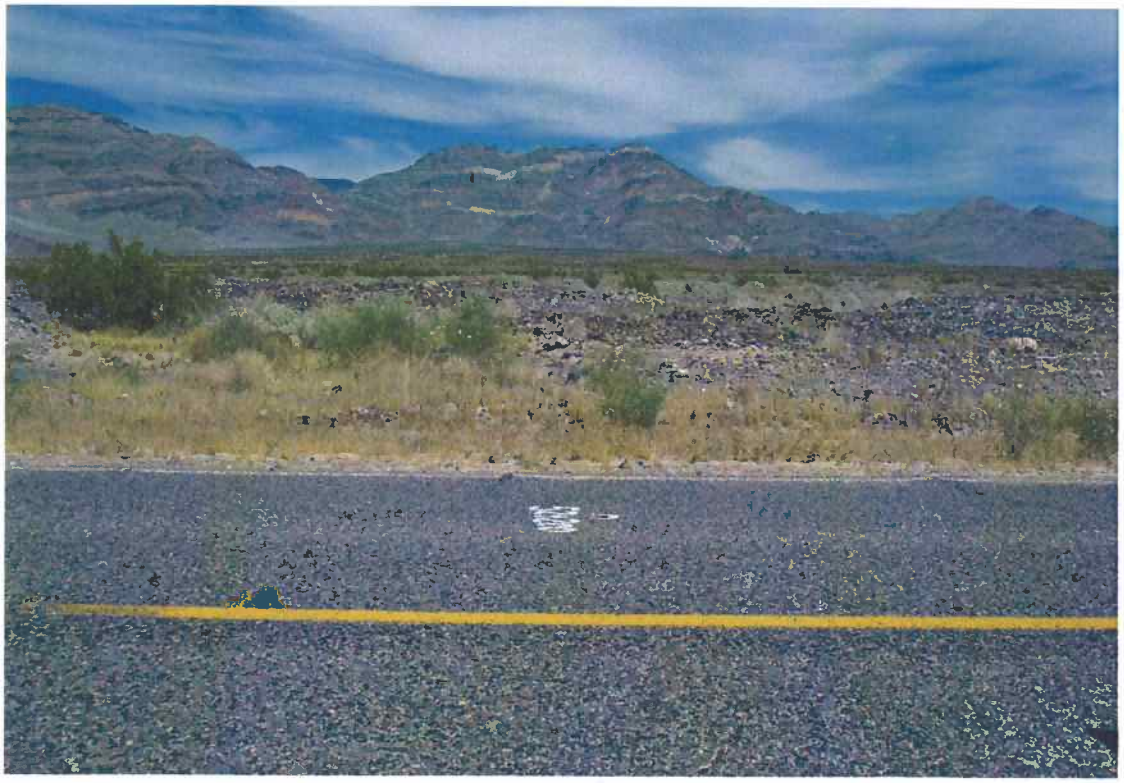
CA PRA DEVA 11(2)
BONNIE CLARE ROAD

PAVEMENT REPORT
Report # 09-06

Pavement Section
March 2009



SIGNATURE SHEET

Report prepared by: _____

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Approved for distribution by: _____

for Richard Duval, Division Pavements Engineer

3-16-09

Date

Distribution
Project Management
Project Development (3)
Acquisition and Contracting
Construction
CFLHD, Central Files
CFLHD, Report Room
Pavements (2)
Materials

TABLE OF CONTENTS

I. INTRODUCTION

This report, #09-06 for milepost (MP) 20.6 to MP 40.9 is a supplement to Report #07-03 that was issued July 2007 for CA PRA 11(3) Bonnie Clare Road which covered MP 7.7 to 20.6.

Projects 11(3) & 11(1) have not been built as planned. Under the economic stimulus bill, American Reinvestment Recovery Act signed in February 2009, projects 11(2) & 11(3) have been combined into one project, CA PRA 11(2) Bonnie Clare Road, MP 7.7 to 40.9. Project 11(1) is a 4R re-construction with a new centerline alignment from MP 0 at the California-Nevada Stateline to MP 7.7, the Grapevine Ranger Station.

Two separate pavements and materials investigations were conducted for 11(2) and for 11(3). Therefore this report only provides the field data and laboratory test results for MP 20.6 to 40.9 to complete the 3R rehabilitation portion of the Bonnie Clare Road.

II. EXISTING PAVEMENT

The proposed project will rehabilitate the Bonnie Clair Road that does not have adequate roadway template, and has moderate to high severity cracking combined with rough surface texturing. The rough texture is from oxidation and the resulting lost of fine aggregate from the bituminous surfaces and age related cracking. Areas are prone to storm damage due to channelization of surface sheet flow during rain events. Erosion was noted at the edge of pavement at several locations. See photographs in Appendix C.

The following charts summarize the pavement thicknesses as recorded April 2005. Pavement thicknesses were recorded every ¼ mile so discrepancies may occur between pavement boring locations.

PAVEMENT & BASE COURSE THICKNESSES

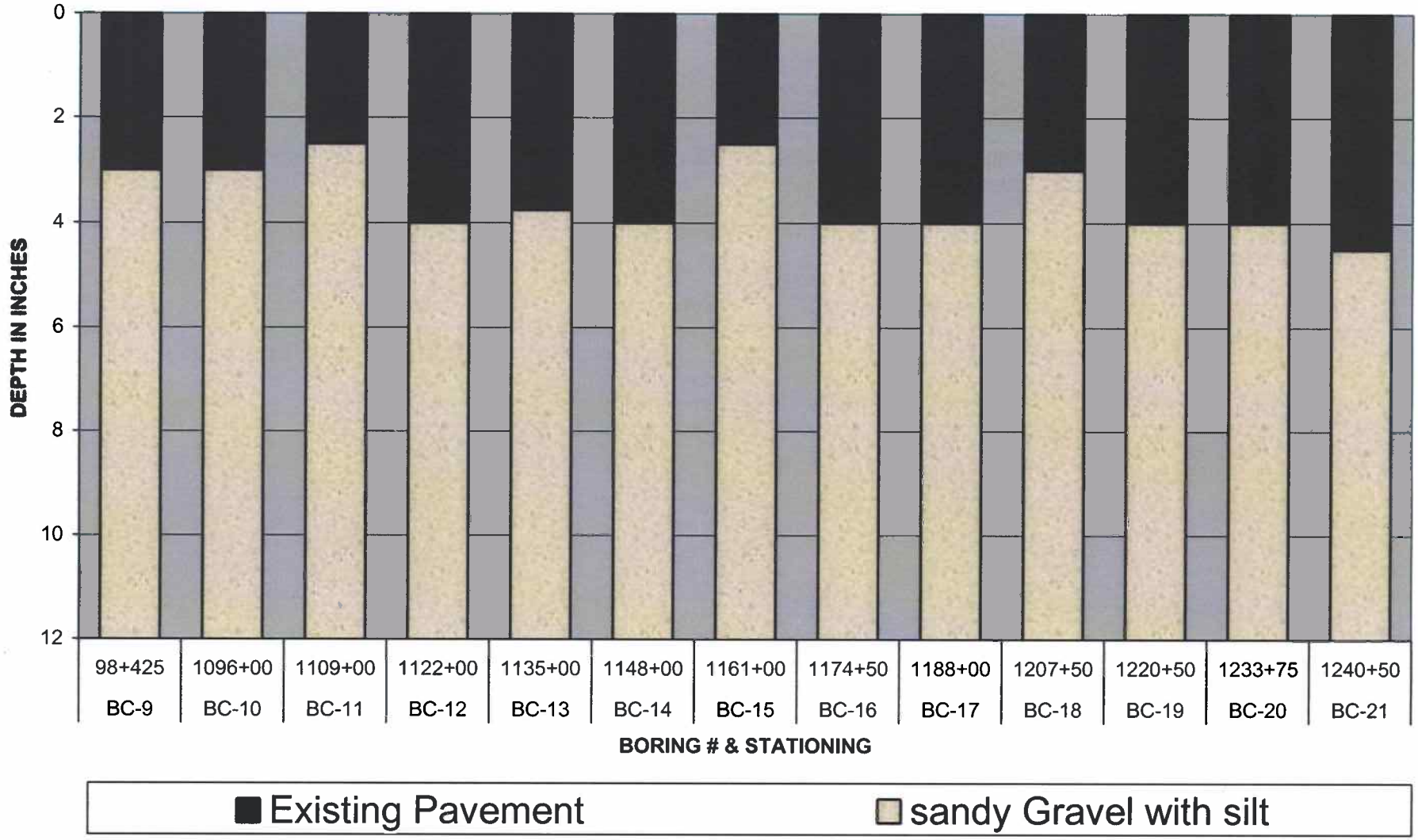


Chart 1

PAVEMENT & BASE COURSE THICKNESSES

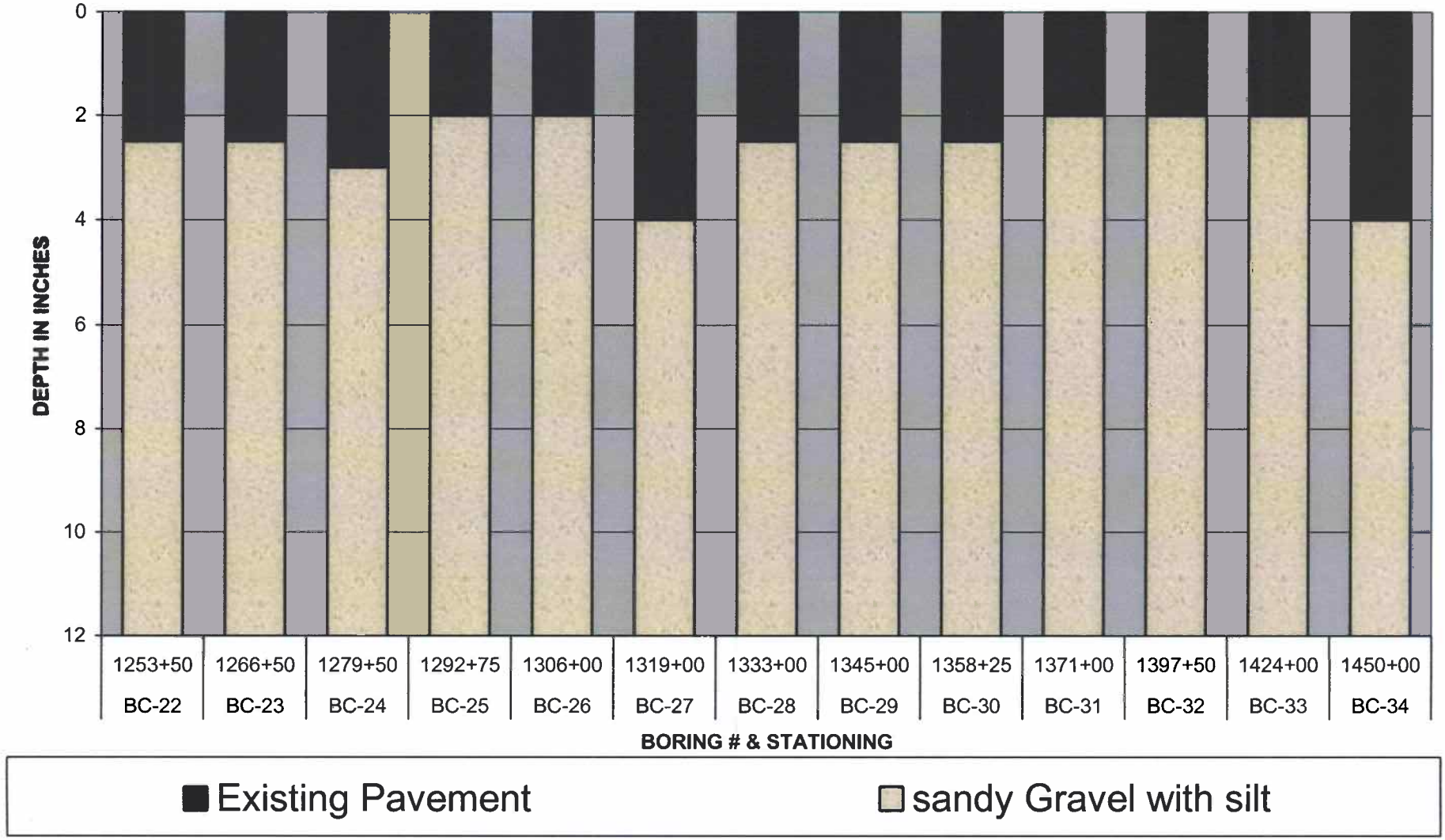


Chart 2

PAVEMENT & BASE COURSE THICKNESSES

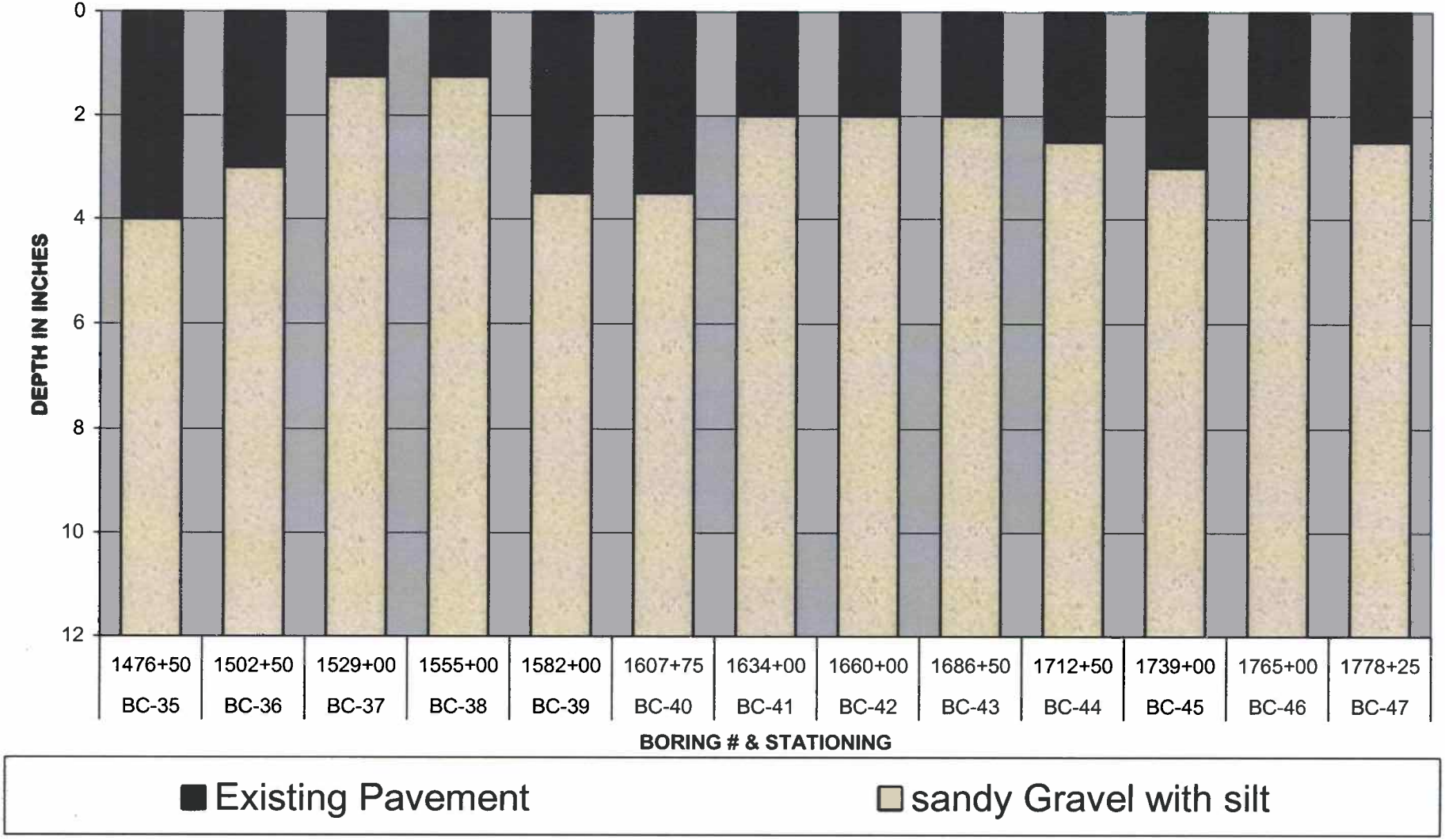


Chart 3

PAVEMENT & BASE COURSE THICKNESSES

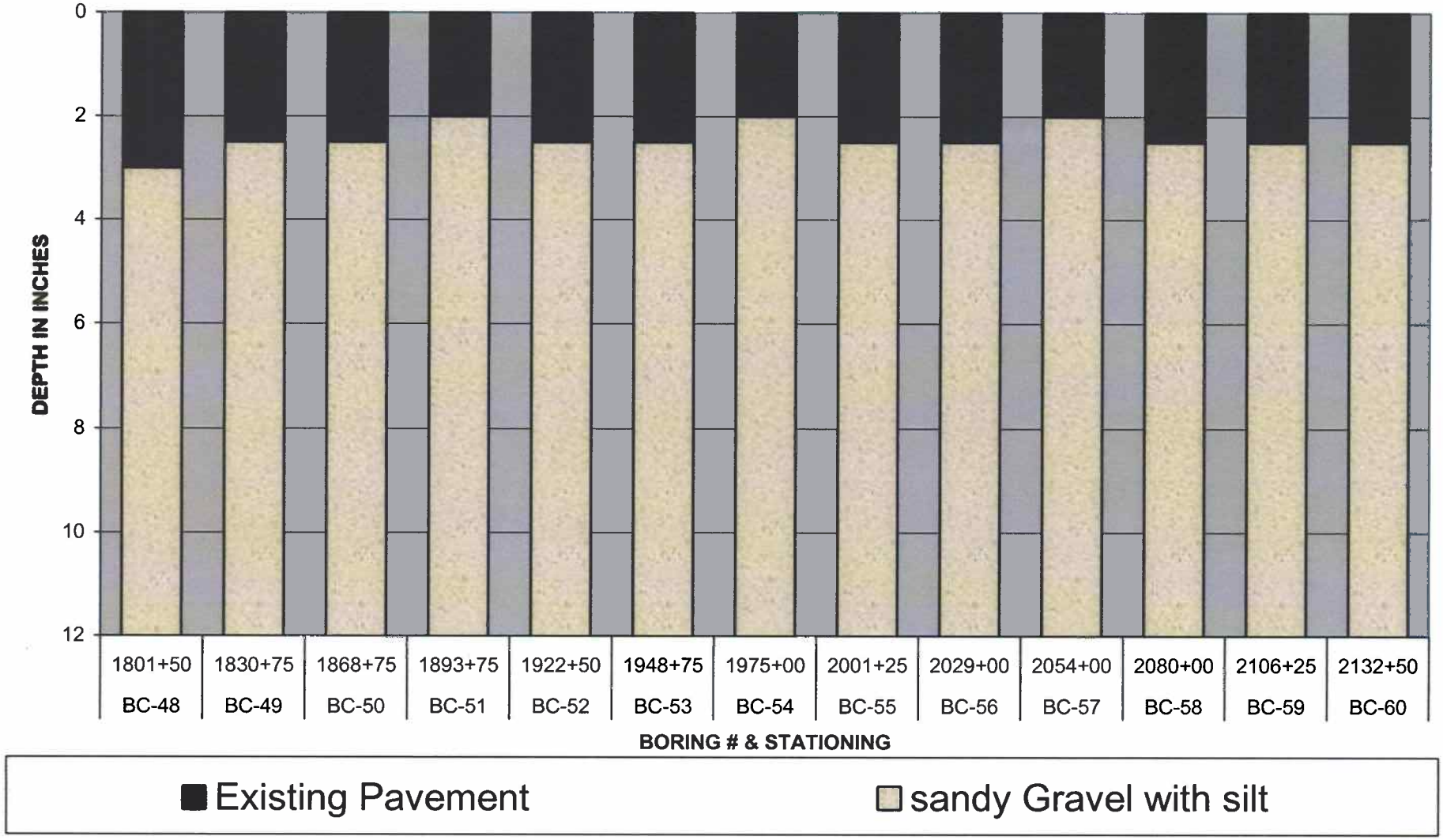


Chart 4

III. EXPLORATION

On April 5 & 6, 2005 a two-person crew from Western Technologies, Inc. was contracted to drilled either 1 foot or 5 foot borings using a CME 55 truck-mounted drill rig to determined pavement thicknesses, and to collected subgrade samples for laboratory testing. All the borings were drilled within the roadway. The National Park Service provided traffic control. All of the borings were located and logged by FHWA personnel. CFLHD staff completed visual identification of the soils and logged the borings. Eight samples were tested for R-Value, soil classification, and in-situ moisture contents. Eleven field tests using a dynamic cone penetronomer (DCP) were also performed during the investigation. Typical pavement distresses were recorded and photos were taken to further document the condition of the pavement. Laboratory test results and photographs of the boring locations are provided in the appendices in the back of this report.

The investigation began on the Mesquite Springs Road that leads to the campground. Mesquite Springs is not part of the 11(2) project but one sample is listed in the laboratory results in the appendix. The investigation for 11(2) Bonnie Clare Road then began from MP 7.7 to MP 34.1 at which point the drill rig broke down. The investigation continued the next day using a jackhammer to determine the mid-lane pavement thicknesses. Samples collected were then only down to 12 inches in depth. Values obtained from the DCP did not change between the investigative techniques, and all DCP & R-Values were excellent.

In addition, a materials investigation was conducted in August 1995. That investigation Report 95-14 by Ronald Andresen drilled the Bonnie Claire Road every 2 miles. Report 95-14 refers to Bonnie Claire Road as California State Highway 267, Scotty's Castle Road. Report 95-14 is included in Appendix F of Report #07-03.

IV. TEST RESULTS

The 11(2) project segment averaged 2.75" HACP thickness. No base course was present. Soil subgrades consisted of alluvial fan deposits, a mix of sand, gravel, cobbles, and silt. The lowest R-Value measured was 50 and the highest five R-Values ranged from 75 to 80. The R-Value of 50 was most likely due to the limitation of the laboratory testing procedure, the rock correction factor than the soil sample being any different from the other samples tested, and should be considered be equally as roadbed supportive as the other samples. The laboratory results matched up well with the laboratory results from the December 1995 report. See Appendix B for a summary of all the test results. The lab result stationing is metric.

Note: cobbles are present beneath the pavement. The cobbles were typically – 3 inch in size but areas of larger cobbles within the road reclaiming prism will be present. A visual survey of the surrounding foreslopes provides is a good indicator of the subgrade make-up.

V. PAVEMENT RECOMMENDATION

The NPS provided traffic counts. The reported ADT and truck loading are low. Even our minimal pavement design section easily exceeds the actual traffic loading the roadway will receive over its design lifetime.

The existing roadways have been chip sealed and repaired numerous times. The asphalt pavements have served their lifetime. The severity and faulting of the cracks eliminates overlay as an option. The subgrade soil is good to excellent material. For the pavement design, the design resilient soil modulus (M_r) is 18,000 psi; or equivalent R-Value= 60. The required structural number (SN) is 1.38; however Federal Lands minimum value is 1.52, so use 1.52.

CA PRA DEVA 11(2) Bonnie Claire Road:

MP 7.7 to MP 40.9 (Station 406+00 to 2158+10.79)
Average existing HACP thickness: 2.75 inches

Recommended Pavement Structural Section:

3 inches HACP
4 inches FDR – Pulverizing
SN = 1.68

A note on the typical sections should state 'reclaim to a depth of 4 inches or 1 inch below the full-depth of the pavement, whichever is larger. Pavement depth varies, varying from 4.5 inches to 1.25 inches, and averaging 2.75 inches.'

APPENDICES

A – Location Map

B – Laboratory Test Results

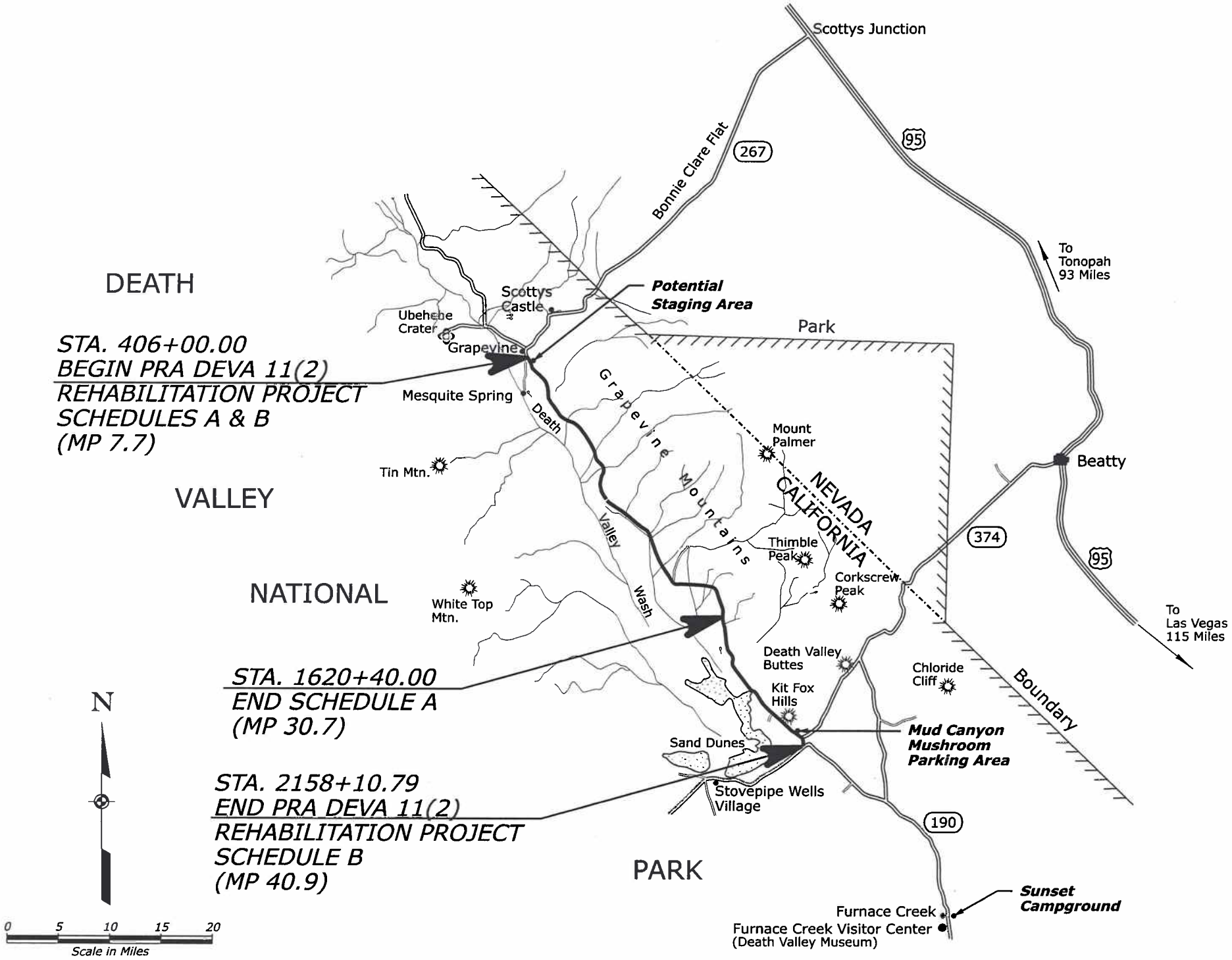
C – Photographs

D – Pavement Design Calculations

E – Field Data Summary

APPENDIX A

LOCATION MAP


DEATH
VALLEY
NATIONAL
PARK
STA. 406+00.00
BEGIN PRA DEVA 11(2)
REHABILITATION PROJECT
SCHEDULES A & B
(MP 7.7)
STA. 1620+40.00
END SCHEDULE A
(MP 30.7)
STA. 2158+10.79
END PRA DEVA 11(2)
REHABILITATION PROJECT
SCHEDULE B
(MP 40.9)
Scottys Junction
Bonnie Clare Flat
267
95
To Tonopah 93 Miles
Potential Staging Area
Scottys Castle
Ubehebe Crater
Grapevine
Mesquite Spring
Death Valley
Park
Grapevine Mountains
Mount Palmer
Tin Mtn.
NEVADA
CALIFORNIA
Beatty
374
95
Thimble Peak
Corkscrew Peak
White Top Mtn.
Valley Wash
To Las Vegas 115 Miles
Death Valley Buttes
Chloride Cliff
Kit Fox Hills
Boundary
Mud Canyon Mushroom Parking Area
Sand Dunes
Stovepipe Wells Village
190
Sunset Campground
Furnace Creek
Furnace Creek Visitor Center
(Death Valley Museum)
N
0 5 10 15 20
Scale in Miles

APPENDIX B

LABORATORY TEST RESULTS

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division Laboratory

An AASHTO and ISO Accredited Laboratory

AASHTO R18 ISO/IEC 17025

Report of Miscellaneous Tests

Project: California PRA DEVA 11 (2) Bonnie Clare Road

Laboratory Numbers: 05-(160-180)-SB

Date Reported: 4/29/2005

Submitted By: Steve Deppmeier

Material Type: Subgrade Soil

Material Source: Soil Borings

Tested For: AASHTO T 265 Moisture Content of Soils

Field Sample Numbers: See Below

Test Results

Laboratory Number	Field Number	Milepost or Station	Sample Depth	Moisture Content (%)
05-160-SB	MS-3	0.5	2" to 6"	6.2
05-161-SB	MS-6	1.25	2" to 5'	6.1
05-162-SB	MS-8	1.75	2" to 6"	5.0
05-163-SB	BC-11	33+797	3" to 8"	0.8
05-164-SB	BC-14	35+000	7" to 12"	2.0
05-165-SB	BC-16	35+801	5" to 10"	1.2
05-166-SB	BC-19	37+199	7" to 12"	0.5
05-167-SB	BC-20	37+600	6" to 12"	3.3
05-168-SB	BC-24	38+998	6" to 1.5'	3.6
05-169-SB	BC-24	38+998	1.5' to 5'	3.5
05-170-SB	BC-26	39+802	3" to 10"	2.9
05-171-SB	BC-28	40+630	5" to 10"	4.6
05-172-SB	BC-31	41+782	3" to 9"	3.4
05-173-SB	BC-41	49+800	4" to 10"	2.4
05-174-SB	BC-42	50+600	6" to 8"	4.5
05-175-SB	BC-43	51+400	2" to 6"	3.3
05-176-SB	BC-44	52+200	2.5" to 6"	2.0
05-177-SB	BC-48	54+909 Right	6" to 12"	4.7
05-178-SB	BC-48	54+909 C.L.	0" to 12"	2.5
05-179-SB	BC-52	58+600	0" to 12"	2.1
05-180-SB	BC-59	64+200	3" to 9"	2.5

All moisture samples were taken from sealed plastic bags.

Distribution:
Laboratory
Pavements
Materials

Num. / Project File
Darrell Harding
Steve Deppmeier
1 Copy

Reported By:

Darrell Harding

Form FHWA 1742 Rev. 12/01

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division Laboratory

An AASHTO and ISO Accredited Laboratory

AASHTO R18 ISO/IEC 17025

Report of Soil or Aggregate Tests

Project: California PRA DEVA 11 (2) Bonnie Clare Road

Submitted By: Steve Deppmeier

Date Reported: 04/29/2005

Sample Number	Lab Number		05-181-RV	05-182-RV	05-183-RV	05-184-RV	05-185-RV
	Hole Number		--	--	--	--	--
	Field Number		MS-6	BC-16	BC-24	BC-31	BC-43
Sample Location	Milepost / Station		1.25	35+801	38+998	41+782	51+400
	Offset		--	--	--	--	--
	Depth		2"-5'	4"-5'	3"-5'	2"-5'	0"-8"
AASHTO T 11, T 27 & T 88 Washed Sieve Analysis % Passing	3"	75.0 mm	100	100	100	100	100
	1 1/2"	37.5 mm	99	98	97	99	90
	1"	25.0 mm	97	93	91	94	84
	3/4"	19.0 mm	95	84	84	87	79
	1/2"	12.5 mm	91	65	73	73	70
	3/8"	9.5 mm	88	51	66	64	64
	#4	4.75 mm	74	31	49	44	51
	#8	2.36 mm					
	#10	2.00 mm	54	22	34	28	41
	#16	1.18 mm	44	19	27	23	28
	#30	600 µm					
	#40	425 µm	29	16	19	16	33
	#50	300 µm					
	#100	150 µm	15	17	13	10	26
	#200	75 µm	8.8	11	9.0	6.3	16
		20 µm					
		2 µm					
		1 µm					
AASHTO T 255	Moisture, %						
AASHTO T 89 & T 90	Liquid Limit		NV	NV	NV	NV	NV
	Plasticity Index		NP	NP	NP	NP	NP
Soil Classification	AASHTO M 145		SW-SM	GP-GM	GP-GM	GP-GM	GM
	ASTM D 2487		A-1-b (0)	A-1-a (0)	A-1-a (0)	A-1-a (0)	A-1-b (0)
AASHTO T 190	R –Value		76	80	80	78	50
AASHTO T 288	Min. Resistivity, ohm-cm						
AASHTO T 289	pH						
AASHTO Method	Optimum Moisture, %						
	Maximum Dry Density, pcf						

Distribution:
Laboratory — Num. / Project File
Darrell Harding
Pavements — Steve Deppmeier
Materials — 1 Copy

Remarks:

Reported By:

Darrell Harding

Form FHWA 1702 Rev. 12/01

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division Laboratory

An AASHTO and ISO Accredited Laboratory

AASHTO R18 ISO/IEC 17025

Report of Soil or Aggregate Tests

Project: California PRA DEVA 11 (2) Bonnie Clare Road

Submitted By: Steve Deppmeier

Date Reported: 04/29/2005

Sample Number	Lab Number		05-186-S	05-187-RV	05-188-S	05-189-RV
	Hole Number		--	--	--	--
	Field Number		BC-48	BC-52	BC-54	BC-59
Sample Location	Station		54+909	58+600	60+200	64+200
	Offset		--	--	--	--
	Depth		0"-12"	0"-12"	0"-12"	0"-12"
AASHTO T 11, T 27 & T 88 Washed Sieve Analysis % Passing	3"	75.0 mm		100		100
	1 1/2"	37.5 mm	100	96	100	99
	1"	25.0 mm	99	91	98	99
	3/4"	19.0 mm	95	85	95	98
	1/2"	12.5 mm	83	75	80	86
	3/8"	9.5 mm	76	68	72	77
	#4	4.75 mm	61	55	57	62
	#8	2.36 mm				
	#10	2.00 mm	49	45	45	50
	#16	1.18 mm	44	42	41	46
	#30	600 µm				
	#40	425 µm	36	37	34	38
	#50	300 µm				
	#100	150 µm	25	25	22	19
	#200	75 µm	14	12	9.4	9.0
		20 µm				
		2 µm				
		1 µm				
AASHTO T 255	Moisture, %					
AASHTO T 89 & T 90	Liquid Limit		NV	NV	NV	NV
	Plasticity Index		NP	NP	NP	NP
Soil Classification	AASHTO M 145		SM	GP-GM	SP-SM	SP-SM
	ASTM D 2487		A-1-b (0)	A-1-b (0)	A-1-b (0)	A-1-b (0)
AASHTO T 190	R –Value			76		75
AASHTO T 288	Min. Resistivity, ohm-cm					
AASHTO T 289	pH					
AASHTO Method	Optimum Moisture, %					
	Maximum Dry Density, pcf					

Distribution:
Laboratory — Num. / Project File
Darrell Harding
Pavements — Steve Deppmeier
Materials — 1 Copy

Remarks:

Reported By:

Darrell Harding

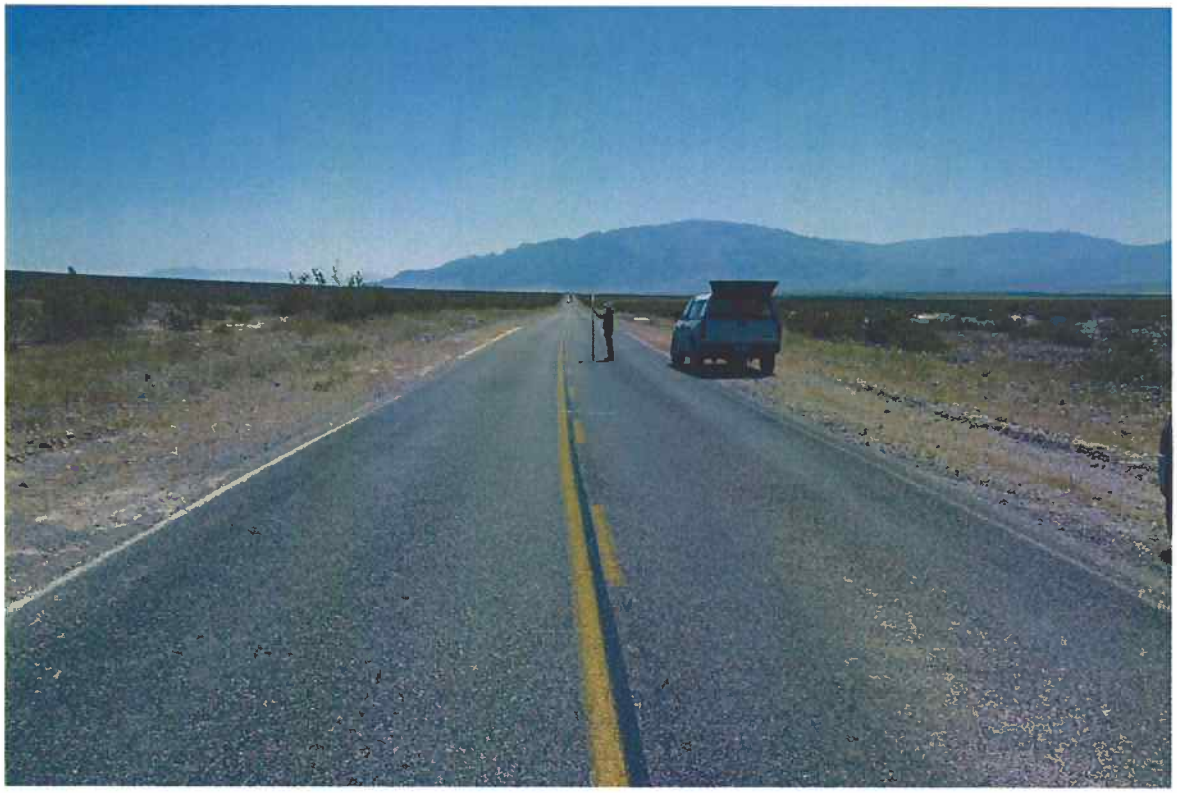
Form FHWA 1702 Rev. 12/01

APPENDIX C

PHOTOGRAPHS

MP 18.6 @ Boring BC-9 looking forward, south

MP 21.25 @ Boring BC-12 looking back, north



MP 22.5@ Boring BC-17 looking forward, south

MP 22.9 @ Boring BC-18, erosion left shoulder

MP 23.7 @ Boring BC-22, erosion right shoulder

MP 25.0 @ Boring BC-27 looking forward, south

MP 25.75 @ Boring BC-30, typical distress

MP 28.0 @ Boring BC-35 looking back, north

MP 30.9 @ Boring BC-41

MP 31.4 @ Boring BC-42 with grass in longitudinal crack

MP 31.9 @ BC-43 looking back, north, note cobbles on the shoulders

MP 33.7 @ BC-47 looking back, north

MP 34.1 @ BC-48, high severity edge cracking

MP 34.1 @ BC-48, pavement directly on subgrade

MP 34.7 @ BC-49 after the drill rig broke down

MP 37.9 @ BC-54 looking back, south, note cobbles on the shoulder

APPENDIX D

PAVEMENT DESIGN CALCULATIONS

1993 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Flexible Structural Design Module

Bonnie Claire

Flexible Structural Design

18-kip ESALs Over Initial Performance Period	61,872
Initial Serviceability	4.2
Terminal Serviceability	2
Reliability Level	75 %
Overall Standard Deviation	0.49
Roadbed Soil Resilient Modulus	18,000 psi
Stage Construction	1
Calculated Design Structural Number	1.38 in

Rigorous ESAL Calculation

Performance Period (years)	20
Two-Way Traffic (ADT)	547
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %
Percent Trucks in Design Direction	60 %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 18-kip ESALs over Performance Period
2	96	1	0.0008	0	2,016
4	1	1	0.88	0	23,102
5	2	1	0.2	0	10,501
8	1	1	1	0	26,253
Total	100	-	-	-	61,872

Growth	Simple
Total Calculated Cumulative ESALs	61,872

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(in)	Width (ft)	Calculated SN (in)
1	HACP	0.44	1	3	-	1.32
2	Pulverize	0.12	1	3	-	0.36
Total	-	-	-	6.00	-	1.68

1993 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Flexible Structural Design Module

Bonnie Claire

Flexible Structural Design

Structural Number	1.68 in
Initial Serviceability	4.2
Terminal Serviceability	2
Reliability Level	75 %
Overall Standard Deviation	0.49
Roadbed Soil Resilient Modulus	18,000 psi
Stage Construction	1
18-kip ESALs Over Initial Performance Period	184,691

Rigorous ESAL Calculation

Performance Period (years)	20
Two-Way Traffic (ADT)	122
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %
Percent Trucks in Design Direction	60 %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 18-kip ESALs over Performance Period
2	96	1	0.0008	0	450
4	1	1	0.88	0	5,153
5	2	1	0.2	0	2,342
8	1	1	1	0	5,855
Total	100	-	-	-	13,800

Growth	Simple
Total Calculated Cumulative ESALs	13,800

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(in)	Width (ft)	Calculated SN (in)
1	HACP	0.44	1	3	-	1.32
2	Pulverize	0.12	1	3	-	0.36
Total	-	-	-	6.00	-	1.68

Five Closest Weather Stations For Latitude/Longitude= 36.477/116.862
Report Date: 3/16/2009
(LTPPBind V3.0 Alpha)

FIVE Closest WS Report Title

General	A=1 km	B=36 km	C=38 km	D=64 km	E=76 km
Station ID	CA2319	NV0150	CA9671	NV0718	NV2251
County/District	inyo	nye	inyo	nye	nye
Weather Station	death valley	amargosa ranch	wildrose r s	beatty 8 n	desert rock
Elevation, m	-55	694	1161	1005	935
Latitude, Longitude	36.47 ,116.87	36.57 ,116.47	36.27 ,117.18	37 ,116.72	36.62 ,116.02
Last Year Data Available	1997	1997	1997	1997	1994

Air Temperature	Mean (Std, N)	Mean (Std, N)	Mean (Std, N)	Mean (Std, N)	Mean (Std, N)
High Temperature	49.4 (12,35)	42.7 (15,23)	38.3 (9,27)	39.2 (11,24)	40.6 (12,12)
Low Temperature	-3.4 (31,35)	-8.6 (28,22)	-9.5 (29,27)	-11.1 (28,25)	-8.2 (30,10)
Low Temperature Drop	24.7 (35,35)	26.5 (21,22)	21.8 (23,27)	24.9 (14,25)	21 (11,10)
Degree-Days > 10C	5862 (215,35)	4717 (189,23)	3721 (200,27)	3896 (206,24)	4138 (154,12)

PG	High Low Rel.	High Low Rel.	High Low Rel.	High Low Rel.	High Low Rel.
Pavement Temperature, C	73.3 -00.6	68.9 -04.4	63.0 -04.9	64.2 -06.3	65.7 -04.1
50% Reliability PG	76-10 (98,98)	70-10 (89,97)	64-10 (90,95)	70-10 (98,90)	70-10 (98,97)
>50% Reliability PG		76-10 (98,97)	70-10 (98,95)	70-16 (98,98)	70-16 (98,98)
=		76-16 (98,98)	70-16 (98,98)		
=					
=					
=					

APPENDIX E

FIELD DATA SUMMARY

CA PRA DEVA 11(2) BONNIE CLAIRE ROAD

Sampled By: S.DEPPMEIER
J. Walters

Investigation used metric stationing. Stationing was then converted to feet and is therefore approxmate. Pavement condition notes as of April 2005, time of the investigation.

SAMPLE ID	STATIONING	ASPHALT THICKNESS	DCP mm/Blow	Roadwidth	Benchwidth	BORING DEPTH	MATERIAL	AASHTO	ASTM	R-Value	MC%	Notes
BC-9	98+425	3"		20.5'	30'	1'	sandy gravel, -1" round rock					No cracks, rough texture, old c.s., pop out left edge
BC-10	1096+00	3"		19.6'	30'	1'	sandy gravel w/silt					No cracks, chip seal (c.s.) beginning to ravel
BC-11	1109+00	2.5"		20.2'	30'	1'	native: sandy gravel w/silt				0.8	No cracks, rough surface, roadway out of template
BC-12	1122+00	4"		20.5'	30'	3.5'	good material: sandy gravel, -2"					No cracks, just rough texture, out of template
BC-13	1135+00	3.75"					good material: sandy gravel, -2"					New flood debris; rough texture, no cracks
BC-14	1148+00	4"	2.9	20.2'	30'	7"					2.0	No cracks; DCP bbouncing @ 10" depth
BC-15	1161+00	2.5"		20.4'	35'		sandy gravel w/silt - as before					No cracks, c.s. is gouged,
BC-16	1174+50	4"		20.8'	40'	5'	sandy gravel w/silt - as before	A-1-a (0)	GP-GM	80	1.2	1st distress, heaved a little in mid lanes
BC-17	1188+00	4"		20.4'	40'		sandy gravel w/silt - as before					Native c.s. raveling, low severity transverse cracking
BC-18	1207+50	3"		20.5'			sandy gravel w/silt - as before					Erosion left edge
BC-19	1220+50	4"	4.1	20.5'	30'	8"	sandy gravel w/silt - as before				0.5	DCP @ too much angle @ 16" depth
BC-20	1233+75	4"		20.0'	25'	2'	sandy gravel w/silt - as before				3.3	Drilled to 2', too rocky, quit; pavement distress now, low severity block & transverse cracking
BC-21	1240+50	4.5"		20.6'	30'		sandy gravel w/silt - as before					Moderate severity long & block cracking
BC-22	1253+50	2.5"		20.4'	30'		sandy gravel w/silt - as before					Moderate severity long & low edge, erosion rt edge
BC-23	1266+50	2.5"		20.8'			sandy gravel w/more silt					More silt than seen before & more moisture; chip seal raveling, rough texture, & low severity block cracking
BC-24	1279+50	3"		20.8'	30'	5'	sandy gravel w/more silt	A-1-a (0)	GP-GM	80	3.6	As BC-23 to 1.5', lense of course sand, then same old same old w/less silt
BC-25	1292+75	2"		20.7'			sandy gravel w/silt - as before					Low severity transverse, longitudinal, & block, older chip seal and is raveling
BC-26	1306+00	2"	rock @ 6"	20.4'		6"	sandy gravel w/silt - as before				2.9	DCP hit rock immediately; moderate long & block
BC-27	1319+00	4"		20.6'	40'		sandy gravel w/silt - as before					Significant distress, high severity trans, long, & block
BC-28	1333+00	2.5"		19.5'		5'	sandy gravel w/silt				4.6	Drilled to 5', too rocky to sample; mod long & block
BC-29	1345+00	2.5"		20.9'	40'		sandy gravel w/silt					HACP includes 0.25" oiled gravel, mod long & block
BC-30	1358+25	2.5"	rocky	19.7'	30'		as before, too rocky for DCP					HACP 2.5" + native oild gravel; begin stripping, moderate transverse, longitudinal, & block cracking
BC-31	1371+00	2"		20.0'	50'	5'	sandy gravel w/silt	A-1-a (0)	GP-GM	78	3.4	X' w/ Titus Canyon, High severity longitudinal & alligator cracking
BC-32	1397+50	2"					sandy gravel w/silt					Native oild & oxidized gravel, beyond the outside of chip seal, this was easily fractured by hammer & then by finger
BC-33	1424+00	2"		23'	30'							
BC-34	1450+00	4"	4.2			4"						DCP too skewed @ 12" depth to continue
BC-35	1476+50	4"					sandy gravel w/silt					HACP 4": most likely native oiled gravel, easily fractured moderate to high severity trans, long, & block
BC-36	1502+50	3"					@ alluvial fan, edge of mtns, really good material					HACP 3": @ edge, 9" past the c.s. most likely native oiled gravel

SAMPLE ID	STATIONING	ASPHALT THICKNESS	DCP mm/Blow	Roadwidth	Benchwidth	BORING DEPTH	MATERIAL	AASHTO	ASTM	R-Value	MC%	Notes
BC-37	1529+00	1.25"										HACP: west lane 1", east lane 1.5"; @ Alluvial Pullout Info
BC-38	1555+00	1.25"		23.1'								
BC-39	1582+00	3.5"		23.8'	30'		sandy gravel w/silt					High severity edge & moderate transverse
BC-40	1607+75	3.5"		23.1'								
BC-41	1634+00	2"	2.7	20.7'		4"	good material: native sandy gravel w/silt				2.4	DCP stopped @ 9" depth due to bouncing; high serverity transverse, longitudinal, & block cracking
BC-42	1660+00	2"									4.5	High severity trans, long, & block, edge curling up
BC-43	1686+50	2"	3.3	20.5'		8"		A-1-b (0)	GM	50	3.3	High severity trans, moderate longitudinal & block cracking
BC-44	1712+50	2.5"	3.0			8"	good material: native sandy gravel w/silt as @ BC-43				2.0	Shiny HACP, newer, patch?, c.s. not as old, high severity edge
BC-45	1739+00	3"		20.9'			as @ BC-44					High severity transverse & edge, pave curling up
BC-46	1765+00	2"		19.8'								
BC-47	1778+25	2.5"		20.5'			native sandy gravel w/silt					High severity trans & edge, and moderate block
BC-48	1801+50	3"	3.2	19.8'		12"	native sandy gravel w/silt	A-1-b (0)	SM	-	4.7	High severity trans & edge, lots of pave chunks, narrow road
BC-49	1830+75	2.5"		19.7'			native sandy gravel w/silt					
BC-50	1868+75	2.5"		20.0'	flat		native sandy gravel w/silt					
BC-51	1893+75	2"		19.5'			native sandy gravel w/silt					High severity trans, moderate block, & low alligator
BC-52	1922+50	2.5"	2.6	20.2'		12"		A-1-b (0)	GP-GM	76	2.1	DCP not progressing, began @ 3.5" and stopped @ 9" in depth; sampled instead
BC-53	1948+75	2.5"										High severity trans & edge, moderate long & block
BC-54	1975+00	2"		20.2'		12"	good material: sandy gravel w/silt	A-1-b (0)	SP-SM	-		Native oiled gravel at 9" depth; 1st crack sealant, high severity transverse & longitudinal cracking
BC-55	2001+25	2.5"		19.6'			sandy gravel w/silt					@ turn-off to Stovepipe Wells Landmark; edge patching, high severity transverse, longitudinal & block cracking
BC-56	2029+00	2.5"		20.0'			sandy gravel w/silt					High severity transverse, and edge, losing chunks of pavement, rough texture surface as all
BC-57	2054+00	2"		20.3'			sandy gravel w/silt					High severity edge & transverse cracking
BC-58	2080+00	2.5"					sandy gravel w/silt					
BC-59	2106+25	2.5"	2.5	20.1'		12"	sandy gravel w/silt	A-1-b (0)	SP-SM	75	2.5	DCP not progressing, began @ 3" and stopped @ 8" in depth
BC-60	2132+50	2.5"		19.9'			sandy gravel w/silt					End of investigation