KALA
Cycle 6

Final Report

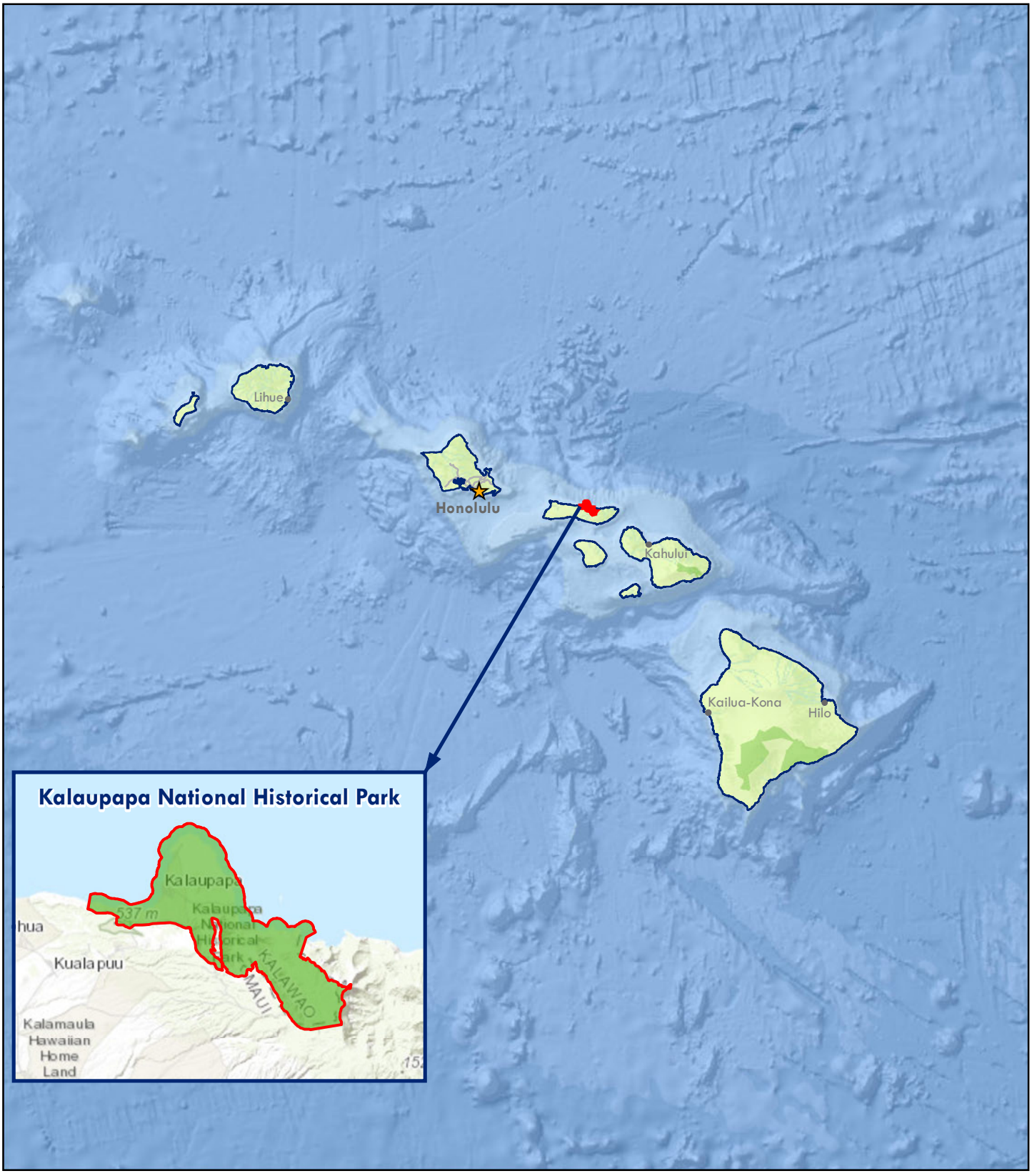
Road Inventory and Condition Assessments for
Kalaupapa National Historical Park

Federal Lands Highway
Road Inventory Program

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

Report Date: September 2022

Kalaupapa National Historical Park
in
Hawaii



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Introduction

Kalaupapa National Historical Park

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 Ashburn, Virginia.

Respectfully,

FHWA RIP Team

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Section 2
Park Route Inventory

Kalaupapa National Historical Park

Federal Lands Highway
Road Inventory Program

Cycle 6 NPS / RIP Route ID Report

Report Date: 09/30/2022

(Numerical By Summary Route and Subcomponent #)

Federal Lands Highway
Road Inventory Program

Shading Color Key

White = Paved Routes, DCV Driven	Grey = Paved Routes, DCV not Driven	Black = Non-NPS Routes
Yellow = Unpaved Routes, DCV not Driven	Blue = Paved Parking Areas	Green = Unpaved Parking Areas

= Concession Route

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KALA *Kalaupapa National Historical Park*

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	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)	Surf. Type	Area Map
0010ZZ	6	1	239507		KAMEHAMEHA STREET	FROM KALAUPAPA AIRPORT PARKING (STATE DOT)	TO BEGINNING OF ROUTE 0012 (DAMIEN STREET) AND BEGINNING OF ROUTE 0013 (BERETANIA STREET)		YES	1.60	0.00	1.60	1		AS	1,1A
0011	6	1	80824		PUAHI STREET	FROM ROUTE 0010ZZ (KAMEHAMEHA STREET)	TO ROUTE 0402AZ (TRAIL ACCESS ROAD) AFTER WAIHANAU BRIDGE (8896-001)		YES	0.45	0.00	0.45	1		AS	1,1A
0012	6	1	239692		DAMIEN STREET	FROM END OF ROUTE 0010ZZ (KAMEHAMEHA STREET)	TO BEGINNING OF ROUTE 0020 (KAPIOLANI STREET)		YES	0.46	0.00	0.46	1		AS	1,1A
0013	6	1	239691		BERETANIA STREET	FROM INTERSECTION OF ROUTE 0012 (DAMIEN STREET) AND ROUTE 0010ZZ (KAMEHAMEHA STREET)	TO ROUTE 0020 (KAPIOLANI STREET) AND BEGINNING OF ROUTE 0400 (DAMIEN ROAD) AT MP 0.40		YES	0.36	0.00	0.36	1		AS	1,1A
0014ZZ	6	1	239693		MISSION STREET	FROM ROUTE 0013 (BERETANIA STREET)	TO ROUTE 0012 (DAMIEN STREET)		YES	0.17	0.00	0.17	1		AS	1,1A
0015	6	1	239699		GOODHUE STREET	FROM ROUTE 0013 (BERETANIA STREET)	TO ROUTE 0023 (SCHOOL STREET)		YES	0.09	0.00	0.09	1		AS	1,1A
0016	6	1	239700		BISHOP STREET	FROM ROUTE 0013 (BERETANIA STREET)	TO ROUTE 0023 (SCHOOL STREET)		YES	0.08	0.00	0.08	1		AS	1,1A
0017	6	1	239694		MCKINLEY STREET	FROM ROUTE 0013 (BERETANIA STREET)	TO ROUTE 0012 (DAMIEN STREET)		YES	0.26	0.00	0.26	1		AS	1,1A
0018	6	1	239695		BALDWIN STREET	FROM ROUTE 0013 (BERETANIA STREET)	TO ROUTE 0012 (DAMIEN STREET)		YES	0.27	0.00	0.27	1		AS	1,1A
0019	6	1	239696		KAIULANI STREET	FROM ROUTE 0013 (BERETANIA STREET)	TO ROUTE 0012 (DAMIEN STREET)		YES	0.28	0.00	0.28	1		AS	1,1A
0020	6	1	239697		KAPIOLANI STREET	FROM ROUTE 0013 (BERETANIA STREET) ON RIGHT AND ROUTE 0400 (DAMIEN ROAD) ON LEFT	TO END OF ROUTE 0012 (DAMIEN STREET)		NO	0.00	0.31	0.31	1		GR	1,1A

Cycle 6 NPS / RIP Route ID Report

Report Date: 09/30/2022

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Federal Lands Highway
Road Inventory Program

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Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Name	Route Description From	Route Description To	Maintenance District	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)	Surf. Type	Area Map
0021	6	1	239698		BAYVIEW LOOP	FROM ROUTE 0012 (DAMIEN STREET)	TO ROUTE 0011 (PUAHI STREET)		YES	0.16	0.00	0.16	1		AS	1,1A
0022ZZ	6	1	239704		HALEAKALA STREET	FROM ROUTE 0017 (MCKINLEY STREET)	TO ROUTE 0020 (KAPIOLANI STREET) AT MP 0.13		YES	0.07	0.07	0.14	1		AS	1,1A
0023	6	1	239706		SCHOOL STREET	FROM ROUTE 0012 (DAMIEN STREET)	TO ROUTE 0017 (MCKINLEY STREET)		YES	0.23	0.00	0.23	1		AS	1,1A
0024	6	1	239707		KILOHANA STREET	FROM ROUTE 0010ZZ (KAMEHAMEHA STREET)	TO ROUTE 0011 (PUAHI STREET)		YES	0.06	0.00	0.06	1		AS	1,1A
0025ZZ	6	1	239705		BISHOP ROAD	FROM INTERSECTION OF ROUTE 0011 (PUAHI STREET) AND ROUTE 0023 (SCHOOL STREET)	TO BISHOP HOME FOR GIRLS		YES	0.27	0.00	0.27	1		AS	1,1A
0026ZZ	6	1	239708		CONRADY PLACE AND MISSION / PUAHI CONNECTOR	FROM ROUTE 0011 (PUAHI STREET)	TO ROUTE 0012 (DAMIEN STREET)		YES	0.08	0.00	0.08	1		AS	1,1A
0028	6	1	239701		STAFF STREET (STAFF ROW)	FROM ROUTE 0013 (BERETANIA STREET)	TO END OF PAVEMENT		YES	0.26	0.00	0.26	1		AS	1,1A
0030ZZ	6	1	239702		MCVEIGH HOME STREETS	FROM ROUTE 0028 (STAFF STREET (STAFF ROW))	THROUGH RESIDENCE AREA		YES	0.27	0.00	0.27	1		AS	1,1A
0400	6	1	80818		DAMIEN ROAD	FROM END OF ROUTE 0013 (BERETANIA STREET) AND ROUTE 0020 (KAPIOLANI STREET) ON RIGHT	TO END OF LOOP AT KALAWAO PARK		NO	0.00	2.68	2.68	1		GR	1,1A
0401	6	1	80312		COASTAL ROAD	FROM KALAUPAPA AIRPORT PARKING (STATE DOT)	TO ROUTE 0400 (DAMIEN ROAD)		NO	0.00	3.15	3.15	4		NV	1
0402ZZ	6	1	80826		TRAIL ACCESS ROADS	FROM END OF ROUTE 0011 (PUAHI STREET) / WAIHANAU BRIDGE	TO KALAUPAPA TRAIL TO TOPSIDE MOLOKA'I		NO	0.00	0.48	0.48	4		NV	1,1A
0403	6	1	80817		CRATER ROAD	FROM ROUTE 0400 (DAMIEN ROAD)	TO END OF LOOP		NO	0.00	0.41	0.41	4		GR	1

Cycle 6 NPS / RIP Route ID Report

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Road Inventory Program

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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	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)	Surf. Type	Area Map
0404	6	1	80821		INTERIOR ROAD TO KAUHAKO CRATER	FROM ROUTE 0403 (CRATER ROAD)	TO DEAD END AT KAUHAKO CRATER		NO	0.00	0.04	0.04	4		GR	1
0405	6	1	80822		LIGHTHOUSE ROAD	FROM ROUTE 0010ZZ (KAMEHAMEHA STREET)	TO KALAUPAPA AIRPORT PARKING (STATE DOT)		NO	0.00	0.55	0.55	4		GR	1
0406	6	1	80814		BEACH HOUSE ROAD	FROM ROUTE 0010ZZ (KAMEHAMEHA STREET) NORTH	TO ROUTE 0010ZZ (KAMEHAMEHA STREET) SOUTH		NO	0.00	0.48	0.48	4		NV	1
0407	6	1	239703		STAFF LOOP	FROM ROUTE 0028 (STAFF STREET (STAFF ROW))	TO ROUTE 0013 (BERETANIA STREET)		NO	0.00	0.17	0.17	4		NV	1,1A
0410	6	1	80819		FENCE LINE ROAD	FROM ROUTE 0010AZ (KAMEHAMEHA STREET A)	TO END OF ROUTE		NO	0.00	1.23	1.23	5		NV	1,1A
0411	6	1	247675		PASCHOAL HALL ROAD	FROM ROUTE 0011 (PUAHI STREET)	TO ROUTE 0013 (BERETANIA STREET)		YES	0.12	0.00	0.12	5		AS	1,1A
0412	6	1	247676		PUMP HOUSE ROAD	FROM ROUTE 0400 (DAMIEN ROAD)	TO END AT PUMP HOUSE		NO	0.00	0.55	0.55	6		GR	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	FLTP	Access Level	Area (SQ FT)	Surf. Type	Area Map
0900	6	1	247677		PASCHOAL HALL PARKING	ADJACENT TO ROUTE 0013 (BERETANIA STREET)			YES	PUBLIC	2,983	AS	1,1A

Report Date: 09/30/2022

Cycle 6 NPS / RIP Route ID Report

(Numerical By Summary Route and Subcomponent #)

Federal Lands Highway
Road Inventory Program

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Cycle 6 Summary Totals for Kalaupapa National Historical Park

Cycle 6 Route Totals

	NPS Maintained	Concessionaire Maintained	Park Totals
Paved Roads, Data Collection Vehicle Rated (Miles)	0	0	**0**
Paved Roads, Manually Rated Length (Miles)	5.54	0	**5.54**
Paved Roads, Manually Rated Area (Sq. Ft.)	0	0	**0**
Unpaved Roads (Miles)	10.11	0	**10.11**
Paved Parking (Sq. Ft.)	2,983	0	**2,983**
Unpaved Parking (Sq. Ft.)	0	0	**0**

Cycle 6 Lane Miles and Overall Pavement Condition

	Lanes Miles*	Pavement Condition Rating**
Data Collection Vehicle Routes	0	N/A
Manually Rated Roads	6.99	77
Parking Areas	0.05	90

* 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

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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.

Report Date: 09/30/2022

NPS / RIP Subcomponent Details for KALA

(Numerical By Summary Route and Subcomponent #)

Federal Lands Highway
Road Inventory Program

Shading Color Key

White = Paved Routes, DCV Driven

Grey = Paved Routes, DCV not Driven

Black = Paved Routes, Non-NPS

= Concession Route

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KALA *Kalaupapa National Historical Park*

SUMMARY ROUTE INVENTORY FOR ROADS (1100 SERIES FMSS LOCATIONS)

Route Number	FMSS Number	Cycle Collected	Iteration Collected	Concession	Route Name	Route Description From	Route Description To	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)
0010ZZ	239507	6	1		KAMEHAMEHA STREET	FROM KALAUPAPA AIRPORT PARKING (STATE DOT)	TO BEGINNING OF ROUTE 0012 (DAMIEN STREET) AND BEGINNING OF ROUTE 0013 (BERETANIA STREET)	YES	1.60	0.00	1.60	1	
0014ZZ	239693	6	1		MISSION STREET	FROM ROUTE 0013 (BERETANIA STREET)	TO ROUTE 0012 (DAMIEN STREET)	YES	0.17	0.00	0.17	1	
0022ZZ	239704	6	1		HALEAKALA STREET	FROM ROUTE 0017 (MCKINLEY STREET)	TO ROUTE 0020 (KAPIOLANI STREET) AT MP 0.13	YES	0.07	0.07	0.14	1	
0025ZZ	239705	6	1		BISHOP ROAD	FROM INTERSECTION OF ROUTE 0011 (PUAHI STREET) AND ROUTE 0023 (SCHOOL STREET)	TO BISHOP HOME FOR GIRLS	YES	0.27	0.00	0.27	1	
0026ZZ	239708	6	1		CONRADY PLACE AND MISSION / PUAHI CONNECTOR	FROM ROUTE 0011 (PUAHI STREET)	TO ROUTE 0012 (DAMIEN STREET)	YES	0.08	0.00	0.08	1	
0030ZZ	239702	6	1		MCVEIGH HOME STREETS	FROM ROUTE 0028 (STAFF STREET (STAFF ROW))	THROUGH RESIDENCE AREA	YES	0.27	0.00	0.27	1	
0402ZZ	80826	6	1		TRAIL ACCESS ROADS	FROM END OF ROUTE 0011 (PUAHI STREET) / WAIHANAU BRIDGE	TO KALAUPAPA TRAIL TO TOPSIDE MOLOKA'I	NO	0.00	0.48	0.48	4	

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NPS / RIP Subcomponent Details for KALA

(Numerical By Summary Route and Subcomponent #)

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KALA *Kalaupapa National Historical Park*

KALA-0010ZZ Subcomponent Breakdown

Route Number	FMSS Number	Cycle Collected	Iteration Collected	Concession	Route Name	Route Description From	Route Description To	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)
0010AZ	239507	6	1		KAMEHAMEHA STREET A	FROM ROUTE 0010BZ (KAMEHAMEHA STREET B) AND KALAUPAPA AIRPORT PARKING (STATE DOT)	TO BEGINNING OF ROUTE 0012 (DAMIEN STREET) AND BEGINNING OF ROUTE 0013 (BERETANIA STREET)	YES	1.53	0.00	1.53	1	
0010BZ	239507	6	1		KAMEHAMEHA STREET B	FROM ROUTE 0010AZ (KAMEHAMEHA STREET A)	TO ROUTE 0010AZ (KAMEHAMEHA STREET A) AND KALAUPAPA AIRPORT PARKING (STATE DOT)	YES	0.07	0.00	0.07	1	

KALA-0014ZZ Subcomponent Breakdown

Route Number	FMSS Number	Cycle Collected	Iteration Collected	Concession	Route Name	Route Description From	Route Description To	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)
0014AZ	239693	6	1		MISSION STREET (MAIN ROAD)	FROM ROUTE 0013 (BERETANIA STREET)	TO ROUTE 0012 (DAMIEN STREET)	YES	0.14	0.00	0.14	1	
0014BZ	239693	6	1		MISSION STREET (SOUTH SPUR ROAD)	FROM ROUTE 0012 (DAMIEN STREET)	TO ROUTE 0014AZ (MISSION STREET (MAIN ROAD))	YES	0.03	0.00	0.03	1	

KALA-0022ZZ Subcomponent Breakdown

Route Number	FMSS Number	Cycle Collected	Iteration Collected	Concession	Route Name	Route Description From	Route Description To	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)
0022AZ	239704	6	1		HALEAKALA STREET PAVED	FROM ROUTE 0017 (MCKINLEY STREET)	TO ROUTE 0022BZ (HALEAKALA STREET UNPAVED)	YES	0.07	0.00	0.07	1	
0022BZ	239704	6	1		HALEAKALA STREET UNPAVED	FROM ROUTE 0022AZ (HALEAKALA STREET PAVED)	TO ROUTE 0020 (KAPIOLANI STREET) AT MP 0.13	YES	0.00	0.07	0.07	1	

NPS / RIP Subcomponent Details for KALA

(Numerical By Summary Route and Subcomponent #)

Federal Lands Highway
Road Inventory Program

Shading Color Key

White = Paved Routes, DCV Driven	Grey = Paved Routes, DCV not Driven	Black = Paved Routes, Non-NPS
Yellow = Unpaved Routes, DCV not Driven	Blue = Paved Parking Areas	Green = Unpaved Parking Areas

■ = Concession Route

DCV = Data Collection Vehicle
MRL = Manually Rated Line
MRP = Manually Rated Polygon
PKG = Parking Areas
NC = Not Collected

KALA *Kalaupapa National Historical Park*

KALA-0025ZZ Subcomponent Breakdown

Route Number	FMSS Number	Cycle Collected	Iteration Collected	Concession	Route Name	Route Description From	Route Description To	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)
0025AZ	239705	6	1		BISHOP ROAD (FRONT LOOP)	FROM INTERSECTION OF ROUTE 0011 (PUAHI STREET) AND ROUTE 0023 (SCHOOL STREET)	TO END OF LOOP	YES	0.15	0.00	0.15	1	
0025BZ	239705	6	1		BISHOP ROAD (BACK LOOP)	FROM ROUTE 0025AZ (BISHOP ROAD (FRONT LOOP))	TO ROUTE 0025AZ (BISHOP ROAD (FRONT LOOP))	YES	0.12	0.00	0.12	1	

KALA-0026ZZ Subcomponent Breakdown

Route Number	FMSS Number	Cycle Collected	Iteration Collected	Concession	Route Name	Route Description From	Route Description To	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)
0026AZ	239708	6	1		MISSION / PUAHI CONNECTOR	FROM ROUTE 0011 (PUAHI STREET)	TO ROUTE 0014AZ (MISSION STREET (MAIN ROAD))	YES	0.03	0.00	0.03	1	
0026BZ	239708	6	1		CONRADY PLACE	FROM ROUTE 0014AZ (MISSION STREET (MAIN ROAD))	TO ROUTE 0012 (DAMIEN STREET)	YES	0.06	0.00	0.06	1	

Report Date: 09/30/2022

NPS / RIP Subcomponent Details for KALA

(Numerical By Summary Route and Subcomponent #)

Federal Lands Highway
Road Inventory Program

Shading Color Key

White = Paved Routes, DCV Driven	Grey = Paved Routes, DCV not Driven	Black = Paved Routes, Non-NPS
Yellow = Unpaved Routes, DCV not Driven	Blue = Paved Parking Areas	Green = Unpaved Parking Areas

■ = Concession Route

DCV = Data Collection Vehicle
MRL = Manually Rated Line
MRP = Manually Rated Polygon
PKG = Parking Areas
NC = Not Collected

KALA *Kalaupapa National Historical Park*

KALA-0030ZZ Subcomponent Breakdown

Route Number	FMSS Number	Cycle Collected	Iteration Collected	Concession	Route Name	Route Description From	Route Description To	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)
0030Z	239702	6	1		MCVEIGH STREET A	FROM ROUTE 0028 (STAFF STREET (STAFF ROW))	TO END OF PAVEMENT	YES	0.06	0.00	0.06	1	
0031Z	239702	6	1		MCVEIGH STREET B	FROM ROUTE 0028 (STAFF STREET (STAFF ROW))	TO END OF PAVEMENT	YES	0.06	0.00	0.06	1	
0032Z	239702	6	1		MCVEIGH STREET C	FROM ROUTE 0028 (STAFF STREET (STAFF ROW))	TO ROUTE 0035Z (MCVEIGH STREET F)	YES	0.05	0.00	0.05	1	
0033Z	239702	6	1		MCVEIGH STREET D	FROM ROUTE 0028 (STAFF STREET (STAFF ROW))	TO END OF PAVEMENT	YES	0.06	0.00	0.06	1	
0034Z	239702	6	1		MCVEIGH STREET E	FROM ROUTE 0031Z (MCVEIGH STREET B)	TO ROUTE 0032Z (MCVEIGH STREET C)	YES	0.03	0.00	0.03	1	
0035Z	239702	6	1		MCVEIGH STREET F	FROM ROUTE 0031Z (MCVEIGH STREET B)	TO ROUTE 0032Z (MCVEIGH STREET C)	YES	0.03	0.00	0.03	1	

KALA-0402ZZ Subcomponent Breakdown

Route Number	FMSS Number	Cycle Collected	Iteration Collected	Concession	Route Name	Route Description From	Route Description To	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)
0402AZ	80826	6	1		TRAIL ACCESS ROAD	FROM END OF ROUTE 0011 (PUAHI STREET) / WAIHANAU BRIDGE	TO KALAUPAPA TRAIL TO TOPSIDE MOLOKA'I	NO	0.00	0.31	0.31	4	
0402BZ	80826	6	1		TRAIL ACCESS SPUR	FROM ROUTE 0402AZ (TRAIL ACCESS ROAD) NORTH	TO ROUTE 0402AZ (TRAIL ACCESS ROAD) SOUTH	NO	0.00	0.16	0.16	4	

Route Identification Changes to Routes from Previous Cycle
Kalaupapa National Historical Park

ROUTES REMOVED FROM PREVIOUS INVENTORY:			
Route No.	**Route Name**	**Type of Change**	**Comments**
0408	JEEP ROAD 1	OTHER	NPS REQUESTED REMOVAL IN 2016, PRIOR TO CYCLE 6 INSPECTION.
0409	JEEP ROAD 2	OTHER	NPS REQUESTED REMOVAL IN 2016, PRIOR TO CYCLE 6 INSPECTION.

ROUTES MODIFIED FROM PREVIOUS INVENTORY:			
Route No.	**Route Name**	**Type of Change**	**Comments**
0020	KAPIOLANI STREET	LENGTH CHANGE	IMPROVED GPS AND LENGTH WERE COLLECTED IN CYCLE 6.
0022BZ	HALEAKALA STREET UNPAVED	LENGTH CHANGE	IMPROVED GPS AND LENGTH WERE COLLECTED IN CYCLE 6.
0022ZZ	HALEAKALA STREET	LENGTH CHANGE	IMPROVED GPS AND LENGTH WERE COLLECTED IN CYCLE 6.
0030ZZ	MCVEIGH HOME STREETS	ROUTES COMBINED	CYCLE 5 ROUTES 0030, 0031, 0032, 0033, 0034, AND 0035 WERE COMBINED UNDER 0030ZZ.
0400	DAMIEN ROAD	LENGTH CHANGE	UNPAVED ROAD GPS AND LENGTH UPDATED.
0401	COASTAL ROAD	LENGTH CHANGE	UNPAVED ROAD GPS AND LENGTH UPDATED.
0402AZ	TRAIL ACCESS ROAD	LENGTH CHANGE	UNPAVED ROAD GPS AND LENGTH UPDATED.
0402BZ	TRAIL ACCESS SPUR	LENGTH CHANGE	UNPAVED ROAD GPS AND LENGTH UPDATED.
0402ZZ	TRAIL ACCESS ROADS	LENGTH CHANGE	UNPAVED ROAD GPS AND LENGTH UPDATED.
0403	CRATER ROAD	LENGTH CHANGE	UNPAVED ROAD GPS AND LENGTH UPDATED.
0404	INTERIOR ROAD TO KAUHAKO CRATER	LENGTH CHANGE	UNPAVED ROAD GPS AND LENGTH UPDATED.
0405	LIGHTHOUSE ROAD	LENGTH CHANGE	UNPAVED ROAD GPS AND LENGTH UPDATED.
0406	BEACH HOUSE ROAD	LENGTH CHANGE	UNPAVED ROAD GPS AND LENGTH UPDATED.

Route Identification Changes to Routes from Previous Cycle
Kalaupapa National Historical Park

ROUTES MODIFIED FROM PREVIOUS INVENTORY:			
Route No.	**Route Name**	**Type of Change**	**Comments**
0407	STAFF LOOP	LENGTH CHANGE	UNPAVED ROAD GPS AND LENGTH UPDATED.
0410	FENCE LINE ROAD	LENGTH CHANGE	UNPAVED ROAD GPS AND LENGTH UPDATED.
0411	PASCHOAL HALL ROAD	ROUTE NAME	ROUTE NAME CHANGED FROM "INDUSTRIAL ROAD".
0412	PUMP HOUSE ROAD	LENGTH CHANGE	UNPAVED ROAD GPS AND LENGTH UPDATED.

Section 3
Park Summary Information

Kalaupapa National Historical Park

Federal Lands Highway
Road Inventory Program

Parkwide Paved Route Condition Summary
Kalaupapa National Historical Park

Table 1: Paved Route Miles and Parking Area Square Footages by Access Level and PCR

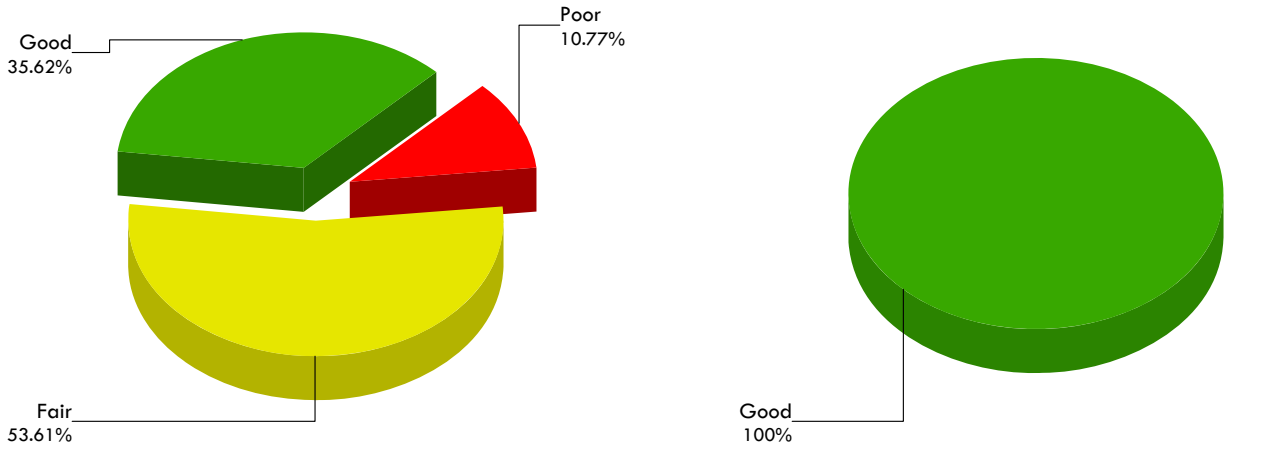
Breakdown of Pavement Condition Rating (PCR) Based on Access Level

	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	0.60	2.85	1.97		5.42
2					
3					
4					
5		0.12			0.12
6					
7					
8					
Total Mileage by PCR	**0.60**	**2.97**	**1.97**	**0**	**5.54**
PAVED PARKING					
Access Level	**Area (sq. ft.)**	**Area (sq. ft.)**	**Area (sq. ft.)**	**Area (sq. ft.)**	**Total Area**
PUBLIC			2,983		2,983
NONPUBLIC					
Total Area by PCR	**0**	**0**	**2,983**	**0**	**2,983**

NOTES:

1. Data are reported in the table only for paved roads and parking lots 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.

Parkwide Condition Percentages



Road Condition Percentages **Parking Area Condition Percentages**

Figure 1: Pavement Condition Rating Breakdown for Paved Roads and Parking Areas

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

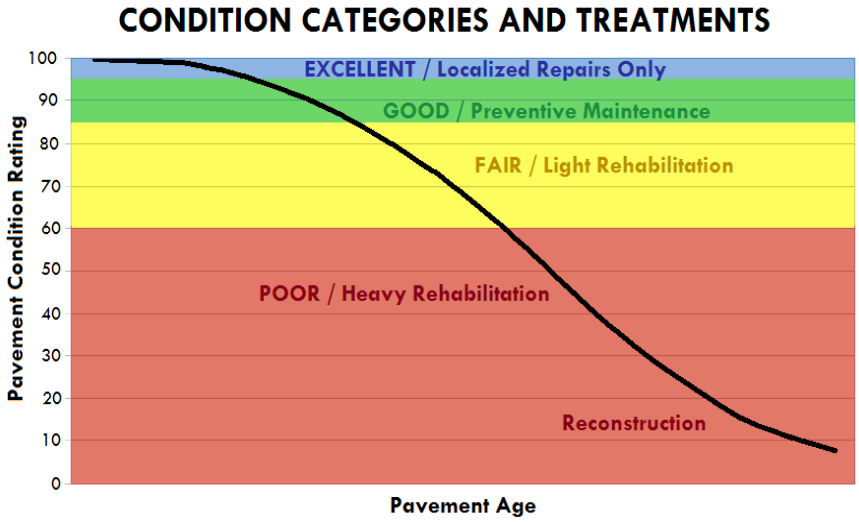
The Road Inventory Program aims to provide assistance in translating the excellent / good / fair / poor rating categories into pavement needs categories. The PCR can be used to indicate the place in the Pavement Life Cycle and the type of treatments that should be considered now and into the future.

- 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 Manually Rated Roads

Kalaupapa National Historical Park

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 at 0.10-mile and 1-mile intervals 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 Line (MRL) Roads

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
KALA-0010AZ	239507	KAMEHAMEHA STREET A	1	AS	1.53	84	NR	84	NR	84	90	90	94	97
KALA-0010BZ	239507	KAMEHAMEHA STREET B	1	AS	0.07	90	NR	90	NR	97	97	97	90	97
KALA-0011	80824	PUAHI STREET	1	AS	0.45	90	NR	90	NR	97	90	90	90	97
KALA-0012	239692	DAMIEN STREET	1	AS	0.46	73	NR	73	NR	90	90	73	73	90
KALA-0013	239691	BERETANIA STREET	1	AS	0.36	73	NR	73	NR	90	90	73	90	90
KALA-0014AZ	239693	MISSION STREET (MAIN ROAD)	1	AS	0.14	73	NR	73	NR	97	90	73	90	97
KALA-0014BZ	239693	MISSION STREET (SOUTH SPUR ROAD)	1	AS	0.03	53	NR	53	NR	53	73	73	73	90
KALA-0015	239699	GOODHUE STREET	1	AS	0.09	90	NR	90	NR	90	90	90	90	97
KALA-0016	239700	BISHOP STREET	1	AS	0.08	90	NR	90	NR	97	90	90	90	97
KALA-0017	239694	MCKINLEY STREET	1	AS	0.26	73	NR	73	NR	90	73	73	90	97
KALA-0018	239695	BALDWIN STREET	1	AS	0.27	53	NR	53	NR	90	73	53	97	90
KALA-0019	239696	KAIULANI STREET	1	AS	0.28	73	NR	73	NR	90	73	73	97	90
KALA-0021	239698	BAYVIEW LOOP	1	AS	0.16	73	NR	73	NR	73	90	73	73	90
KALA-0022AZ	239704	HALEAKALA STREET PAVED	1	AS	0.07	53	NR	53	NR	73	53	73	97	97
KALA-0023	239706	SCHOOL STREET	1	AS	0.23	53	NR	53	NR	73	73	53	73	97
KALA-0024	239707	KILOHANA STREET	1	AS	0.06	90	NR	90	NR	97	97	90	90	97
KALA-0025AZ	239705	BISHOP ROAD (FRONT LOOP)	1	AS	0.15	73	NR	73	NR	90	73	73	97	97
KALA-0025BZ	239705	BISHOP ROAD (BACK LOOP)	1	AS	0.12	73	NR	73	NR	90	90	73	97	97
KALA-0026AZ	239708	MISSION / PUAHI CONNECTOR	1	AS	0.03	90	NR	90	NR	97	90	90	97	97
KALA-0026BZ	239708	CONRADY PLACE	1	AS	0.06	90	NR	90	NR	97	90	90	97	97
KALA-0028	239701	STAFF STREET (STAFF ROW)	1	AS	0.26	73	NR	73	NR	90	73	73	90	97

Data Collection Date: 03/2022

Federal Lands Highway
Road Inventory Program

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

Kalaupapa National Historical Park

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 at 0.10-mile and 1-mile intervals 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 Line (MRL) Roads

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
KALA-0030Z	239702	MCVEIGH STREET A	1	AS	0.06	73	NR	73	NR	90	73	73	73	97
KALA-0031Z	239702	MCVEIGH STREET B	1	AS	0.06	90	NR	90	NR	97	97	90	97	97
KALA-0032Z	239702	MCVEIGH STREET C	1	AS	0.05	90	NR	90	NR	97	90	90	90	97
KALA-0033Z	239702	MCVEIGH STREET D	1	AS	0.06	90	NR	90	NR	90	90	97	97	97
KALA-0034Z	239702	MCVEIGH STREET E	1	AS	0.03	73	NR	73	NR	97	90	73	97	97
KALA-0035Z	239702	MCVEIGH STREET F	1	AS	0.03	73	NR	73	NR	97	90	73	97	97
KALA-0411	247675	PASCHOAL HALL ROAD	5	AS	0.12	73	NR	73	NR	97	90	90	73	97

Data Collection Date: 03/2022

Federal Lands Highway
Road Inventory Program

Cycle 6 - Road Inventory Program
Parking Area Condition Summary Report

Kalaupapa National Historical Park

Condition (Rating / Index) Legend

- EXCELLENT (97)
- GOOD (90)
- FAIR (73)
- POOR* (0, 30, 53)
- NR = NOT RATED

Notes:

- A PCR of 0 indicates a paved parking area in very poor condition. Individual distresses could not be identified.
- Additional details on individual parking areas can be found in Section 6 of the Cycle 6 RIP Report.
- Refer to the RIP Report Appendix for an explanation of the rating system and rating methods.

Condition Rating Details for Paved Parking Areas

							Asphalt Surface Distresses						Concrete Surface Distresses				
Route No.	FMSS No.	Route Name	User Access	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
KALA-0900	247677	PASCHOAL HALL PARKING	PUBLIC	AS	2,983	90	97	90	97	97	97	90					

Data Collection Date: 03/2022

Federal Lands Highway
Road Inventory Program

Cycle 6 - Road Inventory Program
Unpaved Roads Condition Summary Report

Kalaupapa National Historical Park

Condition (Rating / Index) Legend

NATIVE	GRAVEL
EXCELLENT (4)	EXCELLENT (5)
GOOD (3)	GOOD (4)
FAIR (2)	FAIR (3)
POOR (1)	POOR (2)
NR = NOT RATED	POOR (1)
	NR = NOT RATED

Notes:
- Additional details on individual roads 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.

Condition Rating Details for Unpaved Roads Areas

Route No.	FMSS No.	Route Name	Functional Class	Surf. Type	Unpaved Length (Miles)	Unpaved Rating (Paser +)	Unpaved Surface Distresses: Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity	Dust
KALA-0020	239697	KAPIOLANI STREET	1	GR	0.31	2	Med	Med	Med	High	Low
KALA-0022BZ	239704	HALEAKALA STREET UNPAVED	1	GR	0.07	2	Med	Med	High	High	Low
KALA-0400	80818	DAMIEN ROAD	1	GR	2.68	2	Med	Med	Med	Med	Low
KALA-0401	80312	COASTAL ROAD	4	NV	3.15	1	Med	High	Med	High	Low
KALA-0402AZ	80826	TRAIL ACCESS ROAD	4	NV	0.31	2	Med	High	Med	Med	Low
KALA-0402BZ	80826	TRAIL ACCESS SPUR	4	NV	0.16	3	Med	Med	Low	Med	Low
KALA-0403	80817	CRATER ROAD	4	GR	0.41	2	Med	High	Med	High	Low
KALA-0404	80821	INTERIOR ROAD TO KAUHAKO CRATER	4	GR	0.04	2	High	Med	High	Med	Low
KALA-0405	80822	LIGHTHOUSE ROAD	4	GR	0.55	2	Med	Med	Med	Med	Low
KALA-0406	80814	BEACH HOUSE ROAD	4	NV	0.48	2	Med	Med	Med	Med	Low
KALA-0407	239703	STAFF LOOP	4	NV	0.17	3	Med	Med	Low	Med	Low
KALA-0410	80819	FENCE LINE ROAD	5	NV	1.23	2	Med	Med	Med	Med	Low
KALA-0412	247676	PUMP HOUSE ROAD	6	GR	0.55	2	Med	High	Med	Med	Low

Data Collection Date: 03/2022

Parkwide Unpaved Route Condition Summary
Kalaupapa National Historical Park

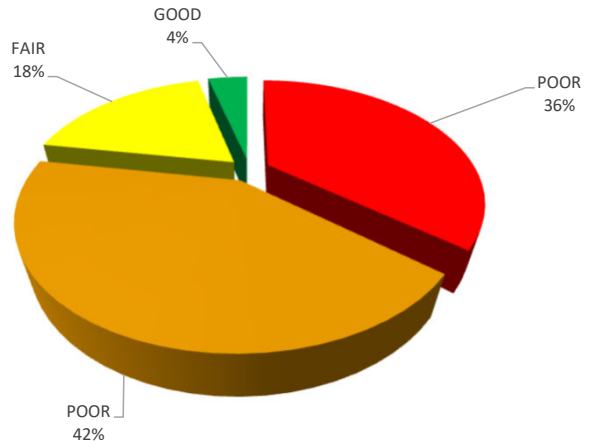
Breakdown of Unpaved Condition Rating (PASER +) Based on Access Level

	POOR	POOR	FAIR	GOOD	EXCELLENT	
UNPAVED ROADS						
Functional Class	**Length (miles)**	**Length (miles)**	**Length (miles)**	**Length (miles)**	**Length (miles)**	**Total Mileage by FC**
1		1.75	0.90	0.40		3.05
2						
3						
4	2.99	1.650	0.63			5.27
5	0.40	0.53	0.20			1.13
6	0.20	0.25	0.10			0.55
7						
8						
Total Mileage by PASER +	**3.59**	**4.19**	**1.83**	**0.40**	**0.00**	**10.01**
UNPAVED PARKING						
Access Level	**Area (sq. ft.)**	**Area (sq. ft.)**	**Area (sq. ft.)**	**Area (sq. ft.)**	**Area (sq. ft.)**	**Total Area**
PUBLIC						
NONPUBLIC						
Total Area by PASER +	**0**	**0**	**0**	**0**	**0**	**0**

NOTES:

1. Data are reported in the table only for unpaved roads and parking lots that received a condition rating.
2. Quantities in the table above are derived from the route condition data within the UNPAVED_PMS_TENTH, UNPAVED_PMS_PARKING in the Park geodatabase.

Parkwide Condition Percentages



Unpaved Road Condition Percentages

No Unpaved Parking Areas to Report

Parking Area Condition Percentages

Section 4
Park Route Location Maps

Kalaupapa National Historical Park

Federal Lands Highway
Road Inventory Program

Kalaupapa National Historical Park

ROUTE LOCATION MAP

Key Map

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

NPS Collected Routes

Miles

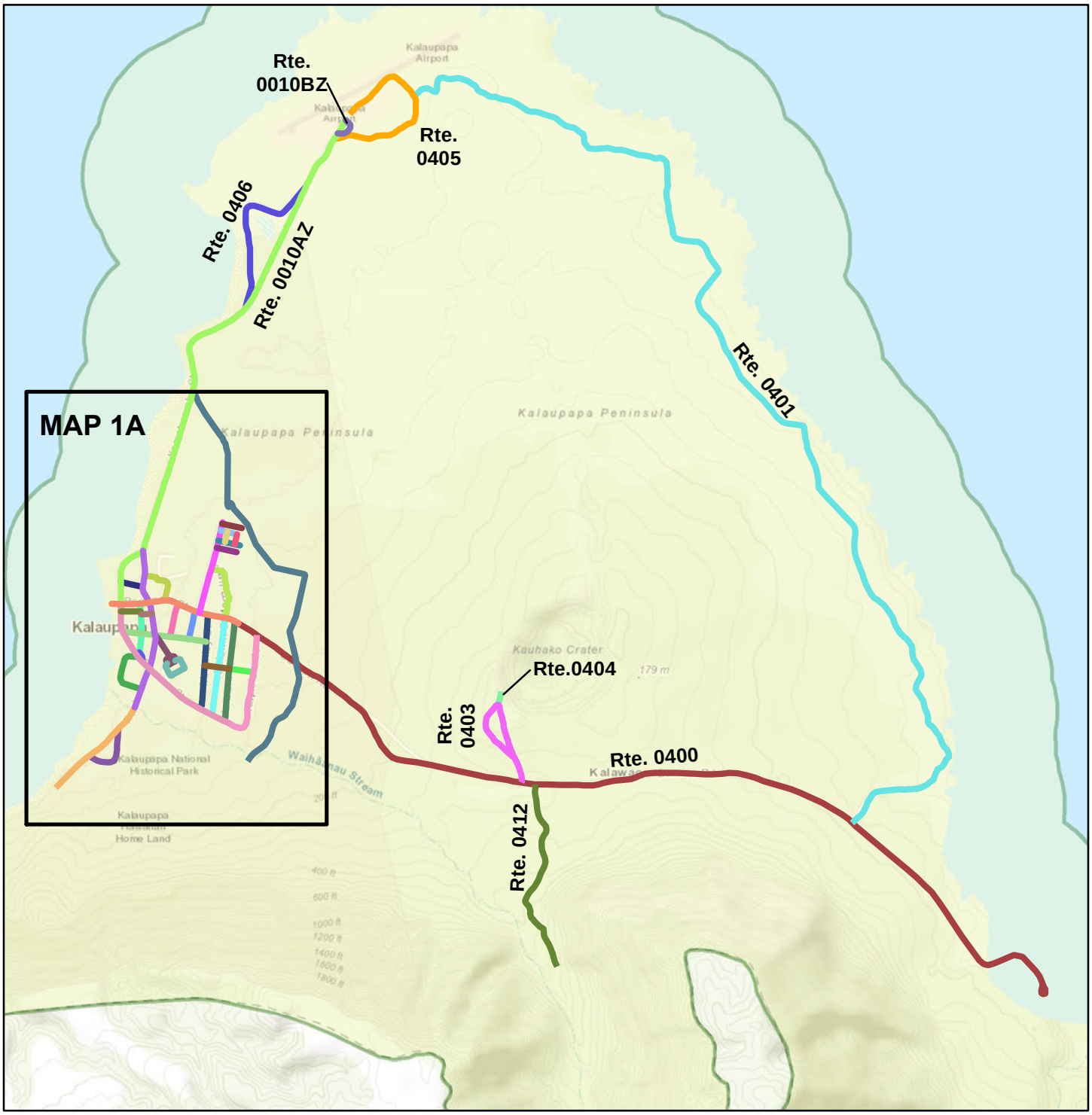
0 1 2

N

Kalaupapa National Historical Park

ROUTE LOCATION MAP

Area Map 1



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

Note: Unique colors are used to differentiate roads

Miles

0 0.5 1

N

Kalaupapa National Historical Park

ROUTE LOCATION MAP

Area Map 1A

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

Note: Unique colors are used to differentiate roads

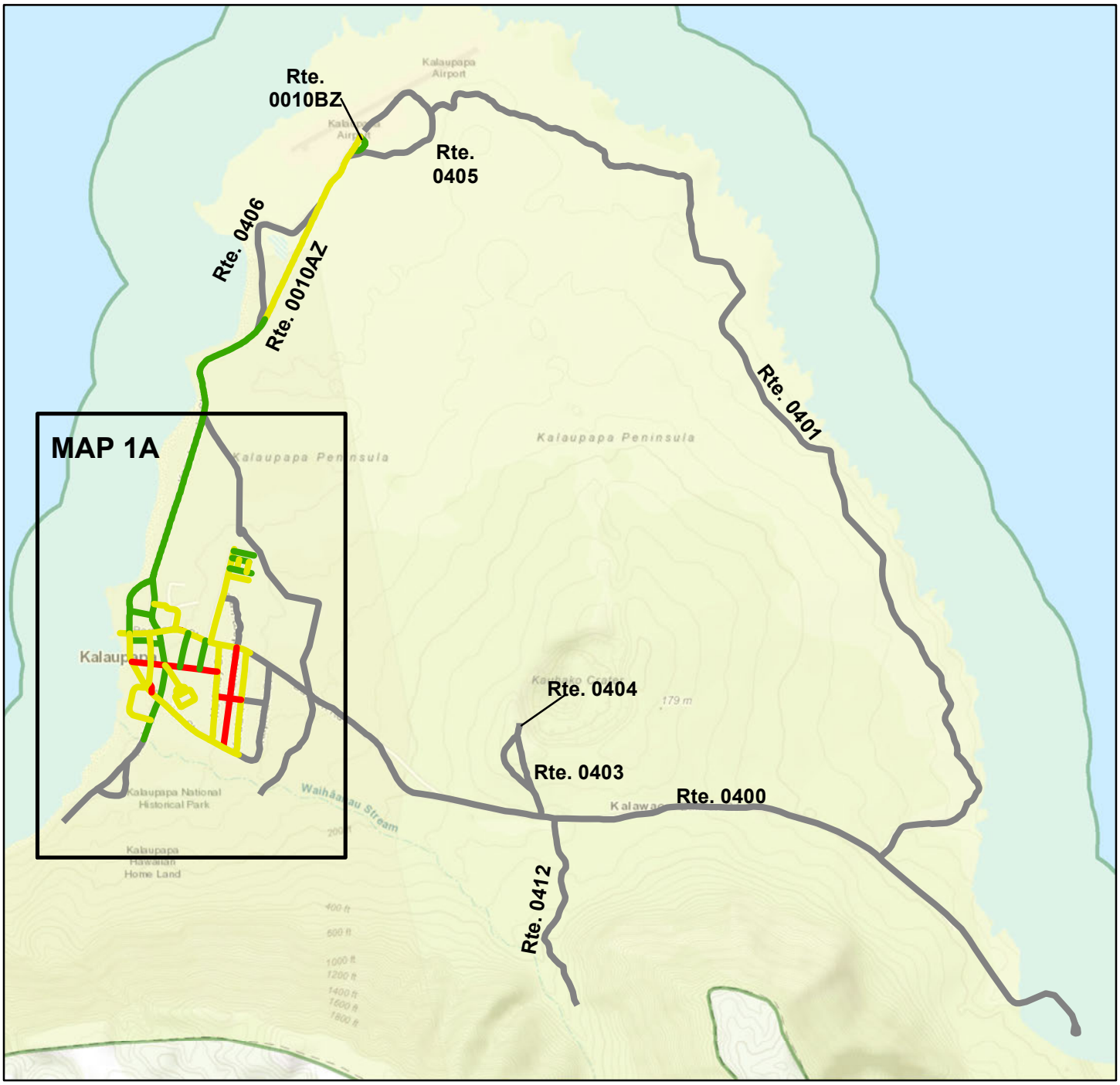
Miles

0 0.25 0.5

N

Kalaupapa National Historical Park

ROUTE LOCATION MAP
PCR - MILE BY MILE
Area Map 1



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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)	Unpaved

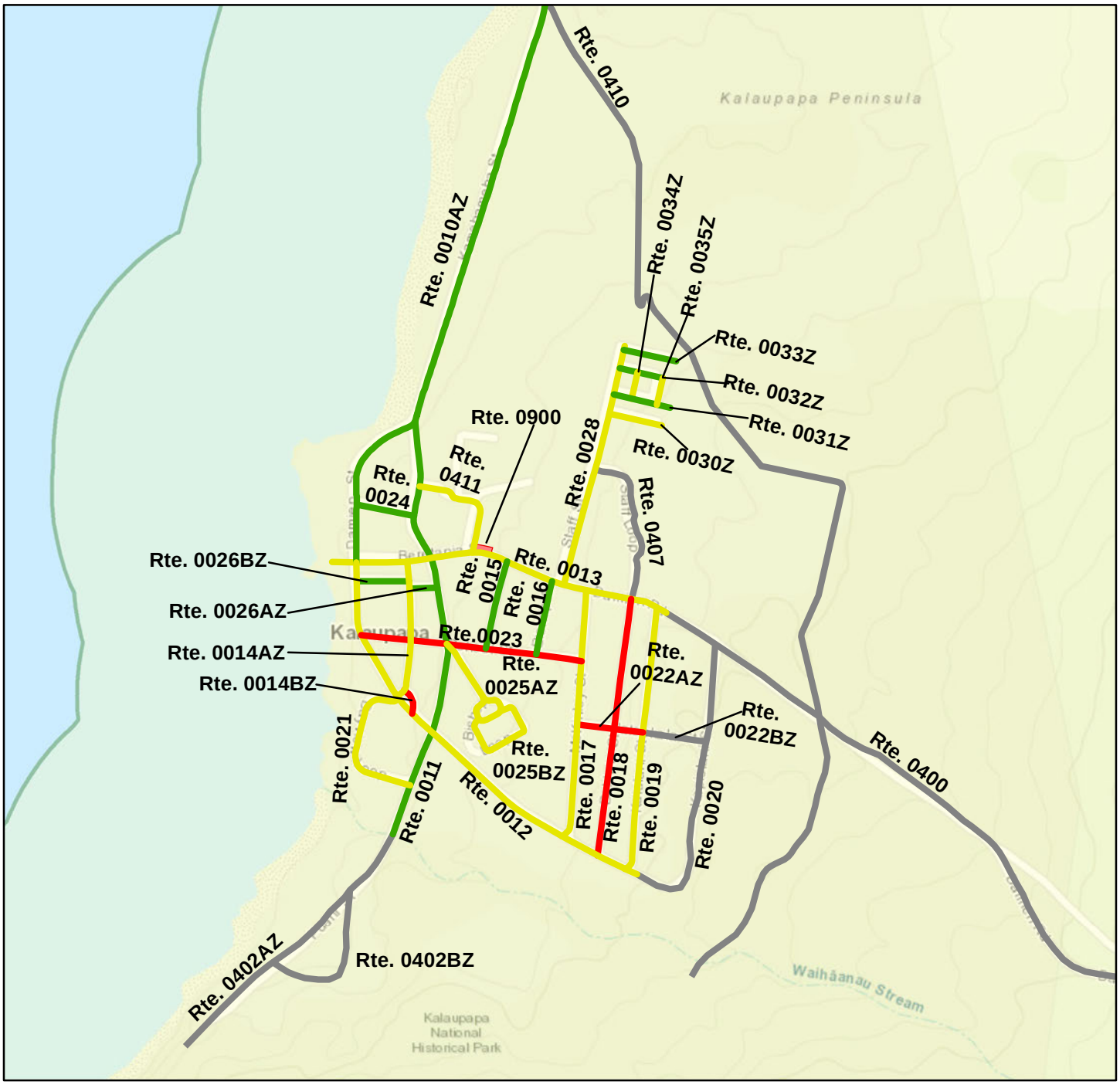
Colors on map represent condition scores at 1-mile intervals. See Appendix for definitions and formulas
Only Data Collection Vehicle and Manually Rated Roads are displayed

Miles
0 0.5 1

N

Kalaupapa National Historical Park

ROUTE LOCATION MAP
PCR - MILE BY MILE
Area Map 1A



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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)	Unpaved

Colors on map represent condition scores at 1-mile intervals. See Appendix for definitions and formulas
Only Data Collection Vehicle and Manually Rated Roads are displayed

Miles
0 0.25 0.5

N

Section 5
Road Condition Rating Sheets

Kalaupapa National Historical Park

Federal Lands Highway
Road Inventory Program

Kalaupapa National Historical Park

ROUTE 0010ZZ: KAMEHAMEHA STREET

Summary Route

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

Note: The weighted average summary PCR value is calculated from only the sections of road where the PCR was collected. The overall PCR for the summary route may not reflect individual subcomponent ratings.

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

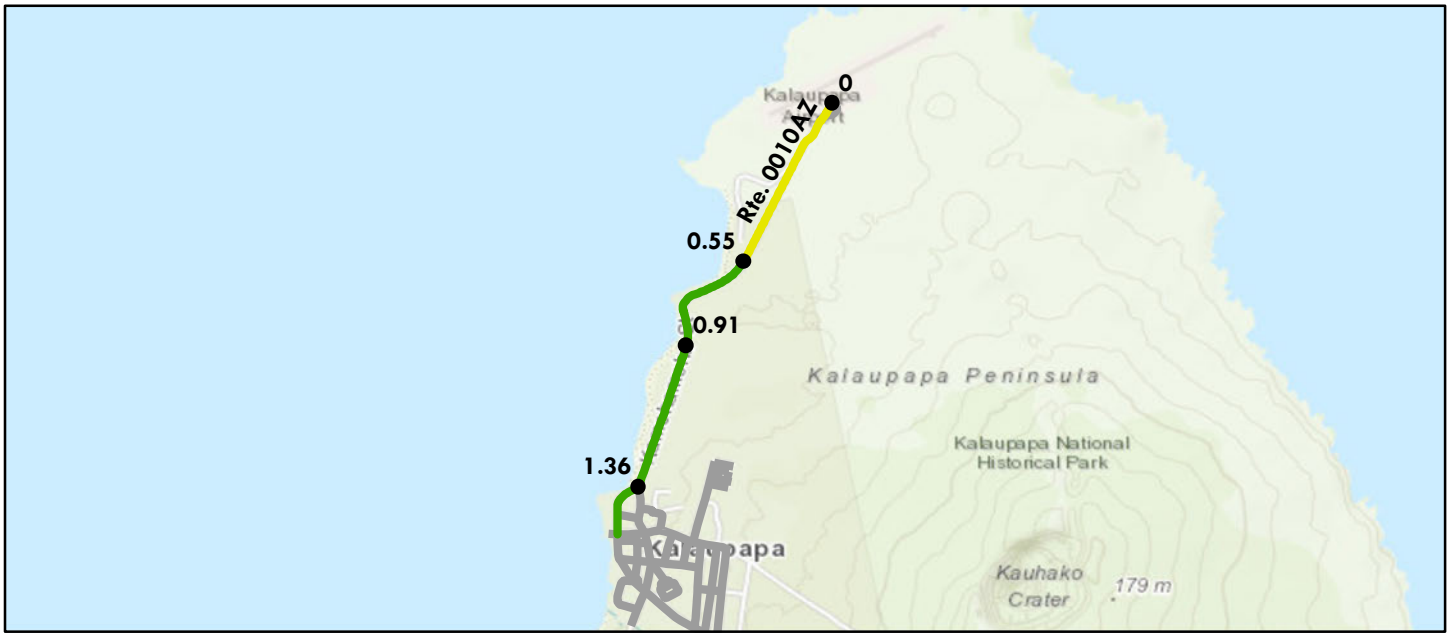
Inspection Date: 3/15/2022							
Paved Length (Miles): 1.6							
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	84						
Lane & Width Information							
Number of Lanes	1						
Paved Width (ft)	14.1						
Lane Width (ft)	13.2						

Kalaupapa National Historical Park

ROUTE 0010AZ: KAMEHAMEHA STREET A

Subcomponent of Route KALA-0010ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00	0.55	0.91	1.36	
Paved Length (Miles): 1.53	**Section Length (MI)**	0.55	0.36	0.45	0.18	
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	84	73	90	90	90	
Surface Condition Rating (SCR)	84	73	90	90	90	
Roughness Condition Index (RCI)	N/A	N/A	N/A	N/A	N/A	
Distress Index Values						
Structural Crack Index	N/A	N/A	N/A	N/A	N/A	
Alligator Crack Index	84	73	90	90	90	
Longitudinal Crack Index	90	90	90	90	90	
Transverse Cracking Index	90	90	90	90	90	
Patching Index	94	90	97	97	97	
Rutting Index	97	97	97	97	97	
International Roughness Index (IRI)	N/A	N/A	N/A	N/A	N/A	
Lane & Width Information						
Number of Lanes	1	1	1	1	2	
Paved Width (ft)	14.2	14	14	14	16	
Lane Width (ft)	13.3	14	14	14	8	

Kalaupapa National Historical Park

ROUTE 0010AZ: KAMEHAMEHA STREET A

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0010AZ_0.006.jpg

KALA_0010AZ_0.220.jpg

KALA_0010AZ_0.535.jpg

KALA_0010AZ_0.893.jpg

KALA_0010AZ_1.037.jpg

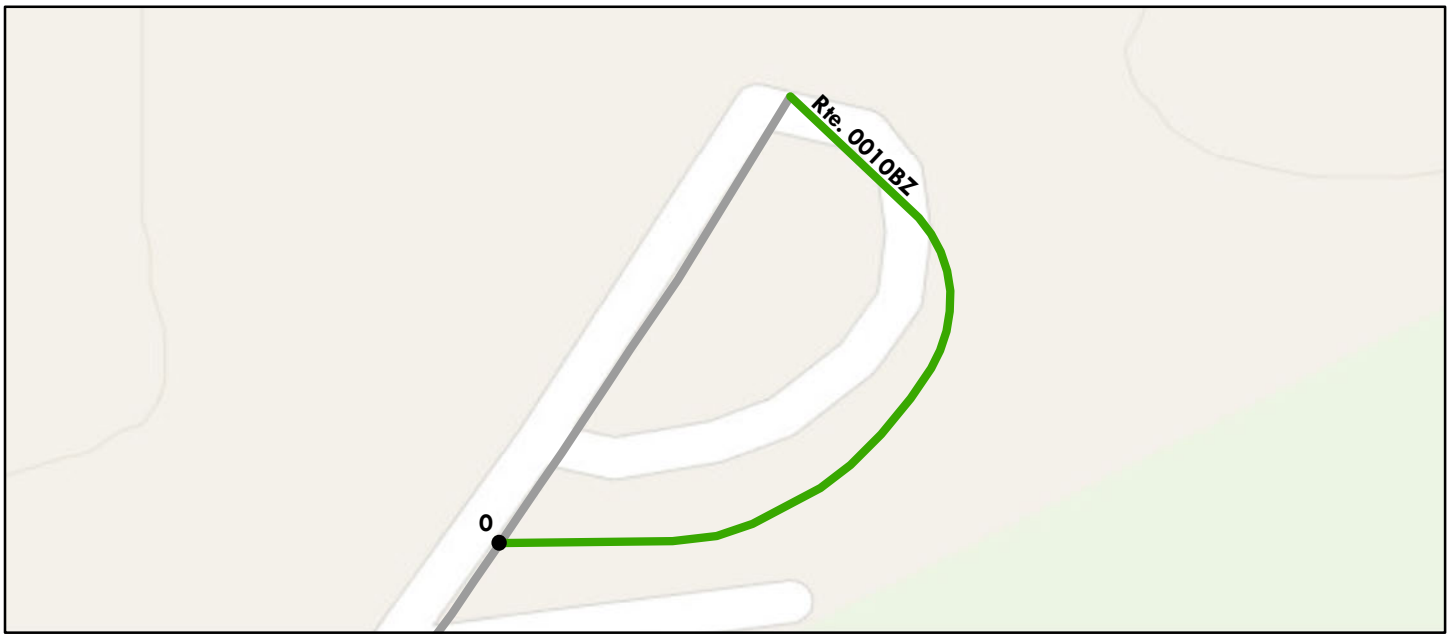
KALA_0010AZ_1.269.jpg

Kalaupapa National Historical Park

ROUTE 0010BZ: KAMEHAMEHA STREET B

Subcomponent of Route KALA-0010ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.07	**Section Length (MI)**	0.07					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	90	90					
Surface Condition Rating (SCR)	90	90					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	97	97					
Longitudinal Crack Index	97	97					
Transverse Cracking Index	97	97					
Patching Index	90	90					
Rutting Index	97	97					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	11	11					
Lane Width (ft)	11	11					

Kalaupapa National Historical Park

ROUTE 0010BZ: KAMEHAMEHA STREET B

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0010BZ_0.000.JPG

KALA_0010BZ_0.017.jpg

KALA_0010BZ_0.026.jpg

KALA_0010BZ_0.036.jpg

KALA_0010BZ_0.046.jpg

KALA_0010BZ_0.052.jpg

Kalaupapa National Historical Park

ROUTE 0011: PUAHI STREET

Manual Rating

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.45	**Section Length (MI)**	0.45					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	90	90					
Surface Condition Rating (SCR)	90	90					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	97	97					
Longitudinal Crack Index	90	90					
Transverse Cracking Index	90	90					
Patching Index	90	90					
Rutting Index	97	97					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	14	14					
Lane Width (ft)	14	14					

Kalaupapa National Historical Park

ROUTE 0011: PUAHI STREET

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0011_0.012.jpg

KALA_0011_0.104.jpg

KALA_0011_0.202.jpg

KALA_0011_0.290.jpg

KALA_0011_0.356.jpg

KALA_0011_0.418.jpg

Kalaupapa National Historical Park

ROUTE 0012: DAMIEN STREET

Manual Rating

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles): 0.46	**Section Length (MI)**	0.46				
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	73	73				
Surface Condition Rating (SCR)	73	73				
Roughness Condition Index (RCI)	N/A	N/A				
Distress Index Values						
Structural Crack Index	N/A	N/A				
Alligator Crack Index	90	90				
Longitudinal Crack Index	90	90				
Transverse Cracking Index	73	73				
Patching Index	73	73				
Rutting Index	90	90				
International Roughness Index (IRI)	N/A	N/A				
Lane & Width Information						
Number of Lanes	1	1				
Paved Width (ft)	14	14				
Lane Width (ft)	14	14				

Kalaupapa National Historical Park

ROUTE 0012: DAMIEN STREET

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0012_0.023.jpg

KALA_0012_0.078.jpg

KALA_0012_0.183.jpg

KALA_0012_0.233.jpg

KALA_0012_0.280.jpg

KALA_0012_0.398.jpg

Kalaupapa National Historical Park

ROUTE 0013: BERETANIA STREET

Manual Rating

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.36	**Section Length (MI)**	0.36					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	73	73					
Surface Condition Rating (SCR)	73	73					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	90	90					
Longitudinal Crack Index	90	90					
Transverse Cracking Index	73	73					
Patching Index	90	90					
Rutting Index	90	90					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	2	2					
Paved Width (ft)	18	18					
Lane Width (ft)	9	9					

Kalaupapa National Historical Park

ROUTE 0013: BERETANIA STREET

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0013_0.000.JPG

KALA_0013_0.003.JPG

KALA_0013_0.010.JPG

KALA_0013_0.015.JPG

KALA_0013_0.023.JPG

KALA_0013_0.046.jpg

Kalaupapa National Historical Park

ROUTE 0014ZZ: MISSION STREET

Summary Route

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

Note: The weighted average summary PCR value is calculated from only the sections of road where the PCR was collected. The overall PCR for the summary route may not reflect individual subcomponent ratings.

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:	3/15/2022
Paved Length (Miles):	0.17
Surface Type:	ASPHALT
Roadway Condition Information	
Pavement Condition Rating (PCR)	70
Lane & Width Information	
Number of Lanes	1
Paved Width (ft)	13.8
Lane Width (ft)	13.8

Route Summary

Kalaupapa National Historical Park

ROUTE 0014AZ: MISSION STREET (MAIN ROAD)

Subcomponent of Route KALA-0014ZZ

Manual Rating

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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:	3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles):	0.14	**Section Length (MI)**	0.14				
Surface Type:	ASPHALT	**Route Summary**					
Roadway Condition Information							
Pavement Condition Rating (PCR)		73	73				
Surface Condition Rating (SCR)		73	73				
Roughness Condition Index (RCI)		N/A	N/A				
Distress Index Values							
Structural Crack Index		N/A	N/A				
Alligator Crack Index		97	97				
Longitudinal Crack Index		90	90				
Transverse Cracking Index		73	73				
Patching Index		90	90				
Rutting Index		97	97				
International Roughness Index (IRI)		N/A	N/A				
Lane & Width Information							
Number of Lanes		1	1				
Paved Width (ft)		14	14				
Lane Width (ft)		14	14				

Kalaupapa National Historical Park

ROUTE 0014AZ: MISSION STREET (MAIN ROAD)

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0014AZ_0.011.jpg

KALA_0014AZ_0.036.jpg

KALA_0014AZ_0.064.jpg

KALA_0014AZ_0.089.jpg

KALA_0014AZ_0.109.jpg

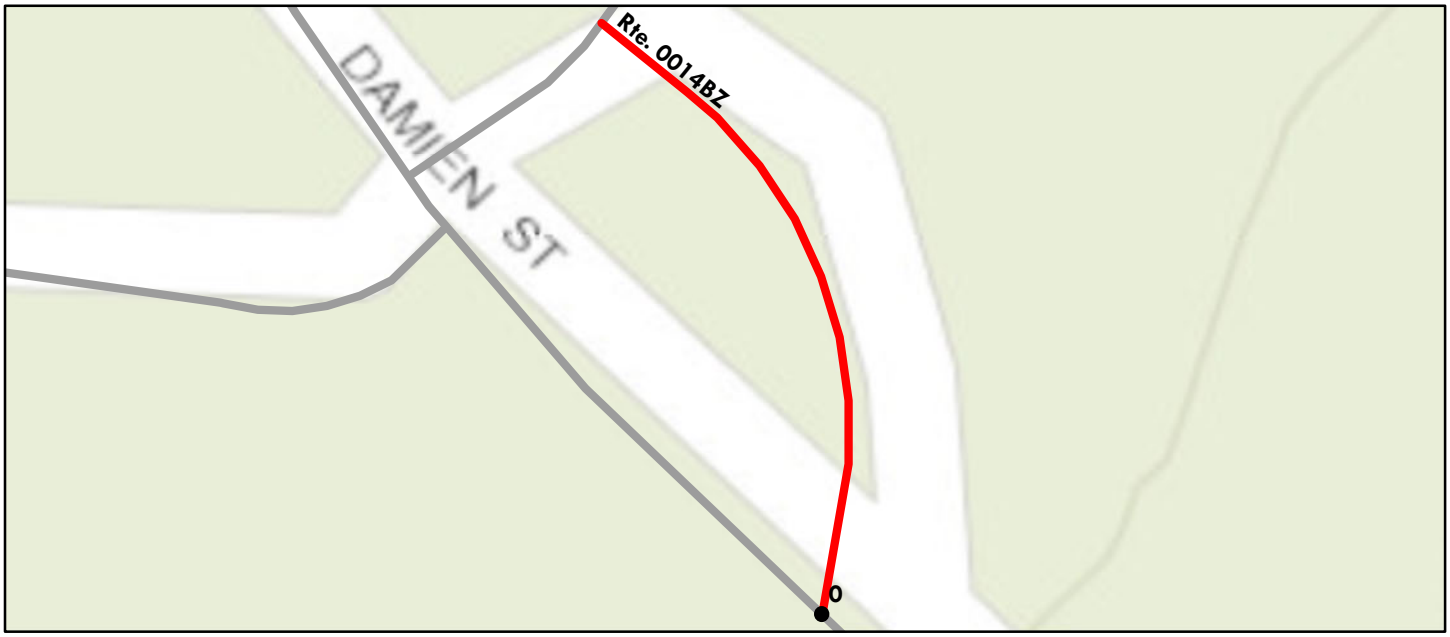
KALA_0014AZ_0.131.jpg

Kalaupapa National Historical Park

ROUTE 0014BZ: MISSION STREET (SOUTH SPUR ROAD)

Subcomponent of Route KALA-0014ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.03	**Section Length (MI)**	0.03					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	53	53					
Surface Condition Rating (SCR)	53	53					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	53	53					
Longitudinal Crack Index	73	73					
Transverse Cracking Index	73	73					
Patching Index	73	73					
Rutting Index	90	90					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	13	13					
Lane Width (ft)	13	13					

Kalaupapa National Historical Park

ROUTE 0014BZ: MISSION STREET (SOUTH SPUR ROAD)

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0014BZ_0.000.JPG

KALA_0014BZ_0.008.jpg

KALA_0014BZ_0.018.jpg

KALA_0014BZ_0.028.JPG

Kalaupapa National Historical Park

ROUTE 0015: GOODHUE STREET

Manual Rating

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.09	**Section Length (MI)**	0.09					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	90	90					
Surface Condition Rating (SCR)	90	90					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	90	90					
Longitudinal Crack Index	90	90					
Transverse Cracking Index	90	90					
Patching Index	90	90					
Rutting Index	97	97					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	11	11					
Lane Width (ft)	11	11					

Kalaupapa National Historical Park

ROUTE 0015: GOODHUE STREET

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0015_0.014.jpg

KALA_0015_0.037.jpg

KALA_0015_0.047.jpg

KALA_0015_0.057.jpg

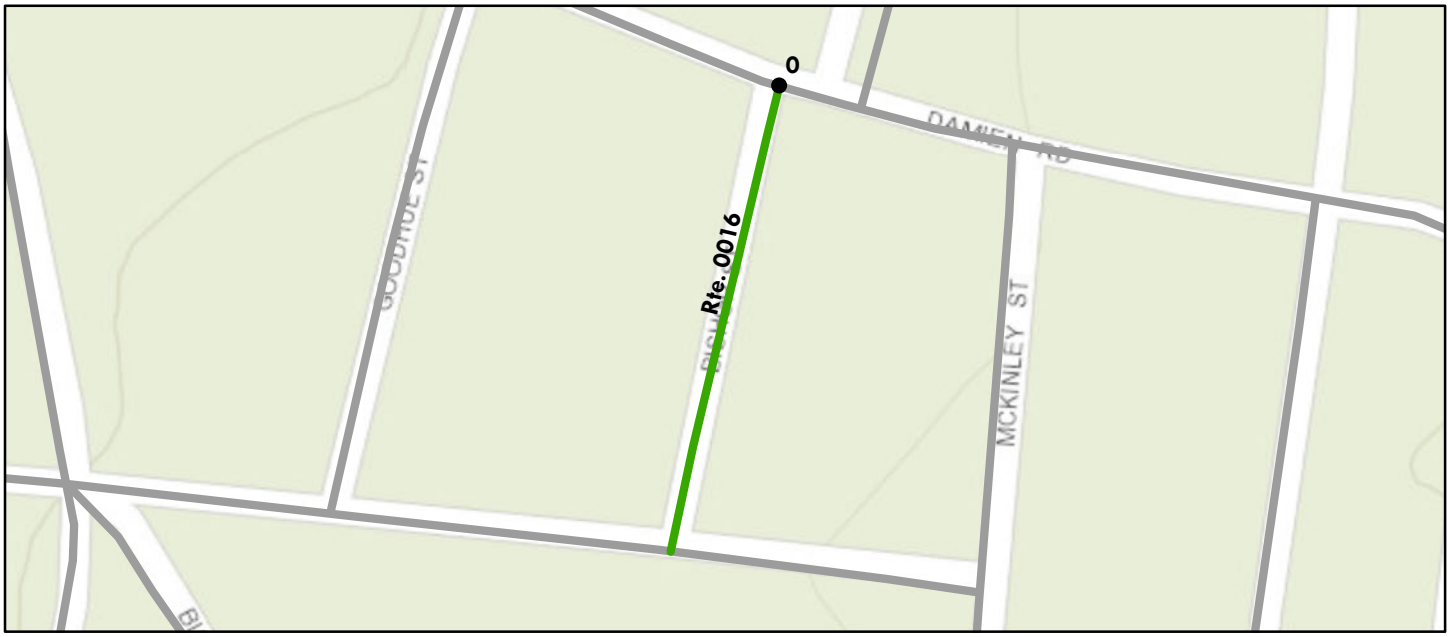
KALA_0015_0.068.jpg

KALA_0015_0.077.jpg

Kalaupapa National Historical Park

ROUTE 0016: BISHOP STREET

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.08	**Section Length (MI)**	0.08					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	90	90					
Surface Condition Rating (SCR)	90	90					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	97	97					
Longitudinal Crack Index	90	90					
Transverse Cracking Index	90	90					
Patching Index	90	90					
Rutting Index	97	97					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	11	11					
Lane Width (ft)	11	11					

Kalaupapa National Historical Park

ROUTE 0016: BISHOP STREET

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0016_0.003.jpg

KALA_0016_0.015.jpg

KALA_0016_0.025.jpg

KALA_0016_0.034.jpg

KALA_0016_0.043.jpg

KALA_0016_0.063.jpg

Kalaupapa National Historical Park

ROUTE 0017: MCKINLEY STREET

Manual Rating

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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:	3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles):	0.26	**Section Length (MI)**	0.26				
Surface Type:	ASPHALT	**Route Summary**					
Roadway Condition Information							
Pavement Condition Rating (PCR)		73	73				
Surface Condition Rating (SCR)		73	73				
Roughness Condition Index (RCI)		N/A	N/A				
Distress Index Values							
Structural Crack Index		N/A	N/A				
Alligator Crack Index		90	90				
Longitudinal Crack Index		73	73				
Transverse Cracking Index		73	73				
Patching Index		90	90				
Rutting Index		97	97				
International Roughness Index (IRI)		N/A	N/A				
Lane & Width Information							
Number of Lanes		1	1				
Paved Width (ft)		13	13				
Lane Width (ft)		13	13				

Kalaupapa National Historical Park

ROUTE 0017: MCKINLEY STREET

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0017_0.023.jpg

KALA_0017_0.058.jpg

KALA_0017_0.107.jpg

KALA_0017_0.149.jpg

KALA_0017_0.187.jpg

KALA_0017_0.241.jpg

Kalaupapa National Historical Park

ROUTE 0018: BALDWIN STREET

Manual Rating

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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:	3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles):	0.27	**Section Length (MI)**	0.27				
Surface Type:	ASPHALT	**Route Summary**					
Roadway Condition Information							
Pavement Condition Rating (PCR)		53	53				
Surface Condition Rating (SCR)		53	53				
Roughness Condition Index (RCI)		N/A	N/A				
Distress Index Values							
Structural Crack Index		N/A	N/A				
Alligator Crack Index		90	90				
Longitudinal Crack Index		73	73				
Transverse Cracking Index		53	53				
Patching Index		97	97				
Rutting Index		90	90				
International Roughness Index (IRI)		N/A	N/A				
Lane & Width Information							
Number of Lanes		1	1				
Paved Width (ft)		13	13				
Lane Width (ft)		13	13				

Kalaupapa National Historical Park

ROUTE 0018: BALDWIN STREET

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0018_0.007.jpg

KALA_0018_0.045.jpg

KALA_0018_0.081.jpg

KALA_0018_0.140.jpg

KALA_0018_0.195.jpg

KALA_0018_0.254.jpg

Kalaupapa National Historical Park

ROUTE 0019: KAIULANI STREET

Manual Rating

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles): 0.28	**Section Length (MI)**	0.28				
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	73	73				
Surface Condition Rating (SCR)	73	73				
Roughness Condition Index (RCI)	N/A	N/A				
Distress Index Values						
Structural Crack Index	N/A	N/A				
Alligator Crack Index	90	90				
Longitudinal Crack Index	73	73				
Transverse Cracking Index	73	73				
Patching Index	97	97				
Rutting Index	90	90				
International Roughness Index (IRI)	N/A	N/A				
Lane & Width Information						
Number of Lanes	1	1				
Paved Width (ft)	13	13				
Lane Width (ft)	13	13				

Kalaupapa National Historical Park

ROUTE 0019: KAIULANI STREET

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0019_0.007.jpg

KALA_0019_0.031.jpg

KALA_0019_0.112.jpg

KALA_0019_0.168.jpg

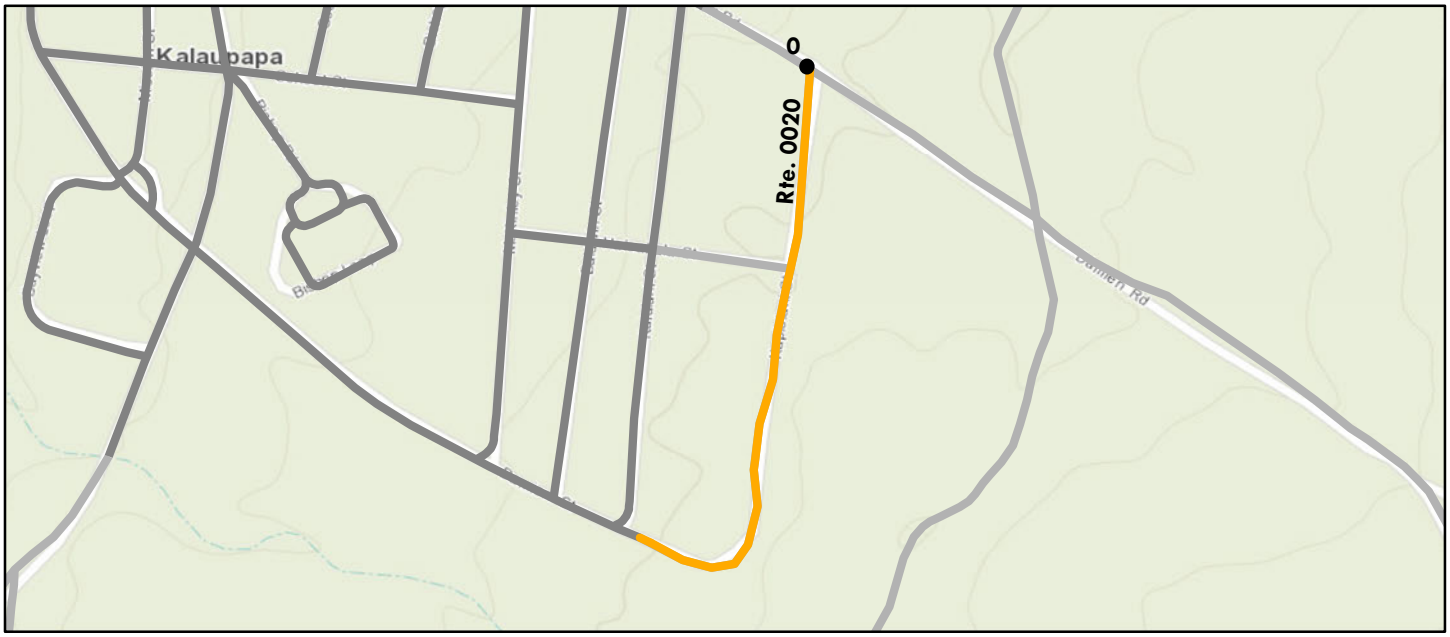
KALA_0019_0.234.jpg

KALA_0019_0.271.jpg

Kalaupapa National Historical Park

ROUTE 0020: KAPIOLANI STREET

Manual Rating



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

Route Condition Legend

Poor (1)	Poor (2)	Fair (3)	Good (4)	Excellent (5)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 0.306 **Surface Type:** GR

Condition Summary Table for KALA-0020

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	0.31	0.31	1	10.0	10.0	Heavy Rehabilitation	$ 48,960	2	Med	Med	Med	High
Route Level Data:	0.31	1	10.0	10.00	Heavy Rehabilitation	$ 48,960	2	Med	Med	Med	High	

Kalaupapa National Historical Park

ROUTE 0020 : KAPIOLANI STREET

Condition Photos

KALA-0020_0.020.jpg

KALA-0020_0.067.jpg

KALA-0020_0.108.jpg

KALA-0020_0.150.jpg

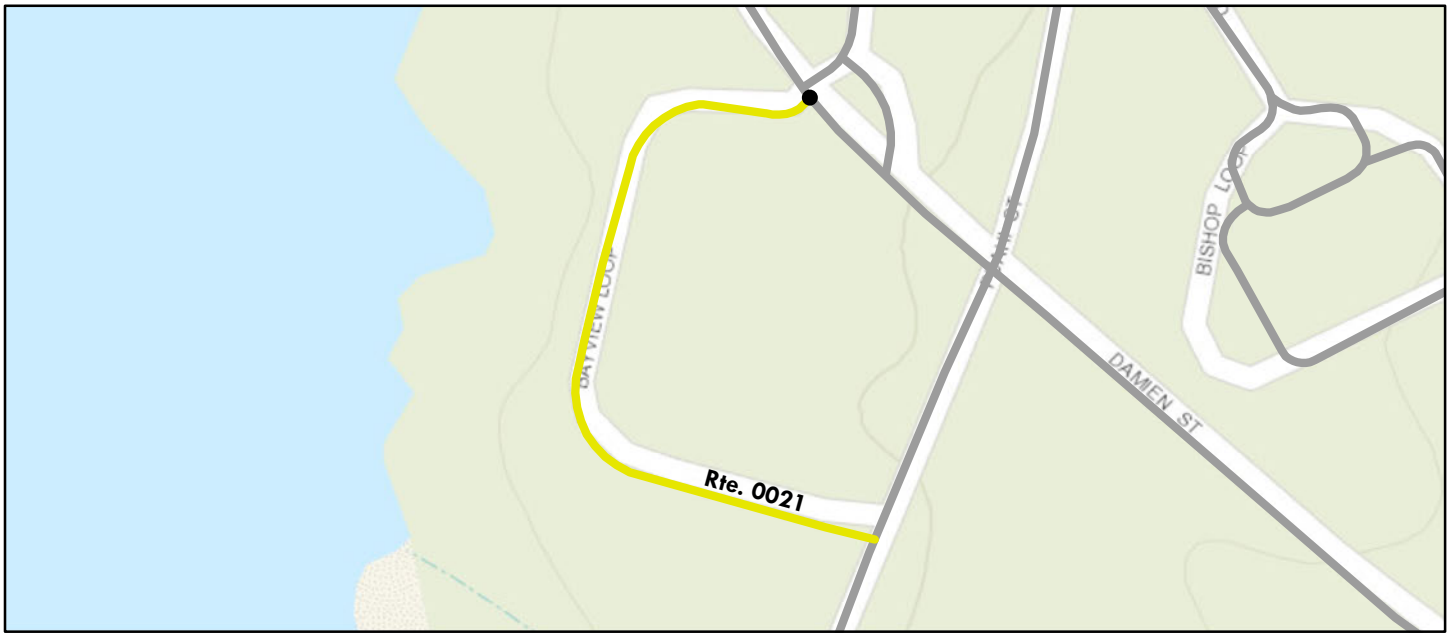
KALA-0020_0.201.jpg

KALA-0020_0.289.jpg

Kalaupapa National Historical Park

ROUTE 0021: BAYVIEW LOOP

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.16	**Section Length (MI)**	0.16					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	73	73					
Surface Condition Rating (SCR)	73	73					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	73	73					
Longitudinal Crack Index	90	90					
Transverse Cracking Index	73	73					
Patching Index	73	73					
Rutting Index	90	90					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	12	12					
Lane Width (ft)	12	12					

Kalaupapa National Historical Park

ROUTE 0021: BAYVIEW LOOP

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0021_0.013.jpg

KALA_0021_0.034.jpg

KALA_0021_0.068.jpg

KALA_0021_0.097.jpg

KALA_0021_0.122.jpg

KALA_0021_0.144.jpg

Kalaupapa National Historical Park

ROUTE 0022ZZ: HALEAKALA STREET

Summary Route

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

Note: The weighted average summary PCR value is calculated from only the sections of road where the PCR was collected. The overall PCR for the summary route may not reflect individual subcomponent ratings.

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

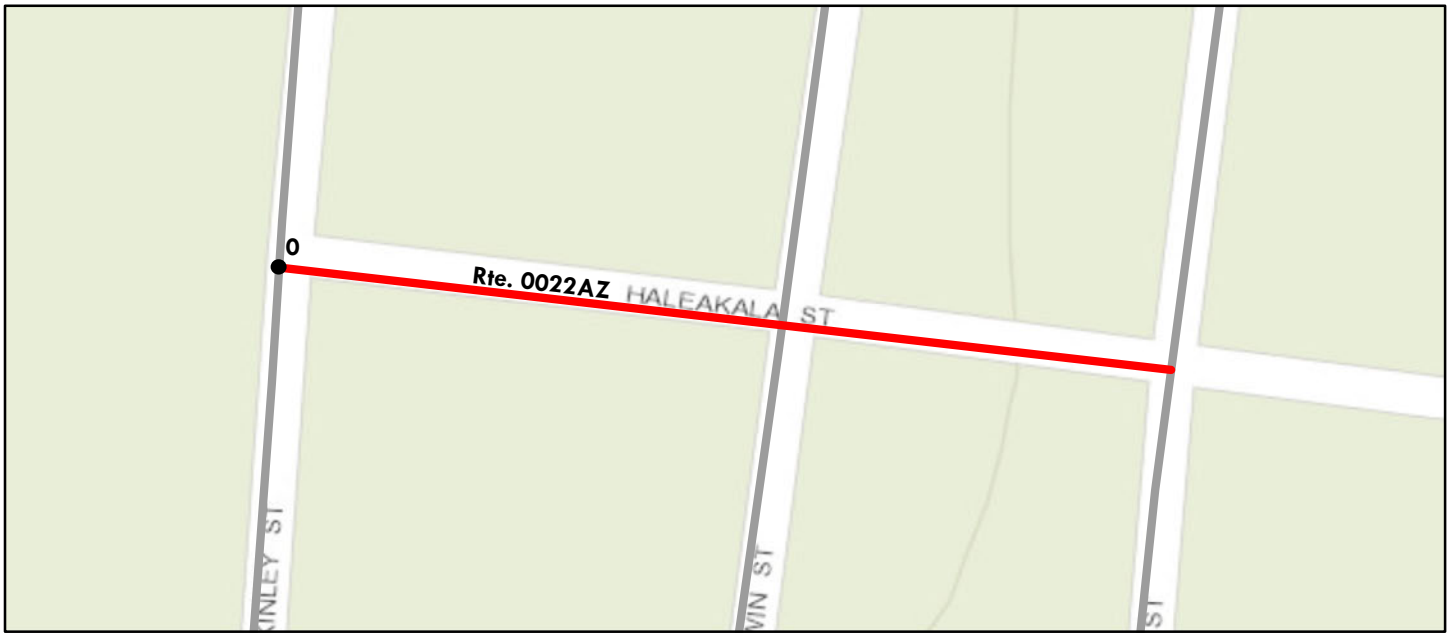
Inspection Date: 3/15/2022	
Paved Length (Miles): 0.21	
Surface Type: ASPHALT and GRAVEL	**Route Summary**
Roadway Condition Information	
Pavement Condition Rating (PCR)	53
Lane & Width Information	
Number of Lanes	1
Paved Width (ft)	11
Lane Width (ft)	11

Kalaupapa National Historical Park

ROUTE 0022AZ: HALEAKALA STREET PAVED

Subcomponent of Route KALA-0022ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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:	3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles):	0.07	**Section Length (MI)**	0.07				
Surface Type:	ASPHALT	**Route Summary**					
Roadway Condition Information							
Pavement Condition Rating (PCR)		53	53				
Surface Condition Rating (SCR)		53	53				
Roughness Condition Index (RCI)		N/A	N/A				
Distress Index Values							
Structural Crack Index		N/A	N/A				
Alligator Crack Index		73	73				
Longitudinal Crack Index		53	53				
Transverse Cracking Index		73	73				
Patching Index		97	97				
Rutting Index		97	97				
International Roughness Index (IRI)		N/A	N/A				
Lane & Width Information							
Number of Lanes		1	1				
Paved Width (ft)		11	11				
Lane Width (ft)		11	11				

Kalaupapa National Historical Park

ROUTE 0022AZ: HALEAKALA STREET PAVED

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0022AZ_0.006.jpg

KALA_0022AZ_0.020.jpg

KALA_0022AZ_0.033.jpg

KALA_0022AZ_0.036.jpg

KALA_0022AZ_0.044.jpg

KALA_0022AZ_0.063.jpg

Kalaupapa National Historical Park

ROUTE 0022BZ: HALEAKALA STREET UNPAVED

Manual Rating

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

Route Condition Legend

Poor (1)	Poor (2)	Fair (3)	Good (4)	Excellent (5)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 0.067 **Surface Type:** GR

Condition Summary Table for KALA-0022BZ

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	0.07	0.07	1	11.0	11.0	Heavy Rehabilitation	$ 10,720	2	Med	Med	High	High
Route Level Data:		0.07	1	11.0	11.00	Heavy Rehabilitation	$ 10,720	2	Med	Med	High	High

Kalaupapa National Historical Park

ROUTE 0022BZ : HALEAKALA STREET UNPAVED

Condition Photos

KALA-0022BZ_0.006.jpg

KALA-0022BZ_0.014.jpg

KALA-0022BZ_0.020.jpg

KALA-0022BZ_0.027.jpg

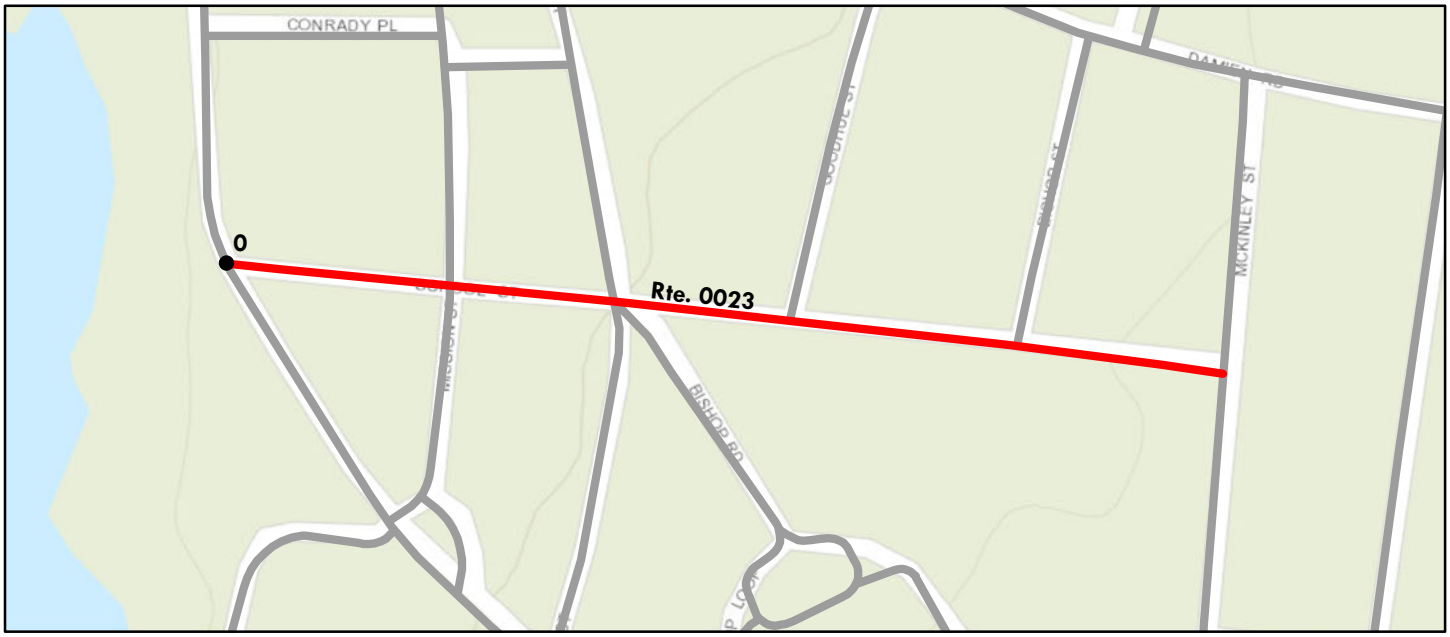
KALA-0022BZ_0.044.jpg

KALA-0022BZ_0.061.jpg

Kalaupapa National Historical Park

ROUTE 0023: SCHOOL STREET

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles): 0.23	**Section Length (MI)**	0.23				
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	53	53				
Surface Condition Rating (SCR)	53	53				
Roughness Condition Index (RCI)	N/A	N/A				
Distress Index Values						
Structural Crack Index	N/A	N/A				
Alligator Crack Index	73	73				
Longitudinal Crack Index	73	73				
Transverse Cracking Index	53	53				
Patching Index	73	73				
Rutting Index	97	97				
International Roughness Index (IRI)	N/A	N/A				
Lane & Width Information						
Number of Lanes	1	1				
Paved Width (ft)	12	12				
Lane Width (ft)	12	12				

Kalaupapa National Historical Park

ROUTE 0023: SCHOOL STREET

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0023_0.014.jpg

KALA_0023_0.032.jpg

KALA_0023_0.073.jpg

KALA_0023_0.106.jpg

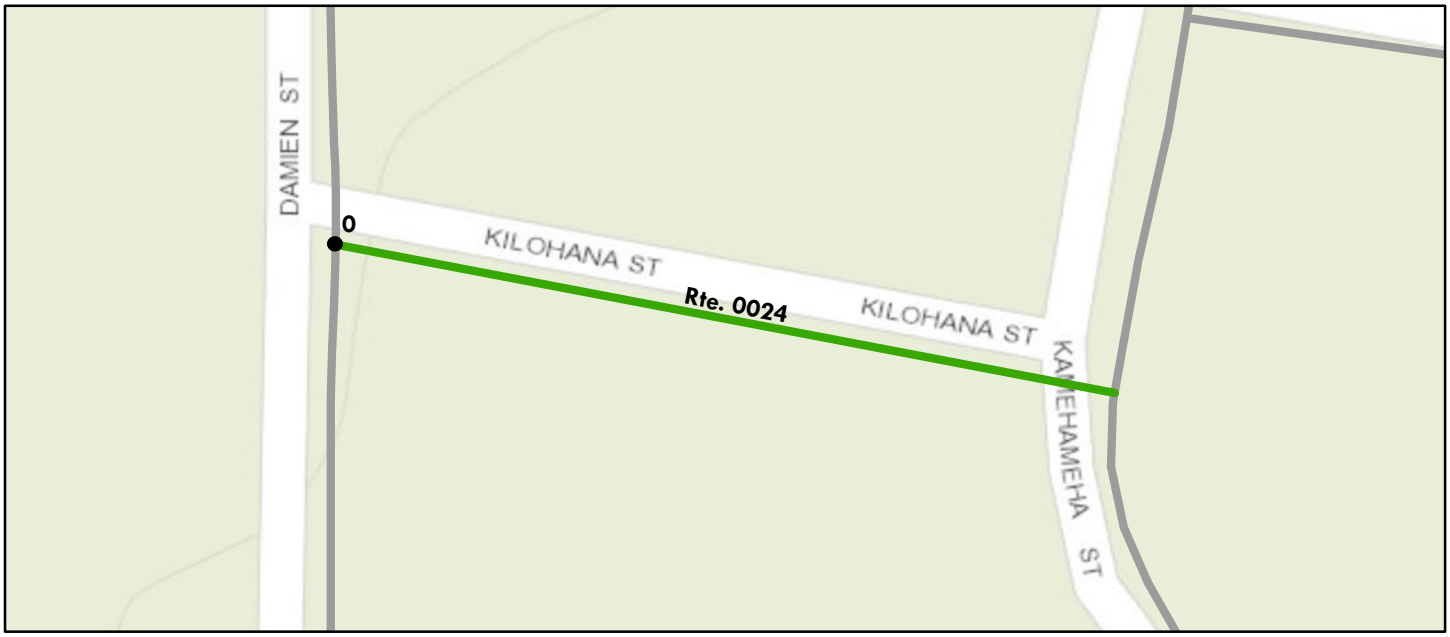
KALA_0023_0.168.jpg

KALA_0023_0.219.jpg

Kalaupapa National Historical Park

ROUTE 0024: KILOHANA STREET

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.06	**Section Length (MI)**	0.06					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	90	90					
Surface Condition Rating (SCR)	90	90					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	97	97					
Longitudinal Crack Index	97	97					
Transverse Cracking Index	90	90					
Patching Index	90	90					
Rutting Index	97	97					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	12	12					
Lane Width (ft)	12	12					

Kalaupapa National Historical Park

ROUTE 0024: KILOHANA STREET

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0024_0.003.jpg

KALA_0024_0.005.jpg

KALA_0024_0.013.jpg

KALA_0024_0.023.jpg

KALA_0024_0.034.jpg

KALA_0024_0.046.jpg

Kalaupapa National Historical Park

ROUTE 0025ZZ: BISHOP ROAD

Summary Route

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

Note: The weighted average summary PCR value is calculated from only the sections of road where the PCR was collected. The overall PCR for the summary route may not reflect individual subcomponent ratings.

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

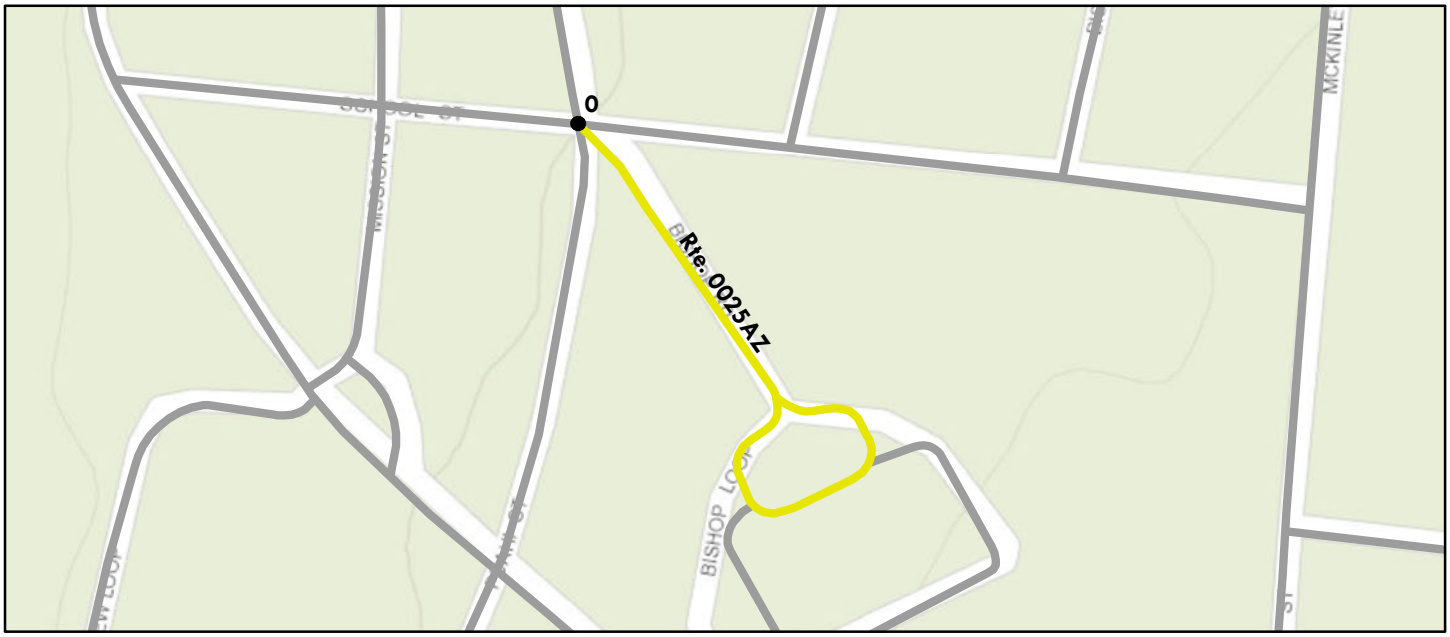
Inspection Date: 3/15/2022							
Paved Length (Miles): 0.27							
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	73						
Lane & Width Information							
Number of Lanes	1						
Paved Width (ft)	15.3						
Lane Width (ft)	10.4						

Kalaupapa National Historical Park

ROUTE 0025AZ: BISHOP ROAD (FRONT LOOP)

Subcomponent of Route KALA-0025ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles): 0.15	**Section Length (MI)**	0.15				
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	73	73				
Surface Condition Rating (SCR)	73	73				
Roughness Condition Index (RCI)	N/A	N/A				
Distress Index Values						
Structural Crack Index	N/A	N/A				
Alligator Crack Index	90	90				
Longitudinal Crack Index	73	73				
Transverse Cracking Index	73	73				
Patching Index	97	97				
Rutting Index	97	97				
International Roughness Index (IRI)	N/A	N/A				
Lane & Width Information						
Number of Lanes	2	2				
Paved Width (ft)	18	18				
Lane Width (ft)	9	9				

Kalaupapa National Historical Park

ROUTE 0025AZ: BISHOP ROAD (FRONT LOOP)

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0025AZ_0.000.jpg

KALA_0025AZ_0.019.jpg

KALA_0025AZ_0.056.jpg

KALA_0025AZ_0.078.jpg

KALA_0025AZ_0.110.jpg

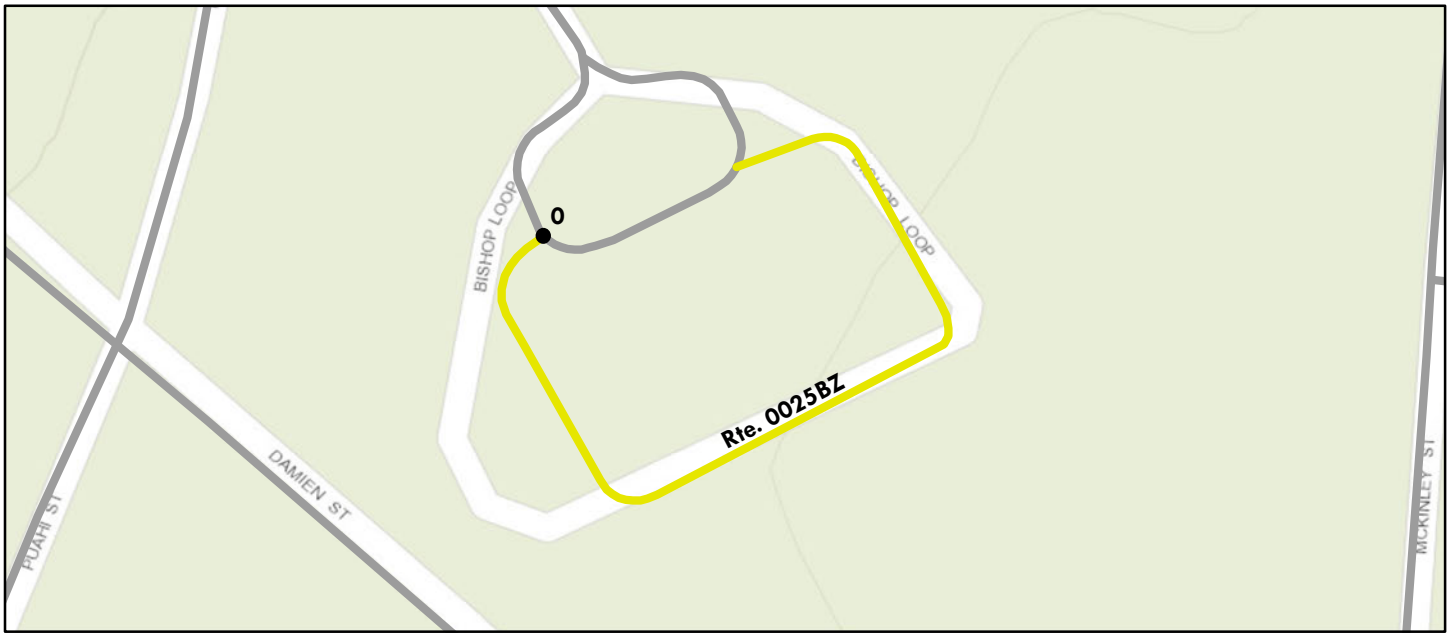
KALA_0025AZ_0.133.jpg

Kalaupapa National Historical Park

ROUTE 0025BZ: BISHOP ROAD (BACK LOOP)

Subcomponent of Route KALA-0025ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles): 0.12	**Section Length (MI)**	0.12				
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	73	73				
Surface Condition Rating (SCR)	73	73				
Roughness Condition Index (RCI)	N/A	N/A				
Distress Index Values						
Structural Crack Index	N/A	N/A				
Alligator Crack Index	90	90				
Longitudinal Crack Index	90	90				
Transverse Cracking Index	73	73				
Patching Index	97	97				
Rutting Index	97	97				
International Roughness Index (IRI)	N/A	N/A				
Lane & Width Information						
Number of Lanes	1	1				
Paved Width (ft)	12	12				
Lane Width (ft)	12	12				

Kalaupapa National Historical Park

ROUTE 0025BZ: BISHOP ROAD (BACK LOOP)

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0025BZ_0.000.jpg

KALA_0025BZ_0.016.jpg

KALA_0025BZ_0.048.jpg

KALA_0025BZ_0.077.jpg

KALA_0025BZ_0.095.jpg

KALA_0025BZ_0.112.jpg

Kalaupapa National Historical Park

ROUTE 0026ZZ: CONRADY PLACE AND MISSION / PUAHI CONNECTOR

Summary Route

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

Note: The weighted average summary PCR value is calculated from only the sections of road where the PCR was collected. The overall PCR for the summary route may not reflect individual subcomponent ratings.

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:	3/15/2022
Paved Length (Miles):	0.08
Surface Type:	ASPHALT
Roadway Condition Information	
Pavement Condition Rating (PCR)	90
Lane & Width Information	
Number of Lanes	1
Paved Width (ft)	14.8
Lane Width (ft)	11.3

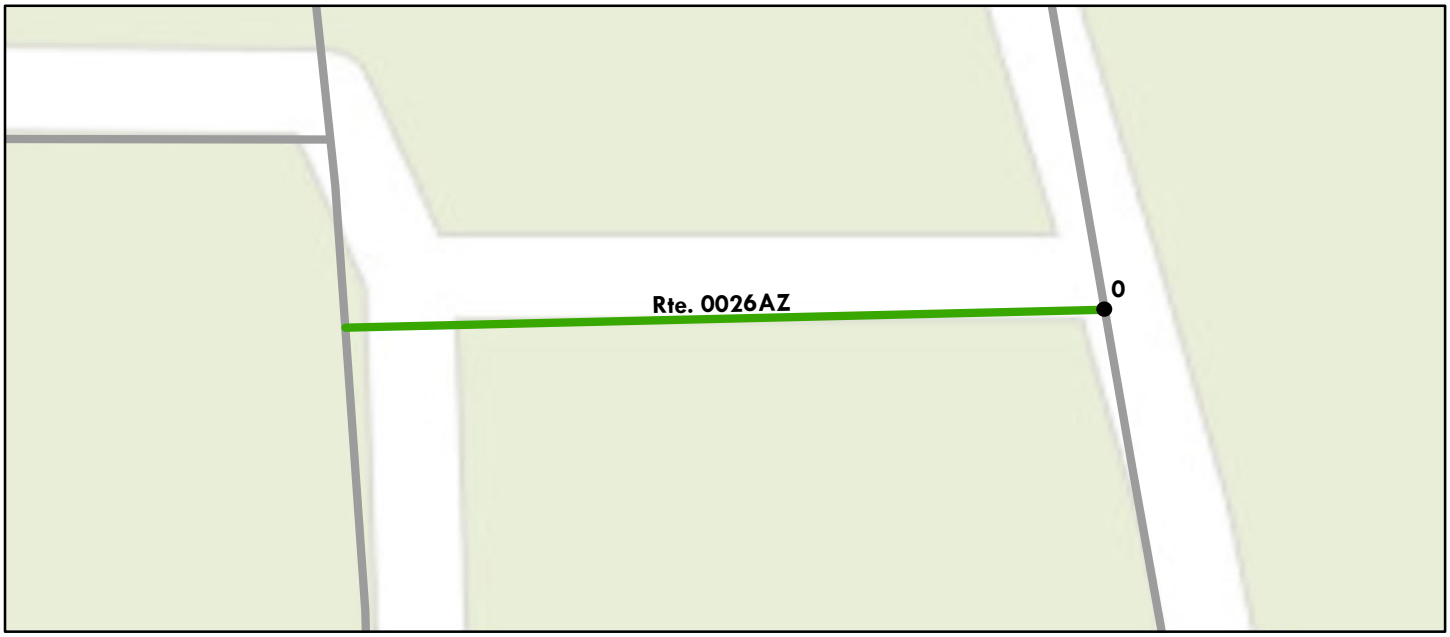
Route Summary

Kalaupapa National Historical Park

ROUTE 0026AZ: MISSION / PUAHI CONNECTOR

Subcomponent of Route KALA-0026ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles): 0.03	**Section Length (MI)**	0.03				
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	90	90				
Surface Condition Rating (SCR)	90	90				
Roughness Condition Index (RCI)	N/A	N/A				
Distress Index Values						
Structural Crack Index	N/A	N/A				
Alligator Crack Index	97	97				
Longitudinal Crack Index	90	90				
Transverse Cracking Index	90	90				
Patching Index	97	97				
Rutting Index	97	97				
International Roughness Index (IRI)	N/A	N/A				
Lane & Width Information						
Number of Lanes	2	2				
Paved Width (ft)	20	20				
Lane Width (ft)	10	10				

Kalaupapa National Historical Park

ROUTE 0026AZ: MISSION / PUAHI CONNECTOR

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0026AZ_0.001.jpg

KALA_0026AZ_0.005.jpg

KALA_0026AZ_0.012.jpg

KALA_0026AZ_0.016.jpg

KALA_0026AZ_0.019.jpg

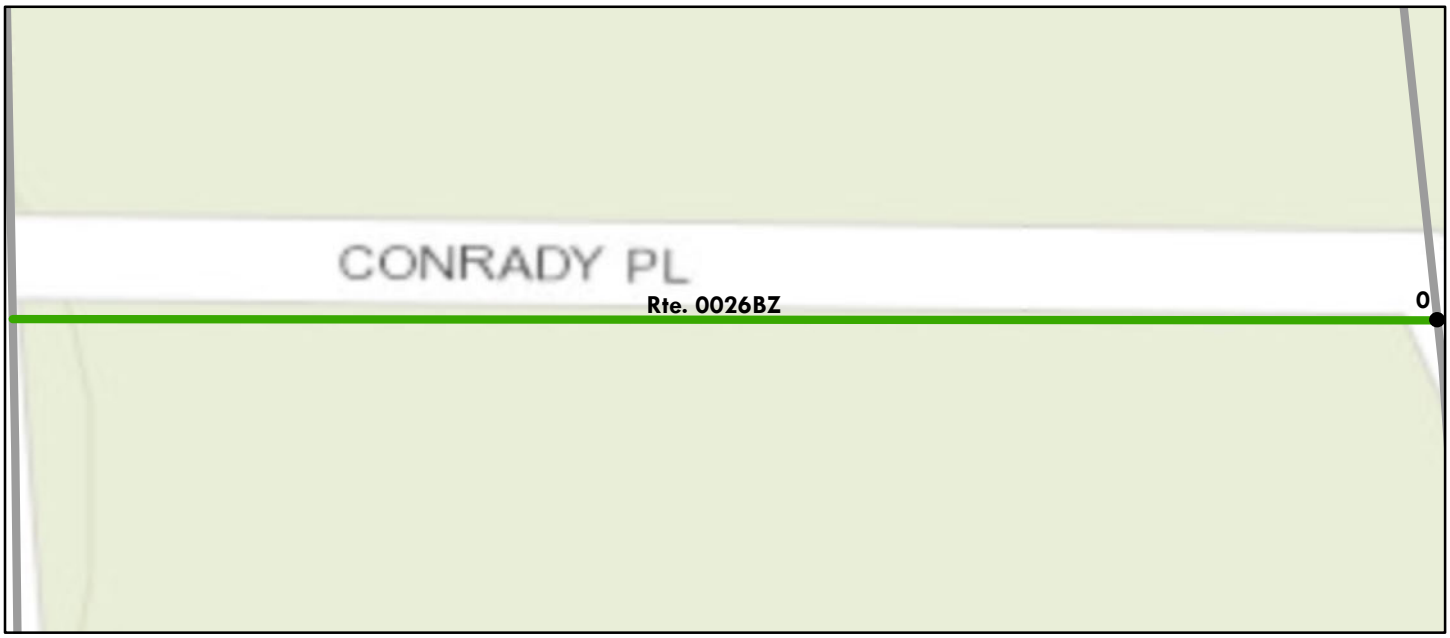
KALA_0026AZ_0.025.jpg

Kalaupapa National Historical Park

ROUTE 0026BZ: CONRADY PLACE

Subcomponent of Route KALA-0026ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.06	**Section Length (MI)**	0.06					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	90	90					
Surface Condition Rating (SCR)	90	90					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	97	97					
Longitudinal Crack Index	90	90					
Transverse Cracking Index	90	90					
Patching Index	97	97					
Rutting Index	97	97					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	12	12					
Lane Width (ft)	12	12					

Kalaupapa National Historical Park

ROUTE 0026BZ: CONRADY PLACE

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0026BZ_0.003.jpg

KALA_0026BZ_0.011.jpg

KALA_0026BZ_0.025.jpg

KALA_0026BZ_0.037.jpg

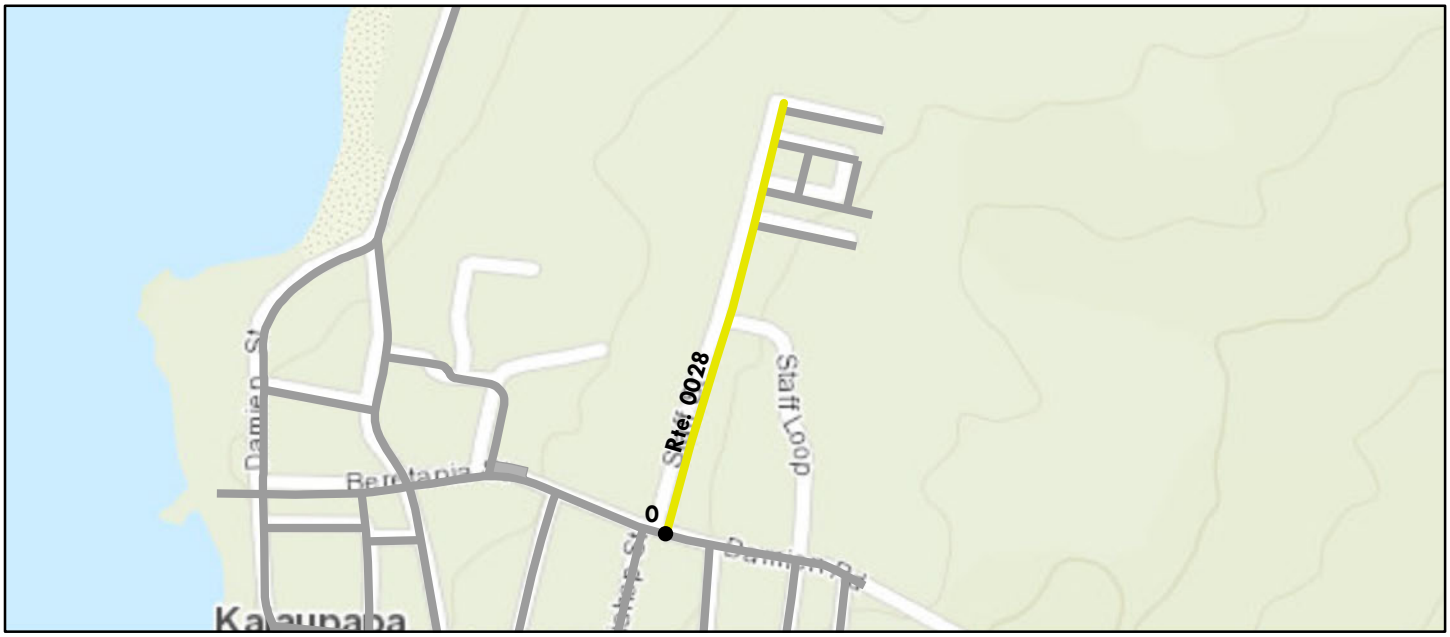
KALA_0026BZ_0.044.jpg

KALA_0026BZ_0.049.jpg

Kalaupapa National Historical Park

ROUTE 0028: STAFF STREET (STAFF ROW)

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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:	3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles):	0.26	**Section Length (MI)**	0.26				
Surface Type:	ASPHALT	**Route Summary**					
Roadway Condition Information							
Pavement Condition Rating (PCR)		73	73				
Surface Condition Rating (SCR)		73	73				
Roughness Condition Index (RCI)		N/A	N/A				
Distress Index Values							
Structural Crack Index		N/A	N/A				
Alligator Crack Index		90	90				
Longitudinal Crack Index		73	73				
Transverse Cracking Index		73	73				
Patching Index		90	90				
Rutting Index		97	97				
International Roughness Index (IRI)		N/A	N/A				
Lane & Width Information							
Number of Lanes		2	2				
Paved Width (ft)		16	16				
Lane Width (ft)		8	8				

Kalaupapa National Historical Park

ROUTE 0028: STAFF STREET (STAFF ROW)

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0028_0.026.jpg

KALA_0028_0.074.jpg

KALA_0028_0.118.jpg

KALA_0028_0.160.jpg

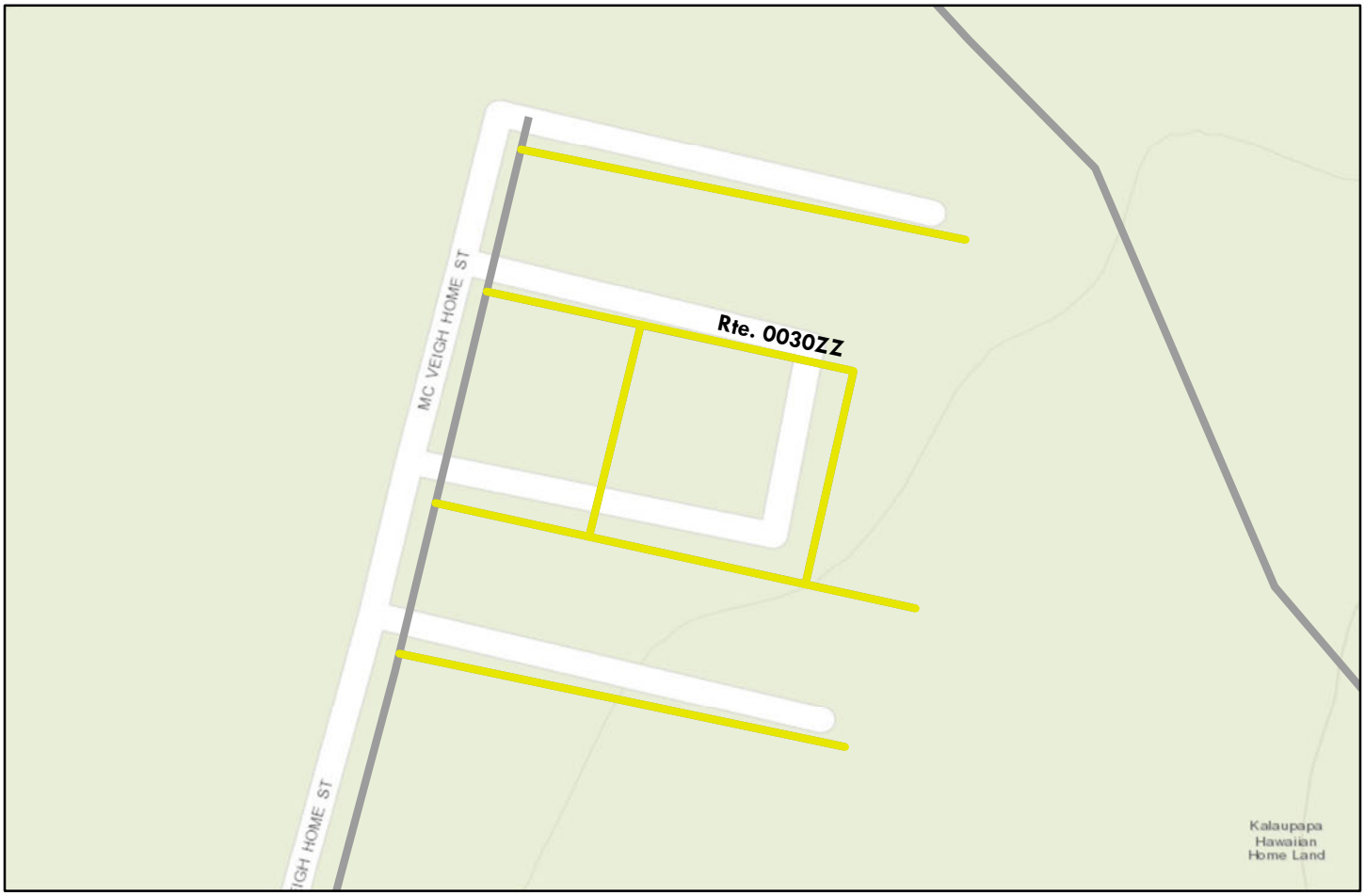
KALA_0028_0.210.jpg

KALA_0028_0.251.jpg

Kalaupapa National Historical Park

ROUTE 0030ZZ: MCVEIGH HOME STREETS

Summary Route



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

Note: The weighted average summary PCR value is calculated from only the sections of road where the PCR was collected. The overall PCR for the summary route may not reflect individual subcomponent ratings.

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:	3/15/2022
Paved Length (Miles):	0.27
Surface Type:	ASPHALT
Roadway Condition Information	
Pavement Condition Rating (PCR)	84
Lane & Width Information	
Number of Lanes	1
Paved Width (ft)	11.2
Lane Width (ft)	11.2

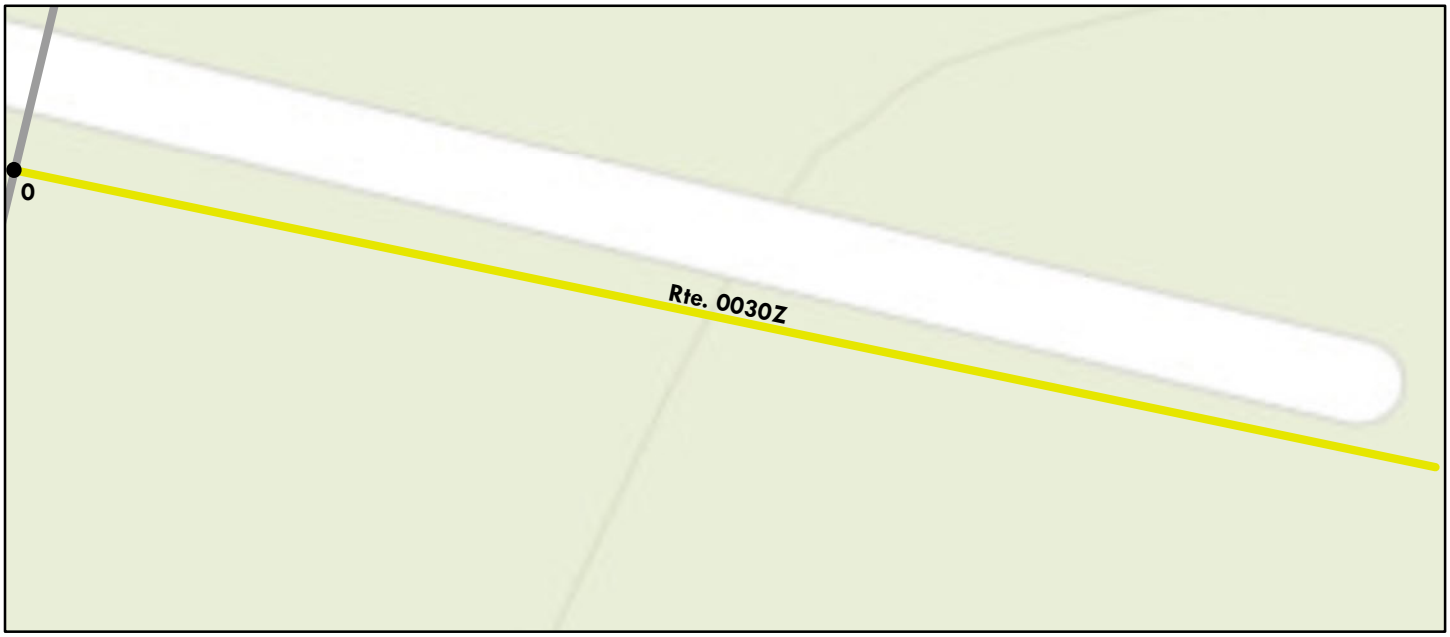
Route Summary

Kalaupapa National Historical Park

ROUTE 0030Z: MCVEIGH STREET A

Subcomponent of Route KALA-0030ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.06	**Section Length (MI)**	0.06					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	73	73					
Surface Condition Rating (SCR)	73	73					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	90	90					
Longitudinal Crack Index	73	73					
Transverse Cracking Index	73	73					
Patching Index	73	73					
Rutting Index	97	97					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	11	11					
Lane Width (ft)	11	11					

Kalaupapa National Historical Park

ROUTE 0030Z: MCVEIGH STREET A

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0030Z_0.003.jpg

KALA_0030Z_0.012.jpg

KALA_0030Z_0.027.jpg

KALA_0030Z_0.041.jpg

KALA_0030Z_0.049.jpg

KALA_0030Z_0.056.jpg

Kalaupapa National Historical Park

ROUTE 0031Z: MCVEIGH STREET B

Subcomponent of Route KALA-0030ZZ

Manual Rating

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.06	**Section Length (MI)**	0.06					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	90	90					
Surface Condition Rating (SCR)	90	90					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	97	97					
Longitudinal Crack Index	97	97					
Transverse Cracking Index	90	90					
Patching Index	97	97					
Rutting Index	97	97					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	12	12					
Lane Width (ft)	12	12					

Kalaupapa National Historical Park

ROUTE 0031Z: MCVEIGH STREET B

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0031Z_0.012.jpg

KALA_0031Z_0.023.jpg

KALA_0031Z_0.035.jpg

KALA_0031Z_0.042.jpg

KALA_0031Z_0.051.jpg

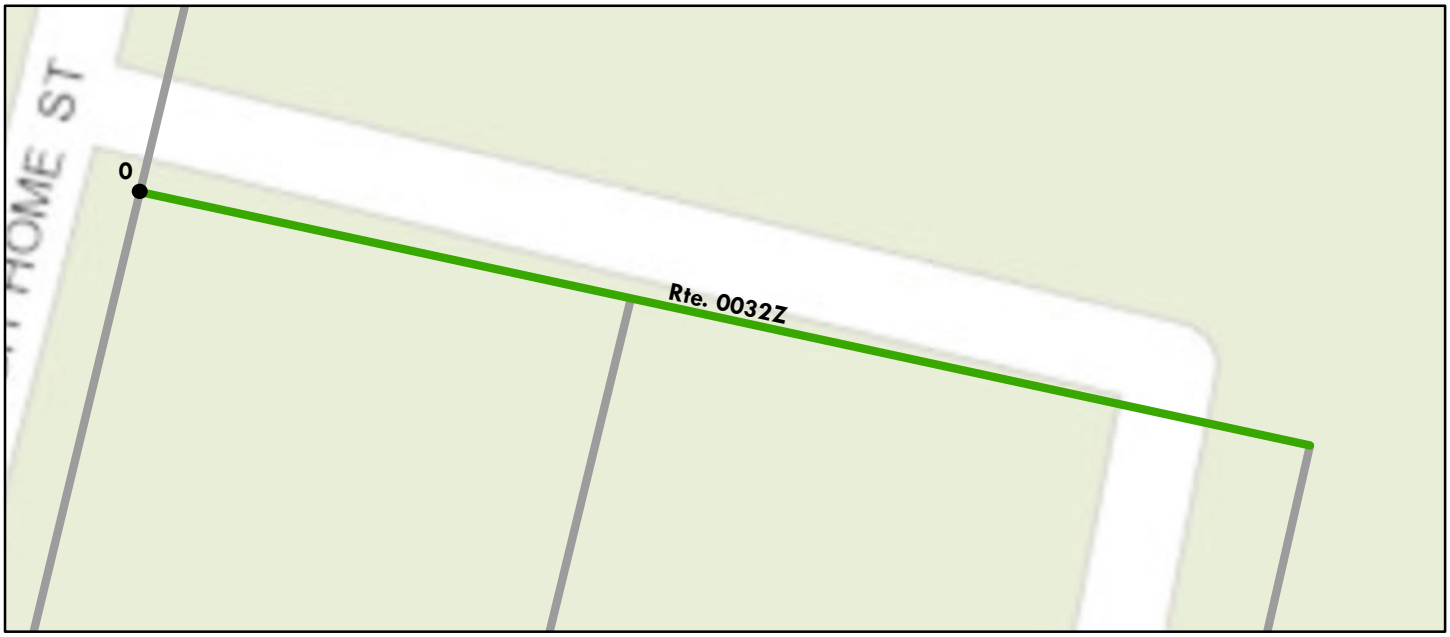
KALA_0031Z_0.056.jpg

Kalaupapa National Historical Park

ROUTE 0032Z: MCVEIGH STREET C

Subcomponent of Route KALA-0030ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.05	**Section Length (MI)**	0.05					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	90	90					
Surface Condition Rating (SCR)	90	90					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	97	97					
Longitudinal Crack Index	90	90					
Transverse Cracking Index	90	90					
Patching Index	90	90					
Rutting Index	97	97					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	11	11					
Lane Width (ft)	11	11					

Kalaupapa National Historical Park

ROUTE 0032Z: MCVEIGH STREET C

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0032Z_0.007.jpg

KALA_0032Z_0.014.jpg

KALA_0032Z_0.022.jpg

KALA_0032Z_0.028.jpg

KALA_0032Z_0.038.jpg

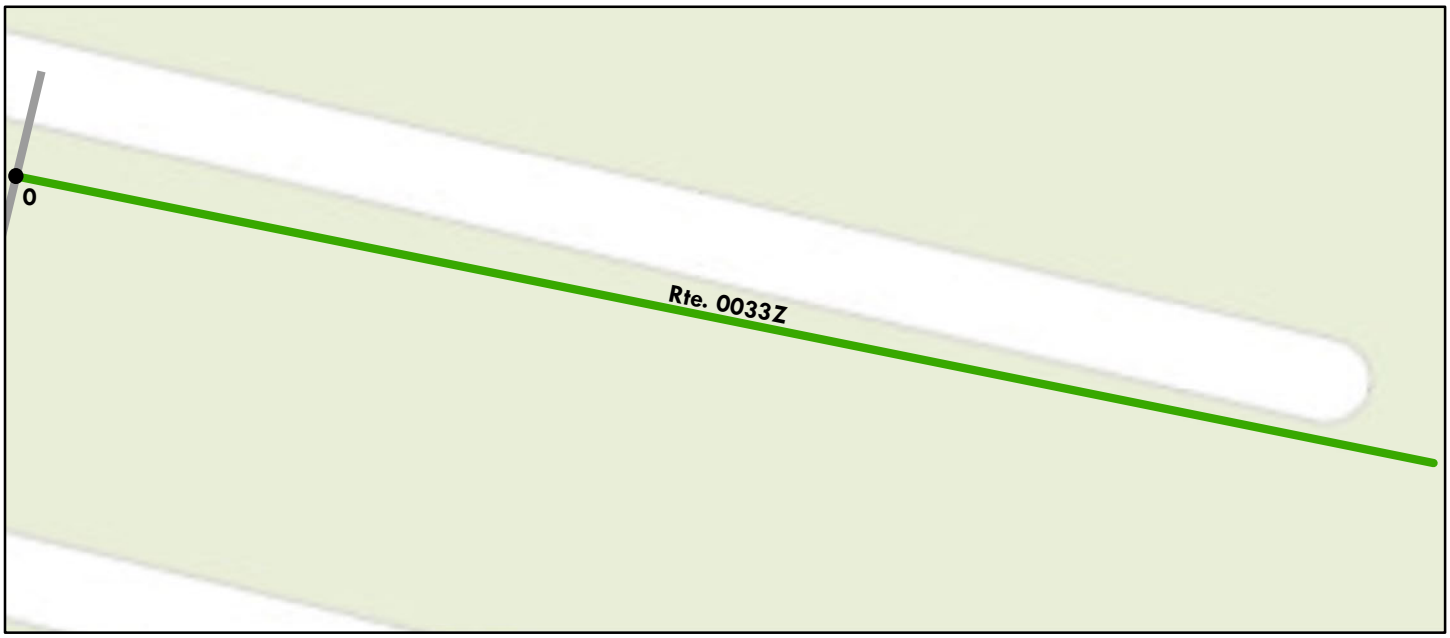
KALA_0032Z_0.045.jpg

Kalaupapa National Historical Park

ROUTE 0033Z: MCVEIGH STREET D

Subcomponent of Route KALA-0030ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.06	**Section Length (MI)**	0.06					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	90	90					
Surface Condition Rating (SCR)	90	90					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	90	90					
Longitudinal Crack Index	90	90					
Transverse Cracking Index	97	97					
Patching Index	97	97					
Rutting Index	97	97					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	12	12					
Lane Width (ft)	12	12					

Kalaupapa National Historical Park

ROUTE 0033Z: MCVEIGH STREET D

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0033Z_0.011.jpg

KALA_0033Z_0.021.jpg

KALA_0033Z_0.028.jpg

KALA_0033Z_0.035.jpg

KALA_0033Z_0.042.jpg

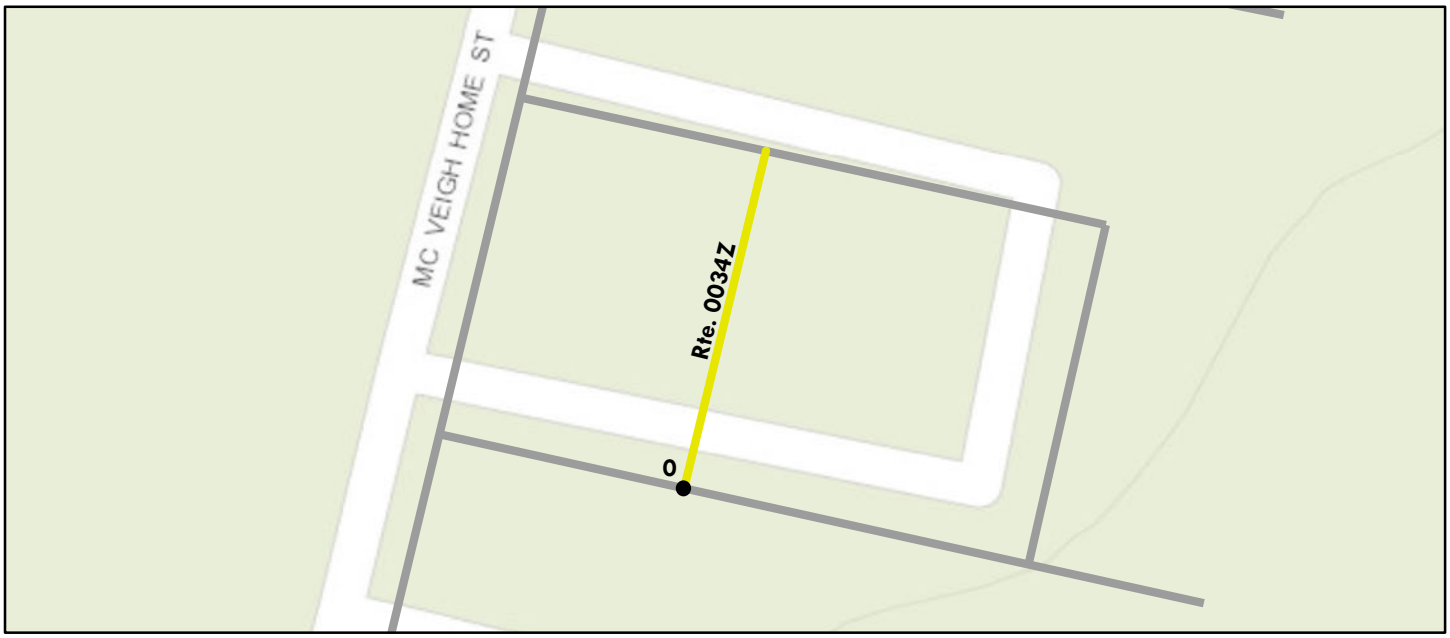
KALA_0033Z_0.047.jpg

Kalaupapa National Historical Park

ROUTE 0034Z: MCVEIGH STREET E

Subcomponent of Route KALA-0030ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles): 0.03	**Section Length (MI)**	0.03				
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	73	73				
Surface Condition Rating (SCR)	73	73				
Roughness Condition Index (RCI)	N/A	N/A				
Distress Index Values						
Structural Crack Index	N/A	N/A				
Alligator Crack Index	97	97				
Longitudinal Crack Index	90	90				
Transverse Cracking Index	73	73				
Patching Index	97	97				
Rutting Index	97	97				
International Roughness Index (IRI)	N/A	N/A				
Lane & Width Information						
Number of Lanes	1	1				
Paved Width (ft)	10	10				
Lane Width (ft)	10	10				

Kalaupapa National Historical Park

ROUTE 0034Z: MCVEIGH STREET E

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0034Z_0.008.jpg

KALA_0034Z_0.012.jpg

KALA_0034Z_0.017.jpg

KALA_0034Z_0.020.jpg

KALA_0034Z_0.023.jpg

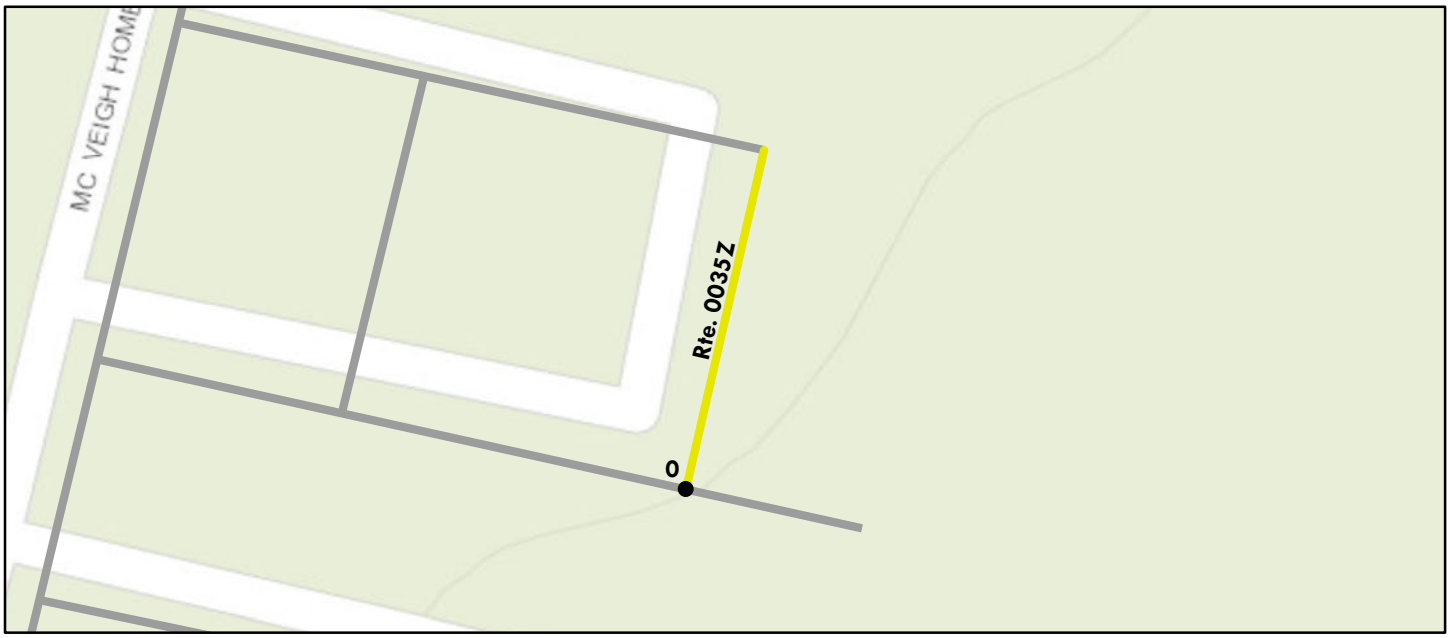
KALA_0034Z_0.025.jpg

Kalaupapa National Historical Park

ROUTE 0035Z: MCVEIGH STREET F

Subcomponent of Route KALA-0030ZZ

Manual Rating



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00					
Paved Length (Miles): 0.03	**Section Length (MI)**	0.03					
Surface Type: ASPHALT	**Route Summary**						
Roadway Condition Information							
Pavement Condition Rating (PCR)	73	73					
Surface Condition Rating (SCR)	73	73					
Roughness Condition Index (RCI)	N/A	N/A					
Distress Index Values							
Structural Crack Index	N/A	N/A					
Alligator Crack Index	97	97					
Longitudinal Crack Index	90	90					
Transverse Cracking Index	73	73					
Patching Index	97	97					
Rutting Index	97	97					
International Roughness Index (IRI)	N/A	N/A					
Lane & Width Information							
Number of Lanes	1	1					
Paved Width (ft)	10	10					
Lane Width (ft)	10	10					

Kalaupapa National Historical Park

ROUTE 0035Z: MCVEIGH STREET F

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0035Z_0.001.jpg

KALA_0035Z_0.011.jpg

KALA_0035Z_0.015.jpg

KALA_0035Z_0.017.jpg

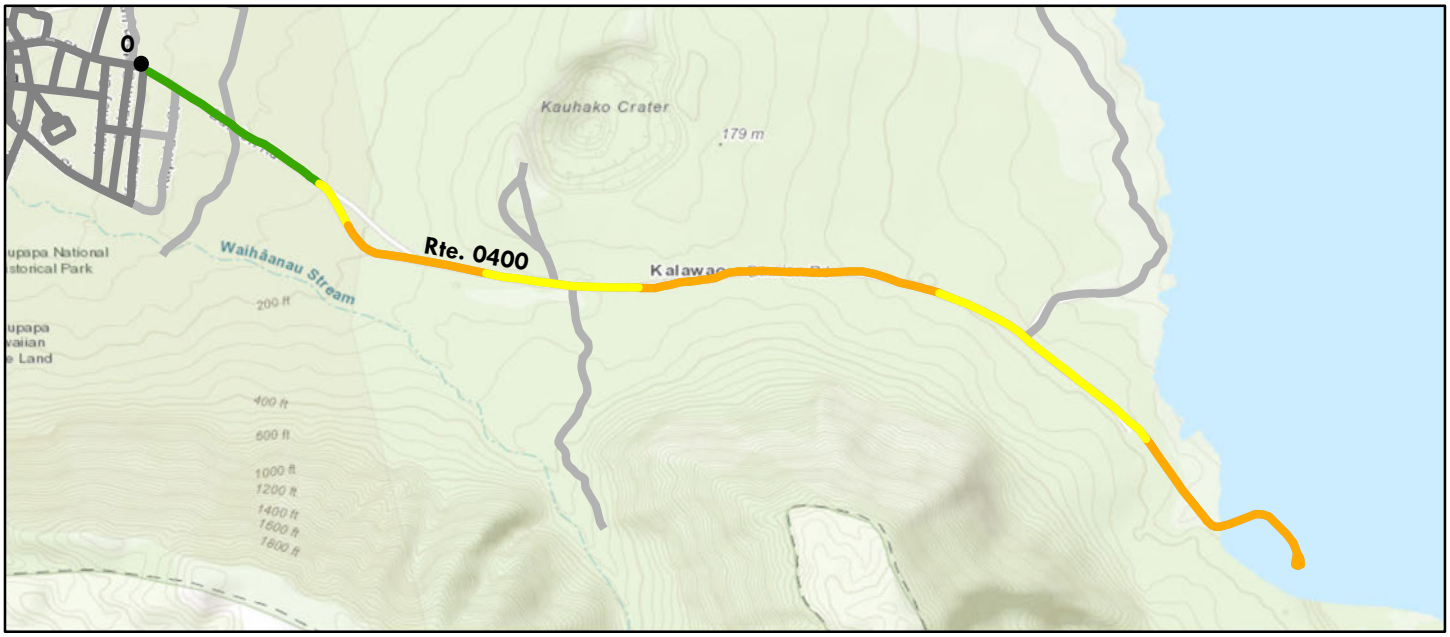
KALA_0035Z_0.021.jpg

KALA_0035Z_0.026.jpg

Kalaupapa National Historical Park

ROUTE 0400: DAMIEN ROAD

Manual Rating



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

Route Condition Legend

Poor (1)	Poor (2)	Fair (3)	Good (4)	Excellent (5)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 2.68 **Surface Type:** GR

Condition Summary Table for KALA-0400

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	1.00	1.00	2	8.0	16.0	Heavy Rehabilitation	$ 160,000	2	Med	Med	Med	Med
1.00	2.00	1.00	2	8.0	16.0	Heavy Rehabilitation	$ 160,000	2	Med	Med	Med	Med
2.00	2.68	0.68	2	9.6	14.4	Light Rehabilitation	$ 68,000	3	Med	Med	Low	Med
Route Level Data:	2.68	2	8.4	15.60	Heavy Rehabilitation	$ 388,000	2	Med	Med	Med	Med	

Kalaupapa National Historical Park
ROUTE 0400 : DAMIEN ROAD

Condition Photos

KALA-0400_0.012.jpg

KALA-0400_0.356.jpg

KALA-0400_0.621.jpg

KALA-0400_1.285.jpg

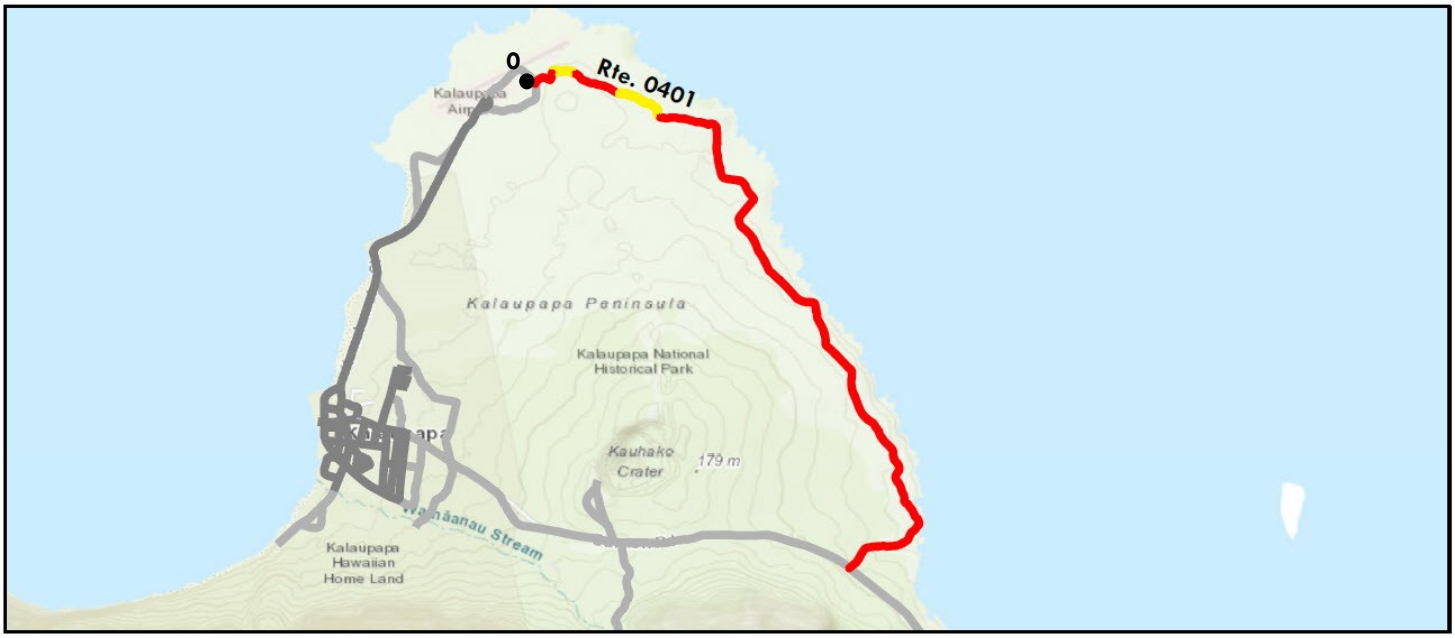
KALA-0400_1.794.jpg

KALA-0400_2.335.jpg

Kalaupapa National Historical Park

ROUTE 0401: COASTAL ROAD

Manual Rating



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

Route Condition Legend

Poor (1)	Fair (2)	Good (3)	Excellent (4)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 3.153 **Surface Type:** NV

Condition Summary Table for KALA-0401

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	1.00	1.00	1	10.0	10.0	Heavy Rehabilitation	$ 40,000	1	Med	Med	Med	High
1.00	2.00	1.00	1	10.0	10.0	Heavy Rehabilitation	$ 40,000	1	Med	Med	Med	High
2.00	3.00	1.00	1	10.0	10.0	Heavy Rehabilitation	$ 40,000	1	Med	High	Med	High
3.00	3.15	0.15	1	10.0	10.0	Heavy Rehabilitation	$ 6,120	1	Med	High	Med	High
Route Level Data:	3.15	1	10.0	10.00	Heavy Rehabilitation	$ 126,120	1	Med	High	Med	High	

Kalaupapa National Historical Park
ROUTE 0401 : COASTAL ROAD

Condition Photos

KALA-0401_0.013.jpg

KALA-0401_0.484.jpg

KALA-0401_1.608.jpg

KALA-0401_2.049.jpg

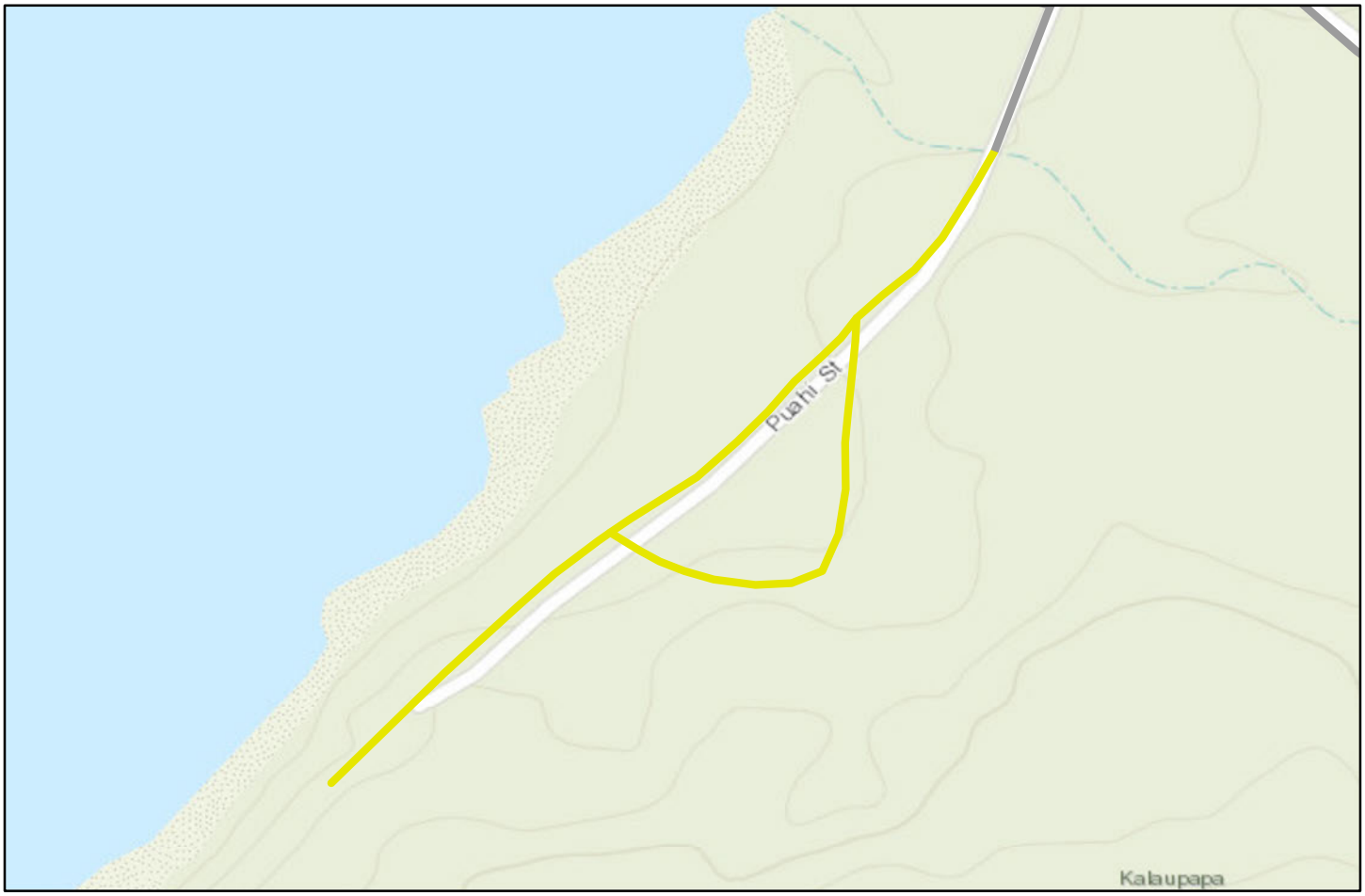
KALA-0401_2.918.jpg

KALA-0401_3.285.jpg

Kalaupapa National Historical Park

ROUTE 0402ZZ: TRAIL ACCESS ROADS

Summary Route



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

Note: The weighted average summary PCR value is calculated from only the sections of road where the PCR was collected. The overall PCR for the summary route may not reflect individual subcomponent ratings.

Route Condition Legend – Pavement Condition Rating (PCR)

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

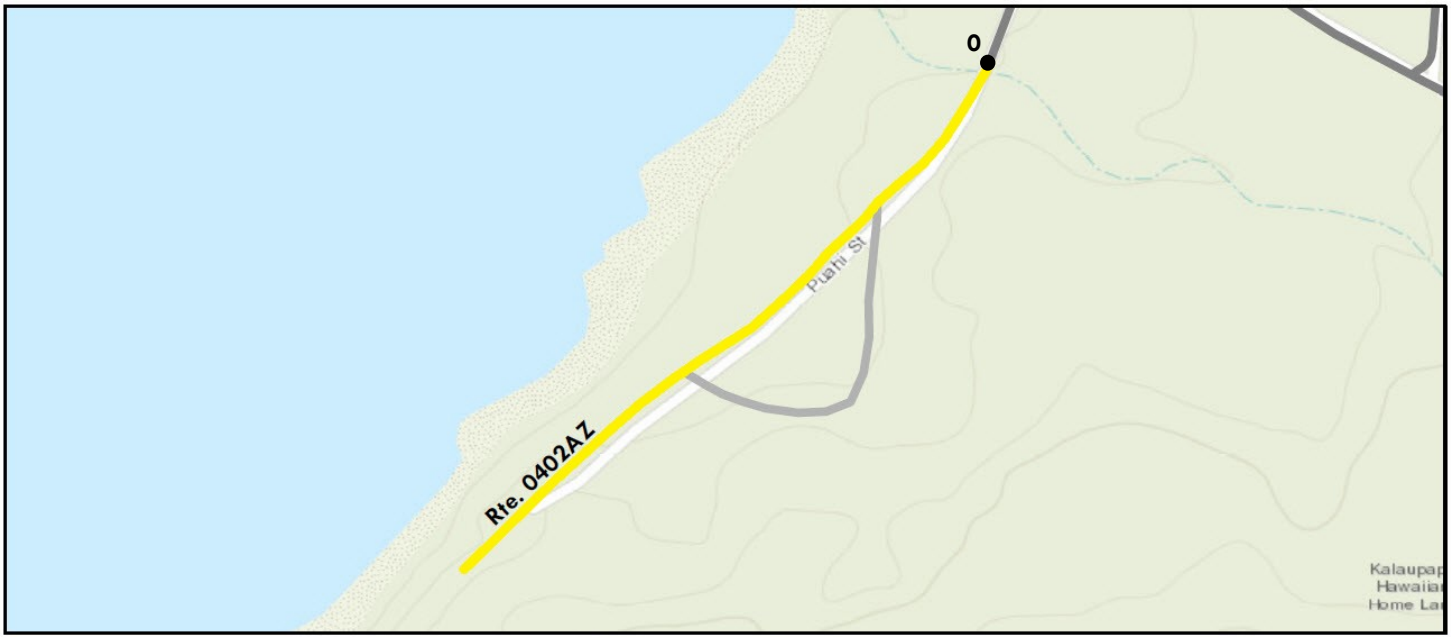
See Appendix for definitions and formulas

	Route Summary
Inspection Date: 3/15/2022	
Paved Length (Miles): 0.48	
Surface Type: NATIVE	
Roadway Condition Information	
Pavement Condition Rating (PCR)	N/A
Lane & Width Information	
Number of Lanes	1
Paved Width (ft)	10
Lane Width (ft)	10

Kalaupapa National Historical Park

ROUTE 0402AZ: TRAIL ACCESS ROAD

Manual Rating



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

Route Condition Legend

Poor (1) | Fair (2) | Good (3) | Excellent (4) | Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 0.311 **Surface Type:** NV

Condition Summary Table for KALA-0402AZ

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	0.31	0.31	1	10.0	10.0	Light Rehabilitation	$ 3,110	2	Med	High	Med	Med
Route Level Data:		0.31	1	10.0	10.00	Light Rehabilitation	$ 3,110	2	Med	High	Med	Med

Kalaupapa National Historical Park
ROUTE 0402AZ : TRAIL ACCESS ROAD

Condition Photos

KALA-0402AZ_0.001.jpg

KALA-0402AZ_0.060.jpg

KALA-0402AZ_0.109.jpg

KALA-0402AZ_0.182.jpg

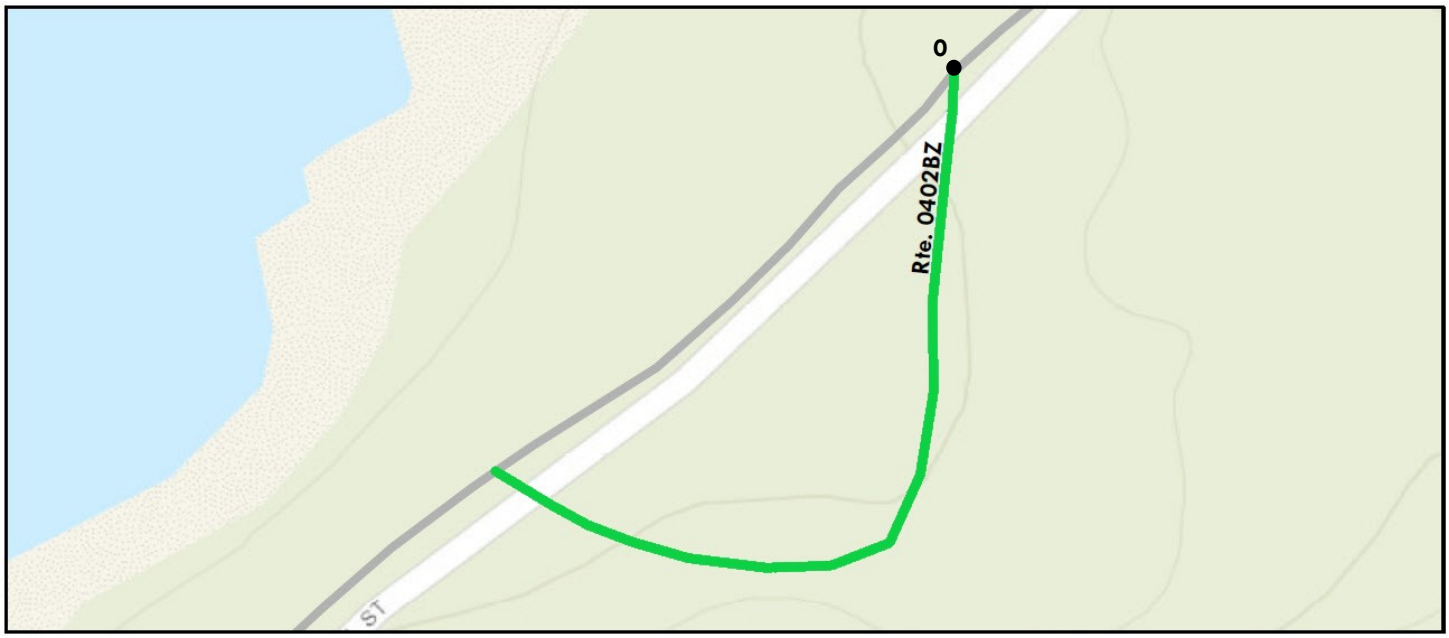
KALA-0402AZ_0.256.jpg

KALA-0402AZ_0.309.jpg

Kalaupapa National Historical Park

ROUTE 0402BZ: TRAIL ACCESS SPUR

Manual Rating



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

Route Condition Legend

Poor (1) | Fair (2) | Good (3) | Excellent (4) | Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 0.164 **Surface Type:** NV

Condition Summary Table for KALA-0402BZ

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	0.16	0.16	1	10.0	10.0	Routine Maintenance	$ 328	3	Med	Med	Low	Med
Route Level Data:		0.16	1	10.0	10.00	Routine Maintenance	$ 328	3	Med	Med	Low	Med

Kalaupapa National Historical Park

ROUTE 0402BZ : TRAIL ACCESS SPUR

Condition Photos

KALA-0402BZ_0.014.jpg

KALA-0402BZ_0.044.jpg

KALA-0402BZ_0.086.jpg

KALA-0402BZ_0.105.jpg

KALA-0402BZ_0.129.jpg

KALA-0402BZ_0.186.jpg

Kalaupapa National Historical Park

ROUTE 0403: CRATER ROAD

Manual Rating

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

Route Condition Legend

Poor (1)	Poor (2)	Fair (3)	Good (4)	Excellent (5)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 0.411 **Surface Type:** GR

Condition Summary Table for KALA-0403

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	0.41	0.41	1	12.0	12.0	Heavy Rehabilitation	$ 65,760	2	Med	High	Med	High
Route Level Data:	0.41	1	12.0	12.00	Heavy Rehabilitation	$ 65,760	2	Med	High	Med	High	

Kalaupapa National Historical Park
ROUTE 0403 : CRATER ROAD

Condition Photos

KALA-0403_0.014.jpg

KALA-0403_0.095.jpg

KALA-0403_0.186.jpg

KALA-0403_0.231.jpg

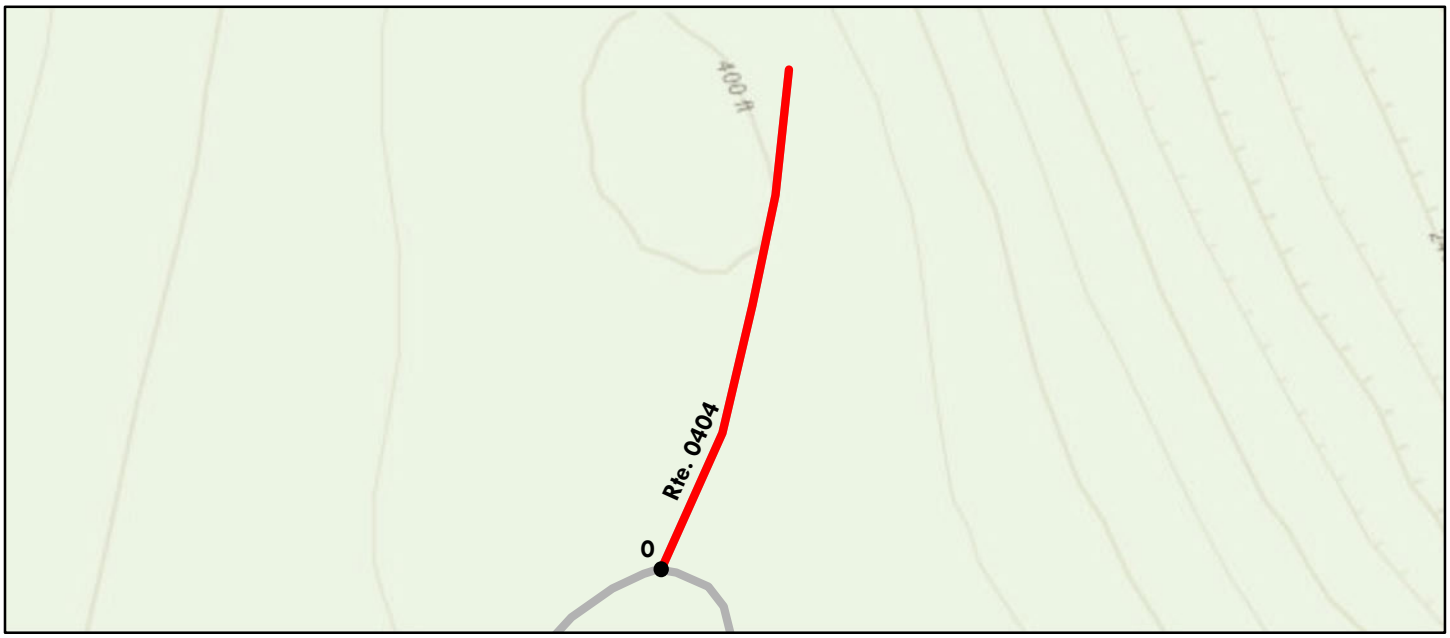
KALA-0403_0.297.jpg

KALA-0403_0.388.jpg

Kalaupapa National Historical Park

ROUTE 0404: INTERIOR ROAD TO KAUHAKO CRATER

Manual Rating



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

Route Condition Legend

Poor (1)	Poor (2)	Fair (3)	Good (4)	Excellent (5)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 0.038 **Surface Type:** GR

Condition Summary Table for KALA-0404

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	0.04	0.04	1	10.0	10.0	Heavy Rehabilitation	$1,520	1	High	Med	High	Med
Route Level Data:	0.04	1	10.0	10.00	Heavy Rehabilitation	$1,520	1	High	Med	High	Med	

Kalaupapa National Historical Park
ROUTE 0404 : INTERIOR ROAD TO KAUHAKO CRATER

Condition Photos

KALA-0404_0.005.jpg

KALA-0404_0.016.jpg

KALA-0404_0.021.jpg

KALA-0404_0.029.jpg

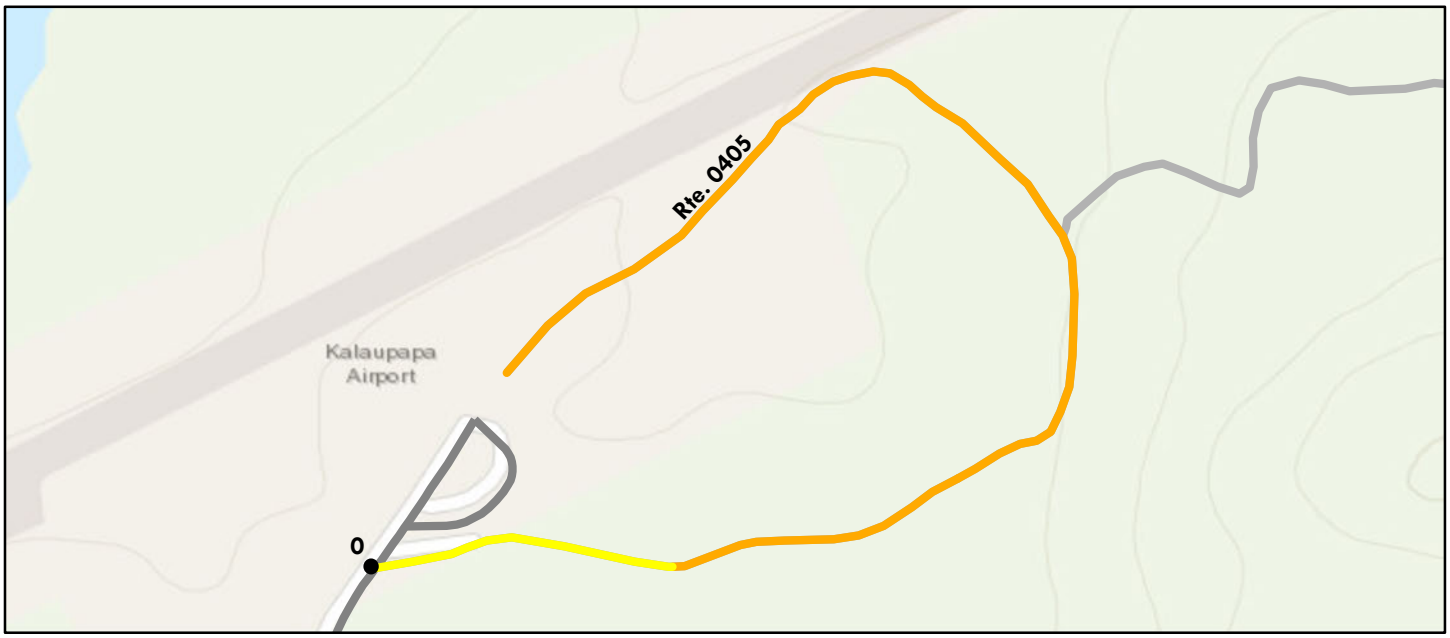
KALA-0404_0.035.jpg

KALA-0404_0.038.jpg

Kalaupapa National Historical Park

ROUTE 0405: LIGHTHOUSE ROAD

Manual Rating



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

Route Condition Legend

Poor (1)	Poor (2)	Fair (3)	Good (4)	Excellent (5)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 0.545 **Surface Type:** GR

Condition Summary Table for KALA-0405

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	0.55	0.55	1	10.0	10.0	Heavy Rehabilitation	$ 87,200	2	Med	Med	Med	Med
Route Level Data:		0.55	1	10.0	10.00	Heavy Rehabilitation	$ 87,200	2	Med	Med	Med	Med

Kalaupapa National Historical Park
ROUTE 0405 : LIGHTHOUSE ROAD

Condition Photos

KALA-0405_0.026.jpg

KALA-0405_0.102.jpg

KALA-0405_0.189.jpg

KALA-0405_0.270.jpg

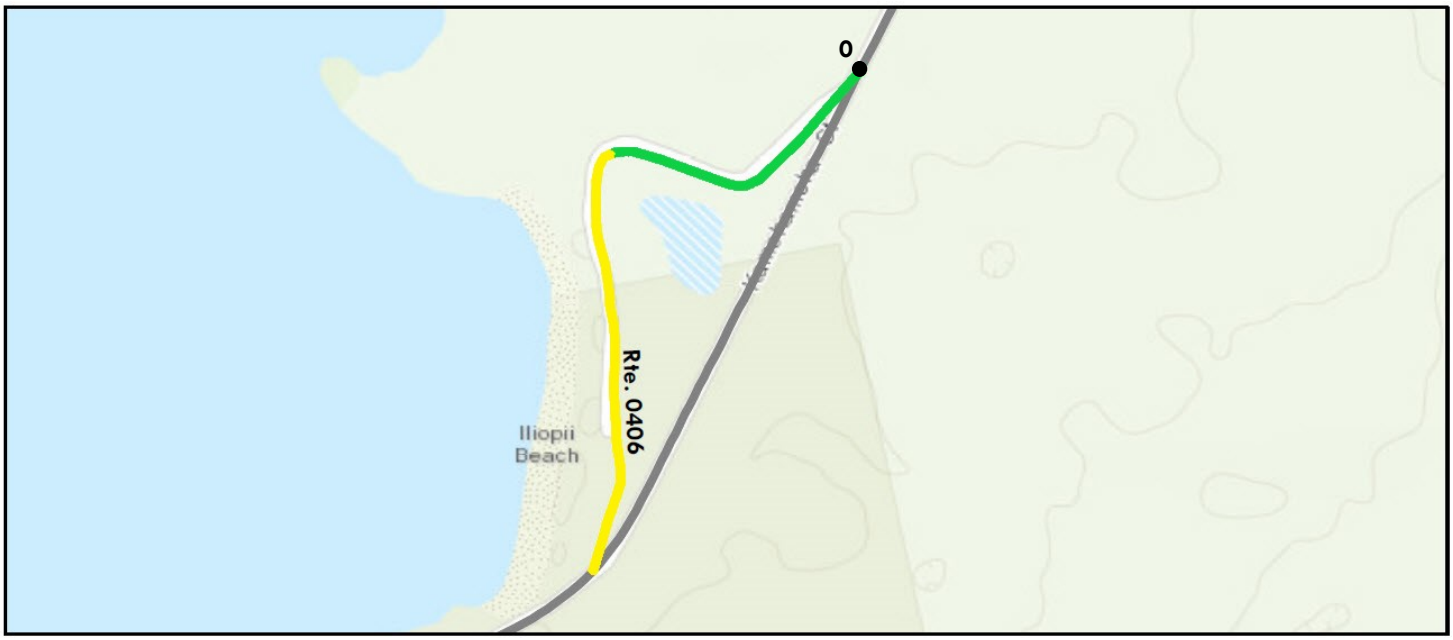
KALA-0405_0.384.jpg

KALA-0405_0.534.jpg

Kalaupapa National Historical Park

ROUTE 0406: BEACH HOUSE ROAD

Manual Rating



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

Route Condition Legend

Poor (1)	Fair (2)	Good (3)	Excellent (4)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 0.483 **Surface Type:** NV

Condition Summary Table for KALA-0406

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	0.48	0.48	1	10.0	10.0	Light Rehabilitation	$ 4,830	2	Med	Med	Med	Med
Route Level Data:		0.48	1	10.0	10.00	Light Rehabilitation	$ 4,830	2	Med	Med	Med	Med

Kalaupapa National Historical Park

ROUTE 0406 : BEACH HOUSE ROAD

Condition Photos

KALA-0406_0.019.jpg

KALA-0406_0.104.jpg

KALA-0406_0.166.jpg

KALA-0406_0.228.jpg

KALA-0406_0.328.jpg

KALA-0406_0.456.jpg

Kalaupapa National Historical Park

ROUTE 0407: STAFF LOOP

Manual Rating

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

Route Condition Legend

Poor (1)	Fair (2)	Good (3)	Excellent (4)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 0.166 **Surface Type:** NV

Condition Summary Table for KALA-0407

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	0.17	0.17	1	10.0	10.0	Routine Maintenance	$ 332	3	Med	Med	Low	Med
Route Level Data:		0.17	1	10.0	10.00	Routine Maintenance	$ 332	3	Med	Med	Low	Med

Kalaupapa National Historical Park
ROUTE 0407 : STAFF LOOP

Condition Photos

KALA-0407_0.010.jpg

KALA-0407_0.037.jpg

KALA-0407_0.067.jpg

KALA-0407_0.092.jpg

KALA-0407_0.122.jpg

KALA-0407_0.157.jpg

Kalaupapa National Historical Park

ROUTE 0410: FENCE LINE ROAD

Manual Rating

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

Route Condition Legend

Poor (1)	Fair (2)	Good (3)	Excellent (4)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 1.231 **Surface Type:** NV

Condition Summary Table for KALA-0410

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	1.00	1.00	1	10.6	10.6	Heavy Rehabilitation	$ 40,000	1	Med	Med	Med	High
1.00	1.23	0.23	1	10.0	10.0	Light Rehabilitation	$ 2,310	2	Med	Med	Med	Med
Route Level Data:		1.23	1	10.5	10.50	Light Rehabilitation	$ 42,310	2	Med	Med	Med	Med

Kalaupapa National Historical Park
ROUTE 0410 : FENCE LINE ROAD

Condition Photos

KALA-0410_0.010.jpg

KALA-0410_0.353.jpg

KALA-0410_0.561.jpg

KALA-0410_0.821.jpg

KALA-0410_0.975.jpg

KALA-0410_1.154.jpg

Kalaupapa National Historical Park

ROUTE 0411: PASCHOAL HALL ROAD

Manual Rating

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) 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: 3/15/2022	**Beginning Section MP**	0.00				
Paved Length (Miles): 0.12	**Section Length (MI)**	0.12				
Surface Type: ASPHALT	**Route Summary**					
Roadway Condition Information						
Pavement Condition Rating (PCR)	73	73				
Surface Condition Rating (SCR)	73	73				
Roughness Condition Index (RCI)	N/A	N/A				
Distress Index Values						
Structural Crack Index	N/A	N/A				
Alligator Crack Index	97	97				
Longitudinal Crack Index	90	90				
Transverse Cracking Index	90	90				
Patching Index	73	73				
Rutting Index	97	97				
International Roughness Index (IRI)	N/A	N/A				
Lane & Width Information						
Number of Lanes	2	2				
Paved Width (ft)	16	16				
Lane Width (ft)	8	8				

Kalaupapa National Historical Park

ROUTE 0411: PASCHOAL HALL ROAD

Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.

KALA_0411_0.017.jpg

KALA_0411_0.030.jpg

KALA_0411_0.047.jpg

KALA_0411_0.066.jpg

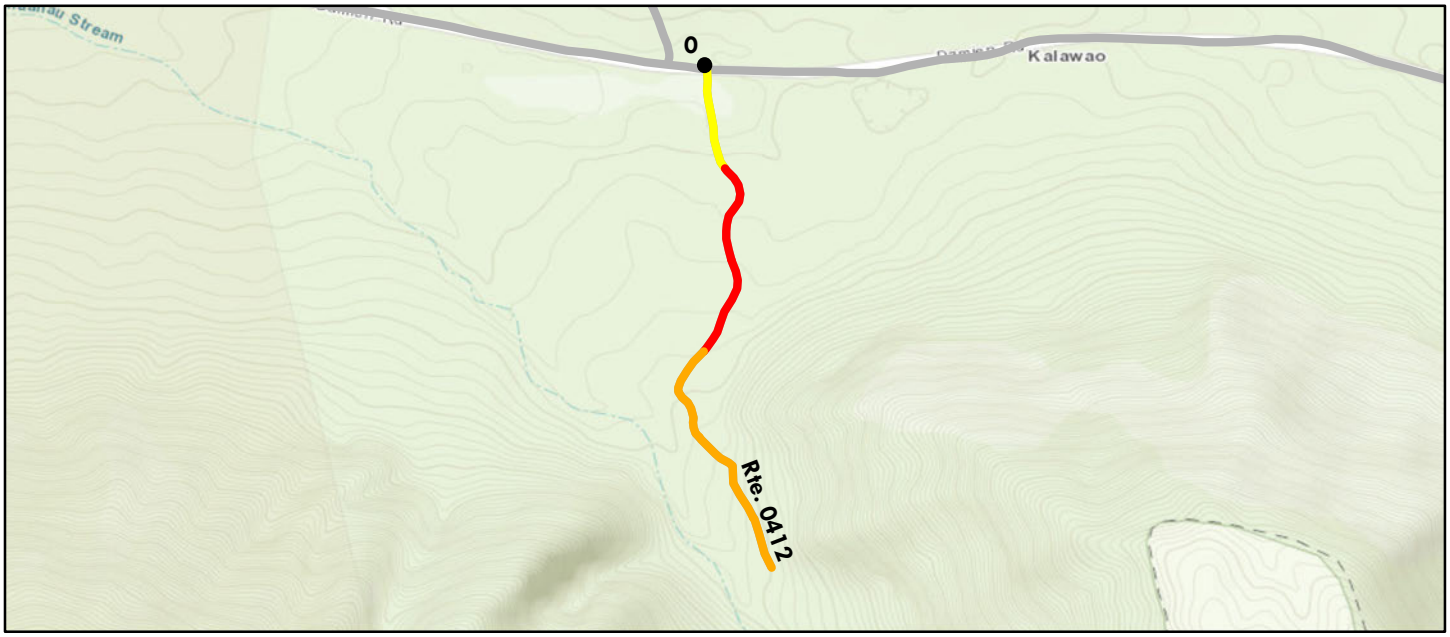
KALA_0411_0.084.jpg

KALA_0411_0.094.jpg

Kalaupapa National Historical Park

ROUTE 0412: PUMP HOUSE ROAD

Manual Rating



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

Route Condition Legend

Poor (1)	Poor (2)	Fair (3)	Good (4)	Excellent (5)	Not Rated

See Appendix for definitions and formulas

Inspection Date: 3/15/2022 **Unpaved Length (Miles):** 0.553 **Surface Type:** GR

Condition Summary Table for KALA-0412

Begin MP	End MP	Section Length	# of Lanes	Lane Width	Road Width	Treatment Recommendation	Treatment Cost	Unpaved Rating (Paser +)	Crown Severity	Drainage Severity	Rutting, Washboard Severity	Potholes / Loose Aggregate Severity
0.00	0.55	0.55	1	12.0	12.0	Heavy Rehabilitation	$ 88,480	2	Med	High	Med	Med
Route Level Data:		0.55	1	12.0	12.00	Heavy Rehabilitation	$ 88,480	2	Med	High	Med	Med

Kalaupapa National Historical Park
ROUTE 0412 : PUMP HOUSE ROAD

Condition Photos

KALA-0412_0.005.jpg

KALA-0412_0.091.jpg

KALA-0412_0.190.jpg

KALA-0412_0.301.jpg

KALA-0412_0.418.jpg

KALA-0412_0.550.jpg

Section 6
Parking Area Condition Rating Sheets

Kalaupapa National Historical Park

Federal Lands Highway
Road Inventory Program

Kalaupapa National Historical Park

ROUTE 0900: PASCHOAL HALL PARKING

Manual Rating

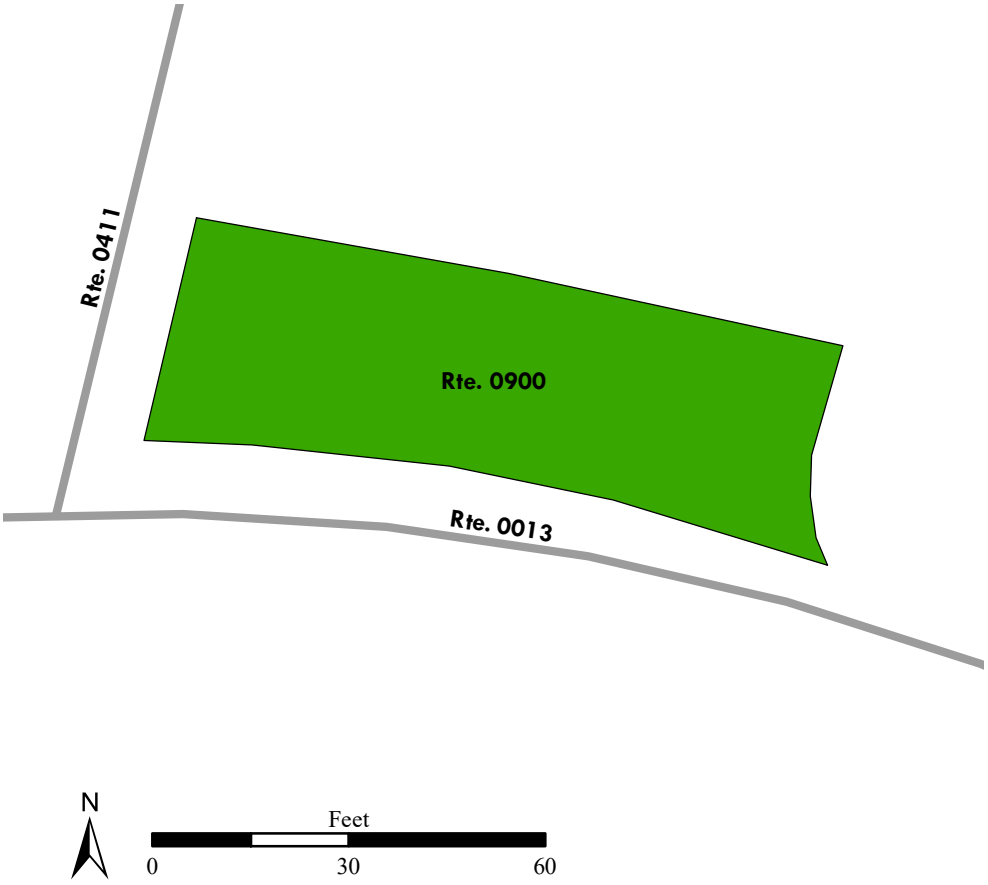
ADJACENT TO ROUTE 0013 (BERETANIA STREET)

Inspection Date	FMSS Number	User Access	Surface Type
3/15/2022	247677	PUBLIC	ASPHALT
Area (Sq. Ft.)	**Lane Miles (11' Widths)**	**Curb Reveal (Inches)**	**Curb Recommendation**
2,983	0.051	4	DO NOTHING
Curb Type		**Curb & Gutter Type**	
CONCRETE		NO CURB AND GUTTER	
Pavement Recommendation		**Condition Rating / PCR**	
PREVENTIVE MAINTENANCE		GOOD / 90	

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 7
Road Milepost Information

Kalaupapa National Historical Park

Federal Lands Highway
Road Inventory Program

KALA: Road Milepost Information

Milepost information is collected with the Data Collection Vehicle (DCV) when it is used to collect pavement condition data. No DCV routes existed in this park at the time of data collection. Therefore, in Cycle 6, there is no data to report for this section.

Section 8
Appendix

Kalaupapa National Historical Park

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.

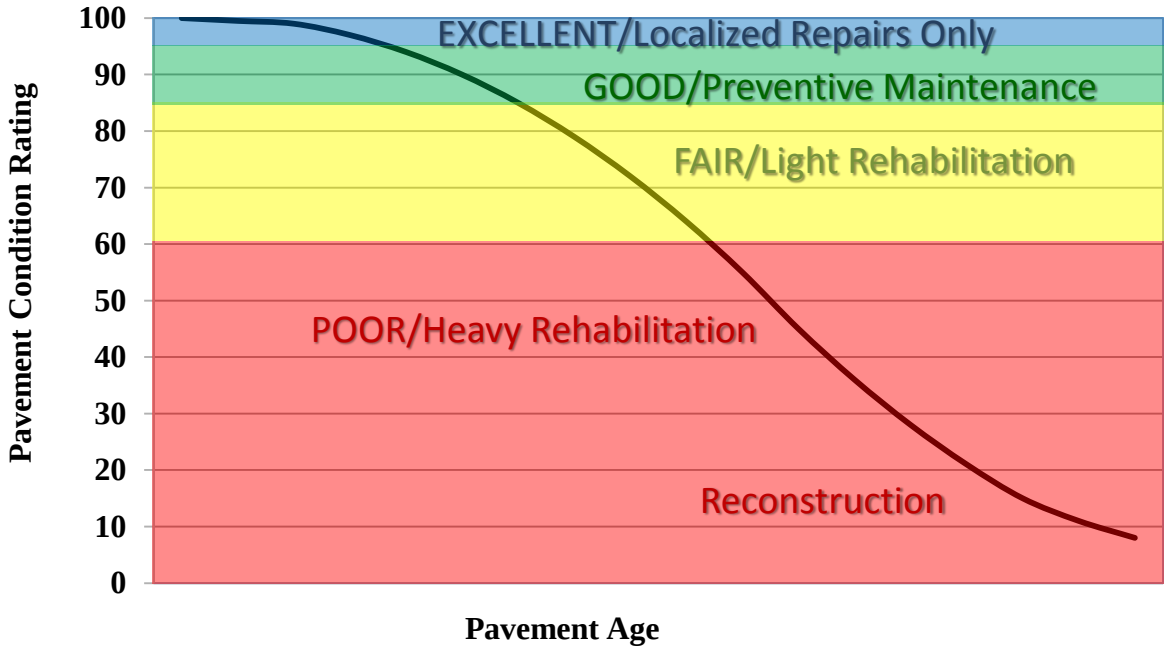
Explanation of the Condition Descriptions

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

Appendix E
Methodology for Determining Condition Ratings Using Manual Rating Procedures for Unpaved Assets

Condition Rating Criteria

ROADS - GRAVEL / NATIVE SURFACES

CROWN

RATING	RATING CRITERIA
MINOR	Center 3" to 6" above sides.
MODERATE	Center < 3" above sides.
SEVERE	Surface is flat or bowled.

DRAINAGE

RATING	RATING CRITERIA
MINOR	Road edge 2" above ground level.
MODERATE	Road edge level with ground level.
SEVERE	Road edge below ground level. Inadequate or missing ditches and side drains. Ponding.

POTHOLES / LOOSE AGGREGATE

Note: Loose Aggregate only applies to Gravel

RATING	RATING CRITERIA
MINOR	Potholes Few <2". Loose Aggregate No exposure of subgrade or stone protusion.
MODERATE	Potholes 2" - 4" Loose Aggregate < 20% (width of road) exposure of subgrade.
SEVERE	Potholes > 4" Loose Aggregate > 20% (width of road) exposure of subgrade.

RUTTING / WASHBOARDING

RATING	RATING CRITERIA
MINOR	Rutting < 1". Washboarding < 1"
MODERATE	Rutting 1" - 3". Washboarding 1"- 3".
SEVERE	Rutting > 3". Washboarding > 3".

DUST

RATING	RATING CRITERIA
MINOR	Dust slight or not visible.
MODERATE	Dust < 2 feet.
SEVERE	Dust > 2 feet.

PARKING - GRAVEL / NATIVE SURFACES

CROWN

RATING	RATING CRITERIA
MINOR	Center 3" to 6" above sides.
MODERATE	Center < 3" above sides.
SEVERE	Surface is flat or bowled.

DRAINAGE

RATING	RATING CRITERIA
MINOR	Road edge 2" above ground level.
MODERATE	Road edge level with ground level.
SEVERE	Road edge below ground level. Inadequate or missing ditches and side drains. Ponding.

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RUTTING / WASHBOARDING

RATING	RATING CRITERIA
MINOR	Rutting < 1". Washboarding < 1"
MODERATE	Rutting 1" - 3". Washboarding 1"- 3".
SEVERE	Rutting > 3". Washboarding > 3".

DUST

RATING	RATING CRITERIA
MINOR	Dust slight or not visible.
MODERATE	Dust < 2 feet.
SEVERE	Dust > 2 feet.

Condition Rating Calculations

FWS Distress calculations – Native/Gravel

Using the "Report Card for Gravel/Native Road Inspection", arriving at an "equivalent PASER score" for different road segment lengths of granularity is necessary.

Individual Distress Score Calculation

Any length of road will have severity lengths for each distress (Crown, Drainage, Rutting/Washboarding, & Potholes/Loose Aggregate). For example, at ***L*** length, there could be 3 different severities of Crown within ***L***. The corresponding Crown score for that length would then take each severity and multiply each to determine the dominate score for that segment.

That can be expressed as:

Distress Score per segment would take the highest value or length of the resulting calculations $= (1\times L_{low}), (2\times L_{med}), (3\times (L_{high} + L_{urgent}))$

Where:

L_{low} = Length of distress rated at Low Severity

L_{med} = Length of distress rated at Medium Severity

L_{high} = Length of distress rated at High Severity

L_{urgent} = Length of distress rated at Urgent Severity

The longest length after weighting has occurred would then determine the severity score for that segment.

Urgent and High severity lengths shall be combined and then multiplied by 3 to arrive at their weighted severity.

For reference –

- If only Low severity and Medium severity are selected for a section, it would take > 33% to be rated as Medium severity for the whole section to have a score of **2.**
- If only Low severity and High severity are selected for a section, it would take >25% to be rated as High severity of the section for the whole section to have a score of **3.**

Examples

528 foot segments

Crown Distress

250 ft Low Severity x **1** = 250 ft weighted severity
150 ft Medium Severity x **2** = 300 ft weighted severity
128 ft High Severity x **3** = 384 ft weighted severity

Since the weighted severity for High is the greatest length, the score for this section would be a **3** for High severity crown.

Rutting/Washboarding

78 ft Low Severity x **1** = 78 ft weighted severity
275 ft Med Severity x **2** = 550 ft weighted severity
180 ft High Severity x **3** = 540 ft weighted severity.

Since the weighted severity for Medium severity is the highest, the score for this section would a **2** for medium severity Rutting/Washboarding.

Treatment Decision Trees

Gravel Surface Decision Tree (Matrix) for Rating Scores and Treatment Types

VERSION #2 - IMPLEMENTED ON JUNE 1, 2019

Distress / Severity	Crown 1			Crown 2			Crown 3		
	Rutting & Washboarding			Rutting & Washboarding			Rutting & Washboarding		
	1	2	3	1	2	3	1	2	3
Drainage 1									
Potholes & Loose Aggregate 1	5	5	4	4	4	3	3	3	2
Potholes & Loose Aggregate 2	5	4	4	4	4	3	3	3	2
Potholes & Loose Aggregate 3	4	4	4	3	3	3	2	2	2
Drainage 2									
Potholes & Loose Aggregate 1	4	4	3	3	3	2	3	2	2
Potholes & Loose Aggregate 2	4	4	3	3	2	2	2	2	2
Potholes & Loose Aggregate 3	3	3	3	2	2	2	2	2	2
Drainage 3									
Potholes & Loose Aggregate 1	3	3	2	3	2	2	2	2	1
Potholes & Loose Aggregate 2	3	3	2	2	2	2	2	1	1
Potholes & Loose Aggregate 3	2	2	2	2	2	2	1	1	1

Severity Levels:

1. Minor
2. Moderate
3. Severe/Urgent

Treatment Types:

- Limited Local Maintenance
- Routine Maintenance
- Light Rehabilitation
- Heavy Rehabilitation
- Reconstruction

Rating Scores:

"PASER +" Score (1-5) shown within colored cells

Note: Dust is collected at the same severity levels shown above. However, dust is not a factor in the overall rating score.

Note: In June 2019, a validation study was performed to ensure appropriate PASER rating scores and treatment recommendations were arrived at using the unpaved matrix (decision trees). Based on the study findings, the gravel matrix scores were slightly modified (shown in red text) and a new native surface decision matrix was created (using the 1 to 4 PASER scale). Version #2 of the matrices are applied to all inspection ratings after June 1, 2019. By using distress quantities/severities and the matrices, a PASER score is determined. This methodology is referred to as "PASER +" by the RIP team.

Native Surface Decision Tree (Matrix) for Rating Scores and Treatment Types

VERSION #2 - IMPLEMENTED ON JUNE 1, 2019

Distress / Severity		Crown 1			Crown 2			Crown 3		
		Rutting & Washboarding			Rutting & Washboarding			Rutting & Washboarding		
		1	2	3	1	2	3	1	2	3
Drainage 1	Potholes 1	4	3	1	4	3	1	3	3	1
	Potholes 2	3	2	1	3	2	1	3	2	1
	Potholes 3	1	1	1	1	1	1	1	1	1
Drainage 2	Potholes 1	4	3	1	3	3	1	3	2	1
	Potholes 2	3	2	1	3	2	1	2	2	1
	Potholes 3	1	1	1	1	1	1	1	1	1
Drainage 3	Potholes 1	3	3	1	3	2	1	2	1	1
	Potholes 2	3	2	1	2	2	1	1	1	1
	Potholes 3	1	1	1	1	1	1	1	1	1

Severity Levels:

1. Minor
2. Moderate
3. Severe/Urgent

Treatment Types:

- Limited Local Maintenance
- Routine Maintenance
- Light Rehabilitation
- Heavy Rehabilitation

Rating Scores:

"PASER +" Score (1-4) shown within colored cells

Note: Dust is collected at the same severity levels shown above. However, dust is not a factor in the overall rating score.