Mr. Gary Gill, Director  
State of Hawaii  
Office of Environmental Quality Control  
220 South King Street, 4th Floor  
Honolulu, Hawaii 96813

SUBJECT: NEGATIVE DECLARATION FOR THE POOPOO BRIDGE REPLACEMENT FEDERAL AID PROJECT NO. BR-0900(40) MAUI, HAWAII

Dear Mr. Gill:

The County of Maui, Department of Public Works has reviewed the comments received during the 30-day public comment period which began on June 23, 1995. The agency has determined that this project will not have a significant environmental effect and has issued a negative declaration. Please publish this notice in the August 8, 1995 OEQC Bulletin.

We have enclosed a completed OEQC Bulletin Publication Form and four (4) copies of the final EA.

If you have any questions, please contact Cary Yamashita of the County of Maui, Department of Public Works, Engineering Division at (808) 243-7746 or Loren Lau of Sato & Associates, Inc. the design consultant at (808) 955-4441.

Thank you for your attention to this matter.

Very truly yours,

CHARLES JENICKS  
Director of Public Works  
and Waste Management

CYch(ED95-960)  
Enclosures
FINAL
ENVIRONMENTAL ASSESSMENT
NEGATIVE DECLARATION
for the
POOPOO BRIDGE REPLACEMENT
MAUI, HAWAII

Prepared for:

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

Prepared by:

SATO & ASSOCIATES, INC.
2046 SOUTH KING STREET
HONOLULU, HAWAII 96826

JULY 1995
# POOPOO BRIDGE REPLACEMENT PROJECT

MAUI, HAWAII

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I PROJECT OVERVIEW

A. INTRODUCTION

Piilani Highway is the only highway between population centers around the southeastern part of Maui, Hawaii. Many bridges along Piilani Highway are old, deteriorated and require frequent maintenance or repair. Their capacities are less than HS 20 (20 ton truck or 36 ton truck/trailer), which is required by the American Association of State Highway and Transportation Officials (AASHTO) for Rural Collector Roads. The County of Maui is in a program of replacing old and deteriorating bridges with new bridges with adequate roadway width and load capacity. The Poopoo Bridge is one of the bridges that require replacement. Refer to Figures 1, 2 and 3.

B. DESCRIPTION OF OBJECTIVES AND PROPOSED ACTION

The proposed project is an agency action by the County of Maui Department of Public Works and Waste Management.

1. Objectives

   The Poopoo Bridge is in need of repair or replacement. The County of Maui has evaluated the condition and projected repair cost, and has determined that replacement of the bridge is required. Refer to Exhibit A.

2. Proposed Action

   The existing Poopoo Bridge is a one lane timber structure with intermediate wood supports which span over Poopoo Stream. The project proposes a new two lane concrete bridge structure without intermediate supports which will span over Poopoo Stream. After the new bridge is activated, the wood bridge will be removed.

   Roadway adjustments to the one lane Piilani Highway will be made at the bridge. Adjustments will be made to provide proper sight distances, horizontal and vertical roadway profiles, and transitions to Piilani Highway.
C. PARTIES INVOLVED

1. **Applicant**
   County Of Maui, Dept. Of Public Works And Waste Management
   Mr. Charles Jencks, Director of Public Works

2. **Approving Agency**
   County Of Maui, Dept. Of Public Works And Waste Management
   Mr. Charles Jencks, Director of Public Works

3. **Consulted Agencies and Parties**

   **Federal**
   - Department of Agriculture, Soils Conservation Service
   - Army Corps of Engineers
   - Department of the Interior, Fish and Wildlife Services
   - Department of Transportation, Federal Highway Administration

   **State of Hawaii**
   - Department of Business, Economic Development and Tourism
   - Department of Hawaiian Home Lands
   - Department Of Land And Natural Resources
   - State Historical Preservation Division - DLNR
   - Environmental Management Division - DOH
   - Department of Transportation
   - Office of State Planning
   - Office of Hawaiian Affairs
   - Office of Environmental Quality Control
   - University of Hawaii at Manoa - Environmental Center

   **County Of Maui**
   - Planning Department
   - Department of Parks and Recreation
   - Department of Public Works and Waste Management

   **Others**
   - Sierra Club - Maui Chapter
   - The Nature Conservancy - Maui
   - Kipahulu Community Association
   - Hana Community Association
   - Hana Advisory Commission
   - Hana Public Library
II. DESCRIPTION OF PHYSICAL ENVIRONMENT

A. SURROUNDING LAND USES

The existing Poopoo Bridge is located on Piilani Highway along the southeastern coast line on the island of Maui. Piilani Highway is on the lower slopes of Mount Haleakala. The bridge carries Piilani Highway over Poopoo Stream, and connects Kaupo to Ulupalakua.

Piilani Highway and the Poopoo Bridge crosses the southern portion of the Haleakala Ranch Company property. Ranching and pasture grazing is the primary activity in this area. Refer to Figure 4.

B. BRIDGE STRUCTURE

The existing Poopoo Bridge is a one lane timber structure, with intermediate wood supports, which spans over Poopoo Stream. The bridge was constructed in 1948 and reconstructed in 1977. The bridge is approximately thirty eight feet above the stream bed. The structural supports consists of concrete abutments and wing walls at both ends, along with two intermediate heavy timber posts on concrete footings supports. Refer to Exhibit A.

C. ROADWAY

Piilani Highway is a lightly traveled, narrow and winding highway. The roadway widths vary from two lanes to one lane, depending on the extent of the highway improvement and topography. At the project site, the roadway is a single lane with asphaltic surface treatment on granular rocky material.

Average Daily Traffic Calculations and Traffic Count was provided by the County of Maui Department of Public Works and is included as Exhibit F.
D. CLIMATE AND AIR QUALITY

The climate is relatively uniform year round due to the proximity to the ocean and tropical latitude. Average temperatures range between 65 degrees and 88 degrees Fahrenheit. Historically the warmest months are July and August, while the coolest months are December and January.

Rainfall is seasonal. Most precipitation occurs between November and February as a result from winterstorms.

Wind patterns vary on a daily basis. Winds blow onshore during the day towards the warm land mass, then towards the warm ocean during the evening.

The lack of residential and commercial development, and the wind conditions would indicate air quality is good in the area. Sources of pollution occurs from vehicles traveling in the area. Degradation of the air quality is not anticipated due to the low vehicular traffic.

E. FLOOD AND TSUNAMI ZONE

The National Flood Insurance Rate Map (FIRM) for this area of the island designates the project site as being within Zone C, indicating an area of minimal flooding. Refer to Figures 5 and 5A.

F. TOPOGRAPHY AND SOILS

The bridge site consists of gently rolling hills with steep banks along both sides of Poopoo Stream. The area is blanketed by basaltic flows of the Kula Volcanic Series. The Kula flows form the surface over most of the northwestern and southeastern segments of Haleakala Mountain. The flows characteristically average twenty feet in thickness at the summit and fifty feet near the coast.

The bottom and sides of Poopoo Gulch consists of massive basalt flows with little or no soil cover. A minor amount of erosion is apparent at the stream bed, but there is little indication of lateral expansion of the stream bed or erosion of the side walls. The basalt was deposited in thick flows with few inclusions of ash or clinker as exhibited in the nearly forty foot vertical exposure on the sides of the gulch. Refer to Site Reconnaissance Report Exhibit B.
G. FLORA AND FAUNA

Flora

The vegetation on the project site and immediate surrounding area consists of buffelgrass grassland on very stony soil. The land is used for pasture. Where the shallow soil is stonier or where there are rocky outcroppings, pitted beardgrass, fuzzy top, and pili grass are codominant with the buffelgrass.

The steep walls of the gulch support scattered patches of buffelgrass, but large rocky outcrops predominate. The native 'akoko is common on the gulch walls. A few patches of 'ihhi occur on the rocky slopes and gulch walls makai of the existing bridge. The gulch bottom consists primarily of basalt bedrock with large boulders and gravel piles. A few small scattered patches of buffelgrass and koa-haele occur on the bottom of the gulch.

None of the plant on the project site is a listed, proposed or candidate threatened and endangered species, nor is any plant considered rare or vulnerable. Refer to Botanical Resources Assessment Exhibit C.

Fauna

The surrounding area has been extensively alter and/or leveled by earthmoving equipment and by animal grazing activity. The area is essentially pasture land for the Haleakala Ranch Company.

The project site is not a natural habitat for any federally listed, proposed, and candidate endangered and threatened species within the area. Refer to Appendix A - U.S. Department of the Interior Fish and Wildlife Service letters.

H. AQUATIC ENVIRONMENT

Poopoo Stream is an intermittent steam which is normally dry during most of the year. During the rainy season, the stream carries rain water from the lower portions of Mount Haleakala to the ocean. The bridge is approximately 750 feet from the ocean. This environment does not support aquatic life in the project area.
I. HISTORICAL AND ARCHAEOLOGICAL RESOURCES

The area has been extensively altered and/or leveled. Several jeep trails are present and bulldozer scars are seen on many of the rocks. Bulldozer piles are present along the sides of the roadway. It is likely that some of the previously disturbed ground observed in the project area is associated with the construction, maintenance and improvement of Piilani Highway and Poopoo Bridge. Ranching activities is also likely to have contributed to the ground disturbance.

A historic stone wall is present within the gulch and is approximately 480 feet mauka of the bridge. A jeep trail crosses the gulch at that point.

Remnant segments of the Hoapili Trail (Site 50-50-15-572) is present in the vicinity and crosses the gulch approximately 500 feet on the mauka side of the existing bridge. In the immediate project area, previous disturbances have destroyed and obliterated all surface indications of the trail and its alignment. The proposed project is not expected to have an adverse impact on any of the intact segments of this trail. Refer to Archaeological Inventory Survey - Exhibit D.

Should inadvertent findings occur during construction activities, work in the immediate area will be halted and the State Historic Preservation Division of the Department of Land and Natural Resources will be notified.

J. NOISE CHARACTERISTICS

Wind and ocean surf noise is the prominent source of noise in the area. Other noise source is generated by light vehicular traffic along the highway.

K. SCENIC AND OPEN SPACE RESOURCES

Scenic resources include Mount Haleakala on the mauka (mountain) side, low rolling hills stretching towards the ocean, and steep cliffs along the shoreline. There are no significant view corridors affected by the bridge project. Refer to Figures 6A, 6B, 6C and 6D.
VIEW TOWARDS THE MOUNTAINS

VIEW TOWARDS ULUPALAKUA SIDE OF BRIDGE

FIGURE 6A
FIGURE 6B

VIEW OF POOPOO GULCH TOWARDS THE MOUNTAINS

VIEW OF POOPOO GULCH TOWARDS THE OCEAN
FIGURE 6D

VIEW TOWARDS MOUNTAINS

VIEW TOWARDS KAUPO
III  DESCRIPTION OF PROJECT CHARACTERISTICS

A.  SITE PLAN

The new concrete bridge would be constructed on the mauka (mountain) side, and parallel, to the existing wood bridge. Traffic would travel along the existing roadway and bridge while the new two lane bridge and roadway approaches are under construction. Grading and cutting into existing hillsides is required to maintain the proper roadway transition to the bridge. Refer to Figure 7.

B.  NEW BRIDGE REPLACEMENT STRUCTURE

The bridge deck would be cast-in-place concrete deck on prestressed precast concrete girders. The span is approximately 63 feet. Tall abutments and wingwalls are required due to the steep face of the gulch. Refer to Figure 7A.

Cast-in-place concrete girders were considered. However, design and construction analysis was not initiated since placement of the formwork within the stream bed during construction may be severely impacted during rain/wet conditions. Also, precautions to prevent debris (construction formwork eroded by heavy stream waters during rainy periods) from entering the ocean appeared to be excessive.

The bridge designed will comply with the 1991 Edition of the Uniform Building Code. Construction cost is estimated to be approximately $1.5 million.

In the future, stream scours beneath the new bridge will be filled with concrete to minimize erosion. Filling of the stream scours will occur after a Federal Nationwide Permit 13 for Bank Stabilization and a State of Hawaii Section 401 Water Quality Certification is obtained.

C.  EXISTING BRIDGE REMOVAL

In the future, the existing wood bridge will be removed. The bridge removal would occur after a State of Hawaii Department of Land and Natural Resources Conservation District Use Application Departmental Permit is obtained, and after the activation of the new concrete bridge.
Removal of the existing bridge would not involve explosives. Bridge removal would involve cutting of the bridge wood and steel material into sections which could be lifted from the site with an overhead crane. Debris materials which fell into the gulch would be promptly removed. The concrete wingwalls at the upper banks of the gulch and concrete pier supports within the gulch would remain. Removal of the concrete may cause deterioration of the gulch area and may increase the potential of debris material entering the gulch.

Restoration of the adjacent landscaping due to the bridge removal activities is not anticipated. The bridge removal process would not adversely effect the adjacent landscaping.

D. LANDOWNERSHIP

The existing roadway and bridge is located within the Haleakala Ranch Company property. Existing Fillani Highway Right-Of-Way Easement documents are not available. Therefore, the new bridge and roadway approaches require establishment of a Roadway Right-Of-Way Easement for the existing and new bridge and roadway. Refer to Figure 4.

E. PERMITS AND APPROVALS REQUIRED

1. Federal

   Federal Permits are not required for the bridge replacement project.

   Concrete filling of the stream scours below the new bridge will occur independently of the new bridge construction work, since this item is not critical to the new bridge operations. Filling of the stream scours will require a Federal Nationwide Permit (NWP) 13 for Bank Stabilization from the U.S. Army Corps of Engineers. The NWP 13 does not initiate Section 106 National Historical Preservation Act.

   Federal Highway Administration has indicated that a Federal Environmental Assessment is not required since the project qualifies for a Code of Federal Regulation 23 Chapter I Part 771.117 Categorical Exclusions (c) (3).
2. **State of Hawaii**

The Department of Land and Natural Resources Commission On Water Resource Management has determined that a Stream Channel Alteration Permit is not required.

Concrete filling of the stream scours will occur independently of the new bridge construction work, since this item is not critical to the new bridge operations. Filling of the stream scours below the new bridge will require a Department of Health Section 401 Water Quality Certification since a Federal NWP 13 is required for bank stabilization work.

A Conservation District Use Application Departmental Permit is required from the Department of Land and Natural Resources for the work which will occur within the Conservation District. The Conservation District boundary follows the mauka edge of the existing Pillani Highway. Work involved in the Conservation District includes roadway modification and bridge removal. Refer to Figures 7B and 7C.

3. **County of Maui**

A Special Management Area (SMA) Assessment is required from the Planning Department since portions of Pillani Highway roadway approaches to the new bridge is within the Special Management Area. The SMA boundary follows the makai edge of the existing Pillani Highway. Roadway modification within the SMA is approximately 500 square feet and is estimated to be approximately $3,000 of the total $1.5M project cost estimate. Refer to Figure 7D.
SCALE 1" = 40'

LEGEND

***** LAND USE DISTRICT BOUNDARY

WORK WITHIN CONSERVATION DISTRICT
IV  AFFECTED ENVIRONMENT

A.  AIR QUALITY

The air quality is good in the area. The only sources of pollution occurs from vehicles traveling in the area. Increase vehicular traffic is not anticipated to occur with the bridge replacement project. Therefore, degradation of the air quality is not anticipated due to the low vehicular traffic.

B.  HYDROLOGIC AND HYDRAULIC ANALYSIS

Hydrologic and hydraulic analysis were completed and indicate that the 100 year and 500 year storms would flow below the new bridge concrete superstructure. Refer to Exhibit E.

C.  TOPOGRAPHY

Grading and cutting into the existing hillside is required to maintain proper roadway transition to the new bridge. The grading and cutting involves approximately 600 lineal feet. The cut into the hillside would taper from existing grade to approximately 15 foot vertical sloped cut into the hillside, on the Ulupalakua side of the bridge.

D.  FLORA AND FAUNA

Flora located within the construction site would be removed to allow access and placement of construction materials. Affect to fauna is not anticipated.

E.  NOISE CHARACTERISTICS

Construction related noise would be introduced into the area. Duration of the noise is actually limited to the short construction period and limited to daily working hours. Noise would be generated from vehicles and equipment delivering and placing the construction materials. Peak noise impact would occur during the grading and cutting process, and placement of the concrete materials.
V POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

A. SURROUNDING LAND USES

Impact to the existing land uses is minimal since encroachment into the pasture land area is minimal and would not adversely impact the adjacent ranching operations.

B. ROADWAY

Impact to the Piilani Highway vehicular traffic would be minimal since the existing roadway and bridge would be operational while the replacement bridge is under construction. The highway would be closed during short periods to facilitate placement of the new bridge structural members. These periods would be of short duration to minimize affect to the surrounding communities.

Increase vehicular traffic to the area is not anticipated since the population of the area is small. The area is rural in nature with large ranching communities without large activity centers.

C. AIR QUALITY

Pollution from construction vehicles and equipment would be introduced at the site. However, this source of pollution would be limited to daily working hours for various construction related vehicles and equipment. Degradation of the air quality is not anticipated since the number of construction vehicles and equipment is relatively small. Dispersion of the pollution is also accelerated by the trade wind activity and the open space at the project site.

D. FLOOD

Poopoo Stream 100 year and 500 year storm water drainage will not be impacted since the water flow is below the new bridge concrete superstructure. Refer to Hydrologic and Hydraulic Analysis Exhibit E.
E. SOILS

Soils erosion is anticipated to be minimal since the existing top soils coverage is minimal over the massive basalt rock material. While a National Pollutant Discharge Elimination System (NPDES) Permit is not required since the project does not exceed five acres, an Erosion Control Plan will be developed to ensure that construction related debris, including construction related soil erosion, is prevented from entering the stream and ocean.

F. FLORA and FAUNA

Impact to the flora and fauna will be negligible since the project site is relatively small and does not contain endangered plant or animal species.

G. AQUATIC ENVIRONMENT

No impact is anticipated to the aquatic environment at the project site since none exists. Construction measures will be taken to prevent construction debris and construction related soil erosion from entering the stream and ocean.

H. HISTORICAL AND ARCHAEOLOGICAL RESOURCES

No impact is anticipated to the historical and archaeological resources since none are in close proximity to the project site.

I. NOISE CHARACTERISTICS

Construction related noise impact to the environment is not anticipated since the construction site is distant from residential, commercial and resort population areas.

J. SCENIC AND OPEN SPACE RESOURCES

Impact to the scenic and open space resources is minimal since the bridge project will not adversely affect the view corridors.

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VI ALTERNATIVE ACTIONS

A. MAKAI (OCEAN) PLACEMENT OF THE NEW BRIDGE

Placement of the new concrete bridge on the makai side, and parallel, of the existing wood bridge was evaluated. Traffic would travel along the existing roadway and bridge while the new two lane bridge and roadway approaches are under construction. Grading and cutting into an existing hillside is required to maintain the proper roadway transition to the bridge. Refer to Figure 8.

The bridge deck would be cast-in-place concrete deck on prestressed precast concrete girders. The span varies from approximately 65 to 85 feet. Placement of the abutment and wingwalls will dictate the actual bridge span. Tall abutments and wingwalls are required due to the steep face of the gulch. Existing stream bed scours beneath the new bridge would be filled with concrete to minimize further erosion. Refer to Figure 8A.

This alternative is more costly than mauka side placement of the bridge since the longer spans require longer concrete structural beams, and the bridge concrete wingwalls are expected to be wider and deeper due to the gulch's steeper face. Delivery of the longer structural beams is also more difficult due to the existing narrow and windy roadway system, which increases the construction cost. Construction cost is estimated to be approximately $1.9 million.

This alternative is not recommended.

B. PLACEMENT OF THE NEW BRIDGE AT THE EXISTING BRIDGE LOCATION

Placement of the new concrete bridge would be at the existing bridge location. During construction, vehicular traffic would travel along a one lane detour roadway on the mauka side of the bridge. Grading, filling and cutting into the existing hillside is required to provide detour vehicular access. Refer to Figure 9.

The detour road would be a one lane oil topped gravel road, with a covered culvert and concrete ford crossing over Poopoo Stream at the location of an abandoned and washout jeep trail ford. Extensive site work
would be required to provide proper sight distances and vertical and horizontal roadway profiles to accommodate various motor vehicles. Removal of the detour road would occur after activation of the new bridge.

The bridge deck would be cast-in-place concrete deck on prestressed precast concrete girders. The span is approximately 63 feet. The existing abutment and wingwalls would be removed and replaced with new structure. Existing stream bed scour beneath the new bridge would be filled with concrete to minimize further erosion.

This bridge will have more adverse impact to the environmental due to the installation and deactivation of the temporary detour roadway over Poopoo Stream. Construction cost is estimated to be approximately $1.7 million.

This alternative is not recommended.

C. NO ACTION

Under the No Action alternative, no new bridge replacement or repair would occur. Future access to areas beyond the bridge by vehicles with heavy loads would be limited to the existing six-ton bridge limit. The bridge would continue to degrade.

Further degradation of the bridge may cause the bridge to close in the future, should the bridge no longer be able to provide safe support for vehicular traffic. This scenario would require the communities, beyond Poopoo Bridge, to use the Hana Highway for vehicular access to the rest of Maui. This would increase the traffic load onto Hana Highway and significantly increase the commute time. Should Hana Highway be closed for a period of time, the communities between Hana and the Poopoo Bridge would be isolated from vehicular access.

Under the No Action alternative, the potential for vehicular isolation to communities between Hana and Poopoo Bridge increase with time. Therefore, the No Action alternative is not considered a feasible option.
PO'O PO'O BRIDGE
SCHEME "B"
LONGITUDINAL SECTION

Existing ground
Upstream edge
Downstream edge

Option w/ Type 2 Girders

Concrete fill in undermined areas

Figure 8A
D. DEFERRED ACTION

Under the Deferred Action alternative, no new bridge replacement would occur. This would require extensive repair and maintenance effort by the County of Maui. This effort would be continued in the future and would be a constant expenditure of manpower and financial resources.

Vehicular access to areas beyond the bridge would be limited to the existing six ton limit. This may significantly limit and degrade potential future improvements to areas beyond the bridge site.

This deferred alternative causes future expenditure of manpower and financial resources without improvement of the bridge structure or performance. This Deferred Action is also not considered a feasible option.
VII FINDINGS AND CONCLUSION

The project involves the replacement of an existing one lane timber bridge structure over Poopoo Stream with a two lane concrete bridge structure. The new bridge provides a more permanent, low maintenance, and wider bridge structure on the Pillani Highway.

The replacement bridge does not introduce new activities or land usage in the general vicinity. Increased vehicular traffic is not anticipated. However, the new bridge allows easier vehicular traffic movement over the bridge and facilitates future Pillani Highway roadway improvements to areas beyond the Poopoo Bridge.

Rare, vulnerable or endangered flora and fauna species would not be affected.

Impact to historical and archaeological elements are not anticipated. Should any cultural material be found during construction, work in the immediate area will be halted and the State Historic Preservation Office will be notified.

Impacts to environmentally sensitive areas, such as flood plains, tsunami inundation zones, erosion prone zones, and pristine coastal waters is not anticipated.

Long term environmental effects as not expected from the new bridge replacement project.
COUNTY OF MAUI
BRIDGE REPORT

EXHIBIT A
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<td>310902825</td>
<td>PIHLANI HWY</td>
<td>12.99MI E/KULA HWY</td>
<td>028.300</td>
<td>20deg 37.7'</td>
<td>1756deg 13.0'</td>
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<td>8 STRUCTURE NUMBER</td>
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<td>6 Features Intrst</td>
<td>POOPOO STRM-STRUC #10</td>
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<td>9 Location</td>
<td>12.99MI E/KULA HWY</td>
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<td>11 Milepoint</td>
<td>028.300</td>
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<td>16 Lat: 20deg 37.7'</td>
<td>17 Long: 156deg 13.0'</td>
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<td>98 Border Br State</td>
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<td>99 Border Br Stru #</td>
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<table>
<thead>
<tr>
<th>STRUCTURE TYPE &amp; MATERIAL</th>
<th>Type- Stringer/Multibeam/Girder 702</th>
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<tbody>
<tr>
<td>Other</td>
<td>Stru Main Material- -Timber</td>
</tr>
<tr>
<td>Deck</td>
<td>400</td>
</tr>
<tr>
<td>Main Span(s)</td>
<td>003</td>
</tr>
<tr>
<td># of Main Spans</td>
<td>000</td>
</tr>
<tr>
<td># of App Spans</td>
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<tr>
<td>Wearing Surf/Protective</td>
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<tr>
<td>Type- Other</td>
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<tr>
<td>Membrane</td>
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<thead>
<tr>
<th>AGE &amp; SERVICE</th>
<th>Year Built: 1948</th>
</tr>
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<tbody>
<tr>
<td>Reconstructed</td>
<td>1977</td>
</tr>
<tr>
<td>Year Reconstrocated</td>
<td>15</td>
</tr>
<tr>
<td>Lanes On Stru: 01</td>
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</tr>
<tr>
<td>Under Stru: 00</td>
<td></td>
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<tr>
<td>ADT</td>
<td>002000</td>
</tr>
<tr>
<td>Yr of ADT</td>
<td>89</td>
</tr>
<tr>
<td>Truck ADT</td>
<td></td>
</tr>
<tr>
<td>Bypass, Detour Length</td>
<td>99</td>
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<table>
<thead>
<tr>
<th>GEOMETRIC DATA</th>
<th>Length of Max Span (ft) : 0018</th>
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<tbody>
<tr>
<td>Structure Length</td>
<td>000060</td>
</tr>
<tr>
<td>Curb/Sidewalk Width</td>
<td>00.0</td>
</tr>
<tr>
<td>Bridge Width</td>
<td>0018.0ft</td>
</tr>
<tr>
<td>Deck Width, out-to-out</td>
<td>002.0ft</td>
</tr>
<tr>
<td>Approach Rdwy Width</td>
<td>0022ft</td>
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</table>

| Bridge median             | 0                                   |
|                          |                                    |
| Skew                      | 35                                 |
| Stt Flared: 0             |                                    |
| Inventory Rt Min Vert Clrn | 99999                               |
| Inv. Rt Total Hors Clrn   | 18.0ft                              |
| Min Vert Clrn over Rdwy  | 9999                                |
| Min Vert Underclerance    | 000000ft                            |
| Min Lateral R Underclrnc  | 000000ft                            |
| Min Lateral L Underclrnc  | 000000ft                            |

<table>
<thead>
<tr>
<th>NAVIGATION DATA</th>
<th>Navigation Control: N</th>
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<tbody>
<tr>
<td>Vertical Protection</td>
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</tr>
<tr>
<td>Vertical Vert Clrn</td>
<td>00000ft</td>
</tr>
<tr>
<td>Vert Lift Br Min Clrn</td>
<td>000000ft</td>
</tr>
<tr>
<td>Navigation Horz Clrn</td>
<td>000000ft</td>
</tr>
<tr>
<td>Date Recorded</td>
<td>11/02/93</td>
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| NBI SIAA Sheet            | 11/02/$                             |

| SUFFICIENCY RATING         | 015.0                               |
| Status                    | Structurally deficient              |

<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>112 NBIIS Bridge Length</th>
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<tbody>
<tr>
<td>104 Hwy System of Inventory Rt:</td>
<td>26 Functional Classification:</td>
</tr>
<tr>
<td>100 Defense Hwy Designation:</td>
<td>101 Parallel Stru Designation:</td>
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<tr>
<td>102 Direction of Traffic</td>
<td>103 Temporary Stru Designation:</td>
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<tr>
<td>110 Designated Natl Network</td>
<td></td>
</tr>
<tr>
<td>20 Toll</td>
<td></td>
</tr>
<tr>
<td>21 Main - :County highway</td>
<td></td>
</tr>
<tr>
<td>22 Owner- :County highway</td>
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</tr>
<tr>
<td>37 Historical Significance</td>
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</table>

<table>
<thead>
<tr>
<th>CONDITIONS</th>
<th>58 Deck</th>
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<tbody>
<tr>
<td>59 Superstructure</td>
<td></td>
</tr>
<tr>
<td>60 Substructure</td>
<td></td>
</tr>
<tr>
<td>61 Channel Protection</td>
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<td>62 Culverts</td>
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<table>
<thead>
<tr>
<th>LOAD RATING &amp; POSTING</th>
<th>31 Design Load - H 10</th>
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<tbody>
<tr>
<td>64 Operating Rating</td>
<td></td>
</tr>
<tr>
<td>66 Inventory Rating</td>
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</tr>
<tr>
<td>70 Posting - Unknown</td>
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<tr>
<td>Stru Open/Posted/Closed:</td>
<td>41 Open, posting recommended</td>
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</table>

<table>
<thead>
<tr>
<th>APPRAISAL</th>
<th>67 Structure Evaluation</th>
</tr>
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<tbody>
<tr>
<td>68 Deck Geometry</td>
<td></td>
</tr>
<tr>
<td>69 Underclearance Vert/Horz</td>
<td></td>
</tr>
<tr>
<td>71 Waterway Adequacy</td>
<td></td>
</tr>
<tr>
<td>72 Approach Roadway Alignmen:</td>
<td></td>
</tr>
<tr>
<td>36 Traffic Safety Features</td>
<td></td>
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<tr>
<td>113 Scour Critical Bridges :</td>
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<table>
<thead>
<tr>
<th>PROPOSED IMPROVEMENTS</th>
<th>75 Type of Work: 0</th>
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<tbody>
<tr>
<td>76 Length of Stru Improv:</td>
<td>94 Bridge Improvement Cost: 0000000</td>
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<tr>
<td>95 Roadway Improv Cost:</td>
<td>96 Total Project Cost (:X): 0000000</td>
</tr>
<tr>
<td>97 Year of Improv Cost Est.:</td>
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<tr>
<td>114 Future ADT: 0000000</td>
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<table>
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<tr>
<th>INSPECTIONS</th>
<th>90 Insp Date: 09/93 91 Freq: 24</th>
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<tbody>
<tr>
<td>92 Critical Feature Insp</td>
<td>93 Dat</td>
</tr>
<tr>
<td>A Frac. Crit Detail :N</td>
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</tr>
<tr>
<td>B Underwater Insp :N</td>
<td></td>
</tr>
<tr>
<td>C Other Special Insp: N</td>
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</tr>
<tr>
<td>Upload to Mainframe /</td>
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</table>
Department of Public Works
Engineering Division

BRIDGE INSPECTION REPORT

Date of Inspection: 9-22-93
Bridge Number: 60068310052755
Bridge Name: POOPOO #11
Number of Spans: 3
Location: Island: MAUI
Route No.: 31
Highway: PILANI
Feature Intersected: POOPOO STREAM
Bridge Material: Superstructure: TIMBER
Substructure: CONC, ABUT/TIMBER

<table>
<thead>
<tr>
<th>36</th>
<th>TRAFFIC SAFETY FEATURES</th>
<th>Condition Rating</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bridge Railings</td>
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<tr>
<td>2.</td>
<td>Transitions</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Approach Guardrail</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Approach Guardrail Ends</td>
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<table>
<thead>
<tr>
<th>58</th>
<th>DECK</th>
<th>Condition Rating</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Wearing Surface</td>
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<tr>
<td>2.</td>
<td>Deck - Structural Condition</td>
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<tr>
<td>3.</td>
<td>Curbs</td>
<td>N</td>
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<tr>
<td>4.</td>
<td>Median</td>
<td>N</td>
<td></td>
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<tr>
<td>5.</td>
<td>Sidewalks</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Parapets</td>
<td>E</td>
<td></td>
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<tr>
<td>7.</td>
<td>Railings</td>
<td>E</td>
<td></td>
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<tr>
<td>8.</td>
<td>Paint</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Drains</td>
<td>E</td>
<td></td>
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<tr>
<td>10.</td>
<td>Lighting Standards</td>
<td>N</td>
<td></td>
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<tr>
<td>11.</td>
<td>Utilities</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Joint Leakage</td>
<td>N</td>
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<tr>
<td>13.</td>
<td>Expansion Joints or Devices</td>
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<table>
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<th>SUPERSTRUCTURE</th>
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<tbody>
<tr>
<td>1.</td>
<td>Bearing Devices</td>
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<td>2.</td>
<td>Stringers</td>
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<tr>
<td>3.</td>
<td>Girders, Beams, or Arches</td>
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<tr>
<td>4.</td>
<td>Floor Beams and Diaphragms</td>
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<td>5.</td>
<td>Trusses - General</td>
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<td>6.</td>
<td>Paint</td>
<td>E</td>
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<td>7.</td>
<td>Machinery (Moveable Spans)</td>
<td>E</td>
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<td>8.</td>
<td>Rivets and Bolts</td>
<td>N</td>
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<tr>
<td>9.</td>
<td>Welds - Cracks</td>
<td>N</td>
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<tr>
<td>10.</td>
<td>Rust</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Timber Decay</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Concrete Cracking and Spalling</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Collision Damage</td>
<td>N</td>
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<tr>
<td>14.</td>
<td>Deflection Under Load</td>
<td>N</td>
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<tr>
<td>15.</td>
<td>Alignment of Members</td>
<td>E</td>
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<td>16.</td>
<td>Vibrations Under Load</td>
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<tr>
<td>17.</td>
<td>Flat Slab</td>
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Inspectors Condition Rating: G
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<thead>
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<th>Material</th>
<th>Code No.</th>
<th>Description of Defect</th>
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<tbody>
<tr>
<td>Concrete</td>
<td>1</td>
<td>Hairline Cracks in Concrete</td>
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<tr>
<td>Concrete</td>
<td>2</td>
<td>Cracks in Concrete</td>
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<tr>
<td>Concrete</td>
<td>3</td>
<td>Spalled Concrete</td>
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<tr>
<td>Concrete</td>
<td>4</td>
<td>Spalled Concrete with reinforcing exposed</td>
</tr>
<tr>
<td>Concrete</td>
<td>5</td>
<td>Scaling</td>
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<tr>
<td>Concrete</td>
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<td>Honeycomb Voids</td>
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<td>Efflorescence</td>
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<td>Rust Stains</td>
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<td>Concrete</td>
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<td>Weathered/Waterstained</td>
</tr>
<tr>
<td>Timber</td>
<td>10</td>
<td>Split Timber</td>
</tr>
<tr>
<td>Timber</td>
<td>11</td>
<td>Decayed Timber</td>
</tr>
<tr>
<td>Timber</td>
<td>12</td>
<td>Crushed Timber</td>
</tr>
<tr>
<td>Timber</td>
<td>13</td>
<td>Splintered Timber</td>
</tr>
<tr>
<td>Timber</td>
<td>14</td>
<td>Weathered/Worn Timber</td>
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<tr>
<td>Timber</td>
<td>15</td>
<td>Insufficient Nailing or Bolting</td>
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<td>Steel</td>
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<td>Rusted Steel</td>
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<td>Steel</td>
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<td>Corroded Steel</td>
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<tr>
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<td>Erosion</td>
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<tr>
<td>Other</td>
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<td>Undermining</td>
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<td>Other</td>
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<td>Footing exposed</td>
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<tr>
<td>Other</td>
<td>21</td>
<td>Settlement of Pavement</td>
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<tr>
<td>Other</td>
<td>22</td>
<td>Vegetation Growth</td>
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<tr>
<td>Other</td>
<td>23</td>
<td>Debris</td>
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<td>Other</td>
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<td>Scour</td>
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</table>
TYPICAL ONE LANE BRIDGE DELINEATION

OTES:

YIELD AHEAD sign (W3-2a) shall be installed only on approaches to a YIELD sign (R1-2) that is not visible for a sufficient distance to permit a driver to bring his vehicle to a stop at the YIELD sign. Final location will be determined in the field by the Engineer.

Stop line and YIELD signs shall be installed on the approach that has the longer or better sight distance. Final location will be determined in the field by the Engineer.

Signs shall be spaced a minimum of 125 feet apart in the same direction of traffic.

STANDARD PLAN TE-67
DELINEATION AND PAVEMENT MARKINGS AT BRIDGES

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

STANDARD PLAN TE-67 07/01/86
### 60. SUBSTRUCTURE

<table>
<thead>
<tr>
<th>Substructure</th>
<th>Condition Rating</th>
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<tbody>
<tr>
<td>1. Abutment</td>
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<tr>
<td>- Backwall</td>
<td>7</td>
</tr>
<tr>
<td>- Footing</td>
<td>7</td>
</tr>
<tr>
<td>- Piles</td>
<td>N</td>
</tr>
<tr>
<td>- Erosion</td>
<td>6</td>
</tr>
<tr>
<td>- Settlement</td>
<td>7</td>
</tr>
<tr>
<td>2. Piers or Bents</td>
<td></td>
</tr>
<tr>
<td>- Caps</td>
<td>6</td>
</tr>
<tr>
<td>- Column</td>
<td>6</td>
</tr>
<tr>
<td>- Footing</td>
<td>N</td>
</tr>
<tr>
<td>- Piles</td>
<td>N</td>
</tr>
<tr>
<td>- Scour</td>
<td>6</td>
</tr>
<tr>
<td>- Settlement</td>
<td>7</td>
</tr>
<tr>
<td>3. Pile Bents</td>
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<tr>
<td>4. Concrete Cracking and/or Spalling</td>
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<tr>
<td>5. Steel Corrosion</td>
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</tr>
<tr>
<td>6. Timber Decay, etc.</td>
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</tr>
<tr>
<td>7. Debris on Seats</td>
<td>N</td>
</tr>
<tr>
<td>8. Paint</td>
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</tr>
<tr>
<td>9. Collision Damage</td>
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Inspectors Condition Rating

### 61. CHANNEL & CHANNEL PROTECTION

<table>
<thead>
<tr>
<th>Channel &amp; Protection</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>2. Embankment Erosion</td>
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<td>3. Drift</td>
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<td>4. Vegetation</td>
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<td>5. Channel Change</td>
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</tr>
<tr>
<td>6. Fender System</td>
<td>N</td>
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<tr>
<td>7. Spur Dikes &amp; Jetties</td>
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<tr>
<td>8. Rip Rap</td>
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<tr>
<td>9. Adequacy of Opening</td>
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Inspectors Condition Rating

### 62. CULVERT & RETAINING WALLS

<table>
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<th>Wall Type</th>
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</thead>
<tbody>
<tr>
<td>1. Barrel:</td>
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<td>- Concrete</td>
<td>N</td>
</tr>
<tr>
<td>- Steel</td>
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</tr>
<tr>
<td>- Timber</td>
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<tr>
<td>2. Headwall</td>
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<td>3. Cutoff Wall</td>
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<td>4. Adequacy</td>
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<tr>
<td>5. Debris</td>
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</table>

Inspectors Condition Rating
Date of Inspection: 9-27-78
Bridge Number: 30-611-4959
Bridge Name: P00000 48-10

93 CRITICAL FEATURE INSPECTION DATE

1. Fracture Critical Details: N
2. Underwater Inspection: N
3. Other Special Inspection: N

CONDITION RATING

REMARKS

RESTRICTIONS:

1. Posted Loading
2. Legibility
3. Visibility

REPAIRS AND IMPROVEMENTS:

1. List all work done to this bridge since the last inspection including cost.
2. Indicate proposed and/or recommended improvements including estimated cost.
3. List any existing temporary conditions.

REMARKS AND RECOMMENDATIONS:

1. Does this bridge require inspection by Bridge Design Section? Yes ___ No ___
2. Remarks: Describe defects. Use sketches, diagrams, and/or photographs where possible.

Inspected by: Signature: ___ Title: ___
Supervised by: Signature: ___ Title: ___
WEST ELEVATION "A-A"

"SCALE: 1" = 10'

STRUCTURE NO.: 10
DISTRICT: "S. HANA"
LOCATION (T.M.K.): 1-91-0
INVENTORY ROUTE: PIILANI HWY.
FEATURES INTERSECTED: POOPOO STREAM

COUNTY of MAUI DEPT. of PUBLIC WOF INVENTORY OF BRIDG
DATE: 7-24-80 PREP BY: KN
SHEET 2 of 5

CONC. PIER FTG.
CONC. & WING WALL
ROCKY SLOPE
CONC. & WING
ROCKY SLOPE
ROCKY STREAM BED WITH LOOSE ROCKS
**APPROACH, HANA SIDE, DOWNSTREAM**

A.C. W/ STEEL BEAM

**CRACKED COLUMN, KAUPO, UPSTREAM**

<table>
<thead>
<tr>
<th>STRUCTURE:</th>
<th>FEATURES INTERSECTED:</th>
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<tbody>
<tr>
<td>POPOPO #10</td>
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<td>PROJECT:</td>
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<td>LOCATION (T.M.K):</td>
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<td>INVENTORY ROUTE:</td>
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<td>PHILANI HWY</td>
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<td>DATE:</td>
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<td>PREP. BY:</td>
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**COUNTY of MAUI**

**DEPT. of PUBLIC WORK**

**INVENTORY OF BRIDGE**

**SHEET 2 of 4 SHEETS**
**Collision Damage, Kaupo Pier, Upstream**

**Undermine, Hana Pier, Downstream**

<table>
<thead>
<tr>
<th>Structure</th>
<th>Features Intersected</th>
<th>County of Maui</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poopoo</td>
<td>Poopoo Stream</td>
<td>Dept. of Public Works</td>
</tr>
<tr>
<td>District: Hana</td>
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<tr>
<td>Location (T.M.K.): 1-9-01</td>
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<tr>
<td>Inventory Route: Pilani Hwy</td>
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<tr>
<td>Date: 9/20/93</td>
<td>Prep. By: S.P.N.</td>
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</table>

Sheet 3 of 4 Sheets
### Table: Debris in Channel, Downstream

<table>
<thead>
<tr>
<th>STRUCTURE:</th>
<th>FEATURES INTERSECTED:</th>
<th>COUNTY of MAUI - DEPT. of PUBLIC WORKS</th>
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<td>S.P.N.</td>
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<td>SHEET 4 of 4 SHEETS</td>
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</tbody>
</table>
TYPICAL CROSS SECTION "B-B"
SCALE: 1/4" = 1'-0"

SOLID ROCK

TYPICAL ABUTMENT SECTION "C-C"
SCALE: 1/4" = 1'-0"
AT ABUT:
PLAN SHOWING 6"X12" STRINGERS
N.T.S.

AT PIER

"ABUTMENT DETAIL "X"
N.T.S.

<table>
<thead>
<tr>
<th>STRUCTURE NO.</th>
<th>FEATURES INTERSECTED</th>
<th>COUNTY of MAUI</th>
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<tbody>
<tr>
<td>10</td>
<td>POOPOO STREAM</td>
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<td>INVENTORY ROUTE:</td>
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<td>K.N.</td>
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<td>SHEET 5 of 5</td>
<td></td>
<td>SI</td>
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</tbody>
</table>
Recommended Repair of cracks and spalls in concrete

Cracks

1. Rout crack with concrete saw or chipping tools
2. Flush out crack with water or solvent
3. Allow surface to dry (use hot-air jet, if required)
4. Drill 3/4" Ø holes, approximately 3/4" deep @ 6" to 12" o.c., into crack
5. Surface seal crack with joint sealant & install epoxy injection valves
   in 3/4" Ø holes, secured with epoxy bonding compound.
6. Inject epoxy bonding compound into crack until the compound flows out of
   adjacent sections of the crack or begins to bulge out of the surface sea

Spalls

1. Remove all unsound, damaged and undesirable concrete.
2. If reinforcing is exposed, remove undesirable concrete around reinforcing
   to a sound substrate. Clean reinforcing steel free of rust, scales, oils
   and other foreign matter deleterious to bonding. (Sandblasting is
   desirable).
3. Clean surface to be joined free of moisture, dust, rust, etc.
4. Apply epoxy bonding compound to surface to be joined.
5. Apply lean, stiff mix concrete to repair area. If form work is involved,
   concrete can be applied pneumatically.

---

Poopoo Bridge

<table>
<thead>
<tr>
<th>STRUCTURE NO.:</th>
<th>FEATURES INTERSECTED:</th>
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<td>10</td>
<td>Poopoo Stream</td>
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COUNTY of MAU
DEPT. of PUBLIC WO

INVENTORY OF - BRIC

---
County of Maui
Dept. of Public Works
Engineering Division

POOPGO #10
REPAIRS & IMPROVEMENTS

1. Work completed since last inspection.
   a. In 1992, the split stringers and defected decking were replaced by
      County crews.

2. Proposed or recommended improvements.
   a. Repair all concrete defects as recommended on Repair of Spalls and
      Cracks sheet.
   b. All timber bents members are split and weathered, and should be
      replaced or repaired.
   c. Install approach guardrails as per Standard Details for Public Works
   d. Install "Narrow Bridge" signs, RH-3's and "No Dumping" signs at
      approaches.

Inspected By: Signature  O. Keana
                Title  Const. Engr. II

Reviewed By: Signature  C. Youngwhite
## COST OF IMPROVEMENTS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>QUANTITY</th>
<th>UNIT COST</th>
<th>COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repair cracks</td>
<td>20 L.F.</td>
<td>$ 76.00/L.F.</td>
<td>$ 1,520.00</td>
</tr>
<tr>
<td>Install additional G.R.</td>
<td>50 L.F.</td>
<td>$ 65.00/L.F.</td>
<td>$ 3,250.00</td>
</tr>
<tr>
<td>Repair spalls</td>
<td>42 SF</td>
<td>$ 250.00/SF</td>
<td>$10,500.00</td>
</tr>
<tr>
<td>Repair columns</td>
<td>All</td>
<td>$1,500.00/LS</td>
<td>$ 1,500.00</td>
</tr>
</tbody>
</table>

*Repair bents
*Install RM-3's, "Narrow Bridge" signs and "No Dumping" signs at approaches
*Repair erosion at upstream/Ulupalakua shoulder
*Replace rusty bolts on parapet railing

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>SUBTOTAL:</strong></td>
<td><strong>$16,770.00</strong></td>
</tr>
<tr>
<td>20% CONTINGENCY:</td>
<td><strong>$ 3,354.00</strong></td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>$ 20,124.00</strong></td>
</tr>
<tr>
<td><strong>CALL:</strong></td>
<td><strong>$ 21,500.00</strong></td>
</tr>
</tbody>
</table>

*Work to be done by County Maintenance forces.*

<table>
<thead>
<tr>
<th>STRUCTURE NAME &amp; NO.</th>
<th>FEATURES INTERSECTED:</th>
<th>COUNTY OF MAUI DEPT. OF PUBLIC WORKS INVENTORY OF BRIDGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>POOPOO # 10</td>
<td>POOPOO STREAM</td>
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<tr>
<td>DISTRICT:</td>
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<tr>
<td>HANA</td>
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<td>LOCATION (TMK):</td>
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<td>1-09-01</td>
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<tr>
<td>INVENTORY ROUTE:</td>
<td>DATE: 11/03/93</td>
<td>PREP BY: A.N.</td>
</tr>
<tr>
<td>PIILANI ENY.</td>
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</tbody>
</table>
County of Maui  
Dept. of Public Works  
Engineering Division  

POODEO #10  
SUMMARY OF RECOMMENDATIONS  

This bridge is structurally in fair condition, but because of continuous maintenance repairs and existing condition of all bents, replacement is recommended.
3 SPAN TIMBER-PLANK BRIDGE

3X12 DECKING L = 1.3' FB = 1500 psi Fb = 0.85 psi

2X12 STRINGERS C 18°/C L = 19.8' FB = 1500 psi Fb = 0.85 psi

CHECK DECKING

\[
M = 15\times12\times3 \times \frac{1}{12} = 2.25 \text{ k-ft}
\]

\[
M_{ wb } = 15\times12\times1.5 = 22.5 \text{ k-ft}
\]

INVENTORY

\[
2.25 \times 20 = 45.0 \text{ k-ft}
\]

\[
1.3 \times 6.45 = 8.38 \text{ k-ft}
\]

SHEAR CHECK

\[
V = \frac{2}{3} \times 0.083 \times 3 \times 12 = 2.28 \text{ k}
\]

\[
V = 8 \text{ k}
\]

INVENTORY

\[
2.28 \times 20 = 45.6 \text{ k}
\]

\[
1.3 \times 6.7 = 8.71 \text{ k}
\]

CHECK C X STRINGER

\[
M_{ wb } = 15 + 1.3 \times 3.5 = 28.4 \text{ k-ft}
\]

\[
M_{ wc } = 0.28(12.8) = 3.6 \text{ k-ft}
\]

\[
M_{ wc } = 135 \times 12 \times 1.2 \times 2 = 16.2 \text{ k-ft}
\]

\[
P = 16 \times 3.5 = 56.2 \text{ k-
}\]

\[
M = 5.2(19.3) = 98.4 \text{ k-ft}
\]

INVENTORY

\[
\frac{14.83}{20.74} \times 20 = 11.52 \text{ k}
\]

\[
17.62 \times 20 = 352.4 \text{ k}
\]

SHEAR CHECK

\[
V = \frac{2}{3} \times 0.083 \times 6 \times 12 = 4.1 \text{ k}
\]

\[
V = 5.2 \text{ k}
\]

INVENTORY

\[
3.82 \times 20 = 76.4 \text{ k}
\]

\[
\frac{505 \times 20}{2} = 19.42 \text{ k}
\]
FEWELL GEOTECHNICAL ENGINEERING, LTD.

SITE RECONNAISSANCE REPORT

17 FEBRUARY 1995

EXHIBIT B
File 1386.01
February 17, 1995

Sato & Associates, Inc.
2046 South King Street
Honolulu, Hawaii 96826

Attention: Mr. Loren G. S. Lau, AIA
Project Manager

Subject: Site Reconnaissance Report
Po'opo'o Bridge Replacement
County of Maui, Hawaii

We have completed our site reconnaissance to develop geotechnical recommendations for the design and construction of the proposed Po'opo'o Bridge Replacement in Maui, Hawaii. This letter summarizes our findings and conclusions and was performed in general accordance with our April 20, 1994 proposal and your Agreement dated October 18, 1994.

Introduction - The existing bridge crossing Po'opo'o Stream at approximately mile post 28.31 along Pilili Highway will be replaced with a new structure. Po'opo'o Stream is on the southern flank of Haleakala and is an intermittent stream within a deeply eroded gulch which has created nearly vertical rock sides approximately 40 feet in height. Pilili Highway in this area, is a narrow roadway and is the only access to the Kaupo area and on to Hana where it connects with Hana Highway.

Existing Po'opo'o Bridge
The existing bridge, shown in the photograph above, is a single-lane timber structure approximately 60 feet in length. It has two separate intermediate concrete supporting piers. The abutments for the bridge are founded on massive basalt at the top of the gulch. The foundations for the intermediate piers are founded within the eroded stream bed on concrete piers resting upon massive basalt which forms the base of the stream.

The approximate location of the bridge and Po'opo'o Gulch is shown on the enclosed Project Location Map, Figure 1.

Project Description - It is our understanding that the new bridge will be a two-lane concrete structure using precast girders. At the present time, three replacement schemes are being evaluated. Scheme A is for a 60- to 70-foot single span bridge located immediately upstream of the existing bridge. This would permit the new structure to be constructed while the existing bridge is kept in service. Scheme A would involve a slight shifting of the roadway alignment to provide access to the new structure.

Scheme B is similar to Scheme A but with the new bridge being located downstream of the existing bridge at a location where the single span would vary from 60 to 85 feet. This alignment would also permit the existing bridge to remain in service while the new bridge is constructed and would require a slight realignment of the existing roadway.

Under Scheme C, the existing bridge would be demolished and a new single 60-foot span bridge constructed at the same location. This scheme would require a temporary detour road on the upstream side with a temporary ford crossing approximately 500 feet upstream from the existing bridge.

It is anticipated that the abutment loads for the three proposed schemes would not exceed 23 kips per linear foot.

Geologic Conditions - Po'opo'o Stream and the proposed new bridge site is on the southern flank of Haleakala Mountain in an area blanketed by basaltic flows of the Kula Volcanic Series. The Kula flows form the surface over most of the northwestern and southeastern segments of Haleakala Mountain. The flows characteristically average 20 feet in thickness at the summit and 50 feet near the coast. Aa lava is predominant but some Pahoehoe is present near vents.

Site Reconnaissance and Discussion - Our site reconnaissance of the proposed bridge locations disclosed that the bottoms and sides of Po'opo'o Gulch consists of massive basalt flows (the Kula Volcanic Series) with little or no soil cover. The existing bridge abutments are supported by massive basalt and show no indications of movements or loss of support. The western abutment is supported upon a dense mass of basalt with columnar jointing.

A minor amount of erosion apparently is occurring at the stream bed level, but there is little indication of lateral expansion of the stream bed or erosion of the side walls. The stream has undercut the sidewalls of the stream channel. The rock should have sufficient strength and rock formation thickness separating the foundations and the undercut locations so that there should be no effect on the foundations. The undercut areas could be filled with concrete to remove any possibility of movement.

A plunge pool has developed on the upper side of the existing bridge at a small waterfall. We do not foresee any problems with this conditions.
The basalt was deposited in thick flows with few inclusions of ash or clinkers as shown in the nearly 40-foot vertical exposure on the sides of the gulch.

The same foundation conditions exist at the three proposed bridge locations. The bridges would be supported upon the same massive basalt formations that has supported the existing bridge. The surrounding conditions consist entirely of rock with little or no soil cover.

The proposed bridge abutments should therefore be supported upon the massive basalt where the foundations can be designed for very high bearing pressures with essentially no anticipated settlements or movements.

The bridge abutments should be set back in the slope to assure that should any future erosion occur, the abutment foundations would not be undermined.

It is anticipated that the abutments would be backfilled with imported granular material since no on-site fill sources are available.

It is our understanding that the roadway pavement will be subjected to only light traffic consisting primarily of automobiles and light trucks and with an occasional heavy truck. The bridge is to be designed for HS 20 loading which is for a 20-ton truck or a 36-ton truck with trailer. Since the roadway will be supported also by rocky formations, a minimal pavement section will be required.

**Recommendations** - The exposed conditions show that the bridge abutments will be supported by competent basalt. The bridge abutments and pavements should be designed in accordance with the following recommendations.

1. The abutment foundations should be designed as spread foundations bearing upon the massive basalt where they may be designed for allowable bearing pressures of up to 20 kips per square foot. The foundations should maintain a minimum width of 3 feet.

2. The foundations should be set back into the slope so that there is a minimum 5-foot setback from the slope face to the outside bottom edge of the abutment foundations.

3. The foundations should be situated on a level bench cut into the basalt with the concrete poured in direct contact with the basalt subgrade. No granular fill should be used beneath the abutment foundations.

4. The backfill for the abutments should be an imported granular material such as Select Borrow or Base Course that can be readily compacted and will minimize the pressures against the abutments.

5. The backfill should be compacted to between 90 and 95 percent of its maximum density. Overcompaction of the backfill should be avoided since this can significantly increase the lateral pressures against the retaining walls.

7. The abutment walls should be designed for at-rest lateral backfill pressures of 45 pounds per cubic foot (p.c.f.) equivalent fluid pressure, if constructed in accordance with the above recommendations. An active pressure of 35 p.c.f. can be used during construction.

8. A friction factor of 0.65 can be used for massive concrete against clean sound rock.

9. The abutment wall backfills should provide a passive pressure of 450 p.c.f. equivalent fluid pressure for the recommended granular backfill.

10. Positive drainage should be provided for the abutment walls to prevent the buildup of hydrostatic pressures behind the abutments or wing walls.

11. The pavement should be based upon a roadway section consisting of a minimum of 2 inches of asphaltic concrete and 6 inches of base course, unless significantly higher traffic volumes than presently occurring on the roadway are anticipated. This pavement section is based upon a "Rural Collector Road" but with a reduced pavement section due to rocky subgrade.

12. All work for the roadway and embankments should be performed in accordance with the Standard Specifications for Public Works Construction, 1986.

Limitations - This report has been prepared for the exclusive use of Sato & Associates, Inc. and the County of Maui, for the design of the Po'opo'o Bridge Replacement. In accordance with generally accepted soil and foundation engineering practices. No other warranty expressed or implied, is made.

The analysis, conclusions, and recommendations of this report are based upon the exposed rock conditions and did not include test borings at the abutment locations. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that planned at the present time, FGE, Ltd. should be notified so that supplemental recommendations can be given, if necessary. Should significant changes in the project occur, the conclusions and recommendations contained in this report shall not be considered valid unless they are reviewed and the conclusions of the report verified in writing.

Unanticipated soil conditions are commonly encountered and cannot be fully determined by soil samples, test borings, or test pits. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. Some contingency funds are recommended to accommodate such potential extra costs.

FGE, Ltd. should be provided the opportunity for a general review of the final design drawings and specifications to verify that the earthwork and foundation recommendations were properly interpreted and implemented in the design and specification. If FGE, Ltd. is not accorded the privilege of making this recommended review, it can assume no responsibility for misinterpretations of the recommendations.
Should you have any questions pertaining to any aspect of this report or if we can be of any further assistance to you, please do not hesitate to contact us.

Respectfully submitted,

FEWELL GEOTECHNICAL ENGINEERING, LTD.

By Richard B. Fewell, P.E.

RBF/tb

Enclosure: Figure 1
CHAR & ASSOCIATES
BOTANICAL RESOURCES ASSESSMENT
NOVEMBER 1994

EXHIBIT C
BOTANCAL RESOURCES ASSESSMENT
PO'OPO'O STREAM BRIDGE REPLACEMENT
HANA DISTRICT, ISLAND OF MAUI

by

Winona P. Char
CHAR & ASSOCIATES
Botanical Consultants
Honolulu, Hawai'i


November 1994
BOTANICAL RESOURCES ASSESSMENT
PO'OPO'O STREAM BRIDGE REPLACEMENT
HANA DISTRICT, ISLAND OF MAUI

INTRODUCTION

The Po'opo'o Stream Bridge is located at milepost 28.30 on the Pi'ilani Highway and crosses Po'opo'o Gulch and Stream, near Pakowai Point. Elevation is roughly 160 ft. The existing bridge is a timber structure which is structurally deficient and will be demolished. The new replacement bridge will be constructed immediately mauka (inland) of the existing structure, and the highway will be realigned on both side of the new bridge.

The new bridge and the realignment areas were flagged and staked by the survey engineers prior to our field studies. The field studies to assess the botanical resources found on the project site were conducted on 26 October 1994. A survey was also made of the area makai (seaward) of the existing bridge since it may be impacted by the construction and demolition activities. The primary objectives of the survey were to: 1) describe the vegetation; 2) search for threatened and endangered species as well as rare and vulnerable plants; and 3) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

DESCRIPTION OF THE VEGETATION

In the following discussion, the plant names used are in accordance with Wagner et al. (1990) for the flowering plants and Lamoureux (1988) for the ferns.
The vegetation on the project site and the immediately surrounding lands consists of buffelgrass grassland on very stony soils -- Waiakea extremely stony silty clay loam, 3 to 25% slopes, eroded (WID2). The land is used for pasture.

Typically, the vegetation consists of somewhat dense mats of buffelgrass (Cenchrus ciliaris), 1 to 2 ft. tall. Buffelgrass is native to Africa and tropical Asia; in Hawai'i it is common in dry areas and sandy soil. Smaller shrubs and herbaceous components associated with this grassland include 'ilima (Sida fallax), 'uhaloa (Waltheria indica), partridge pea (Chamaecrista nictitans), coatbuttons (Tridax procumbens), and cowpea (Macroptilium lathyroides). Where the shallow soil is stonier or where there are rocky outcappings, pitted beardgrass (Bothriochloa pertusa), fuzzy top (Bothriochloa barbinodis), and pili grass (Heteropogon contortus) are codominant with the buffelgrass. Other species found on these more eroded or stonier spots include Portulaca pilosa, three-flowered beggarweed (Desmodium triflorum), and pa'u o Hi'i'aka (Jacquemontia ovalifolia subsp. sandwicensis).

The steep walls of Po'opo'o Gulch support scattered patches of buffelgrass, but large rocky outcrops predominate. The native 'akoko (Chamaesyce celastroides var. laehiensis), a woody, low-spreading shrub with milky sap and bluish-green, somewhat waxy leaves, is common on the gulch walls. A few small patches of 'ihi (Portulaca lutea), a succulent plant with lemon-yellow flowers, occur on the rocky slopes and gulch walls makai of the existing bridge. Other species found in the gulch area include shrubs of pluchea (Pluchea symphytifolia), 'ilima, and koa-haole, 4 to 5 ft. tall; grasses such as sourgrass (Digitaria insularis), Guinea grass (Panicum maximum), and green panicgrass (Panicum maximum var. trichoglume); herbaceous species such as Australian saltbush (Atriplex semibaccata), coatbuttons, wild cucumber (Cucumis dipsaceus), red pualele (Emilia fosbergii), 'aheahea (Chenopodium
murale), and yellow wood-sorrel (Oxalis corniculata); and two ferns -- hairy sword fern (Nephrolepis multiflora) and wood-fern (Christella parasitica). A few plants of 'ilihe'e (Plumbago zeylanica), a sprawling native shrub with white flowers, are also found on the gulch walls.

The gulch bottom consists primarily of dark grayish-colored basalt bedrock with large boulders and gravel piles. A few small scattered patches of the plants found on the gulch walls, mostly buffelgrass and koa-haole, occur on the bottom of the gulch.

DISCUSSION AND RECOMMENDATIONS

The proposed Po'opo'o replacement bridge and highway realignment will cross over vegetation dominated primarily by buffelgrass, an introduced or alien species (i.e. all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact -- Cook's discovery of the islands in 1778). Other introduced plants common on the project site are pitted beardgrass, koa-haole, coatbuttons, partridge pea, and fuzzy top grass. Rocky outcroppings and the Po'opo'o Gulch walls support some native species, the most common of which is the 'akoko (Euphorbia celastroides var. laehiensis), an endemic species, that is, it is native only to the Hawaiian Islands. The other endemic encountered on the project site is pa'u o Hi'i'aka (Jacquemontia ovalifolia subsp. sandwicensis). Indigenous native species, that is, species which are native to the Hawaiian Islands and elsewhere, are 'ihi (Portulaca lutea), 'ilima (Sida fallax), 'uhaloa (Waltheria indica), 'ilihe'e (Plumbago zeylanica), and pili (Heteropogon contortus).

None of the plants found on the project site is a listed, proposed, or candidate threatened and endangered species (U.S.
Fish and Wildlife Service 1992, 1994a, 1994b); nor is any plant considered rare or vulnerable (Wagner et al. 1990). This is not surprising as the lower elevations of leeward East Maui have been disturbed in the past; disturbances include anthropogenic fires, grazing by feral ungulates such as goats and cattle, and displacement of native species by introduced plant species, especially the grasses (Medeiros et al. 1986).

Given the findings above and the limited nature of the project, the proposed Po'opo'o bridge replacement and highway realignment should not have a significant negative impact on the botanical resources. There are no botanical reasons to impose any impediments, restrictions, or conditions to the proposed project. No recommendations are proposed at this time.
LITERATURE CITED


ARCHAEOLOGICAL INVENTORY SURVEY
ASC95-1

AN ARCHAEOLOGICAL INVENTORY SURVEY
FOR THE PROPOSED POOPOO BRIDGE REPLACEMENT
MANAWAINUI, HANA, MAUI
(TMK 1-9-01)

by
Berdena Burgett
Jeffrey Pantaleo
and
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Prepared for
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Honolulu, Hawai‘i 96826

July 1995

Aki Sinoto Consulting
2333 Kapiolani Blvd, No. 2704
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ABSTRACT

An archaeological inventory survey was completed for the proposed Maui County bridge replacement project. The existing Poopoo Bridge timber structure, slated to be replaced, is located at milepost 28.3 on the Piliani Highway at Poopoo Stream, Manawainui, Hana, Maui Island (TMK 1-9-01). The project area is located in Kahikinui, an archaeologically significant region in southeast Maui. Although several important sites have been previously identified in the neighboring vicinity, none have been recorded within the impact area of the current project.

During the course of the background archival search, neither the historic land use documents nor the archaeological literature produced any significant data specifically pertaining to the subject area. The fieldwork also resulted in largely negative findings within a c.16 acre area surrounding the bridge location. The surface survey included the existing bridge and the locations for the proposed temporary bridge and possible staging areas. Subsurface testing was considered unwarranted due to prior disturbances and the exposed bedrock over much of the gulch areas under the bridge location.

Site 50-50-15-572, the Hoapili Trail, is present in remnant segments in the vicinity of the project area and crosses the gulch about 500 ft. (152 m) north of the bridge. Remnant segments of this trail have been documented in this report. In the immediate project area, previous disturbances have destroyed and obliterated all surface indications of the trail and its alignment. The proposed project is not expected to have an adverse impact on any of the intact segments of this trail.

No further work is recommended, based on the absence of significant remains in this project area. The construction plans, which call for the replacement or temporary bridges to be built alongside, immediately mauka, of the existing bridge, will minimize the realignment of the present roadway. However, if inadvertent findings occur during construction activities, the State Historic Preservation Division of the Department of Land and Natural Resources should be contacted.
INTRODUCTION

An archaeological inventory survey was undertaken by Aki Sinoto Consulting of Honolulu, at the request of Sato and Associates, Inc. The project was conducted in conjunction with the proposed replacement of the Poopoo Stream bridge on the Hana Highway. The project area (TMK 1-9-01) is located in Poopoo Gulch, Manawainui ahupua'a, Kahikinui, Hana District, Maui Island (Figs. 1 and 2). Fieldwork was conducted by Berdina Burgett on Monday, 11 April 1994, during an on-site inspection of the project area with representatives from Sato and Associates, Inc. The authors made another site visit on Thursday, June 29, 1995 accompanied by Ms. Amy Dunn, in order to determine the potential adverse impact of the proposed project to the Hoapili Trail, State Site 505-50-15-572.

PROJECT LOCATION

The project area is located on the coast of southeast Maui. The existing timber bridge spans Poopoo Gulch at milepost 28.3 on Piilani Highway, roughly 700 feet (213 m) from the ocean (Fig. 3). The project limits encompass approximately 1.4 acres (5665 sq. m). The surface survey covered roughly 16.5 acres (6.7 ha) surrounding the bridge and included the possible staging areas (Fig. 4).

ENVIRONMENT

Much of leeward, southeast Maui is characterized by the arid, sparsely vegetated, southern slopes of Haleakala. Lying in the rain shadow of Haleakala, the mean annual rainfall is below 20 inches with the highest occurring during the winter months of December through March.

The region surrounding the project area has long been used for cattle grazing as reflected in the vegetation. Low dry grasses comprise the dominant flora with intermittent stands of koa haole (Leucaena leucocephala), christmasberry (Schinus terebinthifolius), kiawe (Prosopis pallida), lantana (Lantana camara), and other low shrubs.

The gulch areas consist of Rock land, where exposed rock covers 25 to 90% of the ground surface. Outcrops and very shallow soils characterize this classification. Soils in the area surrounding the gulch is classified as Waiakea extremely stony silty clay loam and characterized as eroded with stones covering 3 to 15% of the surface. In most areas, about 50% of the surface layer has been eroded away.
Figure 1. Location of Project Area on a Portion of the USGS Lualailua Quadrangle.
Figure 2. The Project Area, LCA, and Grants in Kahikinui as Shown on the Tax Map.
Figure 3. Overview of the Existing Timber Bridge at Poopoo Gulch, View SE.
Figure 4. Aerial Photo Showing Limits of Project Impact and Surface Survey.
HISTORIC LAND USE

The project area is located in the eastern extremity of the traditional district of Kahinkinui. This district is important in Hawaiian mythology and is associated with the early peopling of the Hawaiian Islands from Kahiki (Tahiti). Repeated references to this region infer that it was occupied during prehistoric and early historic times. The inhabitants were probably fishermen and may also have practiced dry land agriculture in the inland areas. With the introduction of cattle and the ensuing deforestation and decrease in available rainfall and water, the populace moved out of this region into neighboring, more favorable, areas such as Hana and Makena. The cattle ranching has continued into modern times.

The Pi'ilani Trail a prehistoric transportation route was known to have traversed this portion of Maui. In the early 1800s, Ulumahipehi or Hoapili ("the close companion" of Kamehameha I), who was Governor of Maui from 1836 to 1840, improved the portion of the old trail between Keone'oio and Kaupo. Segments of the Hoapili Trail are still visible along the present day Pi'ilani Highway and also in the vicinity of the current project.

During the Great Mahele, most of the area was retained by the government or awarded to family members of the Monarchy. Only one kuleana claim, by Makaoe, was made. Three small parcels, consisting of 8 potato patches, other gardens, and a house lot, were awarded as LCA 5404 in 1848. Only one of these parcels is identified today and located to the west of Lualailua. The other two are labeled as unlocated on the current tax map.

Two grants occur near the project area. Grant 2743, a 2394 acre parcel, was awarded to William G. Needham and Thomas E. Cook in 1861. The project area is located within Grant 2986, a 792.75 acre parcel awarded to Elisha H. Allen in 1865.

The bridge spanning Poopoo Gulch was first constructed in 1948 and reconstructed in 1977 (SHPD/DLNR Letter 4-24-95, LOG NO:14273/DOC NO:9504SC04). Thus, some of the ground disturbances observed in the surrounding areas may be attributed to these events.

PREVIOUS ARCHAEOLOGY

Site 50-50-15-572, the aforementioned Hoapili Trail traverses the vicinity of the current project area. No other previously recorded sites occur within the current survey area. However, several regional archaeological studies have taken place in the vicinity over the past 65 years including Walker (1931), Chapman (1966), The Statewide Inventory (1973), and Hammatt and Folk (1994).
Walker surveyed the Kahikinui area as part of his island-wide survey of Maui in 1930. His study primarily documented prominent sites such as heiau and trails. Two Walker sites, 170 and 172 (50-50-15-170 and 172), both heiau, occur about 2 miles west and northwest of the project area. The Statewide Inventory conducted in 1973 revisited the sites recorded by Walker and documented their condition.

In 1966, Chapman and other archaeologists from Bishop Museum conducted a settlement survey in Kahikinui. This survey identified dense clusters of various site and feature types including enclosures, platforms, caves, burials, walls, and heiau. Thirteen site categories were identified. Chapman’s study became the basis of the Kipapa Archaeological District that was established during the Statewide Inventory (Site 50-50-15-1170). This large complex is located approximately 4 miles west of the current project area.

Hammatt and Folk’s recent survey covered an 8,300 acre area for the Department of Hawaiian Home Lands. This reconnaissance survey identified forty-five sites and site complexes, primarily in the mauka sections of Kahikinui to about the 4000 foot elevation. The eastern boundary of the survey area ended at Manawaiinui Gulch, roughly 1/2 mile west of the current project area. Although the eastern end of the survey area (Area B) approached the coast, all of the recorded sites occurred at or above the 600 foot elevation. Site density in this area was characterized as extremely low. The excellent surface visibility led the authors to believe that virtually all of the sites have been located. Interestingly, no sites were recorded in the gulch areas, even in relatively large gulches like Manawaiinui. However, whether this represents the traditional land use patterns of the area or simply a sampling error imposed by the use of helicopter for the survey remains unanswered.

Although, a number of other projects have been completed in the Kahikinui region, these tend to be limited in scope and isolated, much like the current Poopoo Bridge survey.

SETTLEMENT PATTERN
The data from the regional studies reviewed above infers a traditional settlement pattern for Kahikinui consisting of large complexes of high feature density that occurs around Kipapa and Lualailua ahupua’a. The components consist of habitation, agricultural, trails, and religious features. Also the frequency of heiau sites increases near the complex. The marginal areas, especially towards the east, including the subject project area are relatively devoid of sites and consist of infrequent isolated relatively small sites. The absence of sites in gulch areas are indicated, although the factors that caused this finding is still in question.
Historic period sites associated with ranching such as walls, roads, and corrals occur with a wider distribution than the traditional Hawaiian sites. However, these too appear to cluster in the central to western sections of Kahikinui.

SITE EXPECTABILITY
Based on the settlement pattern assessment presented in the preceding section, no significant remains are expected in the subject project area, especially in the immediate gulch areas. The probability for isolated sites and historic period features are higher in the plateau/ridge areas on either side of the gulch. These would include; trails, *ahu*, small temporary habitation sites, and cattle walls, pens, and ranch roads.

METHODS
The surface walk-through survey covered an area within 360 meters (c. 1200 ft.) in a NW/SE direction and 180 meters (c. 600 ft.) in a NE/SW direction from the bridge. Due to the negative results of the surface survey, the limited impact area of the proposed construction, and the character of the area with exposed bedrock and outcrops over much of the ground surface; subsurface testing was considered to be unwarranted. Besides photography, no recording or mapping was done, due to the absence of any findings within the project area.

A literature and documents search was conducted for the specific locality as well as for Kahikinui to determine previous land use, ownership, and to aid in the predictability of site types that may exist within the subject project area. This research was conducted in Honolulu at the State Historic Preservation Division Library, the Hawaii State Archives, Department of Accounting and General Services Survey Office, the Hawaii State Bureau of Conveyances, and the Bishop Museum Library.

RESULTS OF SURVEY
No significant surface cultural remains were located during the current archaeological survey within the project area limits. The area to the north and *mauka* of the bridge has been extensively altered (Fig. 5). Several jeep roads are present and caterpillar scars may be observed on many of the rocks.

Roughly 500 ft. (152 m) north of the bridge, where a jeep road crosses the gulch, a stone retaining wall is located on the western bank of the gulch (Fig. 6). This feature is a segment the Hoapili Trail, Site 50-50-15-572. More recent modifications are evident from mortared sections of retaining wall at the gulch bottom (Fig. 7). Remnant trail segments
Figure 5. Overview of Disturbed Area Paralleling Gulch to East, View NW.
Figure 6. Upper: Overview of Hoapili Trail at Gulch Crossing, View W.
Lower: Closeup of Trail at Crossing, View SW.
Figure 7. Mortared Retaining Wall Section at Gulch Bottom at Crossing, View N.
are present in the plateau area west of the crossing and appear to traverse the landscape in a gradual southwesterly alignment towards the shoreline (Fig. 8). The area east of the crossing is extensively disturbed with the trail poorly defined. It becomes undiscernible beyond the first few meters and its original alignment cannot be ascertained. A bulldozed path roughly parallels the gulch towards the Highway (see Fig. 4). Within the project limits, the area where the Hoapili Trail may have traversed has been extensively disturbed with no observable evidence of the route.

To the south or makai of the bridge, no remains were observed. Bulldozer berms are present along the sides of the highway. In an area roughly 300 ft. (91 m) to the east of the existing bridge is another possible remnant segment of the Hoapili Trail (Fig. 8).

Along the western bank of the gulch, roughly halfway to the crossing, 250 ft. (76m) mauka of the bridge is an overhang shelter located 3 to 4 meters above the gulch bottom. This natural feature is unmodified, but shell midden is scattered on the interior floor and the area fronting the shelter. Due to its location well beyond the project limits, no further work was undertaken.

DISCUSSION AND RECOMMENDATIONS

The current phase of work has resulted in no significant archaeological findings within the project area. Site 50-50-15-572, the Hoapili Trail, is manifested by several remnant segments in the vicinity of the project area. These remains are all well beyond the impact area of the proposed bridge replacement activities. Neither the bridge construction or preparation of the staging area, southwest of the bridge, will impact any cultural resources. The potential for encountering any significant subsurface remains is also minimal.

No further work is recommended prior to commencement of bridge and staging area construction. Archaeological monitoring during construction also appears to be unwarranted. However, following standard procedure, if any unanticipated discoveries are encountered during the course of construction, the Maui Office of the State Historic Preservation Division should be contacted at 243-5169, and activities in the immediate area of the find should be temporarily halted until an archaeological inspection can be made.
Figure 8.  Upper: Trail Remnant in Plateau Area West of Crossing, View E.  
Lower: Possible Trail Remnant in Area East of Bridge, View E.
REFERENCES


Chapman, Peter 1966-67  Map and Field Notes on file at the Anthropology Department, Bishop Museum.


Hawai‘i (Territory) Commissioner of Public Lands 1929  *Indices of Awards Made by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands*. Honolulu: Star Bulletin.


Statewide Inventory of Historic Sites 1973  Site forms for selected sites in Kāhikinui, Hana, Maui. On file at SHPD/DLNR.

Walker, Winslow 1931  *Archaeology of Maui*. Manuscript on file at the Bishop Museum.
HYDROLOGICAL AND HYDRAULIC CALCULATIONS
RUNOFF CALCULATIONS:

Area Calculations (from USGS Map of Maui):

Map Scale: 1" = 2000'
Therefore: 1 in² = 400000 ft² = 91.83 acres

Planimeter Area = 6.5 in²
Catchment Area = 6.5 (91.83) = 596.6 acres

Total Catchment Area for Po'o Po'o Gulch = 597 acres

Runoff Hydrograph Calculations:

Use Storm Recurrence Intervals of 100 & 500 yrs for 24 hrs.

Rainfall Depth = 14.0" (see Fig. 1)

Soil Types: Puu Pa (PZVI) -- Hyd. Group A
(See Fig. 2) Rock Land (rRK) -- Hyd. Group C
Waiakea (WID2) -- Hyd. Group C

Area Percentages for Soil: Puu Pa - 70%
Rock Land - 25%
Waiakea - 5%

Ground Slopes:
Average Slope of Stream = h / L
where: h = 6200'
L = 22800'
Avg. Slope of Stream = 0.272 = .27.2%

Average Slope from edge of area to stream = h / L
where: h = 100'
L = 300'
Avg. Slope = 0.333 = 33.3%

Curve Number, Time of Concentration, and Watershed Hydrograph
calculations performed using the TR-55 program developed by
the Soil Conservation Service.

See following pages for program output.

Peak Runoff Q = 1261 cfs (100 yr., 24-hr. Storm)

For 500 yr. storm, Q = 1.7 * Q(100 yr.)
Q = 1.7 * 1261
Q = 2143 cfs (500 yr., 24-hr. Storm)
PO'O PO'O BRIDGE
WEIGHTED CURVE NUMBER CALCULATIONS
NOTE: USE FARMSTEAD AS CONSERVATIVE
ESTIMATE FOR ROCK LAND & WAIKOA

RUNOFF CURVE NUMBER DATA

Composite Area: POO POO GULCH

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PO'O PO'O BRIDGE TC CALCULATIONS
100-YR, 24-HR STORM
-SHEET FLOW FOR EDGE OF AREA TO GULCH FLOW
-SHALLOW CONCENTRATED FLOW FOR GULCH FLOW TO BRIDGE

TC COMPUTATIONS FOR: POO POO GULCH

SHEET FLOW (Applicable to TC only)
Segment ID A
Surface description GRASS/ROCK
Manning's roughness coeff., n 0.1300
Flow length, L (total < or = 300) ft 300.0
Two-yr 24-hr rainfall, P2 in 5.000
Land slope, s ft/ft 0.3330

0.007 * (n*L)
T = ---------------------------------- hrs 0.09 = 0.09

0.5 0.4
P2 * s

SHALLOW CONCENTRATED FLOW
Segment ID B
Surface (paved or unpaved)? Unpaved
Flow length, L ft 22800.0
Watercourse slope, s ft/ft 0.2720

0.5
Avg.V = Csf * (s) ft/s 8.4147
where:
Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V) hrs 0.75 = 0.75

CHANNEL FLOW
Segment ID
Cross Sectional Flow Area, a sq.ft 0.00
Wetted perimeter, Pw ft 0.00
Hydraulic radius, r = a/Pw ft 0.000
Channel slope, s ft/ft 0.0000
Manning's roughness coeff., n 0.0000

2/3 1/2
V = --------------------- ft/s 0.0000
n
Flow length, L ft 0

T = L / (3600*V) hrs 0.00 = 0.00

TOTAL TIME (hrs) 0.84
Quick TR-55 Version: 5.46 S/N:

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Watershed file: --> C:\PP\POND\PPB .WSD
Hydrograph file: --> C:\PP\POND\PPB .HYD

PO'O PO'O BRIDGE HYDROGRAPH FOR
100 YR., 24 HR. STORM
TOTAL AREA = 597 ACRES

>> Input Parameters Used to Compute Hydrograph <<<

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* Travel time from subarea outfall to composite watershed outfall point.

Total area = 597.00 acres or 0.9328 sq.mi
Peak discharge = 1261 cfs

>>> Computer Modifications of Input Parameters <<<

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* Travel time from subarea outfall to composite watershed outfall point.
Quick TR-55 Version: 5.46 S/N:

TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Watershed file: --> C:\PP\POND\PPB .WSD
Hydrograph file: --> C:\PP\POND\PPB .HYD

PO'O PO'O BRIDGE HYDROGRAPH FOR
100 YR., 24 HR. STORM
TOTAL AREA = 597 ACRES


>>> Summary of Subarea Times to Peak <<<

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TR-55 TABULAR HYDROGRAPH METHOD
Type I Distribution
(24 hr. Duration Storm)

Watershed file: --> C:\PP\FOND\PPB .WSD
Hydrograph file: --> C:\PP\FOND\PPB .HYD

PO'O PO'O BRIDGE HYDROGRAPH FOR
100 YR., 24 HR. STORM
TOTAL AREA = 597 ACRES

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Plotted: 07-25-1995 15:26:30

Flow (cfs)

0  150  300  450  600  750  900  1050  1200  1350  1500  1650

Time

(hrs)

* File: C:\PP\POND\PPB .HYD Qmax = 1261.0 cfs
AVERAGE DAILY TRAFFIC CALCULATIONS AND TRAFFIC COUNT

EXHIBIT F
ADT CALCULATIONS

TRAFFIC AT
Pilani Hwy C.H. mi. SRT. OF Thompson Ro. & Kula Hwy
(Oct 28-29, 1985)

ADT 1985 = 253.

Normal traffic growth, 1974, 1985, or 1.9% /yr.

ADT 1987 = 262.

Normal traffic growth = 1.9% /yr.

generated traffic = 0%

development traffic = 10% /20 yr.

20 yr. traffic projection factor = 1.58

ADT 2007 = 262 x 1.58 = 388.

T = 5% (estimated)

D = 5% x 1.00 = 76.9%.

V should be anywhere from 25 - 45 mph.

Note: This computation was provided by the County of Maui Dept. of Public Works.
### Traffic Count

**Station No.: C-20-B**  
**Station Description:** Pualani Hwy 6.4 miles East of Kula Hwy and Thompson Rd, JCT (Kanaio)  
**Polling Date:** October 28-29, 1995  
**Channel A:** E Rd to Kipahulu – HR #5543  
**Channel B:** W Rd to Ulupalakua Ranch – HR #4463

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<th>CH-B</th>
<th>Total</th>
<th>Time (PM)</th>
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**AM Total:** 26  
**PM Total:** 28  
**24-Hour Total:** 54

**AM Peak Hour:** 10:00-11:00  
**PM Peak Hour:** 10:00-11:00

**AM D-X (Peak-HR):** 15  
**AM D-X (Min-12H):** 47.3  
**AM K Factor:** 5.9

**PM D-X (Peak-HR):** 15  
**PM D-X (Min-12H):** 28.3  
**PM K Factor:** 5.9

**Directional Totals:**  
**CH-A:** 82  
**CH-B:** 71  
**CH-DX:** 32.4  
**CH-DX:** 67.6

**Total:** 253  
**24-Hour Total:** 253
CONSULTATION LETTERS
CONSULTED AGENCIES AND PARTIES

The following list of agencies and organizations were consulted in the preparation of the Final Environmental Assessment. Those parties who responded are noted with an asterisk (*). A double asterisk (**) indicates parties with substantive comments. Letters received, along with responses, are shown on the following pages.

Federal
- Department of Agriculture, Soils Conservation Service
  ** - Army Corps of Engineers
  * - Department of the Interior, Fish and Wildlife Services
  - Department of Transportation, Federal Highway Administration

State of Hawaii
  ** - Department of Business, Economic Development and Tourism
  ** - Land Use Commission - DBEDT
  - Department of Hawaiian Home Lands
  * - Commission On Water Resource Management - DLNR
  ** - State Historical Preservation Division - DLNR
  ** - Environmental Management Division - DOH
  ** - Department of Transportation
  - Office of State Planning
  - Office of Hawaiian Affairs
  - Office of Environmental Quality Control
  ** - University of Hawaii at Manoa - Environmental Center

County Of Maui
  * - Planning Department
  * - Department of Parks and Recreation
  * - Department of Public Works and Waste Management

Others
- Sierra Club - Maui Chapter
- The Nature Conservancy - Maui
- Kipahulu Community Association
- Hana Community Association
- Hana Advisory Commission
- Hana Public Library
# 24-Hour Traffic Count-Station Summary

**Location:** Piilani Hwy 6.4 Miles East of Kula Hwy and Thompson Rd Junction (at Kanaio)

### Station Characteristics

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### 24-Hour Traffic Volumes

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*Form TI 85-3 MID BLOCK L.S. Meters used.

**Station No:** C-20-B

**Traffic Branch**
Regulatory Branch

Mr. Loren G.S. Lau, AIA
Project Manager
Sato & Associates Consulting Engineers
2046 South King Street
Honolulu, Hawaii 96826

Dear Mr. Lau:

This letter is in response to a proposal by the County of Maui concerning the replacement of the existing one lane Paipao bridge with a new two lane concrete bridge located on the Pilani Highway, between Uaupaliku and Kaupo, Maui, Hawaii.

Based on the information submitted, I have determined that this project can be authorized by nationwide permit (NWP) 13, for Bank Stabilization as described at 33 CFR, Part 330, Appendix A, Paragraph B.13. No further Department of the Army processing is necessary. However, this authorization becomes valid only after you have obtained the required Section 401 Water Quality Certification or waiver thereof from the State Department of Health and a Coastal Zone Management Consistency determination from the Office of State Planning.

Until the certification or waivers are received, I am issuing a provisional nationwide authorization for the proposed work. If the State issues the certifications or waivers, this authorization will take effect from the later issuance date and will remain valid for two years, unless the NWP is modified, suspended, or revoked. If, within this two year period, the NWP authorization is renewed without modification or if the activity complies with any subsequent modification of the NWP authorization, this verification will continue to be valid for the remainder of the two year period.

Excerpts from the regulations which list the conditions and management practices of this authorization are enclosed for your information and compliance. In addition to these conditions and management practices, you are advised that:

a. Nationwide permits do not obviate the need to obtain other Federal, state or local authorizations required by law.

b. Nationwide permits do not grant any property rights or exclusive privileges.

c. Nationwide permits do not authorize any injury to the property or rights of others.

d. Nationwide permits do not authorize interference with any existing or proposed Federal project.

Furthermore, the following special condition has been included:

Upon completion of the project, all excess material not used during construction of the new bridge or removal of the existing bridge will be disposed of at a Corps approved upland site.

File number NW75-040 is assigned to this authorization. Please refer to this number in any future inquiries or correspondence. Call Terrell Kelley or Jim Herrington, at 438-6250, ext. 13 or 14, if you have any questions.

Sincerely,

Jim Herrington
Project Manager

Copies Furnished (without attachments):
Clean Water Branch, Environmental Management Division, State Department of Health, Honolulu, Hawaii.
Office of State Planning, CZM Program Office, Honolulu, Hawaii.

RECEIVED
MAY 5 1995

SAND & SUGAR, INC.
Ms. Loren G.S. Lau, Project Manager
Sato & Associates
2046 South King Street
Honolulu, Hawaii 96816

Dear Ms. Lau:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the Pcoapo Bridge Replacement Project, Maui. The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

a. A DA permit may be required for work in waters of the U.S., including wetlands. Further information and a possible field site visit will be required. Please contact Mr. Jim Harrington of our Regulatory Branch for further information at 628-9258.

b. The flood hazard information provided on page 4 of the environmental assessment is correct.

Sincerely,

Wayne E. Sato, P.E.
Director of Engineering

Mr. Loren G.S. Lau
Sato & Associates
2046 King Street
Honolulu, Hawaii 96816

Dear Mr. Lau:

This letter is in response to your request for a no permit confirmation letter on the Pcoapo Bridge Replacement Project dated June 22, 1993.

The Pcoapo Bridge Project involves replacing the existing bridge which spans the Pcoapo Gulch as part of the Piiholo Highway, at TMK 1-9-41, on Maui. As your plans indicate, the replacement bridge is to be constructed immediately adjacent to the existing bridge. Based on the information you provided, no discharge of fill or excavation in waters of the United States shall occur, thus no Department of the Army (DA) permit is required. As per your conversation with Mr. Terrell Kelley of this office, we will expect your request for a Corps permit for the stream bank protection work, to be done at the same site, at a later date.

File number NT 92-086 is assigned to this project. Please contact Terrell Kelley or myself at 628-9258, extension 13 or 14, if you have any questions.

Sincerely,

Walter T. Michel
Captain, U.S. Army
Project Manager

RECEIVED
JUL 3 1995
Sato & Associates, Inc.
Mr. Lau

The U.S. Fish and Wildlife Service (Service) has received your February 1, 1995 letter, requesting information on the presence of federally listed, proposed, and candidate endangered and threatened species within the area of the Pupuoo Bridge on the island of Molokai. It is our understanding that your company has been contracted by the County of Molokai Department of Public Works and Waste Management, to conduct environmental investigations for purposes of obtaining a U.S. Army Corps of Engineers Bank Stabilization Permit.

The Service has reviewed the maps provided with your request and pertinent information in our files. Including maps prepared by the Hawaii Heritage Program of the Nature Conservancy. To the best of our knowledge, the only federal listed species that may occur within the project area is the Pacific mānae malaitea (Hapalopilus pumilus), which is a category 1 candidate species. This species is endangered, which breeds in overflow pools along the main channels of streams, is known to occur just northeast of the project location. We recommend you survey the project area for the presence of this species.

The Service appreciates your concern for endangered species. If you have any questions, please contact our Branch Chief for Interagency Cooperation, Ms. Margo Stahl, or Fish and Wildlife biologist Desiree Dohm at 808-541-2740.

Sincerely,  
Maria S. Kaila  
Branch Chief  
Interagency Cooperation

In Reply Refer To: MSS

Mr. Lau

Dear Mr. Lau:

This letter serves to follow-up the U.S. Fish and Wildlife Service's February 15, 1995 letter and subsequent phone conversations regarding the presence of federally listed, proposed, and candidate endangered and threatened species within the area of the Pupuoo Bridge on the island of Molokai. The Service was able to determine from site visits to the proposed project that the habitat previously available to the Pacific mānae malaitea is no longer present in the project vicinity. Therefore, our recommendation for a survey is no longer necessary.

Thank you for your interest in protecting our resources. If you have any further questions, please feel free to contact me at 808-541-2740.

Sincerely,

Maria S. Kaila

Branch Chief

Interagency Cooperation

In Reply Refer To: OLB

Mr. Lau

Dear Mr. Lau:

The U.S. Fish and Wildlife Service (Service) has received your February 1, 1995 letter, requesting information on the presence of federally listed, proposed, and candidate endangered and threatened species within the area of the Pupuoo Bridge on the island of Molokai. It is our understanding that your company has been contracted by the County of Molokai Department of Public Works and Waste Management, to conduct environmental investigations for purposes of obtaining a U.S. Army Corps of Engineers Bank Stabilization Permit.

The Service has reviewed the maps provided with your request and pertinent information in our files. Including maps prepared by the Hawaii Heritage Program of the Nature Conservancy. To the best of our knowledge, the only federal listed species that may occur within the project area is the Pacific mānae malaitea (Hapalopilus pumilus), which is a category 1 candidate species. This species is endangered, which breeds in overflow pools along the main channels of streams, is known to occur just northeast of the project location. We recommend you survey the project area for the presence of this species.

The Service appreciates your concern for endangered species. If you have any questions, please contact our Branch Chief for Interagency Cooperation, Ms. Margo Stahl, or Fish and Wildlife biologist Desiree Dohm at 808-541-2740.

Sincerely,  
Maria S. Kaila  
Branch Chief  
Interagency Cooperation

In Reply Refer To: MSS

Mr. Lau

Dear Mr. Lau:

This letter serves to follow-up the U.S. Fish and Wildlife Service's February 15, 1995 letter and subsequent phone conversations regarding the presence of federally listed, proposed, and candidate endangered and threatened species within the area of the Pupuoo Bridge on the island of Molokai. The Service was able to determine from site visits to the proposed project that the habitat previously available to the Pacific mānae malaitea is no longer present in the project vicinity. Therefore, our recommendation for a survey is no longer necessary.

Thank you for your interest in protecting our resources. If you have any further questions, please feel free to contact me at 808-541-2740.

Sincerely,

Maria S. Kaila

Branch Chief

Interagency Cooperation

In Reply Refer To: OLB

Mr. Lau
Mr. Loren G.S. Lau  
Project Manager  
Sato & Associates  
2845 South King Street,  
Honolulu, Hawaii 96826

Re: Draft Environmental Assessment for the Poopoo Bridge Replacement Project, Maui, Hawaii  

JUN 9 1995

Dear Mr. Lau:

The U.S. Fish and Wildlife Service has reviewed the Draft Environmental Assessment for the Poopoo Bridge Replacement Project, Maui, Hawaii. The applicant is the County of Maui Department of Public Works. The proposed project involves construction of a new two-lane, concrete bridge to replace the existing one-lane, wooden bridge.

The Service does not anticipate adverse impacts to fish and wildlife resources to result from the proposed project. We appreciate the opportunity to comment. If you have questions regarding these comments, please contact Fish and Wildlife Biologist Christine Willis at (808) 241-2441.

Sincerely,

Brooks Harper  
Field Supervisor  
Ecological Services

cc: DLNR, Hawaii  
DAR, Hawaii  
CZMP, Hawaii  
CWB, Hawaii

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JUL 9 1995  
SAID & ASSOC, INC.
Mr. Loren G.S. Lau, AIA
May 13, 1995
Page 2

Should you have any questions, please contact Mr. Edward Chen,
Engineering Section of the Clean Water Branch, at 586-4309.

Sincerely,

DENIS R. LAU, P.E., CHIEF
Clean Water Branch

Encl:

- Section 401 WQC Guidelines
- Section 401 WQC Application Form
- U.S. Army Corps, Operations Branch (w/o encs.)
- State Dept. of Land and Natural Resources, CWRM (w/o encs.)
- DHO, Maui (w/o encs.)

Mr. Loren G.S. Lau, AIA
May 13, 1995

Dear Mr. Lau:

Subject: Section 401 Water Quality Certification (WQC)
Requirements for County of Maui/Replacement of the
Existing One-Lane Pupoo Bridge with a New Two-Lane
Concrete Bridge located on Piihau Highway between
Ulupalakua and Kaupo, Maui
Army File No. HM-85-040

Reference is made to the May 4, 1995 letter from the U.S. Army
Corps of Engineers (CERL), Honolulu District, to you, regarding
the Department of the Army (DA) permit determination for the
subject project.

As a pre-requisite to the DA permit, a Section 401 WQC is
required. Enclosed is a copy of the Section 401 WQC Guidelines
and Section 401 WQC Application Form. The application form may
be used as the application, if desired. Please read the
guidelines before completing the application form.

In accordance with the Hawaii Administrative Rules, Department of
Health, Title 11, Chapter 54, Water Quality Standards, an
application filing fee in the amount of $100.00 is required. The
filing fee in the form of a certified check or money order shall
be made payable to the State of Hawaii.

The application form and filing fee should be submitted to either
of the addresses listed under the “Contact Addresses” of the
Section 401 WQC Guidelines.
May 1, 1995

Mr. Loren G.S. Lau, AIA
Sato & Associates, Inc.
2044 S. King Street
Honolulu, HI 96826

Dear Mr. Lau:

Subject: Draft Environmental Assessment for the
Holeo Bridge Replacement Project
Hawaiki, Hawai'i

The Department of Health acknowledges the receipt of the draft environmental assessment for the subject project and has the following comments:

1. The applicant should contact the Army Corps of Engineers (COE) to identify whether a Federal permit (including a Department of Army (DA) permit) is required for this project. A Section 404 Water Quality Certification (WQC) is required for all applicants for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, pursuant to Section 401(a)(1) of the Federal Water Pollution Act (commonly known as the “Clean Water Act (CWA)”.

2. If the project involves the following activities with discharges into State waters, an NPDES permit is required for each activity:

a. Discharge of storm water runoff associated with construction activities, including clearing, grading, and excavation that result in the disturbance of equal to or greater than five (5) acres of total land area;

b. Construction dewatering effluent;

c. Non-contact cooling water;
8 June 1995

Mr. Denis R. Lau, P.E., Chief
State of Hawaii, Department of Health
P.O. Box 1378
Honolulu, Hawaii 96819

Subject: Pepeoa Bridge Replacement Project
Draft Environmental Assessment
Maunawili, Hanalei, Kauai, Hawaii

Dear Mr. Lau,

Thank you for your 1 May 1995 comments on the Pepeoa Bridge Replacement Project Draft Environmental Assessment. The new bridge design and construction is not anticipated to require a Federal Permit. However, stream scours below the new bridge will be filled with concrete to minimize further stream bank erosion.

Filling of the stream scours will require a Nationwide Permit (NWP) 13 for Fish Stabilization from the U.S. Army Corps of Engineers. This NWP activates the Section 401 Water Quality Certification from the State of Hawaii Department of Health. Documents associated with the concrete filling of the stream scours, along with the appropriate submittal forms and plans, will be forwarded to the County of Maui Department of Public Works and Waste Management for processing to your department.

A National Pollutant Discharge Elimination System (NPDES) Permit is not anticipated since the project does not exceed 5 acres, and also does not anticipate any construction dewatering effluent, non-contact cooling water, hydrotesting water and underground storage tank activity.

We appreciate your assistance on this project. Should you have any questions, please do not hesitate to contact us.

Very truly yours,
SATO & ASSOCIATES, INC.

Loren G.S. Lau, P.E.
Project Manager

cc: Cary Yamashita - County of Maui, DPW
    Terrell Kelley - COE
Mr. Loren G. S. Lau, AIA  
Project Manager  
Sato & Associates, Inc.  
3048 South King Street  
Honolulu, Hawaii 96826

Dear Mr. Lau:

Subject: Draft Environmental Assessment for the Poo po o Bridge Replacement Project, Pii lani Highway Ulupalakua, Maui; THW: 1-9-1

Thank you for requesting our comments on the Draft Environmental Assessment (EA). Since the Poo po o Bridge was reconstructed in 1977, the existing structure probably does not qualify for any special historic recognition.

We suggest that additional information be included in the Final EA about (1) the volumes and type of traffic that is generated on the existing bridge and (2) the proposed source of funds for the bridge replacement. If Federal funds are to be used, the EA must be a Federal Highway Administration EA and not just for the County of Maui.

Very truly yours,

[Signature]

Director of Transportation

RECEIVED
JULY 18 1995
SATO & ASSOC., INC.
ATTACHMENT I: SPECIFIC COMMENTS ON THE INVENTORY SURVEY OF THE PROPOSED POOPOO BRIDGE REPLACEMENT

DESCRIPTIONS

Page 1. Project Location: Please provide an approximate figure for the total land area covered by the inventory survey.

Page 4. HISTORIC LAND USE: It should be noted at the end of this section that the Poopoo Bridge was first constructed in 1948 and reconstructed in 1977. It is likely that some of the previously disturbed ground observed in the project area is associated with these events.

Pages 5 - 6. METHODS and RESULTS OF SURVEY: Please provide a map, to scale, of the project area. This map should show the project area boundaries, location of the temporary bridge, proposed limits of construction, the staging area(s), and, last but not least, the limits of the inventory survey.

RECOMMENDATIONS

Page 6. Paragraph 4: Please include a statement on the disposition and curatorial of any documents, field notes, photographs, etc. resulting from this project.

April 24, 1995

Mr. Loren G.S. Lau, Project Manager
Sato & Associates Consulting Engineers
2546 South King Street
Honolulu, Hawaii 96826

Dear Mr. Lau:

SUBJECT: Historic Preservation Review of an Inventory Survey for the Proposed Poopoo Bridge Replacement, Manoa, Oahu, HNL.

Thank you for the submission of the inventory survey report on the proposed Poopoo Bridge replacement project (An Archaeological Inventory Survey for the Proposed Poopoo Bridge Replacement, Manoa, Oahu, HNL. [KUH 1-0-99]). We have reviewed the document and provide the following comments:

While we believe that it is likely the project area has been adequately surveyed, finding no historic sites, we cannot be sure until an accurate map of the project area is provided. Once we receive the additional information itemized in Attachment I, we anticipate concluding that the proposed undertakings will have 'no effect' on significant historic sites.

If you or your archaeological consultant disagree with any of the review comments made, please let us know, and we can schedule a consultation meeting to resolve any differences. Please feel free to call Dave Collins at 587-0013, if you have any questions.

Sincerely,

[Signature]

BONN H. BEARD, Administrator
State Historic Preservation Division

RECEIVED
23.7.1995

KUH & KUH, INC.
May 4, 1995

Mr. Loren G.S. Lau, Project Director
Sato & Associates
2946 S. King Street
Honolulu, Hawaii 96826

Dear Mr. Lau:

SUBJECT: Historic Preservation Review of a Draft Environmental Assessment for the Poopoo Bridge Replacement Project

Thank you for the submission of the draft environmental assessment (EA) prepared for the proposed Poopoo Bridge Replacement project at Manaawaini, Hana District, Maui. As you know, we have recently reviewed the archeological inventory survey report included as "Exhibit D" in the draft EA. A copy of our review letter of 24 April 1995 is attached (Hibbard to Lau, LOG NO 14273, DOC NO 95045064).

Once we receive the requested revisions and information, we anticipate concluding that the proposed undertaking will have "no effect" on significant historic sites.

Please feel free to call Sara Collins, at 587-0613, if you have any questions.

Sincerely,

Ann Hibbard, Administrator
State Historic Preservation Division

RECEIVED

May 9, 1995

SATO & ASSOC., INC.
Roger Evans  
Page 2

actually a section of the Hoapili Trail (SHRP Site 50-15-572). Two retaining walls c. 24.0 and 14.0 m long define the downhill side of the trail switchback along the west face of the gulch. The causeway which once crossed the stream channel at this location has been washed away. A jeep trail and ford occurs immediately south of the Hoapili Trail switchback on the west side of the gulch. The trail corridor which goes up the east side of the gulch has been impacted by modern jeep traffic.

The Hoapili Trail was determined to be eligible for listing in the National Register of Historic Places in 1978. This historic transportation route is believed to follow the course of the precontact Pi'ilani Trail; the section of the trail between Ke'ele'oi and Kaupo was improved by Governor Hoapili during the early 1800's. In areas east of Manaunaui Gulch, the existing Pi'ilani Highway closely follows the earlier route of the Hoapili Trail. Undisturbed trail remnants are visible in a number of locations a short distance north from the existing highway corridor.

In the area of the Poopoo Bridge replacement project, it appears that the Hoapili Trail corridor turned northward along the west side of the gulch, made the crossing and turned south following the present highway. Additional sections of stone retaining walls were observed along the east side of the gulch, as well as a clearly defined traffic scar which parallels the gulch. If the Hoapili Trail followed this route, it may be well within the bridge replacement project area.

The archaeological inventory survey of the project area needs to be revised, and the location of the Hoapili Trail needs to be accurately plotted in relation to the proposed project area before we can fully determine the potential impacts of the project on this significant historic site.

We recommend that approval of this project be deferred until the EA can be accurately updated regarding the presence of historic sites known to be present at the Hoapili Trail site. A plan for future surveys and possibly long term preservation will be needed in order to ensure that the project will have "no adverse effect" on this significant historic site.

Khaljen  
c: Loren Lau, Sato & Associates
Mr. L. Lau

We have no other comments to offer at this time. Thank you for the opportunity to comment on this matter.

Please feel free to call Steve Tagawa of our Office of Conservation and Environmental Affairs at 587-0377, should you have any questions.

Aloha,

[Signature]

Mr. Loren G.S. Lau, AIA
Project Manager
Sato & Associates
2046 South King Street
Honolulu, Hawaii 96819

June 5, 1995

Dear Mr. Lau:

SUBJECT: Draft Environmental Assessment (DEA): Poopoo Bridge Replacement Project, Mānā, Maui

We have reviewed the DEA for the subject project received on April 25, 1995, and have the following comments:

Division of Aquatic Resources

Our Division of Aquatic Resources (DAR) comments that the proposed project is not expected to have significant adverse impact on aquatic resource values in the area since Poopoo Stream is an intermittent stream which is normally dry during most of the year. However, during flood conditions, the stream carries water from the lower portion of Mount Haleakalā to the ocean. Therefore, the applicant should take precautions to prevent contaminants such as sediment, pollutants, petroleum products and debris from entering the aquatic environment. Finally, DAR suggests that site work be scheduled for periods of minimal rainfall and lands denuded of vegetation be replanted or covered as quickly as possible to control erosion.

Division of Water and Land Development

Our Division of Water and Land Development (DONALD) comments that although no hydraulic calculations were provided to show how high the water surface elevations would be at the bridge site during a 100-year and 500-year rain event, based on Q100 = 1,251 cfs and Q500 = 2,143 cfs, the water flow area under the bridge is greater than 1,000 sf. Therefore, the bridge would not block the water flow during a 100-year or 500-year rain event.

Historic Preservation Division

Our Historic Preservation Division (HPD) comments were previously forwarded to you by a copy of their memoranda dated May 25, 1995.
Sato & Associates
Consulting Engineers
200 S. King St., Honolulu, Hawaii 96814
Tel: (808) 529-6681
Fax: (808) 524-2077

8 June 1995

Mr. Michael D. Wilson, Chairman
State of Hawaii
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Re: Draft Environmental Assessment for the Puuoo Bridge Replacement Project

Maui, Hawaii

Dear Mr. Wilson,

Thank you for your 6 June 1995 comments on the Draft Environmental Assessment (EA) for the Puuoo Bridge Replacement Project.

Division on Aquatic Resources comments relative to preventing contamination from entering the aquatic environment and to promptly replant or cover areas denuded of vegetation to control erosion will be integrated into the Construction Documents.

Response to the 25 May 1995 Historic Preservation Division memoranda will be forthcoming in a separate letter in the near future.

We appreciate your assistance with this project. Should you have any questions, please contact us or Mr. Cary Yamashita of the County of Maui Department of Public Works at 343-7345.

Very truly yours,

SATO & ASSOCIATES, INC.

[Signature]

Loren O.S. Lau, AIA
Project Manager

cc: Cary Yamashita - County of Maui DPW
531-669

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

May 16, 1995

Mr. Lance G.S. Lau, AIA
Sato & Associates
2665 K. Kapiolani Blvd
Honolulu, Hawaii 96815

Dear Mr. Lau:

This is in response to your letter requesting whether the Poopoo Bridge Replacement Project requires a stream channel alteration permit, pursuant to Section 13-169-50, Hawaii Revised Statutes.

We contacted the Division of Aquatic Resources and the biologist of the Haleakula National Park to determine whether the Poopoo watercourse supports "instream uses." Both agencies indicate that it is unlikely that the Poopoo watercourse supports instream uses because of infrequent flows.

We consider the Poopoo watercourse not likely to support instream uses. Therefore, a stream channel alteration permit pursuant to Section 13-169-50, Hawaii Administrative Rules, will not be required for the proposed bridge replacement.

If you have any questions regarding this letter, please call David Higa at 587-0249. We apologize for not responding to your sooner.

Sincerely,

RAE M. LOUI
Deputy Director

Mr. Rae M. Loui, Deputy Director
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 821
Honolulu, Hawaii 96809

Re: Draft Environmental Assessment for the Poopoo Bridge Replacement Project
Molii, Hawaii

Dear Mr. Loui,

Thank you for your letter of May 16, 1995 concerning the Draft Environmental Assessment (EA) for the Poopoo Bridge Replacement Project. If you have any questions, please contact me at 243-7745.

Very truly yours,

RAE M. LOUI
Deputy Director

cc: Cary Yamashita - County of Maui DPW

Sato & Associates
Consulting Engineers
2665 K. Kapiolani Blvd
Honolulu, Hawaii 96815

Tel: 808-945-4410
Fax: 808-943-3707

8 June 1995

Received
May 16, 1995

Sato & Associates
June 1, 1995

Mr. Loren G.S. Lau, AIA
Project Manager
Sale & Associates
2046 S. King Street
Honolulu, Hawaii 96816

Dear Mr. Lau:

Subject: Peepoo Bridge Replacement Project, Maui

The Land Use Commission offers the attached comments on the subject project.

Thank you for the opportunity to present our comments.

Sincerely,

Shelley M. Mark
Senior Adviser to Director

Enclosure

SUBJECT: Director's Referral No. 95-050-A Draft Environmental Assessment (EA) for the Peepoo Bridge Replacement Project, Maui, Hawaii

We have reviewed the subject draft EA and have the following comments to offer:

1) The State Land Use Agricultural/Conservation District boundary is located on the mouna side of the existing Piiholo Highway easement, in the vicinity of the project site. Based on figures 2 and 7 of the draft EA, the area of the project site located on the mouna side of the mouna boundary of the existing Piiholo Highway easement are located in the State Land Use Agricultural District, while the areas located on the mouna side of the mouna boundary of the existing highway easement are located in the State Land Use Conservation District.

2) We suggest that the State Land Use Districts of the subject project be clearly identified, and a map illustrating the State Land Use Districts in relation to the subject project be included in the final EA.

3) We have enclosed for your information a copy of the State Land Use District boundaries, specifically portion of USDA quad H-12 (Laueala Hills).

We have no other comments to offer at this time.

Su:kyuth
enc.

RECEIVED
Jun 1 5 1995
SIAO FEISOC, INC.
June 9, 1995

Mr. Loren G.S. Lau, AIA
Project Manager
Salco & Associates
2044 South King Street
Honolulu, Hawaii 96826

Dear Mr. Lau:

Subject: Draft Environmental Assessment (EA) for the Puupoo Bridge Replacement Project, Maui, Hawaii

We have received your letter dated June 5, 1995 transmitting a portion of the draft EA and the plans for the subject project pursuant to the request of Fred Talon of my staff.

Based on our review of the information, we have the following comments:

1) As shown on your plans, the project appears to be located within both the State Land Use Agricultural and Conservation Districts. For your information, the Agricultural/Conservation District boundary in the area follows the mauka side of Pillani Highway as shown on the enclosed State land use district boundaries map (H-12, Waialua Hillie).

2) We suggest that the Final EA include a map showing the project site in relation to the State land use districts.

3) As such as a portion of the subject project is located within the State Land Use Conservation District, we suggest that you contact the Department of Land and Natural Resources, Office of Conservation and Environmental Affairs, which is responsible for the administration of Conservation District lands, at the following address:

Department of Land and Natural Resources
Office of Conservation and Environmental Affairs
P.O. Box 521
Honolulu, Hawaii 96809
Tel: 587-577

We appreciate the opportunity to provide comments on this matter.

Should you have any questions, please feel free to call me or Bert Barnakari of our office at 587-3822.

Sincerely,

[Signature]

ESTHER UEBE
Executive Officer

cc: Dept. of Land and Natural Resources

ATTN: OCEA
Mr. Michael D. Wilson, Chairperson  
State of Hawaii  
Department of Land and Natural Resources  
P.O. Box 631  
Hilo, Hawaii 96720

Re: Draft Environmental Assessment for the Poopoo Bridge Replacement Project  
Maui, Hawaii

Dear Mr. Wilson,

We received a 9 June 1995 letter from the State of Hawaii, Department of Business, Economic Development & Tourism Land Use Commission (LUC) which suggest that we contact your office relative to the project site and the State Land Use Conservation District. A copy of the LUC letter is attached for your use.

LUC has identified the Agricultural/Conservation District boundary as the north side of the existing Piilani Highway. The proposed new Poopoo Bridge is located on the north side of the Agricultural District. However, roadway approaches to the new bridge and removal of the existing bridge will require work within the Conservation District. Figure 7 from the Draft EA, has been highlighted to indicate the project area within the Conservation District.

Roadway Approach Modification

Roadway modifications within the Conservation District is required to widen the existing one lane Piilani Highway to merge with the new two lane Poopoo Bridge. The work involves minor grading to blend the existing roadway elevation to the new bridge elevation. The roadway work within the Conservation District involves approximately 4,000 square feet area.

Chapter 13-5, HAR Conservation District, Subchapter 3, P-9 (A-1) Structures. Existing indicates that demolition, removal, or alteration of existing structures, facilities and equipment may require a departmental permit. The State Historical Preservation Department and State Department of Transportation has indicated that the existing bridge is not historically significant — refer to attached letters. We therefore request confirmation that the bridge removal work requires a departmental permit.

Please review the above and inform us if our review of Conservation District Permitting is correct, and inform us of the permitting requirements. The above items were briefly discussed with Mr. Steve Tegana of your office.

We appreciate your assistance with this project. Should you have any questions, please contact us or Mr. Cary Yamashita of the County of Maui Department of Public Works at 243-9745.

Very truly yours,

SATO & ASSOCIATES, INC.

Laure G.S. Loo, AIA  
Project Manager

cc: Cary Yamashita - County of Maui DPW
June 22, 1995

Mr. Loren Lau
Sato & Associates
2325 Moloa Street
Wailuku, Hawaii 96793

Dear Mr. Lau:

Re: Poopoo Bridge Replacement

This letter will acknowledge your letter dated June 2, 1995, requesting clarification on Special Management Area ("SMA") requirements for the above-mentioned project. We apologize for the delay in our response.

Based on the draft environmental assessment and preliminary plans, it appears that only a minor portion of the road realignment to accommodate the new bridge is located within the SMA boundaries. Therefore, said project would probably require an SMA Minor Permit.

However, please submit a complete application for an SMA Assessment when construction plans have been finalized. At such time, the Director will evaluate the project valuation, whether the proposed action is or is not a development, and potential environmental or ecological effects. Based on this evaluation, an official determination will be made as to whether the project is exempt, requires an SMA Minor Permit, or requires a SMA Use Permit.

Should additional clarification be necessary, please contact Mr. Daren Suzuki of my staff at 243-7725.

Yours truly,

[Signature]

GUCHI SHUHI
Acting Director of Planning

May 31, 1995

Mr. Loren G.S. Lau, AIA
SATO & ASSOCIATES
2040 S. King Street
Honolulu, Hawaii 96826

SUBJECT: Draft Environmental Assessment
POOPOO BRIDGE REPLACEMENT PROJECT

Dear Mr. Lau:

We reviewed the subject draft environmental assessment and have no comment.

If you have any questions regarding this letter, please call me at 243-7845.

Very truly yours,

[Signature]

CHARLES JONES
Director of Public Works & Waste Management

Engineering Division
Solid Waste Division
May 19, 1995

Mr. Loren Lau, AIA
Sato & Associates, Inc.
2045 South King Street
Honolulu, Hawaii 96826

Dear Mr. Lau:


We have reviewed the above-mentioned Environmental Assessment (EA) received on April 24, 1995, and offer the following comments:

1. Portions of the new road alignment for the bridge replacement is located within the Special Management Area boundaries; therefore, is subject to the SMA rules and regulations; and

2. The existing bridge was constructed in 1948. Some 47 years ago, and is proposed to be demolished after the construction of the new bridge. Although the structure may not be historically significant, a photographic analysis (preferably black and white) should be submitted to our department for our archives.

Thank you for the opportunity to comment. Should you have any questions, please contact Mr. Daren Suzuki of my staff at 243-7735.

Yours truly,

[Signature]

[Seal]

Sato & Associates
Consulting Engineers
2045 South King Street
Honolulu, Hawaii 96826

2 June 1995

County of Maui
Planning Department
200 South High Street
Wailuku, Hawaii 96793

Attn: Mr. Brian Mikaz, Director

Subject: Draft Environmental Assessment for the Puuapoo Bridge Replacement Project

Dear Mr. Mikaz,

Thank you for your 19 May 1995 comments on the Draft Environmental Assessment (EA) for the Puuapoo Bridge Replacement Project. As requested, a set of photos will be forwarded to your office in the near future.

We are unclear about the Special Management Area (SMA) requirements for the project. We briefly discussed our concerns with Mr. Lynne Zaki of your office on this date. We request a clarification if this project is considered a major or a minor SMA action, or if the project qualifies for an exemption. Attached are portions of the April 1995 Draft EA which may assist you.

Please review the above and contact us should you have any question.

Very truly yours,

[Sato & Associates, Inc.]

[Signature]

Loren O.S. Lau, AIA
Project Manager

[Seal]

cc: Cay Yamashita
July 11, 1995

Ms. Loren G.S. Lau, AIA
Project Manager
Sato & Associates
2046 S. King Street
Honolulu, HI 96826

Subject: Draft Environmental Assessment (EA)
Peopao Bridge Replacement Project

Dear Ms. Lau:

We have no objections to the subject Draft EA. We support the improvements as proposed for the Peopao Bridge.

Thank you for allowing us to comment on the Draft EA.

Sincerely,

CHARMAINE TAVARES
Director

RECEIVED
JUL 17 1995
SATO & ASSOC., INC.
University of Hawai‘i at Mānoa
Environmental Center
A Unit of Water Resources Research Center
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July 24, 1995
EA:0124

Mr. Cury Yamashita
County of Maui
Department of Public Works
200 South High Street
Waikiki, Hawai‘i 96813

Dear Mr. Yamashita:

Draft Environmental Assessment
Poopuu Bridge Replacement
Poopuu Gulch, Maui

The existing one-lane timber bridge, which spans Poopuu Stream on the Piliala Highway, is in need of repair or replacement. The Department of Public Works proposes to construct a new two-lane concrete bridge on the makai side of the old bridge, parallel to the existing structure. The project site includes the southern portions of Halaekala Ranch Company property in an area of ranching and pasture grazing.

We reviewed this Draft Environmental Assessment (EA) with the assistance of Paul Ekens, Emeritus, Agronomy and Soils Scientist; and Paul Berkowitz of the Environmental Center.

Seismic Hazards

For any infrastructure project in Hawai‘i, some assessment must be made of the earthquake danger. All projects must comply with the building codes for their respective seismic zone. Preferably projects should be built conservatively rather than at the minimum standard. For the proposed Poopuu Bridge Replacement, seismic hazards are ignored completely in the EA. This represents a major deficiency in the document.

Hydrological Calculations

Exhibit E provides several maps of the area, however the watershed boundary is not delineated on any of the maps. This information is critical in assessing the validity of the calculations. Furthermore, it appears that the Waikoloa soil type (W1123), which is found directly adjacent to Poopuu Gulch, is not used in any of the runoff calculations. Why is this soil type not considered?

Climatic Region

Some ambiguity exists about the type of climate found in the region. Section 2D (page 4) describes the wind pattern as diurnal, with sea breezes during the day and land breezes at night. Later in this section, it is stated that the region's air quality is good due to trade wind conditions. These two statements are inconsistent. Is the project site in an area affected by trade winds or does the wind direction vary throughout the day?

Economic Analysis

Given the State's financial crisis and the recent national emphasis on cost-benefit analysis, it seems appropriate to include a cost-benefit analysis for the project.

Conclusion

In general, the project appears to be environmentally benign. Before proceeding further, the seismic hazards need to be considered. We are also somewhat concerned about the watershed boundaries and the soil types used in the hydrological calculations.

Thank you for the opportunity to review this Draft EA.

Sincerely,

John T. Harrison
Environmental Coordinator

cc: OEOC
Site and Associates, Inc.
Roger Fujisaki
Paul Ekens
Paul Berkowitz

An Equal Opportunity/ Affirmative Action Institution
26 July 1995

Mr. John T. Nomura, Environmental Coordinator
University of Hawaii at Manoa
Environmental Center, Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

Ref: Draft Environmental Assessment for the Poopoo Bridge Replacement Project
Makalawena, Hawaii

Dear Mr. Nomura,

Thank you for your 24 July 1995 comments on the Draft Environmental Assessment (EA) for the Poopoo Bridge Replacement Project. The following are responses to the comments:

Seismic Hazards
The new concrete bridge will be designed to comply with the 1991 Edition of the Uniform Building Code.

Hydrological Calculations
Watershed soil type (WID1) will be incorporated into Hydrological and Hydraulic Calculations.

Climatic Regime
Wind pattern information will delete "trade" wind.

Economic Analysis
Federal highway funds will fund 80% of the project, with the 20% balance being funded by the County of Maui. The County of Maui Department of Public Works has determined that the County's cost is acceptable. The project will improve public transportation along Pua'a-Kanani Highway while reducing future bridge maintenance costs.

We appreciate your comments on this project. Should you have any questions, please contact us or Ms. Cary Yano of the County of Maui Department of Public Works at 240-7345.

Very truly yours,

SATO & ASSOCIATES, INC.

Loren G. Lei, AIA
Project Manager

cc: Cary Yano - County of Maui DPW