MOJA
Cycle 6

Final Report

Road Inventory and Condition Assessment of Paved Routes
Mojave National Preserve

Federal Lands Highway
Road Inventory Program

Prepared By:
Federal Highway Administration
Eastern Federal Lands Highway Division
Road Inventory Program (RIP)

Report Date: November 2015

Mojave National Preserve
in
California

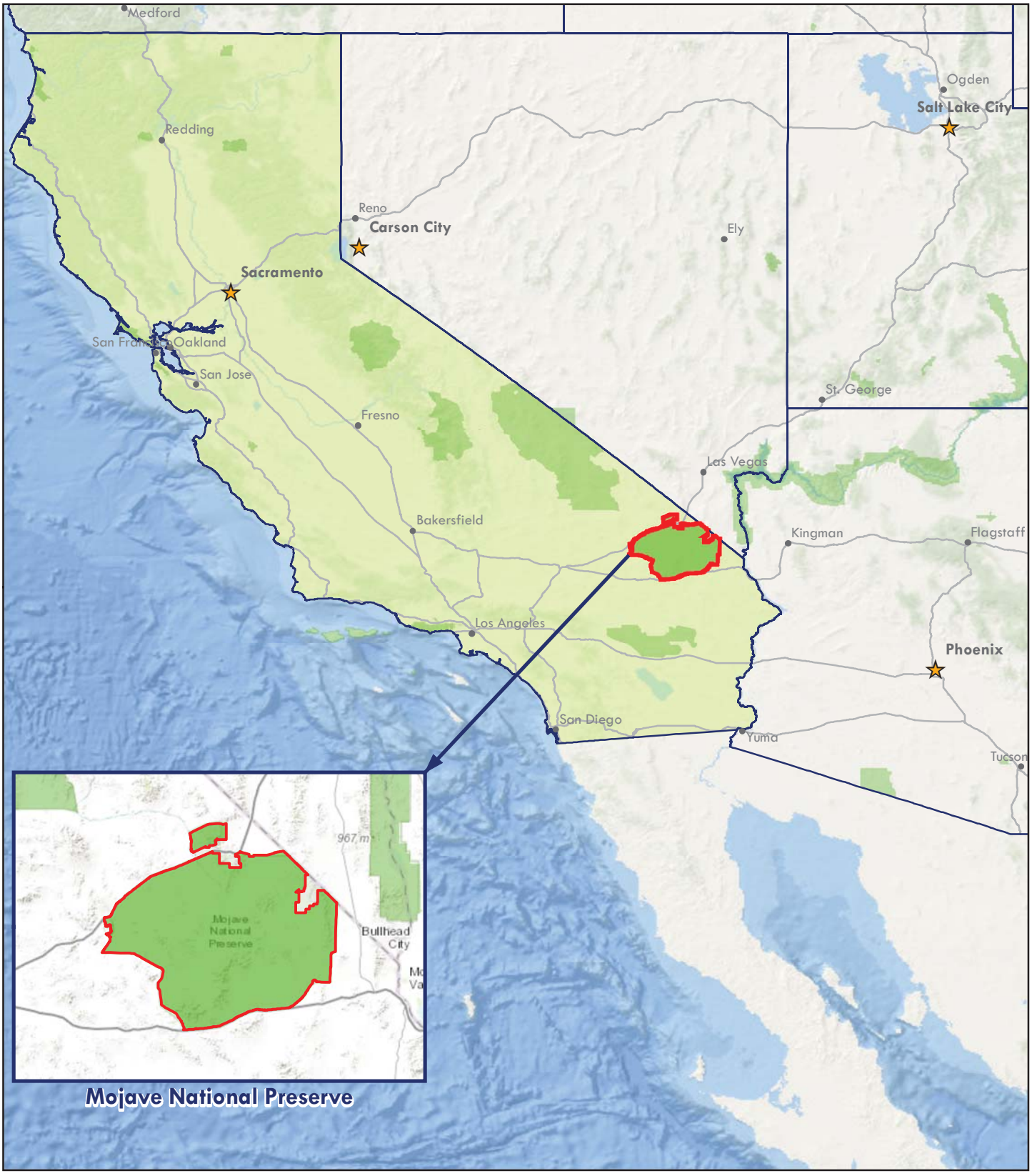

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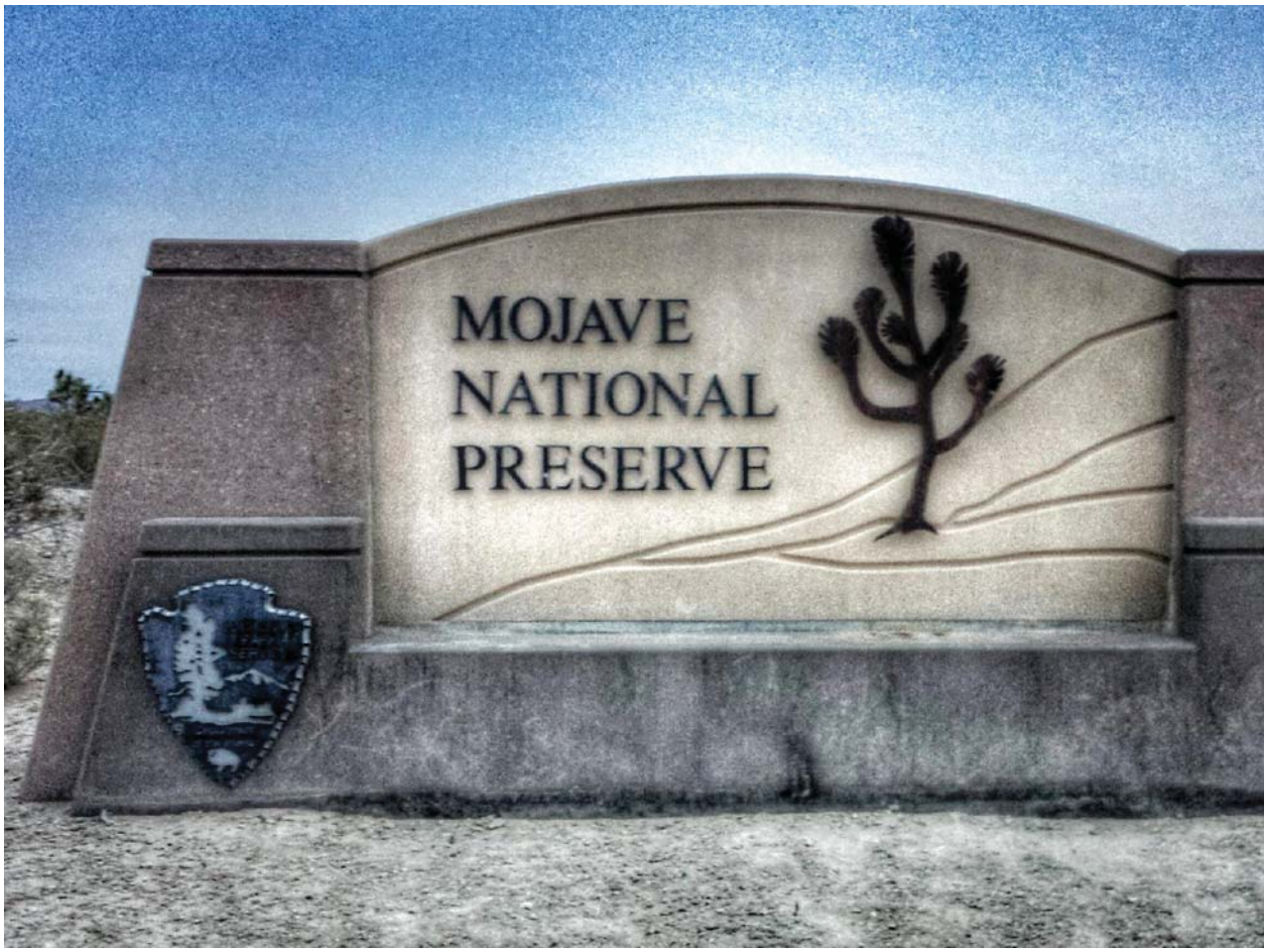
Table of Contents

Section 1
Introduction



Mojave National Preserve

Federal Lands Highway
Road Inventory Program

Introduction

The Federal Highway Administration's (FHWA), Road Inventory Program (RIP) inventories all roads and parking areas in the National Park System, and performs condition inspections on all paved roads and parking areas for the National Park Service (NPS). This report contains the results of the Cycle 6 condition assessment of paved roads and parking lots for this park unit. This assessment was done using an automated, state-of-the-art pavement inspection vehicle as well as manual ratings. This information represents the condition of the paved assets at the time of the inspection. The pavement management system utilized by FHWA and the NPS uses these assessments to estimate future conditions and help prioritize pavement maintenance and rehabilitation projects. Further information about RIP data and its role in managing paved roads and bridges can be obtained by contacting the NPS Regional Transportation Program Manager.

A History of the Road Inventory Program:

The FHWA, in the mid-1970s, was charged with the task of identifying surface condition deficiencies and corrective priorities on NPS roads and parkways. Additionally, FHWA was tasked with establishing an integrated maintenance features inventory, locating features such as culverts, guardrails, and signs, among others, along NPS roads and parkways. As a result, in 1976 the NPS and FHWA entered into a Memorandum of Agreement (MOA) which established the RIP. This MOA was revised in 1980 to update RIP data collection standards and develop a long-range program to improve and maintain NPS roads to designated condition standards and establish a pavement management program.

The FHWA completed the initial phase of inventory in the early 1980s. As a result of this effort, each NPS unit included in the collection received a RIP Report known as the "Brown Book" which contained information that was inventoried during this first RIP phase. In the 1990s, a cyclical program was developed, and since then five cycles of collection have been completed. Cycle 6 is currently in progress. A summary of the RIP collection cycles is shown in the table below.

Cycle	Years	Parks Collected
Cycle 1	1994 - 1997	° 44 Large Parks
Cycle 2	1997 - 2001	° 79 Large Parks ° 5 Small Parks
Cycle 3	2001 - 2004	° All Large Parks ° All Small Parks
Cycle 4	2006 - 2010	° 86 Large Parks ° Several Small Parks
Cycle 5	2010 - 2014	° All Large Parks (Only functional class 1, 2, 7, and new/modified routes collected) ° All Small Parks (all roads and parking areas collected)
Cycle 6	2014 – 2020 (±)	° All roads and parking areas collected at all Parks ° Additional partial collections of functional class 1, 2, and 7 roads at Large Parks ° Cycle 6 is expected to last 6 years

Note: Large Parks have ≥ 10 Paved Miles; Small Parks have < 10 Paved Miles

Since 1984, the Road Inventory Program has been funded through the Federal Lands Highway Park Roads and Parkways (PRP) Program. Currently, coordination of the RIP with Federal Lands Highway (FLH) is under the NPS Washington Headquarters Park Facility Management Division. The FLH Washington office coordinates policy and prepares national reports and needs assessment studies for Congress.

In 1998, the Transportation Equity Act for the 21st Century (TEA-21) amended Title 23 U.S.C., and inserted Section 204(a)(6) requiring the FHWA and NPS, to develop by rule, a Pavement Management System (PMS) applied to park roads and parkways serving the National Park System.

In 2012, the Moving Ahead for Progress in the 21st Century Act (MAP-21) amended Title 23 U.S.C., and under Section 203(c)(1-2) stated that the National Park Service in cooperation with the DOT/FHWA, shall maintain a comprehensive national inventory of their transportation facilities, with the goal of quantifying transportation infrastructure needs within the National Park System.

A History of the Pavement Management System:

In 2005, the FHWA began implementing the use of a pavement management system to assist the NPS in prioritizing Pavement Maintenance and Rehabilitation activities. The system used by FHWA is the Highway Pavement Management Application (HPMA), which has the ability to store inventory and condition data from RIP and forecast future performance using prediction models. Outputs include performance and condition reports at the National, Regional, Park, or Route level. Regional prioritized lists and optimizations have been produced for most regions, and the Service's overall roadway Deferred Maintenance is calculated via the HPMA.

Overview of Cycle 6:

Cycle 6 launched in the spring of 2014 and will again comprise all NPS park units that are served by paved roads and/or parking areas. For Cycle 6, all paved roads (approximately 5,700 miles) and parking areas will be collected in all parks at least once, while the primary routes (functional class 1, 2, and 7 roads) at Large Parks will have additional collections. These multiple collections will provide updated condition data on a majority of the NPS's primary road network and help build a better pavement management system, allowing for more accurate pavement performance prediction models.

FLH is responsible for the accuracy of all data presented in this report. Any questions or comments concerning the contents of this report should be directed to the national RIP Coordinator located in Sterling, Virginia.

Respectfully,

FHWA RIP Team

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Sterling, VA 20166
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12300 West Dakota Ave
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Section 2
Park Route Inventory

Mojave National Preserve

Federal Lands Highway
Road Inventory Program

Cycle 6 NPS / RIP Route ID Report

Report Date: 11/30/2015

(Numerical By Summary Route and Subcomponent #)

Federal Lands Highway
Road Inventory Program

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= Concession Route

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MOJA *Mojave National Preserve*

ROAD INVENTORY (1100 SERIES FMSS LOCATIONS)

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Name	Route Description From	Route Description To	Maintenance District	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)	Surf. Type	Area Map
0010	6	1	111378		KELBAKER ROAD	FROM NORTH PARK BOUNDARY AT END OF THE EXIT RAMP OF INTERSTATE 15 (TEMECULA VALLEY FREEWAY)	TO SOUTH PARK BOUNDARY AT CATTLE GUARD	CINDER CONES	56.98	0.00	56.98	1		AS	1
0011	6	1	111377		KELSO-CIMA ROAD	FROM ROUTE 0010 (KELBAKER ROAD) AT MP 34.63 ON LEFT	TO INTERSECTION OF ROUTE 0012 (CIMA ROAD) AND ROUTE 0013 (MORNING STAR MINE ROAD)	MID HILLS	18.96	0.00	18.96	1		AS	1
0012	6	1	73955		CIMA ROAD	FROM INTERSECTION OF ROUTE 0011 (KELSO-CIMA ROAD) AND ROUTE 0013 (MORNING STAR MINE ROAD)	TO END OF EXIT RAMP AT INTERSTATE 15 (TEMECULA VALLEY FREEWAY)	STANDARD MINING	17.64	6.80	24.44	1		AS	1
0013	6	1	111380		MORNING STAR MINE ROAD	FROM INTERSECTION OF ROUTE 0011 (KELSO-CIMA ROAD) AND ROUTE 0012 (CIMA ROAD)	TO ROUTE 0014 (IVANPAH ROAD) AT MP 2.74 ON RIGHT	MORNING STAR MINE	14.99	0.00	14.99	1		AS	1
0014	6	1	108996		IVANPAH ROAD	FROM END OF ROUTE 5003 (IVANPAH ROAD (EXTENSION))	TO UNPAVED SECTION	OX RANCH	11.57	18.70	30.27	1		AS	1
0016	6	1	105480		CEDAR CANYON ROAD	FROM ROUTE 0011 (KELSO-CIMA ROAD) AT MP 14.34 ON RIGHT	TO UNPAVED SECTION	MID HILLS	2.35	18.00	20.35	1		AS	1
0017	6	1	105481		BLACK CANYON ROAD	FROM ROUTE 0018 (ESSEX ROAD) AT MP 9.71 ON RIGHT	TO UNPAVED SECTION	HOLE IN THE WALL	10.15	11.08	21.23	1		AS	1
0018	6	1	111379		ESSEX ROAD	FROM INTERSTATE 40 (NEEDLES FREEWAY) SOUTH PARK BOUNDARY AT CATTLE GUARD	TO CA STATE PARK BOUNDARY AT CATTLE GUARD	PROVIDENCE MOUNTAINS	13.79	0.00	13.79	1		AS	1
0100	6	1	73952		ZZYZX ROAD	FROM END OF EXIT RAMP AT INTERSTATE 15 (TEMECULA VALLEY FREEWAY)	TO ROUTE 0902 (ZZ PARKING AREA) AT MP 4.71	ZZYZX	4.47	0.22	4.69	2		AS	1
0101	NC		73950		WILDHORSE CANYON ROAD	FROM BLACK CANYON ROAD	TO BLACK CANYON ROAD		0.00	13.00	13.00	2		GR	

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0200	NC		73843		MH CAMPGROUND ROAD	FROM WILD HORSES CANYON ROAD	TO END OF LOOP		0.00	1.00	1.00	3		NV	
0202	NC		73951		KELSO DUNES ROAD	FROM ROUTE 0010 (KELBAKER ROAD) AT MP 42.48 ON RIGHT	TO DEAD END		0.00	4.25	4.25	3		GR	
0205	NC		73954		VALLEY VIEW ROAD	FROM DEER SPRINGS ROAD	TO ROUTE 0012 (CIMA ROAD) AT MP 7.66 ON LEFT		0.00	2.00	2.00	3		NV	
0210	NC		73959		HW VISITOR CENTER/PICNIC AREA ROAD	FROM BLACK CANYON ROAD	TO DEAD END		0.00	0.40	0.40	3		NV	
0212	NC		73961		HW CAMPGROUND ROAD	FROM ROUTE 0017 (BLACK CANYON ROAD) AT MP 10.04 ON LEFT	THROUGH CAMPGROUND		0.00	0.97	0.97	3		NV	
0213	NC		84595		ROCK HOUSE ROAD	FROM CEDAR CANYON ROAD	TO DEAD END		0.00	0.20	0.20	4		NV	
0214	NC		73953		QUAIL BASIN ROAD	FROM KELBAKER ROAD	TO TRAILHEAD		0.00	1.00	1.00	4		NV	
0215	NC		73958		HW FIRE CENTER ROAD	FROM ROUTE 0017 (BLACK CANYON ROAD) AT MP 9.78 ON RIGHT	TO ROUTE 0017 (BLACK CANYON ROAD) AT MP 9.95 ON RIGHT		0.00	0.75	0.75	3		NV	
0216	NC		73960		ROCKIN L ROAD	FROM BLACK CANYON ROAD	TO HOUSE		0.00	1.00	1.00	4		NV	
0217	NC		73962		NUMBER 2 WELL ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0218	NC		73963		FIRE CENTER NUMBER 2 ACCESS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0219	NC		86723		MOJAVE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0220	NC		94507		HART MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0221	NC		105482		CARUTHERS CANYON ROADD	FROM	TO		0.00	0.00	0.00	4		NV	
0222	NC		105484		GLOBE MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	

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0223	NC		105485		MACEDONIA SPRINGS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0224	NC		105486		CHICKEN WATER SPRINGS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0225	NC		106419		NEW YORK MOUNTAINS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0226	NC		106422		HACKBERRY SPRINGS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0227	NC		106426		COYOTE SPRINGS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0228	NC		106427		AIKEN ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0229	NC		106429		STANDAROAD MINING DISTRICT ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0230	NC		106430		CORNFIELD SPRING ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0231	NC		106432		SLAUGHTERHOUSE SPGS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0232	NC		106440		BONANZA KING ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0233	NC		108628		HIDDEN HILLS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0234	NC		108629		ARROWEED SPRINGS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0235	NC		108631		SOUTH GAS LINE	FROM	TO		0.00	0.00	0.00	4		NV	
0236	NC		108632		VULCAN MINE ROAD.	FROM	TO		0.00	0.00	0.00	4		NV	
0237	NC		108633		REX MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0238	NC		108634		BIGHORN MINE ROAD.	FROM	TO		0.00	0.00	0.00	4		NV	

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0239	NC		108635		SILVER KING MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0240	NC		108636		FOROAD DRY LAKE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0241	NC		108637		WATSON WASH ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0242	NC		108639		GOVERNMENT HOLES ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0243	NC		108640		LIVE OAK SPRING ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0244	NC		108641		COTTONWOOD ROAD.	FROM	TO		0.00	0.00	0.00	4		NV	
0245	NC		108643		COTTONWOOD ROAD SPUR 1	FROM	TO		0.00	0.00	0.00	4		NV	
0246	NC		108644		COTTONWOOD ROAD SPUR 2	FROM	TO		0.00	0.00	0.00	4		NV	
0247	NC		108645		BURRO SPRINGS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0248	NC		108646		PIUTE VALLEY ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0249	NC		108647		DEER SPRINGS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0250	NC		108649		COW COVE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0251	NC		108650		HENRY SPRINGS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0252	NC		108995		BUDWISER SPRING ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0253	NC		108998		AVILA RANCH (RANCHO AVENUE)	FROM	TO		0.00	0.00	0.00	4		NV	
0254	NC		109000		ROAD SOUTH POWERLINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	

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0255	NC		109046		ROAD BILLY BOY MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0256	NC		109047		ROAD BULLION MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0257	NC		109048		ALLURED MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0258	NC		109049		MORNING STAR CUTOFF	FROM	TO		0.00	0.00	0.00	4		NV	
0259	NC		109050		KELSO ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0260	NC		109051		BRANNIGAN MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0261	NC		109052		NORTH POWERLINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0262	NC		109053		CLIPPER VALLEY ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0263	NC		109054		BORREGO CANYON ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0264	NC		109055		UP RAILROAD ACCESS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0265	NC		109066		FENNER VALLEY ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0266	NC		109067		SIX MILE TANK ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0267	NC		109083		FOURTEENMILE TANK ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0268	NC		109084		SADDLE HORN ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0269	NC		109085		ONDIAN SPRINGS TRAIL ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0270	NC		109086		INDIAN SPRINGS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	

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0271	NC		109087		MORNING STAR ACCESS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0272	NC		109088		PRESIDENTS MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0273	NC		109092		5 POINT CUTOFF	FROM	TO		0.00	0.00	0.00	4		NV	
0274	NC		109131		EVENING STAR MINE AREA ACCESS ROADS	FROM	TO		0.00	0.00	0.00	4		NV	
0275	NC		109132		STRIPED MOUNTAIN ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0276	NC		109133		JOHNNY MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0277	NC		109134		ROGERS CAMP ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0278	NC		109138		TELEGRAPH ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0279	NC		109139		NEW ERA MINES ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0280	NC		109140		PIUTE MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0281	NC		109279		STANDAROAD LOOP	FROM	TO		0.00	0.00	0.00	4		NV	
0282	NC		109280		BETTY JANE MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0283	NC		109281		BUTTON MOUNTAIN ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0284	NC		109282		GROTTO HILLS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0285	NC		109283		HANK'S MOUNTAIN ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0286	NC		109284		LEVI MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0287	NC		109285		PETROLEUM PIPELINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	

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Yellow = Unpaved Routes, DCV not Driven	Blue = Paved Parking Areas	Green = Unpaved Parking Areas	

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NC = Not Collected

MOJA *Mojave National Preserve*

ROAD INVENTORY (1100 SERIES FMSS LOCATIONS)

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Name	Route Description From	Route Description To	Maintenance District	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)	Surf. Type	Area Map
0288	NC		109286		REST STOP ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0289	NC		109287		PHONE BOOTH ROAD-OLD POWERLINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0290	NC		109288		SILVERADO MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0291	NC		109289		SQUAT HILL ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0292	NC		109290		STANDAROAD MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0293	NC		109291		WHITE EAGLE MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0294	NC		109292		WOODS WASH	FROM	TO		0.00	0.00	0.00	4		NV	
0295	NC		109293		ZOLTEC MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0296	NC		109327		DEER SPRINGS PIPELINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0297	NC		109328		TEUTONIA PEAK ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0298	NC		109329		7IL RANCH ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0299	NC		109330		BEARCLAW WELL ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0300	NC		109331		AIRPORT ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0301	NC		109332		BARBER MOUNTAIN ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0302	NC		109333		CIMA WATER ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0303	NC		109334		CLARK WILDERNESS BOUNDARY ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0304	NC		109335		COLTON HILLS	FROM	TO		0.00	0.00	0.00	4		NV	

Cycle 6 NPS / RIP Route ID Report

Report Date: 11/30/2015

(Numerical By Summary Route and Subcomponent #)

Federal Lands Highway
Road Inventory Program

Shading Color Key

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MOJA *Mojave National Preserve*

ROAD INVENTORY (1100 SERIES FMSS LOCATIONS)

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Name	Route Description From	Route Description To	Maintenance District	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)	Surf. Type	Area Map
0305	NC		109336		CONNER ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0306	NC		109337		CONSTELLATION MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0307	NC		109338		COPPER KING MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0308	NC		109339		CUT SPRING ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0309	NC		109340		EASTER ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0310	NC		109341		GOLD BUTTON MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0311	NC		109342		NELSON'S COPPER CAMP ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0312	NC		109343		PINK FALCON ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0313	NC		109344		MAX DOR ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0314	NC		109345		PACHALKA ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0315	NC		109346		BLUE JAY MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0316	NC		109347		MARL SPRINGS ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0317	NC		109348		YATES WELL ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0318	NC		116547		COLOSSEUM MINE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0319	NC		238423		CIMA RESIDENCE ROAD	FROM	TO		0.00	0.00	0.00	4		NV	
0400	NC		73957		KESSLER SPRINGS ROAD	FROM ROUTE 0012 (CIMA ROAD) AT MP 4.24 (ON RIGHT)	TO ROUTE 0012 (CIMA ROAD) AT MP 4.70 ON RIGHT		0.00	1.40	1.40	5		NV	

Cycle 6 NPS / RIP Route ID Report

Report Date: 11/30/2015

(Numerical By Summary Route and Subcomponent #)

Federal Lands Highway
Road Inventory Program

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MOJA *Mojave National Preserve*

ROAD INVENTORY (1100 SERIES FMSS LOCATIONS)

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Name	Route Description From	Route Description To	Maintenance District	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)	Surf. Type	Area Map
0401	NC		73956		OX ROAD	FROM IVANPAH ROAD	TO HOUSE		0.00	0.50	0.50	5		NV	
0402	6	1	113329		BAKER RESIDENTIAL ROAD	FROM CALTRANS AVENUE	TO PARKING		0.00	0.00	0.00	5	6,826	AS	1

NON-NPS ROADS INVENTORY

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Name	Route Description From	Route Description To	Maintenance District	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)	Surf. Type	Area Map
5000	4	1			NIPTON ROAD	FROM END OF EXIT RAMP AT INTERSTATE 15 (TEMECULA VALLEY FREEWAY)	TO CA/NV STATE BOUNDARY		12.94	0.00	12.94			AS	1
5001	4	1			GOFFS ROAD	FROM END OF EXIT RAMP AT INTERSTATE 40 (NEEDLES FREEWAY)	TO INTERSECTION OF ROUTE 5004 (LANFAIR ROAD (EXTENSION)) AND GOFFS ROAD		10.46	0.00	10.46			AS	1
5002	4	1			EXCELSIOR MINE ROAD	FROM END OF EXIT RAMP AT INTERSTATE 15 (TEMECULA VALLEY FREEWAY)	TO NORTH PARK BOUNDARY AT POWERLINE EAST ROAD		8.51	0.00	8.51			AS	1
5003	4	1			IVANPAH ROAD (EXTENSION)	FROM ROUTE 5000 (NIPTON ROAD)	TO BEGINNING OF ROUTE 0014 (IVANPAH ROAD)		0.49	0.00	0.49			AS	1
5004	4	1			LANFAIR ROAD (EXTENSION)	FROM END OF ROUTE 5001 (GOFFS ROAD)	TO PARK BOUNDARY		0.69	0.00	0.69			AS	1

PARKING AREA INVENTORY (1300 SERIES FMSS LOCATIONS)

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Name	Route Description From	Route Description To	Maintenance District	Access Level	Area (SQ FT)	Surf. Type	Area Map
0900	NC		228803		KELSO DEPOT EAST PARKING AREA	FROM ROUTE 0011 (KELSO-CIMA ROAD)	TO PARKING	KELSO	PUBLIC		GR	

Cycle 6 NPS / RIP Route ID Report

Report Date: 11/30/2015

(Numerical By Summary Route and Subcomponent #)

Federal Lands Highway
Road Inventory Program

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MOJA *Mojave National Preserve*

PARKING AREA INVENTORY (1300 SERIES FMSS LOCATIONS)

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Name	Route Description From	Route Description To	Maintenance District	Access Level	Area (SQ FT)	Surf. Type	Area Map
0901	NC		72619		HWVC PARKING	FROM ROUTE 0017 (BLACK CANYON ROAD)	TO PARKING	HOLE IN THE WALL	PUBLIC		GR	
0902	NC		73825		ZZ PARKING AREA	FROM END OF ROUTE 0100 (ZZYZX ROAD)	TO PARKING	ZZYZX	PUBLIC		GR	
0903	NC		230827		KD KELSO DEPOT NORTH PARKING LOT	FROM	TO		PUBLIC		GR	
0904	NC		65994		KD KELSO DUNES PARKING AREA	FROM	TO		PUBLIC		GR	
0905	NC		86725		FP FORT PIUTE PARKING AREA	FROM	TO		PUBLIC		GR	

Cycle 6 NPS / RIP Route ID Report

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Road Inventory Program

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Cycle 6 Summary Totals for Mojave National Preserve

Cycle 6 Route Totals

	NPS Maintained	Concessionaire Maintained	Park Totals
Paved Roads, Data Collection Vehicle Rated (Miles)	150.90	0	**150.90**
Paved Roads, Manually Rated Length (Miles)	0	0	**0**
Paved Roads, Manually Rated Area (Sq. Ft.)	6,826	0	**6,826**
Unpaved Roads (Miles)	81.27	0	**81.27**
Paved Parking (Sq. Ft.)	0	0	**0**
Unpaved Parking (Sq. Ft.)	0	0	**0**

Cycle 6 Lane Miles and Overall Pavement Condition

	Lanes Miles*	Pavement Condition Rating**
Data Collection Vehicle Routes	328.44	63
Manually Rated Roads	0.12	73
Parking Areas	0.00	N/A

* Equivalent Lane Miles are calculated by route using the following equations:
- DCV and MRLs = (PAVE_WIDTH x PAVED_MI) / 11 foot lane
- MRPs and PKGs = SQ_FEET / 5280 / 11 foot lane

**Parking and Manually Rated Routes are assigned the following PCR values based on the type of observed distresses:
-Excellent = 97 -Good = 90 -Fair = 73
-Poor = 53, 30, or 0 -Construction / Not Rated = -1

Cycle 6 NPS / RIP Route ID Report

Report Date: 11/30/2015

(Numerical By Summary Route and Subcomponent #)

Federal Lands Highway
Road Inventory Program

Shading Color Key

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General Park Road Functional Classification (FC) Table

FC	Type	User Access	Description	Route Numbers
1	Principal Park Road Rural Parkway	Public	Roads which constitute the main access route, circulatory tour, or thoroughfare for park visitors. Rural Parkways (e.g. Natchez Trace) are numbered 0001 - 0009.	0001 - 0009 0010 - 0099
2	Connector Park Road	Public	Roads which provide access within a park to areas of scenic, scientific, recreational or cultural interest, such as overlooks, campgrounds, etc.	0100 - 0199
3	Special Purpose Park Road	Public	Roads which provide circulation within public areas, such as campgrounds, picnic areas, visitor center complexes, concessionaire facilities, etc. These roads generally serve low-speed traffic and are often designed for one-way circulation.	0200 - 0299
4	Primitive Park Road	Public	Roads which provide circulation through remote areas and/or access to primitive campgrounds and undeveloped areas. These roads frequently have no minimum design standards and their use may be limited to specially equipped vehicles. Note: Functional Classes 3 and 4 have the same route numbers because, historically, they were numbered similarly.	0200 - 0299
5	Administrative Park Road	Public	All public roads intended for access to administrative developments or structures such as park offices, employee quarters, or utility areas.	0400 - 0499
6	Administrative Park Road (Restricted Access)	Nonpublic	All roads normally closed to the public, including patrol roads, truck trails, and other similar roads. Note: Functional Classes 5 and 6 have the same route numbers because historically they were numbered similarly and often there is little distinction between these routes. For example, because utility areas and employee housing are often closed to the public, this restriction would result in classification of FC 6 rather than FC 5.	0400 - 0499
7	Urban Parkway	Public	These facilities serve high volumes of park and non-park related traffic and are restricted, limited-access facilities in an urban area. This category of roads primarily encompasses the major parkways which serve as gateways to our nation's capital. Other major park roads or portions thereof, however, may be included in this category.	0001 - 0009
8	City Street	Public	City streets are usually extensions of the adjoining street system that are owned and maintained by the National Park Service. The construction and/or reconstruction should conform with accepted local engineering practice and local conditions.	0600 - 0699
N/A	Non-NPS Roads	Public	State, County, or City owned roads which border, traverse, or provide access to Park Facilities or Locations. Non-NPS roads are not assigned functional classes and are driven for GPS and Video Log only.	5000 - 5999

Surface Types
AS - Asphaltic Concrete Pavement
BR - Brick or Pavers Road Bed
CB - Cobble Stone Road Bed
CO - Portland Cement Concrete Pavement
GR - Gravel Road Bed
NV - Native or Dirt Material Road Bed
OT - Other Materials Road Bed

A park road system contains those roads within or giving access to a park or other unit of the NPS which are administered by the NPS , or by the Service in cooperation with other agencies. The assignment of a functional classification (FC) to a park road is not based on traffic volumes or design speed, but on the intended use or function of that road or route.

The historic route numbering system also included a 300 series for interpretive roads, and a 500 series for one-way roads. There are approximately 250 roads nationwide which are designated by the 300 and 500 series. The numbers for these roads will be maintained for reporting consistency. However, since these interpretive and one-way routes are not as clearly tied to a specific functional class, the 300 and 500 series will be discontinued for future use.

Route Identification Changes to Paved Routes from Previous Cycle
Mojave National Preserve

ROUTES REMOVED FROM PREVIOUS INVENTORY:			
Route No.	**Route Name**	**Type of Change**	**Comments**
0015	LANFAIR ROAD	OTHER	ROUTE WAS REMOVED DURING ROUTE ID MEETING, PARK DOES NOT MAINTAIN THIS ROUTE.

Section 3
Park Summary Information

Mojave National Preserve

Federal Lands Highway
Road Inventory Program

Parkwide Paved Route Condition Summary
Mojave National Preserve

Table 1: Paved Route Miles by Functional Class and PCR

Breakdown of Pavement Condition Rating (PCR) Based on Access Level

	POOR (PCR of 0 - 60)	FAIR (PCR of 61 - 84)	GOOD (PCR of 85 - 94)	EXCELLENT (PCR of 95 -100)	
PAVED ROADS					
Functional Class	**Length (miles)**	**Length (miles)**	**Length (miles)**	**Length (miles)**	**Total Mileage by FC**
1	60.32	39.65	26.50	19.58	146.05
2	0.30	0.54	1.65	1.98	4.47
3					
4					
5		0.06			0.06
6					
7					
8					
Total Mileage by PCR	**60.62**	**40.25**	**28.15**	**21.56**	**150.58**

NOTES:

1. Data are reported in the table only for paved roads that received a condition rating.
2. Non-linear roads (MRP collected routes) are measured by area and converted to equivalent route miles based on a 22-ft pavement width in order to be included in the mileage totals for paved roads shown above.
3. Quantities in the table above are derived from the route condition data within the PMS_20, PMS_MRL, PMS_MRP, and PMS_PKG tables in the Park geodatabase.

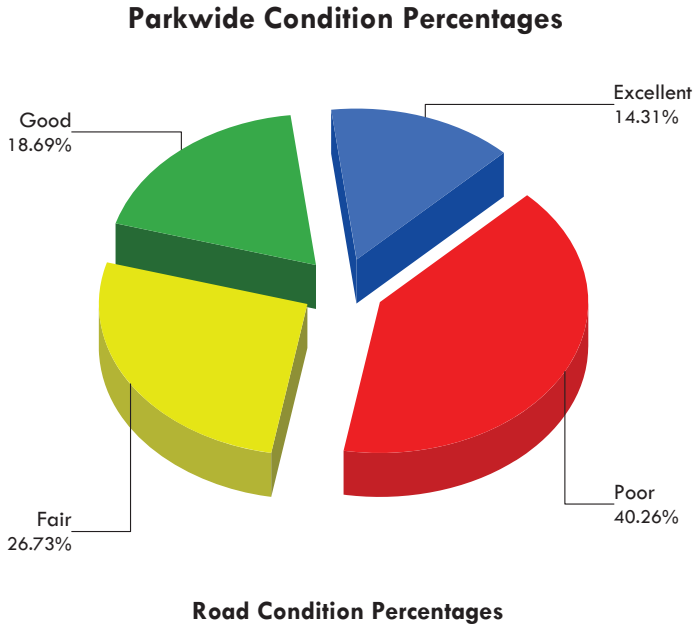


Figure 1: Pavement Condition Rating Breakdown for Paved Roads

Explanation of the Excellent, Good, Fair, and Poor Condition Descriptions

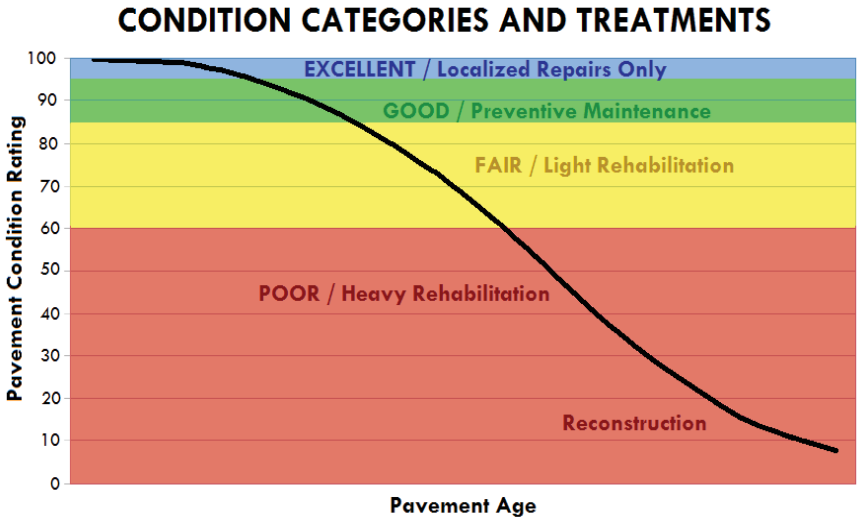
The Road Inventory Program aims to provide assistance in translating the excellent / good / fair / poor rating categories into pavement needs categories. The PCR can be used to indicate the place in the Pavement Life Cycle and the type of treatments that should be considered now and into the future.

- Excellent / New: PCR of 95-100
  - Pavements in this range will require only spot repairs

- Good: PCR of 85-94
  - Pavements in this range will likely be candidates for Preventive Maintenance. Examples include Chip and Slurry Seals, Micro Surfacing and Thin Overlays.

- Fair: PCR of 61-84
  - Pavements in this range will likely be candidates of Light Rehabilitation (L3R). Examples include singlelift overlays up to 2.5 inches in total thickness, milling and overlays.

- Poor: PCR of 0-60
  - Pavements in this range will likely be candidates of Heavy Rehabilitation or Reconstruction (H3R or 4R). Examples include Pulverization, Multiple Lift Overlays, and Reconstruction.



At this time, specific Maintenance and Rehabilitation activities should be evaluated and recommended at the project level. Site-specific conditions that influence treatment type should be determined based on performing a subsurface investigation and/or pavement condition survey, and not be based solely on RIP data. Additionally, RIP produces a snapshot of conditions at the time in which the data were collected. For further information or to obtain additional Pavement Management System's data from our Highway Pavement Management Application (HPMA) please contact the Eastern Federal Lands pavement team.

Federal Lands Highway
Road Inventory Program

Cycle 6 - Road Inventory Program
Road Condition Summary Report for
Data Collection Vehicle (DCV) Rated Roads

Mojave National Preserve

Condition (Rating / Index) Legend

- EXCELLENT (95 - 100)
- GOOD (85 - 94)
- FAIR (61 - 84)
- POOR (0 - 60)
- NR = NOT RATED

Notes:

- This condition summary report contains only the roads rated with the Data Collection Vehicle (DCV).
- Condition on roads that were manually rated and parking areas are shown in separate reports.
- Additional details on individual road ratings can be found in Section 5 of the Cycle 6 RIP Report.
- Refer to the RIP Report Appendix for an explanation of the rating system and rating methods.

Route-Level Condition for Roads Rated with the Data Collection Vehicle (DCV)

Route No.	FMSS No.	Route Name	Functional Class	Surf. Type	Paved Length (Miles)	Pavement Condition Rating (PCR)	Roughness Condition Index (RCI)	Surface Condition Rating (SCR)	Structural Crack Index	Alligator Crack Index	Longitudinal Cracking Index	Transverse Cracking Index	Patch / Pothole Index	Rutting Index
MOJA-0010	111378	KELBAKER ROAD	1	AS	56.98	70	87	59	63	83	80	59	99	92
MOJA-0011	111377	KELSO-CIMA ROAD	1	AS	18.96	36	81	6	6	23	83	77	99	94
MOJA-0012	73955	CIMA ROAD	1	AS	17.64	75	89	66	66	91	75	68	99	94
MOJA-0013	111380	MORNING STAR MINE ROAD	1	AS	14.99	65	87	51	66	98	68	51	99	94
MOJA-0014	108996	IVANPAH ROAD	1	AS	11.57	64	96	42	42	72	70	48	99	97
MOJA-0016	105480	CEDAR CANYON ROAD	1	AS	2.35	80	75	83	83	100	83	85	99	89
MOJA-0017	105481	BLACK CANYON ROAD	1	AS	10.15	46	84	21	38	99	39	21	100	93
MOJA-0018	111379	ESSEX ROAD	1	AS	13.79	46	86	19	51	98	53	19	99	94
MOJA-0100	73952	ZZYZX ROAD	2	AS	4.47	91	85	95	95	100	95	96	100	96

Data Collection Date: 05/2015

Federal Lands Highway
Road Inventory Program

Cycle 6 - Road Inventory Program
Road Condition Summary Report for Manually Rated Roads

Mojave National Preserve

Condition (Rating / Index) Legend

- EXCELLENT (95 - 100)
- GOOD (85 - 94)
- FAIR (61 - 84)
- POOR (0 - 60)
- NR = NOT RATED

Notes:

- This condition summary report contains only the roads that were manually rated.
  - MRL = Manually Rated Line (a linear road)
  - MRP = Manually Rated Polygon (a non-linear road)
- Condition on roads that were rated with the Data Collection Vehicle (DCV) are shown in a separate report.
- A road is manually rated when it is determined to be unsuitable for the DCV to drive.
- Additional details on individual road ratings can be found in Section 5 of the Cycle 6 RIP Report.
- Refer to the RIP Report Appendix for an explanation of the rating system and rating methods.

Route-Level Condition for Manually Rated Polygon (MRP) Roads

							Asphalt Surface Distresses						Concrete Surface Distresses				
Route No.	FMSS No.	Route Name	Functional Class	Surf. Type	Area (Sq. Ft.)	Pavement Condition Rating (PCR)	Alligator Cracking	Longitudinal / Tranverse Cracking	Rutting / Distortions	Potholes / Patching	HMA Patching	Surface Raveling / Bleeding	Joint Faulting	Slab Cracking	Joint Distresses	Delamination / Pop-Outs	Potholes / Patching
MOJA-0402	113329	BAKER RESIDENTIAL ROAD	5	AS	6,826	73	73	90	97	97	97	73					

Data Collection Date: 05/2015

Section 4
Park Route Location Maps

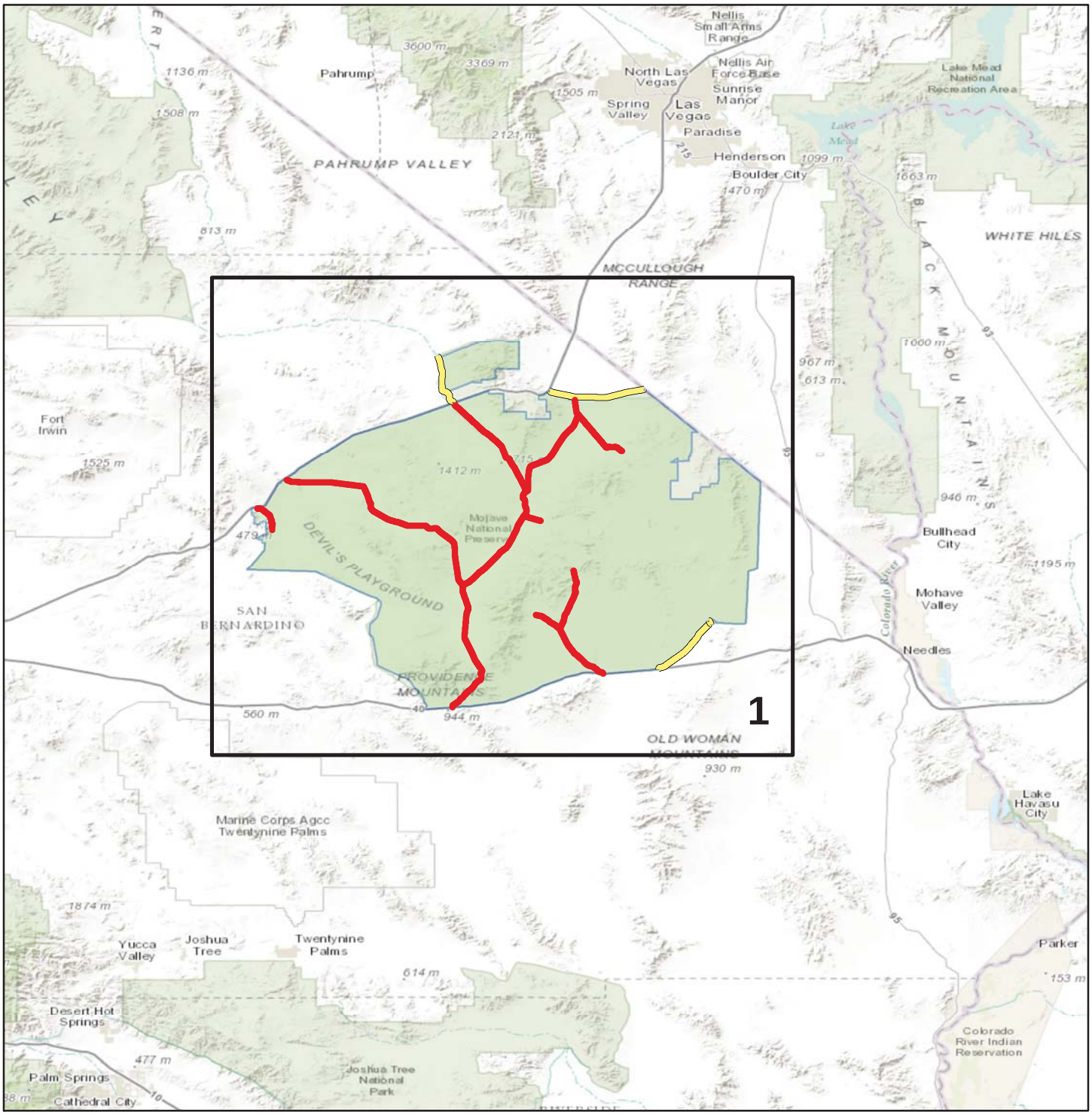
Mojave National Preserve

Federal Lands Highway
Road Inventory Program

Mojave National Preserve

ROUTE LOCATION MAP

Key Map



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

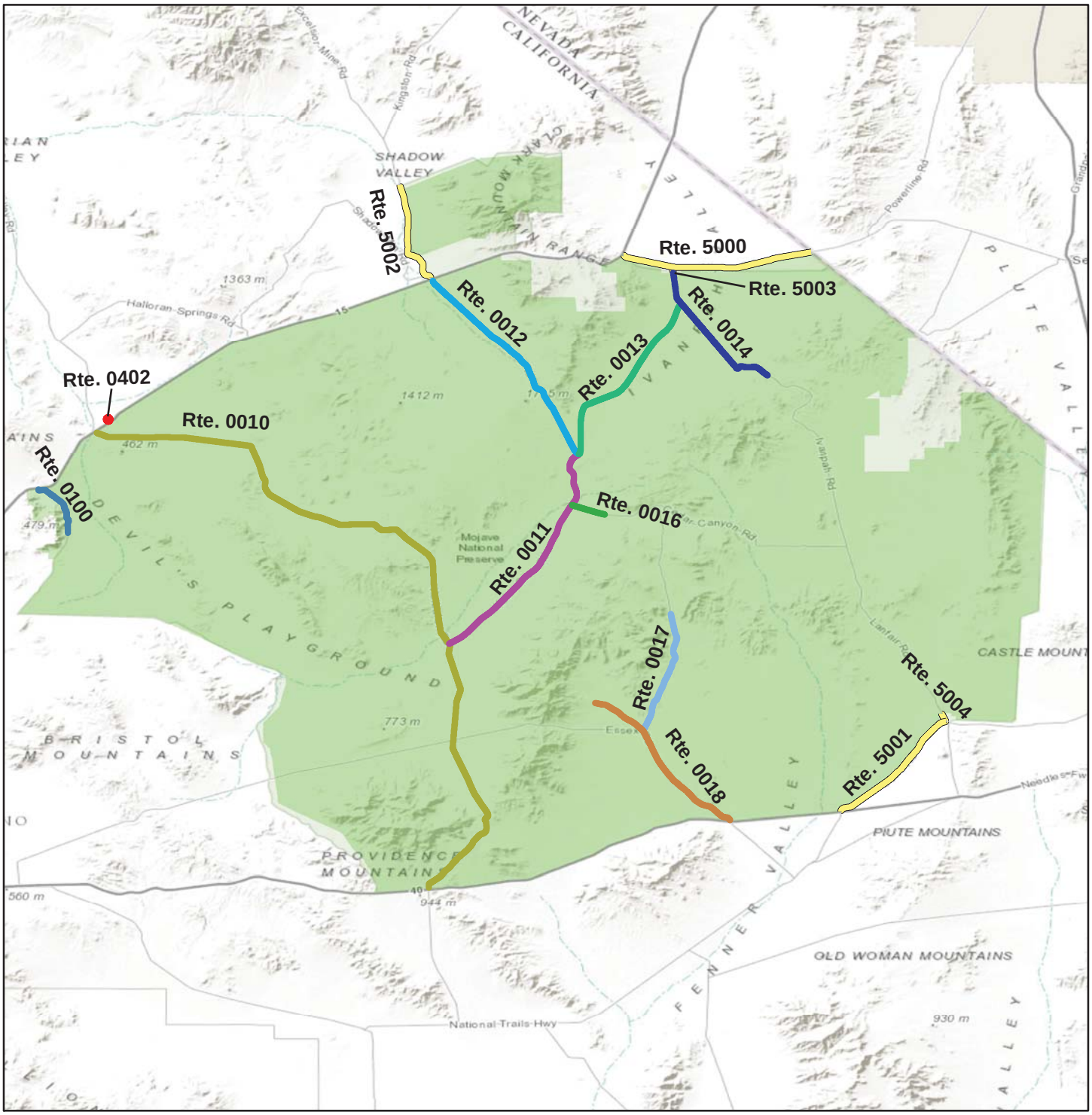
NPS Collected Routes

Non-NPS Collected Routes

Mojave National Preserve

ROUTE LOCATION MAP

Map 1



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Note: Unique colors are used to differentiate roads

Non-NPS Collected Routes

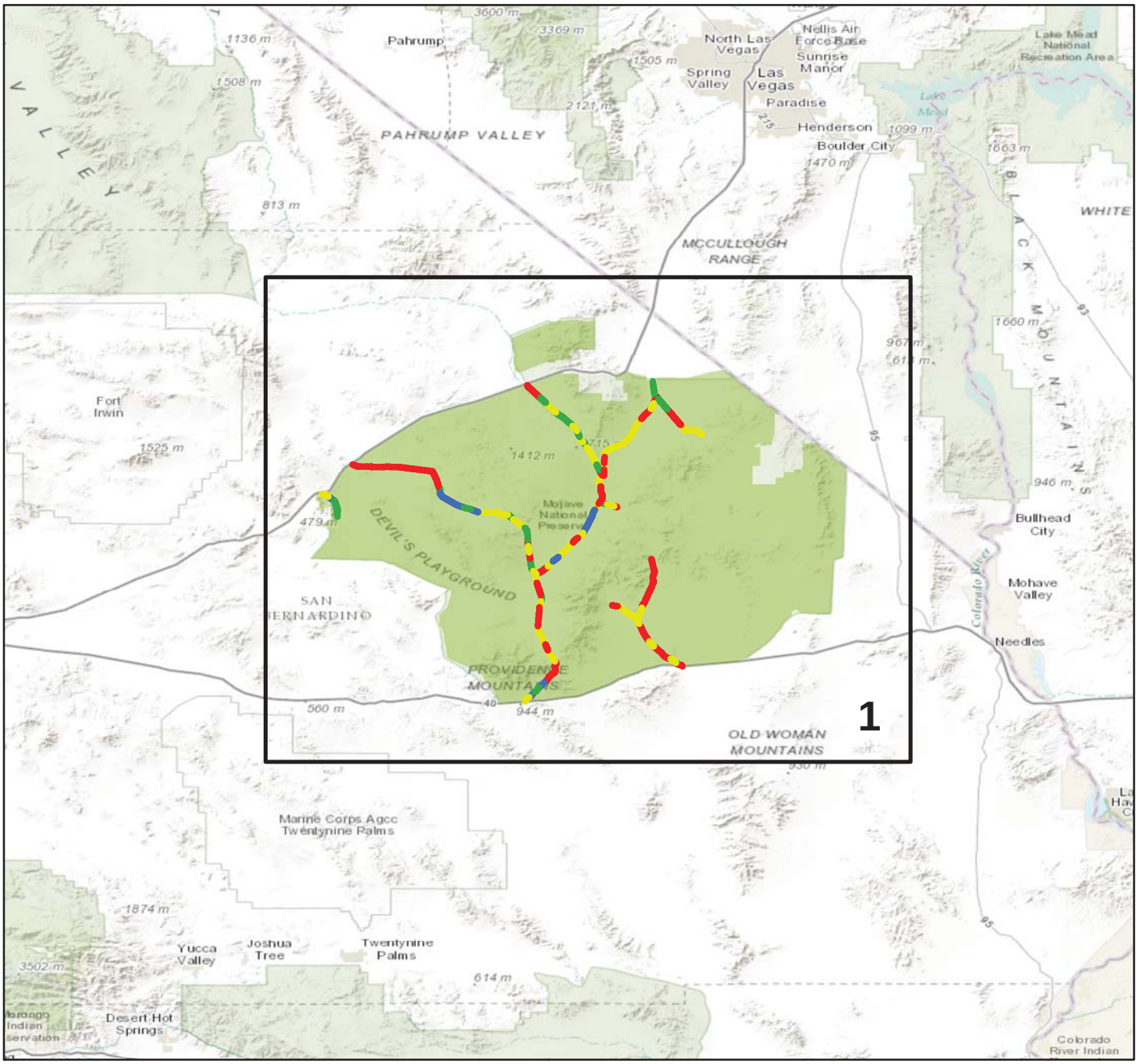
Miles

0 10 20

N

Mojave National Preserve

ROUTE CONDITION MAP
PCR - MILE BY MILE
Key Map



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

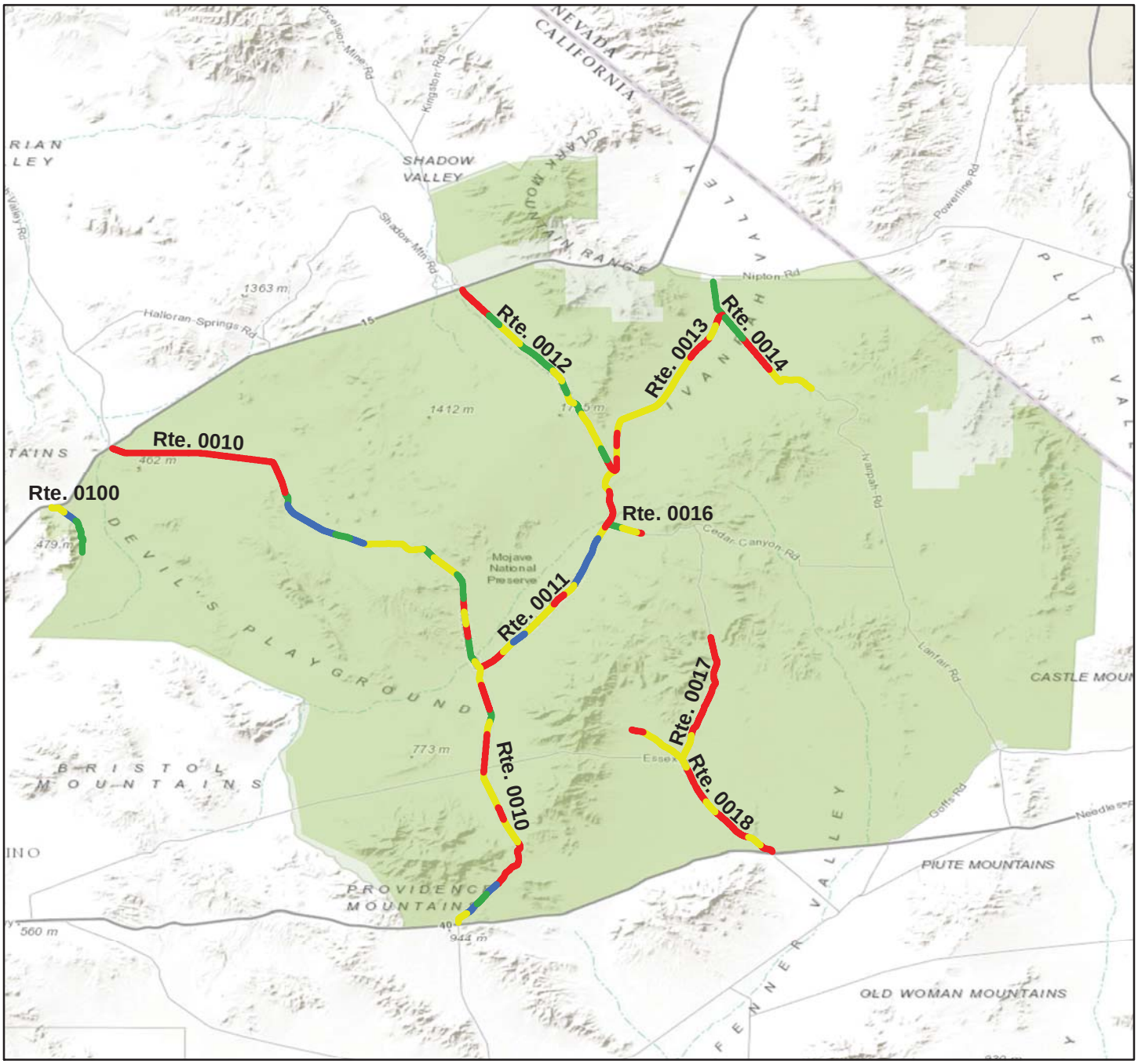
See Appendix for definitions and formulas
Only Data Collection Vehicle and Manually Rated Roads are displayed

Miles
0 30 60

N

Mojave National Preserve

ROUTE CONDITION MAP
PCR - MILE BY MILE
Area Map 1



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

See Appendix for definitions and formulas
Only Data Collection Vehicle and Manually Rated Roads are displayed

Miles
0 10 20

N

Section 5
Paved Road Condition Rating Sheets

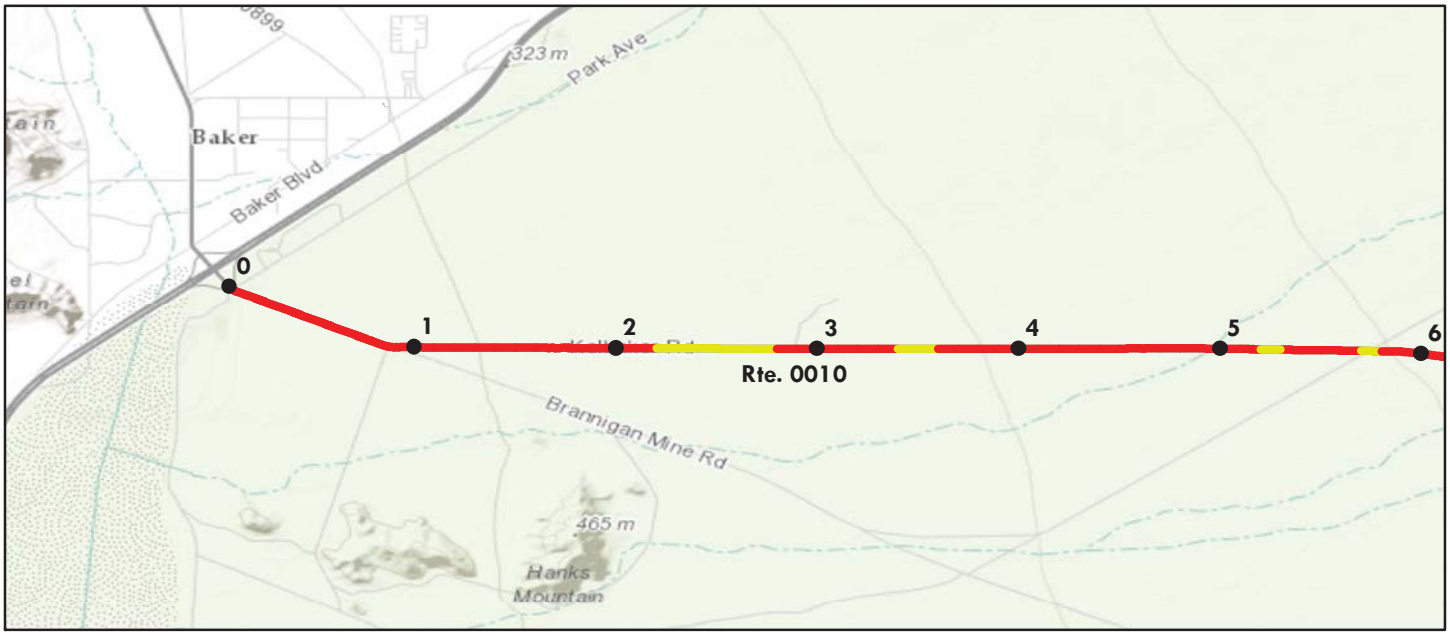
Mojave National Preserve

Federal Lands Highway
Road Inventory Program

Mojave National Preserve

ROUTE 0010: KELBAKER ROAD

Data Collection Vehicle (DCV) Rating



Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

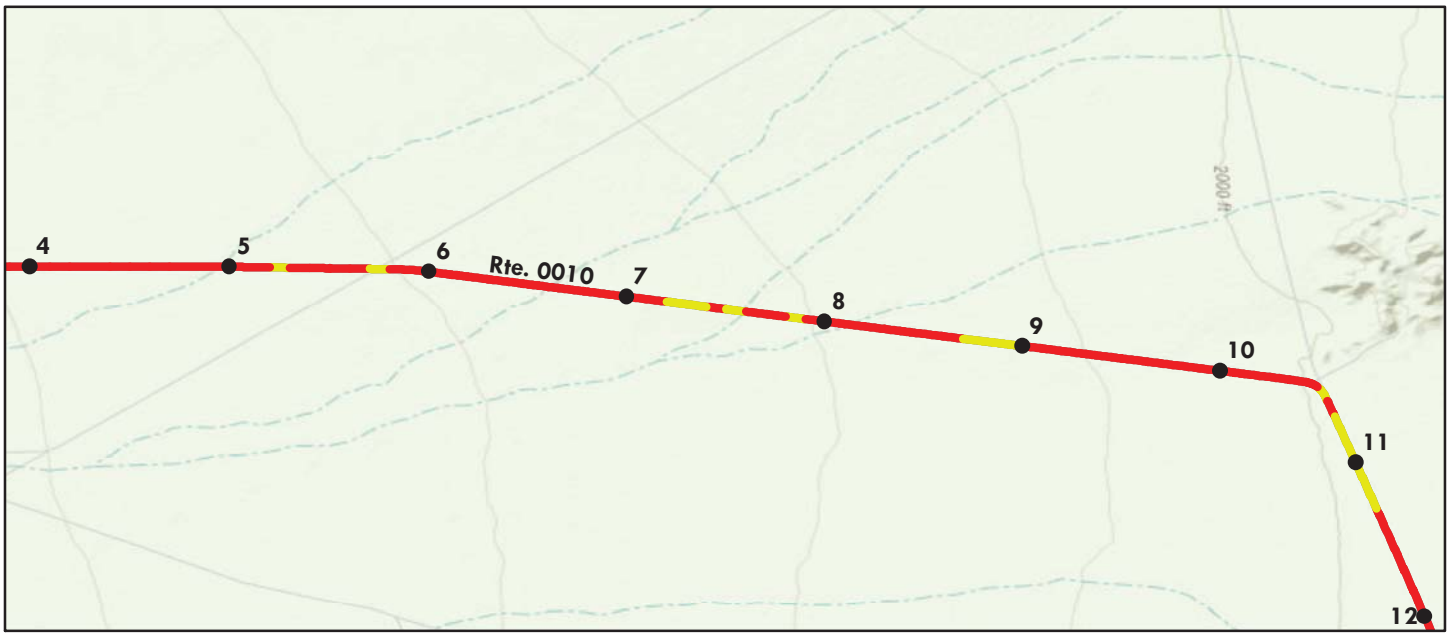
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	0	1	2	3	4
Paved Length (Miles): 56.98	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	70	40	30	56	46	43
Surface Condition Rating (SCR)	59	0	0	27	10	8
Roughness Condition Index (RCI)	87	100	76	99	100	96
Distress Index Values						
Structural Crack Index	63	0	0	27	54	56
Alligator Crack Index	83	0	0	68	100	100
Longitudinal Crack Index	80	72	100	59	54	56
Transverse Cracking Index	59	74	100	56	10	8
Patching Index	99	100	100	100	100	100
Rutting Index	92	98	93	96	95	96
International Roughness Index (IRI)	149	104	183	117	114	125
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	26.9	24	22.6	23.4	23.5
Lane Width (ft)	10.3	10.6	10.3	9.7	9.7	10.1

Mojave National Preserve

ROUTE 0010: KELBAKER ROAD

Data Collection Vehicle (DCV) Rating



Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

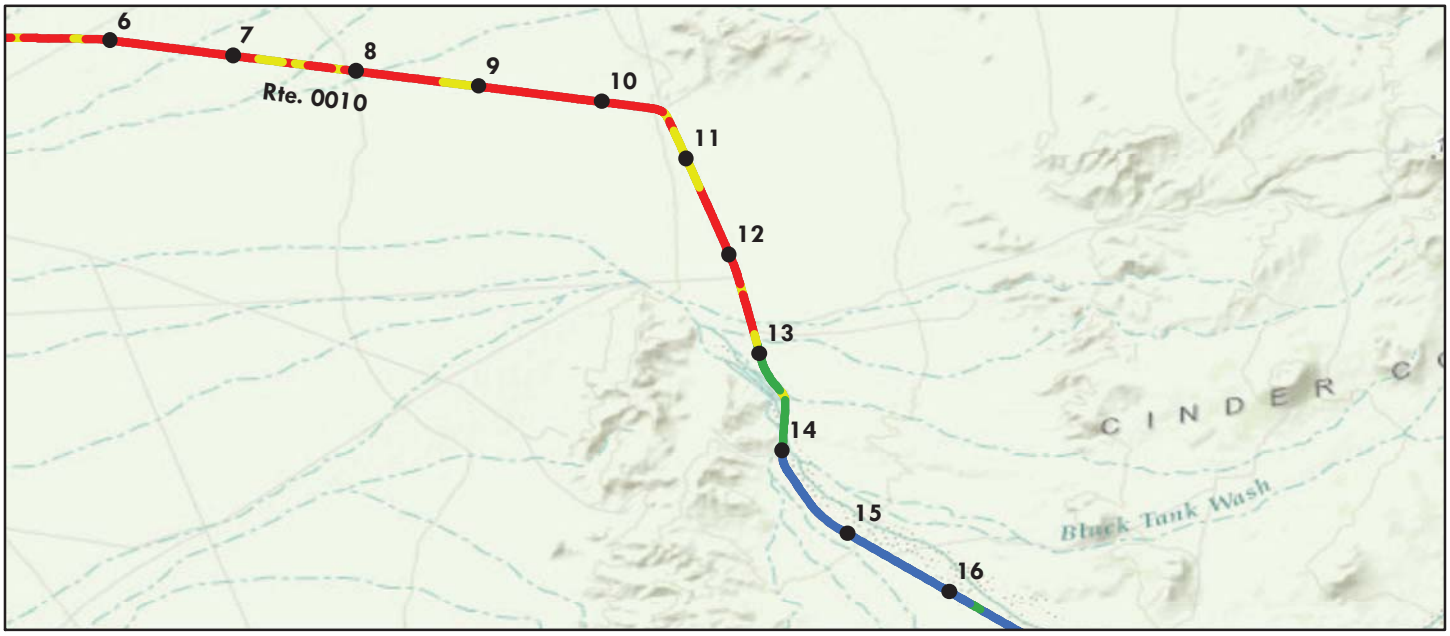
See Appendix for definitions and formulas

Inspection Date:	5/16/2015	**Beginning Section MP**	5	6	7	8	9
Paved Length (Miles):	56.98	**Section Length (MI)**	1	1	1	1	1
Surface Type:	ASPHALT	**Route Summary**					
Roadway Condition Information							
Pavement Condition Rating (PCR)		70	47	48	55	49	40
Surface Condition Rating (SCR)		59	25	18	33	22	0
Roughness Condition Index (RCI)		87	81	94	89	89	100
Distress Index Values							
Structural Crack Index		63	65	69	78	67	54
Alligator Crack Index		83	100	100	100	100	100
Longitudinal Crack Index		80	65	69	78	67	54
Transverse Cracking Index		59	25	18	33	22	0
Patching Index		99	100	99	100	100	100
Rutting Index		92	94	95	95	96	96
International Roughness Index (IRI)		149	165	129	143	143	93
Lane & Width Information							
Number of Lanes		2	2	2	2	2	2
Paved Width (ft)		24.2	24.1	23.5	24	23.7	24.5
Lane Width (ft)		10.3	10.4	10.1	10.3	10.3	10.3

Mojave National Preserve

ROUTE 0010: KELBAKER ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

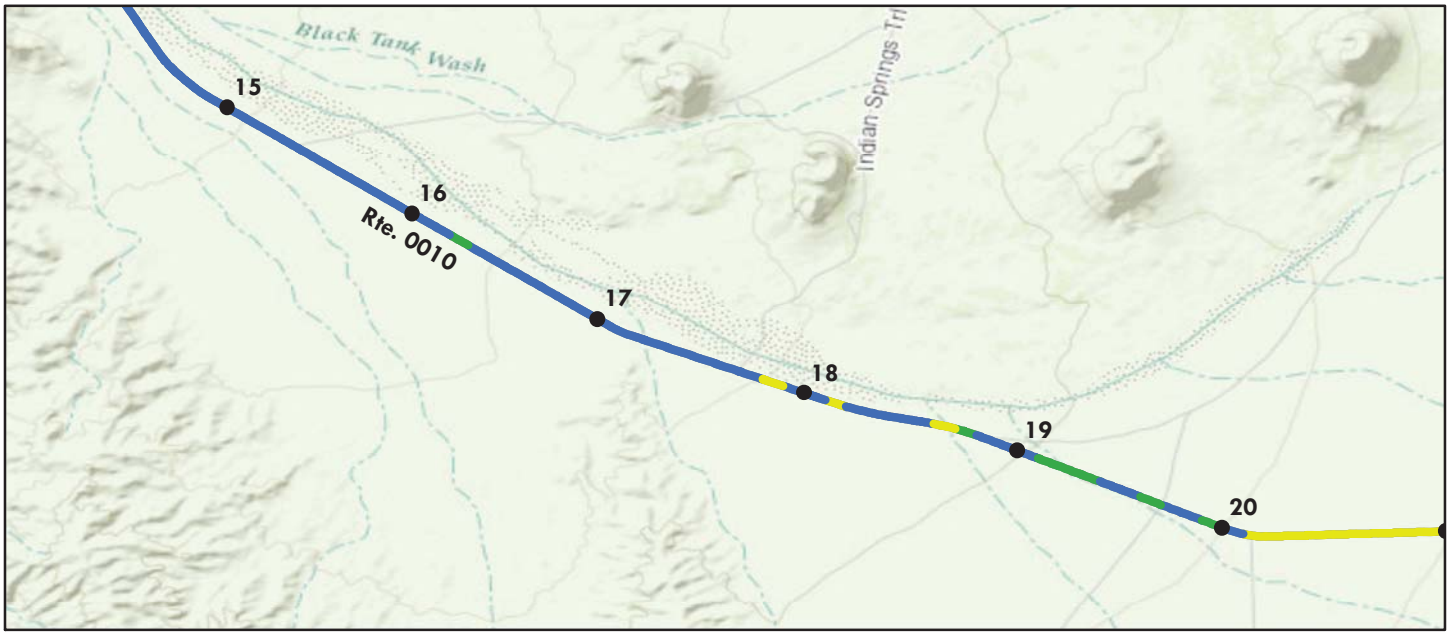
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	10	11	12	13	14
Paved Length (Miles): 56.98	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	70	59	46	39	90	98
Surface Condition Rating (SCR)	59	31	16	0	93	96
Roughness Condition Index (RCI)	87	100	90	97	85	100
Distress Index Values						
Structural Crack Index	63	75	73	62	99	100
Alligator Crack Index	83	100	100	99	100	100
Longitudinal Crack Index	80	75	73	63	99	100
Transverse Cracking Index	59	31	16	0	99	100
Patching Index	99	100	100	100	100	100
Rutting Index	92	94	91	96	93	96
International Roughness Index (IRI)	149	110	139	122	154	102
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	25	24.7	25.4	24.7	25.1
Lane Width (ft)	10.3	10.3	10.7	10.5	10.1	10.1

Mojave National Preserve

ROUTE 0010: KELBAKER ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

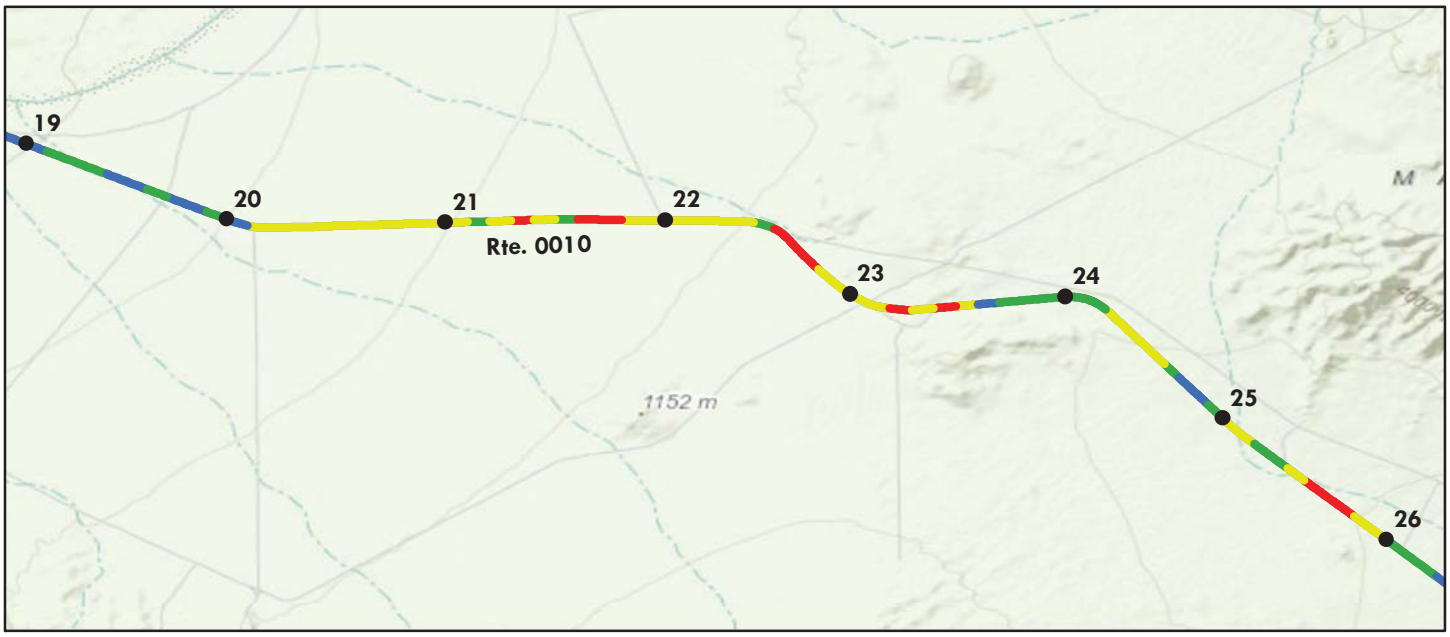
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	15	16	17	18	19
Paved Length (Miles): 56.98	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	70	97	96	97	94	96
Surface Condition Rating (SCR)	59	95	94	95	94	93
Roughness Condition Index (RCI)	87	100	100	100	95	100
Distress Index Values						
Structural Crack Index	63	100	100	100	99	100
Alligator Crack Index	83	100	100	100	100	100
Longitudinal Crack Index	80	100	100	100	99	100
Transverse Cracking Index	59	100	100	100	100	100
Patching Index	99	100	100	100	100	100
Rutting Index	92	95	94	95	94	93
International Roughness Index (IRI)	149	78	84	106	127	114
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	25.7	25.4	25.4	24.8	25.4
Lane Width (ft)	10.3	10.2	10.8	11.1	10.7	10.4

Mojave National Preserve

ROUTE 0010: KELBAKER ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

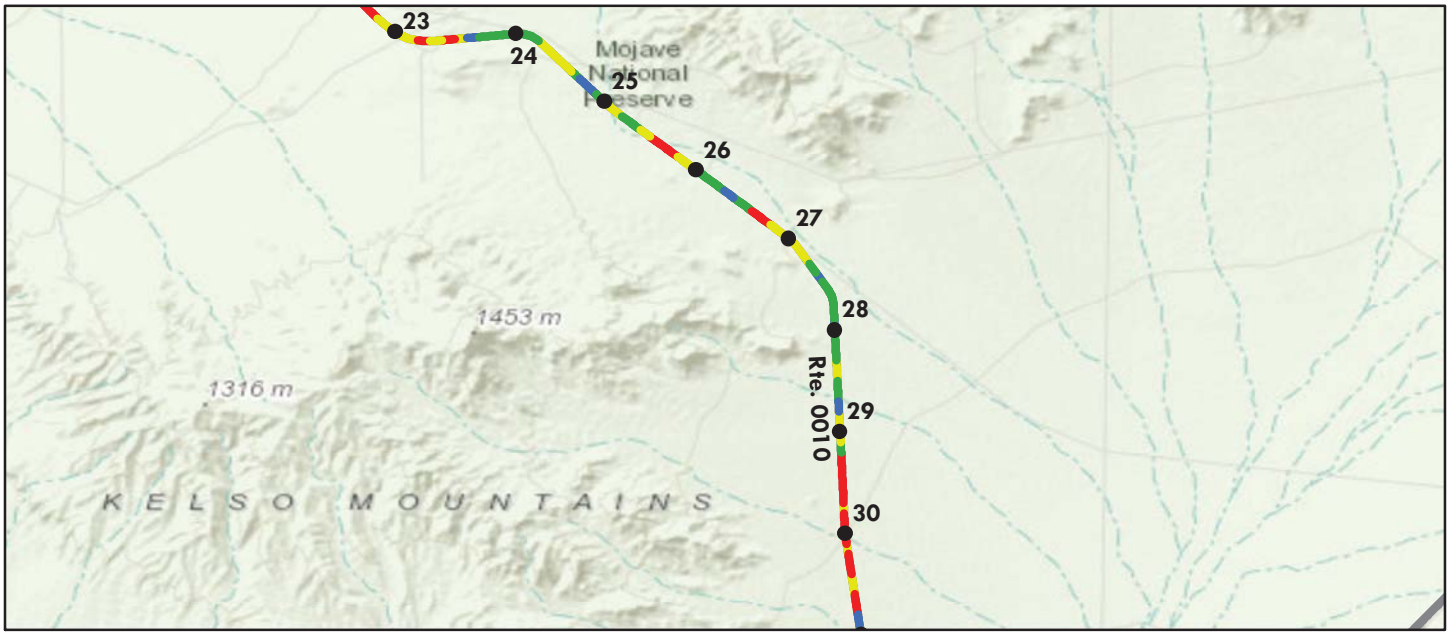
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	20	21	22	23	24
Paved Length (Miles): 56.98	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	70	78	74	67	79	86
Surface Condition Rating (SCR)	59	90	84	80	84	88
Roughness Condition Index (RCI)	87	60	58	47	71	84
Distress Index Values						
Structural Crack Index	63	98	88	97	93	93
Alligator Crack Index	83	100	100	100	100	100
Longitudinal Crack Index	80	98	88	97	93	93
Transverse Cracking Index	59	99	93	98	94	96
Patching Index	99	100	93	94	95	99
Rutting Index	92	90	84	80	84	88
International Roughness Index (IRI)	149	238	248	299	197	156
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	25	22.2	23.6	24.3	24.2
Lane Width (ft)	10.3	10.1	9.9	10	9.5	10.5

Mojave National Preserve

ROUTE 0010: KELBAKER ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

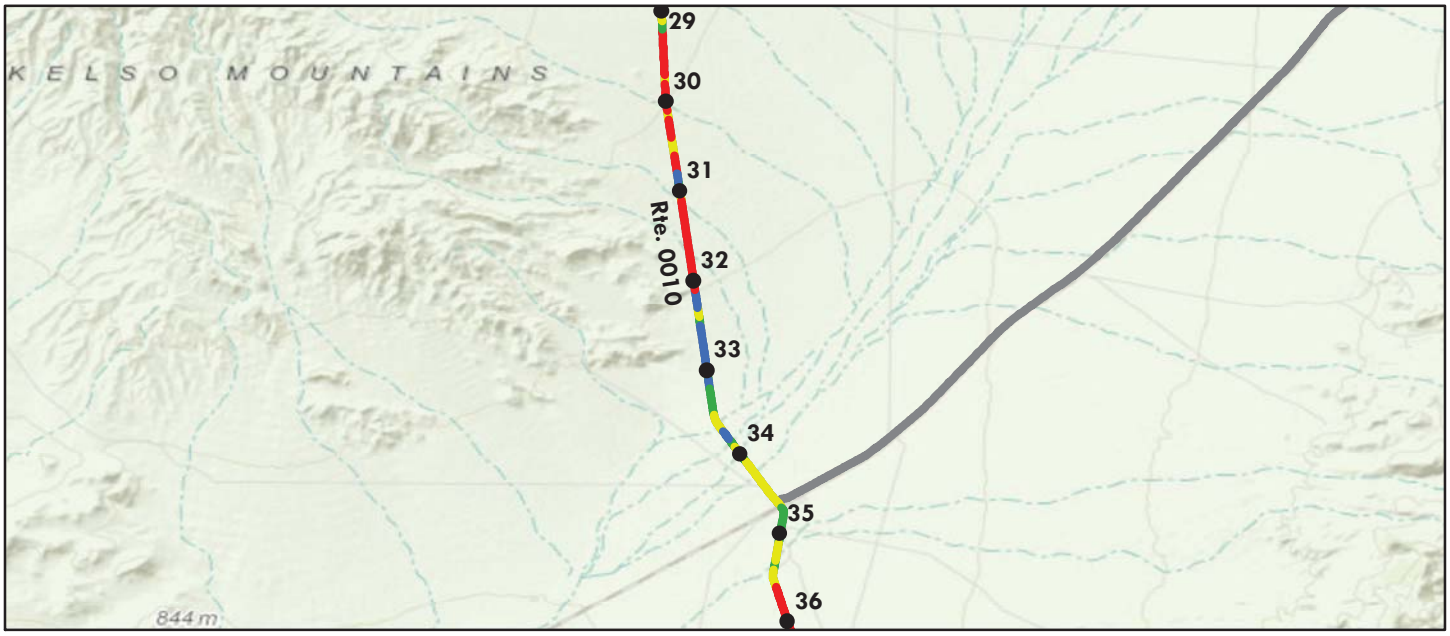
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	25	26	27	28	29
Paved Length (Miles): 56.98	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	70	69	73	88	85	51
Surface Condition Rating (SCR)	59	65	76	88	89	39
Roughness Condition Index (RCI)	87	75	69	87	79	68
Distress Index Values						
Structural Crack Index	63	71	86	99	97	73
Alligator Crack Index	83	95	99	100	100	100
Longitudinal Crack Index	80	76	87	99	97	73
Transverse Cracking Index	59	65	76	100	99	39
Patching Index	99	98	98	100	99	100
Rutting Index	92	82	85	88	89	88
International Roughness Index (IRI)	149	184	207	149	172	208
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	23.4	23.3	23.8	23	22.9
Lane Width (ft)	10.3	10.4	10.2	10.4	10.1	10.3

Mojave National Preserve

ROUTE 0010: KELBAKER ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

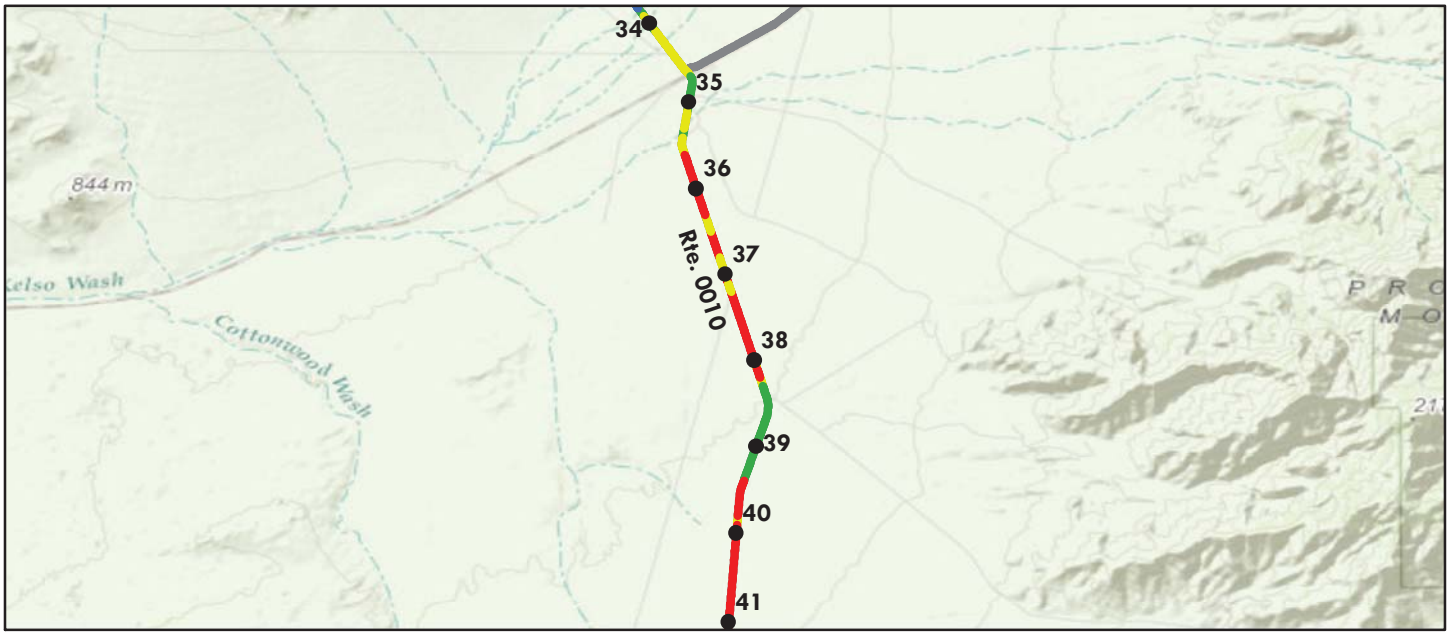
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	30	31	32	33	34
Paved Length (Miles): 56.98	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	70	65	35	91	90	82
Surface Condition Rating (SCR)	59	52	3	91	95	90
Roughness Condition Index (RCI)	87	84	84	92	82	69
Distress Index Values						
Structural Crack Index	63	80	65	95	95	95
Alligator Crack Index	83	100	100	100	100	100
Longitudinal Crack Index	80	80	65	95	95	95
Transverse Cracking Index	59	52	3	91	96	90
Patching Index	99	100	100	100	100	99
Rutting Index	92	89	91	94	95	92
International Roughness Index (IRI)	149	157	158	135	164	204
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	23.6	23.3	23	22.7	23.7
Lane Width (ft)	10.3	9.7	10.1	10.1	9.7	9.7

Mojave National Preserve

ROUTE 0010: KELBAKER ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

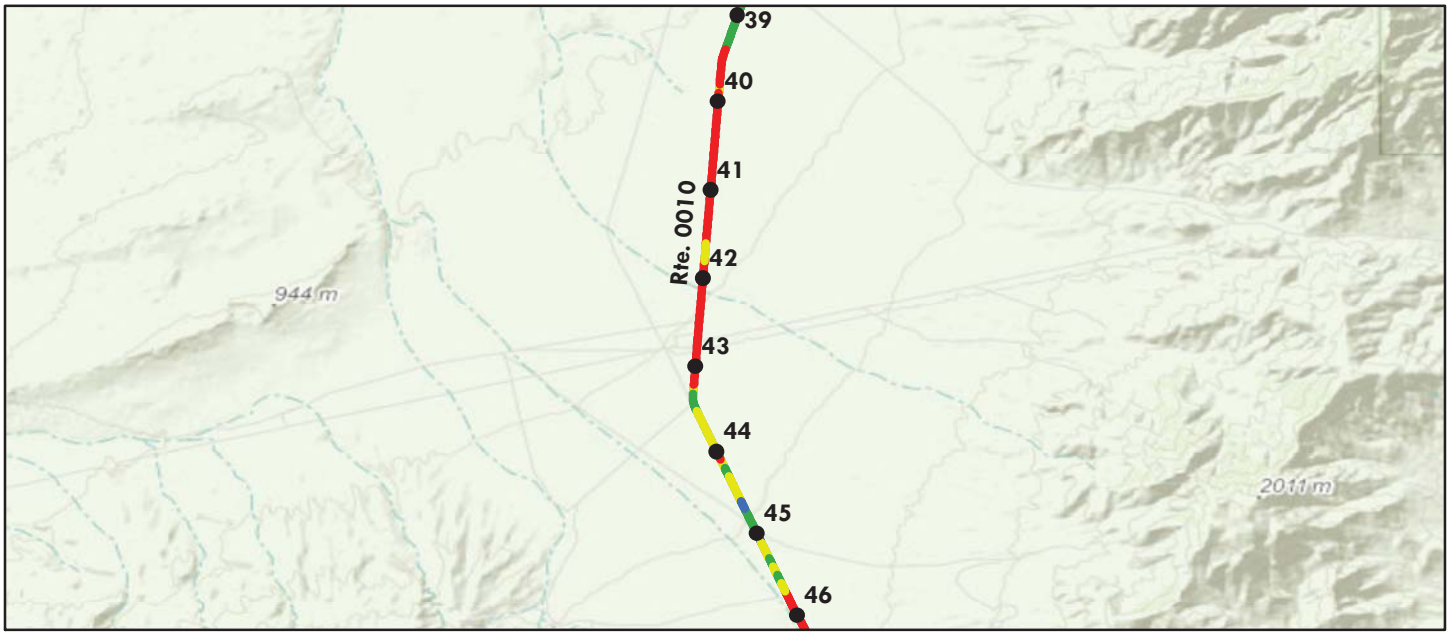
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	35	36	37	38	39
Paved Length (Miles): 56.98	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	70	62	57	50	85	66
Surface Condition Rating (SCR)	59	37	29	25	80	52
Roughness Condition Index (RCI)	87	100	100	87	92	86
Distress Index Values						
Structural Crack Index	63	67	50	72	86	89
Alligator Crack Index	83	100	100	100	100	100
Longitudinal Crack Index	80	67	50	72	86	89
Transverse Cracking Index	59	37	29	25	80	52
Patching Index	99	100	99	100	100	99
Rutting Index	92	98	97	95	92	95
International Roughness Index (IRI)	149	101	112	148	134	151
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	23.9	23.3	23.1	23.5	23.8
Lane Width (ft)	10.3	10	10.2	9.8	9.9	10

Mojave National Preserve

ROUTE 0010: KELBAKER ROAD

Data Collection Vehicle (DCV) Rating



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Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

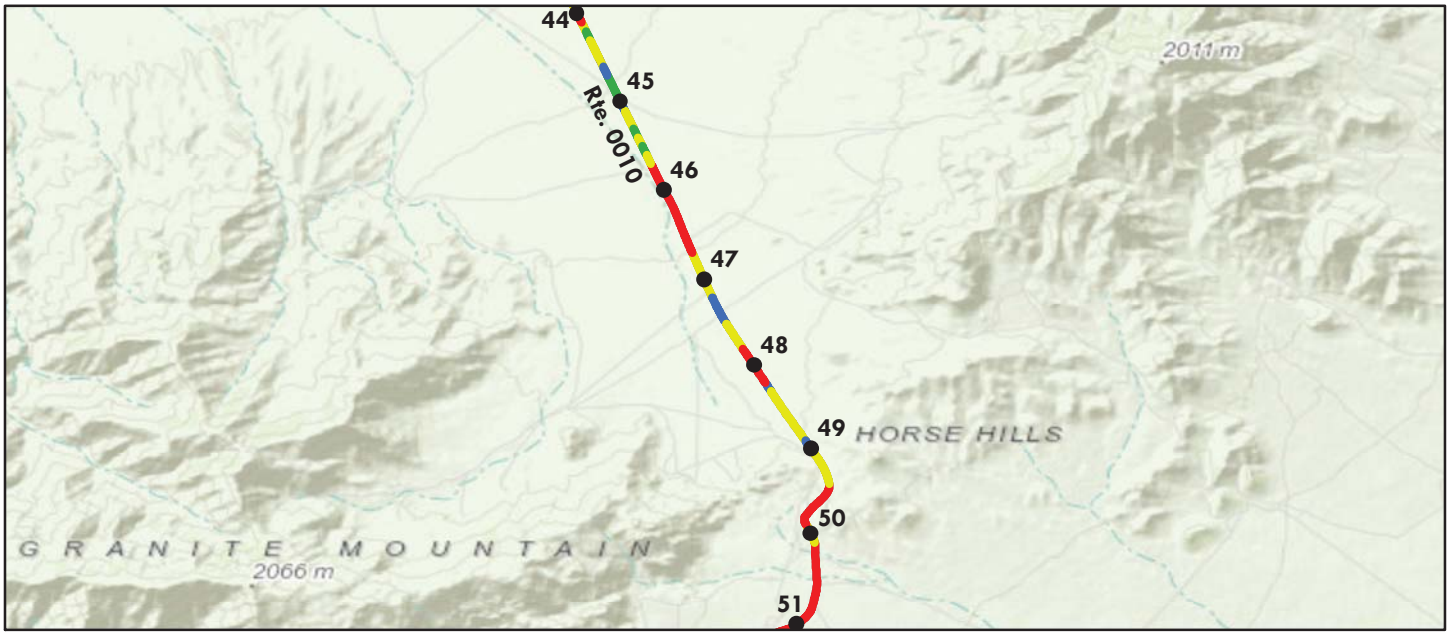
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	40	41	42	43	44
Paved Length (Miles): 56.98	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	70	34	53	36	71	78
Surface Condition Rating (SCR)	59	0	22	0	55	74
Roughness Condition Index (RCI)	87	86	100	90	95	84
Distress Index Values						
Structural Crack Index	63	63	79	64	90	92
Alligator Crack Index	83	98	94	91	99	99
Longitudinal Crack Index	80	65	85	73	91	93
Transverse Cracking Index	59	0	22	0	55	74
Patching Index	99	100	100	100	100	99
Rutting Index	92	95	95	94	96	95
International Roughness Index (IRI)	149	150	101	141	127	157
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	22.9	23.1	23.7	22.4	22.5
Lane Width (ft)	10.3	10	9.9	9.9	9.8	10.1

Mojave National Preserve

ROUTE 0010: KELBAKER ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

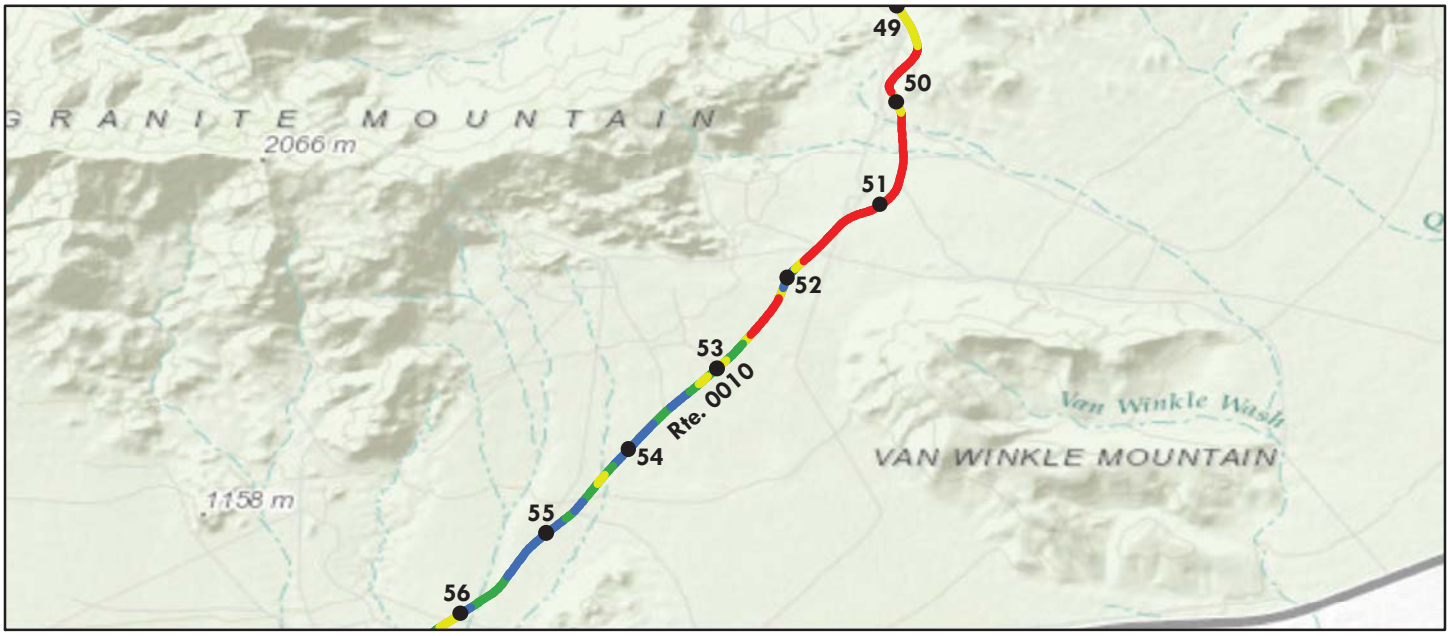
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	45	46	47	48	49
Paved Length (Miles): 56.98	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	70	62	51	75	72	50
Surface Condition Rating (SCR)	59	47	25	61	68	36
Roughness Condition Index (RCI)	87	84	90	95	78	70
Distress Index Values						
Structural Crack Index	63	83	69	78	68	36
Alligator Crack Index	83	99	90	100	100	96
Longitudinal Crack Index	80	84	79	78	68	40
Transverse Cracking Index	59	47	25	61	75	42
Patching Index	99	100	100	99	98	98
Rutting Index	92	95	96	96	94	95
International Roughness Index (IRI)	149	157	141	128	176	203
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	23	24.4	25.3	25.7	26.4
Lane Width (ft)	10.3	9.8	10.7	10.7	10.4	10.8

Mojave National Preserve

ROUTE 0010: KELBAKER ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

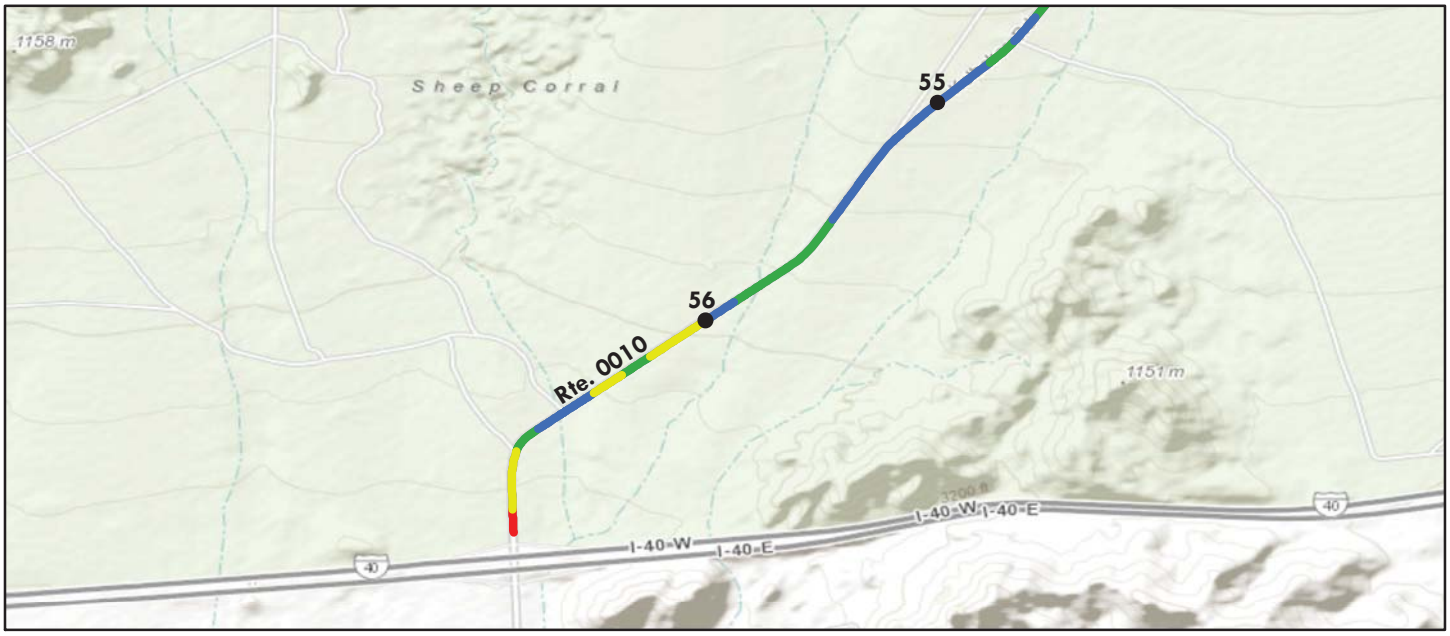
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	50	51	52	53	54
Paved Length (Miles): 56.98	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	70	36	50	59	96	94
Surface Condition Rating (SCR)	59	0	30	48	93	93
Roughness Condition Index (RCI)	87	89	81	75	100	95
Distress Index Values						
Structural Crack Index	63	28	35	48	98	98
Alligator Crack Index	83	99	100	88	100	100
Longitudinal Crack Index	80	29	35	60	98	98
Transverse Cracking Index	59	0	30	86	98	98
Patching Index	99	99	98	98	99	99
Rutting Index	92	98	91	89	93	93
International Roughness Index (IRI)	149	144	167	184	115	127
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	26.2	26.2	25.9	25.8	24.9
Lane Width (ft)	10.3	11	10.7	10.9	11.1	11

Mojave National Preserve

ROUTE 0010: KELBAKER ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	55	56			
Paved Length (Miles): 56.98	**Section Length (MI)**	1	0.98			
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	70	97	82			
Surface Condition Rating (SCR)	59	97	86			
Roughness Condition Index (RCI)	87	98	77			
Distress Index Values						
Structural Crack Index	63	98	92			
Alligator Crack Index	83	100	100			
Longitudinal Crack Index	80	98	92			
Transverse Cracking Index	59	99	86			
Patching Index	99	100	99			
Rutting Index	92	97	91			
International Roughness Index (IRI)	149	120	180			
Lane & Width Information						
Number of Lanes	2	2	2			
Paved Width (ft)	24.2	26.7	26.7			
Lane Width (ft)	10.3	11.1	10.8			

Mojave National Preserve

ROUTE 0011: KELSO-CIMA ROAD

Data Collection Vehicle (DCV) Rating

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

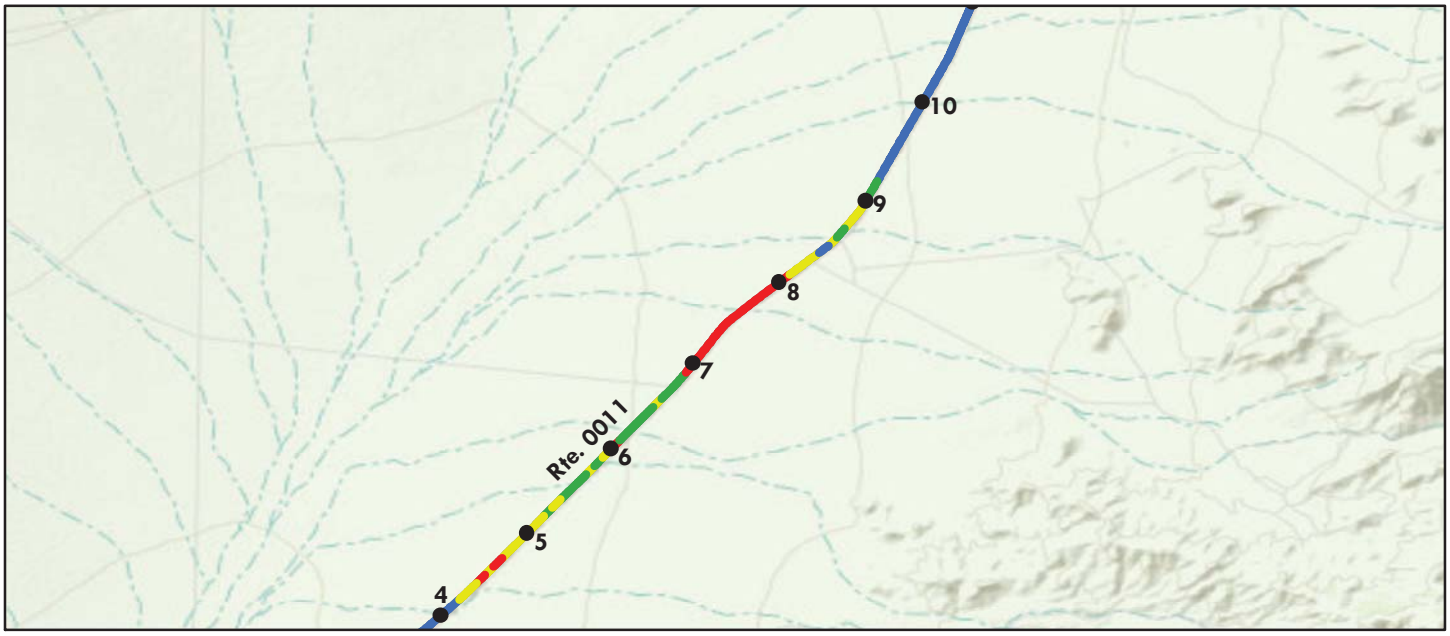
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	0	1	2	3	4
Paved Length (Miles): 18.96	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	36	37	40	84	98	75
Surface Condition Rating (SCR)	6	0	0	78	98	68
Roughness Condition Index (RCI)	81	92	100	92	98	86
Distress Index Values						
Structural Crack Index	6	0	0	78	99	79
Alligator Crack Index	23	0	0	80	100	100
Longitudinal Crack Index	83	98	97	98	99	79
Transverse Cracking Index	77	98	98	98	99	68
Patching Index	99	99	100	100	100	100
Rutting Index	94	96	97	95	98	91
International Roughness Index (IRI)	165	134	115	135	118	151
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	23.5	25.9	26.3	25.4	25.4
Lane Width (ft)	10	9.8	10.1	10.8	10.5	11

Mojave National Preserve

ROUTE 0011: KELSO-CIMA ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

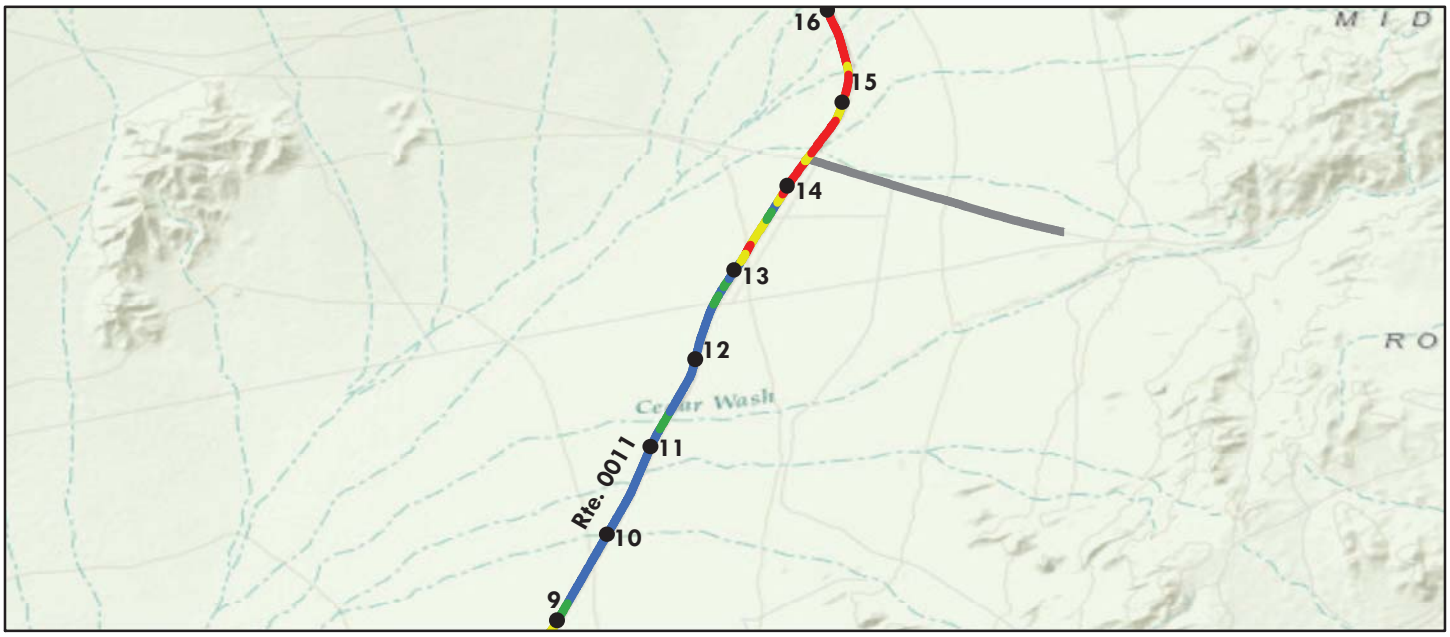
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	5	6	7	8	9
Paved Length (Miles): 18.96	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	36	82	81	24	79	99
Surface Condition Rating (SCR)	6	74	69	0	82	98
Roughness Condition Index (RCI)	81	93	98	61	74	100
Distress Index Values						
Structural Crack Index	6	87	82	29	88	98
Alligator Crack Index	23	100	100	88	100	100
Longitudinal Crack Index	83	87	82	41	88	98
Transverse Cracking Index	77	74	69	0	82	99
Patching Index	99	100	100	97	98	100
Rutting Index	94	93	96	86	90	98
International Roughness Index (IRI)	165	134	120	235	187	92
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	24.8	24.7	22.6	22.8	23.5
Lane Width (ft)	10	10.2	10.5	9.9	9.5	9.8

Mojave National Preserve

ROUTE 0011: KELSO-CIMA ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

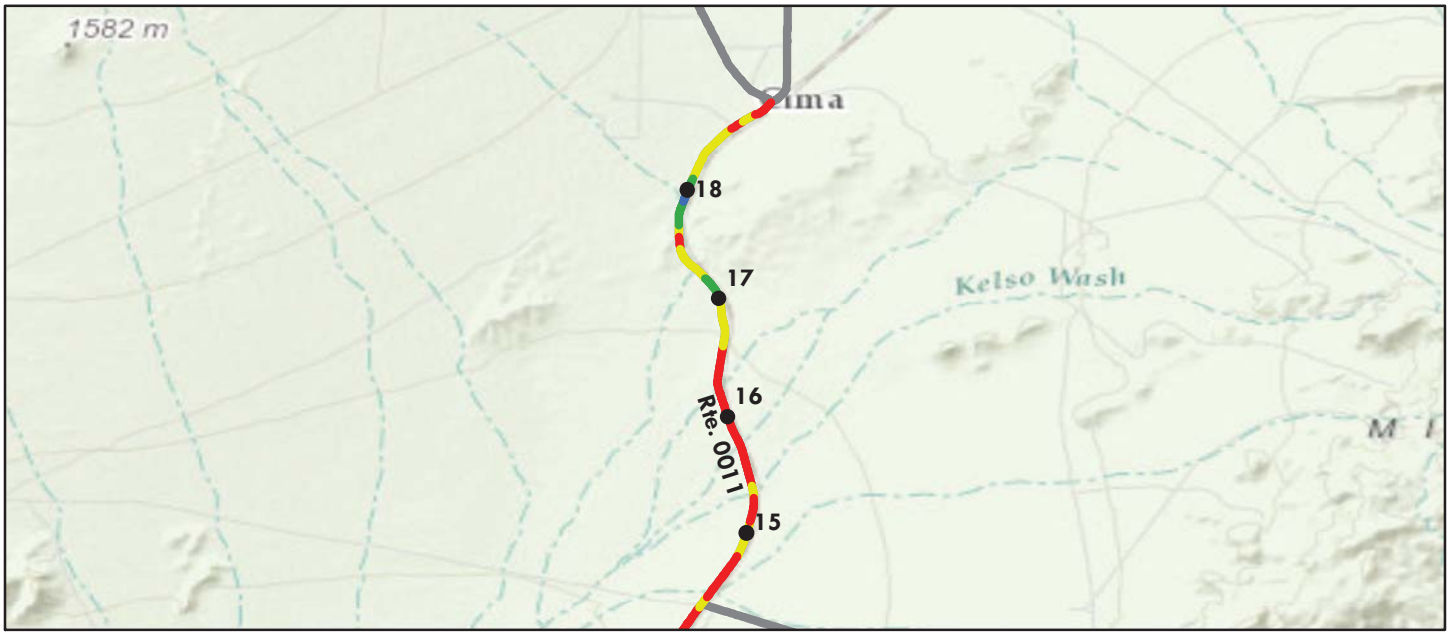
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	10	11	12	13	14
Paved Length (Miles): 18.96	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	36	97	99	99	75	45
Surface Condition Rating (SCR)	6	95	98	98	60	32
Roughness Condition Index (RCI)	81	100	100	100	98	65
Distress Index Values						
Structural Crack Index	6	99	99	99	76	48
Alligator Crack Index	23	100	100	100	100	94
Longitudinal Crack Index	83	99	99	99	76	54
Transverse Cracking Index	77	95	98	98	60	32
Patching Index	99	100	100	100	100	97
Rutting Index	94	99	99	98	94	90
International Roughness Index (IRI)	165	92	105	114	120	220
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	24.2	22.9	22.6	23.2	24.4	23.4
Lane Width (ft)	10	9.9	9.5	9.6	10.2	10.5

Mojave National Preserve

ROUTE 0011: KELSO-CIMA ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

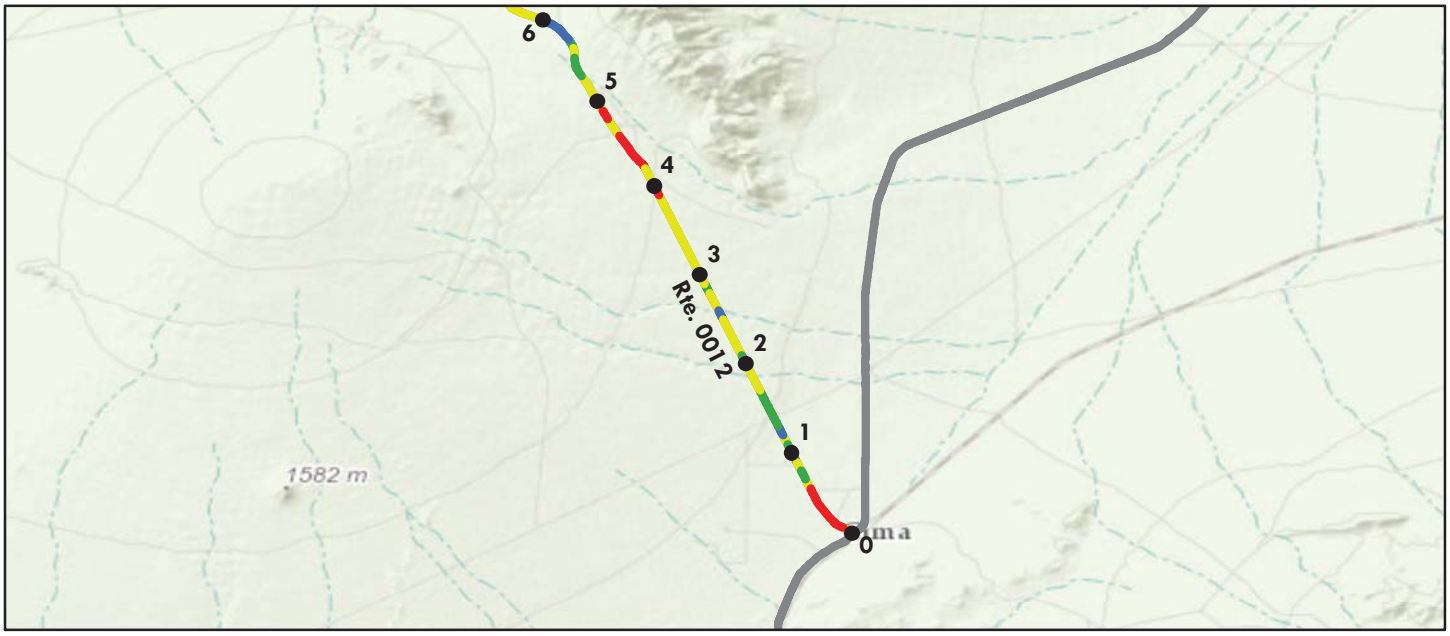
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	15	16	17	18	
Paved Length (Miles): 18.96	**Section Length (MI)**	1	1	1	0.96	
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	36	48	55	79	64	
Surface Condition Rating (SCR)	6	52	49	85	75	
Roughness Condition Index (RCI)	81	41	65	69	47	
Distress Index Values						
Structural Crack Index	6	52	49	85	75	
Alligator Crack Index	23	96	93	99	97	
Longitudinal Crack Index	83	56	56	86	78	
Transverse Cracking Index	77	52	72	94	91	
Patching Index	99	94	96	98	96	
Rutting Index	94	81	91	89	86	
International Roughness Index (IRI)	165	330	219	205	300	
Lane & Width Information						
Number of Lanes	2	2	2	2	2	
Paved Width (ft)	24.2	25.2	26.4	25.3	22.7	
Lane Width (ft)	10	9.6	9.8	9.9	9.5	

Mojave National Preserve

ROUTE 0012: CIMA ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

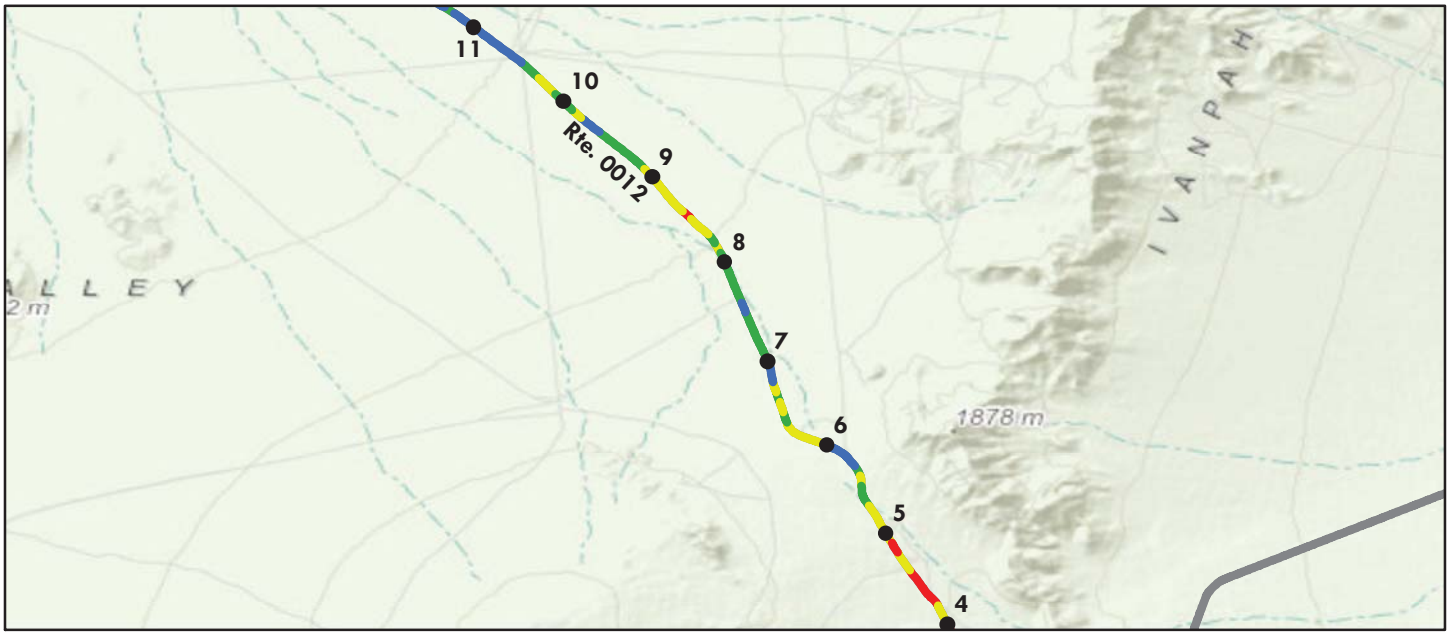
See Appendix for definitions and formulas

Inspection Date: 5/15/2015	**Beginning Section MP**	0	1	2	3	4
Paved Length (Miles): 17.64	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	75	57	87	82	70	65
Surface Condition Rating (SCR)	66	37	84	75	58	61
Roughness Condition Index (RCI)	89	87	92	93	89	70
Distress Index Values						
Structural Crack Index	66	37	84	75	58	62
Alligator Crack Index	91	93	100	100	100	94
Longitudinal Crack Index	75	44	84	75	58	68
Transverse Cracking Index	68	78	84	80	88	61
Patching Index	99	99	100	99	98	99
Rutting Index	94	94	93	95	92	94
International Roughness Index (IRI)	144	149	134	133	143	201
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	23.5	23.4	22.8	24.6	23.3	24
Lane Width (ft)	10	9.8	9.7	9.6	10.6	9.8

Mojave National Preserve

ROUTE 0012: CIMA ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

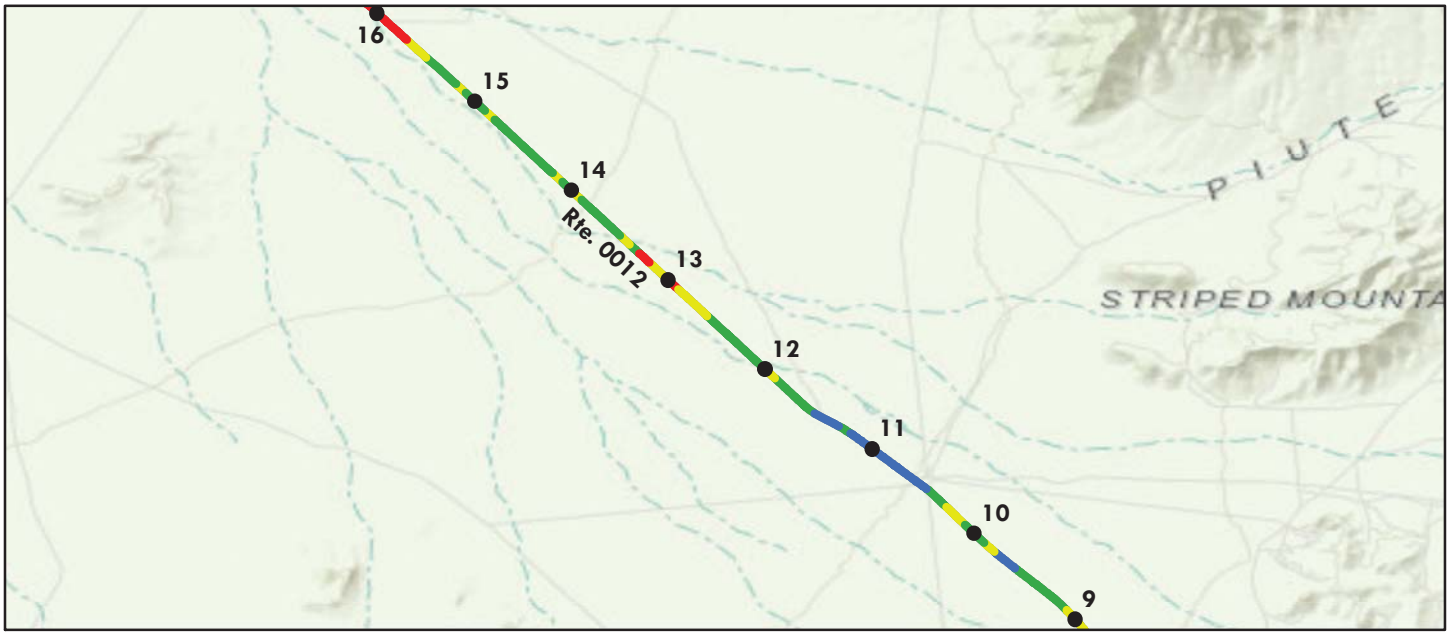
See Appendix for definitions and formulas

Inspection Date: 5/15/2015	**Beginning Section MP**	5	6	7	8	9
Paved Length (Miles): 17.64	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	75	88	83	92	79	90
Surface Condition Rating (SCR)	66	90	87	92	72	87
Roughness Condition Index (RCI)	89	84	78	93	89	95
Distress Index Values						
Structural Crack Index	66	92	87	92	74	87
Alligator Crack Index	91	100	99	100	100	100
Longitudinal Crack Index	75	92	88	92	74	87
Transverse Cracking Index	68	90	91	92	72	92
Patching Index	99	99	99	100	99	99
Rutting Index	94	91	89	94	93	96
International Roughness Index (IRI)	144	156	174	133	143	127
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	23.5	23.9	23.9	23.2	24.2	22.9
Lane Width (ft)	10	9.4	9.8	9.7	10.1	10.3

Mojave National Preserve

ROUTE 0012: CIMA ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

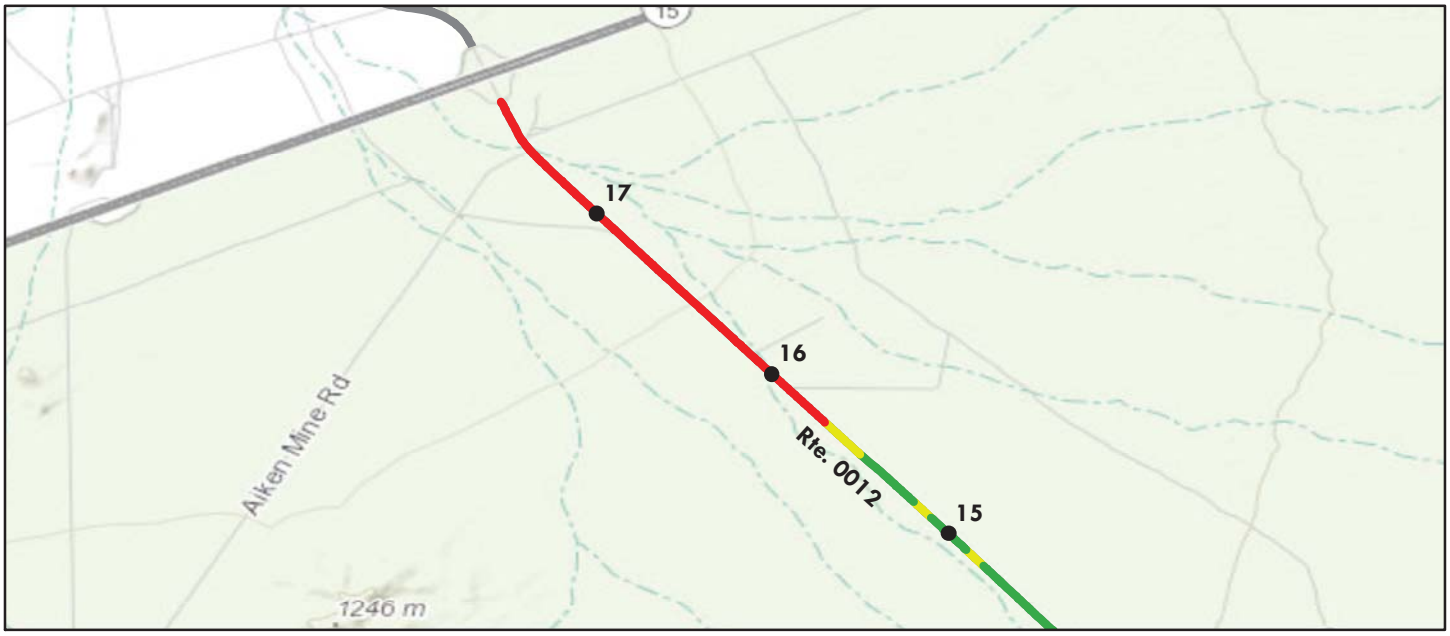
See Appendix for definitions and formulas

Inspection Date: 5/15/2015	**Beginning Section MP**	10	11	12	13	14
Paved Length (Miles): 17.64	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	75	93	94	80	81	87
Surface Condition Rating (SCR)	66	91	90	79	76	85
Roughness Condition Index (RCI)	89	97	100	82	88	90
Distress Index Values						
Structural Crack Index	66	91	90	88	94	98
Alligator Crack Index	91	100	100	100	100	100
Longitudinal Crack Index	75	91	90	88	94	98
Transverse Cracking Index	68	95	95	79	76	85
Patching Index	99	100	100	98	100	100
Rutting Index	94	94	97	91	96	98
International Roughness Index (IRI)	144	121	109	163	146	139
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	23.5	24.3	23.2	23.3	22.9	24.1
Lane Width (ft)	10	10.4	10.5	10.5	10.4	10.2

Mojave National Preserve

ROUTE 0012: CIMA ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

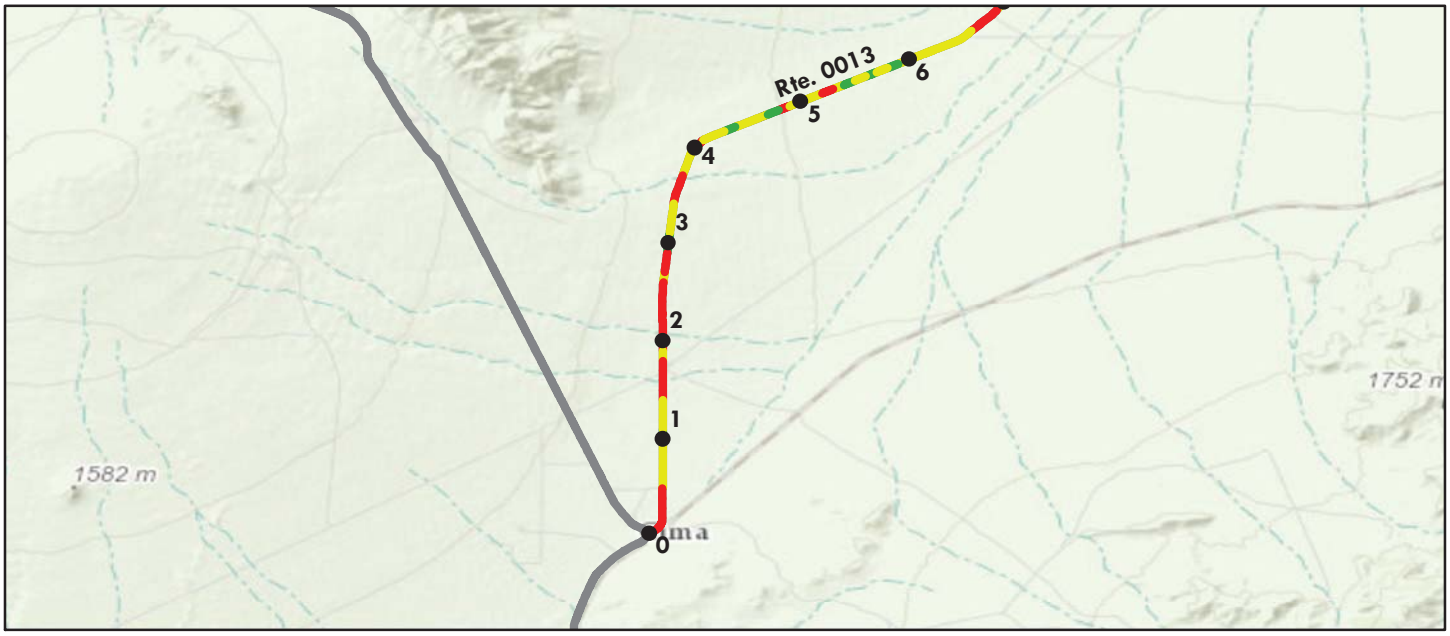
See Appendix for definitions and formulas

Inspection Date: 5/15/2015	**Beginning Section MP**	15	16	17		
Paved Length (Miles): 17.64	**Section Length (MI)**	1	1	0.64		
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	75	59	37	36		
Surface Condition Rating (SCR)	66	41	0	0		
Roughness Condition Index (RCI)	89	86	93	91		
Distress Index Values						
Structural Crack Index	66	57	0	0		
Alligator Crack Index	91	89	52	0		
Longitudinal Crack Index	75	68	20	32		
Transverse Cracking Index	68	41	0	0		
Patching Index	99	100	100	100		
Rutting Index	94	95	96	97		
International Roughness Index (IRI)	144	150	132	139		
Lane & Width Information						
Number of Lanes	2	2	2	2		
Paved Width (ft)	23.5	22	22.6	25.6		
Lane Width (ft)	10	10	9.7	9.9		

Mojave National Preserve

ROUTE 0013: MORNING STAR MINE ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

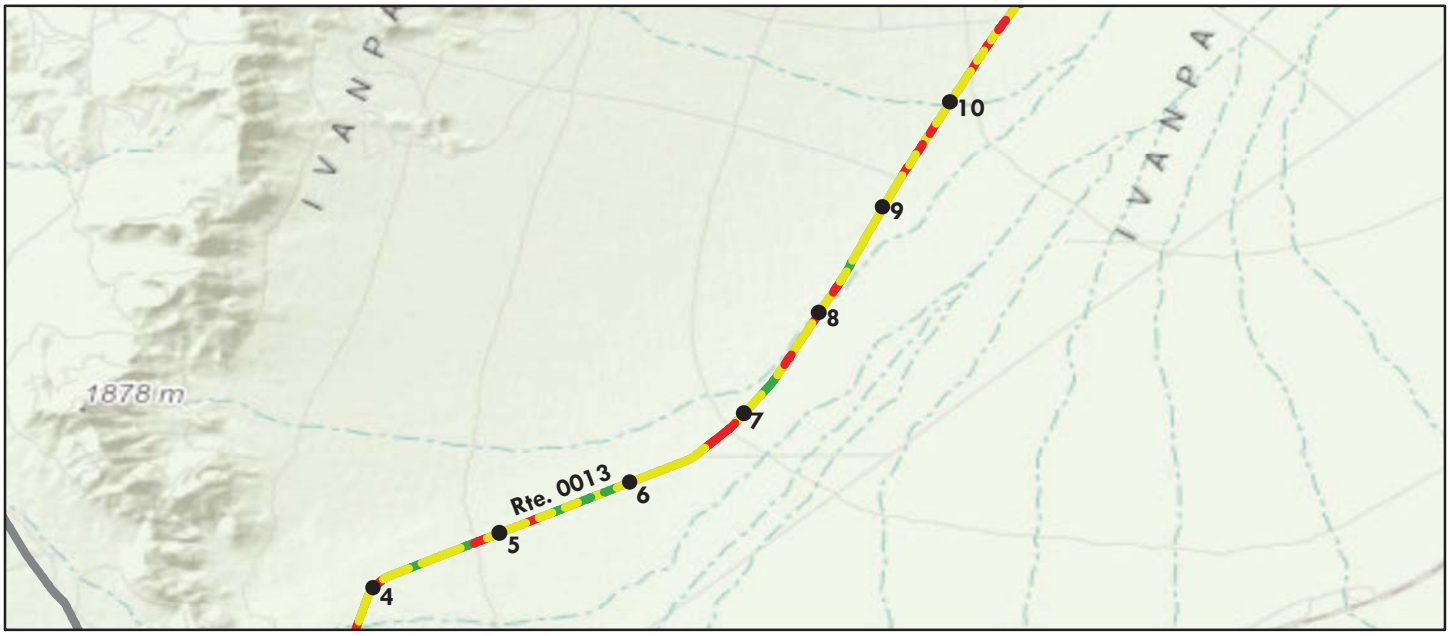
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	0	1	2	3	4
Paved Length (Miles): 14.99	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	65	60	63	44	68	75
Surface Condition Rating (SCR)	51	61	51	44	65	64
Roughness Condition Index (RCI)	87	59	82	45	72	92
Distress Index Values						
Structural Crack Index	66	61	51	44	85	79
Alligator Crack Index	98	95	98	91	100	99
Longitudinal Crack Index	68	66	53	53	85	80
Transverse Cracking Index	51	70	59	54	65	64
Patching Index	99	96	100	94	97	99
Rutting Index	94	91	95	79	87	92
International Roughness Index (IRI)	148	241	162	310	195	136
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	23.4	22.5	23.8	24.3	24.6	24.7
Lane Width (ft)	9.8	9.4	9.6	9.9	9.8	10.5

Mojave National Preserve

ROUTE 0013: MORNING STAR MINE ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

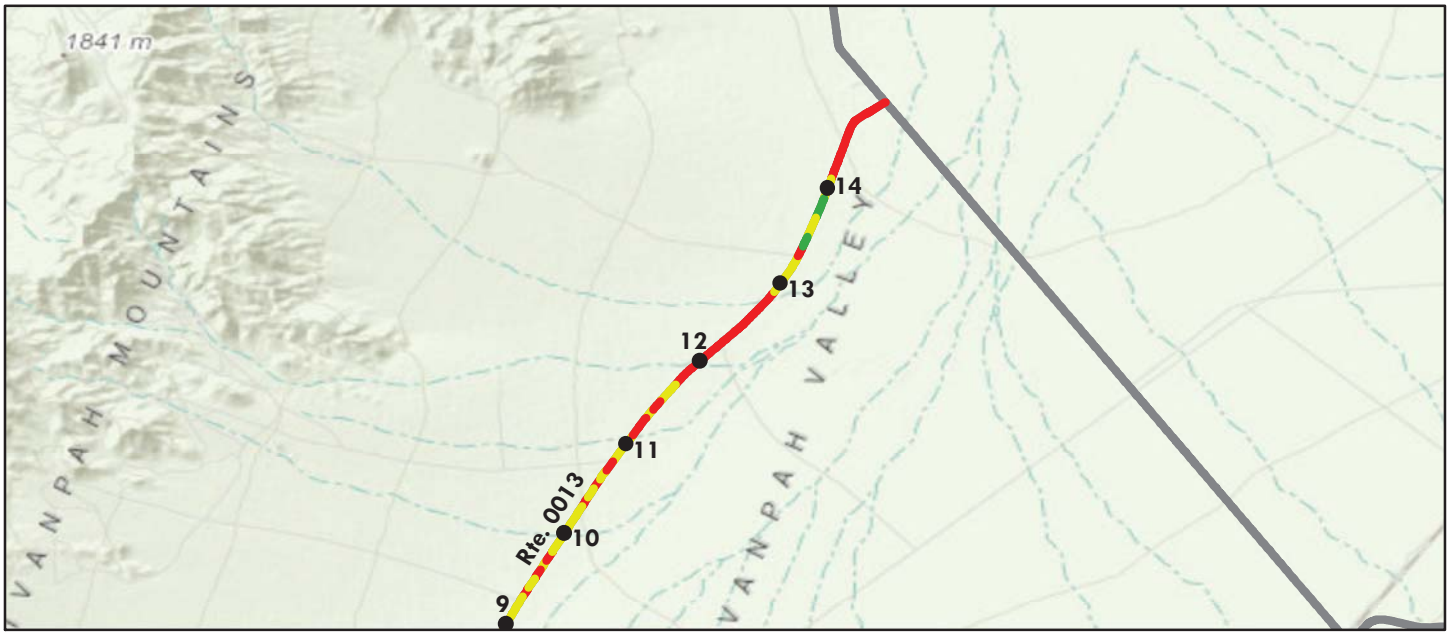
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	5	6	7	8	9
Paved Length (Miles): 14.99	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	65	79	69	75	69	63
Surface Condition Rating (SCR)	51	65	48	59	48	44
Roughness Condition Index (RCI)	87	100	100	100	100	92
Distress Index Values						
Structural Crack Index	66	71	66	72	86	74
Alligator Crack Index	98	100	100	100	99	97
Longitudinal Crack Index	68	71	66	72	87	77
Transverse Cracking Index	51	65	48	59	48	44
Patching Index	99	100	100	100	100	98
Rutting Index	94	98	97	98	98	98
International Roughness Index (IRI)	148	84	80	103	83	135
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	23.4	24.9	23.9	23.6	22.4	22.5
Lane Width (ft)	9.8	10.3	9.8	9.6	9.2	9.4

Mojave National Preserve

ROUTE 0013: MORNING STAR MINE ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

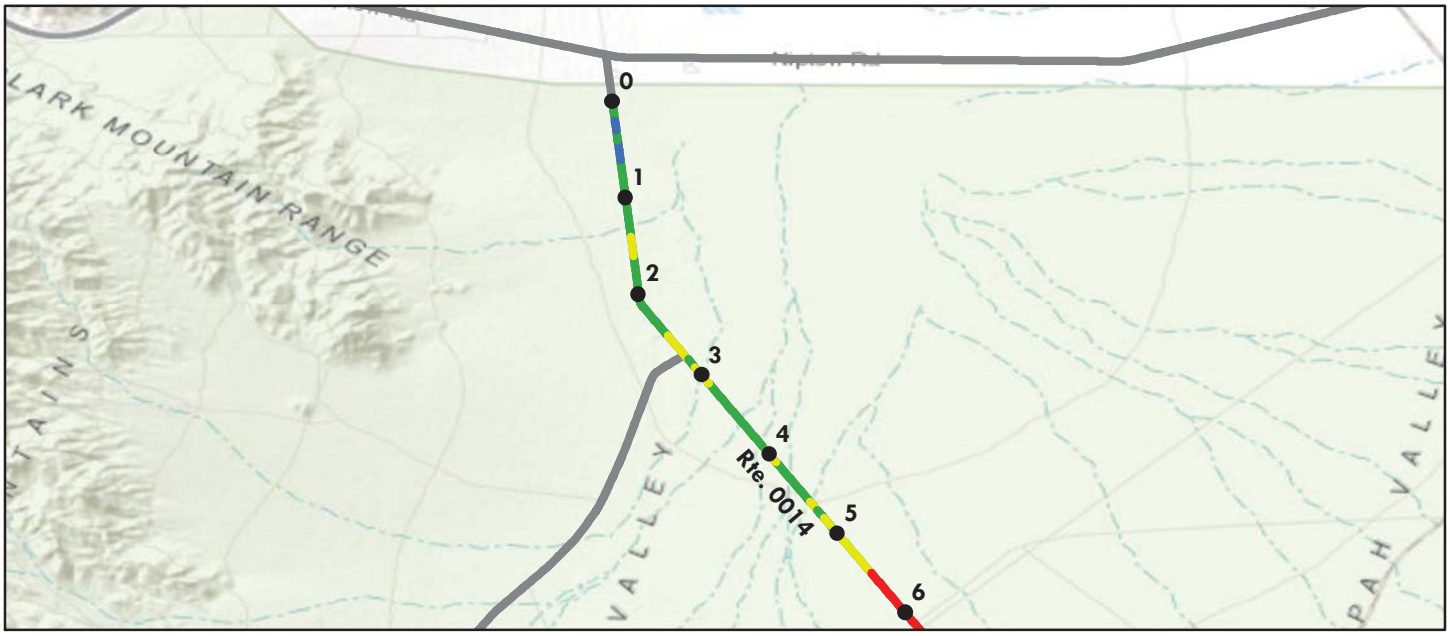
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	10	11	12	13	14
Paved Length (Miles): 14.99	**Section Length (MI)**	1	1	1	1	0.99
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	65	66	53	44	77	39
Surface Condition Rating (SCR)	51	44	37	21	62	4
Roughness Condition Index (RCI)	87	100	76	78	100	91
Distress Index Values						
Structural Crack Index	66	96	76	68	62	4
Alligator Crack Index	98	100	100	99	100	99
Longitudinal Crack Index	68	96	76	69	62	5
Transverse Cracking Index	51	44	37	21	72	10
Patching Index	99	100	98	98	100	100
Rutting Index	94	98	94	90	99	98
International Roughness Index (IRI)	148	104	180	176	90	137
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	23.4	22.7	23.6	22.1	22.2	23.1
Lane Width (ft)	9.8	9.7	10.3	9.3	9.6	10

Mojave National Preserve

ROUTE 0014: IVANPAH ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

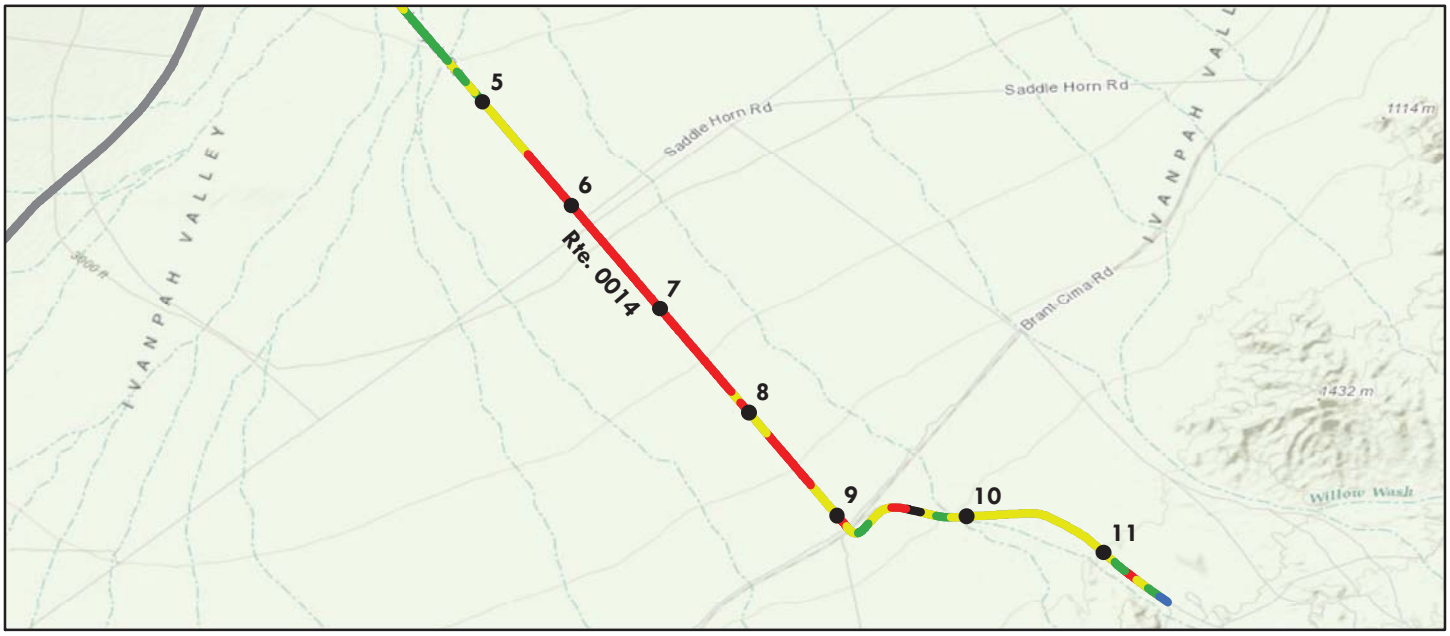
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	0	1	2	3	4
Paved Length (Miles): 11.57	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	64	93	87	86	88	88
Surface Condition Rating (SCR)	42	88	78	76	80	80
Roughness Condition Index (RCI)	96	100	100	100	100	100
Distress Index Values						
Structural Crack Index	42	92	91	84	83	84
Alligator Crack Index	72	100	100	100	100	100
Longitudinal Crack Index	70	92	91	84	83	84
Transverse Cracking Index	48	88	78	76	80	80
Patching Index	99	100	100	100	100	100
Rutting Index	97	100	100	100	100	100
International Roughness Index (IRI)	124	76	54	75	65	60
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	22.5	23	23.2	24.2	24	23.7
Lane Width (ft)	9.6	9.9	10.2	9.9	9.9	10.1

Mojave National Preserve

ROUTE 0014: IVANPAH ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

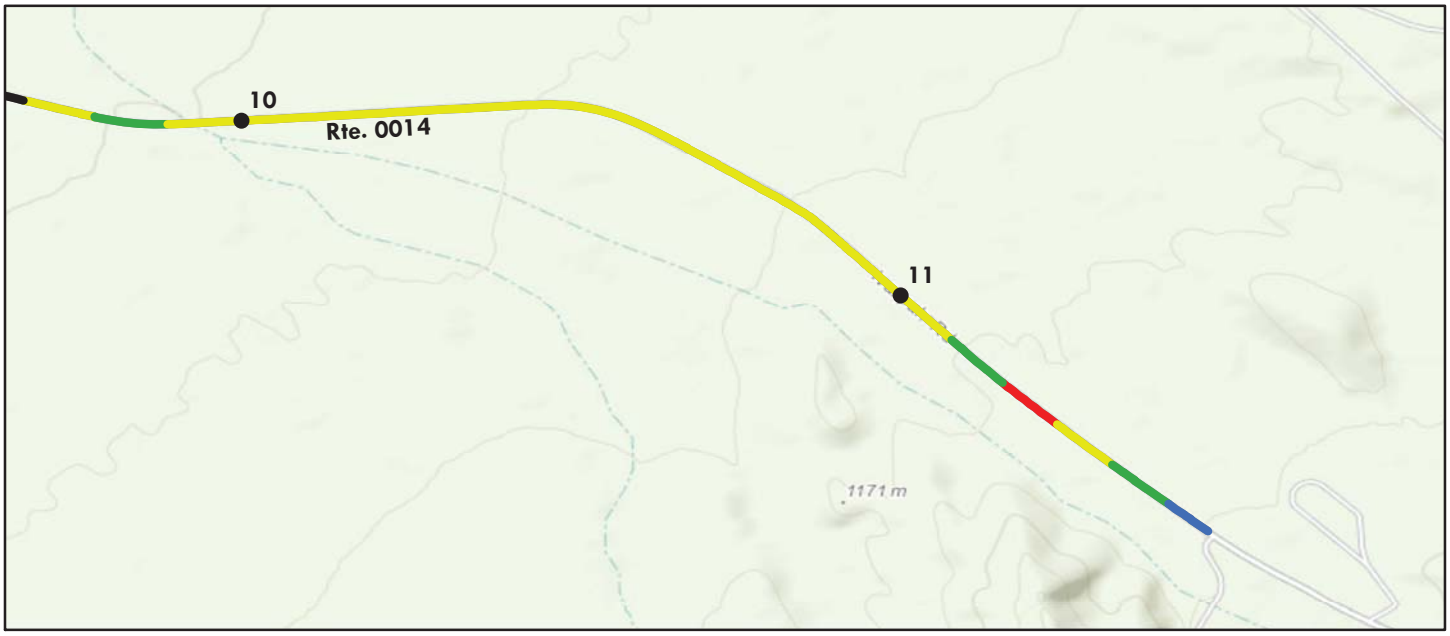
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	5	6	7	8	9
Paved Length (Miles): 11.57	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	64	46	25	27	62	64
Surface Condition Rating (SCR)	42	22	0	0	37	54
Roughness Condition Index (RCI)	96	82	62	68	99	80
Distress Index Values						
Structural Crack Index	42	22	0	0	70	79
Alligator Crack Index	72	58	0	0	100	96
Longitudinal Crack Index	70	64	16	43	70	83
Transverse Cracking Index	48	23	0	0	37	54
Patching Index	99	99	94	95	100	99
Rutting Index	97	97	94	94	96	92
International Roughness Index (IRI)	124	163	232	209	116	170
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	22.5	22.4	21.1	22	22.4	22.2
Lane Width (ft)	9.6	9.9	9	9.1	9.4	9.3

Mojave National Preserve

ROUTE 0014: IVANPAH ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	10	11			
Paved Length (Miles): 11.57	**Section Length (MI)**	1	0.57			
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	64	73	81			
Surface Condition Rating (SCR)	42	63	72			
Roughness Condition Index (RCI)	96	88	95			
Distress Index Values						
Structural Crack Index	42	63	72			
Alligator Crack Index	72	100	100			
Longitudinal Crack Index	70	63	72			
Transverse Cracking Index	48	84	75			
Patching Index	99	100	100			
Rutting Index	97	93	94			
International Roughness Index (IRI)	124	147	127			
Lane & Width Information						
Number of Lanes	2	2	2			
Paved Width (ft)	22.5	21.5	20.4			
Lane Width (ft)	9.6	8.9	9.2			

Mojave National Preserve

ROUTE 0016: CEDAR CANYON ROAD

Data Collection Vehicle (DCV) Rating

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

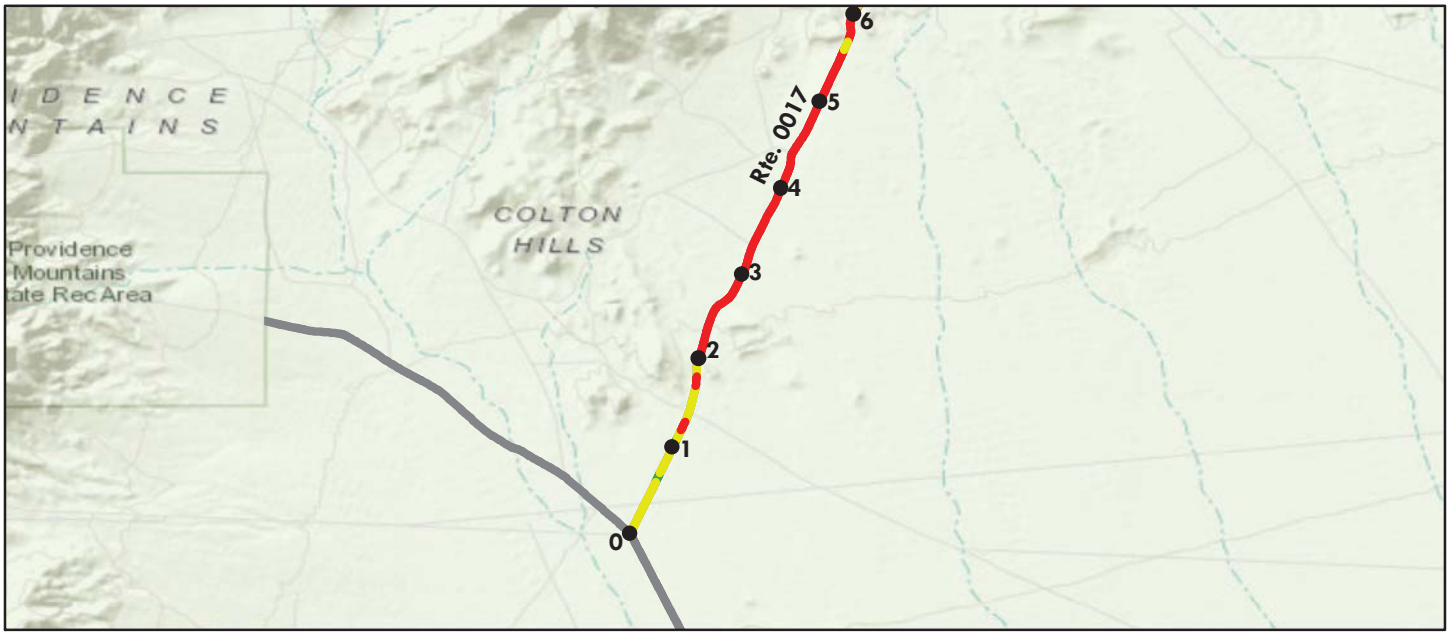
See Appendix for definitions and formulas

Inspection Date: 5/15/2015	**Beginning Section MP**	0	1	2		
Paved Length (Miles): 2.35	**Section Length (MI)**	1	1	0.35		
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	80	89	79	59		
Surface Condition Rating (SCR)	83	90	83	61		
Roughness Condition Index (RCI)	75	88	72	56		
Distress Index Values						
Structural Crack Index	83	90	83	62		
Alligator Crack Index	100	100	100	100		
Longitudinal Crack Index	83	90	83	62		
Transverse Cracking Index	85	92	86	61		
Patching Index	99	100	99	97		
Rutting Index	89	95	89	75		
International Roughness Index (IRI)	184	145	195	256		
Lane & Width Information						
Number of Lanes	2	2	2	2		
Paved Width (ft)	24.3	25.2	24.2	22.2		
Lane Width (ft)	12.1	12.5	12.1	11.1		

Mojave National Preserve

ROUTE 0017: BLACK CANYON ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

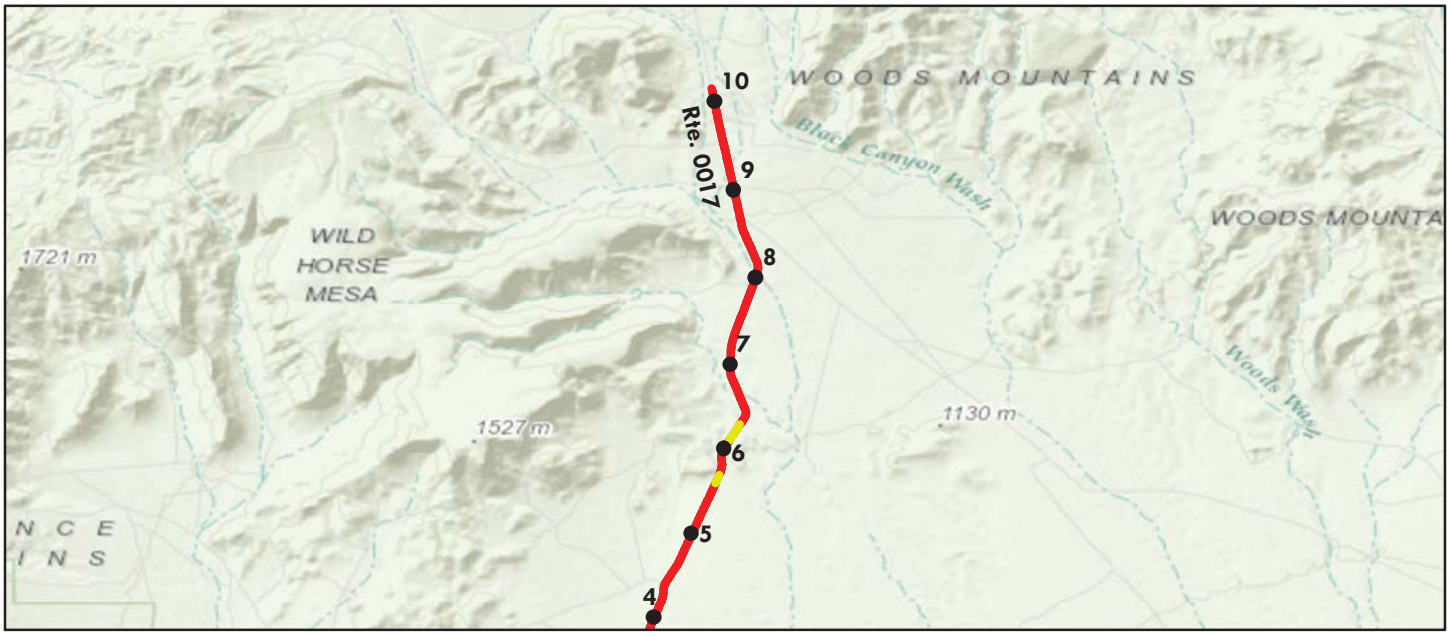
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	0	1	2	3	4
Paved Length (Miles): 10.15	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	46	81	70	39	35	32
Surface Condition Rating (SCR)	21	72	60	11	6	0
Roughness Condition Index (RCI)	84	95	84	80	78	81
Distress Index Values						
Structural Crack Index	38	72	60	36	17	23
Alligator Crack Index	99	99	100	100	100	100
Longitudinal Crack Index	39	73	60	36	17	23
Transverse Cracking Index	21	77	65	11	6	0
Patching Index	100	100	99	100	100	100
Rutting Index	93	95	94	92	89	91
International Roughness Index (IRI)	157	127	158	168	176	167
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	26.9	25.4	25.7	27.1	27.3	27.9
Lane Width (ft)	10.2	10.5	9.8	9.9	10	9.8

Mojave National Preserve

ROUTE 0017: BLACK CANYON ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	5	6	7	8	9
Paved Length (Miles): 10.15	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	46	43	46	41	36	44
Surface Condition Rating (SCR)	21	9	19	10	0	25
Roughness Condition Index (RCI)	84	93	86	88	91	72
Distress Index Values						
Structural Crack Index	38	37	29	32	26	48
Alligator Crack Index	99	100	100	100	95	99
Longitudinal Crack Index	39	37	29	32	31	49
Transverse Cracking Index	21	9	19	10	0	25
Patching Index	100	100	100	100	100	99
Rutting Index	93	95	94	94	96	91
International Roughness Index (IRI)	157	132	152	147	139	195
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	26.9	27.6	28.7	27.7	25.6	26.5
Lane Width (ft)	10.2	10.1	10.4	10.5	10.3	10.4

Mojave National Preserve

ROUTE 0017: BLACK CANYON ROAD

Data Collection Vehicle (DCV) Rating

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

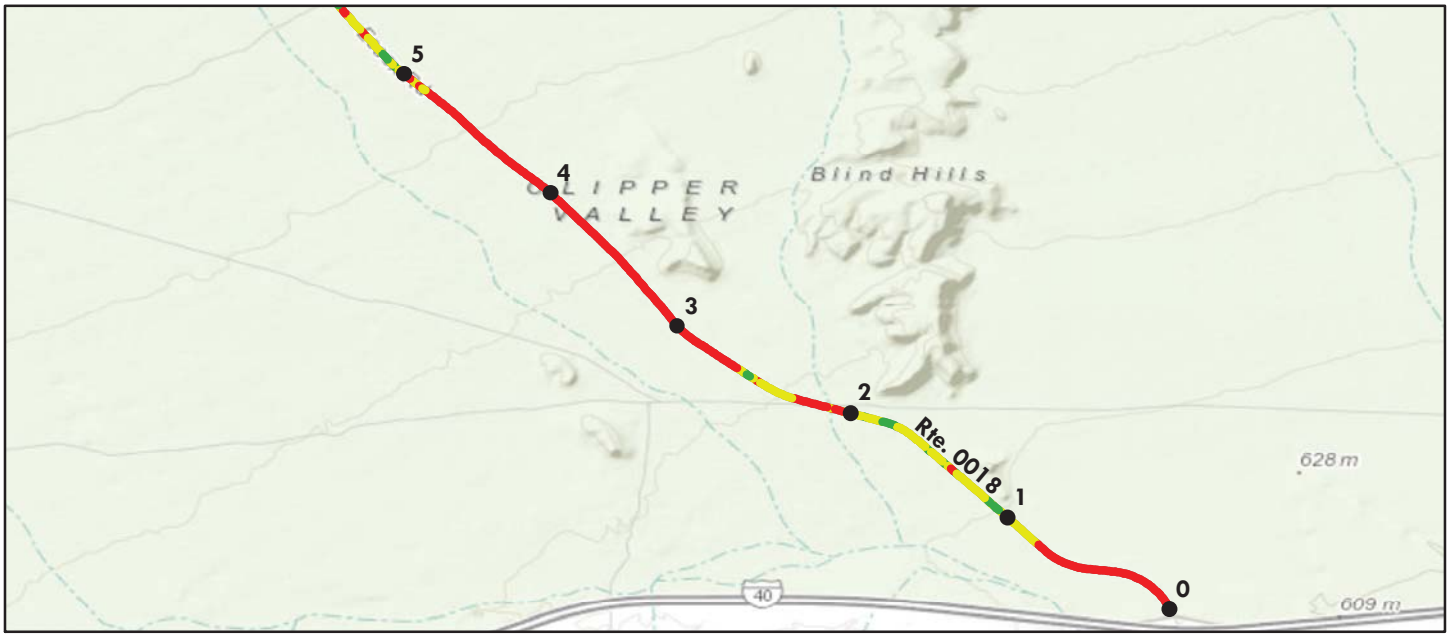
See Appendix for definitions and formulas

Inspection Date:	5/16/2015	**Beginning Section MP**	10				
Paved Length (Miles):	10.15	**Section Length (MI)**	0.15				
Surface Type:	ASPHALT	**Route Summary**					
Roadway Condition Information							
Pavement Condition Rating (PCR)		46	42				
Surface Condition Rating (SCR)		21	22				
Roughness Condition Index (RCI)		84	72				
Distress Index Values							
Structural Crack Index		38	68				
Alligator Crack Index		99	100				
Longitudinal Crack Index		39	68				
Transverse Cracking Index		21	22				
Patching Index		100	98				
Rutting Index		93	93				
International Roughness Index (IRI)		157	194				
Lane & Width Information							
Number of Lanes		2	2				
Paved Width (ft)		26.9	26				
Lane Width (ft)		10.2	10				

Mojave National Preserve

ROUTE 0018: ESSEX ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

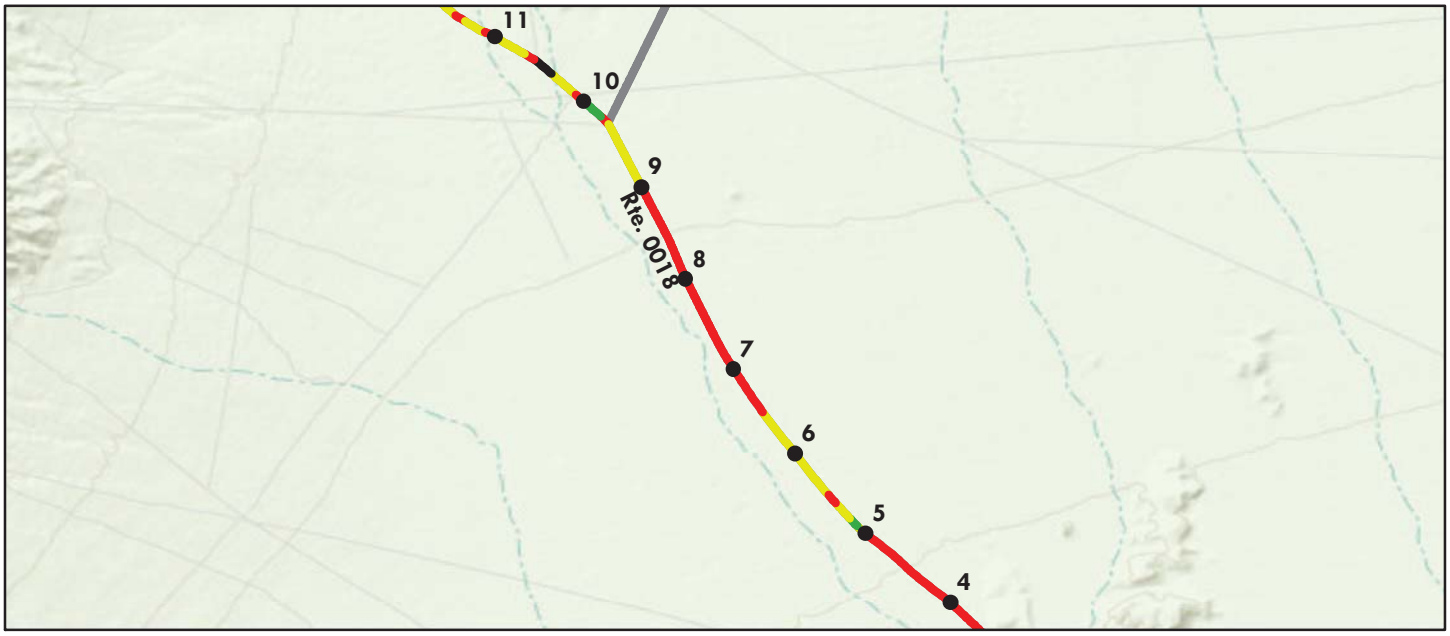
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	0	1	2	3	4
Paved Length (Miles): 13.79	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	46	36	83	36	34	36
Surface Condition Rating (SCR)	19	0	72	10	0	0
Roughness Condition Index (RCI)	86	90	99	75	85	91
Distress Index Values						
Structural Crack Index	51	0	72	46	3	28
Alligator Crack Index	98	97	100	94	97	89
Longitudinal Crack Index	53	0	72	52	6	39
Transverse Cracking Index	19	2	72	10	0	0
Patching Index	99	99	100	99	99	100
Rutting Index	94	93	95	94	94	96
International Roughness Index (IRI)	152	141	118	185	154	137
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	23.9	24	23.8	25	25.2	23.1
Lane Width (ft)	10	10.1	9.7	10.1	10.7	10.3

Mojave National Preserve

ROUTE 0018: ESSEX ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

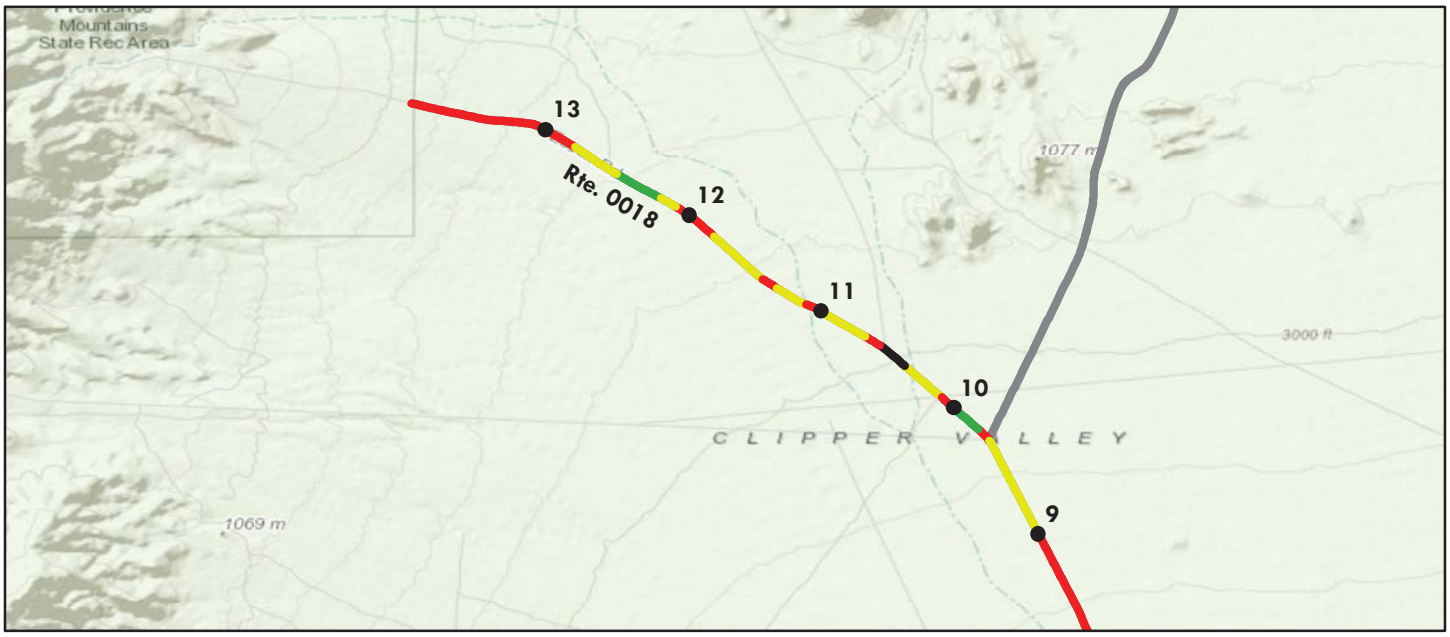
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	5	6	7	8	9
Paved Length (Miles): 13.79	**Section Length (MI)**	1	1	1	1	1
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	46	76	47	39	31	74
Surface Condition Rating (SCR)	19	60	16	0	0	62
Roughness Condition Index (RCI)	86	100	94	98	77	91
Distress Index Values						
Structural Crack Index	51	70	57	48	29	75
Alligator Crack Index	98	98	100	100	99	100
Longitudinal Crack Index	53	72	57	48	30	75
Transverse Cracking Index	19	60	16	0	0	62
Patching Index	99	100	98	100	98	100
Rutting Index	94	96	94	93	90	93
International Roughness Index (IRI)	152	113	130	121	180	138
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	23.9	24.1	24.3	24.3	22.6	23.7
Lane Width (ft)	10	10.4	9.9	10	10.1	9.9

Mojave National Preserve

ROUTE 0018: ESSEX ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

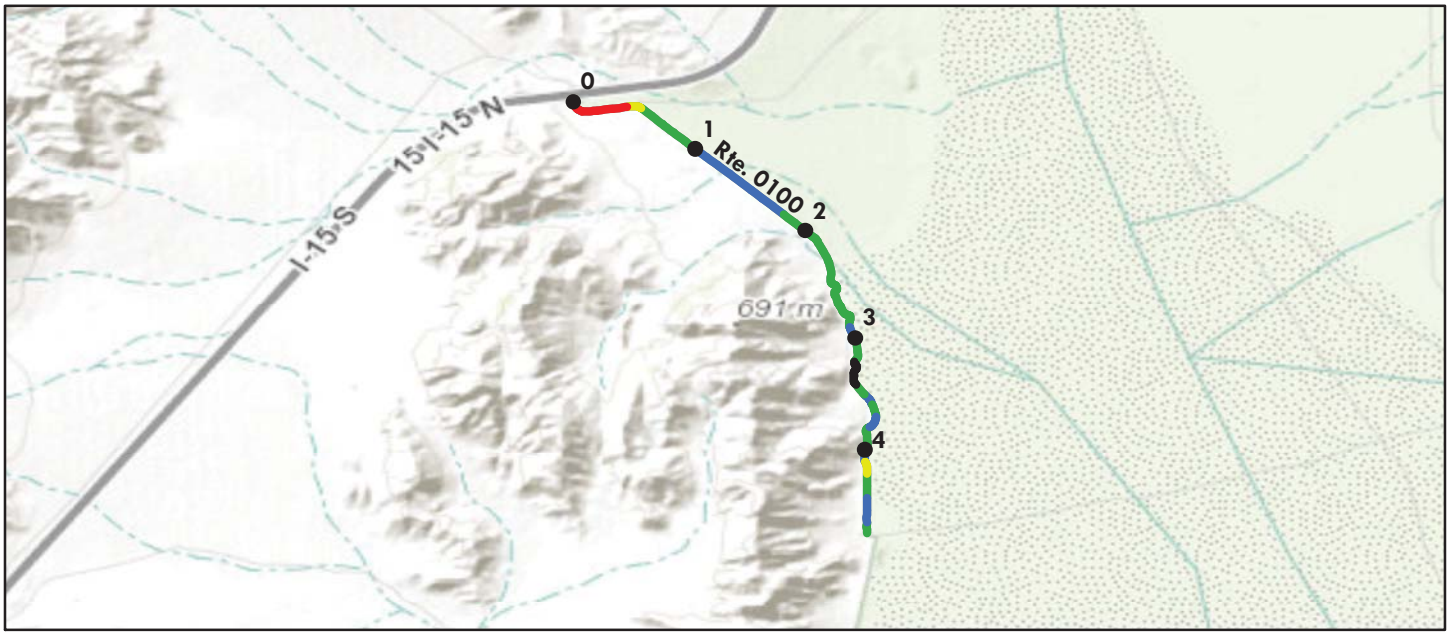
See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	10	11	12	13	
Paved Length (Miles): 13.79	**Section Length (MI)**	1	1	1	0.79	
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	46	71	63	64	34	
Surface Condition Rating (SCR)	19	67	57	58	0	
Roughness Condition Index (RCI)	86	76	71	74	84	
Distress Index Values						
Structural Crack Index	51	86	78	80	63	
Alligator Crack Index	98	100	100	100	100	
Longitudinal Crack Index	53	86	78	80	63	
Transverse Cracking Index	19	67	57	58	0	
Patching Index	99	99	98	98	99	
Rutting Index	94	95	93	93	96	
International Roughness Index (IRI)	152	181	199	187	157	
Lane & Width Information						
Number of Lanes	2	2	2	2	2	
Paved Width (ft)	23.9	24	24.1	23.1	23.7	
Lane Width (ft)	10	9.8	9.5	9.3	9.6	

Mojave National Preserve

ROUTE 0100: ZZYZX ROAD

Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 5/16/2015	**Beginning Section MP**	0	1	2	3	4
Paved Length (Miles): 4.47	**Section Length (MI)**	1	1	1	1	0.69
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	91	75	95	91	93	92
Surface Condition Rating (SCR)	95	76	97	95	95	96
Roughness Condition Index (RCI)	85	74	93	84	91	86
Distress Index Values						
Structural Crack Index	95	76	100	100	100	100
Alligator Crack Index	100	100	100	100	100	100
Longitudinal Crack Index	95	76	100	100	100	100
Transverse Cracking Index	96	82	100	100	100	100
Patching Index	100	99	100	100	100	100
Rutting Index	96	96	97	95	95	96
International Roughness Index (IRI)	154	187	133	157	138	153
Lane & Width Information						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	20.1	20.8	19.9	19.4	20.7	19.9
Lane Width (ft)	10.1	10.6	9.9	9.7	10.3	10

A section of unpaved road was collected from MP 3.18 to 3.40.

Mojave National Preserve

ROUTE 0402: BAKER RESIDENTIAL ROAD

Manual Rating

FROM CALTRANS AVENUE

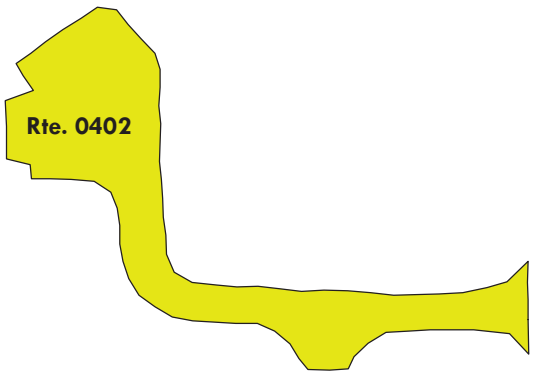
TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
5/16/2015	113329	PUBLIC	ASPHALT
Area (Sq. Ft.)	**Lane Miles (11' Widths)**	**Pavement Recommendation**	
6,826	0.118	LIGHT 3R TREATMENTS	
Condition Rating / PCR			
FAIR / 73			

Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated

See Appendix for definitions and formulas



Section 6
Paved Parking Area Condition Rating Sheets

Mojave National Preserve

Federal Lands Highway
Road Inventory Program

MOJA: Paved Parking Area Condition Rating Sheets

No Paved Parking Areas exist in this park.Therefore, in Cycle 6, there is no data to report for this section.

Section 7
Road Milepost Information

Mojave National Preserve

Federal Lands Highway
Road Inventory Program

Road Milepost Information

This report section contains road milepost information for all paved roads in the park that were collected with the Data Collection Vehicle (DCV). The milepost data is obtained from the DCV by using a distance measuring instrument (DMI) that is calibrated to record mileage to the nearest thousandth of a mile. Park roads that were manually rated did not have milepost data collected, and thus are not included in this report section.

For Cycle 6, the information presented in this section differs from previous RIP cycles in that it does not contain the roadside features inventories for the paved park roads. Some examples of the features previously collected are signs, culverts/drop inlets, guardrails, curbing, pullouts, etc. If the park was collected in a previous RIP cycle, then the latest features data can be obtained by referencing the following:

Where to find the latest Features Inventories for NPS Parks:

- For Small Parks (parks with less than 10 miles of paved roads):
    - Refer to Cycle 5 data (collected 2010 - 2014)
        - Features were reported in Section 9 of the ***Cycle 5*** RIP report
        - Video of features can be viewed using the ***PathViewVO*** program and ***Cycle 5*** data

- For Large Parks (parks with more than 10 miles of paved roads):
    - Refer to Cycle 4 data (collected 2006 - 2009)
        - Features were reported in Section 9 of the ***Cycle 4*** RIP report
        - Video of features can be viewed using the ***VisiData*** program and ***Cycle 4*** data
    - Note: Features inventories were updated in Large Parks in ***Cycle 5*** only on a route by route basis if the route was new or modified in ***Cycle 5***. If this is the case for a particular route, then features for the route can be obtained using the ***PathViewVO*** program and ***Cycle 5*** data (same as above for Small parks).

Milepost Events Verified in Cycle 6

In Cycle 6, the following events were collected and reported in Section 7 of this report:

- Intersections with roads and parking areas
- All bridges and culverts with BIP Numbers (bridge inspection program numbers)
- Mile Marker Signs
- One-Way travel directions
- Overpasses
- Tunnels
- Low Water Crossings (LWCR)
- Surface type changes
- Construction areas where no pavement condition data was obtained

GPS Mileage Matching

A consistent survey milepost and constant route length as recorded by the Data Collection Vehicle (DCV) is a challenge to maintain from one collection cycle to the next. The challenge is due to many factors such as driver characteristics, DMI calibration, tire pressure etc. After Cycle 4 (~2010), a decision was made to hold constant the length of roads so long as there was no physical change from reconstruction projects or realignments that would result in a change to the length of a road. Consequently, the "GPS Mileage Match" was implemented to specify which cycle the route length is being matched. Route mileages and GPS are matched to a previous collection whenever there is no physical change to a route alignment. The route mileage and GPS is not matched to previous cycles whenever it is determined that a road length and GPS needs to be updated. When this happens the GPS and length is updated to the cycle that displays the change, and that collection cycle is used as the matching cycle in subsequent collections of the road. Thus, the Cycle 6 GIS could be either the survey length collected in Cycle 4, Cycle 5, or Cycle 6 and therefore, may not match the survey milepost displayed in the latest Cycle 6 DCV video which is viewable in ***PathView VO***.

The features inventories and road logs collected on NPS routes contain mileposts that are determined from the corresponding cycle that the GPS is matched to. Therefore, the mileposts contained in the Cycle 4 or 5 features inventories or the Cycle 6 road logs may not exactly match the survey milepost collected in the latest Cycle 6 video of the road.

Locating Mile Marker Signs

For routes that have mile marker signs along them, the milepost reported by RIP will most likely not line up exactly with the sign located in the field. This could be happening for many reasons, most likely due to either the error falling within the acceptable calibration range of the vehicle, or the level of accuracy that the mile marker signs were placed in the field.

Because mile marker signs are important features in many project plans and location descriptions, RIP is reporting locations of mile marker signs in three ways in Cycle 6:

1. Mileposts from Cycle 6 GIS: the official RIP milepost taken from the features inventories and the matching GPS/mileage cycle as described above. This is the milepost that should be used on project plans and when finding locations in the field

2. Mileposts from Cycle 6 Video: milepost shown to help locate the mile marker sign in the latest ***PathView VO*** video.

3. Latitude / Longitude: a constant way of locating a mile marker sign so long as the park has not moved the sign

The mileposts from Cycle 6 Video and GIS should be nearly the same, but on longer roads it has been observed that the Video milepost deviates more from the official GIS milepost that comes from the matching cycle.

MOJA: Route Milepost Log

ROUTE 0010: KELBAKER ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.00	0.00	INTERSECTION	N/A	PAVED ROUTE (HWY 127 / DEATH VALLEY ROAD/NON-NPS)
0.00	0.00	INTERSECTION	R	PAVED ROUTE (I-15 OFF RAMP/NON-NPS)
0.00	0.00	PARK BOUNDARY	N/A	NORTH PARK BOUNDARY
0.00	0.00	INTERSECTION	L	PAVED ROUTE (I-15 ON RAMP/NON-NPS)
0.03	0.03	INTERSECTION	R	UNPAVED ROUTE (BAKER COMMUNITY COLLECTION CENTER)
0.03	0.03	INTERSECTION	L	UNPAVED ROUTE (TELEPHONE LINE ROAD)
0.27	0.27	INTERSECTION	R	UNPAVED PARKING (ENTRANCE SIGN)
0.87	0.87	INTERSECTION	R	UNPAVED ROUTE
0.90	0.90	INTERSECTION	R	UNPAVED ROUTE
1.45	1.45	INTERSECTION	R	UNPAVED ROUTE
1.46	1.46	INTERSECTION	L	UNPAVED ROUTE
1.89	1.89	INTERSECTION	R	UNPAVED ROUTE
5.09	5.09	INTERSECTION	R	UNPAVED ROUTE
5.74	5.74	INTERSECTION	R	UNPAVED ROUTE (HENRY SPRINGS ROAD)
5.74	5.74	INTERSECTION	L	UNPAVED ROUTE (HENRY SPRINGS ROAD)
10.45	10.45	INTERSECTION	L	UNPAVED ROUTE
10.52	10.52	INTERSECTION	L	UNPAVED ROUTE
10.53	10.53	INTERSECTION	L	UNPAVED ROUTE
12.23	12.23	INTERSECTION	R	UNPAVED ROUTE
12.75	12.75	INTERSECTION	L	UNPAVED ROUTE (SNAPPER SPRING ROAD)
13.49	13.49	INTERSECTION	L	UNPAVED ROUTE
13.82	13.82	INTERSECTION	L	UNPAVED ROUTE
13.91	13.91	INTERSECTION	R	UNPAVED ROUTE (MOJAVE ROAD)
13.92	13.92	INTERSECTION	L	UNPAVED ROUTE (MOJAVE ROAD)
15.36	15.36	INTERSECTION	L	UNPAVED ROUTE
16.81	16.81	INTERSECTION	L	UNPAVED ROUTE
17.68	17.68	INTERSECTION	L	UNPAVED ROUTE
19.69	19.69	INTERSECTION	L	UNPAVED ROUTE (AIKEN MINE ROAD / NON NPS)
19.70	19.70	INTERSECTION	R	UNPAVED ROUTE (JACKASS SPRING ROAD / NON NPS)

Data Collected on 5/2015

MOJA: Route Milepost Log

ROUTE 0010: KELBAKER ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
20.13	20.13	INTERSECTION	R	UNPAVED ROUTE
23.08	23.08	INTERSECTION	R	UNPAVED ROUTE (POWER LINE ROAD)
23.10	23.10	INTERSECTION	L	UNPAVED ROUTE (POWER LINE ROAD)
23.11	23.11	INTERSECTION	R	UNPAVED ROUTE
34.55	34.55	INTERSECTION	R	PAVED ROUTE (PRIVATE)
34.59	34.62	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
34.60	34.60	INTERSECTION	L	UNPAVED ROUTE
34.63	34.63	INTERSECTION	L	ROUTE 0011 (KELSO-CIMA ROAD)
34.65	34.65	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
34.66	34.66	INTERSECTION	L	UNPAVED ROUTE (RAILROAD ACCESS)
34.67	34.67	RAILROAD CROSSING	N/A	N/A
34.67	34.67	RAILROAD CROSSING	N/A	N/A
34.67	34.67	RAILROAD CROSSING	N/A	N/A
34.68	34.68	RAILROAD CROSSING	N/A	N/A
34.68	34.68	RAILROAD CROSSING	N/A	N/A
34.70	34.70	INTERSECTION	L	UNPAVED ROUTE (RAILROAD HOUSING ACCESS)
34.70	34.70	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
34.74	34.74	INTERSECTION	L	UNPAVED ROUTE
34.76	34.76	INTERSECTION	L	UNPAVED ROUTE
34.78	34.78	INTERSECTION	R	UNPAVED ROUTE
35.33	35.36	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
35.40	35.40	INTERSECTION	L	UNPAVED ROUTE
37.01	37.03	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
37.23	37.23	INTERSECTION	R	UNPAVED ROUTE (PHONE LINE ROAD)
38.35	38.35	INTERSECTION	L	UNPAVED ROUTE

Data Collected on 5/2015

MOJA: Route Milepost Log

ROUTE 0010: KELBAKER ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
38.56	38.56	INTERSECTION	R	UNPAVED ROUTE
38.70	38.73	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
42.48	42.48	INTERSECTION	R	ROUTE 0202 (KELSO DUNES ROAD)
42.62	42.62	INTERSECTION	R	PAVED ROUTE (GAS LINE ROAD)
42.71	42.71	INTERSECTION	L	UNPAVED ROUTE (NON NPS)
42.72	42.72	INTERSECTION	R	UNPAVED ROUTE (NON NPS)
42.82	42.82	INTERSECTION	L	UNPAVED ROUTE
43.39	43.39	INTERSECTION	R	UNPAVED ROUTE (POWER LINE ROAD)
45.76	45.76	INTERSECTION	R	UNPAVED ROUTE
46.55	46.55	INTERSECTION	L	UNPAVED ROUTE (GROVER CANYON ROAD)
47.12	47.12	INTERSECTION	R	UNPAVED ROUTE
47.37	47.37	INTERSECTION	L	UNPAVED ROUTE
47.39	47.39	INTERSECTION	R	UNPAVED ROUTE
49.10	49.10	INTERSECTION	R	UNPAVED ROUTE
49.13	49.13	INTERSECTION	R	UNPAVED ROUTE
49.13	49.13	INTERSECTION	R	UNPAVED ROUTE
49.15	49.15	INTERSECTION	L	UNPAVED ROUTE (SERVICE ROAD)
49.16	49.16	INTERSECTION	R	UNPAVED ROUTE (SERVICE ROAD)
49.18	49.18	INTERSECTION	L	UNPAVED ROUTE
50.20	50.22	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
50.53	50.53	INTERSECTION	R	UNPAVED ROUTE
50.53	50.53	INTERSECTION	L	UNPAVED ROUTE (HIDDEN HILLS ROAD)
50.73	50.73	INTERSECTION	L	UNPAVED ROUTE
51.33	51.33	INTERSECTION	L	UNPAVED PARKING
51.35	51.35	INTERSECTION	L	UNPAVED PARKING
51.35	51.35	INTERSECTION	R	UNPAVED ROUTE (POWER LINE ROAD)
51.67	51.67	INTERSECTION	L	UNPAVED ROUTE
51.67	51.67	INTERSECTION	R	UNPAVED ROUTE

Data Collected on 5/2015

MOJA: Route Milepost Log

ROUTE 0010: KELBAKER ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
51.74	51.74	INTERSECTION	R	UNPAVED ROUTE
52.98	52.98	INTERSECTION	R	UNPAVED ROUTE
54.69	54.69	INTERSECTION	L	UNPAVED ROUTE
55.17	55.17	INTERSECTION	R	UNPAVED ROUTE
56.06	56.06	INTERSECTION	L	UNPAVED PARKING (ENTRANCE SIGN)
56.75	56.75	INTERSECTION	R	UNPAVED ROUTE
56.98	56.98	PARK BOUNDARY	N/A	SOUTH PARK BOUNDARY
56.98	56.98	INTERSECTION	N/A	PAVED ROUTE (KELBAKER ROAD NON NPS)

MOJA: Route Milepost Log

ROUTE 0011: KELSO-CIMA ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.00	0.00	INTERSECTION	L	ROUTE 0010 (KELBAKER ROAD)
0.00	0.00	INTERSECTION	R	ROUTE 0010 (KELBAKER ROAD)
0.04	0.04	INTERSECTION	L	UNPAVED PARKING
0.07	0.07	INTERSECTION	R	UNPAVED PARKING
0.11	0.11	INTERSECTION	R	UNPAVED PARKING (KELSO DEPOT)
0.13	0.13	INTERSECTION	L	UNPAVED ROUTE
0.19	0.19	INTERSECTION	R	UNPAVED PARKING (KELSO DEPOT)
0.19	0.19	INTERSECTION	L	UNPAVED ROUTE
0.23	0.23	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
0.23	0.23	INTERSECTION	L	UNPAVED ROUTE
0.52	0.52	INTERSECTION	L	UNPAVED ROUTE
0.66	0.66	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
0.99	0.99	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
1.01	1.01	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
1.03	1.03	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
1.12	1.12	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
1.16	1.16	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
1.17	1.18	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
1.25	1.25	INTERSECTION	L	UNPAVED ROUTE
1.46	1.46	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
1.48	1.48	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
1.50	1.50	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
1.59	1.59	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
1.73	1.73	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
1.74	1.76	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
1.79	1.79	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
2.15	2.15	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
2.16	2.19	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA

Data Collected on 5/2015

MOJA: Route Milepost Log

ROUTE 0011: KELSO-CIMA ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
2.20	2.20	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
2.41	2.41	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
2.42	2.44	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
2.46	2.46	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
2.88	2.88	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
2.88	2.90	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
2.90	2.90	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
3.33	3.35	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
3.58	3.58	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
3.80	3.80	INTERSECTION	R	UNPAVED ROUTE (GLOBE MINE ROAD)
3.80	3.81	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
3.82	3.82	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
4.01	4.01	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
4.02	4.03	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
4.04	4.04	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
4.47	4.47	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
4.51	4.51	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
4.60	4.60	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
4.71	4.73	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
4.74	4.74	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
5.36	5.38	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
5.56	5.56	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
5.57	5.60	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
5.58	5.58	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
5.61	5.61	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)

Data Collected on 5/2015

MOJA: Route Milepost Log

ROUTE 0011: KELSO-CIMA ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
6.16	6.16	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
6.17	6.17	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
6.20	6.23	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
6.23	6.23	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
6.59	6.62	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
6.63	6.63	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
6.66	6.66	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
6.70	6.70	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
7.02	7.02	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
7.04	7.04	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
7.06	7.06	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
7.26	7.26	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
7.28	7.28	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
7.33	7.33	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
7.36	7.38	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
7.39	7.39	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
7.58	7.58	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
7.59	7.62	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
7.63	7.63	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
7.93	7.93	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
8.08	8.08	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
8.29	8.29	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
8.30	8.32	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
8.33	8.33	INTERSECTION	R	UNPAVED ROUTE (MACEDONIA CANYON ROAD) SPUR
8.45	8.45	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
8.49	8.49	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
8.56	8.56	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)

Data Collected on 5/2015

MOJA: Route Milepost Log

ROUTE 0011: KELSO-CIMA ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
8.58	8.59	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
8.59	8.59	INTERSECTION	R	UNPAVED ROUTE (MACEDONIA CANYON ROAD)
8.60	8.60	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
8.75	8.75	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
8.77	8.77	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
8.78	8.78	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
9.15	9.15	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
9.16	9.18	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
9.18	9.18	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
9.53	9.53	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
9.53	9.55	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
9.56	9.56	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
9.95	9.95	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
9.97	9.97	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
9.98	10.00	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
10.01	10.01	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
10.22	10.22	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
10.23	10.25	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
10.27	10.27	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
10.55	10.55	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
10.58	10.59	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
10.61	10.61	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
11.21	11.21	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
11.27	11.30	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
11.51	11.51	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)

Data Collected on 5/2015

MOJA: Route Milepost Log

ROUTE 0011: KELSO-CIMA ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
11.56	11.58	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
11.57	11.57	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
11.81	11.81	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
11.99	11.99	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
12.02	12.02	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
12.23	12.28	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
12.41	12.41	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
12.41	12.42	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
12.42	12.42	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
12.48	12.48	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
12.54	12.54	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
12.57	12.57	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
12.94	12.94	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
13.01	13.02	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
13.03	13.03	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
13.26	13.27	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
13.28	13.28	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
13.52	13.52	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
13.63	13.63	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
13.64	13.65	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
13.66	13.66	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
14.15	14.15	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
14.15	14.17	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
14.19	14.19	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
14.32	14.32	INTERSECTION	L	UNPAVED ROUTE
14.34	14.34	INTERSECTION	R	ROUTE 0016 (CEDAR CANYON ROAD)

Data Collected on 5/2015

MOJA: Route Milepost Log

ROUTE 0011: KELSO-CIMA ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
14.45	14.48	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
14.50	14.50	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
14.55	14.55	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
14.98	14.98	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
15.08	15.08	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
15.32	15.32	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
15.33	15.34	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
15.36	15.36	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
15.65	15.65	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
15.70	15.70	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
15.72	15.72	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
15.74	15.76	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
15.77	15.77	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
16.23	16.23	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
16.25	16.26	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
16.29	16.29	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
16.70	16.70	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
16.73	16.74	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
16.75	16.75	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
17.07	17.07	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
17.15	17.15	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
17.26	17.26	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
17.29	17.29	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
17.32	17.32	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
17.89	17.89	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
17.96	17.96	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
18.16	18.16	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)

Data Collected on 5/2015

ROUTE 0011: KELSO-CIMA ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
18.46	18.46	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
18.63	18.63	INTERSECTION	L	UNPAVED ROUTE (PRIVATE)
18.68	18.68	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
18.73	18.73	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
18.76	18.76	INTERSECTION	L	UNPAVED PARKING (CIMA POST OFFICE)
18.79	18.79	INTERSECTION	L	UNPAVED PARKING (CIMA POST OFFICE)
18.81	18.81	INTERSECTION	L	UNPAVED PARKING (CIMA POST OFFICE)
18.83	18.83	RAILROAD CROSSING	N/A	N/A
18.88	18.88	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
18.93	18.93	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
18.94	18.94	RAILROAD CROSSING	N/A	N/A
18.96	18.96	INTERSECTION	L	ROUTE 0012 (CIMA ROAD)
18.96	18.96	INTERSECTION	N/A	ROUTE 0013 (MORNING STAR MINE ROAD)

MOJA: Route Milepost Log

ROUTE 0012: CIMA ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.00	0.00	INTERSECTION	R	ROUTE 0013 (MORNING STAR MINE ROAD)
0.00	0.00	INTERSECTION	L	ROUTE 0011 (KELSO-CIMA ROAD)
0.11	0.11	INTERSECTION	L	UNPAVED ROUTE
0.59	0.59	INTERSECTION	R	UNPAVED ROUTE
1.40	1.40	INTERSECTION	L	UNPAVED ROUTE (POWER LINE ROAD)
1.40	1.40	INTERSECTION	R	UNPAVED ROUTE (POWER LINE ROAD)
2.50	2.50	INTERSECTION	L	UNPAVED ROUTE
4.24	4.24	INTERSECTION	R	UNPAVED ROUTE 0400 (KESSLER SPRINGS ROAD)
4.66	4.66	INTERSECTION	L	UNPAVED ROUTE
4.66	4.66	INTERSECTION	R	UNPAVED ROUTE
5.21	5.21	INTERSECTION	R	UNPAVED ROUTE 0400 (KESSLER SPRINGS ROAD)
5.32	5.34	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
5.78	5.78	INTERSECTION	R	UNPAVED ROUTE
6.18	6.18	INTERSECTION	R	UNPAVED ROUTE
6.30	6.30	INTERSECTION	R	UNPAVED ROUTE
6.40	6.40	INTERSECTION	L	UNPAVED PARKING (TRAILHEAD TEUTONIA PEAK)
7.66	7.66	INTERSECTION	L	UNPAVED ROUTE 0205 (VALLEY VIEW ROAD)
10.48	10.48	INTERSECTION	L	UNPAVED ROUTE
10.49	10.49	INTERSECTION	R	UNPAVED ROUTE
10.58	10.58	INTERSECTION	R	UNPAVED ROUTE
10.62	10.62	INTERSECTION	R	UNPAVED ROUTE
15.90	15.90	INTERSECTION	R	UNPAVED ROUTE (XENO ROAD / PRIVATE)
16.86	16.86	INTERSECTION	L	UNPAVED ROUTE (MONUMENT ROUTE)
17.38	17.38	INTERSECTION	L	UNPAVED ROUTE (PRIVATE)
17.39	17.39	INTERSECTION	L	UNPAVED ROUTE
17.44	17.44	INTERSECTION	R	UNPAVED ROUTE (TELEPHONE LINE ROAD)
17.45	17.45	INTERSECTION	R	UNPAVED ROUTE
17.54	17.54	INTERSECTION	R	UNPAVED ROUTE
17.55	17.55	INTERSECTION	R	UNPAVED ROUTE

Data Collected on 5/2015

MOJA: Route Milepost Log

ROUTE 0012: CIMA ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
17.56	17.56	INTERSECTION	R	PAVED PARKING (GAS STATION)
17.58	17.58	INTERSECTION	R	PAVED PARKING (GAS STATION)
17.61	17.61	INTERSECTION	L	UNPAVED PARKING (PRIVATE)
17.64	17.64	INTERSECTION	L	PAVED ROUTE (I-15 OFF RAMP)
17.64	17.64	INTERSECTION	N/A	PAVED ROUTE (CIMA ROAD ((STATE MAINTAINED / NON NPS))
17.64	17.64	INTERSECTION	R	PAVED ROUTE (I-15 ON RAMP)
17.64	17.64	PARK BOUNDARY	N/A	NORTH PARK BOUNDARY

MOJA: Route Milepost Log

ROUTE 0013: MORNING STAR MINE ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.00	0.00	INTERSECTION	N/A	ROUTE 0011 (KELSO-CIMA ROAD)
0.00	0.00	INTERSECTION	L	ROUTE 0012 (CIMA ROAD)
0.03	0.03	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
0.11	0.11	INTERSECTION	R	UNPAVED ROUTE (DEATH VALLEY MINE ROAD)
0.14	0.14	INTERSECTION	R	UNPAVED ROUTE (DEATH VALLEY MINE ROAD)
1.67	1.67	INTERSECTION	L	UNPAVED ROUTE (POWER LINE ROAD)
1.68	1.68	INTERSECTION	R	UNPAVED ROUTE (POWER LINE ROAD)
1.76	1.76	INTERSECTION	R	UNPAVED ROUTE (POWER LINE ROAD)
4.02	4.02	INTERSECTION	L	UNPAVED ROUTE
4.11	4.11	INTERSECTION	L	UNPAVED ROUTE
6.51	6.51	INTERSECTION	R	UNPAVED ROUTE
9.27	9.27	INTERSECTION	L	UNPAVED ROUTE (STAR MINE ROAD)
9.30	9.30	INTERSECTION	L	UNPAVED ROUTE (STAR MINE ROAD) SPUR
10.82	10.82	INTERSECTION	L	UNPAVED ROUTE
14.99	14.99	INTERSECTION	L	ROUTE 0014 (IVANPAH ROAD)
14.99	14.99	INTERSECTION	R	ROUTE 0014 (IVANPAH ROAD)

MOJA: Route Milepost Log

ROUTE 0014: IVANPAH ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.00	0.00	INTERSECTION	N/A	ROUTE 5003 (IVANPAH ROAD (EXTENSION))
0.11	0.11	INTERSECTION	R	UNPAVED PARKING (ENTRANCE SIGN)
0.23	0.23	INTERSECTION	R	UNPAVED ROUTE
0.62	0.62	INTERSECTION	R	UNPAVED ROUTE
0.68	0.68	INTERSECTION	R	UNPAVED ROUTE
1.52	1.52	INTERSECTION	R	UNPAVED ROUTE
2.10	2.10	INTERSECTION	R	UNPAVED ROUTE
2.13	2.13	INTERSECTION	R	UNPAVED ROUTE SPUR
2.54	2.54	INTERSECTION	R	UNPAVED ROUTE
2.74	2.74	INTERSECTION	R	ROUTE 0013 (MORNING STAR MINE ROAD)
3.30	3.32	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
3.52	3.54	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
3.76	3.77	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
4.24	4.25	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
6.13	6.13	INTERSECTION	L	UNPAVED ROUTE (SADDLE HORN ROAD)
6.20	6.20	INTERSECTION	R	UNPAVED ROUTE (POWER LINE ROAD)
6.21	6.21	INTERSECTION	L	UNPAVED ROUTE (PRIVATE)
9.11	9.11	INTERSECTION	L	UNPAVED ROUTE (RAILROAD ACCESS)
9.11	9.11	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
9.13	9.13	RAILROAD CROSSING	N/A	N/A
9.13	9.13	RAILROAD CROSSING	N/A	N/A
9.14	9.14	INTERSECTION	L	UNPAVED ROUTE
9.15	9.15	INTERSECTION	R	UNPAVED ROUTE
9.35	9.35	INTERSECTION	L	UNPAVED ROUTE
9.50	9.50	INTERSECTION	L	UNPAVED ROUTE
9.65	9.66	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA

Data Collected on 5/2015

MOJA: Route Milepost Log

ROUTE 0014: IVANPAH ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
9.95	9.97	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
11.57	11.57	INTERSECTION	N/A	ROUTE 0014 (IVANPAH ROAD) UNPAVED SECTION

Data Collected on 5/2015

ROUTE 0016: CEDAR CANYON ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.00	0.00	INTERSECTION	R	ROUTE 0011 (KELSO-CIMA ROAD)
0.00	0.00	INTERSECTION	L	ROUTE 0011 (KELSO-CIMA ROAD)
0.02	0.02	RAILROAD CROSSING	N/A	N/A
0.79	0.79	INTERSECTION	R	UNPAVED ROUTE
2.35	2.35	INTERSECTION	N/A	ROUTE 0016 (CEDAR CANYON ROAD) UNPAVED SECTION

MOJA: Route Milepost Log

ROUTE 0017: BLACK CANYON ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.00	0.00	INTERSECTION	L	ROUTE 0018 (ESSEX ROAD)
0.00	0.00	INTERSECTION	R	ROUTE 0018 (ESSEX ROAD)
0.28	0.28	INTERSECTION	L	UNPAVED PARKING
0.35	0.35	INTERSECTION	L	UNPAVED ROUTE (POWER LINE ROAD)
0.36	0.36	INTERSECTION	R	UNPAVED ROUTE (POWER LINE ROAD)
1.42	1.42	INTERSECTION	L	UNPAVED ROUTE
1.99	1.99	INTERSECTION	R	UNPAVED ROUTE
2.05	2.05	INTERSECTION	R	UNPAVED ROUTE
2.10	2.10	INTERSECTION	R	UNPAVED ROUTE
3.13	3.15	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
3.31	3.34	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
3.59	3.61	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
4.16	4.19	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
4.38	4.38	INTERSECTION	L	UNPAVED ROUTE
5.75	5.75	INTERSECTION	R	UNPAVED ROUTE (PRIMARY CAMPSITE ROAD)
5.78	5.80	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
6.66	6.68	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
7.94	7.94	INTERSECTION	L	UNPAVED ROUTE
8.03	8.07	LOW WATER CROSSING	N/A	HIGH WATER FLOW AREA
8.68	8.68	INTERSECTION	R	UNPAVED ROUTE
9.03	9.03	INTERSECTION	L	UNPAVED ROUTE
9.04	9.04	INTERSECTION	R	UNPAVED ROUTE
9.55	9.55	INTERSECTION	L	UNPAVED ROUTE (HOLE IN THE WALL CANYON)
9.78	9.78	INTERSECTION	L	UNPAVED ROUTE (HOLE IN THE WALL ROAD)
9.78	9.78	INTERSECTION	R	UNPAVED ROUTE 0215 (HW FIRE CENTER ROAD)
9.95	9.95	INTERSECTION	R	UNPAVED ROUTE 0215 (HW FIRE CENTER ROAD) SPUR

Data Collected on 5/2015

MOJA: Route Milepost Log

ROUTE 0017: BLACK CANYON ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
10.04	10.04	INTERSECTION	L	UNPAVED ROUTE 0212 (HW CAMPGROUND ROAD)
10.05	10.05	INTERSECTION	R	UNPAVED ROUTE
10.15	10.15	INTERSECTION	N/A	ROUTE 0017 (BLACK CANYON ROAD) UNPAVED SECTION

MOJA: Route Milepost Log

ROUTE 0018: ESSEX ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.00	0.00	PARK BOUNDARY	N/A	SOUTH PARK BOUNDARY
0.00	0.00	INTERSECTION	N/A	PAVED ROUTE (ESSEX ROAD)
0.44	0.44	INTERSECTION	R	PAVED PARKING (ENTRANCE SIGN / TURNAROUND)
0.46	0.46	INTERSECTION	R	PAVED PARKING (ENTRANCE SIGN / TURNAROUND)
1.66	1.66	INTERSECTION	R	UNPAVED ROUTE
2.17	2.17	INTERSECTION	L	UNPAVED ROUTE (HIDDEN HILL)
9.71	9.71	INTERSECTION	L	UNPAVED ROUTE (BROTHER CANYON)
9.71	9.71	INTERSECTION	R	ROUTE 0017 (BLACK CANYON ROAD)
9.73	9.73	INTERSECTION	R	UNPAVED PARKING
10.10	10.10	INTERSECTION	R	UNPAVED ROUTE (POWER LINE ROAD)
10.11	10.11	INTERSECTION	L	UNPAVED ROUTE (POWER LINE ROAD)
10.55	10.55	INTERSECTION	R	UNPAVED ROUTE (RANCH ROAD)
13.79	13.79	PARK BOUNDARY	N/A	CA STATE PARK
13.79	13.79	INTERSECTION	N/A	PAVED ROUTE (ESSEX ROAD)

MOJA: Route Milepost Log

ROUTE 0100: ZZYZX ROAD

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.00	0.00	INTERSECTION	N/A	PAVED ROUTE (ARROWHEAD TRAIL ROAD)
0.00	0.00	INTERSECTION	R	PAVED ROUTE (INTERSTATE 15 (TEMECULA VALLEY FREEWAY) RAMP)
0.00	0.00	INTERSECTION	L	PAVED ROUTE (INTERSTATE 15 (TEMECULA VALLEY FREEWAY) RAMP)
0.15	0.15	INTERSECTION	R	UNPAVED ROUTE
0.46	0.46	INTERSECTION	L	UNPAVED ROUTE
1.11	1.11	INTERSECTION	R	UNPAVED ROUTE
3.19	3.19	SURFACE TYPE	N/A	GRAVEL
3.40	3.40	SURFACE TYPE	N/A	ASPHALT
4.49	4.49	INTERSECTION	R	UNPAVED ROUTE
4.64	4.64	INTERSECTION	R	UNPAVED ROUTE
4.66	4.66	INTERSECTION	R	UNPAVED ROUTE
4.69	4.69	INTERSECTION	R	UNPAVED ROUTE (PAUL TIBERIUS ROAD)
4.69	4.69	INTERSECTION	L	UNPAVED ROUTE (PAUL TIBERIUS ROAD)

Section 8
Appendix

Mojave National Preserve

Federal Lands Highway
Road Inventory Program

Improvements to the RIP Index Equations and Determination of PCR

In 2005, the Federal Highway Administration (FHWA) began implementing the use of a Pavement Management System (PMS) to assist the National Park Service (NPS) in prioritizing Pavement Maintenance and Rehabilitation activities. The PMS used by FHWA is the Highway Pavement Management Application (HPMA) which has the ability to store inventory and condition data from the Road Inventory Program (RIP) and forecast future performance using prediction models. Outputs include performance and condition reports at the National, Region, Park, or Route level. A regional prioritized list and optimization have been produced for most regions and the Federal Highway Deferred Maintenance is calculated via the HPMA as well.

In an effort to improve the accuracy of treatment recommendations and pavement condition descriptions the distresses and indexes that comprise the Pavement Condition Rating (PCR), an extensive study was completed throughout 2010 that has resulted in changes to the RIP condition reporting method and specifically, the calculation of PCR. It was determined that a better representation of PCR could be achieved by modifying the relative impact certain distresses would have on the overall rating.

Through the use of HPMA data, it was noted that false failure indicators existed with the existing PCR model, and that it would be necessary to reduce their impact. The distresses affected in this way were Rutting and Roughness. Conversely, experience showed that roadways with extensive cracking present were often shown to have a high PCR. Therefore, the crack index models were adjusted to be more sensitive to changes in crack severity or quantity. It was also determined that these issues were not due to a problem with data acquisition (i.e. the RIP "van"), but with the way the collected data was processed. The final change was to provide guidance on when to use the Roughness Condition Index (RCI) in the PCR calculation. Roughness data is of little value to determining overall condition on routes that, due to their length or geometrics, have lower vehicle operating speeds. Therefore, in Cycle 5, only routes that have lengths of one half mile or greater and posted speed limits of 25 mph or greater will have RCI reported and included in the PCR calculations.

Additionally, methodologies were updated in 2013 for Manually Rated Routes (paved routes that the collection vehicle is unable to drive) as well as Parking Areas to provide more accurate condition data to the HPMA. These updated methodologies allow for the efficient assessment of pavement conditions using a visual inspection method to denote specific distresses. These distresses are indicative of current conditions, the causes for current and future deterioration, and identify the level of targeted repair and rehabilitation practices required.

The changes that were implemented were endorsed by management at both the FHWA and NPS. In order to show the effectiveness of these changes, several sites were ground truth tested in early 2014 to ensure that an improvement was achieved between the relationship of PCR and the actual Maintenance and Rehabilitation needs that were represented. The changes will allow greater use of RIP and HPMA data for not simply condition data reporting, but also as a reliable tool for project identification and selection.

Description of the Rating System

The Federal Highway Administration, National Park Service Road Inventory Program (NPS-RIP), collects roadway condition data on paved surfaces (asphalt, concrete, brick, and cobblestone) on roads, parkways, and parking areas in national parks nationwide. The road surface condition data is collected using an automated Data Collection Vehicle (DCV) and manually using Manually Rated Route (MRR) procedures. Roads having brick or cobblestone surfacing are not normally surveyed with the DCV, but are manually rated for condition rating.

The FHWA RIP is implemented based on the premise that an accurate pavement surface condition assessment can be accomplished using automated crack detection technology as applied to digital images. Various methods of pavement condition assessment have been developed over the years with varying degrees of accuracy and acceptance. The use of digital photography to record pavement images and subsequent crack detection and classification has undergone continuous improvements over the past decade. Digital cameras with increasingly superior resolution and high definition have become more affordable, and the proprietary programming code and algorithms have been improved in crack detection software.

With the use of quality digital photography and automated crack detection software, FHWA RIP is tasked with executing a pavement condition assessment on a network of roughly 5,700 miles of National Park Service roads and parkways. Because a subset of roads will be collected multiple times this cycle, the total collection length will be around 13,000 miles. Foremost in setting up the basis of pavement distress identification is employing the distress identification protocols used by FHWA. There is no single distress identification system that is universal among entities conducting a program of distress identification. For the purpose of the NPS RIP, FHWA employs distress identification protocols that are specific to this program.

FHWA has referenced the "*Distress Identification Manual for the Long-Term Pavement Performance Program", Publication No. FHWA-RD 03-031, June 2003,* as the point-of- reference for distress types on NPS pavement. In truth, the FHWA RIP distress types are similar to those described in the LTPP manual with some modifications. This document, "*Distress Identification Manual for the NPS Road Inventory Program, Cycle 6, 2014-2020"* was developed using the "*Distress Identification Manual for the Long-Term Pavement Performance Program"* as a guideline. Definitions of severity levels based on crack width contained in this document adhere to the LTPP Distress ID Manual. Modifications have been made to the definition of Alligator and Longitudinal Cracking and determination of Alligator Cracking severity. This manual also addresses Rutting and Roughness and its application to RIP.

Cycle 6 has launched in the spring of 2014 and will again comprise all parks, large and small, that are served by paved roads and/or parking areas. For Cycle 6, roughly 333 large and small parks will have all paved routes and parking areas collected at least once in the cycle, some will have multiple collections depending on the size of the park and the functional class of the route.

This "*Distress Identification Manual for the NPS Road Inventory Program, Cycle 6, 2014-2020*" will be used as a reference resource in crack detection and classification, determination of distress severity and extent, and in the calculation of distress index values for the FHWA RIP Cycle 6.

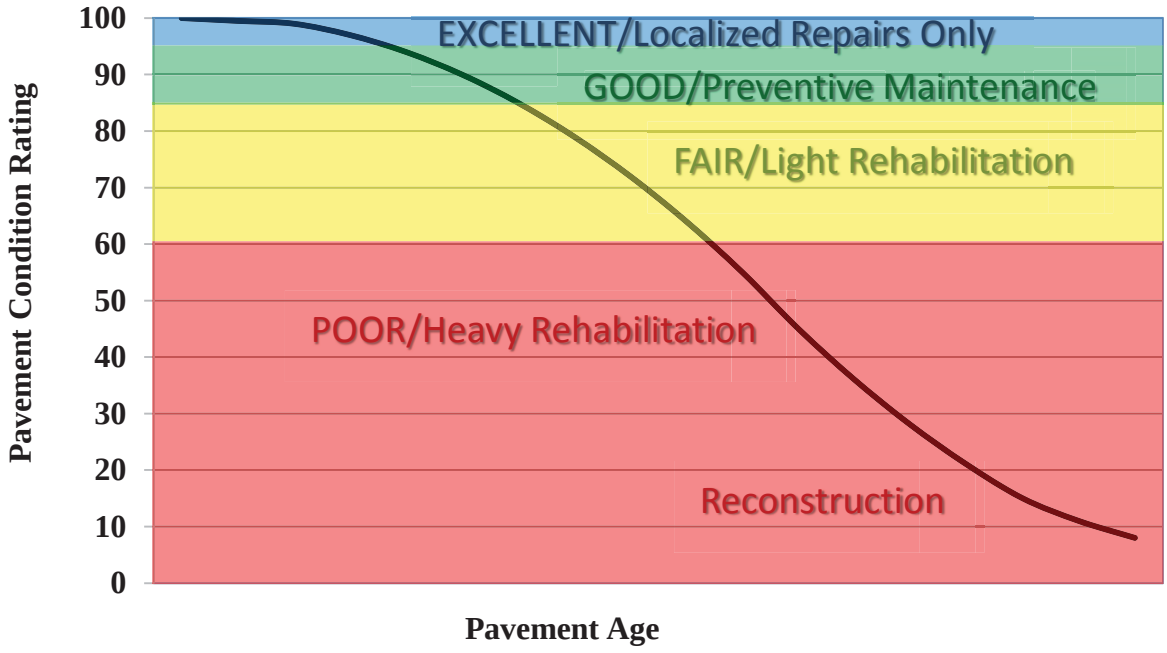
Explanation of the Condition Descriptions

In addition to the RIP Index changes that were implemented in Cycle 5, we will also aim to provide greater assistance in translating good/fair/poor categories into pavement needs categories. The PCR can be used to indicate the place in the Pavement Life Cycle and the types of treatments that should be considered now and into the future.

- Excellent/New: PCR of 95-100. Pavements in this range will require only spot repairs
- Good: PCR of 85-94. Pavements in this range will likely be candidates for preventive maintenance. Examples include Chip and Slurry Seals, Micro Surfacing and Thin Overlays.
- Fair: PCR of 61-84. Pavements in this range will likely be candidates of Light Rehabilitation (L3R). Examples include single-lift overlays up to 2.5 inches in total thickness, milling and overlays.
- Poor: PCR of 60 or below. Pavements in this range will likely be candidates of Heavy Rehabilitation or Reconstruction (H3R or 4R). Examples include Pulverization, Multiple Lift Overlays, and Reconstruction.

At this time, specific maintenance and rehabilitation activities should be evaluated and recommended at the project level. Site-specific conditions that influence treatment type should be determined based on performing a subsurface investigation and/or pavement condition survey, and not be based solely on RIP data. Additionally, RIP produces a snapshot of conditions the year in which the data was collected. For further information or to obtain additional PMS data from our (HPMA) please contact the Eastern Federal Lands pavement team.

Condition Categories and Treatments



Description of Pavement Treatment Types

1. **Preventive Maintenance** is a planned strategy of cost-effective treatments to an existing roadway system and its appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system (without significantly increasing the structural capacity). Preventive maintenance is typically applied to pavements in good condition having significant remaining service life. As a major component of pavement preservation, preventive maintenance is a strategy of extending the service life by applying cost-effective treatments to the surface or near-surface of structurally sound pavements. Examples of preventive treatments include asphalt crack sealing, chip sealing, slurry or micro-surfacing, thin and ultra-thin hot-mix asphalt overlay, concrete joint sealing, diamond grinding, dowel-bar retrofit, and isolated, partial and/or full-depth concrete repairs to restore functionality of individual slabs.

2. Pavement Rehabilitation consists of structural enhancements that extend the service life of an existing pavement and/or improve its load carrying capacity. Rehabilitation techniques include restoration treatments and structural overlays. Rehabilitation projects extend the life of existing pavement structures either by restoring existing structural capacity through the elimination of age-related, environmental cracking of embrittled pavement surface or by increasing pavement thickness to strengthen existing pavement sections to accommodate existing or projected traffic loading conditions. Two sub-categories result from these distinctions, which are directly related to the restoration or increase of structural capacity.

    - **Light Rehabilitation (L3R)** - Examples include single-lift overlays up to 2.5 inches in total thickness and milling and overlays for flexible pavements

    - **Heavy Rehabilitation (H3R)** – Requires rehabilitation with grade improvement. H3R stands for resurfacing, restoration, and rehabilitation projects. H3R projects typically involve multi-depth (overlays greater than 2.5 inches) pavement improvement work (short of full-depth replacement) and targeted safety improvements. H3R projects generally involve retention of the existing three-dimensional alignment.

3. **Reconstruction (4R)** is defined as the replacement of the entire existing pavement structure by the placement of the equivalent or increased pavement structure. Reconstruction usually requires the complete removal and replacement of the existing pavement structure. Reconstruction may utilize either new or recycled materials incorporated into the materials used for the reconstruction of the complete pavement section. Reconstruction is required when a pavement has either failed or has become functionally obsolete.

Appendix A

Methodology for Determining Condition Ratings with the Data Collection Vehicle (DCV)

Surface Distresses Identified by the Data Collection Vehicle

Surface Condition Rating – SCR

Surface distresses are measured in the primary lane only. In the classification and measurement of all paved surface condition data, results will be reported in the database in record intervals of 0.02 miles (105.6 feet) (smallest granularity) along the route.

Surface distresses and rutting are determined from digital images that provide both the longitudinal and transverse profile. The images also provide an elevation profile of the road, creating a 3-dimensional image of the paved surface.

- Transverse Cracks
- Longitudinal Cracks
- Alligator Cracks
- Patching/Potholes
- Rutting

Each of the five surface distresses is assigned a computed surface distress index

- Transverse Crack Index
- Longitudinal Crack Index
- Alligator Crack Index
- Patching/Pothole Index
- Rutting Index

Surface distress data are classified as listed above, measured for severity, and quantified for extent. Classification, severity, and extent of these five surface distresses comprise the three main elements for calculation of Surface Condition Rating (SCR).

In addition to the five surface distresses, a Structural Crack Index is computed, which is a combination of the Longitudinal Crack Index and the Alligator Crack Index. The Structural Crack Index is then used in lieu of the LC and AC indices to compute SCR.

Roughness Condition Index - RCI

Additional condition data measured by DCV (lasers and accelerometers)

- Roughness (IRI)

Roughness is measured by FHWA's DCV and reported as International Roughness Index (IRI) in inches/mile. Using IRI, the Roughness Condition Index (RCI) is computed.

Pavement Condition Rating - PCR

Using the SCR (computed from the five surface distresses) and the RCI, an overall Pavement Condition Rating (PCR) is computed. The formula for PCR is:

Asphalt PCR = (0.60 * SCR) + (0.40 * RCI)
Concrete PCR = RCI

A detailed description of each distress index formula, roughness index formula, SCR and PCR is provided in this document.

Each classified surface distress will fall into one or more severity - LOW, MEDIUM, or HIGH based on criteria listed. For each severity, an extent is established based on the measured quantity of the distress within that severity. Within each severity individual distresses are assigned a Maximum Allowable Extent (MAE). For example, LOW severity transverse cracking may be allowed up to 21.1 cracks within a 0.02 mile interval before it reaches MAE and fails.

The index formulas are based on a scale of 0 to 100. A PCR index value of 100 would indicate a "new" road with no measurable distresses or rough ride. A PCR value of 60 is determined to be terminable serviceability and the road is considered failed. The range of index values with condition descriptors is:

POOR = (less than or equal to 60), **FAIR**= (61 – 84), GOOD= (85 - 94), **EXCELLENT**= (95 - 100)

Index values are generally computed based on cumulative deducts of the measured severities. As shown in the index formulas below, as any single severity reaches or exceeds MAE, the index computes to a value of 60 or less, and the road fails for that 0.02 interval.

> **Note:** *As a result of a unique combination of measured surface distresses and IRI, index values occasionally compute to less than 0 or greater than 100. In this instance, an index value less than 0 defaults to 0. Index values greater than 100 defaults to 100. For all indices, a higher value indicates a better road condition, and a lower value indicates a poorer road condition.*

On the following page, Table 1 summarizes the different types of distresses measured.

ASPHALT-SURFACED PAVEMENT DISTRESS TYPES WITH RUTTING AND ROUGHNESS				
Distress Type	**Units Of Measure**	**Converted To**	**Defined Severity Levels?**	**Measured By**
Alligator Cracking	Square Feet	Percent of Lane Per 0.02 Mile	Yes	3 Dimensional pavement imaging system
Transverse Cracking	Linear feet	Number of Cracks Per 0.02 Mile	Yes	3 Dimensional pavement imaging system
Longitudinal Cracking	Linear feet	Percent of Lane Length Per 0.02 Mile	Yes	3 Dimensional pavement imaging system
Patching / Potholes	Square Feet	Percent of Lane Per 0.02 Mile	No	3 Dimensional pavement imaging system
Rutting	Inches	Rut Depth Per 0.02 Mile	Yes	3 Dimensional pavement imaging system
Roughness	IRI	*RCI Per 0.02 Mile	No	DCV – Lasers / Accelerometers

*Note: *Roughness is measured on concrete roadways, but surface distresses and rutting are not measured. For concrete, PCR = RCI*

Table 1. Distress summary

Alligator Cracking

Description:

Alligator cracking is considered a combination of fatigue and block cracking. It is a series of interconnected cracks in various stages of development. Alligator cracking develops into a many-sided pattern that resembles chicken wire or alligator skin. It can occur anywhere in the road lane. Alligator cracking must have a quantifiable area.

Severity Levels:

LOW
An area with little to no interconnecting cracks with no visible spalling. Cracks are less than or equal to a mean width of 0.25 in. (6mm). Cracks in the pattern are no further apart than 1 foot (0.328 m). May be sealed cracks with sealant in good condition and a crack width that cannot be determined.

MEDIUM
An area of interconnected cracks that form a complete pattern. Cracks may be slightly spalled. Cracks are greater than 0.25 in. (6 mm) but less than or equal to 0.75 in. (19 mm) or any crack with a mean width less than or equal to 0.75 in. (19 mm) and adjacent low severity cracking. Cracks in the pattern are no further apart than 6 in. (150 mm).

HIGH
An area of interconnected cracks forming a complete pattern. Cracks are moderately or severely spalled. Cracks are greater than 0.75 in. (19mm) or any crack with a mean width less than or equal to 0.75 in. (19mm) and adjacent medium to high severity random cracking.

A combination of observed crack width and crack pattern is used to determine overall severity of alligator cracking. Based on above description of each severity, the highest level of crack width and crack pattern determines overall severity as shown in Table 2.

ALLIGATOR CRACKING SEVERITY LEVELS				
	CRACK SEVERITY	**CRACK PATTERN**		
		LOW	**MED**	**HIGH**
CRACK WIDTH	LOW	LOW	MED	HIGH
	MED	MED	MED	HIGH
	HIGH	HIGH	HIGH	HIGH

Table 2. Alligator Crack Severity Levels

Longitudinal Cracking

Description:

Longitudinal cracking occurs predominantly parallel to the pavement centerline. It can occur anywhere within the lane. Longitudinal cracks occurring in the wheelpath may be noteworthy.

Severity Levels:

LOW
Cracks with a mean width less than or equal to 0.25 in. (6 mm). This also includes sealed cracks with sealant in good condition and a width that cannot be determined.

MEDIUM
Cracks with a mean width greater than 0.25 in. (6 mm) but less than 0.75 in. (19 mm). Also, any crack with a mean width less than 0.75 in. (19 mm) and adjacent random low severity cracking.

HIGH
Cracks with a mean width greater than 0.75 in. (19 mm). Also, any crack with a mean width less than 0.75 in. (19 mm) and adjacent random medium to high severity cracking.

Transverse Cracking

Description:

Transverse cracking occurs predominantly perpendicular to the pavement centerline. It can occur anywhere within the lane.

Severity Levels:

LOW
Cracks with a mean width of less than or equal to 0.25 in. (6 mm). Sealed cracks with sealant in good condition and a width that cannot be determined.

MEDIUM
Cracks with a mean width greater 0.25 in. (6 mm) and less than or equal to 0.75 in. (19 mm). Also, any crack with a mean width less than 0.75 in. (19 mm) and adjacent random low severity cracking.

HIGH
Cracks with a mean width greater than 0.75 in. (19 mm). Also, any crack with a mean width less than 0.75 in. (19 mm) and adjacent random medium to high severity cracking.

Patching and Potholes

Description:

Patching is an area of pavement surface that has been removed and replaced with patching material or an area of pavement surface that has had additional patching material applied. Patching may encompass partial lane or full lane width. On full lane width patching; the total, contiguous length of patch may not exceed 0.100 mi. (0.161 km). (Any full-lane patch exceeding 0.100 mi. in length is considered a pavement change). Patching must have a quantifiable area.

Potholes are bowl-shaped holes of various sizes occurring in the pavement surface.

Manhole covers should not be rated as patches unless there is obvious patching around the manhole.

Speed bumps should not be rated as patches

Severity Levels:

There are no stratified severities for Patching and Potholes. They either are present or they are not.

RUTTING

Description:

Rutting is a longitudinal surface depression in the wheelpath.

Severity Levels:

LOW

Ruts with a measured depth of 0.20 inches to 0.49 inches
Ruts less than 0.20 in. are not included in the distress calculations.

MEDIUM

Ruts with a measured depth of 0.50 inches to 0.99 inches

HIGH

Ruts with a measured depth greater than 1.00 inch

ROUGHNESS

Description:

Roughness is the measurement of the unevenness of the pavement in the direction of travel. It is measured in units of IRI (International Roughness Index), inches per mile, and is indicative of ride comfort.

Severity Levels:

There are no stratified severity levels for roughness. The roughness (or smoothness) of a road surface can be defined by IRI in the following table.

IRI DESCRIPTIONS	
Type of Road	**Typical IRI (in/mile)**
New Road, no noticeable roughness	<90
Small level of roughness	90 – 126
Road of average roughness	126 – 190
Road with above average roughness	190 – 253
Road with severe roughness	253 – 380
Nearly impassable	>380

Table 3. International Roughness Index

Roughness Collection Parameters

On shorter roads with a lower speed limit the usefulness in collecting and reporting IRI is negligible. Lower, inconsistent speeds can lead to a less accurate IRI value. Therefore RIP has put in place the following protocols for reporting IRI.

International Roughness Index (IRI) is not reported on routes with the following criteria:

- Posted speed limit is less than 25 mph
- Length of route is less than 0.50 miles

When a collected route has a posted speed limit of at least 25 mph and length of at least 0.50 miles, IRI will be collected except on road sections where the speed is less than 20 mph

Other situations may arise where the speed and length factors are met, but reporting IRI could lead to an inaccurate PCR. RIP will determine whether or not it is reasonable to report IRI on these routes on a case by case basis.

Index Formulas

Note: All index formulas listed below contain MAE applicable to 0.02 mile (105.6 feet) interval.

Alligator Crack Index

AC_INDEX = 100 – 40 * [(%LOW / 35) + (%MED / 15) + (%HI / 5)]

Where:

The values %LOW, %MED and %HI report the percentage of the observed pavement (0.02 mile, primary lane) that contains alligator cracking within the respective severities. These values range from 0 to 100.

%LOW = Percent of total area (primary lane, 0.02 in length), low severity
%MED = Percent of total area (primary lane, 0.02 in length), medium severity
%HI = Percent of total area (primary lane, 0.02 in length), high severity

Percent of total area is computed as:

$$\frac{\text{square foot area of alligator crack severity}}{(0.02\text{ mile})*(\text{lane width})}$$

In AC_INDEX, the denominators 35, 15, and 5 are the Maximum Allowable Extents (MAE) for each severity. In other words, we will allow up to 35% of low severity alligator cracking for a 0.02 interval before failure, 15% for medium severity, and so on. As you can see, if any single severity reaches MAE the resulting index value is 60, or failure.

Longitudinal Crack Index

LC_INDEX = 100 – 40 * [(%LOW / 175) + (%MED / 75) + (%HI / 25)]

Where:

The values %LOW, %MED, and %HI report the length of longitudinal cracking within each severity as a percent of the section length (0.02 mile, primary lane). These values are greater than or equal to 0 and can exceed 100.

%LOW = Percent of interval length (primary lane, 0.02 in length), low severity
%MED = Percent of interval length (primary lane, 0.02 in length), medium severity
%HI = Percent of interval length (primary lane, 0.02 in length), high severity

Percent of interval length is computed as:

$$\frac{\text{length of respective longitudinal cracking}}{(0.02\text{ mile})*(105.6\text{ ft.})}$$

In LC_INDEX, the denominators 175, 75, and 25 are the Maximum Allowable Extents (MAE) for each severity. In other words, we will allow up to 175% of low severity longitudinal cracking for a 0.02 interval before failure, 75% for medium severity, and so on. As you can see, if any single severity reaches MAE the resulting index value is 60, or failure.

Structural Crack Index

SC_INDEX = [100 - ((100 - AC_INDEX) + (100 - LC_INDEX))]

Structural Crack Index is a combination of Alligator Cracking and Longitudinal Cracking, and is used in the SCR formula in lieu of AC and LC separately.

Transverse Crack Index

TC_INDEX = 100 – 40 * [(LOW / 21.1) + (MED / 4.4) + (HI / 2.6)]

Where:

The values LOW, MED and HI report a count of the total number of transverse cracks (reported to three decimals) within each severity level, where one transverse crack is equal to the lane width. These values are greater than or equal to 0.

LOW = Number of cracks in interval (primary lane, 0.02 in length), low severity
MED = Number of cracks in interval (primary lane, 0.02 in length), medium severity
HI = Number of cracks in interval (primary lane, 0.02 in length), high severity

Number of cracks is computed as:

$$\frac{\text{Total length of transverse cracks}}{\text{Lane width}}$$

In TC_INDEX, the denominators 21.1, 4.4, and 2.6 are the Maximum Allowable Extents (MAE) for each severity. In other words, we will allow up to 21.1 low severity transverse cracks for a 0.02 interval before failure, 4.4 cracks for medium severity, and so on. As you can see, if any single severity reaches MAE the resulting index value is 60, or failure.

Patching Index

PATCH_INDEX = (100 – 40) * (%PATCHING / 80)

Where:

The value %PATCHING reports the percentage of the observed pavement (0.02 mile, primary lane) that contains patching/potholes. This value ranges from 0 to 100.

%PATCHING = Percent of total area (primary lane, 0.02 in length)

Percent of total area is computed as:

$$\frac{\text{square foot area of patching/potholes}}{\text{(0.02 mile)*(lane width)}}$$

There are no severity levels for patching. It either exists or does not.

There are no severity levels for patching. It either exists or does not. In PATCH_INDEX, the denominator 80 is the Maximum Allowable Extent (MAE) for each severity. In other words, we will allow up to 80% patching for a 0.02 interval before failure. As you can see, if patching/potholes reaches MAE the resulting index value is 60, or failure.

Rutting Index

RUT_INDEX = 100 – 40 * [(%LOW / 535) + (%MED / 205) + (%HI / 40)]

Where:

20 rut depth measurements are taken per 0.02 interval for each of 2 wheel paths (left and right), resulting in a total of 40 measurements taken for both wheel paths. Each wheelpath is analyzed independently for rut severities. The values %LOW, %MED and %HI report the percentage of the 40 measurements within that severity. These values range from 0 to 200.

%LOW = Percent of LOW ruts in left wheelpath based on 20 ruts, plus percent of LOW ruts in right wheelpath based on 20 ruts.
%MED = Percent of MED ruts in left wheelpath based on 20 ruts, plus percent of MED ruts in right wheelpath based on 20 ruts.
%HI = Percent of HI ruts in left wheelpath based on 20 ruts, plus percent of HI ruts in right wheel path based on 20 ruts.

Percent of rut measurements within each severity can also be computed as:

$$\frac{\textbf{(total number of ruts within each severity in both wheelpaths)}}{\textbf{20}} \times \textbf{100}$$

In RUT_INDEX, the denominators 535, 205, and 40 are the Maximum Allowable Extents for each severity; Low, Medium, and High, respectively. Only the MAE for high severity rutting can fail a section, since 200% of *only* low severity ruts would yield a rut index of 85 and 200% of *only* medium severity ruts would yield a rut index of 61.

Roughness Condition Index (Asphalt)

RCI = 32 * [5 * ($2.718282^{(-.0041 * \text{AVG IRI})}$)]

Where:

The value AVG IRI reports the average value of the Left IRI and Right IRI measurements for the interval (0.02 mile, primary lane). This value can range from approximately 40 to 999.0.

Average IRI is computed as:

$$\frac{\text{(Left wheelpath IRI) + (Right wheelpath IRI)}}{2}$$

There is no applicable threshold for failure for this index.

Roughness Condition Index (Concrete)

RCI = $(-0.0012)(\text{IRI}^2) + (0.0499)(\text{IRI}) + 99.542$

For concrete, PCR = RCI

Surface Condition Rating Index

SCR = Lowest Index Value Of: [SC_INDEX, TC_INDEX, PATCH_INDEX, RUT_INDEX]

Note: *The modified SCR equation above combines AC_INDEX and LC_INDEX, and considers that a single AC/LC index value of the Structural Crack Index (SC_INDEX). The lowest of the four computed index values (SC_INDEX, TC_INDEX, PATCH_INDEX, or RUT_INDEX) becomes the SCR.*

Where:

See above for determinations of SC_INDEX, TC_INDEX, PATCH_INDEX and RUT_INDEX.

The threshold for failure for this index is SCR = 60.Data Collection Vehicle Subsystems

Data on paved roads is collected by FHWA using a Pathway Services Inc. Data Collection Vehicle (DCV), called a PathRunner. The DCV is driven in the primary-direction lane at posted speed limits and less.

Cameras

Forward-facing and rear-facing video is collected as jpeg digital imagery files at a frequency of every 26.4feet.

Two forward-facing cameras are mounted above the vehicle cab, one pointed straight ahead and the other to the right shoulder providing seamless roughly 120 degree viewing. A third camera is mounted in the rear of the vehicle, recording the left shoulder.

CAMERA SPECIFICATIONS TWO FORWARD / ONE REAR FACING CAMERA	
Camera lens/type	Prosilica GT 2750 (GigE Technology)
Image format	*.jpg
Image resolution	2750 x 2200, 18 frames/second
Image pixel size	depends on distance
Zoom ratio	16mm Fixed
Iris range	Aperture Range F 1.8 – Infinity (P-Iris, Automatic

Pavement Imaging and Rutting

High resolution rutting data and surface imaging are collected in a single data stream using a three-dimensional (3D) pavement surface transverse profile data acquisition system. The 3D camera captures a laser line as it is projected over the pavement surface and uses the location of this line to measure the height deviations of the pavement surface. These height deviations can be used to calculate rutting in both wheelpaths. These deviations also provide a grayscale image detailing the change in height throughout the surface, i.e. providing depth measurements for cracking.

THREE-DIMENSIONAL PAVEMENT SURFACE AND TRANSVERSE PROFILE DATA ACQUISITION SYSTEM	
Surface Image Specifications	
Image size	1536 pixels/scan @3000 Hz
Image width	4 meters (3950 mm nominal)
Laser class	3B
Power	16W (Two lasers @ 8W Ea)
Vehicle speed limitations	62 mph
Environment	Dry pavement, day or night
Sensor size (approximate)	1536 pixels x 512 pixels
Image display length	26.4 feet
Rutting Specifications	
Reported rut depth units	Inches
Vehicle speed limitations	Up to 62 mph
Sampling rate	3000 profiles/second
Transverse resolution	1536 points/profile
Transverse field-of-view	14 feet
Depth accuracy (nominal)	<1mm
Environment	Dry pavement, day or night, above 32 degrees F
Adherence to specifications	ASTM E1703M-95 (reapproved 2005)

Distance Measuring Instrument (DMI)

The DMI (Distance Measuring Instrument) obtains road length measurements that are accurate to 0.15% for speeds up to 60 mph. The DMI is connected to the hub of the rear wheel on the driver's side, and is calibrated to the revolutions of the rear vehicle axle on a regular basis.

Roughness (IRI)

IRI SPECIFICATIONS	
Reported IRI units	Inches/mile
Vehicle speed limitations	12-62 mph
IRI equipment certification	Texas Transportation Institute (TTI)
Wavelengths accommodated	0.5 feet to 300 feet
IRI computed & reported	World Bank Technical Paper Number 46
Environment	Dry pavement, day or night, above 32 degrees
Adherence to specifications	ASTM E950 Class 1 & AASHTO M 328

The collection system includes a South Dakota type laser profiler manufactured based on active Class 1 ASTM E950 standards. The dynamic profile of the pavement surface is collected from which the IRI roughness data is computed. The sensors include one accelerometer on each wheelpath, one height sensor (laser) on each wheelpath, and a distance transducer.

GPS & Inertial Systems

GPS is collected by an onboard system employing Omnistar real time correction and a spinning gyroscope to provide accurate positioning data in instances of satellite obstruction. All GPS coordinates are tied to an image and linear distance measurements.

GPS SPECIFICATIONS	
Static accuracy	Sub-meter
Dynamic accuracy	2-3 meters
Receiver	12 satellite tracking
Coordinate system	Lat Lon WGS 84
Environment	Day or night
Cross-slope	± 1.75%
Grade	± 1.75%
Adherence to specifications	ASTM E1703M-95 (reapproved 2005)

*NOTE – GPS accuracy is dependent on many different factors. Satellite constellation, tree coverage, GPS receiver quality, and real-time correction availability can all affect the locational and elevation accuracies. The elevation (z coordinate) accuracy is less dependable than locational or horizontal accuracy (x/y coordinates or latitude/longitude). In areas of heavy tree coverage or poor satellite constellations, elevation data can vary by as much as +/- 100 feet.

Appendix B

Methodology for Determining Condition Ratings Using Manual Rating Procedures

Description of Manual Rating Methods

In 2013, the Federal Highway Administration updated existing Manual Rating Procedures in an effort to better align pavement conditions for Manually Rated Routes and Parking with the Highway Pavement Management Application (HPMA). HPMA is the Pavement Management System used by the FHWA to store inventory and condition data from the Road Inventory Program (RIP) and forecast future performance using prediction models. HPMA uses pavement condition data (collected by the Road Inventory Program) to develop life cycles for pavements and recommend treatments to maximize useable pavement life while minimizing costs associated with maintenance and repair.

The Federal Highway Administration (FHWA) developed a set of manual rating methods for pavement that are appropriate for Federal Roadways. Two different methods were developed for linear roads and a separate method was developed for parking areas and nonlinear roads. These methods employ a 0 to 100 rating scale and improve consistency and objectivity in the manual evaluation of surface distresses. They are compatible with ratings that are collected by the automated Data Collection Vehicle (DCV).

- The first of the two manual evaluation methods for roads uses rating criteria to assign index values to each distress type based on a visual evaluation of severity and extent.

- The second manual evaluation method for roads is very time demanding and is best employed on only a select set of routes which may have the highest visitor use and require a more intensive assessment. This method will be used for the Manual Rating of Function Class 1, 2, 7, and 8 Roads. This method is based on measurements that are recorded for each instance of a surface distress. These measurements are converted into index values using conversion formulas.

- Parking areas and non-linear roads are rated similar to the first method shown above, however, there are some slight differences due to the non-linear nature.

The details and criteria used for each of these rating methods are outlined below.

Visual Inspection Method for Manually Rating Secondary Roads

The visual inspection method for manually rated roads uses condition rating criteria that have been developed by FHWA. This criteria is based on a visual evaluation of the severity and extent of distresses to determine the overall condition of the roadway. This method is used for secondary roads that are Functional Class 3, 4, 5, and 6. This constitutes the majority of manually rated roads collected by the Road Inventory Program.

Rating Section Lengths

For this method, Manually Rated Roads are rated in sections. These sections may be made based on length of changes in surface type or condition as described below. The ratings are then aggregated to give an overall rating for the Route:

- Rating sections should be no longer than 0.25 miles in order to keep the area being rated manageable.
- A new rating section may be started based on changes in condition, width, or surface type if these changes represent a significant portion of the route (are not isolated instances).
- If the road condition, width, and surface type remain constant then new sections do not need to be created unless the road exceeds 0.25 miles.

Rating Criteria

For this method, Manually Rated Roads are evaluated using a visual inspection of the six distress types listed below. Each distress is assigned one of five index values. An overall Surface Condition Rating (SCR) and Pavement Condition Rating (PCR) are calculated based on these index values.

- Alligator Cracking
    - Rating based on percentage of road surface affected
- Longitudinal Cracking
    - Rating based on severity level (crack width) and percentage of road section length of longitudinal cracks
- Transverse Cracking
    - Rating based on crack width, crack spacing, and percentage of surface affected
- Patching
    - Rating based on percentage of road surface affected
- Rutting
    - Rating based on percentage of road section length affected by visible rutting (>1 inch depth) that requires remediation
- Roughness
    - Manual assessments of roughness are not made due to the subjectivity of the measurement. Therefore, roughness is not incorporated into the PCR calculation of manually rated roads.

Concrete Routes also receive a PCR rating based on visual evaluation of the following six distress types.

- Slab Faulting at Joints
- Slab Cracking and breakup
- Surface Delamination and Pop-outs
- Joint Distresses
- Patching

Distress Measurement Method for Manually Rating Primary Roads

A more intensive and time demanding assessment than our standard method was developed for Primary roads that are functional class 1, 2, 7, or 8. These high visitation roads are usually accessible by the automated Data Collection Vehicle but in rare instances may need to be manually rated. The method developed is based on measuring each instance of a distress. These measurements are totaled over each section length being measured and are then converted into index values between 0 and 100 (100 being a road with no distress) using index formula equations outlined below. The goal of this method is to produce measured index values which are directly comparable to the automated DCV.

Rating Section Lengths

For the distress measurement method roads are broken into sections in order to rate. Distress measurements are totaled for each section separately in order to determine the index value for that particular section. The section length to be rated is determined based on the following rules:

- Rating sections are between 0.25 and 0.50 miles long
- A new rating section is created if there is a significant change in condition or pavement width
- If there are no significant changes in condition or pavement width, rating sections are broken at equal intervals, typically 0.50 miles

Manual Distress Measurements

Alligator Cracking

- Alligator cracking is measured by area (square feet). Instances of Alligator cracking are measured along the length and multiplied by the average width of the distressed area.
- The index for alligator cracking takes the total area of cracking compared to the interval length and converts it to a percentage. That percentage is then input into an index formula that yields a value between 0 and 100 (0 being the most distressed).
- Severity levels are not defined for manually measured Alligator cracks. The Alligator Crack Index formula is calculated based on an assumption of medium severity.

Longitudinal Cracking

- Longitudinal cracking (cracking in the direction parallel to the roadway) is measured by length (ft.).
- The index for longitudinal cracking takes the total length of cracking compared to the interval length and converts it to a percentage broken down by severity. That percentage is then input into a formula that yields a value between 0 and 100 (0 being the most distressed).
- Two severity levels are defined for manually measured Longitudinal Cracks. Lower severity cracks are those with a mean width of less than 0.25 inches. Sealed cracks with sealant in good condition are also considered lower severity. Higher severity cracks are those with a mean width of greater than 0.25 inches.

Transverse Cracking

- Transverse cracking (cracking in the direction perpendicular to the roadway) is measured by length (ft).
- The index for transverse cracking takes the total number of cracks (1 crack would encompass the full lane) broken down by severity. The total numbers of each severity are then put into a formula that yields a value between 0 and 100 (0 being the most distressed).
- Two severity levels are defined for manually measured Transverse Cracks. Lower severity cracks are those with a mean width of less than or equal to 0.25 inches. Sealed cracks with sealant in

good condition are also considered lower severity. Higher severity cracks are those with a mean width of greater than 0.25 inches.

Patching and Potholes

- Patching and Potholes are measured by area (square feet). Instances of Patching are measured along the length and multiplied by the average width of the patch.
- Instances of full lane width patching cannot be longer than 0.100 miles, otherwise is should be considered a pavement change rather than a distress.
- There are no stratified severities for Patching. It is either present or it is not.

Rutting

- Visible rutting is measured by length (ft.) in each wheel path. Only visible ruts are rated, which are ruts greater than 1 inch deep.
- All rutting recorded in a manual rating is considered to be high severity (> 1 inch). Lesser severities are generally not distinguishable in a visual inspection.

Roughness

- Manual assessments of roughness are not made due to the subjectivity of the measurement. Therefore, roughness is not incorporated into the PCR calculation of manually rated roads.

Index Formulas for Distress Measurement Method:

The method used to convert distress measurements into index values is shown below. The Surface Condition Rating and Pavement Condition Rating are calculated based on these index values.

Alligator Crack Index for Manual Rating:

AC_INDEX = 100 – 40 * (%ALLIGATOR / 15)

Where:

%ALLIGATOR = Percent of total area of section being rated that contains Alligator cracking.

Longitudinal Crack Index for Manual Rating:

LC_INDEX = 100 – 40 * [(%LOW / 175) + (%MED / 75)]

Where:

%LOW = Percent length of longitudinal cracks where crack width less than or equal to 0.25 inches

%HIGH = Percent length of longitudinal cracks where crack width greater than 0.25 inches

Transverse Crack Index for Manual Rating:

TC_INDEX = (100 – 40) * [(LOW / 21.1) + (MED / 4.4)]

Where:

LOW = Count of the total number of transverse cracks within the section length where one transverse crack is equal to the lane width and the crack width <= 0.25 inches

HIGH = Count of the total number of transverse cracks within the section length where one transverse crack is equal to the lane width and the crack width > 0.25 inches

Number of cracks is computed as:

Total length of transverse cracks/Lane width

Patching Index for Manual Rating:

PATCH_INDEX =(100 – 40) * (%PATCHING / 80)

Where:

%PATCHING = Percentage of pavement section that contains patching/potholes.

Rutting Index for Manual Rating:

RUT_INDEX = 100 – 40 * (%RUTTING / 40)

Where:

%RUTTING = Percentage length of high severity rutting within the section being measured.

Method for Manually Rating Paved Parking Areas and Non-Linear Roads

Parking areas are evaluated based on a visual inspection using condition rating criteria that has been developed by FHWA. This criteria is based on a visual evaluation of the severity and extent of distresses to determine the overall condition of the parking area. This overall condition rating is linked to the level of repair and rehabilitation practices required.

A distress index is determined for each of the distresses listed below for Asphalt and Concrete Parking areas. The overall Pavement Condition Rating (PCR) of the parking lot is driven by the most severe distress present.

Rating Criteria:

Asphalt Parking Distress Types

- Alligator Cracking
  - Rating based on percentage of road surface affected
- Longitudinal, Transverse and Block cracking
  - Rating based on crack width, crack spacing, and percentage of surface affected
- Rutting and Distortions
  - Rating based on percentage of road surface affected
- Hot Mix Asphalt Patches
  - Rating based on overall percentage of HMA patches
- Potholes and Cold Patches
  - Rating based on percentage of road surface affected
- Surface Raveling and Bleeding
  - Rating based on percentage of road surface affected

Concrete Parking Distress Types

- Slab Faulting at Joints
  - Rating based on height differential between adjacent slabs or pieces of broken slabs
- Slab Cracking and breakup
  - Rating based on quantity of cracks and if slab is acting to able distribute load as designed
- Surface Delamination and Pop-outs
  - Rating based on percentage of road surface affected to include pop-outs, spalls and surface delamination
- Joint Distresses
  - Rating based on sealant condition and concrete distresses at/or adjacent to joints
- Patching
  - Rating based on percentage of road surface affected

Curb Inspection and Treatments

During inspections of manually rated parking lots and routes, the curb reveal and overall curb condition are evaluated. The curb condition is used to determine a recommendation.

Curb Reveal
The vertical distance on the curb face from the gutter flow line or pavement surface to the top of curb. When resurfacing adjacent to curb, the resulting curb reveal should be no less than 4 inches. Additionally, when resurfacing adjacent to a gutter, the resulting pavement surface should be flush with the gutter pan. In cases where a resurfacing would violate either of these parameters, the surface may need to be milled or removed to adjust to these field conditions.

Curb Recommendations
The following treatment categories are based on the overall percentage of distresses along the entire curb structure for a specific pavement structure. Distresses include spalling, cracking, loss of material and any other damage which prevents the curb from conveying storm runoff or failing to perform in its intended function.

- Overall curb damage ranging 0%-5%:
    - DO NOTHING
- Overall curb damage ranging 5%-20%
    - LIGHT REPAIR
- Overall curb damage ranging 20%-50%
    - MODERATE REPAIR
- Overall curb damage greater than 50%:
    - REPLACE

GPS for Manually Rated Roads and Parking

GPS information for Manually Collected Cycle 6 Routes will be recorded using the latest hardware and software by TRIMBLE 6000 Series GeoXT. Cycle 6 GPS collection units will allow access to GPS and GLONASS, improving overall GPS reliability, accuracy and precision to submeter accuracy. Additionally, the new GPS units have an enhanced ability to collect accurate signals underneath tree cover or adjacent to buildings or natural terrain with extreme vertical gradations that typically reduce GPS accuracy. Trees and buildings create "satellite shadows", limiting the areas where you can reliably collect high-accuracy GPS data. The updated GPS receiver will deliver improved usable data under tree canopy or in natural or urban canyons. Routes that were previously collected accurately will not be recollected in Cycle 6.

TRIMBLE 6000 SERIES GeoXT GPS SPECIFICATIONS	
Receiver	Trimble Maxwell™ 6 GNSS chipset
Channels	220 channels
Systems	GPS / GLONASS / WAAS
Accuracy	Sub-meter
Operation Temperature	–20 °C to +60 °C (–4 ºF to +140 ºF)
Cellular and Wireless	UMTS / HSDPA / GPRS / EDGE / Wi-Fi / Bluetooth
Internal Still Camera w/ GEOTAG ability	Autofocus 5 MP (JPG) and WMV w/ Audio

Appendix C

Description of Cycle 6 Deliverables

Interim Report Delivery

Partial report will be primarily focused on manually collected routes. The report will be released approximately four months after manual collection of parking lots and other manually collected routes to provide NPS an immediate report on the condition of routes collected manually.

The Interim Report Delivery consists of an Interim Report PDF that contains the following:

- Parking lot and manually rated route conditions
- Route ID Reports
- Route ID Changes Report.

Please note that since the Data Collection Vehicle will have not collected data at this point in time, the following will not be in the Interim Report:

- No park summary information will be provided in the report
- No DCV data will be provided in report
- No road logs will be provided in report
- No maps will be provided in report
- Any mileages collected will be approximate

All data provided in the Interim Report will also be included in the Final Report.

Final Report Delivery

The Final Report will contain all data collected by Manual Inspection and the Data Collection Vehicle. All information provided in the Interim Report will be included in the Final report. Manually collected information reported in the Interim Report may be updated in the Final Report if pavement conditions have substantially changed between the Manual Inspection and Data Collection Vehicle Inspection or other unforeseen circumstances.

The final report will be released approximately 8 months after the Data Collection Vehicle completes its collection of that specific park.

Data included in the Final Report package consists of the following:

- **Condition Photos:** All photos taken during Cycle 6.
- **Data Video:** Data and video of each route collected by the DCV will viewable through PATHVIEW software. PATHVIEW Software and training will be provided to NPS personnel by Eastern Federal Lands.
- **GPS on All Rated Routes:** All GPS data collected from the DCV will be provided. Parking areas, some roads, and other paved areas that are not fully drivable with the DCV are collected manually by field technicians. GPS is collected for these routes using portable Trimble GPS units.
    - GPS will be provided as Shapefiles and KMLs
    - All GPS data related to road collection with be linear referenced to the collected length
- **Geodatabase – Background and Metadata:** In addition to this park report, a geodatabase containing both tabular and spatial data specific to this park has been provided.
    - All data disseminated in the preceding report has been obtained from the tables and fields within said geodatabase. The geodatabase can be referenced for tabular data via Microsoft Access or for both tabular and spatial data via ESRI's ArcGIS Suite of software which consists of; ArcMap, ArcCatalog and ArcExplorer.
    - Consolidating the RIP data into one database creates a seamless relationship of tables and geographic data. It allows RIP to facilitate easier updates and enhancements in the future. A geodatabase can be thought of as simply a database containing spatial data. A complete and thorough description of the tables and fields contained within this geodatabase can be found in the metadata. The metadata is attached directly within the geodatabase and can be accessed via ESRI's ArcCatalog.
- **Report (RIP Report and Route ID):** A PDF report will be provided that includes a list of all routes and key data. Condition reports for each route will be included. All changes, additions and deletions to any route will be included in the report. Features along routes will not be collected in Cycle 6.

Partial DCV Collections

Additional Partial DCV Collections may be done on specific parks depending on their size and overall mileage of routes within its boundaries during Cycle 6. Parks with greater than 10 miles of paved roadways will receive at least one additional Partial DCV collection during Cycle 6. Data collected during these Partial DCV Collections will not result in the delivery of an additional report to the park.

Data collected by the DCV during Partial DCV Collection will be used to improve HPMA modeling by providing additional "snapshots in time" of park pavement conditions. This improved HMPA modeling will assist in the programing and budgeting of future projects which will help maximize the life of pavement infrastructures.

Instead of receiving a report of conditions collected during the Partial DCV collection, the park will receive a formal letter from the Road Inventory Program requesting coordination for the additional Partial DCV collection, identifying the dates of the Partial DCV Collection and will reinforce the purpose and importance of the Partial DCV Collection.

Appendix D

Glossary of Terms and Abbreviations

Glossary of Terms and Abbreviations

TERM OR ABBREVIATION	DESCRIPTION OR DEFINITION
AC	Alligator Cracking
CRS	Condition Rating Sheets (Section 5)
Curb Recommendation	Curb remediation based on overall percentage of curb distress
Curb Reveal	Height of curb exposed from gutter flow line to top of curb
DCV	Data Collection Vehicle
Excellent	Excellent rating with an index value of 95 to 100
Fair	Fair rating with an index value from 61 to 84
FUNCT_CLASS	Functional Classification (see Route ID, Section 2)
Good	Good rating with an index value from 85 to 94
IRI	International Roughness Index
HPMA	Highway Pavement Management Application
Lane Width	Width from road centerline to fogline, or from centerline to edge-of-pavement when no fogline exists
LC	Longitudinal Cracking
MRR	Manually Rated Route
MRL	Manually Rated Line
MRP	Manually Rated Polygon
N/A	Not Applicable
NC	Not Collected
PATCH	Patching and Potholes
Paved Width	Width from edge-of-pavement to edge-of-pavement
PCR	Pavement Condition Rating
PKG	Parking Area
Poor	Poor rating with an index value of 0 to 60
RCI	Roughness Condition Index
SC	Structural Cracking
SCR	Surface Condition Rating
TC	Transverse Cracking