CHAPTER II: ALTERNATIVES

Introduction

Chapter II describes two alternatives for rehabilitating a 2.8 mile segment of Crater Rim Drive, beginning just after the junction with State Highway 11 (just before the park entrance station), and continuing to the gate just west of the Jaggar Museum parking area (Federal Highway station numbers 750 to 601). The No Action Alternative describes continuing present management activities. It is the basis for comparison for the Preferred Alternative and its environmental consequences. The descriptions of alternatives include potential actions, results, related mitigation, and a summary of the environmental consequences. An alternative comparison table, Table II-2, compares and contrasts the two alternatives, identifies the degree to which each alternative accomplishes the purpose and need, and identifies what objectives are met by each alternative. The table can be found at the end of this chapter. One alternative is identified as the environmentally preferred alternative, which is the alternative that best promotes the national environmental policy as expressed in NEPA's Section 101. Alternatives considered but dismissed from detailed analysis are discussed near the end of this chapter.

Crater Rim Drive Alternatives

Alternative 1 – No Action Alternative

Alternative 1, the No Action Alternative, would continue present management activities, which provide for existing vehicular access on the road. On the 2.8 mile segment, two-way vehicular travel would continue as seismic and eruptive conditions allow. The road has been closed between Jaggar Museum and the Devastation parking area since March 18, 2008, because of the volcanic eruption at the Halemaumau Crater.

Under the No Action Alternative, the roadway segment would not undergo comprehensive resurfacing or other improvement. The NPS would respond to future needs without major actions or changes from current management activities. Routine roadway feature repair and cyclic maintenance, preservation maintenance, and minor rehabilitation would continue in accordance with available funding and as seismic and eruptive conditions allow. Actions that would continue include: Maintain current roadway width, which ranges from 18 to 26.5 feet; asphalt patching, crack sealing, and application of slurry- or chip-seal treatments (if pavement condition allowed); ditch clearing; culvert cleaning; vegetation maintenance; traffic control striping; informal pullout removal; and signage replacement as needed. This alternative would include some minor reconstruction of existing roadway features if failure occurred.

The existing Crater Rim Drive was not designed or constructed using modern highway geometric and safety standards to handle current and future traffic volume or sizes. These geometric and safety standards would not be addressed in the No Action Alternative.

Alternative 2 – Preferred Alternative

This alternative would rehabilitate the 2.8 mile segment of Crater Rim Drive from just after the junction with State Highway 11 (just before the park entrance station), and continuing to the gate just west of the Jaggar Museum parking area. Included in the rehabilitation are adjacent parking areas at Volcano House, Kilauea Visitor Center, Steam Vents, and the Jaggar Museum. Deteriorated pavement and related roadway structures would be rehabilitated to provide another 20 or more years of service, and better accommodate the size and volume of traffic. Rehabilitation would occur in a manner consistent with the goals established in the 1984 NPS *Park Road Standards*, which state that:

> The purpose of park roads remains in sharp contrast to that of the Federal and State highway systems. Park roads are not intended to provide fast and convenient transportation; they are intended to enhance visitor experience while providing safe and efficient accommodation of park visitors and to serve essential management access needs.

The rehabilitated roadway would be paved at a typical and continuous width of 22 feet. There would be two 10-foot travel lanes, each with a one-foot paved and chip sealed shoulder. In areas where the current pavement width is greater than 22 feet, the paved width would be reduced to the 22 foot template. The pavement width would not be reduced in areas where the paved road is currently wider than 22 feet due to intersections with parking areas or other roads, at the entrance station where the number of lanes tapers, and on one tight-radius curve. The existing roadway, averaging 21 feet, would be widened an average of 1 foot through the length of the project. The narrowest parts of road, at 18 feet, would be widened by about 4 feet. Table II-1 summarizes the existing pavement widths for each segment of this 2.8 mile project.

CRATER RIM DRIVE ROAD SEGMENT	FHWA STATION (Approximate)	TO	FHWA STATION (Approximate)	EXISTING RANGE OF PAVEMENT WIDTH (FT)	EXISTING AVERAGE PAVEMENT WIDTH (FT)
JUST BEFORE THE ENTRANCE STATION TO VOLCANO HOUSE	750		731	22-26.5	23
ROAD SEGMENT WEST OF KILAUEA VISITOR CENTER	731		711	19-26	22
STEAM VENTS ROAD	711		688	19-22	20
ROAD SEGMENT FROM THE KILAUEA MILITARY CAMP TO THE JAGGAR MUSEUM	687		601	18-26	20
SUMMARY				18-26.5	20

Table II-1. Existing Range & Average Paved Width by CRD Road Segments & FHWA Station Numbers

The rehabilitation process would begin with the excavation and moving of approximately 2 feet of material on either side of the planned (new) edge of pavement to eliminate contaminating the structural base of the roadbed with weeds and vegetation. The existing pavement would then be pulverized in place using specialized heavy equipment. The pulverized asphalt would be recycled and used for the structural base to improve the drainage and structural capacity of the roadbed. In areas where the pulverized asphalt forms less than 6 inches of base, additional imported crushed aggregate base may be used. A new layer of asphalt pavement would be placed on the compacted roadbed, raising the road profile by approximately 3 inches. A coarse chip seal, or similar treatment, would be placed on top of the asphalt shoulders to present a visually distinct appearance from the travel lanes and maintain the appearance of a narrower historic road. The material excavated at the beginning would then be replaced next to the chip sealed shoulders to backfill against the new 3 inch lip and form a foreslope, with a maximum 1 (vertical): 5 (horizontal) slope. Finally, the new roadway would be striped with yellow centerlines.

Parking area rehabilitation would replace deteriorated pavement and sidewalks, address drainage problems, and improve parking and pedestrian accessibility at the Kilauea Visitor Center, Volcano House, Steam Vents, and Jaggar Museum. Informal pullouts would be removed and rehabilitated to protect park resources; methods could include temporary fencing, revegetation, and boulder placement. Signs would be installed that would better inform road users of parking areas for the Kilauea Overlook and Picnic Area and the Jaggar Museum. Both parking areas are close to the informal pullouts that would be removed.

Additional actions included in this alternative:

- Roadwork would occur as permitted by seismic and eruptive conditions and Special Status Wildlife concerns.

- Preserve in place historic road features unless specified in the project design.

- Minimal tree removal would occur. Where possible trees would be limbed, trimmed, or salvaged, rather than removed. Approximately 15 trees would need to be removed because of their proximity to the road.

- Construction would be phased to reduce impacts to visitors, employees, and wildlife.

- During construction the road would remain open. Generally, one lane would be undergoing construction and the other lane would be open for travel; for brief periods of time, both lanes may be closed. Delays would be limited to typically 15 minutes or less per passage through a construction segment. The road would be opened to emergency vehicles within 5 minutes of notification. Traffic control, such as flaggers, would regulate traffic flow through the construction site. The park would make efforts to inform visitors of where construction/delays are occurring on a given day so they can plan accordingly.

- During construction at the entrance station one inbound traffic lane would remain open. The line of vehicles waiting to pass through the entrance station would be controlled so that they did not back up to the highway. In the entrance station area, effort would be made to avoid construction during the peak visitor use time of the day.

- The Mauna Loa Strip Road between State Highway 11 and Crater Rim Drive could be used during construction as an alternate entrance and exit for construction traffic and employees if there were no Special Status Wildlife concerns. This would reduce the number of vehicles passing through the entrance station. A controlled vehicle entry system (e.g., key pad) may be installed at one of the road's two existing gate locations.

- A plan for bicycle road use during construction would be developed and this might include restricted access during some construction phases. Bicycle tour companies would be provided this information in advance so they could plan alternate routes as needed.

- During construction a temporary zone of disturbance/construction would be established on both sides of the road for the length of the project. This zone would be up to 10 feet on either side of the road, and includes (not in addition to) the space needed to widen the pavement and rebuild road shoulders. Disturbance from construction can include vehicles or workers going through that zone to do construction related activities such as setting up erosion control. This zone would not extend 10 feet out in areas where the landscape (e.g., below Volcano House) does not permit, or in areas where, in consultation with NPS resources specialists, restrictions exist related to off-pavement activity to protect resources (e.g., such as the section from the Kilauea Military Camp to the Jaggar Museum parking area).

Actions specific to road segments:

Roadway Located Just Before the Park Entrance Station to Volcano House

The existing road surface would be pulverized and overlaid with a new mat of asphalt pavement. Surface drainage would be improved around the north edge of the entrance station by crowning or sloping the area to direct water towards existing drains. A concrete ramp would be installed in the north inbound lane. The existing concrete ramp in the south inbound lane would be expanded to match the new ramp in the north lane. The concrete curb island between the two inbound traffic lanes would be extended. The road width through this segment meets the 22 foot design template and would not be widened.

Volcano House Parking Area

The parking area would be milled and receive an asphalt overlay. Curbstones would be removed and reset during this process. Surface drainage in the parking lot would be improved by minor regrading to eliminate low spots in paved areas. Parking stalls may be reconfigured, but the parking area footprint would not change. The existing crosswalk (leading from Volcano House to the Kilauea Visitor Center, by the Ohia Wing) would be realigned with an accessible ramp to the Volcano House entrance. Accessible parking stalls and an accessible route from the stalls to

the front door would be added. A walkway to the Volcano House entrance may be constructed or striped in front of the parking stalls on the Volcano House side of the parking area. The parking stalls would have wheel stops to prevent vehicles from overhanging into the walkway.

Kilauea Visitor Center Parking Area

The Kilauea Visitor Center parking area would be milled and receive an asphalt overlay. Surface drainage in the parking area would be improved by minor regrading to eliminate low spots in paved areas and installing dry wells to accommodate water drainage flows. Parking stalls may be reconfigured but the parking area footprint would not change. Accessible parking stalls would be added in front of the Kilauea Visitor Center entrance. The sidewalk running from the front door of the Kilauea Visitor Center towards the northeast overflow parking area would be rebuilt and slightly widened; the curbstones would be removed and reset in the process. Foot lighting would be installed along the new sidewalk, and wheel stops would be added in these parking stalls to prevent vehicles from overhanging onto the sidewalk.

The intersection at the west end of the Kilauea Visitor Center parking area (between the Volcano House and the Volcano Art Center) would be raised to meet accessibility grades. Two painted crosswalks would be added at this intersection. During the road rehabilitation, the lighted crosswalk between the Kilauea Visitor Center and the Volcano House would be dug up and removed. A new lighted crosswalk may be installed back in that location. The curb stones would be removed and reset during the road rehabilitation.

Road Segment West of Kilauea Visitor Center

The existing average road width in this segment is 22 feet, but ranges from 19 to 26 feet. The narrowest segment of road here, between an almost vertical historic rock cut slope and a historic stone guardwall, would be widened by approximately 3 feet. The existing rock cut slope would be cut back in several small locations to create sufficient road width. An estimated 10 rock cuts would be needed over a road length of approximately 60 feet; each would be cut back approximately 2 to 10 inches, and would be done by NPS-approved stone masons. The new cut surfaces would be visually compatible with the existing cut.

The pavement is severely cracked, spalled, and broken throughout this area, caused by the absence of adequate drainage. The road would be excavated so additional aggregate base material could be placed to improve surface drainage and structural bearing capacity. The new road surface would be 3 to 9 inches lower than the existing road surface, exposing more of the historic stone guardwall, the base of which has been obscured by layers of accumulated asphalt. A narrow drainage ditch would be constructed in this section to improve surface drainage. All drainage in this segment would be routed into the landscape where possible; however, a seepage pit may be installed if the landscape cannot adequately drain the area. Drain coverings located beyond the edge of the paved roadway would use constructed masonry or naturalistic design rather than large horizontal metal grates. Naturalistic design may include vegetated swales, native rock, or blue stone swales.

Steam Vents Road

Along approximately 1,450 feet of roadway in the Steam Vents area, there are two rows of historic stone masonry shoulders, most of which are hidden under the existing asphalt pavement. Some of this masonry is visible through the cracked and broken spalling asphalt, about 1 inch below the road surface. These features were originally built as shoulder treatment for the 1941 road; the paved surface between the masonry shoulders was about 17 feet. Subsequent paving operations paved over the stones resulting in a wider paved surface averaging 20 feet, but ranging from 19 to 22 feet.

Under this alternative, the masonry shoulder stones would be paved over. The road between the stone shoulders would be pulverized and the existing asphalt removed by hand from the shoulder stones. A barrier fabric, followed by 5 inches of new asphalt, would be placed over the stones, preserving them in place. The thicker layer of asphalt would also protect the new road surface from cracking stresses, caused by anticipated differential settlement between the stones. The 5 inches of asphalt pavement overlay would raise the existing roadway profile. This would increase the width of the foreslope necessary to properly transition the grade to the natural landscape. There are several instances through Steam Vents where new foreslopes would need to be constructed, and they may extend out between 6 feet and 7 feet from the edge of existing pavement (what is there currently, pre-project).

Steam Vents Parking Area

The Steam Vents parking area has eleven parking stalls that include one accessible stall and one stall marked for a large bus. The parking area would be rehabilitated within its existing disturbed footprint. Additional parking spaces would be constructed to prevent overflow parking that causes resource damage. Areas now disturbed by overflow parking would be revegetated. Measures would be taken, such as using signs and temporary fences, to keep vehicles on the pavement.

The parking area would be designated one-way to reduce the road width and accommodate additional parking. Signage necessary to guide one-way traffic would be added. The rehabilitated parking area would accommodate two bus parking stalls and a sidewalk for loading and unloading passengers that would also direct them to the steam vents. The road would be pulled back from the steam vent resources. The combination of designated bus parking and pulling the road away from the steam vents would prevent the current practice of buses coming to a rolling stop, immediately adjacent to the steam vents and pedestrians. Further, the area around the railed steam vents would be improved into a hardened accessible surface and the pipe railings replaced.

Steam Vents Roadside Trail

A paved roadside trail begins at the Sulphur Bank Trail intersection with Crater Rim Drive and continues to approximately 350 feet before the first road into the Kilauea Military Camp. The existing condition of the trail varies from paved to deteriorated asphalt. Under this alternative this roadside trail would be repaved. The profile relationship of the trail to the road would be

maintained or improved to reduce the drop-off between the road and trail. Signage at the intersection of Sulphur Bank Trail and Crater Rim Drive would be improved, encouraging pedestrians to utilize the Sulphur Bank Trail rather than the road shoulder to access the Kilauea Visitor Center area.

Road Segment between the Kilauea Military Camp and the Gate just West of the Jaggar Museum

The average existing paved width of this road segment is 20 feet, ranging from 18.5 to 26 feet. All areas less than 22 feet in paved width would be widened to 22 feet. Approximately 8500 feet of road would require pavement widening from 1 to 3.5 feet through this segment; the average widening being just less than 2 feet. Fiber optic and water line utilities run underground through this area. They are adjacent to the south (caldera) side of the road. In order to avoid damage to or relocation of these lines, most of the road through this segment would have the centerline shifted and the road widened to the north side. The new foreslope would be graded to transition to the existing landscape. A 2:1 max slope would be used to accomplish this. If this cannot be accomplished with a 2:1 slope, then the roadway may be lowered in this segment.

Jaggar Museum Parking Area

The Jaggar Museum parking area would be repaved and surface drainage improved. The surface of the lot would be raised approximately 3 inches to lessen the frequency of vehicle bumpers scraping on the curbstones. There would be no increase in the number of parking spaces. Accessible parking spaces would be provided. A bicycle parking rack would be installed in the parking area. The entry into the parking area would be reduced in width to more clearly direct visitors towards Jaggar Museum rather than the USGS Hawaiian Volcano Observatory, which is behind the museum. After pavement removal there, the area would be revegetated. The Jaggar Museum sign would be adjusted to better guide visitors by duplicating it, or relocating it in a more visible place, such as at the center median.

The existing sidewalk leading from the parking area to the museum's front door would have foot lighting added to improve visibility at night. The sidewalk located west of the designated bus parking would be widened and regraded to accommodate accessibility standards for unloading and loading buses. The curbstones there would be removed and reset in the process. The sidewalk to the south, leading from the bus parking to the museum, would be regraded to meet accessibility standards. A new sidewalk would be added, where there is currently a social trail along the eastern end of the parking area, between the USGS Hawaiian Volcano Observatory sign and the entrance to Jaggar Museum. The corner of the social trail that intersects with the restrooms would be revegetated.

Informal Roadside Pullouts

Informal pullouts (created by visitor use rather than by design) along the 2.8 mile project segment would be removed and rehabilitated to protect park resources. Methods could include temporary fencing, revegetation, and boulder placement. Signs would be installed to more clearly inform road users of the parking areas at the Kilauea Overlook and Picnic Area parking area and the Jaggar Museum, which are nearby some of the informal pullouts.

Staging Areas

Staging and stockpile areas would be limited to areas that are previously disturbed. Areas under consideration for staging and stockpiling include: Kilauea Overlook (would keep a portion open for visitor use) for equipment and material, the park rain shed for equipment, and Kipuka Puaulu turn around (at mile 1.6, marking the end of the original Uwekahuna-Bird Park Road) for equipment and some material stockpiles. All stockpile and staging areas would be park approved and mitigation implemented as needed to protect resources and visitor use.

Mitigation Measures

Mitigation measures are presented as part of the Preferred Alternative to minimize the potential for adverse impacts. Following General Measures, mitigations measure are listed in the order the resource impact topics were introduced in Chapter I. As certain mitigations apply to more than one resource topic there is some repetition in the measures listed here. For more information refer to Chapter IV of this EA.

General Measures

- The NPS project manager and park Superintendent would work with the FHWA project engineer to ensure the project remains within the construction limits and that parameters established in the compliance documents including mitigation measures are properly implemented.

- Construction zones (including clearing/disturbance limits) would be identified and, as necessary, fenced or clearly marked with construction tape, flagging, or other similar method before any construction activity. The construction limits would be defined and activity confined to the minimum area required for construction.

- All protection and mitigation measures would be clearly stated in the construction specifications and special construction requirements. Workers would be instructed to avoid conducting activities beyond the limits as defined by the construction fencing or similar material. This includes temporary structures such as erosion control fencing.

- Staging areas for stockpiles, materials, and equipment, and vehicle turn-around areas would be located on paved or previously disturbed, park-approved locations. An orange fence, tapeline, or other method would be erected for containment.

- Staging areas would be protected from spillover impacts by the placement of barriers or other measures as appropriate and would be returned to pre-construction conditions upon completion of the project.

- All tools, equipment, barricades, signs, surplus materials, and rubbish would be removed from the project work limits upon project completion. Any asphalt surfaces damaged due to work on the project would be repaired to original condition. All demolition debris would be removed from the project site, including all visible concrete and metal pieces.

- Contractors would be required to properly maintain construction equipment (i.e., mufflers) to minimize noise from use of the equipment.

- Where appropriate and available "environmentally friendly" grease, hydraulic oil, and bar and chain oil would be used. These lubricants are vegetable or mineral oil based, less toxic, and biodegradable. Contractor would be encouraged to use biodiesel or alternative fueled vehicles. Contractor would be encouraged to use these materials and fuels, but not required.

- All equipment on the project would be maintained in a clean and well-functioning state to avoid or minimize contamination from automotive fluids. All equipment would be checked daily.

- Best management practices for drainage and sediment control, as identified and utilized by the Federal Highway Administration and the Hawaii Department of Health Storm Water Pollution Prevention Plan, would be implemented to prevent or reduce nonpoint source pollution and minimize soil loss and sedimentation in drainage areas. Use of Best Management Practices in the project area for drainage area protection would include all or some of the following actions, depending on site-specific requirements:

    - Permit requirements fulfilled such as NPDES (National Pollutant Discharge Elimination System).

    - Keeping disturbed areas as small as practical to minimize exposed soil and the potential for erosion.

    - Locating waste and excess excavated materials outside of drainages to avoid sedimentation.

    - Installing silt fences, temporary earthen berms, temporary water bars, sediment traps, stone check dams, or other equivalent measures (including installing erosion-control measures around the perimeter of stockpiled fill material) before construction.

    - Conducting regular site inspections during the construction period to ensure that erosion-control measures were properly installed and are functioning effectively.

    - A hazardous spill plan would be in place, stating what actions would be taken in the case of a spill, notification measures, and preventive measures to be implemented, such as the placement of refueling facilities, storage, and handling of hazardous materials, etc.

    - Storing, using, and disposing of chemicals, fuels, and other toxic materials in a proper manner.

- Disposal area for natural material from the park would be handled in the park or else disposed of legally outside the park. Out-of-park material disposal removal requirements would be needed.

- A schedule would be prepared identifying the hours and days the contractor would work. Holiday and weekend work may occur provided the vendor/contractor make a request in advance to the park, and appropriate staff are notified. The park would submit dates of holidays and events they do not want work to occur.

- There would be no night work, including night work requiring stand alone lighting.

- There would be restricted entry zones for construction vehicles (only accessible by contractor, not open to the public).

- Traffic controls and roadway signs would be used for traffic safety, parking, and pedestrian control.

- A litter control program would be implemented during construction to eliminate the accumulation of trash and wind blown trash.

- Park staff would ensure ditches and culverts are cleaned before construction. The contractor would ensure ditches and culverts are cleaned at the end of construction.

- Historic and non-historic road features including stone curbs and drainage structures, such as culverts, headwalls, and drainage ditches, would have debris cleaned by hand.

- A typical 15-foot vertical clearance would be maintained along most of the roadway edge to provide clearance from tree branches. Vegetation along the roadway edge, including trees and limbs, would be trimmed to eliminate traffic hazards, but retain forested overhangs where possible as integral to the visitor experience.

Geologic Resources: Faults, Cracks, Lava Tubes, and Collapsed Features

- Before construction, a detailed non-invasive geophysical investigation would be conducted on the roadway and the parking areas that are proposed for rehabilitation. Using Ground Penetrating Radar and Magnetic surveys, anomalies (such as large cracks or lava tubes) that exist beneath the ground surface and that may be affected by the construction procedures would be identified. If anomalies are located within 5 feet of the surface, equipment and weight/vibrations over these areas would be restricted during construction. This would be done to try and prevent any surface collapse. If any of the identified anomalies are too close to the surface and their collapse may not be prevented or they may require support to assure safety, an appropriate plan would be developed and submitted to the park for approval before construction begins. If possible a park archeologist would be provided the opportunity to investigate the tube or cave for the presence of natural and/or cultural resources.

- Should a lava tube or cave be discovered during construction (that was not identified during the pre-construction survey), work would halt in the discovery area, the site secured, and a park archeologist contacted. Options (preserving/building over versus collapsing) would be discussed with the project engineers, contractors, and park staff. If necessary, appropriate regulatory agencies would be consulted regarding the options.

- Around the Steam Vents construction erosion control (following NPDES standards) would be set up to prevent soil and debris from construction activity from flowing into the vents. Rainwater currently naturally drains into the vents, and would continue to do so during and following construction.

Geologic Hazards: Faults, Cracks, Lava Tubes, and Collapsed Features

- The road would remain open for access during construction.

- If volcanic changes occur in or near the project area, construction and workers would be subject to protocols outlined in the park's *Volcanic Event Contingency Planning Strategy* (NPS 2008b).

- The park would continue to inform visitors and staff (including construction workers) about poor air quality and mitigation measures (such as not working outdoors during high levels of poor air quality). The park would continue to make all aware of NPS air quality monitoring and advisories and associated actions under certain air conditions (i.e. closures).

Vegetation

- A vegetation rehabilitation/restoration plan would be developed by the park. It would include, but not be limited to, the following actions:

    - Disturbed area rehabilitation and restoration would occur as needed to the roadside and parking areas.

    - Before road or road feature work begins, vegetation would be salvaged, as appropriate and according to park specifications, for replanting after construction is completed. Revegetation would rely heavily on natural regeneration.

    - Initiate revegetation of disturbed sites immediately following construction activities.

    - Disturbed and revegetated areas along the roadside would not have vegetation that is attractive to nene.

    - Rehabilitated/restored areas would be monitored to determine if efforts are successful or if additional remedial actions are necessary, as outlined in the revegetation plan.

    - For every ohia (*Metrosideros polymorpha*) tree removed for the purpose of rehabilitating the road, at least 5 ohia would be replanted by the park.

- There is no net green loss, if vegetation is removed for the purpose of expanding development, an equivalent size area would be restored by the park.

- Minimize impacts to vegetation by:
    - Minimizing soil disturbance.
    - Limiting vehicle parking to existing roadways, parking areas, or access routes.
    - Limiting disturbance to roadsides and culvert areas, including limiting equipment to the roadbed area—no machinery or equipment should access areas outside the construction limits.

Non-native Species Control

- Non-native species control measures would be implemented, including:
    - The contractor would ensure that all construction equipment, vehicles, and machinery are weed, seed, and coqui frog free before entering the park.
    - Weed-free sources for gravel and soil are required. If the gravel and soil is infested it would be turned back.
    - Cover all haul trucks bringing fill materials (excluding asphalt) from outside the park to prevent seed transport and dust deposition along the roadway.
    - Non-native species control protocols would be implemented. The park would monitor disturbed areas for up to three years following construction to identify and treat growth of noxious weeds or non-native species. Treatment of non-native species would be completed in accordance with NPS Director's Order 13, *Integrated Pest Management Guidelines*.

Wildlife

- Before removing any trees January through July, surveys for native bird nests would be needed.

Special Species Status – Vegetation – Silene hawaiiensis

- Through consultation with the U.S. Fish and Wildlife Service (USFWS), 3/29/06 USFWS letter, the following procedures were developed:
    - Informal pullouts with or adjacent to areas with *Silene hawaiiensis* would be removed (blocked off).
    - New pullouts would only be constructed in locations without potential impacts on *Silene hawaiiensis*. (Note: No new pullouts would be constructed.)

  - Any *Silene hawaiiensis* within 10 feet of the roadway would be flagged, fenced off, and avoided during construction.

  - On field review and before final drawings, the roadway would be walked by engineers and resource specialists and avoidance of potentially impacted *Silene hawaiiensis* would be incorporated into the final drawings.

- Consult with park botanists before any off pavement activity between Kilauea Overlook and the Jaggar Museum. Proposed area for off pavement activity must be flagged and botanically surveyed for *Silene hawaiiensis*.

- Consult with a park botanist on the removal and rehabilitation of informal pullouts where *Silene hawaiiensis* is in the vicinity (between Kilauea Overlook and the Jaggar Museum).

Special Species Status – Wildlife – Bats and Birds

- Construction personnel would be informed of the occurrence and status of special status species and would be advised of the potential impacts to the species and potential penalties for taking or harming a special status species. Construction personnel would be informed to report sightings of special status species immediately to the NPS project manager.

- *Hawaiian Hoary Bat.* The Hawaiian Hoary bat or opeapea (*Lasiurus cinereus semotus*) has been identified in the project area. No trees greater than 15 feet in height in potential endangered bat habitat should be removed during May-August without prior monitoring and approval by the park biologist.

- *Hawaiian Petrel and Band-rumped Storm-Petrel.* The federally endangered Hawaiian Petrel or uau (*Pterodroma sandwichensis*) and the State listed Band-rumped Storm-Petrel or akeake (*Oceanodroma castro*) may fly over the project area between dusk and dawn during breeding season (March through November). As artificial light can be potential disorienting, no night work would be conducted.

- *Hawaiian Hawk/Io.* Potential nesting habitat for the Hawaiian hawk or io (*Buteo solitarius*) is limited to rainforest between the park entrance station and the Kilauea Visitor Center. No nests have been reported in this heavily trafficked area in the past. However, in the rare event that an io nest is observed adjacent to the project area (nesting typically is between March and September), construction would be halted and the situation assessed by a park biologist. Construction would only resume after coordination with USFWS has occurred**.**

  - To the degree possible, construction in this segment (entrance station to the Kilauea Visitor Center area) would be conducted outside of nesting season (March through September).

  - If construction activities must occur during the breeding season, a nest search of the area adjacent to the road corridor would be conducted by the park bird biologist or qualified ornithologist immediately prior.

- If an active nest is detected, construction activity would be halted and would not resume until the nest has been vacated or further coordination with the U.S. Fish and Wildlife Service has occurred.

- *Hawaiian Goose/Nene.* The Hawaiian goose or nene (*Branta sandvicensis*) is an endangered species and the project area passes through nene habitat. While nene may be found in the project area throughout the year, they are most sensitive during breeding, brooding, and molting (typically September through April). Breeding and molting habitat extends from Kilauea Military Camp to the Jaggar Museum. Construction activities in this portion of the project area are limited to May 1 through August 31 (refer to potential exceptions below). Between May 1 and August 31, nene may still be in the area; however, there may need to be little if any change in construction related activities during this period. For example, if nene are seen in the immediate work area, construction should be temporarily halted until the park bird biologist is notified to assess the situation and/or until the birds move off.

  Nene nesting, brooding, and molting are not synchronous; there is annual variation in the onset of breeding. If it starts earlier than September or later than April, the construction activities may need to be modified or halted (there may be little to no advance notice). However, based on past data, the probability of this is low.

  From September 1 through April 30, if the Kilauea Overlook and Picnic Area was used for staging and/or the lower Mauna Loa Strip Road was used for access, the adjacent area would be routinely surveyed for nene nests and broods. If a nest or pair with goslings is located within the survey area, measures would be taken to protect the nest and nene, and this may include temporary closure.

  Between Kilauea Military Camp and the Jaggar Museum some road activities, like striping or sign installation, may be permitted during the breeding season window, typically September through April (refer to U.S. Fish and Wildlife Service, USFWS, guidelines below). However, all activities during this time must be approved in advance by the park bird biologist, who would determine what activities are acceptable.

  The park's bird biologist would work with the project manager to identify project areas and specific construction-related activities (including those at staging areas and on access roads) for which advance notice is needed. This would enable the biologist to assess activities for potential impacts upon nene and develop mitigation measures as needed, which may require activities to be modified. The activity assessment would include potential impacts upon the soundscape, as well as other potential impacts

  Through consultation with the USFWS via a 3/29/06 USFWS letter, and subsequent phone consultations with USFWS staff, the following procedures for nene were developed:

  - Road construction activities that take place on the portions of the road that pass through nene nesting habitat (of the total 2.8 miles, this applies to the 1.4 mile section from

Kilauea Military Camp to the Jaggar Museum) would occur outside the nene breeding season. Therefore, road construction would be confined to May through August.

- It is understood activities such as sign installation, roadway striping or use of an area for construction staging involve minimal noise and therefore may not be a disruptive to nene during the breeding season window (September through April). Therefore these activities may be permitted from Kilauea Military Camp to the Jaggar Museum during the breeding season with approval from the park bird biologist. Before these activities take place in this area during breeding season, a park biologist would survey the area for nests and nene activity to assess what potential impacts the above activities would have upon nene.

- Park staff would give the contractor a briefing on nene and potential project impacts and would include instructions to immediately report any nene sightings in the area.

- No feeding or approaching wildlife.

- Any wildlife collisions would be reported to park bird biologist immediately.

The following measures would be taken to ensure that there is no increase in nene road kill during and following construction:

- No increased speed limits. If vehicles are routinely speeding following road rehabilitation, the park would consult with FHWA to identify measures that could be taken to ensure speed is reduced.

- Disturbed and revegetated areas along the roadside would not have vegetation that is attractive to nene.

Cultural Resources: Including Archeological, Historic Structures & Cultural Landscapes, & Ethnographic Resources

- On field review and before final drawings, the roadway would be walked by engineers and resource specialists and avoidance of archeological resources would be incorporated into the final drawings.

- If unknown archeological resources or historic features are discovered during construction, work would halt in the discovery area, the site would be secured, and the appropriate Cultural Resources staff contacted. Consultation may be needed with the Hawaii SHPO and others, in accordance with 36 CFR 800.13. Appropriate NPS Cultural Resource staff would document, as necessary and appropriate, historic features revealed during construction.

- Archeological artifacts found within the construction area would be removed only by the National Park Service or their designated representatives.

- The archeologist would be given a plan identifying pullouts to be removed and methods for removal and rehabilitation. The archeologist would identify what if any mitigation was

needed before pullouts were removed and rehabilitation. Archeological testing would be needed for some pullouts before they were removed. Testing is more likely where there would be ground disturbance and less likely if removal and rehabilitation are accomplished through placing barriers that do not involve ground disturbance.

Depending on the presence of cultural resources and the potential for effect, additional Section 106 consultation may be needed before pullouts are removed and rehabilitated.

- All ground disturbing activities would be monitored by an NPS Archeologist between the Kilauea Military Camp and Jaggar Museum. Ground disturbing activities in other areas would be monitored as deemed necessary by the archeologist.

- All off-pavement activity between the Kilauea Military Camp and the Jaggar Museum (~ Station 650-601) would be limited to the area necessary for widening the road rebuilding the shoulders, and rehabilitating the informal pullouts. The NPS Archeologist would conduct ground testing prior to this construction.

- Known archeological sites/features and road features that are not specifically addressed in the Preferred Alternative but have a potential to be affected would be flagged (as appropriate) and avoided during construction. An NPS Archeologist would be on site during the entire ground disturbance near these sites.

- In compliance with the Native American Graves Protection and Repatriation Act of 1990, the National Park Service would notify and consult concerned Native Hawaiian representatives for the proper treatment of human remains, funerary, and sacred objects should these be discovered during the project.

- Access to traditional cultural properties for traditional ceremonies or other traditional practices would be allowed.

- Construction activities in some areas may be stopped for short-term periods to allow for traditional cultural practices, including providing for the absence of construction-associated sound (notification would be given in advance).

- Preserve in place historic road features unless specified in the project design.

- Asphalt would be removed by hand from the shoulder stones in the Steam Vents area.

- Historic feature treatment would be in accordance with the Secretary of Interior's Standards for the Treatment of Historic Properties, e.g., rehabilitation would be in accordance with the Standards for Rehabilitation and have an approved rehabilitation plan. Historic feature treatment plans may require additional consultation with the Hawaii SHPO and others.

- All new and reconstructed stone masonry features would be built in accordance with the Secretary of Interior's Standards for the Treatment of Historic Properties. Specifications for

new construction would be written and approved before the advertisement of construction bid documents.

- Areas outside of the construction limits, inside and outside of the park (including but not limited to material sources, disposal sites, waste areas, haul roads, and staging areas) are subject to Section 106 of the National Historic Preservation Act and are subject to the Section 106 process (cultural compliance), which must be completed before these are used.

Park Operations

- Traffic monitors would have park radios with the appropriate park frequency and appropriate safety clothing and reflective signs.

- Emergency vehicles would be allowed through the construction areas as needed.

- Delays for emergency response vehicles would be kept to a minimum by having the emergency responders notify the traffic monitors by a park radio/frequency immediately when the vehicle is dispatched, allowing approximately 5 minutes to clear the road before the arrival of the emergency vehicle.

- Delays for non-emergency park staff would be the same as for the public (park visitors), with delays limited to no more than 15 minutes per passage through a construction segment.

- One lane would remain open at the entrance station and traffic would not be allowed to back up to State Highway 11.

- Project manager would provide a project schedule to park administrative officials and division chiefs. Updates would be provided as needed based on project and/or information changes. Weekly meetings held between the park and the contractor.

- The posted speed limit would remain between 15 to 35 mph; lower speeds may be needed during construction.

Visitor Use and Experience

- The road would remain open during construction.

- Delays for park visitors would be limited to no more than 15 minutes per passage through a construction segment. The park would inform the public about construction delays. Methods may include posting information on the park web site, press releases, and information provided at the entrance station or Kilauea Visitor Center.

- At any time during construction, there would only be one construction site with traffic delays.

- At the traffic delay locations and if conditions warrant, NPS staff would be present to answer questions from visitors and advise them of procedures and construction expectations.

Commercial Operations

- The park would inform the commercial operators about construction delays. Methods may include posting information on the park web site, press releases, letters, and information provided at the entrance station or Kilauea Visitor Center.

- Rehabilitation of the Volcano House parking area would be coordinated with the Volcano House concessioner and park staff.

Topography, Soils, and Drainage

- Erosion and sediment control would be required (see "General Measures").

- The park must approve all topsoil sources and sources must be from the park.

- Topsoil removed from its immediate location during construction, would be returned to the same area due to the extreme variation of soils between construction segments. The park would provide the contractor with information regarding the zones of soil types. The contractor would label and bin soil during construction and return it to the same area following construction.

- Repair affected slopes, slope failures, and erosion near the road, and remove eroded material. Ground surface treatment would include grading to natural contours, and installing erosion control measures as needed.

Water Quality

- Sediment traps, erosion checks, and/or filters would be constructed preceding or following all culvert drains (if such drains are required) and in all other ditches before the water (runoff) leaves the project construction limits.

- At all cut and fill areas, erosion and sedimentation control would be implemented to minimize impacts to water quality.

- Surface restoration and re-vegetation of disturbed soils would be implemented to minimize long-term soil erosion.

- Water needed for construction and dust control would come from the existing developed water systems within the park, until water supplies are low. At this point the park would give one week notice to contractor when water would be discontinued.

Air Quality

- To control fugitive dust, water sprinkling would occur, as needed, on active work areas where dirt or fine particles are exposed.

- Non-operation related construction vehicles (i.e. worker vehicles traveling from point to point, not construction vehicles involved in ongoing construction work) would not idle more than 3 minutes when parked.

- All vehicles waiting in construction delay must turn off their engines after 3 minutes.

- Concrete and asphalt plants would be located outside the park.

- Construction debris would be hauled from the park to an appropriate disposal location.

Greenhouse Gas Emissions, Climate Change, and Energy Conservation

- All non-operation related construction vehicles (i.e., worker vehicles traveling from point to point, not construction vehicles involved in ongoing construction work), and vehicles waiting in construction delays would not idle more than 3 minutes; engines would need to be turned off

.

- A temporary card gate would be installed allowing park employees to access the park via and alternate location, and reducing the amount of vehicles stuck in construction delays.

- Asphalt on the existing road would be recycled into the structural base of the rehabilitated road.

General Construction Schedule and Costs

Construction to rehabilitate the Crater Rim Drive is expected to take place between 2010 and 2012. All construction activities taking place on the portions of the road passing through nene nesting habitat (the stretch of the road between Kilauea Military Camp and the Jaggar Museum) would occur outside the nene breeding season, construction in this area would be confined to May through August.

Kilauea Overlook and Picnic Area would need to be clear of work/construction activity during the Merrie Monarch Festival, which typically follows Easter.

Construction could begin or extend beyond the timeframe identified previously based on weather conditions or resource issues per contractual requirements, but only after the Superintendent receives a formal written request, and grants permission. In 2009 the estimated value of the construction effort is $6.5 million.

Environmentally Preferred Alternative

In accordance with *Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision-Making* and the Council on Environmental Quality (CEQ) requirements, the NPS is required to identify the "environmentally preferred alternative" in all environmental documents, including Environmental Assessments (NPS 2001a). The environmentally preferred alternative is determined by applying the criteria in the National Environmental Policy Act (NEPA) of 1969 and CEQ regulations. The "environmentally preferable alternative is the alternative that would promote the national environmental policy as expressed in NEPA's Section 101," including:

1. Fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations;
2. Ensuring for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
3. Attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
4. Preserving important historic, cultural, and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice;
5. Achieving a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities, and
6. Enhancing the quality of renewable resources and approaching the maximum attainable recycling of depletable resources.

Alternative 2, the Preferred Alternative, is the environmentally preferred alternative in this environmental assessment. This alternative was selected for the following reasons:

The No Action Alternative would:

- Not address the deteriorating road surface, variable road width, and long-term maintenance needs (criteria 1 and 2 not met as well as under the Preferred Alternative),

- Not attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences (criterion 3 not met as well as under the Preferred Alternative).

- Preserve important natural and cultural resources better than the Preferred Alternative. Both alternatives would preserve natural and cultural resources through resource avoidance and with vegetation rehabilitation and restoration. However, the first part of criterion 4 is better met under the No Action Alternative. Both alternatives equally support diversity and variety of individual choice (the second part of criterion 4 is equally met by both alternatives).

- Not reduce the need for road and road feature maintenance that consumes depletable resources (criteria 6 not met as well as under the Preferred Alternative).

The Preferred Alternative would:

- Address the deteriorating road surface, variable road width, and long-term maintenance needs (criteria 1 and 2 met better under the Preferred Alternative).

- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences (criterion 3 met better under the Preferred Alternative).

- Preserve important natural and cultural resources, but not as well as the No Action Alternative. The road work would be a compatible alteration for the historic road under the Secretary of Interior's Standards for Rehabilitation. The design retains historic road conditions and preserves in place historic features. Natural resources would be protected through resource avoidance measures, as well as vegetation rehabilitation and restoration (the first part of criterion 4 is better met under the No Action Alternative). Both alternatives equally support diversity and variety of individual choice (the second part of criterion 4 is equally met by both alternatives).

- Improve operations efficiency and sustainability by reducing the need for ongoing road maintenance and the consumption of depletable resources associated with such maintenance (criterion 6 best met under the Preferred Alternative).

Alternatives Considered but Dismissed

The NPS considered and dismissed the following alternatives for Crater Rim Drive:

Rehabilitate 4.6 Miles of Crater Rim Drive

This project was initiated in 2003. Rehabilitating 4.6 miles of Crater Rim Drive, from the entrance station to the Southwest Rift Zone, was considered in all the action alternatives. However, the eruption of Kilauea at the Halemaumau Crater (begun March 2008) continues and the road remains closed past Jaggar Museum (1.8 miles of the 4.6 miles). As a result, rehabilitating the 1.8 miles beyond the Jaggar Museum was dismissed.

Rehabilitate Crater Rim Drive at Current Width

An alternative to rehabilitate 4.6 miles (and following the road closure just 2.8 miles) of the Crater Rim Drive roadway surface at existing pavement widths was considered but dismissed. This would not have corrected the narrow roadway below Volcano House (west of the Kilauea Visitor Center); the narrow roadway between the rock-lined ditches and steep/deep drop-offs in the Kau curves; and the narrow roadway and steep drop-offs due to the road sitting far above the existing landscape through the Southwest Rift Zone**.**

Rehabilitate Crater Rim Drive and Limit All Vehicles to One-Way Traffic

An alternative to rehabilitate 4.6 miles of Crater Rim Drive and limit all vehicles to one-way traffic was considered and dismissed because 1) there was no significant gain in historic feature protection over Alternative 2, 2) the roadside hazards would not be addressed, and 3) it would change the Crater Rim Drive flow pattern and access to the Chain of Craters Road; road users would be forced to drive the entire Crater Rim Drive. The one-way traffic option might increase traffic and driving time on Crater Rim Drive, as Chain of Craters Road is accessed from the Crater Rim Drive and drivers would have to drive around the entire Crater Rim Drive. (Two way traffic allows drivers to bypass the Kilauea Caldera road segment). Road users would not have the option of seeing only a portion of Crater Rim Drive. Under this alternative emergency response vehicles and other NPS authorized vehicles would have the option of two-way traffic using a specially marked contra-flow lane. Because of the potential impacts on the entire Crater Rim Drive and access to the Chain of Craters Road, the one way alternative is outside the scope of this EA. Due to the fundamental change in traffic flow this alternative provides, this approach would likely be considered in the park's broader transportation section of the General Management Plan. Alternatives 1 and 2 do not preclude choosing a one-way route in the future.

Rehabilitate Crater Rim Drive and Limit Commercial Motor Vehicles to One-Way Traffic from Jaggar Museum to the Halemaumau Parking Area

An alternative to limit commercial vehicles to one way traffic from Jaggar Museum to the Halemaumau parking area was considered as a way to reduce road widening and reduce impacts to the historic road features. There was no significant reduction in resource impacts; impacts to cultural resources would have been similar to Alternative 2. This alternative would have caused a fundamental change in traffic flow. This approach would likely be considered in the park's broader transportation section of the General Management Plan. Alternatives 1 and 2 do not preclude choosing a one-way route in the future. Therefore this alternative was dismissed.

Rehabilitate Crater Rim Drive, Limit Commercial Vehicle Size, and Limit Commercial Vehicles to One-Way Traffic from Jaggar Museum to Halemaumau Parking Area

An alternative to limit commercial vehicle size as well as limit them to one way traffic from Jaggar Museum to the Halemaumau parking area was considered as a way to reduce impacts to the historic road features. There was no significant reduction in resource impacts; impacts to cultural resources would have been similar to Alternative 2. This alternative would have caused a fundamental change in traffic flow and in the commercial vehicles that could be used in the park. This approach would likely be considered in the park's broader transportation section of the General Management Plan. Alternatives 1 and 2 do not preclude choosing a one-way route or limiting commercial size of tour vehicles in the future. Therefore this alternative was dismissed.

Rehabilitate Road at Steam Vents by Altering Road Profile and Exposing Shoulder Stones on One Side

An alternative to rehabilitate Crater Rim Drive at Steam Vents by altering the road profile and exposing the north shoulder stones was considered. Under this alternative the pavement would be removed from the north (mauka) historic shoulder stones. The road would be extended to the south (towards the caldera), over the south shoulder stones, for a pavement width of 22 feet. The road would be crowned and the centerline shifted to the south to allow for the pavement depth on the south side. In some areas the south shoulder currently serves as a retaining wall for the roadbed. At these locations fill would be added to raise the shoulder to match the road grade. This alternative was dismissed because the resulting cross-slope would create a hazard. In addition, while this would allow for the historic shoulder stones to be exposed on the north side, there would be an increase in the area affected, greater than what is currently affected, because of the fill slope.

Rehabilitate Road at Steam Vents by Altering Road Profile and Moving and Exposing the Shoulder Stones on both Sides

An alternative to rehabilitate the road through Steam Vents was considered that would have exposed the shoulder stones on both sides of the road. The shoulder stones would be removed, the road widened to 22 feet, and the shoulder stones then placed on both sides. This alternative would increase the area affected, beyond that which is currently affected, because of the widening. The historic shoulder stones would lose integrity because they were moved. While the shoulder stones would be visible, the relationship of the road to the landscape would be changed because of the increased road width. Because impacts to the cultural resources would be greater and because impacts to natural resources would also be greater than what exist currently, this alternative was dismissed.

Implement an Alternative Transportation System

An alternative to improve the visitor experience by implementing an alternative transportation system consisting of shuttle buses and large staging areas was considered but dismissed. Existing parking facilities are not capable of supporting the staging needs for a shuttle system. This alternative is outside the scope of this EA, but may be considered under the park's General Management Plan. The alternatives that are being analyzed in this EA would not preclude the future implementation of an alternative transportation system.

Add Bicycle Lanes to Crater Rim Drive

The possibility of creating bicycle lanes along the Crater Rim Drive project was considered during the planning process. This would require additional roadway widening, which would increase the potential to impact threatened and endangered species and cultural resources. The addition of bicycle lanes was dismissed as an alternative component. Concurrent use of park roads by commercial vehicles, personal vehicles, bicycles, and pedestrians would be considered during the park's General Management Plan/Environmental Impact Statement process, which is currently underway

Table II-2.
Comparative Summary of the No Action and Preferred Alternatives

Alternative 1 – No Action Alternative	Alternative 2 - Preferred Alternative
Crater Rim Drive would not be rehabilitated. Park staff would respond to future needs and conditions associated with the road without major actions or changes in the present cyclic maintenance course. Deterioration of the road surface would continue because of the advanced age of the pavement and insufficient subsurface structure. Improvements to the parking areas and pullouts would not occur without special funding, as is currently the case. There would continue to be variable road widths for the 2.8 miles. Steep drop-offs would persist. Meets project objectives? **No.** Continuing the existing Crater Rim Drive roadway maintenance would not improve the overall road surface conditions, the deficiencies in the underlying road structure, or address the issue of variable and narrow road widths. Drainage along the road would not be corrected. The repaving of the parking areas meets the objectives of this proposal. Informal roadside pullouts would be removed and rehabilitated. Historic road character would be maintained; most historic road features would be preserved and protected in place. .	This alternative would rehabilitate the 2.8 mile segment of Crater Rim Drive from just after the junction with State Highway 11 (just prior to the park entrance station) through the Visitor Center/Volcano House area to the gate just west of the Jaggar Museum. The rehabilitated roadway would be paved at a typical design template of 22 feet. There would be two 10-foot travel lanes, each with a one-foot paved and chip sealed shoulder. This design template would be modified in areas where the paved road is wider due to intersections with parking areas and other roads, at the entrance station where the number of lanes taper, and on one tight-radius curve. Road drainage would be improved at the entrance station and the road segment west of the Kilauea Visitor Center. The Volcano House, Kilauea Visitor Center, Steam Vents, and Jaggar Museum parking areas would be repaved and drainage improved. Informal roadside pullouts would be removed and rehabilitated. Two crosswalks would be added between Volcano House and the west side of the Kilauea Visitor Center parking area. Meets project objectives? **Yes.** The roadway and roadway related structures would be rehabilitated to better accommodate traffic volumes and vehicle sizes, correct identified safety issues by providing a uniform road width with wider lanes on curves; provide a 20-year road service life; improve operational efficiency and maintainability; and maintain much of the historic road character; most historic road features would be preserved and protected in place.