

WIM System Field Calibration and Validation Handout Guide

Indiana SPS-6
SHRP ID – 180600

Validation Date: August 6, 2013



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1 Site Information

Site ID:	180600	State:	Indiana
LTPP Region:	North Central	Configuration:	Loop- quartz-quartz-loop
Controller Type:	iSINC	Sensor Type:	Quartz- Piezo
Power:	AC	Communication:	Landline
Class Scheme:	LTPP Mar 06	CPU type/setup:	iSINC

2 Contact Information

Agency	Contact	Position	Phone	E-Mail
FHWA	Debbie Walker	COTR	202 493-3068	deborah.walker@dot.gov
FHWA	Tom Duncan	Division Office	317-226-5622	thomas.duncan@dot.gov
RSC	Frank Meyer	North Central	716-632-0804	fmeyer@stantec.com
IN DOT	Ju Sang Lee	LTPP contact	765-463-1521 ext349	jlee@indot.in.gov
IN DOT	Tommy Nantung	Coordinator	765-463-1521 ext 248	tnantung@indot.in.gov
IN DOT	William Flora	LTPP Contact	317 233-1060	wflora@indot.in.gov
IN DOT	Marcia Gustafson	Traffic Contact	317-232-5134	mgustafson@indot.in.gov
ARA	Dean Wolf	Task Leader	717-512-6638	dwolf@ara.com
ARA	Olga Selezneva	Project Manager	410-540-9949	oselezneva@ara.com

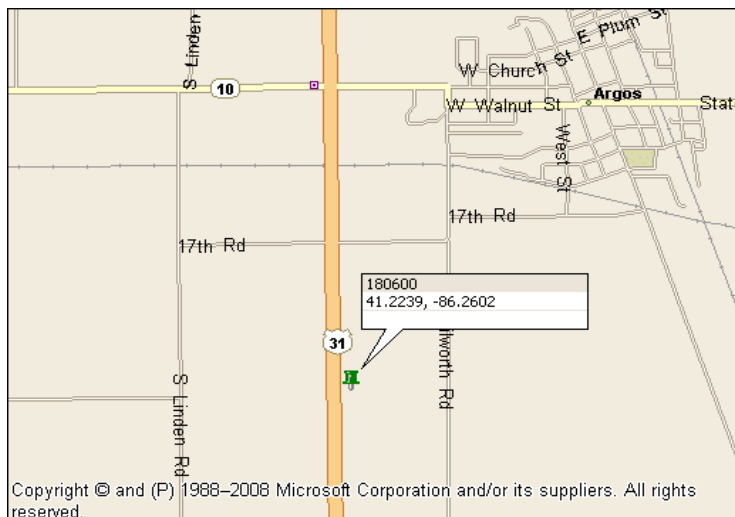
3 Schedule of Events

Date	Event	Location	Start Time
8/6/13	Travel	Plymouth, IN	TBD
8/7/13	Test Truck Weigh/Measure/Inspection	CAT Scale	6:30 am
8/7/13	Equipment Assessment	WIM Site	8:00 am
8/7/13	Initial Performance Evaluation	WIM Site	8:30 am
8/7/13	System Test/Class and Speed Study	WIM Site	TBD
8/8/13	Test Truck Weigh	CAT Scale	6:30 am
8/8/13	Calibration/Validation (if required)	WIM Site	8:00 am
8/9/13	Travel	Camp Hill, PA	TBD

4 Maps

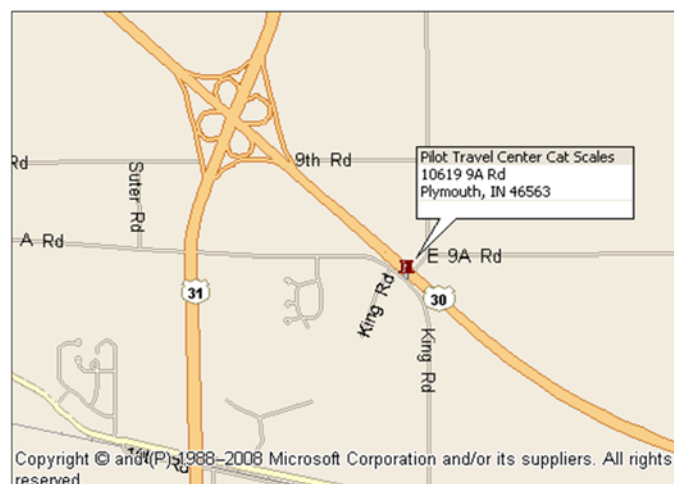
4.1 Site Location

Location:	US-31 North at M.P. 216.9		Direction:	NB
Latitude:	41.22390°	Longitude:	-86.26020°	



4.2 Truck Scale Location

Name:	Pilot Travel, Plymouth	Location:	US Hwy 30 & 31
Latitude:	41.3418000	Longitude:	-86.2625000



4.3 Airport Location

Name:	South Bend Regional Airport	Location:	South Bend, IN
Latitude:	41.070141	Longitude:	-86.30901



4.4 Hospital Location

Name:	St. Josephs regional medical center		
Phone:	(574) 936-3181	Phone:	(574) 936-3181



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:	18
	SPS WIM ID:	180600
	DATE (mm/dd/yyyy)	8/6/2013

1. ROUTE:	US-31	MILEPOST:	216.9	LTPP DIRECTION:	north
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2. WIM SITE DESCRIPTION

Grade: <1% Sag Vertical: N
Nearest Upstream SPS Section: 180601
Distance from sensors to SPS Section: 3256 feet

3. LANE CONFIGURATION

Lanes in LTPP direction:	<u>2</u>	Median:	<u>3 - grass</u>
Lane width:	<u>12'</u>	Shoulder:	<u>2 - paved AC</u>
Shoulder width:	<u>11'</u>		

4. PAVEMENT TYPE

5. PAVEMENT SURFACE CONDITION - Distress Survey

Date: 8/6/13 Photo Filename: 180600_downstream_8_6_13.jpg
 Date: 8/6/13 Photo Filename: 180600_trailing_loop_8_6_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:	Y
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:	18
	SPS WIM ID:	180600
	DATE (mm/dd/yyyy)	8/6/2013

10. CABINET LOCATION

Same side of road as LTPP lane: Y
 Distance from edge of traveled lane: 64 ft
 distance from system: 70 ft
 type: M

Cabinet access controlled by: Agency and LTPP
 Contact name: Roy Czinku Phone # 306-270-9492
 Alternate name: Kirk Mangold Phone # _____

11. POWER

Distance to cabinet from drop: 26 ft
 Type: AC
 AC in cabinet? Y
 Service provider: _____ Phone # _____

12. TELEPHONE

Distance to cabinet from drop: 26 ft
 Type: landline
 Service provider: _____ Phone # _____

13. SYSTEM

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

14. TEST TRUCK TURNAROUND TIME

Duration: 9 minutes Distance: 4.8 miles

15. PHOTOS

Filename

Power source: 180600_power_service
 Phone source: 180600_telephone_pedestal_8_6_13.jpg
 Cabinet exterior: 180600_cabinet_exterior_8_6_13.jpg
 Cabinet interior: 180600_cabinet_interior_front_8_6_13.jpg
 Weight sensors: 180600_leading_WIM_sensor_8_6_13.jpg
 180600_trailing_WIM_sensor_8_6_13.jpg
 Other sensors: 180600_leading_loop_8_6_13.jpg
 180600_trailing_loop_8_6_13.jpg
 Downstream from sensors on LTPP lane: 180600_downstream_8_6_13.jpg
 Upstream from sensors on LTPP lane: 180600_upstream_8_6_13.jpg

Traffic Sheet 18 LTPP MONITORED TRAFFIC DATA WIM SITE COORDINATION	STATE CODE: 18 SPS WIM ID: 180600 DATE (mm/dd/yyyy) 8/6/2013
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1. DATA PROCESSING

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

2. EQUIPMENT

- a. Purchase LTPP
- b. Installation LTPP contract
- c. Maintenance Separate contract LTPP
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 Asphalt Concrete
- b. Allowable Rehabilitation activities Maintenance only
- c. Profile Site Markings Temporary

Traffic Sheet 18
LTPP MONITORED TRAFFIC DATA
WIM SITE COORDINATION

STATE CODE: 18
 SPS WIM ID: 180600
 DATE (mm/dd/yyyy) 8/6/2013

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-	<u>Air suspension 3S2</u>	<u>LTPP</u>
2nd-	<u>Air Suspension 3S2</u>	<u>LTPP</u>
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: 18 SPS WIM ID: 180600 DATE (mm/dd/yyyy) 8/6/2013
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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 Carl Stockberger Phone # 574-936-2238
Agency Stockberger Materials Transport
- f. Traffic control
Name _____ Phone # _____
Agency _____
- g. Enforcement coordination
Name _____ Phone # _____
Agency _____
- h. Nearest static scale
Name Stockberger Materials Transport Location: US 30& US 31
Phone: 574-936-2238

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 1	STATE CODE: 18
	SPS WIM ID: 180600
	DATE (mm/dd/yyyy) 8/6/2013

CALIBRATION TEST TRUCK - Primary

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		12380	12070	Direct
B		16700	16725	Direct
C		16700	16725	Direct
D		17865	17945	Direct
E		17865	17945	Direct
F				

4. GVW (same units as axles)

a. Empty GVW: _____
b. Average Pre-Test Loaded weight: 81510
c. Post Test Loaded Weight: 81410
d. Difference Post Test - Pre-Tests: -100

5. TRUCK DESCRIPTION

a. Tractor Cab Style: Conventional Sleeper Cab: No
photo: ☒

b. Make: Cummins
c. Model: Eagle

d. Trailer Load Distribution Description:

rock

photo: ☒

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

A to B 13.0 B to C 4.3 C to D 22.3 D to E 4.2 E to F _____

h. Wheelbase - ☐ Measured _____ ☒ Computed 43.8
i. Kingpin offset from Axle B (units) -3'10" photo: ☐
j. Overall Length - ☒ Measured 50.0

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # <u>1</u>	STATE CODE: 18 SPS WIM ID: 180600 DATE (mm/dd/yyyy) 8/6/2013
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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	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 # <u>1</u>	STATE CODE: 18 SPS WIM ID: 180600 DATE (mm/dd/yyyy) 8/6/2013
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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 # <u>1</u>	STATE CODE: 18 SPS WIM ID: 180600 DATE (mm/dd/yyyy) 8/6/2013
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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	12420	16690	16690	17860	17860		81520
2	12340	16710	16710	17870	17870		81500
Avg.	12380	16700	16700	17865	17865		81510

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	12080	16770	16770	17900	17900		81420
2	12060	16680	16680	17990	17990		81400
Avg.	12070	16725	16725	17945	17945		81410

Validation Test Truck Run Set - Pre

Measured By: Dean Wolf

Verified By: Aditya R.

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 2	STATE CODE: 18
	SPS WIM ID: 180600
	DATE (mm/dd/yyyy) 8/6/2013

CALIBRATION TEST TRUCK - Secondary

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		11810	11750	Direct
B		14820	14760	Direct
C		14820	14760	Direct
D		13795	13840	Direct
E		13795	13840	Direct
F				

4. GVW (same units as axles)

a. Empty GVW: _____
b. Average Pre-Test Loaded weight: 69040
c. Post Test Loaded Weight: 68950
d. Difference Post Test - Pre-Tests: -90

5. TRUCK DESCRIPTION

a. Tractor Cab Style: Conventional Sleeper Cab: No
photo: ☒

b. Make: Cummins
c. Model: Eagle

d. Trailer Load Distribution Description:

rock

photo: ☒

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

A to B 13.0 B to C 4.3 C to D 22.3 D to E 4.2 E to F _____

h. Wheelbase - ☐ Measured _____ ☒ Computed 43.8
i. Kingpin offset from Axle B (units) -3'10" photo: ☐
j. Overall Length - ☒ Measured 50.0

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 2	STATE CODE: 18 SPS WIM ID: 180600 DATE (mm/dd/yyyy) 8/6/2013
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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	11R24.5	steel spring	☒
B	11R24.5	air	☒
C	11R24.5	air	☒
D	11R24.5	air	☒
E	11R24.5	air	☒
F			☐

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

Steering Axle	Axle B	Axle C	Axle D	Axle E	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: 18 SPS WIM ID: 180600 DATE (mm/dd/yyyy) 8/6/2013
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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		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 # 2	STATE CODE: 18 SPS WIM ID: 180600 DATE (mm/dd/yyyy) 8/6/2013
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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	11720	14890	14890	13770	13770		69040
2	11900	14750	14750	13820	13820		69040
Avg.	11810	14820	14820	13795	13795		69040

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	11680	14790	14790	13850	13850		68960
2	11820	14730	14730	13830	13830		68940
Avg.	11750	14760	14760	13840	13840		68950

Validation Test Truck Run Set - Pre

Measured By: Dean Wolf

Verified By: Aditya R.

Traffic Sheet 21 (Wheel Load) LTPP MONITORED TRAFFIC DATA WIM SYSTEM TRUCK RECORDS										STATE CODE: 18 SPS WIM ID: 180600 DATE: (mm/dd/yyyy): 8/6/2013									
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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
90.7	47	1	1	12:18:24	3643	47.0	12.9	16.9	16.7	18.7	18.1		83.3	13.0	4.3	22.4	4.4		44.1	50.0
90.7	47	2	1	12:20:26	3672	47.0	11.7	14.5	14.1	13.5	12.9		66.7	13.1	4.3	22.5	4.4		44.3	50.0
90.7	54	1	2	12:23:38	3705	54.0	12.7	16.1	16.9	16.8	18.6		81.0	13.1	4.3	22.5	4.4		44.3	50.0
90.7	56	2	2	12:26:05	3737	55.0	11.9	14.6	14.4	13.4	14.4		68.7	13.1	4.3	22.5	4.4		44.3	50.0
88.1	59	1	3	12:30:35	3790	59.0	12.7	16.3	16.9	17.0	17.9		80.8	13.1	4.3	22.6	4.4		44.4	50.0
88.1	60	2	3	12:33:08	3837	60.0	12.0	14.6	14.4	13.8	13.5		68.3	13.1	4.3	22.5	4.4		44.3	50.0
90.0	49	1	4	12:36:35	3882	48.0	12.7	16.6	16.7	17.3	18.4		81.6	13.1	4.3	22.5	4.4		44.3	50.0
90.0	49	2	4	12:38:11	3905	49.0	12.1	14.3	14.0	14.5	12.2		67.3	13.1	4.3	22.5	4.4		44.3	50.0
90.1	54	1	5	12:41:53	3959	54.0	12.6	16.7	16.3	19.7	18.5		83.8	13.1	4.3	22.5	4.4		44.3	50.0
90.1	54	2	5	12:43:51	3982	54.0	12.4	15.0	14.7	14.7	13.1		69.7	13.0	4.4	22.5	4.4		44.3	50.0
90.1	58	1	6	12:47:21	4029	59.0	12.4	16.1	16.7	17.0	17.5		79.7	13.1	4.3	22.5	4.4		44.3	50.0
90.1	59	2	6	12:53:14	4109	60.0	12.0	14.7	14.3	14.2	13.7		68.9	13.1	4.3	22.4	4.4		44.2	50.0
88.0	47	1	7	12:54:27	4132	47.0	12.7	16.4	16.5	18.6	17.9		82.0	13.1	4.3	22.6	4.4		44.4	50.0
88.0	48	2	7	12:58:52	4191	48.0	12.2	14.7	13.8	14.2	13.5		68.4	13.1	4.4	22.5	4.4		44.4	50.0
87.6	54	1	8	13:00:36	4217	54.0	12.6	16.9	16.5	17.5	18.4		81.9	13.1	4.3	22.6	4.4		44.4	50.0
87.6	53	2	8	13:04:38	4265	54.0	12.3	14.5	14.4	14.3	13.2		68.8	13.1	4.3	22.5	4.4		44.3	50.0
88.1	59	1	9	13:07:33	4296	59.0	12.7	16.6	17.0	18.0	19.1		83.3	13.1	4.3	22.4	4.4		44.2	49.0
88.1	58	2	9	13:11:46	4355	59.0	11.6	14.4	14.0	13.9	14.0		67.9	13.1	4.3	22.5	4.4		44.3	49.0
88.4	48	1	10	13:13:17	4371	48.0	12.7	16.9	16.9	18.3	18.1		82.9	13.0	4.3	22.5	4.4		44.2	49.0
88.4	54	2	10	13:17:47	4423	54.0	12.2	15.2	14.8	14.9	14.0		71.0	13.1	4.3	22.5	4.4		44.3	50.0
90.0	53	1	11	13:20:51	4474	53.0	12.8	16.6	16.5	19.6	18.8		84.2	13.0	4.3	22.5	4.4		44.2	50.0
90.0	53	2	11	13:23:55	4506	54.0	12.0	14.3	14.1	14.4	13.1		67.8	13.1	4.3	22.5	4.4		44.3	50.0
90.3	59	1	12	13:29:01	4576	59.0	12.6	16.3	16.7	17.4	18.4		81.4	13.1	4.3	22.6	4.4		44.4	50.0
90.3	59	2	12	13:31:37	4611	59.0	11.7	14.3	14.2	13.6	12.4		66.1	13.1	4.3	22.5	4.4		44.3	49.0

Recorded By: djw

Verified By: ar

Run Set Pre

Traffic Sheet 21 (Wheel Load) LTPP MONITORED TRAFFIC DATA WIM SYSTEM TRUCK RECORDS										STATE CODE: 18 SPS WIM ID: 180600 DATE: (mm/dd/yyyy): 8/6/2013									
---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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
89.0	49	1	13	13:34:33	4654	49.0	12.5	16.6	16.6	17.7	17.7		81.0	13.1	4.3	22.5	4.4		44.3	50.0
89.0	49	2	13	13:37:24	4691	49.0	12.2	14.8	14.4	14.2	14.2		69.8	13.1	4.4	22.5	4.4		44.4	50.0
87.7	52	1	14	13:41:16	4746	53.0	12.9	16.8	16.3	18.3	18.5		82.7	13.1	4.3	22.5	4.4		44.3	50.0
87.7	54	2	14	13:43:23	4785	54.0	12.6	14.7	14.4	14.4	13.3		69.4	13.1	4.3	22.5	4.4		44.3	50.0
86.7	59	2	15	13:52:39	4901	59.0	12.5	14.6	14.2	13.8	12.3		67.3	13.1	4.3	22.5	4.4		44.3	50.0
86.7	49	2	16	13:59:25	4993	49.0	11.8	14.9	14.2	14.4	14.6		69.8	13.1	4.4	22.5	4.4		44.4	50.0
87.9	54	1	15	14:02:33	5040	54.0	12.3	16.7	16.3	17.8	18.1		81.3	13.1	4.3	22.6	4.4		44.4	50.0
87.9	54	2	17	14:06:23	5098	54.0	12.4	14.8	14.3	14.6	14.2		70.2	13.1	4.3	22.5	4.4		44.3	50.0
89.8	59	1	16	14:11:22	5168	59.0	12.6	16.7	16.8	17.4	17.9		81.4	13.0	4.3	22.5	4.4		44.2	50.0
89.8	59	2	18	14:12:53	5187	59.0	11.4	14.5	14.3	13.2	13.5		67.0	13.0	4.3	22.5	4.3		44.1	49.0
90.9	47	1	17	14:17:21	5249	47.0	12.6	16.1	16.3	17.9	18.7		81.5	13.1	4.3	22.5	4.4		44.3	50.0
90.9	48	2	19	14:20:43	5314	48.0	12.0	14.8	14.2	14.0	14.3		69.3	13.1	4.3	22.5	4.4		44.3	50.0
92.6	54	1	18	14:24:47	5380	55.0	12.6	17.4	16.6	18.7	18.3		83.6	13.0	4.4	22.5	4.4		44.3	49.0
92.6	60	2	20	14:27:03	5428	54.0	12.5	14.7	14.1	14.6	14.2		70.1	13.2	4.3	22.4	4.3		44.2	49.0
93.5	59	1	19	14:32:23	5502	59.0	12.5	16.7	16.5	16.8	18.3		80.9	13.1	4.3	22.5	4.4		44.3	50.0
93.5	58	2	21	14:35:00	5531	58.0	12.2	14.7	14.1	14.1	13.9		69.0	13.1	4.3	22.5	4.3		44.2	49.0
95.3	58	1	20	14:46:40	5709	59.0	12.5	16.4	16.3	17.4	17.7		80.2	13.0	4.3	22.4	4.4		44.1	49.0
95.3	59	2	22	14:47:38	5725	59.0	12.1	14.9	14.8	14.3	12.8		69.0	13.1	4.3	22.4	4.4		44.2	50.0
Recorded By: <u> djw </u>																				

Traffic Sheet 22 LTPP MONITORED TRAFFIC DATA SITE EQUIPMENT ASSESSMENT LTPP LANE ONLY	STATE CODE:	18
	SPS WIM ID:	180600
	STATE ASSIGNED ID	N/A
	DATE (mm/dd/yyyy)	8/6/2013

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>iSINC</u>
		SERIAL#	<u>80412304</u>
5. WEIGHING SENSOR TYPE		<u>quartz</u>	
6. SYSTEM SOFTWARE VERSIONS:			
CPU		<u></u>	
LOOP		<u></u>	
PIEZO		<u></u>	
WEIGHTPAD/ 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: 18 SPS WIM ID: 180600 STATE ASSIGNED ID N/A DATE (mm/dd/yyyy) 8/6/2013
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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: 18 SPS WIM ID: 180600 STATE ASSIGNED ID N/A DATE (mm/dd/yyyy) 8/6/2013
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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: 18 SPS WIM ID: 180600 STATE ASSIGNED ID N/A DATE (mm/dd/yyyy) 8/6/2013
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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>61.2</u>	mph
Mean Difference	<u>0.1</u>	mph	SD of mean	<u>0.8</u>	

Posted Speed Limit	<u>60</u>	mph			
Speed Range	15th percentile -	<u>61</u>	mph	85th percentile-	<u>68</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>4.31</u>	ft (WIM system average)
=	<u>1.5</u>	%	

Average front axle weight for Class 9 vehicles		<u> </u>	lbs
% error from 10.3 kips (industry average) OR	OR	<u>12.3</u>	lbs (known site value)
=	<u>19.8</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:	18
	SPS WIM ID:	180600
	STATE ASSIGNED ID	N/A
	DATE (mm/dd/yyyy)	8/6/2013

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 _____ Dean Wolf

Traffic Sheet 22 Addendum - Kistler Quartz LTPP MONITORED TRAFFIC DATA SITE EQUIPMENT ASSESSMENT LTPP LANE ONLY	STATE CODE:	18
	SPS WIM ID:	180600
	STATE ASSIGNED ID	N/A
	DATE (mm/dd/yyyy)	8/6/2013

STATIC EQUIPMENT VALUES (SYSTEM OFF)

1. POWER

a. Solar Panel		WATTS		VDC
b. Equipment Power	119.6	VAC		VDC
c. Battery 1	13.5	VDC		
d. Battery 2		VDC		
e. Regulated		VDC		
f. Power Supply	13.4	VAC		VDC
g. System Input		VAC		VDC
h. Modem Power		VAC		VDC
i. Telephone	52.2	VDC		

2. LOOP SENSORS

	Resistance	Inductance	Shield
a. Leading	0.9 Ω	138.4 μ h	inf M Ω
b. Trailing	1.4 Ω	137.2 μ h	inf M Ω

3. KISTLER SENSORS

	Resistance	Capacitance
a. K1 (lead/left)	10 ¹⁰ Ω	10.3 nF
b. K2 (lead/middle)	10 ¹¹ Ω	11.8 nF
c. K3 (lead mid/right)	10 ¹¹ Ω	12.9 nF
d. K4 (lead/right)	10 ¹¹ Ω	12.1 nF
e. K5 (trail/left)	10 ¹⁰ Ω	11.1 nF
f. K6 (trail/mid left)	10 ¹⁰ Ω	10 nF
g. K7 (trail/mid right)	10 ¹⁰ Ω	5.13 nF
h. K8 (trail/right)	10 ⁹ Ω	4.77 nF

DYNAMIC EQUIPMENT VALUES (SYSTEM ON)

4. LOOP SENSORS

	Frequency
a. Leading	12.9 KHz
b. Trailing	12.9 KHz

5. KISTLER SENSORS

Dynamic testing for the Kistler Quartz sensor is not recommended.

Assessor _____ Dean Wolf

Traffic Sheet 24A LTPP MONITORED TRAFFIC DATA SITE PHOTO LOG - Equipment	STATE CODE: 18 SPS WIM ID: 180600 DATE (mm/dd/yyyy) 8/6/2013
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Item	Description	Filename
1	Power Source	180600_power_service
2	Telephone Source	180600_telephone_pedestal_8_6_13.jpg
3	Cabinet Exterior	180600_cabinet_exterior_8_6_13.jpg
4	Cabinet Interior - Front	180600_cabinet_interior_front_8_6_13.jpg
5	Cabinet Interior - Rear	180600_cabinet_interior_back_8_6_13.jpg
6	Leading weight sensor	180600_leading_WIM_sensor_8_6_13.jpg
7	Trailing weight sensor	180600_trailing_WIM_sensor_8_6_13.jpg
8	Leading classification sensor	
9	Trailing classification sensor	
10	Leading loop sensor	180600_leading_loop_8_6_13.jpg
11	Trailing loop sensor	180600_trailing_loop_8_6_13.jpg
12	Downstream from site	180600_downstream_8_6_13.jpg
13	Upstream from site	180600_upstream_8_6_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: 18 SPS WIM ID: 180600 DATE (mm/dd/yyyy) 8/6/2013
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Item	Description	Filename
1	Tractor, Truck #1	180600_Truck_1_Tractor_8_6_13.jpg
2	Trailer/Load, Truck #1	180600_Truck_1_Trailer_8_6_13.jpg
3	Kingpin Offset, Truck #1	
4	Suspension A, Truck #1	180600_Truck_1_Suspension_1_8_6_13.jpg
5	Suspension B, Truck #1	180600_Truck_1_Suspension_2_8_6_13.jpg
6	Suspension C, Truck #1	180600_Truck_1_Suspension_3_8_6_13.jpg
7	Suspension D, Truck #1	180600_Truck_1_Suspension_4_8_6_13.jpg
8	Suspension E, Truck #1	180600_Truck_1_Suspension_5_8_6_13.jpg
9	Suspension F, Truck #1	
10	Tractor, Truck #2	180600_Truck_2_Tractor_8_6_13.jpg
11	Trailer/Load, Truck #2	180600_Truck_2_Trailer_8_6_13.jpg
12	Kingpin Offset, Truck #2	
13	Suspension A, Truck #2	180600_Truck_2_Suspension_1_8_6_13.jpg
14	Suspension B, Truck #2	180600_Truck_2_Suspension_2_8_6_13.jpg
15	Suspension C, Truck #2	180600_Truck_2_Suspension_3_8_6_13.jpg
16	Suspension D, Truck #2	180600_Truck_2_Suspension_4_8_6_13.jpg
17	Suspension E, Truck #2	180600_Truck_2_Suspension_5_8_6_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		