



INTERNATIONAL ROAD DYNAMICS INC.

LTPP SPS PHASE II

WEIGH-IN-MOTION DETAILED REPORT

**ILLINOIS SPS6 - LTPP ID 170600
2005-08-22
CLIN 1004A TASK ORDER 2**



CONTRACT NO. DTFH61-05-D-00001



**LONG TERM
pavement
PERFORMANCE**

EXECUTIVE SUMMARY

The Illinois SPS-6 Weigh-in-Motion (WIM) site was installed on July 26th and 27th, 2005. During this time all conduits, pull boxes, cabinet foundation and in road sensors were installed. On August 1st, the WIM controller cabinet was installed, wired and tested. The landline phone service was taken from an abandoned traffic counter system located next to the new WIM cabinet. On August 8th the AC power was trenched in from a service drop approximately 800 ft. south of the WIM cabinet.

Calibration and validation were performed at the Illinois SPS-6 WIM on August 10th and 11th. Two test trucks were used. Each truck made over 20 passes for both calibration and validation at speeds ranging from 50-70 mph.

On August 10th calibration was performed. Four changes were made during calibration to adjust the axle spacing and weight results.

On August 11th we conducted the Performance Evaluation. No adjustments were made to the correction factors. The results demonstrate the WIM system meets the LTPP performance requirements for weight and axle spacing as detailed in the *Data Collection Guide for SPS WIM Sites*.

On August 10th the speed and classification test was performed for a 1 hour period. One hundred and twenty five random vehicles were sampled. The visual observation, radar speed and the WIM equipment output were recorded. The results showed the WIM equipment did not meet the requirements for classification. More than 5% of the observed vehicles were classified incorrectly by the WIM equipment. It was determined that the vehicle algorithm currently installed did not match the FHWA Class Scheme. On August 12th a new class scheme was uploaded remotely to the iSINC (WIM controller) to fix this problem.

We discovered during installation that the pavement transverse profile did not meet smoothness requirements. The pavement profile evaluation procedures failed to detect this flaw. We recommend reviewing the procedures.

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POINTS OF CONTACT FOR CLIN 1004

- Contracting Officer's Technical Representative (COTR)
 - o Debbie Walker – FHWA-LTPP 202-493-3068
- State Highway Agency (SHA)
 - o Tom Winkelman – SHA/IDOT 217-782-2940
 - o Ramon Taylor – SHA/IDOT 217-782-2065
- Phase 2 Contractor Project Manager
 - o Bruce Myers – IRD 717-264-2077
- B.A. Patterson Trucking
 - o Brian Patterson – Calibration Trucks 317-271-8545

SHEET 16 – SITE CALIBRATION SUMMARY

SITE CALIBRATION INFORMATION

1. DATE OF CALIBRATION (MONTH/DAY/YEAR): **2005-08-11**

2. TYPE OF EQUIPMENT CALIBRATED:

- ☒ WIM
☐ CLASSIFIER
☐ BOTH

3. REASON FOR CALIBRATION

- ☐ REGULARLY SCHEDULED SITE VISIT
☐ RESEARCH
☐ EQUIPMENT REPLACEMENT
☐ TRAINING
☐ DATA TRIGGERED SYSTEM REVISION
☒ NEW EQUIPMENT INSTALLATION
☐ OTHER (SPECIFY) _____

4. SENSORS INSTALLED IN LTPP LANE AT THIS SITE (CHECK ALL THAT APPLY):

- ☐ BARE ROUND PIEZO CERAMIC
☐ BARE FLAT PIEZO
☒ BENDING PLATES
☐ CHANNELIZED ROUND PIEZO
☐ LOAD CELLS
☐ QUARTZ PIEZO
☐ CHANNELIZED FLAT PIEZO
☒ INDUCTANCE LOOPS
☐ CAPACITANCE PADS
☐ OTHER (SPECIFY) _____

5. EQUIPMENT MANUFACTURER: **International Road Dynamics Inc.**

WIM SYSTEM CALIBRATION SPECIFICS

6. CALIBRATION TECHNIQUE USED:

- ☐ TRAFFIC STREAM:
NUMBER OF TRUCKS _____

- ☐ STATIC SCALE

- ☒ TEST TRUCKS:

NUMBER OF TEST TRUCKS **2**

PASSES PER TRUCK **20**

TRUCK#	TYPE	SUSPENSION
--------	------	------------

1	<u>9</u>	<u>1 & 2</u>
---	----------	------------------

2	<u>9</u>	<u>1 & 2</u>
---	----------	------------------

3	<u>X</u>	<u>X</u>
---	----------	----------

4	<u>X</u>	<u>X</u>
---	----------	----------

5	<u>X</u>	<u>X</u>
---	----------	----------

TYPE PER FHWA 13 BIN SYSTEM

SUSPENSION TYPES:

1 – AIR

2 – LEAF SPRING

3 – OTHER

7. SUMMARY CALIBRATION RESULTS (EXPRESSED AS A PERCENT)

GVW MEAN DIFFERENCE	<u>2.0%</u>	STANDARD DEVIATION	<u>2.3%</u>
SINGLE AXLE MEAN DIFFERENCE	<u>-0.1%</u>	STANDARD DEVIATION	<u>5.4%</u>
DOUBLE AXLES MEAN DIFFERENCE	<u>2.5%</u>	STANDARD DEVIATION	<u>3.6%</u>

8. NUMBER OF SPEEDS AT WHICH CALIBRATION WAS PERFORMED: 5

9. DEFINE THE SPEED RANGES USED (MPH): 48-52, 53-57, 58-62, 63-67, 68-72

10. CALIBRATION FACTOR (AT EXPECTED FREE FLOW SPEED) See following sheets

11. IS AUTO-CALIBRATION USED AT THIS SITE? ☐

IF USED, LIST AND DEFINE AUTO-CALIBRATION VALUE _____

CLASSIFIER TEST SPECIFICS

12. METHOD FOR COLLECTING INDEPENDENT VOLUME MEASUREMENT BY VEHICLE CLASS:

☐ VIDEO
☒ MANUAL
☐ PARALLEL CLASSIFIERS

13. METHOD TO DETERMINE LENGTH OF COUNT:

TIME 1 hour
NUMBER OF VEHICLES 125
NUMBER OF TRUCKS 66

14. MEAN DIFFERENCE IN VOLUMES BY VEHICLES CLASSIFICATION:

FHWA CLASS 2	<u>7%</u>
FHWA CLASS 3	<u>8%</u>
FHWA CLASS 4&5	<u>15%</u>
FHWA CLASS 8	<u>33%</u>
FHWA CLASS 9	<u>0%</u>
FHWA CLASS 12	<u>100%</u>
"UNCLASSIFIED" VEHICLES:	<u>0%</u>

15. PICTURES: _____

16. NOTES:

PERSON LEADING CALIBRATION EFFORT: <u>Bruce Myers</u>
CONTACT INFORMATION: <u>717-264-2077</u>

FINAL SITE CALIBRATION FACTORS LTPP ILLINOIS 170600, I-57 MP 225.6

Time of Change : 2005-08-10 15:10	
Site Parameters Site Parameters Lane 1 Upstream Loop Loop State Enabled Module ID 9 Channel ID 0 Polarity Active Low Width (cm) 183 Downstream Loop Loop State Enabled Module ID 9 Channel ID 1 Polarity Active Low Width (cm) 183 Distance (cm) 720 Axle Sensors Axle 1 Axle State Enabled Module ID 5 Channel ID 0 Polarity Active High Type Bending Plate Distance (cm) 270 Axle 2 Axle State Enabled Module ID 5 Channel ID 1 Polarity Active High Type Bending Plate Distance (cm) 580	Calibration Lane 1 Axle Sensor 1 Threshold 40 WIM Calib Factors Speed Bin 1 Max Speed 80 kph (50 mph) Calibration Factor 3710 Speed Bin 2 Max Speed 88 kph (55 mph) Calibration Factor 3740 Speed Bin 3 Max Speed 96 kph (60 mph) Calibration Factor 3745 Speed Bin 4 Max Speed 104 kph (65 mph) Calibration Factor 3711 Speed Bin 5 Max Speed 112 kph (70 mph) Calibration Factor 3641 Axle Sensor 2 Threshold 40 WIM Calib Factors Speed Bin 1 Max Speed 80 kph (50 mph) Calibration Factor 3710 Speed Bin 2 Max Speed 88 kph (55 mph) Calibration Factor 3740 Speed Bin 3 Max Speed 96 kph (60 mph) Calibration Factor 3745 Speed Bin 4 Max Speed 104 kph (65 mph) Calibration Factor 3711 Speed Bin 5 Max Speed 112 kph (70 mph) Calibration Factor 3641

CHANGE #3 CALIBRATION FACTORS LTPP ILLINOIS 170600, I-57 MP 225.6

Time of Change : 2005-08-10 14:45	
Site Parameters Site Parameters Lane 1 Upstream Loop Loop State Enabled Module ID 9 Channel ID 0 Polarity Active Low Width (cm) 183 Downstream Loop Loop State Enabled Module ID 9 Channel ID 1 Polarity Active Low Width (cm) 183 Distance (cm) 720 Axle Sensors Axle 1 Axle State Enabled Module ID 5 Channel ID 0 Polarity Active High Type Bending Plate Distance (cm) 270 Axle 2 Axle State Enabled Module ID 5 Channel ID 1 Polarity Active High Type Bending Plate Distance (cm) 580	Calibration Lane 1 Axle Sensor 1 Threshold 40 WIM Calib Factors Speed Bin 1 Max Speed 80 kph (50 mph) Calibration Factor 3710 Speed Bin 2 Max Speed 88 kph (55 mph) Calibration Factor 3780 Speed Bin 3 Max Speed 96 kph (60 mph) Calibration Factor 3745 Speed Bin 4 Max Speed 104 kph (65 mph) Calibration Factor 3711 Speed Bin 5 Max Speed 112 kph (70 mph) Calibration Factor 3641 Axle Sensor 2 Threshold 40 WIM Calib Factors Speed Bin 1 Max Speed 80 kph (50 mph) Calibration Factor 3710 Speed Bin 2 Max Speed 88 kph (55 mph) Calibration Factor 3780 Speed Bin 3 Max Speed 96 kph (60 mph) Calibration Factor 3745 Speed Bin 4 Max Speed 104 kph (65 mph) Calibration Factor 3711 Speed Bin 5 Max Speed 112 kph (70 mph) Calibration Factor 3641

CHANGE #2 CALIBRATION FACTORS LTPP ILLINOIS 170600, I-57 MP 225.6

Time of Change : 2005-08-10 10:45	
Site Parameters Site Parameters Lane 1 Upstream Loop Loop State Enabled Module ID 9 Channel ID 0 Polarity Active Low Width (cm) 183 Downstream Loop Loop State Enabled Module ID 9 Channel ID 1 Polarity Active Low Width (cm) 183 Distance (cm) 720 Axle Sensors Axle 1 Axle State Enabled Module ID 5 Channel ID 0 Polarity Active High Type Bending Plate Distance (cm) 270 Axle 2 Axle State Enabled Module ID 5 Channel ID 1 Polarity Active High Type Bending Plate Distance (cm) 580	Calibration Lane 1 Axle Sensor 1 Threshold 40 WIM Calib Factors Speed Bin 1 Max Speed 80 kph (50 mph) Calibration Factor 3675 Speed Bin 2 Max Speed 88 kph (55 mph) Calibration Factor 3710 Speed Bin 3 Max Speed 96 kph (60 mph) Calibration Factor 3745 Speed Bin 4 Max Speed 104 kph (65 mph) Calibration Factor 3675 Speed Bin 5 Max Speed 112 kph (70 mph) Calibration Factor 3605 Axle Sensor 2 Threshold 40 WIM Calib Factors Speed Bin 1 Max Speed 80 kph (50 mph) Calibration Factor 3675 Speed Bin 2 Max Speed 88 kph (55 mph) Calibration Factor 3710 Speed Bin 3 Max Speed 96 kph (60 mph) Calibration Factor 3745 Speed Bin 4 Max Speed 104 kph (65 mph) Calibration Factor 3675 Speed Bin 5 Max Speed 112 kph (70 mph) Calibration Factor 3605

CHANGE #1 CALIBRATION FACTORS LTPP ILLINOIS 170600, I-57 MP 225.6

Time of Change : 2005-08-10 07:55	
Site Parameters Site Parameters Lane 1 Upstream Loop Loop State Enabled Module ID 9 Channel ID 0 Polarity Active Low Width (cm) 183 Downstream Loop Loop State Enabled Module ID 9 Channel ID 1 Polarity Active Low Width (cm) 183 Distance (cm) 720 Axle Sensors Axle 1 Axle State Enabled Module ID 5 Channel ID 0 Polarity Active High Type Bending Plate Distance (cm) 270 Axle 2 Axle State Enabled Module ID 5 Channel ID 1 Polarity Active High Type Bending Plate Distance (cm) 580	Calibration Lane 1 Axle Sensor 1 Threshold 40 WIM Calib Factors Speed Bin 1 Max Speed 80 kph (50 mph) Calibration Factor 3500 Speed Bin 2 Max Speed 88 kph (55 mph) Calibration Factor 3500 Speed Bin 3 Max Speed 96 kph (60 mph) Calibration Factor 3500 Speed Bin 4 Max Speed 104 kph (65 mph) Calibration Factor 3500 Speed Bin 5 Max Speed 112 kph (70 mph) Calibration Factor 3500 Axle Sensor 2 Threshold 40 WIM Calib Factors Speed Bin 1 Max Speed 80 kph (50 mph) Calibration Factor 3500 Speed Bin 2 Max Speed 88 kph (55 mph) Calibration Factor 3500 Speed Bin 3 Max Speed 96 kph (60 mph) Calibration Factor 3500 Speed Bin 4 Max Speed 104 kph (65 mph) Calibration Factor 3500 Speed Bin 5 Max Speed 112 kph (70 mph) Calibration Factor 3500

INITIAL CALIBRATION FACTORS LTPP ILLINOIS 170600, I-57 MP 225.6

Time of Change : 2005-08-10 07:00	
Site Parameters Site Parameters Lane 1 Upstream Loop Loop State Enabled Module ID 9 Channel ID 0 Polarity Active Low Width (cm) 183 Downstream Loop Loop State Enabled Module ID 9 Channel ID 1 Polarity Active Low Width (cm) 183 Distance (cm) 720 Axle Sensors Axle 1 Axle State Enabled Module ID 5 Channel ID 0 Polarity Active High Type Bending Plate Distance (cm) 270 Axle 2 Axle State Enabled Module ID 5 Channel ID 1 Polarity Active High Type Bending Plate Distance (cm) 570	Calibration Lane 1 Axle Sensor 1 Threshold 40 WIM Calib Factors Speed Bin 1 Max Speed 80 kph (50 mph) Calibration Factor 3710 Speed Bin 2 Max Speed 88 kph (55 mph) Calibration Factor 3740 Speed Bin 3 Max Speed 96 kph (60 mph) Calibration Factor 3745 Speed Bin 4 Max Speed 104 kph (65 mph) Calibration Factor 3711 Speed Bin 5 Max Speed 112 kph (70 mph) Calibration Factor 3641 Axle Sensor 2 Threshold 40 WIM Calib Factors Speed Bin 1 Max Speed 80 kph (50 mph) Calibration Factor 3710 Speed Bin 2 Max Speed 88 kph (55 mph) Calibration Factor 3740 Speed Bin 3 Max Speed 96 kph (60 mph) Calibration Factor 3745 Speed Bin 4 Max Speed 104 kph (65 mph) Calibration Factor 3711 Speed Bin 5 Max Speed 112 kph (70 mph) Calibration Factor 3641

SHEET 17 – WIM SITE INVENTORY

1. ROUTE I-57 MILEPOST: 225.6 LTPP DIRECTION: N S E W

2. SITE DESCRIPTION

GRADE: <1%

☐ Sag vertical

Nearest SPS section upstream of the site: 0664

Distance from sensor to nearest upstream SPS Section: 8020 ft.

3. LANE CONFIGURATION

Number of lanes in LTPP direction: 2

Lane width: 12 ft.

☐ Median painted

☐ Median physical barrier

☒ Median grass

☐ Median none

Shoulder width: 10 ft.

☐ Shoulder curb and gutter

☐ Shoulder paved AC

☒ Shoulder paved PCC

☐ Shoulder unpaved

4. PAVEMENT TYPE: 12 inch jointed PCC

5. CONDITION: (Surface distresses by type / severity within WIM section)

6. SENSOR SEQUENCE: Loop, Bending Plate/Bending Plate, Loop

7. PAVEMENT REPLACEMENT AND/OR GRINDING:

Straightedge check: Performed _____ Result: ☐ Pass / ☐ Marginal / ☐ Unsatisfactory

Short wave check: Performed _____ Result: ☐ Pass / ☐ Marginal / ☐ Unsatisfactory

Long wave check: Performed _____ Result: ☐ Pass / ☐ Marginal / ☐ Unsatisfactory

8. ANY EFFECTS FROM RAMPS OR LANE TRANSITIONS:

☐ Intersection/driveway within 300m upstream, distance: _____

☐ Intersection/driveway within 300m downstream, distance: _____

☐ Is shoulder routinely used for turns / passing

9. DRAINAGE:

☐ Open to ground

☐ Pipe to culvert or ditch

☐ None

☒ French drain

Clearance under plates: 3 inches

Clearance/access to flush fines from under system: Unbolt retaining rails and lift bending plate

10. CABINET LOCATION:

- ☒ Same side of road as LTPP lane
☐ Median
☐ Behind barrier

Distance from edge of travel lane to cabinet: 50 ft

Distance from sensors: 0 ft

Type: 336

Access controlled by: ☐ LTPP / ☒ State / ☐ Joint

Primary contact: Tom Winkleman 217-782-2940

Alternate contact: Ray Taylor 217-782-2065

11. POWER:

Power type: ☐ Overhead / ☒ Underground / ☐ Solar

Distance from cabinet to drop: 800 ft

Service provider: _____

12. TELEPHONE:

Telephone type: ☐ Overhead / ☒ Underground / ☐ Cell

Distance from cabinet to drop: 10 ft

Service provider: _____

13. SYSTEM:

Software: iSINC

Version: _____

Connection: ☒ RS232 / ☐ Parallel port / ☐ USB / ☐ Other

14. TEST TRUCK CYCLE:

Turnaround time: 20 minutes

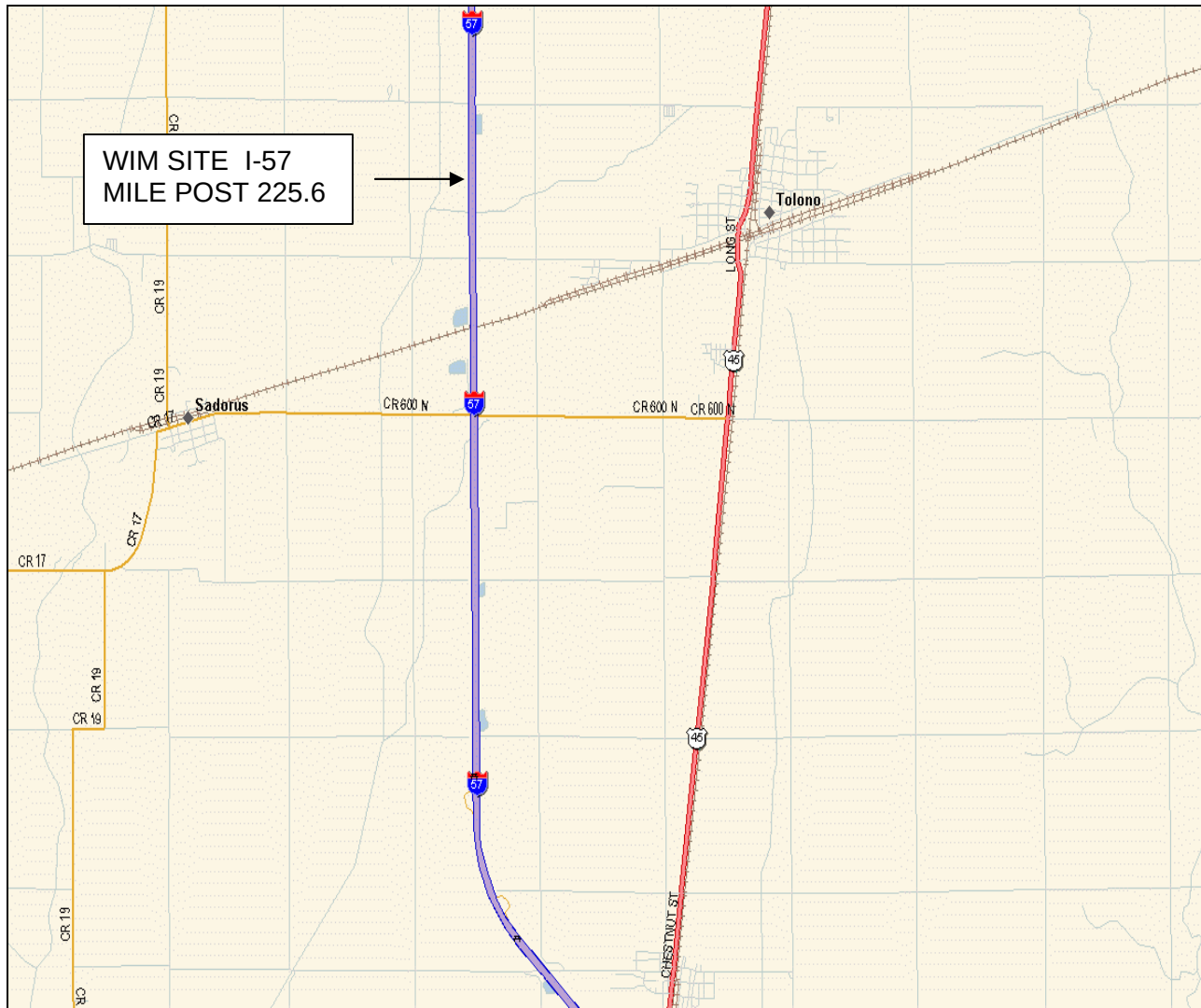
Turnaround distance: 17 miles

15. PICTURES: See following pages, Map, Cabinet views 1 to 3, Site layout drawing

16. NOTES:

COMPLETED BY: Bruce Myers CONTACT INFORMATION: 717-264-2077
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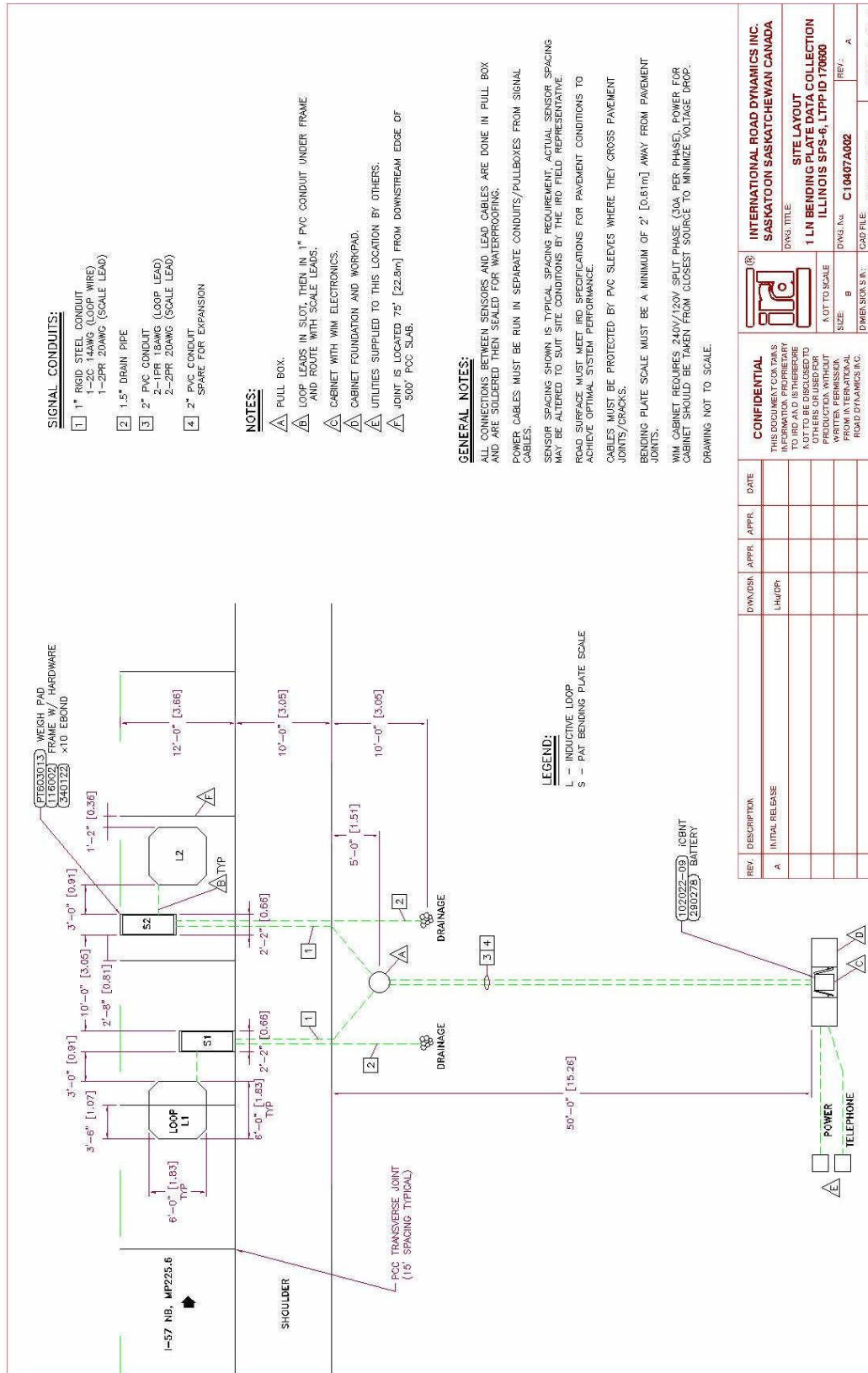
MAP



PICTURES, CABINET



DIAGRAM, SITE LAYOUT



SHEET 19 – SPS WIM VALIDATION – TEST TRUCK INFORMATION

DATE OF CALIBRATION: 2005-08-10

1. TEST TRUCK NUMBER: 1 2. FHWA CLASS: 9 3. Number of axles: 5

Axle	Empty Truck Axle Weights (lb)	4. Pre-Test Loaded Axle Weights (lb)	5. Post-Test Loaded Axle Weights (lb)	6. Measured Directly or Calculated
A		9740	9566	D
B		32580	32146	D (B&C combined)
C				
D		36480	36580	D (D&E combined)
E				

7. CALCULATIONS:

Empty Truck Gross Weight (lb)	Pre-Test Loaded Gross Weight (lb)	Post-Test Loaded Gross Weight (lb)	Pre to Post Difference (lb)
	78800	78293	507

8. TRACTOR CAB STYLE: ☐ Cab over engine / ☒ Conventional ☐ With sleeper

9. TRACTOR MANUFACTURER:

Make: Kenworth

Model: T-800

10. TRAILER LOAD DESCRIPTION: Concrete barriers strapped to flatbed trailer, barriers placed longitudinally on trailer

11. TRAILER TARE WEIGHT (lb): _____

12. AXLE SPACINGS

Axle	Spacing (feet & inches)
A-B	12' 1"
B-C	4' 4"
C-D	30' 8"
D-E	10' 2"

KINGPIN OFFSET FROM AXLE B (ft, + towards rear): +2 ft

SUSPENSION:

Axle	17. Tire Size	18. Suspension description (leaf, air, # of leaves, taper or flat leaf, etc.)
A	295 75R225	Leaf spring – two leaves
B	295 75R225	air
C	295 75R225	air
D	295 75R225	air
E	295 75R225	air

COMPLETED BY: Bruce Myers

CONTACT INFORMATION: 717-264-2077

INSTALLATION, CALIBRATION, MAINTENANCE, AND REPAIR OF WEIGH-IN-MOTION (WIM) SYSTEMS AT LTPP SITES

CONTRACT No. DTFH61-05-D-0001

INTERNATIONAL ROAD DYNAMICS INC.

PICTURES, TEST TRUCK 1



Sheet 19 – SPS WIM Validation – Test Truck Information

DATE OF CALIBRATION: 2005-08-10

1. TEST TRUCK NUMBER: 2 2. FHWA CLASS: 9 3. Number of axles: 5

Axle	Empty Truck Axle Weights (lb)	4. Pre-Test Loaded Axle Weights (lb)	5. Post-Test Loaded Axle Weights (lb)	6. Measured Directly or Calculated
A		11793	11446	D
B		32020	29860	D (B&C combined)
C				
D		21880	21893	D (D&E combined)
E				

7. CALCULATIONS:

Empty Truck Gross Weight (lb)	Pre-Test Loaded Gross Weight (lb)	Post-Test Loaded Gross Weight (lb)	Pre to Post Difference (lb)
	63693	63200	493

8. TRACTOR CAB STYLE: ☐ Cab over engine / ☒ Conventional ☒ With sleeper

9. TRACTOR MANUFACTURER:

Make: Freightliner

Model: FLD120

10. TRAILER LOAD DESCRIPTION: Concrete barriers strapped to flatbed trailer, barriers placed longitudinally on trailer

11. TRAILER TARE WEIGHT (lb): _____

12. AXLE SPACINGS

Axle	Spacing (feet & inches)
A-B	17' 4"
B-C	4' 3"
C-D	36' 0"
D-E	4' 0"

KINGPIN OFFSET FROM AXLE B (ft, + towards rear): +2 ft

SUSPENSION:

Axle	17. Tire Size	18. Suspension description (leaf, air, # of leaves, taper or flat leaf, etc.)
A	295 75R225	Leaf spring – two leaves
B	295 75R225	air
C	295 75R225	air
D	295 75R225	air
E	295 75R225	air

COMPLETED BY: Bruce Myers

CONTACT INFORMATION: 717-264-2077

INSTALLATION, CALIBRATION, MAINTENANCE, AND REPAIR OF WEIGH-IN-MOTION (WIM) SYSTEMS AT LTPP SITES

CONTRACT No. DTFH61-05-D-0001

INTERNATIONAL ROAD DYNAMICS INC.

PICTURES, TEST TRUCK 2



Sheet 19 – SPS WIM Validation – Test Truck Information

DATE OF CALIBRATION: 2005-08-11

1. TEST TRUCK NUMBER: 1 2. FHWA CLASS: 9 3. Number of axles: 5

Axle	Empty Truck Axle Weights (lb)	4. Pre-Test Loaded Axle Weights (lb)	5. Post-Test Loaded Axle Weights (lb)	6. Measured Directly or Calculated
A		9920	9640	D
B		32606	32326	D (B&C combined)
C				
D		36493	36486	D (D&E combined)
E				

7. CALCULATIONS:

Empty Truck Gross Weight (lb)	Pre-Test Loaded Gross Weight (lb)	Post-Test Loaded Gross Weight (lb)	Pre to Post Difference (lb)
	79020	78453	567

8. TRACTOR CAB STYLE: ☐ Cab over engine / ☒ Conventional ☐ With sleeper

9. TRACTOR MANUFACTURER:

Make: Kenworth

Model: T-800

10. TRAILER LOAD DESCRIPTION: Concrete barriers strapped to flatbed trailer, barriers placed longitudinally on trailer

11. TRAILER TARE WEIGHT (lb): _____

12. AXLE SPACINGS

Axle	Spacing (feet & inches)
A-B	12' 1"
B-C	4' 4"
C-D	30' 8"
D-E	10' 2"

KINGPIN OFFSET FROM AXLE B (ft, + towards rear): +2 ft

SUSPENSION:

Axle	17. Tire Size	18. Suspension description (leaf, air, # of leaves, taper or flat leaf, etc.)
A	295 75R225	Leaf spring – two leaves
B	295 75R225	air
C	295 75R225	air
D	295 75R225	air
E	295 75R225	air

COMPLETED BY: Bruce Myers

CONTACT INFORMATION: 717-264-2077

INSTALLATION, CALIBRATION, MAINTENANCE, AND REPAIR OF WEIGH-IN-MOTION (WIM) SYSTEMS AT LTPP SITES

CONTRACT No. DTFH61-05-D-0001

INTERNATIONAL ROAD DYNAMICS INC.

Sheet 19 – SPS WIM Validation – Test Truck InformationDATE OF CALIBRATION: **2005-08-11**

1. TEST TRUCK NUMBER:
- 2
2. FHWA CLASS:
- 9
3. Number of axles:
- 5

Axle	Empty Truck Axle Weights (lb)	4. Pre-Test Loaded Axle Weights (lb)	5. Post-Test Loaded Axle Weights (lb)	6. Measured Directly or Calculated
A		11933	11686	D
B		30206	29946	D (B&C combined)
C				
D		21860	21873	D (D&E combined)
E				

7. CALCULATIONS:

Empty Truck Gross Weight (lb)	Pre-Test Loaded Gross Weight (lb)	Post-Test Loaded Gross Weight (lb)	Pre to Post Difference (lb)
	64000	63506	494

8. TRACTOR CAB STYLE:
- ☐
- Cab over engine /
- ☒
- Conventional
- ☒
- With sleeper

9. TRACTOR MANUFACTURER:

Make: FreightlinerModel: FLD120

10. TRAILER LOAD DESCRIPTION:
- Concrete barriers strapped to flatbed trailer, barriers placed longitudinally on trailer

11. TRAILER TARE WEIGHT (lb): _____

12. AXLE SPACINGS

Axle	Spacing (feet & inches)
A-B	17' 4"
B-C	4' 3"
C-D	36' 0"
D-E	4' 0"

KINGPIN OFFSET FROM AXLE B (ft, + towards rear): +2 ft

SUSPENSION:

Axle	17. Tire Size	18. Suspension description (leaf, air, # of leaves, taper or flat leaf, etc.)
A	295 75R225	Leaf spring – two leaves
B	295 75R225	air
C	295 75R225	air
D	295 75R225	air
E	295 75R225	air

COMPLETED BY: **Bruce Myers**CONTACT INFORMATION: **717-264-2077**

SHEET 20 – LTPP SPEED AND CLASSIFICATION CHECKS

Sheet 20					* STATE_CODE				
LTPP Traffic Data					*SPS PROJECT_ID				
Speed and Classification Checks * 1 of 50					* DATE				
Rev. 08/31/2001									
WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class	WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class
65	2	10701	65	2	63	3	1840	61	3
65	9	10702	65	9	74	3	10842	74	3
70	3	10715	70	3	63	9	10848	64	9
67	9	10721	65	9	72	3	10850	71	3
62	9	10726	63	9	68	2	10852	68	2
70	2	10728	67	2	61	2	10854	61	2
68	3	10729	68	3	64	9	10856	64	9
60	9	10734	61	9	75	3	10858	73	3
67	9	10743	68	9	65	4	10862	65	5 or 4
67	3	10747	66	3	62	9	10871	63	9
62	9	10751	62	9	71	3	10873	71	3
64	9	10755	64	9	62	9	10876	62	9
62	9	10757	60	9	59	5	10881	58	5
67	2	10759	65	2	56	5	10885	55	8
64	10	10763	65	12	68	2	10890	68	2
62	9	10796	61	9	62	5	10892	58	5
64	2	10803	65	2	77	5	10908	75	5
74	2	10805	74	2	65	9	10913	63	9
61	5	10807	63	5	66	1	10945	67	1
72	2	10810	70	2	55	9	10950	56	9
69	3	10818	66	3	64	9	10953	63	9
58	5	10823	58	5	57	7	10954	58	9
70	2	10827	69	2	60	9	10959	60	9
65	9	10829	65	9	62	5	10964	64	5
70	2	10832	70	2	54	9	10968	53	9

Recorded by Bruce Myers Direction NB Lane 1 Time from 3:45pm to 4:45pm
Tim Weber

OK Scale

Sheet 20					* STATE_CODE <u>12</u>				
LTPP Traffic Data					*SPS PROJECT_ID <u>170600</u>				
Speed and Classification Checks * <u>51</u> of <u>100</u>					* DATE <u>8/10/2005</u>				
Rev. 08/31/2001									
WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class	WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class
61	3	10969	61	3	62	9	11088	62	9
60	9	10976	66	9	63	5	11095	66	5
65	11	10980	63	10	68	9	11099	68	9
59	5	10994	59	5	74	3	11101	73	3
66	3	11000	65	3	66	3	11104	67	3
58	9	11005	58	9	65	10	11105	61	10
57	9	11007	57	9	64	9	11110	62	9
56	4	11016	55	4.5	70	2	11113	69	2
68	2	11017	66	2	70	2	11116	68	2
65	4	11020	64	4	62	4	11122	61	4
62	9	11026	62	9	64	9	11125	65	9
59	5	11033	60	5	59	9	11128	57	9
73	3	11035	72	3	72	2	11130	72	2
71	2	11038	68	2	60	9	11135	59	9
71	3	11039	73	2	59	8	11137	58	8
64	9	11047	64	9	74	3	11139	73	3
59	9	11049	58	9	59	9	11141	59	9
80	3	11052	79	3	68	2	11142	69	2
59	10	11061	58	10	68	2	11145	67	2
68	2	11066	68	2	62	9	11147	61	9
68	3	11068	67	3	57	9	11148	59	9
61	9	11072	60	9	62	9	11149	64	9
68	3	11078	66	3	62	8	11159	63	8
68	5	11081	66	3	71	2	11164	70	2
60	9	11083	59	9	66	3	11169	67	3

Recorded by BRUCE MYERS Direction NB Lane 1 Time from 3:45 to 4:45pm
TIM WEBER

Sheet 20					* STATE_CODE <u>17</u>				
LTPP Traffic Data					*SPS PROJECT_ID <u>170600</u>				
Speed and Classification Checks *100 of* <u>125</u>					* DATE <u>8/10/2005</u>				
Rev. 08/31/2001									
WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class	WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class
70	2	11174	68	2					
66	9	11177	69	9					
59	9	11183	57	9					
62	9	11187	61	9					
65	10	11226	66	12					
63	10	11236	64	12					
66	2	11242	71	2					
64	9	11249	63	9					
69	3	11251	73	2					
59	9	11255	58	9					
59	9	11258	59	9					
65	9	11263	65	9					
68	2	11264	67	2					
58	2	11266	56	2					
61	9	11268	61	9					
68	5	11270	67	3					
63	2	11274	59	2					
62	9	11277	62	9					
65	3	11278	64	3					
64	3	11282	61	3					
70	2	11287	69	2					
72	3	11293	68	3					
64	5	11295	63	4 or 5					
56	5	11299	56	5					
59	9	11300	57	9					

Recorded by Bruce Myers Direction NR Lane 1 Time from 3:45 to 4:45
Tim Weber

SHEET 21 – WIM SYSTEM TEST TRUCK RECORDS

Date	Pvmt Temp	Radar Speed	Truck#	Time	WIM Veh#	WIM Speed	Steer	WIM Weights		Gross	WIM Spacings			
								Tandem1	Tandem2		A-B	B-C	C-D	D-E
2005/08/10	80	54	1	7:46	7123	52	8.8	30.5	33.4	72.6	11.7	4.2	29.8	9.8
2005/08/10	83	60	1	8:07	7282	61	8.0	29.1	33.5	71.6	12.1	4.4	30.9	10.1
2005/08/10	82	53	1	8:27	7424	52	8.8	29.6	34.0	72.4	12.0	4.4	30.7	10.1
2005/08/10	82	55	1	8:47										
2005/08/10	79	65	1	9:07	7689	66	9.2	31.4	36.1	76.6	12.1	4.4	30.8	10.1
2005/08/10	89	65	1	9:27	7825	64	9.5	31.7	36.0	77.2	12.1	4.4	30.8	10.1
2005/08/10	87	58	1	9:47	7925	57	7.9	32.2	35.2	75.4	12.1	4.3	30.7	10.1
2005/08/10	85	63	1	10:07	7998	63	9.3	28.4	35.7	73.2	12.1	4.4	30.8	10.1
2005/08/10	88	61	1	10:33	8189	61	9.4	31.6	33.2	74.3	12.0	4.4	30.6	10.1
2005/08/10	96	67	1	10:57	8364	66	9.3	31.6	34.6	75.7	12.0	4.4	30.7	10.1
2005/08/10	94	53	1	11:21	8554	55	8.4	31.5	34.9	74.7	12.1	4.3	30.7	10.1
2005/08/10	108	59	1	11:42	8727	60	9.5	34.2	35.1	78.8	12.1	4.4	30.7	10.1
2005/08/10	108	65	1	12:57	9345	66	9.2	31.3	36.4	76.9	12.0	4.5	30.9	10.1
2005/08/10	108	53	1	13:17	9497	57	9.4	32.8	35.8	78.0	12.1	4.4	30.8	10.1
2005/08/10	98	63	1	13:38	9651	64	9.3	33.7	36.8	79.8	12.1	4.3	30.8	10.2
2005/08/10	98	55	1	13:59	9803	57	10.1	31.5	35.9	77.4	12.1	4.4	30.8	10.2
2005/08/10	96	59	1	14:19	9997	61	9.5	32.7	37.1	79.4	12.0	4.4	30.7	10.1
2005/08/10	99	65	1	14:39	10157	65	9.7	32.5	33.4	75.6	12.1	4.4	30.9	10.1
2005/08/10	99	55	1	14:59	10359	57	9.9	34.9	35.8	80.5	12.1	4.4	30.6	10.1
2005/08/10	102	65	1	15:20	10538	65	9.7	33.3	32.6	75.6	12.1	4.4	30.9	10.2
2005/08/10	80	54	2	7:46	7124	52	10.3	27.8	20.5	58.6	17.0	4.2	35.1	3.9
2005/08/10	83	60	2	8:07	7283	60	11.8	27.3	19.2	58.2	17.5	4.2	36.3	4.2
2005/08/10	82	53	2	8:27	7425	54	10.4	28.3	21.6	60.3	17.5	4.3	36.6	4.2
2005/08/10	82	55	2	8:47	7559	55	10.5	28.7	22.5	31.6	17.5	4.2	36.1	4.1
2005/08/10	79	65	2	9:07	7690	66	11.4	28.3	20.6	60.3	17.6	4.3	36.3	4.1
2005/08/10	89	65	2	9:27	7826	66	8.5	29.0	22.0	59.5	17.8	4.3	36.5	4.2
2005/08/10	87	58	2	9:47	7926	57	9.8	30.3	20.0	60.1	17.7	4.3	36.2	4.1
2005/08/10	85	63	2	10:07	7999	63	11.3	26.1	21.0	58.6	17.5	4.3	36.3	4.1
2005/08/10	88	61	2	10:33	8190	63	11.1	29.6	21.0	61.7	17.6	4.3	36.4	4.1
2005/08/10	96	67	2	10:57	8365	66	11.8	29.5	22.2	63.4	17.7	4.3	36.5	4.1
2005/08/10	94	53	2	11:21	8555	55	10.8	28.2	22.1	61.2	17.5	4.3	36.2	4.0
2005/08/10	108	59	2	11:42	8728	60	11.6	28.4	24.1	64.0	17.6	4.3	36.4	4.1
2005/08/10	108	65	2	12:57	9346	66	10.9	28.3	21.9	61.0	17.6	4.2	35.9	4.1
2005/08/10	108	53	2	13:17	9498	55	10.6	29.2	20.2	60.0	17.5	4.3	36.4	4.1
2005/08/10	98	63	2	13:38	9652	62	11.8	28.4	21.8	62.0	17.5	4.3	36.4	4.1
2005/08/10	98	55	2	13:59	9804	55	10.5	30.4	23.2	64.1	17.4	4.2	36.2	4.1
2005/08/10	96	59	2	14:19	9998	60	9.6	26.2	22.0	57.9	17.5	4.3	36.2	4.1
2005/08/10	99	65	2	14:39	10158	65	11.5	30.4	22.5	64.5	17.7	4.3	36.3	4.1
2005/08/10	99	55	2	14:59	10360	56	10.5	32.0	24.8	67.3	17.6	4.3	36.3	4.1
2005/08/10	102	65	2	15:20	10539	67	11.8	29.7	23.4	64.8	17.6	4.3	36.3	4.1

Date	Pvmt Temp	Radar Speed	Truck#	Time	WIM Veh#	WIM Speed	Steer	WIM Weights		Gross	WIM Spacings			
								Tandem1	Tandem2		A-B	B-C	C-D	D-E
2005/08/11	80	56	1	7:58	15717	55	10.3	32.1	36.1	78.5	12.1	4.4	30.7	10.1
2005/08/11	81	62	1	8:16	15853	63	10.3	33.8	38.0	82.2	12.1	4.4	30.8	10.1
2005/08/11	82	66	1	8:38	16013	67	9.7	32.0	37.5	79.2	12.1	4.4	30.8	10.2
2005/08/11	82	57	1	8:57	16165	57	10.2	31.8	37.3	79.2	12.1	4.4	30.8	10.1
2005/08/11	83	60	1	9:17	16312	60	9.9	34.2	38.1	82.1	12.1	4.4	30.8	10.2
2005/08/11	88	65	1	9:36	16458	66	9.8	30.7	35.9	76.4	12.1	4.4	30.8	10.1
2005/08/11	85	57	1	10:02	16665	57	10.1	32.0	36.4	78.5	12.1	4.3	30.8	10.1
2005/08/11	92	60	1	10:22	16809	60	10.2	32.5	37.9	80.6	12.1	4.4	30.8	10.1
2005/08/11	93	65	1	10:41	16964	65	9.6	31.8	37.1	78.6	12.1	4.4	30.8	10.1
2005/08/11	98	59	1	11:01	17121	60	10.2	34.1	37.4	81.7	12.1	4.4	30.8	10.1
2005/08/11	103	59	1	11:23	17299	62	10.1	33.4	37.6	81.1	12.1	4.4	30.9	10.1
2005/08/11	103	66	1	11:42	17468	67	9.8	32.4	37.7	79.9	12.1	4.4	30.8	10.1
2005/08/11	102	56	1	12:50	18033	56	10.3	33.0	37.2	80.5	12.1	4.3	30.8	10.1
2005/08/11	105	61	1	13:11	18202	62	10.0	33.9	37.7	81.6	12.1	4.4	30.9	10.1
2005/08/11	106	67	1	13:30	18384	68	9.8	32.4	37.0	79.1	12.1	4.4	30.8	10.1
2005/08/11	108	55	1	13:51	18578	55	10.1	31.8	37.2	79.1	12.1	4.4	30.6	10.1
2005/08/11	107	60	1	14:10	18750	61	10.2	32.1	38.2	81.2	12.1	4.4	30.7	10.1
2005/08/11	112	66	1	14:50	19093	66	9.8	33.6	37.2	80.5	12.1	4.4	30.8	10.1
2005/08/11	112	56	1	15:10	19255	57	10.1	31.0	36.8	78.0	12.1	4.4	30.7	10.1
2005/08/11	106	61	1	15:29	19443	62	10.1	34.4	37.5	82.0	12.0	4.4	30.8	10.1
2005/08/11	80	56	2	7:58	15718	55	11.0	29.4	23.2	63.6	17.6	4.3	36.3	4.1
2005/08/11	81	62	2	8:16	15867	62	12.5	31.6	23.0	67.1	17.6	4.3	36.4	4.1
2005/08/11	82	66	2	8:38	16014	65	12.4	30.5	22.1	65.9	17.6	4.3	36.5	4.1
2005/08/11	82	57	2	8:57	16166	56	10.8	31.8	21.7	66.2	17.6	4.3	36.3	4.1
2005/08/11	83	60	2	9:17	16313	61	12.9	31.6	24.0	68.4	17.6	4.3	36.4	4.1
2005/08/11	88	65	2	9:36	16459	65	12.7	30.6	22.3	65.5	17.6	4.3	36.4	4.1
2005/08/11	85	57	2	10:02	16666	56	11.0	31.4	23.4	65.9	17.6	4.3	36.3	4.1
2005/08/11	92	60	2	10:22	16810	58	10.7	31.5	24.5	66.7	17.6	4.3	36.3	4.1
2005/08/11	93	65	2	10:41	16965	66	11.8	30.0	22.2	64.0	17.6	4.3	36.3	4.1
2005/08/11	98	59	2	11:01	17122	57	11.3	30.4	23.0	64.7	17.6	4.2	36.3	4.1
2005/08/11	103	59	2	11:23	17300	62	12.3	31.1	24.1	67.6	17.6	4.3	36.5	4.1
2005/08/11	103	66	2	11:42	17469	65	12.5	30.5	22.4	65.4	17.6	4.3	36.4	4.1
2005/08/11	102	56	2	12:50	18034	56	10.6	31.7	23.0	65.3	17.5	4.3	36.3	4.1
2005/08/11	105	61	2	13:11	18203	62	12.3	31.3	23.8	67.3	17.6	4.3	36.3	4.1
2005/08/11	106	67	2	13:30	18385	65	12.7	30.4	22.3	65.4	17.6	4.3	36.4	4.1
2005/08/11	108	55	2	13:51	18579	55	11.2	29.2	22.6	63.0	17.6	4.3	36.3	4.1
2005/08/11	107	60	2	14:11	18751	61	12.4	30.9	24.7	68.1	17.6	4.3	36.4	4.1
2005/08/11	110	52	2	14:30	18924	54	10.6	30.0	23.8	64.4	17.5	4.3	36.3	4.1
2005/08/11	112	66	2	14:50	19094	66	12.1	30.1	22.7	64.9	17.6	4.3	36.4	4.1
2005/08/11	112	56	2	15:10	19256	57	10.5	31.5	23.9	66.0	17.5	4.3	36.3	4.1

PERFORMANCE EVALUATION

International Road Dynamics Inc.

FHWA VERIFICATION

Specifications

Confidence	95%	Speed range low	50	to	57
	(1.96)	Speed range medium	57	to	62
Gross vehicle weight	10%	Speed range high	62	to	70
Tandem group weight	15%	Temperature range low	80	to	90
Single axle weight	20%	Temperature range medium	90	to	100
Axle spacings	0.5	Temperature range high	100	to	120

Overall

Characteristic	Error	StdDev	Specification	Calculated	Pass/Fail
Gross vehicle weight	2.0%	2.3%	10%	6.5%	pass
Tandem group weight	2.5%	3.6%	15%	9.4%	pass
Single axle weight	-0.1%	5.4%	20%	10.7%	pass
Axle spacings	0.1	0.1	0.5	0.3	pass

Speed range 50 to 57 (14 runs)

Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	0.8%	1.7%	10%	4.2%
Tandem group weight	1.8%	3.8%	15%	9.2%
Single axle weight	-3.7%	6.2%	20%	9.3%
Axle spacings	0.1	0.1	0.5	0.3

Speed range 57 to 62 (13 runs)

Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	4.2%	1.5%	10%	7.2%
Tandem group weight	4.8%	3.3%	15%	11.4%
Single axle weight	2.2%	4.2%	20%	10.7%
Axle spacings	0.1	0.1	0.5	0.4

Speed range 62 to 70 (13 runs)

Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	1.1%	1.9%	10%	4.9%
Tandem group weight	0.9%	2.2%	15%	5.3%
Single axle weight	1.4%	3.5%	20%	8.4%
Axle spacings	0.1	0.1	0.5	0.4

Temperature range 80 to 90 (14 runs)

Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	1.9%	2.8%	10%	7.5%
Tandem group weight	1.9%	3.5%	15%	9.0%
Single axle weight	0.7%	5.6%	20%	12.0%

Temperature range 90 to 100 (6 runs)

Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	1.7%	1.9%	10%	5.5%
Tandem group weight	2.7%	3.7%	15%	10.1%
Single axle weight	-2.2%	5.0%	20%	12.4%

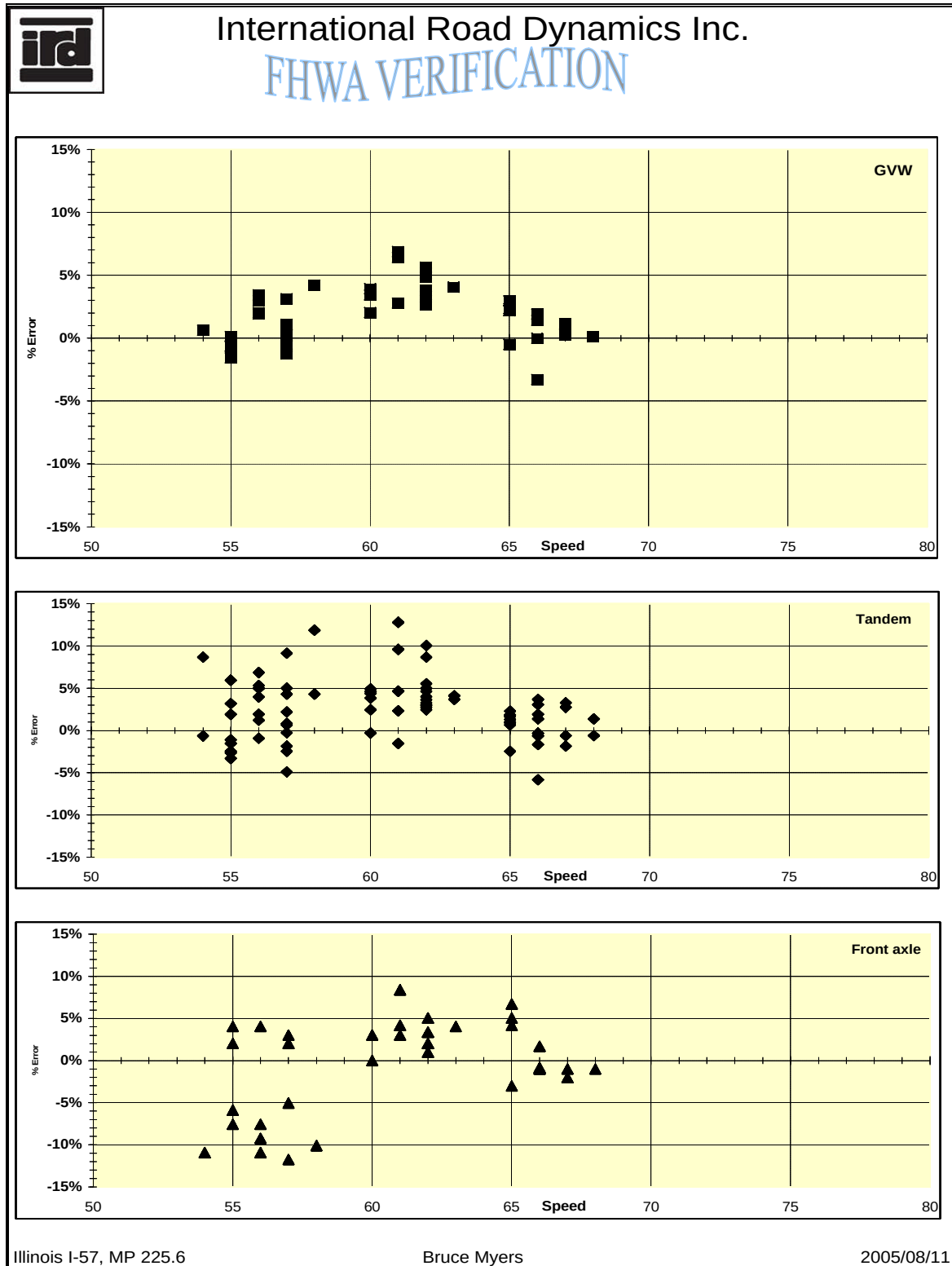
Temperature range 100 to 120 (20 runs)

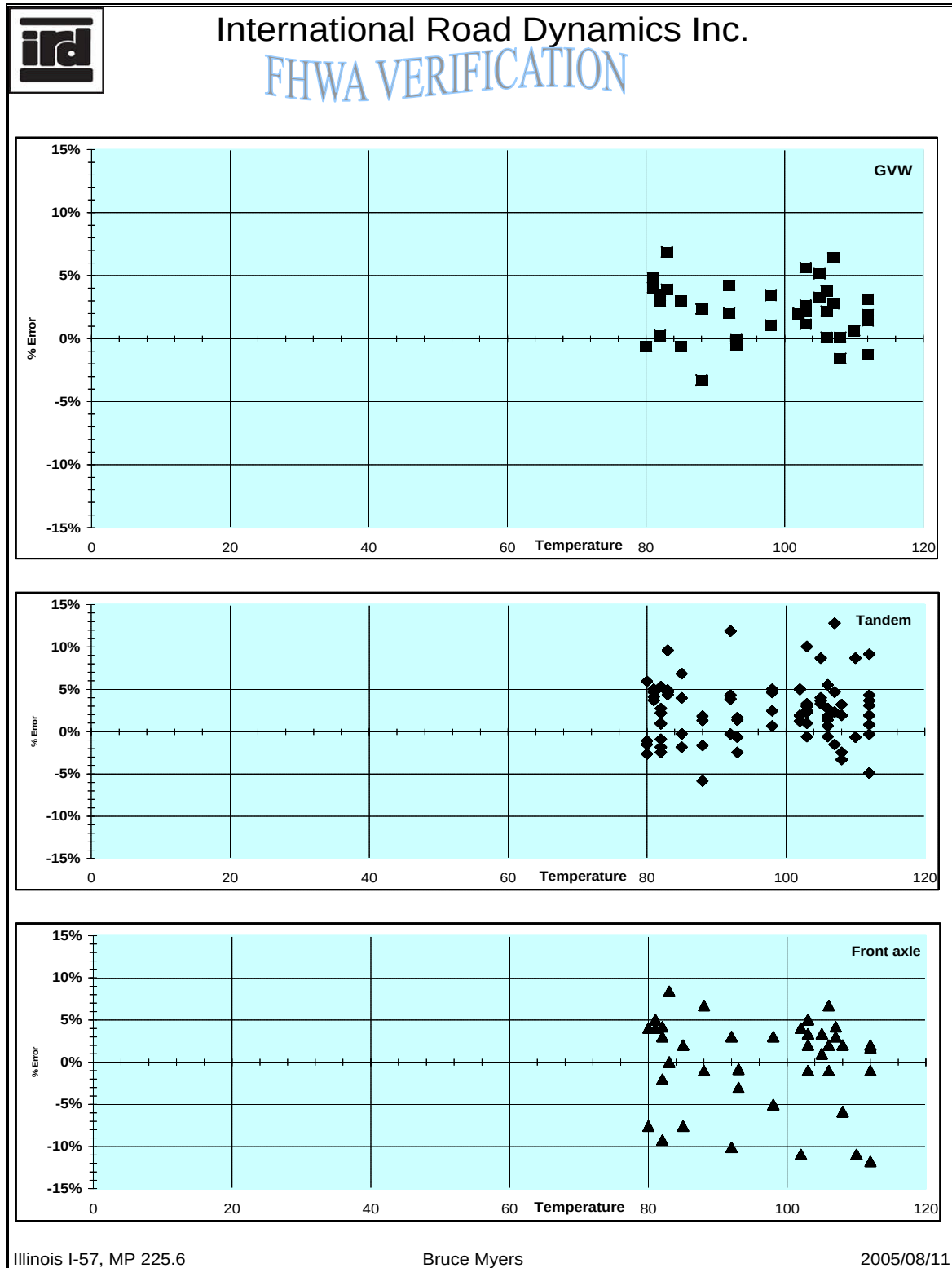
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	2.2%	2.1%	10%	6.4%
Tandem group weight	2.8%	3.6%	15%	10.0%
Single axle weight	-0.1%	5.5%	20%	11.2%

Illinois I-57, MP 225.6

Bruce Myers

2005/08/11





ELECTRICAL READINGS

		International Road Dynamics Inc. Site Service Sheet		Clear	
Bending Plate		System Type: <u>iSINC</u>			
Date: <u>2005/08/10</u>		State: <u>IL</u>		Location: <u>I-57 Mile Post 225.6</u>	
Job #: <u>10407A</u>		Site #: _____		Directions: <u>South of Champaign</u>	

	Lane - 1	Lane -	Lane -	Lane -
Loops				
Resistance	0.8	0.8		
Leakage	inf.	inf.		
Shield	inf.	inf.		
Frequency	Med	High		

	Lane - 1	Lane -	Lane -	Lane -
Weighpads				
Supply	9780	9780		
Signal	8400	8400		
Shield	inf.	inf.		
Zero Pt	0.01 mV	0.01 mV		
Serial #	175-3465	175-3462		

	Lane -	Lane -	Lane -	Lane -
Piezos				
Amplitude				
Capacitance				
Resistance				

	Temp Sensor
System	
A/C Service	120 VAC
Power Supply	13.4 VDC
Solar Panel	N/A
Back-Up	13.4 VDC
System Input	N/A
Modem Power	13.4 VDC
Phone off	10 VDC
Phone on	52 VDC

Technician: <u>Bruce Myers</u>	Date: <u>2005/08/09</u>
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