

Office of Environmental Quality Control
Office of the Governor
550 Halekauwila Street
Tani Office Building, Third Floor
Honolulu, Hawaii 96813

REVISED

ENVIRONMENTAL ASSESSMENT FOR PERMIT APPLICATION

THE STORM DRAIN OUTLET

ADJACENT TO KANEOHE YACHT CLUB

Prepared by:

GRAY, RHEE & ASSOCIATES, INC.
116 South King St., Suite 508
Honolulu, Hawaii 96813

Phone: 521-0306

February 14, 1974

ENVIRONMENTAL ASSESSMENT OF THE STORM DRAIN OUTLET

ADJACENT TO KANEOHE YACHT CLUB

SECTION A

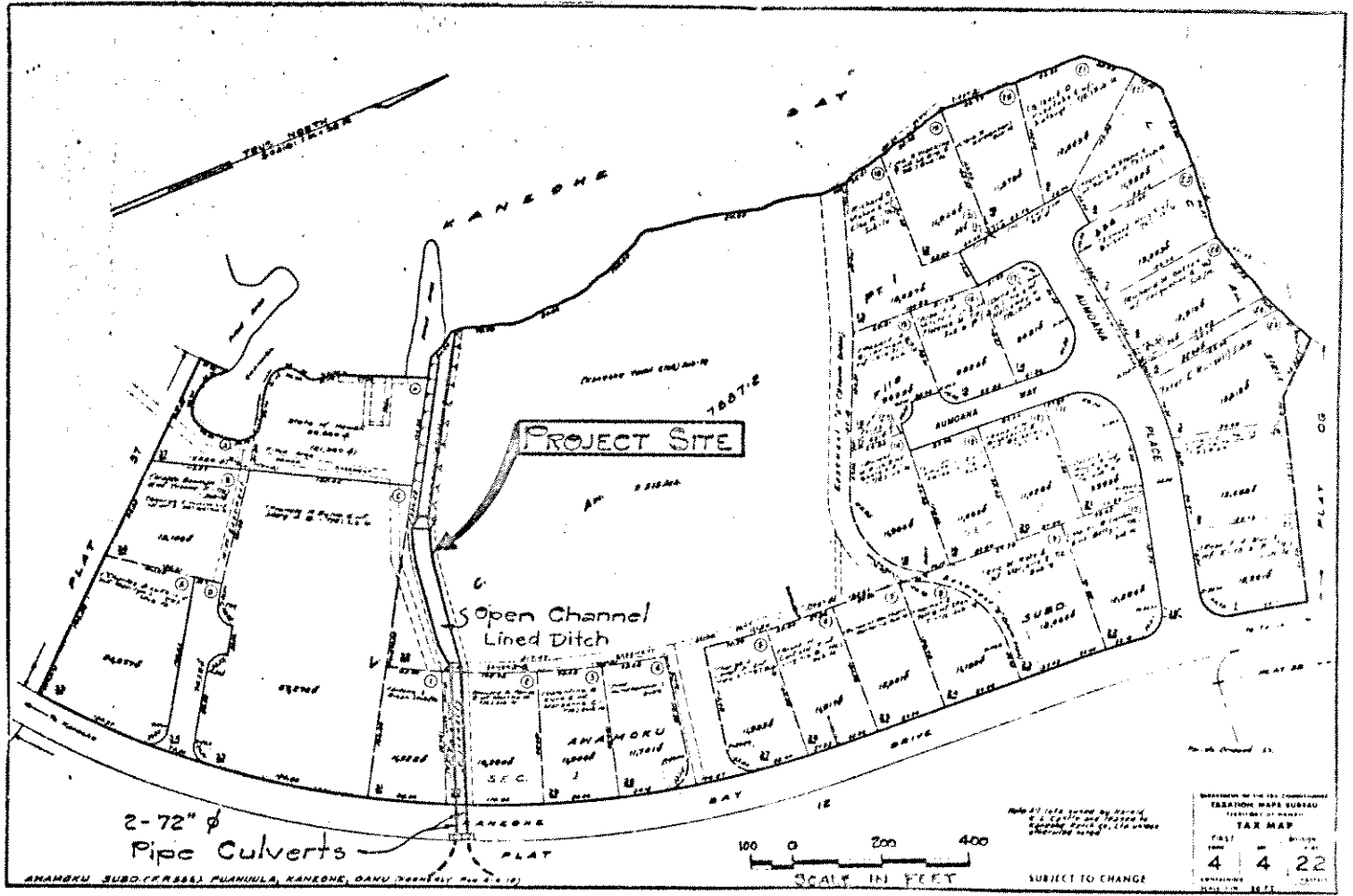
PROJECT DESCRIPTION

The proposed project consists of improvements including drainage channel widening and dredging to improve hydraulic capacity of the existing City & County of Honolulu storm drainage channel on the southern boundary of the Kaneohe Yacht Club (TMK: 4-4-22:32) in Puahuula, Kaneohe, Oahu (See Exhibit A). The hydraulic capacity of the drainage channel has been severely restricted in recent years by the accumulation of silt and debris after storm runoff. Because the channel has inadequate capacity, adjacent lots have experienced flooding conditions over the years.

The proposed alignment of the open channel drain extends approximately 500 feet from Kaneohe Bay Drive to Kaneohe Bay. The right-of-way is 30 feet wide of which a 6-foot width is for the sewer easement leaving a 24-foot width for the open drain.

Work to be done to construct the project includes replacement of an existing 6' x 6' box culvert beneath Kaneohe Bay Drive with a two-barrel 72-inch diameter reinforced concrete pipe culvert. The pipe culvert is to extend underground another 170 feet beyond Kaneohe Bay Drive toward the bay. Placing of this culvert underground minimizes the possibility of floodwater inundation of the existing houses (TMK: 4-4-22:2) which occurred occasionally in the past. The pipe culverts empty into the proposed improved storm drainage channel, the first one-half of which will be lined. A drop in the invert of the lined portion is provided to act as an energy dissipator.

The estimated cost of the proposed project is \$160,000. Estimated duration for construction is three months. Total



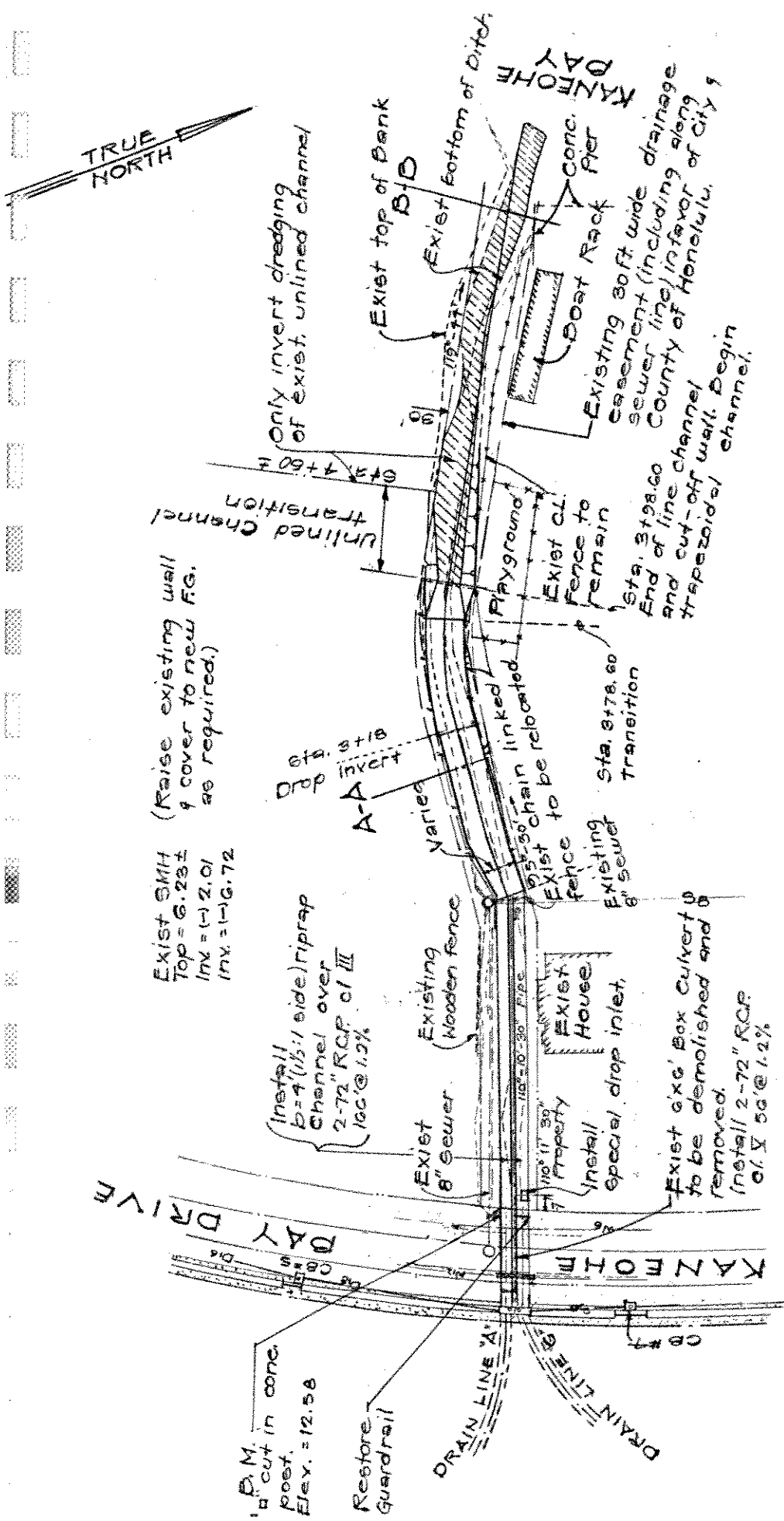
**PROPOSED STORM DRAINAGE
CHANNEL IMPROVEMENT
ADJACENT TO
KANEEOHE YACHT CLUB**

**CITY AND COUNTY OF HONOLULU
STATE OF HAWAII**

**APPLICANT :
DAN OSTROW CONSTRUCTION Co**

EXHIBIT ~ "A"





Exist SMH
 Top = 6.23 ±
 Inv. = (-) 2.01
 Inv. = (-) 6.72

(Raise existing wall
 & cover to new FG.
 as required.)

{ Install
 b=4' (1/2:1 side) riprap
 Channel over
 2-72" RCP of III
 100' @ 1.5%

Exist
 8" Sewer

Existing
 Wooden fence

EXIST
 HOUSE

Install
 Special drop inlet,

Exist 6x6' Box Culvert
 to be demolished and
 removed.
 Install 2-72" RCP
 of V 50' @ 1.2%

P.M.
 1' cut in conc.
 post.
 Elev. = 12.58

Restore
 Guardrail

DRAIN LINE 'A'

DRAIN LINE 'B'

100' @ 1.5% Pipe

100' @ 1.5% Property

100' @ 1.5% Sewer

100' @ 1.5% Transition

PLAN
 Scale: 1" = 80'-0"

PROPOSED STORM DRAINAGE
CHANNEL IMPROVEMENT
 ADJACENT TO

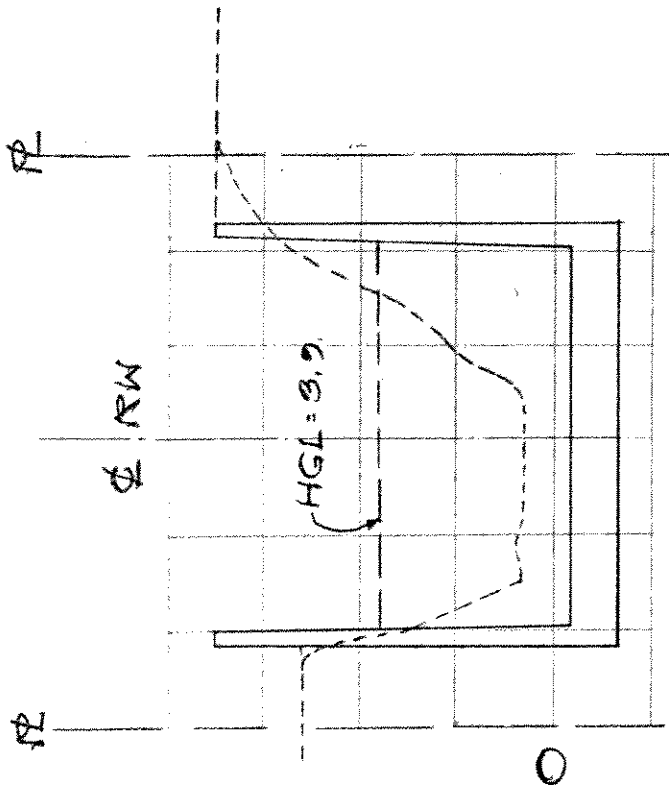
KANEHOE YACHT CLUB

APPLICANT:

DAN OSTROM CONSTRUCTION CO.

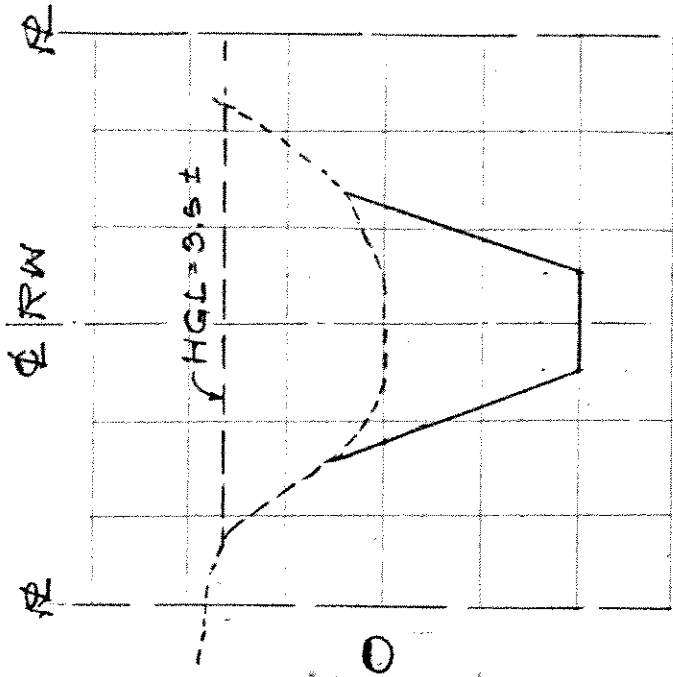
GRAY, RHEE & ASSOC.,
 CONSULTING ENGINEERS
 116 So. King St. RM. 508

Feb. 14, 1974



SECTION "A-A"

Scale: Vert. = 1" = 4'-0"
 Hori. = 1" = 10'-0"



SECTION "B-B"

Scale: Vert. = 1" = 4'-0"
 Hori. = 1" = 10'-0"

PROPOSED STORM DRAINAGE
CHANNEL IMPROVEMENT
 ADJACENT TO
KANEOHE YACHT CLUB

APPLICANT:

DAW OSTRON CONSTRUCTION CO.

GRAY, RHEE & ASSOCIATES
 CONSULTING ENGINEERS
 116 SO. KING ST. RM. 508

Feb. 14, 1974

excavation quantity for the project is 1,200 cubic yards with approximately two-thirds of that quantity dredge spoil from the construction of the open channel portion of the project. Method of dredging will be by crane and clam shell, with disposition of spoil handled by the contractor at a site approved by the City & County of Honolulu Dept. of Public Works. Dredge spoil will consist mainly of bay muds comprising clay, clayey sands, and loose sands with coral and shells.

SECTION B

ENVIRONMENTAL SETTING WITHOUT THE PROJECT

The proposed project is located on the windward side of Oahu Island in the vicinity of the southeastern sector of Kaneohe Bay. Median rainfall for the area is about 45 inches per year. The drainage basin for the drainage canal outlet extends from sea level to approximately elevation 475 at the peaks of the Mokapu peninsula hills and is approximately 152 acres. Fifty-year storm runoff is estimated at 550 cfs.

Construction of Interstate Highway H-3 has divided the upper and lower portions of the drainage basin approximately in half. Numerous culverts cross the highway transporting storm runoff from the upper to the lower lands. The drainage system eventually centralizes to the existing 6' by 6' box culvert under Kaneohe Bay Drive (See Photograph #1).

Runoff occurring during the grading of the H-3 highway resulted in considerable transport of sediment and silt through the box culvert into the drainage channel. Disposition of these materials has resulted in markedly reduced flow capacity of the storm drain outlet (See Photograph #2). Consequently, flooding of lots surrounding the drainage channel has occurred with some property damage.

Primary level of development in the area adjacent to the proposed project site is in residential subdivision. A part of the drainage area above the H-3 freeway is in the conservation district. It is not expected that a significant increase in intensity of development will occur in the future within the drainage basin except for 22 acres of urban land immediately above Kaneohe Bay Drive.

Additional urbanization of 22 acres of land directly above Kaneohe Bay Drive will change the drainage pattern somewhat. An increase in runoff is expected from the urbanization, but in quantities (two to three per cent more) considered minimal. With the approval for urbanization, however, the City & County of Honolulu has mandated the improvements to the storm drainage channel to minimize the risk of flooding of the lower parcels. The improvements, as mentioned earlier, are replacement of the existing box culvert, widening and dredging of the channel, and the lining of part of the channel.

The environment in southeastern Kaneohe Bay has been of much recent concern to ecologists, many who feel that this portion of the bay is hopelessly degraded because of man's urbanizing activities in the bay watersheds. Pollution arising from uncontrolled erosion and discharge of partially treated sewage in the confined waters of the bay have resulted in massive sedimentation and anoxic conditions. Consequently, the bay ecosystems have changed markedly over the past two decades from characteristic coral reef communities to sediment-ridden, turbid waters with sponges, polychaete worms and masses of Dictyosphaeria or bubble algae which dominated after the reefs have died.

The waters of the bay immediately adjacent to the proposed project are similar, with turbid conditions prevailing. The receiving waters for the storm drainage outlet are presently classified as Class "B" by the Hawaii State Dept. of Health. This classification is reserved primarily for boat harbors, like the

dredged Kaneohe Yacht Club Basin.

Benthic organisms including crabs, barnacles, and mussels were observed at the channel outlet. The drainage channel itself (See Photographs #4, #5 & #6) is vegetated on its banks primarily by haole koa and hau trees, along with various other brushes and grasses. There are no known endangered species of flora or fauna within the project site.

Because of the confined nature of the southeastern portion of Kaneohe Bay, significant current patterns are nonexistent, resulting in buildup of pollutant concentrations in this area. Minimal flushing is accomplished only by tidal exchange, not enough to prevent silt-laden, turbid water conditions. Most of the effects are attributable to sewage discharge and uncontrolled erosion resulting from urbanization of the bay watersheds.

Although the construction of the drainage channel improvement will not improve the environment at the receiving waters, the consideration is the alleviation of flood hazard on the stream banks. The improvement will be constructed with the environment in mind, with practices minimally detrimental to the bay ecosystem utilized.

Primary traffic flow in the area is along Kaneohe Bay Drive. However, with the recent construction of the Mokapu Saddle Road, most of the traffic has been diverted away from Kaneohe Bay Drive, leaving mainly local traffic. Disruption of traffic during construction will be minimized by requiring the contractor to provide at least two bi-direction traffic lanes as noted on the construction plans.

SECTION C

ENVIRONMENTAL IMPACT OF THE PROPOSED PROJECT

The estimated fifty-year storm runoff after completion of the project will be about 577 cfs compared to the 500 or so with existing conditions. The improved channel however, will be able

to accommodate the runoff, eliminating flooding problems presently existing.

Because of the nature of construction activity, the improvements will be made during the drier summer months to minimize carrying over of excessive silt and debris to the bay while the box culvert is replaced. Traffic flow will be inconvenienced, but not stopped altogether. The contractor shall provide for as smooth a traffic flow as possible during the course of construction.

The predominant environmental impact of the storm drainage channel improvement is the disturbance and destruction of the flora and fauna within the project site. Excavation to improve the channel dimensions will necessarily destroy the habitats of those estuarine organisms presently existing in the channel. It is not felt, however, that the destruction will be of a magnitude large enough to cause concern to environmentalists. Moreover, recolonization of the affected area by the benthos will begin once the dredging is completed. Vegetation alongside the channel banks will be destroyed during construction. The vegetation is not considered valuable enough to be a concern, however.

Dredging of the channel during construction will result in turbidity of the waters immediately surrounding the project site. The aesthetics of the area will be negatively affected by the turbidity arising from the dredging operation. This effect, however, will be temporary, lasting only until the dredging is completed.

Improvements to the drainage system will accommodate some additional urbanization, but not more than a few acres.

Improving the drainage channel will cause an increase of velocity of storm waters entering Kaneohe Bay. Velocity at the outlet will be about 5 feet per second, dissipating rapidly to near zero as the open water regime is encountered. It is not expected that boats berthed near the discharge point will be affected to any degree greater than they now are by the stormwaters.

Noise will be an undesirable feature as with all construction activities. Again, this effect will be temporary, lasting only during the construction phase of the proposed project.

SECTION D

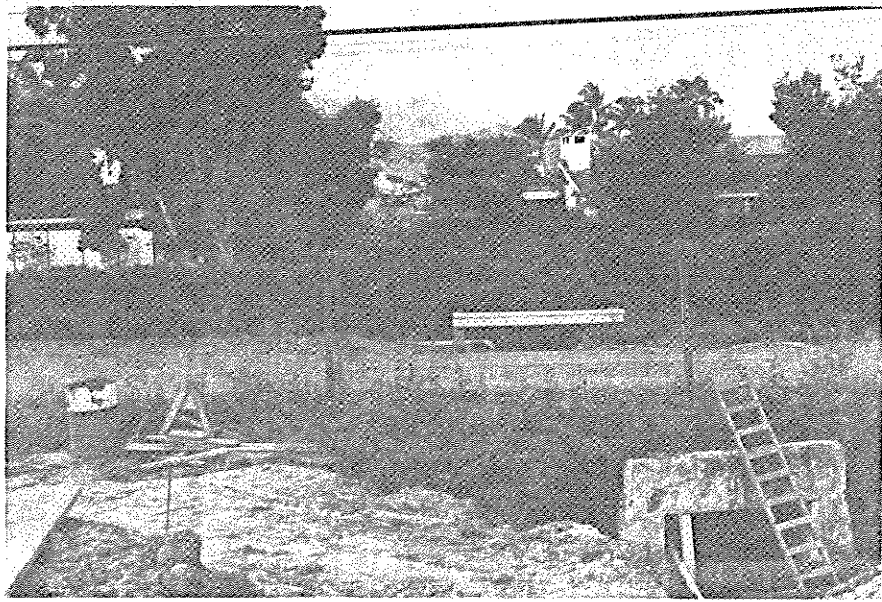
ALTERNATIVES TO THE PROPOSED ACTION

An alternative to the proposed project is no action at all. This, however, will result in the continuation of the flooding hazard if the drainage channel is left unaltered. The liability of the City with regards to flooding will be greatly alleviated by improving the channel outlet.

The environmental impacts of the proposed project are barely significant when viewed in the light of problems that could occur should existing conditions prevail. Except for a minor increase in runoff, the drainage pattern is left unchanged by the improvement.

Another alternative is to divert the runoff from the existing storm drainage channel, thereby preserving the environment at this location and reducing the flooding problem. However, the runoff would have to eventually be discharged into the ocean. To do so would mean creating another outlet and disrupting the ecosystem at the new location, more severely, perhaps, because the ecosystem at the new location would not have been acclimated to fresh water discharge. Diversion of runoff out of the confined waters of Kaneohe Bay into an open ocean regime, although desirable, is impractical because of the distance of travel.

Finally, a debris basin could be constructed as part of the overall drainage project. However, limited availability of land within the storm drainage easement precludes this possibility. Furthermore, large debris will be entrapped by debris catchers and field inlets upstream of the drainage channel. Construction debris will be removed by a temporary silting basin just upstream of Kaneohe Bay Drive.



PHOTOGRAPH #1

Looking towards Kaneohe Bay across Kaneohe Bay Drive over the storm drainage easement. Note existing 6'x6' box culvert under Kaneohe Bay Drive



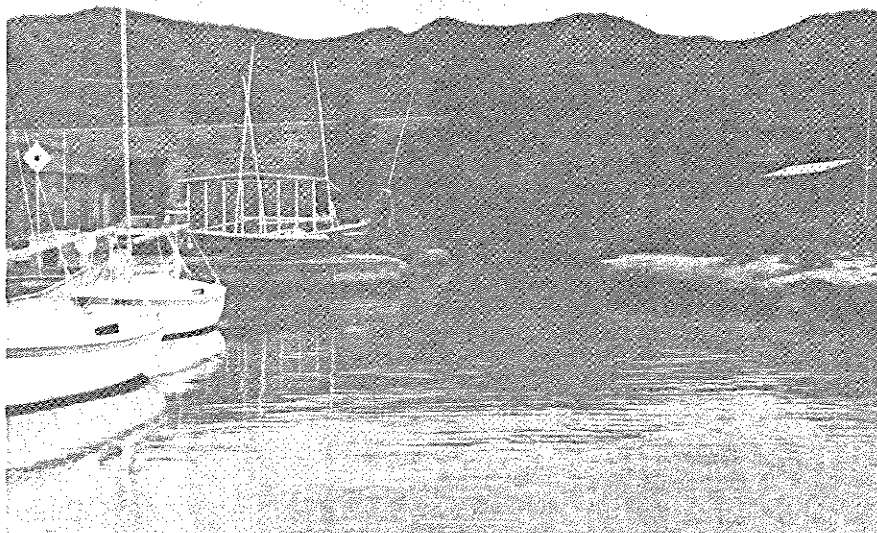
PHOTOGRAPH #2

Note accumulated silt and debris within the drainage channel.



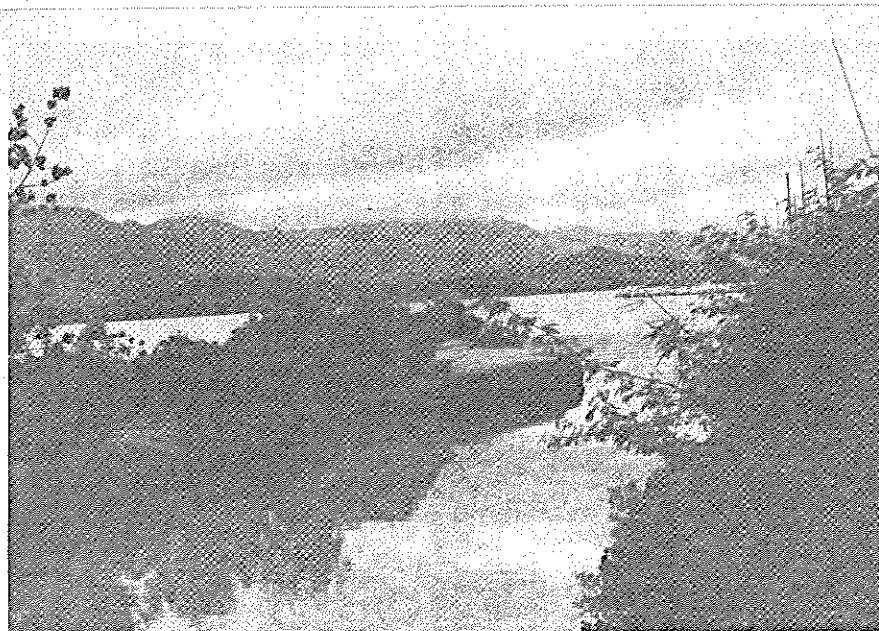
PHOTOGRAPH #3

Note accumulated silt and debris within the drainage channel



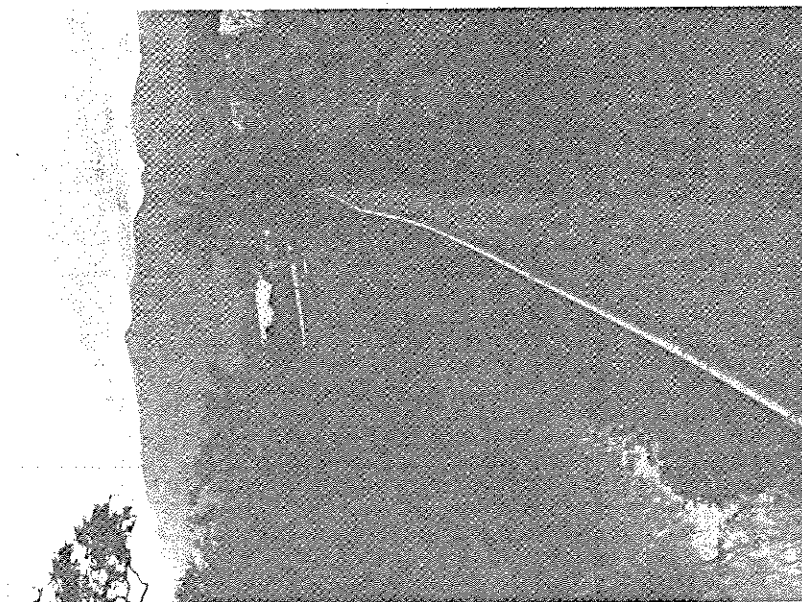
PHOTOGRAPH #4

Looking upstream at mouth of channel from Kaneohe Yacht Club pier.
Note Interstate Highway H-3, Mokapu peninsula hills in background.



PHOTOGRAPH #5

Looking toward Kaneohe Bay at mouth of channel. Note turbidity of water.



PHOTOGRAPH #6

Looking toward Kaneohe Bay over drainage easement. Kaneohe Yacht Club on the right.