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LTPP Seasonal Monitoring Program

Site Monitoring Suspension Status Draft Final Report for GPS Section 276251 (27C) Bemidji, Minnesota

Research

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FHWA Contract No. DTFH61-96-00013 November 1997

LTPP Seasonal Monitoring Program

Site Monitoring Suspension Status
Draft Final Report for
GPS Section 276251 (27C)
Bemidji, Minnesota

FHWA CONTRACT No. DTFH61-96C-00013

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15. Supplementary Notes

FHWA LTPP Technical Representative - Aramis Lopez, HNR-40

16. Abstract

This report contains information on suspension of NCRCO's data collection activities for the Long Term Pavement Performance (LTPP) General Pavement Study (GPS) section 276251 conducted on September 10, 1997. The report presents a description of the following activities: SMP data collection activities, including evaluation of instrument and equipment performance prior to suspension of data collection, and monitoring resumption schedule. The resumption of monitoring at this site is scheduled for September, 1998. All instrumentation at the site will be tested at that time.

17. Keyword	18. Distribution Statement		
Long Term Pavement Performance, LTPP, Seasonal Monitoring Program, SMP, Time Domain Reflectometry, TDR, Piezometer, Falling Weight Deflectometer	**No restrictions. This document is available to the public from the sponsoring agency.**		
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Draft Final Report for
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Bemidji, Minnesota

1.0 INTRODUCTION

As dictated by seansonal montioring procedures, the North Central Regional Coordination Office (NCRCO) has suspended data collection for the Long Term Pavement Performance (LTPP) General Pavement Study (GPS) section 276251 for a period of one year effective September 10, 1997. The test section, which is part of the Seasonal Monitoring Program (SMP) managed by the Federal Highway Administration (FHWA) LTPP Division, is approximately 2 kilometers southeast of Bemidji, Minnesota, on the westbound driving lanes of US Highway 2. Additional background information on the test section, types of instruments installed, and the in-place pavement structure can be found in the *Site Installation Report for GPS Section 276251 (27C), Bemidji, Minnesota,* dated January 1996 (1).

This report contains information on data collection activities conducted on September 10, 1997. After the installation of instrumentation in the test section on September 14, 1993, the test section was visited 26 times for SMP data collection by Braun Intertec, until June 15, 1995. The test section was then visited 10 times for onsite SMP data collection by MN-DOT. Beginning October 10,

1996, the site was visited 14 times for SMP data collection by ERES Consultants. As of September 10, 1997, MN-DOT has assumed SMP data collection from the site, until September 1998, after which ERES Consultants will monitor the site for another year. The dates of these visits and the activities performed can be found in the SMP data collection summary table in appendix A. This section is planned to be monitored every other year for the remainder of the LTPP study or until it is removed from the study.

The report presents a description of the following activities: SMP data collection activities, including evaluation of instrument and equipment performance prior to suspension of monitoring, and schedule for resumption of monitoring.

2.0 SMP DATA COLLECTION

2.1 SMP Data Collection and Upload

On ERES Consultants' last site visit of September 10, 1997, the full suite of SMP monitoring measurements in the *LTPP Seasonal Monitoring Program Instrument Installation and Data Collection Guidelines* (2) was performed. These include the following:

- FWD and associated measurements.
- Elevation survey.
- Manual distress survey with transverse profile measurements.
- Manual electrical resistivity measurements (two- and four-point).

- Automated mobile data measurements (Time Domain Reflectometry [TDR] and resistivity).
- Water table measurements.

A summary of all the SMP data collected to date can be found in the SMP data collection summary table in appendix A. The specific type and amount of data collected can be found on the SMP field activity report (data sheet SMP-D10) in appendix B. Six other SMP data sheets pertaining to the data collection activities are also in appendix B. The locations for FWD and elevation measurements can be found in the site information sheet (SIS) in appendix C.

As can be seen in the SMP data collection summary table in appendix A, longitudinal profile measurements were recorded. All the data collected to date have been processed and uploaded into the RIMS.

2.2 Instrument and Equipment Problems

All the sensors in the test section (TDR, rain gauge, and Measurement Research Corporation [MRC]) were evaluated by reviewing the data from the onsite and mobile dataloggers using the SMPCheck 2.5c program (3). A review of the data collected during this visit indicated that all sensors were functioning as expected. The TDR traces all have the maximum and minimum points on the traces that enable analysis.

3.0 INSTRUMENT DE-INSTALLATION ACTIVITIES

3.1 Suspension Preparation and Repairs to Instrumentation Hole

All instrumentation remains installed at this site. The instrument block is in excellent condition, and the temperature profile holes in the pavement have been filled with silicone sealant.

3.2 Unique Site Features

This test section is the 3rd SMP installation in the LTPP North Central Region, In the course of monitoring this site, a solar panel was installed on top of the cabinets to prolong the life of the battery onsite. The solar panel was found to be an effective and significant addition to the SMP onsite data collection equipment that ensured efficient storage and collection of the SMP data stored onsite.

4.0 INSTRUMENT REINSTALLATION

All instrumentation remains installed at this site. Resumption of SMP monitoring by ERES Consultants scheduled for September, 1998.

5.0 SUMMARY

This report contains information on data collection activities for the LTPP GPS section 276251, conducted on September 10, 1997. The report presents a description of the SMP data collection activities, including an evaluation of the SMP sensors and equipment. No problems were noted from the data recorded from August 14, 1997, through September 10, 1997. The TDR traces all have the required maximum and minimum points that enable analysis of the TDR data.

Resumption of monitoring at this site by ERES Consultants is scheduled for September, 1998.

LIST OF REFERENCES

1. *LTPP Seasonal Monitoring Program Site Installation Report for GPS Section 276251 (27C) Bemidji, Minnesota,* Federal Highway Administration, LTPP Division, HNR-40, Turner-Fairbanks Highway Research Center, McLean, Virginia. January 1996.
2. *LTPP Seasonal Monitoring Program: Instrumentation Installation and Data Collection Guideline.* FHWA-RD-94-110, Federal Highway Administration, LTPP Division, HNR-40, Turner-Fairbanks Highway Research Center, McLean, Virginia. April 1994.
3. SMPCheck, computer software version 2.5c, prepared for the Federal Highway Administration, Pavement Performance Division, HNR-30, McLean, Virginia. July 1997.
4. Lopez, Aramis, Jr. *Long Term Pavement Performance Directive for the Seasonal Monitoring Program: Directive Number SM-8, Suspension of SMP Site Monitoring Activities.* Federal Highway Administration, LTPP Division, HNR-40, Turner-Fairbanks Highway Research Center, McLean, Virginia. March 1995.

Appendix A - SMP Data Collection Summary Table

27SC - 276251, US-2 WB LANES, IN BEMIDJI, MN (MP113.8)

Date dd/mmm/yy		ONSITE Data: Pvmt. Temp.	Air Temp.	Rain	MOBILE Data: TDR	Frost Volts	Backup TDR	Backup TDR	Manual Data: Frost 2-Pt.	Frost 4-Pt.	Water Table	Pvmt. Elev.	Joint Open.	Joint Fault	FWD Data: Man. Temp.	OWP	ML	PE	Distress: M	P	Profile: P	D	Comments
2-Jun-93																				X			
14-Jun-93																			X				
21-Aug-93																					X		
14-Sep-93	93A														X	1	1						INSTALLATION, MANUAL TDR DATA, FWD TESTING FROM 5+00 TO 5+20.
15-Sep-93	93B	P	P	P	P	P					P	P			X	4	4						NO RESISTIVITY SWITCH BOX
19-Oct-93	93C	P	P	P	P	P					P				X	3	3						NO RESISTIVITY SWITCH BOX
16-Nov-93																					X		
17-Nov-93	93D	P	P	P	P	P			P	P	P	P			X	3	3						ADDED RELAY TO ONSITE, TWO FILES FOR THE DAY.
15-Dec-93	93E	P	P	P	P	P					P	P			X	3	3						BAD RESISTIVITY SWITCH BOX
16-Jan-94																			X				
19-Jan-94	94A	P	P	P	P	P																	WEATHER REDUCED FROM FWD TESTING. BAD RESISTIVITY SWITCH BOX.
16-Feb-94	94B	P	P	P	P	P			P	P	P	P			X	3	3						
21-Feb-94																					X		
16-Mar-94	94C	P	P	P	P	P			P	P	P	P			X	3	3						
30-Mar-94	94D	P	P	P	P	P					P	P			X	3	3						MANY REPEAT FWD TESTS, PARTIAL RESISTIVITY DATA.
13-Apr-94	94E	P	P	P	P	P			P	P	P	P			X	3	3						
15-Apr-94																					X		MANY REPEAT FWD TESTS.
3-May-94	94F	P	P	P	P	P			P	P	P				X	3	3						FWD D1 READINGS BAD.
17-May-94	94G	P	P	P	P	P			P	P	P	P			X	3	3						
22-Jun-94	94H	P	P	P	P	P			P	P	P				X	1	1						
16-Jul-94																					X		
27-Jul-94	94I	P	P	P	P	P			P	P	P	P			X	4	4						
24-Aug-94	94J	P	P	P	P	P			P	P	P	P			X	4	4		X				
29-Sep-94	94K	P	P	P	P	P			P	P	P	P			X	4	4						CHECK CALIBRATION RESISTOR FOR POSITIONS 39 AND 40. TOO HIGH?
12-Oct-94	94L	P	P	P	P	P			P	P	P				X	3	3						
9-Nov-94	94M	P	P	P	P	P			P	P	P	P			X	3	3						
10-Nov-94																					X		PROFILE DATA NOT RECEIVED BY RCO.
7-Dec-94	94N	P	P	P	P	P			P	P	P				X	3	3						
11-Jan-95	95A	P	P	P	P	P			P	P	P												WEATHER REDUCED FWD TESTING.
20-Jan-95																					X		PROFILE DATA NOT RECEIVED BY RCO.
8-Feb-95	95B	P	P	P	P	P			P	P	P	P			X	2	2						ALL ELEVATIONS EXCEPT ML ARE SHIFTED 6" OVER ON PAVEMENT.
16-Mar-95	95C	P	P	P	P	P			P	P	P	P			X	2	2						LAST 2PT. AND 4PT. RESISTIVITY READINGS HAD 0 CURRENT?
30-Mar-95	95D	P	P	P	P	P			P	P	P	P			X	3	3		X				
13-Apr-95	95E	P	P	P	P	P			P	P	P				X	3	3						
22-Apr-95																					S		
27-Apr-95	95F	P	P	P	P	P			P	P	P				X	1	1						
10-May-95	95G	P	P	P	P	P			P	P	P	P			X	4	4						FIXED PIN #1 ON THE RESISTIVITY PROBE CABLE CONNECTOR.
15-Jun-95	95H	P	P	P	P	P			P	P	P	P			X	4	4						
27-Jun-95																					S		

Notes

- P — Denotes data collected and processed by Braun Intertec Corp
- P — Denotes data collected and processed by ERES Consultants, Inc
- X — Denotes data collected by Braun Intertec Corp.
- X — Denotes data collected by ERES Consultants, Inc.
- Denotes data collected by Braun Intertec Corp. and processed by ERES Consultants, Inc.
- S — Denotes data collected and processed by SME

27SC - 276251, US-2 WB LANES, IN BEMIDJI, MN (MP113.8)

		ONSITE Data			MOBILE Data				Manual Data						FWD Data				Distress		Profile		
Date dd/mmm/yy		Pvmt. Temp.	Air Temp.	Rain	TDR	Frost Volts	Backup TDR	Backup TDR	Frost 2-Pt.	Frost 4-Pt.	Water Table	Pvmt. Elev.	Joint Open.	Joint Fault	Man. Temp.	OWP	ML	PE	M	P	P	D	Comments
2-Aug-95																			X				
11-Nov-95	95I	M	M	M																			
15-Jan-96	96A	M	M	M																			
3-Mar-96	96B	M	M	M																			
14-May-96	96C	M	M	M																			
15-May-96	96D	M	M	M																			
29-May-96	96E	M	M	M																			
29-May-96	96F	M	M	M																			
11-Jun-96	96G	M	M	M																			
2-Jul-96	96H	M	M	M																			
17-Aug-96	96I	M	M	M																			
10-Oct-96	96J	P	P	P	P	P			P	P	P	P			X	3	3						
8-Nov-96	96K	P	P	P	P	P			P	P	P	P			X	4	4						
4-Dec-96	96L	P	P	P	P	P			P	P	P					0	0						
8-Jan-97	97A	P	P	P																			
18-Jan-97																					X		
6-Feb-97	97B	P	P	P	P	P			P	P	P	P				1	1						No TDR 1-4, MPX failure
19-Mar-97	97C	P	P	P		P			P	P	P				X	4	4						Bad multiplexer, pipe frozen
9-Apr-97	97D	P	P	P	P	P			P	P	P	P			X	2	2						
21-Apr-97																					X		
23-Apr-97	97E	P	P	P	P	P			P	P	P	P			X	4	4						
7-May-97	97F	P	P	P	P	P			P	P	P	P			X	2	2						
29-May-97	97G	P	P	P	P	P					P	P			X	4	4						
11-Jun-97	97H	P	P	P	P	P			P	P	P	P			X	4	4						
10-Jul-97	97 I	P	P	P	P	P			P	P	P	P			X	3	3						
14-Aug-97	97J	P	P	P	P	P			P	P	P				X	3	3						
10-Sep-97	97K	P	P	P	P	P			P	P	P	P			X	3	3		X				
11-Sep-97																					X		

Notes

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X Denotes data collected by Braun Intertec Corp.

X Denotes data collected by ERES Consultants, Inc.

Denotes data collected by Braun Intertec Corp. and processed by ERES Consultants, Inc.

M Denotes data collected by MN-DOT.

Appendix B - SMP Data Sheets

- SMP-D10: SMP Field Activity Report
- SMP-D03: Contact Resistance Measurements
- SMP-D04: Four-Point Resistivity Measurements
- SMP-D05: Ground Water Table Measurement
- SMP-D09: Elevation Measurements - AC
- SMP-M1: Distress Survey of Instrument Area

LTPP Seasonal Monitoring Program Data Sheet SMP-D10 SMP Field Activity Report	Agency Code [27] LTPP Section ID [6251]

Onsite Datalogger and Instrumentation		
File Name - *.ONS	275C97RI	Comments:
Battery Replace	Yes - (No)	Voltages - 13.2
Repairs/Calib.		
Other: _____		

Mobile Datalogger		
File Name - *.MOB		Comments:
TDR/Resistance Voltages	Sets (0 1)	
Other: _____		

Manual Data Collection		
Piezometer	(Yes) - No	Comments:
Resistance 2 pt.	Sets (0 1)	
Resistivity 4 pt.	Sets (0 1)	
Elevations	Sets (0 1)	
Distress Survey	(Yes) - No	
Long. Dipstick Profile	Yes - (No)	
Photos or Video	(Yes) - No	
Other: _____		

FWD and Associated Data		
FWD Testing	Sets (0 3)	Operator: DSP
JCP - Snap Rings	Sets (—)	AC
JCP - Faulting	Sets (—)	AC
Other: _____		

IF REQUIRED, ATTACH SKETCHES TO THIS DATA SHEET

Comments: _____

Prepared by: GEE Employer: ERES/NCR

Date (dd/mmm/yy): 10/SEP/97 Daylight Savings Time (Y or N): Y

LTPP Seasonal Monitoring Program Data Sheet SMP-D03 Contact Resistance Measurements	Agency Code [27] LTPP Section ID [6251]

Start Time (military): [1015]

Test Position	Switch Settings I1 V1	Switch Settings I2 V2	Voltage (ACV) Range Setting	Voltage (ACV) Reading	Current (ACA) Range Setting	Current (ACA) Reading	Comments
1	1	2	mil	252.2	mic	6.8	
2	2	3		249.8		6.3	
3	3	4		250.0		6.7	
4	4	5		243.3		7.2	
5	5	6		245.9		5.5	
6	6	7		255.8		4.3	
7	7	8		255.3		4.4	
8	8	9		2.8		0.7	
9	9	10		235.3		6.0	
10	10	11		237.7		6.0	
11	11	12		244.8		6.2	
12	12	13		236.7		8.3	
13	13	14		212.8		8.2	
14	14	15		236.6		7.1	
15	15	16		237.9		6.4	
16	16	17		247.2		5.0	
17	17	18		247.5		5.8	
18	18	19		240.5		6.8	
19	19	20		236.4		7.8	
20	20	21		235.2		6.6	
21	21	22		246.7		3.6	
22	22	23		260.2		3.9	
23	23	24		142.5		3.3	
24	24	25		249.4		6.0	
25	25	26		254.1		5.8	
26	26	27		259.6		5.1	
27	27	28		266.0		5.1	
28	28	29		267.1		4.8	
29	29	30		267.0		4.6	
30	30	31		273.7		4.2	
31	31	32		269.7		5.3	
32	32	33		262.0		6.8	
33	33	34		251.5		9.8	
34	34	35		231.3		11.6	
35	35	36		221.6		14.6	
36	36	37		0.2		221.0	R1 =
37	37	38		20.3		201.3	R2 =
38	38	39		117.4		117.1	R3 =
39	39	00		253.1		0.3	R4 =

Note: R = V/I, in ohms; measured resistances should be compared with known values.

Comments: _____

Prepared by: GFE Employer: ERES/NCR

Date (dd/mmm/yy): 10/SEP/97

LTPP Seasonal Monitoring Program Data Sheet SMP-D04 Four-Point Resistivity Measurements	Agency Code [27] LTPP Section ID [6251]

Start Time (military): 1025

Test Position	Switch Settings				Voltage (ACV)		Current (ACA)		Comments
	I1	V1	V2	I2	Range Setting	Reading (Volts)	Range Setting	Reading (Amps)	
1	1	2	3	4	mil	12.6	mic	2.1	
2	2	3	4	5		11.2		1.8	
3	3	4	5	6		10.7		1.4	
4	4	5	6	7		12.9		1.4	
5	5	6	7	8		11.4		1.4	
6	6	7	8	9		8.5		1.4	
7	7	8	9	10		8.3		1.4	
8	8	9	10	11		6.0		0.9	
9	9	10	11	12		9.0		1.6	
10	10	11	12	13		10.2		2.2	
11	11	12	13	14		10.1		1.5	
12	12	13	14	15		8.6		1.9	
13	13	14	15	16		11.0		2.1	
14	14	15	16	17		10.0		1.5	
15	15	16	17	18		11.3		1.9	
16	16	17	18	19		8.7		1.6	
17	17	18	19	20		9.1		1.6	
18	18	19	20	21		10.5		1.4	
19	19	20	21	22		11.1		1.3	
20	20	21	22	23		12.8		1.8	
21	21	22	23	24		8.1		1.4	
22	22	23	24	25		6.4		1.3	
23	23	24	25	26		5.2		0.9	
24	24	25	26	27		10.4		1.5	
25	25	26	27	28		13.2		1.3	
26	26	27	28	29		13.3		1.2	
27	27	28	29	30		14.1		1.0	
28	28	29	30	31		12.9		1.1	
29	29	30	31	32		15.8		1.3	
30	30	31	32	33		13.0		1.2	
31	31	32	33	34		14.5		1.7	
32	32	33	34	35		14.6		2.4	
33	33	34	35	36		14.5		3.4	
36	36	36	37	37		0.2		214.1	R1 =
37	37	37	38	38		20.1		199.7	R2 =
38	38	38	39	39		112.4		112.2	R3 =
39	39	39	00	00		250.9		0.3	R4 =

Note: R = V/I, in ohms; measured resistances should be compared with known values.

Comments: _____

Prepared by: GFE Employer: ERES

Date (dd/mmm/yy): 10/SEP/97

LTPP Seasonal Monitoring Program Data Sheet SMP-D05 Ground Water Table Measurement	Agency Code [27] LTPP Section ID [6251]

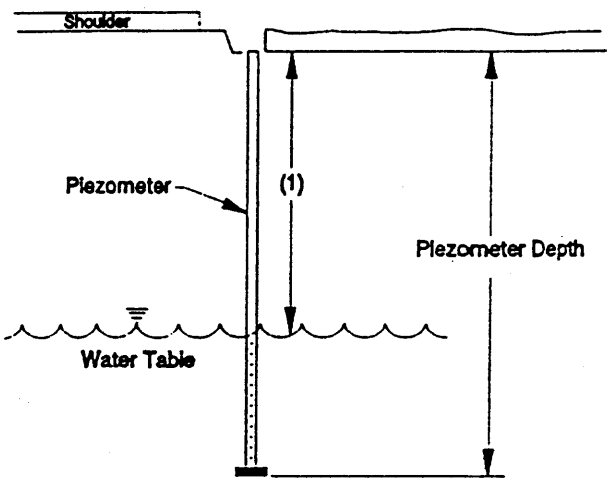
Piezometer Depth (m): 3.720

Measurement Number	Time (military)	Depth to Water[1,2] (m)	Comments
1	0900	0.97	
2	____	__.__	

[1] Distance from top of piezometer pipe to top of ground water table; to an accuracy of ±10 mm (0.4 in)

[2] If piezometer pipe is dry or frozen, enter "time" when observation was made, leave "depth to water" field blank, and enter "pipe is dry" or "pipe is frozen" under comments column.

2.16
3.72
2.75
.97



Comments: _____

_____

_____

Prepared by: GFE Employer: ERES/NCR

Date (dd/mmm/yy): 10/SEP/97

LTPP Seasonal Monitoring Program Data Sheet SMP-D08 Elevation Measurements - AC	Agency Code [27] LTPP Section ID [6251]

Type of Instrument: NA 2000

Start Time (military): 1345

BM	Station	BS	HI	IFS	FS	ELEV	CLOSE
Piez.	4+00	1.2733		1.2735			1.2733
Other	5+00	0.6004					0.6001

	Station	Offset (PE): 0.16 m	Offset (OWP): 0.76 m	Offset (ML): 1.83 m	Offset (IWP): 2.90 m	Offset (ILE): 3.51 m	Comments
91.4	3+00	1.0464	1.0307	0.9910	0.9609	0.9383	
99.1	3+25	1.0162	0.9990	0.9607	0.9335	0.9096	
106.7	3+50	0.9912	0.9748	0.9306	0.9034	0.8741	
114.3	3+75	0.9695	0.9520	0.9126	0.8833	0.8582	
121.9	4+00	0.9489	0.9323	0.8909	0.8607	0.8381	
129.5	4+25	0.9323	0.9146	0.8746	0.8433	0.8187	
137.2	4+50	0.9162	0.8969	0.8583	0.8251	0.7998	
141 144.8	4+75	0.8841	0.8630	0.8137	0.7830	0.7562	
152.4	5+00	0.8380	0.8182	0.7754	0.7425	0.7171	
155.4	5+10	0.8260	0.8046	0.7610	0.7274	0.7004	
157.0	5+15	0.8247	0.7974	0.7525	0.7177	0.6918	
158.5	5+20	0.8120	0.7897	0.7444	0.7169	0.6901	

Comments: _____

Prepared by: GFE Employer: ERES/NCR

Date (dd/mmm/yy): 10/SEP/97

27 5 C 9 7 K

LTPP Seasonal Monitoring Program Data Sheet SMP-M1 (Page Distress Survey of Instrumentation Area	Agency Code [27] Test Section Number [6 2 5 1]

Rate the condition of the instrumentation area (check one):

X Good (little or no distress; repairs are not required in the immediate future)

____ Poor (significant distress, repairs required now or in the immediate future)

List any repairs (type and extent) done since instrumentation installation and/or last survey of instrumentation area: _____

Additional Comments: _____

Prepared by: GFE Employer: ERES/NCR

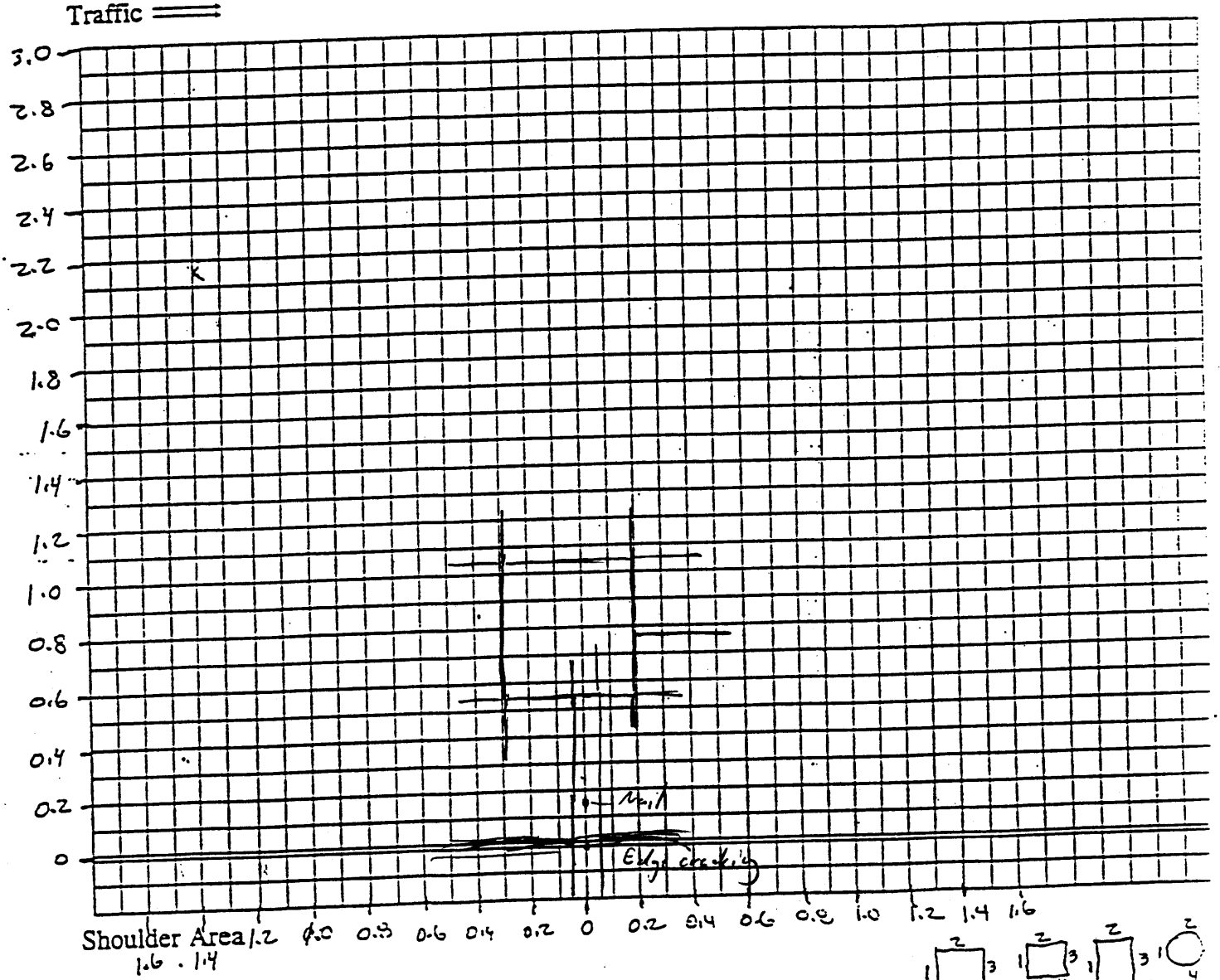
Date: 10 / Sep / 97

2 7 S C 9 7 K

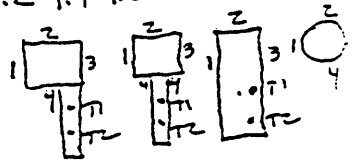
LTPP Seasonal Monitoring Program Data Sheet SMP-M1 (Page Distress Survey of Instrumentation Area	Agency Code [27] SHRP Section ID [6251] Survey Date [10/SEP/92]

Use grid below to sketch distresses within 1.5 m (5 ft) of instrumentation block/hole and trench. Use LTPP Distress Identification Manual to extent possible. (Note: each square in grid equals 0.1 m by 0.1 m area)

Traffic ⟹



Use table below to record settlement of pavement in instrumentation area.



Measurement Device: DIPSTICK / STRAIGHT EDGE

Location	Settlement, mm			
	Location 1	Location 2	Location 3	Location 4
Instrumentation block/hole	0.0	0.0	0.0	0.0
Trench	-4.0	-2.0	n/a	n/a

Appendix C- Site Information Sheet (SIS)

276251 - 27SC

LOCATION - US-2 WB Lanes, on bypass in Bemidji, MN (MP 113.8)
CONTACTS - Cliff Moening (218) 755-3799, Dave Dolager (218) 281-6054
TEMP HOLES - Sta 5+03, Depths are about 1.1", 4.0", and 5.8" (AC thickness = 7.0").

DISTRESS COMMENTS:

Sta F1 - Tests at 25 foot intervals from Sta 3+00 to Sta 5+00, and at Sta 5+15.

325	M-LONG.CR. 2' LEFT OF LP AND SENSORS, L-TRANS CR 2' AHEAD OF D7
350	M-TRANS.CR. UNDER LP AND L-LONG.CR BEHIND THE LP
375	M-TRANS.CR. BETWEEN D6 AND D7, L-TRANS CR 2' BEHIND LP
425	M-LONG.CR. 2' LEFT OF LP AND SENSORS
450	MULT. M-LONG.CR. NEAR LP AND ALL SENSORS, MULT L-TRANS CR 2' AHEAD OF D7
475	M-TRANS.CR. 1' BEHIND LP
515	LP ADJACENT TO INSTRUMENTATION HOLE AND M-TRANS.CR. BETWEEN D6 AND D7

Sta F3 - Tests at 25 foot intervals from Sta 3+00 to Sta 5+00, and at Sta 5+10, and 5+20

325	L-LONG.CR. FROM LP TO D6
350	M-TRANS.CR. UNDER LP, L-LONG CR 2' RT OF LP AND SENSORS
375	M-TRANS.CR. BEHIND LP AND BETWEEN D6 AND D7
425	L-TRANS CR 2' RT OF LP AND SENSORS
450	L-TRANS CR 2' RT OF LP AND SENSORS
475	M-TRANS.CR. UNDER THE LP, L-LONG CR 2' RT OF LP AND SENSORS
510	D7 ON INSTRUMENTATION HOLE
520	H-TRANS.CR. 1.5' BEHIND THE LP

PIEZOMETER - Sta 4+00, 2.0 feet from the edge of paved shoulder, Depth = 3.727M.

ELEVATIONS - Mn/DOT BM at Sta 5+00, 57 feet from the edge of paved shoulder.

Offsets:	PE	OWP	ML	IWP	ILE
(M)	0.16	0.76	1.83	2.90	3.51
		(Assuming 12 foot lane, not from white stripe.)			
(ft)	0.5	2.5	6.0	9.5	11.5
	(nail)	(hole)	(hole)	(hole)	(nail)

Sta: Transverse profiles every 25 feet from Sta 3+00 to Sta 5+00, and at Sta 5+10, 5+15, and 5+20.

COMMENTS -- Frank or Daryl on traffic control