

APPENDIX D:
Civil Engineering
Reconnaissance

SANITARY SEWER SYSTEM - EXISTING CONDITIONS

Description of Existing System

The on-site sanitary sewer system which consisted of Building connections to individual cesspools was recently upgraded. Cesspools were abandoned and direct sewer connections were made to a new sanitary sewer system which connects directly to the existing City & County of Honolulu's Sewer System at the intersection of Waimano Home Road and Hookiekie Street. This was constructed under D.A.G.S. Job No. 22-20-0905, "Waimano Training School & Hospital Sewer Connection". Construction of the new sewer system was completed in 1989. The maintenance of the sewer system is currently under State jurisdiction.

The sewer system consists of a main trunk line consisting of approximately 2700 lineal feet of 12-inch vitrified clay pipe (VCP) sewer connecting from the existing 8-inch City & County sewer system at Waimano Home Road up to Building No. 4 and approximately 3200 lineal feet of 8-inch VCP extending up to Building No. 6. There are two branch connections; one 6-inch branch connection of approximately 400 lineal feet servicing the Administration Building Complex and another 6-inch branch connection of approximately 1200 lineal feet extending to the Boys Kitchen Building. A small Sewer Pumping Station connects the Sun Project House to this branch line. The Sewer Pumping Station consists of a duplex submersible pump system with capacity of 20 gallons per minute (gpm).

The existing sewer system is shown in Figure 14: "Major Onsite Utilities."

Existing Sewer Capacity Study

A sewer system study was conducted in September 1987 by Okahara & Associates

as part of the design for the "Waimano Training School & Hospital Sewer Connection" project. The study determined the existing peak sewage flow to be 425 gallons per minute (gpm). The design of the sewer system also incorporated additional capacity for the proposed Department of Health's Laboratory Facility.

Design data and calculations for the proposed Department of Health's Laboratory Facility was obtained from Imata & Associates. A sewer capacity study indicates that the existing sewer system would be adequate for the additional sewage flows. The following is a summary of peak sewer flow data obtained from Imata & Associates:

Existing Waimano Facility	425 gpm	0.612 mgd
Proposed D.O.H. Laboratory	800 gpm	1.152 mgd
Total	1225 gpm	1.764 mgd

The proposed Laboratory Facility's sanitary sewer system will consist of a new 8-inch sewerline connecting to the existing 12-inch sewerline in the area of Building No. 4. The Laboratory Facility has obtained approval for connection into the existing City & County Sewage System and reservation of available sewer capacity from the City & County of Honolulu's Division of Wastewater Management. The Division had indicated that the existing sewer system downstream from the site was reaching capacity and any new connections would require separate approvals.

Based on the study by Imata & Associates, Inc., the peak sewer flow is 1.764 mgd. or 1225 gpm. The controlling factor in the existing 12-inch sewerline is the portion between the Administration Building complex and the Maintenance Building where the gradual pipe slope provides a maximum design flow of 2.19 mgd. or 1520

gpm. Therefore, available capacity for future development without major sewer system improvements is 0.426 mgd or 295 gpm.

The City & County of Honolulu's Division of Wastewater Management currently requires submittal of a sewer connection application request in order to make a determination whether or not the existing City & County Sewer System has adequate sewer capacity. Pertinent information required is the existing numbers and types of structures on site, the number and types of structures to be demolished and the number and types of new structures planned.

WATER SYSTEM

Description of the Existing System

The Waimano Training School & Hospital Facility has its own potable water source provided by two deep wells located on-site. The pump house is located at an approximate elevation of 500 feet. The deepwells extend to a depth of 500 feet. There is a 250 gpm pump and a 400 gpm pump. Average pumping rates for July 1989 thru June 1990 are approximately 100,571 gallons per day (gpd). Water Treatment is by an automatic chlorine injection system. Water is pumped through a 6-inch ductile iron (D.I.) pipe to a 100,000 gallon concrete reservoir located at elevation 611 feet. There are two 1800 gpm booster pumps which transfers water through a 6-inch D.I. pipe to a 100,000 gallon and a 590,000 gallon steel water storage tanks located at elevation 868 feet. The main water system throughout the site consists of the 6-inch D.I. Pipe which connects to on-site fire hydrants, standpipes and to sprinkler systems at the Buildings. There are smaller water laterals which branch to individual Buildings. Under the proposed D.O.H.'s Laboratory Facility project, a new 12-inch

water connection to the existing water storage tanks from the Laboratory facility is proposed. New on-site fire hydrants connecting from the 12-inch waterline will be provided for the Laboratory Facility.

The existing water system is shown in Figure 14: "Major Onsite Utilities."

Existing Water System Study

The domestic water system currently appears to be adequate for the present needs. The on-site fire protection system, however, may require upgrading. Based on Board of Water Supply Standards, there appears to be adequate storage capacity for a 2-hour fire duration 2000 gpm x 120 minutes = 240,000 gallon storage (Total on-site storage is 790,000 gallons). The 6-inch waterline size, however, is not adequate to provide the required fire flow of 2000 gpm to the on-site fire hydrants. Standpipes will also have to be upgraded to fire hydrants. A new 12-inch line may be required to connect from the water tanks down to the Administration Building Complex.

At the present, the water system is operated and maintained by the State. Upgrade of the Water System to meet the Board of Water Supply's (BWS) Standards will require major upgrade of the existing fire protection system including constructing additional on-site fire hydrants. In order to turn the Water Supply and Storage System over to the Board of Water Supply (BWS) this will require upgrade of the Deepwell pump and the Booster Pump system and Pump House to meet BWS standards. The steel tanks will have to be replaced with concrete reservoirs. An all weather, 20 foot wide paved access road to the water storage tanks will be required. The Deepwell and Booster Pump system will also require a standby power system.

DRAINAGE SYSTEM

Description of the Existing System

The buildable project site area ranges from elevations 442 feet to 785 feet and is surrounded by gullies on both sides. The existing on-site stormwater drainage system consists of swales, lined channels and roadway culverts which pipe stormwater runoff to the adjacent gullies. The existing on-site drainage system is shown in Figure 14: "Major Onsite Utilities".

There does not appear to be any drainage problems on-site. For proposed development, the City & County of Honolulu Drainage Standards require consideration of designs to prevent increase of additional stormwater runoff from leaving the project site. Implementation of storage or siltation basins and debris barriers will need to be taken into consideration.

SLOPE SEVERITY ANALYSIS

The existing Buildings are constructed on level areas and areas of "moderate" slopes varying from 0% to 15% as indicated in Figure 11: "Slope Analysis". These areas are considered to be buildable without major grading. "Steep" slopes are indicated in areas between 15% to 30%. These areas are buildable but will require major grading, retaining walls and extensive drainage structures. Access roadways will be difficult to construct. Maximum roadway grades should not exceed 20%. "Very steep" slopes are indicated in areas between 30% to 40% and are located mainly in the gullies. Construction is extremely difficult and erosion problems will be very severe. Slopes greater than 40% are contained within the gully areas and are not buildable.