



# University of Hawaii at Manoa

Environmental Center  
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July 31, 1990  
RP:0130

Mr. Manabu Tagomori, Deputy Director  
Commission on Water Resource Management  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, Hawaii 96822

Dear Mr. Tagomori:

Application for Stream Channel Alteration Permit  
Waikakalaua Stream  
Waipio, Oahu

The Environmental Center has reviewed the above document with the assistance of Paul Ekern, Hydrology, and Carolyn D. Cook, Environmental Center. Towne Realty, Inc. proposes to decrease stream flow within Waikakalaua Stream during heavy storms by constructing a detention basin with an outlet pipe. The pipe will be used to control the release of water into the stream.

## Soils

The design of the retention berm for the basin should be reexamined. Two potential problems are foreseen by reviewers: a lack of strength in the soil in the upstream side of the berm and the lack of drainage provisions for the soil of the downstream side. The Soils Investigation Report (Appendix C) indicates that a reddish brown clayey silt (colluvium) is predominant at the location. This type of soil rapidly decreases its friction angle when wet and is very difficult to dry enough to recompact. The optimum moisture content for recompaction is 30-33 percent, and even a slight increase in water content (eg. 34-38 percent) can change the angles of internal friction decreasing the strength. Because of the danger of berm failure and consequential flooding downstream, we suggest incorporating a plastic liner into the drainage basin. This will insure its impermeability and strength. Preferably, this liner would be installed inside the berm and also line a portion of the drainage basin.

Because of the high moisture content in the soil on the downstream side the berm, it is possible that large portions of the berm will slip away. It

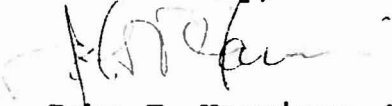
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is advisable to incorporate toe drains into this side of the soil barrier so that water does not accumulate within the berm and decrease soil stability.

For more detailed descriptions of red/brown clayey silt properties regarding dry and moist characteristics and recompaction, Briones' Physics of Drained Paddy Soils (1969, UH Agronomy Ph.D. dissertation) is a useful reference.

Thank you for the opportunity to comment on this document, and we hope that you will find our comments helpful.

Yours truly,



John T. Harrison, Ph.D.  
Environmental Coordinator

cc: OEQC  
L. Stephen Lau  
Paul Ekern  
Carolyn D. Cook