FINAL
Environmental Impact Statement
for the Proposed
Mililani Town Expansion

Prepared for submission to:
City and County of Honolulu
Department of Land Utilization

By:
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For:
Mililani Town, Inc.
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CHAPTER I. PROJECT DESCRIPTION

INTRODUCTION

Mililani Town is situated on the gently sloping Schofield Plateau and is surrounded by several deep gulches and extensive agricultural lands which constitute an effective greenbelt separating it from other urban development. The ±3,500 acre total project site represents a geographically united community which is divided into three distinct segments by two major transportation corridors, Kamehameha Highway and the H-2 freeway. These three segments are approximately equal in size.

When the initial increment of homes at Mililani Town was completed in 1968, it marked the first step in the development of a new community that was planned to accommodate over 60,000 residents. One of the first totally planned communities in the state, the Mililani concept of organized growth in accordance with a comprehensive, long-range master plan was a sharp contrast to the haphazard urban sprawl that characterized development elsewhere on Oahu at that time.

The overall master plan proposes that two of the segments, 1,100 acres west of Kamehameha Highway and approximately 1,250 acres northeast and mauka of the H-2 freeway, be developed primarily as residential areas (see Figure I-1). Each of these would contain all appropriate community facilities such as elementary schools, neighborhood parks, and commercial facilities. The central segment of the town encompasses about 1,150 acres between Kamehameha Highway and the H-2 Freeway, and includes the 476 acres covered by the present rezoning request. The master plan conceives of this area as the core of the entire development.

The west segment is today about 85 percent complete, and construction on all of the land except a 46-acre parcel not yet zoned for urban use should have started by the end of 1978. More than half of the central segment has already been developed, and the construction covered by the present request would bring this portion of the town nearly to completion. The land mauka of the H-2 Freeway, scheduled for the final phase of the total development plan, is still designated for agricultural uses by the State and County.

Approval of the present application to rezone 476 acres within this central segment would allow the design and construction of the Mililani Town community core to proceed as planned. In addition to extensive park areas, as well as substantial public and quasi-public open space, this increment would contain the town center, which with its civic/commercial area, district park and medium-density residential development, promises to become the cultural focal point of the town and to provide both life and identity to the entire community. As a result, the area covered by this request plays a key role in the overall Mililani Town development concept.
This Environmental Impact Statement (EIS), was undertaken at the request of the Department of Land Utilization (DLU). It is intended to accompany an application to rezone 476 acres within the central segment of Mililani Town (see Appendix A). It describes the development that would occur on this land should the proposed rezoning be granted, and points out the significant impacts that would be produced. Hence, the EIS provides information that will allow decision makers to make knowledgeable and expedient judgments regarding the proposed action and serves to inform interested parties, public and private, of the beneficial and adverse impacts of this proposal.

Chapter I describes the location of the project, as well as introduces the developer and his proposal. Subsequent chapters deal with pertinent topics in more detail; they also specify more precisely the expected impacts and alternatives.

LOCATION OF THE PROJECT

Mililani Town is located in the ahupua'a of Waipio in Central Oahu, and is bordered by military reservation lands, pineapple fields and the urban lands of Waipio Acres. The 476 acres described in this report adjoin the existing development at Mililani Town. Figure I-2 illustrates the location of the 476 acres relative to the existing Mililani Town development. It also indicates areas where the development is completed, where it is currently in the detailed engineering or construction phases, and where proposed zoning has not yet been requested. Based upon physical proximity and community growth needs, the development of these 476 acres is the next logical step in the implementation of the overall master plan. Specifically, the land designated for rezoning is identified by the following tax map key numbers:

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<th>Tax Map Key No.</th>
<th>Approximate Area (Acres)</th>
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<td>9-4-05 Por. 3</td>
<td>66</td>
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<tr>
<td>9-4-05 Por. 27</td>
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<td>9-5-01 Por. 8</td>
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<td>9-5-01 Por. 10</td>
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<td>9-5-01 Por. 11</td>
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<td>9-5-01 Por. 16</td>
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<td>9-5-03 Por. 1</td>
<td>81</td>
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<td></td>
<td>476</td>
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All of the land affected by the proposed action is within the State Land Use Commission's Urban District (Figure I-2). The request is also consistent with the Detailed Land Use Map for Mililani Town as amended by Ordinance No. 46-40 on October 14, 1976.

BRIEF HISTORY OF DEVELOPMENT AT MILILANI TOWN

The idea for Mililani Town was conceived in the late 1950's when the Hawaiian Pineapple Company, subsequently merged into Castle and Cooke, Inc., began exploring ways of diversifying the use of their large land holdings in Central
SCHEMATIC LOCATION OF MILILANI TOWN ON OAHU

WEST SEGMENT:
INCLUDES ALL LAND WEST OF KAMEHAMEHA HIGHWAY

CENTRAL SEGMENT:
INCLUDES ALL LAND BETWEEN KAMEHAMEHA HIGHWAY AND THE H-2 FREEWAY

NORTH-EAST OR MAUKA SEGMENT:
INCLUDES ALL LAND NORTH-EAST OF ‘MAUKA’ OR THE H-2 FREEWAY

MILILANI TOWN
3,500 ACRE PLAN

FIGURE I-1
An inter-disciplinary team of planners, economists, engineers, and designers prepared a twenty-year development plan for the new community that they called Mililani Town. On the basis of this "3,500 Acre Master Plan," as it came to be known, Castle and Cooke's development arm, Oceanic Properties, Inc., created Mililani Town, Inc. (MTI), as the corporate entity charged with implementation of the plan. MTI began sales in 1968, and currently owns and/or holds options to acquire and develop all of the land covered by the master plan.

This rezoning application is the sixth increment of rezoning requested by Mililani Town and, if granted, would bring the total zoned area of the town to about 2,200 acres. This is slightly over sixty percent of the 3,500+ acres designated for potential development in the master plan.

As of December 31, 1977, 2,931 single family dwellings (1,126 in the central segment and 1,805 in the west segment) and 2,186 multi-family dwellings (1,194 in the central segment and 992 in the west segment) had been constructed at Mililani Town. Assuming an average of 3.5 persons per dwelling unit, the population of Mililani Town as of December 1977 was about 17,900. Thus far, Mililani Town has not been developed as densely as had been originally intended. If this pattern continues, its ultimate population would be considerably below the 63,000 to 65,000 cited in the "3,500-Acre Master Plan."

DEVELOPMENT OBJECTIVES

In the late 1950's and early 1960's, as result of rising agricultural labor and production costs, profitability of Hawaiian canned pineapple declined. Agricultural production by Castle and Cooke's Dole Division shifted to other areas of the world, first to the Philippines and then to Thailand. Major cutbacks were made in the amount of Central Oahu land under cultivation as Dole's Hawaiian production shifted to the fresh pineapple market. At the same time, Oahu's growing population made urban development a financially attractive alternate use of the land. In response to these socio-economic forces, some of the former pineapple land was put into sugar cane production, some was sold, and some was set aside for eventual urban development.

As previously indicated, development of Mililani Town is controlled through a three-tiered corporate structure involving Castle and Cooke, Inc., Oceanic Properties, Inc., and Mililani Town, Inc. All of these entities have as their fundamental objective the provision of an optimal return on the investments of their stockholders. It should be noted, however, that Castle and Cooke's size, its traditional importance in the state's economy, and its commitment to continued operations in Hawaii have imparted a sense of responsibility and a commitment to quality that has had a significant effect on development decisions at Mililani.

PURPOSE AND GENERAL DESCRIPTION OF THE PROPOSED ACTION

PURPOSE

The proposed expansion of Mililani Town would:

- provide 3,450 low and medium density residential units designed to meet the demand for homes in the moderate to middle price ranges (possibly including housing for such specialized groups as the elderly);
create a "Town Center" that would contain commercial and public facilities serving all of Mililani Town. This would provide it with a sense of identity and with urban amenities lacking in smaller suburban housing developments;

- add nearly 100 acres of natural open space and 40 acres of park land to the town; and

- continue the planned development program.

PROPOSED LAND USE PATTERN

The proposed land uses for the 476 acres covered by the rezoning request include:

- 290 acres of single- and multi-family residential;
- 40 acres of business/commercial;
- 12 acres of schools and other institutional; and
- 134 acres of recreation and open space.

Table I-1 indicates the type of land use that is anticipated for each of the 15 separate parcels included in the rezoning request. Table I-2 summarizes the proposed zone changes. The location of the various parcels referred to in Table I-1 is shown in Figure I-3.

R-6 Designated Lands

The 182 acres proposed for R-6 residential zoning would contain the same types of units as are found in previous residential development at Mililani Town. This would include traditional single-family detached homes and the "zero-lot-line" variant of that type, duplexes, townhouses, and patio homes. The bulk of these units would be located on the periphery of the town (see Figure I-3). The dwelling units would continue to be sold in fee. Table I-3 indicates the density that is anticipated in R-6, A-1, and A-2 designated zones; it also contains estimates of the population which could be expected in each type of development.

Apartment Designated Lands

Both low and medium density apartments (A-1 and A-2) are proposed within the subject area (Table I-3). In general, the density of the apartments would be similar to those already developed at Mililani Town, i.e., the MF-21 townhouse type units (12 units/acre) Nob Hill Apartments (20 units/acre), and 2- and 3-story walk-up apartments (20-25 units/acre).

An exception to this is a 36 acre parcel (Parcel M) where A-2 zoning is proposed. This parcel lies within the 102 acre Town Center (Figure I-3). Since it is directly adjacent to the civic/commercial core with excellent view potential, this area is planned for a mix of development densities (25 to 35 units/acre). This apartment area is in accordance with the Mililani master plan and is in conformance with the civic and commercial uses proposed for the Town Center.
Table I-1. REQUESTED LAND USE CHANGE BY PARCEL

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<td>&quot;D&quot;</td>
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<td>Preservation (P-1)</td>
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<td>&quot;J&quot;</td>
<td>AG-1</td>
<td>&quot;</td>
<td>20.41</td>
<td>District Park</td>
</tr>
<tr>
<td>&quot;K&quot;</td>
<td>AG-1</td>
<td>Preservation (P-1)</td>
<td>20.41</td>
<td>&quot;</td>
</tr>
<tr>
<td>&quot;L&quot;</td>
<td>AG-1</td>
<td>&quot;</td>
<td>476.19</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

TOTAL

Table I-2. SUMMARY OF REQUESTED ZONING CHANGES

<table>
<thead>
<tr>
<th>Zoning District</th>
<th>Existing Zoning (in acres)</th>
<th>Proposed Zoning (in acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-6: Residential</td>
<td>± 20</td>
<td>181.83</td>
</tr>
<tr>
<td>A-1: Low Density Apartment</td>
<td>0</td>
<td>15.66</td>
</tr>
<tr>
<td>A-2: Medium Density Apartment</td>
<td>0</td>
<td>91.87</td>
</tr>
<tr>
<td>B-2: Business</td>
<td>0</td>
<td>46.38</td>
</tr>
<tr>
<td>P-1: Preservation</td>
<td>0</td>
<td>140.45</td>
</tr>
<tr>
<td>AG-: Agriculture</td>
<td>±456</td>
<td>0.00</td>
</tr>
</tbody>
</table>

TOTAL ±476 476.19
NOTE:
This map outlines the 476 acres under petition and indicates the parcels (A through Q), the town center (shaded area) and the proposed land use and zoning.

MILILANI TOWN ZONING BY PARCEL  FIGURE I-3
Table I-3. PROJECTED POPULATION OF THE PROPOSED INCREMENT

<table>
<thead>
<tr>
<th>Proposed Land Use</th>
<th>Proposed Zoning</th>
<th>Acreage</th>
<th>Approx. Density (Unit/Acre)</th>
<th>Number of Units</th>
<th>Persons Per Unit</th>
<th>Estimated Resident Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family or Cluster Develop.</td>
<td>R-6</td>
<td>182</td>
<td>6</td>
<td>1,092</td>
<td>3.7</td>
<td>4,050</td>
</tr>
<tr>
<td>Multi-Family(L)</td>
<td>A-1</td>
<td>16</td>
<td>10</td>
<td>160</td>
<td>2.8</td>
<td>450</td>
</tr>
<tr>
<td>Multi-Family(M)</td>
<td>A-2</td>
<td>56</td>
<td>20</td>
<td>1,120</td>
<td>2.5</td>
<td>2,800</td>
</tr>
<tr>
<td>Multi-Family(M) Town Center</td>
<td>A-2</td>
<td>36</td>
<td>30</td>
<td>1,080</td>
<td>2.5</td>
<td>2,700</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>289</td>
<td></td>
<td>3,452</td>
<td></td>
<td>10,000</td>
</tr>
</tbody>
</table>

\(^1\) Occupancy factors in this column were obtained from a mail survey of Mililani residents conducted in the fall of 1977.

Business Designated Land (Commercial/Civic)
This area would contain a community or small regional shopping center. Initially, the gross leasable area would be about 100,000 to 125,000 square feet. Depending upon the success of the first increment and possible future growth in the area, it might eventually be expanded to a maximum of approximately 350,000 square feet of gross leasable space.

Civic uses such as a public library, auditorium, Satellite City Hall, fire station and police station could also be included within this complex. Unlike existing commercial development in Mililani Town, which provides only a limited range of services and is aimed solely at Mililani residents, the development proposed for the Town Center would house a wide variety of establishments. If developed to a full 350,000 square feet, it could attract shoppers from Wahiawa and as far away as Waipahu and the North Shore.
Preservation Designated Lands

Parks A neighborhood park, a community park, and a district park are proposed for the area covered by this rezoning request. In addition to providing open space, the 20-acre district park (5 acres of which would be privately-owned) planned for the town center could accommodate facilities and programs that would complement the commercial and civic activities anticipated on adjacent land. Like the parks that have been developed to date, they would be dedicated to the City and County of Honolulu for operation and maintenance. The size, type, and location of the proposed parks are based upon criteria established by the City and County's Department of Parks and Recreation. In all, 40 of the 476 acres included in this request would be designated P-1 for park use.

In addition to the parks operated by the City and County, the Mililani Town Association (MTA) currently owns and maintains two recreation centers; a third is presently being constructed; and a fourth is in the planning stage. Each homeowner at Mililani Town is assessed a monthly fee (currently $7.30 per month) which allows him the use of the above-mentioned facilities and covers the maintenance of MTA common areas.

Open Space Open space at Mililani Town is generally of two types: (1) natural open space, mostly gulch land, which is left in its original state; and (2) community association areas that are landscaped by Mililani Town, Inc., and then dedicated to and maintained by Mililani Town Association. These MTA common areas are located adjacent to major parkways and collector roads, at major entries along Kamehameha Highway, and at the Mililani Town Interchange. Mililani Town’s pedestrian walkway system is also included in this type of open space. This system would be continued in the proposed increment. These open spaces can also serve as bikeways and, where appropriate, can be used in conjunction with natural drainage courses. Altogether, approximately 94 of the 476 acres of land in the project area would be open space.

Schools The school sites shown on the plan have been selected in consultation with the State Department of Education pending final approval of the Department of Accounting and General Services. Mililani High School presently serves the area. A site west of Kamehameha Highway has been designated for an intermediate school, should it be needed. To date, three elementary school sites have been developed in Mililani Town, and a fourth site is reserved in the area west of Kamehameha Highway. A six-acre elementary school site within the area covered by the present rezoning request is proposed for P-1, preservation zoning.

INFRASTRUCTURE

Vehicular Circulation

Two major roads provide access to and from Mililani Town: Kamehameha Highway passes through the western portion of the town, and the recently completed H-2 Freeway is located further east (see Figure I-4). Three access points have been authorized on Kamehameha Highway by the State Department of Transportation. One is at Kamehameha Highway and Kuahelani Avenue, a second is the intersection of Kamehameha Highway and Meheula Parkway, and a third at Kamehameha Highway and Lanikuhana Avenue. All of the intersections are signalized. The Mililani Interchange of the H-2 Freeway is open, but, at
present, is linked to the development only by a temporary private access road. This access road is being upgraded by Mililani Town, Inc., and will be dedicated to the City and County by the end of 1978.

Internally, the major segments of Mililani Town are connected by a central road, Meheula Parkway, which will run from the town's western border to the H-2 Freeway's Mililani Interchange. It forms an effective "spine" from which secondary arterial roadways are branched. The town's principal community-scale facilities and higher density housing areas are located along either side. The parkway forms the western boundary of the proposed increment and would carry much of the vehicular traffic to and from it.

One of the town's secondary loop roads Lanikuhana Avenue, passes through the proposed increment and would run adjacent to the commercial/civic portion of the town center. In addition to providing access to Kamehameha Highway and Meheula Parkway for residents in the southwest portion of the area, Lanikuhana Avenue would also provide access to and from the proposed shopping complex, district park and civic center. Another secondary loop road, Kuahelani Avenue, services the northwest portion of the area.

Mililani Town has a hierarchical street system that limits through-traffic to the spine road and its principal arterial feeders. Consequently, the vast majority of the residential units have frontage only on minor roads. This concept would be continued in the proposed increment as would the general principle that straight stretches interspersed with relatively sharp turns should be used on minor roads serving low density residential areas in lieu of continuous, gradual curves to provide better orientation and greater visual interest. Roadways in the proposed increment would be constructed by Mililani Town, Inc., and dedicated to the City and County.

Pedestrian Circulation
Running parallel to all major roadways and all but a few of the minor roads and cul-de-sacs in the existing development is a network of sidewalks. In some instances these have a landscaped buffer area that separates them from the vehicular roadway. In addition, a system of pathways provides pedestrians and bicyclists with access to the schools and town center (see Figure I-4). This system would be extended into the proposed increment.

Storm Drainage
The overall topography of the project site would be virtually unchanged by the proposed development (see Figure I-5), although minor grading would be required for roads and building pads. Continuing the basic system established during previous development at Mililani Town, storm drainage facilities would collect surface water runoff in catch basins located along roadways and pipe it to outlet structures which, in this increment, discharge into various small gulleys tributary to Kipapa Gulch (see Figure I-6). Generally, lots fronting the gulch would be graded so as to drain away from it. Consequently, Kipapa Stream would receive little, if any, sheet-run off from the plateau. The proposed drainage outlet structures would be designed in such a way that the water they release would be impeded at the outfall, thus lowering the velocities of water entering the gulch and reducing potential erosion and sedimentation problems. The system would conform to the City and County of Public Works Storm Drainage Standards.
MILILANI TOWN MAJOR DRAINAGE SYSTEM FIGURE I-6
Potable Water
The Water Master Plan for Mililani Town partitions the 3,500 acre site into three water zones as illustrated in Figure I-7. Four wells (nos. 1, 2, 3 and 4), each with a 2-mgd rated capacity submersible turbine pumps and supporting facilities, presently tap the Pearl Harbor aquifer and supply the community's water needs. Two reservoirs, with a combined storage capacity of 3.0 mgd, are also operating. Only three of the four operational wells are used on a daily basis; the other is used as a standby source.

The water master plan for the entire portion of Mililani Town makai of the H-2 Freeway (including the area covered by the rezoning request) has already been approved by the City and County of Honolulu Board of Water Supply (see Appendix D). It calls for the construction of four additional wells, (wells Nos. 5-8) each with a rated pump capacity of 2.0 mgd, a control building, and related facilities. Wells Number 5 and 6 will be located adjacent to the existing 865-foot elevation reservoir (see Figure I-8). The preliminary engineering report and site plan for these wells have already been completed, and the wells will be constructed when demand warrants it. Well sites No. 7 and No. 8 are located in the vicinity of the 685 foot elevation reservoir. These wells would be drilled when water demand at Mililani reaches 6 mgd (see Appendix D).

It is estimated that development proposed for the 476 acre subject property would, upon completion, consume an average of 1.64 million gallons of water per day. Of this approximately 1.25 mgd or 76 percent would be used by residential units, with the remaining 0.39 million gallons of water to be utilized within park, civic/commercial and school areas (see Table I-4).

Sewerage
The Mililani Sewage Treatment Plant is located at the southern edge of Mililani Town west of Kamehameha Highway. It presently serves Mililani Town and portions of Melemanu Woodlands and Waipio (see Figure I-9). A recently completed 1.8 mgd expansion of the plant's facilities has boosted its capacity to 3.6 mgd (see Table I-5). The secondarily treated effluent from the plant is presently discharged into Kipapa Stream and, thence, into the West Loch of Pearl Harbor.

The treatment plant (which is laid-out in such a way that it can eventually be expanded to accommodate Mililani total planned population) would be enlarged to a total capacity of 5.0 mgd as part of the proposed project. This increase in capacity would involve construction and/or installation of the following facilities for which a preliminary engineering report has been approved by the City and County, Department of Public Works:

- a larger barminutor, an additional aerated grit chamber, and a bypass channel;
- an additional primary settling tank (20 ft by 110 ft);
- three additional aeration basins and submerged turbine aerators—complete mix process;
- an additional settling basin of 3,600 sq. ft. surface area with energy dissipating feedwell; and
FIGURE I-7
MILILANI TOWN
3,500 ACRE PLAN
MAJOR WATER SYSTEM
Table I-4. POTABLE WATER DEMAND FOR THE PROPOSED INCREMENT

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Intensity Min.</th>
<th>Min.</th>
<th>Max.</th>
<th>Total Daily Water Use (in gal.) Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>10,000 people</td>
<td>100</td>
<td>150</td>
<td>1,000,000</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Schools</td>
<td>1,000 students</td>
<td>25</td>
<td>50</td>
<td>25,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Commercial</td>
<td>46 acres</td>
<td>4,000</td>
<td>6,000</td>
<td>184,000</td>
<td>276,000</td>
</tr>
<tr>
<td>Parks</td>
<td>40 acres</td>
<td>2,000</td>
<td>4,000</td>
<td>80,000</td>
<td>160,000</td>
</tr>
</tbody>
</table>

Total Range: 1,289,000 gal per day or 1.64 mgd

Average Estimated Consumption: 1,637,500 gal per day or 1.64 mgd

---

1 See Table I-2.
2 Based on DOE school enrollment factors.
3 See Table I-1.
### Table I-5. MILILANI SEWAGE TREATMENT PLANT CAPACITY AND USE COMMITMENTS

<table>
<thead>
<tr>
<th>Development Increment</th>
<th>Capacity (mgd)</th>
<th>Use Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I (1968)</td>
<td>0.9</td>
<td>Mililani Town, Inc.</td>
</tr>
<tr>
<td>Phase II (1972)</td>
<td>0.9</td>
<td>Mililani Town, Inc.</td>
</tr>
<tr>
<td>Phase III (1978)</td>
<td>1.8</td>
<td>Melemanu</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mililani Town, Inc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Waipio Acres</td>
</tr>
<tr>
<td>Subtotal</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>Phase IV (1980)</td>
<td>1.4</td>
<td>Mililani Town, Inc.</td>
</tr>
<tr>
<td>TOTAL Capacity</td>
<td>5.0 mgd</td>
<td></td>
</tr>
</tbody>
</table>

Total Commitment: Mililani Town, Inc. 3.7
Melemanu 1.0
Waipio Acres 0.3

---

1 Use commitment is based upon who paid to construct the facility. Private developers often construct a facility (previously approved by the regulating governmental agency) and then dedicate it to the City and County.
o a chlorine contact tank containing two additional bays to increase contact volume by approximately 7,300 cubic feet.

A diagram showing both the existing plant and the proposed Phase IV expansion facilities is presented in Figure I-10.

The question of alternate disposal sites for the secondarily treated sewage effluent is discussed in detail in Chapter IV. Existing sewer trunk lines at Mililani have been sized to accommodate the flows that would be generated if all 3,500 acres covered by the long-range Mililani Town, 3500-Acre Master Plan were developed as planned. Because of this, the system proposed for the 476-acre increment covered by this report would be able to tap into the existing system with no difficulty.

Electrical Power

Mililani Town is supplied with electrical power primarily from the Hawaiian Electric Company's Waiau Power Plant through an overhead transmission system. Interconnections with the Kahe and Honolulu plants insure continuity of service. Three substations within the development area (Uwapo, Upper Kipapa, and Mililani) distribute the electrical energy through an underground system. The Mililani substation, adjacent to the H-2 Freeway Interchange, has been designed and designated to service the proposed expansion at Mililani Town. An additional transformer would be added within the station's enclosure when power demands necessitate. Power distribution cables, ducts, and accessory equipment for the proposed project would be underground, and would be installed at the expense of Mililani Town, Inc. Following construction, they would be dedicated to the Hawaiian Electric Co. (HECo) for operation and maintenance.

The existing 46 KV overhead transmission lines that cross the north-eastern corner of the proposed development would be moved to a new alignment paralleling Kipapa Gulch as far as the H-2 Freeway. HECo plans to cross the H-2 Freeway with an overhead system and continue the line to the upper Kipapa substation. From there, the line would be extended beneath the Freeway interchange through existing ducts and to the Mililani substation.

Telecommunications

Telephone, fire signal, and other telecommunications cables, ducts and accessory equipment for the proposed project would be underground. They would be installed at the expense of Mililani Town, Inc. Following construction, they would be dedicated to Hawaiian Telephone Company and other appropriate firms for operation and maintenance.

Solid Waste

Solid waste collection and disposal for residential areas would be provided by the City and County of Honolulu or by private firms on a twice weekly basis (see Chapter IV-Public Services). Solid waste from the commercial areas would be picked up according to specific arrangements that are made by the Commercial Center. In general, the waste would be trucked to the Waipahu incinerator or to approved landfill sites for disposal.
Liquified Petroleum Gas

Natural gas service is not available at Mililani Town, but the Honolulu Gas Company does provide liquidified petroleum gas in varied size containers. It is estimated that only five percent of the residences will opt for gas service, but this may increase depending on the relative cost of gas as compared to electricity. It is expected that most commercial facilities requiring heating (cooking and hot water) would install gas facilities.

TERMINATION OF EXISTING USES

Approximately 380 of the 476 acres for which rezoning is proposed are presently being used by Castle and Cooke, Inc. for the cultivation of pineapple. (Note that this is gross acreage and that net acreage, which is normally used by the growers when stating their pineapple acreages, is about 10 to 15 percent less.) This use would cease as the proposed development plan was implemented. The remainder of the site is too steep for practical agricultural use and would remain in its present state.

PHASING

Experience indicates it is difficult to accurately predict completion dates for various increments of large-scale construction projects. Even when only one development type is involved, such as single-family detached homes, market conditions and sales fluctuate significantly; eventually these fluctuations are reflected in changes in construction rates. In the case of Mililani Town's incremental expansion, where commercial and public uses are being proposed in addition to several different residential unit types, the situation is further complicated. As a result, the probable phasing of the project can only be discussed in general terms.

The rate of single-family construction has always been the key to phasing at Mililani Town. All the major roads and utility infrastructure are normally installed concurrently with single-family unit construction. This practice would continue for the proposed development. Should the rezoning application be approved, land development would begin in early 1979 to insure continuity of housing production. Figure I-11 illustrates the lead time planning schedule and the anticipated starting time for the single family units in the proposed development. Assuming the rate of single-family unit sales continues at its historical average rate, the 1,092 single-family units (see Table I-3) proposed for this increment would be ready for occupancy at a rate of about 30 units per month beginning in late 1979. The last of them should be completed by the end of 1982 (see Figure I-12). This implies that all utilities and infrastructure would also be completed or nearly completed by that date. Construction would begin adjacent to the H-2 Freeway with Unit 47 and progress generally southward.

The two 10-acre neighborhood park sites and the 6-acre school site situated in the northern half of the increment would be graded at the same time as the surrounding development. The parks would be dedicated to the City and County as soon as possible after the sites are prepared. The school site would be acquired at such time as the Department of Education has formally determined the need for an additional facility, selected a site, and programmed the school into its budget. The recent decline in the average number of school
Figure I-11  Processing Schedule and Lead Time Requirements - 476 Acre Parcel
Figure I-12  Development Schedule - 476 Acre Parcel
children per family has led to the cancellation or deferral of several schools originally planned for the town and could affect the DOE's plans in the proposed development.

The timing of construction of the low and medium density apartment units and the commercial space being proposed is the most difficult to predict. A moderately large, medium density apartment area adjacent to the Town Center is a key element in the whole Mililani Town concept. On the other hand, multi-family units at Mililani have not always performed as strongly on the market as have the town's single-family units, and the rate at which the 2,360 apartment units shown on the plan would be absorbed remains uncertain. Similarly, the rate at which the commercial area in the Town Center would be marketed is a function of future demand and cannot be accurately determined at this time.
PROJECT RATIONALE
CHAPTER II. PROJECT RATIONALE

INTRODUCTION

The term "rationale" is defined as the fundamental reasons for something; its logical basis. It follows, then, that the "Project Rationale" for the proposed expansion must explain the basic reasons why the developer, Mililani Town, Inc. wishes to undertake the project. At the same time, however, it is important to remember that governmental approval is required if the proposed development is to be implemented. Because of this, a complete rationale for development must assess its desirability from the point of view of the general public as well.

The developer, Mililani Town, Inc., views this project as a means of fulfilling its corporate objectives. Analysis of population growth projections, housing and economic trends and sales history records at Mililani indicates a future need and demand for housing in this part of Oahu. The developer's perspective will be examined by discussing the marketability of the proposed housing development and how this particular project fits into long-range master plan for community development at Mililani Town.

The public is primarily concerned with the project as it relates to the State and County General Plan, policies, development plans, zoning and other regulatory ordinances. Therefore, from the public perspective, the proposed development is evaluated in terms of its consistency with regulations and policies.

THE DEVELOPER'S PERSPECTIVE

Mililani Town, Inc. is in the business of real estate development and has been operating successfully as such for over ten years. Long-term consumer satisfaction and compliance with public regulation and opinion have been the key to the firm's longevity. The developer is interested in providing a product that fills a need in the Hawaii housing consumer market, thereby insuring continuity of the steady sales success the firm has thus far enjoyed.

MARKET DEMAND

Past Sales Record

Construction and sales activities at Mililani Town have always been governed by housing trends as evidenced by market demand. Although fluctuations in that market do occur, wise forecasting and innovative design have enabled Mililani Town, Inc. to maintain a constant annual production and sales level relative to the industry as a whole. Table II-1 lists the historical production/sales rate at Mililani since 1969, its first complete year of operation.

It is worth noting that, due to a construction schedule tailored to market absorption rates, Mililani Town has not generally had a standing inventory of completed single family units. Production, sales and delivery of these units have been consistently accomplished without considerable delays or interruptions.

Chapter II
Table II-1. YEARLY RECAP OF HOUSING DELIVERIES AT MILILANI TOWN 1969-1977

<table>
<thead>
<tr>
<th>Year</th>
<th>Single Family</th>
<th>Multi-Family</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>239</td>
<td>-</td>
<td>239</td>
</tr>
<tr>
<td>1970</td>
<td>370</td>
<td>-</td>
<td>370</td>
</tr>
<tr>
<td>1971</td>
<td>354</td>
<td>162</td>
<td>516</td>
</tr>
<tr>
<td>1972</td>
<td>521</td>
<td>356</td>
<td>877</td>
</tr>
<tr>
<td>1973</td>
<td>388</td>
<td>484</td>
<td>869</td>
</tr>
<tr>
<td>1974</td>
<td>236</td>
<td>432</td>
<td>668</td>
</tr>
<tr>
<td>1975</td>
<td>176</td>
<td>474</td>
<td>650</td>
</tr>
<tr>
<td>1976</td>
<td>336</td>
<td>112</td>
<td>448</td>
</tr>
<tr>
<td>1977</td>
<td>314</td>
<td>166</td>
<td>480</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2,931</td>
<td>2,186</td>
<td>5,117</td>
</tr>
<tr>
<td>AVERAGE/YEAR</td>
<td>326</td>
<td>312 (^1)</td>
<td>569</td>
</tr>
</tbody>
</table>

\(^1\) In 1969 and 1970 no multi-family units were constructed or marketed.

Source: Mililani Town, Inc.

Housing Sales: Mililani Town and Oahu-Wide
Since 1969 an average of 569 housing units per year have been produced at Mililani Town. The stability of this sales average, particularly with regard to single family units, is highlighted in Table II-2. As can be seen from the table, Mililani's share of single-family housing produced by tract developers on Oahu has increased from 9% in 1970 to 45% in 1977. This is due primarily to the decline in islandwide housing production. Multi-family unit sales at Mililani have declined in recent years, as has the industry's generally. Due to the cyclic nature of the housing industry this trend could be reversed at any time. When this occurs, Mililani Town, Inc. could increase production of this unit type.

Mililani Town, Inc.'s sales record indicates a consistent and proven source of desirable housing. The proposed rezoning petition, if approved, would allow this productivity to continue.
Mililani Town, Inc. has, over the years, offered homes affordable by families with a wide range income levels. Initially, multi-family apartments and townhouses ranged from $26,000 to $31,500. Today multi-family units range between $49,000 and $60,000. In 1977 the average cost of a single-family home was $81,000, of which $1,909 was for optional features. Figure II-1 graphically illustrates the stability of single-family unit sales at Mililani Town. Until a few years ago, the average price of new single-family tract homes at Mililani was well below the Oahu-wide average. Largely as a result of the recent sharp drop in new construction in the relatively expensive east Honolulu area, single-family homes at Mililani are now selling closer to the average for the island. While they are no longer distinguished by a major price advantage, compared to other projects having units in the same price range, Mililani offers single-family units that are generally larger, situated on bigger lots, and of a higher quality of construction. Moreover, unlike much of the competition, land at Mililani is sold in fee. Perhaps the most convincing proof of Mililani's value is the fact that it has captured nearly 50 percent of the Oahu market for single-family tract homes in each of the past two years.

Projections for additional residential tract homes on Oahu, based upon previous years' sales (Table II-2), the General Plan's population growth and redistribution goals, and standard replacement levels, indicate that a viable market exists for the additional housing being proposed for Mililani Town. A quantitative discussion of this need is presented in Chapter V of this report.

Mililani Housing Costs
As previously indicated, the majority of the homes sold at Mililani have been to families in the middle income level range. A survey of families buying new homes at Mililani Town indicates that, in 1977, the combined monthly family income of new single-family homebuyers at Mililani was about $2,400 and that 33% of the single-family units sold were purchased by first home buyers. The extent to which the proposed project would meet the needs of moderate income families is discussed in more detail in Chapter V.

OTHER CONSIDERATIONS

Fee Simple
The leasehold system of homebuying, which has been prevalent in Hawaii for so long, has made the concept of owning the land on which one lives attractive to prospective homebuyers. Mililani Town, Inc. will continue to offer fee simple homes affordable to middle-income families.

Support Facilities
Mililani Town provides not only residential homes, but also a pleasant setting in a community having easily accessible educational, commercial, and recreational facilities. The proposed project includes a major commercial complex and a civic center that would greatly expand these support facilities. The ability of public services and utility systems to support the proposed development is discussed in Chapter IV.

Experience
Ten years of successful operation testifies to the capability and commitment of Mililani Town, Inc. to maintain a consistent production and sales record. The experience gained during this period will be applied to the proposed project.
SINGLE FAMILY UNITS MARKETED-OAHU/MILILANI 1969-1977

Figure II-1
Table II-2  PRODUCT MARKETED - MILILANI TOWN AND OTHER TRACT DEVELOPMENTS ON OAHU

<table>
<thead>
<tr>
<th></th>
<th>Single Family</th>
<th>Multi-Family (Low Density)</th>
<th>Single Family &amp; Multi-Family (Low Density)</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MT Total Other</td>
<td>MT Total Other</td>
<td>MT Total Other</td>
<td>MT Total Other</td>
</tr>
<tr>
<td>1969</td>
<td>239 9.0</td>
<td>0 0</td>
<td>MT 239 8.0</td>
<td>2,753 2,992</td>
</tr>
<tr>
<td>1970</td>
<td>370 9.5</td>
<td>0 0</td>
<td>MT 370 8.15</td>
<td>4,169 4,539</td>
</tr>
<tr>
<td>1971</td>
<td>354 15.0</td>
<td>162 9.3</td>
<td>MT 516 12.6</td>
<td>3,574 4,090</td>
</tr>
<tr>
<td>1972</td>
<td>521 24.5</td>
<td>356 23.7</td>
<td>MT 877 24.2</td>
<td>2,747 3,624</td>
</tr>
<tr>
<td>1973</td>
<td>385 20.7</td>
<td>484 31.2</td>
<td>MT 869 25.6</td>
<td>2,530 3,399</td>
</tr>
<tr>
<td>1974</td>
<td>236 33.0</td>
<td>432 41.7</td>
<td>MT 668 38.1</td>
<td>1,086 1,754</td>
</tr>
<tr>
<td>1975</td>
<td>176 26.0</td>
<td>474 38.6</td>
<td>MT 650 34.2</td>
<td>1,252 1,902</td>
</tr>
<tr>
<td>1976</td>
<td>336 48.0</td>
<td>112 12.2</td>
<td>MT 448 28.1</td>
<td>1,168 1,594</td>
</tr>
<tr>
<td>(1977)</td>
<td>314 (166)</td>
<td>(480)</td>
<td></td>
<td>(1,400)</td>
</tr>
</tbody>
</table>

Total Thru 1976  2,617 18.0 12,302 14,919 2,020 22.5 6,977 8,977 4,637 19.4 19,279 23,894 1,340

MT Thru 1977(2,931) (5,117) (1,400)

Long-Term Planning
When operating on such a large scale, long-term planning becomes critical. The availability of land must be guaranteed; petitions for proper land use and zoning designation must be initiated and carried through; preliminary approval from affected governmental agencies must be negotiated to assure that sufficient utilities and public services will be available. This takes time and requires fiscal stability. Mililani Town, Inc. has proceeded incrementally from the 1960's, through a series of petitions to both the State Land Use Commission and the City Council. Each time MTI has committed to develop the land in a reasonable and prescribed manner, and each time it has carried out this commitment.

Continuity
One of the reasons for Mililani's success is the fact that MTI has been able to maintain the continuity of the development process. Because of this, housing construction has proceeded at a steady rate, and the start-up costs associated with assembling a work force have been minimized. These cost savings have been reflected in the prices of homes sold at Mililani.

At the present rate of development (see Figure II-2), construction on land already zoned for residential use would be completed in the latter part of 1979. Processing requirements for the rezoning application being what they are, the land covered by this report could not be available for land development until early 1979 and for the start of house construction until the second half of 1979 (see Figure I-11). Hence, even assuming no delays, approvals would occur just in time to insure that construction work could continue without interruption.

THE PUBLIC PERSPECTIVE

This section deals with existing governmental land use plans, policies and controls applicable to the proposed project. Both specific land use regulations and more general policy guidelines pertinent to the project are described below. In addition, the consistency of the proposed project with these regulations and policies is discussed.

SPECIFIC LAND USE REGULATIONS

Land use on the site of the proposed project is directly regulated by three sets of land use controls: the State Land Use Law, the City and County of Honolulu's "Detailed Land Use Maps" (DLUMs), and its Comprehensive Zoning Ordinance. In addition, there are a number of more general "policy plans" that affect the proposed rezoning, the most important of these being the Oahu General Plan. Both the controls and the policies are discussed below.

State Land Use Law
The current State Land Use Commission Regulations are intended to "preserve, protect and encourage the development of lands in the State for those uses to which these lands are best suited in the interest of public health and welfare of the people of Hawaii." In accordance with these regulations, all lands in the State have been placed into one of four Land Use District categories—Urban, Agriculture, Conservation or Rural. Detailed standards for establishing district boundaries and permissible uses within each district are clearly defined in the Land Use Regulations (1975). The State Land Use Commission reviews petitions from both governmental and private sectors for amendments to district boundaries.

Chapter II
Figure II-2  House Construction Schedule of Remaining Zoned Area West of Kamehameha Highway
In June, 1977, the State Land Use Commission redistricted the 476-acre parcel covered by this EIS from agricultural to urban. As a result, all of the land in the western and central areas covered by the Mililani Town 3,500-acre Master Plan is now designated for urban use. The responsibility for control of the land use has been assumed by the City and County of Honolulu.

**Detailed Land Use Maps (DLUM)**

The land use map adopted as part of the 1964 Oahu General Plan provided a general indication of the land use pattern desired for the Island. To supplement this map and to provide more precise guidance regarding allowable land uses on specific parcels, the County produced a series of Detailed Land Use Maps (DLUMs) that indicated permissible Land Use on a parcel by parcel basis for most urbanized areas. While the 1964 General Plan has been replaced by a new General Plan adopted in January, 1977, the DLUMs remain in effect. They will continue to guide the County in dealing with specific development requests until the County's Development Plans have been adopted by the City Council.

The 476 acres under discussion here are shown on the Waipio Detailed Land Use Map. The proposed rezoning (Figure I-3) is in accordance with land use designated on the DLUM.

**Comprehensive Zoning Code**

A second way in which the County regulates the use of land within the urban district is through the Comprehensive Zoning Code. Zoning designations are similar to DLUM land use designations but are much more definitive as to the density, building height, size, location and lot size which can be used. Most of the land being petitioned for rezoning is presently zoned for agricultural use (Ag-1), a designation which does not allow the type of development being proposed for the property. Hence, the rezoning application for which this EIS was prepared must be approved before the project can be undertaken.

**POLICY PLANS**

In addition to the specific land use regulations discussed above, there are a number of policy-level plans which do not contain specific controls or maps, but are designed to guide land use decisions. These policies are intended to alert both public officials and land developers regarding the general use of the land desired by the people of Hawaii. Only the most important of these are discussed here.

**Oahu General Plan**

The 1977 Oahu General Plan, prepared by the City and County of Honolulu, identifies nine areas of concern and thirty-two objectives for long-range development. It further lists 180 policies intended to serve as guidelines in achieving the stated objectives. Each policy is individually addressed as it relates to the proposed development at Mililani Town in Exhibit "C" of the letter of "Application for Change of Zoning Mililani Town, Waipio, Oahu (Phase V)" submitted to the Department of Land Utilization on October 19, 1977.

The proposed development at Mililani Town is in accordance with the General Plan and is consistent with its policies and objectives. It would benefit the economy in the short run through continued construction and in the long run through the provision of a commercial center and community support services.
and of attractive and needed housing at reasonable prices. Development would take advantage of scenic views where possible, and gulch areas (20% of the subject area) would remain in their natural state as open space. Public facilities in Mililani Town for water supply, sewage treatment, power transmission, transportation, and education are either already operational or have been approved by respective public or private agencies. The incremental development pattern at Mililani Town is in conformance with the General Plan Policy. Recreational facilities, parks, and natural and landscaped open space offer a pleasant community atmosphere for the residents. The estimated population increase and resulting Islandwide distribution would fall within the range of General Plan population allocation for the Mililani-Waipio area.

The Mililani-Waipio area is listed as "Urban fringe" in the General Plan. As such, it serves as a suburb to the primary urban center (Honolulu and Aiea-Pearl City) and to the anticipated secondary urban center at Ewa Makakilo. The Mililani Master Plan indicates the proposed development on the subject 476 acres to be a residential community with single-family homes and low and medium density apartment complexes. The commercial/civic center is planned to support Mililani Town residents as well as draw from the adjacent communities.

Hawaii State Plan
The Hawaii State Plan was approved by the 1978 Hawaii State Legislature. The Plan addresses broad demographic, economic, environmental and socio-cultural areas of concern. Proposed development at Mililani Town generally conforms to this Plan. Twelve functional plans which address agriculture, housing, tourism, transportation, conservation lands, education, energy, higher education, health, historic preservation, recreation and water resources development will be prepared and presented to the State Legislature in 1979 and 1980 for adoption.

The Growth Policies Plan addresses the notion of slower population growth in Hawaii and improved quality of the growth that does occur. The proposed development at Mililani Town conforms to the concepts and suggestions presented in this document insofar as:

a. It is part of a larger master plan, complements an already existing community, and provides a comfortable, well-designed residential environment.

b. It conforms to planned urban expansion, considering that a newly-completed major road, H-2 Freeway, already services Mililani Town and has the capacity to handle the anticipated commuter increase.

c. The moderate, and middle income housing proposed in this increment would serve the existing population in Hawaii and should not, in and of itself, act as an in-migration attraction.

d. Existing public facilities can service the added development with "as needed" expansion rather than entirely new systems having to be constructed. Operating educational facilities are readily accessible and capable of accommodating additional student population.
e. The commercial/civic complex is easily accessible by Schofield military personnel and their families and could draw upon this source for economic support.
ASSESSMENT FRAMEWORK
CHAPTER III. ASSESSMENT FRAMEWORK

CAUSES OF PROJECT-RELATED IMPACTS

In assessing the potential impact of the Mililani Town project, it is useful to separate the project-related actions and the physical changes which cause them into three more easily examined categories:

- the activities required to transform the land from one use to another;
- permanent physical modifications of the environment that alter the existing ecological balance; and
- the activities required to operate and maintain the project as part of a long-term residential community.

Initially, activity for the Mililani Town expansion project would be directed at preparing the site for its intended use: surveying and clearing the land, grading, installation of the utilities and roadways, construction of the buildings, and landscaping. Seen in this light, the project appears as a series of distinct, but interrelated, actions occurring over an extended period of time and resulting in a number of both desirable and undesirable impacts. Employment is by far the most important type of beneficial impact that accompanies these transformation-related activities. Potentially, adverse impacts are more numerous, but not necessarily more significant. They include temporarily increased noise levels from the operation of construction equipment, interruption of normal traffic patterns by adding heavy truck movements, and the addition of construction generated dust to the surrounding area.

The preceding paragraph focuses on the impacts that can result from the act of constructing a new residential community. In addition to those impacts, there are a number of other effects that can result from the mere existence of the new structures and reworked landscape. New structures can obstruct the view and alter visual aesthetics; the same buildings affect microscale wind patterns and insolation; the storm drainage system carries surface runoff along new pathways and can affect the flow of surface or groundwater. While these changes occur gradually over the course of the construction period, dealing with rapid, day-to-day changes in project configuration would place an impossible burden on our analysis and yield few, if any, benefits in return. Because of this, the EIS does not evaluate this type of effect for intermediate stages in the project's development except in cases where there is a particular reason to believe that they might be significant.

Finally, just as impacts during the construction phase can be viewed as the result of both the activities involved and of physical changes in the site that modify the pre-existing ecological balance, so too the operation and maintenance of the completed development involves impact-generating activities. Here again, because of the phased construction schedule, part of the
AFFECTED ENVIRONMENTAL SYSTEMS

Considering the interrelationship of all its elements, any subdivision of the ecosystem for the purpose of analysis and discussion is to a certain degree arbitrary. Nonetheless, some subdivision is essential if the task is to be kept within manageable proportions. Hence, the discussion of impacts contained in this report has been divided into eleven different sections, one for each of the following natural and man-made environmental subsystems:

- Geologic/Pedologic/Physiographic
- Hydrologic
- Biologic
- Historical/Archeological
- Visual
- Circulation
- Public Services and Facilities
- Public Utilities
- Physical Hazards
- Sonic
- Socio-Economic

OVERVIEW OF THE INITIAL ASSESSMENT METHODOLOGY AND ORGANIZATION OF THE DISCUSSION OF IMPACTS

To insure that all potential impacts of the Mililani Town Project are considered, each category of proposed action has been broken down into distinct, impact-producing components. Each component was analyzed to determine which environmental subsystem would be affected. The results of this analysis are discussed below and summarized in Table III-1. The key words that appear in parentheses after each of the impacting activities listed indicate the section in Chapters IV and V which contain a more detailed discussion of that particular activity and impact.
LAND TRANSFORMATION/CONSTRUCTION

Site Clearance
Initially, activity at Mililani Town would involve preparing the site for transformation to its newly-intended use. Engineering teams would survey the site, and heavy equipment would perform the necessary grading. The impacts that could result from this type of activity include:

- the release of dust and emissions from internal combustion engines into the atmosphere (atmospheric);
- the generation of noise by people, trucks and heavy equipment (sonic);
- the destruction of existing flora and, perhaps, some fauna (biologic);
- the possible loss of archaeological or historical resources (archaeologic/historic);
- an increase in the volume of truck and automobile traffic (circulation);
- the generation of employment and material sales opportunities (socio-economic);
- changes in the structural/functional characteristics of the soil and geologic structures (geologic/pedologic); and
- changes in surface cover type, possibly altering the hydrology (hydrologic).

Infrastructure
Once the site is cleared and otherwise prepared, the basic utility and circulation systems would be installed (sewers, roads, water, power, drainage, etc.), and construction of individual unit foundations would begin. These activities would result in:

- the release of dust and emissions from internal combustion engines (atmospheric);
- the generation of noise by trucks and heavy equipment (sonic);
- changes in the movement and quality of surface and groundwater as a result of the installation of a new storm drainage system (hydrologic);
- the possible loss of archaeological or historical resources (archaeologic/historic);
- an increase in the volume of automobile and truck traffic (circulation); and
- the creation of employment and material sales opportunities (socio-economic).

possible erosion and added sediment loading into adjacent gulches.
Building Construction and Landscaping

These activities would be conducted during the final stages of development, and, in many ways, are similar to those already discussed. The Mililani Town, Inc.'s portion of this phase includes construction of buildings and landscaping of public areas (i.e., Mililani Town Association common areas, road shoulders and medians). Individual home sites would be landscaped by the home owner, an example of the overlapping nature of construction and operational phases. In any event, construction workers and materials would need to be transported to the project site; structures would have to be erected and landscaping installed; waste materials would have to be removed; and final utility line connections would need to be made. Among the more important results of this activity would be:

- the continued release of dust and pollutants from internal combustion engines (atmospheric);
- the continued generation of noise from construction equipment (sonic);
- construction employment and material and equipment sales (socio-economic);
- continued automobile and truck traffic on nearby roads (circulation); and
- changes in the scenic-aesthetic quality of the area (visual).

PERMANENTLY ALTERED ENVIRONMENTAL CONDITIONS

The impacts discussed thus far are produced by activities which take place on and around the site. As stated earlier, there are other impacts that would occur because of project-related changes in the physical environment which permanently modify the flow of environmental forces. Included among these potential impacts are:

- changes in the timing, intensity, and volume of surface runoff from the site (hydrologic);
- changes in the pattern of groundwater and surface water flow (hydrologic);
- changes in the volume of surface water and groundwater runoff (hydrologic);
- changes in the microclimate of the area (atmospheric);
- changes in the transmission and attenuation of sound in and around the project (sonic);
- alterations in the biologic community as a result of changed environmental conditions (biologic); and
- changes in the aesthetic or visual character of the area (visual).
COMMUNITY ACTIVITY

This category consists of actions which may produce both beneficial and adverse impacts. These actions will be of a much longer duration in that they are concerned with the long-term operation and maintenance of the community. The most significant of the changes during this phase of the project include:

- changes in the amount of emissions into the atmosphere from internal combustion engines and commercial facilities (atmospheric);
- changes in the amount of noise generated as a result of increased human activity and traffic (sonic);
- modification of the biological activity in nearby gulches and Kipapa Stream (biologic);
- increased demand for public utilities (water, electricity, telephone service, etc.) and public services as a result of the greater number of people using the site (public utilities/public services);
- increase of sewage effluent to be treated and properly disposed of (hydrologic);
- increased economic opportunity associated with residential support services and the commercial center (socio-economic);
- increased traffic within the community, especially at peak commuter hours (circulation); and
- changes in the visual and aesthetic character of the area (visual).
Table III-1. ENVIRONMENTAL SUBSYSTEMS AFFECTED BY SPECIFIC PROJECT-RELATED ACTIVITIES AND ENVIRONMENTAL MODIFICATIONS

<table>
<thead>
<tr>
<th>Project-Related Activities &amp; Environmental Modifications</th>
<th>Geologic/Pedologic</th>
<th>Hydrologic</th>
<th>Atmosphere</th>
<th>Biologic</th>
<th>Sonic</th>
<th>Visual</th>
<th>Historical/Archaeological</th>
<th>Public Facilities</th>
<th>Utilities</th>
<th>Circulation</th>
<th>Physical Hazards</th>
<th>Total Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Site Clearance</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>a. Clear land</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>b. Survey and grade</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
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<tr>
<td>c. Remove debris from existing landscaping</td>
<td>x</td>
<td></td>
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<td>x</td>
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<tr>
<td>2. Construct Utility and Circulation Systems</td>
<td></td>
<td></td>
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<td>x</td>
<td></td>
<td></td>
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<tr>
<td>a. Install utility lines</td>
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<td>x</td>
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<tr>
<td>b. Construct roadways &amp; paths</td>
<td>x</td>
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<td>x</td>
<td>x</td>
<td></td>
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<td></td>
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<tr>
<td>3. Construct Foundations</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
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<tr>
<td>4. Construct Residential and Commercial Units</td>
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<tr>
<td>a. Import workers &amp; materials to site</td>
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<td>x</td>
<td></td>
<td></td>
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<tr>
<td>b. Erect structures</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
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<td></td>
<td></td>
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<tr>
<td>5. Landscape Individual Units</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6. Permanent Modification of Environmental Flows as a result of existence of new structures, drainage system and landscaping</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>7. Operation of Community</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>8. Landscape Maintenance</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
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IV

PROBABLE ENVIRONMENTAL EFFECTS
Physical
CHAPTER IV. PROBABLE ENVIRONMENTAL EFFECTS: PHYSICAL

This chapter contains ten sections; each one corresponds to one of the environmental subsystems listed in Chapter III. Since a single action, such as site-clearance, can act upon a number of different subsystems, its effects may be discussed in more than one section. This chapter is limited to a discussion of impacts on the physical environment; socio-economic effects are discussed in Chapter V.

GEOLOGIC/PEDALOGIC/PHYSIOGRAPHIC RESOURCES

This section discusses the physical capacity of the land to support the proposed type of development, the significance of changes in landform and the composition and characteristics of the soil as they relate to its ability to accommodate the proposed activity. The particular activities which affect this subsystem include clearing the land, and grading.

GEOLOGY

The island of Oahu is a volcanic doublet made up of the Waianae Range on the west and the Ko'olau Range on the east. Each is the remnant of a large shield volcano, but the term "range" conveys the fact that they have lost most of their original shield shape and now appear as long narrow ridges shaped primarily by erosion. Lavas from the Ko'olau Volcano, the younger of the two, banked against the already-eroded flank of the Waianae Volcano to form the gently sloping surface of the Schofield Plateau. Beneath Mililani, the thin-bedded a'a and pahoehoe lavas of the Ko'olau series reach from the surface to well below sea level. Two properties of these lavas are important to note: (1) they have high permeability or capacity to transmit water making the specific yield of wells in these flows very high; and (2) they weather to depths of 50-75 feet in gently sloping areas such as Mililani Town, creating a thick soil mantle overlying the lava (Visher and Mink, 1964; Stearns and Vaksvik, 1935).

Specific analyses of soils on the Schofield Plateau at existing and developing areas of Mililani Town have been performed by Walter Lum and Associates, Inc., Soils Engineers. From this analysis and from data published in the State Soil Survey (U.S.D.A., 1972) it appears that the soils in the area proposed for rezoning have no significant structural use limitations. No problems regarding underlying structural support are known to have arisen in the vicinity of Mililani Town. The relationship between Central Oahu geological structure and water resources is discussed under the hydrology section of this chapter.
LANDFORMS

The portion of the Schofield Plateau on which Mililani Town is situated slopes towards Pearl Harbor at an average grade of three to five percent. There are localized exceptions (e.g., Mililani's Nob Hill) which have slopes of slightly over 10 percent (see Figure I-5). For the most part, the steep slopes occur only on the sides of gulches traversing the plateau. In the vicinity of the proposed project, these steep areas can be found in Waikakahalaua Gulch to the North, Waikele Gulch to the east, and Kipapa Gulch to the south. In all, these heavily vegetated gulches comprise about 20% of the area proposed for rezoning (approximately 94 acres). All of this acreage would be left in its natural state and dedicated to open space or park use. The topographic map in Figure I-5 shows the location of these gulches in relation to the plateau and the proposed land use.

SOILS

The impacts of the proposed project on soils would be of two different types. First, the changes in topography, drainage, and surface cover that would result from the urban development of the site would affect the rate of soil erosion from the plateau. Secondly, the same urban development would preclude large-scale agricultural use of the land indefinitely. (It would not, of course, prevent residents of the community from maintaining productive home gardens).

The first of these impacts can be discussed in purely physical terms, but the second is so closely interwoven with agricultural economics that it must be examined in a much broader context. Because of this, only erosion-related impacts are covered in this section; the significance of the withdrawal of the soil (land) from agricultural use is considered separately in Chapter VI.

Existing Soils
In general, the soils on Oahu's central plateau have been formed in place by weathering of the underlying basaltic lavas of the Ko'olau series. For the most part, they are Oxisols, are reddish in color, and have a featureless profile consistent with the area's gently sloping land forms. The development covered by the present zoning request would occur on soils in the Manana, Wahiawa, and Helemano series. Characteristics of these soils are as follows:

Wahiawa Silty Clay, 0-8 Percent Slope (WaA, WaB) This soil covers most of the site. Its permeability is moderately rapid, runoff from it is slow, and the erosion hazard is slight. The shrink swell potential is low.

Manana Silty Clay, 3-15 Percent Slope (MpB, MpC) The runoff from this soil, is slow, and the erosion hazard is slight to moderate depending upon the slope angle. Both its permeability and shrink swell potential are low. It is found on about 55 acres of the site between Nob Hill and Kipapa Gulch.
Helemano Silty Clay, 30-90 Percent Slope (HLMG) This soil is found only in the steep gulches on the site. Its permeability is moderately rapid, runoff is medium to very rapid, and the erosion hazard is severe to very severe. (U.S.D.A., 1972)

Factors Influencing the Rate of Erosion

Soil erosion occurs when soil particles are detached from the place where they were formed and are transported, usually by water or wind, to a new location. Its corollary, sedimentation, occurs when the transporting agent redeposits the particles. The rate of erosion is a function of many factors, including the physical characteristics of the soil particles (size, mineralogy, etc.), the length and gradient of the slope over which the water or wind flows, the type of groundcover, and the rainfall and wind intensity. In general, construction activity on a site temporarily increases the erosion potential by removing vegetation which reduces the force with which water drops impacts on the soil surface; decreasing the velocity of surface runoff; and, binding soil particles together. Construction also fosters erosion by disturbing the natural stability of the soil horizons. Once construction has been completed and a vegetative or soil protective ground cover has been reestablished, erosion will decrease. Depending upon the nature of the original conditions and those occuring once the development has been completed and stabilized, the rate of erosion may be higher, lower, or the same as it was originally. The remainder of this section attempts to quantify the changes in the rate of erosion that could be expected to occur as a result of the proposed project.

Projected Changes in the Rate of Erosion

Historically, agricultural activities and urban development in Central Oahu have resulted in considerable erosion. A United States Geodetic Survey study of sediment transported by streams gives some idea of the severity of the problem (Jones et al., 1971). According to the above study, an average of 350 tons of sediment per square mile per year was carried from Kipapa Basin where rainfall is heavy, the land is steep-sloped, and human activities are minimal.

In comparison, the drier, flatter lands in the lower portions of the basin that, all other things being equal, would be expected to have a lower sediment yield, produced an estimated 850 tons per square mile per year. Presumably, the higher rate of erosion is attributable to the extensive agricultural and, to a lesser extent, urban activities and construction found there. Unfortunately, the data from the Geodetic Survey study does not make it possible to determine exact erosion rates for urban, as contrasted to agricultural, land. However, given the relative sizes of agricultural and urban/construction uses, it appears that, in terms of erosion, the former is the greater offender.

As another means of determining the impact of the proposed project, the universal soil loss equation was used to estimate erosion rates for the property with and without the proposed development. Three different conditions were considered: (1) existing agricultural use (primarily pineapple cultivation), (2) construction, and (3) the completed development.
The Universal Soil Loss Equation is expressed as \( A = RKLSCP \) (U.S. Department of Agriculture, Soil Conservation Service, March 1975), where

- \( A \) = the computed soil loss per unit area
- \( R \) = the rainfall factor
- \( K \) = the soil erodibility factor
- \( L \) = the slope length factor
- \( S \) = the slope gradient or percent slope factor
- \( C \) = the cropping management factor
- \( P \) = the practice factor

Using values in the equation appropriate for each of the three different site conditions, it is clear that there would be a six-fold increase in erosion on cleared areas left exposed, i.e., not given ground cover, during the construction period (see Table IV-1). The calculations also suggest that the rate of erosion following completion of the project and the firm establishment of landscaping would be only an eighth of what it is at present.

### Table IV-1. ESTIMATED SOIL EROSION FROM THE PROJECT SITE UNDER DIFFERENT CONDITIONS

<table>
<thead>
<tr>
<th>Conditions</th>
<th>( R )</th>
<th>( K )</th>
<th>( L )</th>
<th>( C )</th>
<th>( P )</th>
<th>( A ) (in tons/acre/yr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pineapple Cultivation</td>
<td>325</td>
<td>0.17</td>
<td>1.10</td>
<td>0.256</td>
<td>0.75</td>
<td>11.7</td>
</tr>
<tr>
<td>Construction</td>
<td>325</td>
<td>0.17</td>
<td>1.25</td>
<td>1.0</td>
<td>1.0</td>
<td>69.0</td>
</tr>
<tr>
<td>Urbanized</td>
<td>325</td>
<td>0.17</td>
<td>.54</td>
<td>.1</td>
<td>.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>


The estimates shown in Table IV-1 are not intended to be precise. They do, however, indicate the relative magnitudes of the changes that may be expected. It is also important to note that the per-acre rates shown for the construction period apply only to those areas that have actually been cleared in preparation for construction. To minimize total construction-related erosion, Mililani Town, Inc.'s development program conforms to the grading ordinance established by the City and County of Honolulu and to applicable Soil Conservation Service Standards. In addition, the following measures would be practiced in order to further reduce erosion:

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Homesite lots bordering the gulch areas would be graded so as to direct runoff into storm drains. This would significantly reduce erosion on the steep sides of the gulches.

Energy dissipators would be used on the storm drainage outlets discharging into gulches to reduce the velocity of the flow and, therefore, the amount of erosion that it would cause.

Settling basins and control ditches would be used for all grading operations in conformance with the City and County grading ordinance.

Hydromulching techniques would be used on newly graded exposed slope areas to quickly provide ground cover. Watering trucks and irrigation systems would be used to minimize wind erosion and airborne particulates, and adjacent streets would be washed down and/or swept regularly.

Portions of filled gulches would be engineered to minimize erosion and washout.

Generally, the soils in Mililani are not overly susceptible to erosion and are suited to urban development. An increased erosion hazard would exist during the construction period, however, and the aforementioned controls would only minimize that hazard, not eliminate it. Thus, while these controls generally meet or exceed City and County Erosion Control Standards, some increase in the amount of erosion from the project site should be expected during the construction period. At the same time, the construction phase is a temporary one, and erosion from the site following the end of construction would be lower than it is at present. Moreover, the proposed project involves a continuation, rather than an increase, in the level of construction activity at Mililani. It would not, therefore, result in an increase in the total sediment load presently imposed upon streams or in airborne particulates. Sedimentation as it relates to water quality is discussed in the Hydrologic Section of this chapter.

HYDROLOGIC SYSTEM

Some of the activities and changes associated with the development proposed at Mililani Town have the potential to significantly affect water resources. Despite the fact that all State and County Codes and Standards would be strictly adhered to during the construction, operation, and maintenance stages of this project, hydrologic impacts would occur both immediately and over the long-term.

The aspects of the project which could have significant effects on the hydrologic regime of the area include:

- changes in effective topography and in the permeability and texture of the land surface that would alter the volume and route of storm water runoff;

- changes in the amount of soil erosion, the types of chemical pollutants present (e.g., insecticides, street surface contaminants, etc.), and the volume and treatment of sewage that would affect ground and surface water quality; and
changes in water withdrawals from and recharge to the Pearl Harbor aquifer that would affect this important groundwater body.

Each of these is discussed in turn in the remainder of this section. Insofar as is possible, an attempt is also made to assess their significance and to indicate measures that would be taken to reduce adverse impacts.

STORM WATER VOLUME AND DRAINAGE PATTERN

Increased Storm Water Runoff
About 94 of the 476 acres for which rezoning is being sought is currently in a naturally vegetated state; the remainder is being used for pineapple cultivation. Since Castle and Cooke's pineapple operation currently has more acreage than it needs to meet its production requirements, it occasionally allows fields to lie fallow for a time. Whether they are being actively cropped or are lying fallow, the fields generally have a large percentage of their surface area available for infiltration by water. Construction of the proposed development would result in 40-50% of the residential areas being covered with impermeable surfaces and in substantial changes to the vegetative cover on the remainder. Park areas would be relatively unaffected, but commercial and institutional areas might have an even higher proportion of impermeable surfaces.

As a result of the change in permeability and of site grading designed to prevent retention of rainfall as standing water, the project would reduce the immediate absorption capacity of the area and, logically, increase the amount of surface runoff generated. This stormwater runoff would be gathered into the storm drainage system at collection basins, transported through the system, in pipe conduits, and discharged via four outlets into gulches which ultimately drain into Kipapa Stream.

Estimates of existing stormwater runoff from the development area (the 476 acre area minus the undeveloped gulch areas left in open space) were made using the rational method and hydrologic factors from the City and County of Honolulu's Storm Drainage Standards. The method is a relatively crude one that involves a number of qualitative estimates, and more accurate estimates of increased runoff could undoubtedly be arrived at if more sophisticated techniques were used. At the same time, the fact that the 380 acres on which development would occur constitute only one percent of the drainage basin, that there is no development immediately downstream which could be affected by the projected increase in runoff, that more sophisticated methods are extremely complex, and that no detailed plans for the project are available appears to warrant the simplistic approach that has been used.
The rational formula for determining runoff is expressed as $Q = CIA$

where:

- $Q = \text{the flow rate in cubic feet per second}$
- $C = \text{the runoff coefficient indicating the proportion of rainfall that runs off}$
- $I = \text{the rainfall intensity for a period equal to the time of concentration of the tributary area (expressed as inches per hour)}$
- $A = \text{the area of the drainage basin in acres}$

Because of the relationships that are involved, it is necessary to estimate $I$ before dealing with $C$. In choosing an appropriate $I$ value, one begins by determining the time of concentration, $T$, of the tributary area. This, in turn, is a function of the degree of slope, the surface texture, and the slope length. For the site under discussion, the average slope is 5 percent, the slope length is 1,200 feet, and the ground is either bare or planted in rows of pineapple, depending upon the particular stage in the planting cycle.

Using this information and Table 3 of the City and County of Honolulu's Storm Drainage Standards, it is estimated that the time of concentration for the site in its present state is about 5 minutes. Using the nomograph shown in Plate 3 of the same report, $T_c$ is estimated at 25 minutes. Figure 15.2 of the Soil Conservation Service's National Engineering Handbook - Section 4: Hydrology gives a $T_c$ of 10 minutes. It is our belief that a $T_c$ of 20 to 25 minutes is most realistic, but carried both that and a $T_c$ of 10 minutes through our computations.

One hour rainfall intensities for a 50-year recurrence interval are given in Plate 2 of the City and County's Storm Drainage Standards, and correction factors that can be used to convert these to intensities appropriate for the calculated $T_c$ are contained in Plate 4. While this latter figure is intended for use in drainage basins with areas of 100 acres or less, its use for the approximately 380-acre area with which we are concerned is reasonable. Using this method, it is estimated that $I$ with a recurrence interval of 50 years is between 6.7 and 8.3 inches per hour.

The runoff coefficient, $C$, is the variable in the rational method least susceptible to precise determination. The way in which it is used in the formula suggests that it is a fixed ratio for any given drainage area. In reality, this is not the case, because the coefficient is an expression of the integrated effects of infiltration, detention storage, evaporation, retention, flow routing, and interception. The comprehensiveness of this one factor means that it is difficult to attach a single value to it, and its quantification is as much an art as a science.

Table 1 of the City and County's Storm Drainage Standards gives values of the runoff coefficient, $C$, as a function of the average rainfall intensity,
I, and the slope and ground cover. If the existing pineapple fields are considered to be relatively flat farmlands and I is at the lower end of the range given earlier (i.e., 6.7 inches per hour), then C is on the order of 0.35 to 0.40. If, on the other hand, one considers a storm occurring when the pineapple has just been planted and almost the entire surface is composed of bare soil and strips of plastic, then a C value of 0.8 or more could be appropriate for a rainfall intensity at the upper end of the estimated range.

The one factor that is relatively certain is the area, A. As previously indicated, the total area to be developed is approximately 380 acres.

As can be seen from Table IV-2, estimates of existing runoff arrived at using the rational formula vary from 800 cfs to 2,130 cfs. Most probably, peak runoff from a 50-year storm is on the order of 900 cfs.

**Table IV-2. RUNOFF ESTIMATES MADE USING THE RATIONAL METHOD**

<table>
<thead>
<tr>
<th>I</th>
<th>C (inches/hr.)</th>
<th>A (acres)</th>
<th>Q (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Conditions</td>
<td>0.35-0.80</td>
<td>6-7</td>
<td>380</td>
</tr>
<tr>
<td>Proposed Project</td>
<td>0.5 -0.75</td>
<td>7</td>
<td>380</td>
</tr>
</tbody>
</table>

Source: Belt, Collins & Associates.

The proposed project would result in changes to two of the three factors in the rational formula. By collecting much of the rainfall into a storm drainage system rather than allowing it to follow its present overland path, it would significantly reduce the time of concentration. Assuming that the greatest distance travelled by water in the artificial system would be about 2,800 feet, the average velocity, considering both the overland flow and through-conduit portions of the runoff path, would probably be on the order of 3 to 4 feet per second. Combining these, it is estimated that the time of concentration would be about 15 minutes. Based on this, it is estimated that the I value for a rainfall with a recurrence interval of 50 years would be about 7 inches per hour.

As previously indicated, the selection of an appropriate C value for the equation is an inherently qualitative task. Based on the moderate densities that are proposed, they could be as low as 0.5 or as high as 0.75 for the present project.

As indicated in Table IV-2, these admittedly crude calculations suggest that runoff from the project site resulting from the 50-year storm would increase by about 700 to 800 cfs or 90 to 100 percent.
Significance of Increased Flows
As we have tried to indicate, the projected changes in storm flows given here are only order-of-magnitude estimates that provide some basis for discussion. Assuming they are in the correct range, however, we can turn to the important questions of whether or not increased runoff from the site is likely to alter flow in Kipapa or Waiekele Stream (to which Kipapa Stream is tributary) to the extent that it would significantly affect the downstream environment.

There are only two stream gaging stations which can provide input into the discussion -- Gage #2128, located on the upper reaches of Kipapa Stream above Mililani Town, and Gage #2130, located on Waiekele Stream just above the West Loch of Pearl Harbor (see Figure IV-1). Gage #2128 monitors drainage from a 4.3 square mile area. Records from it show an 18 year average daily flow of 11.0 cfs, a maximum flow for 1976 of 1,390 cfs, and a maximum discharge of 5,680 cfs on May 14, 1963. The U.S. Army Corps of Engineers Flood Control Management Office and the Drainage Division of the City and County of Honolulu Department of Public Works do not have any records of serious flooding along Kipapa on Waiekele Streams on these dates.

Gage #2130 on Waiekele Stream at Waipahu, which receives water from a 45.7 square mile watershed that includes Kipapa Stream, Waikakalaua Stream, and Huliwai Stream, had an average discharge for a 22 year period of record (1954-1976) of 39.2 cfs. Its 1976 maximum flow was 2,780 cfs; its maximum recorded flow of 13,600 cfs occurred on November 28, 1954. Flood frequency estimates for this location are shown in Table IV-3.

Mililani Town is in a relatively isolated location relative to other development adjacent to Kipapa and Waiekele Streams. In fact, the closest urbanized areas are about four miles below Mililani. Because of this, it is likely that surface runoff from the project site would be attenuated by 25 to 30 percent by the time it reached downstream areas that are susceptible to flood damage. Hence, for storms centered over Mililani itself, it appears that the proposed development would increase flows at that point resulting from a rainfall there with a recurrence interval of 50 years by 650 to 700 cfs. However, it should be noted that many of the peak flows in the lower reaches of the stream are the result of intense rainfall over only a portion of the 45 square mile basin, and not over Mililani itself. Because of this, it would be incorrect to interpret the Q_{50} flow for the entire basin as being increased by 650 to 700 cfs. The actual Q_{50} increase would be considerably less.

WATER QUALITY

Changes in water quality generated by the proposed development at Mililani Town could arise from three general sources: (a) sedimentation, (b) street surface contaminants, and (c) additional treated sewage effluent. Changes could affect the quality of water endangering the "Class AA" receiving waters of Pearl Harbor's West Loch and, possibly the biota found in Kipapa and Waiekele Streams (Department of Health 1973a). Each of these general pollutant sources is addressed individually below.
Figure IV-1 Gage Station Locations
Table IV-3. FLOOD FREQUENCY ESTIMATES

Using annual peak flow records from the years 1952 to 1975, frequency distribution curves predict Qt at U.S.G.S. gage station 2130, Waikule Stream (see Figure IV-1).

\[
Qt = \text{Discharge at recurrence interval (t).} \\
\text{Exceedence probability} = 1/T
\]

\[
Q_2 = 3,680 \text{ cfs}
\]
\[
Q_5 = 7,780 \text{ cfs}
\]
\[
Q_{10} = 10,270 \text{ cfs}
\]
\[
Q_{25} = 12,840 \text{ cfs}
\]
\[
Q_{50} = 14,330 \text{ cfs}
\]
\[
Q_{100} = 15,500 \text{ cfs}
\]

NOTE: These estimates are valid only at gage station 2130.

Source: Data obtained from U.S. Geological Survey Reports Water Resources Data for Hawaii and Other Pacific Areas, Water Years 1952-1975.
Sedimentation

Sedimentation as it relates to soil erosion has already been discussed under the Geologic/Pedalogic section of this Chapter. The nature of the actions required for the proposed development project (i.e., land clearing, grading and building construction) dictates a temporary increase in the amount of exposed or bared soils and a corresponding increase in erosion by surface runoff water. The increased sediment load in the water includes increased chemical and biochemical precipitates and additional decomposed organic material, such as humus, and causes greater turbidity. During the construction phase of the project, extensive preventative measures would be employed to mitigate this impact as noted in the Geologic/Pedalogic section. It must also be remembered that this construction activity would not begin until much of the development activity presently underway at Mililani Town has been completed. Thus, the net affect would be to maintain, rather than to increase, current construction activity. Hence, it is expected that the rate of sedimentation would remain at about its present level for the duration of the construction phase.

As residents occupy the homes and establish a yard planting program, there should be a reduction in the sediment load of the runoff. Evidence already presented suggests that overall sediment yield from the project site would decrease. However, for low-intensity rains, the soils' polluting effect will probably be the same as it is at present due to the ease with which fine particles of soil can be removed from streets and other impermeable surfaces where they have collected and be carried through drainage conduits typical of residential development.

There is considerable variation in the proportion of Kipapa Stream's flow that actually reaches Waikele Stream at the 2130 gage. During periods of relatively low or moderate streamflow, much, if not all of the flow exfiltrates into the ground through the streambed or is diverted below Mililani Town for irrigation purposes. At such times, the relatively small amounts of suspended solids in the water are deposited in the stream channel. Siltation becomes a serious problem in Kipapa Stream only during periods of intense rainfall. For example, U.S.G.S. records indicate that on April 17, 1974, the mean discharge at gage 2128 was 739 cfs and the sediment discharge for that day 4,110 tons. This one day's output represents 54% of the annual sediment discharge of 7,587 tons. The mean concentration of sediment for that day (905 mg/l) was also the highest recorded that year.

The very large percentage of the year's total suspended solids (sediment) carried on this one day is a reflection of the flushing action that occurs in the streambed during periods of high flow. Soil particles previously deposited on the channel bottom are dislodged and put into suspension. Redeposition, and the consequent siltation, occurs when the water reaches the lower energy environment near the mouth of the stream or in Pearl Harbor. While down- and side-cutting by the stream itself produces a limited amount of sediment carried by the stream, the bulk of it is eroded from the top of the plateau. Thus, while one might expect that the increased surface runoff from the site of the proposed expansion would produce higher peak streamflow and, consequently, slight changes in the cross-section and profile of the stream, the decrease in soil erosion that would accompany the shift from agricultural to urban use would result in a net reduction in the sediment load in the stream.
As has been pointed out, the amount of soil eroded from portions of the project site actually under construction would be higher than it is at present even assuming that all feasible mitigating actions are taken. The eroded soil would, of course, eventually appear as sediment in the streams. However, given that the project represents a continuation of the existing level of construction activity for the entire Mililani area, not an increase, it seems likely that the receiving waters and their biota would not be adversely affected.

Street Surface Contaminants
Street surface contaminants represent the second major source of pollutants which could affect the water quality of Kipapa Stream and its receiving waters. Because of its intermittent nature and relatively low normal flow volume, very little water quality data is presently available from this stream. Water quality records from gage 2130 monitoring Waikele Stream at Waipahu are not highly correlated with those from Kipapa Stream. Without exhaustive studies, few definitive quantitative statements can be made. However, studies of pollutants generated from similar urban developments do provide qualitative insights into the kinds of contaminants that might result from the proposed use. (See, for example, Lau, et al, 1970; Cox and Gordon, 1978; Lau 1972, 1973).

Pollutants associated with agricultural land use include soils runoff, fertilizers, and pesticides. The combination of water transportable pollutants varies with crop type, irrigation and fertilizing methods, and rainfall/landform characteristics. The project area borders steeply sloped gulch areas, and a fairly heavy runoff presently occurs with its associated agricultural pollutants. The shift from agricultural to urban use would result in a significant change in the types of pollutants carried by this water.

The U.S. Environmental Protection Agency's (EPA) report Water Pollution Aspects of Street Surface Contaminants (Sartor and Boyd, 1972) lists suspended and settleable solids, oxygen demand, algal nutrients, coliform bacteria, heavy metals, and pesticides as the major pollutants originating on urban streets. The most notable alteration in pollutant type would be the increased solids and oil-based derivatives resulting from greater traffic volumes and additional paved roadways. This can be alleviated somewhat by proper street cleaning techniques. The high portion of residential use, the relatively low density, and the total absence of industrial use would tend to place pollutant levels for the proposed expansion at Mililani at the lower end of the "urbanized land use" pollutant scale (U.S. Department of the Interior, 1970). Proceeding on the premise that a certain amount of pollutants would be picked up from the proposed development's streets and carried to Kipapa Stream by storm water runoff, the following potential impacts can be discussed.

First, it should be pointed out that much of the water received by Kipapa Stream never reaches its final drainage destination but is exfiltrated back into the ground. Because of the intermittent nature of the stream and the pollutant composition of existing runoff waters, no adverse effect on stream biota is expected. (See the biologic section of this chapter).
The second potential pollutant danger would exist when the contaminants are discharged into the Class "AA" receiving waters of Pearl Harbor's West Loch. This would occur only on the relatively few days during the year when flow in the stream is too great to allow 100% exfiltration. On such occasions, some water from Kipapa Stream, together with its accompanying contaminants, would reach the West Loch.

The question now is whether or not this would significantly affect or alter the receiving waters. Unfortunately, a search of water quality records failed to uncover sufficient data upon which a substantive evaluation of the pollutants' impact on receiving waters could be based. We know that the concentrations of street pollutants in them would rise, but do not know by how much. Conversations with representatives of the Navy suggest that, while the Navy is interested in controlling the influx of such contaminants into West Loch, sedimentation is their primary concern. Furthermore, there is little if any scientific data that points to a probable significant impact from street surface contaminants in that area. Given the size of the proposed project relative to that of the drainage basin as a whole, the relatively non-polluting nature of residential development, and the street-sweeping and other maintenance operations that would be employed in the completed development, we may infer that the impact of this type of pollutant is likely to be slight. Unfortunately, area-specific data that might confirm this estimate is not available at the present time.

Sewage Effluent

Sewage effluent emanating from the Mililani Sewage Treatment Plant presents another potential source of adverse impact on the quality of receiving waters at West Loch. Secondarily treated effluent from the Mililani plant is currently discharged into Kipapa Stream which in turn discharges into Pearl Harbor's West Loch. Under Hawaii's Public Health Regulations (Department of Health, 1973) the receiving waters at West Loch are listed as Class "AA". Although the Federal Water Pollution Control Act of 1972 requires that sewage effluent discharging into this class of water receive tertiary treatment, a National Pollutant Discharge Elimination System (NPDES) permit No. HI-0020061 was issued on March 3, 1975, that allows the continued discharge of secondarily-treated effluent into Kipapa Stream until March 3, 1980. Thereafter, the effluent must receive advanced treatment or be diverted to a less sensitive receiving site.

The 476-acre proposed development site would generate an estimated 1.03 million gallons per day (mgd) of additional sewage effluent (see Table IV-4). The existing demand on the facility is 1.4 mgd, and other use commitments total 1.53 mgd (Table IV-5). Hence, an additional expansion of the facility would be necessary to service the proposed development. This expansion is Phase IV in the long-term development program for sewage
### Table IV-4. PROJECTED ADDITIONAL SEWAGE FLOW FROM THE PROPOSED EXPANSION

<table>
<thead>
<tr>
<th>Estimated Population Increase</th>
<th>Average Per Capita Flow</th>
<th>Projected Sewage Flows (in mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Table I-2 10,000</td>
<td>100 gal/day</td>
<td>Average: 1.00, Maximum: -</td>
</tr>
<tr>
<td>From Public Works Dept. Formula 10,268</td>
<td>100 gal/day</td>
<td>Average: 1.03, Maximum: 2.08</td>
</tr>
</tbody>
</table>

1. Design Standards of the Division of Sewers, October 1970, prepared by the Public Works Department, City and County of Honolulu, Hawaii, requires that the new sewer systems be designed on the basis of 100 gallon per capita per day; population estimates based upon four persons per single-family residential unit and 2.5 persons per multi-family unit.

Source: Belt, Collins & Associates; Division of Sewers, Department of Public Works, City and County of Honolulu.

### Table IV-5. EXISTING DEMANDS, COMMITMENTS, AND RESERVE CAPACITIES OF MILILANI STP

<table>
<thead>
<tr>
<th>User</th>
<th>Existing Use (mgd)</th>
<th>Committed Use¹ (mgd)</th>
<th>Total (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mililani Town</td>
<td>1.3</td>
<td>1.00</td>
<td>2.30</td>
</tr>
<tr>
<td>Melemano Woodland</td>
<td>0.05</td>
<td>0.95</td>
<td>1.00</td>
</tr>
<tr>
<td>Waipio</td>
<td>0.05</td>
<td>0.25</td>
<td>0.30</td>
</tr>
<tr>
<td>ALL</td>
<td>1.4²</td>
<td>2.20</td>
<td>3.60</td>
</tr>
</tbody>
</table>

Total Capacity of Mililani STP 3.6 mgd

¹These flows are derived from Table I-5 and, although not being handled by the facility at the present time, are committed to approved or anticipated future development.

²See Table I-5.

Source: Sewers Division, City and County of Honolulu, Department of Public Works.

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treatment facilities at Mililani (see Table I-5), and it would increase the capacity of the plant from 3.6 mgd to 5.0 mgd. This expansion would, with design approval of the Department of Public Works, be constructed and paid for by Mililani Town, Inc., and dedicated to the City and County of Honolulu.

The Mililani STP has had a history of non-compliance with effluent limitations, particularly in the area of total nitrogen and total phosphorus (NPDES Permit). The recent expansion (February 1978) of the Mililani STP has temporarily alleviated the compliance problem by increasing the capacity of the plant by 1.8 mgd to a total of 3.6 mgd. The effluent from the new addition is of sufficiently high quality to meet NPDES standards even when it is mixed with the poorer-quality effluent from the original plant. (Note: the two phases operate semi-independently). The proposed 1.4 mgd phase IV expansion of the STP, which is scheduled for completion sometime in 1980, would also be a secondary treatment facility.

An important remaining issue relates to the disposal of the secondarily-treated sewage effluent after March 3, 1980, the expiration date of the NPDES permit. At that time the discharge of secondarily-treated sewage effluent into Kipapa Stream will be in violation of the Federal Water Pollution Control Act and would constitute an illegal action. The question has been under consideration for some time by the City and County of Honolulu Department of Public Works, which operates and maintains the present facility at Mililani. The problem is not being addressed solely from the standpoint of effluent disposal, but includes water conservation considerations as well. The five different wastewater disposal alternatives that have been examined are:

- use of secondarily-treated wastewater for agricultural irrigation;
- deep well injection back into the aquifer;
- conversion of the existing Mililani STP to tertiary treatment, and continued use of existing outfalls;
- disposal of secondarily-treated wastewater through deep ocean outfall at Barbers Point; and
- no action at all resulting in eventual violation of State and Federal standards.

Following a review of these options, the Department of Public Works has decided upon the secondary treatment/sugarcane irrigation alternative. This concept has been under study for some time now, and is discussed in detail in the Environmental Impact Statement for Mililani Sewage Treatment Plant Effluent Disposal System (Park Engineering, 1977). On-going studies conducted by the University of Hawaii’s Water Resources Research Center (WRRC) have examined the possibility of using secondarily-treated wastewater for irrigation of sugarcane and the impact this would have on water quality within the Pearl Harbor basal lens. The studies thus far have been positive and offer encouragement for this form of water reuse (Lau, 1975). The Oahu Sugar Company has agreed to accept 5 mgd of treated effluent and to use it for irrigation of some of their fields. If this plan is implemented, as now seems likely, treated effluent from the Mililani Sewage Treatment plan
would flow onto the agricultural fields of central Oahu rather than into Pearl Harbor's Class "AA" waters. This would bring the facility into compliance with Federal standards except during extended periods of unusually high rainfall. At such times, effluent flows might exceed irrigation use and the reservoir storage capacity, thus requiring discharge of secondarily treated effluent into Kipapa Stream under an approved emergency discharge permit. According to the EIS for the system, it is believed that this would occur so infrequently, and circumstances would provide sufficient dilution of waste water with peak volumes of storm runoff water, that the impact on the quality of receiving waters would be insignificant. If approved, the project would be completed by 1982. A short-term extension of the NPDES Permit has already been tentatively approved by the Department of Health should this plan be implemented.

Mililani Town, Inc. is currently proceeding on the assumption that this plan, proposed by the City and County of Honolulu Department of Public Works, will be approved and acted upon. If it is, discharge into Pearl Harbor would be almost totally eliminated. Moreover, in conjunction with good water conservation practices, the water effluent from the plant would be reused.

If unexpected problems were to preclude the proposed effluent disposal method, it is unlikely that an alternative solution could be found in time to comply with the existing NPDES permit. This is true regardless of whether or not the Mililani Sewage Treatment Plant is serving only development that has already been approved or the additional units included in the present zoning request as well. Furthermore, since approval of subdivision is contingent upon the availability of adequate treatment capacity, development of the proposed increment could be halted as soon as it became evident that the City and County's plan was not going to materialize.

WATER WITHDRAWALS

In 1977, average water use at Mililani was about 2.8 mgd (see Table IV-6). All of this water was pumped from four existing on-site wells that tap the Pearl Harbor basal lens. The proposed project would increase average water use by an estimated 1.64 mgd, and, based on present plans, this water would be supplied by additional wells drilled to the basal lens. While the proposed wells have already been approved by the Honolulu Board of Water Supply, the present water situation on Oahu, and particularly in the Pearl Harbor area, is sufficiently critical that a fairly detailed consideration of the probable effects of the proposed withdrawals is warranted.

Groundwater in Central Oahu

General In general, the groundwater underlying central Oahu is of two different types: basal water and high-level dike water. As shown in Figure IV-2, the basal water body is split into two hydrologically distinct compartments (Pearl Harbor and Waialua-Haleiwa) by the geologic structures associated with the Schofield high-level water. Because of recharge from rainfall, the upper part of the basal water body is commonly fresh (i.e., has a lower salinity than seawater); this fresh water is in the form of a lens that floats atop the denser seawater which saturates the highly permeable lavas that make up the island to an unknown depth. This lens of fresh water provides Oahu with a major source of potable water.

<table>
<thead>
<tr>
<th>Month</th>
<th>Average Daily Withdrawals (in mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>2.72</td>
</tr>
<tr>
<td>February</td>
<td>2.89</td>
</tr>
<tr>
<td>March</td>
<td>1.97</td>
</tr>
<tr>
<td>April</td>
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<td>May</td>
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<td>June</td>
<td>2.59</td>
</tr>
<tr>
<td>July</td>
<td>2.96</td>
</tr>
<tr>
<td>August</td>
<td>3.26</td>
</tr>
<tr>
<td>September</td>
<td>2.99</td>
</tr>
<tr>
<td>October</td>
<td>3.64</td>
</tr>
<tr>
<td>November</td>
<td>3.26</td>
</tr>
<tr>
<td>December</td>
<td>2.81</td>
</tr>
</tbody>
</table>

1977 Daily Average . . . . . 2.81 MG

Source: Board of Water Supply

Chapter IV 18
Figure IV-2  Ground Water in Central Oahu

- Hydrologic Boundary
- 20'' Piezometric Surface
- Spring Discharge
The impact of the proposed project on Oahu's groundwater resources can best be addressed by a consideration of the water budget for the Pearl Harbor basal lens. The critical issue here is the relationship between recharge and withdrawals. By determining the net loss or gain to the Pearl Harbor aquifer anticipated as a result of the proposed project, and assessing the effect that this would have on the fresh/salt water interface within the aquifer, it is possible to gain at least a qualitative understanding of the project's probable impacts on the island's groundwater system.

Available Fresh Water The additional wells proposed in support of this project would tap the Pearl Harbor aquifer from surface elevations of 865 feet and 685 feet (see Figure I-7). The elevation of the water table varies through the aquifer, with water levels generally rising as one proceeds inland. In the vicinity of the proposed wells, it is at an elevation of about 26 feet above mean sea level.

Because of the aquifer's importance to Oahu's overall water supply, numerous hydrologic studies have been undertaken aimed at determining the amount of water that could be safely withdrawn from it. On the basis of historical records of spring flow, pumping rates, and water table levels, Visher and Mink (1964: 70-71) suggested that as much as 195 to 230 mgd might be withdrawn from the Pearl Harbor basal lens without causing significant harm to the aquifer. This includes both water pumped from wells tapping the aquifer and the discharge of the Pearl Harbor springs.

Bowles (1973) estimated that the maximum safe yield of the aquifer is on the order of 200 mgd. His estimate was based on the belief that the recharge to the aquifer from both natural and human sources (e.g. irrigation return water) was about 250 mgd, and that about three-quarters of this could be withdrawn without affecting the long-term viability of the source. More recently, Mink (1974) and others have found evidence that, given the present conditions, it might be possible to take 85 percent of the flow. If this is correct, the Bowles estimate could be raised to about 215 mgd.

The Honolulu Board of Water Supply has estimated that the "sustainable yield" for the Pearl Harbor area is on the order of 250 mgd (Letter dated July 3, 1978, from the BWS to the Chairman of the State Environmental Quality Commission). R.H. Dale (1967) of the U.S. Geological Survey does not refer to the sustainable yield but gives the same 250 mgd figure as the long-term average discharge from the aquifer.

As indicated by the figures for the past eleven years that are summarized in Table IV-7, average pumpage from the aquifer for the past three years (1975-1977) was 226.9 mgd. During that same period the average spring and free flow was 58.7 mgd, and total discharge averaged 285 mgd. While some hydrologists have argued that the present rate of withdrawals cannot be sustained indefinitely, the Honolulu Board of Water Supply has stated that, "So far there is no conclusive evidence that the Pearl Harbor basin is being overstressed." The resolution of such a complex question as this would require for more work than could be undertaken as part of this EIS—if, in fact, it could be resolved at all. Hydrology, especially groundwater hydrology, is an inexact science, and the estimates cited above are necessarily crude.
Given the disagreement that exists between the experts cited above as to whether or not the present rate of withdrawal is below or in excess of the amount that can be taken from the aquifer on a sustained basis, no final conclusions can be reached at the present time. Clearly, however, the source requires careful management if its integrity is to be maintained.

Table IV-7. Discharge From The Pearl Harbor Aquifer: 1967-1977

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Plantation</td>
<td>12.5</td>
<td>122.7</td>
<td>144.1</td>
<td>160.1</td>
<td>147.7</td>
<td>139.2</td>
<td>142.7</td>
<td>111.0</td>
<td>119.3</td>
<td>133.9</td>
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<td>2.7</td>
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<td>21.0</td>
<td>21.5</td>
<td>17.1</td>
<td>19.5</td>
</tr>
<tr>
<td>BWS</td>
<td>33.3</td>
<td>32.8</td>
<td>35.0</td>
<td>41.2</td>
<td>46.1</td>
<td>53.3</td>
<td>59.7</td>
<td>58.5</td>
<td>61.9</td>
<td>69.9</td>
<td>70.6</td>
<td>51.1</td>
</tr>
<tr>
<td>Total Pumpage</td>
<td>180.5</td>
<td>177.0</td>
<td>199.8</td>
<td>226.2</td>
<td>212.5</td>
<td>213.4</td>
<td>226.0</td>
<td>226.7</td>
<td>229.8</td>
<td>244.2</td>
<td>209.9</td>
<td></td>
</tr>
</tbody>
</table>

| Spr. & Free Flow | 56.5 | 59.9 | 60.4 | 48.2 | 50.7 | 43.9 | 52.0 | 70.8 | 68.4 | 58.4 | 49.4 | 56.2 |
| Total           | 237.0| 236.9| 260.2| 274.4| 263.2| 257.3| 296.8| 263.3| 275.1| 288.2| 293.6| 266.1|

1Values for 1967-1972 are estimated; values for 1973-1977 are based on actual measurements.
2Figures in this row were calculated by Belt, Collins & Associates based on the preceding data.

Source: Letter from the Honolulu Board of Water Supply to the Chairman of the State Environmental Quality Commission dated July 3, 1978.

Impact of the Proposed Project on Groundwater Supply

Theoretically, the proposed expansion of Mililani Town has the potential to affect the Pearl Harbor basal lens in two different ways. First, by altering the surface of the land it could change the amount of recharge entering the aquifer. Second, withdrawals of water for domestic use could reduce residual flow. Both of these potential effects are discussed below.

Changes in Recharge

While agricultural return water is of some importance to the Pearl Harbor basal lens, the primary source of recharge is rainfall. In this respect, it is very important to recognize that rainfall is very unevenly distributed across the half-million acre recharge area of the aquifer (see Figure IV-3). It approaches an average of 300 inches per year near the crest of the Ko'olau Range and is as low as 25 inches per year in the vicinity of Pearl Harbor. For a variety of reasons, the high rainfall areas are much more important for recharge of the aquifer than their areal extent and average annual rainfall would suggest.

Average annual rainfall at Mililani Town is about 40 inches per year, and the median is only 31 inches per year. The precipitation is markedly seasonal, with about two-thirds of it falling in five winter months, November through March. Monthly totals as high as 17.4 inches (January) and as low as a trace have occurred. A quick review of soil characteristics and rainfall records for the site indicates that most of the rainfall goes to make up soil moisture deficits and that relatively little recharge occurs.

Chapter IV 21
When it does occur, it is usually during a few extended periods of wet weather during the winter. While no exact estimate is possible, a figure of about .07 mgd of recharge per year for the entire 476-acre site appears reasonable. Assuming that up to half of this might be lost as a result of the increase in impermeable surface associated with the development, the actual decrease in recharge to the basal lens would be about 0.03 mgd. This is less than 12-thousandths of one percent of the estimated 250+ mgd flow through the aquifer. Since the pineapple crop now being grown on the site is not irrigated, the project would not reduce the amount of irrigation return water reaching the aquifer. Hence, the 0.03 mgd decrease in recharge cited above represents the total effect of the project if no special mitigation measures are taken. However, as indicated in the last part of this section, there are several factors which may reduce or totally eliminate this potential decrease.

Changes in Withdrawals As previously indicated, projected water consumption by the proposed project is about 1.64 mgd (see Table I-4). This is 0.72 percent of average withdrawals from the aquifer during 1975-1977. While this may seem inconsequential, the already heavy draft from the basin means that it must be considered significant. Possible means of eliminating this potential adverse impact are discussed below.

Possible Mitigation of Adverse Effects The average of 11 million gallons per year of recharge that might be lost as a result of the proposed project could be eliminated by the use of artificial recharge systems ranging from stormwater retention ponds to injection wells, but the engineering or power required to accomplish this task (e.g. seepage pits, injection pumps, etc.) could be substantial.

At present, it appears that the best means of offsetting water withdrawals associated with the proposed project is to re-use sewage effluent from the Mililani Sewage Treatment Plant. Present City and County plans call for using the effluent from the sewage treatment plant to irrigate nearby sugarcane fields. Depending upon the results of tests now underway, either ditch or drip irrigation systems would be used. The drip system allows plantation managers to adjust their irrigation to match the soil moisture requirements of the growing plants. Hence, unlike the ditch system, where over-irrigation is common and there is a significant amount of percolation to the underlying water table, the drip system produces little recharge. Whichever system is used, however, the use of effluent from the Mililani STP for the irrigation means that potable water previously drawn from the aquifer for that purpose need not be used. As a result, most of the increased water withdrawal by wells at Mililani could be offset by reductions in agricultural water use. Inevitably, some water would be lost from the cycle, but these leakages are expected to be relatively small.

We hasten to add that such a compensating reduction will not occur automatically. Water currently used to irrigate the fields on which the treated sewage effluent would be applied is from the Waiahole Ditch. Hence, the conversion to the proposed effluent re-use scheme would not necessarily result in a reduction in pumpage from the Pearl Harbor basin. If this is to occur, adjustments will have to be made in the current use pattern, and government agencies may have to exert their considerable influence to insure that the improvements in the groundwater situation made possible by the recycling are, in fact, realized.

Chapter IV
Figure IV-3  Average Annual Rainfall
BILOGIC

The area being petitioned for rezoning and subsequent residential development is presently comprised of pineapple fields and steep sloped gullies created by the intermittent flow in Kipapa Stream. The gently sloping plateau area has been under pineapple cultivation for nearly a century, an activity which has all but eliminated endemic floral species there. On the steep slopes of the gullies leading down into Kipapa Stream, the vegetation is, for the most part, exotic or introduced by man. Eucalyptus and Guava underlain by tall weeds and grasses predominant. Data gathered in 1931 indicates that endemic plant species could at that time be found in the general area (Hosaka, 1937). This is not the case today (Herbst, 1978; Coueret, 1978).

Besides agricultural land use, two other factors have played major roles in the destruction of endemic flora. First, prior to pineapple cultivation large herds of wild cattle roamed freely and destroyed much of the plant life by their grazing and general movement. Secondly, fires and the military's clearing of some areas of Kipapa Gulch for an ammunition storage depot also destroyed much of the natural vegetation in the area.

Dr. Darryl Herbst (1978), a plant taxonomist in the Endangered Species Section of the U.S. Fish and Wildlife Service, has indicated that there are presently no known endangered or unique plant species that would be affected by the proposed development. Dr. Herbst also noted that these are some important plant species in Kipapa Gulch, but at an elevation of about 1,800 feet, well beyond the mauka limits of the Mililani 3,500 acre plan; these species would not be affected by the proposal in any way.

Perhaps because of the severely altered vegetative habitat on the plateau (natural to pineapple), there are few indigenous animal species in the parcels proposed for rezoning. Common finches, thrushes, and some rodents, all of which were introduced on Oahu by man, can be found. The same animals and mongoose are known to exist within the gulch. The riparian habitat created by the stream is not highly productive because of the intermittent nature of streamflows (Couveret, 1978; Shallenberger, 1977a). Kipapa Stream, in this instance, is not considered a significant wetland habitat for birds (Shallenberger, 1977b).

Although there are no recorded sightings of either species, both the Pueo (Hawaii State Endangered Species list) and the Hawaiian Hoary Bat (on both State and Federal Endangered Species list) could theoretically take advantage of the present habitat. The range of both species, should they inhabit the area, would be reduced if development occurred (Berger, 1978; Walker, 1978). However, given the doubt as to the presence of either species in the area and the minor impact on the owls' relatively large hunting range, this possible effect does not appear to be significant.

Kipapa Gulch and its tributary gullies would remain virtually unchanged and could continue to support the exotic species of plants and animals that pre-
sently exist there. At present, heavy surface runoff from the plateau is eroding the sides of the gulch so severely in some areas that no vegetation is able to establish itself. The proposed development's storm drainage system would greatly decrease uncontrolled flows over that area, and, quite possibly, aid in the restablishment of vegetation on those slope areas.

In summary, there appears to be no important or rare flora or fauna that would be significantly affected by the proposed development at Mililani. The landscape program planned by Mililani Town, Inc., is designed to bring shade and color to the area by providing numerous species of trees and shrubs. Hopefully, these will attract songbirds and other animal life to the area.

HISTORICAL/ARCHAEOLOGICAL

According to the State Department of Land and Natural Resources (DLNR) and the State Historic Preservation Officer, there are no known historically or archaeologically significant sites on the 476 acres proposed for rezoning. Neither are there any sites listed in the Statewide Inventory of Historic Places or recorded in DLNR's Historic Site File. Any sites which may at one time have been present on the plateau would almost certainly have been destroyed by pineapple cultivation.

Kipapa Gulch has some historical significance dating back to pre-contact times. At that time, inter-island warfare was prevalent, and Oahu was a prime target for invaders from the neighboring islands. An army from Hawaii led by Hilo battled with Oahu's defending army under the generalship of Mailikukahi in Kipapa Gulch. The invading force was soundly defeated, and the remnants of their army were pursued as far as Waimano. Hilo was decapitated, and his head was carried to Honouliuli in triumph. Kipapa Gulch received its name from this battle—Kipapa meaning "plain of corpses" in Hawaiian (Fornander, 1969).

There were at one time two heiaus in Kipapa Gulch, the Mosula Heiau and Heiau o Umi, located on the Honolulu side of the gulch, northeast of the military access roads (McAllister, 1971). However, these were destroyed long ago. According to Walton (1977), although artifacts may surface in the area periodically, taken in their own context these artifacts are not archaeologically significant enough to warrant the designation of a historical or archaeological site. If, in the course of land clearing and infrastructure construction, buried artifacts or sites are unearthed, the proper authorities would be notified immediately and appropriate action taken.

VISUAL

EXISTING CONDITIONS

The land being petitioned for rezoning lies in an agricultural pocket between the existing community of Mililani and Kipapa Gulch. The area is part of the gently sloping Schofield Plateau and is relatively flat except for the intrusion of several gulches tributary to Kipapa Stream. At present, the land on the plateau is under pineapple cultivation and, with the exception of a small area on Nob Hill, is uninterrupted by trees or buildings. About 35 single-family units along Meheula Parkway have views of the agricultural fields and some of the taller trees projecting above the rim of the
gulch. The same is true of some of the units in the Nob Hill Apartments. Since arterial roads (Meheula Parkway and Lanikuhana Avenue) separate the project area from the existing community, the view includes these roads. In some instances, however, homeowners with backyards adjacent to these roadways have elected to erect fences which offer privacy but significantly diminish the view.

The pineapple fields are a form of open space, but do create expanses of exposed soil. The fine textured, reddish dirt is easily blown or tracked into streets, sidewalks, and driveways, and may, sometimes, present an unsightly appearance.

VISUAL IMPACTS

Construction
Experience with past construction activity at Mililani Town suggests that the proposed expansion of the town would produce an adverse visual effect during the construction phase. Heavy equipment, trucks, dust from grading and site clearing activity, and stored construction materials would create a less serene atmosphere than the pineapple fields. Visual disruption of this kind is a necessary, but temporary, by-product of development activities. There are, however, some factors which would tend to mitigate the impact of the construction activities. First, a large portion of the project area borders uninhabited gulch area and would be somewhat isolated from the existing community (see Figure I-2). Second, buyers of new houses at Mililani purchase their homes with full knowledge of the entire Mililani Master Plan and the understanding that the development is a long-term project with all of the construction activity which it implies. In fact, for the past few years MTI has required all new buyers to sign a paper acknowledging that they have been informed of future development. Much of the proposed construction includes promised amenities such as a district park, civic center, and commercial complex. The willingness of people to continue to buy homes in Mililani despite the temporary visual discomfort brought about by ongoing construction indicates that homebuyers do not consider this a major objection. Because of its isolated location, the proposed construction activity at well sites #5 and #6 and the sewage treatment plant would create virtually no visual effects.

Operation of the Completed Project
The completed project would present a significantly different scene to current homeowners in the area. In place of pineapple fields would be a residential community with all of the people, structures, and vehicles that implies. This community has been designed to provide a pleasant visual setting. This, in fact, is one of its major marketing features. Three separate parcels totaling forty acres have been designated for park and recreation areas and an additional 94 acres of natural open space would be
interspersed throughout the residential housing zones (see Figure I-3). Roadway medians and planting strips have historically been landscaped and well maintained at Mililani. The sale of fee simple homes encourages homebuyers to create an attractive lot.

The rezoning petition includes 92 acres for A-2 medium density apartments, which sets building heights at forty feet (City and County of Honolulu, 1969). Zoning A-1, R-6, and B-1 all have lower building height requirements. Thus, no highrise apartment or commercial structures that would radically alter the character of this rural/suburban area or mar the view could be constructed unless first approved by the City Council following detailed design review as part of a PUD.

View opportunities are relative to the location, orientation, and topography of the particular site and dwelling unit. Units located on the periphery adjacent to Kipapa Gulch and its tributaries would have view opportunities over the naturally wooded areas of these open spaces. They would also have vistas of the surrounding mountains and, in some cases, of the distant ocean as well. Units located on Nob Hill would also have view opportunities.

Generally, units sited even one lot back of peripheral lots would have limited view potential beyond their own lot and street scene. The design of the street scene and the development in general would offer visual amenities of the same quality as are available to the existing community.

Outside of Mililani Town proper, at the Mililani Sewage Treatment Plant and at 865’ elevation reservoir (see Figure I-7), the visual impact would be slight. The STP facilities expansion would require construction activity only within the existing plant compound, and would be barely noticeable to Mililani residents. The approximately 100-foot buffer zone between the plant and the nearest homes attenuates the impact.

The construction of wells #5 and #6 at the 865’ reservoir would be in an area where there is no residential development. Construction would again occur within an existing compound, and the equipment traffic generated would not visually impact the residents of Mililani.

PUBLIC SERVICES AND FACILITIES

This section discusses the various public services required to support the proposed expansion of the Mililani Town community. Included are police and fire protection, medical services, and recreational facilities. The narrative describes the existing services and indicates the extent to which they would have to be expanded to provide adequate service and protection to the community.

POLICE PROTECTION

The Research and Development section of the Honolulu Police Department indicates that the proposed expansion of Mililani would not present any
problem to that Department, and that adequate police service would be provided as necessary (Clark; 1978; Toews, 1978). The proposed project, upon its completion, would increase the resident population of Mililani Town by an estimated 10,000 persons (see Table I-3). Using the current officer to population ratio of 2.1 officers per 1,000 population, it is estimated that a minimum of 21 additional police officers would be required to adequately service the proposed expansion (Keala, 1978). These officers would be phased into the police force as residential units were completed and occupied.

Initially, the present Wahiawa Police Station would respond to calls for service in Mililani Town. In the course of the next 2-4 years, some 6 additional officers would be hired to supplement the existing force. Public service buildings, including a police station, are proposed for construction at Wahiawa in the early 1980's. This new facility would probably assume responsibility for Mililani Town police service.

FIRE PROTECTION

The Mililani Fire Station, located just off Kamehameha Highway near Kualakailani Avenue, presently services Mililani Town (see Figure I-2). The City and County of Honolulu Fire Department does not feel that the proposed rezoning of 476 acres by Mililani Town, Inc., would adversely affect their fire protection plans. They indicate that existing fire protection at Mililani Town, together with supportive services from Wahiawa Fire Station and the Waipahu Fire Station, would be adequate. No point in the proposed development is more than a mile and a quarter from the Mililani Fire Station. The Fire Department has also advised that they have proposed in their capital improvement program the construction of a fire station within the Gentry-Waipio development. If this is constructed, it would further enhance the fire coverage for the Mililani District.

MEDICAL SERVICES

At the present time, Mililani Town is provided with medical service from a number of different sources, including:

<table>
<thead>
<tr>
<th>Facility</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wahiawa General Hospital</td>
<td>Wahiawa</td>
</tr>
<tr>
<td>Fronk Clinic</td>
<td>New Town</td>
</tr>
<tr>
<td>Straub Clinic</td>
<td>Pearlridge</td>
</tr>
<tr>
<td>Honolulu Home Care Program</td>
<td>Waipahu</td>
</tr>
<tr>
<td>Mililani Fire Station</td>
<td>Mililani Town</td>
</tr>
</tbody>
</table>

With the existing highway system, each of these medical facilities is only 5 to 10 minutes away. They provide a full range of services, including 24-hour emergency service. Many residents of Mililani Town, because of employment programs, insurance, or preference, obtain continuing medical services in the downtown Honolulu area, taking advantage of the large hospitals and clinics specialized services. The proximity of these large Honolulu hos-
hitals to Mililani eliminates the need for extensive medical facilities within the development itself.

The State Health Planning and Development Agency, working with proposed Federal medical guidelines and the Central Oahu Sub-area Health Planning Council, is presently gathering data to provide information for medical services planning in central Oahu. Present Federal guidelines suggest a maximum of 4 general, short-term hospital beds per 1,000 population. This figure is influenced by the type of facilities available within a 30-minute drive, the percentage of elderly in the population served, the presence of transients, and other factors. Oahu presently has 2.58 beds per 1,000 population, considered quite adequate for the Island generally. In addition, during severe emergencies Civil Defense and/or military paramedical equipment would also be available.

Conversations with the administrator of Wahiawa General Hospital indicate that modern additions have recently been completed at that facility, including a large, well-equipped emergency room. The existing building has a foundation that can support six additional floors. This would permit an expansion of Wahiawa General Hospital of approximately 70 percent, from 78 beds presently to roughly 130 beds (Baltch, 1978).

RECREATIONAL FACILITIES

The recreational facilities at Mililani Town, both now and in the future, appear to be adequate. A number of parks (7) have already been dedicated by Mililani Town, Inc., to the City and County of Honolulu, which subsequently assumed responsibility for their operation and maintenance. Within the 476 acres being petitioned for rezoning, 40 additional acres have been designated for parks, and their location and size have been reviewed by the Department of Parks and Recreation (see Table IV-8). These proposed parks would ultimately be dedicated in accordance with standards and requirements set forth by Rule 9 of the Park Dedication Rules and Regulations of the City and County of Honolulu. Figure IV-4 illustrates the location of these parks. The proposed 20-acre district park which is planned within the Town Center is of particular interest (see Figure I-3). This park is located directly beside the proposed commercial/civic center. The proximity of the two offers an excellent opportunity for many community-wide functions and civic activities.

Two recreation centers containing swimming pools and gymnasium equipment are owned by the Mililani Town Association, and for a small monthly service fee, are available to all Mililani Town residents. A third recreation center will be completed in mid-1978, and a fourth, tennis-oriented, recreation center is presently contemplated (see Figure IV-4). An 18-hole public golf course is also available to Mililani Town residents. Three operating elementary schools and the Mililani High School also provide recreational facilities and programs for young people in Mililani Town.
TABLE IV-8. LIST OF PARKS AND RECREATION CENTERS AT MILILANI TOWN

Dedicated Parks:

<table>
<thead>
<tr>
<th>Name</th>
<th>Area</th>
<th>Cumulating Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kipapa Neighborhood</td>
<td>5.00 acres</td>
<td></td>
</tr>
<tr>
<td>Waena Neighborhood</td>
<td>6.50 acres</td>
<td></td>
</tr>
<tr>
<td>Noholoa Neighborhood</td>
<td>7.26 acres</td>
<td></td>
</tr>
<tr>
<td>Mililani Neighborhood</td>
<td>5.00 acres</td>
<td></td>
</tr>
<tr>
<td>Hokuamahi Neighborhood</td>
<td>4.01 acres</td>
<td></td>
</tr>
<tr>
<td>Mililani Uka Neighborhood</td>
<td>4.00 acres</td>
<td></td>
</tr>
<tr>
<td>Mililani District</td>
<td>19.23 acres</td>
<td></td>
</tr>
</tbody>
</table>

Total Area of Dedicated Parks 51.00 acres 51 acres

Neighborhood Parks - Zoned But Not Dedicated:

3 @ 4 acres per park 12 acres 63 acres

Parks Proposed in 476-Acre Increment:

<table>
<thead>
<tr>
<th>Name</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>District Park</td>
<td>Public 15 acres</td>
</tr>
<tr>
<td>Community Park Neighborhood</td>
<td>Private 5 acres</td>
</tr>
<tr>
<td></td>
<td>10 acres</td>
</tr>
</tbody>
</table>

Area of Proposed Parks 40 acres 103 acres

TOTAL PARK AREA 103 acres

Recreation Centers:

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swim/Rec Center One</td>
<td>Completed and Operated by MTA</td>
</tr>
<tr>
<td>Swim/Rec Center Two</td>
<td>Completed and Operated by MTA</td>
</tr>
<tr>
<td>Swim/Tennis Center Three</td>
<td>Under Construction</td>
</tr>
<tr>
<td>Rec Center Four</td>
<td>Planned</td>
</tr>
</tbody>
</table>
EDUCATIONAL SERVICES

Throughout the development of Mililani Town, school locations have been planned in cooperation with the State Department of Education. Three elementary schools, Kipapa, Mililani Waena, and Mililani Uka, presently serve the community. A fourth elementary school site, Mililani Iki, is designated for the area makai of Kamehameha Highway, and an environmental impact statement has recently been submitted (State of Hawaii, 1978). Another is proposed for the area within this rezoning request if needed (see Figure IV-4). Mililani High School serves the community, and an intermediate school site has been reserved adjacent to the district park in the segment west of Kamehameha Highway for future use should it be necessary.

Primary attention has been given to the location of public schools. Elementary schools have been situated in such a way as to minimize both the distance that children traveling to and from school would have to walk and the number of major street crossings. All schools have been located to maximize access to all sections of the community. Agreements between the State DOE and the Hawaii Teachers Union set the minimum student to teacher ratio at 26.15 to 1. The board of education has a commitment to maintain this ratio and an obligation to retain as high an education standard as possible. No adverse effect in this regard is anticipated from this expansion project.

Conversations with the State Department of Education's Central Oahu District office indicate that school enrollment generally has been unstable. Table IV-9 shows present and projected student enrollment and present school capacities. Although enrollments next year will approach or exceed permanent capacity (temporary facilities expansion will be provided), the real problem at Mililani Town could be declining enrollment rather than an excess of students. Student enrollment is expected to peak in 1982; following this, a gradual decline is projected (Nakamoto, 1978). This projected decline in student enrollment has made the Department of Education hesitant to construct schools now, considering that they may not be needed in the future. In any event, the Department is aware of proposed development plans at Mililani Town, and has included this in their planning. Sufficient land for schools has been designated by Mililani Town, Inc., Should educational facility expansion be necessary in the future.

TABLE IV-9. SCHOOL ENROLLMENTS MILILANI TOWN

<table>
<thead>
<tr>
<th>School</th>
<th>Enrollment</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kipapa</td>
<td>730</td>
<td>786</td>
</tr>
<tr>
<td>Mililani Waena</td>
<td>782</td>
<td>783</td>
</tr>
<tr>
<td>Mililani Uka</td>
<td>790</td>
<td>875</td>
</tr>
<tr>
<td>Elementary Totals</td>
<td>2,302</td>
<td>2,444</td>
</tr>
<tr>
<td>Mililani High School</td>
<td>1,286</td>
<td>1,360</td>
</tr>
</tbody>
</table>

Source: Mr. George Nakamoto, DOE Central Oahu District Office
With one exception, all the collection and disposal of residential solid waste at Mililani is being handled by the City and County of Honolulu out of the Wahiawa refuse yard. The only exception is the 126 unit Makana Hale townhouse area, where the refuse is collected by a private company, Oahu Scavengers, Inc. The same company collects the solid waste generated by the Mililani Shopping Center.

All the refuse which is collected by the City and County is taken for disposal to either the City-owned and operated Waipahu incinerator or to the Palailai Sanitary landfill, which belongs to and is operated by the Pacific Concrete and Rock Company, Ltd. The Waipahu incinerator, with a refuse receiving potential of 600 tons per day (T/d), is presently operating at full capacity and will not be expanded in the future. Instead, the City has decided to begin the operation of a new Leeward District Sanitary Landfill. The recently chosen site of this landfill is Makaiwa Gulch, located on the southern slopes of Waianae Range directly above the Barbers Point Naval Air Station. The City expects to begin the operation of this landfill by the end of 1978, at the same time abandoning the Palailai site. The service area of the Makaiwa Landfill will include the Honolulu, Ewa, Waianae, Wailua and Wahiawa districts. According to the City and County Department of Public Works, Division of Refuse Collection and Disposal, the refuse generated by any additional development at Mililani will be taken to the Makaiwa Gulch facility for disposal. The privately collected refuse is taken, at the present time to the Palailai Landfill site at the rate of about 5.5 tons per week.

Assuming a receiving capacity of 500 T/day, the proposed Makaiwa Gulch sanitary landfill will have a life span of about 30 years. Table IV-10 indicates projected solid waste generation by the proposed development at Mililani.

**PUBLIC UTILITIES**

Effects that various public utilities might have on the natural environment are discussed elsewhere in this report. There are, however, several points relative to the utility systems themselves that deserve further discussion.

**SEWERAGE**

Environmental impact assessments of the proposed Mililani Sewage Treatment Plant are based upon several legal and political assumptions. Should these assumptions come to pass, the long-term environmental impacts on water quality and groundwater resources would probably be beneficial (see the hydrologic section). A discussion of the events that have transpired to this point can provide a better idea of the probability that these assumptions are indeed valid.

The proposed STP expansion is part of a long-term master plan (Phase IV). Mililani Town, Inc., which would build and pay for the addition, is preparing engineering design plans that will be submitted to the City
Table IV-10. PROJECTED SOLID WASTE GENERATION BY THE PROPOSED PROJECT

RESIDENTIAL

Projected population - 10,000
Solid waste generation per capita - 3.5 lbs/day = 35,000 lbs/day = 17.5 T/day

COMMERCIAL

Proposed Commercial Center
if 100,000 sq. ft. (gross leasable space) @ 0.06 lbs/ft.2/wk =
6,75 lbs/wk = 982 lbs/d = 0.5 T/d

if 350,000 sq. ft. (gross leasable space) @ 0.06 lbs/ft2/wk =
21,000/lbs/wk = 3,000 lbs/d = 1.5 T/d

TOTAL RESIDENTIAL AND COMMERCIAL:

Solid Waste Generation by the Proposed Development = 18.0-19.0 T/d

Source: City and County of Honolulu, Department of Public Works Division of Refuse Collection and Disposal; Oahu Scavengers, Inc.

and County of Honolulu, Public Works Department for approval. The completed facilities will be dedicated to the City and County of Honolulu, which will assume the responsibility for its proper operation and maintenance. The decision to continue sewage treatment at the secondary level dictates that an alternate effluent disposal system be established which can legally accept secondarily treated effluent (NPDES Permit HI-0020061). The Public Works Department has taken it upon itself to plan, design, and officially propose (Park Engineering, Inc., 1977) an alternative disposal system which would reuse the treated effluent for agricultural irrigation. Extensive supporting research, the need for innovative water management practices, and support both from concerned private industry (Oahu Sugar Company) and government agencies (State Department of Health) indicate that the proposed effluent disposal system will be approved and implemented. The Department of Public Works has already received assurance that the NPDES Permit which expires in March, 1980 will be extended until the alternate system is constructed. To date the assumptions appear valid.
WATER

The addition of water service lines to the proposed project area and the physical construction of additional wells does not constitute a significant environmental hazard. The recharge capability of this area should not be significantly changed, but it is estimated that an additional 1.64 mgd would be pumped out of the Pearl Harbor aquifer. With net pumpage already exceeding the sustainable yield of the source, either population control, water conservation, or alternate sources are needed.

ELECTRICAL POWER

According to estimates by the Hawaiian Electric Company (HECo), the proposed development at Mililani Town would add about 10,000 kilowatts (kw) to the peak demand and approximately 3,000 kilowatt hours per person per year to the annual power requirement on Oahu (an anticipated population increase of 10,000 would require 3,000,000 kw hours per year). The Mililani power substation, which presently provides most of Mililani Town's electrical energy, was designed to accommodate additional transformers, each of which could increase the substation's output capacity by 12,600 kw. According to HECo, there is no problem or anticipated adverse impact involved in getting power to Mililani Town as described in Chapter I. Energy, however, has become a precious commodity as fuel resources are continuously depleted. Table IV-11 shows peak consumer power demands on Oahu and HECo's present and future capacity to meet those and projected requirements. The Kahe 6 power plant expansion will be completed by 1980, well before the Mililani expansion project would be finished. Anticipated power demands generated by this project are included in HECo's medium-range planning and power consumption projections.

Table IV-11. HECO ELECTRICAL POWER DATA (OAHU): 1978

<table>
<thead>
<tr>
<th>Maximum Recorded Peak Demand</th>
<th>919,000 kw</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Installed Capacity</td>
<td>1,209,000 kw</td>
</tr>
<tr>
<td>Total Installed Capacity Less Capacity of the Largest Generating Unit (141,000 kw)</td>
<td>1,068,000 kw</td>
</tr>
<tr>
<td>Kahe 6 Power Plant Expansion (1980)</td>
<td>141,000 kw</td>
</tr>
<tr>
<td>Total Installed Capacity Less the Capacity of the Largest Generating Unit (1980)</td>
<td>1,209,000 kw</td>
</tr>
</tbody>
</table>
Though the electrical power can be supplied to the proposed project by HECO, the larger question of future energy availability remains. Fossil fuels, which supply most of Oahu's energy, are fast becoming depleted, and the search for alternate sources is a long and costly process. Large-scale geothermal, solar, wind, and ocean energy sources are presently being studied. Yet the time is fast approaching when individuals must begin to accept at least some of the responsibility for energy conservation.

While there is nothing in the proposed project that would make it any worse than existing development in terms of energy consumption, neither is there anything in the proposed plan that would improve the present situation. Mililani Town, Inc., has periodically evaluated the possibility of offering a solar option on their residential units, but, thus far, has concluded that such a step was premature. The solar industry is still relatively new in this country, and manufacturers have yet to produce systems that combine thermal efficiency, reliability, and low cost. The industry is maturing rapidly, however, and it seems likely that there will be rapid advances in the state-of-the-art over the next few years. Hence, while it might be unreasonable to insist that all units produced today be equipped with solar collectors for hot water heating, it is not unreasonable to inquire as to the difficulty that owners might experience in attempting to retrofit their homes with solar units at some time in the future.

Single-family detached homes can easily be retrofitted with solar systems, and the cost of a retrofit for single-family units is probably no greater than if they were installed in the new construction. Given the expected improvement in solar technology and the absence of any significant penalty (other than the inability to include the system's cost in the regular home mortgage) for leaving installation of a solar system to the discretion of the individual homeowner, this course of action appears quite reasonable.

Because of both legal and architectural considerations, multi-family units present a significantly different problem. The multi-family designs now being constructed at Mililani are not as readily adaptable for solar systems as are the single-family homes. Problems such as limited space for the larger hot water storage tank required for a solar system and the absence of appropriate locations for solar collectors make it much more difficult for residents of such units to retrofit them with solar systems at some time in the future. Thus, it is important that detailed plans for the proposed multi-family areas give proper consideration to the basic requirements of solar water heating systems if the project is to effectively provide for their future use.

TELECOMMUNICATIONS

Mililani Town, Inc., is in regular communication with the Hawaiian Telephone Company. In the past, this continued interaction has forestalled problems regarding telephone service in Mililani Town and should continue to do so in the future.

Until one year ago, Oceanic Cablevision, Inc. assisted the developer in funding cable TV systems in Mililani. According to Oceanic's president, Don E. Carroll, the company is presently rebuilding much of the original system at Mililani Town, and has installed an expensive microwave system to improve
regular TV reception. When internal economics and improved marketing conditions dictate, Oceanic Cablevision, Inc. will again initiate cable service to Mililani.

PHYSICAL HAZARDS

FLOODING

No portion of the land proposed for development lies within a flood-prone area (U.S.G.S., 1975). The project's storm drainage system is designed to standards set by the City and County of Honolulu Department of Public Works, and the only flooding which may be expected to occur would be from rainfalls with a recurrence interval of more than ten years. Except in the most severe instances, however, most on-site flooding would be confined to streets and other open areas where the amount of damage would be limited. Off-site storm runoff is discussed in the Hydrology section of this report.

SEISMICITY

Oahu, along with Molokai and Lanai, lies in Seismic Probability Zone 1 (Furumoto et al., 1972). This classification indicates that the most severe earthquake that can be expected would result in only minor damage. The Furumoto report does suggest, however, that the seismic risk on Oahu might have been underestimated, as it is based only on previous experience. It has been suggested, therefore, that the Island of Oahu be reclassified to Zone 2 on the seismic probability scale of 0 through 3, where:

- Zone 0 = no damage
- Zone 1 = minor damage
- Zone 2 = moderate damage
- Zone 3 = major damage

Still, considering the magnitude of past earthquakes on Oahu, which have caused only such minor damage as cracked walls in some older structures, the Uniform Building Code requires only that all construction on Oahu meet the requirements specified for Seismic Risk Zone 1. An exception to this requirement are all public buildings funded by the State, which must be designed in accordance with the seismic probability Zone 3 requirements. All the schools, for instance, are constructed in compliance with the publicly funded building standards.

According to the U.S.D.A. Soil Conservation Service (1972), the soil found on the site is suitable for the residential and commercial development that is proposed.

MAN-MADE

For a number of years the U.S. Army maintained an ammunition storage depot in Kipapa Gulch, a short distance from the project site. During that time, the Army leased a safety zone which previously impacted the proposed project. The Army's lease has expired, however, and the use of this depot was discontinued in the latter part of 1977. No explosive hazard exists in this area at this time.

Chapter IV
CIRCULATION

Mililani Town's vehicular circulation system is described in Chapter I. As previously indicated, it concentrates most of the major traffic flows onto three main arterials, Meheula Parkway, Lanikuhana Avenue, and Kuahelani Avenue, insuring that traffic on residential streets remains light. At the same time, however, Mililani is essentially a "bedroom community" with a relatively high percentage of commuters. As a result, it generates a significant amount of traffic to and from employment centers in Honolulu and Ewa during peak morning and afternoon hours. Because it is this commuter traffic that constitutes the greatest burden on both the town's own arterial roadways and the regional highway system, the remainder of this section focuses primarily on the effect of increased commuter traffic into and out of the community. In addition, some consideration is given to traffic that might be generated by the proposed commercial center.

EXISTING ROADS AND TRAFFIC

There are presently two major roads providing access to and from Mililani Town--Kamehameha Highway to the west and the H-2 Freeway to the east. Internal arterial roads provide access to these major roadways at four key points as illustrated in Figure I-4. In order to determine existing traffic volumes at Mililani and to obtain data on which estimates of future traffic might be based, traffic counts were taken on Kamehameha Highway north and south of Mililani Town and on the H-2 on-ramp during March, 1978. The results of the sampling program are summarized in Table IV-12, and conclusions that can be drawn from the data that was collected are discussed below.

First, and somewhat surprisingly, during the sampling period, overall (i.e., 24-hour) traffic volume on Kamehameha Highway was no higher south of Mililani Town than it was to the north. While no definitive explanation for this is possible without a detailed study of turning movements at the intersections of all the Mililani Town access points to Kam Highway, our observations and information from a recent survey of residents of Mililani suggest that it is related to the large amount of through-traffic that uses the road; to shopping, school, and recreational trips made by Mililani Town residents to the north; and to the fact that southbound traffic onto the H-2 Freeway from Mililani Town outweighs northbound traffic 3.3:1.

Second, the peak hour traffic generated by the town is in the morning, and is primarily in the southbound direction. For the most part, it represents work trips towards Honolulu. A second peak occurs in the late afternoon. At that time traffic is primarily in the northbound direction, and it is about 10 to 15 percent lower than it is in the morning. Because of this, our investigation focused mainly on the morning hours. Southbound a.m. peak hour traffic on Kamehameha Highway north of Mililani Town averaged 414 vehicles; south of the town it was 1,466. Since at least a few of the southbound vehicles counted north of the town were almost certainly destined for Mililani, it appears that Mililani added about 1,100 cars to the southbound traffic during the peak hour. During the same hour, an average of 582 vehicles entered H-2 southbound from Mililani. Hence, total morning peak hour southbound traffic generated by the town seems to be on the order of 1,700 vehicles. Southbound peak hour traffic on both Kam Highway and the
Table IV-12. RESULTS OF TRAFFIC COUNTS ON KAMEHAMEHA HIGHWAY AND ENTRANCE RAMPS TO H-2 FREEWAY:

<table>
<thead>
<tr>
<th>Location of Traffic</th>
<th>Traffic Volume</th>
<th>Avg. Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Traffic Volume</td>
<td>as Percent of</td>
</tr>
<tr>
<td></td>
<td>as Percent of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avg. Total Daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avg. Total Daily</td>
<td></td>
</tr>
<tr>
<td>Kam Hwy. North of Kuahelani Street</td>
<td>Southbound</td>
<td>8,448</td>
</tr>
<tr>
<td></td>
<td>Northbound</td>
<td>9,330</td>
</tr>
<tr>
<td></td>
<td>Two-Directional</td>
<td>17,778</td>
</tr>
<tr>
<td>Kam Hwy. South of Lanikuhana Ave.</td>
<td>Southbound</td>
<td>8,971</td>
</tr>
<tr>
<td></td>
<td>Northbound</td>
<td>8,095</td>
</tr>
<tr>
<td></td>
<td>Two-Directional</td>
<td>17,066</td>
</tr>
<tr>
<td>Entrance to the H-2 Freeway</td>
<td>Southbound</td>
<td>3,608</td>
</tr>
<tr>
<td></td>
<td>Northbound</td>
<td>1,090</td>
</tr>
<tr>
<td></td>
<td>Two-Directional</td>
<td>4,698</td>
</tr>
</tbody>
</table>

NOTE: Counts were made using two Stevens Model 7551-2 Print-Punch Traffic Recorders. Because only two counters were available, it was impossible to monitor cars at all three stations simultaneously. Data was also collected on weekends, Good Friday, and Kuhio Day, but are not shown here because the traffic figures are atypical.

Source: Belt, Collins & Associates.
Mililani entrance to H-2 is 16 percent of the total daily southbound traffic that originates at Mililani, an indication of the relative magnitude of the commuter component.

Third, it is interesting to note that Mililani Town generates about twice as much morning peak hour southbound traffic on Kamehameha Highway as it does on H-2 — 1,100 vehicles per hour (vph) compared to 582 vph. Apparently, residents of the town, especially those who live on the west side of Kamehameha Highway, find it more convenient to use the older road. Possibly, some commuters may be influenced by the fact that access to the H-2 Freeway is presently via a temporary two-lane roadway, and would switch to H-2 when Meheula Parkway is completed as planned. Another factor influencing the proportion of the traffic that uses H-2 is the amount of congestion existing on Kamehameha Highway south of Mililani Town. As it increases, more and more Mililani residents are likely to choose the H-2 alternative.

Finally, while the volume of northbound peak hour traffic generated by Mililani Town is much smaller than the southbound traffic, it is still significant. The figures shown in Table IV-12 indicate that it is at least 550 vph. Given the near certainty that a significant proportion of the northbound vehicles counted south of Mililani Town were destined for it, the number is probably closer to 700 vph. It is believed that the majority of this traffic is destined for jobs or school at Wheeler Air Force Base, Schofield Barracks, and Wahiawa.

IMPACT

Changes In Traffic Resulting From Increased Residential Development

The proposed project would increase the number of residential units at Mililani by about 3,400 and the resident population by approximately 10,000 persons. In addition, even without the proposed project, ongoing development in the area of the town already having the necessary zoning would increase traffic above its present level. In order to estimate the probable magnitude of this increase, two different estimating techniques were used. The first of these involved the application of traffic generation rates developed by the City and State Departments of Transportation to the existing and projected population figures. The second approach utilized the traffic and unit counts compiled for this study as the basis for estimates of the probable traffic impacts. Results of both approaches are discussed below.

All families moving into new residential units at Mililani Town are asked to provide certain basic socio-economic and behavioral information about themselves. While homebuyers may refuse to participate in the survey, very few do, and their answers provide a valuable data base concerning residents of the town. According to the survey, there are an average of 1.67 workers per single-family unit and 1.49 workers per multi-family unit. The State Department of Transportation reports the average number of persons per car during the peak hour as 1.75 in the winter and 1.67 during the summer (the difference presumably being attributable to the lower number of school children who ride in the summer). City and County of Honolulu traffic counts indi-
cate that about 45% of all work-bound trips are made during the morning peak hour. Finally, data collected both for this study and by the City and County Department of Transportation Services indicate that about 25 to 30 percent of the morning commuter-hour traffic generated is northbound. Based on these figures, it is estimated that total peak hour vehicle trips generated by development at Mililani Town completed as of January 1, 1978, was about 2,270 (see Table IV-13). Development of areas west of Kamehameha Highway already having the necessary zoning approvals would increase this to about 2,610 vph. Finally, the proposed project would add another 1,414 vehicle trips per hour to this for a total of 4,024 vph during the a.m. peak.

To check the accuracy of this estimate, the January 1978 estimates produced using these trip generation factors were compared with actual traffic counts taken in March of that same year. As can be seen from the tabulation shown in Table IV-13, the traffic volumes estimated using the model are remarkably close to those actually observed on the roadway.

While we are quite confident regarding the accuracy of our estimate of the total number of peak hour trips, it is more difficult to say exactly what route this traffic would follow. Unless a significant number of new employment opportunities are generated in the Wahiawa/Schofield/Wheeler area, a possibility which at present does not seem very likely, the percentage of traffic from the proposed development which would be northbound would probably be slightly lower than it is from the existing development, perhaps 20 to 25 percent of the total. Because of its proximity to the H-2 entrance, it is also likely that a greater proportion of northbound peak hour traffic from this increment would use the freeway than is presently the case for Mililani as a whole; hence, we have assumed that it would be about 40 to 50 percent rather than the present 5 percent (see Table IV-12). Based on this, it appears likely that the project would increase peak hour northbound traffic just north of Mililani Town by about 135 vph on H-2 and by approximately 180 vph on Kamehameha Highway. This is not enough to have a significant adverse effect on traffic flow on either of these roadways.

Southbound peak hour traffic from the proposed development is expected to be about 75 to 80 percent of total peak hour traffic, i.e., about 1,000 vph. The manner in which this would be split between Kamehameha Highway and the H-2 Freeway is dependent upon a number of variables, many of which are beyond the control of Mililani Town, Inc. The most important consideration, of course, is the amount of congestion that occurs on these facilities below Mililani. Given the present situation, and the downstream capacity restrictions on Kamehameha Highway, it is our belief that at least 80 percent of the southbound drivers from the proposed increment would use the H-2 Freeway and 20 percent would use Kamehameha Highway. This would mean an increase of about 900 to 925 vph southbound on H-2 and 175 to 200 vph on Kamehameha Highway (see Table IV-13.

Since the projected peak hour volume southbound on Kam Highway south of Mililani following completion of development in areas already having the necessary zoning is about 1,680, the projected increase of 175 to 200 vph would bring total southbound traffic to about 1,875 vph. This is slightly more than the 1,788 vph that were counted at this location by the State Department of Transportation in March, 1976, a time when that road segment
<table>
<thead>
<tr>
<th>Area</th>
<th>Type of Unit</th>
<th>Number of Units</th>
<th>Avg. No. of Workers per Unit</th>
<th>Avg. No. of Workers per Auto</th>
<th>Peak Hr. as percent of Total</th>
<th>Total</th>
<th>Estimated Traffic Vehicles Per Peak A.M. Hour</th>
<th>Measured Traffic Northbound</th>
<th>Southbound</th>
<th>Northbound (20%)</th>
<th>Southbound (7%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Development (as of Jan. 1, 1978)</td>
<td>Sing. Fam.</td>
<td>3,184</td>
<td>1.67</td>
<td>1.7</td>
<td>45</td>
<td>1,407</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Multi. Fam.</td>
<td>2,307</td>
<td>1.49</td>
<td>1.7</td>
<td>45</td>
<td>863</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ALL</td>
<td>5,371</td>
<td></td>
<td></td>
<td>2,270</td>
<td>595</td>
<td>45</td>
<td>1,065</td>
<td>565</td>
<td>2,310</td>
<td>560 50</td>
</tr>
<tr>
<td>Ongoing Dev. on Land West of Kam. Hwy.</td>
<td>ALL</td>
<td>768</td>
<td>1.67</td>
<td>1.7</td>
<td>45</td>
<td>340</td>
<td>75</td>
<td>200</td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Sing. Fam. Residential Only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Total From Approved Development</td>
<td></td>
<td>6,139</td>
<td></td>
<td></td>
<td>2,610</td>
<td>670</td>
<td>45</td>
<td>1,265</td>
<td>630</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proposed Development</td>
<td>Sing. Fam.</td>
<td>1,092</td>
<td>1.67</td>
<td>1.7</td>
<td>45</td>
<td>483</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Multi. Fam.</td>
<td>2,360</td>
<td>1.49</td>
<td>1.7</td>
<td>45</td>
<td>931</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>ALL</td>
<td>3,452</td>
<td></td>
<td></td>
<td>1,414</td>
<td>182</td>
<td>137</td>
<td>182</td>
<td>913</td>
<td></td>
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<tr>
<td>Projected Mililani Total</td>
<td>ALL</td>
<td>9,591</td>
<td></td>
<td></td>
<td>4,024</td>
<td>852</td>
<td>182</td>
<td>1,447</td>
<td>1,543</td>
<td>n.a.</td>
<td></td>
</tr>
</tbody>
</table>

1Traffic splits based on data collected during March, 1978, and discussed earlier in this section (See Table IV-12).
3City and County of Honolulu data.
was quite congested. Adding 900 to 925 vehicles per hour to the access road to H-2 southbound would bring total traffic on that roadway to about 1,500 vph. This is well below its estimated design capacity of 2,000 vph. However, it indicates potential traffic problems around the Meheula Parkway-Lanikuhana Avenue intersection. As a result, great care has been exercised in designing this intersection and the portion of Meheula Parkway leading up to it. Plans for this roadway have been approved by the City and County of Honolulu. It also makes vehicle movement in and out of the proposed town center a critical issue. Further, it hints at potential problems if traffic from development south of Mililani Town, e.g., Gentry-Waipio, clogs Kamehameha Highway and forces drivers from Mililani who now use that road to switch to the H-2 Freeway. Since such development has already been approved, this possibility bears some additional discussion.

Implications of the Proposed Gentry-Waipio Project

At present, Kipapa Bridge is the controlling factor on Kamehameha Highway below Mililani. Should the Gentry-Waipio development be completed as is now proposed, the intersections of Kamehameha Highway with the Gentry-Waipio access roads would have a capacity even less than that of the bridge. As a result, motorists who would otherwise take Kam Highway would probably seek alternative routes.

One possibility is that the Gentry-Waipio development might cause the proportion of Honolulu-bound commute trips from the proposed development made via H-2 to increase from 80 percent to 100 percent of the total, and that most of the residents of the existing portions of Mililani Town who now use Kamehameha Highway would switch to H-2. Similarly, more of the commuter trips that originate north of Mililani would probably be made via H-2. While the free-flow portions of the freeway appear able to accept this increase without serious effect, the Mililani Interchange and Mililani's internal road system (especially Meheula Parkway and Lanikuhana Avenue) would be strained.

According to the EIS prepared for the Gentry-Waipio project, it would generate 2,113 vehicle trips on Kamehameha Highway during the morning peak hour. The EIS cites a need to improve the portion of the highway below the proposed project, but offers no assurance that that would be done. The projected traffic from Gentry-Waipio vastly exceeds the estimated capacity of the existing roadway even if one assumes that no other traffic is on the highway. Even should the highway be upgraded to four lanes, signalization would still be required at the Gentry-Waipio/Kam Highway intersections. In order to accommodate the volume of traffic that the project would produce, the access roads would have to utilize essentially all of the available green time. Hence, the capacity of the through lanes on Kamehameha Highway would be reduced to a few hundred vehicles per hour.

The implications of this are obvious. Drivers from above Gentry-Waipio would seek alternative routes and/or change their departure times to avoid the congestion. Existing traffic on Kam Highway is sufficiently high that the Gentry project would probably necessitate a major shift in commuter-hour driving patterns even if no additional development is approved at Mililani Town. If the rezoning application is fully approved, the situation would be worse. With a total of almost 3,000 vehicles wanting to get out of Mililani Town during the peak a.m. hour in the southbound direction alone, and few, if any, of them able to use Kamehameha Highway because of the congestion

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caused by the Gentry-Waipio development, most of the commuters would attempt
to use H-2. Given the capacity limitations at the intersection of Meheula
Parkway and Lanikuhana Avenue and on the H-2 on-ramp, it does not appear
that they would succeed. Even assuming that a slight re-design of the
planned on-site roadway system (especially near the Lanikuhana-Meheula
intersection) eliminates bottlenecks there, the present 2,000 vph capacity
of the H-2 southbound on-ramp would be limiting. Clearly, some significant
adjustments are in order if Gentry-Waipio is built as planned.

Before closing this discussion of the potential impacts of the Gentry-Waipio
project, two other comments are in order. First, zoning approval for the
entire project has not yet been granted, and the possibility exists that the
proposal may never be fully implemented. To the extent that it is not,
traffic problems on Kamehamehame Highway would be lessened. Secondly, and
perhaps more realistically, the construction of an interchange on H-2 that
would serve the Gentry-Waipio development would eliminate the problem en­
tirely. While the State Department of Transportation has opposed the con­
struction of such an interchange in the past, a recent traffic study con­
ducted by Alan M. Voorhees and Associates, Inc. indicates that the benefit/
cost ratio for such an improvement would be 11.1:1. With such a favorable
ratio, there may be a possibility that the State will reverse its previous
stand. If this should occur, the interchange could be constructed in time
to alleviate the problem.

Changes In Traffic Resulting From the Proposed Commercial Development

As presently proposed, the Town Center area would contain a moderately-sized
community shopping center ultimately containing 250,000 to 350,000 square
feet of gross leasable floor area. At this time, not even conceptual de­
signs for the center have been prepared. Hence, our discussion of its
probable impact on traffic flow in and around Mililani Town must remain very
general.

Trip-generation rates for shopping centers reported by the Institute of
Transportation Engineers are reported in Table IV-14. Similar data has been
collected by the Arizona Department of Transportation and is summarized in
Figure IV-5. The two sources agree quite closely, and indicate that total
traffic from a 250,000 square foot gross floor area shopping center would be
about 12,000 vpd on weekdays and 20,000 vpd on Saturdays. If it should
approach the 350,000 square foot upper limit, traffic would probably average
about 15,000 vpd on weekdays and 27,000 vpd on Saturdays.

While no exact quantitative assessment of the proposed commercial center's
impact on traffic flow is possible at this time, it seems safe to say that a
facility of the size being proposed, i.e., 350,000 square feet of gross
leasable floor area, would cause additional problems in a situation which
might already be difficult. On the other hand, the 100,000 square feet
center that is being considered as a first phase could be accommodated
without difficulty, primarily because it would tend to intercept shopping
trips currently made from Mililani to other areas without attracting a
significant number of shoppers from elsewhere in the region.

The ITE data shown in Table IV-14 indicate that peak hour traffic volume
generated by a 350,000 square feet shopping center would be about 5 trips
per 1,000 square feet on a weekday and 11 trips per 1,000 square feet on a
Table IV-14  AVERAGE VEHICLE TRIP ENDS AT SHOPPING CENTERS

<table>
<thead>
<tr>
<th>Size of Center (Square feet of gross leasable floor area)</th>
<th>Trip Rate Per 1,000 ft. Gross Floor Area</th>
<th>No. of Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
<td>Maximum</td>
</tr>
<tr>
<td>200,000 to 299,999 Average Weekday</td>
<td>49.9</td>
<td>92.0</td>
</tr>
<tr>
<td>Peak Hour of Adjacent Street Traffic AM</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PM 4.8</td>
<td></td>
</tr>
<tr>
<td>Peak Hour of Generator AM</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PM 5.3</td>
<td></td>
</tr>
<tr>
<td>Average Saturday</td>
<td>82.7</td>
<td></td>
</tr>
<tr>
<td>Peak Hour of Generator AM</td>
<td>8.3</td>
<td></td>
</tr>
<tr>
<td>300,000 to 499,000 Average Weekday</td>
<td>40.4</td>
<td>58.4</td>
</tr>
<tr>
<td>Peak Hour of Adjacent Street Traffic AM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PM 5.2</td>
<td></td>
</tr>
<tr>
<td>Peak Hour of Generator AM</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PM 5.2</td>
<td></td>
</tr>
<tr>
<td>Average Saturday</td>
<td>78.9</td>
<td></td>
</tr>
<tr>
<td>Peak Hour of Adjacent Street Traffic AM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.8</td>
<td></td>
</tr>
</tbody>
</table>

Source: Institute of Transportation Engineers (1976).
SCATTER DIAGRAM OF DATA POINTS FOR SHOPPING CENTERS

TRIPS VS. 1000 GFA

OBSERVATIONS WITHIN PLOT = 141
OBSERVATIONS OUTSIDE OF PLOT = 2

SOURCE: ARIZONA DEPARTMENT OF TRANSPORTATION

Figure IV-5 Scatter Diagram of Data Points For Shopping Centers
weekend, i.e., 1,750 vph and 3,850 vph, respectively. The table also suggests that about as many cars are entering as are leaving during peak periods. Unfortunately, neither the ITE nor Arizona reports specify the exact time distribution of shopping center traffic. Moreover, they do not indicate what percentage of the shopping center trips are "stopovers" made during trips already counted among peak hour traffic. Hence, it is impossible to precisely estimate the peak traffic that would occur on roadways feeding the shopping center. Probably, a 350,000 square foot center would make p.m. peak hour traffic about 10 to 20 percent heavier than it would be without the shopping center, but no site specific data is available that would confirm this. More significantly, perhaps, if the volume of outgoing traffic it generated northbound on H-2 were substantial, it could significantly reduce the ability of the Mililani Interchange to accommodate vehicles leaving the freeway from the northbound lanes of H-2. In this respect, it is worth noting that a smaller center aimed almost entirely at the local Mililani market would generate far less northbound traffic than would a larger one drawing from the entire region.

Public Transit

Currently, MTL, Inc., furnishes both regular and express bus service for Mililani Town. The regular service (#52) follows Kamehameha Highway in both directions through the town. At present, five express runs, two to the Pearl Harbor area and three to the Downtown/University of Hawaii area (both a.m. and p.m.), utilize the spine road and secondary loop roads to service essentially all of Mililani Town at the peak commuter time periods. One of these proceeds down Kamehameha Highway southwest to the H-1 Freeway and downtown Honolulu. The other four runs loop back onto the H-2 Freeway for quicker, more direct service. The proposed project would undoubtedly increase ridership on these routes, but the extent of the increase is impossible to determine with any certainty. At the very least, it would be proportional to the increase in Mililani's population. More likely, ridership on the peak hour express buses would rise even more as a result of the projected increase in peak hour congestion and the presence of the reserved bus/carpool lanes on the H-2 Freeway. The low-density character of the development makes it unlikely that many of the town's residents would be relieved of their dependence upon the private automobile. But the presence of the high-density town-center area suggests that residents of that area may be able to undertake at least some of their shopping and recreational trips on foot.

SONIC

The construction and operation of the proposed expansion project at Mililani Town would increase noise levels in the area. For purposes of this analysis, the noise may be thought of as stemming from a number of related, but identifiably separate, sources:

- land clearing, site preparation, and construction of infrastructure;
- operation of on-site construction equipment and activities of construction workers;
operation of vehicles bringing workers and materials to the project site during the construction phase; and

operation of the completed project, i.e., the residential community of Mililani Town.

Since these general categories of activity are actually composites of many diverse sources of noise generation and are subject to variations over time, the discussion of them will deal with average conditions and most severe cases. The discussion focuses on two major issues. The first is the amount and distribution of noise that would be generated by the project. The second concerns the effects that this noise would have on people and animals that are exposed to it.

EXISTING AMBIENT SOUND LEVELS

Existing sound levels at Mililani Town are important to this discussion of sonic impacts for two reasons. First, they provide a baseline against which projected noise levels (i.e., those that would occur should the proposed development be implemented) can be judged. Second, because the types of units and activities in the proposed increment are quite similar to those already found at Mililani Town, measurements of existing noise levels there provide valuable insights into the noise levels that might result from the proposed project.

To provide the necessary information, sound level measurements were made in three different types of areas:

- existing agricultural areas within the boundaries of the proposed project;
- areas within the existing development where construction is still underway; and
- completed residential and commercial areas within the existing development that have community noise levels representative of the post-construction period.

The data used in the analysis was obtained between 3:00 p.m. and 4:30 p.m. on March 22, 1978 using the slow-response mode on a Bruel and Kjaer model 2219 sound meter. This meter meets standards for Type 2 sound meters contained in IEC 123 and NASI S.14-1971. The meter was calibrated both before and after the measurements were taken using a B and K Type 4230 acoustic sound level calibrator. Data was recorded manually at approximately 10 second intervals and represents the instantaneous value at each sampling time.

Agricultural Fields

Nearly all of the actual construction that the proposed project would entail would occur in areas where pineapple is now cultivated. Because of their
low, stiff foliage, pineapple plants themselves produce very little noise even on a windy day. Background dB(A) noise levels measured in the middle of the fields during our sampling were in the low 40's or below (see Table IV-15). Noise levels on the edge of the field closest to existing development were somewhat higher as a result of vehicular traffic on the bordering roadways. Higher noise levels do occasionally occur in the fields during routine cultivation and at harvesting, but these activities are relatively infrequent.

Construction Areas
Because of the type of structures that are being developed at Mililani and the absence of difficult soil or geological conditions, pile-drivers, jackhammers, and other types of exceptionally noisy construction equipment are not needed. As a result, the most intrusive noise sources in areas under development were found to be trucks; heavy construction equipment is only a close second.

As indicated in Table IV-15, noise levels were highest in areas where houses were being erected and finished. With an average reading of 70 dB(A) and a maximum instantaneous value of 80 dB(A), noise levels adjacent to this activity were significantly higher than the 65 dB(A) average and 75 dB(A) peak produced by the site clearance and grading operations at Unit 35. These results were somewhat surprising in view of the construction equipment noise levels that are most often cited in the literature (see Figure IV-6). At least part of the discrepancy can be explained by the fact that the averages for the site clearance and grading activities include some measurements taken when the moving equipment was more than 50 feet (the standard reference distance) from the meter. Nevertheless, it appears that the heavy equipment in use at Mililani is measurably quieter than the average. It should also be noted that the relatively high noise levels reported in the vicinity of the homebuilding are partly the result of light trucks moving about the area and passing within about 30 feet of the meter. Because of this, noise levels experienced by listeners would vary greatly depending upon their exact position with respect to access corridors and roads.

Residential and Commercial Areas
Residential areas at Mililani are relatively quiet, an indication of the success that the development has had in confining through vehicular traffic to major roads. The average sound levels recorded during our limited sampling in residential areas was 45 dB(A). The peak was about 50 dB(A) and, as expected, was produced by passing automobiles.

Ambient noise levels were also measured in the middle of the parking lot at the Mililani Shopping Center. Average sound levels at this location were about 55 dB(A). The highest readings were between 66 and 70 dB(A) and occurred only 6 percent of the time. They occurred when automobiles moving through the parking area passed close to the sound level meter.

PROJECT-RELATED CHANGES IN NOISE LEVELS

Areas Adjacent to the Proposed Increment
The proposed project involves the development of land that is now used only for pineapple cultivation. In the process, average ambient noise levels on the site would increase from their present low level to ones similar to
<table>
<thead>
<tr>
<th>Type of Land Use/Activity</th>
<th>dB(A) Range</th>
<th>Average dB(A)</th>
<th>Time of Day (P.M.)</th>
<th>Sampling Period (Sec.)</th>
<th>Distance from Activity (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential (Single-family units)</td>
<td>40-60</td>
<td>44</td>
<td>3:55</td>
<td>390</td>
<td>NA</td>
</tr>
<tr>
<td>Residential (Multi-family units)</td>
<td>40-60</td>
<td>45</td>
<td>3:40</td>
<td>370</td>
<td>NA</td>
</tr>
<tr>
<td>Commercial</td>
<td>45-70</td>
<td>55</td>
<td>3:25</td>
<td>320</td>
<td>NA</td>
</tr>
<tr>
<td>Mililani Shopping Center</td>
<td>56-75</td>
<td>65</td>
<td>3:10</td>
<td>410</td>
<td>50</td>
</tr>
<tr>
<td>Construction (Site Clearing Equipment)</td>
<td>56-75</td>
<td>65</td>
<td>3:10</td>
<td>410</td>
<td>50</td>
</tr>
<tr>
<td>Construction (House Construction)</td>
<td>45-80</td>
<td>70</td>
<td>3:00</td>
<td>500</td>
<td>50</td>
</tr>
<tr>
<td>Pineapple Fields</td>
<td>40-50</td>
<td>40</td>
<td>4:10</td>
<td>350</td>
<td>NA</td>
</tr>
</tbody>
</table>

1 Readings on the B and K sound level meter were taken approximately every 10 seconds.

Comment: Highest readings in many cases were caused by motor vehicles (commercial and/or passenger) passing near meter to or from site.

Source: Belt, Collins & Associates.
<table>
<thead>
<tr>
<th>Equipment Category</th>
<th>NOISE LEVEL (dBA) AT 50 FT.</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
<th>110</th>
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<tbody>
<tr>
<td>Compactors (Rollers)</td>
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<td></td>
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<tr>
<td>Front Loaders</td>
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<tr>
<td>Backhoes</td>
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<tr>
<td>Scrapers, Graders</td>
<td></td>
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<tr>
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<td>Trucks</td>
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<td>Concrete Mixers</td>
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<tr>
<td>Cranes (Movable)</td>
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<tr>
<td>Cranes (Derrick)</td>
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<td>Pumps</td>
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<td>H</td>
<td>H</td>
<td>H</td>
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<tr>
<td>Generators</td>
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<tr>
<td>Jackhammers and Rock Drills</td>
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<td>Pile Drivers (Peaks)</td>
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<td></td>
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<td></td>
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<tr>
<td>Other</td>
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<td></td>
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<tr>
<td>Vibrator</td>
<td></td>
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<tr>
<td>Saws</td>
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<td></td>
</tr>
</tbody>
</table>

NOTE: BASED ON LIMITED AVAILABLE DATA SAMPLES


BELT, COLLINS AND ASSOCIATES APRIL 1978

Figure IV-6  Construction Equipment and Noise Ranges
those now found in the already developed portions of Mililani Town, i.e.,
from an average of about 40 dB(A) to an average of about 45dB(A) in the
residential areas and 55dB(A) in the commercial areas. Somewhat higher
levels, probably on the order of a 65-70 dB(A) average, may occur imme-
diately adjacent to construction sites, but these would normally persist for
no more than a year in any one location. At the same time, of course,
construction noise that affects the portion of Mililani Town that is now
under development would cease.

The eastern side of the proposed project is adjacent to permanent open
space, and its northern side borders the H-2 Freeway. Hence, the only
existing development that might be directly affected by noise generated on
the project site is the Nob Hill Apartments to the south and the school and
residential areas on the far side of Meheula Parkway to the west.

Mililani High School and Units 3a, 3b, 12a, and 12b would be separated from
the proposed commercial, apartment, and residential areas by the parkway's
wide right-of-way. This buffer would reduce the impact on this area of even
the loudest construction noises likely to be produced on the project site to
70 dB(A) or less. Assuming source noise levels approximately equal to those
produced at the sites now being developed, average sound levels on the
sidewalks on the west side of Meheula Parkway attributable to onsite construc-
tion activities would be approximately 55 dB(A) or less. This is about the
same as is produced by automobile traffic on Meheula Parkway at the present
time. This noise level would decrease as the construction moved further
into the project site and away from the border areas.

The area most likely to be adversely affected by construction noise is the
Nob Hill Apartments. However, the closest of these is 200 feet to 500 feet
from the nearest potential apartment site in the proposed increment. This
distance would provide an attenuation of 10-15 dB, reducing average sound
levels produced by construction to 50-55 dB(A).

Areas Within the Proposed Increment
With a project of this size, it is obvious that there would be large varia-
tions in the sound levels within the area proposed for development. With the
exception of the proposed commercial/civic center and the town's increased
overall population, however, there is nothing in the proposal which suggests
the possibility of noise levels measurably different than those recorded in
the existing development. Since the major enduring noise source related to
the commercial center is almost certain to be the traffic it generates, it
is the areas adjacent to the roadways feeding into it that are likely to be
most affected.

Areas Adjacent to Major Roadways
Approximate noise levels for the areas adjacent to Meheula Parkway that
would be most affected by the project were projected using a model developed
by the National Highway Institute of the U.S. Department of Transportation
(1974). The model indicates that, during periods of peak traffic flow,
noise levels immediately adjacent to Meheula Parkway near the H-2 Freeway
would be about 60-65 dB(A), or about 5 to 7 dB(A) higher than they are at
present.
Other areas adjacent to roadways that would experience increased traffic as a result of the project would also have higher noise levels. No attempt was made to estimate the exact magnitude of the increases, but in no case would the resulting noise levels be as high as those cited above.

No residential units face directly onto a major roadway or arterial. Virtually all residential units bordering these roadways normally have wooden or cinderblock structures between their backyard and the noise source. This design feature serves to attenuate the noise generated on these arterial roadways.

ATMOSPHERIC SYSTEM

Introduction
On a theoretical level, it is apparent that the proposed project could have a multitude of effects on such factors as air circulation patterns, ground temperature, surface albedo, etc. With one exception, however, these changes would be of such an insignificant magnitude, or are so dependent upon specific building layouts and landscaping details that are not known at the present time, that they will not be dealt with here. The one exception is in the area of air quality, and the remainder of this section presents a rather detailed assessment of the potential air quality impact of the proposed project.

EXISTING AIR QUALITY

There are no ambient air quality sampling stations in the vicinity of Mililani Town. The nearest station operated by the State Department of Health is located in Pearl City, some six miles distant, and even it does not collect data on carbon monoxide concentrations. The only air quality sampling station in the entire state where carbon monoxide is continuously monitored is at the Department of Health building in downtown Honolulu.

On a statewide basis, the only pollutants that are monitored that are in excess of the State standards with any regularity are carbon monoxide, total suspended particulates, and sulfur oxides (Health, Department of, State of Hawaii, 1976). Total suspended particulate standards are violated at several of the Oahu stations, but the sulfur oxides standard is violated only in the vicinity of power plants.

With the exception of one occasion in 1973, the background levels of automotive pollutants have not been found to exceed Federal standards anywhere in Hawaii. This accounts for the fact that the U.S. Environmental Protection Agency has designated the State of Hawaii as Priority III with respect to automotive pollutants and Priority II with respect to total suspended particulates (U.S. Government, 40 CFR, Part 52). For the purposes of this study, a nominal 1 mg/m³ was taken as the background level of carbon monoxide. In the case of total suspended particulates, a background concentration of 30 μg/m³ was assumed based on State Department of Health data from its Waimanalo sampling station. It should be noted that present total suspended particulate concentrations on the project site almost certainly exceed this assumed background level on days when brisk winds and/or activity in the pineapple fields stirs up dust. If a higher value for

Chapter IV 53
existing total suspended particulate levels had been assumed, the relative change in concentrations between before-and after-project periods reported later in this section would have been reduced.

TRAFFIC PROJECTIONS

Because the most serious project-related effects on air quality would occur as a result of the increased traffic that it would generate, our analysis began with the traffic projections developed for this study. Because the number of units being proposed was reduced just as this report was about to be printed, the traffic projections used in assessing the probable air quality impact of the proposed project were slightly higher than those reported in the Circulation section of this report. The difference is a small one, however. Since the result is an overstatement of the probable air quality impact, and because correcting for the newer figures would have required recalculating all of the traffic assignments and pollutant concentrations, the earlier traffic projections were used. The regional analysis, which talks only in terms of total emissions, was corrected to reflect the change in the number of units being proposed.

For the purposes of this air quality impact assessment, three different traffic conditions during the a.m. peak hour were considered. Case I included only traffic generated by existing and already approved development. Case II added on the traffic that would be generated by the proposed development, and Case III simply rerouted traffic on the assumption that traffic from the Gentry-Waipio project would eventually produce so much congestion on Kamehameha Highway that most of the commuter traffic from Mililani Town would attempt to use the H-2 Freeway. The traffic assignments used in the analysis are shown in Appendix F.

For p.m. peak-hour traffic, only the Meheula Parkway-Lanikuhana Avenue intersection was analyzed, primarily because it appears to have the greatest potential for becoming overburdened. Because no detailed p.m. peak-hour traffic projections were available, the evening traffic was estimated by assuming that it would be of the same magnitude, but in the opposite direction from, the morning peak-hour traffic. Since the actual p.m. peak-hour volumes are known to be significantly below the a.m. peak, the analysis overstates the severity of the air quality impact in the evening.

In order to assess the regional impact of the proposed project, it was necessary to estimate the total annual vehicle miles travelled by residents of the expansion area. Data for the years 1974, 1975, and 1976 indicate that the average passenger car and light truck travels 8,129 miles per year (Transportation, Department of, State of Hawaii, 1977). With 3,452 units in the proposed development and an average of 1.9 vehicles per unit, the development would generate about $5.35 \times 10^7$ vehicle miles travelled per year. This value does not include trips of service vehicles attracted to Mililani by the presence of the additional people and commercial facilities. In calculating total emissions, an adjustment was made to account for this fact. Finally, it was assumed that 90 percent of the traffic generated consisted of light-duty vehicles and 10 percent light-duty trucks.
EMISSIONS

Localized 1985 composite emission factors were calculated for the project. These take into account average vehicle operating speed, local vehicle age distribution (Data Systems, Department of, City and County of Honolulu, 1976), and vehicle mix. The procedures used are the latest outlined by the U.S. Environmental Protection Agency (1977). The results of these calculations are tabulated in Table IV-16.

Table IV-16. 1985 EMISSION FACTORS

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Emission Factor (g/mi)</th>
<th>CO</th>
<th>HC</th>
<th>NOx</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDV</td>
<td>28.7</td>
<td>2.89</td>
<td>2.61</td>
<td></td>
</tr>
<tr>
<td>LDT</td>
<td>73.6</td>
<td>4.99</td>
<td>2.70</td>
<td></td>
</tr>
<tr>
<td>HDG</td>
<td>241.</td>
<td>14.8</td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td>HDD</td>
<td>24.4</td>
<td>6.03</td>
<td>20.2</td>
<td></td>
</tr>
<tr>
<td>LDV:LDT (90:10)</td>
<td>33.2</td>
<td>3.10</td>
<td>2.62</td>
<td></td>
</tr>
</tbody>
</table>

Source: Belt, Collins & Associates.

The regional impact of the proposed development in terms of air pollutant emissions was estimated by simply multiplying the estimated vehicle miles travelled by residents of the project by the appropriate emission factors and then increasing this by 10 percent to account for the contribution of the various service trips that would also be generated. The results of these computations are shown in Table IV-17.
Table IV-17. ESTIMATED 1985 MOBILE SOURCE EMISSIONS

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Without Project</th>
<th>With Project</th>
<th>Change</th>
<th>Percent of 1976 Oahu Emissions Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>3,470</td>
<td>5,600</td>
<td>+2,130</td>
<td>1.19</td>
</tr>
<tr>
<td>HC</td>
<td>320</td>
<td>530</td>
<td>+210</td>
<td>0.75</td>
</tr>
<tr>
<td>NOx</td>
<td>270</td>
<td>440</td>
<td>+170</td>
<td>1.07</td>
</tr>
</tbody>
</table>

Source: Belt, Collins & Associates.

IMPACT ON AMBIENT AIR QUALITY

Screening Analysis

Procedures outlined by the U.S. Environmental Protection Agency (1975) and Federal and State air quality standards (see Table IV-18), were used to assess the impact of the proposed project. The approach is designed to identify traffic conditions which may produce violations of air quality standards under adverse meteorological conditions (i.e., conditions which contribute to the build-up of pollutant levels). Carbon monoxide was the only pollutant considered because of its relatively inert character and its generally high rate of emission from motor vehicles. The assumed "worst case" meteorological conditions are 1 meter/second wind speed, stable atmospheric conditions (Pasquill-Gifford Stability Class D), and wind-road angles selected to produce the highest pollutant concentrations.

In this particular study, analyses were limited to major intersections since these were the critical points in terms of traffic congestion and high emission rates. An extensive intersection-by-intersection analysis was done for the a.m. peak-hour, since this was believed to represent the "worst case" both in terms of high traffic volumes and the probability of adverse meteorological conditions. Our analyses of p.m. peak-hour and commercial center impacts were not so extensive for the opposite reasons, as well as for the lack of detailed plans for the commercial center. In all cases, sidewalks along the streets involved were selected as the worst case receptor locations (the assumed locations were 5 meters from the nearest traffic lane). The intersection geometries are shown in Appendix F.

A.M. Peak-Hour The major intersections examined were the proposed junction of Lanikuhana Avenue and Meheula Parkway and the existing Kamehameha Highway...
<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Sampling Period</th>
<th>Federal Standards</th>
<th>State Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Primary (^a)</td>
<td>Secondary (^b)</td>
</tr>
<tr>
<td>1. Suspended Particulate Matter</td>
<td>Annual Geometric Mean</td>
<td>75</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Annual Arithmetic Mean</td>
<td></td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>Maximum Average in Any 24 Hours</td>
<td>260</td>
<td>150</td>
</tr>
<tr>
<td>2. Sulfur Dioxide</td>
<td>Annual Arithmetic Mean</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Maximum Average in Any 24 Hours</td>
<td>365</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Maximum Average in Any 3 Hours</td>
<td>1300</td>
<td>400</td>
</tr>
<tr>
<td>3. Carbon Monoxide</td>
<td>Maximum Average in Any 8 Hours</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>(Milligrams per cubic meter)</td>
<td>Maximum Average in Any 1 Hour</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>4. Hydrocarbons: Nonmethane</td>
<td>Maximum Average in Any 3 Hours</td>
<td>160</td>
<td>100</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Photochemical Oxidants</td>
<td>Maximum Average in Any 1 Hour</td>
<td>160</td>
<td>100</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Nitrogen Dioxide</td>
<td>Annual Arithmetic Mean</td>
<td>100</td>
<td>70</td>
</tr>
<tr>
<td>(micrograms per cubic meter)</td>
<td>Maximum Average in Any 24 Hours</td>
<td></td>
<td>150</td>
</tr>
</tbody>
</table>

\(^a\)Designed to prevent against adverse effects on public health.

\(^b\)Designed to prevent against adverse effects on public welfare including effects on comfort, visibility, vegetation, animals, aesthetic values, and soiling and deterioration of materials.
intersections of Lanikuhana Avenue, Meheula Parkway, and Kuahelani Avenue. The access ramp from Meheula onto H-2 southbound was also studied. In the case of the existing intersections, the current green-to-cycle ratios (G/Cy) for the traffic signals were used. For the Lanikuhana-Meheula junction, the G/Cy ratio and the traffic assignments were adjusted in order to balance the service levels on each leg of the intersection. Since traffic estimates did not include off-peak direction volumes, an assumption of 10 percent of the peak-direction service volume was used throughout. In all cases, the average downstream speed was assumed to be 20 miles per hour. The service levels and intersection balancing were determined according to methods outlined in the Highway Capacity Manual (National Academy of Sciences, 1965). The results of these analyses are summarized in Tables IV-19, IV-20, and IV-21.

P.M. Peak-Hour As previously noted, only the Meheula-Lanikuhana intersection was analyzed for its p.m. peak-hour impact. The results of this analysis are summarized in Table IV-22.

H-2 On-Ramp The Highway Capacity Manual states that, under ideal conditions, a short (less than 1,000 feet), single-lane freeway on-ramp can accommodate up to 2,000 vehicles per hour. The Mililani southbound on-ramp is well over 1,000 feet long, and is sufficiently wide (15 feet) that no side constraint exists. As a result, its capacity is believed to approximate the theoretical maximum. Furthermore, traffic on the ramp merges smoothly with through-traffic on the H-2 because it transitions into a third lane that begins just south of the interchange. In terms of capacity, the most limiting area is at the approach to the on-ramp where two lanes of approach traffic must merge into one lane in order to utilize the ramp. Based on the estimated traffic volume shown in Appendix F, 1-hour carbon monoxide estimates were calculated for a potential receptor site along the Meheula approach to the ramp. For Case II conditions (with the proposed project), the estimate was 14 mg/m$^3$. For Case III (the proposed project plus traffic from Gentry-Waipio), it was 30 mg/m$^3$. The high value was due to the queuing that would result from a volume/capacity ratio significantly greater than 1.0 on both the approach and the ramp itself.

Eight-Hour Concentrations In order to estimate the maximum 8-hour carbon monoxide concentrations at the major intersections, it was necessary to project average off-peak traffic volumes. This was done by reviewing traffic count data from access roads to the Seaview and Newtown developments. The review indicated that approximately 50 percent of the average daily traffic occurs during the peak 8-hour period and that the peak-hour is about 10 percent of average daily traffic. Using the peak-hour service volume for Mililani, it was possible to compute average daily traffic and average off-peak service volumes. Maximum 8-hour carbon monoxide concentrations were computed using these service volumes and a meteorological adjustment factor of 0.6 to account for the lack of persistence of the assumed worst-case wind and stability conditions. The results are summarized in Tables IV-23 and IV-24.
Table IV-19. A.M. PEAK-HOUR AIR QUALITY IMPACT: CASE I TRAFFIC CONDITIONS - 1985

<table>
<thead>
<tr>
<th>INTERSECTION</th>
<th>TOTAL 2-WAY VOLUME (vph)</th>
<th>G/Cy</th>
<th>SERVICE LEVEL</th>
<th>1-HOUR CO CONCENTRATION (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanikuhana @ Meheula (south leg)</td>
<td>389</td>
<td>.42</td>
<td>A</td>
<td>5.7</td>
</tr>
<tr>
<td>Meheula @ Lanikuhana (west leg)</td>
<td>198</td>
<td>.42</td>
<td>A</td>
<td>4.7</td>
</tr>
<tr>
<td>Lanikuhana @ Kam Hwy (west leg)</td>
<td>1078</td>
<td>.26</td>
<td>A</td>
<td>16.9</td>
</tr>
<tr>
<td>(east leg)</td>
<td>262</td>
<td>.26</td>
<td>A</td>
<td>5.6</td>
</tr>
<tr>
<td>Meheula @ Kam Hwy (west leg)</td>
<td>553</td>
<td>.26</td>
<td>A</td>
<td>8.6</td>
</tr>
<tr>
<td>(east leg)</td>
<td>208</td>
<td>.26</td>
<td>A</td>
<td>4.5</td>
</tr>
<tr>
<td>Kuahelani @ Kam Hwy (west leg)</td>
<td>236</td>
<td>.26</td>
<td>A</td>
<td>7.6</td>
</tr>
<tr>
<td>(east leg)</td>
<td>175</td>
<td>.26</td>
<td>A</td>
<td>5.3</td>
</tr>
</tbody>
</table>

Source: Belt, Collins & Associates.
Table IV-20. A.M. PEAK-HOUR AIR QUALITY IMPACT: CASE II TRAFFIC CONDITIONS - 1985

<table>
<thead>
<tr>
<th>INTERSECTION</th>
<th>TOTAL 2-WAY VOLUME (vph)</th>
<th>G/Cy</th>
<th>SERVICE LEVEL</th>
<th>1-HOUR CO CONCENTRATION (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanikuhana @ Meheula (south leg)</td>
<td>1022</td>
<td>.42</td>
<td>A</td>
<td>12.6</td>
</tr>
<tr>
<td>Meheula @ Lanikuhana (west leg)</td>
<td>412</td>
<td>.42</td>
<td>A</td>
<td>7.9</td>
</tr>
<tr>
<td>Lanikuhana @ Kam Hwy (west leg) (east leg)</td>
<td>1078</td>
<td>.26</td>
<td>A</td>
<td>16.9</td>
</tr>
<tr>
<td></td>
<td>739</td>
<td>.26</td>
<td>A</td>
<td>11.0</td>
</tr>
<tr>
<td>Meheula @ Kam Hwy (west leg) (east leg)</td>
<td>553</td>
<td>.26</td>
<td>A</td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td>317</td>
<td>.26</td>
<td>A</td>
<td>6.0</td>
</tr>
<tr>
<td>Kuahelani @ Kam Hwy (west leg) (east leg)</td>
<td>236</td>
<td>.26</td>
<td>A</td>
<td>7.6</td>
</tr>
<tr>
<td></td>
<td>175</td>
<td>.26</td>
<td>A</td>
<td>5.3</td>
</tr>
</tbody>
</table>

Source: Belt, Collins & Associates.
Table IV-21. A.M. PEAK-HOUR AIR QUALITY IMPACT: CASE III TRAFFIC CONDITIONS - 1985

<table>
<thead>
<tr>
<th>INTERSECTION</th>
<th>TOTAL 2-WAY VOLUME (vph)</th>
<th>G/Cy</th>
<th>SERVICE LEVEL</th>
<th>1-HOUR CO CONCENTRATION (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanikuhana @ Meheula (south leg)</td>
<td>1944</td>
<td>.42</td>
<td>F</td>
<td>21.9</td>
</tr>
<tr>
<td></td>
<td>*1446</td>
<td></td>
<td>E</td>
<td>16.6</td>
</tr>
<tr>
<td>Meheula @ Lanikuhana (west leg)</td>
<td>858</td>
<td>.42</td>
<td>A</td>
<td>14.2</td>
</tr>
<tr>
<td></td>
<td>*1355</td>
<td></td>
<td>E</td>
<td>20.6</td>
</tr>
<tr>
<td>Lanikuhana @ Kam Hwy (west leg)</td>
<td>1078</td>
<td>*.45</td>
<td>A</td>
<td>16.6</td>
</tr>
<tr>
<td></td>
<td>(east leg)</td>
<td>958</td>
<td>*.45</td>
<td>6.9</td>
</tr>
<tr>
<td>Meheula @ Kam Hwy (west leg)</td>
<td>553</td>
<td>.26</td>
<td>A</td>
<td>12.1</td>
</tr>
<tr>
<td></td>
<td>(east leg)</td>
<td>461</td>
<td>.26</td>
<td>3.7</td>
</tr>
<tr>
<td>Kuahelani @ Kam Hwy (west leg)</td>
<td>236</td>
<td>.26</td>
<td>A</td>
<td>7.6</td>
</tr>
<tr>
<td></td>
<td>(east leg)</td>
<td>214</td>
<td>.26</td>
<td>3.6</td>
</tr>
</tbody>
</table>

*Indicates traffic redistribution or change in G/Cy was necessary to "balance" level of service.

Source: Belt, Collins & Associates.
Table IV-22. P.M. PEAK-HOUR AIR QUALITY IMPACT: MEHEULA-LANIKUHANA INTERSECTION - 1985

<table>
<thead>
<tr>
<th>CASE</th>
<th>TOTAL 2-WAY VOLUME</th>
<th>LEFT TURN VOLUME</th>
<th>LEFT TURN G/Cy</th>
<th>SERVICE LEVEL</th>
<th>1-HOUR CO CONCENTRATION (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>578</td>
<td>354</td>
<td>.42</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>II</td>
<td>1434</td>
<td>929</td>
<td>.42</td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td>II (with 2 left turn lanes)</td>
<td>1434</td>
<td>929</td>
<td>.42</td>
<td>D</td>
<td>A</td>
</tr>
<tr>
<td>II (with less left turn traffic)</td>
<td>1434</td>
<td>217</td>
<td>.22</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>III</td>
<td>2801</td>
<td>1767</td>
<td>.42</td>
<td>F</td>
<td>A</td>
</tr>
</tbody>
</table>

Source: Belt, Collins & Associates.
### MAXIMUM 8-HOUR CARBON MONOXIDE CONCENTRATIONS WITHOUT THE PROJECT - 1985

<table>
<thead>
<tr>
<th>INTERSECTION</th>
<th>AVERAGE HOURLY TRAFFIC (vph)</th>
<th>8-HOUR CO CONCENTRATION (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanikuhana @ Meheula (south leg)</td>
<td>222</td>
<td>2.6</td>
</tr>
<tr>
<td>Meheula @ Lanikuhana (west leg)</td>
<td>113</td>
<td>1.7</td>
</tr>
<tr>
<td>Lanikuhana @ Kam Highway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West leg</td>
<td>614</td>
<td>6.0</td>
</tr>
<tr>
<td>East leg</td>
<td>149</td>
<td>2.3</td>
</tr>
<tr>
<td>Meheula @ Kam Highway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West leg</td>
<td>315</td>
<td>3.8</td>
</tr>
<tr>
<td>East leg</td>
<td>119</td>
<td>2.7</td>
</tr>
<tr>
<td>Kuahelani @ Kam Highway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West leg</td>
<td>135</td>
<td>2.2</td>
</tr>
<tr>
<td>East leg</td>
<td>100</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Source: Belt, Collins & Associates.
Table IV-24. MAXIMUM 8-HOUR CARBON MONOXIDE CONCENTRATIONS WITH THE PROJECT - 1985

<table>
<thead>
<tr>
<th>INTERSECTION</th>
<th>AVERAGE HOURLY TRAFFIC (vph)</th>
<th>8-HOUR CO CONCENTRATION (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanikuhana @ Meheula (south leg)</td>
<td>583</td>
<td>4.5</td>
</tr>
<tr>
<td>Meheula @ Lanikuhana (west leg)</td>
<td>235</td>
<td>2.2</td>
</tr>
<tr>
<td>Lanikuhana @ Kam Highway West leg</td>
<td>614</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>421</td>
<td>4.2</td>
</tr>
<tr>
<td>Meheula @ Kam Highway West leg</td>
<td>315</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td>181</td>
<td>2.7</td>
</tr>
<tr>
<td>Kuahelani @ Kam Highway West leg</td>
<td>135</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Source: Belt, Collins & Associates.
Construction Dust

Fugitive dust arising from construction can create serious short-term problems if left unabated. Studies by the U.S. Environmental Protection Agency have found that "medium" construction such as that involved in the development of shopping centers can emit up to 1.2 tons of particulates per month per acre assuming a moderate silt content in the soil (about 30 percent) and a semiarid climate (Thorntwaite, 1931). Naturally, day-to-day variations in the rate of emissions can be substantial. The same studies also indicate that twice-daily watering can reduce these emissions by up to 50 percent.

In order to get some idea of the order of magnitude of downwind total solid particulate concentrations per acre of construction for the proposed project, the above monthly emission rate was adjusted for use in a Gaussian diffusion equation (U.S. Environmental Protection Agency, 1970) by assuming an 8-hour workday, six days per week. Twelve and twenty-four hour concentrations were calculated at various distances under different wind conditions both with and without twice-daily watering. Neutral stability and a background concentration of 30 μg/m³ were assumed throughout. The results are summarized in Table IV-25.

CONCLUSIONS

As is evident from Table IV-17, it is anticipated that the proposed project would result in a 55 percent increase in emissions by motor vehicles owned by residents of Mililani Town. Based on the 1976 emissions inventory for the City and County of Honolulu, the increase amounts to approximately one percent of the present Oahu total. It would appear that this project on its own is not likely to cause a regional air pollution problem. While it might be viewed as causing an incremental decline in air quality, the same could be said of a similar development any place on the island.

A.M. Peak-Hour

Case I The results in Table IV-19 suggest that, without the project, the 1-hour carbon monoxide standard would be met at the most critical intersections in Mililani Town in 1985. The one possible exception would be the west leg of Lanikuhana Avenue at Kamehameha Highway; here the combination of relatively heavy right-turn traffic onto Kamehameha Highway, moderate left-turn traffic, and a low G/Cy ratio may result in high carbon monoxide levels under the worst-case assumptions. It should be kept in mind that the carbon monoxide concentrations reported here are for a receptor site close to the highway, i.e., 5 meters from the nearest traffic lane, and that the concentration drops-off rather sharply as one moves away from the highway. Since there are very few persons this close to the roadway during the morning rush hour, the concentrations likely to be experienced by a significant number of individuals are much lower.

Wind data from Wheeler Air Force Base indicates that the cumulative frequency of wind directions in the 0-3 kts class which would make the angles with Lanikuhana Avenue necessary to result in "worst case" conditions is .050. In other words, one would expect that under the stated traffic conditions a concentration of 16.9 mg/m³ might occur not more than 5% of the time. The situation is confounded, however, by the 50% frequency of calms
Table IV-25. ESTIMATES OF TOTAL SUSPENDED PARTICULATE CONCENTRATIONS DOWNWIND OF A ONE-ACRE CONSTRUCTION SITE

<table>
<thead>
<tr>
<th>WIND SPEED: 1 m/sec</th>
<th>TSP CONCENTRATION (ug/m³)</th>
<th>12-HOUR</th>
<th>24-HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>WITH TWICE DAILY WATERING</td>
<td>WITH NO WATERING</td>
</tr>
<tr>
<td>DOWNWIND DISTANCE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 m</td>
<td>800</td>
<td>1600</td>
<td>420</td>
</tr>
<tr>
<td>200 m</td>
<td>370</td>
<td>700</td>
<td>200</td>
</tr>
<tr>
<td>600 m</td>
<td>100</td>
<td>170</td>
<td>65</td>
</tr>
<tr>
<td>1 km</td>
<td>60</td>
<td>95</td>
<td>45</td>
</tr>
</tbody>
</table>

| WIND SPEED: 4 m/sec |                           |         |         |                     |                 |
|---------------------|---------------------------|---------|---------|
|                     |                           | WITH TWICE DAILY WATERING | WITH NO WATERING | WITH TWICE DAILY WATERING | WITH NO WATERING |
| 100 m               | 230                       | 420     | 130     | 230                 |
| 200 m               | 115                       | 200     | 70      | 115                 |
| 600 m               | 50                        | 65      | 40      | 50                  |
| 1 km                | 40                        | 45      | 35      | 40                  |

Background: 30 ug/m³
12-hr standard: 150 ug/m³ above background
24-hr standard: 100 ug/m³

Source: Belt, Collins & Associates.
during the early morning. For close-in receptors, i.e., at 5 meters, the high frequency of calms means that the probability of reaching the stated concentration may well exceed 50%. As before, values at more distant receptors would be sharply lower.

Case II The additional traffic generated by the proposed development could result in the 1-hour State carbon monoxide standard being exceeded at two more locations. Table IV-20 indicates that the south leg of the Lanikuhana-Meheula intersection, as well as the east and west legs of the Lanikuhana-Kam Highway junction, may experience elevated carbon monoxide levels. At the Lanikuhana-Kam intersection the reason is basically the same as in Case I, and the probability of occurrence is the same. The problem foreseen where Lanikuhana meets Meheula is the heavy right-turn movements toward the H-2 freeway. Despite the "free" right-turn from the right lane, some delays are expected, and this accounts for the higher carbon monoxide estimate. The probability of occurrence of 0-3 knots winds from the appropriate wind directions and speed at this location is 6%. Once again, however, the high frequency of calms must be considered for nearby receptors; thus, the probability may exceed 50%.

Case III In this case, the large diversion of traffic from Kam Highway to H-2 southbound due to congestion on Kamehameha Highway caused by traffic from the Gentry-Waipio project is reflected in high carbon monoxide concentrations (see Table IV-21), particularly around the Meheula-Lanikuhana intersection. Some voluntary rerouting by motorists could balance the service level at that intersection, but it is still expected to be undesirably congested, and carbon monoxide levels would remain high. Based on meteorological parameters alone, the probability of reaching the stated concentrations at nearby receptors could exceed 50%. A change in the G/Cy ratio could balance the service as the volume of through traffic increases at the Lanikuhana-Kam junction. The carbon monoxide level declines slightly due to the redistribution of through and right-turn traffic on the west leg. The east leg concentration drops because of the higher G/Cy ratio as well as the reduction in Kam Highway southbound traffic. The west leg of the Meheula-Kam intersection shows an increase in the carbon monoxide level, but this could be reduced simply by giving that leg more green time, i.e., by raising the G/Cy ratio.

H-2 Ramp (Southbound) Based on the traffic projections, it appears that during the a.m. peak-hour the approach to this ramp and the ramp itself will be approximately at capacity in Case II and well over capacity under Case III conditions. In both cases, carbon monoxide levels above the state standard are expected with a frequency over 50% for nearby receptors. If such conditions develop, adjustments to the roadway and/or traffic pattern may be necessary.

P.M. Peak-hour Table IV-22 displays the effects of homebound traffic on the Meheula-Lanikuhana intersection. The results suggest that, under Case III conditions, the high volume of left-turn traffic may exceed the capacity of this intersection and cause high carbon monoxide levels adjacent to it. The cumulative frequency of 0-3 kts winds necessary to cause the stated carbon monoxide levels is about 1 percent; thus, there is a low probability, based on meteorological parameters, of reaching those levels. A more probable wind speed
would be 8 kts which would reduce the stated concentrations by a factor of $\frac{4}{5}$. Thus, the concentrations in Table IV-22 would range from 2.5 to 9.9 mg/m$^3$. Since much of the congestion would be indirectly attributable to an overburdened Kamehameha highway in the Gentry-Waipio project area, any highway improvements in that area should lessen the burden on Mililani Town's access to H-2.

Dispersion of Pollutants
All of the estimated pollutant concentrations cited above are at a distance of only five meters from the nearest traffic lane. As has been indicated previously, the predicted concentrations drop sharply as one moves away from the roadway. To gain some appreciation of this effect, trial calculations were made to determine the distance at which concentrations would be at or below the State standard.

For the Lanikuhana-Meheula and Lanikuhana-Kamehameha Highway intersections, for example, the State 1-hour standard of 10 milligrams per cubic meter would be met at a distance of about 15 to 20 meters under Case III conditions. For Case II conditions, i.e., with the proposed project but ignoring potential changes in traffic patterns resulting from the Gentry-Waipio development, the standard would be met at a distance of about 7 or 8 meters.

The intersection likely to be most impacted by the project is the Lanikuhana-Meheula junction. Under Case III conditions, the air quality standards would not be met until a distance of about 40-45 meters. This would occur only in the p.m., however, and only on the relatively rare instances (less than 5 percent of the time) when "worst-case" meteorological conditions were present.

Commercial Center
The preceding sections have indicated that the Meheula-Lanikuhana intersection is very likely to experience heavy traffic volumes and high carbon monoxide concentrations during peak traffic hours. To the extent that traffic is generated by the proposed commercial/civic center during the evening rush hour, it could compound the problem, both in terms of traffic congestion and higher carbon monoxide levels. It appears that appropriate design could alleviate much of the problem except for the large volume of traffic expected to pass through intersection as a result of congestion at the Gentry-Waipio area of Kam Highway. Again, it is important to note that the meteorology is generally more favorable during the p.m. peak-hours; thus despite potentially high traffic volumes, the frequency of standards violations would be low.

8-Hour Air Quality Impact
With the exception of the west leg of the Lanikuhana-Kam Highway intersection, it appears that even under worst case meteorological assumptions, the state's 8-hour carbon monoxide standard of 5 mg/m$^3$ would not be exceeded at the major intersections studied. It should be mentioned, however, that, when the proposed commercial/civic center is completed, traffic levels at all of these intersections, and especially the Lanikuhana-Meheula junction, may increase. For those intersections in Table IV-24 that appear near to exceeding the 8-hour standard, this increase may be sufficient to raise nearby carbon monoxide concentrations to 5mg/m$^3$. While the frequency of days during which 1 m/sec winds will coincide with the peak 8-hour traffic hours is probably rather low, some such days will occur, and the standard, which is not to be exceeded at any time, may be violated.
Construction Dust
This analysis demonstrated the effects of twice-daily watering and wind speed on 12-hour and 24-hour total suspended particulate concentrations at various downwind distances. The results suggest that both the 12-hour and 24-hour standards could be exceeded out to about 600 meters with no watering. Most of the soils in this area are silty clays and thus contain 40 to 60 percent silt, which is well above the approximate 30 percent silt content inherent in the EPA emission factor used. This suggests the possibility of a higher emission rate and higher downwind concentrations. On the other hand, another inherent assumption is a semiarid climate, but the temperature-rainfall data for the Mililani area suggest a subhumid climate which would tend to reduce emission rates. Finally, as noted previously, there is a great deal of variability in the emission rate due to changes in the level of daily activity; thus, the emission rate could be much higher or lower than the average value used here. The point of this exercise was to indicate that state air quality standards can be exceeded relatively easily unless effective dust control measures are employed. Such control is particularly important during the summer months which weather records indicate are characterized by higher than average wind speeds and lower than average rainfall.
PROBABLE ENVIRONMENTAL EFFECTS Socio-Economic
CHAPTER V. SOCIO-ECONOMIC IMPACTS

INTRODUCTION

Thus far this EIS has focused on the physical impacts of the proposed action as it is described in Chapter I. The analysis now addresses the sociologic and economic factors which could be affected by a decision to rezone the subject property. Our discussion relies on the general background information presented in Chapter II to familiarize the reader with both the developer's and the public's goals. This chapter discusses the relationship of the project to:

- projected population growth and distribution
- the need for housing on Oahu
- employment
- fiscal demands/benefits to government
- socio-cultural goals of the State

These topics are reviewed as the project relates both to the community of Mililani and to Oahu generally.

HOUSING

DEMAND

This section addresses both the existing and projected demand for housing on Oahu. The existing demand is easier to quantify, using factors of current population (based on the latest census), average estimated family size, available housing stock, vacancy rates, adequacy of the existing housing stock, and cost of housing. In order to arrive at a well-founded demand projection, however, the above factors must be further supplemented by such variables as expected population change (either increase or decrease), changes in family size and structure, demolition of existing housing stock, and changes in economic conditions. These variables are never static, and the projections must be periodically adjusted to reflect changes in economic and social indicators. In an environment so susceptible to change as Hawaii, it is impossible to develop accurate long-term population projections based solely on the simple extension of past trends. Because the task is so complex, the numerous available forecasts of the State's population vary widely. Because it is essential, however, to adopt a uniform set of statistical data for the purposes of planning, this report uses the State of Hawaii, Department of Planning and Economic Development's (DPED) Revised
Population and Economic Projections: 1975-2000 (March 1, 1978) as its database. These projections have been designated by DPED as Series II-F, and are designed to refine and update the preceding Series E-2 of 1974. They incorporate the latest information on the number and distribution of inhabitants, fertility and mortality patterns, and migration trends, and are the official basis for all current planning by the State.

As indicated in Table V-1, Oahu's total resident population increased from 630,528 in April 1970 to 705,400 in July 1975, an average annual increase of 14,974 persons (2.2% compounded annually). Future population growth on Oahu will depend on the rate of natural increase (fertility-mortality rates), the in-migration of people from the mainland, and, to a lesser extent, the net arrival of immigrants from Asia and the Pacific. It should also be noted that the presence of a large military population adds to the uncertainties in forecasting population, since policy and budgetary considerations at the national level will affect the military population on Oahu. The latest estimates indicate that the Island's military population is 126,000 (including dependents), representing about 18% of Oahu's total population.

Table V-1. RESIDENT POPULATION ESTIMATES -- OAHU: APRIL 1970 - JULY 1990

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Resident Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970-April</td>
<td>630,528</td>
</tr>
<tr>
<td>1975-July</td>
<td>705,400</td>
</tr>
<tr>
<td>1980-July</td>
<td>753,700</td>
</tr>
<tr>
<td>1985-July</td>
<td>803,800</td>
</tr>
<tr>
<td>1990-July</td>
<td>845,000</td>
</tr>
</tbody>
</table>

5-Year Increase

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
<th>Avg. Annual Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970-April</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1975-July</td>
<td>74,872</td>
<td>+2.2</td>
</tr>
<tr>
<td>1980-July</td>
<td>48,300</td>
<td>+1.3</td>
</tr>
<tr>
<td>1985-July</td>
<td>50,100</td>
<td>+1.3</td>
</tr>
<tr>
<td>1990-July</td>
<td>41,200</td>
<td>+1.0</td>
</tr>
</tbody>
</table>

1Includes military personnel and their dependents; includes residents temporarily absent. Excludes visitors.

In order to determine future gross housing demand for Oahu, it was first necessary to estimate the number of households. To do this, the projected civilian population during the years 1980, 1985, and 1990 were divided by the estimated number of persons per household during the same years (see Table V-2).

As indicated in the table, the projected increase in the number of households is a function of changes in both the resident population and the average household size. Related to this latter factor, it should be noted that the figures shown in the column titled "Average Number of Persons Per Household" incorporate a great many unstated assumptions about such things as the average age at which persons marry, the age distribution of the population, the tendency of parents and children to establish separate households at an early age, and the cost of housing relative to disposable income. Hence, the "Households" figures shown are not absolute, but rather an estimate of what might occur under a given set of conditions. Typically, many persons continue to live as part of an extended family or to live with other, unrelated persons longer than they would choose to do so if they were not constrained by costs. This relationship between housing cost and demand is an extremely complex one; hence, while it is fundamental to a realistic consideration of the problem, limitations on the time and resources available for this study have made it necessary to deal with the cost/demand relationship in only a cursory and qualitative way.

Table V-2. HOUSING DEMAND--OAHU: 1980, 1985, 1990

<table>
<thead>
<tr>
<th>Year</th>
<th>Est. Pop</th>
<th>Average No. of Per./Household</th>
<th>Households</th>
<th>Additional Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>753,700</td>
<td>3.45</td>
<td>218,463</td>
<td>-</td>
</tr>
<tr>
<td>1985</td>
<td>803,800</td>
<td>3.23</td>
<td>248,854</td>
<td>30,391</td>
</tr>
<tr>
<td>1990</td>
<td>845,000</td>
<td>3.0</td>
<td>281,666</td>
<td>32,812</td>
</tr>
</tbody>
</table>

TOTAL HOUSEHOLD INCREASE (1980-1990) 63,203

Source: Population--State Department of Planning and Economic Development; Persons-per-household estimates--U.S. Department of Housing and Urban Development.

Based on the projections shown in the above table, it is estimated that a net annual average of 6,320 new units will be required each year between 1980 and 1990 to accommodate the projected increase in the number of households on Oahu. To determine gross housing demand, the additional factor of demolitions must be added. The Department of Planning and Economic Development's publication *Housing Supply and Demand in Hawaii, 1975*, indicates
that demolitions averaged 686 units per year over the years 1970-1975 (latest available figures). Assuming that this rate will continue, the projected housing demand on Oahu during the 1980 to 1990 period would be just over 7,000 units per year.

To check the accuracy of this estimates, it was compared with projections made in an earlier report entitled "Housing For Hawaii's People" (Daly and Associates, 1977) prepared for the Hawaii Housing Authority and the State Department of Planning and Economic Development. Tables III-5 and V-1 of that report indicate that Oahu would have an average housing supply requirement for the 1975-1985 period of about 6,000 units per year. (Note: this figure represents an estimate since no disaggregated, i.e., County-level, figures were given for some of the components.) This is reasonably close to the 7,000 unit per year estimate arrived at previously.

Estimating the way in which this overall demand would be distributed between different types of units is an even more ambitious undertaking than projecting the total number that will be required. On an island-wide basis, multi-family units have been capturing an increasingly large share of the total new housing market. Some of this is undoubtedly attributable to changes in household size and makeup that have occurred over the past decade. At the same time, a growing number of potential buyers of single-family units have found that sky-rocketing construction and development costs have forced the prices of single-family houses so high that they are unable to realize their preference for that type of home. The result of all this is that, island-wide, only 30 to 40 percent of the units sold in the 1970-75 period were single-family units. The remainder fell into the low-, medium-, and high-density multi-family category. In contrast, single-family sales at Mililani have been 57 percent of the total. Moreover, during 1976 and 1977, single-family units at Mililani outsold their multi-family counterparts by almost 2.5:1. Despite this high proportion of recent single-family sales, a glance at the figures given in Table I-3 shows that Mililani Town, Inc. is hoping that the market for multi-family units at Mililani will improve to the point where it will be possible to develop the Town Center as a relatively high-density core area for the town.

COST OF HOUSING

Income vs. Housing Costs on Oahu
As has been noted above, many Oahu families prefer single-family housing to any other type. However, their ability to convert their desires into purchases depends largely on the prevailing cost of the units that are available on the market. Due to the high and ever-increasing cost of housing, there exists a wide discrepancy between the potential demand and the effective demand. While the former is a function solely of the number of households, the latter largely depends on the distribution of family income and the relationship of this distribution to the selling prices of homes. Though total personal income in the City and County of Honolulu increased by
48% between 1970 and 1977 (D.P.E.D., 1977), this gain has been offset by inflation. Between 1970 and 1977, for example, average per capita personal income on Oahu rose by about 55 percent. During the same period, the consumer price index rose by slightly less than 50 percent, but the construction price index jumped by almost 85 percent.

The estimated annual family income distribution for Oahu and housing values which are affordable at those incomes are shown in Table V-3. The distribution of housing prices on Oahu in 1976 is shown in Tables V-4 and V-5. A comparison of the figures in Table V-3 with those in Table V-4 points to the seeming inability of the housing industry to provide housing units at prices affordable by a large segment of the population. For example, nearly 90% of the units completed in 1976 were priced over $50,000, whereas only 42% of the families had incomes enabling them to qualify for even the least expensive units in the over $50,000 price range. The same data suggests that fewer families, perhaps on the order of 25 to 30 percent, had incomes that would qualify them for the basic single-family home that was being marketed at Mililani at the time. Before continuing on to a more detailed consideration of these relationships, it must be noted that Table V-3 does not account for the substantial number of homebuyers on Oahu that make downpayments above the minimum required (either as a result of equity accumulated in their previous house or through other sources of funds). As a result, it tends to underestimate the percentage of families that can afford the higher priced housing.

Based on the above statistical data, it may be safely stated that there exists a considerable need for moderately priced housing units on the Island of Oahu. Taking into consideration the preference for low-density housing, especially by families with children, the construction of such units at moderate prices appears to be desirable. At the same time, it should be pointed out that housing demand is not limited to lower-priced units. On the contrary, in fact, the successful sales of single-family tract housing at Mililani and other developments on Oahu indicates that a substantial number of island residents are willing and able to pay more for high-quality, low-density homes.

Prices of Proposed Housing at Mililani
In order to satisfy the need for moderately priced housing in the preferred low- and medium-density configurations, as well as the continuing demand for the higher cost single-family units, Mililani Town, Inc., is planning to provide many different kinds of homes within the proposed 476-acre development. Table V-6 presents the proposed housing types and their pricing structure in 1977 constant dollars. The exact mix of unit types will vary according to demand.
Table V-3. HONOLULU SMSA ESTIMATED 1976 FAMILY INCOME DISTRIBUTION AND QUALIFYING HOUSE PURCHASE PRICE

<table>
<thead>
<tr>
<th>Family Income Range</th>
<th>Percent of Families</th>
<th>Cumulative Percent</th>
<th>Qualifying House Purchase Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $5,000</td>
<td>7</td>
<td>7</td>
<td>$12,500</td>
</tr>
<tr>
<td>$5,000 - $9,999</td>
<td>15</td>
<td>22</td>
<td>$12,500 - $24,999</td>
</tr>
<tr>
<td>10,000 - 12,499</td>
<td>9</td>
<td>31</td>
<td>25,000 - 31,249</td>
</tr>
<tr>
<td>12,500 - 14,999</td>
<td>9</td>
<td>40</td>
<td>31,250 - 37,499</td>
</tr>
<tr>
<td>15,000 - 17,499</td>
<td>10</td>
<td>50</td>
<td>37,500 - 43,749</td>
</tr>
<tr>
<td>17,500 - 19,999</td>
<td>8</td>
<td>58</td>
<td>43,750 - 49,999</td>
</tr>
<tr>
<td>20,000 - 22,499</td>
<td>7</td>
<td>65</td>
<td>50,000 - 56,249</td>
</tr>
<tr>
<td>22,500 - 24,999</td>
<td>6</td>
<td>71</td>
<td>56,250 - 62,499</td>
</tr>
<tr>
<td>25,000 - 29,999</td>
<td>10</td>
<td>81</td>
<td>62,500 - 74,999</td>
</tr>
<tr>
<td>30,000 - 34,999</td>
<td>8</td>
<td>89</td>
<td>75,000 - 87,499</td>
</tr>
<tr>
<td>$35,000 or more</td>
<td>11</td>
<td>100</td>
<td>$87,500 And Up</td>
</tr>
</tbody>
</table>

1Based on 2.5 times income and a minimum down-payment (i.e., 20 percent). A larger down-payment makes it possible for a family to qualify for a higher-priced home.

Table V-4. DELIVERIES OF NEW HOUSING UNITS ON OAHU BY PRICE RANGE: 1976

<table>
<thead>
<tr>
<th>Price Range</th>
<th>Number Total</th>
<th>Leasehold</th>
<th>Simple</th>
<th>Percent Leasehold</th>
<th>Fee Simple</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5,654</td>
<td>4,299</td>
<td>1,355</td>
<td>100</td>
<td>100</td>
<td>100.0</td>
</tr>
<tr>
<td>Under $25,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$25,000 - $29,999</td>
<td>34</td>
<td>-</td>
<td>34</td>
<td>-</td>
<td>2.5</td>
<td>0.6</td>
</tr>
<tr>
<td>30,000 - 34,999</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>35,000 - 39,999</td>
<td>306</td>
<td>210</td>
<td>96</td>
<td>4.9</td>
<td>7.1</td>
<td>5.4</td>
</tr>
<tr>
<td>40,000 - 44,999</td>
<td>247</td>
<td>214</td>
<td>33</td>
<td>5.0</td>
<td>2.4</td>
<td>4.4</td>
</tr>
<tr>
<td>45,000 - 49,999</td>
<td>450</td>
<td>416</td>
<td>34</td>
<td>9.7</td>
<td>2.5</td>
<td>8.0</td>
</tr>
<tr>
<td>50,000 - 59,999</td>
<td>1,473</td>
<td>1,382</td>
<td>91</td>
<td>32.1</td>
<td>6.7</td>
<td>26.1</td>
</tr>
<tr>
<td>60,000 - 69,999</td>
<td>1,303</td>
<td>1,048</td>
<td>255</td>
<td>24.3</td>
<td>18.9</td>
<td>23.0</td>
</tr>
<tr>
<td>70,000 - 99,999</td>
<td>1,563</td>
<td>837</td>
<td>726</td>
<td>19.5</td>
<td>53.6</td>
<td>27.6</td>
</tr>
<tr>
<td>$100,000 and over</td>
<td>278</td>
<td>192</td>
<td>86</td>
<td>4.5</td>
<td>6.3</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Source: U.S. Department of Housing and Urban Development
Table V-5 NEW HOUSING UNITS COMPLETED ON OAHU BY TYPE OF UNIT AND LAND OWNERSHIP: 1976

<table>
<thead>
<tr>
<th>Price</th>
<th>Ownership</th>
<th>Number</th>
<th>Units in Price Range By Type</th>
<th>Total No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Single-Family Attached</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detached</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Multi-Family</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Less than $50,000</td>
<td>Lease</td>
<td>853</td>
<td>80.6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Fee</td>
<td>205</td>
<td>19.4</td>
<td>118</td>
<td>11.2</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>1,058</td>
<td>100.0</td>
<td>118</td>
<td>11.2</td>
</tr>
<tr>
<td>$50,000 or more</td>
<td>Lease</td>
<td>3,446</td>
<td>75.0</td>
<td>156</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>Fee</td>
<td>1,150</td>
<td>25.0</td>
<td>130</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>4,596</td>
<td>100.0</td>
<td>286</td>
<td>6.2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>Lease</td>
<td>4,299</td>
<td>76.0</td>
<td>156</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>Fee</td>
<td>1,355</td>
<td>24.0</td>
<td>248</td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>5,654</td>
<td>100.0</td>
<td>404</td>
<td>7.2</td>
</tr>
</tbody>
</table>

Source: U. S. Department of Housing and Urban Development

Table V-6. PROPOSED HOUSING TYPES AND PRICES ON THE PROJECT SITE

<table>
<thead>
<tr>
<th>Housing Type</th>
<th>Approximate No. of Units</th>
<th>Projected Price Range</th>
<th>Estimated Average Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential (R-6)</td>
<td>1,100</td>
<td>$73,000 - 105,000</td>
<td>$86,000</td>
</tr>
<tr>
<td>Single Family Detached</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zero Lot Line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duplex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-Family</td>
<td>1,275</td>
<td>$47,000 - 72,000</td>
<td>59,000</td>
</tr>
<tr>
<td>A-1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Townhouses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patio Homes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-3 Story Walkup</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apartment (Town Center)</td>
<td>1,075</td>
<td>$55,000 - 90,000</td>
<td>$75,000</td>
</tr>
</tbody>
</table>

1 In 1978 constant dollars.
OTHER HOUSING PROJECTS ON OAHU

Mililani Town has never been conceived of as a proper place for very high-density housing. The densest area built there to date, the Nahoa Apartment site, has about 23 units per acre. Even the apartment area proposed for the Town Center as part of this project would have an average density of only 25-35 units per acre as compared to the 70 to 100+ units per acre densities found in apartment buildings that have been built adjacent to such areas as Pearlridge and Kahala Mall. Because of this, and because land already zoned for high-density apartments is both abundant and controlled by a large number of different owners, it is extremely difficult to accurately predict the future rate of construction for such units. As a result, our review of other major housing projects on Oahu is limited to those having low and medium densities. Figure V-1 indicates the general location of these major projects.

Table V-7 indicates that large developers would build no more than 1,700 new low- and medium-density housing units per year between 1978 and 1982. Given the problems that several of these potential developments face in obtaining financing and necessary government approvals, the actual number is likely to be closer to 1,200 units per year. Assuming that individuals and small developers may contribute another 500 units per year, it is apparent that from three-quarters to two-thirds of the projected demand for new residential units would have to be met by relatively high-density multi-family units if the proposed expansion were not approved. The situation with respect to single-family detached homes would be even worse.

PROJECT-RELATED EMPLOYMENT, INCOME, AND BUSINESS SALES

Introduction

As shown in Table V-1, State and County population projections for Oahu indicate that the number of people on the island will continue to rise over the next ten years. At the same time, the trend towards smaller households is expected to continue. Together, these two forces will generate a strong demand for new housing. To the extent that this demand is met, the result will be continued employment in construction and related fields. In one sense, it would be unfair to claim that the proposed project is generating this employment since the same jobs would be created if the island's housing needs were met by some other project in a different location. On the other hand, not many organizations in Hawaii are capable of successfully implementing a development program on the scale of Mililani's. Due to the insufficient quantities of appropriately zoned land now in the hands of developers having access to the necessary financing, it is almost certain that other developers would find it impossible to accelerate their construction rates sufficiently to completely fill the gap that would result should the present rezoning request be denied and Mililani Town, Inc., cease its operations. Because of this, it seems reasonable to give the proposed project at least partial credit for the construction employment that it would generate.

Employment generation projections for the proposed expansion at Mililani Town must examine both the short-term construction phase and the longer-term operational phase of the completed project. The two phases can be distinguished in that construction of the proposed project would involve only a slight increase over the current level of construction activity at Mililani,
Figure V-1  Major Current and Proposed Housing Projects on Oahu
Table V-7. OTHER MAJOR LOW-DENSITY HOUSING PROJECTS ON OAHU

<table>
<thead>
<tr>
<th>Name of Project</th>
<th>Units Types</th>
<th>Planned Delivery Rate Per Year</th>
<th>Total Units 1979-1982</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makakilo</td>
<td>Garden Apt. Single-family Townhouse</td>
<td>300</td>
<td>1,200</td>
</tr>
<tr>
<td>Gentry-Waipio</td>
<td>Single-family Townhouse</td>
<td>400</td>
<td>1,600</td>
</tr>
<tr>
<td>Village Park</td>
<td>Single-family Townhouse</td>
<td>400</td>
<td>1,600</td>
</tr>
<tr>
<td>Kahuku</td>
<td>Single-family</td>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>Paalaakai</td>
<td>Duplex Single-family</td>
<td>150</td>
<td>300</td>
</tr>
<tr>
<td>Puu Alii</td>
<td>Townhouse</td>
<td>100</td>
<td>400</td>
</tr>
<tr>
<td>Hokuloa</td>
<td>Townhouse</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>New Town</td>
<td>Single-family</td>
<td>200</td>
<td>600</td>
</tr>
<tr>
<td>Parkway</td>
<td>Townhouse</td>
<td>150</td>
<td>300</td>
</tr>
<tr>
<td>Hawaii Loa Ridge</td>
<td>Lots Only</td>
<td>75</td>
<td>300</td>
</tr>
</tbody>
</table>

TOTAL = 6,675

Average No. of Units Per Year = ~1,700

Source: Belt, Collins & Associates.
whereas the employment resulting from the day-to-day operation of the completed development is entirely new. However, with respect to this latter item it should be noted that, although the estimated resident population increase at Mililani would create an additional demand for goods and services, it is not anticipated that this 476-acre project would serve as a major regional employment center. Moreover, the project itself would serve, not generate, the projected resident population. Hence, it is likely that most, if not all, of the permanent employment associated with it would occur regardless of whether or not this particular project is implemented.

Fluctuations in the housing market and the uncertainty involved in predicting economic conditions four or five years hence necessitate approximate projections in the area of employment income, particularly when addressing the operational phase.

CONSTRUCTION PHASE

Job-Generation Since the proposed project would result in a only a modest increase in the rate of construction at Mililani, present construction-related employment figures were used as a basis for determining future employment levels. Mililani Town, Inc. (MTI), is and would continue to be, the largest single employer involved in the project. MTI maintains an in-house staff of about 110 employees. These direct the activity of a General Contractor and 17-19 subcontractors involving an additional 465 workers. Table V-8 tabulates the various job categories and lists approximately 690 jobs directly or indirectly related to future employment potential at Mililani Town. Considering that in 1976, 28% of all low-density residential tract housing units constructed on Oahu were at Mililani, the employment opportunity provided there represents jobs for a significant portion of the construction-related work force in this segment of the industry. Approval of the residential portion of this project would insure the maintenance of this construction level until at least 1982. In addition, construction of the first phase of the commercial and civic facilities proposed for the town center would generate approximately 60 person-year of construction employment.

Income Generation The incomes generated by the various jobs created by the project range from an average $8,000 to $10,000 per year for secretarial and clerical personnel to an average of $30,000 to $50,000 for top real estate salespersons and a few corporation executives. Construction workers' annual salaries range from the top salary of a journeyman carpenter making $21,000 to $25,000 with overtime but excluding benefits, to a laborer making $10,000 to $12,000 excluding benefits. The average salary for construction industry workers according to the Construction Industry Legislative Organization, Inc. (1978) is $15,740. Six hundred ninety jobs would thus produce approximately $11 million in income. Since the construction phase would be continuous for about four years (1979-1982), this income generation would be repeated annually for the duration of this phase. When the proposed commercial/civic center is taken into account, this would amount to almost $50 million in wages directly generated by the construction activity. When multiplier effects are considered, the total effect on the Oahu economy would, of course, be much greater.
Table V-8. EMPLOYMENT GENERATED BY MILILANI TOWN PROJECT (CONSTRUCTION PHASE)

<table>
<thead>
<tr>
<th>Source of Employment</th>
<th>Personnel</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mililani Town, Inc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admin./Mgt.</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Accounting</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Carpenters &amp; Laborers</td>
<td>52±</td>
<td>110±</td>
</tr>
<tr>
<td>General &amp; Subcontractors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct (construction workers)</td>
<td>350±</td>
<td></td>
</tr>
<tr>
<td>Indirect (support staff)</td>
<td>115±</td>
<td>465±</td>
</tr>
<tr>
<td>Other Direct Suppliers</td>
<td>115±</td>
<td>115±</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>110±</td>
<td>465±</td>
</tr>
</tbody>
</table>

Source: Mililani Town, Inc.

Source of Employees: Construction at Mililani has been more or less continuous for more than 10 years. There is some worker turnover, of course, but because nearly all the construction has been done by the same contractor and subcontractors, the project offers relatively steady employment. There is no reason to expect this to change should the project be approved.

Business Sales: In 1977 the sale of new homes at Mililani Town generated 43.2 million dollars in sales volume. The expansion project proposes to construct about 3,400 additional housing units (see Table I-3). Using 1978 dollars and average 1978 selling prices for single-family and multifamily units (see Table V-9), this project would generate approximately 250 million dollars in housing sales. The sale or lease of commercial facilities would increase that figure.

Table V-9. PROJECTED RESIDENTIAL SALES VOLUME FOR THE PROPOSED PROJECT

<table>
<thead>
<tr>
<th>Zoning</th>
<th>No. of Units</th>
<th>Average Price (in $)</th>
<th>Sales Value (in $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-6</td>
<td>1,092</td>
<td>86,000</td>
<td>94,000,000</td>
</tr>
<tr>
<td>A-1/A-2</td>
<td>1,280</td>
<td>59,000</td>
<td>75,500,000</td>
</tr>
<tr>
<td>Town Center</td>
<td>1,080¹</td>
<td>75,000</td>
<td>81,000,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>3,452</td>
<td></td>
<td>250,000,000</td>
</tr>
</tbody>
</table>

¹This is for the ultimate development of the Town Center. It is estimated that only about 20 percent of this would be completed by 1982.

Source: Mililani Town, Inc.
During the construction phase, some portion of the estimated 50 million dollars in income generated by project-related employment would be available for retail purchases. According to The Economy of Hawaii (DPED, 1977), 42% of that income is expended on retail purchases. Using this figure, retail sales would be directly increased by about $21 million over this period. The multiplier effect would bring the total impact of construction wages on retail sales on Oahu to about $36 million.

OPERATIONAL PHASE

This project is designed primarily as a residential community rather than as an employment or business center. Nonetheless, some employment and sales revenue would occur through community support facilities. Table V-10 illustrates some of the more predictable employment opportunities that would occur. Using HUD projections of 1985 median income prepared by the U.S. Department of Housing and Urban Development, it is estimated that this would generate about 3 million dollars of income annually (HUD, 1978).

During the operational phase of the project, business sales would be generated primarily through the retail activity of the shopping center. On the basis of experience at similar shopping complexes, it is estimated that gross annual sales at the proposed shopping center would be on the order of $135 per square foot. Hence, the 100,000 square foot first phase of the commercial center should generate about $14,000,000 per year in retail sales.

### Table V-10. EMPLOYMENT GENERATED BY MILILANI TOWN PROJECT (OPERATIONAL PHASE)

<table>
<thead>
<tr>
<th>Source of Employment</th>
<th>Personnel</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mililani Town, Inc.¹</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Property Management</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Commercial Center²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Police Force</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>Mililani Town Association¹</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>Other Utilities &amp; Public Services³</td>
<td>9</td>
<td>126</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>143</strong></td>
<td></td>
</tr>
</tbody>
</table>

¹Based upon estimated population increases and proportionate increases in support activities.

²Based on an average shopping center mix in 100,000 square feet gross leaseable area. This could increase by 3 to 3-1/2 times if the center expands to 300,000 to 350,000 square feet of gross leaseable area.

³Approximation of refuse collection, medical, sewage treatment, transportation services that would be needed.
PUBLIC BENEFIT/COST

The question of "benefits" and "costs" incurred by the State and County governments as a result of a project such as is proposed for Mililani must be related to the broader issue of existing and projected housing needs on Oahu. Considering that the demand for new residential units on the Island is well-documented, and that it is not expected to subside during the foreseeable future, the public costs and benefits generated by the fulfillment of this need may be best understood in terms of particular merits that can be credited to a specific development. It is important to consider, therefore, how efficiently in terms of the expenditure of public funds each project adds to the improvement of the housing situation on Oahu. The complexity of the problem and the limited resources available for this EIS made it impossible to conduct a rigorous benefit/cost analysis for each of the many projects on the market. Because of this, only a few brief and admittedly qualitative comments are in order.

Because the proposed development at Mililani is not a new project, but rather an expansion of an existing community, the initial capital improvement costs, as well as the need for increased operational expenditures, would be substantially lower than in the case of a totally new development. There would be no need, for instance, to invest in an entirely new system of roads, sewers, and water supply facilities. Instead, only an extension and/or modification of the already existing systems would be required. Similarly, many of the public services, such as schools and fire protection, are already in existence at Mililani. Moreover, the physical characteristics of the Mililani site make it comparatively inexpensive to provide and maintain the facilities needed to serve the resident population.

About the only public fiscal (as opposed to non-monetary) costs that would be higher for development at Mililani than for a similar project some place else on Oahu are those related to maintenance of the regional transportation system. On the other hand, economies of scale mean that many of the necessary facilities and services can be provided more efficiently there.

SOCIO-CULTURAL IMPACTS

The proposed expansion of Mililani Town would do more than merely enlarge the existing community. By providing civic and commercial facilities and services now absent, it would probably alter its essential character. Mililani would become a more vital community. The primary force behind this projected change is the development of a Town Center containing a shopping complex, civic amenities, a district park, and medium-density apartments. The Town Center, an important design feature of the long-range master plan, would significantly impact not only new residents within the project site, but the entire existing community at Mililani Town as well.

Chapter V
ALTERNATIVES TO THE PROPOSED ACTION
CHAPTER VI. ALTERNATIVES TO THE PROPOSED ACTION

INTRODUCTION

Sub-Part E, Section 1:41.g. of the Environmental Quality Commission's Environmental Statement Regulations requires that: "Any known alternatives for the action which could feasibly attain the objectives of the action—even though more costly—shall be described and explained as to why they were rejected."

The intent of this requirement is fairly clear insofar as projects initiated by public agencies are concerned. In contrast, its implications for projects initiated by private groups such as Mililani Town, Inc., are rather vague. Hence before formulating alternatives to the proposed project, it is first necessary to define two key phrases: "objectives of the action" and "feasibly attain."

As was pointed out near the beginning of this report, the proposed project has a number of "objectives". Realistically, the most important of these is that it contribute to the profitability of Mililani Town, Inc., and its parent companies, Castle and Cooke, Inc., and Oceanic Properties, but the other considerations and forces mentioned in Chapter I are also at work. These, then, are the "objectives" towards which the proposed project is aimed, and, to constitute a real alternative, another course of action must have a reasonable chance of obtaining similar results. The term "feasible" means practicable or capable of being successfully brought about. While an "objective" may be any desired end or result, a "feasible objective" is one which is not only desirable, but reasonably capable of achievement as well.

ALTERNATIVES SELECTED FOR EVALUATION

Given the constraints identified above, our analysis indicates that there are four basic alternatives to the proposed project that deserve to be discussed:

- No project, i.e., continued use of the land for pineapple cultivation or for other agricultural purposes.
- Recreational use—purchase of the property by the Federal, State or local government and its development for recreational use.
- Alternative forms of urban development—residential, mixed (different mix than currently proposed), commercial, industrial and institutional.
- Bulk sale of the property to another owner.

NO PROJECT

Considering that pineapple cultivation, for which much of the proposed development site is currently utilized, falls within a broader definition of
agricultural uses, the "no project" alternative will address the possible continuation of the present land use in two configurations:

1. continuation of use for pineapple cultivation; and
2. changing to an alternate crop or crops.

Removing this land from cultivation and allowing it to lay fallow cannot be considered as either an economically feasible or socially desirable alternative, especially if Oahu's limited land resources are taken into account. The following discussion will concentrate therefore, on the two alternatives enumerated above.

Pineapple Cultivation

As approximately 380 of the 476-acres of the parcel proposed for rezoning are classified by the State Department of Agriculture as either "unique" or "prime" agricultural land (Figure VI-1), it should be safe to assume that from a purely physical perspective, the continued cultivation of some crop or crops is a feasible alternative to the proposed development on this site. Because pineapple has been cultivated very successfully on this land for many years, its suitability for high-yield cultivation of this crop is well documented. In fact, Central Oahu is ideally suited for the cultivation of pineapple due to its climate, good soils, and gentle terrain. If, therefore, the only consideration in deciding the best use of this land was its physical capability, then continued cultivation of pineapple would appear to be appropriate.

Added to the physical aspects, however, must be economic considerations. Dole's present production schedule calls for the planting of about 1,325 net acres of pineapple per year at its Wahiawa Plantation. While the planting cycle on most of the Central Oahu fields cultivated by Del Monte, the other major pineapple grower on the island, is 3 to 3-1/2 years, Dole's bromelain-recovery operation requires that its plants be left in the ground for a considerable length of time after the ratoon crop is harvested. As a result of this and other factors, Dole's planting cycle is planned for about 3.8 years per crop. Hence, to maintain their production goal, they must maintain about 5,035 net acres in pineapple (3.8 years x 1,325 acres per year). Since Dole currently controls about 5,430 net acres, it has almost 400 acres more than its estimated requirements. [It should be noted, however, that this does not mean that 400 acres of Dole's Central Oahu land is lying fallow. Instead, it is a reflection of the fact that the relative abundance of land has resulted in the operation becoming somewhat less efficient with respect to land utilization than would be the case if less acreage were available. As a result, the average planting cycle for the plantation now stands at just over four years. To make up for the land that would be lost as a result of the proposed development, the average planting cycle would have to be brought somewhat closer to its planned level.]

From the above, it appears that continued pineapple cultivation on all of Dole's Central Oahu land is not necessary to meet its present production target. However, it does not necessarily follow that other pineapple growers could not make profitable use of more land or that future changes in the market for fresh pineapple might not make Dole want to increase its own production of the fruit. Because of this, it is necessary to take a somewhat broader look at the question than has been done up to this point.
As indicated above, Dole has more than enough acreage available to meet its present production requirement. Del Monte, the island's other major grower is not as fortunate as Dole with respect to land holdings and has been tentatively looking for additional acreage. A continued increase in demand for fresh pineapple could send both into the market for additional land. Because of this, it is reasonable to ask whether or not the proposed conversion of about 325 net acres of pineapple land to urban use would constrain future pineapple production on Oahu.

Many of the Central Oahu fields now being used to grow sugarcane are suitable for both sugar and pineapple. Historically, the growers have responded to changes in the relative price of the two crops by switching from one to the other. The major cutback in pineapple cultivation on Oahu that occurred during the late-60's and early-70's was followed by a significant expansion of the area cultivated by the sugar companies. The present low sugar prices mean that sugar production is, at best, only marginally profitable on much of the unirrigated sugar land formerly planted to pineapple. Assuming the cooperation of the landowners, it would be a simple matter to switch several thousand of these acres back into pineapple. Representatives of the sugar industry have indicated that a modest reduction in sugar acreage would not adversely affect their operation at current sugar price levels. Hence, while pineapple cultivation is probably a feasible alternative for the project site, from the point of view of agricultural productivity (in an economic sense), it does not appear to be necessary.

Changing to Alternate Crop or Crops According to a report entitled Central Oahu Land Use Study-Agriculture, prepared by Agro Industrial Associates, Inc. as a component of Castle and Cooke's Oahu Land Study of 1973, the lands of Central Oahu are, in addition to pineapple, highly suitable for the cultivation of sugarcane. The major limitation to such an alternative, however, is that sugarcane requires extensive irrigation which, in the case of this particular site, would necessitate costly pumping of already-limited water. The above study also indicates the suitability of the land in this area, in order of decreasing desirability, for the following crops:

- Nursery and ornamental crops, including flowers, orchids, anthuriums, ornamental shrubberies, etc. These provide an especially attractive alternative due to a potentially high revenue per acre, large export potential, and special desirability near urbanized areas.

- Truck crops, such as various vegetables and melons. Such crops also yield a high revenue per acre and, additionally, conform to the State Policy which foresees the 75 percent self-sufficiency for the above in Hawaii by 1980.

- Seed-farms. The climate of Central Oahu is good for this use, and, under the right condition, such operations tend to be highly profitable. Attempts at establishing large-scale seed-farm operations here have met with only partial success, however, and such a use must still be considered speculative.
The crops and various farm uses which are agriculturally suited to the area but, because of the limited market, low profitability, and objectionable environmental factors, are not considered feasible for commercial production in this area were:

- feed grains
- corn and sorghum
- alfalfa
- papaya
- animal farms
- beef cattle

The Agro-Industrial Associates, Inc. study also listed three additional crops which are agriculturally suitable within the study area, limes, mango, and avocado, but indicated that the economics of their production there requires further study.

The actual need for agricultural land on Oahu where some of the above mentioned crops could be cultivated can be largely satisfied by the existing Kahuku Agricultural Park. Only 1,500 of the total 3,000 acres available there are presently under cultivation:

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed Corn</td>
<td>800</td>
</tr>
<tr>
<td>Mellon, corn, green peppers, eggplant</td>
<td>240</td>
</tr>
<tr>
<td>Tropical fruits (guava, lilikoi, papaya)</td>
<td>450</td>
</tr>
<tr>
<td>Fallow</td>
<td>1,510</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>3,000</td>
</tr>
</tbody>
</table>

In addition, there is a 40-acre fresh water prawn farm.

The land at Kahuku Agricultural Park is available to farmers at relatively low rents. More importantly, the organizational structure and water provided by the State at that location make it appear that many of the crops which could conceivably be cultivated at Mililani could be grown more profitably at Kahuku. Most of the vegetables, fruits, and ornamentals are suitable for cultivation at this Agricultural Park, and the available acreage is sufficient to satisfy a large portion of the need for such lands on Oahu. In fact, the projected acreage needed to satisfy the state policy for 75 percent self-sufficiency in truck crops by 1980 is only 2,090 acres on Oahu (Department of Planning and Economic Development, 1978).

RECREATIONAL USE

The feasibility of this site being purchased by either Federal, State, or Local government and developed for recreational purposes can be addressed within the general framework of five major criteria:

- the need for recreational land on Oahu;
the types of recreational sites desired and their availability;

- the need for recreational open space in Central Oahu;

- the desirability of the parcel in question for exclusively recreational use; and

- the costs, both short- and long-term, of such an alternative.

Because all of the above areas of concern overlap to a certain extent, they will be discussed in a single section, with no special attempt at separation of these interrelating elements. As a complete analysis of Oahu's recreational system is beyond the scope of this report, the reader is advised that the outdoor recreational resources, potentials, and needs on Oahu are fully addressed in the 1975 State Comprehensive Outdoor Recreation Plan (SCORP), published by the Department of Planning and Economic Development.

Generally, it should be pointed out that the entire State of Hawaii is subject to very special and fortunate natural climatic and geographic conditions which allow nearly all outdoor recreational activities to take place year-round. It may also be added that the prevailing preference of Oahu residents and visitors alike is for beach-front recreation. With the exception of mountain hiking trails, certain golf courses, and various, mostly school-associated, playing fields, a large percentage of outdoor recreation on Oahu takes place along the shoreline. The greatest need, therefore, is for the development of additional public beaches, ocean-front parks, and such water-related facilities as public marinas and boat ramps.

Mililani, as an "inland" community, does not possess the natural amenities most needed by the island's recreational system. As a planned residential community, Mililani already offers an extensive network of outdoor recreational facilities to its residents, including playing fields, swimming pools, tennis courts, and a golf course. The proposed development would continue the previously established pattern, and include acres of recreational open space within the neighborhood, community, and district parks. In addition, approximately 94 acres of land would be left as undeveloped open space (mostly in the gulch areas), adding to the open feeling of the entire development. Nothing about the site, the known recreational needs of island residents, or the existing development at Mililani suggests that recreational use of the entire site would be a desirable alternative.

ALTERNATIVE FORMS OF URBAN DEVELOPMENT

Possible alternative forms of urban development fall into two different categories:

- A different form, in terms of physical design and configuration, of essentially the same development concept; and

- a development entirely different in form and function from that originally proposed.

The development concept proposed for the project site has been fully described in previous sections of this report. No final design of individual
structures for the over-all site plan has as yet been done, but it is anticipated that, especially in the case of single-family homes, the basic style developed in Mililani until now will continue. Some of the proposed medium-density multi-family housing will take different forms than has been used at Mililani heretofore. Specifically, a greater integration of various housing forms and other functions are anticipated in the Town Center area of the development.

Theoretically, an infinite number of variations are possible in a mixed-use development such as is being proposed for the project site. Presumably, every developer would take a somewhat different approach in solving the same design problems. In practice, however, the variations are usually of an insignificant magnitude.

Commercial Alternative The proposed development of the project site includes, among other uses, the construction of a community shopping center which would eventually be expanded to a sub-regional scale. As an element of the Town Center, this shopping complex would initially contain about 100,000 square feet of gross leasable area with possible future expansion increasing the gross leasable area to a maximum of 350,000 square feet. Of the Town Center's 102 acres, 40 acres are to be used for the shopping center, with the balance given to civic activities, apartments, and a park. If development of all 350,000 square feet proves feasible, the service area of the proposed commercial activities at the Town Center would extend well beyond Mililani and attract shoppers from such communities as Wahiawa, the Gentry-Waipio development, and the North Shore. Considering the presence of the Pearlridge shopping center, it appears that the commercial area proposed for the project site will more than fill the needs of the region. In addition, Mililani already has a community shopping center. The use of the entire 476 acre site for commercial activities is certainly not feasible.

Institutional As mentioned above, the proposed Town Center would contain civic uses. These may include a library, post office, satellite city hall, and police station. In terms of possible use of the entire project site for institutional development, two alternatives come to mind: educational institutions or health care facilities. Though the University of Hawaii had at one time considered locating its West Oahu campus on approximately 200 acres of land in Mililani, the ultimate decision was to construct it on a site in Ewa. As has been mentioned in Chapter IV of this report, the existing health care facilities appear to be adequate in Central Oahu, with Wahiawa General having recently completed expansion and modernization. Major medical facilities tend to be located in Central Honolulu, and no shift in this pattern is anticipated. There exists a possibility that the Town Center area will contain specialized housing for senior citizens. Though this cannot be considered as an institutional use, it may decrease demand for such institutions as nursing homes.

Industrial The 1964 General Plan and DLUM for the City and County of Honolulu designated 227 acres of land on the Honolulu side of Kipapa Gulch adjacent to, and north of, the proposed Gentry-Waipio development, for industrial use. The development of this industrial-designated land is included as an element of Mililani Town's long-range plan, and a petition is being prepared to the State Land Use Commission to reclassify this land from Agriculture to Urban. In addition to the above planned industrial area, the

Chapter VI
Gentry-Waipio community will contain a 120-acre industrial park, the first phase of which (52 acres) is already under development. With relation to regional industrial acreage, then, there appears to be no need for an expansion greater than that which is already being proposed and, it appears that industrial use is not a viable alternative to the proposed development of the project site.

BULK SALE OF THE PROPERTY TO ANOTHER OWNER

As a final alternative, the land could always be sold in bulk to another owner. Sites for Merchant builders such as Quality Pacific’s Fairway Village Townhouses have, in fact, been sold to other developers in the past, and this may occur to a very limited extent again in the proposed development. In terms of alternatives, however, the new owner would have essentially the same choices as does Mililani Town, Inc. Because of this, its implications are the same as those of the options that have already been discussed.
SUMMARY OF PROBABLE ADVERSE EFFECTS WHICH CANNOT BE AVOIDED
CHAPTER VII. SUMMARY OF ADVERSE ENVIRONMENTAL IMPACTS

Despite the special precautions and mitigating measures that have been incorporated into the design of the proposed project, it would still have a number of adverse environmental effects. The most important of these impacts are summarized below. Detailed discussions of all significant adverse and beneficial impacts can be found in Chapters IV and V.

Loss of Agricultural Land Construction of the proposed project would require the withdrawal from cultivation of about 380 gross acres of land now used by the Dole Division of Castle and Cooke for the production of pineapple. Because Dole presently has control of somewhat more land than it needs to maintain its regular planting schedule, this would not result in any decrease in its output of pineapple. Over the long-run, an increase in the demand for fresh pineapple could be accommodated by moving acreage from sugar back into pineapple. This would reduce the amount of land on which sugar is cultivated, but the reduction would involve only the poorer sugar fields. As a result, it would not have an adverse effect on the profitability of the sugar companies. It would, however, decrease the total area on Oahu available to agriculture by about 0.8%.

Urbanization would also eliminate the possibility of growing crops other than pineapple on the land. While limited water availability, insects, and market conditions have led to the failure of past efforts to establish diversified agriculture in the area, it is impossible to prove that possible future changes in market conditions, agricultural technology, or water management practices would not make diversified agriculture a viable undertaking. Hence, it is remotely possible that the project would result in a reduction in the amount of land being cultivated for crops other than pineapple as well.

Increased Surface Runoff The proposed development would result in an increase in peak runoff from the project site resulting from a rainfall with a recurrence interval of 50 years of as much as 800 to 900 cfs. Increased flow at downstream locations along Kipapa and Waikele Streams would probably be on the order of 650 to 700 cfs. Because of the uneven distribution of rainfall over the 45 square mile basin, the increase in the Q50 in downstream areas would be considerably less than this. No measurable increase in flood damage is expected as a result.

Erosion/Sedimentation Inevitably, soil erosion and sedimentation would increase temporarily during the construction phase of the project. The increase in the rate of erosion, which would amount to about 57 tons per year per acre of exposed ground, would occur only on the portion of the site actually being worked at any given time (say 30 to 50 acres). Moreover, because the project represents a continuation of the existing development
program rather than the establishment of a new one, the resulting erosion/sedimentation actually represents a continuation of existing conditions. Erosion rates from the project site following the completion of the project and the establishment of its permanent landscaping are expected to be about one-seventh of their present rate. In the long run, then, it would result in a measurable decrease in the amount of sediment reaching Pearl Harbor.

Increases In Certain Water Pollutants While the proposed project would result in a decrease in the amount of sediment and certain agricultural pollutants reaching Pearl Harbor's Class AA waters, it would lead to an increase in others, notably, heavy metals, petroleum products, and coliform bacteria. These are typical of all urban development, and, because of Mililani Town's low-density, residential character, would probably be found in relatively low concentrations. Moreover, they would accompany similar development anywhere on the island. However, it is possible that the receiving water into which this runoff eventually discharges is more susceptible to the accumulation of such pollutants than less confined coastal waters, and it will be important to continue monitoring West Loch for possible long-term effects.

Increase in Sewage Loads at the Mililani Sewage Treatment Plant The proposed project would result in an increase in the amount of wastewater treated by the Mililani Sewage Treatment Plant. Because effluent from the existing plant does not meet present EPA standards, the STP is now operating under a temporary NPDES permit issued by that agency. The permit expires in 1980, and continued discharge of the effluent into Kipapa Stream following that date would be in violation of Federal law. The City and County of Honolulu has developed plans to use the secondarily-treated effluent from the plant for sugarcane irrigation, but this program probably could not be implemented before 1982. Hence, an extension of the NPDES permit will be required. Assuming the successful implementation of the City and County's re-use scheme, the project would result in only a temporary increase in the discharge of treated effluent into Pearl Harbor. If these plans encounter unexpected difficulties, all of the sub-standard effluent generated by the project would have to be discharged into Kipapa Stream and, thence, into West Loch.

Water Withdrawals Wells serving the proposed project would eventually withdraw an average of about 1.8 mgd from the Pearl Harbor basal lens. This would represent an increase in the present rate to withdrawal of only 0.63 percent, but it would aggravate the existing overdraft condition even further. On the other hand, the proposed recycling of 5.0 mgd of water from the Mililani Sewage Treatment Plant would allow an equivalent reduction in irrigation water withdrawals from the basal lens. This, in turn, would more than offset the 1.8 mgd that would be needed to supply domestic water to residents of the proposed project. Assuming the recycling plans would be implemented regardless of whether or not the proposed increment is approved, the present project cannot fairly be credited with the full 5.0 mgd, but most of its gross water use of 1.8 mgd would be recycled. Hence, net water consumption by the project would be only a small fraction of the total pumped by the wells.
Traffic

The proposed project would generate about 1,400 trips on Kamehameha Highway and the H-2 Freeway during the peak morning rush hour. Under existing traffic conditions, it is expected that about 180 of these trips would be southbound on Kamehameha Highway and about 915 would be southbound on H-2. Assuming no substantial change in the volume of through-traffic on Kam Highway originating north of Mililani Town, this would bring traffic on that road over Kipapa Bridge up to the highway's capacity. Traffic on the H-2 southbound entrance road would be about 1,550 or 450 vph below its calculated capacity. Congestion might develop at the intersection of Lanikuhana Avenue and Meheula Parkway, but could be kept within acceptable limits by proper roadway and intersection design.

While it appears that the project would not, by itself, generate any significant traffic problems, the addition of traffic from the recently started Gentry-Waipio project to Kam Highway will probably change this significantly. Data presented in the EIS for that project indicates that, upon completion, it will generate significantly more traffic than can be accommodated by Kamehameha Highway. The resulting congestion will force most of the vehicles from Mililani that now use Kam Highway to switch to H-2 or another, more circuitous route. If this occurs to the extent that it appears it may, there would be severe traffic tie-ups during the peak morning hour at the Lanikuhana-Meheula intersection and on the access ramp to H-2 southbound. At present, it appears that the only means of preventing these problems would be to provide the Gentry-Waipio project with direct access to the H-2 freeway and by improving the portion of Kamehameha Highway between the Gentry project and the H-1 interchange.

Air Quality

Traffic associated with the proposed development could cause violations of the state's 1-hour CO standard. This is particularly likely during the a.m. peak hours when meteorological conditions conducive to pollutant buildup have approximately a 50% frequency of occurrence. It is much less likely during the p.m. peak hours because at that time higher wind speeds and atmospheric instability which contribute to better pollutant dispersion are much more prevalent. For the same reasons, there is a relatively low probability that the state's 8-hr CO standard would be exceeded. Completion of the commercial/civic center would result in some increase in this probability. The worst traffic conditions, and, therefore, the greatest emissions would occur only if the Gentry-Waipio development is allowed to reach its full size and if no improvements are made to that project's access to H-2 and Kamehameha Highway.
CHAPTER VIII. REFERENCES


Clark, Lt. and D. Toews (March, 1978). Research And Development Section, City and County of Honolulu, Police Dept. Personal Communication.


Institute of Transportation Engineers (1976). Trip Generation. Author: Arlington, Virginia, var. pag.

Keala, F. (Jan 24, 1978). Letter from Chief of Police, City and County of Honolulu, Police Dept. to Belt, Collins and Associates (see Appendix B, this report.)


APPENDICES
APPENDIX A

Environmental Assessment/Determination
Rezoning Request - Mililani Town,
From the Environmental Quality
Commission.
Mr. Donald Bremner, Chairman  
Environmental Quality Commission  
550 Halekauwila Street, Rm. 301  
Honolulu, Hawaii  

Dear Mr. Bremner:  

Environmental Assessment/Determination  
Rezoning Request--Mililani Town  
Phase V  

In accordance with Section 4(c), Chapter 343, HRS, we are notifying you of our intent to require an Environmental Impact Statement (EIS) for the above. Attached is an EIS Preparation Notice.

By copy of this letter, with attachment, we are also notifying the applicant of our decision.

If you should have any questions or wish any additional information on this matter, please contact Mrs. Lorrie Chee of our staff at 523-4077.

Very truly yours,

GEORGE S. MORIGUCHI  
Director of Land Utilization  

GSM:ey  
Enclosure  
cc: Millilani Town Inc.
CHAPTER 343, HRS
ENVIRONMENTAL ASSESSMENT/DETERMINATION

Applicant: Mililani Town Inc.
Landowner: Castle & Cooke, Inc.
Project Location: Waipio
Tax Map Keys: 9-4-05: portion of 3, & 27
9-5-01: 11 portion of 8, 10 & 16
9-5-03: 1
Request: Rezoning of 476 acres, various districts
Determination: EIS Required

I. Proposed Action

The proposed project is intended to be an integral part of an on-going planned community similar in character and compatible with the surrounding community. The 476 acres of land was the subject of a General Plan/Detailed Land Use Map amendment adopted by Ordinance Nos. 4639 & 4640 on October 14, 1976. Approximately 456 acres are presently zoned Ag-1 Restricted Agriculture, the remaining 20 acres are zoned R-6 Residential District.

This is the sixth increment of rezoning requested by Mililani Town and, if granted, would bring the total zoned acreage of the town to about 1800 acres. This is about one-half of the 3500+ acres designated for potential development and would nearly complete the rezoning necessary west of Kamehameha Highway.

The primary objectives of the proposed expansion include:

1. Construction of 3000 low and medium density residential units on 289 acres designed to meet demand for moderate and middle price homes.

2. There are also plans for a town center on 46 acres for commercial and public facilities.

3. In addition, approximately 100 acres would be left as natural open space and 40 acres would be developed for park use. About 6 of these acres would be set aside for an elementary school site. (Figure 2 and Table 1 show the proposed zoning districts, acreages involved and density proposed.)
A. Technical Characteristics

1. Proposed Land Use

The development will primarily include fee simple residential units together with land uses for community amenities.

2. Housing Types

There would be seven housing types: single family, duplex, zero lot line, cluster, town houses and low and medium density apartment units.

3. Commercial Development

Gross leasable area between 300,000 and 500,000 square feet of commercial floor area is proposed in a regional shopping center. Civic uses, such as a public library, auditorium, satellite City Hall, fire station and police station are also planned. Construction is planned to begin in early 1980.

4. Vehicular Circulation

Plans for the internal street system integrate the various segments of Mililani Town. The central roadway, Meheula Parkway forms the "spine" road from which secondary roadways branch out into minor roads. Meheula Parkway and Lanikuhana Avenue will act as the principal arterial feeders.

5. Phasing

Construction of residential units would begin adjacent to the H-2 freeway and progress generally southward. Approximate completion date of R-6 Residential District lands are as follows:

<table>
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<th>Completion Date (Approximate)</th>
<th>(R-6 Residential) No. of Units</th>
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<tr>
<td>Nov. 1979</td>
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<tr>
<td>1980</td>
<td>198</td>
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<td>1981</td>
<td>327</td>
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<tr>
<td>1982</td>
<td>58</td>
</tr>
<tr>
<td>Total</td>
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</table>
Three proposed planned unit developments would probably be developed at about the same time as the surrounding single-family and cluster units.

Two 10-acre neighborhood park sites and the 6-acre school site would also be graded at the same time. The parks would be dedicated to the city but the school would not be acquired immediately by the Department of Education.

Apartment areas are not anticipated to be developed until much of the single-family units are completed.

6. Drainage

Drainage facilities would collect surface run-off in catch basins along roadways and pipe it to four major outlet structures discharging into various small gullies tributary to Kipapa Gulch. Lots fronting the gulch would be graded away from it.

7. Potable Water

Water needs for this development are approximately 1.76 million gallons of water per day (MGD). Four existing wells tapping the basal lens would be augmented by four additional 2 MGD capacity wells from the same source. Two wells would be located adjacent to both the 865 elevation and 685 feet elevation reservoirs. Mililani Town would pay for the installation of the wells, but would dedicate them to the Board of Water Supply for operation and maintenance. All of these facilities have received preliminary approval of the Board of Water Supply.

8. Sewage Collection and Disposal

Sewage generated by this development would be handled by the existing sewage treatment plant. At present the treatment plant serves Mililani Town, Waipio Acres and Melemanu Woodlands and has a capacity of 1.8 MGD and an average flow of 1.4 MGD. Current expansion of the treatment plant will raise capacity of the plant but not enough to accommodate the second half of the proposed development. Cost of the expansion will be borne by Mililani Town, Inc.
9. Electrical Power

Electrical, telephone and CATV Cables would be located underground. The proposed development would require the realignment of the north-south 46 kv transmission lines.

B. Social and Economic Characteristics

The proposed development would be expected to increase property values. Presently, much of the land is being used by Castle & Cooke (Dole Pineapple Co.) to grow pineapple. There would be displacement of about 12 regular and 6 semi-casual workers and loss of agricultural lands when the development begins.

There would be employment and income generated by the construction activities and commercial center.

The new residents and other activities would increase demand for public facilities and services. Although the initial expenses would be borne by the developer, government would incur the operational and maintenance expenses, e.g. personnel needed to operate and maintain parks, sewage treatment plant, etc.

New neighborhoods would be created. The different mix of housing types relative to the existing town may change the socio-economic profile of the population.

C. Environmental Characteristics

In general the proposed project lies on the southern portion of the Schofield Plateau. The steep sides of Kipapa Gulch mark its eastern boundary and it is bisected by a deep gully that extends to within 500 feet of Meheula Parkway. With the exception of these features, slopes are moderate (1-8%).

The soils on the site are classified into three different series: Wahiawa silty clay, Manana silty clay and Helemano silty clay.

Average annual rainfall at the site is uneven throughout the year with over two-thirds of it falling during November through March.
Winds are most commonly tradewinds from the northeast. Temperatures on an average summer day range from a low of 66°F to a high of 82°F.

All of the run off from the site flows into Kipapa Stream as direct surface runoff.

At present, effluent from Mililani Sewage Treatment Plan is discharged into Kipapa Stream at a rate of about 1.5 MGD. Most of this eventually finds its way into the class AA waters of Pearl Harbor, or via exfiltration through the streambed, to the basal lines.

According to the Department of Public Works, the Mililani Sewage Treatment Plant would not meet the new National Pollutant Discharge Elimination System (NPDES). In addition, the Department of Health and Federal authorities may impose a moratorium on further expansion of the treatment facility.

Mililani Town is situated over the northern edge of Pearl Harbor compartment of the basal lens, the largest of three central Oahu aquifers. The Board of Water Supply wells that supply Mililani with water, use this source. There has been a significant decrease in ground water levels, and a corresponding increase in the chloride content of water taken from coastal wells, and, consequently, there is concern over the continued use of the aquifer.

The dominant plants on the site are eucalyptus, guava and various tall grasses and weeds. Pineapple has been cultivated on nearly all of the land atop the plateau for over 3/4 of a century.

Common finches, thrushes, and rodents can be found on the plateau. The Pueo or Hawaiian owl has occasionally been sighted in the gulch areas.

The State Historic Preservation Officer reports no known archeological or historic sites within the area under consideration.

II. Affected Environment

The proposed development is located between Kamehameha Highway and the H-2 freeway. 90% of the first segment of development is
complete, and it is expected that all of the land except a few parcels zoned for apartments will be built on by the end of 1978. Land mauka of the H-2 is still zoned for agricultural and conservation uses by the State and County.

The land is zoned AG-1 Restricted Agriculture and R-6 Residential Districts. Ordinance Nos. 4639 and 4640 designated the site for various urban uses. The request for rezoning conforms to and would implement this land use plan.

A. Major Impacts

Potential environmental impacts, beneficial or adverse, direct or indirect, have been broadly identified as follows: air and water quality, noise, drainage and flood control, effects on adjacent highways, effects on existing residential development, impact on utilities, changes in density, impact on government services and facilities, aesthetics or visual effects and alteration to the economic and population distribution pattern.

B. Mitigation Measures

No attempt has been made to distinguish adverse from beneficial on the above assessment of impacts. It is expected that conventional methods as required by State and County regulatory agencies would be employed by the applicant and contractors to alleviate short-term and some long-term adverse effects during site preparation and development, specifically in the areas of erosion, siltation, dust control and noise. An in-depth examination of potential impacts should result in a more thorough discussion of other possible mitigation measures.

C. Alternatives to the Proposed Action

"Any known alternatives for the action which could feasibly attain the objectives of the action—even though more costly—shall be described and explained as to why they were rejected."1/  

1/Environmental Quality Commission Regulations, Sec. 1:42g.
D. **Areas Requiring Further Study**

All studies concerning flood control, sewage treatment, air quality, etc., should be incorporated into the EIS.

**III. Reasons Supporting Determination**

The decision to require an EIS is based on the "significance criteria" contained in Section 1:31 of the Environmental Quality Commission's Regulations implementing Chapter 343, HRS.

**IV. Agencies to be Consulted in Preparation of the EIS**

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<tr>
<th>Federal</th>
<th>State</th>
<th>Univ. of Hawaii</th>
<th>City &amp; County of Honolulu</th>
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V. Required Scope and Content of the EIS

A. The EIS should discuss anticipated environmental effects of the proposed development, including those areas which will provide elaboration on impacts described under Section IIA.

B. Content should conform to Section 1:42 of the Environmental Quality Commission's Environmental Impact Statement Regulations.

Additional guidance on 1 and 2 above will be provided on request by the Department of Land Utilization before and during EIS processing.

APPROVED
GEORGE S. MORIGUCHI
Director of Land Utilization

GSM:ey
Attach.
Table 1. Proposed Zoning and Land Use

<table>
<thead>
<tr>
<th>Proposed Land Use</th>
<th>Proposed Zoning</th>
<th>Approx. Acreage</th>
<th>Approx. Density (unit/acre)</th>
<th>Number of Units</th>
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<th>Resident Population</th>
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\(^1\) Based on 288 acres having residential development.

NOTE: N.A. = Not Applicable
APPENDIX B

I. Letter of Transmittal of Environmental Assessment/Determination Sent to Agencies and Groups, and List of Those to Whom Transmittal Was Sent.

II. List of Governmental Agencies and Groups Consulted During EIS Preparation.

III. Letters of Communication Between EIS Preparation Team (Belt, Collins & Associates) and Agencies Contacted.

NOTE: NO RESPONSE WAS RECEIVED FROM THE FOLLOWING.

- Mililani Town Association
- Neighborhood Board No. 25
- Life of the Land
- State Dept. of Education
- Senator Joseph T. Kuroda
- Senator Francis A. Wong
- Senator Patsy K. Young
- Senator Donald D. H. Ching
- Representative Daniel Kihano
- Representative Mitsuno Shito
- Gentry-Pacific
I. Letter of Transmittal of Environmental Assessment/Determination Sent to Agencies and Groups, and List of Those to Whom Transmittal Was Sent.

Dear

As first reported in the Environmental Quality Commission Bulletin of December 8, 1977, Mililani Town, Inc. is requesting rezoning for 476 acres of land at Waipio, Oahu, to allow further expansion of Mililani Town. The rezoning would allow the construction of 1,500 low density and 2,300 medium density residential units and a "town center" containing commercial and public facilities serving all of Mililani Town. In addition, it provides for 100 acres of open space and 40 acres of park land. Belt, Collins and Associates has been retained to prepare an environmental impact statement for the proposed project.

The construction and operation of the proposed increment to the existing development could have a number of potentially significant effects that may be of concern to your organization. To insure that you are fully informed of the nature of the proposed action, we are transmitting to you a copy of the "Environmental Assessment/Determination" prepared for the project by the City and County of Honolulu's Department of Land Utilization. It provides a general description of the proposed action as well as a broad indication of the types of impacts that may be expected.

It is our intention to explore all aspects of the project's probable effects in the EIS, but the scale of the development and the wide range of impacts that it could cause make it essential that the bulk of our work be directed toward those specific issues that are of greatest concern. We would appreciate it very much if you would help us in this task by indicating in writing the specific questions, issues, and topics you want to see addressed. The more exact you can be, the better the chance that we will be able to respond satisfactorily. In your response, would you also indicate whether or not you wish to meet to discuss your concerns or consider written correspondence adequate. In addition, it would also be helpful if you would specify any special sources of information you are familiar with that might be relevant to our work.
As you probably know, the State Environmental Quality Commission's Environmental Impact Statement Regulations stipulate that written response to this request for comments must be made within 30 days of its receipt unless this is extended by the accepting agency. ..."upon good cause shown..." While we expect that the dialogue between ourselves and interested parties will continue far beyond the mandatory time limit, it is our hope that you will make every effort to initiate your contact with us within the prescribed time period. This will insure that all issues receive adequate attention.

If all goes as planned, it is expected that the draft of the environmental impact statement will be available in April, 1978. At that time, the document will be circulated for review and comment by all of the parties that have expressed an interest in the project. If the consultation process works as we intend it should, all of your concerns will be explored adequately in the draft EIS. If, however, you find there are issues that have not been covered in sufficient depth, this final review process will provide you with an opportunity to have the deficiencies corrected.

If you have any questions regarding the project or do not fully understand what kind of response from you would be most helpful, please call me at 521-5361. I would be more than happy to try to provide any information that I can.

Sincerely,

Perry J. White

PJW:gf

Encl.
MILILANI TOWN MAILING LIST

Mrs. Helen Lacro
Waipio Community Association
95-137 Waioni Street
Wahiawa, Oahu, Hawaii 96786

Environmental Center
University of Hawaii
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

Ms. Jane Helliwell
Mililani Town Community Association
95-400 Ikaloa Street
Mililani, Oahu, Hawaii 96789

Mr. Charles Prentiss, President
Neighborhood Board 25
94-247 Hokuili Street
Mililani, Oahu, Hawaii 96789

Life of the Land
404 Piikoi Street
Room 209
Honolulu, Hawaii 96814

Dr. Ryokichi Higashionna
Acting Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Mr. Kazu Hayashida
Department of Transportation Services
650 South King Street
Honolulu, Hawaii 96813

Mr. Ramon Duran
Department of General Planning
650 South King Street
Honolulu, Hawaii 96813

II. List of Governmental Agencies and Groups Consulted During EIS Preparation.

Mr. Tyrone T. Kusao
Department of Housing & Community Development
650 South King Street
Honolulu, Hawaii 96813

Department of Parks and Recreation
650 South King Street
Honolulu, Hawaii 96813

Chief Francis Keala
Police Department
1455 South Beretania Street
Honolulu, Hawaii 96814

Mr. Wallace S. Miyahira
Department of Public Works
650 South King Street
Honolulu, Hawaii 96813

Mr. Boniface K. Aiu
Fire Department
1455 South Beretania Street
Honolulu, Hawaii 96814

Mr. Hideto Kono
Dept. of Planning & Economic Development
250 South King Street
Honolulu, Hawaii 96813

Dr. Andrew Chang
Department of Social Services & Housing
P. O. Box 339
Honolulu, Hawaii 96809

Mr. Edward Y. Hirata
Board of Water Supply
P. O. Box 3410
Honolulu, Hawaii 96843

10 January 1978
Soil Conservation Service
U. S. Department of Agriculture
Room 4316, Federal Building
Honolulu, Hawaii 96813

Pacific Ocean Division
Department of the Army
Building 230
Fort Shafter, Hawaii 96858

Environmental Protection Agency
Room 1302
Federal Building
Honolulu, Hawaii 96813

U. S. Department of Housing & Urban Development
Room 3318, Federal Building
Honolulu, Hawaii 96813

Mr. John Farias, Jr.
Department of Agriculture
1428 South King Street
Honolulu, Hawaii 96814

Mr. Charles Clark
Department of Education
P. O. Box 2380
Honolulu, Hawaii 96804

Mr. George Yuen
Department of Health
P. O. Box 3378
Honolulu, Hawaii 96801

Mr. William Thompson
Department of Land & Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809
Adj. General Valentine Siefermann  
Department of Defense  
Fort Ruger, Hawaii 96816

Water Resources Research Center  
University of Hawaii  
2540 Dole Street  
Honolulu, Hawaii 96822

Hawaiian Electric Company  
900 Richards Street  
Honolulu, Hawaii 96813

District Civil Engineer (code 48)  
Fourteenth Naval District  
Box 110  
Pearl Harbor, Hawaii 96860

Colonel Carl P. Rodolph, USA  
Headquarters  
U.S. Army Support Command, Hawaii  
Attention: AFZV-FE  
Fort Shafter, Hawaii 96858

Land Use Commission  
State of Hawaii  
190 South King Street  
Honolulu, Hawaii 96813

Office of Environmental Quality Control  
550 Halekauwila Street  
Room 301  
Honolulu, Hawaii 96813
Senator Joseph T. Kuroda  
State Senate  
Hawaii State Capitol  
Honolulu, Hawaii 96813

Senator Francis A. Wong  
State Senate  
Hawaii State Capitol  
Honolulu, Hawaii 96813

Senator Patsy K. Young  
State Senate  
Hawaii State Capitol  
Honolulu, Hawaii 96813

Representative Daniel J. Kihano  
House of Representatives  
State Capitol  
Honolulu, Hawaii 96813

Representative Mitsuo Shito  
House of Representatives  
State Capitol  
Honolulu, Hawaii 96813

Mr. John Moriyama  
Community Information & Resource Center  
Leeward Community College  
96-045 Ala Ike  
Pearl City, Hawaii 96782

Hon. Donald D.H. Ching, Senator  
Fourth Senatorial District  
State Senate  
Hawaii State Capitol  
Honolulu, Hawaii 96813

Mr. Norman Dyer  
Gentry Pacific  
Post Office Box 295  
Honolulu, Hawaii 96809
III. Letters of Communication Between
EIS Preparation Team (Belt, Collins
& Associates) and Agencies Contacted.

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January 10, 1978

Mr. Tyrome T. Kusao, Director
Department of Housing and Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Kusao:

Environment Impact Statement for the Proposed Zoning and Expansion of Mililani Town

Thank you for your letter of January 10, 1978, regarding the proposed project. The information regarding projected cost/selling prices that you requested will be included in the EIS. In addition, the extent to which the proposed housing would meet the needs of low and moderate income individuals and families will be discussed.

Sincerely,

Perry White

February 6, 1978

Mr. Tyrone T. Kusao, Director
Department of Housing and Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Attention Mr. Perry J. White

Gentlemen:

Subject: Expansion of Mililani Town Environmental Impact Statement

This is to acknowledge receipt of your letter dated January 10, 1978.

We reviewed the “Environmental Assessment/Determination” and recommend that the question of furnishing dwellings to low and moderate income individuals and families be addressed in the Environmental Impact Statement. Cost and probable sale price should be included.

Thank you for consulting us prior to the preparation of the EIS.

Sincerely,

Tyrome T. Kusao
Director
Belt, Collins & Associates
745 Fort Street, Suite 514
Honolulu, Hawaii 96813

Attention: Mr. Perry J. White

Gentlemen:

Subject: Environmental Assessment/
Determination for Proposed Rezoning
of 476 Acres by Hililani Town, Inc.

This letter is in response to your letter of January 10, 1978
regarding the subject matter.

In preparation of this EIS, please consider how the socio-economic
profile of this project will complement established need areas in
housing. It is requested that consideration be given to moderate
income and elderly housing. This would be consistent with a report
prepared by Daley & Associates for the Hawaii Housing Authority
entitled, Housing for Hawaii's People which points out the need
for said housing.

Please feel free to contact the undersigned if we may be of further
assistance.

Sincerely,

[Signature]

HAROLD I. KURIHARA
Development Administrator

February 6, 1978

Mr. Harold I. Kurihara
Hawaii Housing Authority
State Dept. of Social Services & Housing
P. O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Kurihara:

Environmental Impact Statement for
the Proposed Expansion of Millilani Town

Thank you for your letter of January 29, 1978, identifying issues
you would like to see addressed in the EIS for the proposed project.
Planners for the project are familiar with the need for housing for
moderate income and elderly housing and have taken it into consideration
in establishing the proposed land use plan. The extent to which the
housing needs identified in Housing for Hawaii's People are met by the
proposed development will be discussed in the EIS.

Sincerely,

Perry J. White
January 23, 1978

Mr. Perry J. White
Belt, Collins & Associates
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. White:

Subject: Request for Comments on Proposed Environmental Impact Statement (EIS) for Mililani Town, Inc.

Thank you for allowing us to review and comment on the subject proposed EIS. We submit the following comments for your information:

Sewage Disposal

Currently, the city is undertaking an effluent irrigation study and diversion of the sewage treatment plant effluent from Kipapa Stream. This work should be completed prior to any new connections which would cause permit violations to occur to the Mililani Sewage Treatment Plant. The effluent from the Sewage Treatment Plant should be diverted before those additional flows occur.

Air Quality

Screening procedures as described in Guidelines for Air Quality Maintenance Planning and Analysis, Volume 9: Evaluating Indirect Sources, EPA Publication-450A-75-001, or similar should be used to assess air quality impact of proposed users.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussions. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

Sincerely,

James S. Kumagai, Ph.D.
Deputy Director for Environmental Health

Dr. James S. Kumagai
State Department of Health
P. O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Kumagai:

Environmental Impact Statement for the Proposed Rezoning and Expansion at Mililani Town

Thank you for your letter of February 6, 1978, regarding the proposed project. The subject of sewage disposal, as well as general water quality impacts, is thoroughly discussed in the EIS.

Your comment concerning the timing of the diversion of treated sewage effluent is valid. The sewage effluent disposal system as proposed by the City and County of Honolulu Department of Public Works is closely related to all anticipated expansion at Mililani Town. As such, it receives attention in the EIS. The project's impact on air quality is being studied by our consultant, Mr. James Morrow, and will be thoroughly discussed.

Sincerely,

Perry J. White

Belt, Collins & Associates
A division of Lyon Associates, Inc.
Engineers • Planners • Landscape Architects
334 Hawaii Building • 745 Fort Street • Honolulu, Hawaii 96813 • Telephone (808) 922-3301
April 12, 1978
Mr. Perry J. White
Belt, Collins & Associates
745 Fort Street, #514
Honolulu, HI 96813

Dear Mr. White:

We have received your letter requesting EPA's comments and suggestions to your Environmental Assessment/Determination on the further expansion of Mililani Town.

Preparation of an EIS for this project would be to comply with the requirements of Chapter 343 of the Hawaii Revised Statutes which is administered by the Office of Environmental Quality Control. The Environmental Protection Agency as a Federal government agency is not routinely involved in the State's EIS process.

We certainly appreciate your concern to comply with all environmental laws.

Sincerely,

Vicki H. Tsubako
Manager, PICO

Ms. Vicki H. Tsubako
Environmental Protection Agency
Region IX - Pacific Islands Office
P. O. Box 50003
Honolulu, HI 96850

Dear Ms. Tsubako:

Environmental Impact Statement for the Proposed Rezoning and Expansion at Mililani Town

Thank you for your letter of January 23, 1978, regarding the proposed project. While we understand that the EPA is not routinely involved with the State EIS process, we did not want to overlook a potential source of valuable input.

Yours truly,

Perry J. White

PJM:gw
Gentlemen:

Reference is made to your 10 January 1978 letter advising of plans to prepare an environmental impact statement (EIS) in connection with rezoning of 476 acres of land at Millani Town, Inc.

Our study of the proposal reveals no significant increase in environmental impact on nearby Army installations beyond those already experienced from the presence of Millani Town.

This command is particularly interested in obtaining further information on location of the four proposed new water wells, location of the four new storm drain outlets into Kipapa Gulch, anticipated increase in traffic on Kamehameha Highway and disposal of treated sewage into Kipapa Stream. It is assumed these questions will be answered in the draft EIS. A meeting on the subject is not believed needed at this time.

Present plans call for continued Army aviation activities at Wheeler Air Force Base and your EIS should include an assessment of this condition.

We look forward to an opportunity to review the draft EIS in April. Your list of agencies to be consulted (page seven) should be corrected to read US Army Support Command, Hawaii, instead of Dept. of Army.

Sincerely,

CARL P. RODOLPH
Colonel, CE
Director of Facilities Engineering
Col. Carl P. Rodolph
Facilities Engineering
Department of the Army
Headquarters U.S. Army Support Command, Hawaii
Fort Shafter, Hawaii 96850

Dear Col. Rodolph:

Environmental Impact Statement for the Proposed
Rezoning and Expansion Project at Mililani Town

Thank you for your letter of January 24, 1978, regarding the proposed project. The questions of water wells, storm water drainage, traffic, and sewage treatment facilities are all being discussed in considerable detail in the EIS. A separate EIS prepared by the Department of the Army in July of 1977 addressed the aviation activities at Wheeler Army Airfield and is referenced in the Mililani report. Noise level readings will also be taken at Mililani Town.

The error on our list of agencies has been noted and corrected.

Yours truly,

Perry J. White

PJM: gk
January 24, 1978

Mr. Perry White
Belt, Collins & Associates
514 Hawaii Building
745 Fort Street
Honolulu, Hawaii 96813

Subject: Notification of Intent to File an Environmental Impact Statement for Mililani Town, Inc., Oahu, Hawaii

Dear Mr. White:

The proposed development of 476 acres in Mililani Town has been reviewed by this department. The project would create 1,500 low density and 2,300 medium density dwelling units beginning in 1979. Upon completion of this project there would be an approximate increase of some 11,035-12,920 residents in the area. Using our current officer to population ratio of 2.1 officers per 1,000 populace, an additional 23-27 officers would be required to handle calls for police service. This would be a minimal number due to the fact that the project also includes a 46 acre commercial and public facility plan, an elementary school, and 40 acres for park use.

During the first four year construction phase, approximately 6 additional officers will be required if the construction of 630 R-6 residential units are built as scheduled.

This project would bring approximately 7,600 vehicles (1976 datum) into the area. The central roadway-Melehula Parkway, and the adjoining secondary roadways would provide adequate vehicular movement to and from the area.

The present Wahiawa Police Station would handle all calls for service. The anticipated construction of public service buildings (including a police station) in the early part of the 1980's would contribute to the support of additional police manpower and equipment required.

We hope this information will be of assistance to you. If you have any further questions, please contact the Research and Development Division at 955-8131.

Sincerely,

FRANCIS KEOALA
Chief of Police
February 6, 1970

Mr. Francis Keala, Chief
Honolulu Police Department
City & County of Honolulu
Honolulu, Hawaii 96814

Dear Chief Keala:

Environmental Impact Statement for
the Proposed Expansion of the Kealiiwa Resort

Thank you for your letter of January 24, 1970, responding to our request for comments regarding the proposed project. The information you provided will be of considerable help to us and is greatly appreciated.

Sincerely,

Perry J. White

PJMgk
Mr. Perry J. White  
Delt, Collins & Associates  
514 Hawaii Building  
745 Fort Street  
Honolulu, Hawaii 96813  

Dear Mr. White:

I am writing in response to your letter of January 10, 1978 regarding your preparation of an EIS for the future expansion of Millilani Town. Hawaiian Electric Co. has been negotiating with Mr. Gene Ferguson, Vice President and General Manager of Millilani Town, Inc., to develop a relocation alignment for our 46 kv A transmission line. The Department of Land Utilization Environmental Assessment/Determination mentions this in paragraph IA9. We are now waiting responses from Millilani Town, Inc. to our November 23, 1977 proposal letter.

I understand that electrical distribution facilities are available from an existing Millilani substation or by the addition of the transformer inside their substation.

I hope that these comments will help you in the preparation of your draft EIS. I look forward to reviewing the draft EIS in April.

Yours truly,

John C. McCain, Ph.D.  
Manager of Environmental Department

JCMc1cm
Mr. Perry J. White
Belt, Collins & Associates
514 Hawaii Building
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. White:

Subject: Mililani Town, Inc. Request Rezoning, Waipio, Oahu

We have reviewed the environmental assessment and offer the following comments for your consideration.

The environmental assessment recognizes that 456 acres of the proposed development is zoned A-1 Restricted Agriculture. However, mention should be made to the fact that these lands are all prime agricultural lands that would be taken out of agricultural production forever.

The 456 acres may not seem much compared to all the prime agricultural lands available on Central Oahu. What needs to be noted is the amount of this primeland that is being encroached upon by developments in the area.

Reducing prime agricultural land in Central Oahu will result in either agriculture being lost entirely in this part of the island or forcing agricultural operations to poorer lands.

We feel that the loss of this primeland should be addressed as a major environmental impact. A few items we would like to see discussed are: the overall effect the loss of primelands will have on Central Oahu, the mitigative measures planned to offset the loss of primeland, and the benefits foregone if primeland is taken.

Your written correspondence will be adequate. We look forward to your reply. Thank you for the opportunity to review this environmental assessment.

Sincerely,

Jack P. Kanalz
State Conservationist

---

Mr. Jack P. Kanalz
State Conservationist
Soil Conservation Service, U.S.D.A.
P. O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Kanalz:

Environmental Impact Statement
Concerning the Re-zoning of 476 Acres of Land for the Proposed Expansion of Mililani Town

Thank you for your letter dated January 26, 1978, commenting on the proposed project. I agree that the loss of a substantial amount of land presently used for agricultural production is a significant aspect of the proposed project. The implications that this change would have for agriculture in the state in general and on Oahu in particular will be fully discussed in the EIS. If you would like to have me respond directly to your questions as well as to answer them in the official draft of the statement that will be submitted to the Environmental Quality Commission, please call me at 521-5361.

Sincerely,

Perry J. White

---

February 6, 1978
Mr. Perry J. White  
Belt, Collins and Associates  
514 Hawaii Building  
765 Fort Street  
Honolulu, HI 96813

Dear Mr. White:

Based on information provided in your notice of intent to prepare an environmental statement for the proposed Hillland Town expansion, we find that the project does not have a direct effect on any Corps projects or areas of responsibilities. In accordance with your request, the following points are provided for your consideration in preparing the draft environmental statement for the proposed project:

a. Flood plain evaluations for the 100-year flood should be addressed in the environmental statement.

b. How will sewage be accommodated and treated if a moratorium is placed on expansion of the existing treatment plant an indicated on page 3 of your environmental assessment?

c. Suggest including a discussion of pollution levels in Kipapa Stream and Pearl Harbor as a result of construction activities and increases in urban stormwater runoff.

d. The effects of tapping groundwater sources on the aquifer need to be evaluated and the development designed to conserve water resources.

e. The effects of urban encroachment on military lands and operations should be addressed.

f. The effects of the project on agricultural lands, wildlife, recreational hunting and stream ecology should be addressed.

g. Suggest that the State of Hawaii, Department of Land and Natural Resources and the U.S. Fish and Wildlife Service be consulted in the planning and environmental statement process.

We thank you for the opportunity to review and comment on your notice of intent to prepare an environmental statement for the project.

Sincerely yours,

F. H. Pender  
Colonel, Corps of Engineers  
Deputy Division Engineer
February 7, 1978

Col. Carl P. Rodolph
U.S. Army Support Command, Hawaii
Fort Shafter, Hawaii 96853

Dear Col. Rodolph:

Environmental Impact Statement for
the Proposed Expansion of Millani Town

Thank you for your letter of January 24, 1978, commenting on the proposed expansion of Millani Town. The EIS will provide the information you have requested regarding the proposed water wells, the new storm drain outlets, increases in traffic, and sewage treatment. In addition, it will include a discussion of the aviation operations at Wheeler Air Force Base in relationship to the proposed development.

Sincerely,

Perry H. White

PJW:tgk
January 27, 1978

Mr. Gene Ferguson
Millilani Town, Inc.
Financial Plaza of
the Pacific, 21st Floor
Honolulu, Hawaii 96813

Dear Mr. Ferguson,

The following comments on the Environmental Impact Statement
Preparation Notice for the Millilani Town rezoning request were con-
tributed by Jack Zimmerman (Lecturer, Social Sciences) and John
Horikawa (Office of Special Programs and Community Services) from
Leeward Community College.

1. Fuel and Energy Resource
What will an increased population in Millilani Town mean in
terms of added fuel and energy consumption? Please consider
possible longer driving distances to employment
areas as well as increased fuel usage due to highway
congestion. Incidentally, what is the status of the
proposed industrial park in this community?

2. Social Services
Please describe the estimated increase in demand for social
services such as health facilities, handicap program,
family counseling, police and fire protection etc. How
much of these services could be accommodated with present
programs and facilities?

3. Ground Water Levels
What will the removal of 476 acres of agricultural lands
have on the resupplying of the ground water level? How
much will the new wells affect the ground water levels at
different times during the year?

4. Type of Employment
While new jobs will be created as a result of this proposed
project, there will be endogenous based jobs as opposed to
the jobs that will be displaced which are of an endogenous
economic industry. Would the benefit of the first be offset
by the loss of the second?

5. Parks
Details of the different park facilities should be explained
in light of the specific demand for recreational activities
for the residents of the planned service area.

6. Moderate-Income Housing
Please describe the number, price, and location of any
moderate-low income housing that are being planned for this
project.

7. Scenery
Please describe in detail how excess sewage will be disposed
after the existing STW has reached its capacity. That
effect would a sewer moratorium have on this housing project?
What alternatives will you pursue if this happens?

8. Public Facilities
Which public facilities will be initially paid for by the
developer and then operated and maintained by the govern-
ment?

Sincerely yours,

John E. Horikawa
Community Information and
Resource Center

cc ODC
Millilani Town Assn.
Millilani Neighborhood Board
Wahiawa Community & Businessmen's Association
February 3, 1970

Mr. John E. Moriyama
Community Information and Resource Center
Leeward Community College
96-045 Ala Ike Road
Pearl City, Oahu, Hawaii 96782

Dear Mr. Moriyama:

Environmental Impact Statement for
the Proposed Expansion of Millilani Town

Thank you for your letter of January 27, 1970, regarding the proposed project. The EIS we are preparing will address all of the issues listed in your letter. In doing so, it will also provide all of the descriptive material that you have requested. I should state, however, that the Pueo's situation will be discussed only insofar as it would be measurably affected by the proposed project.

In paragraph two of your letter, you inquire into the status of the proposed industrial park. At present 200+ acres of industrial land are shown on the Detailed Land Use Map for the area. We are assisting in the preparation of an application for a State Land Use District boundary change for the area that should be submitted later this year, but, to my knowledge, no firm dates have been set.

Sincerely,

[Signature]

Perry White

PJMzk
expansion of Millilani Town

Thank you for your letter of January 10, 1978 regarding the Environmental Impact Statement for further expansion of Millilani Town.

At this time, we do not have any issues or topics that we wish addressed. We note, however, that the proposed expansion of the community facilities may exceed the present coverage of the Oahu Civil Defense disaster warning sirens in the area. We recommend that coordination be made with the Oahu Civil Defense Agency to determine if additional siren coverage is required. In view of the fact that the community development is a private venture, it should not be unreasonable to expect that any additional siren coverage be funded as part of the development. The Oahu Civil Defense Agency will assist in determining the site location, subject to the final approval of the State Civil Defense Division. This department has standard plans and specifications available upon request.

If we may be of further assistance please do not hesitate to call my Engineering Officer, Captain Wayne R. Tomoyasu, at 737-6733.

Very truly yours,

Valentine A. Siefermann
Major General, HAWAII
Adjutant General

cc: OCDA

Major General Valentine A. Siefermann
Department of Defense
Office of the Adjutant General
3949 Diamond Head Road
Honolulu, Hawaii 96816

Dear General Siefermann:

Environmental Impact Statement for the Proposed Rezoning and Expansion Project at Millilani Town

Thank you for your letter of January 21, 1978, regarding the proposed project. The Oahu Civil Defense Agency will be contacted as per your recommendation, and the issue of siren coverage will be discussed. We appreciate your making plans and specifications for siren coverage available to us if necessary.

Sincerely,

Perry J. White

PJM:gl
February 2, 1978

Mr. Perry J. White
BELT, COLLINS & ASSOCIATES
514 Hawaii Building
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. White:

Subject: Environmental Impact Statement for Mililani Town Expansion

Thank you for your letter of January 11, 1978, requesting our comments regarding the forthcoming environmental impact statement.

We have no comments to offer at the present time but do appreciate the opportunity of review.

Sincerely,

GORDAN Y. FURUTANI
Executive Officer

February 6, 1978

Mr. Gordon Y. Furutani
Land Use Commission
Suite 1795
Pacific Trade Center
190 South King Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

Environmental Impact Statement for the Proposed Expansion of Mililani Town

Thank you for your letter of February 2, 1978, commenting on the proposed project. We look forward to having you review the EIS after it has been officially submitted.

Very truly yours,

GORDAN Y. FURUTANI
Executive Officer

Perry J. White
February 2, 1978

Dear Mrs. Lacro:

We have received your communication to the Department of Land Utilization regarding an application for the expansion of Mill1an Town. We have received a letter from the Waipio Community Association expressing their support for the proposed project. We are pleased and support your proposal.

Thank you for your timely and open-minded response.

Sincerely,

[Signature]

The Waipio Community Association

February 6, 1978

Mrs. Helen Lacro, President
Waipio Community Association
95-317 Wainoni Street
Waikiki, Oahu, Hawaii 96786

Dear Mrs. Lacro:

Thank you for your letter of February 2, 1978. In response to our request for comments concerning the proposed expansion of Milllani Town, I will note that the project has the support of the Waipio Community Association.

Sincerely,

[Signature]

Perry J. White
Belt, Cooper & Associates
514 Hanini Bldg.
745 Fort Street
Honolulu, Hawaii 96813
February 1, 1978

Mr. Perry J. White
Belt, Collins and Associates
514 Hawaii Building
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. White:

EIS Preparation Notice for Rezoning
of 476 Acres at Mililani Town, Waipio
Comments Requested January 10, 1978

We suggest that the EIS include discussion on the following items:

The Need for Specific Rezonings

The EIS should discuss the need for the specific rezonings requested, particularly the multi-family residential and commercial zones. What is the basis for the acreages requested? How many units by type, price range, tenure and density are proposed? How many low- and moderate-income family units will be provided? What is the present supply of vacant land in each of the zoning categories requested? What is the rate of development of such lands? Mililani Town, Incorporated has indicated that present market for apartments is "soft," but the proposed rezoning (Table 1 in Department of Land Utilization's assessment) shows that the proposed rezonings will allow a high ratio of apartment units to single-family units? What is the present ratio of such sales? What is projected? A commercial/Civic Center of 46 acres is requested. The EIS should differentiate between the need for commercial space and public facilities, and, if possible, include support from the public agencies to document their need for space in the town center. The EIS should discuss the relationship of the proposed rezonings to the Revised General Plan, i.e., how does the number of units permitted under the rezonings requested relate to allocations of future growth for the Mililani-Waipio area, particularly in view of other developments proposed in the area?

Traffic

The EIS should show existing and projected traffic on the various major elements of the circulation system. Ideally the traffic generated from each of the various zones should be estimated.

View Corridors

Significant view corridors should be identified. How these view corridors could be affected by maximum heights permitted in the apartment and commercial zones should be discussed.

Drainage

The ultimate fate of drainage should be indicated, and flow and sedimentation loads should be estimated.

Sewage Disposal

The Department of Land Utilization's environmental assessment indicates the possible problems in meeting National Pollutant Discharge Elimination System (NPDES) requirements (p.5) and that current expansion of the Mililani Sewage Treatment Plant will raise capacity but not enough to accommodate the second half of the proposed development (p. 3). The EIS should discuss this in detail. How many units would be affected? What is the present schedule for development? For further expansion of the treatment plant?

Blast Hazard Zone

Ammunition and other explosives are presently stored in tunnels in Kipapa Gulch. The blast hazard should be discussed. What areas are affected? What are long range plans with respect to ammunition storage? If this is to be discontinued, what is the schedule for removal of the hazard?

Transmission Lines

The environmental assessment indicates that the proposed development will require realignment of 46 KV transmission lines. The EIS should show the present location of the lines and the proposed relocation.
Mr. Perry J. White  
Belt, Collins and Associates  
Page 3

Noise

Noise studies have recently been completed for Wheeler Airfield. Noise from operations at Wheeler may affect the area. A copy of the noise study is available at the Department of Land Utilization.

Thank you for the opportunity to indicate the specific questions and issues we would like to see you address in your EIS.

Sincerely,

RAMON DURAN  
Acting Chief Planning Officer

Mr. Ramon Duran  
Department of General Planning  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Duran:

Environmental Impact Statement for the Proposed Rezoning and Expansion Project at Mililani Town

Thank you for your letter of February 1, 1978 indicating issues of particular concern with respect to the proposed project. The responses that we have received from you and others have been quite helpful in helping us to prioritize our investigation of potential impacts. As you know, the proposed project is part of a much larger Mililani Master Plan that has been ongoing for more than ten years. Close interaction with all concerned governmental agencies has occurred on a regular basis and will continue in the future.

All of the physical impacts (i.e. traffic, drainage, sewage disposal, etc.) mentioned in your letter will be discussed in detail in the EIS. With respect to "The Need for Specific Rezoning" the issues are much more complex. Nonetheless we will attempt to address each specific question you have raised. Again, we appreciate your comments.

Yours truly,

Perry J. White

B-28

Belt, Collins & Associates  
A division of Lyon Associates, Inc.  
Engineers + Planners + Landscape Architects  
914 Kapiolani Building • 745 Fort Street • Honolulu, Hawaii 96813 • Telephone (808) 328-5361  
April 13, 1978

Mr. Ramon Duran  
Department of General Planning  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Duran:

Environmental Impact Statement for the Proposed Rezoning and Expansion Project at Mililani Town

Thank you for your letter of February 1, 1978 indicating issues of particular concern with respect to the proposed project. The responses that we have received from you and others have been quite helpful in helping us to prioritize our investigation of potential impacts. As you know, the proposed project is part of a much larger Mililani Master Plan that has been ongoing for more than ten years. Close interaction with all concerned governmental agencies has occurred on a regular basis and will continue in the future.

All of the physical impacts (i.e. traffic, drainage, sewage disposal, etc.) mentioned in your letter will be discussed in detail in the EIS. With respect to "The Need for Specific Rezoning" the issues are much more complex. Nonetheless we will attempt to address each specific question you have raised. Again, we appreciate your comments.

Yours truly,

Perry J. White
February 1, 1978

Mr. Perry J. White
Belt, Collins & Associates
514 Hawaii Building
745 Fort Street
Honolulu, HI 96813

SUBJECT: Environmental Impact Statement Preparation Notice
Millani Town Inc. Rezoning of 476 acres.

Thank you for allowing us to review the subject EIS Preparation Notice.

In addition to the minimum EIS content requirements,
(EIS Regs. Section 1:42), we feel special attention should be paid to the following topics:

Potential traffic increases on the highways and roads affected by the project and the resultant air quality impacts from such increases should be discussed.

The soil erosion potential and sedimentation effects on the waters of Pearl Harbor should be evaluated in the EIS.

The impact on the continued removal of lands capable of allowing water infiltration to allow for recharge of the aquifer should be discussed. The alternatives of using catch basins and/or day ponds for water retention and recharge rather than drainage into Kipapa Gulch should be investigated.

The relationship of the projects to the State's Environmental goals and as set forth in Chapter's 342 and 344 should be discussed. The rationale for proceeding with the proposed project in light of the potential adverse consequences on the State's environmental goals and guidelines should also be included in this discussion.

Sewage treatment for all of the proposed units appears to be an unresolved issue. How would a limited sewage treatment capacity affect the project?

When the EIS for this project becomes available, we will review it and possibly offer further comments.

Sincerely,

Harry Y. Akagi
Acting Director
February 6, 1978

Mr. Harry Y. Akagi
Office of Environmental Quality Control
Room 351
550 Naekawa Street
Honolulu, Hawaii 96813

Dear Mr. Akagi:

Environmental Impact Statement for
the Proposed Expansion of Millipai Town

Thank you for your letter of February 1, 1978, indicating areas of particular concern with respect to the proposed project. The responses that we are receiving from you and other consulted parties are proving to be quite helpful in prioritizing our investigation of potential impacts. All of the specific issues mentioned in your letter will be dealt with in considerable detail in the EIS.

Sincerely,

Perry L. White

P.M.ck
Mr. Perry J. White
Belt, Collins & Associates
514 Hawaii Building
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. White:

Environmental Assessment/Determination
Proposed Expansion of Mililani Town, Waipio, Oahu
for 3,800 new Residential Units and Center

The subject Environmental Assessment/Determination Notice, which was forwarded by your letter of 10 January 1978, has been reviewed, and the following comments are submitted:

a. Page Three (A-6) contains a discussion of drainage facilities, with discharge into various small gullies tributary to Kipapa Gulch, and that lots fronting the gulch would be graded away from it. There is no discussion in your outline of erosion and sediment control during the construction period and during period of heavy rains. Agricultural lands converted for housing use can contribute heavily to the siltation of West Loch, Pearl Harbor, into which Kipapa Stream flows.

Comment. The U. S. Navy has taken vigorous steps to reduce the flow of sedimentation into Pearl Harbor, requiring extensive maintenance dredging periodically.

On October 13-14, 1977, it staged a NAVY ACTION '77 Environmental Conference on Erosion and Tributary Flow, addressing this very problem.

Request. The Environmental Impact Statement (EIS) should have a separate section addressing problems of soil erosion and runoff during ground clearance operation, the construction period, and upon completion of the project, before landscaping is mature. It should contain detailed statistical information on how such erosion may affect siltation in West Loch, into which Kipapa Stream flows.

b. Page Five (C) mentions that the Mililani Sewage Treatment Plant would not meet the new National Pollutant Discharge Elimination System (NPDES) requirements and that the Department of Health and Federal authorities may impose a moratorium on further expansion of the treatment facility.

Comment. Since the effluent from Mililani Sewage Treatment Plant reaches Pearl Harbor, the U. S. Navy is concerned about the impact.

Request. Please discuss this subject fully, as it relates to the waters of Pearl Harbor, under U. S. Navy responsibility.

Thank you for the opportunity to review this Environmental Assessment/Determination and make suggestions for subjects to be covered in the forthcoming EIS. Please insure that the U. S. Navy receives its cover for further review.

Sincerely,

[Signature]

Copy to:
Environmental Quality Commission
Room 301, 550 Nailekawila Street
Honolulu, Hawaii 96813

Phone: (808) 474-2103
April 13, 1978

Captain R. P. Nystad
Headquarters Fourteenth Naval District
Box 110
Pearl Harbor, Hawaii 96860

Dear Captain Nystad:

Environmental Impact Statement for the Proposed Reservoir and Expansion Project at Mililani Town

Thank you for your letter of February 2, 1978 commenting on the proposed project. Both of the issues raised in your letter, stormwater runoff/sedimentation and the disposal of treated sewage effluent, are being discussed in the report. Realizing the concern of the Navy regarding sedimentation in Pearl Harbor, this topic will be given added emphasis based upon the information available to us. We appreciate your comments, and will keep the Navy informed of our findings.

Yours truly,

Perry J. White

Principal: Robert M. Bell, James R. Bell, Paul M. Hines, Frank E. Lyon, Jr.
Assistant: William D. Ng, Raymond P. Cohn, Mark H. Hines, Larry L. Hohs, Joseph Yvonne, Jr., Paul F. Walschut, Jr.
February 2, 1978

Gentlemen:

Subject: EIS Preparation Notice for Rezoning of 476 Acres in Mililani Town, Waipio, Oahu

We have reviewed the environmental assessment of the proposed rezoning action and have the following comments.

Wastewater. The current capacity of the Mililani treatment plant is being expanded to 3.60 mgd, average daily flow. Completion of the expansion is scheduled in April 1978. Future expansion of the plant capacity can be made if such improvements are financed by the developers. Based on the information available, the limiting capacity of the plant will be either 5.0 mgd or 7.58 mgd, depending on the final method of effluent disposal and studies now underway by the University of Hawaii's Water Resources Research Center (UH-WRRC).

The present method of effluent disposal into Kipapa Stream will be terminated and the effluent will be redirected into two irrigation reuse options. The discharge options are: discharge of the effluent to the proposed "Five Fingers Reservoir" and reuse for sugar cane by furrow irrigation; and discharge of the effluent to Waiahole Ditch and reuse for sugar cane by furrow irrigation. If the first option is adopted, the average flows will be limited to 5 mgd. If the second option is selected, the limiting flow will be greater than 5.0 mgd but will be dependent on the economic of post treatment (tertiary treatment) and dilution considerations.

Based on the above discussion, rezoning of urban lands should be limited so that the sewage flows from Waipio Tract, Melemanu, and Mililani Town will not exceed 5.0 mgd. In about two years, we may be able to determine whether the limiting flow of 5.0 mgd can be increased based on present studies now underway by UH-WRRC.

Drainage. The proposed drainage plan for the affected area should be coordinated with the Drainage Section of the Division of Engineering. We expect the matter of drainage to be discussed in the EIS.

Solid Wastes. The construction of 3,805 units as proposed will require a minimum of two additional refuse collection crews at an annual cost in excess of $150,000 annually. Collection services will be provided from the Waipahu Corporation Yard. Refuse will be hauled to Waipahu incinerator for final disposal.

Others. Grading, soil erosion and sediment control measures that will be employed during and after construction of the proposed developmental areas should be discussed in the EIS.

Very truly yours,

WALLACE MIYAHIRA
Director and Chief Engineer

cc:
Div. of Engineering (Drainage Section)
Div. of Refuse (Planning Engineer)
Div. of Wastewater Management (Planning Branch)
Mr. Wallace Miyahira, Director  
Department of Public Works  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813  

Dear Mr. Miyahira:

Environmental Impact Statement for the Proposed  
Rezoning and Expansion Project at Millitary Town.

Thank you for your letter of February 2, 1978 commenting on the  
proposed project. The issue of sewage treatment at Millitary and the  
method of its effluent disposal is discussed in considerable depth in the  
EIS. The project would call for expanding the present capacity of the  
Millitary Sewage Treatment Plant from 3.6 mgd to 5.1 mgd. This is  
0.1 mgd more than the 5.0 mgd limitation suggested in your letter. If  
possible, at least 8.0 mgd could be utilized, and even the slight effluent  
surplus mentioned above would be eliminated.

Stormwater drainage will also be discussed in the EIS, as will  
specific measures undertaken to mitigate the impacts on soil erosion  
and sedimentation. Your comments on refuse collection are appreciated.

Sincerely,

Perry J. White

PJW:ff

Principals: Robert M. Bah, James R. Bell, Paul M. Hearn, Frank L. Lyon, Jr.
Re: Your letter of January 10, 1978 and the requested rezoning of 476 acres at Waipio to allow further expansion of Millian Town. The following are concerns that we feel should be allowed in an Environmental Impact Statement for the project:

1. Will any areas be reserved for green belt purposes?
2. We are engaged in several studies on wastewater effluent at and adjacent to the Millian STP, will areas be reserved and protected for the continuation and completion of these studies?
3. The potential reduction of groundwater recharge and increases in stormwater runoff should be evaluated.

We look forward to reviewing the completed EIS.

Sincerely yours,

[Signature]

R. J. White

cc: L. S. Lau
February 3, 1978

Mr. Perry J. White  
Belt Collins and Associates  
514 Hawaii Building  
745 Fort Street  
Honolulu, Hawaii 96813

Dear Mr. White:

Your Letter of January 10, 1978 Relating to  
Resoning of 476 Acres at Millilani

Issues that we want addressed in the environmental impact statement for the proposed rezoning are:

1. The potential effects the proposed rezoning will have on water demand.
2. The potential effects that other alternative land uses will have on water demand.
3. The source of water and its effects on existing nearby sources should the rezoning occur.
4. The potential effects the proposed rezoning will have on groundwater resources and groundwater recharge.
5. The potential effects the proposed rezoning and development will have on our existing water distribution system.

If further information is needed on this matter, please call Lawrence Whang at 548-5221.

Very truly yours,

EDWARD Y. HIRATA  
Manager and Chief Engineer

---

Mr. Edward Y. Hirata  
Board of Water Supply  
City and County of Honolulu  
650 South Beretania Street  
Honolulu, Hawaii 96843

Dear Mr. Hirata:

Environmental Impact Statement for the Proposed Rezoning and Expansion Project at Millilani Town

Thank you for your letter of February 3, 1976, regarding the proposed project. The issue of potable water on Oahu is recognized as being one of the single most significant items in the EIS being prepared. As such, the particular questions raised in your letter will be dealt with in considerable detail. The feasibility of reusing treated sewage effluent from the Millilani STP for cane irrigation is examined as a potential water conservation measure. Alternative uses of the land, and the impact of each, will also be discussed in the EIS.

Sincerely,

Perry J. White

---

Belt, Collins & Associates  
A division of Lyon Associates, Inc.  
Engineers + Planners + Landscape Architects  
514 Hawaii Building • 745 Fort Street • Honolulu, Hawaii 96813 • Telephone (808) 332-3331

April 6, 1978

Mr. Perry J. White  
Belt Collins and Associates  
514 Hawaii Building  
745 Fort Street  
Honolulu, Hawaii 96813

Dear Mr. Hirata:

Employee Benefits Statement for the Proposed Rezoning and Expansion Project at Millilani Town

Thank you for your letter of February 3, 1976, regarding the proposed project. The issue of potable water on Oahu is recognized as being one of the single most significant items in the EIS being prepared. As such, the particular questions raised in your letter will be dealt with in considerable detail. The feasibility of reusing treated sewage effluent from the Millilani STP for cane irrigation is examined as a potential water conservation measure. Alternative uses of the land, and the impact of each, will also be discussed in the EIS.

Sincerely,

Perry J. White

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Belt, Collins & Associates  
A division of Lyon Associates, Inc.  
Engineers + Planners + Landscape Architects  
514 Hawaii Building • 745 Fort Street • Honolulu, Hawaii 96813 • Telephone (808) 332-3331

April 6, 1978

Mr. Perry J. White  
Belt Collins and Associates  
514 Hawaii Building  
745 Fort Street  
Honolulu, Hawaii 96813

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Employee Benefits Statement for the Proposed Rezoning and Expansion Project at Millilani Town

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Sincerely,

Perry J. White

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April 6, 1978

Mr. Perry J. White  
Belt Collins and Associates  
514 Hawaii Building  
745 Fort Street  
Honolulu, Hawaii 96813

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Employee Benefits Statement for the Proposed Rezoning and Expansion Project at Millilani Town

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Sincerely,

Perry J. White

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A division of Lyon Associates, Inc.  
Engineers + Planners + Landscape Architects  
514 Hawaii Building • 745 Fort Street • Honolulu, Hawaii 96813 • Telephone (808) 332-3331

April 6, 1978

Mr. Perry J. White  
Belt Collins and Associates  
514 Hawaii Building  
745 Fort Street  
Honolulu, Hawaii 96813

Dear Mr. Hirata:

Employee Benefits Statement for the Proposed Rezoning and Expansion Project at Millilani Town

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Sincerely,

Perry J. White
Belz, Collins and Associates
514 Hawaii Building
745 Fort Street
Honolulu, Hawaii 96813

Attention: Mr. Perry T. White

Subject: Environmental Impact Statement Preparation Notice for Millilani Town, Waipio, Oahu

Gentlemen:

Pursuant to your letter of January 10, 1978, we have reviewed the subject EIS preparation notice and wish to offer the following comments for your consideration.

Specifically, the EIS document should contain detailed information and impact evaluations for the following areas:

Population

1) Identify and evaluate the projected population for the proposed increment to Millilani Town and its conformance to existing population projections for the Millilani-Waipio area and Oahu District, as stated in the Oahu General Plan.

Housing Need

2a) Identify the projected number of additional housing units needed in the Millilani-Waipio area and the Oahu District using population projections from the Oahu General Plan.

2b) Identify all proposed housing projects and the number of units involved in the Millilani-Waipio area and the Oahu District as a whole. Evaluate the effects that the proposed increment to Millilani Town will have on the projected number of additional housing units and population for both the Millilani-Waipio area and the Oahu District.

2c) Describe and assess housing market considerations (e.g. income levels, range of prices, family makeup, vacancy levels, etc.) for different types of housing within the Millilani-Waipio area and Oahu as a whole. Specify the proposed housing market for the proposed increment to Millilani Town.

3) Identify the amount of vacant residentially zoned land in the Ewa District and the extent to which the projected number of additional housing units for the Ewa District could be accommodated on those lands.

Timing and Phasing

4) Describe the timing and phasing for all the proposed project elements within the proposed increment to Millilani Town. An attempt should be made to identify and evaluate potential adverse impacts according to their cumulative or temporal effect on existing community or environmental conditions.

Commercial Development

5) Indicate the type of commercial development proposed in the regional shopping center and identify and evaluate the potential impacts to other commercial ventures in the Millilani, Waipio, and Pearlridge area.

Open Space

6) Evaluate the utility of the open space areas in the proposed development in terms of slope, topography, proposed recreational or park amenities and availability to the general public.

Infrastructural Facilities

7) Existing capacities of infrastructural facilities and services (e.g. roads, schools, parks, police, fire, water, sewage) should be evaluated, along with anticipated demands resulting from the implementation of the proposed project.

Sewage

8a) Indicate the effect that the proposed increment to Millilani Town will have on sewage treatment and disposal.

8b) Indicate how the proposed increment to Millilani Town will meet the National Pollutant Discharge Elimination System (NPDES) permit effluent limitation for nitrogen and phosphorus removal.

Drainage

9) Indicate how adverse effects from drainage will be mitigated or minimized.

Traffic

10) Assess the community and islandwide effects that the proposed increment to Millilani Town will have on existing traffic patterns and highway capacities, especially through the Kamuela Highway, Pearl City and Red Hill areas.
Agricultural Lands

11a) Indicate the amount of acres for the proposed increment to Mililani Town that are situated on prime, unique, and other important agricultural land as classified in "Agricultural Land of Importance to the State of Hawaii" done by the Soil Conservation Service and the State Department of Agriculture.

11b) Indicate the soil productivity (as classified in "Detailed Land Classification - Island of Oahu" done by the Land Study Bureau) for types of agricultural uses on the land in which the proposed increment to Mililani Town is situated.

11c) Discuss how conversion of agricultural land to urban use in the proposed increment to Mililani Town conforms to State plans and policies. Include statement regarding Land Use Commission reclassification of subject properties from Agricultural to Urban.

11d) Assess the effects of conversion from agriculture to urban upon agricultural and other resources.

Army Safety Zone

12a) Identify any area of the proposed increment to Mililani Town that lies within the Army's Safety Zone due to the existing high explosive storage in the adjoining Federally owned Kipapa Gulch area.

12b) Indicate any hazards involved due to the close proximity of the high explosive storage and how any hazard conditions would be mitigated.

Water

13) Assess the impact that the proposed development will have on existing groundwater resources of the area.

We hope that the above suggestions will be useful in developing the subject EIS. We would appreciate the opportunity to provide further input when the draft impact statement is available for review.

Sincerely,

HIDETO KONO
Director
Mr. Perry J. White
Belt, Collins & Associates
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. White:

Subject: Rezoning of 476 acres
Millani Town, Inc.
TMK: 9-4-05: portion of 3, 8 & 27
9-5-01: II portion of 8, 10, & 16
9-5-03: 1

In reference to the above-captioned action, the consequent development is consistent with the Master Plan of Millani Town which was considered in the planning of Interstate Route H-2 and Millani Interchange. Thus, this rezoning action will have no adverse impact upon our existing or planned transportation facilities.

Sincerely,

R. Higashionna, Ph.D.
Director

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 Punchbowl Street
Honolulu, Hawaii 96813

April 13, 1978

Dr. R. Higashionna
Department of Transportation
State of Hawaii

Dear Dr. Higashionna:

Environmental Impact Statement for the Proposed Rezoning and Expansion Project at Millani Town

Thank you for your letter regarding the proposed project at Millani. Even though the development proposed is consistent with the transportation Master Plan of Millani Town, the question of traffic is being addressed in some detail in the EIS.

Yours truly,

Perry J. White
Mr. Perry J. White  
BELT, COLLINS & ASSOCIATES  
514 Hawaii Building  
745 Fort Street  
Honolulu, Hawaii 96813

Dear Mr. White:

SUBJECT: Request For Rezoning By Mililani Town, Inc.

The proposed rezoning of 476 acres for Area 1 by Mililani Town Inc. should not adversely affect our fire protection plans. Except for the fringes beyond the mile-and-a-half radius from the Mililani Fire Station, fire protection should be adequate with supportive services from the Wahiawa Fire Station and the Waipahu Fire Station.

Please be advised that we have proposed in the capital improvement program to construct a fire station within the Gentry-Waipio development. When this is completed, it will greatly improve the fire coverage for the Mililani district. However, should Mililani Town continue to expand beyond Area 1, we would highly recommend, at that time, that an additional fire station site be established for a new fire station.

Should you need additional information, please contact Assistant Chief Stanley Tom at 955-8304.

Very truly yours,

Perry J. White

Belt, Collins & Associates  
A division of Lyon Associates, Inc.  
Engineers + Planners + Landscape Architects  
214 Hawaii Building • 745 Fort Street • Honolulu, Hawaii 96813 • Telephone (808) 541-3361

Mr. Boniface K. Au, Fire Chief  
City and County of Honolulu  
1455 South Beretania Street  
Room 305  
Honolulu, Hawaii 96814

Dear Mr. Au:

Environmental Impact Statement for the Proposed Rezoning and Expansion Project at Mililani Town

Thank you for your letter of February 6, 1978, regarding the proposed project at Mililani Town. We are pleased to hear the project would not adversely affect the County's fire protection plan. The information provided in your letter is much appreciated.

Yours truly,

Perry J. White
Mr. Parry J. White  
Delt, Collins & Associates  
514 Hawaii Building  
745 Fort Street  
Honolulu, Hawaii 96813  

Dear Mr. White:

In responding to your request for comments on an EIS that will be prepared by your office for Mililani Town, we understand that HUD participation is not under consideration.

Even though HUD is not participating in the project which will provide an additional 3800 dwelling units in Mililani Town you might consider the following issues in the EIS:

1. Noise sensitive sites exposed to high traffic volumes should be identified and measures outlined that will attenuate noise to acceptable levels.

2. The total water demand for Mililani Town, Crestview and the Gentry-Nalilo project should be explored to assure that the basalt water lens will have adequate capacity to accommodate the proposed project without such lowering as to cause an increase in the chloride level from salt water intrusion of the coastal wells. Two new wells of 4 mgd production in Crestview are reported under construction for exporting water to Honolulu.

3. The timing of expansion and the proposed capacity of the Mililani sewage treatment plant should be studied to coordinate tentative plans for the Mililani STP to accommodate effluent from the Gentry-Nalilo project prior to completion of the Honolulu STP.

4. The additional vehicular traffic generated by the project should be studied to determine its impact on H-2 freeway and Kamehameha Highway as it affects congestion, noise and air quality.

We would appreciate receiving a copy of the Draft EIS as well as the final EIS.

Sincerely,

Alvin K. R. Pang  
Director
Mr. Alvin K. H. Pang, Director  
Department of Housing and Urban Development  
P.O. Box 50007  
Honolulu, Hawaii 96850  

Dear Mr. Pang:

Environmental Impact Statement for the Proposed Rezoning and Expansion Project at Millilani Town

Thank you for your letter of February 6, 1978, indicating particular issues that should be discussed in the EIS for the proposed project at Millilani. All of the items you listed are being dealt with in the report in terms of both impacts and mitigating measures being applied. A copy of the draft EIS will be forwarded to you by the Environmental Quality Commission for your review and comment.

Sincerely,

[Signature]

Perry J. White

PJW:II
Belt, Collins & Associates

514 Hawaii Building - 745 Fort Street
Honolulu, Hawaii 96813

Attention: Mr. Perry J. White

Gentlemen:

Environmental Assessment/Determination for Rezoning of Land in Mililani Town

The requested rezoning of land will have a significant impact on the Mililani Town area. Your Environmental Impact Statement should address the following concerns:

1. The total person trips that will be generated by the proposed development and the mode of transportation that will be utilized (i.e., bus, automobile, bike, walk, etc.).

2. The anticipated origin and destinations of the generated trips.

3. The anticipated automobile trips and the impact of the additional traffic on existing facilities.

4. The anticipated bus patronage and the impact of this additional ridership on existing services (present bus service consists of Route 52 Circle Island - frequency of 30 minutes Kanesaka/Honolulu bound, 30 minutes Wahiawa bound).

5. The impact of the development on the Master Planned Transportation network.

6. Mitigating measures to minimize the impact of the project on the surrounding street system during construction.

Very truly yours,

Kazu Hayashida
Director
April 12, 1978

Mr. Kazu Hayashida, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Hayashida:

Environmental Impact Statement for the Proposed
Rezoning and Expansion of Millan Town

Thank you for your letter of February 7, 1978, indicating areas of particular concern with respect to transportation services at the proposed project. Special traffic counts, data collected via the Millian Town Homebuyers Survey, and other information are being utilized to properly address the specific issues referred to in your letter.

However, because of the type of analysis being used and the fact that a detailed circulation plan for the proposed increment has not been completed, our discussion focuses on vehicle-trips, rather than person-trips, and does not include a breakdown by mode. Similarly, the EIS contains only a general discussion of the project's potential effects on bus patronage. It is our belief that the level of detail being provided is appropriate given the present stage of the planning and the relative importance of different types of impacts.

Sincerely,

Perry J. White

PJM:bf
February 7, 1978

Mr. Perry J. White
Belt, Collins & Associates, Inc.
514 Hawaii Building
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. White:

Re: EIS Preparation Notice for Millani Town,
Sixth Increment (TMs: 9-7-05; por 3 & 27;
9-5-01; 11, por 8, 10 & 16; 9-9-03: 1)

Thank you for your letter of January 10, 1978, requesting our input on issues that should be addressed in the subject environmental impact statement. Listed below are some suggestions:

1. In previous verbal and written testimony to the Land Use Commission regarding the subject project, a statement was made that there would be no loss of jobs resulting from removal of the land from pineapple production. The Environmental Assessment/Determination notice, however, states that 12 regular and 6 semi-casual workers will be displaced. This matter should certainly be made clear in the EIS.

2. The project will result in loss of agricultural lands; in particular, lands classified as "Agricultural Lands of Importance to the State of Hawaii." We suggest that the USDA Soil Conservation Service Office in Honolulu be consulted in this regard.

3. The draw down effect upon the Pearl Harbor basal lens resulting from the proposed new wells should be adequately addressed to include consideration of the potential increased chloride content of coastal wells.

4. There seems to be a question as to the sewage treatment capacity and/or approval which should be clarified in the EIS.

5. In previous testimony, it was indicated that the project will not affect pineapple production lands. However, since this project constitutes only one half of the total proposed development and

will lead eventually to the next increment, we suggest that the long-range agricultural land and water impacts of the total development be addressed in the EIS.

These are some of our present concerns. Please call on Bob Huria of our Planning Office if we may be of assistance in the EIS preparation.

Many thanks,

JOHN FARIAS, JR.
Chancellor, Board of Agriculture
April 13, 1978

Mr. John Farias, Jr.
State Department of Agriculture
1428 South King Street
Honolulu, Hawaii 96814

Dear Mr. Farias:

Environmental Impact Statement for the Proposed
Rezoning and Expansion at Millilani Town.

Thank you for your letter of February 7, 1978, indicating
particular issues you would like to see addressed in the EIS for
the proposed project. The USDA Soil Conservation Service has been
consulted regarding the loss of agricultural lands, and that subject
will be discussed in the EIS. The impact of this on agricultural
employees will certainly be clarified.

Although adjacent lands will be examined as they relate to
the project through the Millilani Master Plan, the agricultural
lands mauka of the H-2 Freeway will not be discussed in detail.
Contrary to the statement at the bottom of page one of your letter,
it is by no means certain that this increment of development
will lead eventually to the next increment. In fact, the
State Land Use Commission and other public agencies have made it
quite clear that development mauka of H-2 is quite another question.
Thus, while Millilani Town, Inc., is hopeful that the necessary
approvals can be obtained, it is clearly an issue that is separate
from the present request. Presumably, the topic would be covered
in exhaustive detail at such time as the necessary land use
approvals are sought.

Sincerely,

Perry J. White

PJM:der
February 8, 1978

Belt, Collins & Associates
516 Hawaii Building
745 Fort Street
Honolulu, Hawaii 96813

Attention: Perry J. White

Gentlemen:

SUBJECT: ENVIRONMENTAL ASSESSMENT - MILILANI TOWN REZONING OF 746 ACRES

We have reviewed the Environmental Assessment for the rezoning of 746 acres of land in Mililani Town and find it generally acceptable.

A review of this subject area was made in April 1976 as a General Plan Amendment wherein the recreational needs of the project were established and concurred by our Department.

Although the location and size of the proposed parks were determined, it will be necessary for the project to comply with the following:

1. Dedication of the proposed park sites will meet the standards and requirements set forth by Rule 9 of the Park Dedication Rules and Regulations of the City and County of Honolulu.

2. Submit a street tree and planting plan of the 746-acre project for review and approval.

Should you have any questions, please contact Mr. Jason Yuen at 523-4884.

Sincerely,

ROBERT T. FUKUDA, DIRECTOR

Mr. Robert T. Fukuda, Director
Department of Parks and Recreation
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Fukuda:

Environmental Impact Statement for the Proposed Rezoning and Expansion Project at Mililani Town

Thank you for your letter of February 8, 1978, regarding the proposed project at Mililani. The project would involve 476 acres, rather than 746 acres as stated in your letter. Of these, about 40 acres have been designated for neighborhood or district park use. The EIS addresses the issue of recreational facilities and park site location. The developer will comply with all of the necessary Park Dedication Rules and Regulations. Street tree planting plans will only be developed as each unit of the proposed increment is designed and engineered, something that has not yet been done. Because of this, it is impossible to discuss these items in the EIS.

Sincerely,

P.J.Wigk

Perry J. White
Mr. Perry J. White
Belt Collins & Associates
514 Hawaii Building
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. White:

We concur that rezoning three-fourths of a square mile of Oahu for urban use should require an EIS.

We suggest that there be full discussion of the soil resources of the area and of any potential for re-use of wastewater. It appears to us that the water requirement of 1.76 MGD is excessive suggesting service for 11,000 persons. A budget breakdown of the 1.76 MGD may shed some light.

It is also timely for serious consideration of mass transit services to this town.

A review of existing public school facilities and services is also warranted if the population is to increase by 2000 and the school population by 50%. We believe it is not enough to consider just the site requirements of school needs. The effect of population changes on pupil-teacher ratios, class assignments and schedules, adequacy of supplies and equipment, transfer of personnel, et al. in the face of predetermined biennial budgets should also be taken into account.

Very truly yours,

W. Y. Thompson
Chairman of the Board
Mr. Perry White
Belt, Collins & Associates
514 Hawaii Building
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. White:

Environmental Assessment/Determination Preparation Notice

For Rezoning of 476 acres of existing Hililani Town, Inc. at Waipio, Oahu

March 23, 1978

The Environmental Center of the University of Hawaii does not generally participate in the preparation stage of the EIS process. We have taken this position so later conflict with our review responsibilities can be avoided.

Certainly the outline you have submitted shows many areas of deep concern that will require considerable research for the EIS. Of particular importance to us are the secondary aspects and the cumulative development effects in areas like the Waipio area with other areas on Oahu. In addition to the usual analysis of drainage soils, etc., emphasis should be placed on those secondary impacts also.

We couldn't help but notice how serious both the water and sewage problems are. If head drop should be lowered, salinity probably would also increase.

Of course the Environmental Library is always available to you for your research. We look forward to reviewing your EIS draft in April.

Yours truly,

Perry J. White
Director

B-50

cc: Jacqueline Miller

Environment Center
Crawford 317, 2550 Campus Road
Honolulu, Hawaii 96822

Mr. Deak C. Cox
Environmental Center
Crawford 317, 2550 Campus Road
Honolulu, Hawaii 96822

Dear Dr. Cox:

Environmental Impact Statement for the Proposed Rezoning and Expansion at Hililani Town

Thank you for your letter of March 23, 1978, regarding the proposed project. Secondary and cumulative development effects on Hililani and neighboring communities will be noted in the statement, but are not being investigated in great detail because of the project's consistency with existing public plans for the area. Impacts of both water demand and sewage effluent disposal are being studied carefully, and they will be discussed in depth in the EIS report.

We appreciate your comments and thank you for making your environmental library available to us.

Yours truly,

Perry J. White

ENVIRONMENTAL CENTER
Crawford 317, 2550 Campus Road
Honolulu, Hawaii 96822

March 23, 1978

Mr. Perry White
Belt, Collins & Associates
514 Hawaii Building
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. White:

Environmental Assessment/Determination Preparation Notice

For Rezoning of 476 acres of existing Hililani Town, Inc. at Waipio, Oahu

March 23, 1978

The Environmental Center of the University of Hawaii does not generally participate in the preparation stage of the EIS process. We have taken this position so later conflict with our review responsibilities can be avoided.

Certainly the outline you have submitted shows many areas of deep concern that will require considerable research for the EIS. Of particular importance to us are the secondary aspects and the cumulative development effects in areas like the Waipio area with other areas on Oahu. In addition to the usual analysis of drainage soils, etc., emphasis should be placed on those secondary impacts also.

We couldn't help but notice how serious both the water and sewage problems are. If head drop should be lowered, salinity probably would also increase.

Of course the Environmental Library is always available to you for your research. We look forward to reviewing your EIS draft in April.

Yours truly,

Perry J. White
Director

B-50

cc: Jacqueline Miller

Environment Center
Crawford 317, 2550 Campus Road
Honolulu, Hawaii 96822

Mr. Deak C. Cox
Environmental Center
Crawford 317, 2550 Campus Road
Honolulu, Hawaii 96822

Dear Dr. Cox:

Environmental Impact Statement for the Proposed Rezoning and Expansion at Hililani Town

Thank you for your letter of March 23, 1978, regarding the proposed project. Secondary and cumulative development effects on Hililani and neighboring communities will be noted in the statement, but are not being investigated in great detail because of the project's consistency with existing public plans for the area. Impacts of both water demand and sewage effluent disposal are being studied carefully, and they will be discussed in depth in the EIS report.

We appreciate your comments and thank you for making your environmental library available to us.

Yours truly,

Perry J. White
April 18, 1978

Mr. Wallace Miyahira, Director
Department of Public Works
City and County of Honolulu
550 South King Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Your Letter of April 13, 1978, Regarding the EIS for the Proposed Rezoning and Expansion Project at Mililani Town

As stated in our letter of February 2, 1978, the capacity of the Mililani plant will be limited to 5.0 mgd based upon the present understanding between the City and County and Oahu Sugar Company. If you wish to use a plant design capacity of 5.1 mgd for the purpose of discussion in the EIS, we will have no objection, just as long as the effluent does not exceed 5.0 mgd.

In computing and projecting flows for the Mililani plant, we must caution you that flows from Waipio Tract and the Melemanu development must be considered.

Very truly yours,

WALLACE MIYAHIRA
Director and Chief Engineer

cc: Div. of Wastewater Management

April 13, 1978

Mr. Wallace Miyahira, Director
Department of Public Works
City and County of Honolulu
550 South King Street
Honolulu, Hawaii 96813

Dear Mr. Miyahira:

Environmental Impact Statement for the Proposed Rezoning and Expansion Project at Mililani Town

Thank you for your letter of February 2, 1978 commenting on the proposed project. The issue of sewage treatment at Mililani and the method of its effluent disposal is discussed in considerable depth in the EIS. The project would call for expanding the present capacity of the Mililani Sewage Treatment Plant from 3.6 mgd to 5.1 mgd. This is 0.1 mgd more than the 5.0 mgd limitation suggested in your letter. If possible, at least 8.0 mgd could be utilized, and even the slight effluent surplus mentioned above would be eliminated.

Stormwater drainage will also be discussed in the EIS, as will specific measures undertaken to mitigate the impacts on soil erosion and sedimentation. Your comments on refuse collection are appreciated.

Sincerely,

Perry White
APPENDIX C

Draft Environmental Impact Assessment for Mililani Wells II -
Prepared by M & E Pacific,
Honolulu, Hawaii.
PROJECT TITLE AND LOCATION

The project title is Mililani Wells II. The proposed deep well facilities, located in central Oahu between Kipapa Gulch and Waipio Valley, will be constructed within the existing Board of Water Supply's 2.0 million gallon reservoir site. This site is situated adjacent to the Dole Company's pineapple fields, approximately one mile north of the H-2 highway off ramp to the Mililani Town development, as shown on Figure I-1.

PROPOSING AGENCY

The proposing agency is the Board of Water Supply, City and County of Honolulu.

PURPOSE OF ENVIRONMENTAL IMPACT ASSESSMENT

The purpose of this report is to provide an assessment on the environmental impacts of the construction, operation, and maintenance of the proposed deep well facility and to determine the need, if any, for an environmental impact statement.

DESCRIPTION OF EXISTING WATER SUPPLY FACILITIES

The existing water system for the Mililani Town development consists of the following facilities (see Figure I-2):

1. Deep well pumping station (Mililani Well I): Control building, chlorination facilities, four-2.0 million gallons per day (mgd) pumping units
2. Storage reservoir with a capacity of 1.0 million gallons
3. Storage reservoir with a capacity of 2.0 million gallons
4. Network of distribution piping
The existing system presently serves the developed areas makai of the H-2 highway.

**Water Master Plan**

A water master plan for the Mililani Town development, formulated on October 12, 1967 and later revised and approved by the Board of Water Supply on February 14, 1977, divides the development into three water zones, which are described below and shown on Figure I-2.

- Water Zone 1: Area above elevation 765 feet
- Water Zone 2: Area between elevation 585 and 765 feet
- Water Zone 3: Area below elevation 585 feet

The projected water demand for the Mililani Town development is shown in Table I-1.

As delineated in the approved master plan, the major requirements are as follows:

1. Requirement for Zone 1 have not been approved. The proposed water supply facilities will be identified prior to development of areas in water zone 1.

2. Requirements for zones 2 and 3 are as follows:
   a. Source
      1) A total of eight-2 mgd wells will be required to meet the cumulative maximum day demand (well nos. 1, 2, 3, and 4 are existing).
      2) Well nos. 5 and 6 shall be located at the existing 865-foot reservoir site.
      3) Well nos. 7 and 8 shall be located in the vicinity of the 685-foot reservoir site.
   b. Reservoir. For the existing reservoirs, a total storage capacity of 3.0 million gallons is adequate.

**OBJECTIVES AND DESCRIPTION OF THE PROPOSED PROJECT**

The construction of well nos. 5 and 6 is in accordance with the water master plan and is specifically required to meet the maximum-day water
<table>
<thead>
<tr>
<th>Land Use</th>
<th>Zone 1</th>
<th>Zone 2</th>
<th>Zone 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Units</td>
<td>Ave. Day Demand</td>
<td>Max. Day Demand</td>
</tr>
<tr>
<td>Single Family (units)</td>
<td>4,244</td>
<td>2.04</td>
<td>3.06</td>
</tr>
<tr>
<td>Multi-Family and Apartment (units)</td>
<td>2,090</td>
<td>0.88</td>
<td>1.32</td>
</tr>
<tr>
<td>Parks (acres)</td>
<td>46</td>
<td>0.15</td>
<td>0.23</td>
</tr>
<tr>
<td>School (acres)</td>
<td>18</td>
<td>0.06</td>
<td>0.09</td>
</tr>
<tr>
<td>Church (acres)</td>
<td>2</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Commercial (acres)</td>
<td>5</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Industrial (acres)</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td>3.16</td>
<td>4.73</td>
<td>5.41</td>
</tr>
</tbody>
</table>
requirements for the area south of the H-2 highway. The proposed facilities to be located within the existing reservoir site are shown on Figure I-3 and are described as follows:

1. Deep well nos. 5 and 6 consisting of turbine line shaft pumps and motors
2. A control building housing the motor control center, chlorination system, transformers, storage area, and bathroom facilities
3. Automatic irrigation system consisting of a controller, pump, valves, piping, and appurtenances
4. Hydropneumatic system consisting of a 1,000 gallon tank, two turbine feed pumps, valves, piping, and appurtenances
5. Force main connecting the proposed deep well pumps to the existing influent-effluent line within the existing 2.0 million gallon reservoir site
6. Power transmission lines (offsite)

The operation of pump nos. 5 and 6 will be controlled by both the water level in the reservoir and the master controller located in the existing motor control center at the Well I site. A chlorination system is proposed in the event that water from well nos. 5 and 6 or in the reservoir becomes contaminated. A hydropneumatic system is required to provide adequate water pressure for the operation of the hydraulically-controlled valves of the pumping units.

**IMPACT OF THE PROPOSED PROJECT TO THE MILILANI TOWN DEVELOPMENT**

The proposed well nos. 5 and 6 will service developments within water zones 2 and 3 shown on Figure I-2. The land areas within these water zones are currently zoned urban, except for parcels 1, 2, and 3 as delineated on the map.

As indicated in Table I-2, the projected water demand for the presently zoned urban areas is 6.16 mgd. This figure is derived by taking the difference between the total maximum-day demand for water zones 2 and 3.
<table>
<thead>
<tr>
<th>Land Use</th>
<th>Parcel 1 (476 acres)</th>
<th>Parcel 2 (242 acres)</th>
<th>Parcel 3 (118 acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Units</td>
<td>Ave Day Demand</td>
<td>Max Day Demand</td>
</tr>
<tr>
<td>Single Family (units)</td>
<td>911</td>
<td>0.44</td>
<td>0.66</td>
</tr>
<tr>
<td>Multi-Family and Apartments (units)</td>
<td>2,340</td>
<td>0.98</td>
<td>1.47</td>
</tr>
<tr>
<td>Parks (acres)</td>
<td>40</td>
<td>0.13</td>
<td>0.20</td>
</tr>
<tr>
<td>Schools (acres)</td>
<td>6</td>
<td>0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Commercial (acres)</td>
<td>46</td>
<td>0.14</td>
<td>0.21</td>
</tr>
<tr>
<td>Open Space (acres)</td>
<td>96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roads (acres)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial (acres)</td>
<td>10,26 mgd maximum-day demand</td>
<td>1.71</td>
<td>2.59</td>
</tr>
<tr>
<td></td>
<td>242</td>
<td>0.97</td>
<td>1.45</td>
</tr>
<tr>
<td></td>
<td>118</td>
<td>0.06</td>
<td>0.08</td>
</tr>
</tbody>
</table>

From Table I-1 (Zones 2 and 3) 10.26 mgd maximum-day demand
Parcel 1 -2.59
Parcel 2 -1.45
Parcel 3 -0.08
6.16 mgd (for areas in Zones 2 and 3 already zoned for urban development)

Number of wells required with 2 mgd pumps of 17.5-hour pumping cycle per day as approved by the BWS:
\[
\frac{6.16 \text{ mgd}}{2 \text{ mgd}} \times \frac{24 \text{ hr/day}}{17.5 \text{ hr/day}} = 4.3 \text{ wells; use 5 pumps with 1 standby = 6 pumps}
\]
(10.26 mgd) and the maximum-day demand for the areas not presently zoned urban (parcels 1, 2, and 3), which amounts to 4.10 mgd.

Based on current requirements of the Board of Water Supply, well nos. 5 and 6 are required to meet the 6.16 mgd water demand projected for the areas already zoned urban. In effect, this means that the need for well nos. 5 and 6 is exclusive of the 476-acre area (parcel 1) for which Mililani Town, Inc. has initiated action for rezoning from agricultural to urban use.
II. PHYSICAL ENVIRONMENT

PHYSICAL CHARACTERISTICS

The physical features that characterize the project site and the Mililani Town development are as follows:

1. Prevailing tradewinds are from the northeast and are somewhat gentler than those found in exposed coastal areas.

2. The average annual rainfall is approximately 50 inches.

3. The average low temperature is about 64 deg F, while the average high temperature is about 80 deg F, with the average mean temperature being about 72 deg F.

4. Varying soil layers of medium to stiff reddish-brown and mottled brown silty clays can be found to a depth of 45 feet.

5. The existing ground elevation varies from 835 to 841 feet, with the groundwater table at approximately the 25-foot elevation.

6. Vegetation in the reservoir site consists primarily of wedelia and several eucalyptus trees.

7. The proposed site is located adjacent to a gulch on one side and is surrounded by pineapple fields along the other sides.

The proposed project site is within an existing BWS reservoir site, which is approximately 0.6 acres in size, with a 6-foot-high chain link fence along its boundary. The site is circular, with a 2.0 million gallon concrete reservoir, about 33 feet high, as the outstanding structure. Other structures include a drain outlet and an instrument house that contains the reservoir water level transmitter-controller. This reservoir, along with well nos. 1 and 2, was constructed in 1968 to serve the first increment of the residential subdivision known as the Mililani Town development.

RELATIONSHIP OF PROPOSED ACTION TO LAND USE PLANS, POLICIES, AND CONTROLS

The present land use of the proposed project site is AG-1 (Restricted Agricultural District). Water wells and water control structures are
permissible; therefore, the proposed well nos. 5 and 6 with their supporting facilities will not alter the land use plan or policies.
III. ENVIRONMENTAL IMPACTS

PRIMARY EFFECTS

The primary effects of this project are basically short term in nature, being associated with construction activities. These short-term construction operations include clearing and grubbing, excavation, importation of material, and construction of the concrete structure. More specifically, these short-term effects associated with construction operations include the following:

1. Noise and exhaust fumes emanating from construction machinery
2. Dust resulting from construction activity
3. Interference with Dole Company and BWS operations
4. Added sediment loading into the adjacent gulch and possibly into Waikakahalua Stream in the event a rain storm occurs during construction of the proposed facility

Although all of the above effects are unavoidable, all regulations and requirements governing the construction of the proposed facility will be adhered to during construction. It is noted that the proposed facility is located about one mile mauka of the existing H-2 highway in the pineapple fields; therefore, the noise, exhaust fumes, and dust resulting from construction activities will have minimal impact to the nearest residential area (Mililani Town development).

A long-term effect of the proposed project relates to the aesthetic factor. The proposed control building will be architecturally designed to meet the BWS standards. The present site is landscaped with ground cover (wedelia) and eucalyptus trees.

Other long-term effects are those related to the operation and maintenance of the proposed facility. Routine maintenance will involve periodic visits to the site to check the reservoir water level and to maintain pumps and electrical equipment and the grounds. Noise emanating from pump operation will be limited by a muting device.
There are no known archaeological or historical sites within the reservoir site. Not only has the site been modified during construction of the existing reservoir but the area has also been cultivated by pineapple growers for over 75 years.

The impact on the fauna and flora of the reservoir site is insignificant. The area is planted with wedelia and eucalyptus trees.

SECONDARY EFFECTS

The secondary effects of this project include the following:

1. Commitment of space taken by the proposed facility
2. Provision to meet water needs for the Mililani Town development

Construction of the proposed facility within the existing 2.0 million gallon reservoir site will deprive the BWS of using this space for other uses. Due to the limited area within the proposed site, however, it is very unlikely that the area would have been used for other activities.

A long-term secondary impact is that the provision to meet water needs for the area presently zoned urban will be satisfied, and development of this area can proceed in an orderly, controlled manner.
IV. MITIGATING MEASURES PROPOSED TO MINIMIZE IMPACT

Most of the adverse impacts of the proposed facility are related primarily to construction activities and can be mitigated through several construction methods or procedures.

Since the proposed facility is situated within the Dole Company pineapple fields and is approximately one mile mauka of the Mililani Town development and the H-2 highway, the effect of noise and dust will be minimal. The magnitude and direction of the prevailing tradewinds will also be beneficial by averting the dispersion problems associated with noise, dust, and exhaust fumes from entering the inhabited areas of the Mililani Town development.

In any event, the contractor will be required to comply with applicable noise and exhaust fume control regulations. Dust control will include periodic watering down of affected areas, as required. Interference with the operations of Dole Company and the Board of Water Supply can be minimized by properly coordinating and scheduling the construction activities with these two groups. It is recommended that construction activities be halted during a rain storm should any problems materialize as a result of sediment loading to the adjacent gulch and/or Waikakalaua Stream.
V. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This project would involve two irreversible and irretrievable commitments of resources, a commitment of land space required for the proposed facilities and the expenses associated with the construction, operation, and maintenance of the project. As mentioned previously, the proposed facility is located within the existing reservoir site, and it is unlikely that this committed space will be used for other activities. Hence, this commitment of land can be considered negligible.
VI. ALTERNATIVES TO THE PROPOSED ACTION AND ASSOCIATED IMPACTS

The two alternatives to the proposed action considered are (1) to do nothing or (2) to select an alternate site for the facility.

DO-NOTHING ALTERNATIVE

To do nothing regarding the source of the water supply would curtail further development of Mililani Town. This would deprive the people of Oahu of many badly needed homes and would also deprive Mililani Town, Inc. from developing lands that are presently zoned urban. This alternative appears unjustified in light of the demand for housing and the conformity to the general plan.

ALTERNATIVE SITE

Well nos. 5 and 6 were initially designated to be constructed at the existing well field I along with well nos. 1, 2, 3, and 4. Since that time, hydrogeological data have indicated the possible impairment of the groundwater basal lens by a concentrated drawoff by a closely grouped well system. For that reason, the BWS mandated that well nos. 5 and 6 be constructed at the proposed site.
VII. SUMMARY AND CONCLUSIONS

The need for the two additional wells and appurtenances was established in order to meet the maximum day water demand requirements for the areas below the H-2 highway that are zoned for urban development. Most of the adverse impacts of the project are short term and construction related and can be mitigated by proper construction methods or procedures.

The impact of the proposed project is therefore not considered to be detrimental to the surrounding environment, and an environmental impact statement is not required.
APPENDIX D

Letters from City and County of Honolulu Board of Water Supply to M & E Pacific (Sunn, Low, Tom & Hara), February 14, 1977 and June 1, 1977.
June 1, 1977

Sunn, Low, Tom & Hara, Inc.
Pacific Trade Center
Suite 600, 190 So., King Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Your letter of May 13, 1977 relating to Mililani Town Water Master Plan

We are returning your sepia of the water master plan for Mililani Town. There is no need for our approval of this plan as our February 14, 1977 letter approves the development plan for Zones 2 and 3 subject to certain conditions.

We concur with your tentative locations of the future wells. Final adjustments will be made when construction plans are submitted. Future wells (Nos. 7 and 8) should be part of the "685" system rather than the "865" system.

If you have any questions, please call Ichiro Tanaka at 548-6129.

Very truly yours,

Edward Y. Hirata
Manager and Chief Engineer

[Signature]

Attach.
February 14, 1977

Mr. Paul T. F. Low
Senior Vice President
Sunn, Low, Tom & Hara, Inc.
Pacific Trade Center
190 So. King St., Suite 600
Honolulu, Hawaii 96813

Dear Mr. Low:

SUBJECT: Revised Water Master Plan for Mililani Town Dated July 1976

The subject master plan for Zones 2 and 3 is approved subject to the following:

1. The number of wells (8) and storage requirements for Zones 2 and 3 as previously determined shall be applicable to the subject master plan (see attachment).

2. The two wells (No.'s 5 and 6) which were approved on May 15, 1975 must be drilled when the combined annual average daily draft for Zones 2 and 3 reaches 4 mgd.

3. Two additional wells (No.'s 7 and 8) per master plan dated October 12, 1967 must be drilled when the combined annual average daily demand for Zones 2 and 3 reaches 6 mgd. These two wells should be a minimum of 100 linear ft. apart and be located in the vicinity of the 6851 Reservoir site.

The master plan for Zone 1 is not approved at this time as the development of its sources is subject to further study and evaluation of the area's water resources. However, the designated low pressure area in Zone 1 cannot be served off the 1080' system as per our letter dated August 29, 1967. It will require a completely separate water system. All water facility requirements for Zone 1, the designated low pressure area, and any changes or additions to the subject master plan must comply with our latest system requirements.
In conjunction with the subject master plan, we request a development implementation schedule for all the units in Zones 2 and 3 showing all existing, approved, and proposed units together with their projected water demands.

Very truly yours,

Edward Y. Hirata
Manager and Chief Engineer

ATTACH.
SUMMARY

1. Requirements for Zone 1 and Low Pressure Area

   A. Not approved at this time. However, all facilities must conform to our system requirements that are in effect at the time of their approval.

2. Requirements for Zones 2 and 3

   A. Source

      1. Total number of wells - 8 (Master Plan dated October 12, 1967).

      2. Well No.'s 1, 2, 3 and 4 are existing.

      3. Well No.'s 5 and 6 shall be located at the 865' Reservoir site (our letter dated May 15, 1975). These two wells shall be drilled when the annual average daily draft reaches 4 mgd.

      4. Well No.'s 7 and 8 shall be located in vicinity of the 685' Reservoir site. These two wells shall be drilled when the annual average daily draft reaches 6 mgd.

   B. Reservoirs

      1. For 685' system - 1.0 mg reservoir (existing)

      2. For 865' system - 2.0 mg reservoir (existing)

   C. Mains

      1. Any changes or additions in the transmission main network and all distribution network that are to be sized in subsequent submittals shall conform to our system requirements that are in effect at the time of their approval.
Mr. Paul T. F. Low  
Senior Vice President  
Sunn, Low, Tom & Hara, Inc.  
190 South King Street, Suite 600  
Honolulu, Hawaii 96813

Dear Mr. Low:

SUBJECT: Mililani Town Water System Plan  
Submitted January 21, 1977

We are evaluating the subject plan and shall inform you of our findings by February 28, 1977.

Very truly yours,

Herbert H. Minakami  
Assistant Waterworks Chief Engineer
January 21, 1977

Mr. Herbert Minakami
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96813

SUBJECT: Mililani Town Water System

As requested at our meeting on January 10, 1977, we are transmitting herein the following items:

1. A copy of the proposed water system plan that was submitted to the BWS on August 8, 1967

2. A copy of the BWS letter dated August 29, 1967 approving the plan

3. A copy of our summary report to Mililani Town, Inc., which includes the basis for design used in the development of the above water system plan

We appreciate your consideration to review the original water master plan and commitment made by the BWS. We will be glad to meet with you on this matter, or, should you need further information, please call me or Robert Lau at 521-3031.

PAUL T. F. LOW
Senior Vice President

RL/bs

Encl.
APPENDIX E

List of Necessary Approvals and Their Status.
The following is a general list of approvals needed to complete the development and construction process on the 476-acre area. Documents will need to be prepared and applications will be submitted to the appropriate agency on all of the processes noted below with the exception of the rezoning application which was submitted in November of 1977. Processing of the rezoning application is awaiting acceptance of this EIS.

<table>
<thead>
<tr>
<th>APPROVAL NEEDED</th>
<th>APPROVED BY</th>
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<tbody>
<tr>
<td>Rezoning</td>
<td>City Council/Mayor</td>
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<tr>
<td>Planned Development</td>
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<td>(Where Applicable)</td>
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<tr>
<td>Cluster Development</td>
<td>City Council</td>
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<td>(Where Applicable)</td>
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<tr>
<td>Subdivision Approval</td>
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<tr>
<td>1) Tentative Approval of Preliminary Map</td>
<td>Department of Land Utilization</td>
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<td>2) Approval of Final Map</td>
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<td>3) Approval of Stamped Map</td>
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<tr>
<td>Grading Permit</td>
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<td>Civil Engineering</td>
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<tr>
<td>Refuse</td>
<td>Department of Land Utilization</td>
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<tr>
<td>Sewer</td>
<td>Department of Health</td>
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<tr>
<td>Drainage</td>
<td>Department of Public Works</td>
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<tr>
<td>Street Construction, Signing, and</td>
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<tr>
<td>Pavement Markings</td>
<td>Department of Transportation Services</td>
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<tr>
<td>Electrical, Telephone, and</td>
<td>Hawaiian Electric Co.</td>
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<tr>
<td>Street Lights</td>
<td>Hawaiian Telephone Co.</td>
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<tr>
<td>Water</td>
<td>Department of Parks and Recreation</td>
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<tr>
<td>Street Tree Plan</td>
<td>Hawaiian Telephone Co.</td>
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* Bill 22 currently before the Council could change current procedures.
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<thead>
<tr>
<th>APPROVAL NEEDED</th>
<th>APPROVED BY</th>
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<tr>
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<td>Park Dedication</td>
<td>Department of Parks and Recreation</td>
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<td>Street Names</td>
<td>City Council/Mayor</td>
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<td></td>
<td>City Council/Mayor</td>
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</table>
APPENDIX F

Traffic Assignments and Highway Geometrics Used for Estimating Probable Air Quality Impacts.
1985 TRAFFIC ASSIGNMENTS - A.M. PEAK HOUR
MEHEULA AT LANIKUHANA INTERSECTION

CASE III

Meheula Parkway

Kuahelani Avenue

780

1767

H-2

Kuahelani Avenue

389

3098

220
1985 TRAFFIC ASSIGNMENTS - P.H. PEAK HOUR
MEHEULA AT LANIKUHANA INTERSECTION

CASE I

1985 TRAFFIC ASSIGNMENTS - P.H. PEAK HOUR
MEHEULA AT LANIKUHANA INTERSECTION

CASE II

F-6
1985 TRAFFIC ASSIGNMENTS - P.H. PEAK HOUR
MEHEULA AT LANIKUKANA INTERSECTION

CASE III

Meheula Parkway

Lanikuhana Avenue

F-7
MEHEULA - KAM HIGHWAY INTERSECTION
GEOMETRICS

KUAHELANI - KAM HIGHWAY INTERSECTION
GEOMETRICS

Receptor Location

NOT TO SCALE
### APPENDIX G. COMMENTS AND RESPONSES

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<th>Page</th>
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<td>U.S. Army, Directorate of Public Health</td>
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<tr>
<td>Dept. of Public Works, C&amp;C of Honolulu</td>
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<td>U.S. Navy, Headquarters, Fifteenth Naval District</td>
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<td>U.S. Coast Guard</td>
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<td>Dept. of Parks and Recreation, C&amp;C of Honolulu</td>
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<td>Dept. of Transportation, State of Hawaii</td>
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<td>Dept. of Transportation Services, C&amp;C of Honolulu</td>
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<td>Honolulu Board of Water Supply</td>
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<tr>
<td>Mililani Town Association</td>
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<td>Water Resources Research Center, University of Hawaii</td>
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<td>Environmental Center, University of Hawaii</td>
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<tr>
<td>Dept. of Education, State of Hawaii</td>
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<td>U.S. Dept. of the Air Force</td>
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<tr>
<td>Dept. of Health, State of Hawaii</td>
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<td>Hawaii Housing Authority</td>
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<tr>
<td>Douglas Meller</td>
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<tr>
<td>Dept. of Planning &amp; Economic Development, State of Hawaii</td>
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<tr>
<td>Dept. of General Planning, C&amp;C of Honolulu</td>
<td>G-49</td>
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<tr>
<td>Office of Environmental Quality Control, State of Hawaii</td>
<td>G-55</td>
</tr>
</tbody>
</table>
May 26, 1978

Mr. Tyrone T. Kusao
Dept. of Housing & Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Kusao:

Environmental Impact Statement
Proposed Mililani Town Expansion

Thank you for your letter of May 26, 1978, regarding the Environmental Impact Statement for the proposed expansion of Mililani Town. We appreciate the time spent by you and your staff in reviewing the document, and are pleased that you found it to contain an adequate assessment of the probable effects of the proposed project. I have discussed with Mililani Town, Inc. your desire that housing for low- and moderate-income families be provided in the single-family portions of the proposed development rather than in multi-family structures or in separate developments. The results of these discussions are summarized below.

As you may know, about 20 percent of all the residential units constructed at Mililani Town to date have been in the moderate-price categories (see Table 1). As indicated in the EIS, this policy would be continued in the proposed increment. In addition to this, Mililani Town, Inc.’s parent company, Oceanic Properties, Inc., has been involved in a number of housing projects on Oahu that are aimed at low- and middle-income families. Among these are Whitmore Village (12 three-bedroom units sold in 1972 for $32,000 each), Lalawal Hale (96 two-and-three-bedroom units sold in 1972 for $32,000 each and sponsored by HHA), and Waialua Town (76 three-bedroom single-family units sold in 1975 and 1976 for $32,000 each). At present, Oceanic is completing an agreement with your office...
for another single-family project in the Waialua District that would be aimed at families with incomes below the Oahu median. The relatively low prices envisioned for that project are possible only because government agencies have relaxed certain development standards and because the units are smaller and of a somewhat lower quality than those at Mililani Town.

Mililani Town, Inc. would be pleased to discuss with you the possibility of using Community Development Block Grant funds or other City or State programs to subsidize the sales price of certain homes at Mililani. Such a subsidy might make it possible to implement your suggestion that moderate-income detached housing be provided that is integrated with other detached housing in Mililani Town. Mr. Gene Ferguson, General Manager of Mililani Town, Inc., can be reached at 546-4833.

Sincerely,

Perry J. White

cc: Mililani Town, Inc.
Department of Land Utilization
Environmental Quality Commission
Do Reviewer,

STATE OF HAWAII

CIVILIAN QUALITY CONTROL DIVISION OF THE GOVERNOR

May 22, 1978

Dear Reviewer:

Attached for your review is an Environmental Impact Statement (EIS) prepared pursuant to Chapter 343, Hawaii Revised Statutes and its Rules and Regulations:

Title: Wailanu Town Expansion
Location: Wailanu, Oahu
Classification: Applicant Action

We would appreciate your comments or acknowledgement of no comments. Please submit one copy each to:

1) Accepting Authority: Dept. of Land Utilization
   Address: City and County of Honolulu
   Honolulu Municipal Building
   Honolulu, HI 96813

2) Proposing Party: Wailanu Town, Inc.
   Address: P.O. Box 2780
   Honolulu, HI 96803

Your comments must be received or postmarked by: June 22, 1978

If you have no future use for this document, please return the EIS to the Commission. (Comments or acknowledgement of no comments should be directed to both the accepting authority and proposing party.

Thank you for your participation and cooperation in the EIS process.

Patricia A. Greene
Colonel, ANC
Chief, Preventive Medicine Activity
Directorate of Health Services

Belt, Collins & Associates

A division of Lyon Associates, Inc.

Engineers, Planners, Landscape Architects

511 Hawaii Building • 745 Fort Street • Honolulu, Hawaii 96813 • Telephone (808) 941-3308

June 9, 1978

Col. Patricia A. Greene
Chief, Preventive Medicine Activity
Directorate of Health Services
U.S. Army
Tripler Army Medical Center
Tripler AMC, Hawaii 96859

Dear Col. Greene:

Thank you for reviewing the Environmental Impact Statement for the proposed Wailanu Town Expansion Project.

Sincerely,

P.J.W.:dmr

Patricia A. Greene
Colonel, ANC
Chief, Preventive Medicine Activity
Directorate of Health Services

Principals: Robert M. Bell, James R. Bell, Paul M. Hilma, Frank F. Love, Jr.

Assistants: William B. Ng, Raymond F. Cane, Mark H. Hudson, Laura A. Heffey, Joseph Vinci, Jr., Paul P. Walkshammeister, Jr.
MEMORANDUM

TO: MR. GEORGE MORIGUCHI, DIRECTOR
    DEPARTMENT OF LAND UTILIZATION

FROM: WALLACE MIYAMIRA, DIRECTOR AND CHIEF ENGINEER

SUBJECT: EIS FOR MILILANI TOWN EXPANSION

June 2, 1978

We have reviewed the subject document and have the following comments.

1. Design flows (Qo) for major drainage outlets as shown on Figure I-6 can be considered accurate subject to further review by the Drainage Section.

2. Sewage lift stations are generally undesirable because of their operation and maintenance costs. Therefore, before the station, as shown in Figure I-9, is allowed to be constructed, a comparative cost analysis between pumping and gravity systems must be conducted.

3. Table IV-4 does not include the flows from the commercial area (shopping center). Other errors are also noted. Mr. George Iwamoto (523-4067) from the Wastewater Management Division should be consulted for the revision of this table.

4. In the discussion of erosion/sedimentation (Chapter VII, page 1) it is stated that 30 to 50 acres will be worked on at any given time. With respect to grading and grubbing operations, the ordinance limits the maximum area to 15 acres at any one time.

5. In our letter of February 2, 1978, we pointed out that there will be an additional annual cost of $150,000 for refuse collection and disposal should the proposed rezoning be approved. The corresponding annual cost of sewage treatment will be about $73,000.

Mr. George Moriguchi

June 2, 1978

WALLACE MIYAMIRA
Director and Chief Engineer

cc: Mililani Town, Inc.
    Div. of Engineering (Drainage Section)
    Div. of Refuse Collection & Disposal
    Div. of WW (Planning Branch)
MEMORANDUM

TO: MR. GEORGE MORIGUCHI, DIRECTOR DEPARTMENT OF LAND UTILIZATION

FROM: WALLACE MIYAHIRA, DIRECTOR AND CHIEF ENGINEER

SUBJECT: EIS FOR MILILANI EXPANSION

We wish to amend our memorandum ENV 78-174 dated June 2, 1978, by adding the following comments.

6. The buffer area between the treatment plant and Mililani Town appears to be in jeopardy. We understand that this area is now under the control of a third party who is not obligated to the City with a written agreement to maintain the area as a buffer zone.

7. There was a tacit understanding between Mililani Town, Inc., and the Division of Wastewater Management (Sewers) that the boundary on the Waianae side of the plant (next to the sludge drying beds) could be relocated to provide additional space for future increments. If post treatment units and storage ponds are required on the plant site as part of the effluent reuse plan, the proposed Increment IV of the plant expansion could be in jeopardy.

cc: Mililani Town, Inc.
Div. of Wastewater Management

July 17, 1978

Mr. Wallace Miyahira
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Miyahira:

Mililani Town Expansion EIS

Thank you for reviewing the Mililani Town Expansion Environmental Impact Statement prepared by Belt, Collins & Associates. We appreciate the careful attention that your staff gave to the document, and hope that the following point-by-point response to the comments contained in your letters of June 2 and June 8, 1978, will be adequate.

1. The design flows of the sewerage system shown on Figure 1-6 are preliminary. They will, of course, be confirmed with your Department as part of the normal construction review process.

2. We are aware of the advantages of gravity sewerage systems, and conceptual plans for the proposed project have been based on the assumption that they would be used wherever possible. At present, a 12-acre residential area adjacent to the H-2 Freeway at the eastern corner of the site is the only one where it appears that a sewage lift station might be required. However, no engineering for this area has been done as yet. If, after further study, it appears that the use of a lift station offers significant engineering and economic benefits, a comparative analysis of the alternatives would be submitted to your Department for review.

3. You are correct in your observation that Table IV-4 does not include flows from the proposed commercial center, and I have discussed the matter with Mr. George Iwamoto of your Department. Using the City and County design standard of 4,000 gallons per day per acre of local business area, the 46-acre

commercial center would generate an average of 184,000 gallons per day. Adding this to the 1,025,800 gallons per day that would be generated by the proposed residential development gives a total increase in average sewage flows from the proposed development area of 1,210,800 gallons per day or 1.21 mgd. If the maximum rate of flow is estimated using this number and the Babbit curve shown on page 15 of the Division of Sewers "Design Standards", then the "maximum flow" is 3.05 times this, or approximately 3.7 mgd. Peak flow, which takes into account infiltration of 1,250 gallons per acre per day from the approximately 335 acres on which development would occur, would be about 0.42 mgd higher or 4.12 mgd.

While this figure would be appropriate for sizing the sewer trunk lines serving the project, it would overestimate the impact that the proposed development would have on maximum and peak flows arriving at the sewage treatment plant. Here, flows from the project site would be combined with those from other areas, thereby reducing the variability of flow volumes. To arrive at a fairer estimate of the project's effects on flows at this point, we may begin with the conservative assumption that all of the 3.6 mgd capacity of the existing sewage treatment plant will be fully utilized before flows from the proposed project begin. For an average daily flow of 3.6 mgd, the Babbit curve indicates a maximum flow rate of 2.45 times the average, or 8.82 mgd. Adding the 1.21 mgd average flow estimated for the project to the 3.6 mgd gives a total average daily flow of 4.81 mgd. The maximum flow for this rate shown on the Babbit curve is about 2.3 times this, or about 11.06 mgd. This is 2.24 mgd higher than the maximum flow calculated using an average daily flow of 3.6 million gallons. As before, infiltration must be added to this to obtain a figure for peak flow.

4. The City and County of Honolulu's grading ordinance states:

"The maximum-sized parcel of land that may be opened for grading or grubbing is 15 acres. Non-contiguous increments may be worked concurrently provided no single parcel exceeds 15 acres." (Sec. 23-3.1.E)

The reference in the EIS noted in your letter (Chapter VII, p. 1) was to the total area of the site on which some type of construction activity was likely to be occurring at any given time. In general, construction at Millilani is phased in units of about 100 lots. When a unit exceeds 15 acres, it is divided into increments for grading purposes. Hence, no more than 15 acres of any one parcel is being graded at any one time. Construction is usually underway on several parcels at once, however. Consequently, the total area exposed on the entire 476 acre site would be somewhat more than this, perhaps 25 to 35 acres. Because these different areas are not contiguous, the operations are consistent with the 15-acre maximum set by the ordinance. The EIS's reference to 30 to 50 acres "...actually being worked at one time..." took into account the fact that more than one parcel might be the subject of grading operations at the same time and that temporarily increased erosion might be expected from areas where buildings had been constructed but where landscaping had not been firmly established.

5. Thank you for the cost figures provided for sewage treatment and solid waste collection and disposal. They will be appended to the EIS.

Your comments nos. 6 and 7 have already been responded to by Mr. Gene Ferguson, vice-president and general manager of Millilani Town, Inc., in a letter dated June 30, 1978. Rather than repeat the material contained in them, I have attached a copy of that letter to this response.

Sincerely yours,

Perry J. White

PjW:kko

attachment

cc: Millilani Town, Inc.
Dept. of Land Utilization
Environmental Quality Commission
June 30, 1978

Mr. George Moriguchi, Director
Department of Land Utilization
City & County of Honolulu
650 South King St. - 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Moriguchi:

EIS for Mililani Expansion

This is in regard to the memorandum of Mr. Wallace Miyahira, Director and Chief Engineer, to you dated June 8, 1978, wherein he amends his previous comments with reference to the expansion of the Mililani Treatment Plant.

Mr. Miyahira expressed his concern about the use of the buffer area, being Lot 5412, now Lot 6412, Map 466. The creation of this buffer lot was the subject of my letter to you dated May 28, 1976 explaining that the lot would be used for a proposed nursery site by third parties. It was felt that the continued agricultural use of the property was better protection for its role as a buffer zone than leaving the land idle.

The occupant of the lot, Watanabe Floral, Inc., is aware of the purpose and nature of the lot and the treatment plant and in that regard is required to create a buffer zone of trees between its operation and the homesites. Hopefully, he will be able to recycle sewage effluent for use in his nursery. In addition, our agreement with Mr. Watanabe under his lease and option to purchase is that only one residence would be built for security purposes. Thus the buffer zone can be maintained in productive use totally compatible with the zoning and the objective of retaining the area as protection against claims of nuisance, etc. In the event the treatment plant is not operating properly and odors are emitted, the buffer zone of intense agricultural use would help alleviate that problem. This is to assure you that the lessee of the property and potential owner is aware of the functions of the lot as a buffer between the treatment plant and the residences, and that the use is strictly limited to agricultural uses, consistent with the zoning under the lease covenants as well as the option to purchase.

With regard to areas needed for expansion for future increments, Mililani Town, Inc. is the holder of an option from Castle and Cooke, Inc. which provides the right to acquire properties for sewage treatment and other utility facilities. This right extends to the adjacent agricultural properties south and west of the sewage treatment plant and the buffer zone. These areas can be made available for expansion of the STP and would not appear to be a problem from an engineering standpoint. For an example, we have outlined in yellow on the attached map an area which could be used.

We hope that our explanation will relieve the concerns of the City on Mililani STP expansion.

Very truly yours,

FJILLILANI TOWN INC.

Gene Ferguson
Vice President and General Manager

cc: Wallace Miyahira
Division of Wastewater Management
May 31, 1978

GEORGE S. MORIGUCHI, DIRECTOR
Department of Land Utilization
City & County of Honolulu
650 S. King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Moriguchi:

This is in response to the request of the Environmental Quality Commission for our comments on the E.I.S. for the Mililani Town Expansion dated May, 1978.

As you know, we have previously commented (at the DLUM amendment phase) that the project is inappropriate since it utilizes valuable agricultural land. We also note that the total population of the Mililani-Waipio area will exceed the year 2000 population allocation of the New General Plan if the zoning request is approved (see attachment). The Headrick Development Company is also asking approval for a major population increasing project in the area. We expect that your Department will respect the New General Plan.

The most important piece of information in the E.I.S. is the admission that the wells to be drilled to provide the potable water source for the project will result in salt water intrusion into the aquifer and the possible (p. 20). On Page 22, the E.I.S. indicates that the problem of water consumption by the proposed project "would aggravate the existing overdraft situation and must, therefore, be considered significant".

We believe that the preceding discussion (p. 22) on problem mitigation proposed measures which are inadequate to solve the problem. It is proposed, for example, that the re-use of sewage effluent from the Mililani Sewage Treatment Plant to irrigate the nearby sugarcane fields will free water to be used for residential purposes. There are two main deficiencies with this proposal.

1. Much of the water used by the sugar company comes from Waiahole Ditch which is not water from the Pearl Harbor aquifer. This water is imported from the Koolau Range. Therefore, decreasing the use of this irrigation water will not make water available in the Pearl Harbor aquifer. In fact, it will worsen the situation since a large amount of irrigation water percolates into the ground and replenishes the aquifer. This is primarily water that is imported via the Waiahole Ditch from the Koolau Mountains. The use of drip irrigation will therefore further lower the water table.

2. The second problem is related to the first, in that the sugar company will not give up any of the Waiahole Ditch water; in fact, they speak of increasing the number of acres in cane cultivation which will increase the use of Waiahole Ditch water for agricultural use.

There is little justification, therefore, for the statement on page 24, that the "increased water withdrawal by wells at Mililani would be offset by reductions in agricultural water use".

The conclusion must be that an adequate water source to serve the project at the present time does not exist.

The Central Oahu water problem is compounded by the imminent construction of the Gentry-Waipio urban development. This project will also dig four wells in the Pearl Harbor aquifer nearby. The Board of Water Supply has stated in conjunction with this project that an overdraft condition exists.

There is one very important point to note here. In approving the Mililani and Waipio wells, the Board of Water Supply is not saying that adequate water exists to serve the projects. They are maintaining the position that it is not their responsibility to disapprove a request for water even though the supply is not adequate. They have taken the position that they will indicate the water situation to other decision-making agencies such as yours. They are thereby passing the (buck) decision on the appropriateness of the projects to you and the City Council. The Board of Water Supply has said on numerous occasions that it does not consider itself to be a regulatory agency.

As a result of the water situation that has come to light as a result of the E.I.S., we see no way that the rezoning could be justified at this time.

Sincerely,

Richard Poirier, Chairman
Planning & Zoning Committee

cc: MTL - For Response
Barnhorst
Planning Commission
EQC
Mililani Town Association
Life of the Land
Board of Water Supply
All Board Members
ATTACHMENT I

COMPARISON OF MILILANI-WAIPIO EXISTING AND PROPOSED POPULATION WITH GENERAL PLAN POPULATION ALLOCATIONS

<table>
<thead>
<tr>
<th>Area</th>
<th>Existing Population</th>
<th>Proposed Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waipio area</td>
<td>1,098</td>
<td>3,315</td>
</tr>
<tr>
<td>Melemanu I &amp; II (1,105 x .30)</td>
<td>3,315</td>
<td>3,315</td>
</tr>
<tr>
<td>Melemanu III (proposed)</td>
<td>2,300</td>
<td>2,300</td>
</tr>
<tr>
<td>MTI constructed or zoned by 1975</td>
<td>22,693</td>
<td>22,693</td>
</tr>
</tbody>
</table>

Sub Total (without any new MTI rezonings) = 30,192

MTI requested rezonings (proposed)

<table>
<thead>
<tr>
<th>Area</th>
<th>Low (5%)</th>
<th>Stated</th>
<th>High (15%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area I</td>
<td>11,035</td>
<td>37,050</td>
<td>39,000</td>
</tr>
<tr>
<td>Area II</td>
<td>1,700</td>
<td>34,250</td>
<td>36,750</td>
</tr>
<tr>
<td>Area III</td>
<td>700</td>
<td>4,577</td>
<td>4,527</td>
</tr>
<tr>
<td>TOTAL</td>
<td>13,435</td>
<td>43,627</td>
<td></td>
</tr>
</tbody>
</table>

1MTI data.

2Assuming approval of Melemanu Unit III (about 765 units).

3Use of the low or high for one area may require a simultaneous increase or decrease in some other area of the Island.
Mr. Richard Poirier, Chairman
Planning and Zoning Committee
Millilani/Waipto/Helemanu Neighborhood
Board No. 25
c/o Wahiawa Satellite City Hall
830 California Avenue
Wahiawa, Hawaii 96786

Dear Mr. Poirier:

Thank you for your letter of May 31, 1978, commenting on the environmental impact statement for the proposed Millilani Town Expansion. I appreciate the fact that you responded so promptly rather than waiting until the end of the comment period.

Your letter raises three major objections with regard to the proposed project:

1. It is inappropriate since it would result in the conversion of valuable agricultural land to urban use (p. 1, para. 2);
2. The total population of the Millilani-Waipto area will exceed the year 2000 population allocation of the 1977 Oahu General Plan if the zoning request is approved (p. 1, para. 2); and
3. The impact of the proposed project would result in an increase in withdrawals from the Pearl Harbor aquifer, a source which the Board of Water Supply has stated is already being over-utilized.

Of the three concerns listed above, the only one which you clearly state is not dealt with to your satisfaction is the third, i.e., increased water withdrawals from the Pearl Harbor basin lens. However, based on the fact that the population projections shown on your "Attachment I" differ substantially from those shown in the EIS, I will touch briefly on that issue as well. Nothing in your letter indicates dissatisfaction with our discussion of the agricultural lands issue, and it is not addressed below.

Population

Your "Attachment I" states that the ultimate population of the portion of Millilani Town approved to date would be 22,683. As a source you refer vaguely to "MII data"; I assume that you are referring to estimates shown in the General Plan Amendment application that included the same area covered by the present rezoning request, but cannot be sure. Much more current population data are now available and should be used. Because of this, I would like to begin by briefly reviewing the figures cited in "Attachment I" of your letter.

As shown in Table 1, the best information available indicates that as of December 31, 1977, the population of the Millilani-Waipto area was 20,760. Once units in Helemanu, Millilani, and Village Park that have already been approved are completed, it is estimated that the population will be about 30,225 higher, or 50,855. This includes a significant amount of development in the proposed Village Park development not included in your summary. The figures shown do not include Helemanu III because the proposed site is neither general planned nor zoned for that development, although it is in the State Land Use Commission's Urban District. Finally, it should also be noted that "Areas II & III" shown in your Attachment I are erroneously included under the heading of "MII requested rezonings (proposed)". The most recent General Plan changes at Millilani were for three areas designated I, II, and III, and I assume that you obtained the figures shown from the General Plan Amendment application. The present rezoning request is only for the area that was referred to as Area I, however, and the total number of units in the area proposed for rezoning should read 30,000 (see Page 1-10 of the EIS). Hence, the total number of people in the Millilani-Waipto planning area following completion of the proposed development at Millilani and all other property having the proper zoning would be just under 41,000 people assuming a continuation of present persons-per-unit levels. In fact, the average number of persons per unit is expected to decline measurably over the next ten years, and this would result in a significantly lower population in the Planning Area than we are projecting.

One of the key elements in the new Oahu General Plan is the allocation of projected population growth to various areas of the island. The Council based its distribution on the then-current series E-2 projection made by the State Department of Planning and Economic Development, i.e., on a year 2000 Oahu population of 1,039,000. Of these, 3.8 percent of this amount, or 39,482 people, were allocated to the Millilani-Waipto area (Millilani-Waipto is slightly higher than the 39,000 also shown in the same table. The difference of 482 is presumably attributable to rounding.) Since the General Plan indicates that a variation of ±5 percent is acceptable, the population could range from 37,500 to 41,456 and still be consistent with it. Hence the projected population of about 41,000 with the proposed project is within the range deemed acceptable.

In March, 1978, the Department of Planning and Economic Development released a new set of population projections designated II-F. These indicate a year 2000 Oahu population of about 917,000 and are presumably the source of the 917,000 figure shown in your attachment I. The City Council has not yet acted to adjust the General Plan population allocations to the various planning areas in view of the significantly lower islandwide projection, although there are indications that they will eventually do so. If and when that occurs, it is very likely that they will reduce growth in all areas equally as you have done. Because of this, I do not believe there is any firm basis for the lower population allocation to the Millilani-Waipto area that you have shown (i.e., 35,000).
Table 1. Existing and Projected Population of the Millilani/Valipio Area

<table>
<thead>
<tr>
<th>Area</th>
<th>Dwelling Units Completed As of 12/31/77</th>
<th>Avg. No. of Persons/Unit</th>
<th>Vacancy Rate (%)</th>
<th>Estimated Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valipio Acres</td>
<td>5122</td>
<td>2.9</td>
<td>2.5</td>
<td>1,391</td>
</tr>
<tr>
<td>Honolulu</td>
<td>6422</td>
<td>2.7</td>
<td>2.5</td>
<td>1,594</td>
</tr>
<tr>
<td>Millilani Town</td>
<td>5,118</td>
<td>2.6</td>
<td>2.5</td>
<td>12,165</td>
</tr>
</tbody>
</table>

Dwelling Units Approved but Not Completed as of 12/31/77

<table>
<thead>
<tr>
<th>Area</th>
<th>Avg. No. of Persons/Unit</th>
<th>Rate (%)</th>
<th>Estimated Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honolulu</td>
<td>2.7</td>
<td>2.5</td>
<td>1,107</td>
</tr>
<tr>
<td>Millilani</td>
<td>2.6</td>
<td>2.5</td>
<td>1,097</td>
</tr>
<tr>
<td>Village Park</td>
<td>1,500</td>
<td>2.8</td>
<td>2,506</td>
</tr>
<tr>
<td>Total Population in Areas Having Zoning</td>
<td>30,985</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Existing and Projected Population of Millilani Area

<table>
<thead>
<tr>
<th>Area</th>
<th>Dwelling Units Completed As of 12/31/77</th>
<th>Avg. No. of Persons/Unit</th>
<th>Vacancy Rate (%)</th>
<th>Estimated Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millilani</td>
<td>3,450</td>
<td>2.9</td>
<td>2.5</td>
<td>10,800</td>
</tr>
</tbody>
</table>

Total Projected Population | 49,885

Water Withdrawals From The Pearl Harbor Basal Lens

We agree with you that the question of possible adverse effects resulting from increased water withdrawals from the Pearl Harbor basal lens is an important one. That is why considerable attention was devoted to this matter in the EIS despite the fact that the proposed project's effects on the 250 to 300 mgd discharge rate of the aquifer are likely to be extremely small.

With regard to this matter, it should also be noted that the discussion of this topic has been altered slightly in the final EIS as a result of comments received from the Honolulu Board of Water Supply. I have attached a copy of the Board's letter and revised Pages IV-20 to IV-24 of the EIS for your use.

There is, we believe, one further point that needs to be made concerning impacts on the aquifer. The Oahu General Plan, the State Plan, and other relevant policy documents accept the idea of moderate population growth on the island through the year 2000. Regardless of whether this population is housed, it will require additional water. Moreover, the two areas where growth seems most likely to occur -- the Ewa plain and the Honolulu urban core -- would have to either draw from the Pearl Harbor aquifer or import water from another groundwater area. The Schofield high level aquifer is the one largely untapped resource within a reasonable transmission distance of the areas where additional development is likely, and it is much closer to Millilani than to either Ewa or Honolulu. From this point of view, then, the problems of obtaining water for these other areas appear to be at least as great as those faced at Millilani.

Paragraphs four through seven of your letter relate reasons why you believe the mitigation measures discussed in the EIS "...are inadequate to solve the problem." I will attempt to respond to the specific points made in this portion of your letter first, and then expand somewhat on the discussion contained in the report.

You state that there are two main deficiencies with the EIS's argument that "...the reuse of sewage effluent from the Millilani Sewage Treatment Plant to irrigate the nearby sugarcane fields will free water to be used for residential purposes. The first is that much of the water now being used to irrigate the fields in question comes from the Waialae Ditch rather than the Pearl Harbor Basin; the second is that the sugar company will not reduce its use of other water once it begins receiving the effluent.

The specific wording in the EIS relative to this matter is as follows:

"...the use of effluent from the Millilani STP for the irrigation of the sugarcane fields means that potable water previously drawn from the aquifer need not be used. As a result, it is reasonable to expect that most of the increased water withdrawal by wells at Millilani would be offset by reductions in agricultural use." (p. IV-22 & 24)
The phrase "need not be used" was carefully chosen to indicate that a reduction in withdrawals from the aquifer was possible as a result of the re-use scheme, but would not occur automatically. In expressing a belief that the effluent would be used to reduce the amount of agricultural water drawn from the aquifer, we were admittedly making an inference. However, given the heightened public concern relative to the wise use of Oahu's water resources in general, and the Pearl Harbor aquifer in particular, we believe that there are strong enough inducements that the responsible government agencies will act to insure that such quid pro quo reductions will occur.

If effluent from the sewage treatment plant is used on fields that, as you have correctly indicated, are now irrigated by water from the Waipio Ditch, water from that source could be used to irrigate fields that now depend on water pumped from the Pearl Harbor basal lens. This, in turn, would allow pumping to be reduced below its current levels. You have indicated that the Oahu Sugar Company would utilize the "extra" water that would be available to expand the amount of sugar cane acreage it has under cultivation. Given the current price of sugar, this appears extremely unlikely. A more likely use of this water would be to increase the intensity of irrigation on their existing sugar lands as a means of boosting productivity. If the water savings referred to in the EIS are to be used to reduce the stress on the aquifer, it will be necessary to insure that this latter course is not followed. In retrospect, I believe the difficulties inherent in implementing the proposal could have been somewhat more play in the EIS. Nonetheless, the problems are not so difficult as to be insurmountable, and it is our hope that the EIS's public discussion of the problem will provide an incentive to the parties that are involved to work out a satisfactory arrangement.

I hope the above has answered the questions you raised in your letter. If there is additional information that I can provide, please contact me at 521-5361.

Sincerely,

Perry J. White

cc: Mililani Town, Inc.
    Dept. of Land Utilization
    Environmental Quality Commission
June 22, 1978

Col. B. R. Schlapak
District Engineer
U.S. Army Engineer District, Honolulu
Building 230
Fort Shafter, Hawaii 96858

Dear Col. Schlapak:

Environmental Impact Statement
Proposed Millilani Town Expansion

Thank you for your letter of June 8, 1978, regarding the Environmental Impact Statement for the proposed expansion of Millilani Town. We appreciate your staff's effort in reviewing the document, and are pleased that you found it contained a thorough assessment of the project's probable impacts.

Sincerely,

Perry J. White

cc: Dept. of Land Utilization
Millilani Town, Inc.
Environmental Quality Commission
HIELGO

STATE OF HAWAI'I
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
Fort Ruger, Honolulu, Hawaii 96816
3949 Diamond Head Road, Honolulu, Hawaii 96816

30 MAY 1978

Gentlemen:

Hililani Town, Inc.
P.O. Box 2780
Honolulu, Hawaii 96803

We have received a copy of the "Hililani Town Expansion, Hililani, Ewa, Oahu" Environmental Impact Statement, and we have no comments to offer at this time.

Yours truly,

WAYNE R. TOMOYASU
Captain, CE, DARNG
Contr & Engr Officer

Belt, Collins & Associates
A division of Lyon Associates, Inc.
Engineers, Planners, Landscape Architects, Architects
514 Hawaii Building, 745 Fort Street, Honolulu, Hawaii 96813

June 5, 1978

Captain Wayne R. Tomoyasu
Office of the Adjutant General
Department of Defense, State of Hawaii
3949 Diamond Head Road
Honolulu, Hawaii 96816

Dear Captain Tomoyasu:

Thank you for reviewing the environmental impact statement for the proposed expansion of Hililani Town. Your letter of 30 May 1978 will be attached to the final EIS.

Sincerely,

Perry J. White

Capt, CE, DARNG

PJM: sk
Environmental Quality Commission  
Office of the Governor  
State of Hawaii  
550 Halekauwila Street, Room 301  
Honolulu, Hawaii 96813  

Gentlemen:  

Mililani Town Expansion  
Environmental Impact Statement  

The Environmental Impact Statement for the Mililani Town Expansion forwarded by your letter of 22 May 1978 has been reviewed and the Navy has no comments. The subject EIS will be retained by this Command for record purposes. Thank you for the opportunity to review the EIS.  

Sincerely,  

Copy to:  
Dept of Land Utilization  
Mililani Town, Inc.
State of Hawaii
Environmental Quality Commission
Office of the Governor
530 Kalakaua Street
Room 301
Honolulu, Hawaii 96813

Gentlemen:

Staff review of the Mililani Town Expansion EIS has been completed, and the Coast Guard has no comments to offer on the project. This office has no future use for the document and thus it is returned herewith.

The opportunity to review and comment on this EIS is appreciated.

Sincerely,

H. G. HOLMGREN
Captain, U. S. Coast Guard
Chief of Staff
Fourteenth Coast Guard District

Dear Captain Holmgren:

Thank you for reviewing the Mililani Town Expansion Environmental Impact Statement. We are pleased to know that you have no further questions regarding the proposed project.

Sincerely,

Perry White

June 9, 1978
May 30, 1978

Dear Ms. Jane L. Silverman,

Thank you for reviewing and commenting upon the Draft Environmental Impact Statement for the Proposed Mililani Town Expansion, Mililani, Ewa, Oahu, May 1978.

The proposed undertaking will have no effect upon any known historic or archaeological site on or likely to be eligible for inclusion on the Hawaii Register and/or National Register of Historic Places. This office has no reservations for the project to proceed.

In the event that any unanticipated sites or remains are encountered, please inform the applicant to contact this office immediately.

Sincerely yours,

Jane L. Silverman
Historic Preservation Officer
State of Hawaii

cc: Mililani Town, Inc.
P. O. Box 2780
Honolulu, Hawaii 96803

Ms. Jane L. Silverman
Historic Preservation Officer
Department of Land & Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Silverman:

Thank you for reviewing and commenting upon the Environmental Impact Statement for the Proposed Mililani Town Expansion. We are pleased to know that your office agrees that the proposed project would not have an effect upon any known historic site on, or likely to be eligible for inclusion on, the Hawaii or National Register of Historic Places.

Sincerely,

Perry J. White
ATTENTION: Mr. Perry J. White

Gentlemen:

Environmental Impact Statement
Hililani Town Expansion, Oahu

In general, we find that the above document is well written and well organized. The information is succinct and covers all areas of potential concern. However, we do have comments on some of the points raised in the EIS.

   Comment: In view of the importance of the water supply question and the rather significant discrepancy in estimates of sustainable yield, the most recent estimate which is attributed to Mr. Chester Lao of the Board of Water Supply should be confirmed in writing. Regardless of which estimate is considered most accurate, all of them indicate that water withdrawal has been exceeding the sustainable yield. In this regard, what, if any, actions have been taken by the State Board of Land and Natural Resources with respect to its authority under Chapter 177, HRS ("Ground Water Use")?

   Comment: It is our understanding that the present source of irrigation water for the cane in this area is Waiahole Ditch. Therefore, the net withdrawal from the Pearl Harbor lens will not be decreased by the use of Hililani Sewage Treatment Plant effluent for irrigation. Moreover, the re-use of effluent is considered an experimental program which will be closely monitored for possible deleterious effects on public health. It should not be assumed that the program will be successful before it has even begun.

   Comment: The traffic analysis should include effects on peak-hour volumes in the Pearl City corridor through the Moanalua screen line.

   Comment: There should be written confirmation from the U.S. Army that all explosive ordnance has been removed from Kipapa Gulch.

   Comment: The potential of diversified agricultural use on this property is compared unfavorably with that of "the existing Kahuku Agricultural Park." However, sources at the State Department of Agriculture indicate that there is no functioning agricultural park at Kahuku. Furthermore, the contention that truck crops are more feasible at Kahuku than at Hililani is not substantiated by data.

Should you wish any elaboration or clarification of these comments, please contact Mr. John Whalen of our staff at 523-4077.

Very truly yours,

WILLIAM E. WANKET
Acting Director
Mr. William E. Wankett, Acting Director  
Department of Land Utilization  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawai'i 96813  

Dear Mr. Wankett:  

Environmental Impact Statement  
Proposed Hililani Town Expansion  

Thank you for your letter of June 19, 1978, regarding the Environmental Impact Statement for the proposed Hililani Town Expansion project. We are, of course, pleased that you found that the document covered all areas of potential concern. Your comments regarding several of the points made in the EIS are well taken, and I would like to respond briefly to them.

1. Sustainable yield of the Pearl Harbor basal lens.

Subsequent to circulation of the EIS for review and comment, we have met with the staff of the Honolulu Board of Water Supply on two occasions to discuss the groundwater situation in the Pearl Harbor basin. As a result of these meetings and of written comments from the Board dated July 3, 1978, it has become clear that the EIS mis-reported the Board of Water Supply's position with respect to the present rate of groundwater withdrawals from the Pearl Harbor basin. Because of this, pages IV-20 through IV-24 have been revised. I have attached copies of the revised material and the Board of Water Supply's comments to the back of this letter.

Following receipt of your letter I have spoken to a representative of the State Department of Land and Natural Resources and to Mr. Larry Whang of the Honolulu Board of Water Supply. Both indicated that no official actions have been taken relative to the Pearl Harbor basin by the B.L.H.R. under the authority granted it in Chapter 177, HRS. The State is presently conducting a series of public hearings regarding proposed changes to the B.L.H.R.'s regulations covering groundwater use, however. Depending upon the results of those hearings, some changes in the existing regulatory structure could occur.

Pursuant to Robert L. Belt, James R. Bell, Paul H. Hume, Frank J. Lyon, Jr. 
Assistants: William B. Ng, Richard F. Cate, Karl H. Haines, Larry J. Helmer, Joseph Yamaoka Jr., Paul P. Washikamau Jr.

July 19, 1978

Mr. William E. Wankett  

2. Use of secondarily-treated effluent from the Hililani Sewage Treatment Plant for sugarcane irrigation.

You are correct that the water now being used to irrigate sugarcane in the immediate vicinity of the proposed project originates in Windward Oahu and is brought to the Schofield plateau by the Waihalo Ditch. As a result, use of treated sewage effluent from the Hililani Sewage Treatment Plant for irrigation of some of the fields now supplied by the Ditch would not automatically result in a decrease in amount of water withdrawn from the Pearl Harbor basal lens. In discussing the re-use of treated sewage effluent, we used the heading "Possible (emphasis added) Mitigation of Adverse Effects" (p. IV-22). The intent was to indicate ways that effluent recycling could be used to reduce the consumptive use of water:

"...the use of effluent from the Hililani STP for the irrigation means that potable water previously drawn from the aquifer for that purpose need not be used (emphasis added)." (paragraph 4, line 11, page IV-22).

We did not mean to say that it is certain that the water gained by recycling the effluent would be used to partially offset current and proposed withdrawals, merely that it could be. There are admittedly a number of obstacles that will make it difficult to effect such a reduction, including:

- the fact that the water in the Waihalo Ditch is not owned by Castle and Cooke or its subsidiaries, but rather by a subsidiary of the Oahu Sugar Company;
- the fact that there is a fairly direct relationship between the per acre yields of sugar and the amount of irrigation water applied, and, therefore, a strong tendency to increase agricultural water use when additional supplies become available; and
- the fact that, in order to reduce pumping from the basal lens, Waihalo Ditch water or water from the treatment plant would have to be used on fields now irrigated with water from the basal lens and a corresponding reduction made in withdrawals from that source.

I could continue to add to this list, but the basic point is already clear: if the potential reduction in withdrawals for agricultural use referred to in the EIS is to be effected, it will only be because some party exercises a major effort towards that end. In retrospect, it appears that that point should have been more clearly made. Nevertheless, despite the formidable obstacles that admittedly exist, it is still our opinion that the savings are technically, economically, and politically feasible if the appropriate governmental agencies exert their considerable influence towards that end.
The second point made under this item, i.e., that the effluent re-use program is an experimental one that will be closely monitored for possible deleterious effects on public health, is quite valid, and should have been stated in the EIS. It should be noted, however, that the idea has been under study for a number of years, that the re-use has been authorized only after extensive studies by the Hawaii Water Resources Research Center indicated that it would have no significant adverse effects on the water supply, and that the City and County Department of Public Works has concluded that there is sufficient chance of success to warrant the expenditure of public funds to implement the system.

There is, as you point out, no guarantee that the system will prove safe; only years of monitoring will do that. But the evidence suggests that it will, and the intensive monitoring program that is planned is designed to detect unexpected effects well before they would constitute a serious health hazard.


In responding to our request for comments regarding the proposed project, the State Department of Transportation (DOT) stated:

"Thus, this rezoning action will have no adverse impact upon our existing or planned transportation facilities." (p. B-40 in Appendix B of the EIS).

Despite the fact that the major transportation facilities likely to be affected by the proposed project are under the control of the DOT, we devoted considerable time to an analysis of the project's probable impacts upon traffic flow on the H-2 Freeway and Kamehameha Highway. We did not, however, extend this analysis to the Hoanalua screenline. I believe there are a number of reasons why any attempt to do so would be unproductive, and would like to outline them briefly below.

The primary intent of an EIS is to indicate ways in which conditions "with" a proposed project or action would differ from those that could be expected to occur without it. Residential and commercial development at Millikani would undoubtedly increase traffic volumes on Kamehameha Highway and the H-2 Freeway over the level that would be experienced without it because there is no other potential development along the Central Oahu corridor where an equivalent amount of residential construction could occur. The same cannot be said of traffic through the Hoanalua screenline.

The Oahu General Plan accepts the notion that significant population growth will occur on Oahu in the years ahead and that a large portion of this growth is to be accommodated in West Honolulu and in Ewa. Given this, and the fact that these areas contain the vast majority of the readily developable land in proximity to the urban core, it is our belief that if the residential expansion currently being proposed for Millikani is not approved, there is likely to be a corresponding increase in the amount of residential construction in other areas lying to the west of the Hoanalua screenline. From this it follows that the proposed project at Millikani would not increase traffic at the screenline over what would occur without it. In short, traffic volumes at the screenline would increase by about the same amount regardless of where in the West Honolulu-Ewa-Central Oahu area the residential growth necessary to meet the General Plan population and housing objectives occurs; an increase at that point does not, therefore, appear to be a legitimate impact of this particular project.

Even if one does not accept the preceding argument, there are a number of technical considerations that lead us to question the value of a detailed analysis of the proposed project's impact on traffic flow through the Hoanalua screenline. First, the screenline's distance from Millikani means that it is difficult to accurately assess the volume of Millikani-generated vehicles that would pass through it or the exact time at which they would do so. This problem is made particularly acute by our finding that traffic from the Gentry-Waipio project would raise the vehicle/capacity (v/c) ratio on Kamehameha Highway below Millikani to well over 1.0, and that Millikani residents' attempts to adjust to the congestion that this would produce might well cause problems at the Millikani H-2 interchange as well. While existing traffic models are reasonably accurate at v/c ratios of 1.0 and below, at significantly higher v/c ratios they are not. Hence, it is impossible to accurately predict the rate at which vehicles would emerge from the congestion and enter the flow of traffic headed for the Hoanalua screenline.

Second, the highway network is in such a state of flux at the present time that any analysis based on existing conditions would be totally invalid in only a short while. Completion of H-1 between the Aloha Stadium and Middle Street will open up a major new highway corridor, and it is impossible to predict exactly how drivers will respond to this in terms of their choice of routes. Without such information, any useful kind of discussion is impossible. Moreover, while roadway constraints on the through lanes of the Hoanalua and H-1 Freeways are now the primary cause of congestion in this area, this may not be the case following completion of highway improvements now underway. In this case, congestion will not disappear, but rather will be transferred to the off-ramps and city streets feeding into the employment centers.
Other changes are being proposed closer to Mililani, where another
on-ramp to the H-2 Freeway is being suggested to serve the Gentry- Waipio
development and the proposed industrial area at Mililani. In addition,
some changes are almost certain to be made in Kane`akeha Highway in the
vicinity of the Gentry project. Given the intensity of the problem, the
number of unknowns that are involved, and the resources that we or
anyone else other than the State Department of Transportation could
bring to bear, further investigation does not appear to us to be fruitful
at this time.

4. Ammunition Storage.

A copy of a letter from the U.S. Army to Mililani Town, Inc.,
officially confirming the deactivation of the ammunition storage area
which formerly affected the site of the proposed project arrived in
our office today. I have attached it to the back of this letter.

5. Alternative of diversified agricultural use.

I believe that the apparent disagreement as to whether or not there is
or is not a functioning agricultural park at Kahuku is solely a
problem of semantics. We have talked on several occasions with Mr.
Seiko Shiroma, the man identified by the Board of Agriculture's chair-
man, Mr. John Farias, Jr., as being "... one of the key coordinators of a... our Kahuku Agricultural Park coordinator." (Letter dated January 19, 1978, from Mr. John Farias, Jr. to Mr. Perry White regarding the EIS for the proposed expansion of the Kuli`ou Town, Inc.) Because of this reference, and the fact that Mr.
Shiroma has been working at Kahuku for some time, it was our understand-
ing that the Kahuku Agricultural Park was already in operation.

Subsequent to receiving your letter, I have talked again with Mr.
Shiroma and discovered that the final lease agreement between the State
and Campbell Estate has not yet been signed. Hence, your source at the
Department of Agriculture is technically correct in saying that there is
no functioning agricultural park at Kahuku. However, Mr. Shiroma
indicated that the original deadline for the closing of the lease agree-
ment was June 30, that there have already been three or four rounds of
negotiations, and that the lease arrangements will almost certainly be
concluded within the next few weeks. When they are, the Kahuku Agri-
cultural Park will become a legal reality. Because about 3,500 of the
approximately 3,000 acres which it will encompass are already under
cultivation by farmers having lease agreements with Campbell Estate, and

because the terms of the lease will allow present agricultural users to
continue their operations following the land's lease to the State, we
believe that, in a practical sense, there already is a "... functioning
agricultural park at Kahuku."

It was not our intention to unfavorably compare the quality of the
land at Mililani with that available at Kahuku. In fact, it is my
belief that our discussion was quite honest in its evaluation; certainly,
it clearly indicated that the soils at Mililani are quite well-suited
for a number of agricultural uses. It was our evaluation of water and
institutional considerations that led us to conclude that it appears that many of the crops which could conceivably be cultivated at
Mililani could be grown more profitably at Kahuku.

The primary physical advantage of the Kahuku site is the ready availa-
bility of cheap water. Without it, almost any diversified agriculture
is impossible, and, as previously indicated, water at Mililani is not
readily available at any price, much less cheaply. The water supply
problem is one of the main reasons why pineapple, which needs very
little irrigation, has remained atop the plateau while sugar is found at
lower elevations and in areas that can be supplied with water from the
Waiahole Ditch. In short, the water consideration alone gives Kahuku an
important advantage over Mililani.

Kahuku's institutional advantages are less permanent than its better
access to water, but are significant nonetheless. The land on which the
proposed Mililani Town development would occur is owned by an organi-
ization that wants to convert it to urban use. If this proves impossible,
it would almost certainly be left in pineapple production. In short, it
is unlikely that a denial of the present rezoning request would result
in any move to establish diversified agriculture on the land. In con-
trast, Campbell's Kahuku lands really have no such alternative use, and
the Estate is actively working toward the creation of an agricultural
park there.

Given that Castle and Cooke is unlikely to establish diversified
agriculture on the Mililani land of its own accord, such a change in
land use would have to be completely handled by the State. This would
involve the establishment of an organizational structure similar to that
which already exists at Kahuku, acquisition of the land, and construc-
tion of the necessary infrastructure. Given the costs which these
things would entail -- especially the acquisition of the land and the
development of a water source -- it seems probable that either lease
rents for land in an agricultural park at Mililani would have to be
considerably higher than those for similar land at Kahuku or that the
State would have to provide a significant on-going subsidy. In summary, while the soils at both sites are of equivalent quality, other factors tend to favor Kahuku as the site of an agricultural park. I hope that the above provides the answers you were seeking. If any questions remain, please call me at 521-5361.

Sincerely,

Perry J. White

cc: Millili Town, Inc.
Dept. of Land Utilization
Environmental Quality Commission

Mr. William E. Wankett
- 7 -
July 19, 1978

Mr. George W.Y. Yim
Senior Vice President
and Secretary
Oceanic Properties, Inc.
P.O. Box 2780
Honolulu, Hawaii 96803

Dear Mr. Yim:

This headquarters has been advised by the Pacific Ocean Division, Corps of Engineers, of your inquiry regarding the status of ammunition storage at the Army's Upper Kipapa Military Reservation and its resultant effect on the adjacent Millili Town development.

As you are aware, the Army notified the State of Hawaii Land Use Commission on March 1, 1977 that because of ammunition storage at Upper Kipapa, this headquarters opposed the proposal to incorporate approximately 591 acres from Agricultural District into Urban District at Millili Town. Planning, however, was initiated at that time to develop alternatives for the storage of ammunition located at Upper Kipapa. Further, it would require as a minimum, a period extending to September 30, 1978 to implement an acceptable alternative.

As a result of the foregoing, the Army was able to obtain suitable alternate facilities for the ammunition stored at Upper Kipapa. Consequently, all of the ammunition formerly stored at this installation has been relocated and it is currently maintained in an inactive status.

This headquarters realizes the difficulties posed by this situation and appreciates the assistance of all concerned in deferring implementation of the decision on usage of the real estate adjacent to Millili Town until the relocation of the Army's ammunition at Upper Kipapa was satisfactorily resolved.

Sincerely yours,

Carl P. Rodolfo
Colonel, CE
Director of Facilities Engineering
United States Department of Agriculture
Soil Conservation Service
P. O. Box 50004, Honolulu, HI 96850

June 14, 1978

Millilani Town, Inc.
P. O. Box 2780
Honolulu, HI 96803

Received

June 21, 1978

Mr. Jack P. Kanalz
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Kanalz:

Environmental Impact Statement
Proposed Millilani Town Expansion

Thank you for your letter of June 14, 1978, regarding the Environmental Impact Statement for the proposed expansion of Millilani Town. We are pleased that the document adequately addressed your concerns with respect to the project, and appreciate the time spent by you and your staff in reviewing it.

Sincerely yours,

Perry J. White

cc: Department of Land Utilization
City and County of Honolulu
Honolulu Municipal Building
Honolulu, HI 96813

Belt, Collins & Associates
A division of Lyon Associates, Inc.
Engineers * Planners * Landscape Architects * Architects
511 Hawaii Building • 745 Fort Street • Honolulu, Hawaii 96813 • Telephone 808/321-3361

June 21, 1978

Gentlemen:

Subject: Millilani Town Expansion, Millilani, Ewa, Oahu

We have reviewed the subject document and find that our previous concerns have been addressed; therefore, we have no further comments to offer.

Thank you for the opportunity to review the document.

Sincerely,

Jack P. Kanalz
State Conservationist

cc:
Department of Land Utilization
City and County of Honolulu
Honolulu Municipal Building
Honolulu, HI 96813
June 14, 1978

Office of the Governor
550 Halonaaua Street, Room 301
Honolulu, Hawaii 96813

Gentlemen:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
MILLIANI TOWN EXPANSION

We have reviewed the Environmental Impact Statement for the proposed Milliani Town Expansion and find it acceptable. The proposed parks as designated in the EIS report is in concurrence with plans of the Department of Parks and Recreation and will adequately serve the project's needs.

Sincerely,

ROBERT T. FUKUDA, DIRECTOR

CC: Department of Land Utilization
    Milliani Town, Inc.
June 23, 1978

Mr. Ryokichi Higashionna, Director
State Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

Environmental Impact Statement
Hhillilani Town Expansion

Thank you for your letter of June 15, 1978, commenting on the EIS for the Hillilani Town expansion project. We appreciate the time spent by your department reviewing the document, and are pleased that you found that it adequately addressed the impacts of the proposed project.

Sincerely,

Perry J. White

cc: Hillilani Town, Inc.
Department of Land Utilization
Environmental Quality Commission
May 26, 1978

Honorable George R. Ariyoshi
Governor of Hawaii
550 Halokauwila Street
Honolulu, Hawaii 96813

Dear Sir:

We have reviewed the EIS for expansion of Hililani Town and have no comments to add to our letter of February 17, 1978 on this matter.

Very truly yours,

W. Y. THOMPSON
Chairman of the Board

Mr. W. Y. Thompson, Chairman
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Thompson:

Environmental Impact Statement
Proposed Hililani Town Expansion

Thank you for your comments on the Environmental Impact Statement for the proposed expansion of Hililani Town. We appreciate the time spent by you and your staff reviewing the document, and are pleased that you found it adequately assessed the probable impacts of the proposed project.

Sincerely,

Perry A. White

cc: Hililani Town, Inc.
Dept. of Land Utilization
Environmental Quality Commission
Hililani Town, Inc.
P.O. Box 2780
Honolulu, Hawaii 96803

Gentlemen:

Subject: EIS for Hililani Town Expansion

Thank you for this opportunity to comment.

Our review of the subject statement indicated that the expansion will not have any adverse environmental effects on any existing or planned facilities serviced by our department.

Very truly yours,

RIKIO NISHIOKA
State Public Works Engineer

June 26, 1978

Mr. Rikio Nishioka
State Public Works Engineer
Division of Public Works
State of Hawaii
Department of Accounting & General Services
P.O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Nishioka:

Environmental Impact Statement
Hililani Town Expansion

Thank you for your letter of June 20, 1978, regarding the Environmental Impact Statement for the proposed Hililani Town Expansion. We are pleased to know that the EIS contained an adequate assessment of the impacts of the proposed project and that the proposed expansion would not have any adverse effects on any existing or planned facilities serviced by your department.

Sincerely,

Perry J. White

cc: Hililani Town, Inc.
Department of Land Utilization
Environmental Quality Commission
Environmental Quality Commission  
550 Halekauwila St., Rm. 301  
Honolulu, Hawaii 96813

Gentlemen:

Environmental Impact Statement for Millilani Town Expansion, Millilani, Ewa, Oahu

We have reviewed the subject Environmental Impact Statement and recommend that corrections be made on page 47, under the paragraph, Public Transit, by deleting "MTL Inc." and inserting "City and County, Department of Transportation Services."

Very truly yours,

KAZU HAYASHIDA  
Director

cc:  Millilani Town, Inc.  
Department of Land Utilization  
Office of Environmental Quality Control

Mr. Kazu Hayashida, Director  
Department of Transportation Services  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Hayashida:

Environmental Impact Statement  
Proposed Millilani Town Expansion

Thank you for your letter of June 20, 1978, regarding the Environmental Impact Statement for the proposed expansion of Millilani Town. We appreciate the time spent by your department reviewing that document. The reference to "MTL, Inc." on page IV-47 will be changed to read "The City and County of Honolulu, Department of Transportation Services" as you suggested.

Sincerely,

Perry J. White

cc:  Millilani Town, Inc.  
Department of Land Utilization  
Environmental Quality Commission
Mr. Donald A. Bremer
Chairman
Environmental Quality Commission
State of Hawaii
550 Halikauwila Street
Honolulu, Hawaii 96813

Dear Mr. Bremer:

Your Letter of May 22, 1978 Requesting Review and Comments on Environmental Impact Statement (EIS) for Mililani Town Expansion

Our comments are addressed to Table IV-7, "Estimated Water Usage for the Pearl Harbor Area," page 21. The data noted in the table reflect only pumping for the periods for 1972 and 1963-1973 and do not include springs and free flow. The data for the period 1974-1977 does include springs and free flow along with pumping.

We, therefore, recommend the use of our enclosed table in place of that shown on page 21. The sustainable yield for the Pearl Harbor area has been generally estimated as 250 mgd by consultant geologists, the U.S. Geological Survey, and the Honolulu Board of Water Supply. Springs and free flow are a significant portion of the total daily discharge and are reflected in the enclosed table. However, their impact on the draft from the basin is difficult to assess.

In order to better understand and manage the Pearl Harbor basin, studies on various subject matters are or will be undertaken as follows:

1. Radioisotope tracing data to determine the age of water being pumped which, in turn, can give us some indication if recharged water or stored water is being pumped.

2. Evapotranspiration studies in high rainfall areas to determine amount of rainfall being lost due to evapotranspiration.

3. Southern Oahu Water Resources Assessment - study to determine the best methods to develop and manage the basin.

Mr. Donald A. Bremer

July 3, 1978

Mr. Donald A. Bremer
Chairman
Environmental Quality Commission
State of Hawaii
550 Halikauwila Street
Honolulu, Hawaii 96813

These studies should give us a better insight into the groundwater condition of the basin and help us develop an operational plan to maximize the utilization of the basin while maintaining an equilibrium condition.

In the absence of conclusive answers, we have used our best judgement to determine the condition of the basin. We believe that the most accurate assessment must be based on the changes of the underground basin induced by draft. So far there is no conclusive evidence that the Pearl Harbor basin is being overdrawn. However, we have taken a conservative approach in assessing the basin condition and therefore, we have approved well applications on a case by case basis.

If there are any questions on this matter, please call Herbert Hinakami, at 548-6183.

Very truly yours,

Edward Y. Hirata
Manager and Chief Engineer

Enc.

cc: Mr. George S. Moriyuchi
Mililani Town, Inc.
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* Springs & Free Flow: 56.5, 59.9, 60.4, 48.2, 50.7, 43.9, 52.0, 70.8, 68.4, 58.4, 49.4, 61.9

* 1967-1972, estimated values
* 1973-1977, measured values
June 20, 1978

TO: MR. GEORGE S. MORIGUCHI
DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: LEROY G. RATHBURN
ACTING MANAGER AND CHIEF ENGINEER

SUBJECT: ENVIRONMENTAL QUALITY COMMISSION’S MAY 22, 1978 REQUEST FOR COMMENTS ON ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR MILLILANI TOWN EXPANSION

We request your approval as accepting authority to extend the receipt of comments on the EIS from June 22, 1978 to July 14, 1978.

If you have any questions on this matter, please contact Lawrence Uhang at 548-5221.

Sincerely,

LEROY G. RATHBURN
Acting Manager and Chief Engineer

cc: Mr. Donald A. Bremner
Chairman, EQC
Millilani Town, Inc.

Belt, Collins & Associates
A division of Lyon Associates, Inc.
Engineers + Planners + Landscape Architects + Architects
514 Hawaii Building • 745 Fort Street • Honolulu, Hawaii 96813 • Telephone 681-518-5361
July 19, 1978

Mr. Edward Y. Hirata
Board of Water Supply
P. O. Box 3410
Honolulu, Hawaii 96843

Dear Mr. Hirata:

Environmental Impact Statement
Proposed Millilani Town Expansion

Thank you very much for your letter of July 3, 1978, commenting on the Environmental Impact Statement for the proposed expansion of Millilani Town. The time spent by you and your staff in reviewing the document and talking with us is greatly appreciated.

As I have already indicated to Mr. Minakami, we have revised Table IV-7 in line with your suggestions. At the same time, the text on Pages IV-20 through IV-24 has been modified to reflect the changes made in the table (see attachment). I hope you agree that this portion of the report now contains a more accurate portrayal of the Board of Water Supply's position with respect to this matter.

If you have any further questions, please call me at 521-5361.

Sincerely,

Perry J. White

Attachment

cc: Millilani Town, Inc.
Dept. of Land Utilization
Environmental Quality Commission
Mr. George S. Moriguchi  
Director, Department of Land Utilization - 7th Floor  
City and County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813  

June 21, 1978  

Dear Mr. Moriguchi:  

The following comments are submitted in response to a request of the Environmental Quality Commission on the E.I.S. for the Millilani Town, Inc. EIS expansion dated May, 1978.  

Millilani is a ten year old planned community whose needs should have been anticipated and planned for. This request includes the town center area that many residents have looked forward to eagerly. It will include our library, civic center, and opportunity for goods and services which we anticipate will reduce greatly the necessity to travel on the highway.

Studies of the water levels in Central Oahu show that the underground water supply is being overdrawn. This Board has been concerned for some time with what appears to be a piecemeal approach to approval of water systems within the Pearl Harbor aquifer i.e. Gentry-Waipio project, and the possible negative effect this might have on existing residents. Anything that will lead to such inflationary ideas as desalination plants should be avoided and the Board of Water Supply should be given some clear directions as to their responsibility for timely warning when wells are being requested. Presumably, water can be obtained for this project from areas to the north of town preventing us from further aggravating the water table problems. Too, as reasonable citizens, we expect the solution to sewage disposal problems will be forthcoming.

If the problems addressed in the EIS have reasonable solutions, it is felt that the addition of this increment to the town will be to the benefit of our current members as well as those provided housings in the new area.

Sincerely,  

[Signature]

MICILLANI TOWN ASSOCIATION  
FOR THE BOARD

June 26, 1978  

Mr. Travis J. L. Stephens, President  
Millilani Town Association  
95-400 Ikaola Street  
Millilani Town, Hawaii 96789  

Dear Mr. Stephens:  

Environmental Impact Statement  
Millilani Town Expansion  

Thank you for your letter of June 21, 1978, commenting on the Environmental Impact Statement for the proposed expansion of Millilani Town. The time you devoted to reviewing the document is much appreciated. We are pleased that you found it adequately addressed the potential impacts of the proposed project. I am sure that they will be carefully weighed before final approval for the proposed project is given.

Sincerely,  

[Perry J. White]  

[Signature]  

cc: Millilani Town, Inc.  
Dept. of Land Utilization  
Environmental Quality Commission

Principal: Robert M. Belt, James B. Bell, Paul W. Hee; Frank F. Lyon, Jr.  
June 29, 1978

Dr. Reginald H. F. Young
Water Resources Research Center
University of Hawaii
2540 Dole Street
Honolulu, Hawaii 96822

Dear Dr. Young:

Environmental Impact Statement
Proposed Millilani Town Expansion

Thank you for your letter of June 16, 1978, regarding the Environmental Impact Statement for the proposed expansion of Millilani Town. We appreciate the time expended by yourself and other members of the W.R.R.C. staff, and are pleased that you found the document to contain an adequate assessment of the probable effects of the proposed project.

Sincerely,

[Signature]
Perry O. White

P/H:dur

cc: Millilani Town, Inc.
    Dept. of Land Utilization
    Environmental Quality Commission

---

June 16, 1978

Environmental Quality Control
550 Naikawila Street
Room 301
Honolulu, Hawaii 96813

Gentlemen:

Subject: EIS for Millilani Town Expansion, May 22, 1978

We have reviewed this EIS with great interest, particularly with respect to stormwater runoff, sewage effluent, and water supply. Research by Fok and Huriabayashi at Millilani Town has shown that the infiltration capacity of soils in the area is decreased 70-80% after utilization. Thus runoff volume is expected to double in the changeover from agricultural to urban land use. The increase in runoff projected in the EIS is in this range.

Further data on the quality constituents in urban runoff from source Oahu sites (p. IV-13) can be found in WRRRC Technical Reports No. 63 and 100 and in a M.S. thesis by Thomas O. Fujiwara.

We have no critical comment on the discussion of sewage effluent reuse and impact of further groundwater withdrawals on the Pearl Harbor basin lens. The material presented covers the topics adequately.

Sincerely,

[Signature]
Reginald H. F. Young
Assoc. Director, WRRRC
Dear Sir:

Review of Environmental Impact Statement 
for the Proposed Hillani Town Expansion

The Environmental Center review of the above cited EIS has been prepared 
with the assistance of the following members of the University community:
Gordon Dugan, Civil Engineering; Paul Ekern, Water Resources Research Center; 
Don Bell, Real Estate; John Holmstrom, Pacific Urban Studies Planning Program; 
Margaret Kimmerer, Jacqueline Hiller, Environmental Center.

Our reviewers have found the document to be exemplary in its address of 
the possible significant environmental impacts that can be expected as a result 
of this project. The information is presented in a clear, concise format and 
represents an excellent evaluation of the project. We would, however, like to 
offer several comments.

Some of our reviewers were concerned with the use of secondary treated 
sewage effluent for irrigation of sugar cane. While we commend the idea in 
practice, we cannot ignore the fact that secondary treated sewage can contain 
bacteria and viruses which may be a health hazard. We want to stress the 
importance of safe management practices as well as periodic monitoring in order 

to ensure the health of employees and nearby residents.

The discussion of the sewage effluent and the current NPDES permit may 
be misleading (Chapter IV, p. 14). While the EIS states that the permit will 
allow continued discharge of secondary treated effluent until March, 1980, it 
does not discuss the specific conditions of this permit. If the permit was 
approved for the existing level of discharge, then any increase which would 
result from the proposed development would violate the existing permit.

We have noticed that the implications of the proposed Gentry-Waiplu 
project have been fully discussed in regard to traffic. We would consider the 
implications of the proposed development on water, sewage, and solid waste to 
be as equally important. These implications should be discussed further as they 
could significantly effect the entire central Oahu area.

Yours very truly,

Don Bell, Real Estate; John Holmstrom, Paul Ekern, Jacqueline Hiller

Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

June 20, 1978

cc: Hillani Town, Inc.
Office of Environmental Quality Control
Gordon Dugan
Paul Ekern
Don Bell
John Holmstrom
Margaret Kimmerer
Jacqueline Hiller

The socio-economic impacts discussed in Chapter 5 may be expanded to include 
a discussion on the economic impact of the agricultural sector which would 
result from the withdrawal of the land from productive agricultural use. 
Discussions within the text fairly portray the existing use and productivity 
of the land in pineapple cultivation and discusses how management of remaining 
lands will permit continued efficient operations. Further discussion should 
address the employment and other economic implications of the change in land 
use specifically in terms of agricultural employment, not only construction 
employment.

On a minor note, we could not determine what the access was to the small 
12-acre residential parcel in the south-east corner of the area. Would the 
access route reduce the area designated for park and/or open space?

We would like to, once again, take this opportunity to sincerely commend 
the drafters of this EIS in their preparation of an excellent document.

Yours truly,

Doak C. Cox
Director

AN EQUAL OPPORTUNITY EMPLOYER
As I'm sure you know, the proposed use of secondarily-treated sewage effluent for sugar cane irrigation has been approved on a trial basis only after extensive tests and monitoring by the Hawaii Water Resources Research Center, the State Department of Health, and others. While the results of tests to date suggest that the effluent recycling will not result in a significant health hazard, the treated wastewater can contain bacteria, viruses, and other potentially polluting constituents. Because of this, the program will be carefully monitored for potentially adverse effects. The disposal system is being carefully designed to minimize potential dangers, and the operators of the system will follow stringent wastewater management procedures. Should unexpected problems arise, disposal of the effluent into Kipapa Stream remains a viable, though undesirable, temporary alternative that could be utilized until a permanent solution can be found.

Subsequent to receiving your question concerning the specific terms of the NPDES permit for the Hililiani Sewage Treatment Plant, I have read the entire document and found that the present permit applies only to the existing design treatment capacity of 3.6 mgd. Hence, expansion of the sewage treatment plant to accommodate all of the effluent that would be generated by the proposed project would, in fact, be contingent upon the issuance of a revised NPDES permit. This important fact was overlooked in our first reading of the permit, and I thank you for calling it to our attention. Should the U.S. Environmental Protection Agency refuse to modify the permit to allow the higher rate of discharge into Kipapa Stream, the later phases of the proposed Hililiani project could not be constructed until the effluent re-use program has been put into effect, and the Hililiani development program would have to be modified accordingly.

Implications of Other Regional Development

As you have indicated, the EIS discusses the effect that the proposed Gentry-Waipio development would have on traffic in considerable detail. It does not, however, provide similar treatment for water, sewage, and solid waste, because, in our opinion, the effects of the Hililiani and Gentry-Waipio projects on these systems are neither so closely linked to one another nor as severe as in the case of traffic.

Present plans call for the Gentry-Waipio project to also draw its water from the Pearl Harbor aquifer. Estimated water use by the first phase of the Gentry-Waipio development, which is all that has been approved, is about one mgd. Thus, while the operation of these wells would slightly increase the stress on the aquifer, the net effect on its 250 mgd through-flow would not be substantial. Since the ground water situation was thoroughly discussed with respect to the proposed wells at Hililiani, and since the addition of the Gentry-Waipio wells would not alter the situation to any great extent, we did not belabor the point. Nevertheless, you are correct in noting that the effects of the two projects would be cumulative, and this should have been stated in the EIS.

I would also like to call your attention to the attached correspondence between ourselves and the Board of Water Supply. In their comments on the EIS, the Board has suggested that Table IV-7 be altered to more clearly reflect the long-term pumping and spring-flow from the Pearl Harbor aquifer, and this has been done. As a result of this and other comments in the Board of Water Supply's letter, the narrative on
Agricultural Impacts

As indicated on page VI-2 of the EIS, Castle & Cooke does not expect that there would be a reduction in either pineapple production or employment as a result of the proposed project. While Castle & Cooke presently controls about 5,430 acres of land actually planted in pineapple land in Central Oahu, it needs only 5,035 acres to maintain its present production rate. Because of this, the reduction in Castle & Cooke's acreage that would occur as a result of the proposed project is not expected to be accompanied by any drop in agricultural employment. While there is no doubt that continued conversion of agricultural land to urban use may some day necessitate a corresponding decrease in agricultural employment, the present supply of fallow or under-utilized land is sufficiently large that no such direct cause-effect relationship is evident.

Access to 12-Acre Residential Parcel

The maps included in the EIS do make it appear as though provision of access to the 12-acre residential area in the southeast portion of the site might necessitate a reduction in the amount of park or open space area. However, a 56-foot wide right-of-way exists adjacent to the fence bordering the H-2 Freeway so that no such action would be required.

Thank you again for your gracious comments regarding the overall quality of the EIS. If you desire further clarification of points made in the EIS or in this letter, please call me at 521-5361.

Sincerely,

Perry J. White

PM\wigk

attachment

c: Hilihili Town, Inc.
Dept. of Land Utilization
Environmental Quality Commission
Dear Mr. Tom:

SUBJECT: Mililani Town Expansion

Environmental Impact Statement

We have reviewed the Environmental Impact Statement accompanying the application to rezone 476 acres from agriculture to urban use. We concur with the subject E.I.S. with the following comments:

1. The need for the elementary school is contingent upon total enrollment generated by Mililani Town.

2. The school site is subject to site selection studies conducted by the Department of Accounting and General Services prior to final approval.

As the phasing of the construction scheduling has direct implications on our planning for classroom capacity, we would appreciate a continuation of the fine coordination between our Department and Mililani Town.

Thank you for the opportunity to review and comment on the subject E.I.S.

Sincerely,

CHARLES G. CLARK, Superintendent

cc: Department of Land Utilization

Mililani Town Inc.

Central Oahu District

Mr. Kohchi H. Tokushige

AN EQUAL OPPORTUNITY EMPLOYER
DEEV (Mr. Nakashima, 4491831)

SUBJECT: Environmental Impact Statement (EIS) for the Proposed Mililani Town Expansion

1. This office has reviewed the subject EIS and has no comment to render relative to the overall developmental objectives of the proposed Mililani Town expansion project. However, a schematic layout of existing Air Force fuel lines located within the project boundaries is forwarded for your information and guidance.

2. We greatly appreciate your cooperative efforts in keeping the Air Force apprised of your project and thank you for the opportunity to review the document.

3. If we could be of further assistance to you during the final developmental stages of the project, please feel free to contact us at any time.

ROBERT Q. K. CHENG
Chief, Engineering, Construction and Environmental Planning Div
Directorate of Civil Engineering

1 Atch
Schematic Plan
Cy to: Mililani Town, Inc.
P. O. Box 2700
Honolulu, Hawaii 96803
June 30, 1978

Mr. Robert Q.K. Ching
Directorate of Civil Engineering
Department of the Air Force
Headquarters 15th Air Base Wing (PACAF)
Hickam Air Force Base, Hawaii 96853

Dear Mr. Ching:

Environmental Impact Statement
Proposed Hilllani Town Expansion

Thank you for your letter of 23 June, 1978, regarding the Environmental Impact Statement for the proposed expansion of Hilllani Town. We appreciate the information you provided concerning the Air Force fuel lines located within the project boundaries.

Sincerely,

Perry J. White

cc: Hilllani Town, Inc.
    Dept. of Land Utilization
    Environmental Quality Commission

Prepared: Robert W. Bell, John R. Bell, Paul H. Howard, Frank J. Shinn, Jr.

Language: William D. Steiner, Raymond F. Lam, Mark H. Brown, Earl J. Ruben, Joseph Yama, Jr., Paul F. Valdez, Jr.
MENORANDUM

To: Belt, Collins & Associates

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Mililani Town Expansion

Thank you for allowing us to review and comment on the subject EIS. On the basis that the project will comply with all applicable Public Health Regulations, please be informed that we have no objections to this project.

We note that approval of the proposed Mililani Town expansion is contingent upon the adequate expansion of the existing sewage treatment plant capacity.

We realize that the statements are general in nature due preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

cc: Environmental Quality Commission
Dept. of Land Utilization

PJM: gk

cc: Mililani Town, Inc.
Dept. of Land Utilization
Environmental Quality Commission

James S. Kumagai, Ph.D.
Deputy Director for Environmental Health
State Department of Health
P. O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Kumagai:

Environmental Impact Statement
Proposed Mililani Town Expansion

Thank you for your letter of June 29, 1978, regarding the Environmental Impact Statement for the proposed expansion of Mililani Town. We appreciate the time you and your staff have spent reviewing the document, and are pleased that you found it to contain a satisfactory assessment of the probable impacts of the proposed project. As you indicated, final approval for all aspects of the project is required before it can be implemented, and you will have the opportunity to review detailed plans as soon as they are available.

Sincerely,

Perry J. White

cc: Mililani Town, Inc.
Dept. of Land Utilization
Environmental Quality Commission
Hililani Town, Inc.
P. O. Box 3780
Honolulu, Hawaii 96803

Gentlemen:

Subject: Review of Environmental Impact Statement for Hililani Town Expansion

The Hawaii Housing Authority has reviewed the E.I.S. for the subject project and can offer no comments relative to the proposed action.

Thank you for allowing us to comment on this matter.

Sincerely yours,

FRANKLIN Y. K. SUNN
Executive Director

Mr. Franklin Y. K. Sunn
Hawaii Housing Authority
State Department of Social Services and Housing
P. O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Sunn:

Environmental Impact Statement
Proposed Hililani Town Expansion

Thank you for your letter of July 6, 1978, regarding the Environmental Impact Statement for the proposed expansion of Hililani Town. We appreciate the time spent by you and your staff in reviewing the document, and are pleased that you found it to contain an adequate discussion of the potential effects of the project.

Sincerely,

Perry J. White

cc: Hililani Town, Inc.
Dept. of Land Utilization
Environmental Quality Commission
June 20, 1978

Millilani Town Inc.
P.O. Box 2780
Honolulu, Hawaii 96803

Re: Millilani Town Expansion EIS

Gentlemen:

The Regulations of the Environmental Quality Commission require that EIS documents address "The relationship of the proposed action to land use plans, policies, and controls for the affected area." The draft Millilani Town Expansion EIS sloughs over this requirement.

Millilani Town is asking for agricultural land to be rezoned. For that reason, the EIS should address two questions:

1. Is more residential zoning needed to accomplish the population objectives of the 1977 Oahu General Plan?

2. Are the environmental impacts of the proposed development in conformance with the 1977 Oahu General Plan and the new State Plan?

Unfortunately, the draft EIS offers no proof that there is not already sufficient residential zoning to accommodate population growth planned through the year 2000 in the region extending from Waipio through Millilani. Rather than unfounded claims that there is a need for more residential zoning, the Millilani EIS instead should provide a letter from the City Department of General Planning addressing the capacity of existing zoning to accommodate population growth in the region.

Unfortunately, the draft EIS addresses the 1974 State of Hawaii Growth Policies Plan and not the new State Plan. The Legislature was asked -- and refused to endorse or adopt the Growth Policies Plan. However, the new State Plan is law and it binds actions by public agencies. Since the new State Plan addresses preservation of prime agricultural land, there is some question whether expansion of Millilani Town would be in conformance with the new State Plan. The Millilani Town EIS should discuss the subject.

Thank you for addressing my concerns.

Sincerely,

Douglas Heller

de: DLU

Belt, Collins & Associates
A division of Lyon Associates, Inc.
Engineers • Planners • Landscape Architects • Architects
311 Hawaii Building • 748 Fort Street • Honolulu, Hawaii 96813 • Telephone (808) 521-2261
July 21, 1978

Mr. Douglas Heller
1450 Ala Street
Apt. #2205
Honolulu, Hawaii 96817

Dear Mr. Heller:

Environmental Impact Statement
Proposed Millilani Town Expansion

Thank you for your letter of June 20, 1978, regarding the Environmental Impact Statement for the proposed expansion of Millilani Town. You obviously read the document with great care, and we are pleased that the only way in which it fell short of your expectations was in reviewing "... the relationship of the proposed action to land use plans, policies, and controls for the affected area." Still, the questions you raise are important ones, and I will respond to them below.

Need For Additional Residential Zoning

To my knowledge, the EIS does not make "... unfounded claims that there is a need for more residential zoning (in the Millilani-Waipio planning area)." In fact, it focuses solely on the question of the need for housing; no attempt is made to translate this into zoning acreages. I am aware that planners commonly equate "vacant zoned land" with housing potential, but believe that experience throughout the Island has shown that there is a poor correlation between the two. The development of housing on a large scale requires far more than ownership of vacant land having the appropriate zoning; it demands a desire to undertake the risks inherent in such a project; planning, legal, and financial expertise; access to sources of financial capital; and the perseverance to carry through in the face of the inevitable delays and setbacks. Because "vacant land inventories" find it impossible to measure all of the factors that actually determine whether a specific parcel will be developed in the way that its zoning would allow, we did not feel that such an inventory would provide useful information for the EIS. Our opinion has not changed. Nevertheless, in hopes that I can convince you that we are not merely avoiding a touchy issue, I would like to run through some very coarse numbers that provide at least some insights into the question.

The most recent comprehensive listing of vacant zoned land in the Millilani area that I am aware of is contained in the Data Book For The Millilani/Waipio/ Helensau Neighborhood (No. 25) published in 1977 by the City Department of General Planning. While the acreages it contains are not out of date, the data it provides on existing development (p. 25) and zoning and D.U.M. designations of vacant land (p. 33), together with our own brief review of zoning maps of the time, indicates that essentially all of the "vacant usable"
zoned land in the Neighborhood No. 25 area was in the development areas of the Mililani and Helemano projects. The only significant amount of residentially zoned land in the Oahu General Plan's Mililani-Waipahu Planning Area that was not in Neighborhood No. 25 was the proposed site of the Village Park project.

While the total amount of zoned land and residential development in the Mililani-Waipahu Planning Area has increased substantially since 1975, all of the new zoning has been in projects where development was already under way in that year. As a result, it is reasonably easy to estimate the number of persons who could be accommodated within the Planning Area on land presently having the necessary zoning. These computations are shown in Table 1.

The 1977 Oahu General Plan establishes a population target for the Mililani-Waipahu Planning Area of 3.8 percent (± 5 percent) of a year 2000 Oahu total of 1,039,000, or 37,508 to 41,456. Based on this, and assuming that all of the zoned land will be developed as allowed by its zoning, it can be seen that the Planning area would be short of housing for from 6,500 to 10,500 persons if the proposed project is not implemented. 4 If the proposed Mililani Town expansion is carried out as planned, and if the long-delayed Village Park project is eventually implemented, it is our estimate that the population of the Planning area would be about 41,000. This is within the range stipulated in the General Plan. The computations upon which these conclusions are based are shown in the attached table.

We have not sought a letter from the City and County's Department of General Planning (DGP) regarding the ability of existing zoning to accommodate population growth in the region as you requested. One reason for this is the unlimited time available within which to respond to comments on the EIS, but there are other compelling ones as well. First, County zoning is the responsibility of the Department of Land Utilization (DLU) rather than the DGP. Hence, there appears to be no reason why the latter would be in a position to answer the question any more thoroughly than we have done. Secondly, the Department of General Planning has endorsed the proposed project at both the General Plan amendment proceedings and the hearings before the State Land Use Commission. It is our belief that this constitutes the most convincing evidence possible that the Department believes the proposed project is in accordance with the City's objectives. Finally, as we have previously suggested, the availability of zoned land does not insure the provision of an adequate housing supply at a reasonable price; only a skilled, efficient developer can do that. Because of this, any attempt to judge the need for additional zoning by looking solely at the existing supply of vacant zoned land would be overly simplistic, and we believe the DGP would eschew it.

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1[General Plan population (37,508 to 41,456)]

2[Population potential of existing zoned area (30,985)] = 6,523 to 10,471

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Table 1. Existing and Projected Population of the Mililani-Waipahu Area

<table>
<thead>
<tr>
<th>Area</th>
<th>Dwelling Units Approved but Not Completed as of 3/01/77</th>
<th>Avg. No. of Persons/Unit</th>
<th>Vacancy (%)</th>
<th>Estimated Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dwelling Units Approved but Not Completed as of 3/01/77</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Dwelling Units Approved but Not Completed as of 3/01/77</td>
<td>Avg. No. of Persons/Unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proposed Dwelling Units Approved but Not Completed as of 3/01/77</td>
<td>Avg. No. of Persons/Unit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mr. Douglas Heller  
July 21, 1978
The State Plan

At the time the EIS was written, the State Plan had not been signed into law. Indeed, it was so controversial that its fate was in doubt until the last days of the 1978 Legislature. Because the Plan's contents were constantly changing, it was impossible to discuss the proposed project's relationship to it. Even had a final draft been available in time for it to be used in the preparation of the EIS, the State Plan is of such a general nature that any analysis we could have performed would have been hopelessly vague. I expect that this problem will be eliminated as the State Functional Plans are completed and adopted, but it is an important constraint at present.

The effect that the proposed project would have on agriculture is discussed in several places in the EIS. The most extensive coverage is in Chapter VI. As indicated there, the soils on the project site are physically well-suited for agriculture, and their conversion to urban use would effectively preclude their use for that purpose in the future. It would not, however, impose a meaningful limitation on agricultural production on Oahu either now or in the foreseeable future.

I assume that your statement that, "... the new State Plan addresses preservation of prime agricultural..." refers to Part III, Sec.-103(d)(3), which indicates that one of the priority actions should be to "Seek to protect prime agricultural and aquacultural lands through affirmative and comprehensive programs." The only other reference that I can find on which you might have based your statement is Part I, Sec.-7(b)(6), but that portion makes no specific reference to prime agricultural land:

"(6) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs."

In addition, the proviso that the lands have "adequate water" appears to exclude the site of the proposed project since it lacks sufficient water for irrigation of diversified agricultural crops. Given this, pineapple, which does not require irrigation in this area, appears to be the only crop that can be grown profitably. This possibility is discussed on pages IV-2 and IV-3 of the EIS.

If you have any remaining questions regarding the EIS, please call me at 521-5361, and I will attempt to answer them.

Sincerely,

Perry J. White

cc: Wiliami Town, Inc.
Dept. of Land Utilization
Environmental Quality Commission
Mr. George Horiguchi
Page 2
June 20, 1978

Identification of policy tradeoffs involved in Items "a" through "d" and description of how a proposed activity/development -- on balance -- relates favorably to the State Plan, Priority Directions, affected State Functional Plans, and involved County General Plan and Development Plan.

The EIS gives only brief reference to Item "d."

2. More specific State Plan-related policy concerns surrounding the expansion of Mililani that require objective discussion in the EIS include these items:

a. the short- and long-range impacts of the expansion on planned population projections/distributions for this area and for Central/Oahu as a whole.

b. effects of town expansion on projected housing and land availability in Ewa as resources to be used in meeting Oahu's growth needs in the immediate future.

c. impact of the proposed housing involved in the town's expansion on meeting Oahu's "gap group" needs.

d. effects of the expansion on existing/proposed ground water supply in the area, in Central Oahu, and on an Islandwide basis.

e. impacts of the proposed expansion on existing/potential agricultural resources in the area, on prime agricultural lands in Central Oahu, and in relationship to State and City agricultural policies.

3. Central to all the items above is the issue of timing and how it affects the appropriateness of expanding Mililani Town at this time. This issue needs further review/assessment by all public and private parties involved because it plays a major role in determining the impact of the proposed expansion to the Hawaii State Plan, statewide Priority Directions, State Functional Plans, County General Plan and Development Plans, and each of the aforementioned concerns.

4. Page 4, Chapter VI, states that "the projected acreage needed to satisfy the State policy for 75% self-sufficiency in truck crops by 1980 is only 2,000 acres on Oahu." This statement should be further clarified and a precise documentation of the source of the statement provided.
5. The EIS neglects to discuss the army safety zone and the potential hazards of the ammunition storage areas on urban development of the area.

6. The discussion on housing does not take into consideration vacant urban land information and the potential housing units that could be developed on these areas. Discussion is limited to known proposed single family and low density residential developments by large developers.

Thank you for the opportunity to provide our comments on the EIS.

Sincerely,

[Signature]

cc: Office of Environmental Quality Control

Millani Town Inc.
Mr. Hideto Kono
Director
Department of Planning & Economic Development
State of Hawaii
P. O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Kono:

Environmental Impact Statement
Mililani Town Expansion

Thank you for your letter of June 20, 1978, commenting on the Environmental Impact Statement for the proposed expansion of Mililani Town. I appreciate the effort you and your staff expended in reviewing the document. The remainder of this letter contains a point-by-point response to the issues you raised.

1. Conformance With the State Plan

As you know, the Act creating the State Plan was not signed into law until May 22, 1978; the Mililani EIS was completed well before this date. During the time that our report was being prepared, efforts were made to determine exactly what the State Plan's final shape might be so that it could be discussed intelligently in the EIS. Unfortunately, the bill was surrounded by so much controversy that it did not take its final form until the last few days of the Legislature. Because of this, we did not attempt to evaluate the proposed Mililani project's conformance with it. Even had the completed bill been available at an earlier date, I question whether or not a detailed discussion of its relationship to the project would have been fruitful. To illustrate this point, I would like to use some specific examples.

Relationship to Applicable Policies. The policies contained in the plan are necessarily broad, and its drafters assumed that they would be given specific meaning by the State Functional Plans, County General Plans, and County Development Plans. While we could have taken each of the policies listed in the State Plan and discussed the proposed project's relationship to it, there seemed to be little meaningful that we could say. Now, for example, could it be proved that the proposed expansion of Mililani Town would or would not help:

"... Manage population growth statewide in a manner that provides increased opportunities for Hawaii's people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county." [Sec. -5(b)(1)]

The answer, we believe, is that it could not. Even for seemingly more specific policies such as:

"Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs." [Sec.-7(b)(7)]

It is necessary to define such terms as "agriculturally suitable", "availability" in operational terms before an evaluation can be made. All of these definitions involve value judgments that can only be made by responsible public bodies, not by the author of an EIS. Because of this, we are of the opinion that an extensive discussion of such topics by us would serve no useful purpose.

Relationship to Priority Directions. The "Priority Directions" of the State Plan are of the same general nature as the policies discussed above. Because of that, any attempt to analyze the project's relationship to them is subject to the same kinds of limitations as are noted above.

State Functional Plans. The State Functional Plans mandated by the State Plan have not been developed. Even the first of these is not expected for about a year, and several will not be available until 1980. Because of this, they could not be included in our discussion.

County General Plan and Development Plans. The Oahu General Plan was discussed in general terms in the EIS. A more detailed review can be found as an attachment to the Mililani Town expansion rezoning application on file with the Department of Land Utilization. However, because the Oahu General Plan is a policy document, the discussion is necessarily general. The Development Plan for the Mililani-Waipio Planning Area will not be completed for at least a year.

2. Item Two of Your Comments

(a) As indicated on Page II-9 of the EIS, "The estimated population increase resulting in an islandwide distribution would fall within the range of General Plan population allocation for the Mililani-Waipio area." This conclusion is based on the calculations shown on the attached sheet indicating that the population of the area would be 40,985 following completion of the proposed Mililani Town expansion and all other approved development. The population allocation for the planning area shown in the 1977 Oahu General Plan is 3.4% of the islandwide population total of 1,039,000, plus or minus 5 percent, i.e., 37,508 to 41,456. Hence, it appears that the projected population of the area would fall within the acceptable range shown in the General Plan.

\[1,039,000 \times 0.034 = 35,400; \ 35,400 \times 0.95 = 33,930; \ 33,930 \times 1.05 = 35,708\]
Table 1. Existing and Projected Population of the Millilani-Waipio Area

<table>
<thead>
<tr>
<th>Area</th>
<th>Dwelling Units Completed</th>
<th>Average No. of Persons per Unit</th>
<th>Vacancy Rate (%)</th>
<th>Estimated Population</th>
</tr>
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<tr>
<td>Millilani Town</td>
<td>3,450</td>
<td>2.5</td>
<td>2.5</td>
<td>10,000</td>
</tr>
<tr>
<td>Village Park (V.P.)</td>
<td>1,156</td>
<td>2.4</td>
<td>2.4</td>
<td>3,956</td>
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<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td>30,965</td>
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</table>

(a) Because the proposed project is located in Millilani-Waipio, rather than Ewa, it would have no effect on the availability of land or housing in that planning area. It would, of course, result in a decrease in the amount of undeveloped land and an increase in the housing stock needed to accommodate the projected growth in the number of households on Oahu.

(b) I assume that the term "gap group" refers to families whose income is too low to allow them to be eligible for public assistance and too low to qualify for mortgages from regular commercial lenders. As indicated on pages V-5 and V-8 of the EIS, the proposed project would contain a substantial number of units at hom and moderate income groups. At $47,000, the least expensive of these would still involve a considerable investment, but they would have to be considered bargains in today's Oahu housing market. Slightly less expensive units would probably be available in a few areas of Oahu, but these are generally of a significantly lower quality and/or measurably farther from employment centers and civic amenities. In short, while the proposed project would, in all likelihood, offer about the best quality-price combination available on Oahu, it would not substantially reduce the size of the gap group. While this is indeed unfortunate, it is a result of cost pressures common to the entire housing industry. Barring some major changes in the basic structure of that industry and in national and international trends in the prices of raw materials, labor, and capital, there appears to be little that can be done to lower housing prices here.

(d) The effects of the proposed project on water supply are thoroughly discussed on pages IV-17 through IV-24 of the EIS. At this time, there appears to be little that could be added to this analysis.

(e) All of the questions relating to agriculture resources that are raised in your letter are discussed on pages VI-1 through VI-4 of the EIS.

3. Timing of the Proposed Project

The phasing of the proposed project is described in some detail on pages 1-25 through 1-28 of the EIS. We believe that the information presented there is sufficiently detailed to allow the responsible parties to adequately assess the impact of the proposed project.

4. Self-Sufficiency in Truck Crops

As I indicated to Ms. Esther Ueda of your Department over the telephone, the reference cited in the EIS for this statement is incorrect. The estimate is from The Central Oahu Land Study: Agriculture by Agro-Industrial Associates, Inc., rather than from The Hawaii State Plan: The Economy. The latter gives low, medium, and high projections for the need for diversified agricultural crops on Oahu in 1970 of 2,000, 2,200, and 2,400 acres, respectively. This is very close to the 2,080-acre figure given in the EIS.
5. Army Safety Zone

The previously existing Army safety zone is discussed on page IV-37 of the EIS under the heading of "Physical Hazards: Mamade." On July 19, 1978, Millilani Town, Inc. received a letter from the Department of the Army confirming that the ammunition storage area in question has been deactivated. A copy of that letter is attached.

6. Vacant Land Potential

Over the past decade, several attempts have been made to identify developable vacant land and to compare this with projected needs. While these inventories have produced a significant amount of valuable information, they have not proved particularly useful in predicting where additional development will actually occur. The discussion in the EIS was limited to known low density developments by large developers for three reasons. First, this is the market within which the proposed Millilani Town project would compete. Second, there seems to be little likelihood that smaller developers have the financial leverage and management skills to provide more than a small portion of the number of units that are needed. Finally, the multi-family/high-density market fluctuates so widely that anything we might say would be little more than speculation.

If you have any remaining questions, please contact me at 521-5361.

Sincerely,

Penny J. White

PJM:tgk
Attachments
cc: Millilani Town, Inc.
Dept. of Land Utilization
Environmental Quality Commission
June 22, 1978

Mr. George S. Moriguchi, Director
Department of Land Utilization
City and County of Honolulu
Honolulu, Hawaii

Dear Mr. Moriguchi:

Millilani Town Expansion
Environmental Impact Statement (May 1978)

Our concerns expressed earlier in our letter of February 1, 1978 with respect to the proposed rezoning have not been adequately addressed. For example:

1. Under the Oahu General Plan in Chapter II (page 9), the EIS indicates "... the estimated population increase and resulting Islandwide distribution would fall within the range of General Plan population allocation for the Mililani-Waipio area . . ." This is incorrect.

Resezoning of some 290 acres to residential districts coupled with the expected Helemanu Phase III development could accommodate an estimated population of 43,285 in the Waipio-Millilani area. In this regard, it should be noted that the City Council has recently approved certain adjustments to the population distribution in the new General Plan to reflect the State's II-F projections. Given this situation, therefore, a population of 43,285 would result in a 23% increase over the 35,000 population allocation for the area. Subsequent residential development in the area could produce a community that surpasses the 35,000 population limit allocated for the Millilani-Waipio area and thus would conflict with the expressed population policies of the new General Plan. This has implications on the community's long-range orderly growth and development of other areas.

2. Chapter II on Project Rationale lacks a detailed discussion on the specific need to rezone some 108 acres to apartment uses. Data reflected in Table II-2 in the EIS shows that multi-family (low density) units declined markedly from 41.7% in 1974 to 12.2% in 1976. While evidence shows that the market for apartment units has fallen, about 108 more acres are being requested to be rezoned for apartment purposes. The EIS should provide a comprehensive discussion and information that would support and justify the specific need for additional apartments at this particular time.

3. Neither data nor a detailed discussion on the current supply or inventory of vacant lands in each of the zoning categories being requested has been provided. With the rezoning being substantial in magnitude, we believe this information would help in assessing the need for rezoning.

4. Table V-9 (page 13) reflecting projected residential sales volume for the proposed project shows more apartment units (by 171) than single-family units within the community. In light of a declining market for apartment units, as indicated in this document, the rationale for more of these units should be discussed.

5. The EIS does not provide a detailed discussion relative to the project's impact upon the Army's Upper Kipapa Ammunition Storage operations. Maps indicating the boundaries of the project site and the general limits of the "blast hazard zone" should be included in the document. The discussion should cover the points raised in our letter of February 1, 1978 to the EIS consultant.

Thank you for providing the opportunity to comment on this impact statement.

Sincerely,

Ramon Duran
Chief Planning Officer
Mr. Ramon Duran
Chief Planning Officer
Dept. of General Planning
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Duran:

Environmental Impact Statement
Proposed Millilani Town Expansion

Thank you for your letter of June 22, 1978, commenting on the Environmental Impact Statement for the proposed expansion of Millilani Town. We appreciate the time and your staff spent reviewing the document, but we are disappointed to hear that you feel "...the concerns expressed in your letter of February 1, 1978, with respect to the proposed rezoning have not been adequately addressed." While it is our experience that the draft of any document charged with assessing the impact of a project on the scale being proposed at Millilani inevitably contains some errors and omissions, I believe that the majority of your criticisms are undeserved.

Before beginning on a point-by-point response to your comments, I would like to return briefly to your assertion that we have not addressed the concerns expressed in your letter of February 1, 1978. That document suggested eight different topics that should be addressed in the EIS. So far as I can tell from your letter of June 22, you are dissatisfied with the EIS's coverage of only two of those---the need for specific rezonings and the blast hazard zone. The second of these is, in fact, covered on page IV-37; while the coverage is admittedly brief, it is our belief that little would have been gained by belaboring the fact that the ammunition storage areas that resulted in the establishment of a "blast hazard zone" are no longer in use. Hence, it appears to me that the deficiencies you have noted involve only one of the eight topics listed in your original letter. Your other comments on the draft of the EIS are related to items not previously mentioned by you.

Compliance With the Population Policy of the Oahu General Plan

Your letter states that:

"Rezoning of some 290 acres to residential districts coupled with the expected Melemanu Phase III development could accommodate an estimated population of 43,285 in the Waipio-Millilani area."

I assume that the 43,285 population figure refers to the total population of the entire Waipio-Millilani planning area and not, as you have stated, merely to the population of the proposed Millilani expansion and Melemanu Phase III. Even with this clarification, we were unable to determine exactly how the estimate was derived.

Our own conclusion that the population of the Millilani-Waipio planning area would remain within the limits laid down by the Oahu General Plan was based on the calculations shown on the attached sheet. The results of these calculations show that the population of the area would be 40,988 following completion of the proposed Millilani Town expansion and all other approved development. The population allocation for the planning area shown in the 1977 Oahu General Plan is 3.0% of an island-wide population total of 1,039,000, plus or minus 5 percent, i.e., 37,482 to 41,456. Hence, it appears that the projected population of the area would fall within the acceptable range shown in the General Plan.

Your letter does not use a General Plan population range of 37,509 to 41,456. Instead it states that there is a "...35,000 population allocation for the area. The absence of any supporting data or calculations makes it difficult to ascertain exactly where our differences lie. However, I presume that your figure must have been arrived at by applying the geographic distribution of the population shown in the 1977 General Plan (i.e., 3.0% of the Oahu total in the Millilani-Waipio area) to the population projections released by the State Department of Planning.

\[1,039,000 \times 0.03 = 30,443,300 \times 0.05 = 37,509\]
\[37,482 \times 1.05 = 41,456\]
and Economic Development in March of this year. If I am correct, your calculated range would have been 33,104 to 36,558, with 34,046, say 35,000 being the midpoint. Having read the General Plan quite carefully, I can find no firm support for this interpretation of its population objectives.

First, whereas your letter states, "It should be noted that the City Council has recently approved certain adjustments to the population distribution to reflect the State's II-F projections," both Ali Shebani and Ralph Fortmore of Council Services have indicated that they have no knowledge of such action by the Council. One note attached to the population figures contained in the General Plan does state that, "The figure of 3,039,000 for the year 2000 and the corresponding distribution of the population to the various designated areas...will be revised as the State Department of Planning and Economic Development revises its population projection." I assume that this note serves as the basis for the idea that the General Plan population policy should be amended in view of the new series II-F population projections. However, a close reading of the General Plan makes it clear that it neither states nor implies that this adjustment should be made by mechanically applying the same percentage distribution to a revised Islandwide population. On the contrary, common sense would suggest that this is not at all what was intended.

The framers of the General Plan worked first with real numbers and distributed the projected population to the various planning areas based on a specific knowledge of what was realistic and desirable. The percentages were calculated only after the manipulation was completed, and they are intended primarily as a means of providing lay readers with a better means of understanding the implications of the population policy incorporated in the Plan. Thus, while it may be mathematically convenient to apply the percentages in the way that you have done, this does not appear to have been the Council's intent.

Need For Apartment Zoning

As indicated in the EIS, the Millilani Town 3,500-acre Master Plan envisioned a "town center" as a key element in efforts to make Millilani more than just another bedroom community. Its higher density, as well as the proximity of commercial facilities to residential units, would create a different type of space than can be found in typical residential subdivisions. The town center apartments have been shown on the master plan for the town since its inception, and buyers throughout Millilani Town have purchased homes with the expectation that they would eventually have access to the facilities which only the higher population density made possible by the existence of the town center could effectively support. Because of this important relationship between density and community amenities (both public and private), Millilani Town, Inc. has been reluctant to convert areas planned for multi-family use to single-family development, even when such a conversion would have been the most lucrative course to follow.

With specific reference to Table II-2, your letter states "...that multi-family (low-density) units declined markedly from 41.7% in 1974 to 12.2% in 1976." Based on this, it goes on to conclude that the "...market for apartment units has fallen." The figures quoted by you refer to multi-family unit completions at Millilani as a percentage of total multi-family unit completions on Oahu. They cannot, therefore, be used to make your point. A more valid measure of the market for multi-family units is the absolute number of units completed, or, as an alternative, the percentage of units sold, either at Millilani or Island-wide. I have compiled this information on the attached sheet.

The table provides some interesting insights into historical trends in the Oahu housing market, and I would like to comment briefly on those that are most germane to our present discussion. First, and perhaps most importantly, the data makes it clear that both the relative and absolute demand for low-density multi-family housing and single-family housing fluctuates significantly. Moreover, multi-family sales appear to evidence a cyclical pattern that is not apparent from looking only at the 1974-1975 period referred to in your letter. The multi-family share of the total Oahu low-density housing market rose steadily from about 32 percent in 1970 to 64.9 percent in 1975; at Millilani the rise was from 0 to 27.9 percent. Following this, there was a sharp drop in the multi-family percentage at Millilani to 25 percent in 1976 and 35 percent in 1977. Only a slightly less drastic change occurred in the total Oahu market where the multi-family share dropped to 27 percent in 1976 and 32.2 percent in 1977.
The point to this is that, while multi-family sales at Millani have been weaker during the past two years than for some time previously, the demand for such units is cyclical. Hence, it is expected that multi-family sales will rise at some time in the not-too-distant future. It is Millani Town, Inc.'s belief that the creation of an attractive commercial complex within an easy walking distance of the apartment areas will encourage this. If, in the long run, it proves difficult to market the apartments, some of the apartment designated land could be converted to lower-density units. Zoning for the entire area planned for apartments was requested at this time because of the flexibility which it would provide.

Vacant Lands

I am aware that "vacant zoned land" is often equated with housing potential, but believe that experience throughout the island has shown that there is a poor correlation between the two. The development of housing on a large scale requires far more than ownership of vacant land having the appropriate zoning; it demands a desire to undertake the risks inherent in such a project; planning, legal, and financial expertise; access to sources of financial capital; and the perseverance to carry through in the face of the inevitable delays and setbacks. Because "vacant land inventories" find it impossible to measure all of the factors that actually determine whether a specific parcel will be developed in the way that its zoning would allow, we did not feel that a detailed inventory would provide useful information for the EIS. Our opinion has not changed. Nevertheless, in hopes that I can convince you that we are not merely avoiding a touchy issue, I would like to run through some very coarse numbers that provide some insights into the question.

The most recent comprehensive listing of vacant zoned land in the Millani area that I am aware of is contained in the Data Book For The Millani/Waipio/Helamani Neighborhood [No. 25] published in 1977 by your Department. While the acreages it contains are now out of date, the data it provides on existing development (p. 25) and zoning and D.L.U.H. designations of vacant land (p. 33), together with our own brief review of zoning maps of the time, indicates that essentially all of the "vacant usable zoned land" in the Neighborhood No. 25 area was in the Millani and Helamani projects. The only significant amount of residentially zoned land in the Oahu General Plan's Millani-Waipio Planning Area that was not in Neighborhood No. 25 was the proposed site of the long-delayed Village Park project.

While the total amount of zoned land and residential development in the Millani-Waipio Planning Areas has increased substantially since 1975, all of the new zoning has been in projects where development was already underway in that year. As a result, it is reasonably easy to estimate the number of persons that could be accommodated within the Planning Area on land presently having the necessary zoning. These computations are shown in Table 2. The table does not provide a breakdown of the zoned land by specific zoning designation, but it does provide a general indication of the type of development that could occur without further re-zoning. Whether or not the potential of the zoned parcels will be fully realized is another question.

Projected Residential Sales Volume

Your remarks concerning Table V-9 make it obvious that that table is not as clear as it might be. I believe that the 17 percent figure given in Item four of your letter was arrived at by dividing the number of units in A/1-A/2-zoned area (1,280) by the number of units proposed for the R-6-zoned area (1,092). Units in the "Town Center" appear to have been neglected. Actually, the units in the A/1-A/2 areas would generally be townhouses and patio homes, not apartments. It is the 1,092 units in the Town Center that would generally be apartments, and they would account for only 31 percent of the total. In other words, there would be 119 percent more single-family detached and attached units than there would be apartments.

Upper Kipapa Ammunition Storage

On July 19, 1978, Millani Town, Inc. received a letter from the Department of the Army confirming that the Upper Kipapa ammunition storage facilities had been deactivated. A copy of that letter is attached.

If you would like to discuss any of the points made in this letter or require further clarification of statements made in the EIS, please call me at 521-5361.

Sincerely,

Perry J. White

Pjwbh
cc: Millani Town, Inc.
Dept. of Land Utilization
Environmental Quality Commission
Attachments
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Table 1. Comparison of Multi-Family (Low-Density)/Single-Family Proportions: Million Total and Other-Use
Mr. George W.Y. Yim
Senior Vice President
and Secretary
Oceanic Properties, Inc.
P.O. Box 2780
Honolulu, Hawaii 96803

Dear Mr. Yim:

This headquarters has been advised by the Pacific Ocean Division, Corps of Engineers, of your inquiry regarding the status of ammunition storage at the Army’s Upper Kipapa Military Reservation and its resultant effect on the adjacent Mililani Town development.

As you are aware, the Army notified the State of Hawaii Land Use Commission on March 1, 1977 that because of ammunition storage at Upper Kipapa, this headquarters opposed the proposal to incorporate approximately 591 acres from Agricultural District into Urban District at Mililani Town. Planning, however, was initiated at that time to develop alternatives for the storage of ammunition located at Upper Kipapa. Further, it would require as a minimum, a period extending to September 30, 1978 to implement an acceptable alternative.

As a result of the foregoing, the Army was able to obtain suitable alternate facilities for the ammunition stored at Upper Kipapa. Consequently, all of the ammunition formerly stored at this installation has been relocated and it is currently maintained in an inactive status.

This headquarters realizes the difficulties posed by this situation and appreciates the assistance of all concerned in deferring implementation of the decision on usage of the real estate adjacent to Mililani Town until the relocation of the Army’s ammunition at Upper Kipapa was satisfactorily resolved.

Sincerely yours,

CARL P. RODOLPH
Colonel, CE
Director of Facilities Engineering
Mr. George S. Moriguchi, Director
Department of Land Utilization
City and County of Honolulu
Honolulu Municipal Building
Honolulu, HI 96813

June 22, 1978

Dear Mr. Moriguchi,

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT FOR MILILANI TOWN EXPANSION, MILILANI, OAHU, HAWAII

We have reviewed the above document and offer the following comments for your consideration:

1. The discussion of the proposed action in terms of the surrounding area such as Gentry-Waipio, Village Park, and Melanano Woodland developments should be expanded. Although some of these developments have been mentioned, these areas as a whole will place a significant impact and stress on resources and facilities such as water supply and sewage treatment facilities (in this case, Mililani Sewage Treatment Plant).

2. Chapter IV, page 32

The EIS indicates that increased water pumpage would have a long-term impact on Pearl Harbor aquifer. At present, the aquifer is being pumped more than the estimated sustainable yield. Chester Lao of the Board of Water Supply estimates the sustainable yield of the aquifer to be 270 mgd. The average pumpage between 1975-1977 is 285.6 mgd. With more large developments being proposed such as Gentry-Waipio, Village Park, and Melanano Woodland, water will be a critical issue. As a result, a closer examination of the water supply versus all the developments in the upper Ewa plain is needed.

3. Chapter IV, pages 30-43

The EIS considers the cumulative traffic impact on H-2. However, it should also be recognized that H-1 will be affected by the proposed developments. What percentage of the H-2 traffic from Mililani will be using H-1? Will H-1 be able to handle its overflow, especially in the Red Hill area?

4. What is the present occupancy rate for Mililani? How many existing residential units are vacant?

5. The EIS Regulations require a section on unresolved issues. Are there any unresolved issues? If so, they should be discussed.

As of this date, this Office has received fourteen comments on the environmental impact statement. An attached sheet lists the responding agencies and/or organizations.

We trust that our comments will be helpful to you. We thank you for the opportunity to review this document. We look forward to the revised EIS.

Sincerely,

Richard L. O'Connell
Director

Attachments

cc: Belt, Collins & Associates (w/attachment)
Attn: Perry White
July 21, 1978

Mr. Richard L. O'Connell, Director
Office of Environmental Quality Control
State of Hawaii
550 Halekauila Street
Honolulu, Hawaii 96813

Dear Mr. O'Connell:

Environmental Impact Statement
Proposed Mililani Town Expansion

Thank you for your letter of June 22, 1978, regarding the Environmental Impact Statement for the proposed expansion of Mililani Town. We appreciate the time spent by you and your staff reviewing the document. The remainder of this letter contains point-by-point responses to your comments.

Consideration of Surrounding Developments

You are correct in saying that there are other proposed developments in the general vicinity of the Mililani property covered by the EIS that will have significant effects on resources and public facilities. Where these other projects appeared to have an important bearing on the impacts that would result from the proposed Mililani expansion, we included them in our discussion (see, for example, traffic). However, where there appeared to be little significant relationship between Mililani and other projects, we did not undertake a comprehensive analysis of the situation.

In the case of the Mililani Sewage Treatment Plant which you mentioned specifically in your letter, the proposed project was discussed in the context of other developments that might affect that facility. As indicated in Table 1-5, a total of 1.3 mgd of the Mililani STP's existing capacity of 3.6 mgd is reserved for Helemanu Woodlands and Naipio Acres. The Gantry-Naipio project would utilize a portion of the STP capacity reserved for Helemanu until it can accomplish its planned hook-up with the Honolulu STP, but this would not affect Mililani Town.

Pumpage From the Pearl Harbor Basal Lens

Subsequent to circulation of the EIS for review and comment, we have met with the staff of the Honolulu Board of Water Supply on two occasions to discuss the groundwater situation in the Pearl Harbor basin. As a result of those meetings and of a letter from the Board of Water Supply dated July 3, 1978, containing comments on the EIS, it has become apparent that we inadvertently mis-reported the Board of Water Supply's position with respect to the current status of the aquifer. Because of this, pages IV-20 through IV-24 have been revised. I have attached copies of the Board's comments and the rewritten portions of the EIS to the back of this letter.

We agree completely with your conclusion that a closer examination of water supply versus all developments in the upper Ewa plain is needed. To be useful, however, such an investigation would have to take into consideration the entire groundwater basin, not just the upper Ewa plain. Moreover, since the Board of Water Supply's system is a regional one that presently depends upon extensive inter-basin transfers of water, such a study would have to take into consideration land uses and source and distribution systems for the greater part of the entire island. While it was feasible for the Mililani EIS to call attention to the potential problem, its solution is far beyond the resources of Mililani Town, Inc. or its consultants. Fortunately, there are studies now underway by the Board of Water Supply and others that should provide answers to your questions.

Impact on Traffic On H-1

In responding to our request for comments regarding the proposed project, the State Department of Transportation (DOT) stated:

"Thus, this rezoning action will have no adverse impact upon our existing or planned transportation facilities." (p. B-40 in Appendix B of the EIS).

Despite the fact that the major transportation facilities likely to be affected by the proposed project are under the control of the DOT, we devoted considerable time to an analysis of the project's probable impacts upon traffic flow on the H-2 Freeway and Kanehameha Highway. We did not, however, extend this analysis to the Moanalua screenline on H-1. I believe there are a number of reasons why any attempt to do so would be unproductive, and would like to outline them briefly below.
The primary intent of an EIS is to indicate ways in which conditions "with" a proposed project or action would differ from those that could be expected to occur without it. Residential and commercial development at Millilani would undoubtedly increase traffic volumes on Kamehameha Highway and the H-2 Freeway over the level that would be experienced without it because there is no other potential development along the Central Oahu corridor where an equivalent amount of residential construction could occur. The same cannot be said of traffic through the Moanalua screenline.

The Oahu General Plan accepts the notion that significant population growth will occur on Oahu in the years ahead and that a large portion of this growth is to be accommodated in West Honolulu and in Ewa. Given this, and the fact that these areas contain the vast majority of the readily developable land in proximity to the urban core, it is our belief that if the residential expansion currently being proposed for Millilani is not approved, there is likely to be a corresponding increase in the amount of residential construction in other areas lying to the west of the Moanalua screenline. From this it follows that the proposed project at Millilani would not increase traffic at the screenline over what would occur without it. In short, traffic volumes at the screenline would increase by about the same amount regardless of where in the West Honolulu-Ewa-Central Oahu area the residential growth necessary to meet the General Plan population and housing objectives occurs; an increase at that point does not, therefore, appear to be a legitimate impact of this particular project.

Even if one does not accept the preceding argument, there are a number of technical considerations that lead us to the value of a detailed analysis of the proposed project's impact on traffic flow through the Moanalua screenline. First, the screenline's distance from Millilani means that it is difficult to accurately assess the volume of Millilani-generated vehicles that would pass through it or the exact time at which they would do so. This problem is made particularly acute by our finding that traffic from the Gentry-Halplo project would raise the vehicle/capacity (v/c) ratio on Kamehameha Highway below Millilani to well over 1.0, and that Millilani residents' attempts to adjust to the congestion that this would produce might well cause problems at the Millilani H-2 interchange as well. While existing traffic models are reasonably accurate at v/c ratios of 1.0 and below, they are not designed to be accurate at very high v/c ratios. Hence, it is impossible to accurately predict the rate at which vehicles would emerge from the congestion and enter the flow of traffic headed for the Moanalua screenline.

Second, the highway network is in such a state of flux at the present time that any analysis based on existing conditions would be totally invalid in only a short while. Completion of H-1 between the Aloha Stadium and Middle Street will open up a major new highway corridor, and it is impossible to predict exactly how drivers will respond to this in terms of their choice of routes. Without such information, any useful kind of discussion is impossible. Moreover, while roadway constraints on the through lanes of the Moanalua and H-1 Freeways are now the primary cause of congestion in this area, this may not be the case following completion of highway improvements now underway. If this proves the case, congestion will not disappear, but rather will be transferred to the off-ramps and city streets feeding into the employment centers.

Other changes are being proposed closer to Millilani, where another on-ramp to the H-2 Freeway is being suggested to serve the Gentry-Halplo development and the proposed industrial area at Millilani. In addition, some changes are almost certain to be made in Kamehameha Highway in the vicinity of the Gentry project. Given the immensity of the problem, the number of unknowns that are involved, and the resources that we or anyone else other than the State Department of Transportation could bring to bear, further investigation does not appear to us to be fruitful at this time.

Occupancy Rates At Millilani

Sales of single-family homes at Millilani are very strong. Hence, new units of this type are typically sold several months before they are completed, and buyers occupy them as soon as construction is finished. Occasionally Millilani Town, Inc. has a small inventory of unsold completed multi-family units, but, this historically, has never amounted to more than about 10 homes. Resales at Millilani are common, but homes seldom remain vacant for a significant period of time between owners. Overall, it is estimated that the occupancy rate there is about 97.5 percent.

Unresolved Issues

As indicated in the preceding sections of this EIS, the proposed project would have a number of significant effects -- adverse as well as positive. Similarly, a great many specific approvals must be obtained before it can be implemented (see Appendix E). However, with the exception of the project's compliance with the population objectives of the Oahu General Plan, there does not appear to be any significant ongoing controversy with respect to the assessment of impacts contained in this report.
If you have any additional questions, please call me at 521-5361.

Sincerely,

Perry J. White

cc: Mililani Town, Inc.
Dept. of Land Utilization
Environmental Quality Commission