



## DRAINAGE REPORT

### HONOAPIILANI HIGHWAY SHORELINE PROTECTION LOWALU, MAUI, HAWAII

TMK: (2) 4-8-03

*Prepared for*

State of Hawaii

Department of Transportation, Highways Division

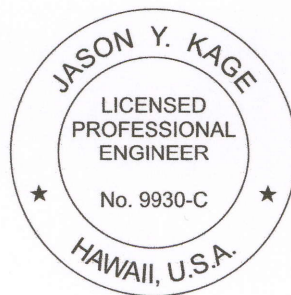
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## **PROJECT LOCATION**

This project is located in Olowalu, on the southern coast of the Island of Maui. The project is located along Honoapiilani Highway, between approximate stations 552+00 and 559+00. Mile marker 16 is located at approximate station 567+50. The roadway is bordered by the shoreline to the west and undeveloped land used for agricultural purposes to the east.

## **PROJECT DESCRIPTION**

At the project area, Honoapiilani Highway is a two-lane, paved roadway with shoulder areas on both sides. The project includes improvements to reduce the potential for erosion of the roadway caused by wave action. These proposed improvements include placing boulders, geotextile fabric, filling and widening the existing road shoulder, and installing jersey crash barriers.

## **FLOOD HAZARD**

Flood Insurance Rate Map (FIRM) published by the Federal Emergency Management Agency (FEMA), panel number 150003 0227B, indicates that the project site is located within Zone V12. Zone V12 is designated as areas of 100-year coastal flood with velocity (wave action); base flood elevation and flood hazard factors determined.

## **EXISTING DRAINAGE CONDITIONS**

The project site is a two lane highway. For the majority of the area of improvement, the roadway slopes away from the ocean. The storm water runoff generated on site flows off the roadway and flows along the roadway to an existing headwall with a 24" drainline that crosses beneath the roadway and outlets to the ocean. An existing earth berm is located east of the roadway intercepts offsite runoff from flowing onto the roadway. A portion of the roadway on the north side of the improvements transitions from sloping away from the ocean to sloping towards the ocean.

Refer to Appendix A for a runoff map showing existing runoff conditions and Appendix B for a runoff summary.

## **DEVELOPED DRAINAGE SYSTEM**

The proposed improvements do not alter the existing storm water runoff flow patterns. The existing 24" drainline that crosses beneath the roadway and outlets to the ocean will be extended to accommodate the shoreline improvements. A new headwall will be installed at the 24" drainline outlet.

Refer to Appendix A for a runoff map showing developed runoff conditions and Appendix B for a runoff summary.

## **HYDROLOGIC DESIGN CRITERIA**

The hydrologic design criteria for the proposed drainage system is outlined in Title MC-15, Chapter 4, *Rules for the Design of Storm Drainage Facilities in the County of Maui*, Department of Public Works and Waste Management. Hydrologic calculations for both existing and developed conditions, were done using the Rational Method.

### **Recurrence Interval (Tm)**

A recurrence interval of 10 years was used to evaluate the system.

Recurrence Interval = 10 years

1-Hour Rainfall = 2.0 inches (Plate 4)

### **Runoff Quantity**

The rational method ( $Q=CIA$ ) is used to estimate the storm runoff from drainage areas, where:

- Q = design rate of flow in cubic feet per second
- C = weighted rational coefficient for the drainage area
- I = rainfall intensity in inches per hour for a duration equal to the time of concentration
- A = drainage area in acres

### **Runoff Coefficient (C)**

The runoff coefficient was determined by the weighted average of the paved areas and grassed areas. A "C" value of 0.95 is used for the paved areas and a "C" value of 0.40 is used for the grassed areas. A summary of the runoff calculations are attached in the Appendix B.

### **Time of Concentration (Tc)**

Overland flow time is determined by using the hydraulic length and slope of the ultimate developed area to the intake point of the drainage system (Plate 1).

### **Rainfall Intensity (I)**

Rainfall intensity is determined by the storm's duration and frequency for each drainage sub-area (Plate 2).

A summary of the hydrologic calculations are provided in Appendix B.

## **SUMMARY**

Existing storm water runoff flow patterns are not altered by the proposed improvements. The existing 24" drainline crossing Honoapiilani Highway will be extended to accommodate the shoreline improvements and a new headwall will be installed at the outlet. The proposed improvements do not adversely impact any of the adjacent properties.