INTERNATIONAL ROAD DYNAMICS INC.

LTPP WIM DATA COLLECTION SYSTEMS

INSTALLATION AND CALIBRATION FOR MAINE SPS-5 LTPP ID 230500

AUGUST 7, 2007

CLIN 2004C TASK ORDER # 15

CONTRACT NO. DTFH61-05-D-00001

U.S. Department of Transportation
Federal Highway Administration

LONG TERM Pavement PERFORMANCE

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

This report details the installation and calibration of the Maine SPS-5 Weigh-in-Motion (WIM) system. The site is located approximately 20 miles north of Bangor on I-95, mile post 200.1. The WIM site is instrumented with IRD's iSINC (Intelligent Sensor Interface Network Controller) WIM Electronics and Kistler Quartz Sensors. The LTPP lane is in the north bound driving lane it's instrumented with two inductive loops and 8 Kistler Quartz sensors. The WIM system uses a CDMA modem for communication. Power is provided by two 80 watt Solar Panels charging two 12 volt, 64 amp hr. batteries. The WIM Controller cabinet is located on the north bound shoulder.

The WIM equipment installation began on May 22, 2007 and was completed on May 23, 2007. 2007. The WIM system was commissioned and calibrated on July 23, & July 24 respectively.

The calibration 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*.

2.0 POINT OF CONTACTS

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Bruce Myers (Project Manager)
International Road Dynamics (Phase 2 Contractor)
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Fox & Gammon (Calibration Trucks)
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3.0 SHEET 16 – SITE CALIBRATION SUMMARY

SITE CALIBRATION INFORMATION

1. DATE OF CALIBRATION (MONTH/DAY/YEAR): **July 24, 2007**

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 **21**

TRUCK#	TYPE	SUSPENSION
1	**9**	**1 & 2**
2	**9**	**1 & 2**
3	**X**	**X**
4	**X**	**X**
5	**X**	**X**

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	**0.0 %**	STANDARD DEVIATION	**2.2%**
SINGLE AXLE MEAN DIFFERENCE	**-0.5%**	STANDARD DEVIATION	**5%**
DOUBLE AXLES MEAN DIFFERENCE	**0.1%**	STANDARD DEVIATION	**2.7%**

8. NUMBER OF SPEEDS AT WHICH CALIBRATION WAS PERFORMED: **3**

9. DEFINE THE SPEED RANGES USED (MPH): **45 - 55, 55 – 65, 65 - 70**

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
    - NUMBER OF VEHICLES
    - NUMBER OF TRUCKS

14. MEAN DIFFERENCE IN VOLUMES BY VEHICLES CLASSIFICATION:

FHWA CLASS 2	100**%**
FHWA CLASS 3	100**%**
FHWA CLASS 4&5	100**%**
FHWA CLASS 8	100**%**
FHWA CLASS 9	100**%**
FHWA CLASS 12	**%**
"UNCLASSIFIED" VEHICLES:	**%**

15. PICTURES: _____

16. NOTES:
    _____

PERSON LEADING CALIBRATION EFFORT: **Steven Schroader**
CONTACT INFORMATION: **724-822-7826**

3.1.1 iSINC SITE CALIBRATION FACTORS - JULY 24, 2007

Select Lane		1					
Select Axle Sensor		1					
Threshold		16					
WIM Calib Factors >		Select Speed Bin	1	2	3	4	5
		Max Speed (kph)	80	88	96	105	112
		Calib Factor	3053	2991	3084	3053	3053

Select Lane		1					
Select Axle Sensor		2					
Threshold		16					
WIM Calib Factors >		Select Speed Bin	1	2	3	4	5
		Max Speed (kph)	80	88	96	105	112
		Calib Factor	3053	2991	3084	3053	3053

Select Lane		1					
Select Axle Sensor		3					
Threshold		16					
WIM Calib Factors >		Select Speed Bin	1	2	3	4	5
		Max Speed (kph)	80	88	96	105	112
		Calib Factor	3053	2991	3084	3053	3053

Select Lane		1					
Select Axle Sensor		4					
Threshold		16					
WIM Calib Factors >		Select Speed Bin	1	2	3	4	5
		Max Speed (kph)	80	88	96	105	112
		Calib Factor	3053	2991	3084	3053	3053

3.1.2 iSINC SITE PARAMETERS - JULY 24, 2007

Lane Name			1
Lane State			ENABLED
Upstream Loop >		Loop State	ENABLED
		Module UID	9
		Channel Num	0
		Polarity Active	LOW
		Width (cm)	183
Downstream Loop >		Loop State	ENABLED
		Module UID	9
		Channel Num	1
		Polarity Active	LOW
		Width (cm)	183
		Distance(cm)	671
Axle Sensors >		Select Axle	1
		Axle State	ENABLED
		Module UID	5
		Channel Num	0
		Polarity Active	HIGH
		Type	KISTLER_DUAL
		Distance(cm)	274
		Temp State	ENABLED
		Temp Module UID	5
		Temp Channel Num	0
Axle Sensors >		Select Axle	2
		Axle State	ENABLED
		Module UID	5
		Channel Num	1
		Polarity Active	HIGH
		Type	KISTLER_DUAL
		Distance(cm)	274
		Temp State	ENABLED
		Temp Module UID	5
		Temp Channel Num	0
Axle Sensors >		Select Axle	3
		Axle State	ENABLED
		Module UID	5
		Channel Num	2
		Polarity Active	HIGH
		Type	KISTLER_DUAL
		Distance(cm)	579
		Temp State	ENABLED
		Temp Module UID	5
		Temp Channel Num	0
Axle Sensors >		Select Axle	4
		Axle State	ENABLED
		Module UID	5
		Channel Num	3
		Polarity Active	HIGH
		Type	KISTLER_DUAL
		Distance(cm)	579
		Temp State	ENABLED
		Temp Module UID	5
		Temp Channel Num	0

Processing >	MaxTimeout(ms)		3000
	Dynamic Comp(%)		105
	Sig Wt Diff(%)		40
	Min Axle Wt(kg)		1360
	Veh Rec Mode		Split
	Axl Sep(cm)		305
DIOM Debounce Times	Loop On (ticks)	40	
	Loop Off (ticks)	40	
	OvrHgt On (ticks)	40	
	OvrHght Off (ticks)	0	
	Axle On (ticks)	40	
	Axle Off (ticks)	40	
Axle Snsor Debounce >	Type	KISTLER_DUAL	PIEZO
	On (ticks)	8	8
	Off (ticks)	40	40

4.0 WIM SITE INVENTORY

1. ROUTE I-95 MILEPOST: 200.1 LTPP DIRECTION: **N** S E W

2. SITE DESCRIPTION
   GRADE: <1%
   ☐ Sag vertical
   Nearest SPS section downstream of the site: 230500
   Distance from sensor to nearest upstream SPS Section:

3. LANE CONFIGURATION
   Number of lanes in LTPP direction: 2 lanes
   Lane width: 12 ft.
   ☐ Median painted
   ☐ Median physical barrier
   ☒ Median grass
   ☐ Median none
   ☐ Shoulder curb and gutter
   ☒ Shoulder paved AC
   ☐ Shoulder paved PCC
   ☐ Shoulder unpaved
   Shoulder width: 10 ft.

4. PAVEMENT TYPE: AC

5. CONDITION: (Surface distresses by type / severity within WIM section)
   Some distress visible but areas have been patched

6. SENSOR SEQUENCE: Loop - Kistler - Kistler - 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: _____
   ☐ LTPP lane used for passing by vehicles traveling in south bound lane

9. DRAINAGE:
   ☐ Open to ground
   ☐ Pipe to culvert or ditch
   ☒ None
   ☐ French drain

10. CABINET LOCATION:
    - ☒ Same side of road as LTPP lane
    - ☐ Median
    - ☐ Behind guard rail

    Distance from edge of travel lane to cabinet: 70 ft
    Distance from sensors: 80 ft
    Type: 336
    Access controlled by: ☐ LTPP / ☒ State / ☐ Joint
    Primary contact: Tim Soucie (207) 624-3264
    Alternate contact:

11. POWER:
    Power type: ☐ Overhead / ☐ Underground / ☒ Solar
    Distance from cabinet to drop: 5 ft
    Service provider: N/A.

12. TELEPHONE:
    Telephone type: ☐ Overhead / ☐ Underground / ☒ Cell
    Distance from cabinet to drop: N/A
    Phone # : mainesps5wim.eairlink.com

13. SYSTEM:
    Software: iSINC
    Version:
    Connection: ☒ RS232 / ☐ Parallel port / ☐ USB / ☐ Other

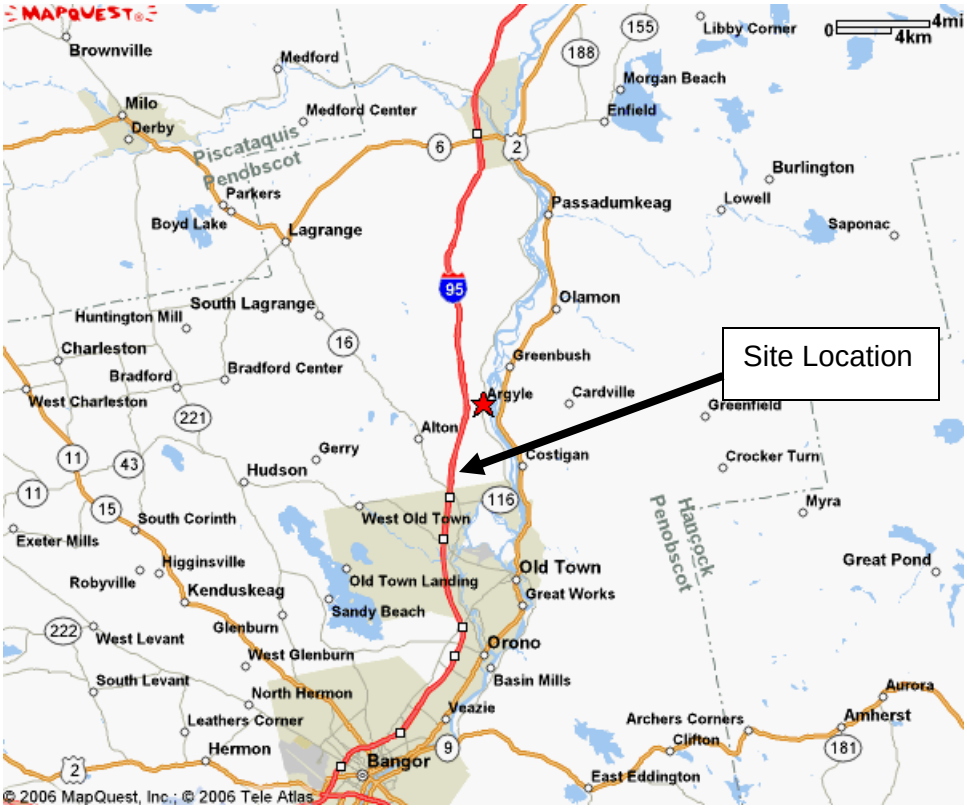
14. TEST TRUCK CYCLE:
    Turnaround time: 17 minutes
    Turnaround distance: 17 miles

15. PICTURES: See following pages, Site Map, WIM Site, Site layout drawings

16. NOTES:

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

4.1.1 SITE MAP


MAPQUEST
Brownville
Medford
Milo
Derby
Medford Center
Piscataquis
Penobscot
Parkers
Boyd Lake
Lagrange
South Lagrange
Huntington Mill
Charleston
Bradford
Bradford Center
West Charleston
Gerry
Hudson
South Corinth
Exeter Mills
Higginsville
Robyville
Kenduskeag
Glenburn
West Levant
West Glenburn
South Levant
North Hermon
Leathers Corner
Hermon
Bangor
Veazie
Basin Mills
Orono
Old Town
Old Town Landing
Great Works
Sandy Beach
West Old Town
Alton
Argyle
Greenbush
Olamon
Passadumkeag
Enfield
Morgan Beach
Libby Corner
Burlington
Lowell
Saponac
Cardville
Greenfield
Costigan
Crocker Turn
Myra
Great Pond
Hancock
Penobscot
Aurora
Amherst
Archers Corners
Clifton
East Eddington
Site Location
0
4mi
4km
© 2006 MapQuest, Inc.; © 2006 Tele Atlas

4.1.2 PICTURES, WIM SITE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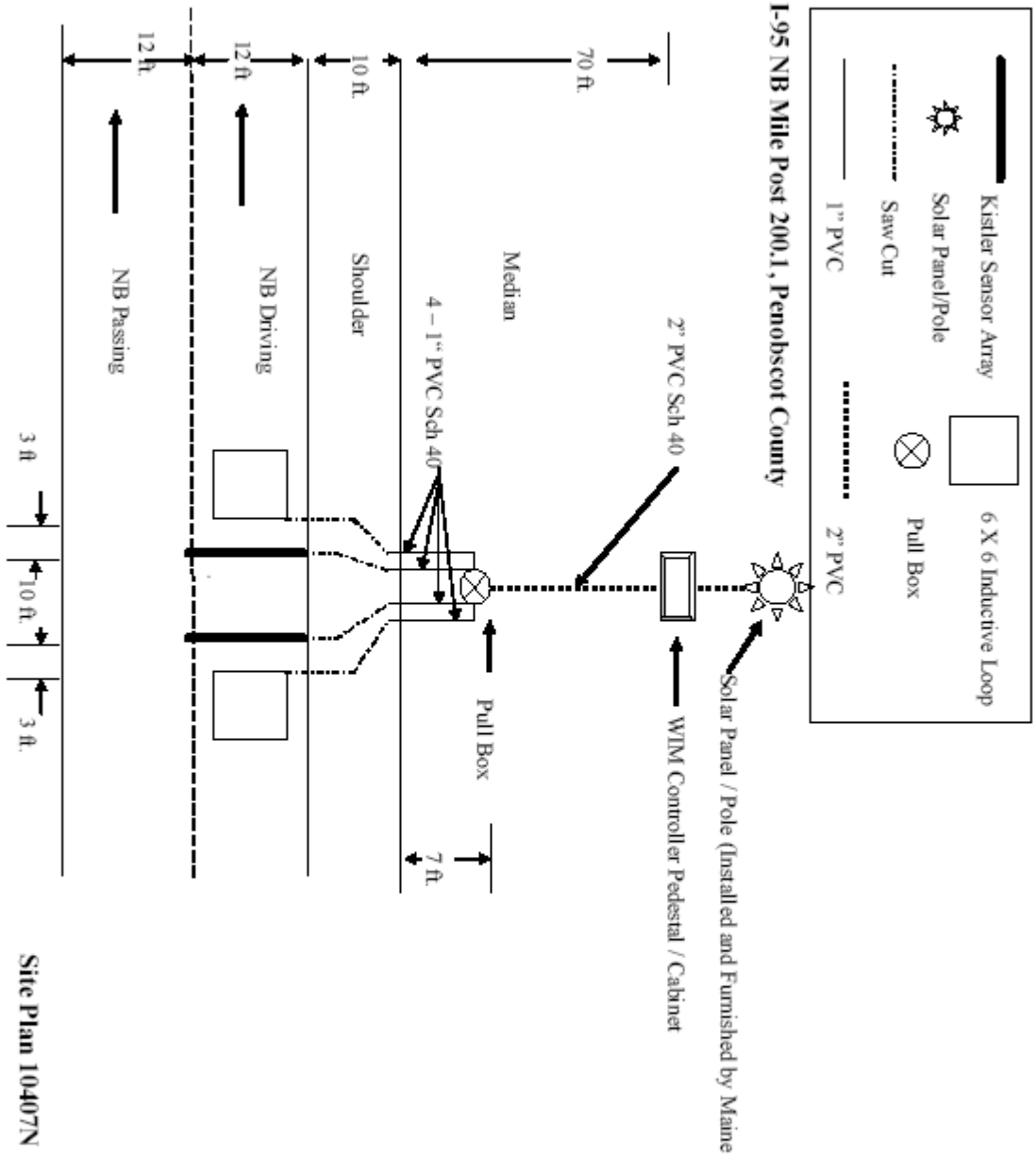
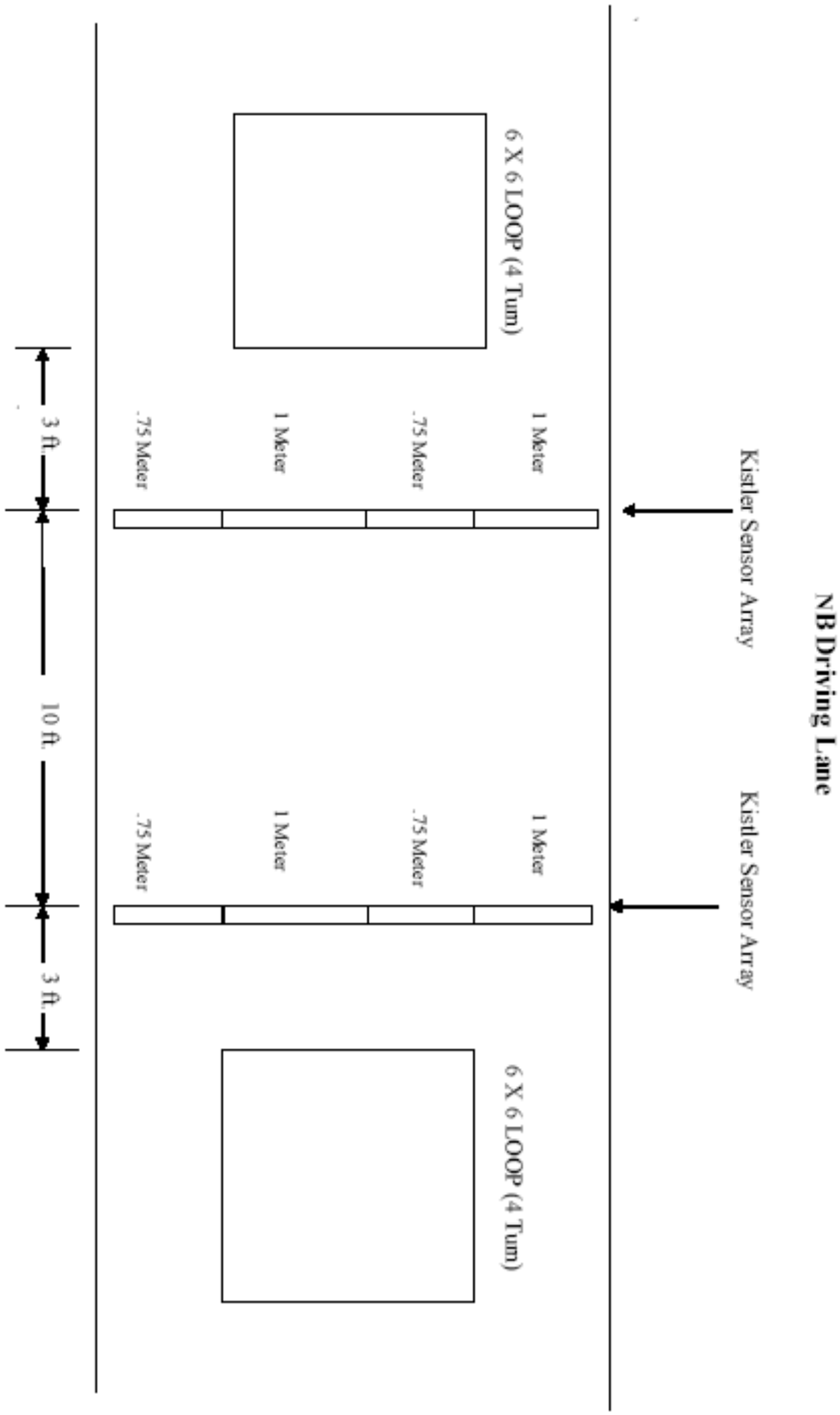
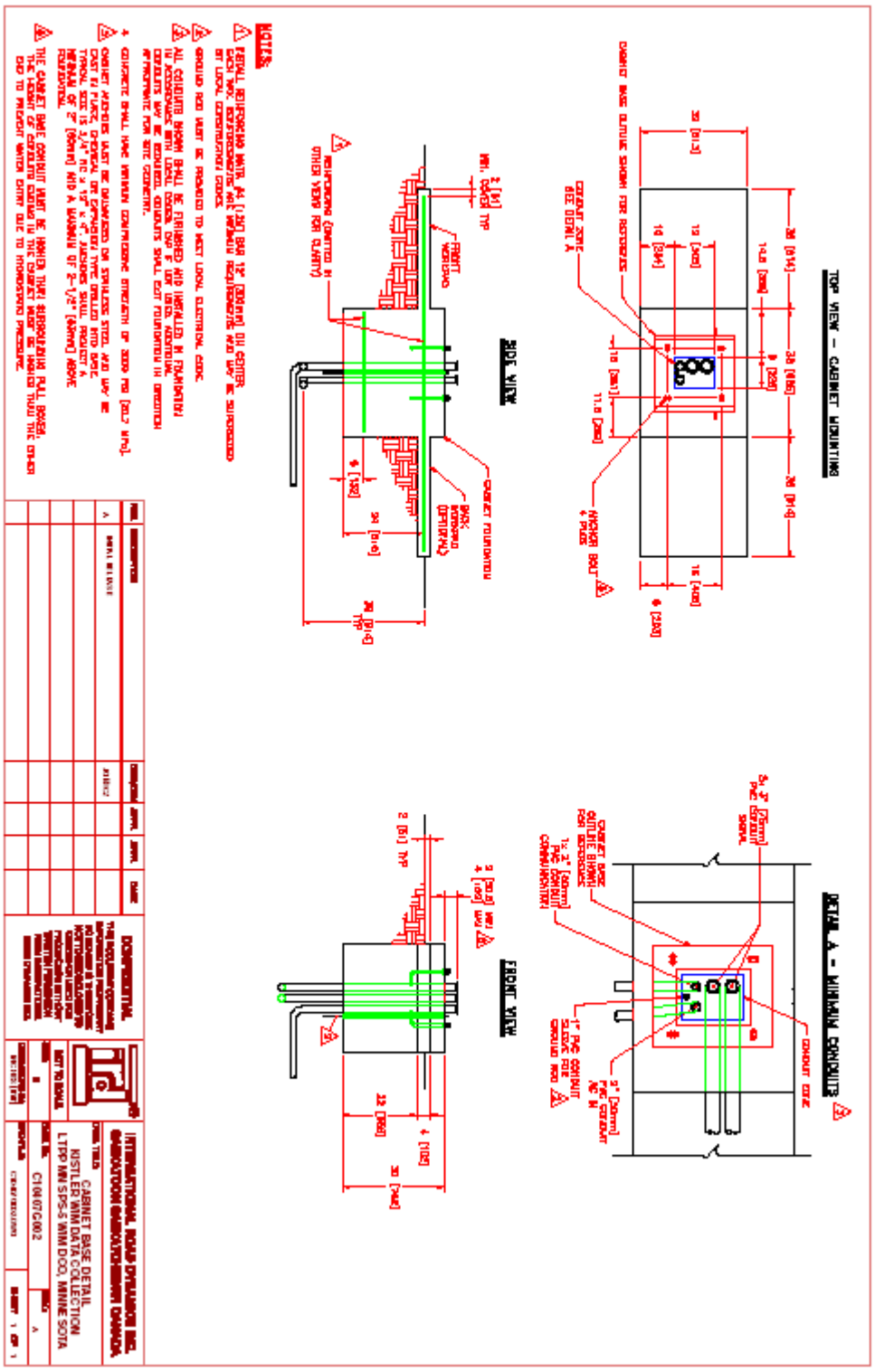
4.1.3 STE LAYOUT




NB Driving Lane
Kistler Sensor Array
Kistler Sensor Array
6 X 6 LOOP (4 Turn)
6 X 6 LOOP (4 Turn)
1 Meter
.75 Meter
1 Meter
.75 Meter
1 Meter
.75 Meter
1 Meter
.75 Meter
3 ft.
10 ft.
3 ft.

4.1.4 WIM CABINET CONCRETE PEDESTAL



4.1.5 ELECTRICAL READINGS

IRD

Site Service Sheet

Clear

System Type: iSINC / Kistler Quartz

Date: 7/23/2007 **State:** ME **Location:** I-95 Mile Post 200.1
Job #: 10407N **Site #:** **Directions:** Approx. 20 Miles North of Bangor

		Lead	Trail						
Loops	**Lane**	**1 NB**	**1 NB**						
Resistance		1.1 ohm	1.2 ohm						
Leakage		inf	inf						
Inductance uH		129.0	135.0						
Frequency									
Kistler	**Lane - 1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Amplitude		OK	OK	OK	OK	OK	OK	OK	OK
Capacitance		4.5nF	5.8nF	4.5nF	5.6nF	5.0nF	5.5nF	4.9nF	5.6nF
Resistance		inf	inf	inf	inf	inf	inf	inf	inf
Serial #		1571571	1571515	1565916	1538115	1574135	1568722	1574108	1574977
Kistler	**Lane - 2**								
Amplitude									
Capacitance									
Resistance									
Serial #									
Piezo	**Lane - 3**								
Amplitude									
Capacitance									
Resistance									
Serial #									
Kistler	**Lane - 4**								
Amplitude									
Capacitance									
Resistance									
Serial #									

System

A/C Service	N/A
Power Supply	13.4 Vdc
DC Supply	11.4 Vdc
Back-Up	13.4 Vdc
System Input	
Modem Power	
Phone off	N/A
Phone on	N/A

Temp Sensor

Red to Blk	8 M ohm
Red to Wht	6.5M ohm
Wht to Blk	39K ohm

Software

System	iSINC

Site Full Operating Capacity **Pass ?** **Fail**

Technician: Steven Schroader **Date:** 7/23/2007

5.0 WIM CALIBRATION

5.1.1 TEST TRUCK #1 INFORMATION

DATE OF CALIBRATION: **July 24, 2007**

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		9800		D
B		37400		D (B&C combined)
C				
D		31300		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)
	78600		78600

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

9. TRACTOR MANUFACTURER:
   Make: International
   Model:

10. TRAILER LOAD DESCRIPTION: Concrete Blocks, Fork Lift, GMC Truck

11. TRAILER TARE WEIGHT (lb): _____

12. AXLE SPACINGS

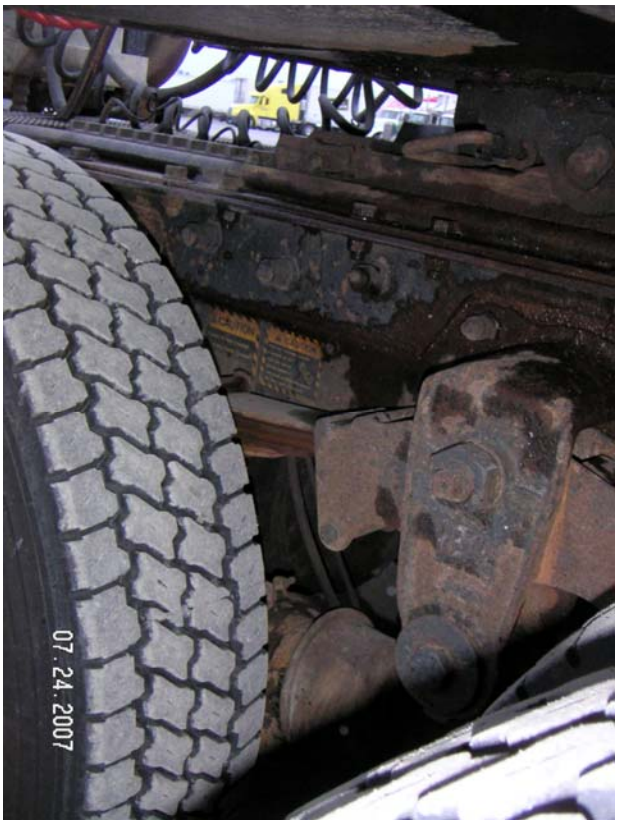
Axle	Spacing (feet & inches)
A-B	10.9'
B-C	4.3'
C-D	33.2’
D-E	4’

KINGPIN OFFSET FROM AXLE B (ft, + towards rear): +1.5 ft

SUSPENSSION:

Axle	17. Tire Size	18. Suspension description (leaf, air, # of leaves, taper or flat leaf, etc.)
A	11R24.5	Leaf spring – two leaves
B	11R24.5	Mechanical
C	11R24.5	Mechanical
D	75R22.5	air
E	75R22.5	air

5.1.2 PICTURES, TEST TRUCK 1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5.1.3 TEST TRUCK #2 INFORMATION

DATE OF CALIBRATION: **July 24, 2007**

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		9500		D
B		28700		D (B&C combined)
C				
D		24800		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)
	62900		62900

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

9. TRACTOR MANUFACTURER:
   Make: International
   Model:

10. TRAILER LOAD DESCRIPTION: Two Fork Lifts

11. TRAILER TARE WEIGHT (lb): _____

12. AXLE SPACINGS

Axle	Spacing (feet & inches)
A-B	11.9’
B-C	4.4’
C-D	32.8’
D-E	4’

KINGPIN OFFSET FROM AXLE B (ft, + towards rear): +1.5 ft

SUSPENSSION:

Axle	17. Tire Size	18. Suspension description (leaf, air, # of leaves, taper or flat leaf, etc.)
A	11R24.5	Leaf spring – two leaves
B	11R24.5	air
C	11R24.5	air
D	75R22.5	air
E	75R22.5	air

5.1.4 PICTURES, TEST TRUCK 2


FOX & GAMMON
RIGGING
07.24.2007


07.24.2007


07.24.2007

6.0 TEST TRUCK CALIBRATION RECORDS

6.1.1 VALIDATION RUNS

International Road Dynamics Inc.

FHWA VERIFICATION

Static Test Vehicle Measurements

ID				GVW	F/A	T1	T2	1>2	2>3	3>4	4>5
1				78.6	9.8	37.4	31.3	10.9	4.3	33.2	4.0
2				62.9	9.5	28.7	24.8	11.9	4.4	32.8	4.0

Dynamic Test Vehicle Measurements

ID	V#	Speed	Temp	GVW	F/A	T1	T2	1>2	2>3	3>4	4>5	
1	3316	47	82	78.7	9.7	37.9	31.0	11.0	4.3	33.3	4.1	12:00
2	3317	50	82	66.4	9.8	29.8	26.8	11.9	4.3	32.8	4.1	
1	3402	58	83	78.4	9.3	37.8	31.3	11.0	4.3	33.3	4.1	12:17
2	3403	57	83	63.7	9.8	28.7	25.2	11.8	4.4	32.9	4.1	
1	3470	63	86	81.5	9.4	38.8	33.4	11.0	4.3	33.4	4.1	12:34
2	3471	65	86	64.0	9.8	28.8	25.5	11.8	4.4	32.6	4.1	
1	3553	48	92	79.7	9.2	38.0	32.5	10.9	4.3	33.4	4.1	12:54
2	3554	50	92	64.9	10.0	28.9	25.9	11.9	4.4	32.8	4.1	
1	3642	60	98	79.5	9.9	37.5	32.2	11.0	4.3	33.3	4.1	13:13
2	3643	60	98	59.5	8.8	26.9	23.9	11.8	4.4	32.8	4.1	
1	3836	68	99	75.7	8.4	37.2	30.1	10.9	4.3	33.2	4.1	13:52
2	3837	69	99	64.0	9.8	28.8	25.4	11.9	4.4	32.8	4.1	
1	3924	50	103.6	78.9	10.0	37.7	31.2	11.0	4.3	33.3	4.1	14:11
2	3925	50	104	63.5	9.8	28.8	24.9	11.8	4.4	32.8	4.1	
1	4025	59	104	78.9	9.4	37.6	31.9	11.0	4.3	33.3	4.1	14:29
2	4026	60	104	63.0	9.5	28.2	25.1	11.8	4.4	32.8	4.1	
1	4127	67	105	78.3	9.6	38.4	30.2	10.9	4.3	33.4	4.1	14:47
2	4128	70	105	63.6	9.6	29.0	25.0	11.8	4.4	32.8	4.1	
1	4264	49	107	77.7	9.6	37.0	31.0	10.9	4.3	33.4	4.1	15:13
2	4265	50	107	63.2	9.7	28.5	25.0	11.9	4.4	32.7	4.1	
1	4366	57	107	77.4	9.2	37.4	30.7	10.9	4.3	33.3	4.1	15:31
2	4367	59	107	61.9	9.7	27.7	24.5	11.8	4.4	32.7	4.1	
2	4480	70	106	62.9	9.3	27.6	25.9	11.8	4.4	32.9	4.1	15:50
1	4594	49	109	79.8	10.7	38.4	30.7	11.0	4.3	33.3	4.1	
2	4595	48	109	60.9	9.5	27.5	23.9	11.8	4.4	32.6	4.1	16:07
1	4711	60	105	78.7	10.1	37.4	31.3	10.9	4.3	33.3	4.1	
2	4712	59	105	63.6	10.1	28.4	25.2	11.8	4.4	32.9	4.1	16:25
1	4898	67	104	78.7	9.8	36.9	32.0	11.0	4.3	33.3	4.1	
2	4899	69	104	63.1	9.9	28.0	25.1	11.8	4.4	32.8	4.1	16:55
1	5033	59	102	77.3	9.6	36.6	31.1	11.0	4.3	33.3	4.1	
1	5148	70	98	79.7	9.4	37.7	32.6	11.0	4.3	33.3	4.1	17:13
2	5149	69	98	62.6	9.5	28.2	24.9	11.8	4.4	32.7	4.1	
1	5245	59	96	76.2	9.1	36.7	30.3	10.9	4.3	33.4	4.1	17:30
2	5246	59	96	63.7	9.7	28.9	25.2	11.9	4.4	32.9	4.1	
1	5344	67	92	76.5	8.5	36.3	31.6	10.9	4.3	33.3	4.1	17:47
2	5345	70	92	63.8	9.8	28.5	25.5	11.8	4.4	32.8	4.1	
1	5451	59	90	77.7	10.1	36.6	30.8	11.0	4.3	33.3	4.1	18:04
2	5452	59	90	60.2	9.6	27.0	23.6	11.8	4.4	32.7	4.1	

Date:	2007/07/24
Technician:	steven schroeder
Location:	Maine LTPP

6.1.2 TEST TRUCKS ERROR CALCULATIONS

Truck	V#	Speed	Temp	GVW	F/A	T1	T2	1>2	2>3	3>4	4>5
1	3316	47	82	0.1%	-1.0%	1.3%	-1.0%	0.1	0.0	0.1	0.1
2	3317	50	82	5.6%	3.2%	3.8%	8.1%	0.0	-0.1	0.0	0.1
1	3402	58	83	-0.3%	-5.1%	1.1%	0.0%	0.1	0.0	0.1	0.1
2	3403	57	83	1.3%	3.2%	0.0%	1.6%	-0.1	0.0	0.1	0.1
1	3470	63	86	3.7%	-4.1%	3.7%	6.7%	0.1	0.0	0.2	0.1
2	3471	65	86	1.7%	3.2%	0.3%	2.8%	-0.1	0.0	-0.2	0.1
1	3553	48	92	1.4%	-6.1%	1.6%	3.8%	0.0	0.0	0.2	0.1
2	3554	50	92	3.2%	5.3%	0.7%	4.4%	0.0	0.0	0.0	0.1
1	3642	60	98	1.1%	1.0%	0.3%	2.9%	0.1	0.0	0.1	0.1
2	3643	60	98	-5.4%	-7.4%	-6.3%	-3.6%	-0.1	0.0	0.0	0.1
1	3836	68	99	-3.7%	14.3%	-0.5%	-3.8%	0.0	0.0	0.0	0.1
2	3837	69	99	1.7%	3.2%	0.3%	2.4%	0.0	0.0	0.0	0.1
1	3924	50	104	0.4%	2.0%	0.8%	-0.3%	0.1	0.0	0.1	0.1
2	3925	50	104	1.0%	3.2%	0.3%	0.4%	-0.1	0.0	0.0	0.1
1	4025	59	104	0.4%	-4.1%	0.5%	1.9%	0.1	0.0	0.1	0.1
2	4026	60	104	0.2%	0.0%	-1.7%	1.2%	-0.1	0.0	0.0	0.1
1	4127	67	105	-0.4%	-2.0%	2.7%	-3.5%	0.0	0.0	0.2	0.1
2	4128	70	105	1.1%	1.1%	1.0%	0.8%	-0.1	0.0	0.0	0.1
1	4264	49	107	-1.1%	-2.0%	-1.1%	-1.0%	0.0	0.0	0.2	0.1
2	4265	50	107	0.5%	2.1%	-0.7%	0.8%	0.0	0.0	-0.1	0.1
1	4366	57	107	-1.5%	-6.1%	0.0%	-1.9%	0.0	0.0	0.1	0.1
2	4367	59	107	-1.6%	2.1%	-3.5%	-1.2%	-0.1	0.0	-0.1	0.1
2	4480	70	106	0.0%	-2.1%	-3.8%	4.4%	-0.1	0.0	0.1	0.1
1	4594	49	109	1.5%	9.2%	2.7%	-1.9%	0.1	0.0	0.1	0.1
2	4595	48	109	-3.2%	0.0%	-4.2%	-3.6%	-0.1	0.0	-0.2	0.1
1	4711	60	105	0.1%	3.1%	0.0%	0.0%	0.0	0.0	0.1	0.1
2	4712	59	105	1.1%	6.3%	-1.0%	1.6%	-0.1	0.0	0.1	0.1
1	4898	67	104	0.1%	0.0%	-1.3%	2.2%	0.1	0.0	0.1	0.1
2	4899	69	104	0.3%	4.2%	-2.4%	1.2%	-0.1	0.0	0.0	0.1
1	5033	59	102	-1.7%	-2.0%	-2.1%	-0.6%	0.1	0.0	0.1	0.1
1	5148	70	98	1.4%	-4.1%	0.8%	4.2%	0.1	0.0	0.1	0.1
2	5149	69	98	-0.5%	0.0%	-1.7%	0.4%	-0.1	0.0	-0.1	0.1
1	5245	59	96	-3.1%	-7.1%	-1.9%	-3.2%	0.0	0.0	0.2	0.1
2	5246	59	96	1.3%	2.1%	0.7%	1.6%	0.0	0.0	0.1	0.1
1	5344	67	92	-2.7%	13.3%	-2.9%	1.0%	0.0	0.0	0.1	0.1
2	5345	70	92	1.4%	3.2%	-0.7%	2.8%	-0.1	0.0	0.0	0.1
1	5451	59	90	-1.1%	3.1%	-2.1%	-1.6%	0.1	0.0	0.1	0.1
2	5452	59	90	-4.3%	1.1%	-5.9%	-4.8%	-0.1	0.0	-0.1	0.1

6.1.3 OVERALL PERFORMANCE

International Road Dynamics Inc.

FHWA VERIFICATION

Specifications						
Confidence	95%	Speed range low	45	to	55
	(1.96)	Speed range medium	55	to	65
Gross vehicle weight	10%	Speed range high	65	to	76
Tandem group weight	15%	Temperature range low	80	to	95
Single axle weight	20%	Temperature range medium	95	to	104
Axle spacings	0.5	Temperature range high	104	to	120

Overall					
Characteristic	Error	StdDev	Specification	Calculated	Pass/Fail
Gross vehicle weight	0.0%	2.2%	10%	4.3%	pass
Tandem group weight	0.1%	2.7%	15%	5.3%	pass
Single axle weight	-0.5%	5.0%	20%	10.2%	pass
Axle spacings	0.0	0.1	0.5	0.2	pass

Speed range 45 to 55 (10 runs)				
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	0.9%	2.3%	10%	5.7%
Tandem group weight	0.8%	2.8%	15%	6.4%
Single axle weight	1.6%	4.2%	20%	6.5%
Axle spacings	0.0	0.1	0.5	0.2

Speed range 55 to 65 (16 runs)				
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	-0.6%	2.3%	10%	5.3%
Tandem group weight	-0.5%	2.8%	15%	6.0%
Single axle weight	-0.9%	4.3%	20%	9.5%
Axle spacings	0.0	0.1	0.5	0.2

Speed range 65 to 76 (11 runs)				
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	-0.1%	1.7%	10%	3.6%
Tandem group weight	0.2%	2.5%	15%	5.1%
Single axle weight	-2.2%	6.3%	20%	14.9%
Axle spacings	0.0	0.1	0.5	0.2

Temperature range 80 to 95 (12 runs)				
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	0.8%	2.7%	10%	6.4%
Tandem group weight	1.0%	3.3%	15%	7.6%
Single axle weight	-0.6%	5.5%	20%	11.7%

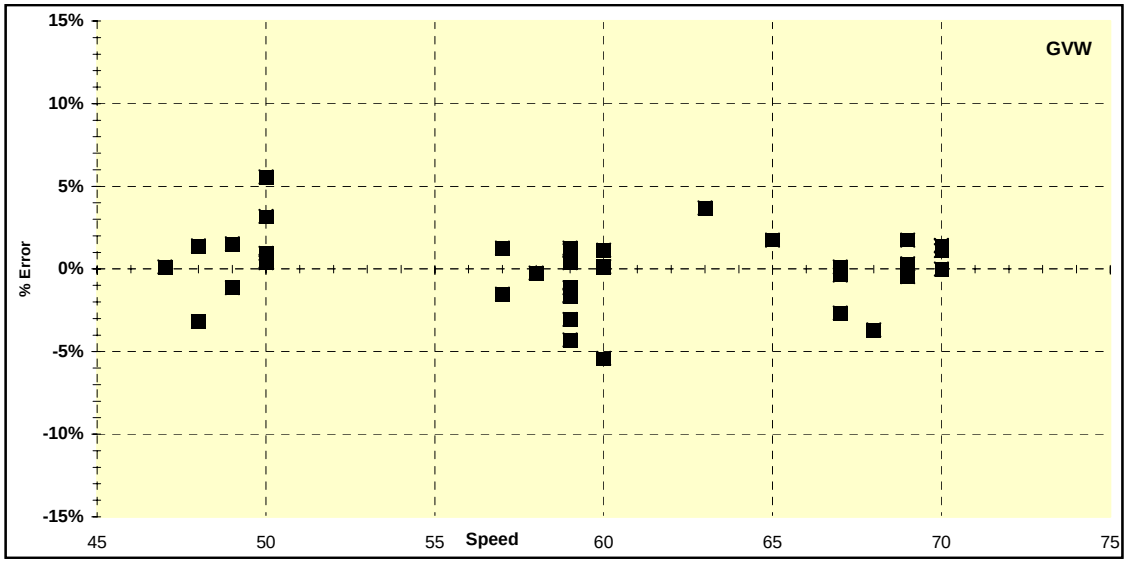
Temperature range 95 to 104 (15 runs)				
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	-0.4%	2.1%	10%	4.7%
Tandem group weight	-0.2%	2.2%	15%	4.7%
Single axle weight	-1.6%	5.1%	20%	11.8%

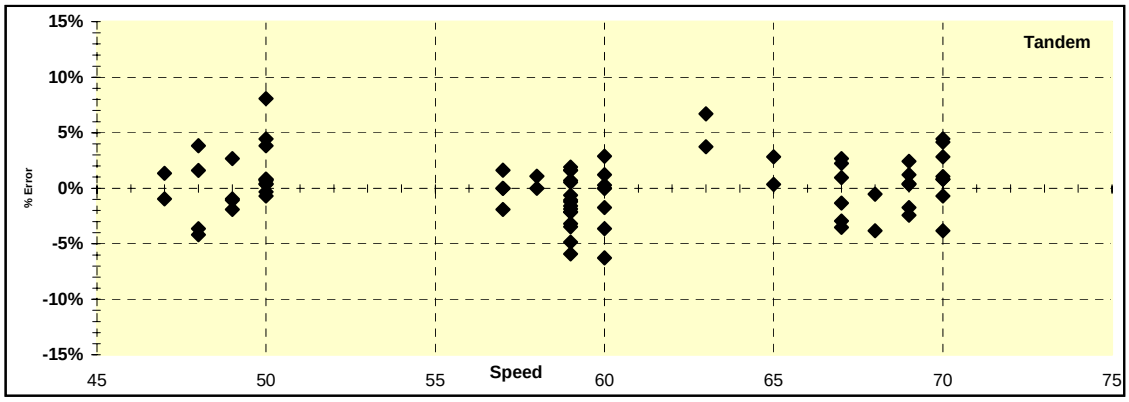
Temperature range 104 to 120 (11 runs)				
Characteristic	Error	StdDev	Specification	Calculated
Gross vehicle weight	-0.3%	1.4%	10%	3.2%
Tandem group weight	-0.6%	2.3%	15%	5.3%
Single axle weight	1.0%	4.3%	20%	9.7%

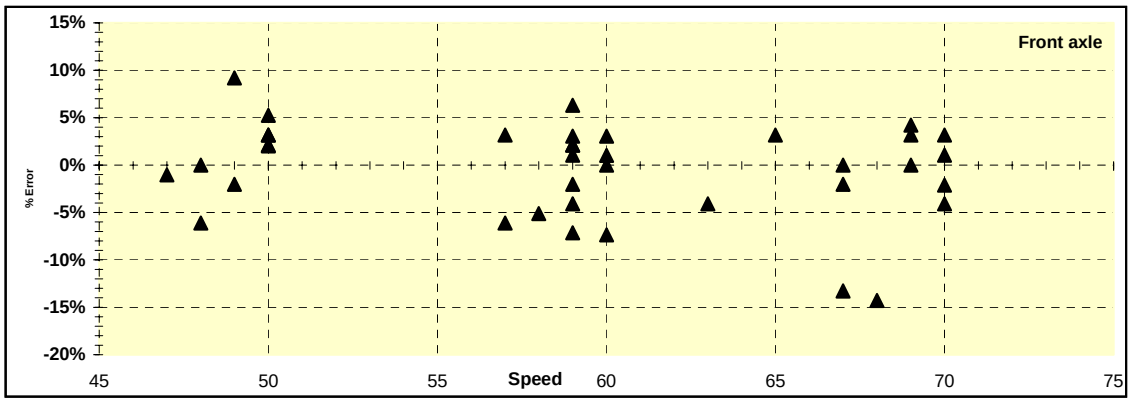
Maine LTPP steven schroeder 2007/07/24

6.1.4 WEIGHT GRAPHS

International Road Dynamics Inc.







6.1.5 TEMPERATURE INFLUENCE GRAPHS

International Road Dynamics Inc.

FHWA VERIFICATION