

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 040779

FEDERAL AID PROJECT NO. NHPP-0017(45)

ELMO CREEK STR. & APPRS. (S)

STATE HIGHWAY 220 SECTION 2

IN CRAWFORD COUNTY

The information contained herein was obtained by the Department for design and estimating purposes only. It is being furnished with the express understanding that said information does not constitute a part of the Proposal or Contract and represents only the best knowledge of the Department as to the location, character and depth of the materials encountered. The information is only included and made available so that bidders may have access to subsurface information obtained by the Department and is not intended to be a substitute for personal investigation, interpretation and judgment of the bidder. The bidder should be cognizant of the possibility that conditions affecting the cost and/or quantities of work to be performed may differ from those indicated herein.



ARKANSAS DEPARTMENT OF TRANSPORTATION

ArDOT.gov | IDriveArkansas.com | Scott E. Bennett, P.E., Director

MATERIALS DIVISION

11301 West Baseline Road | P.O. Box 2261 | Little Rock, AR 72203-2261 | Phone: 501.569.2185 | Fax: 501.569.2368

July 9, 2019

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 040779
Elmo Creek Str. & Apprs. (S)
Route 220 Section 2
Crawford County

Attached is the requested soil survey, strength data, and Resilient Modulus test results for the above referenced job. The project consists of replacing the bridge at Elmo Creek on Highway 220. Samples were taken in the existing travel lanes, shoulders and ditch line.

The subgrade soils consist primarily of clayey sands. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction. Rock was encountered at log mile 5.43 5 and 30 feet right of centerline at a depth of 2.5 feet; at log mile 5.59 5 and 14 feet left of centerline at a depth of 2.5 feet. There were no slide areas observed within the project limits.

Earthwork recommendations will be made upon request when plans are further developed and cross sections are available.

Listed below is the additional information requested for use in developing the plans:

- 1. The Qualified Products List (QPL) indicates that Aggregate Base Course (Class CL-7) is available from commercial producers located in the vicinity of Van Buren.

- 2. Asphalt Concrete Hot Mix

Table with 3 columns: Type, Asphalt Cement %, Mineral Aggregate %. Rows include Surface Course, Binder Course, and Base Course.

Handwritten signature of Michael C. Benson, Materials Engineer

MCB:pt:bjj
Attachment

cc: State Constr. Eng. - Master File Copy
District 4 Engineer
System Information and Research Div.
G. C. File

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION
MICHAEL BENSON, MATERIALS ENGINEER
*** SOIL SURVEY STRENGTH TEST REPORT ***

DATE - 06/18/2019
JOB NUMBER - 040779

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 17
DISTRICT NO. - 04

JOB NAME - ELMO CREEK STR. & APPRS. (S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 13

RESILENT MODULUS
STA.LM 5.43 6629

REMARKS -
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AASHTO TESTS : T190

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

**AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED SAMPLES**

Job No.	040779	Material Code	SSRVPS
Date Sampled:	5/2/19	Station No.:	LM 5.43
Date Tested:	June 4, 2019	Location:	30'RT
Name of Project:	ELMO CREEK STR. & APPRS. (S)		
County:	Code: 17	Name:	CRAWFORD
Sampled By:	FRAZIER / BATES		
Lab No.:	20191426	Depth:	0-5
Sample ID:	RV350	AASHTO Class:	A-4 (2)
LATITUDE:		Material Type (1 or 2):	2
		LONGITUDE:	

1. Testing Information:

Preconditioning - Permanent Strain > 5% (Y=Yes or N= No)	N
Testing - Permanent Strain > 5% (Y=Yes or N=No)	N
Number of Load Sequences Completed (0-15)	15

2. Specimen Information:

Specimen Diameter (in):	
Top	3.95
Middle	3.95
Bottom	3.95
Average	3.95
Membrane Thickness (in):	0.01
Height of Specimen, Cap and Base (in):	8.02
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.02
Initial Area, Ao (sq. in):	12.18
Initial Volume, AoLo (cu. in):	97.68

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3345.80
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4. Soil Properties:

Optimum Moisture Content (%):	13.8
Maximum Dry Density (pcf):	115.8
95% of MDD (pcf):	110.0
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3345.80
Compaction Moisture content (%):	13.9
Compaction Wet Density (pcf):	130.51
Compaction Dry Density (pcf):	114.58
Moisture Content After Mr Test (%):	13.7

6. Quick Shear Test (Y=Yes, N=No, N/A=Not Applicable):

#VALUE!

7. Resilient Modulus, Mr:

7961(Sc)^{-0.22690}(S3)^{0.41623}

8. Comments

9. Tested By:

GW

Date: June 4, 2019

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

**AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED SAMPLES**

Job No. 040779 Material Code SSRVPS
 Date Sampled: 5/2/19 Station No.: LM 5.43
 Date Tested: June 4, 2019 Location: 30'RT
 Name of Project: ELMO CREEK STR. & APPRS. (S)
 County: Code: 17 Name: CRAWFORD
 Sampled By: FRAZIER / BATES Depth: 0-5
 Lab No.: 20191426 AASHTO Class: A-4 (2)
 Sample ID: RV350 Material Type (1 or 2): 2
 LATITUDE: LONGITUDE:

PARAMETER	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Average Recov Def. LVDT 1 and 2	Resilient Strain	Resilient Modulus
DESIGNATION UNIT	S ₃ psi	S _{cyclic} psi	P _{max} lbs	P _{cyclic} lbs	P _{contact} lbs	S _{max} psi	S _{cyclic} psi	S _{contact} psi	H _{avg} in	ε _r in/in	M _r psi
Sequence 1	6.0	2.0	25.2	22.5	2.7	2.1	1.8	0.2	0.00104	0.00013	14,236
Sequence 2	6.0	4.0	47.4	44.7	2.7	3.9	3.7	0.2	0.00223	0.00028	13,218
Sequence 3	6.0	6.0	70.0	66.5	3.5	5.7	5.5	0.3	0.00369	0.00046	11,860
Sequence 4	6.0	8.0	93.3	87.3	6.0	7.7	7.2	0.5	0.00541	0.00067	10,620
Sequence 5	6.0	10.0	116.5	108.2	8.3	9.6	8.9	0.7	0.00717	0.00089	9,932
Sequence 6	4.0	2.0	25.1	22.5	2.6	2.1	1.8	0.2	0.00122	0.00015	12,089
Sequence 7	4.0	4.0	46.9	44.3	2.7	3.9	3.6	0.2	0.00274	0.00034	10,651
Sequence 8	4.0	6.0	68.1	65.4	2.7	5.6	5.4	0.2	0.00449	0.00056	9,595
Sequence 9	4.0	8.0	91.5	86.5	5.0	7.5	7.1	0.4	0.00631	0.00079	9,018
Sequence 10	4.0	10.0	114.2	106.8	7.5	9.4	8.8	0.6	0.00825	0.00103	8,519
Sequence 11	2.0	2.0	24.8	22.1	2.7	2.0	1.8	0.2	0.00156	0.00019	9,325
Sequence 12	2.0	4.0	45.5	42.9	2.7	3.7	3.5	0.2	0.00353	0.00044	7,996
Sequence 13	2.0	6.0	65.6	62.9	2.7	5.4	5.2	0.2	0.00571	0.00071	7,243
Sequence 14	2.0	8.0	87.8	83.5	4.2	7.2	6.9	0.3	0.00795	0.00099	6,920
Sequence 15	2.0	10.0	109.8	103.1	6.7	9.0	8.5	0.6	0.01024	0.00128	6,629

TESTED BY _____ DATE June 4, 2019
 REVIEWED BY _____ DATE _____

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

**AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED / THINWALL TUBE SAMPLES**

Job No.	040779	Material Code	SSRVPS
Date Sampled:	5/2/19	Station No.:	LM 5.43
Date Tested:	June 4, 2019	Location:	30'RT
Name of Project:	ELMO CREEK STR. & APPRS. (S)		
County:	Code: 17	Name:	CRAWFORD
Sampled By:	FRAZIER / BATES	Depth:	0-5
Lab No.:	20191426	AASHTO Class:	A-4 (2)
Sample ID:	RV350	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

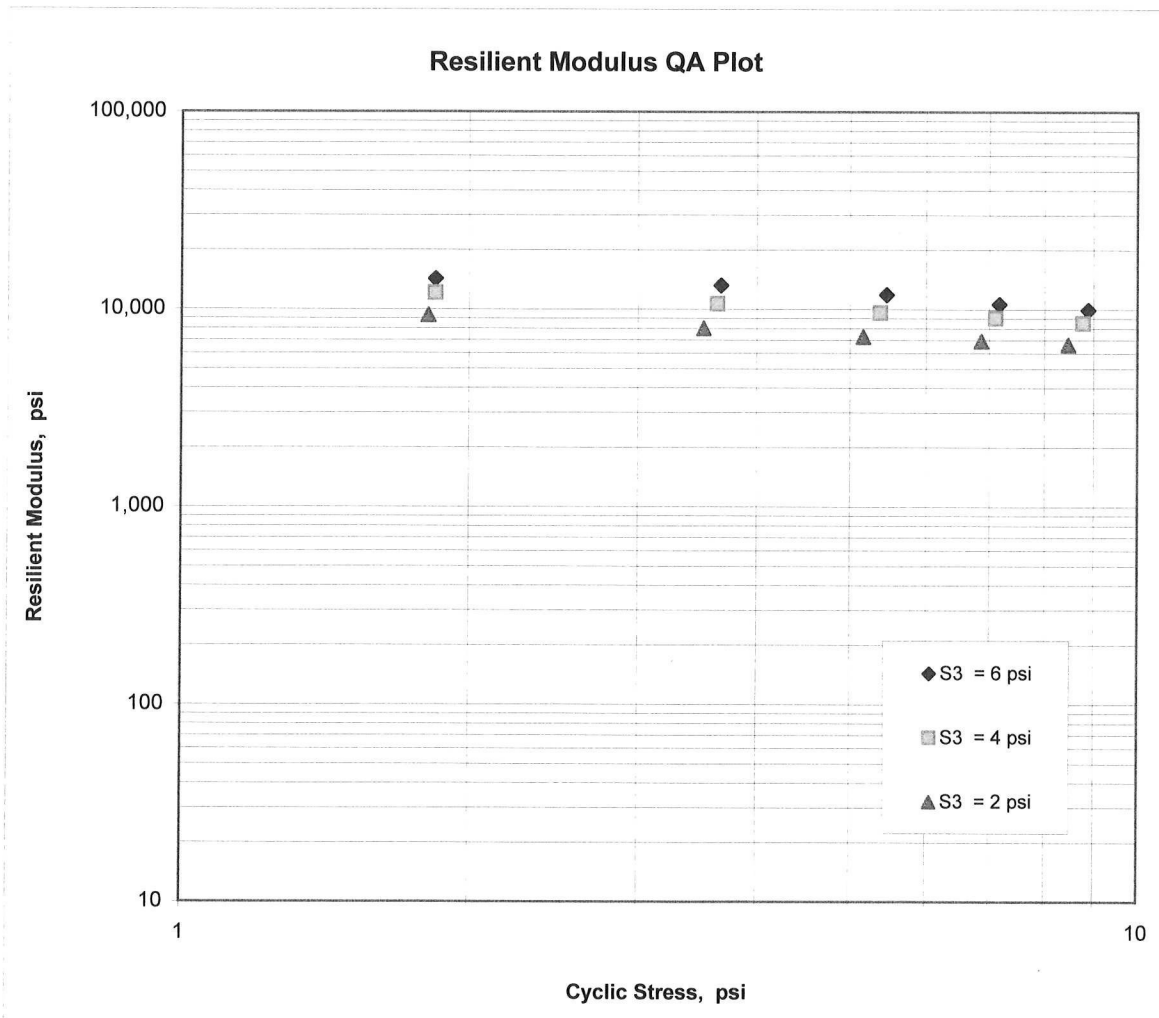
$$M_R = K_1 (S_C)^{K_2} (S_3)^{K_5}$$

$$K_1 = 7,961$$

$$K_2 = -0.22690$$

$$K_5 = 0.41623$$

$$R^2 = 0.99$$



JOB: 040779

Arkansas State Highway Transportation Department

JOB NAME: ELMO CREEK STR. & APPRS. (S)

Materials Division

COUNTY NO. 14 DATE TESTED 6/19/2019

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR						L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				#4	#10	#40	#80	#200					
				S	I	E	V	E	S				
LM 5.43	30 RT	0-2.5z	RD/BR	86	82	78	72	62	23	7	A-4(2)	RV350	
LM 5.43	05 RT	0-2.5z	RD/BR	93	87	80	71	51	18	4	A-4(0)	S346	11
LM 5.43	30 RT	0-2.5z	RD/BR	96	94	92	84	73	23	6	A-4(2)	S347	17.9
LM 5.59	05 LT	0-2.5z	RD/BR	62	56	53	49	36	ND	NP	A-4(0)	S348	12.8
LM 5.59	14 LT	0-2.5z	RD/BR	82	75	71	66	50	23	8	A-4(1)	S349	13.9

comments:

Wednesday, June 26, 2019

JOB: 040779

JOB NAME: ELMO CREEK STR. & APPRS. (S)

**Arkansas State Highway Transportation Department
Materials Division**

DATE TESTED
6/19/2019

COUNTY NO. 14

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

LM 5.43	05 RT	ACHM SC	1.0	CHIP SEAL	.25	ACHM BC	2.75	AGG.BASE CRS.CL-7	2.0
LM 5.43	30 RT	ACHM SC	---	CHIP SEAL	---	ACHM BC	---	AGG.BASE CRS.CL-7	---
LM 5.59	05 LT	ACHM SC	1.0	CHIP SEAL	.25	ACHM BC	2.0	AGG.BASE CRS.CL-7	2.0

comments:

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION

MICHAEL BENSON, MATERIALS ENGINEER

*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE - 06/19/19 SEQUENCE NO. - 1
JOB NUMBER - 040779 MATERIAL CODE - SSRVPS
FEDERAL AID NO. - TO BE ASSIGNED SPEC. YEAR - 2014
PURPOSE - SOIL SURVEY SAMPLE SUPPLIER ID. - 1
SPEC. REMARKS - NO SPECIFICATION CHECK COUNTY/STATE - 17
SUPPLIER NAME - STATE DISTRICT NO. - 04
NAME OF PROJECT - ELMO CREEK STR. & APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - CRAWFORD, COUNTY DATE SAMPLED - 05/02/19
SAMPLED BY - FRAZIER/BATES DATE RECEIVED - 05/13/19
SAMPLE FROM - TEST HOLE DATE TESTED - 06/19/19
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	-	20191422	-	20191423	-	20191424
SAMPLE ID	-	S346	-	S347	-	S348
TEST STATUS	-	INFORMATION ONLY	-	INFORMATION ONLY	-	INFORMATION ONLY
STATION	-	LM 5.43	-	LM 5.43	-	LM 5.59
LOCATION	-	05 RT	-	30 RT	-	05 LT
DEPTH IN FEET	-	0-2.5z	-	0-2.5z	-	0-2.5z
MAT'L COLOR	-	RD/BR	-	RD/BR	-	RD/BR
MAT'L TYPE	-		-		-	
LATITUDE DEG-MIN-SEC	-	35 39 23.70	-	35 39 23.60	-	35 39 29.00
LONGITUDE DEG-MIN-SEC	-	94 20 50.40	-	94 20 50.10	-	94 20 57.60
% PASSING						
2 IN.	-		-		-	
1 1/2 IN.	-		-		-	100
3/4 IN.	-	100	-	100	-	95
3/8 IN.	-	98	-	98	-	79
NO. 4	-	93	-	96	-	62
NO. 10	-	87	-	94	-	56
NO. 40	-	80	-	92	-	53
NO. 80	-	71	-	84	-	49
NO. 200	-	51	-	73	-	36
LIQUID LIMIT	-	18	-	23	-	ND
PLASTICITY INDEX	-	4	-	6	-	NP
AASHTO SOIL	-	A-4 (0)	-	A-4 (2)	-	A-4 (0)
UNIFIED SOIL	-		-		-	
% MOISTURE CONTENT	-	11.0	-	17.9	-	12.8
ACHM SC (IN)	-	1.0	-	---	-	1.0
CHIP SEAL (IN)	-	.25	-	---	-	.25
ACHM BC (IN)	-	2.75	-	---	-	2.0
AGG. BASE CRS. CL-7 (IN)	-	2.0	-	---	-	2.0
	-		-		-	
	-		-		-	
	-		-		-	
	-		-		-	

REMARKS -
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AASHTO TESTS : T24 T88 T89 T90 T265
:

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION

MICHAEL BENSON, MATERIALS ENGINEER

*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE	- 06/19/19	SEQUENCE NO.	- 2
JOB NUMBER	- 040779	MATERIAL CODE	- SSRVPS
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2014
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 17
SUPPLIER NAME	- STATE	DISTRICT NO.	- 04
NAME OF PROJECT	- ELMO CREEK STR. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- CRAWFORD, COUNTY	DATE SAMPLED	- 05/02/19
SAMPLED BY	- FRAZIER/BATES	DATE RECEIVED	- 05/13/19
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 06/19/19
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20191425	-	-
SAMPLE ID	- S349	-	-
TEST STATUS	- INFORMATION ONLY	-	-
STATION	- LM 5.59	-	-
LOCATION	- 14 LT	-	-
DEPTH IN FEET	- 0-2.5z	-	-
MAT'L COLOR	- RD/BR	-	-
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 35 39 29.00	-	-
LONGITUDE DEG-MIN-SEC	- 94 20 57.80	-	-
% PASSING	2 IN.	-	-
	1 1/2 IN.	-	-
	3/4 IN.	100	-
	3/8 IN.	90	-
	NO. 4	82	-
	NO. 10	75	-
	NO. 40	71	-
	NO. 80	66	-
	NO. 200	50	-
LIQUID LIMIT	- 23	-	-
PLASTICITY INDEX	- 8	-	-
AASHTO SOIL	- A-4 (1)	-	-
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 13.9	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
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	-	-	-
	-	-	-

REMARKS -
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AASHTO TESTS : T24 T88 T89 T90 T265
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ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION

MICHAEL BENSON, MATERIALS ENGINEER

*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE - 06/19/19 SEQUENCE NO. - 1
JOB NUMBER - 040779 MATERIAL CODE - RV
FEDERAL AID NO. - TO BE ASSIGNED SPEC. YEAR - 2014
PURPOSE - SOIL SURVEY SAMPLE SUPPLIER ID. - 1
SPEC. REMARKS - NO SPECIFICATION CHECK COUNTY/STATE - 17
SUPPLIER NAME - STATE DISTRICT NO. - 04
NAME OF PROJECT - ELMO CREEK STR. & APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - CRAWFORD, COUNTY DATE SAMPLED - 05/02/19
SAMPLED BY - FRAZIER/BATES DATE RECEIVED - 05/13/19
SAMPLE FROM - TEST HOLE DATE TESTED - 06/19/19
MATERIAL DESC. - SOIL SURVEY - RESISTANCE R-VALUE ACTUAL RESULTS

LAB NUMBER	-	20191426	-	-
SAMPLE ID	-	RV350	-	-
TEST STATUS	-	INFORMATION ONLY	-	-
STATION	-	LM 5.43	-	-
LOCATION	-	30 RT	-	-
DEPTH IN FEET	-	0-2.5z	-	-
MAT'L COLOR	-	RD/BR	-	-
MAT'L TYPE	-		-	-
LATITUDE DEG-MIN-SEC	-	35 39 23.60	-	-
LONGITUDE DEG-MIN-SEC	-	94 20 50.10	-	-
% PASSING	2	IN.	-	-
	1 1/2	IN.	-	-
	3/4	IN.	-	100
	3/8	IN.	-	93
	NO. 4		-	86
	NO. 10		-	82
	NO. 40		-	78
	NO. 80		-	72
	NO. 200		-	62
LIQUID LIMIT	-	23	-	-
PLASTICITY INDEX	-	7	-	-
AASHTO SOIL	-	A-4 (2)	-	-
UNIFIED SOIL	-		-	-
% MOISTURE CONTENT	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-

REMARKS -
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AASHTO TESTS : T24 T88 T89 T90 T265
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