Addendum to
HALEAKALA NATIONAL PARK ROADS
Haleakala National Park
Pukalani Vicinity
Maui County
Hawaii

HAER No. HI-52

BLACK & WHITE PHOTOGRAPHS
WRITTEN HISTORICAL & DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
U.S. Department of the Interior
National Park Service
Oakland, California

HISTORIC AMERICAN ENGINEERING RECORD
HALEAKALA NATIONAL PARK ROADS

This report is an addendum to an 85-page report previously transmitted to the Library of Congress.

Location: Haleakala National Park, Maui, Hawaii.

Construction Date: 1933-1935.

Designer: National Park Service, Bureau of Public Roads.

Builder: E. E. Black, Honolulu, Hawaii.

Present Owner: National Park Service, Haleakala National Park.

Present Use: Vehicular road.

Significance: Haleakala Highway (Haleakala Park Road) provides access to the summit and crater of the dormant volcano, Haleakala, showcasing striking views and native Hawaiian ecosystems. The road represents the classic National Park Service (NPS) park road development tradition. It was designed and built by the NPS and the Bureau of Public Roads during the Great Depression.

Project Information: This addendum report is produced to comply with a stipulation in the Programmatic Agreement executed (November 13, 2009) between the National Science Foundation, NPS, Advisory Council on Historic Preservation, the Hawaii State Historic Preservation Officer and others for the Advanced Technology Solar Telescope (ATST) project. The ATST is to be constructed at the Haleakala Observatories, adjacent to Haleakala National Park, on land owned by the State of Hawaii and managed by the University of Hawaii Institute for Astronomy. This report photographically documents the Haleakala Park Road and the 45 contributing features (1 bridge and 44 culverts) as identified in the following report: National Park Service, Cultural Landscapes Inventory, 2001, Haleakala Highway, Haleakala National Park (CLI). This report also provides written descriptions of these features. The majority of the written historical context in this addendum is quoted from the CLI.

Description of Culverts, Box Culverts, Bridge and Road

The culverts, box culverts, and bridge are some of the key characteristics that historically defined the Haleakala Highway[1] (Haleakala Park Road). They were built in the Park Service Rustic style using basalt lava rock from the site. This style is based on using indigenous materials and construction techniques of the region, which were integrated into the natural forms and character of the site.[2]

In addition to the associated features of the culverts, box culverts, and bridge, the roadway itself shows qualities of rustic design in several areas: one being its simple appearance, which contradicts the considerable design effort expended in construction. Other examples of rustic design of the roadway are its alignment following the natural contour of the land to reduce its intrusion on the landscape, lack of guardrails to maximize views, and natural road shoulders and cut and fill areas.[3]

Culverts

The drainage culvert inlet and outlet headwalls along the summit road in the park consist of several different types; basalt masonry with concrete mortar, drystack basalt rubble, cast concrete, and earth. Basalt masonry with concrete mortar occurs in three types; random rubble, coursed rubble, and coursed quarry-faced basalt ashlar. These are typically set in concrete mortar containing small aggregate. The top surface is typically level, and on random rubble construction it is common for this top surface to be formed of a single course of roughly squared stones. Overall width dimensions of all basalt masonry types range from 6'-6" to 14'-6". Height dimensions are noted as the portion of the masonry visible above grade, and these vary from 2'-0" to 10'-0". Occasionally these headwall types are found with wingwalls of either rubble masonry or cast concrete.

Drystack basalt rubble is found only at culvert outlets and is typically formed to follow the contour of the hillside with indeterminate dimensions. Earth headwalls are also found only at outlets; it is apparent if earth outlets were constructed or if they were drystack outlets that have eroded.

All culverts have corrugated metal pipe lining the bore. This is found in four diameters; 24", 32", 36", and 42".

Box Culverts

These culverts have larger, rectangular-section bores that are lined with board-formed concrete. Inlet and outlet headwalls are of three types: coursed, quarry-faced basalt ashlar masonry with cement mortar, random rubble basalt masonry with cement mortar, and cast concrete. The random rubble construction has roughly squared basalt quoins at the vertical corners where the headwall joins the bore. Atop the bore of both types of basalt construction are concrete slabs

[1] National Park Service, *Cultural Landscapes Inventory, Haleakala Highway, Haleakala National Park*, 2008. P. 14.
[2] Ibid. P. 16.
[3] Ibid. P. 17.

with varying thicknesses, from 10" to 1'-3". The ends of these slabs are exposed in the headwalls.

Cast concrete construction is found in several box culvert headwalls. These have cast concrete wingwalls. Two box culverts (contributing features numbers 2.950 and 4.209, inlets) have the ends of basalt quoins exposed a short distance inside the bore. This indicates that the cast concrete is a later addition over former basalt masonry work.

Box culvert bores vary in width from 6'-0" to 10'-6", and are typically board-formed concrete.

Bridge

The bridge (contributing feature number 1.612) has a total width of about 24'-6" and a roadway width of about 20' that carries two lanes of traffic. It is reinforced concrete construction with basalt random rubble masonry parapets and coursed, quarry-faced ashlar retaining walls and abutments. The superstructure (deck underside, beams, and approximate 4' high outboard sides) is board-formed concrete.

The span of the bridge between abutments is about 37' on the down slope side and about 47' on the up slope side. The flat topped parapets are typically between 1'-8" and 1'-10" wide and 1'-9" high. They are each set on basalt curbs that are 8" wide and about 4" high. The parapet on the down slope side is about 68' long and the parapet on the up slope side is about 78' long.

The underside of the bridge has three longitudinal concrete beams and one transverse concrete beam near the midpoint of the single span. At each outer edge, the longitudinal beam is 2'-6" wide. The center longitudinal beam is 1'-6" wide. On the down slope edge of the bridge, the outer longitudinal beam is about 3' high. The center longitudinal beam is about 4' high. The underside of the deck slab is canted atop these varying height beams, reflecting the super elevation of the curved roadway surface. (Due to the precipice into the gulch below the bridge, it was not possible to measure the height of the outer longitudinal beam on the up slope edge during fieldwork for this report.)

Road

The Haleakala Highway (Haleakala Park Road) inside the National Park has a typical width of about 20' to 22'. Except for widened sections with extra lanes at Park Headquarters (for bus parking) and three slow vehicle pull-outs, it is two-lane for its entire length. Switchbacks in the road (9) are also wider, although still only two lanes. The road extends approximately 10.6 miles from the Park entrance at about 6,700' elevation to the terminus at 9,735' elevation at White Hill. From this terminus a spur road was constructed in 1941 to the summit (Red Hill, 10,023'). The majority of the road's length has either narrow gravel shoulders or none. There are no guardrails along the road, reflecting the intent of the original design to have as little visual impact on the landscape as possible.

The road follows its original alignment from the Park entrance to White Hill. It traverses through a terrain of scattered trees at the entrance and as it progresses higher, through low scrub vegetation which can be especially dense in areas that collect rain runoff. The scrub becomes sparser at increased altitude, and diminishes by about the 9,000' elevation, where rock, cinder

and gravel are exposed on the upper slopes. The path of the road switches back as it climbs, allowing a fairly gently grade for its entire length. The area it crosses is generally free of large gulches, and only one bridge is used. At numerous places the roadbed is cut out of the hillside, and all gulches except the one spanned by the bridge have been filled and culverts set.

TABLE 1: Culvert Descriptions on Haleakala Highway in Haleakala National Park

		Details of Masonry Construction					
Feature Number	Type	Inlet (Masonry Dimens.)	Inlet Description	Outlet (Masonry Dimens.)	Outlet Description	Culv. Bore (dia.)	Notes
0.627	CULV	9' w x 3'-6" h	random rubble	8' w x 4' h	coursed rubble	24"	
0.844	CULV	7'-7" w x 3'-6" h	random rubble	8' w x 2'-6" h	coursed rubble	24"	
0.883	CULV	11' w x 4' h	random rubble	8' w x 3'-6" h	coursed rubble	24"	
0.993	CULV	12' w x 5'-6" h	random rubble	9' w x 3' h	random rubble	32"	
1.296	CULV	7' 6" w x 3' h	random rubble	12'-3" w x 4' h	random rubble	24"	
1.361	CULV	inaccessible	inaccessible	11' w x 4' h	random rubble	24"	inlet inaccessible, vegetation/slope
1.55	CULV	7'-6" w x 2'-9" h	random rubble	drystack	drystack	24"	
1.558	CULV	6'-9" w x 4' h	random rubble	11'-10" w x 5' h	random rubble	24"	
1.612	BRIDGE						see text for description of bridge
1.705	CULV	7'-9" w x 4' h	random rubble	drystack	drystack		
1.777	CULV	11'-9" w x 4'-3" h	random rubble	drystack	drystack	24"	inlet= concrete wingwalls & 2' high concrete header atop masonry
1.847	CULV	12'-6" w x 4'-9" h	random rubble	drystack	drystack	24"	
1.993	box CULV	35' w x 9'-6" h	coursed quarry faced ashlar	43' w x 11' h	coursed quarry faced ashlar	8'-6" wide	1' thick conc slab atop the bore, associated diversion structure
2.010	CULV	10' w x 3'-10" h	random rubble	8' w x 4'-6" h	random rubble	24"	culvert pipe forms a bend under the road
2.113	CULV	11'-6" w x 3'-9" h	random rubble	drystack	drystack	24"	
2.195	CULV	7'-2" w x 4' h	random rubble	7' w x 3'-1" h	coursed quarry faced ashlar	24"	
2.428	CULV	7'-3" w x 3' h	random rubble	6'-6" w x 2' h	coursed rubble	24"	
2.497	CULV	9'-5" w x 3'-5" h	random rubble	drystack	drystack	24"	
2.621	box CULV	30' w x 8'-4" h	coursed quarry faced ashlar	36' w x 8' 2" h	random rubble	6' wide	10" thick conc slab atop the bore
2.700	CULV	9'-6" w x 3'-3" h	random rubble	12' w x 5'-8" h	coursed quarry faced ashlar	36"	
2.855	CULV	8' w x 4'-4" h	coursed rubble	drystack	drystack	24"	
2.863	CULV	7-3" 4 x 3' h	random rubble	inacessible	inaccessible	24"	outlet inaccessible, vegetation/ slope
2.937	box CULV	40' w x 10'-4" h	coursed quarry faced ashlar	32' w x 10'-2" h	random rubble w/quoins	8' wide	1' thick conc slab atop the bore
2.950	box CULV	41'-6" total width: 12'-6" & 18'-6" wingwalls, 12'-8" h	cast concrete	41'-6" w x 13'-2" h	coursed quarry faced ashlar	10'-6" wide	inlet = cast concrete with wingwalls, quoins visible in bore, 15" thick conc slab atop the bore
3.345	CULV	12'-4" w x 3'-9" h	random rubble	earth	earth	24"	

TABLE 1 (cont'd): Culvert Descriptions on Haleakala Highway in Haleakala National Park

		Details of Masonry Construction					
3.513	CULV	13'-9" w x 6'-8" h	random rubble	earth	earth	32"	
3.583	CULV	12'-3" w x 3'-8" h	random rubble	drystack	drystack	24"	outlet = drystack with 9' long drystack wingwalls
3.698	CULV	8' w (plus 5' wingwalls) x 7'-4" h	random rubble	9'-9" w x 3'-10" h	random rubble	32"	inlet = headwall & wingwalls are random rubble. Appear original.
3.789	CULV	9' w x 2'-9" h	random rubble	drystack	drystack	24"	
3.966	box CULV	39' w x 12' h	random rubble	44'-6" w x 11'-6" h	random rubble	10' wide	10' wide bore is set at a sharp diagonal to inlet & outlet headwalls resulting in a 12' wide opening along the face of the walls. 15" thick slab atop the bore. Inlet = top courses of stones form a curb at the road 1' wide, 38' long.
4.209	box CULV	20'-6" total width: 6' & 8'-6" wingwalls, 8' h	cast concrete	32' w x 9'-2" h	random rubble	6' wide	inlet =concrete with wingwalls, quoins visible in bore, 10" thick beam atop bore
4.250	CULV	14'-4" w x 5'-4" h	random rubble	11'-6" w x 4'-7" h	random rubble	36"	
4.300	CULV	14' w (plus 4'-6" & 8'-6" wingwalls) x 10' h	random rubble	14'-6" w (plus a 20' long retaining wall) x 4'-10" h	random rubble	42"	inlet = 4'-8" high historic stonework topped by added stonework to give total headwall ht of 10'
4.800	CULV	8' w x 3'-6" h	random rubble	earth	earth	24"	
4.873	CULV	9'-9" w x 4'-6" h	random rubble	11'-7" w x 5'-8" h	random rubble	36"	
4.985	box CULV	20'-6" w x 8'-4" h	random rubble	17' w x 8'-4" h	random rubble	6' wide	10" thick conc slab atop the bore
5.212	box CULV	15' total width: 5'-6" & 3'-6" wingwalls, 9'-6" h	cast concrete	31'-10" w x 10'-2" h	random rubble	6' wide	10" thick conc slab atop the bore
5.819	box CULV	20'-9" w x 7'-9" h	random rubble	23'-4" w x 8' h	random rubble	6' wide	10" thick conc slab atop the bore
5.840	box CULV	31' w x 7'-10" h	random rubble	26'-2" w x 8' h	random rubble	6' wide	10" thick conc slab atop the bore
5.910	box CULV	24' w, 6' concrete wingwalls, 10'3" h	cast concrete & random rubble	24'-3" w x 7'-10" h	random rubble	6' wide	1' thick conc slab atop the bore. Above outlet is added 23' wide retaining wall of 1'-10" high cast concrete and 4'-4" high rubble
6.269	CULV	12' w x 6' h	random rubble	12' w x 4'-9" h	random rubble	36"	inlet= 27' long rubble sidewall 3'-6" high.
6.499	CULV	11' w x 4'-9" h	random rubble	12'-4" w x 4'-8" h	random rubble	36"	
6.599	CULV	17' w x 9'-10" w	random rubble	12'-9" w x 5'-9" h	random rubble	36"	
8.547	CULV	8'-8" w x 3'-6" w	random rubble	8'-6" w x 5'-8" h	random rubble	24"	outlet = 3' high added rubble section
10.500	CULV	5'-8" w x 2'-6" h	random rubble	8' w x 3'-2" h	random rubble	24"	outlet = 15' wingwalls of natural rock

Historical Context

See HAER HI-52, data pages 1-85, for the historic context on the Haleakala Park Roads that was provided in that 1999 report. The text that follows is additional history that covers the 1960s to the present.

Mission 66 Program

Between 1956 and 1966 the NPS undertook a $1 billion program of infrastructure improvements within the parks. This program was called Mission 66 and was "the largest program for park improvements ever initiated by the NPS and [is] one of the most significant federal undertakings of the twentieth century."[4] The name was chosen to symbolize the program's "goal-oriented ideology"[5] and to represent the 1966 completion date of the ten-year program, which would coincide with the 50-year anniversary of the beginning of the NPS. The Mission 66 program was conceived by Conrad L. Wirth, Director of the NPS from 1951 to 1964. Wirth had a background in landscape planning before he became a member of the National Capital Park and Planning Commission in 1928. In 1931, he joined the NPS as an assistant director for Land Planning. As the Director of the NPS, Wirth was responsible for cultivating the presidential and congressional support for Mission 66 that allowed its implementation.

During the post World War II years prior to the Mission 66 program, a large increase in the use of National Parks resulted in deteriorating park facilities and the over use of natural areas and features. "By the early 1950s the crisis had grown to overwhelming proportions" and was only anticipated to intensify as visitor levels climbed to an expected 80 million yearly by 1966.[6]

Wirth envisioned the Mission 66 program as implementing system-wide changes in how the parks interacted with the visiting public through the introduction of improved facilities and infrastructure, new educational methods for visitors, and perhaps most visibly, the introduction of the now familiar visitor center. In a departure from pre-war rustic-style park buildings and previous park policy that generally discouraged conspicuous building locations, Mission 66 placed relatively large, contemporary styled visitor center buildings in prominent, high traffic areas. This was intended to maximize the percentage of visitors receiving interpretive and educational information about the park in an effort to protect park resources.

The front piece of all NPS submissions for improvements under the Mission 66 program included the following mission statement:

What is Mission 66?

> Mission 66 is a forward-looking program for the National Park System intended to so develop and staff these priceless possessions of the American people as to permit their

[4] Christine Madrid French, "Mission 66, Modern Architecture in the National Parks." Website www.mission66.com ca. 2011. n.p.
[5] Ibid.
[6] Ibid.

> wisest possible use; maximum enjoyment for those who use them; and maximum protection of the scenic, scientific, wilderness, and historic resourced that give them distinction.
>
> Construction is an important element on the program. Modern roads, well planned trails, utilities, camp and picnic grounds, and many kinds of structure needed for public use or administration, to meet the requirements of an expected 80 million visitors in 1966, are necessary; but they are simply one means by which "enjoyment-without-impairment" is to be provided.
>
> Under this program, outmoded and inadequate facilities will be replaced with physical improvements adequate for expected demands but so designed and located as to reduce the impact of public use on valuable and destructible features. It will provide both facilities and personnel for visitor services of the quality and quantity that the public is entitled to expect in its National Park System. It is intended to assure the fullest possible degree of protection, both to visitors and resources.[7]

To follow below is additional historical context for the Haleakala Highway that was not included in the first 85 data pages of HAER HI-52, including additional background on Mission 66. This material is taken directly from *National Park Service, Cultural Landscapes Inventory, 2008, Haleakala Highway, Haleakala National Park* (CLI). The parenthetical citations in the original 2008 CLI text were changed to HAER–standard footnote form for this report. (Note that a number of citations in the original 2008 CLI text do not have corresponding entries in the original 2008 CLI bibliography. These citations are reproduced here just as they are found in the 2008 document, and it is noted in each footnote that there is no entry in the CLI bibliography. The entire 2008 CLI bibliography is reproduced in the "Sources, Bibliography" section of this HAER report.)

> Mission 66 was a high profile, ten-year nationwide initiative aimed at modernizing the Park Service and accommodating changing visitation patterns. The program was so named because it would conclude in 1966 and commemorate the Service's fiftieth anniversary year. The years of neglect brought about by the economic climate of the war years left many of the Park Service facilities in substandard condition. The Service not only had inadequate housing for its own staff, it was also completely unprepared to meet the demands of the new influx of visitors introduced by a higher post-war standard of living and the automobile. The lack of adequate facilities in the parks was widely publicized. Popular magazines ran articles about the state of the parks, with some observers suggesting that a typical trip to a National Park would be an experiment in "discomfort, disappointment, even danger."[8] It was commonly felt that the public faced an "overuse of the deteriorating and outdated infrastructure in the parks, resulting in injuries,

[7] U.S. Department of the Interior, National Park Service, Gettysburg, PA. n.d. Text of mission statement "What is Mission 66?" on front piece of all NPS submissions for improvements under the project. From Christine Madrid French, "Mission 66" website www.mission66.com.

[8] Stevenson 1955. P. 57. *this citation not in the CLI bibliography*

complaints, and damage to the parks, and a generally unfulfilling experience for tourists."[9]

Mission 66 was conceived as a billion-dollar program to improve park facilities, increase staffing, and plan for the future expansion of the system. When the NPS was established in 1916, it put forth two basic concepts to define development of land for public use. The first NPS Director Stephen Mather argued for tourism development to attract people to the parks and in turn generate public and congressional support to ensure the parks' survival. NPS Director during the Mission 66-era, Conrad Wirth, argued in the same vein as Mather. He believed that development would control public access and prevent deterioration through what was termed the "paradox of protection by development."[10] Wirth believed:

> Development is based on the assumption that when facilities are adequate in number, and properly designed and located, large numbers of visitors can be handled readily and without damage to the areas. Good development saves the landscape from ruin, protecting it for its intended recreational and inspirational values. It is the purpose of Mission 66 to locate developed areas where they will not invade the wilderness, impair fragile areas or features, or encroach upon a well-thought-out plan for the protection and interpretation of the natural and historic features of the areas.[11]

Wirth was an adept politician and first convinced President Eisenhower in a special White House presentation on the need for improved park facilities. He addressed the President, "The problem of today is simply that the parks are being loved to death. They are neither equipped nor staffed to protect their irreplaceable resources, nor to take care of their increasing millions of visitors."[12] He illustrated his argument with slides of parks that he compared to slums, with campers and autos overcrowding park facilities, noting the growing number of visitors that were literally being turned away at the entrances. He then successfully lobbied Senate and House members for funding of his development plan.

In an effort to meet tremendous park needs with a limited budget, Mission 66 planners sought ways to modernize or update park facilities and, at the same time, decrease the cost of development. The NPS adopted contemporary Modern architectural styles and methods of construction that were typically less expensive than traditional park styles and methods. Modern Style architecture emphasized machine production over craftsmanship and the use of new materials (inexpensive steel, concrete, and glass). Structural honesty, the use of simple, geometric forms, and restrained use of architectural details were important elements that characterized this style. The NPS adapted the style to visually blend the buildings into their surroundings through plainness, low massing, horizontal lines, and earth tone colors. To further increase efficiency, the NPS produced standardized architectural plans for park buildings that that were repeated throughout the

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[9] Madrid 1998. P. 16. *this citation not in the CLI bibliography*

[10] Richard West Sellars, *Preserving nature in the National Parks: A history*. (New Haven: Yale University Press, 1997). P. 181.

[11] U.S. Dept. of the Interior 1957. P. 308. *this citation not in the CLI bibliography*

[12] Dilsaver 1994. P. 194. *this citation not in the CLI bibliography*

> region and nation, with modifications allowed to address specific landscape constraints, such as sloping topography, as well as variations in climate.
>
> During the Mission 66-era, most developed areas along the Haleakala Road were updated, but the most significant developments along the road were at the Leleiwi Lookout Point, the Kalahaku Overlook, and Red Hill…. (P. 45-46)

Recent History of Haleakala Highway

The CLI explains that improvements were needed between the 1976 and 1999 due to increased traffic along the Highway.

> Haleakala Highway was a narrow, one-and-a-half lane road as late as the 1970s. The road was entirely resurfaced in a three-phase project that began in 1976 and was completed in the early 1980s. The projects were contracted to Goodfellows Brothers, Inc. and Fong Construction of Kahului, Maui. Fong Construction's contract was for the "lower road," between the park entrance at Station 0+00 to just below the Halemau'u parking area at Station 235+00, and the "upper road," between Station 470+00 just above the Kalahaku Overlook to the Red Hill parking area and to the end of the road at the park boundary. The original plans called for the new road surface to be 20 feet wide on tangents, although the as-constructed plans show that the surface was widened to 22 feet. Curves were also widened, although the width varied. The road in front of park headquarters was widened to four lanes to accommodate bus parking. New cement rubble headwalls were constructed where culverts had to be widened.[13] The reconstructed road utilized a structural section consisting of a 1-1/2 inch thick asphaltic concrete over a 2-3/4 inch asphalt stabilized base course.[14]
>
> The large increase in traffic, especially buses, since the 1976-1980 reconstruction had created numerous sites where the pavement was cracking, settling, and breaking up. The area with the most severe damage was a 5,000 foot section of road between the park entrance and headquarters, where the entire road was cracked and settling. Above the headquarters, spot pavement failures ranged in size from 50 square feet to 1,500 square feet. Two culverts were buried with so little cover soil that the pipes were partially collapsed and the pavement was flexing and breaking up. Many of the spot failures were creating traffic hazards, since cars had to occasionally cross the centerline to avoid potholes. The environmental assessment stated that the road did not retain any historic integrity due to road work in 1976-1980, however, while the original pavement had admittedly been replaced, this assessment did not take in to account the surviving bridge

[13] Department of the Interior, National Park Service, "Environmental Assessment, Road Rehabilitation and Repair Project, West Crater Road, Haleakala National Park, Island of Maui, Hawaii, May 1993," (Haleakala National Park, 1993), HALE library.

[14] U.S. Department of the Interior. National Park Service. "Environmental Assessment, Road Rehabilitation and Repair Project, West Crater Road, Haleakala National Park, Island of Maui, Hawaii, May 1993." (Haleakala National Park, 1993). HALE library.

and remaining masonry culvert headwalls, or address such broader concerns as the integrity of the general alignment and associated landscaping.[15]

Haleakala Highway was resurfaced in October 1999. The job added a pullout just before the Halemau'u Trailhead and used the excavated materials to stabilize portions of the shoulder that were badly eroded. The excavated material also allowed the Park Service to enlarge a pullout near the turn at the 8,500 foot elevation.[16] (P. 50-51)

Haleakala Highway's Alteration History

The CLI provides an analysis of the Highway's historic integrity, and a summary regarding changes since its period of significance, as discussed below.

Haleakala Highway

The portion of the Haleakala Highway within the park boundaries began at the end of the territorial approach highway near Pu'u Nianiau at the park boundary and extended to the rim of Haleakala Crater near White Hill. The elevation at the lower terminus was 6,700', at the upper terminus, 9,735'. The construction project consisted of 10.658 miles of grading, draining, and surfacing with treated, crusher-run base course. The road was designed to have as little visual impact on the landscape as possible with narrow travel lanes, no shoulders, and no guard rails. Historically, the controlling width of the roadway was 14', carrying a crown section of 8' with 3' shoulders on each side and no ditches. Standard widening was used on all curves. All blind curves and reverses were widened by an extra 8'. Slopes were flattened and widened wherever the terrain permitted. The roadbed from shoulder to shoulder was surfaced with a 4" course of crusher-run material. The surface was treated with an application of asphalt emulsion and covered with clean stone screenings.

Since the period of significance, the road has undergone some alterations to address maintenance and safety concerns. For instance, the road has been resurfaced and several intersections, spur roads, and pullouts have been added. In addition, travel lanes have been widened and in some areas, this has resulted in widening of the original prism of the roadbed, especially in the upper portions of the road and on sharp switchback turns. As a result of road widening and loss of historic culverts, the upper four miles of the road have diminished integrity. The road was resurfaced in a three-phase project that began in 1976 and was completed in 1980. The original plans called for the new road surface to be 20' wide on tangents, although the as-constructed plans show that in some areas the surface was widened to 22' including gravel shoulders. Curves were also widened, although the width varied. The road in front of park headquarters was widened to four lanes to accommodate bus parking. The reconstructed road utilized a structural

[15] Ron Nagata, Resource Management Specialist, Haleakala National Park, electronic mail correspondence with author, October 18, 1999.
[16] "Haleakala visitors set record in 1997," *Honolulu Advertiser*, June 19, 1997. P. Bl.

section consisting of a 1-1/2" thick asphaltic concrete over a 2-3/4" asphalt stabilized base course.[17]

Haleakala Highway was again resurfaced in October 1999. The job added a pullout just before the Halemau'u Trailhead and used the excavated materials to stabilize portions of the shoulder that were badly eroded. The excavated material also allowed the Park Service to enlarge a pullout near the turn at the 8,500' elevation. The road was also widened near the park boundary to accommodate a new fee station in the middle of the road.

The result of these later modifications has impacted some portions of the road's integrity, but overall the majority of the historic road character is still intact. Widened portions of the road include the upper segments of the road, the switchback turns, and the segments of road at the park entrance station and the park headquarters building.

Today, the road continues to provide a unique experience of driving on a steep, windy, relatively narrow road, unique from typical highways constructed today. The road has limited shoulders and no guardrails, other than boulder barriers on some of the switchback turns, and continues to follow its original alignment as it zigzags up the slope of the volcano with nine switchbacks. (P. 84-85)

Turnouts and pull-outs (non-contributing)

Historic construction documents of the Haleakala Highway do not indicate any pullouts were built along the road during the period of significance. Over time, some pullouts have been added as the road was widened. Some of the more prominent pull outs or turnouts along the road include a pullout to access a water tank at MP 1.652, slow vehicle turnouts along both travel lanes at MP 2.955, the Hitchhiker's pullout at MP 4.454, and two additional slow vehicle turnouts at MP 6.790 and 8.272. These turnouts and pullouts are paved with asphalt.

Less formalized, gravel pullouts are located at the following mile points: MP 0.843, MP 1.412, MP 1.432, MP 2.827, MP 3.840, MP 4.400, MP 4.768, MP 4.950, MP 6.019, and MP 6.500.

Summary

The road was designed to have as little visual impact on the landscape as possible with narrow travel lanes, no shoulders, and no guard rails. Since the period of significance, travel lanes have been widened and several intersections, spur roads, and pullouts have been added. However, the road continues to feel narrower and less intrusive than typical roads constructed today. The road has limited shoulders and no guardrails, other than boulder barriers on some of the switchback turns. The road continues to zigzag up the slope of the volcano with nine switchbacks. Parking and trails are located at White Hill, the historic terminus of the road. (P. 89)

[17] U.S. Department of the Interior. National Park Service. "Environmental Assessment, Road Rehabilitation and Repair Project, West Crater Road, Haleakala National Park, Island of Maui, Hawaii, May 1993." Haleakala National Park, 1993. HALE library.

Sources

A. Architectural Drawings

No original drawings of the Haleakala Highway in Haleakala National Park were located for this report.

B. Early Views

Early photographs of the opening ceremony of the Haleakala Highway in Haleakala National Park are located at the Hawaii State Archives in folder PP113-2.

C. Bibliography

French, Christine Madrid. "Mission 66, Modern Architecture in the National Parks." Website www.mission66.com accessed on April 12, 2012. N.d. (ca. 2011).

National Park Service. Cultural Landscapes Inventory, 2008, Haleakala Highway, Haleakala National Park (CLI).

U.S. Department of the Interior, National Park Service, Gettysburg, PA. n.d. Text of mission statement "What is Mission 66?" on front piece of all NPS submissions for improvements under the project. From Christine Madrid French, "Mission 66" website www.mission66.com.

The following section is the bibliography provided on pages 105-111 of the CLI.

Government Documents

Albright, Horace, Field Assistant to the Director, National Park Service. "Annual Report." 1920. Pamphlet files, HAVO library.

Apple, Russell A. National Register of Historic Places Inventory-Nomination Form for 1790 Footprints. Honolulu: U.S. Department of the Interior, National Park Service, 1973.

_____. National Register of Historic Places Inventory-Nomination Form for Old Volcano House #42. Honolulu: U.S. Department of the Interior, National Park Service, 1973.

_____. National Register of Historic Places Inventory-Nomination Form for Whitney Seismograph Vault #29. Honolulu: U.S. Department of the Interior, National Park Service, 1973.

Architect Design Associates. "Restoration and Rehabilitation of Homes in Ewa Villages; Tenney, Renton, and Varona Villages; Ewa, Hawaii." In Ewa Plantation: Ewa Village Revitalization Project [online],1998 [cited February 28, 2002]. Available at http://www.lava.net/~ada/history.html.

Balachowski, Joseph, Cathy Gilbert, Elizabeth Gordon, Kimball Koch and Peggy Nelson. Preliminary Cultural Landscape Inventory for the Headquarters Area, Haleakala National Park, Maui, Hawaii. 2001.

_____. Preliminary Cultural Landscape Inventory for the Pu'u Nianiau Area, Haleakala National Park, Maui, Hawaii. 2001.

Barton, Eugene J. "Assistant Superintendent's Report." Reports attached to "Superintendent's Monthly Report," May 1949 and June 1949. HAVO library.

_____. "Haleakala Section Report." Multiple reports attached to "Superintendent's Monthly Report," March 1952 to October 1956. HAVO library.

_____. "Maintenance Report." Attached to "Superintendent's Monthly Report," November 1954. HAVO library.

_____. Memorandum Attached to "Superintendent's Monthly Report." August 1949. HAVO Library.

Bevens, Darcy, Taeko Jane Takahashi, and Thomas L. Wright, eds. The Early Serial Publications of the Hawaiian Volcano Observatory. 3 vols. Hawaii National Park: Hawaii Natural History Association, 1988.

Carey & Co. Inc., Historic Resources Study, Hawaii Volcanoes and Haleakala National Parks, The Early Years (1916-1945)," August 30, 2002. HALE Library Collection.

Carson, Mike T. and Melanie A. Mintmier. "Archeological Survey of Previously Recorded Sites in Front Country Areas in Front Country Areas in the Summit District of Haleakala National Park, Maui Island, Hawaii." Prepared for the National Park Service, Pacific West Region, Pacific Islands Support Office. International Archaeological Research Institute, Inc., Honolulu

Circular of General Information Regarding Hawaii National Park. Washington, D.C.: U.S. Government Printing Office, 1929.

Crane, Richard W. "Bridge Safety Inspection Report, Seven Pools Bridge, Haleakala N. P., Structure No. 8290-002P." U.S. Department of Transportation, Federal Highway Administration, Region 8, Office of Western Bridge Design. Denver, 1978. HABS/HAER office, Washington, D.C.

Circular of General Information Regarding Hawaii National Park. Washington, D.C.: U.S. Government Printing Office, 1931.

Drury, Newton B., Director of the National Park Service. Letter to James S. Achong, Clerk, House of Representatives, Territory of Hawaii, December 19, 1950. "Haleakala Sections Roads, 1950-1953" folder, File 631-03, HAVO archives.

Duensing, Dawn E. Historic American Engineering Record for Haleakala Highway. Washington, D.C.: U.S. Department of the Interior, Historic American Engineering Record, 1999.

Handley, H. L. "Final Construction Report on the Haleakala Road, Project NR-7, Hawaii National Park, Island of Maui, Territory of Hawaii, 1933-1935," approved March 30, 1935. U.S. Department of Agriculture, Bureau of Public Roads. Honolulu, 1935. HAVO archives.

_____. "Report on Haleakala Location Survey, Hawaii National Park, Island of Maui, Territory of Hawaii." U.S. Dept. of Agriculture, Bureau of Public Roads. Honolulu, January 16, 1933. NARA.

Jackson, Frances. An Administrative History of Hawaii Volcanoes National Park [&] Haleakala National Park. Honolulu: n.p., 1971.

Kittredge, Frank A. "Investigation Road Program, Hawaii National Park." U.S. Department of Agriculture, Bureau of Public Roads. Honolulu, 1925. NARA.

Leavitt, E.P. Letter from HNP Superintendent, to NPS Director, 28 September 1931, "60003-Development Outline" Folder, Box 1175, Record Group 79, National Archives and Records Administration at College Park, College Park, Maryland

Lindsay, James C., Park Ranger, Haleakala Section, Hawaii National Park. "Monthly Narrative Report to Assistant Superintendent." Attached to "Superintendent's Monthly Report," October 1940. HAVO library.

MacDonald, Gordon A. and Douglass H. Hubbard. Volcanoes of the National Parks in Hawaii. 4th ed. Hawaii Volcanoes National Park: Hawaii Natural History Association, Ltd., 1968.

Paige, John C. The Civilian Conservation Corps and the National Park Service, 1933-1942: An Administrative History. Washington, DC: U.S. Department of the Interior, National Park Service, 1985.

"Red Hill Site Plan - Haleakala." October 10, 1960. Microfiche #3121. HAVO Maintenance Division files.

Sager, Merel S. "Final Construction Report Haleakala Highway Project 7, Bituminous Surface Treatment, Island of Maui, T.H. [Territory of Hawaii], December 10, 1935." U.S. Department of the Interior, National Park Service. Hawaii National Park, 1935. HAVO archives.

_____. "Final Construction Report Haleakala Highway, Project 7, Hawaii National Park, Island of Maui, T.H., April 16, 1935." U.S. Department of the Interior, National Park Service. Hawaii National Park, 1935. HAVO archives.

_____. "Radio Talk for Haleakala Road Opening." Text attached to "Superintendent's Monthly Report," March 1935. HAVO library.

Sellars, Richard West. Preserving nature in the National Parks: A history. New Haven: Yale University Press, 1997.

"Silversword Road and Parking - Haleakala." March 1, 1954. Microfiche #2105. HAVO Maintenance Division.

"Superintendent's Monthly Reports." 1922-1967. HAVO library.

Tweed, William C., Laura E. Soulliere and Henry G. Law. National Park Service Rustic Architecture: 1916-1942. Western Regional Office: U.S. Department of the Interior, National Park Service, 1977.

U.S. Department of the Interior. National Park Service. "Environmental Assessment, Road Rehabilitation and Repair Project, West Crater Road, Haleakala National Park, Island of Maui, Hawaii, May 1993." Haleakala National Park, 1993. HALE library.

_____. "Haleakala National Park, West Crater Rim Road Reconstruction, Park Entrance to Red Hill, As Constructed, Contract No. CX-8000-9-9003, May 4, 1979." Haleakala National Park, 1979. HALE Maintenance Division files.

_____. "Master Plan, Environmental Impact Statement, Haleakala National Park, 'Draft Subject to Change." Haleakala National Park, 1971.

_____. Mission 66 for the National Park system. Government report. Washington, DC: Government Printing Office, 1956.

_____. "Planning Options, Haleakala National Park, Seven Pools." Denver Service Center. Denver, 1975. HALE library.

U.S. Department of Transportation. Federal Highway Administration. "Report on the Anticipated Effects of Observatory Construction on Crater District Roads, Routes 10,100, and 200 Haleakala National Park, Maui, Hawaii, June 1992, 'Trip Report." Central Federal Lands Highway Division. 1992. HALE library.

Vaughan, Thomas, Russell A. Apple, and E.J. Ladd. National Register of Historic Places Inventory-Nomination Form for Crater Historic District, Haleakala National Park. Honolulu: U.S. Department of the Interior, National Park Service, 1974.

Whitcraft, Thomas, Assistant Superintendent, Haleakala Section, Hawaii National Park. "Haleakala Section Report." Attached to "Superintendent's Monthly Report," October 1956. HAVO library.

Pamphlets

"Souvenir Program for the Opening of Haleakala Road, Island of Maui, February 23, 1935." HAVO library.

Books

Bartholomew, Gail, comp. and ed. The Index to The Maui News, 1933-1950. Wailuku, Hawaii: Maui Historical Society, 1985.

Bartholomew, Gail. Maui Remembers: A Local History. Honolulu: Mutual Publishing, 1994.

Carr, Ethan. Wilderness by Design: Landscape Architecture and the National Park Service. Lincoln, NE: University of Nebraska Press, 1998.

Carr, Ethan. Mission 66: Modernism and the National Park Dilemma. Amherst, MA: University of Massachusetts Press, 2007.

Kyselka, Will and Ray Lanterman. Maui, How It Came to Be. Honolulu: University of Hawaii Press, 1980.

Maui News Haleakala Souvenir Edition, Supplement to Maui News, Issued in Commemoration of the Official Opening of the Scenic Highway to the Summit of Haleakala, the World's Greatest Dormant Volcano. Wailulcu, HI: Maui Publishing Co., February 23, 1935.

McClelland, Linda. Presenting Nature: The Historic Landscape Design of the National Park Service, 1916 to 1942. Washington, D.C.: Interagency Resources Division, National Register of Historic Places, National Park Service, U.S. Department of the Interior, 1993.

_____. Building the National Parks. Baltimore: Johns Hopkins University Press, 1998.

_____. National Register of Historic Places Multiple Property Documentation Form for Historic Park Landscapes in National and State Parks. Washington, D.C.: U.S. Department of the Interior, National Park Service, 1995.

Medeiros, A.C., L.L. Loope, and C.G. Chimera. Technical Report 120, Flowering Plants and Gymnosperms of Haleakala National park. U.S. Department of the Interior, National Park Service. Hawaii National Park, 1998.

Pukui, Mary Kawena and Samuel H. Elbert. Hawaiian Dictionary. Honolulu: University of Hawaii Press, 1986.

Pukui, Mary Kawena, Samuel H. Elbert, and Esther T. Mookini. Place Names of Hawaii. 2d ed., rev. and enl. Honolulu: University Press of Hawaii, 1974.

Sandler, Rob. Architecture in Hawaii: A Chronological Survey. Honolulu: Mutual Publishing, c. 1993.

Whitney, Henry M., comp and ed. The Tourists' Guide Through the Hawaiian Islands, Descriptive of Their Scenes and Scenery. Honolulu: The Hawaiian Gazette Company, 1890.

Wilkes, Charles. Narrative of the United States Exploring Expedition During the Years 1838, 1839, 1840, 1841, 1842. Vol. 4. New York: G.P. Putnam, 1856.

Periodicals

Dougherty, Henry E. "When the Earth Growls." Paradise of the Pacific 52, no. 12 (December 1940): 28-30.

Gordon-Cumming, Constance Frederica, "The Largest Extinct Volcano (An Ascent of Haleakala.)" Scribner's Monthly 22, no. 2 (June 1881): 272-275.

Jackson, Frances. "Military Use of Haleakala National Park." Hawaiian Journal of History 6 (1972): 129-141.

_____. "Bombs in a National Park: Military Use of Hawaii National Park During World War II." Hawaiian Journal of History 10 (1976): 102-7.

Hubbard, Douglas H. "Unique Park of Two Islands." Paradise of the Pacific 60, no. 12 (December 1948): 102-104.

Missionary Herald 25, no. 8 (August 1829): 246-251.

Thurston, Lorrin A. "The Proposed Hawaiian National Park." The Mid-Pacific Magazine 1, no. 3 (March 1911): 303-327.

Wingate, Edward G. "Hawaii National Park." Paradise of the Pacific 49, no. 12 (December 1937): 69-72.

Newspapers Articles

Honolulu Advertiser. June 19, 1997 and November 24, 1998.

Honolulu Star-Bulletin. November 24, 1998. Maui News. January 14, 1911 to July 9, 1941.

Personal Contacts

Nagata, Ron, Chief of Resource Management, Haleakala National Park. Electronic mail correspondence with author. October 18, 1999.

_____. . Interview by author, October 1999.

Reeser, Donald, Superintendent, Haleakala National Park. Electronic mail correspondence with author. October 18, 1999 and May 31, 2000.

Maps

"Haleakala Headquarters & White Hill Area" [drawing], 1936, "Master Plans—Hawaii National Park" Folder 3 of 5, Record Group 79, NARA-College Park.

Master Plans. Complete original drawing sets for 1931, 1932, 1935, 1936, 1937, 1938, and 1939 are located at the National Archives and Records Administration's College Park, Maryland facility (hereafter NARA-College Park). It is unclear if updates were prepared in 1933, 1934, 1940, 1941, or 1942. Additional master planning documents, including six-year plans and development outlines, and correspondence files from the period make no reference to drawings for these years.

"Special Areas & Fire Control Plan" [drawing], 1931, "Master Plans—Hawaii National Park" Folder 3 of 5, Record Group 79, NARA-College Park.

Websites

"Hawaiian Style Cottages 1995." In State of Hawaii Department of Land and Natural Resources Historic Sites Calendar 1995 [online], c. 2002 [cited April 3, 2002]. Available at http://www.Hawaii.gov/d1nr/hpd/hpcal95.htm.

Lockwood, J.P. and J.M. Rhodes. "Mauna Loa: A Decade Volcano." In University of Hawaii School of Ocean and Earth Science and Technology [online], 1995 [cited February 11, 2002]. Available at http://www.soest.Hawaii.edu/mauna_loa/intro.html.

Archives

Bancroft Special Collections, University of California, Berkeley, California.

Bishop Museum Archives, Honolulu, Hawaii. Hawaii State Archives, Honolulu, Hawaii.

National Archives and Records Administration Pacific Region Archives, San Bruno, California.

National Archives and Records Administration at College Park, College Park, Maryland.

Park Archives, Haleakala National Park, near Kula, Maui, Hawaii. Park Archives, Hawaii Volcanoes National Park, near Hilo, Hawaii.

Pacific Great Basin Support Office, National Park Service, Oakland, California.

Technical Information Center, Denver Service Center, National Park Service, Denver, Colorado.

United States Army Museum of Hawaii, Ft. Shafter, Hawaii.

Location map for culverts and bridge on the section of the Haleakala Park Road within the National Park. No scale.