.0	12.0	12.5	12.3	12.7	13.2		62.7	18.1	4.2	27.7	4.0		54.0	62.0
75.9	57	2	11	14:27:37	4234	57.0	8.7	5.9	12.2	11.3	12.9	14.2	65.3	13.7	4.2	4.2	29.0	4.0	55.1	62.0
75.9	62	1	11	14:27:59	4238	59.0	10.7	16.3	15.9	17.3	17.5		77.7	12.8	4.3	29.1	4.1		50.3	58.0
75.9	49	3	12	14:49:12	4436	48.0	13.2	12.1	12.1	11.6	11.9		60.9	18.2	4.2	27.6	4.0		54.0	61.0
75.9	49	2	12	14:49:32	4437	46.0	10.3	7.3	10.7	10.8	13.8	12.5	65.6	13.6	4.2	4.2	28.7	4.1	54.8	61.0
75.9	51	1	12	14:49:46	4440	50.0	11.4	15.8	14.8	16.8	16.7		75.5	12.7	4.4	29.1	4.1		50.3	58.0
77.5	53	3	13	15:12:02	4726	53.0	13.6	11.7	11.5	12.2	11.9		60.9	18.3	4.2	27.8	4.0		54.3	62.0
77.5	52	2	13	15:12:10	4727	52.0	9.4	6.7	12.2	11.6	14.5	14.3	68.6	13.8	4.3	4.3	29.1	4.1	55.6	62.0
77.5	53	1	13	15:12:29	4729	54.0	11.3	15.1	15.4	16.1	16.8		74.7	12.7	4.3	29.1	4.0		50.1	57.0
76.9	55	3	14	15:33:29	4965	59.0	11.3	12.1	11.9	12.4	12.6		60.3	18.3	4.2	27.7	4.1		54.3	62.0
76.9	58	2	14	15:34:01	4974	57.0	8.7	5.8	12.0	11.5	14.5	14.2	66.8	13.8	4.2	4.3	29.2	4.1	55.6	61.0
76.9	61	1	14	15:35:00	4981	60.0	10.2	15.3	14.9	17.8	17.7		75.9	12.9	4.3	29.1	4.1		50.4	58.0

Recorded By: <u> kt </u>										Verified By: <u> djw </u>										Run Set <u> Pre </u>	
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Traffic Sheet 22 LTPP MONITORED TRAFFIC DATA SITE EQUIPMENT ASSESSMENT LTPP LANE ONLY	STATE CODE:	53
	SPS WIM ID:	530200
	STATE ASSIGNED ID	P7C
	DATE (mm/dd/yyyy)	6/18/2013

SITE EQUIPMENT INFORMATION

1. TYPE OF EQUIPMENT		<u>BOTH</u>	
2. LANE NUMBER ON SITE		<u>1</u>	3. DIRECTION ON SITE <u>north</u>
4. VENDOR	<u>IRD</u>	MODEL	<u>1068</u>
		SERIAL#	<u>03098406</u>
5. WEIGHING SENSOR TYPE		<u>quartz</u>	
6. SYSTEM SOFTWARE VERSIONS:			
CPU	<u></u>		
LOOP	<u></u>		
PIEZO	<u></u>		
WEIGHPAD/ LOADCELL	<u></u>		
COMMUNICATIONS	<u></u>		
7. CLASSIFICATION VIDEO:			
TIME FROM:	<u></u>	TO:	<u></u>
TIME FROM:	<u></u>	TO:	<u></u>

SITE CONDITIONS

8. PAVEMENT:

Indicate any deficiencies that may affect the performance of the WIM system. List all photos on Sheet 24 that support the evaluation.

There were no pavement distresses noted that may affect the accuracies of the WIM system.

Traffic Sheet 22 LTPP MONITORED TRAFFIC DATA SITE EQUIPMENT ASSESSMENT LTPP LANE ONLY	STATE CODE: 53 SPS WIM ID: 530200 STATE ASSIGNED ID P7C DATE (mm/dd/yyyy) 6/18/2013
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9. IN ROAD SENSORS:

Describe any deficiencies regarding the sensor installation. Indicate sensors that show any signs of being broken, severely worn, missing, removed, or loose. List photos on Sheet 24 for

the equipment is operating within the manufacturer's tolerances. None of the in-road sensors show signs of damage or excessive wear and appear to be fully secured in the pavement.

TRUCK OBSERVATIONS

- 10.** Indicate any irregular truck behaviors such as bouncing, swerving, or braking near the weighing area (within 40 meters). Note the distance from the weighing sensors.

A visual observation of the trucks as they approach, traverse, and leave the sensor area did not indicate any adverse dynamics that would affect the accuracy of the WIM system. The trucks appear to track down the center of the lane.

Minimum 15 minute or 35 truck sample video sample for pavement interaction deficiencies:

Tape Filename:

Time:

From:

To:

Traffic Sheet 22 LTPP MONITORED TRAFFIC DATA SITE EQUIPMENT ASSESSMENT LTPP LANE ONLY	STATE CODE: 53 SPS WIM ID: 530200 STATE ASSIGNED ID P7C DATE (mm/dd/yyyy) 6/18/2013
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11. CLASSIFICATION VERIFICATION VIDEO:

TAPE 1- NAME: _____

Interval	Filename	From	To
1			
2			
3			
4			
5			
6			
7			
8			

TAPE 2- NAME: _____

Interval	Filename	From	To
1			
2			
3			
4			
5			
6			
7			
8			

TAPE 3- NAME: _____

Interval	Filename	From	To
1			
2			
3			
4			
5			
6			
7			
8			

Traffic Sheet 22 LTPP MONITORED TRAFFIC DATA SITE EQUIPMENT ASSESSMENT LTPP LANE ONLY	STATE CODE: 53 SPS WIM ID: 530200 STATE ASSIGNED ID P7C DATE (mm/dd/yyyy) 6/18/2013
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SYSTEM ACCURACY TESTS

12. CONDUCT THE FOLLOWING SYSTEM ACCURACY TESTS EITHER ON- SITE OR IN OFFICE

Speed Accuracy - Complete Sheet 20 and attach.

Average radar speed	<u>61.1</u> mph	Average WIM Speed	<u>60.3</u> mph
Mean Difference	<u>-0.8</u> mph	SD of mean	<u>2.8</u>

Posted Speed Limit	<u>60</u> mph		
Speed Range	15th percentile - <u>#NUM!</u> mph	85th percentile-	<u> </u> mph

Spacing and Weight - Complete Sheet 21 and attach.

Average distance between axles of drive tandem		<u> </u> feet	
% error from 4.25 ft (industry average)	OR	<u>4.26</u>	ft (WIM system average)
= <u>0.3</u> %			

Average front axle weight for Class 9 vehicles		<u> </u> lbs	
% error from 10.3 kips (industry average) OR		<u>11.0</u>	lbs (known site value)
= <u>6.5</u> %			

SUPPORT EQUIPMENT STRUCTURES

17. Indicate any deficiencies with any site equipment other than the in-road sensors. List all photos on the Sheet 24 for each occurrence.

Cabinet/Foundation None ☒

no cabinet or foundation deficiencies

Pull Boxes None ☒

no pull box deficiencies

Mast None ☒

no service mast deficiencies

Solar Panels None ☒

no solar panel deficiencies

Traffic Sheet 22 LTPP MONITORED TRAFFIC DATA SITE EQUIPMENT ASSESSMENT LTPP LANE ONLY	STATE CODE: 53 SPS WIM ID: 530200 STATE ASSIGNED ID P7C DATE (mm/dd/yyyy) 6/18/2013
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Telephone D-Mark Box None ☒

no telephone d-mark box deficiencies

Power Service Box None ☒

no power service box deficiencies

Grounding None ☒

no grounding deficiencies

Conduit None ☒

no conduit deficiencies

STATIC AND DYNAMIC ELECTRONIC EQUIPMENT TESTS

18. Complete and attach a Sheet 22 addendum applicable to the installed road equipment.

ADDITIONAL COMMENTS

All values for the WIM sensors and inductive loops were within tolerances. Electronic tests of the power and communication devices indicated that they were operating normally.

Assessor Greg Helman

Traffic Sheet 22 Addendum - Kistler Quartz LTPP MONITORED TRAFFIC DATA SITE EQUIPMENT ASSESSMENT LTPP LANE ONLY	STATE CODE:	53
	SPS WIM ID:	530200
	STATE ASSIGNED ID	P7C
	DATE (mm/dd/yyyy)	6/18/2013

STATIC EQUIPMENT VALUES (SYSTEM OFF)

1. POWER

a. Solar Panel		WATTS		VDC
b. Equipment Power	121.1	VAC		VDC
c. Battery 1		VDC		
d. Battery 2		VDC		
e. Regulated		VDC		
f. Power Supply	121.1	VAC		VDC
g. System Input	121.1	VAC		VDC
h. Modem Power		VAC		VDC
i. Telephone		VDC		

2. LOOP SENSORS

	Resistance		Inductance		Shield
a. Leading	0.9 Ω		145.0 μ h		inf M Ω
b. Trailing	1.1 Ω		144.9 μ h		inf M Ω

3. KISTLER SENSORS

	Resistance		Capacitance
a. K1 (lead/left)	10 ⁹ Ω		15 nF
b. K2 (lead/middle)	10 ⁹ Ω		16 nF
c. K3 (lead mid/right)	Ω		nF
d. K4 (lead/right)	Ω		nF
e. K5 (trail/left)	Ω		nF
f. K6 (trail/mid left)	Ω		nF
g. K7 (trail/mid right)	<10 ⁹ Ω		8 nF
h. K8 (trail/right)	10 ¹¹ Ω		15 nF

DYNAMIC EQUIPMENT VALUES (SYSTEM ON)

4. LOOP SENSORS

	Frequency
a. Leading	13.01 KHz
b. Trailing	13.68 KHz

5. KISTLER SENSORS

Dynamic testing for the Kistler Quartz sensor is not recommended.

Assessor Greg Helman

Traffic Sheet 24A LTPP MONITORED TRAFFIC DATA SITE PHOTO LOG - Equipment	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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Item	Description	Filename
1	Power Source	530200_power_box_6_17_13.jpg
2	Telephone Source	530200_telephone_service_6_17_13.jpg
3	Cabinet Exterior	530200_cabinet_exterior_6_17_13.jpg
4	Cabinet Interior - Front	530200_cabinet_interior_front_6_17_13.jpg
5	Cabinet Interior - Rear	
6	Leading weight sensor	530200_leading_WIM_sensor_6_17_13.jpg
7	Trailing weight sensor	530200_trailing_WIM_sensor_6_17_13.jpg
8	Leading classification sensor	
9	Trailing classification sensor	
10	Leading loop sensor	530200_leading_loop_6_17_13.jpg
11	Trailing loop sensor	530200_trailing_loop_6_17_13.jpg
12	Downstream from site	530200_downstream_6_17_13.jpg
13	Upstream from site	530200_upstream_6_17_13.jpg
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

Traffic Sheet 24B LTPP MONITORED TRAFFIC DATA SITE PHOTO LOG - Test Trucks	STATE CODE: 53 SPS WIM ID: 530200 DATE (mm/dd/yyyy) 6/18/2013
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Item	Description	Filename
1	Tractor, Truck #1	530200_Truck_1_Tractor_6_17_13.jpg
2	Trailer/Load, Truck #1	530200_Truck_1_Trailer_6_17_13.jpg
3	Kingpin Offset, Truck #1	
4	Suspension A, Truck #1	530200_Truck_1_Suspension_1_6_17_13.jpg
5	Suspension B, Truck #1	530200_Truck_1_Suspension_2_6_17_13.jpg
6	Suspension C, Truck #1	530200_Truck_1_Suspension_3_6_17_13.jpg
7	Suspension D, Truck #1	530200_Truck_1_Suspension_4_6_17_13.jpg
8	Suspension E, Truck #1	530200_Truck_1_Suspension_5_6_17_13.jpg
9	Suspension F, Truck #1	
10	Tractor, Truck #2	530200_Truck_2_Tractor_6_17_13.jpg
11	Trailer/Load, Truck #2	530200_Truck_2_Trailer_6_17_13.jpg
12	Kingpin Offset, Truck #2	
13	Suspension A, Truck #2	530200_Truck_2_Suspension_1_6_17_13.jpg
14	Suspension B, Truck #2	530200_Truck_2_Suspension_2_6_17_13.jpg
15	Suspension C, Truck #2	530200_Truck_2_Suspension_3_6_17_13.jpg
16	Suspension D, Truck #2	530200_Truck_2_Suspension_4_6_17_13.jpg
17	Suspension E, Truck #2	530200_Truck_2_Suspension_5_6_17_13.jpg
18	Suspension F, Truck #2	
19	Tractor, Truck #3	
20	Trailer/Load, Truck #3	
21	Kingpin Offset, Truck #3	
22	Suspension A, Truck #3	
23	Suspension B, Truck #3	
24	Suspension C, Truck #3	
25	Suspension D, Truck #3	
26	Suspension E, Truck #3	
27	Suspension F, Truck #3	
28	Scale	
29		
30		