WIM System Field Calibration and Validation Handout Guide

Colorado, SPS-2
SHRP ID – 080200

Validation Date: July 23, 2013

Table of Contents

1 Site Information

Site ID:	080200	**State:**	Colorado
LTPP Region:	Western	**Configuration:**	Loop-2 Bending Plates-Loop
Controller Type:	iSINC	**Sensor Type:**	Bending Plate
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	Donna Harmelink	FHWA Division	720-963-3021	donna.harmelink@fhwa.dot.gov
RSC	Kevin Senn	Project Manager	775-329-4955	KSenn@nce.reno.nv.us
CO DOT	Roberto E. de Dios	LTPP Coordinator	303-757-9975	roberto.dedios@state.co.us
CO DOT	Leo Livecchi	Traffic Coordinator	303-757-9498	Leo.Livecchi@state.co.us
CO DOT	Larry Haas	Traffic Engineer		larry.haas@dot.state.co.us
CO DOT	Steven Abeyta	Traffic Contact		steven.abeyta@dot.state.co.us
CO DOT	Skip Outcalt	Contact	303-757-9984	Skip.Outcalt@state.co.us
ARA	Dean Wolf	Task Leader	717-512-6638	dwolf@ara.com
ARA	Olga Selezneva	Project Manager	410-540-9949	oselezneva@ara.com

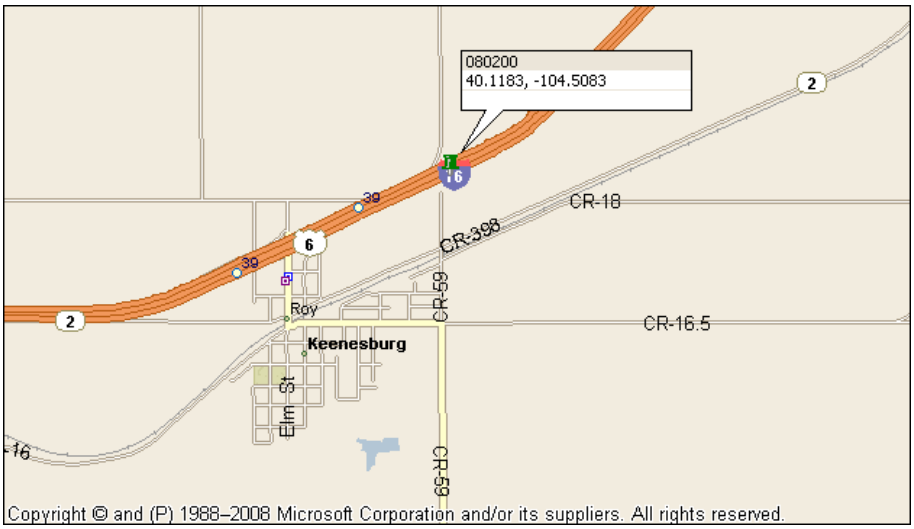
3 Schedule of Events

Date	Event	Location	Start Time
7/22/13	Travel	Denver, CO	TBD
7/23/13	Equipment Assessment	WIM Site	3:30 pm
7/23/13	Test Truck Weigh/Measure/Inspection	CAT Scale	6:30 am
7/23/13	Initial Performance Evaluation	WIM Site	8:30 am
7/23/13	System Test/Class and Speed Study	WIM Site	TBD
7/24/13	Test Truck Weigh (if required)	CAT Scale	7:00 am
7/24/13	Calibration/Validation (if required)	WIM Site	8:00 am
7/25/13	Travel	Camp Hill, PA	TBD

4 Maps

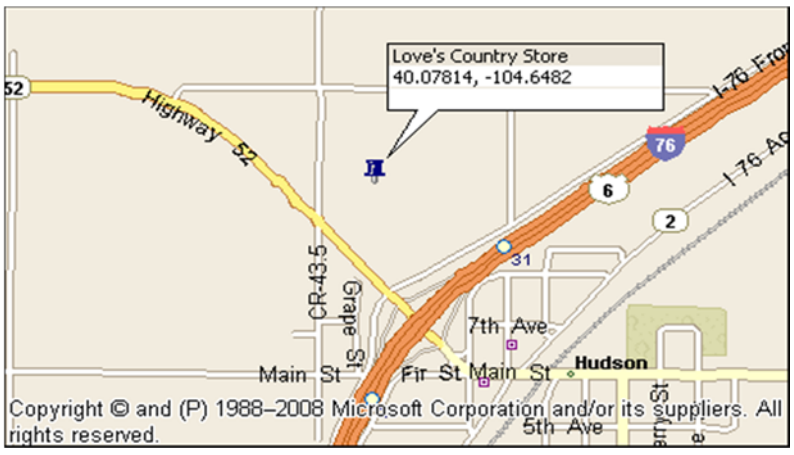
4.1 Site Location

Location:	I-76 East at M.P. 39.7 .75 miles east of Market Street interchange			**Dir:**	EB
Latitude:	40.11830°	**Longitude:**	-104.50830°		



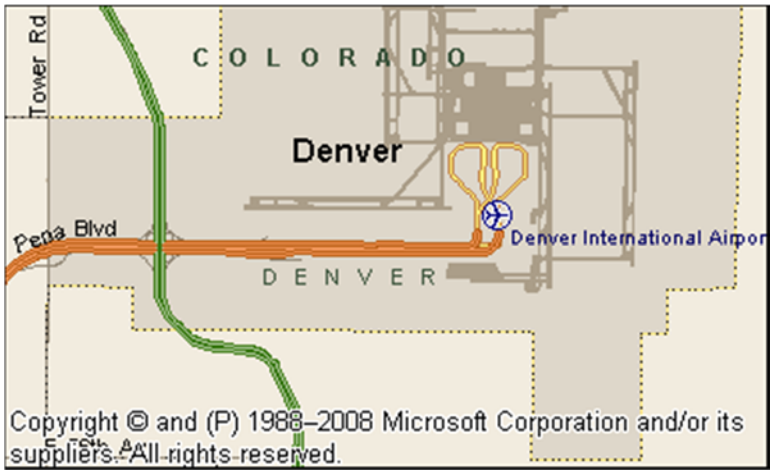
4.2 Truck Scale Location

Name:	Love's Country Store	**Location:**	I-76/CO HWY 52 Exit 31
Latitude:	40.07814	**Longitude:**	-104.64816



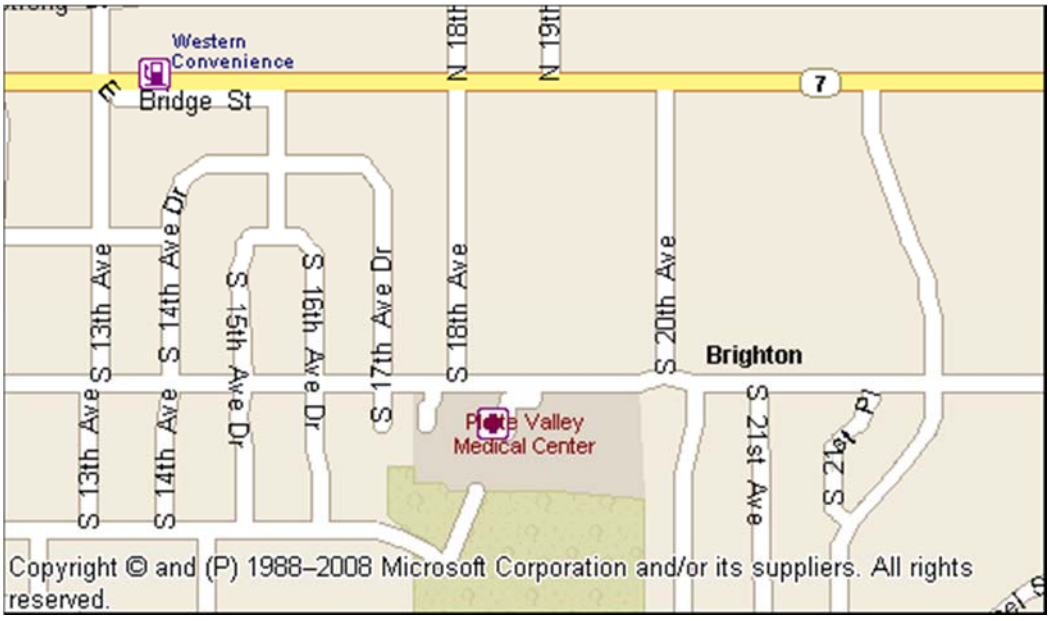
4.3 Airport Location

Name:	Denver International Airport	**Location:**	Pena Blvd, Denver, CO
Latitude:	39.8360°	**Longitude:**	-104.6717°



4.4 Hospital Location

Name:	Platte Valley Med Center		
Phone:	(303) 498-1600	**Location:**	1600 Egbert Street Brighton, CO



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: 08 SPS WIM ID: 080200 DATE (mm/dd/yyyy) 7/23/2013

1. ROUTE: I-76 **MILEPOST:** 39.7 **LTPP DIRECTION:** east

2. WIM SITE DESCRIPTION

Grade: <1% Sag Vertical: N
Nearest Upstream SPS Section: 80223
Distance from sensors to SPS Section: 19.2 miles

3. LANE CONFIGURATION

Lanes in LTPP direction: 2 Median: 3 - grass
Lane width: 12' Shoulder: 3 - paved PCC
Shoulder width: 10'

4. PAVEMENT TYPE PCC

5. PAVEMENT SURFACE CONDITION - Distress Survey

Date: 7/23/13 Photo Filename: 080200_downstream_7_23_13.jpg
Date: 7/23/13 Photo Filename: 080200_trailing_loop_7_23_13.jpg
Date: Photo Filename:

6. SENSOR SEQUENCE

Loop - 2 Bending Plate - 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)* : 1 - Open to Ground
Clearance under plate (in.): 4"
Clearance /access to flush fines from under system: N

Traffic Sheet 17 LTPP MONITORED TRAFFIC DATA WIM SITE INVENTORY	STATE CODE: 08 SPS WIM ID: 080200 DATE (mm/dd/yyyy) 7/23/2013

10. CABINET LOCATION

Same side of road as LTPP lane: Y
Distance from edge of traveled lane: 45 ft
distance from system: 55 ft
type: M

Cabinet access controlled by: Agency and LTPP
Contact name: Roberto E. de Dios Phone # 303-757-9975
Alternate name: Roy Czinku Phone # 306-653-6627

11. POWER

Distance to cabinet from drop: 287 ft
Type: AC
AC in cabinet? Y
Service provider: Phone #

12. TELEPHONE

Distance to cabinet from drop: 288 ft
Type: landline
Service provider: Phone #

13. SYSTEM

Software and version no. MBUS v5.0
Computer connection: RS-232

14. TEST TRUCK TURNAROUND TIME

Duration: 25 minutes Distance: 28 miles

15. PHOTOS

	Filename
Power source:	080200_power_box_7_23_13.jpg
Phone source:	080200_telephone_service_7_23_13.jpg
Cabinet exterior:	080200_cabinet_exterior_7_23_13.jpg
Cabinet interior:	080200_cabinet_interior_front_7_23_13.jpg
Weight sensors:	080200_leading_WIM_sensor_7_23_13.jpg
	080200_trailing_WIM_sensor_7_23_13.jpg
Other sensors:	080200_leading_loop_7_23_13.jpg
	080200_trailing_loop_7_23_13.jpg
Downstream from sensors on LTPP lane:	080200_downstream_7_23_13.jpg
Upstream from sensors on LTPP lane:	080200_upstream_7_23_13.jpg

Traffic Sheet 18 LTPP MONITORED TRAFFIC DATA WIM SITE COORDINATION	STATE CODE: 08 SPS WIM ID: 080200 DATE (mm/dd/yyyy) 7/23/2013

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 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: 08 SPS WIM ID: 080200 DATE (mm/dd/yyyy) 7/23/2013

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-	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: 08 SPS WIM ID: 080200 DATE (mm/dd/yyyy) 7/23/2013

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 Shawn Sweetman Phone # 303-289-2152
Agency Sweetman Enterprises

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: 08 SPS WIM ID: 080200 DATE (mm/dd/yyyy) 7/23/2013

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		9990	9460	Direct
B		16790	16500	Direct
C		16790	16500	Direct
D		16810	16770	Direct
E		16810	16770	Direct
F				

4. **GVW (same units as axles)**
   - a. Empty GVW:
   - b. Average Pre-Test Loaded weight: 77190
   - c. Post Test Loaded Weight: 76000
   - d. Difference Post Test - Pre-Tests: -1190

5. **TRUCK DESCRIPTION**
   - a. Tractor Cab Style: Conventional Sleeper Cab: No
     photo: ☑
   - b. Make: Peterbilt
   - c. Model: 378
   - d. Trailer Load Distribution Description:
     gravel (pipe bedding/squegee)
     photo: ☑
   - e. Tractor Tare weight - -
   - f. Trailer Tare weight - -
   - g. Axle Spacing - (feet and tenths)

A to B 17.8 B to C 4.3 C to D 24.8 D to E 3.9 E to F

   - h. Wheelbase - ☐ Measured ☑ Computed 50.8
   - i. Kingpin offset from Axle B (units) -2'2" photo: ☐
   - j. Overall Length - ☑ Measured 55.5

Traffic Sheet 19	STATE CODE:	08
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	080200
CALIBRATION TEST TRUCK # 1	DATE (mm/dd/yyyy)	7/23/2013

CALIBRATION TEST TRUCK - Primary

6. SUSPENSION

	a. Tire size	b.Suspension description (leaf, air # of leaves, taper or flat leaf, etc.)	c. photo
A	11 R 24.5	steel spring	☑
B	11 R 24.5	air	☑
C	11 R 24.5	air	☑
D	11 R 24.5	air	☑
E	11 R 24.5	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	STATE CODE:	08
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	080200
CALIBRATION TEST TRUCK # 1	DATE (mm/dd/yyyy)	7/23/2013

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	STATE CODE:	08
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	080200
CALIBRATION TEST TRUCK # 1	DATE (mm/dd/yyyy)	7/23/2013

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	10020	16770	16770	16810	16810		77180
2	9960	16810	16810	16810	16810		77200
Avg.	9990	16790	16790	16810	16810		77190

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	9440	16510	16510	16770	16770		76000
2	9480	16490	16490	16770	16770		76000
Avg.	9460	16500	16500	16770	16770		76000

Validation Test Truck Run Set - Pre

Measured By: Greg Helman

Verified By: Dean Wolf

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 2	STATE CODE: 08 SPS WIM ID: 080200 DATE (mm/dd/yyyy) 7/23/2013

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		10110	9780	Direct
B		15385	15085	Direct
C		15385	15085	Direct
D		12170	12250	Direct
E		12170	12250	Direct
F				

4. GVW (same units as axles)

a. Empty GVW:
b. Average Pre-Test Loaded weight: 65220
c. Post Test Loaded Weight: 64450
d. Difference Post Test - Pre-Tests: -770

5. TRUCK DESCRIPTION

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

b. Make: Peterbilt
c. Model: 378

d. Trailer Load Distribution Description:

gravel

photo: ☑

e. Tractor Tare weight - -
f. Trailer Tare weight - -
g. Axle Spacing -

A to B 17.8 B to C 4.3 C to D 24.6 D to E 4.0 E to F

h. Wheelbase - ☐ Measured ☑ Computed 50.7
i. Kingpin offset from Axle B (units) -1'10" photo: ☐
j. Overall Length - ☑ Measured 55.5

Traffic Sheet 19 LTPP MONITORED TRAFFIC DATA CALIBRATION TEST TRUCK # 2	STATE CODE: 08 SPS WIM ID: 080200 DATE (mm/dd/yyyy) 7/23/2013

CALIBRATION TEST TRUCK - Secondary

6. SUSPENSION

	a. Tire size	b.Suspension description (leaf, air # of leaves, taper or flat leaf, etc.)	c. photo
A	11 R 24.5	steel spring	☑
B	11 R 24.5	air	☑
C	11 R 24.5	air	☑
D	11 R 24.5	air	☑
E	11 R 24.5	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	STATE CODE:	08
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	080200
CALIBRATION TEST TRUCK # 2	DATE (mm/dd/yyyy)	7/23/2013

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	STATE CODE:	08
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CALIBRATION TEST TRUCK # 2	DATE (mm/dd/yyyy)	7/23/2013

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	10120	15370	15370	12190	12190		65240
2	10100	15400	15400	12150	12150		65200
Avg.	10110	15385	15385	12170	12170		65220

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	9800	15090	15090	12240	12240		64460
2	9760	15080	15080	12260	12260		64440
Avg.	9780	15085	15085	12250	12250		64450

Validation Test Truck Run Set - Pre

Measured By: Greg Helman

Verified By: Dean Wolf

Traffic Sheet 21 (Wheel Load) LTPP MONITORED TRAFFIC DATA WIM SYSTEM TRUCK RECORDS	STATE CODE: 08 SPS WIM ID: 080200 DATE: (mm/dd/yyyy): 7/23/2013

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	64	1	1	3:20:05	262	64.0	10.0	17.5	17.0	18.2	17.2		79.9	17.7	4.3	24.8	3.9		50.7	56.0
89.0	64	2	1	3:20:10	263	64.0	10.6	16.0	15.3	12.8	12.0		66.7	17.8	4.3	24.8	4.0		50.9	56.0
90.7	72	1	2	3:49:13	423	73.0	10.4	17.2	16.7	17.7	17.3		79.4	17.8	4.3	24.9	4.0		51.0	56.0
90.7	69	2	2	3:49:17	424	68.0	10.4	16.1	15.1	12.4	12.4		66.4	17.8	4.4	24.8	3.9		50.9	56.0
94.6	64	1	3	4:16:20	566	64.0	9.9	16.6	16.9	16.7	16.8		76.9	17.7	4.3	24.8	3.9		50.7	56.0
94.6	64	2	3	4:16:22	567	64.0	10.5	16.6	15.4	12.7	11.9		67.2	17.7	4.3	24.8	3.9		50.7	56.0
97.0	68	1	4	4:43:21	699	68.0	10.2	16.7	16.5	18.0	17.2		78.6	17.7	4.3	24.8	3.9		50.7	56.0
97.0	68	2	4	4:43:23	700	68.0	10.6	15.8	15.6	12.8	12.7		67.5	17.8	4.3	24.7	3.9		50.7	56.0
98.9	72	1	5	5:11:32	853	73.0	9.9	16.6	16.2	17.0	17.4		77.1	17.8	4.3	24.9	3.9		50.9	57.0
98.9	71	2	5	5:11:37	854	73.0	10.0	15.6	14.4	13.5	12.5		65.8	17.7	4.4	24.7	3.9		50.7	56.0
101.2	63	1	6	5:38:28	986	64.0	10.1	17.0	17.1	17.4	17.4		79.1	17.8	4.3	24.9	3.9		50.9	56.0
101.2	65	2	6	5:38:30	987	64.0	10.3	15.6	15.3	12.3	11.9		65.6	17.8	4.3	24.7	3.9		50.7	56.0
103.8	61	1	7	6:05:20	1106	63.0	9.6	16.6	16.6	17.3	16.6		76.8	17.8	4.4	24.8	3.9		50.9	56.0
103.8	61	2	7	6:05:28	1107	69.0	10.3	15.3	14.4	12.3	12.1		64.5	17.8	4.3	24.6	3.9		50.6	56.0
107.4	73	1	8	6:35:26	1241	73.0	9.3	16.7	16.1	17.0	17.3		76.3	17.8	4.3	25.0	3.9		51.0	57.0
107.4	73	2	8	6:35:30	1242	73.0	9.8	15.3	14.2	12.1	12.6		63.9	17.8	4.4	24.7	3.9		50.8	56.0
109.6	64	1	9	7:02:37	1351	64.0	9.7	16.7	16.7	16.4	17.0		76.5	17.7	4.3	24.8	3.9		50.7	56.0
109.6	64	2	9	7:02:39	1352	62.0	10.5	15.4	14.8	12.3	11.6		64.7	17.8	4.4	24.6	3.9		50.7	56.0
111.9	69	1	10	7:30:12	1466	69.0	9.4	16.5	16.3	17.2	17.5		76.9	17.7	4.3	24.7	3.9		50.6	56.0
111.9	69	2	10	7:30:13	1467	68.0	10.2	14.9	14.5	11.9	12.7		64.3	17.8	4.3	24.7	3.9		50.7	56.0
113.1	73	1	11	7:57:02	1605	73.0	9.8	16.7	16.4	16.7	17.4		77.0	17.7	4.3	24.8	3.9		50.7	56.0
113.1	72	2	11	7:57:04	1606	72.0	9.9	16.0	14.9	13.1	12.4		66.4	17.8	4.4	24.7	3.9		50.8	56.0
114.4	64	1	12	8:24:18	1702	64.0	10.2	17.1	16.8	17.4	16.5		78.1	17.7	4.3	24.9	4.0		50.9	57.0
114.4	65	2	12	8:24:22	1703	65.0	10.3	15.6	15.1	11.9	12.2		65.0	17.8	4.3	24.7	3.9		50.7	57.0

Recorded By: gh Verified By: djw Run Set Pre

Traffic Sheet 21 (Wheel Load) LTPP MONITORED TRAFFIC DATA WIM SYSTEM TRUCK RECORDS	STATE CODE: 08 SPS WIM ID: 080200 DATE: (mm/dd/yyyy): 7/23/2013

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
114.1	68	1	13	8:51:52	1811	68.0	9.6	16.6	16.6	17.2	17.3		77.4	17.7	4.3	24.8	3.9		50.7	56.0
114.1	68	2	13	8:51:55	1812	68.0	9.9	15.3	15.0	12.1	12.0		64.2	17.8	4.4	24.7	3.9		50.8	56.0
112.0	73	1	14	9:18:31	1936	73.0	9.8	16.9	16.5	17.6	17.3		78.0	17.8	4.3	24.9	3.9		50.9	56.0
112.0	73	2	14	9:18:33	1937	73.0	9.9	15.0	14.9	12.0	12.0		63.9	17.8	4.3	24.7	3.9		50.7	56.0
113.3	62	1	15	9:37:02	2026	62.0	9.6	16.5	16.6	16.5	16.1		75.2	17.8	4.3	24.9	3.9		50.9	56.0
113.3	66	2	15	9:37:37	2030	66.0	9.9	15.3	15.0	13.2	12.1		65.5	17.8	4.4	24.8	3.9		50.9	56.0
114.0	68	1	16	10:04:01	2136	68.0	9.7	16.9	16.3	17.3	16.4		76.7	17.8	4.3	24.9	4.0		51.0	57.0
114.0	68	2	16	10:04:04	2137	68.0	10.2	15.3	14.7	13.0	12.2		65.4	17.8	4.4	24.8	3.9		50.9	56.0
109.3	64	1	17	10:31:29	2260	64.0	9.5	17.1	17.0	17.7	16.4		77.6	17.7	4.3	24.8	3.9		50.7	56.0
109.3	63	2	17	10:31:31	2261	63.0	9.8	15.6	15.0	12.1	12.3		64.9	17.8	4.4	24.7	3.9		50.8	56.0
105.5	72	1	18	10:57:53	2369	72.0	9.2	16.5	16.0	18.0	16.9		76.6	17.8	4.3	24.8	3.9		50.8	57.0
105.5	73	2	18	10:57:56	2370	73.0	9.9	15.4	15.2	11.6	12.3		64.3	17.8	4.3	24.7	3.9		50.7	57.0
102.7	61	1	19	11:16:35	2454	61.0	9.5	16.7	16.6	16.9	16.8		76.6	17.8	4.3	24.9	3.9		50.9	56.0
102.7	67	2	19	11:16:44	2455	67.0	9.9	15.4	15.0	13.1	11.7		65.1	17.8	4.4	24.8	4.0		51.0	57.0
98.4	68	1	20	11:43:30	2559	68.0	10.0	16.6	16.2	17.4	17.0		77.1	17.8	4.4	24.9	3.9		51.0	56.0
98.4	68	2	20	11:43:34	2560	68.0	9.9	15.7	15.1	13.5	11.4		65.7	17.8	4.4	24.7	4.0		50.9	56.0

Recorded By: gh Verified By: djw Run Set Pre

Traffic Sheet 22 LTPP MONITORED TRAFFIC DATA SITE EQUIPMENT ASSESSSMENT LTPP LANE ONLY	STATE CODE: 08 SPS WIM ID: 080200 STATE ASSIGNED ID 0 DATE (mm/dd/yyy) 7/23/2013

SITE EQUIPMENT INFORMATION

1. TYPE OF EQUIPMENT BOTH

2. LANE NUMBER ON SITE 1 **3. DIRECTION ON SITE** east

4. VENDOR IRD **MODEL** WCU-II **SERIAL#** 51202224

5. WEIGHING SENSOR TYPE bending plate

6. SYSTEM SOFTWARE VERSIONS:

CPU	
LOOP	DIOM
PIEZO	
WEIGHPAD/ LOADCELL	SSM
COMMUNICATIONS	WCU-II

7. CLASSIFICATION VIDEO:

TIME FROM: 3:13:44 TO: 5:57:24
TIME FROM: TO:

SITE CONDITIONS

8. PAVEMENT:

Indicate any deficiencies that may affect the performance of the WIM sytem. 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	STATE CODE:	08
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	080200
SITE EQUIPMENT ASSESSSMENT	STATE ASSIGNED ID	0
LTPP LANE ONLY	DATE (mm/dd/yyy)	7/23/2013

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	STATE CODE:	08
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	080200
SITE EQUIPMENT ASSESSSMENT	STATE ASSIGNED ID	0
LTPP LANE ONLY	DATE (mm/dd/yyy)	7/23/2013

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	STATE CODE:	08
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	080200
SITE EQUIPMENT ASSESSSMENT	STATE ASSIGNED ID	0
LTPP LANE ONLY	DATE (mm/dd/yyy)	7/23/2013

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 67.9 mph Average WIM Speed 68.7 mph
Mean Difference 0.8 mph SD of mean 1.3

Posted Speed Limit 75 mph
Speed Range 15th percentile - 68 mph 85th percentile- 80 mph

Spacing and Weight - Complete Sheet 21 and attach.

Average distance between axles of drive tandem feet
% error from 4.25 ft (industry average) OR 4.33 ft (WIM system average)
= 1.9 %

Average front axle weight for Class 9 vehicles lbs
% error from 10.3 kips (industry average) OR 10.0 lbs (known site value)
= -3.3 %

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 occurance.

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 ASSESSSMENT LTPP LANE ONLY	STATE CODE: 08 SPS WIM ID: 080200 STATE ASSIGNED ID 0 DATE (mm/dd/yyy) 7/23/2013

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 Greg Helman

Traffic Sheet 22 Addendum - Weighpad	STATE CODE:	08
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	080200
SITE EQUIPMENT ASSESSSMENT	STATE ASSIGNED ID	0
LTPP LANE ONLY	DATE (mm/dd/yyy)	7/23/2013

STATIC EQUIPMENT VALUES (SYSTEM OFF)

1. POWER

a. Solar Panel	122.7	WATTS		VDC
b. Equipment Power	13.45	VAC		VDC
c. Battery 1		VDC		
d. Battery 2	13.45	VDC		
e. Regulated	13.53	VDC		
f. Power Supply	123.4	VDC		VDC
g. System Input		VAC	11.77	VDC
h. Modem Power	49.2	VAC		VDC
i. Telephone		VDC		

2. LOOP SENSORS

	Resistance		Inductance		Shield	
a. Leading	0.4	Ω	144.2	µh	inf	MΩ
b. Trailing	0.5	Ω	144.1	µh	inf	MΩ

3. WEIGHPAD SENSORS

	Input		Output		Shield	
a. Leading	979	Ω	846	Ω	inf	Ω
b. Trailing	979	Ω	846	Ω	inf	Ω

DYNAMIC EQUIPMENT VALUES (SYSTEM ON)

4. LOOP SENSORS

	Frequency	
a. Leading	20.5	KHz
b. Trailing	20.6	KHz

5. WEIGHPAD SENSORS

	Zero Point	
a. Leading	0.2	mV
b. Trailing	0.2	mV

Assessor Greg Helman

Traffic Sheet 24A LTPP MONITORED TRAFFIC DATA SITE PHOTO LOG - Equipment	STATE CODE: 08 SPS WIM ID: 080200 DATE (mm/dd/yyy) 7/23/2013

Item	Description	Filename
1	Power Source	080200_power_box_7_23_13.jpg
2	Telephone Source	080200_telephone_service_7_23_13.jpg
3	Cabinet Exterior	080200_cabinet_exterior_7_23_13.jpg
4	Cabinet Interior - Front	080200_cabinet_interior_front_7_23_13.jpg
5	Cabinet Interior - Rear	
6	Leading weight sensor	080200_leading_WIM_sensor_7_23_13.jpg
7	Trailing weight sensor	080200_trailing_WIM_sensor_7_23_13.jpg
8	Leading classification sensor	
9	Trailing classification sensor	
10	Leading loop sensor	080200_leading_loop_7_23_13.jpg
11	Trailing loop sensor	080200_trailing_loop_7_23_13.jpg
12	Downstream from site	080200_downstream_7_23_13.jpg
13	Upstream from site	080200_upstream_7_23_13.jpg
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

Traffic Sheet 24B	STATE CODE:	08
LTPP MONITORED TRAFFIC DATA	SPS WIM ID:	080200
SITE PHOTO LOG - Test Trucks	DATE (mm/dd/yyy)	7/23/2013

Item	Description	Filename
1	Tractor, Truck #1	080200_Truck_1_Tractor_7_23_13.jpg
2	Trailer/Load, Truck #1	080200_Truck_1_Trailer_7_23_13.jpg
3	Kingpin Offset, Truck #1	
4	Suspension A, Truck #1	080200_Truck_1_Suspension_1_7_23_13.jpg
5	Suspension B, Truck #1	080200_Truck_1_Suspension_2_7_23_13.jpg
6	Suspension C, Truck #1	080200_Truck_1_Suspension_3_7_23_13.jpg
7	Suspension D, Truck #1	080200_Truck_1_Suspension_4_7_23_13.jpg
8	Suspension E, Truck #1	080200_Truck_1_Suspension_5_7_23_13.jpg
9	Suspension F, Truck #1	
10	Tractor, Truck #2	080200_Truck_2_Tractor_7_23_13.jpg
11	Trailer/Load, Truck #2	080200_Truck_2_Trailer_7_23_13.jpg
12	Kingpin Offset, Truck #2	
13	Suspension A, Truck #2	080200_Truck_2_Suspension_1_7_23_13.jpg
14	Suspension B, Truck #2	080200_Truck_2_Suspension_2_7_23_13.jpg
15	Suspension C, Truck #2	080200_Truck_2_Suspension_3_7_23_13.jpg
16	Suspension D, Truck #2	080200_Truck_2_Suspension_4_7_23_13.jpg
17	Suspension E, Truck #2	080200_Truck_2_Suspension_5_7_23_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		