Hawaii Electric Light Company, Inc.

KEAHOLE GENERATING STATION AND AIRPORT SUBSTATION
URBAN RECLASSIFICATION

FINAL
ENVIRONMENTAL IMPACT STATEMENT

North Kona, Hawaii

January 24, 2005

LINDA LINGLE
GOVERNOR

ANTHONY J.H. CHING
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
P.O. Box 2359
Honolulu, Hawaii 96804-2359
Telephone: 808-587-3822
Fax: 808-587-3827

February 23, 2005

RECEIVED
05 FEB 23 P2:11

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813-2437

Dear Ms. Salmonson:

Subject: LUC Docket No. A03-743/Hawaii Electric Light Company, Inc.
(Keahole Generating Station and Airport Substation Urban Reclassification)
Final Environmental Impact Statement (FEIS)
Keahole, North Kona, Hawaii
Tax Map Key: 7-3-49: 36 and 37

At its meeting on February 10, 2005, the Land Use Commission accepted the FEIS for the subject project. We respectfully request the publication of this acceptance in the next available issue of The Environmental Notice.

Enclosed please find the following:

1) OEQC Bulletin Publication Form
2) Project Summary Description (an electronic copy is also provided herein)
3) Completed FEIS Distribution Cover Letter to Participants
4) Completed FEIS Distribution List
5) Four Copies of the FEIS

A copy of the Commission's Order reflecting its action of February 10, 2005, will be provided to you under separate cover.

Please feel free to contact Bert Saruwatari of my office at 587-3822, should you require clarification or any further assistance.

Sincerely,

ANTHONY J. H. CHING
Executive Officer

Enclosures

c: Benjamin A. Kudo, Esq. (w/o enclosures)
Lee Sichter (w/o enclosures)

This Environmental Impact Statement (EIS) has been prepared by Belt Collins Hawaii Ltd., acting as a consultant to Hawaii Electric Light Company, Inc. The EIS has been prepared under the signatories' direction and supervision. All information submitted, to the best of signatories' knowledge, fully addresses document content requirements set forth in Sections 11-200-17 and 11-200-18 of the Hawaii Administrative Rules, as appropriate.

HAWAII ELECTRIC LIGHT COMPANY, INC.

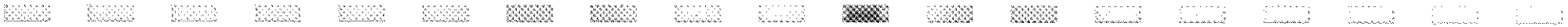
By: _____ 24 JAN 2005
WARREN H.W. LEE Date
Its: President

BELT COLLINS HAWAII LTD.

By: _____ Jan. 24, 2005
ANNE L. MAPES Date
Its: President

OFFICE OF ENVIRONMENTAL QUALITY CONTROL
CONTENT REQUIREMENTS CHECK LIST

FINAL ENVIRONMENTAL IMPACT STATEMENT	MISCELLANEIOUS	SUMMARY	CHAPTER ONE	CHAPTER TWO	CHAPTER THREE	CHAPTER FOUR	CHAPTER FIVE	CHAPTER SIX	CHAPTER SEVEN
THE DRAFT EIS REVISED TO INCORPORATE SUBSTANTIVE COMMENTS RECEIVED DURING THE CONSULTATION AND REVIEW PROCESSES;									✓
REPRODUCTION OF ALL LETTERS RECEIVED CONTAINING SUBSTANTIVE COMMENTS AND, AS APPLICABLE, SUMMARIES OF ANY SCOPING MEETINGS									✓
A LIST OF PERSONS, ORGANIZATIONS, AND PUBLIC AGENCIES COMMENTING ON THE DRAFT EIS;									✓
THE RESPONSES OF THE APPLICANT TO EACH SUBSTANTIVE COMMENT									✓
THE RESPONSE TO COMMENTS SHALL INCLUDE:									
Point-by-point discussion of the validity, significance, and relevance of comments; and									✓
Discussion as to how each comment was evaluated and considered in planning the proposed action.									✓
Response letters reproduced in the final EIS shall indicate verbatim changes that have been made to the draft EIS.									✓
Reasons why specific comments were not accepted, and factors of overriding importance warranting an override									✓
THE READER CAN EASILY DISTINGUISH CHANGES MADE TO THE DRAFT EIS.	✓								
THE APPLICANT SHALL SIGN THE FINAL EIS AND SHALL INDICATE THAT DOCUMENTS WERE PREPARED UNDER THE SIGNATORY'S DIRECTION	✓								



REVISIONS TO THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

SECTION	CHANGE[1]
Signature Page	A Signature Page has been added to the beginning of the document.
After Signature Page	EIS Checklist has been added after the Signature page
Acronyms, Page 3	Added HCPS = Hawaii Content and Performance Standards
Acronyms, Page 3	Added HFP = HFP Acoustical Consultants
Acronyms, Page 4	Added MSRI = Million Solar Roofs Initiative
Acronyms, Page 5	Added SCANS = Secretary's Commission on Achieving Necessary Skills
Executive Summary, Page 1, 2nd paragraph	Changed 1st sentence to "The reclassification has been required by the State Board of Land and Natural Resources." Added: "Once reclassified from the Conservation District to the Urban District, HELCO must seek rezoning to Industrial." Added "." at the end of second paragraph
Executive Summary, Page 2, last paragraph	Added "HELCO will conduct additional studies to determine the type of ammonia it will use in the SCR unit (anhydrous or urea pellets), whether to use naphtha as an alternate fuel source, and if it is environmentally appropriate and economically feasible to construct an additional wastewater treatment facility on site to treat the wash water from periodic cleaning of SCR components (the wash water would contain heavy metals and therefore be classified as hazardous waste). Once all necessary approvals for the facility are secured (2007 or beyond), HELCO will commence its studies associated with the ammonia and naphtha. The analysis of the potential need for an additional wastewater treatment facility will not commence until operational experience has been gained to determine the actual volume of wash water generated and the frequency of required cleanings."
Executive Summary, Page 3, lst paragraph	Removed "Proposed" from the third line.
Executive Summary, Page 3	Deleted "." at end of second paragraph Inserted "Hawaii County Planning Commission/" at the beginning of the fifth bullet
Chapter One, Section 1.1, Page 1, fourth paragraph, 1st line	Emphasis added to <u>its</u>
Chapter One, Section 1.2, Page 1, 3rd sentence	Deleted the phrase "...and is in conformance with the Conservation District"
Chapter One, Section 1.6.2,	Added: It should be noted that several other projects in the region surrounding the Keahole Generating Station are presently

[1] To readily identify any changes made to the Draft Environmental Impact Statement, the additions noted in this table will be made to the Chapters in grey and underlined. Deletions will be noted in the right margin.

	undergoing environmental review. For a broader perspective, the reader may wish to consult the Office of Environmental Quality Control to obtain copies of documents pertaining to the University of Hawaii's proposed West Hawaii campus, the Hiluhilu development (also known as Palamanui), and the Department of Hawaiian Home Lands."
Chapter One, Section 1.7.2., Page 4	Added "(6)" before developing . . .
Chapter One, Section 1.7.8	Added New Section "Additional Studies Required" with following text: "HELCO must conduct additional studies to determine the type of ammonia it will use in the SCR unit (anhydrous or urea pellets), whether to use naphtha as an alternate fuel source, and if it is environmentally appropriate and economically feasible to construct an additional wastewater treatment facility on site to treat the wash water from periodic cleaning of SCR components (the wash water would contain heavy metals and therefore be classified as hazardous waste). The studies associated with the ammonia and the naphtha will not commence until all necessary approvals for the facility are secured (2007 or beyond). The analysis of the potential need for an additional wastewater treatment facility will not commence until operational experience has been gained to determine the actual volume of wash water generated and the frequency of required cleanings."
Chapter One, Section 1.9, Page 1-6	Added "See Section 2.10 for a more detailed explanation" Added "Planning Commission/" after Hawaii County in the sixth bullet point
Chapter Two, Section 2.1, Page 1, 3rd sentence	Footnote added: "It should be noted that the rules governing permitted uses in the Conservation District have evolved over time. In 1973, industrial uses (such as a power plant) were deemed to be appropriate uses in the Conservation District. This helps explain why the original facility was permitted in the first instance"
Chapter Two, Section 2.2, Page 2, 1st paragraph, 1st line	Added ", and both owned by the applicant."
Chapter Two, Section 2.3, end of first paragraph, page 2-6	Added "The subject properties were originally zoned Open by the County to conform with the State Land Use Commission's classification of the property as Conservation District in the early 1960s."
Chapter Two, Table 2-A, Page 7	Added discussion of engineering and design-related activities between 2004 and 2009 to the table entries
Chapter Two, Section 2.4.1, last paragraph	Deleted the phrase "...and is in conformance with the Conservation District" Added to the end of the paragraph: "The reclassification and change in zoning would bring the subject property into conformance with its existing use for industrial purposes. The generating station and airport substation have been operating on the subject property since 1973, and HELCO has been serving the island of Hawaii (Big Island)

	since 1894. The ongoing consumption of petroleum for the generation of electricity ensures long-term economic productivity on the island. The addition of ST-7 is intended to improve efficiency, thereby contributing to a reduction in the facilities' dependence upon increased consumption of petroleum."
Chapter Two, Section 2.7.1. , Page 17	Added "there" after Recognizing that . . .
Chapter Two, Section 2.9.3.2, Page 23	Added last paragraph to read: "Although regulatory officials applied an "emissions netting" formula to exclude the mandatory use of SCR at the Keahole Generating Station, under the Settlement Agreement, HELCO and State Department of Health officials agreed to the use of SCR."
Chapter Two, Section 2.9.4.7, Page 27	Added: "HELCO is also required to prepare and submit a Risk Management Plan (RMP) in accordance with guidelines issued by the Environmental Protection Agency (EPA) pursuant to Section 112(r) of the Clean Air Act Amendments of 1990. Ammonia, in both anhydrous and aqueous forms, is listed as a regulated substance under 40 CFR Part 68. The RMP will include the following components: ▪ Hazard assessment that details the potential effects of an accidental release, an accident history over the last five years, and an evaluation of worst-case and alternative accidental releases; ▪ Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and ▪ Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies should an accident occur. These plans are submitted to the EPA and made available for public review. The plans must be updated and resubmitted every five years. Also, under EPA's Emergency Planning and Community Right to Know Act (EPCRA), the quantities of ammonia and storage locations are reported to the State of Hawaii Department of Health, the Local Emergency Planning Committee, and the Hawaii County Fire Department. This information is submitted annually under the EPCRA Tier II program. Compliance with the risk management program requirements (including submission of an RMP) is required by the date on which a regulated substance first becomes present above a threshold quantity in a process at a stationary source (the initial compliance deadline was June 21, 1999 for sources holding more than a threshold quantity of a regulated substance in a process prior to that date) (40 CFR §68.10(a)). If EPA adds a chemical to the list of regulated substances, part 68 requirements must be met with respect to that chemical within three years of the date on which the chemical is listed (40 CFR §68.10(a) (2))."

REVISIONS TO THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

Chapter Two, Section 2.9.5.8., Page 28	Changed "." to "," in $4,870,000
Chapter Two, Section 2.9.6.2, Page 33	Changed "Agriculture" to "Agricultural"
Chapter Two, Section 2.10, Page 34	Added explanation of status of each permit or approval needed. Also added new discussion of the need for Public Utilities Commission approval for CT-2 Noise Modification.
Chapter Three, Section 2.9.6.2, Page 31, 2nd paragraph, 3rd sentence	Changed "Agriculture" to "Agricultural"
Chapter Three, Section 3.5.10.3., Page 14	Deleted extra "."
Chapter Three, Section 3.6.1, Page 17	Deleted sixth paragraph.
Chapter Three, Section 3.6.2, Point 3, end of 3rd paragraph, Page 19	Added: "A wash water sample will be collected each time the HRSG tubes are washed. All samples will be analyzed by an analytical laboratory following appropriate EPA methodologies for determining hazardous wastes. The frequency of sampling may be adjusted after significant testing (e.g., after collection of 10 or more data sets) has been conducted to properly characterize the waste stream as being hazardous or not. The need to wash the HRSG boiler tubes will be dependent on the freshness of the SCR catalyst and type of fuel. The fresher the catalyst and higher the sulfur content in the fuel, the more frequent washing will be needed. If the catalyst is kept fresh and low sulfur fuel is used, washing could be required only once per year; otherwise it could be more frequent, possibly quarterly. Hazardous wash water will be sent to EPA-approved treatment and disposal facilities on the mainland, in compliance with all applicable Federal and State hazardous waste regulations. These are EPA-permitted facilities that are designed to properly treat and/or dispose of hazardous wastes. However, at some future time, HELCO may determine that is economically prudent and environmentally appropriate to the wash water on site at the Keahole facility. Such treatment would involve the construction of a separate discrete wastewater treatment facility dedicated to treating the wash water. The sizing of the facility cannot yet be determined because the actual volume of wash water will depend upon the frequency that washing will occur. Therefore, the matter of whether or not the wash water may at some future time be treated on site is an Unresolved Issue. For further discussion of this matter, please refer to Section 6.4 of this EIS."
Chapter Three, Section 3.8.3.1, Page 27	Added: "Carbon Dioxide (CO_2). Although carbon dioxide is not a regulated substance, it is a topic of ongoing discussion with regard to global warming. The issue of climate change continues to undergo complex debate at international levels. It is appropriate that once global strategies are developed, national and state strategies and action plans should follow in that order. In the meantime, Hawaiian Electric Company and its subsidiaries remain committed to doing their part in addressing the issue of climate change by participating in voluntary efforts such as the U.S. Department of Energy's Climate Challenge Program, supporting renewable energy, offering demand side management and energy efficiency programs, developing efficient combined heat and power systems for customers, and

	continuously working to improve the efficiency of its generating units."
Chapter Three, Section 3.8.6.3, Page 34	Changed three 15-minute period to three 15 minute periods
Chapter Three, Section 3.17.2, Page 66	Added: "Further, traditional and customary Native Hawaiian cultural practices that may occur along the Keahole shoreline are not anticipated to be negatively impacted by the proposed project. As discussed in Section 3.6.2, the project will have no significant adverse impacts on the nearshore waters resulting from its use of groundwater and the subsequent disposal of the facility's effluent.
Chapter Three, Section 3.18, Page 66	Section 3.18 added to address solid waste impacts
Chapter Four, Figures 4-2 and 4-3, Page 4	Deleted "\FF codes
Chapter Four, Section 4.8.7, Page 22	New section added to address impacts on public services and facilities, including distance to nearest public school.
Chapter Four, Section 4.11., Page 26	Capitalized "Settlement"
Chapter Five, Section 5.1, Page 1, 3rd sentence	Changed "Agriculture" to "Agricultural"
Chapter Five, Table 5-A, Page 13	Under commentary, paragraph three, deleted ", which"
Chapter 5, Section 5.3.4.2, Page 32, 4th paragraph	Paragraph revised to provide consistency with content of Final EIS for Palamanui
Chapter Five, Section 5.3.13.2, Page 43	Changed ":" to "."
Chapter Five, Section 5.8., Page 50	Added "in" after as discussed in third paragraph
Chapter Five, Section 5.10, Page 57	Capitalized County or State in first paragraph
Chapter Five, Section 5.11, Page 68+, 3rd paragraph	Paragraph changed to new paragraphs summarizing the project's conformance with 10 objectives of CZM program
Chapter Five, Section 5.13, Page 58	New section added: Federal Aviation Administration
Chapter Six, Section 6.4, Page 6	Added new paragraphs: "At the time of the preparation of this Environmental Impact Statement, a determination has not yet been made regarding the type of ammonia (anhydrous or urea pellets) that will be utilized at the facility. A decision is anticipated before mid-2007. Once a decision has been made a plan addressing emergency procedures in case of accidental release or spill during transit or operations at the facility will be developed and submitted to the State Department of Health for approval. At the time this Environmental Impact Statement is being prepared HELCO has not yet determined whether it is economically prudent and environmentally appropriate to treat the wash water on site rather than ship it to a disposal facility on the mainland. If treated on site, the heavy metals removed from the wash water would be shipped to an EPA-approved disposal facility on the mainland. This would greatly reduce the volume of hazardous material being transported. If treated onsite, all wastestreams (water and solid) should be nonhazardous. Samples will be collected to confirm this. As such, the treated nonhazardous sludge remaining after treatment

	(which will contain heavy metals) can be dewatered and disposed of at a local landfill (e.g., West Hawaii Landfill). All requests for solid waste disposal at the West Hawaii Landfill must go through a review and approval process. This option for waste disposal could eliminate the need to send anything to the mainland. However, a detailed analysis must be conducted by HELCO to determine the feasibility of this approach before a commitment can be made to a specific course of action. At this time, it is HELCO's intention that once the ST-7 unit with the SCR has become operational, and the frequency of washing the HSRG tubes has been determined, a study will be conducted to determine the feasibility of treating the wash water on site. This study will include an analysis of the physical requirements of a discrete wash water treatment facility, the operational requirements, the cost, and most importantly, the environmental considerations, including mitigations and a detailed response plan for emergency situations. HELCO recognizes that the decision to treat hazardous waste on site is a matter that deserves full public disclosure, review and participation, and will therefore comply with all applicable requirements of environmental review pursuant to Chapter 343, Hawaii Revised Statutes as amended. At this point in time, it is anticipated that a study to determine the feasibility of treating wash water on site commence approximately one year after ST-7 becomes operational.
Chapter Six, Section 6.6, Page 8 and 9	Sections 6.6.1 to 6.6.6 added to address cumulative impacts. 6.6.1. DRAINAGE AND RUNOFF The project's cumulative contribution to regional drainage and runoff as it relates to surrounding land uses, both present and future, is anticipated to be negligible. As is required of any new development, storm runoff generated by new impermeable surfaces (roofs and pavement) is required to be minimized and must be contained on site. With regard to regional drainage, the high permeability of the ground at and around the property results in no observable drainageways. Thus, the presence of the project is not anticipated to have a cumulative impact upon drainage or runoff, when combined with the projected effects of the adjacent DHHL lands. Other projects such as Palamanui, Ooma, and Kohanaiki are too far from the Keahole site to be considered for prospective cumulative drainage impacts. 6.6.2. TRAFFIC As the proposed project is anticipated to have a negligible impact on regional traffic (a total of 21 A.M. peak hour trips and 14 P.M. peak hour trips on a roadway with over 1,100 vehicles moving in each direction during peak hours), both now and in the foreseeable future, the anticipated impact, when taking into account other proposed regional projects, is also negligible. As discussed in Section 3.9.2, the traffic impacts of the proposed Palamanui project were included in the traffic analysis of future impacts for the Keahole project. General traffic impacts related to other development projects in the area were assumed to be part of an annual future growth factor of 4.8 percent.

	6.6.3. VISUAL The cumulative visual impacts of the project, with relation to future surrounding development cannot be assessed easily, as the visual character of development that may be proposed on the adjacent DHHL land is not yet known. As discussed in this Final EIS, the proposed project includes specific landscaping recommendations to help mitigate its visual impacts. If it can be assumed that other projects will consider similar landscaping mitigation measures, then the cumulative impact may be a regional change in the character of the landscaping. The low scrub vegetation may be replaced with more formalized landscaping, including trees and palms and hedges to screen specific project elements. 6.6.4. AIR AND NOISE The subject property is required to operate under very specific air quality and noise regulations. Given the assumption that it will continue to do so, the cumulative impact on regional noise and air quality, when taking into consideration other adjacent or nearby development proposals, is not anticipated to constitute a significant negative impact. As CT-4 and CT-5 will be in operation well before other developments in the region commences, and ST-7 will be implemented with SCR and noise controls to specifically reduce air quality and noise impacts, other future projects will have to include the Keahole Generating Station and Airport Substation as part of the baseline condition. 6.6.5. GROUNDWATER The proposed project will have no substantive cumulative impact upon the quality or quantity of groundwater that enters the ocean approximately three and a half miles down slope from the project site. As the project has already been granted the necessary withdrawal permits and it is not anticipated that well practices will deviate from their current permits, the proposed project is considered as part of the baseline condition for future development projects in the region and future development projects' assessment of cumulative impacts will have to take into account the operations of the Keahole facility. In addition, the State's continuing oversight with regard to new well permits represents an opportunity for the cumulative impacts on groundwater and the aquifer to be addressed with each new project. Thus, through the previous granting of the withdrawal permit for the Keahole facility, the project's cumulative impacts on the regional groundwater have already been assessed and found to not have a significant impact on water resources in the region. 6.6.6. COASTAL WATERS Closely related to the discussion of groundwater above, the project's cumulative impacts upon coastal waters relate to the dynamics of surface runoff and drainage, groundwater impacts, and social impacts. In the former two instances, surface runoff and drainage, and groundwater impacts, are anticipated to not have a significant impact on water resources in the region. Therefore, no significant negative impact upon the coastal waters is anticipated. The cumulative impact of other existing and proposed developments has

	been taken into account in this finding to the extent that specific facts about those projects are known. Future projects that are only in their conceptual stage will have to include the Keahole facility in their baseline. With regard to social impacts, as the project will create only a limited number of new permanent jobs and will have no identifiable impact on population generation, the project's presence is not anticipated to generate an increase in shoreline recreational activity (either passive or active), that in turn might impact the quality of coastal waters.
Chapter Seven, Section 7.2.3, Page 6 to 31	Images of letters enlarged.
Chapter Seven, Section 7.2.3, Page 31	"Blank box" removed from the Melvin Kaku letter
Chapter Seven, Section 7.3, Page 42, second page of response letter	Added the following sentence after Land Ownership paragraph: "Permits and approvals: Section 2.10 has been revised to include the status of the permits."
Appendix Table of Contents	Revised to correct Appendix M and Appendix N titles
Appendix I	Amended to include bibliography Page 2 revised to remove a pencil mark.

TABLE OF CONTENTS

PHOTOGRAPHS

LIST OF FIGURES

LIST OF TABLES

S U M M A R Y S H E E T

PETITIONER:	Hawaii Electric Light Company, Inc.
PROPERTY LOCATION:	73-4249 Queen Kaahumanu Highway • Kailua-Kona, Hawaii 96740 (Keahole, North Kona, approximately one mile east of the Kona International Airport at Keahole)
TAX MAP KEY(S)	7:-3-049:036 ("Keahole Generating Station" or "Parcel 36"), consisting of 14.998 acres, and 7-3-049:037 ("Airport Substation" or "Parcel 37"), consisting of 0.645 acres.
TOTAL AREA:	15.643 acres.
PROPOSED PROJECT:	Reclassification of the subject property from the State of Hawaii Conservation District to the State Urban District; subsequent rezoning from the Open zone to the General Industrial zone; and the installation of a heat recovery steam generator system and additional air quality control technology to improve operational efficiency of the existing facility and further reduce impacts to air quality.
SIGNIFICANT BENEFICIAL IMPACTS:	The provision of a source of firm and reasonably reliable electrical energy to the entire island to meet growing demand for the foreseeable future.
SIGNIFICANT ADVERSE IMPACTS:	Noise and air quality impacts to occupants of surrounding properties.
PROPOSED MITIGATION MEASURES:	The installation of a Selective Catalyst Reduction (SCR) system to reduce nitrogen oxide emissions to the air and the installation of equipment to mitigate the noise impacts of the heat recovery steam generator system to levels compatible with State Department of Health regulations.
UNRESOLVED ISSUES:	The rate of growth in demand for electrical energy; the cost-efficiency of emerging renewable resource technologies; the future plans of independent power producers; continuing opposition to the project by Waimana Enterprises; and the proposed widening of Queen Kaahumanu Highway, together with a possible new interchange at the Airport Access Road intersection, or further north of the Keahole facility. Also, additional studies will be conducted in the next several years to determine the feasibility of implementing an alternate fuel source (naphtha), determining the type of ammonia to be used in the SCR (anhydrous or urea pellets), and whether it is environmentally feasible to treat wash water containing heavy metals on site. The studies are awaiting the overall project approval, and in the case of the wash water treatment, require at least a year of operational experience to generate the data necessary for analysis.

COMPATIBILITY WITH LAND USE PLANS AND POLICIES:

The proposed project is compatible with the Hawaii County General Plan as well as all other known land use plans and policies.

PERMITS AND APPROVALS NEEDED:

Federal Environmental Protection Agency - Prevention of Significant Deterioration air permit, covered source permits; State Land Use Commission - Reclassification from the Conservation District to the Urban District; State Department of Health - Air permit approvals, covered source permit, Underground Injection Control permit, community noise permit renewal, National Pollutant Discharge Elimination System permit, and Heat Ventilation Air Conditioning permit; State Water Commission - Pump Installation Permit; State Board of Land and Natural Resources - Revocable Water Permit and Water Lease; Hawaii County Council/Mayor - Rezoning from Open to Industrial; Hawaii County Department of Public Works - Building Permits; and Hawaii County Department of Water Supply - Water meter and back-flow preventor plan approval.

A C R O N Y M S A N D A B B R E V I A T I O N S

AAQS	Ambient Air Quality Standards
ACSR	Aluminum conductor steel reinforced
ADPV	Average delay per vehicle, in seconds
ADT	Average daily trips
AEC	Apollo Energy Corporation
AFDUC	Allowance for funds used during construction
AFFF	Aqueous film-forming foam
AFL-CIO	American Federation of Labor, Congress of Industrial Organizations
AGC	Automatic generation control
ALISH	Agricultural lands of importance to the State of Hawaii
AVC	Average visitor count
ANSI	American National Standards Institute
BACT	Best available control technology
BCH	Belt Collins Hawaii Ltd.
Be	Beryllium
BESP	Battery energy storage plan
BESS	Battery energy storage system
BLNR	Board of Land and Natural Resources
BOD	Biochemical oxygen demand
CA	Consumer advocate
CAA	Clean Air Act
CAB	Clean Air Branch
CADD	Computer-aided design and drafting
CDUA	Conservation District Use Application
CDUP	Conservation District Use Permit
CEMP	Comprehensive Environmental Monitoring Program
CEMS	Continuous emissions monitoring system
CFLs	Compact fluorescent lamps
CFR	Code of Federal Regulation
CHP	Combined heat and power
CICR	Commercial and industrial customized rebate
CIEE	Commercial and industrial energy efficiency
cm	Centimeter
CO	Carbon monoxide
CO_2	Carbon dioxide
CWRM	Commission on Water Resource Management (State, DLNR)
CT	Combustion turbine
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Area
D	Diesel (generating unit)

ACRONYMS AND ABBREVIATIONS

DAGS	Department of Accounting and General Services (State)
DAHS	Data Acquisition and Handling System
dB	Decibel
dBA	Decibel (A-weighted scale)
dBC	Decibels with C weighted average
DBEDT	Department of Business, Economic Development, and Tourism (State)
DEIS	Draft Environmental Impact Statement
DC	Direct current
DER	Distributed energy resources
DG	Distributed generation
DHHL	Department of Hawaiian Home Lands (State)
DHS	Department of Human Services (State)
DLIR	Department of Labor and Industrial Relations (State)
DLNR	Department of Land and Natural Resources (State)
DNL	Day-night sound level
D&O	Decision and order
DOA	Department of Agriculture (State)
DOD	Department of Defense (Federal)
DOE	Department of Education (State)
DOH	Department of Health (State)
DOT	Department of Transportation (State)
DSM	Demand-side management
DTCC	Dual-train, combined cycle
DTCT	Dual-train, combustion turbine
DTS	Department of Transportation Services (City)
DTST	Dual-train, steam turbine
DWS	Department of Water Supply (County of Hawaii)
EFOR	Equivalent forced outage rate
EIS	Environmental Impact Statement
EISPN	Environmental Impact Statement Preparation Notice
EMD	Electro-motive diesel
EMF	Electromagnetic fields
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ESA	Electronic shock absorber
ESLs	Effects screening levels
F	Fahrenheit
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency

ACRONYMS AND ABBREVIATIONS

FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FI	Fluorine or fluoride
FOR	Forced outage rate
ft/sec	Feet per second
GEP	Good engineering practice
GPD	Gallons per day
gpm	Gallons per minute
GWh	Gigawatt hours
H_2S	Hydrogen sulfide
HAP	Hazardous air pollutant
HAR	Hawaii Administrative Rules
HCM	Highway Capacity Manual
HCPC	Hilo Coast Power Company (formerly Hilo Coast Processing Company)
HCPS	Hawaii Content and Performance Standards
HECO	Hawaiian Electric Company, Inc.
HEI	Hawaiian Electric Industries, Inc.
HELCO	Hawaii Electric Light Company, Inc.
HEP	Hamakua Energy Partners
HERS	Hawaiian Electric Renewable Systems (subsidiary of HEI)
HFD	Honolulu Fire Department
HFP	HFP Acoustical Consultants
Hg	Mercury
HNEI	Hawaii Natural Energy Institute
HOST	Hawaii Ocean Science and Technology
HPD	Honolulu Police Department
H-Power	Honolulu Project of Waste Energy Recovery
HRD	Hawi Renewable Development
HRS	Hawaii Revised Statutes
HRSG	Heat recovery steam generator
HUD	Housing and Urban Development
HVAC	Heating, ventilation, air conditioning
HVCB	Hawaii Visitors & Convention Bureau
Hz	Hertz
IBEW	International Brotherhood of Electrical Workers
ICBO	International Conference of Building Officials
IGAP	Intermittent generation assessment protocol
IPP	Independent Power Producers
IR	Information request
IRP	Integrated Resource Planning

ACRONYMS AND ABBREVIATIONS

JCA	Jim Clary & Associates
KCMIL	1000 circular mils
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt hour
lb	Pound
LED	Light emitting diode
LEL	Lower explosive limit
Leq	Equivalent sound level
LOS	Level-of-service
LOTMA	Leeward Oahu Transportation Management Association
LUC	Land Use Commission (State)
LUPAG	Land Use Pattern Allocation Guide
MACT	Maximum Achievable Control Technology Standards
MCF	Million cubic feet
MECO	Maui Electric Company, Inc.
MG	General industrial (County zoning designation)
mgd	Million gallons per day
mg/l	Milligrams per liter
mil	Millimeters
MKAEC	Mauna Kea Astronomy Education Center
MSFO	Medium sulfur fuel oil
msl	Mean sea level
MSRI	Million Solar Roofs Initiative
MVA	Megavolt-amperes
MW	Megawatt
MWH	Megawatt hour
NAAQS	National Ambient Air Quality Standards
NELH	National Energy Laboratory Hawaii
NELHA	National Energy Laboratory Hawaii Authority
NEM	Net energy metering
NEMA	National Electrical Manufacturer Association
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NH_3	Ammonia
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NREL	National Renewable Energy Laboratory
NRIAQ	Noise Radiation and Indoor Air Quality

NSPS	New Source Performance Standards
NSR	New Source Review
ntu	Nephelometric turbidity units
NUG	Non-utility generator
O	Open (County zoning designation)
O_2	Oxygen
O_3	Ozone
OEQC	Office of Environmental Quality Control (State)
OHA	Office of Hawaiian Affairs (State)
ONR	Office of Naval Research
OTEC	Ocean thermal energy conversion
Pb	Lead
PBR	Performance-based rate-making
PD-R	Planned Development – Resort
PEA	Preliminary energy assessment
PGV	Puna Geothermal Venture
PHRI	Paul H. Rosenthal Ph.D., Inc.
PICHTR	Pacific International Center for High Technology Research
PACRC	Pacific Aquaculture and Coastal Resources Center
PM_{10}	Particulate matter less than 10 microns in diameter
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter
PPA	Power purchase agreement
ppm	Parts per million
ppmdv	Parts per million on dry volume
PSD	Prevention of Significant Deterioration
PSH	Pumped storage hydroelectric
psi	Pounds per square inch
psig	Pounds per square inch gage
pte	Potential to emit
PUC	Public Utilities Commission (State)
PV	Photovoltaic
RCP	Reinforced concrete pipe
R&D	Research and development
RD&D	Research, development, and demonstration
RE	Renewable energy
RE RFPP	Renewable Energy Request for Project Proposals
REWH	Residential efficient water heater
RFEIS	Revised Final Environmental Impact Statement
RO	Reverse osmosis
ROH	Revised Ordinances of Honolulu

RPS	Renewable portfolio standard
SAAQS	State Ambient Air Quality Standards
SCANS	Secretary's Commission on Achieving Necessary Skills
SCR	Selective catalytic reduction
SFCA	State Foundation on Culture and Arts
SHPD	State Historic Preservation Division
SLUC	State Land Use Commission
SMA	Special Management Area
SMS	SMS Research & Marketing Services, Inc.
SNG	Synthetic natural gas
SO_2	Sulfur dioxide
SO_4	Sulfate
SO_x	Sulfur oxides
SPCC	Spill Control & Counter Measures
ST	Steam turbine
TAT	Transient Accommodations Tax
TCEQ	Texas Commission on Environmental Quality
T&D	Transmission and distribution
TMK	Tax map key
tpy	Tons per year
TRB	Transportation Research Board
TNWRE	Tom Nance Water Resource Engineering
TRC	Total resource cost
TSS	Total suspended solids
UBC	Uniform Building Code
UC	Utility cost
ug	Micrograms
ug/lit	Microns per liter
ug/m^3	Microns per cubic meter
UH	University of Hawaii
USEPA	U.S. Environmental Protection Agency
V/C	Volume-to-capacity ratio
VFD	Variable frequency drive
VOC	Volatile organic compound
vog	Volcanic haze or smog
w.c.	Water column
Wh	Watt hour

EXECUTIVE SUMMARY

BRIEF DESCRIPTION OF THE ACTION

Hawaii Electric Light Company, Inc. (HELCO) seeks a reclassification of its Keahole Generating Station and Airport Substation lands (collectively "subject property") from the State of Hawaii (State) Conservation District to the Urban District, and a subsequent change in Hawaii County zoning from Open ("O") to General Industrial ("MG"). The accepting authority is the State Land Use Commission.

The reclassification has been required by the State Board of Land and Natural Resources. Once reclassified from the Conservation District to the Urban District, HELCO must seek rezoning to Industrial. Improvements would then be made at the facility to increase generating capacity with the installation of a steam turbine (ST-7) with selective catalytic reduction (SCR). The installation would allow the utilization of waste heat generated by two recently completed combustion turbines (CT), which would make the plant more fuel-efficient.

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SIGNIFICANT BENEFICIAL IMPACTS

The principal long-term benefits of the project would include increased generating capacity for the County of Hawaii. The added capacity would accommodate increased demand for electrical energy by providing a firm and reasonably reliable source at an existing facility. HELCO would be able to (1) improve the subject property; (2) implement environmental mitigation measures; and (3) accommodate future legal and operational requirements. The long-term productivity of the subject property would be significantly enhanced with the installation of ST-7 with SCR. The community would benefit by being provided with a source of reasonably reliable electrical power.

SIGNIFICANT ADVERSE IMPACTS

Neighboring property owners and/or tenants have raised concerns about increased noise, air quality, and visual impacts arising from the proposed improvements to the generating station.

PROPOSED MITIGATION MEASURES

Mitigation measures include ammonia injection for nitrogen oxides (NO_X) control, installation of enclosures around certain equipment and the installation of silencers in the CT horizontal exhaust ducts at ground level. Furthermore, the perimeter landscaping along the southwest, west, and northwest sections of the property will be redone or enhanced to help mitigate the adverse visual impacts of the improvements to the station. HELCO will create bermed planters in areas that are currently landscaped and transplant some of the existing vegetation. New trees and plants would also be added to create a more effective and attractive visual buffer. The area of the proposed planters is approximately 9,500 square feet. HELCO will also convert its existing fence into a permanent perimeter fence and modify two existing gates by recessing the gates into the facility. The new gates would be automated, electronic card-reading gates.

ALTERNATIVES CONSIDERED

Four alternatives to the Preferred Alternative (also known as the Proposed Project and Alternative 2) that sketch different approaches to meeting the Big Island's need for firm generating capacity (electrical power that can be reliably supplied at any time of day, in all climatic conditions) have been considered for the future of the Keahole facilities. These include: Alternative 1 – *No Action*; Alternative 3 – *West*

Hawaii; Alternative 4 – *East Hawaii*; and Alternative 5 – *Renewable Resource - Biomass*. Under the No Action Alternative, the land would remain under the current State Land Use Designation and County zoning. The installation of ST-7 with SCR would not be possible at Keahole. The West Hawaii Alternative would involve a new site in West Hawaii, possibly at Puu Anahulu adjacent to the existing landfill. The East Hawaii Alternative would involve expanding the Hill Station in Hilo and using new transmission lines to deliver power across the island to meet demand largely from West Hawaii. The Renewable Resource Alternative would involve a new biomass plant at an unknown location in either Hamakua or North Kohala and the cultivation of a biomass product as fuel.

UNRESOLVED ISSUES

One of the ways HELCO intends to meet growing demand is through the increased use of renewable energy resources. However, major impediments to the increased use of renewable energy sources include high costs, proximity to the grid, and reliability. Most renewable energy source(s) have not developed to the point where they can replace fossil fuels reliably at a reasonable cost to the consumer. In the near term, Hawaii will continue to need fossil fuels for its electrical energy and transportation needs. As such, HELCO must continue to use a multi-faceted energy portfolio using combined-cycle fossil-fuel-fired power plants together with wind, hydroelectric for central stations, geothermal, and distributed generation for selected sites in order to provide quality power reliably. The State's Renewable Portfolio Standard law requires electrical utilities to increase their use of renewable energy sources and meet a percentage of electricity sales that should come from renewable energy. HELCO has been able to meet the requirements of the law. However, the emerging and evolving character of supply and demand means that some issues pertaining to HELCO's future ability to produce energy from renewable resources are unresolved at the time this document is prepared.

HELCO is also mindful of the operating status of various Independent Power Producers (IPPs), which provide approximately 43 percent of HELCO's generating capacity under power purchase agreements. Hilo Coast Power Company (HCPC), which supplies energy from coal, ceased to be a source of firm power on December 31, 2004.

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HELCO completed installation of two combustion turbines and has laid the groundwork for the implementation of ST-7 with SCR. However, HELCO's plans for the installation of ST-7 and SCR are pending until it obtains the reclassification of the subject property from the Conservation District to the Urban District, the subsequent rezoning to General Industrial, and other necessary permits. Additionally, project opponents have continued to pursue efforts to stop or delay the Keahole project and to interfere with implementation of a recent Settlement Agreement. As a result, there could be further delays in completing construction.

HELCO will conduct additional studies to determine the type of ammonia it will use in the SCR unit (anhydrous or urea pellets), whether to use naphtha as an alternate fuel source, and if it is environmentally appropriate and economically feasible to construct an additional wastewater treatment facility on site to treat the wash water from periodic cleaning of SCR components (the wash water would contain heavy metals and therefore be classified as hazardous waste). Once all necessary approvals for the facility are secured (2007 or beyond), HELCO will commence its studies associated with the ammonia and naphtha. The analysis of the potential need for an additional wastewater treatment facility will not commence until operational experience has been

gained to determine the actual volume of wash water generated and the frequency of required cleanings.

COMPATIBILITY WITH LAND USE PLANS AND POLICIES

HELCO's petition for a reclassification of the subject property from the State Conservation District to the Urban District is generally consistent with the overall objectives and policies of the Hawaii State Plan, the State Functional Plans, the County of Hawaii General Plan, the West Hawaii Regional Plan, the Keahole to Kailua plan, and recently enacted land classifications for power plant use.

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LISTING OF PERMITS OR APPROVALS

- Federal Environmental Protection Agency - Prevention of Significant Deterioration air permit, covered source permits
- State Land Use Commission - Reclassification from the Conservation District to the Urban District
- State Department of Health - Air permit approvals, covered source permit, Underground Injection Control permit, community noise permit renewal, NPDES permit, and HVAC permit
- State Water Commission - Pump Installation Permit
- State Board of Land and Natural Resources - Revocable Water Permit and Water Lease
- Hawaii County Planning Commission/Hawaii County Council/Mayor - Rezoning from Open to Industrial
- Hawaii County Department of Public Works - Building Permits
- Hawaii County Department of Water Supply - Water meter and back-flow preventor plan approval

CHAPTER ONE: SUMMARY OF THE PROPOSED ACTION

1.1. APPLICANT AND ACCEPTING AUTHORITY

The applicant, Hawaii Electric Light Company, Inc. (HELCO), is a Hawaii corporation that has served the island of Hawaii (Big Island) for over a century. HELCO has a history intertwined with the growth and modernization of the Big Island.

In 1890, the trustees of the Hilo Boarding School and others installed a small water-driven dynamo at the school's irrigation ditch to light 12 light bulbs in a study hall and the principal's cottage from dusk to 10:00 p.m. Acting on requests by citizens, the group formed a private company called Hilo Electric Light Company. In 1894, the Legislature of the Republic of Hawaii officially granted the company a franchise to operate. From 1920 through 1955, Hilo Electric either acquired or merged with other electrical utility companies in Kohala and Kona until an island-wide grid was formed. Hawaiian Electric Company, Ltd. (HECO) acquired Hilo Electric in 1970 and subsequently changed its name to more accurately reflect its island-wide service area.

HECO and its subsidiaries are a critical part of Hawaii's economy and supply power to over 400,000 customers or 93 percent of the Hawaii market through its electrical utilities. The State of Hawaii (State) Public Utilities Commission (PUC) regulates HELCO and all other utility companies.

HELCO has filed a petition for a boundary amendment to reclassify its Keahole Generating Station and Airport Substation properties (collectively "subject property") located in North Kona, from the Conservation District to the Urban District. HELCO's facilities have been operating on the subject property since 1973. The accepting authority for the reclassification is the State Land Use Commission (Commission).

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1.2. PROPOSED GOVERNMENT ACTION

The proposed action is the reclassification of the subject property from the State Conservation District to the State Urban District and a subsequent change of County of Hawaii zoning from Open (O) to General Industrial (MG). The State Department of Land and Natural Resources (DLNR), the government entity vested with jurisdiction over Conservation District lands, has highly encouraged the reclassification of the subject property for industrial purposes. Although the current use of the subject property has been permitted, urban classification is more in line with recently enacted land classifications for power plant use. The present situation limits HELCO's ability to make future improvements to existing facilities, including environmental mitigation measures, which would make it more efficient and consistent with legal and operational requirements, and commitments made in a recent Settlement Agreement. Furthermore, reclassification and a zone change would allow HELCO to make appropriate changes to the existing plant that may be required by future legal and operational requirements.

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1.3. PURPOSE OF THIS DOCUMENT

The purpose of this document is twofold: (1) to comply with the provisions of Section 11-200-6(b)(1)(F) of the Hawaii Administrative Rules (HAR), which requires the applicant to prepare an environmental impact statement (EIS) for the reclassification of any land in the State Conservation District, as well as Section 343-5(a)(9)(E), Hawaii Revised Statutes, as amended, which requires an EIS for the expansion of a power-generating facility; and (2) to provide baseline information to support an application to the

County of Hawaii for a zone change if the Commission approves the reclassification of the land to the State Urban District.

HELCO filed in 1992 a State Conservation District Use Application (CDUA) with the Board of Land and Natural Resources (BLNR) to amend its existing Conservation District Use Permit (CDUP) #HA-487 to increase the generating capacity of the plant by 56 megawatts (MW). An EIS was also filed with the State BLNR, and in December 1993, the BLNR accepted HELCO's *Revised Final Environmental Impact Statement* (1993 RFEIS). However, at this time, the applicant has decided to file a new document with current data. Although no substantive work is presently anticipated at the Airport Substation, HELCO has included the substation parcel in the proposed land use reclassification to ensure uniformity in the subject property's land use entitlements. The current EIS is intended to comply with the requirements of HAR, Section 11-200-6(b)(1)(F).

1.4. STATEMENT OF OBJECTIVES

HELCO is seeking the proposed action in order to: (1) bring the State Land Use District Classification into conformance with the existing and proposed use of the project area as an electrical generating station and substation; (2) facilitate future operation and maintenance of the generating station; and (3) implement proposed environmental mitigation measures.

1.5. SUBJECT PROPERTY

The subject property is situated in Keahole, North Kona, on the west side of the Big Island in the State Conservation District General Subzone. It is designated as Urban Expansion on the Land Use Pattern Allocation Guide map of the 1989 Hawaii County General Plan and as Urban Expansion on the December 21, 2001 County of Hawaii General Plan Revision draft document. The subject property is not located within the Special Management Area (SMA). It is zoned Open (O) by the County of Hawaii.

1.6. PROJECT DESCRIPTION

1.6.1. PROPOSED ACTION AND ALTERNATIVE

HELCO plans to complete the following:

- Conversion of two simple-cycle combustion turbines (CT-4 and CT-5) to a combined-cycle system by adding a steam turbine generation system (ST-7), which is comprised of two heat recovery steam generators, a steam condensing system, and a nominal 17.8-MW steam turbine generator, including ancillary equipment. Together, these components will constitute a nominal 60-MW net, dual-train, combined-cycle plant[1].

- Secure the necessary approvals to draw brackish water from a groundwater supply well that has already been permitted and constructed at the Keahole Generating Station[2].

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[1] Preliminary efficiency testing of CT-4 and CT-5 indicates that their estimated output may be nominally 60 megawatts, rather than the 56 megawatts presented in previous documents, including the EIS Preparation Notice for this project, which was based upon the manufacture's specifications. However, it should be noted that the 60 megawatt number may change slightly, once ST-7 is installed, noise mitigations are implemented, the plant becomes fully operational, and a subsequent round of efficiency testing is conducted.

[2] At the time of the preparation of this EIS, the necessary approvals have been secured but they have been subjected to a court challenge.

- Implementation of new emissions controls, specifically a Selective Catalytic Reduction (SCR) system, which is expected to involve ammonia or urea transport, storage, and usage, as well as improvements to the existing wastewater treatment system to process on-site and dispose of on-site treated waste, generated as a result of the SCR system.

In the future, HELCO may use alternate fuels, specifically naphtha, to reduce emissions, which could result in having to enlarge existing fuel storage tanks and tank-yard berm walls, adding more storage tanks, additional fuel distribution pumps/piping, and additional fire protection (foam tank, nozzles and piping).

In addition, HELCO anticipates the following improvements and upgrades to the Airport Substation:

- Future replacement or addition of transformers and switchgear equipment at the Airport Substation to service the area community.

- Painting and landscape improvements to mitigate visual impacts at the Airport Substation.

1.6.2. SCOPE OF THE EIS

This EIS will address the reclassification of the subject property from the Conservation District to the Urban District. It will also address the impacts of the improvements and expansion of the generating station to ensure that they are assessed within the context of the environmental, social, economic, and cultural conditions that currently exist in North Kona and on the Big Island today.

It should be noted that several other projects in the region surrounding the Keahole Generating Station are presently undergoing environmental review. For a broader perspective, the reader may wish to consult the Office of Environmental Quality Control to obtain copies of documents pertaining to the University of Hawaii's proposed West Hawaii campus, the Hiluhilu development (also known as Palamanui), and the Department of Hawaiian Home Lands.

1.7. SUMMARY OF UNRESOLVED ISSUES

HELCO is faced with an increased demand for electrical power due to the Big Island's steadily growing population and heightened economic activity, particularly on the west side of the island. One of the ways HELCO would like to meet growing demand is through the increased use of renewable energy resources, which in 2003 amounted to 22 percent of HELCO's total annual electrical energy production. However, major impediments to the increased use of renewable energy sources include high costs, proximity to the grid, and reliability. As such, HELCO must continue to use a multi-faceted energy portfolio using combined-cycle fossil-fuel-fired power plants together with wind, hydroelectric for central stations, geothermal, and distributed generation for selected sites in order to provide quality power reliably.

The State's Renewable Portfolio Standard law requires electrical utilities to increase their use of renewable energy sources and meet a percentage of electricity sales that should come from renewable energy. HELCO has been able to meet the requirements of the law, but must continue with parallel path planning, using a multi-pronged approach, for its operations until such a time that a renewable energy source(s) has developed to the point where it can replace fossil fuels reliably at a reasonable cost to the consumer. In the near term, Hawaii will continue to need fossil fuels for its electrical energy and transportation needs.

The State requires that every energy utility systematically and thoroughly develop long-range plans for meeting Hawaii's future energy needs. HELCO evaluates and integrates both resources that supply electricity and resources that reduce or better manage the demand for electricity and prepares an Integrated Resource Plan (IRP), which is then submitted to the PUC. (See Appendices E and F in Volume 2 of the EIS.) The emerging and evolving character of supply and demand means that some issues pertaining to HELCO's future ability to produce energy are unresolved at the time this document is prepared. These are presented below.

1.7.1. Puna Geothermal Venture (PGV) Capacity Issues

HELCO has a 35-year power purchase agreement (PPA), which expires on December 31, 2027, with PGV for 30 MW of firm capacity from its geothermal steam facility. PGV's output was reduced to 6 MW from April 2002 to March 2003. The loss of generation was attributed to the blockage of a source well due to a failed liner 5,000 feet below the earth's surface and decreasing steam quality emanating from one of PGV's source wells. PGV completed drilling an additional source well in February 2003, and converted the blocked source well into an injection well in early March 2003. As of early 2004, PGV anticipated that it would be fully restored to 30 MW by late 2004, with the increase of steam supply from existing wells. As of September 2004, PGV exports approximately 26 MW.

In September 2003, PGV announced that it had long-range plans to expand the capacity of the facility to 60 MW, in 8 MW increments. However, in April 2004 Ormat Industries purchased PGV for $71 million. Therefore, current long-range planning activities do not assume that PGV will provide capacity above 30 MW. As further information becomes available as to the direction Ormat Industries will take the company in the near future, HELCO would then be able to include actual anticipated geothermal capacity in the next IRP.

1.7.2. Distributed Generation Docket

In October 2003, the PUC opened Docket No. 03-0371 to investigate Distributed Generation (DG) issues in Hawaii. DG involves the use of small electric power generators, using fossil fuels or renewable energy sources, located on the utility system at a utility site or at a customer site that may or may not be connected to the utility's power grid. The issues include, but are not limited to: (1) addressing interconnection matters; (2) determining who should own and operate distributed generation projects; (3) identifying what impacts, if any, distributed generation will have on Hawaii's electric distribution systems and market; (4) defining the role of regulated electric distributions companies and the PUC in the deployment of distributed generation in Hawaii; (5) identifying the rate design and cost allocation issues associated with the deployment of distributed generation facilities; and (6) developing the necessary revisions to the integrated resource planning process, if necessary.

As of September 2004, HELCO is unable to predict the outcome of the proceedings, and how it may impact long-term planning activities such as IRP.

1.7.3. Competitive Bidding for New Generation

In October 2003, the PUC opened Docket No. 03-0372 to evaluate competitive bidding as a mechanism for acquiring or building new generating capacity in Hawaii. The competitive bidding process has been widely implemented throughout the United States and may serve as an alternative for Hawaii to facilitate wholesale market competition and enhance the potential for higher efficiency and lower costs for its electric industry. Competitive bidding for new generating capacity is often referred to as a wholesale

market model that includes equity and efficiency considerations, encouragement of competitive generation options and new technologies, lower costs through competition, more choices, reliable supplies, and a level playing field on which all generation options could compete. The issues include, but are not limited to: (1) evaluating the benefits and impacts of competitive bidding; (2) developing a fair competitive bidding system, if necessary, (a) ensuring that competitive benefits result from the system and ratepayers are not placed at undue risk; (b) specifying competitive bidding guidelines and requirements to prospective bidders, including the evaluation system to be used, and process for evaluation and selection; (3) encouraging broad participation from a range of prospective bidders; and (4) developing the necessary revisions to the integrated resource planning process, if necessary.

As of September 2004, HELCO is unable to predict the outcome of the proceedings, and how it may impact long-term planning activities such as IRP.

1.7.4. Utility and Non-Utility Combined Heat and Power

Combined Heat and Power (CHP), or cogeneration, is an electricity generation technology that involves the recovery of waste heat from the electric generation process to produce other forms of useful energy simultaneously, such as useable heat or steam. CHP is better for the environment, the economy, and our nation's energy supply than generating heat and power separately because conventional electricity generation is inherently inefficient.

For the purposes of this analysis, forecasts have been made regarding the impact of Utility and Non-Utility CHP units on the HELCO system. These estimates are consistent with the October 2003 PUC application for approval of a proposed utility-owned CHP program in Docket No. 03-0366. At this time, HELCO is unable to predict the outcome of the proceedings.

In reference to load forecast, while a comprehensive analysis is undertaken to develop HELCO's Sales and Peak forecast, there are uncertainties regarding any forecast. Load forecasts are used to help determine when a generating unit must be added. Therefore, the precise timing of unit additions, especially in distant years, is often difficult to achieve.

1.7.5. Hilo Coast Power Company (Formerly Hilo Coast Processing Company) (HCPC) Contract Termination

On October 4, 1999, HELCO entered into a power purchase agreement (PPA) with HCPC effective January 1, 2000. The agreement terminated on December 31, 2004, subject to early termination by HELCO after two years, whereby HELCO purchases 22 MW of firm capacity from HCPC's coal-fired facility.

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1.7.6. County Municipal Solid Waste (MSW)

As of September 2004, HELCO in unaware of any MSW projects. However, HELCO is aware of the County of Hawaii's ongoing process of soliciting proposals to handle solid-waste, which may include a future MSW plant. If such a facility is constructed in the future, inclusion of garbage-to-energy technology could have a beneficial impact upon the availability of additional electrical energy resources.

1.7.7. Queen Kaahumanu Highway

Access to the Keahole facility is presently provided by two roads that intersect with Queen Kaahumanu Highway, one to the south and one to the north. A private development project, Palamanui, north of the

Keahole facility, has proposed to realign and expand the right of way of the access road on the north side of the generating station. At this point in time, the location and configuration of the realigned access road's intersection with Queen Kaahumanu Highway has not been resolved between Palamanui and the State Department of Transportation. However, because the Keahole Generating Station can continue to use the access road on the south side of the generating station, the ultimate decision regarding the northern access road intersection would not substantively affect the future operation of the facility, one way or the other.

1.7.8. ADDITIONAL STUDIES REQUIRED

HELCO will conduct additional studies to determine the type of ammonia it will use in the SCR unit (anhydrous or urea pellets), whether to use naphtha as an alternate fuel source, and if it is environmentally appropriate and economically feasible to construct an additional wastewater treatment facility on site to treat the wash water from periodic cleaning of SCR components (the wash water would contain heavy metals and therefore be classified as hazardous waste). Once all necessary approvals for the facility are secured (2007 or beyond), HELCO will commence its studies associated with the ammonia and naphtha. The analysis of the potential need for an additional wastewater treatment facility will not commence until operational experience has been gained to determine the actual volume of wash water generated and the frequency of required cleanings.

1.8. SUMMARY OF COMPATIBILITY WITH LAND USE PLANS AND POLICIES

HELCO's petition for a boundary amendment to reclassify the subject property from the Conservation District to the Urban District appears to be compatible with existing land use plans, policies, and controls for the affected area, as discussed in Chapter Five.

1.9. NECESSARY APPROVALS AND PERMITS

HELCO has or is in the process of obtaining the following permits and/or approvals for the subject property. See Section 2.10 for a more detailed explanation.

- Federal Environmental Protection Agency - Prevention of Significant Deterioration (PSD) air permit, covered source permits
- State Land Use Commission - Reclassification from the Conservation District to the Urban District
- State Department of Health - Air permit approvals, covered source permit, Underground Injection Control permit, community noise permit renewal, National Pollutant Discharge Elimination System (NPDES) permit, and Heating, Ventilation, Air Conditioning (HVAC) permit.
- State Water Commission - Pump Installation Permit
- State Board of Land and Natural Resources - Revocable Water Permit and Water Lease
- Hawaii County Planning Commission/Council/Mayor - Rezoning from Open to Industrial
- Hawaii County Department of Public Works - Building Permits
- Hawaii County Department of Water Supply - Water meter and back-flow preventor plan approval

CHAPTER TWO: DESCRIPTION OF THE PROPOSED PROJECT

2.1. INTRODUCTION

This Environmental Impact Statement (EIS) is required by Hawaii Electric Light Company, Inc.'s (HELCO) proposed reclassification of its Keahole Generating Station and Airport Substation land (collectively "subject property") from the Conservation District to the Urban District. Unlike most projects, the subject property is already developed and was the subject of a previous EIS (1993 RFEIS). The subject property in question has been used for industrial purposes since 1973 under permits granted by the State of Hawaii (State) Board of Land and Natural Resources (BLNR).[1] The underlying land use designation is now being changed to bring it into conformance with its existing use for industrial purposes.

The project is complicated by the fact that the improvements addressed in the 1993 RFEIS, though approved by the accepting authority, had been tied up in the judicial system for over 10 years. The Third Circuit Court ("Circuit Court") on November 12, 2003 issued a *Findings of Fact, Conclusions of Law, and Order* vacating a previous 2002 order that had halted the completion of the improvements. Up until that point, 85 percent of the improvements addressed in the 1993 RFEIS had been completed. The Circuit Court issued its November 12, 2003 decision as a result of a mediated settlement agreement (Settlement Agreement or Settlement) reached between HELCO and the various organizations and individuals that were opposing the improvements to the facilities. The Circuit Court found that the resolution of issues between the parties would accrue in the public interest as a whole.

HELCO has now completed a substantial portion of the construction of combustion turbines (CT) CT-4, CT-5, and related ancillary equipment. HELCO proposes to: (1) bring the State Land Use District Classification into conformance with the existing and proposed use of the project area as an electrical generating station and substation; (2) facilitate future operations and maintenance of the generating station; and (3) implement proposed environmental mitigation measures. The project scope includes:

- Conversion of two simple-cycle CTs (CT-4 and CT-5) to a combined cycle system by adding a steam turbine generation system (ST-7), which is comprised of two heat recovery steam generators, a steam condensing system, and a nominal 17.8-megawatt (MW) steam turbine generator, including ancillary equipment. Together, these components will constitute a nominal 60.3-MW net dual-train, combined-cycle plant.
- Securing the necessary approvals to draw brackish water from a groundwater supply well that has already been permitted and constructed at the Keahole Generating Station[2].
- Implementation of new emissions controls, specifically a Selective Catalytic Reduction (SCR) system, which is expected to involve ammonia or urea transport, storage, and usage, as well as improvements to the existing wastewater treatment system to process on-site and dispose of on-site treated waste, generated as a result of the SCR system.

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[1] It should be noted that the rules governing permitted uses in the Conservation District have evolved over time. In 1973, industrial uses (such as a power plant) were deemed to be appropriate uses in the Conservation District. This helps explain why the original facility was permitted in the first instance.

[2] At the time this Environmental Impact Statement was being prepared, the necessary approvals have been secured but they have been challenged in court.

In the future, HELCO may use alternate fuels, specifically naphtha, which could result in having to enlarge existing fuel storage tanks and tank-yard berm walls, adding more storage tanks, additional fuel distribution pumps/piping, and additional fire protection (foam tank, nozzles and piping). (See discussion on naphtha in subsequent sections.)

In addition, HELCO anticipates the following improvements and upgrades to the Airport Substation:

- Future replacement or addition of transformers and switchgear equipment at the Airport Substation to service the area community.
- Painting and landscape improvements to mitigate visual impacts at the Airport Substation.

Thus, for the purposes of this EIS, the "existing use" of the subject property includes all of the components of the facilities that exist on the subject property and/or are under construction, pursuant to the 1993 RFEIS and the Settlement Agreement. It is anticipated that most all of the improvements would be completed by the end of 2004.

This EIS, unlike the 1993 RFEIS, also includes reclassifying the abutting Airport Substation area for purposes of land use consistency. Additionally, because over 10 years has lapsed since the 1993 RFEIS, the impacts of the improvements of the existing facilities upon the current physical and social environment are being evaluated in this EIS.

The following sections describe the proposed project (the urbanization of the land, the construction and operation of ST-7, and various mitigative issues), and begins with a description of the regional context, followed by a review of all the existing facilities at the plant, including those under construction. This Chapter then places the existing facility in the context of planning for the Big Island's energy future and concludes with a description of the proposed action.

2.2. REGIONAL CONTEXT

The subject property consists of two abutting tax map key parcels, both situated in Keahole, North Kona, on the west side of the island of Hawaii (Big Island), and both owned by the applicant. The tax map key numbers are (3) 7-3-049:036 ("Keahole Generating Station" or "Parcel 36"), consisting of 14.998 acres, and (3) 7-3-049:037 ("Airport Substation" or "Parcel 37"), consisting of 0.645 acres. The total area of the subject property is 15.643 acres.

The subject property is located approximately eight miles north of Kailua-Kona, within the district of North Kona, which is one of the fastest growing areas on the island, in terms of new development. Since the early 1990s, several large commercial and residential projects have been either approved, built, or are under consideration.

Economically, the Big Island has endured a number of years of uncertainty with high unemployment, but today, the economy stands strong with a robust visitor industry; a soaring real estate market; an active construction industry; a healthy diversified agriculture industry; continuing expansion of high-tech research organizations; and a growing retail industry. The Big Island's unemployment rate has fallen steadily from 10.2 percent in 1997 to

5.6 percent in 2004.[3] Nearly 40 percent of the Big Island's residents live in the West Hawaii region, and daily visitors equate to over 30 percent of the resident population in West Hawaii compared to 15 percent island wide.[4]

Kona International Airport is one mile west of the subject property. Just west of Kona International Airport is the Natural Energy Laboratory of Hawaii Authority (NELHA) located on 870 acres of State-owned land. NELHA supports the research, development, and commercialization of alternative energy and Ocean Thermal Energy Conversion (OTEC)-related technologies. HELCO is an active participant and monitors the open-cycle OTEC demonstration project at NELHA. Commercial companies located at NELHA specialize in a variety of land-based operations, including the production of algae, finfish, crustaceans, and mollusks. Other tenants are researching alternative energy, ocean instrumentation, marine biotechnology, and desalination.

2.3. HISTORY OF THE FACILITY

The Keahole Generating Station and Airport Substation were built in 1973 on Conservation District land. Under State law, HELCO first needed to obtain a Conservation District Use Permit (CDUP) from the BLNR of the State Department of Land and Natural Resources (DLNR) before it could utilize the land for the generating station. The BLNR approved a CDUP in 1973, and HELCO has operated its facilities on the subject property since. Over the course of time, various improvements have been made to the facilities as conditions have changed.

Since the 1970s, the population on the Big Island has more than doubled and HELCO has had to expand its facilities accordingly, to accommodate growth in the region and the demand for additional power. In 1970, the U.S. Census registered 73,325 residents; in 1980 92,053; in 1990 120,317; and in 2000 148,677 residents. On any given day, the influx of visitors to the island adds approximately 15 percent to the population count, which today exceeds over one million visitors annually. The West Hawaii region has grown more substantially than the east side. For example, the combined energy sales of the Kona and Waimea districts in a five-year period (1998 through 2003) have grown approximately 35-40 percent faster than sales in the Hilo district. Over a 10-year period (1993 through 2003) combined energy sales growth in the Kona and Waimea districts was approximately 100 percent higher than the energy sales growth of the Hilo district. The subject properties were originally zoned Open by the County to conform with the State Land Use Commission's classification of the property as Conservation District in the early 1960s.

[3] First Hawaiian Bank Economic Forecast, 2004. http://www.fhb.com/pdf/oahu_ef.pdf

[4] *Socio-Economic Impact Assessment of Redesignation of Keahole Generating and Transmission Sites* prepared by SMS.

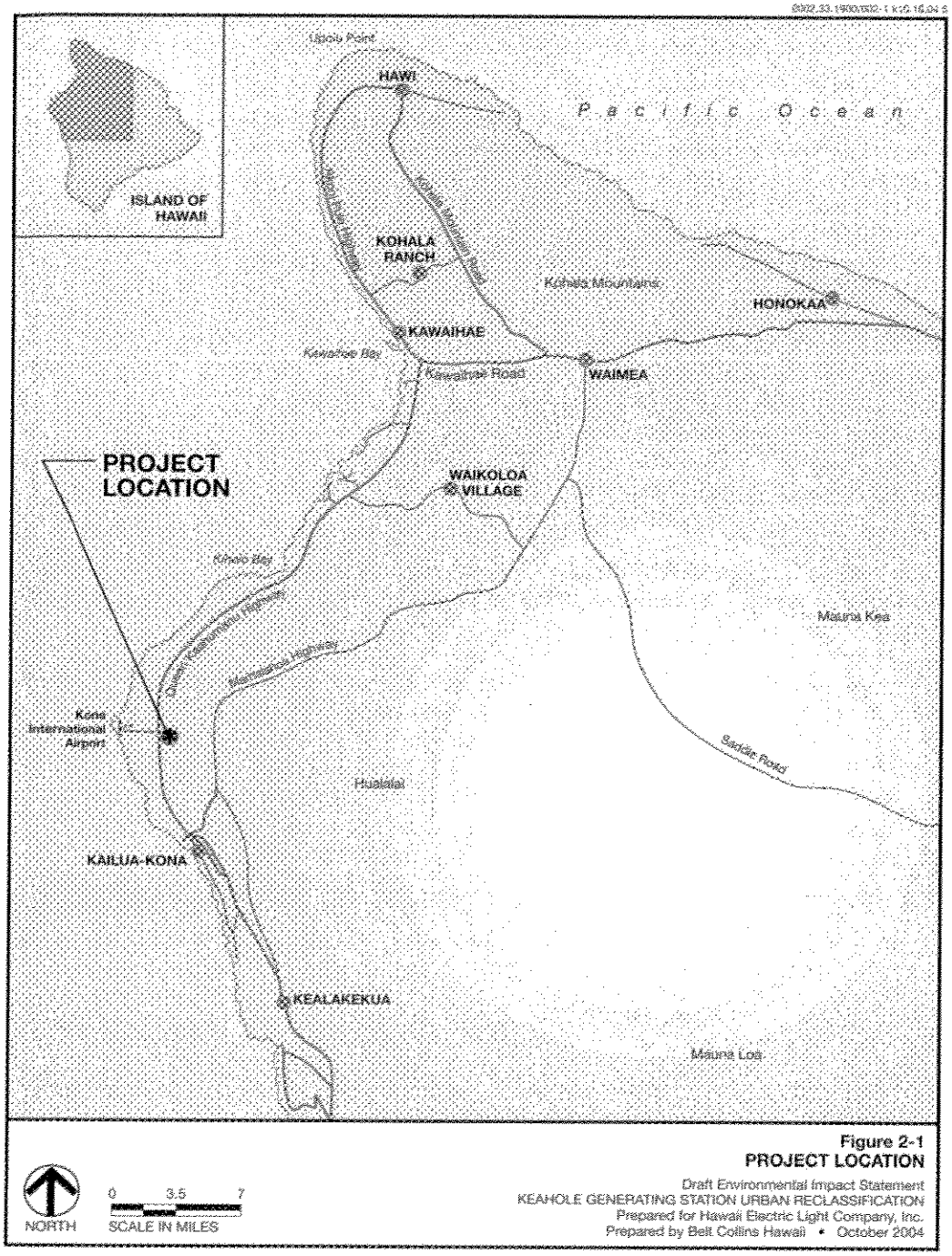

Figure 2-1
PROJECT LOCATION

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Prepared for Hawaii Electric Light Company, Inc.
Prepared by Belt Collins Hawaii • October 2004

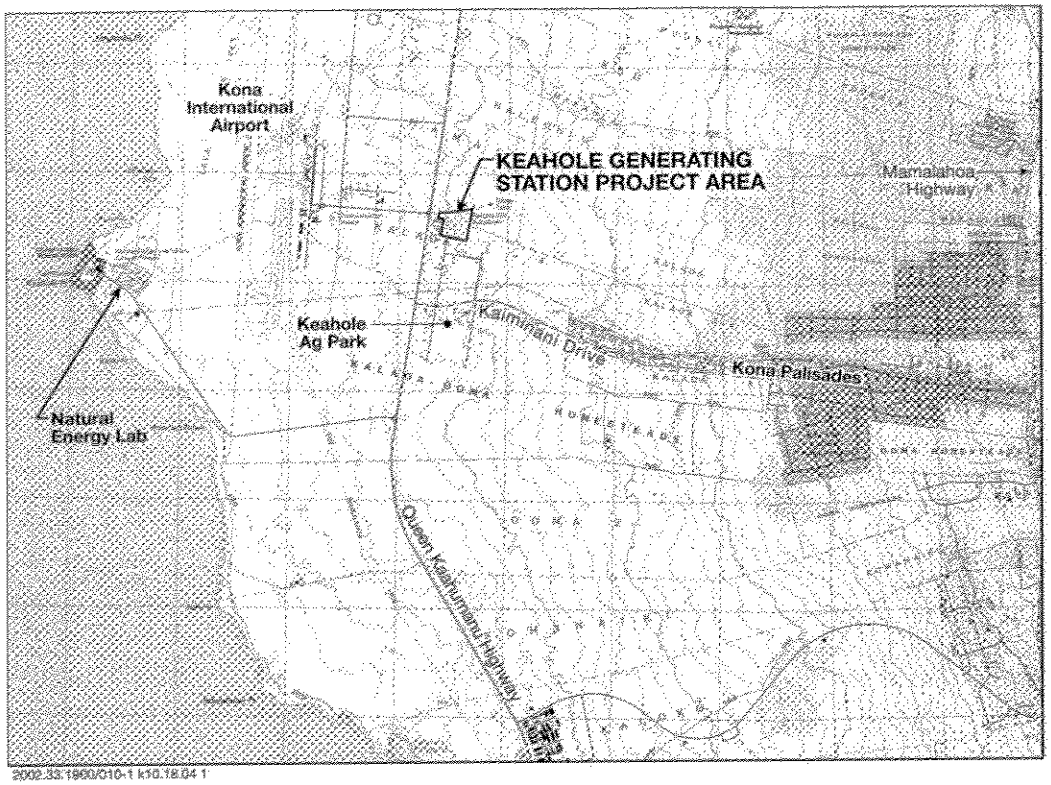

Figure 2-2
MAP OF EXISTING AND SURROUNDING USES

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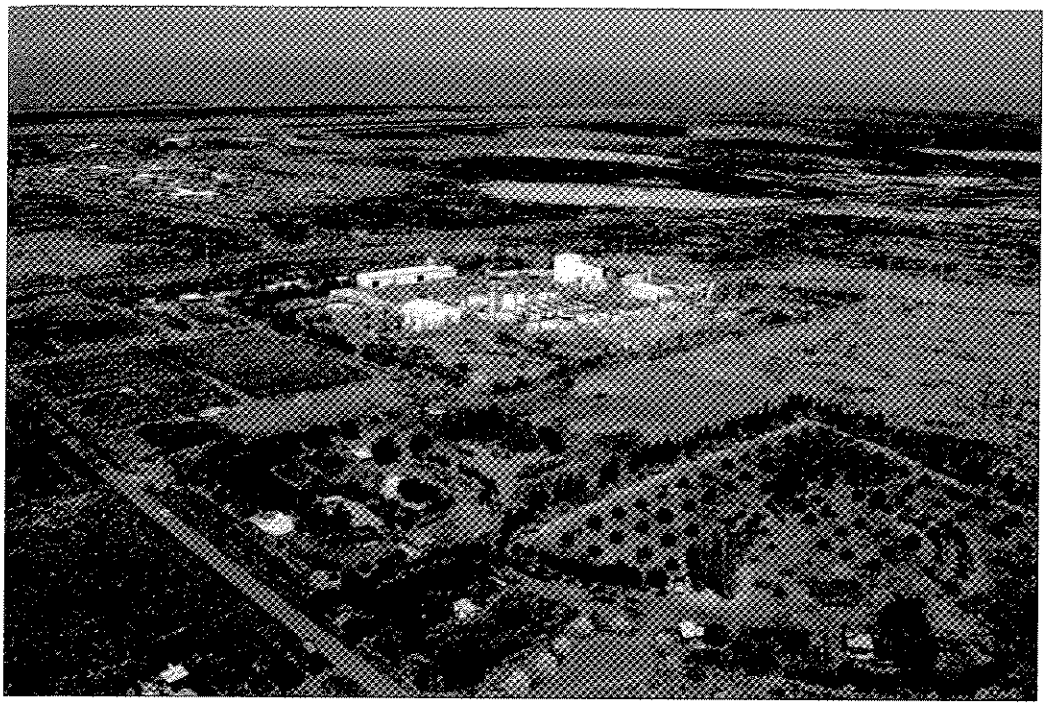
Prepared by Belt Collins Hawaii • October 2004

The subject property is surrounded by vacant areas of open lava flows to the north and east, the Keahole Agricultural Park to the south and southeast, and a residential subdivision, Kona Palisades, beginning approximately 3,500 feet to the southeast. Four 90-foot towers owned by the Big Island Broadcasting Co. are located on a 4-acre parcel on the subject property's eastern boundary. The adjacent property to the north is owned by the Department of Hawaiian Home Lands (DHHL), and is planned for residential and commercial development. To the south and southeast of the subject property is the State Keahole Agricultural Park, a 179-acre owned and leased subdivision of approximately 36 five-acre lots used for diversified agriculture. About 25 of the lessees have built homes on their properties. The subject property is situated approximately 750 feet east (upslope) of Queen Kaahumanu Highway, the principal arterial roadway serving the coastal areas of the North Kona District.

PHOTOGRAPH 2-1: VIEW OF KEAHOLE LOOKING WEST/NORTHWEST WITH THE KEAHOLE AGRICULTURAL PARK IN THE FOREGROUND. KAIMINANI DRIVE APPEARS AT LOWER LEFT.



The BLNR in 1973 originally approved 8.25 megawatt (MW) of generating capacity for the Keahole Generating Station. As the demand for additional power grew, particularly in the West Hawaii region, HELCO applied for subsequent amendments to the CDUP, which were subsequently approved by the BLNR. The following Table provides a brief historical chronology of the expansion and improvements to the generating station:

TABLE 2-A: HISTORICAL OVERVIEW OF THE KEAHOLE GENERATING STATION AND AIRPORT SUBSTATION

YEAR	HELCO ACTIONS	APPROVING AUTHORITY	CAPACITY
1973	HELCO seeks approval to build Keahole Generating Station and Airport Substation	BLNR grants CDUP allowing three 2.75 MW generators	8.25 MW
1984	HELCO files amendment to CDUP for additional generating power	BLNR approves two additional 2.75 MW generators	13.75 MW
1987	HELCO files amendment to CDUP for additional generating power	BLNR approves an additional 2.75 MW generator	16.50 MW
1988	HELCO files amendment to CDUP for additional generating power, stating that this would be the last amendment because other sites at Kawaihae and Puu Anahulu were being investigated	BLNR approves a 13.75 MW combustion turbine (CT)	30.25 MW
1988-1991	HELCO's attempt to acquire and develop a new generating site at Kawaihae or Puu Anahulu prove unsuccessful and much too costly.		

YEAR	HELCO ACTIONS	APPROVING AUTHORITY	CAPACITY
1988-1991	HELCO enters into a contract with Puna Geothermal Ventures (PGV) to provide specified increments of geothermal power	PGV encounters start-up problems and are unable to provide increments of geothermal power on a timely basis	
1992	HELCO files a Conservation District Use Application (CDUA) for an additional 56 MW of power, and submits an EIS to amend CDUP HA-487.	BLNR accepts 1993 RFEIS and approves the CDUA for the installation of a combined-cycle plant.	
1993	Various stakeholders oppose expansion; HELCO obtains a default entitlement as a result of a contested case hearing	Judge Ronald Ibarra rules in favor of HELCO	
1994	HELCO loses firm biomass power as Hamakua Sugar Company closes		
1997	HELCO seeks building permit for installation of combined-cycle plant per 1993 RFEIS	County of Hawaii grants HELCO a permit to install CT-4, CT-5, and the related ancillary equipment	
1998	HELCO appeals an administrative decision in order to proceed with its improvements and expansion plans	Circuit Court rules that HELCO may proceed with the default entitlement provided by the CDUA	
2001	HELCO obtains an air permit from the Environmental Protection Agency (EPA)	Federal Environmental Appeals Board affirms permit on appeal	
2002	HELCO completes 85 percent of installation of CT-4, CT-5, and ancillary equipment	Project opponents oppose expansion; Circuit Court halts completion of work ruling that a lapsed construction deadline could not be extended by the BLNR	
2003	HELCO reaches settlement with a majority of project opponents (fully executed on 11/5/03)	Circuit Court issues order vacating 2002 ruling	
2003	HELCO petitions Land Use Commission (Commission) pursuant to DLNR recommendations to reclassify the land from the Conservation District to the Urban District		
2004	HELCO proceeds to complete the installation of CT-4, CT-5, ancillary equipment, and mitigation measures		
2004	HELCO retires diesel units D18, D19, and D20.		22 MW
2004	HELCO completes installation of CT-4, CT-5 ancillary equipment and mitigation measures, and begins the process of reclassifying the land and obtaining permits for the installation of the steam turbine generation system (ST-7) with SCR.		64.6 MW
2006	Contract engineering consultant and commence engineering design for ST-7. Conduct analysis of changing to Naphtha as a fuel source.		
2007	Equipment bid selection and order. Submit building permit application.		
2008	Begin construction of ST-7 with SCR.		
2009 or sooner	ST-7 with SCR to be operational		82.4 MW

Deleted: HELCO will begin the engineering, design, and construction of ST-7 with SCR by converting two simple-cycle CTs (CT-4 and CT-5) to a combined cycle system by adding ST-7, which will be comprised of two heat recovery steam generators, a steam condensing system, and a nominal 17.8-MW steam turbine generator, including ancillary equipment

2.4. DESCRIPTION OF THE EXISTING FACILITY

A site plan of the existing facility, color-coded to depict the proposed improvements is presented as Figure 2-3. The proposed improvements generally include a Heat Recovery Steam Generator (HRSG) that will improve the efficiency of CT-4 and CT-5, a new SCR system to reduce nitrogen oxide (NO_X)[5] emissions, and the appurtenant facilities and systems to support these improvements, together with additional transformers and switching gear at the Airport Substation. All the existing and proposed facilities are described in more detail below.

2.4.1. PURPOSE AND NEED

The proposed action is the reclassification of the subject property from the State Conservation District to the State Urban District and a subsequent change of County zoning from Open (O) to General Industrial (MG).

The rules and regulations governing the Conservation District mainly deal with protecting and preserving the land, while the Urban District is generally defined as lands in urban use with sufficient reserve to accommodate foreseeable growth. The use of urban lands is governed by the County, while the use of conservation lands is governed by the State DLNR, and permitting processes for special uses can be lengthy and cumbersome. The BLNR/DLNR has highly encouraged the reclassification of the subject property to the Urban District for purposes more suited for industrial use.

The Hawaii County Code defines the O district as "areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to: (1) encourage development around it such as a golf course and park; (2) protect investments which have been or shall be made in reliance upon the retention of such open type use; (3) buffer an otherwise incompatible land use or district; (4) preserve a valuable scenic vista or an area of special historical significance; or (5) protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide)." Utility substations, as permitted under section 25-4-11 of the Hawaii County Code, are allowable.

The MG district applies to "areas for uses that are generally considered to be offensive or have some element of danger." The MG designation is more appropriate for the generating station and the land uses in the immediate area.

Some of the permitted uses in the MG district include:

- Agricultural products processing, major and minor
- Airfields, heliports and private landing strips
- Aquaculture activities and facilities
- Broadcasting stations

[5] Nitrogen oxides (NO_X), the generic term for a group of highly reactive gases that contain nitrogen and oxygen in varying amounts, play a major role in the formation of ozone, PM, haze, and acid rain. (See also Chapter Three and the glossary at the end of this EIS for definitions of various emissions.)

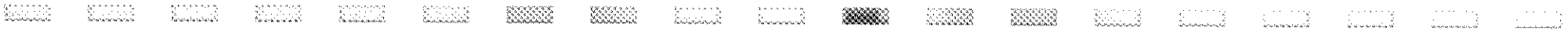
- Greenhouses, plant nurseries
- Utility facilities, public and private, including power plants, offices or yards for equipment
- Utility substations, as permitted under section 25-4-11

Although the current use of the subject property has been permitted, the present situation limits HELCO's ability to make future improvements to existing facilities, including environmental mitigation measures, which will make it more efficient and consistent with legal and operational requirements and commitments made in the Settlement. Reclassification and a zone change would allow HELCO to make appropriate changes to the existing plant that may be required by future legal and operational requirements. The reclassification and change in zoning would bring the subject property into conformance with its existing use for industrial purposes. The generating station and airport substation have been operating on the subject property since 1973, and HELCO has been serving the island of Hawaii (Big Island) since 1894. The ongoing consumption of petroleum for the generation of electricity ensures long-term economic productivity on the island. The addition of ST-7 is intended to improve efficiency, thereby contributing to a reduction in the facilities' dependence upon increased consumption of petroleum.

Deleted: and is in conformance with the Conservation District

2.4.2. NEW AND EXISTING COMPONENTS

As stated in the above historical table, HELCO completed in 2002 approximately 85 percent of the installation of CT-4, CT-5, and ancillary equipment but halted completion of the work after a lawsuit was filed. Work recommenced after an agreement had been reached in November 2003 among the intervening parties. On June 30, 2004, CT-4 and CT-5 were placed in commercial operation on a limited basis. Once noise mitigations are completed, CT-4 and CT-5 will become fully operational. Both will be online with noise mitigation equipment before the end of the year. The following description presents all the existing and proposed components of the Keahole Generating Station and the Airport Substation, including those presently under construction (see Figure 2-3). The reference numbers correspond to those in Figure 2-3.



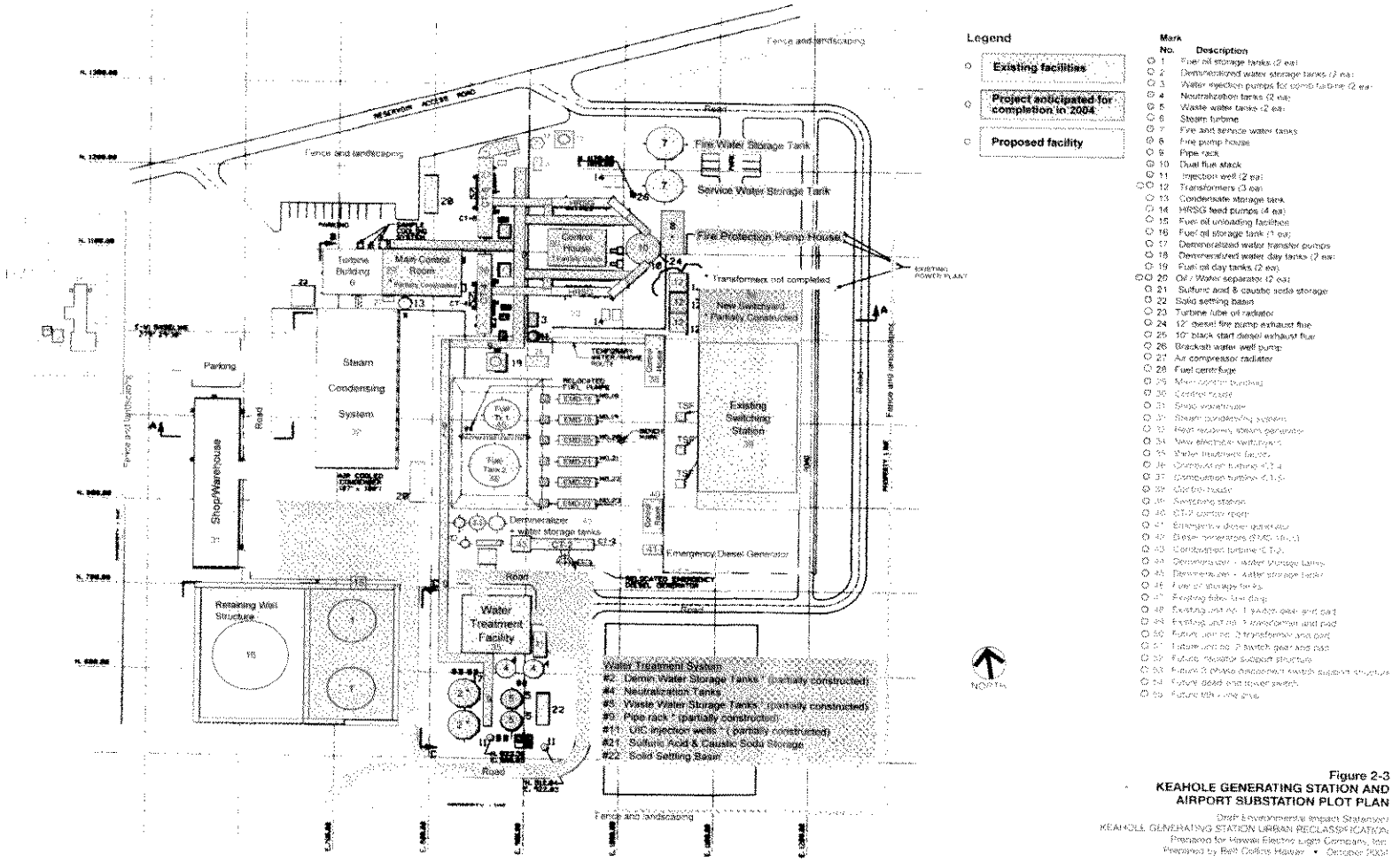


Figure 2-3
KEAHOLE GENERATING STATION AND AIRPORT SUBSTATION PLOT PLAN

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No.	Systems	Qty	Description
1.	Fuel oil storage tanks	2	Each storage tank is 50 feet in diameter and 42-feet high, and has a 617,000-gallon capacity. The components include two storage tanks, transfer pumps, and piping. The tanks store No. 2 diesel fuel, which is received from tanker trucks.
2.	Demineralized water storage tanks	2	Each water storage tank is 30 feet in diameter and 24-feet high, and has a 110,000-gallon capacity. The components include two storage tanks, transfer pumps, and piping. The tanks serve as the main demineralized water storage for the station.
3.	Water injection pumps for combustion turbine (CT) (2 ea)	4	The water injection pumps pump demineralized water into the CTs for NOx emissions controls.
4.	Neutralization tanks	2	Each tank is 10 feet in diameter and 20-feet high, and has a 10,000-gallon storage capacity. The neutralization tanks are used as mixing tanks to treat the station's wastewater.
5.	Wastewater tanks	2	Each tank is 20 feet in diameter and 24-feet high, and has a 150,000-gallon capacity. The wastewater tanks are used for the storage of treated and untreated wastewater.
6.	Steam turbine (ST-7) building	1	The building will house the future ST-7 steam turbine generator and ancillary steam turbine equipment.
7.	Fire and service water tanks (both tanks same size)	2	Each tank is 35 feet in diameter and 36-feet high, and has a 240,000-gallon capacity. The fire water tank is a reservoir for potable water, which supplies water to the fire protection system in case of a fire. The service water tank can store either potable water or brackish water, which is used to supply feed water to the demineralizer system.
8.	Fire pump package	1	The fire pump package is on a 700 square-foot concrete pad. The components include one 2,000 gpm electric fire pump, one jockey pump, one 2,000 gpm diesel fire pump, and piping. The package contains the fire protection pumps and ancillary equipment.
9.	Pipe rack	1	The pipe rack is a structure that secures and elevates the fuel transfer piping, service water piping, demineralized water piping, wastewater piping, fire protection water piping, electrical power and data conduits, and compressed air piping. The pipe rack traverses the water treatment facility, each of the CTs, the Main Control Room building, and the Control House building.
10.	Dual flue stack	1	The stack measures 104 feet above sea level with a 24-feet outer flue diameter. The components include one inner flue for CT-4, one inner flue for CT-5, obstruction lighting (at top), and continuous emissions monitoring system (CEMS) room (at bottom). The dual flue stack primarily serves as an exhaust structure for both combustion turbines.
11.	Injection well	2	Each injection well is 8 inches in diameter by 508 feet deep. Both wells combined have a permitted daily maximum flow rate of 251,000 gallons per day (gpd). The injection wells are used to dispose of treated wastewater from the plant's wastewater treatment facility. The wastewater is injected into the well at an average rate of 148,000 gpd.
12.	Main Step-up Transformers	3	The transformers convert lower voltage electrical power from CT-4, CT-5, and future ST-7 generators to higher transmission power voltage. There is one for each CT-4, CT-5, and ST-7. The transformer for ST-7 will be installed. when ST-7 is installed.
13.	Condensate storage tank	1	The condensate storage tank is 12 feet in diameter and 14 feet high, and has a 11,700-gallon storage capacity. The tank will serve as storage for ST-7 condensate fluid, which is demineralized water that is heated in the HRSGs to produce steam to rotate the steam turbine. The tank will be built with ST-7.
14.	Heat recovery steam generator (HRSG) feed pumps	4	Each pump has a 400 gpm capacity
15.	Fuel oil unloading facilities	1	The unloading facilities include two fuel unloading pumps, each with a capacity of 250 gpm each. The impervious unloading system transfers diesel fuel from the tanker trucks to the main fuel storage tanks in a safe and expedient manner. The system is designed to contain and recycle any spilled fuel.
16.	Fuel oil storage tank	1	The tank is 80 feet in diameter and 42 feet high, and has a 1.5 million gallon capacity. The components include one tank, fuel transfer pumps, and piping. It is used to store diesel fuel to support the ST-7 system. The tank is placed on an impervious surface within berms designed to contain any leakage or spills. The tank will be constructed for the ST-7 system.
17.	Demineralized water transfer pumps	2	Each pump has a 350 gpm capacity for the transfer of demineralized water from the storage tanks to the demineralized water day tanks.

No.	Systems	Qty	Description
18.	Demineralized water day tanks	2	Each tank is 12 feet in diameter and 16 feet high, with a capacity of 13,600 gallons. The day tanks are intermediate demineralized water storage tanks that receive water from the demineralized water storage tanks and supply water to the water injection pumps for the combustion turbines.
19.	Fuel oil day tanks	2	Each tank is 12 feet in diameter and16 feet high with a capacity of 13,600 gallons each. The day tanks are intermediate fuel storage tanks that receive fuel from the fuel centrifuge and supply fuel to the fuel injection pumps for the combustion turbines.
20.	Oil/Water separator	2	Each separator has a 65 gpm capacity to process oily wastewater, sending the coalesced water to the wastewater system and the oily waste to a holding tank within the wastewater treatment facility for off-site recycling.
21.	Sulfuric acid & caustic soda storage	2	Each storage tank is 5 feet in diameter and 7 feet high, with a capacity of 1,000 gallons. These chemicals are used to neutralize wastewater, and to process demineralized water by regenerating the demineralizer mixed bed resin.
22.	Solid settling basin	1	The basin has a capacity of 60 gpm. It is used to filter wastewater solids, as part of the wastewater disposal process.
23.	Turbine-Generator lube oil radiator	1	The radiator is a heat exchanger used to cool lubricating oil for the combustion turbines. It has a 150-gallon turbine lube oil and 215-gallon generator lube oil capacity.
24.	12" diesel fire pump exhaust flue	1	The exhaust is 12 inches in diameter by 104 feet high. It serves as a chimney for diesel-driven fire protection pump.
25.	10" blackstart diesel exhaust flue	1	The flue is 10 inches in diameter and 71 feet high. It is used as a chimney for the station emergency diesel generator.
26.	Brackish water well pump	1	The pump has a 500-gpm capacity. It is a vertical pump used to withdraw brackish water from the groundwater well, approximately 250-feet deep.
27.	Air compressor radiator	1	The radiator has a capacity of 90 gallons and is used to cool cooling fluid for air compressors inside the Main Control Building
28.	Fuel centrifuge	1	The centrifuge has a nominal 90-gpm capacity. It serves as a fuel clarifier and separator that removes water and impurities from diesel fuel originating from main storage tanks.
29.	Main Control Building	1	The Main Control Building is comprised of the main station control room, control system hardware, electrical shop, electrical switchgear, air compressors, personnel office space, and restrooms.
30.	Control House	1	The Control House is comprised of the electrical switchgear and breakers, control system hardware, and battery banks.
31.	Shop/Warehouse	1	The Shop/Warehouse is comprised of a maintenance shop, warehouse, and restrooms.
32.	Steam Condensing System	1	The steam-condensing system is sized to support a 20 MW steam turbine. It is a ST-7 cooling system that cools steam exiting the steam turbine in order to condense the steam into water (condensate), which is reused in the HRSGs.It will be built with ST-7.
33.	Heat Recovery Steam Generator	2	The generator has 2 x 10-MW capacity. It is part of the future ST-7 system that uses waste heat from the combustion turbine exhaust gases (1,000 degrees Fahrenheit) to heat condensate (water) to make steam, which drives the steam turbine-generator, and additional power is produced with essentially no additional consumption of fuel.
34.	New electrical switchyard	1	The electrical switchgear and breakers are used to connect the export power from the CT-4, CT-5, and future ST-7 generators to the HELCO electrical grid. This system is also used to connect import power from the grid to the Keahole plant. The ST-7 portion has not been built yet.
35.	a. Water Treatment Facility	1	The capacity for the water treatment facility is 131 gpm input with a 67.3 gpm output of demineralized water. The facility is comprised of a dual-train demineralized water system. The demineralizer processes either potable water or brackish water to produce distilled water (i.e. demineralized water) for the combustion turbines' water injection (for NO_x control) and/or steam turbine condensate.
	b. Wastewater Treatment Facility		The wastewater system collects station generated wastewater, neutralizes it, and disposes of the neutralized water by discharging to the reinjection well. Wastewater streams that are sent to the wastewater treatment facility include 63.7 gpm of rejected water from the water treatment facility, and 4.1 gpm from site's oil/water separator

No.	Systems	Qty	Description
36.	Combustion Turbine (CT-4)	1	The capacity of CT-4 is 21.3 MW. It is an oil-fired, simple cycle combustion turbine (model GE LM-2500).
37.	Combustion Turbine (CT-5)	1	The capacity of CT-4 is 21.3 MW. It is an oil-fired, simple cycle combustion turbine (model GE LM-2500).
38.	Control House	1	The Control House is the previous administration building for HELCO personnel.
39.	Switching Station	1	The Switching Station holds the electrical switchgear and breakers used to connect the export power from the CT-2 and D18-23 generators to the HELCO electrical grid. This system is also used to connect import power from the grid to the Keahole plant.
40.	CT-2 Control Room	1	The Control Room serves as the control center for CT-2.
41.	Emergency Diesel Generator	1	The capacity of the generator is 600 kilowatt (KW) and serves as the station's emergency generator.
42.	Diesel Generators (EMD 18-23)	6	Each diesel generator has a capacity of 2.75 MW. D18, 19, 20 were retired in 2004. D21, 22, 23 are still in operation.
43.	Combustion Turbine (CT-2)	1	The capacity of CT-2 is a nominal 13.75 MW. It is a diesel-fired, simple-cycle combustion turbine.
44.	Demineralizer	1	The demineralizer has a capacity of 40 gpm. It processes potable water to produce distilled water (i.e. demineralized water) for the CT-2 combustion turbine water injection (for NOx control).
45.	Demineralizer Water Storage Tanks	2	Each tank is 16 feet in diameter and 18 feet high, with a 33,000-gallon capacity. The tanks store demineralized water for CT-2.
46.	Fuel Oil Storage Tanks	2	Tank 1 (TK-1) is 35 feet in diameter and 18 feet high with a capacity of 115,248 gallons. Tank 2 (TK-2) is 50 feet in diameter and 18 feet high with a capacity of 220,332 gallons. The tanks store diesel fuel for CT-2 and D21-23 (D18-20 have been retired), and previously received fuel from tanker trucks. Once the CT-4 and CT-5 main storage tanks are commissioned, these tanks will receive cleaned fuel from the fuel centrifuge.
47.	69kv line drop	1	Delivers electrical power to the Airport Substation
48.	Unit No. 1 switchgear and pad	1	High voltage switch used to transfer power
49.	Unit No. 1 transformer and pad	1	Steps voltage down for local use
50.	Future Unit No. 2 transformer and pad	1	Steps voltage down for local use
51.	Future Unit No. 2 switchgear and pad	1	High voltage switch used to transfer power
52.	Future insulator support structure	1	Structure supporting high voltage insulation
53.	Future 3-phase disconnect Switch support structure	1	Switch to disconnect three high voltage conductors
54.	Future dead-end tower switch	1	Switch at the terminus of a high voltage line coming into the substation
55.	Future 69kv line drop	1	Delivers electrical power to the Airport Substation

2.4.3. Potable Water

The County of Hawaii, Department of Water Supply (DWS), provides approximately 40,000 gallons per day (gpd) for CT NO_x control, the production of steam, domestic consumption by employees, and landscape irrigation. Upon completion of the improvements to the facilities, the demand for potable water from the DWS will decrease to 15,000 gpd. The reduction of approximately 25,000 gallons per day results from the conversion of the facility from potable to brackish water use as described below.

2.4.4. NON-POTABLE WATER

HELCO's onsite brackish supply well, identified as State No. 4461-02 and depicted at item 26 in Figure 2-3, was developed and pump tested in 1993, and has been in use since mid-2004. About 210,000 to 230,000 gpd of brackish, basal groundwater would be pumped to provide the remaining supply requirement for the plant's improvements. The additional supply is necessary to accommodate the combined cycle portion of the improvements to the plant.

2.4.5. PROPOSED CHANGES TO WATER USAGE

HELCO has converted its industrial consumption of water at Keahole from potable to brackish water to the extent allowable, as specified in the November 2003 Settlement negotiated among HELCO and the parties contesting the original project. Once HELCO has established its right to use brackish water, HELCO will transfer 90 percent of its existing additional incremental potable water allocation of 100,000 gpd to DHHL, subject to DWS approval. The consent to transfer activity could begin promptly, but the actual transfer of potable water to DHHL cannot begin until a legal challenge to the granting of brackish water use to HELCO by the DLNR has been resolved.

2.4.6. EMISSION CONTROLS

The Keahole facility is presently operating under three Air Quality Permits issued by the State Department of Health (DOH) on July 5, 1989, May 30, 2002, and July 25, 2001. The first two permits allow the operation of the Keahole facilities in existence prior to 2003. The third permit allows the operation of CT-4 and CT-5 and ST-7.

2.4.7. DOMESTIC WASTEWATER TREATMENT AND DISPOSAL

Upon completion of the improvements to the generating station, the amount of domestic wastewater generated by employees from sinks, showers, and toilets that will be treated and disposed of in the plant's existing septic tank and leach field system will be increased by approximately 2,000 gpd. All of this water will ultimately reach the underlying basal lens. The additional leachate will add nutrients to the underlying basal groundwater, but in negligible quantities as compared to the levels of nutrients "naturally" occurring in the groundwater. (See Tom Nance Water Resource Engineering report in Volume 2 of the EIS, identified as Appendix P.)

2.4.8. INDUSTRIAL WASTEWATER

HELCO developed two 500-foot deep disposal wells in 1993 under Underground Injection Control (UIC) Permit No. UH-1776, (their locations are shown as item 11 in Figure 2-3, the project site plan). These are used to dispose of the plant's various wastewaters which will consist of the concentrate from reverse osmosis (RO) filtration units; backwash water from the RO plant, demineralizers, and dual media filters; wastewater from the HRSG units; and storm-water runoff after it has passed through oil/water separators. All of the various wastewaters are directed into a storage tank. When the water reaches a pre-set level in the tank, it is pumped at 250 gpm through a filter medium and cartridge filter and then to disposal in the UIC wells. The expected operating time of 8-1/2 hours each day will dispose of about 130,000 gpd. This would amount to approximately 55 percent of the combined supply from DWS and the onsite brackish well. Most of the remaining supply would be lost to the atmosphere. (See Tom Nance Water Resource Engineering's report in Appendix P.)

2.4.9. PERSONNEL

HELCO presently employs 12 personnel at the subject property. Upon completion of the current construction activities, on-site staff will increase by an additional three people — a control technician, a power plant supervisor, and a material coordinator. Approximately 73 percent of HELCO's staff in trade, craft, and clerical positions are unionized members of the American Federation of Labor, Congress of Industrial Organizations (AFL-CIO), International Brotherhood of Electrical Workers (IBEW), Local 1260.

2.4.10. VEHICULAR ACCESS AND ROADWAYS

The subject property is accessible by two roadways, one on either side of the facility, and both linking it to the Queen Kaahumanu Highway. The facility's main entrance is located on the south side of the subject property and is accessed by Pukiawe Street, which intersects Kaiminani Drive. On the north side, the subject property is accessed by Reservoir Road, which contains three access easements. The easements are Easement 1, containing an area of approximately 0.068 acres; Easement 2, containing an area of approximately 0.552 acres; and Easement 3, containing an area of approximately 1.541 acres. All three easements are on property owned by the State and controlled by the State Department of Transportation (DOT).

2.4.11. EXISTING AND PROPOSED LANDSCAPE

The landscaping surrounding the subject property was installed pursuant to the 1993 RFEIS. Norfolk pine, coconut palms, native wiliwili (fiddle leaf), and areca palms were planted around the subject property to help lessen the visual impacts of the generating station. HELCO plans to redo and enhance portions of the perimeter landscaping along the southwest, west, and northwest sections of the property, since it appears that certain trees have grown slower than anticipated. Bermed planters will be placed in certain areas, trees will be transplanted, and new trees and plants will be added. The existing fence will be converted to a permanent fence and two gates will be modified to automated electronic card-reading gates. (See landscape sketches in Chapter Three.)

2.4.12. ELECTRICAL ENERGY CONSUMPTION

The Keahole Generating Station presently uses 0.8 megawatts of electrical energy to power the facility. Upon completion of the ST-7 unit, the total electrical energy consumption of the plant will increase to 2.1 megawatts.

2.5. THE PLANNING HORIZON

2.5.1. INTEGRATED RESOURCE PLANNING

Each energy utility in the State is required by the Public Utilities Commission (PUC) to systematically and thoroughly develop long-range plans for meeting Hawaii's future energy needs through Integrated Resource Planning (IRP). IRP evaluates and integrates both resources that supply electricity and resources that reduce or better manage the demand for electricity. HELCO on March 31, 2004 filed with the PUC an evaluation (Appendix F) of its second Integrated Resource Plan (IRP-2), which was originally filed in September 1998 (Appendix E). HELCO is in the process of preparing its third IRP (IRP-3), which will address long-term planning issues and be completed in the 2005 timeframe. The evaluation of IRP-2 provides an update of recent developments (i.e. changes in forecasts) that may significantly impact IRP-2 since its filing in 1998. A key element of the evaluation includes the installation on the subject property of

ST-7 with SCR emissions control. The engineering, design, and installation of ST-7 with SCR is estimated to begin once the reclassification, rezoning, and permitting processes have been completed.

2.5.2. Estimating Short- and Long-Term Growth of Electricity

HELCO uses various forecasting techniques to estimate short- and long-term growth of electricity "Sales and Peaks." Load-reducing factors such as "Demand-Side Management" (DSM) programs and "Rate Riders" are also estimated. DSM programs promote technologies that help HELCO customers use electricity more efficiently, thereby theoretically reducing overall consumption. Rate riders are incentives offered to consumers to reduce peak-load demand. While DSM programs will be used to offset a portion of the load growth, new sources of firm power are needed to meet the growing energy needs of HELCO's customers.

HELCO typically performs a short-term forecast of electricity Sales and Peaks on an annual basis. This short-term forecast estimates load growth for a nominal period of five or six years. Long-term forecasts covering 20-year periods are periodically performed as part of HELCO's major IRP processes. HELCO plans to update its long-term forecast in the 2004 timeframe, in conjunction with its major IRP-3 filing planned for 2005.

2.6. THE NATURE OF DEMAND

While there may be uncertainties with regard to the rate at which load will grow, there is little uncertainty in the direction of growth: HELCO is faced with increasing consumer demand for electricity with each passing year. This trend is consistent with other electric utilities in the State, as well as most areas of the United States with the exception of areas in which the economy is declining.

2.6.1. East vs. West

Most of HELCO's existing generation is located on the east side of the island. However, load growth on the west side has been increasing at a much faster pace. For example, the combined energy sales of the Kona and Waimea district in a five-year period, 1998 through 2003, have grown at approximately 35-40 percent faster than sales in the Hilo district. Over a ten-year period, 1993 through 2003, combined energy sales growth in the Kona and Waimea districts was approximately 100 percent higher than the energy sales growth of the Hilo district. It is advantageous to locate new generating units in areas where they are closer to the faster-growing loads. Stated simply, infrastructure improvements should be located where they are needed most. If new generating units were to be placed on the east side, existing transmission lines may need to be replaced with larger capacity conductors, or new transmission lines may need to be built. These improvements would be necessary to increase the ability to transport bulk power from the area of generation to the area of load (demand). Furthermore, large distances between load and generation result in increased transmission losses and exposure to transmission system contingencies.

2.6.2. Peak Demand

Growth in system peak is the primary driver for new generating units, and is caused by the simultaneous demand for electricity. Consistent growth of the system peak is not unique to the HELCO system or the State. The forecast for HELCO's peak demand is summarized in Table 2-B, and takes into account the peak-reducing impacts of HELCO's DSM programs

TABLE 2-B: ESTIMATE OF HELCO'S PEAK DEMAND

YEAR	MEGAWATTS
2005	192
2010	214
2015	240
2020	280
2025	322

2.6.3. TECHNOLOGICAL DEPENDENCY

In the development of a Sales and Peak forecast, trends in recent recorded sales are analyzed. The total average monthly kilowatt-hour (kWh) use per residential customer for 2002 increased approximately 11 kWh from 2001. The average kWh use per customer increased in all three of HELCO's service districts: Hilo, Kona, and Waimea. HELCO's sales data over a longer period are illustrated below.

TABLE 2-C: AVERAGE KWH USE PER RESIDENTIAL CUSTOMER

YEAR	KWH
1992	552
1994	564
1996	557
1998	549
2000	561
2002	569

HELCO anticipates that the total average use per customer will continue to grow in 2003 through 2008. This expectation is due to various factors such as: (1) rising popularity of home-based businesses and home electronics; (2) high demand in mortgage refinancing that provides homeowners with purchasing power (e.g. larger refrigeration units, air conditioning, etc.); and (3) increasing occupancy in timeshare condominium units.

2.6.4. CONSERVATION

2.6.4.1. Energy Efficiency

HELCO's DSM programs provide incentives to customers to install energy efficiency measures such as solar water heating and high-efficiency electric-resistance water-heaters (for residential customers) or high-efficiency lighting, air conditioning, and motors (for commercial and industrial customers), thereby reducing the overall demand for electricity on the HELCO system, and at the same time, allowing consumers to save on electricity costs.

2.6.4.2. Consumer Responsibility

HELCO, through its parent company, continues to promote energy-efficient technologies to commercial and residential customers through various media: the worldwide web, newsprint media (including advertisements in Hawaii Tribune Herald, West Hawaii Today, Hawaii Island Journal, and Kamaaina Shopper), bill inserts, lobby displays, and energy exhibits at community events. However, awareness of

energy-efficiency benefits in itself does not always lead to implementation. Conservation programs depend on voluntary consumer participation. Because participation is not mandatory, the consumer bears the responsibility to adopt energy-efficient technologies and conservation practices. As an analogy, many automobiles with poor fuel-efficiency are very popular, even though many consumers have the option of driving vehicles with higher fuel-efficiency and are fully aware of the societal objectives of consuming less oil. HELCO will continue to do its part in promoting energy efficient technologies to commercial and residential customers, but the full potential of these programs cannot be achieved without voluntary consumer participation.

2.7. THE ISSUE OF SUPPLY

To meet HELCO's near-term future energy needs, a portfolio of resources will be required. Demand-side resources allow both commercial and residential customers to reduce electrical usage, and help to defer the need for additional generation. Increased renewable energy generation from as-available (e.g. wind, solar, hydro) resources will reduce the consumption of fossil fuels. HELCO and non-utility central station resources will continue to provide firm power (e.g. fossil fuels, geothermal, biomass) in order to meet the growing demand for electricity. Lastly, it is also estimated that customer-sited combined heat and power (CHP) units will begin to play a larger role in Hawaii's energy future.

The following subsections provide background information on various supply issues, including the difference between firm capacity and as-available generation, a discussion of alternative energy resources, and a description of distributed generation.

2.7.1. FIRM CAPACITY AND AS-AVAILABLE GENERATION

Unlike electric utilities in the continental United States that are able to obtain power from other states through transmission lines, utilities in Hawaii do not have interconnections to other utilities to provide backup power. Hawaii utilities, therefore, must rely on dependable firm power that can be dispatched to customers when needed. Many renewable resources, such as solar, wind, and run-of-river hydro, are not available on demand, and therefore, require backup generation or energy storage to ensure power is available when needed. HELCO estimates that two large wind farms will add roughly 10 to 20 MW of as-available capacity to the HELCO system prior to the installation of ST-7 at Keahole. In addition, it is estimated that HELCO will be able to rehabilitate its Puueo hydroelectric plant in the 2005 timeframe, replacing an aged, severely damaged 1,500 kilowatt (kW) generator with a modern, efficient turbine generator sized between 2, 280 kW and 2,400 kW. The new wind and hydroelectric facilities will increase the amount of renewable generation on the HELCO system, reducing the consumption of fossil fuels. However, these renewable projects use as-available resources, and cannot be depended on to serve consumers when the wind is not blowing and rains do not support river flow. HELCO must therefore plan for the addition of firm capacity, such as that represented by the installation of ST-7 at Keahole, which will improve operational efficiency by producing energy from otherwise wasted heat. Recognizing that there are emerging technologies in the field of heat recovery and improved facility efficiency, HELCO will continue to explore the means to maximize operational efficiency at Keahole. HELCO also recognizes that recent revisions to Chapter 343, Hawaii Revised Statutes require that any improvements to an existing energy plant that result in the increase of 5 megawatts or more be subjected to an environmental assessment. Therefore, if its quest for improved operational efficiency results in a substantive increase in megawatt output, HELCO is committed to fulfilling its obligations pursuant to Chapter 343.

At full build out, the dual-train combined cycle (DTCC) unit to be added to the subject property will provide approximately 60.3 MW of firm capacity to the HELCO system.

2.7.2. INDEPENDENT POWER PRODUCERS

HELCO currently purchases power from a wide variety of independent power producers (IPPs), as shown in Table 2-D. As-available producers include Wailuku River Hydroelectric (run-of-river hydro) and Apollo Energy Corporation (wind). Additional as-available generation is expected to be added to the system in future years. As previously mentioned, as-available generation cannot be relied upon to meet the consumer's growing demand for firm power.

Firm power is currently purchased from PGV, Hilo Coast Power Company (HCPC), and Hamakua Energy Partners. It should be noted that HCPC's contract has been terminated, and HCPC ceased to be a source of firm power on December 31, 2004.

Deleted: will

Deleted: or before

TABLE 2-D: INDEPENDENT POWER PRODUCERS ON THE HELCO SYSTEM

ENTITY	SOURCE OF ENERGY	FIRM OR AS-AVAILABLE	MAXIMUM CAPACITY (NOMINAL)
Wailuku River Hydroelectric	Run-of-River Hydro	As-Available	12.1 MW
Apollo Energy Corporation	Wind	As-Available	7 MW
Various Small Producers	Wind and Hydro	As-Available	Less than 1 MW
Puna Geothermal Venture	Geothermal	Firm	30 MW
Hamakua Energy Partners	Naphtha	Firm	60 MW
Hilo Coast Power Company	Coal	Firm	22 MW

2.8. THE RECOMMENDED STRATEGY

To meet HELCO's future energy needs, a mix of demand-side resources, central-station generators, and CHP systems will be used. Demand-side resources allow both commercial and residential customers to reduce electricity usage, and help to defer the need for additional generation. Central station resources on the HELCO system will consist of both utility and non-utility generators, firm and as-available, fossil-fueled and renewable. It is also estimated that customer-sited CHP units will begin to play a larger role in Hawaii's energy future, and HELCO's IRP Evaluation reflects this expectation.

2.9. DISCUSSION OF THE PROPOSED ACTION AND ALTERNATIVES

Five alternatives have been considered in planning for the future of the Keahole facilities. These alternatives have been formulated in coordination with the aforementioned 1998 IRP-2 and the recently filed IRP-2 Evaluation. The alternatives are presented in Table 2-E and include 1 - No Action; 2 – IRP Preferred Alternative; 3 – West Hawaii Alternative; 4 - East Hawaii Alternative; and 5 – Renewable Resource Alternative. The Proposed Action discussed in this EIS is the IRP Preferred Alternative (#2).

As discussed in previous sections, the ability of HELCO to meet the energy demands of the future will depend upon a variety of initiatives, both on the demand side and on the supply side. Each program may be considered to be a variable for which the outcome may not yet be known. This fact complicates the discussion of alternatives. There are, in fact, so many variations on the alternatives that presenting them and analyzing them becomes unwieldy for both the writer and the reader, and counterproductive to the process. Therefore, all five alternatives assume the *status quo* for energy supply and demand on the rest of

the island. This means that no significant changes in forecast supply or demand are anticipated beyond those expressed in the IRP. Secondly, all five alternatives assume that the IRP programs discussed in Appendix G, *A Review of Alternative Resources Discussed in the IRP* will be pursued and implemented as opportunities arise.

2.9.1. Description of the Proposed Action

The proposed action (Preferred Alternative) includes the urbanization of the land at the Keahole Generating Station and Airport Substation and the addition of ST-7 with SCR. The two simple-cycle combustion turbines about to come on line (CT-4 and CT-5) will be converted to a combined-cycle unit by adding two HRSGs and a steam turbine generator (ST-7). Together, these components will constitute a nominal 60.3-MW (net) DTCC. It is estimated that the DTCC will be completed by 2009 or sooner, subject to the duration of the permitting process.

In addition to the new generating facilities, HELCO proposes to install an air-cooled condenser to support combined-cycle operation. The utilization of waste heat will make the DTCC unit fuel-efficient. In the State, DTCC units have been installed on Oahu (Kalaeloa), Maui (Maalaea), and Hawaii (Hamakua Energy Partners), as both utilities and IPPs alike have recognized the benefits offered by DTCC units.

2.9.2. The Practicality of ST-7 at Keahole Instead of an Alternative Site

The subject property is the only viable alternative for the following reasons:

- The site is owned by HELCO and is large enough to accommodate the proposed expansion.
- Substantial air quality data has already been collected and submitted to the EPA.
- The proposed expansion, which will occur on or before 2009, will meet the need to add new generating capacity.
- The proposed unit addition will improve overall system reliability and keep additional capital, operating, and maintenance expenses at a reasonable level. Installation of ST-7 at Keahole will allow for the utilization of waste heat from the existing CT-4 and CT-5, which will make the completed Keahole DTCC unit fuel-efficient. In the State, DTCC units have been installed on Oahu (Kalaeloa), Maui (Maalaea), and Hawaii (Hamakua), as both utilities and Independent Power Producers (IPP) alike have recognized the benefits offered by DTCC technology.
- The proposed expansion will optimize the benefits of using existing utility infrastructure, such as existing transmission lines. If a new site were selected for development, new transmission lines would be needed to link the new source of generation to the existing transmission system.
- Developing new generating units in West Hawaii near the area of demand will reduce transmission line losses and will reduce the need for transmission line construction between East and West Hawaii. In addition, attempting to add generation to East Hawaii, either by developing a new site or expanding an existing site, would result in the same permitting delays identified for a new West Hawaii site. Specifically, a new air permit would have to be obtained for new generation in East Hawaii.

2.9.3. Selective Catalytic Reduction (SCR) system

The Keahole combined-cycle project consists of the installation of a nominal 60.3-MW DTCC electric generating facility, utilizing two CTs. Each of the CTs exhaust into a HRSG, which provides steam to a

steam turbine-generator. The CTs fire No. 2 fuel oil and employ water injection for combustion-based NOx mitigation. A SCR system within the HRSG is a system that further reduces NO_x emissions.

2.9.3.1. SCR System Description

There are two ways to describe this system: from a layman's perspective and from a technical perspective. In the interest of ensuring a better understanding for the reader, we offer both descriptions. We begin with the layman's.

The SCR system is designed to reduce NO_x emissions. There are two types of NO_x emissions: thermal NO_x or fuel NO_x. Thermal NO_x is created by the high temperature reaction of nitrogen and oxygen in the combustion air. It is a function of the combustion chamber design and technical parameters such as flame temperature, residence time at flame temperature, combustion pressure, and air/fuel ratios in the primary combustion zone. Fuel NO_x, on the other hand, is formed by the gas-phase oxidation of fuel-bound nitrogen, and is largely independent of the combustion temperature and the nature of organic nitrogen compound.

SCR is a post-combustion NO_x control technology that utilizes ammonia. The ammonia is injected into the exhaust gas created after combustion of the fuel. The ammonia reacts with the NO_x to form molecular nitrogen and water vapor. Optimum NO_x reduction occurs at temperatures between 500° F and 750° F. Below this optimum temperature range, catalyst activity is greatly reduced, allowing unreacted ammonia to slip through (this is what is referred to as "ammonia slip"). Above 850° F, ammonia begins to oxidize to form additional NO_x. The ammonia oxidation increases with increasing combustion temperature. Sulfur released from the diesel fuel used for combustion oxidizes and reacts with the ammonia, forming ammonium bisulfate and other sulfate solids. Because these ammonia bisulfate compounds are corrosive, they need to be periodically removed from the interior of the system using high pressure washing. The resulting wash water is deemed a hazardous waste and is collected, contained and transported out of state for disposal.

Here is a much more technical description. NO_x emissions from CTs are classified by their formation mechanisms as either thermal NO_x or fuel NO_x. Thermal NO_x is created by the high temperature reaction of nitrogen and oxygen in the combustion air and is a function of the combustion chamber design and the turbine operating parameters. Fuel NO_x is formed by the gas-phase oxidation of fuel-bound nitrogen.

SCR is a post-combustion NO_x control technology that has been extensively applied to natural gas-fired and to a very limited extent to liquid fuel fired, combined cycle CT operations. In this process, ammonia is injected into the turbine exhaust gas upstream of a catalyst bed. On the catalyst surface, the ammonia reacts with NO_x in the flue gas to form molecular nitrogen and water vapor.

The expected inlet concentration of the NO_x is 42 (parts per million on dry volume) ppmvd @15 percent O_2 with water injection mitigation measures. The maximum fuel bound nitrogen content per the fuel specification is 0.015 percent by weight. The 42 ppmvd @ 15 percent O_2 value accounts for this level of fuel bound nitrogen. The SCR system is designed to further reduce NO_x emissions from the stack to the desired or required levels. For this study, a reduction to 15 ppmvd @ 15 percent O_2 and 11.7 lb/hr NO_x from the inlet 42 ppmvd @ 15 percent O_2 is assumed and provides the basis of the estimates and calculations presented later in the study.

The SCR system controls will be designed to inject ammonia to meet the NO_x limit with a maximum ammonia slip (emissions) of 3.5 lb/hr and 10 ppmvd @ 15 percent O_2.

The SCR catalyst would be located within the HRSG casing downstream of the high pressure evaporator tube section, to provide optimum exhaust gas temperature for the reaction. Optimum NO_x reduction occurs at catalyst bed temperatures between 500° and 750° F for conventional base metal oxide (vanadium- or titanium-based) catalyst types.

2.9.3.2. Control Philosophy

The philosophy of the SCR control system is to inject ammonia (NH_3) into the turbine exhaust upstream of a reactor that contains catalyst to promote the reaction of NH_3 with NO_x and thereby limit NO_x emissions to concentrations at or below the regulatory levels described in the operating permit. Ammonia is delivered to the reactor using the inlet NO_x and oxygen concentrations and turbine-operating parameters for feed forward control and outlet NO_x concentration for feedback trim.

The SCR will have a dedicated ammonia injection grid to distribute ammonia evenly across the catalyst face. The ammonia flow control to this grid anticipates the amount of ammonia flow required to achieve an outlet NO_x concentration of 15 ppmvd based on turbine operating conditions and the catalyst inlet NO_x and Oxygen concentrations. The ammonia demand signal is then trimmed using a feedback controller that compares the measured SCR outlet NO_x to the operator controlled set-point. Finally, the resulting ammonia demand signal is compared to the measured ammonia flow rate, the difference is conditioned, and the resulting control signal is used to modulate the ammonia flow control valve.

Ammonia emissions, or ammonia slip, may be directly measured (using differential NO_x measurement), or calculated (using Predictive Emissions Monitoring) depending on the operating permit.

Although regulatory officials applied an "emissions netting" formula to exclude the mandatory use of SCR at the Keahole Generating Station, under the Settlement Agreement, HELCO and State Department of Health officials agreed to the use of SCR.

2.9.3.3. Ammonia Supply

The ammonia supplied to the flow control skid can be one of several forms: (1) aqueous ammonia; (2) anhydrous ammonia; or (3) urea solution (using urea to ammonia technology).

AQUEOUS AMMONIA. Aqueous ammonia is typically either 19 percent or 29 percent ammonia in solution with water, and is not recommended or considered further in the study because of premiums in costs due to its shipping requirements, its requirement for high purity water, and the need for a heat source to vaporize the ammonia.

ANHYDROUS AMMONIA. Anhydrous ammonia is a volatile form of ammonia that is transported as a liquified compressed gas. For the application at Keahole, a 20,000 gallon pressurized storage tank is proposed in order to maintain a one-month storage of ammonia that will support both combustion turbines operating at full load in combined cycle mode.

The storage tank for the anhydrous ammonia will contain liquid and gaseous ammonia in equilibrium. The vapor pressure of the ammonia at 50° F is 75 pounds per square inch gage (psig), which will provide sufficient pressure to deliver the ammonia vapor to the control valve. In the event the storage tank supply pressure is not sufficient, an immersion heater would be provided to raise the saturation

temperature/pressure. A pressure controller will control the heat input such that the vapor pressure is maintained at a minimum of 75 psig.

UREA. Urea systems convert granular urea or urea solution to ammonia. The systems are safer than the anhydrous system and are available in several designs. One design involves dry urea, which is delivered in palletized form, and is solid under ambient conditions, is a nontoxic substance and presents essentially no danger to humans and the environment. Urea can be economically and safely shipped and stored in bulk quantities until it is eventually mixed with water. Dry urea is received in pelletized form and unloaded by pneumatic conveying into a dry storage silo. The typical capacity of a truck transporting urea is approximately 25 tons, which equals approximately a one month supply for the Keahole plant. To allow complete unloading of the tank truck, a storage silo of approximately 1,000 cubic feet is required. From the storage silo the urea is delivered to a mixing tank via a rotary feeder where the urea is mixed with demineralized water to produce a 40 percent urea solution.

An alternate design includes a 40 percent urea solution at the plant site. The 40 percent urea solution would also be delivered by truck and would require a storage tank of approximately 7,000 gallons to allow complete truck unloading. This would offer approximately a three-week supply for the Keahole plant. This system has a lower capital cost and operating cost compared to the dry urea system discussed above, however its viability depends on the availability of the urea solution.

In a typical urea to ammonia system, the ammonia solution is delivered to a pressurized vessel, with the heat input controlled to maintain the pressure. The urea is decomposed into a NH_3, CO_2 and water vapor mixture, and the mixture is further diluted with air prior to discharge into the flue gas.

Other urea systems introduce ammonia into the flue gas by spray injection of ammonia solution into a hot flue gas bleed stream followed by a decomposition catalyst. The mixture is discharged into a hot flue gas bleed stream as a fine mist and subsequently vaporized. The flue gas and ammonia mixture is then injected into the main flue gas stream upstream of the SCR catalyst.

AMMONIA INJECTION. Prior to entering the flue gas, ammonia vapor from the ammonia storage tank is supplied to a flow control skid where the ammonia flow rate is controlled and also the ammonia is diluted with air below the LEL. The NH_3 is diluted with air to less than 3 percent by volume, which is considerably below the LEL of 16.5 percent. The ammonia/air mixture is then delivered to an injection grid, which distributes the ammonia into the flue gas within the HRSG casing directly upstream of the catalyst.

2.9.4. EQUIPMENT PHYSICAL ATTRIBUTES AND LAYOUT

The proposed action also includes several minor changes to the facilities operations. These are discussed below.

2.9.4.1. Ammonia Storage

ANHYDROUS AMMONIA. An Anhydrous Ammonia System will include a storage tank and associated containment areas, and could be located north of the CT-5 HRSG, adjacent to the plant access road. On the north side of the containment area would be a curbed area for truck unloading, with ammonia flow control skids adjacent to each HRSG. An area for catalyst loading/unloading is also provided for each HRSG. Anhydrous ammonia is delivered by truck in liquid form and delivered to an on-site storage tank utilizing ammonia vapor compressors.

All piping and hose connections to the storage tank would be provided with excess flow valves. A dual safety valve system is also provided which includes two 100 percent capacity relief valves, which are connected to a three-way valve, which allows one valve to be isolated for servicing while the others remain on line.

The unloading station includes an ammonia compressor to withdraw ammonia vapor from the top of the storage tank. The vapor is then compressed and the pressure forces the liquid ammonia from the isotainer (container used for ammonia transport) into the storage tank. A containment area, which consists of a raised concrete curb, surrounds the storage tank. The containment area would also capture water from the misting system in the event of an accidental release of ammonia vapor.

UREA. A urea system will include a urea storage silo, pneumatic conveying system for truck unloading, mixing tank, heat exchanger, hydrolyzer vessel and flash tank, a hydrolyzer feed pump and dilution air system. This equipment would be located in the same general area as shown for the anhydrous ammonia storage tank.

The urea system utilizes pelletized urea. It is a solid under ambient conditions, and can be economically and safely shipped and stored in bulk quantities until it is eventually mixed with water. Urea would typically be delivered by truck and unloading would be performed by a pneumatic conveying system using a blower and discharging into a storage silo. Conveying air would be discharged to atmosphere through a bin vent filter mounted on top of the storage silo.

2.9.4.2. HRSG/Catalyst

The HRSG design would need to be modified significantly to accommodate an SCR system, including additional ductwork sections to house the catalyst and the ammonia injection grid.

Downstream of the catalyst, in low temperature sections, tubes may be subject to ammonium bisulfate deposition, specifically in the low-pressure economizer. All tubes and fins subject to this should be of 409 SS material and a maximum fin spacing of 4 fins per inch should be used. A maximum of 10 rows of tubes per bank should be used and a minimum of 4 feet between tube banks is required to facilitate washing operations.

The SCR section of the HRSG is a duct section, which is filled with catalyst modules. Each catalyst module contains catalyst elements. An opening is provided in the top of the SCR duct to allow installation and removal of the catalyst modules with a monorail hoist system. The SCR section is located downstream of the HP evaporator. Clearances between catalyst modules and between the modules and the SCR housing are sealed to prevent any flue gas from bypassing the catalyst. The SCR system is typically designed to limit the gas side pressure drop to 2" w.c. (water column). Additional pitch of the catalyst will be required to minimize soot deposits associated with the diesel fuel.

2.9.4.3. Continuous Emissions Monitoring System (CEMS)

The CEMS will consist of all hardware and software required to measure and report regulated emissions. CEMS will be able to measure and report NO_X and carbon monoxide (CO) emissions. The existing simple-cycle CEM system will be expanded to handle these functions.

2.9.4.4. Ammonia Tank Misting System

A misting system would be installed to control and mitigate an ammonia vapor cloud, in the event of an ammonia leak from the tank area. The misting system would be automatically activated upon detection of ammonia vapor by the Ammonia Detection System. Water supply for the misting system would be from the fire protection piping loop. Upon system activation, an alarm will sound locally and in the control room. A diked area is provided for the ammonia storage tank, containing the contents of the storage tank, as well as any water discharged from the misting system.

2.9.4.5. Ammonia Detection

Ammonia detectors would be located in the vicinity of the storage tank, and will activate both alarms locally and in the control room, and the misting system.

2.9.4.6. Waste Generation and Disposal

Because the catalyst has an affinity for heavy metals, it is possible that spent catalyst may have to be treated as hazardous waste. HELCO will comply with all federal, state, and county laws regarding the handling, transport, and disposal of hazardous waste. Only certified hazardous material transporters and disposal facilities will be used for managing/disposing of hazardous wastes. Currently, all certified disposal facilities are located out of state.

Water washing of the HRSG tubes will be required to remove corrosive deposits of heavy metals, which accumulate on the tubes/fins. The main deposition is typically ammonium bisulfate containing heavy metals from the tubes/fins, and can be removed by water washing. If the wash water waste is determined to be hazardous, it will be collected for off-site disposal. Hazardous wastewater generated from HSRG cleaning will need to be collected in drums and shipped to an offsite (mainland) disposal site. Wastewater will be containerized and then shipped, following all federal, state, and county requirements. It is estimated that approximately 40,000 gallons per year of HRSG wash water will be generated. If it is determined that the wash water is non-hazardous, an additional wastewater treatment system may be added to the Keahole facility to treat the wash water to a level that would allow it to be disposed at an onsite injection well.

2.9.4.7. Ammonia Supply Logistics

Ammonia delivered to the Keahole plant site is expected to be in anhydrous form or as urea solution or pellets. The ammonia consumption rate is expected to be approximately 1,000 gallons per week.

The vessels that are utilized to deliver anhydrous ammonia are called "isotainers" which also contain pressurized liquid anhydrous ammonia. An isotainer contains approximately 6,000 gallons of ammonia. Isotainers are typically dedicated to a particular plant and delivered to the plant every three weeks.

The isotainers are typically filled on the mainland (in the Los Angeles area), shipped to Hawaii and then transported by truck to the site and emptied into the plant storage tank. The empty isotainers are then returned to the mainland for refilling. This entire cycle takes approximately 3 weeks.

Urea can be supplied to the plant site as a solid or in solution. As a solid, the urea is delivered in pelletized form. The estimated annual cost of solid urea for the Keahole Plant is approximately $70,000. If delivered in solution, the urea is supplied as a 40 percent solution. The estimated annual cost of urea

solution for the Keahole Plant is approximately $275,000. These costs reflect urea supply from the mainland U.S.

Urea systems which receive dry urea offer cost advantages for urea delivery, but initial capital cost and operating costs will be higher when compared with the urea solution systems. A dry urea system would require a larger storage tank, would require demineralized water and a source of heat to dissolve the urea.

HELCO is also required to prepare and submit a Risk Management Plan (RMP) in accordance with guidelines issued by the Environmental Protection Agency (EPA) pursuant to Section 112(r) of the Clean Air Act Amendments of 1990. Ammonia, in both anhydrous and aqueous forms, is listed as a regulated substance under 40 CFR Part 68. The RMP will include the following components:

- Hazard assessment that details the potential effects of an accidental release, an accident history over the last 5 years, and an evaluation of worst-case and alternative accidental releases;
- Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and
- Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies should an accident occur.

These plans are submitted to the EPA and made available for public review. The plans must be updated and resubmitted every five years. Also, under EPA's Emergency Planning and Community Right to Know Act (EPCRA), the quantities of ammonia and storage locations are reported to the State of Hawaii Department of Health, the Local Emergency Planning Committee, and the Hawaii County Fire Department. This information is submitted annually under the EPCRA Tier II program.

Compliance with the risk management program requirements (including submission of an RMP) is required by the date on which a regulated substance first becomes present above a threshold quantity in a process at a stationary source (the initial compliance deadline was June 21, 1999 for sources holding more than a threshold quantity of a regulated substance in a process prior to that date) (40 CFR §68.10(a)). If EPA adds a chemical to the list of regulated substances, part 68 requirements must be met with respect to that chemical within three years of the date on which the chemical is listed (40 CFR §68.10(a) (2)).

2.9.5. ALTERNATIVE FUEL : NAPHTHA

Keahole CT-4 and CT-5 are currently configured to burn No. 2 diesel. In the event that fuel diversity or alternatives are sought for availability, reliability, or regulatory reasons, Naphtha will be considered as one of the alternative fuel sources. Combustion turbine performance with naphtha will generate essentially equal power ratings as for No. 2 diesel.

Use of naphtha would require significant modifications to the fuel storage and handling systems, as well as the combustion turbine fuel supply, ventilation, and control systems. No. 2 diesel fuel would still be required for start-up and low output operation.

2.9.5.1. Naphtha Properties

Naphtha is a light fraction fuel produced through refinement of crude oil. The sulfur content in naphtha is low in comparison to diesel fuel. Naphtha has less than 0.05 percent sulfur content, while conventional

diesel fuel has a sulfur content of approximately 0.40 percent. Because of this, naphtha will burn more cleanly than conventional diesel fuel and generate correspondingly lower sulfur dioxide emissions.

Naphtha, unlike diesel fuel, more easily vaporizes and produces ignitable gases at low air pressures, resulting in a low flash point for the fuel. The flash point for naphtha is typically in the 20-55 degree F range.

Because of this low flash point, naphtha requires an alternative fuel to add stability and prevent possible explosions during system start-up or low-load operation. The diesel fuel supply system would be retained for use as a start-up fuel for naphtha. A flash point detection system would be required to switch fuels and operate on diesel at lower loads.

Naphtha vapors, which are heavier than air, require heavy gas fans in the bottoms of enclosures to remove them. The fuel skid and turbine compartment require special ventilation systems that vent the exhaust to an unconfined area to minimize the explosive hazard.

Because naphtha is very sensitive to changes in temperature, the fuel and piping must be maintained between 68° F and 140° F. A naphtha cooler is required prior to the booster pumps if the naphtha cannot be maintained below 140° F. Heat tracing of piping will be required if the temperature range cannot be maintained.

2.9.5.2. Naphtha System Description

The following modifications to the existing equipment are necessary for operation with Naphtha:

- A grounding system and new unloading pumps will be required at the unloading facility.
- The planned diesel fuel storage tanks for CT-4 and CT-5 would be converted to naphtha storage tanks. The converted storage tanks would include floating roofs and be equipped with gimbals for fuel loading, floating pump suction, and floating roof drain. The lined containment area for the tanks will be sized to ensure there is adequate secondary containment in the event of a tank breach.
- Fire protection requirements for Naphtha include an aqueous film-forming foam (AFFF) system for the fuel unloading and storage areas, foam spray systems for the truck unloading area (with automatic foam chambers to dispense AFFF in the tank), and foam monitors around the perimeter of the containment area.
- Naphtha is pumped directly to the combustion turbine fuel injection pumps from the main storage tank, and forwarding pumps will be mounted in a pit to prevent cavitation.
- For fuel control and flow division, naphtha will require new VFD (variable frequency drive) pumps, delivering both naphtha and No. 2 diesel. A three-way valve is required on the pump feed to control the switch over of fuel.
- Fuel injection nozzle materials and design must be modified to account for naphtha's greater potential for erosion. Fuel injection will be accomplished by a new pressure flow division system, which would be used for both naphtha and No. 2 diesel.
- A flash point detection system can be employed to optimize the switchover point to diesel, monitoring and controlling fuel switch-over to diesel at low loads. Heavy gas exhaust fans are required for the

combustion turbine enclosure, and LEL sensors and control system are required for the turbine and generator compartments.

- Additional control modifications will be required in the existing ABB/Bailey distributed control system.

2.9.5.3. Equipment Physical Attributes and Layout

FUEL STORAGE TANKS AND CONTAINMENT. The floating roof storage tanks required for naphtha, will require that the two existing 617,000 gallon No. 2 diesel fuel storage tanks (PLTLF-TK1A and PLTLFTK2A) be expanded to accommodate a volume of 775,000 gallons for naphtha (increasing their heights from 42 feet. to approximately 54 feet), and a new 2,000,000 gallon (42 feet high, 90 feet diameter) tank would also be provided for the naphtha. The volume of the containment area around the storage tanks would need to be increased accordingly.

FUEL UNLOADING FACILITY. The fuel unloading facility size and location would remain essentially unchanged, but would require some enhancements to safely handle naphtha, including grounding system, a breather system, and an AFFF spray system.

FIRE FIGHTING SYSTEM. An AFFF fire fighting system is required for the storage tank areas, consisting of a foam chamber for each storage tank (two required for the future TK1C), foam spray systems in the unloading area, 1,100 gallon horizontal bladder tank (foam storage), and foam monitors around the perimeter of the containment area (supplied with 265 gallon totes of foaming agent which is educated into the monitor when in use).

FUEL FORWARDING PUMPS. Naphtha forwarding pumps would be located in a recessed pit in the containment area.

DIESEL FUEL SYSTEM. The existing diesel unloading and storage facilities would be used for start-up and low power operation of CT-4 and CT-5.

TURBINE SUPPORT EQUIPMENT. New fuel pumps and filters are required for delivery of naphtha to the combustion turbine, with a three-way control valve required for fuel switch over. These would be housed in an enclosed area near the combustion turbine and the enclosure will require a C O_2 fire protection system.

TURBINE ENCLOSURE MODIFICATIONS. Additional LEL and fire detection sensors and control equipment will be housed within the existing turbine enclosure, with heavy gas exhaust fans attached to the enclosure.

2.9.5.4. Waste Product Production and Disposal

Normal operation of the facility should produce no continuous waste streams containing naphtha. As rated by the National Fire Protection Agency (NFPA), naphtha has a more severe hazard classification for health and flammability than diesel fuel and has the same rating for the reactivity hazard classification. Naphtha has a health classification of 1 (Diesel has 0) and is only slightly hazardous to health with only breathing protection is needed. Naphtha has a flammability classification of 4 (Diesel has a 2), which is the most flammable. The preferred method of controlling a fire is to stop the flow of material and to allow the fire to burn itself out. In controlling a naphtha fire, AFFF is preferred to water.

2.9.5.5. Regulatory and Permitting Requirements

For the conversion to naphtha, the following permits will likely require updates or resubmittal.

LAND USE PERMITS. If the property remains in the Conservation District, the conversion to naphtha would not be possible. If the land is reclassified to the Urban District, then a permit would be obtained from the County of Hawaii.

PERMIT MODIFICATIONS. An updated air permit will be required to verify that all requirements of the Clean Air Act (CAA) are satisfied, including National Ambient Air Quality Standards (NAAQS), State Ambient Air Quality Standards (SAAQS), New Source Review/Prevention of Significant Deterioration (NSR/PSD), and Good Engineering Practice (GEP) stack height provisions. Plant sulfur emissions (H_2S, SO_2) will be considerably lower with naphtha, with other emissions such as NO_X, CO, and PM_{10} remaining essentially unchanged from No. 2 diesel (see Appendix N).

EPA RISK MANAGEMENT PLAN: The plan will be revised to address emergency response requirements in the event of a fire or fuel spill and would be revised to reflect changes associated with storing and using naphtha as the primary fuel.

All other permits associated with noise generation, well water supply, waste water reinjection, etc., are unaffected by the conversion to naphtha and would not require modification.

2.9.5.6. Naphtha Supply and Logistics

The availability of naphtha in Hawaii is highly dependent on the type of crude oil processed by the refineries and available supplies will be dependent on the level of demand from other users of naphtha in Hawaii. Currently all naphtha used in Hawaii is produced on Oahu. Naphtha is presently transported in barges from Oahu to Hilo, where an off-loading facility or terminal exists. New terminaling infrastructure would need to be installed to support Keahole's needs and additional storage tanks also need to be installed at the loading terminal on Oahu to accommodate additional volumes.

Estimates for fuel delivery indicate that transportation costs for naphtha are approximately equal to No. 2 diesel on a $/Btu basis and ultimately, the total number of trips required for fuel will remain essentially unchanged with naphtha.

2.9.5.7. Environmental Impacts and Mitigation

Emergency response plans will need to be created in response to all foreseeable conditions where naphtha fuel spills, leaks or burns. The following mitigation features are currently envisioned; 100 percent fuel containment volume provided with foam spray system, fuel unloading area draining to the tank containment area with foam spray system, training and proper permitting of the transportation company, and LEL detection and CO_2 fire protection systems.

2.9.5.8. Engineering, Procurement, and Construction Cost Estimate

The following budgetary price estimate includes budgetary quotes for capital equipment where available and estimates for engineering and construction. The estimated cost reflects 2003/2004 labor and material rates, and labor escalation factors and material cost changes should be considered for implementation of the project at some point in the future.

COST SUMMARY			
	QTY.	UNIT PRICE	TOTAL PRICE
ENGINEERING			$120,000
PROCUREMENT			
700,000 gal Floating Roof Storage Tank	2	$350,000	$700,000

Cost Summary			
	Qty.	Unit Price	Total Price
2,000,000 gal Floating Roof Storage Tank (future) (Note 1)	1	$450,000	$450,000
GE LM2500 MODIFICATIONS INCLUDING: Naphtha pump/filter/fuel injection system; Control System upgrade (Note 2); LEL System; Heavy Exhaust System	2	$1,000,000	$2,000,000
AQUEOUS FILM-FORMING FOAM (AFFF) SYSTEM	1	$100,000	$100,000
CONSTRUCTION AND STARTUP			$1,500,000
		TOTAL	$4,870,000

Notes 1. The original estimate contained $400,000 for a 1,600,000 gallon tank.
2. Includes complete controls upgrade to a Mark VI. Per GE, controls upgrade is $650,000/unit.

2.9.6. Alternatives to the Proposed Action

Conceptual alternatives to urbanizing the property and installing new generation (Preferred Alternative 2) are summarized below.

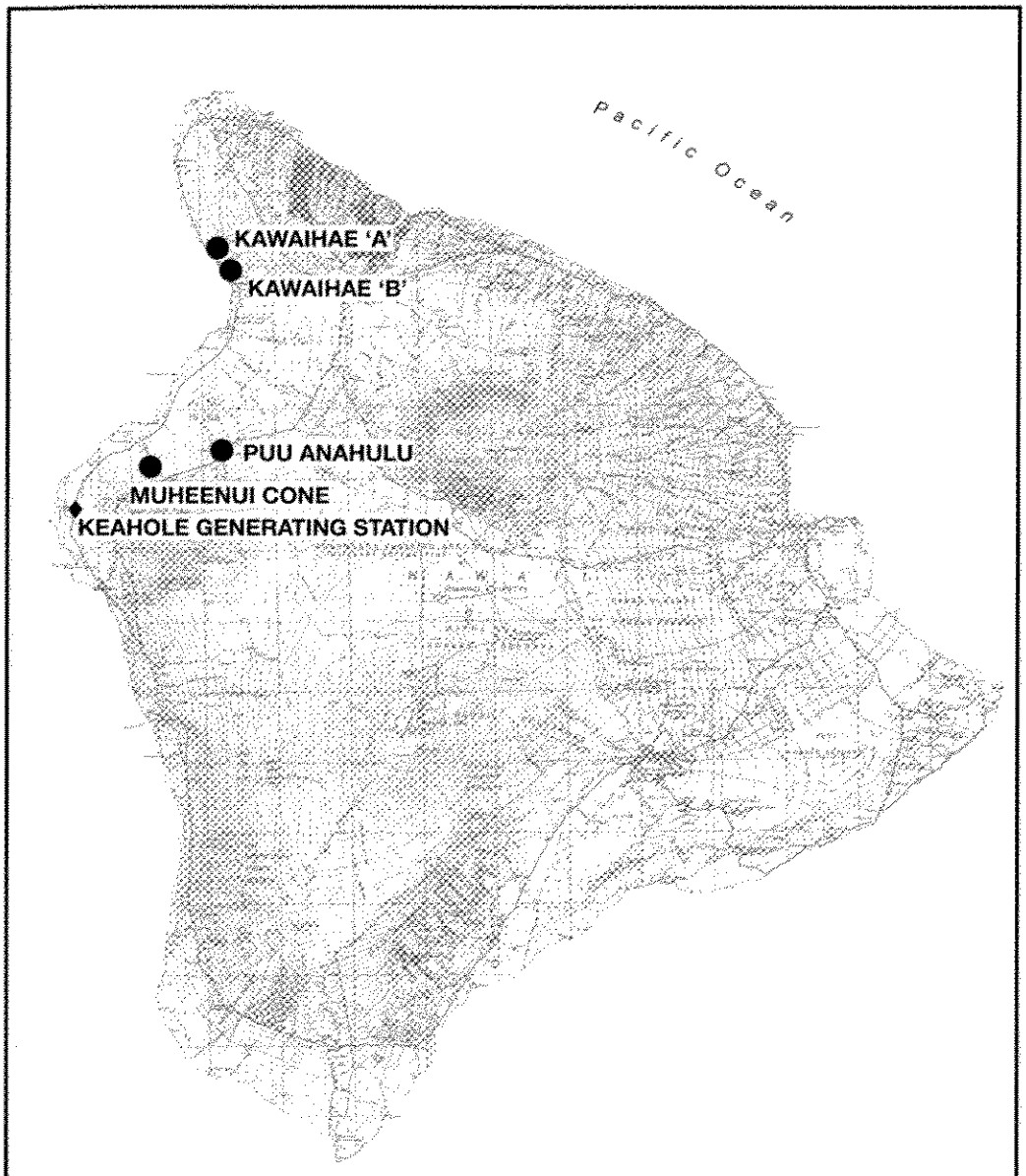
2.9.6.1. Alternative 1 - No Action Alternative

The No Action Alternative assumes that the Keahole facility will remain in the Conservation District and operate at a capacity no greater than 64.6 megawatts. It assumes that ST-7 will not be constructed and that no SCR unit would be added. It assumes that CT-4 and CT-5 will come on line in 2004.

2.9.6.2. Alternative 3 - Simple-Cycle Combustion Turbine in West Hawaii, other than at Subject Property

In this planning scenario, the subject property is not expanded after the installation of CT-4 and CT-5 generating units. Efforts are made to purchase a site with an advantageous location in West Hawaii. A combustion turbine, very similar or identical to CT-4, is installed and operated in simple cycle mode.

A logical place to start in selecting an alternative site was to review past efforts: in this case, the 1988 West Hawaii Site Study prepared by CH2M Hill. The study identified 20 possible locations and concluded with the ranking of 7 potential sites, utilizing twenty-two weighted site evaluation criteria. These criteria included land use, environmental, cost and operational, and site development issues.



Source: CH2MHILL, 1998

Figure 2-4
WEST HAWAII SITE STUDY
Four Alternative Sites
Draft Environmental Impact Statement
KEAHOLE GENERATING STATION URBAN RECLASSIFICATION
Prepared for Hawaii Electric Light Company, Inc.
Prepared by Belt Collins Hawaii • October 2004

The study concluded that of the possible sites identified, two sites at Kawaihae appeared to be the most suitable for a power plant facility, followed by a site which has subsequently been developed as the Puu Anahulu landfill, and a site at the Muheenui Cone. (See Figure 2-4.)

For the purposes of this alternatives analysis, potential sites must be available for purchase and development by HELCO. The Kawaihae sites have been eliminated from further consideration because they are owned all or in part by the Department of Hawaiian Home Lands (DHHL), and therefore, are not available for purchase by HELCO. Waimana Enterprises, a native Hawaiian company, qualifies as a potential lessee for the site identified as Kawaihae B and in the early 1990s proposed the construction of a power plant there. Nothing has come of the proposal and at the time of the preparation of this environmental impact statement, Waimana holds no lease for the property. Should Waimana eventually secure a lease and successfully develop Kawaihae B as a power plant, it is assumed that HELCO would enter into negotiations with Waimana as a potential IPP.

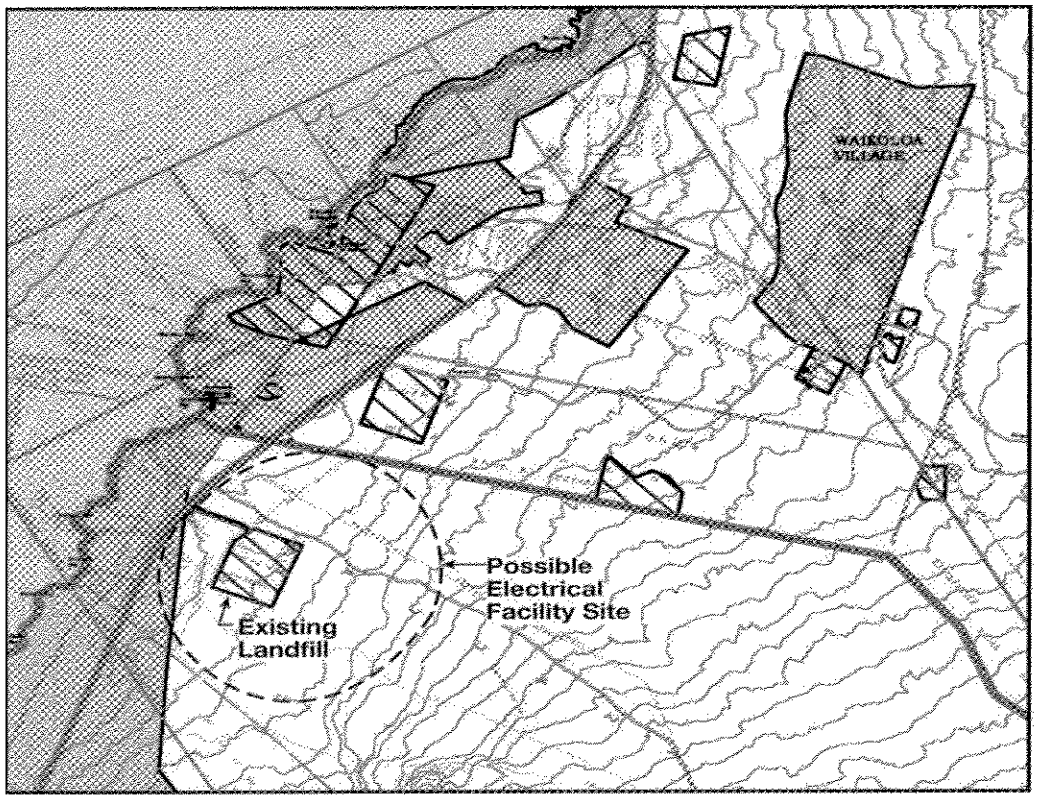


Figure 2-5
PUU ANAHULU SITE

NORTH

0 4000 8000
SCALE IN FEET

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KEAHOLE GENERATING STATION URBAN RECLASSIFICATION
Prepared for Hawaii Electric Light Company, Inc.
Prepared by Belt Collins Hawaii • October 2004

Of the two remaining sites, the Muheenui Cone site was eliminated because it is situated within the State Conservation District. Due to a recent rule change by the Board of Land and Natural Resources, power generating facilities are no longer allowed in the Conservation District. The Muheenui Cone site would have to be reclassified to the Urban District and would likely meet the same opposition as the proposed expansion of the Keahole site did in the early 1990s. In addition, it is immediately inland of the Kukio Resort and would be likely opposed by the resort's owners and residents.

Therefore, the Puu Anahulu site was selected as a viable alternative site for a new West Hawaii power generating facility for the purposes of this alternatives analysis. It is a 30-acre area situated within the State Agricultural District approximately five miles inland from the Queen Kaahumanu Highway. The nearest residential or resort development is several miles away from the site. The property is owned by the State and is available for either purchase or lease by HELCO. A power generating station would require a Special Use Permit to operate in the State Agricultural District or a State Land Use District boundary amendment from Agricultural to Urban, and subsequent industrial zoning. This alternative assumes that new transmission lines will be required to connect a Puu Anahulu power generating plant to the existing West Hawaii transmission system.

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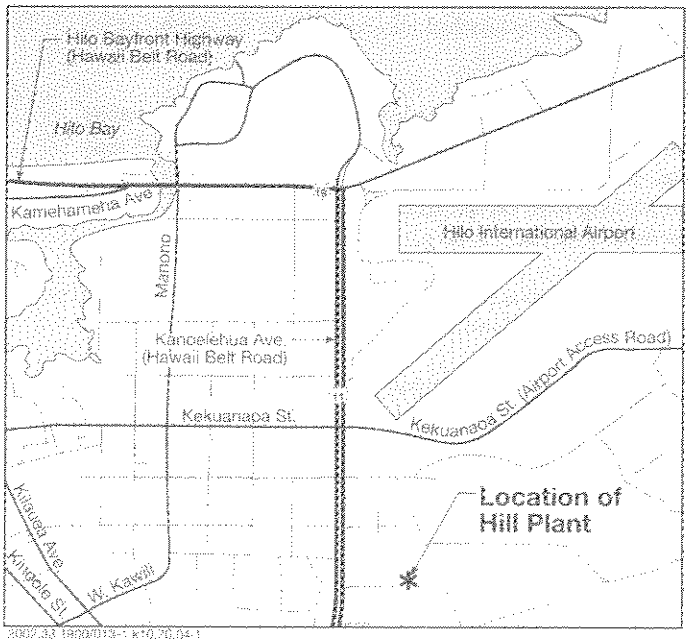


NOT TO SCALE

NORTH

Figure 2-6
LOCATION OF HILL PLANT IN EAST HAWAII

Draft Environmental Impact Statement
KEAHOLE GENERATING STATION URBAN RECLASSIFICATION
Prepared for Hawaii Electric Light Company, Inc.
Prepared by Belt Collins Hawaii • October 2004

2.9.6.3. Alternative 4 - Dual-Train Combined-Cycle Plant in East Hawaii

In this planning scenario, new combustion turbines would be installed near an existing steam unit in Hilo rather than at Keahole. The existing Hill 5 boiler, which currently burns No. 6 medium sulfur fuel oil (MSFO), would be retired or mothballed. Two new HRSGs would be installed. The exhaust heat from the combustion turbines would be directed to the HRSGs to generate steam. The steam would be used to drive the Hill 5 steam turbine. The condensing system would remain the same. This alternative assumes that the additional power produced at Hill 5 would be directed to West Hawaii via new transmission lines crossing the island.

2.9.6.4. Alternative 5 - Utilization of Firm Renewable Resources

In this planning scenario, the subject property is not expanded after the installation of CT-4 and CT-5 generating units. Instead, efforts are made to install a firm generating resource that uses renewable energy. Since many renewable resources are unable to provide firm capacity, a 25 MW biomass plant is assumed to be a reasonable source of firm power derived from a renewable resource.

To date, there are no known commercially dedicated biomass-to-electricity facilities in the United States. All existing biomass-to-electricity plants use waste products (i.e., wood waste, agricultural wastes, etc.) to power their facilities as part of a cogeneration process. In Hawaii, the cultivation of sugar cane provided the waste product known as bagass, which was used as a biomass fuel. However, since the demise of the sugar industry, no replacement has emerged.

Since the production of fuel crops is not HELCO's core business, it would have to depend on a non-utility entity to grow and harvest the fuel. This entity would need to withstand fluctuating yields that may accompany periodic poor weather or disease, so that it can supply firm power to the utility for the duration of a long-term contract. In absence of a long-term commitment, HELCO would not be able to rely on this resource and would be unable to defer or eliminate the installation of other generating units.

Furthermore, if a non-utility entity intends to build the biomass plant, it must secure the site and necessary permits, and obtain financing for its capital investment. These hurdles are not trivial.

Lastly, the location of the combustion facility used to generate the power must be considered. If the former agricultural areas of North Hilo, Hamakua, and North Kohala are assumed to be the most reasonable locations for the cultivation of a potential biomass product, then it would be expected that the combustion facility needed to produce firm energy would be located in reasonable proximity to the fields. It is assumed that new transmission lines would be required to connect the combustion facility to the grid and transmit power to West Hawaii.

Table 2-E summarizes the milestone events associated with each of the five alternatives during the planning horizon. Milestone events are defined as those actions that have been identified at this point in time to ensure that supply is sufficient to accommodate anticipated demand.

TABLE 2-E: ALTERNATIVE PLANS

YEAR	ALTERNATIVE 1 NO ACTION *** ADDITIONS/RETIREMENTS	ALTERNATIVE 2 IRP PREFERRED ADDITIONS/RETIREMENTS	ALTERNATIVE 3 NEW WEST HAWAII SITE ADDITIONS/RETIREMENTS	ALTERNATIVE 4 EAST/WEST HAWAII ADDITIONS/RETIREMENTS	ALTERNATIVE 5 RENEWABLE ADDITIONS/RETIREMENTS
2004	Add CT-4/5, Retire D18, 19, and 20 Terminate HCPC	Add CT-4/5, Retire D18, 19, and 20 Terminate HCPC	Add CT-4/5, Retire D18, 19, and 20 Terminate HCPC	Add CT-4/5, Retire D18, 19, and 20 Terminate HCPC	Add CT-4/5, Retire D18, 19, and 20 Terminate HCPC
2005					
2006					
2007					
2008		↑			
2009		Anticipated completion of ST-7 with SCR **			
2010					
2011					
2012					
2013					
2014	Inadequate Capacity				
2015			Add West Hawaii CT X1	Add Hill 5 Repower 1st CT	Add Biomass #1
2016					
2017		Add West Hawaii CT X1	Add West Hawaii CT X2		
2018				Add Hill 5 Repower 2nd CT Convert to Hill 5 Repower DTCC	Add Biomass #2
2019					
2020		Add West Hawaii CT X2	Convert to West Hawaii DTCC X1X2	Add West Hawaii CT X1	
2021					Add Biomass #3
2022		Convert to West Hawaii DTCC X1X2	Add West Hawaii CT X3		
2023				Add West Hawaii CT X2	
2024		Add West Hawaii CT X3	Add West Hawaii CT X4		Add Biomass #4
2025				Add West Hawaii CT X3	

Notes:

* CT = combustion turbine; D = diesel; DTCC = dual-train combined cycle; HCPC = Hilo Coast Power Company (formerly Hilo Coast Processing Company); IRP = Integrated Resource Planning; ST-7 = steam turbine; SCR = selective catalyst reduction; X = future turbine (e.g. CT6, etc.)

** Should the permitting process allow for earlier installation of ST-7 with SCR, then the installation would be in place sooner than 2009.

*** Under the No Action Alternative, the turbines would be brought on line, but no further development occurs at Keahole. Under the Preferred Alternative, new development occurs at Keahole as soon as practicable. The remaining alternatives have been generated using a model that identifies when new capacity would be needed in order to deliver power reliably in response to demand. (The No Action Alternative does not show new capacity; the power in the grid is expected to be well below the level demanded by users.)

2.10. NECESSARY APPROVALS AND PERMITS

As stated in Chapter One, HELCO is in the process of or has obtained the following permits and/or approvals:

- Federal Environmental Protection Agency - Prevention of Significant Deterioration air permit, covered source permits

  Status: To be submitted in the first quarter of 2005.

- State Land Use Commission - Reclassification from the Conservation District to the Urban District

  Status: Petition filed with State Land Use Commission on November 25, 2003.

- State Department of Health - Air permit approvals, covered source permit, Underground Injection Control permit, community noise permit renewal, NPDES permit, and HVAC permit.

  Status: Air permit and covered source permit to be submitted in the first quarter of 2005. The existing UIC permit was renewed on January 15, 2004. Further modification of the UIC permit will be required to address the discharge of onsite generated and treated wastewater related to ST-7 operations, as necessary. The National Pollution Discharge Elimination System (NPDES) permit application will be submitted when construction on ST-7 begins (2009 or earlier). The application for the heating, ventilation and air conditioning (HVAC) permit will be submitted in 2007 or 2008, depending upon other permit approvals.

- State Water Commission - Pump Installation Permit

  Status: This permit has been granted.

- State Board of Land and Natural Resources - Revocable Water Permit and Water Lease

  Status: This permit and lease has been granted.

- Hawaii County Planning Commission/Council/Mayor - Rezoning from Open to Industrial

  Status: Rezoning cannot be considered by Hawaii County until the subject property is classified in the Urban District. The County has no jurisdiction over the Conservation District. If the Petition for reclassification to the Urban District is approved by the State Land Use Commission, the application for rezoning is anticipated for submission to the County in the first half of 2006.

- Hawaii County Department of Public Works - Building Permits

  Status: A building permit application for CT-2 Noise Modification will be submitted in the first quarter of 2005. The application for a building permit for ST-7 will be submitted in 2009 or earlier, subject to other permits being granted.

- Hawaii County Department of Water Supply - Water meter and back-flow preventor plan approval

  Status: If HELCO's potable water allocation is transferred to the Department of Hawaiian Homelands (which is subject to Legislative review), the DWS approval is not needed.

- Public Utilities Commission (PUC) approval of CT-2 Noise Modification

  Status: The application has been submitted and a waiver has been obtained to proceed with the bid and planning process. The project is scheduled for completion June 30, 2005, subject to building permit approval.

CHAPTER THREE: ENVIRONMENTAL SETTING

3.1. INTRODUCTION

The Hawaiian Islands are located just below the Tropic of Cancer in the middle of the Pacific Ocean. Many people consider Hawaii's tropical climate to be the world's ideal. The northeast trade winds prevail for most of the year to make what some would consider humid temperatures very comfortable. The environment and natural beauty of the islands have created a lucrative tourism industry that contributes heavily into State of Hawaii's (State) economy. The State also draws a large amount of federal dollars because of its strategic location, which is important to the global defense system of the United States. Activities of national and international importance include research and development in oceanography, geophysics, astronomy, satellite communications, and biomedicine.

While Hawaii's unique location has many advantages, its isolation also serves as an economic disadvantage, due in large part to Hawaii's dependence on imports. Transportation and shipping costs are included in the prices of nearly all consumer goods and services, and contribute, among other factors, to the high cost of living in Hawaii.

Hawaii's insularity serves as somewhat of a disadvantage for electrical utility providers and the public they serve. Unlike mainland electrical utility companies that can interconnect between states to save on costs, each of the islands must have its own grids to maintain and operate. Additionally, fuel needs to be transported across the Pacific, which further adds to the cost of electricity. As a result, consumers in Hawaii pay higher prices for power, which in turn affects the cost of all goods and services in Hawaii. However, because Hawaii's utilities must be more self-reliant, they are ranked among the most reliable in the nation. Mainland utilities have lower reserve margins because they can rely on imported power via interconnections to other utilities. Hawaii utilities must (1) have enough generators to produce power during "peak" times; (2) install more reserve generation to account for generating units taken down for regular maintenance; and (3) cover the potential unplanned loss of the largest generating unit.

Hawaii Electric Light Company, Inc. (HELCO) provides electrical power for the largest island in the island chain. All other islands combined in terms of area can fit into the island of Hawaii (Big Island). According to the 2000 U.S. Census, the Big Island has 148,700 people occupying a land area of 4,028 square miles (approximately 37 persons per square mile) compared to Oahu's 881,000 people that occupy a land area of 600 square miles (approximately 1,468 persons per square mile). This means that fewer people carry the costs for the electrical infrastructure and service on the Big Island, which results in a resident typically paying almost double per kilowatt-hour (kWh) than a person living on Oahu.

Operating an island-wide grid over a large, relatively sparsely populated area has had its challenges. By seeking a reclassification of its lands and improving the generating station, HELCO would like to ensure that its capacity and reserve margins are adequate to fulfill the growing needs of the Big Island. As a publicly regulated utility, HELCO's primary goal is to provide reliable power to Big Island consumers at a reasonable cost.

FIGURE 3-1: ALL OTHER ISLANDS CAN FIT INTO THE BIG ISLAND.

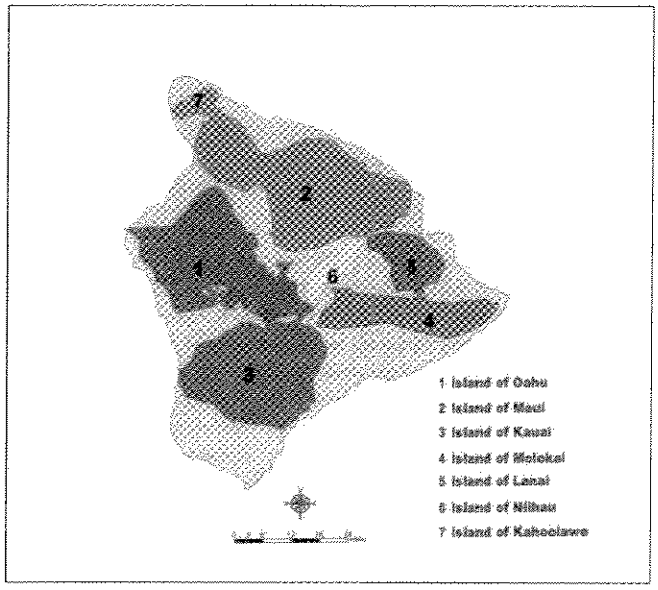
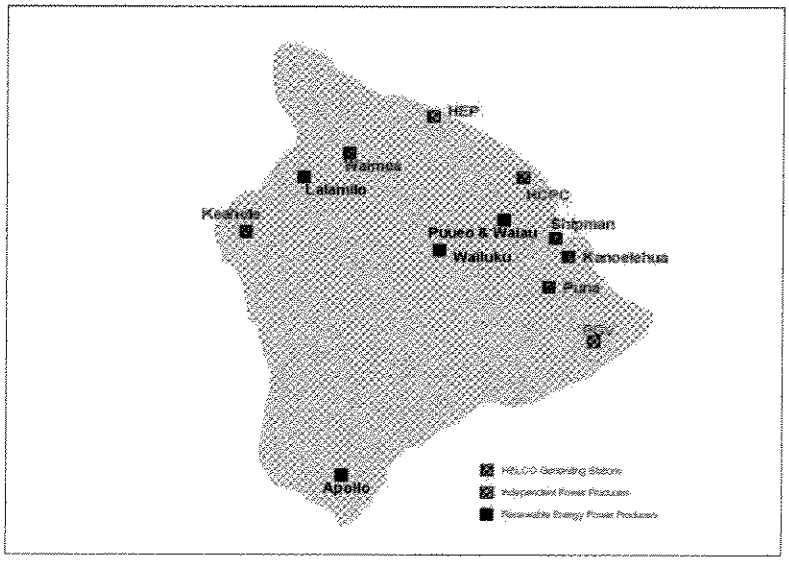


FIGURE 3-2: POWER PLANT LOCATIONS ON THE BIG ISLAND



As part of a publicly traded company with 20,000 Hawaii residents as shareholders, the company is also obligated to its shareholders to make wise decisions that maximize efficiency and increase profits. The company remains one of the few locally owned and operated major companies in the State. It must proceed with caution as unstable world events, national policies, rising oil prices, changes in technology, and other challenges could alter future plans. While sales have increased over the previous year due to economic growth on the Big Island, conditions may be subject to change. HELCO sales rounded to nearest gigawatt hours (GWh) was as follows:

TABLE 3-A: HELCO SALES IN GWH

YEAR	GWH
2001	963
2002	993
2003	1,046
1/1/2003 thru 6/30/2003	505
1/1/2004 thru 6/30/2004	526

The exemplar economic activity that exists on the Big Island today stands as a stark contrast to the economic conditions that existed just a couple of years ago following the events of September 11 and the adverse affects of the Iraq war on tourism and the Hawaii economy.

To meet HELCO's near-term future energy needs, a portfolio of resources will be required. Demand-side resources allow both commercial and residential customers to reduce electrical usage, and help to defer the need for additional generation. Increased renewable energy generation from as-available resources will reduce the consumption of fossil fuels. HELCO and non-utility central station resources will continue to provide firm power in order to meet the growing demand for electricity. Lastly, it is also estimated that customer-sited combined heat and power (CHP) units will begin to play a larger role in Hawaii's energy future.

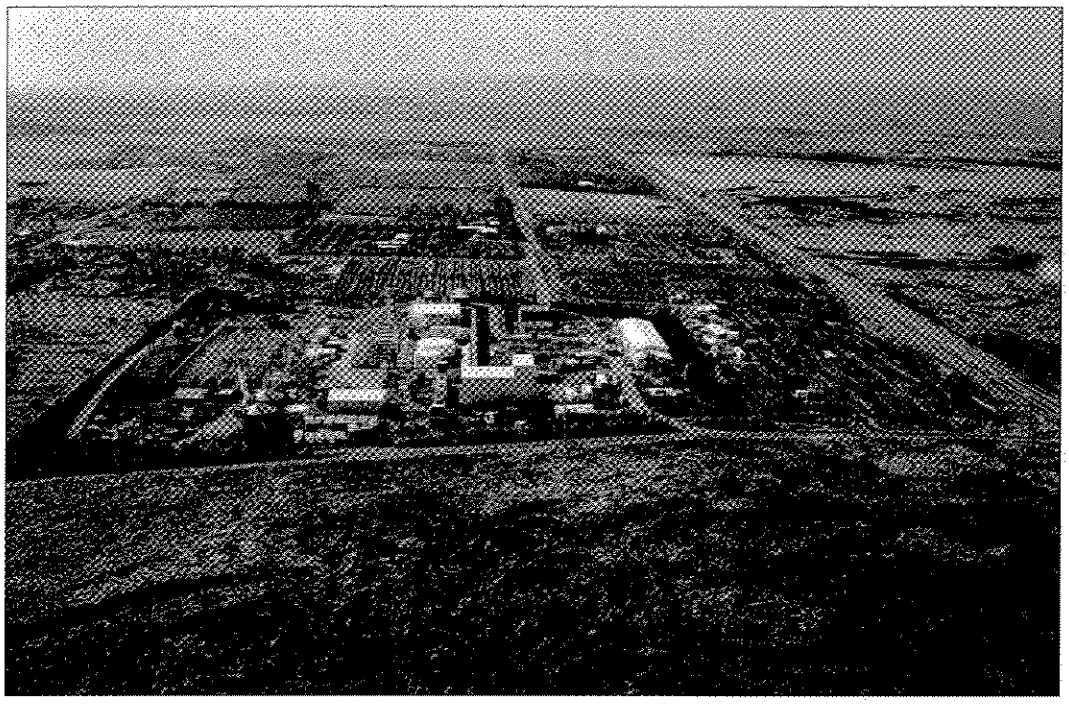
3.2. PHYSICAL SETTING

3.2.1. EXISTING CONDITIONS

HELCO in 1973 constructed the Keahole Generating Station and Airport Substation (collectively "subject property") in the West Hawaii region to solidify the generation of electrical power on the Big Island, and in particular, to accommodate growth in the region. The facilities were built on Conservation District land under permits granted by the Board of Land and Natural Resources (BLNR) of the State Department of Land and Natural Resources (DLNR). As is evident from the Site Plan (Chapter Two, Figure 2.3), the entire project site consists of improved land that has been extensively modified to accommodate the various components of the subject property. Its physical appearance is that of an industrial facility.

The subject property consists of two adjoining tax map key parcels (3-7-3-049:036 and 3-7-3-049:037), all situated in Keahole, North Kona, on the west side of the Big Island. The total area of the subject property is 15.643 acres. It is situated approximately one mile east of Kona International Airport at Keahole and approximately 750 feet east (upslope) of Queen Kaahumanu Highway. The terrain is relatively flat and consists of lava flows, grasses, and low brush. Access to the generating station from Queen Kaahumanu Highway is from a 16-foot-wide, paved roadway. The subject property is surrounded

PHOTOGRAPH 3-1: VIEW OF KEAHOLE GENERATING STATION LOOKING SOUTH. THE SECONDARY ACCESS OFF THE RESERVOIR ROAD IS IN THE FOREGROUND.



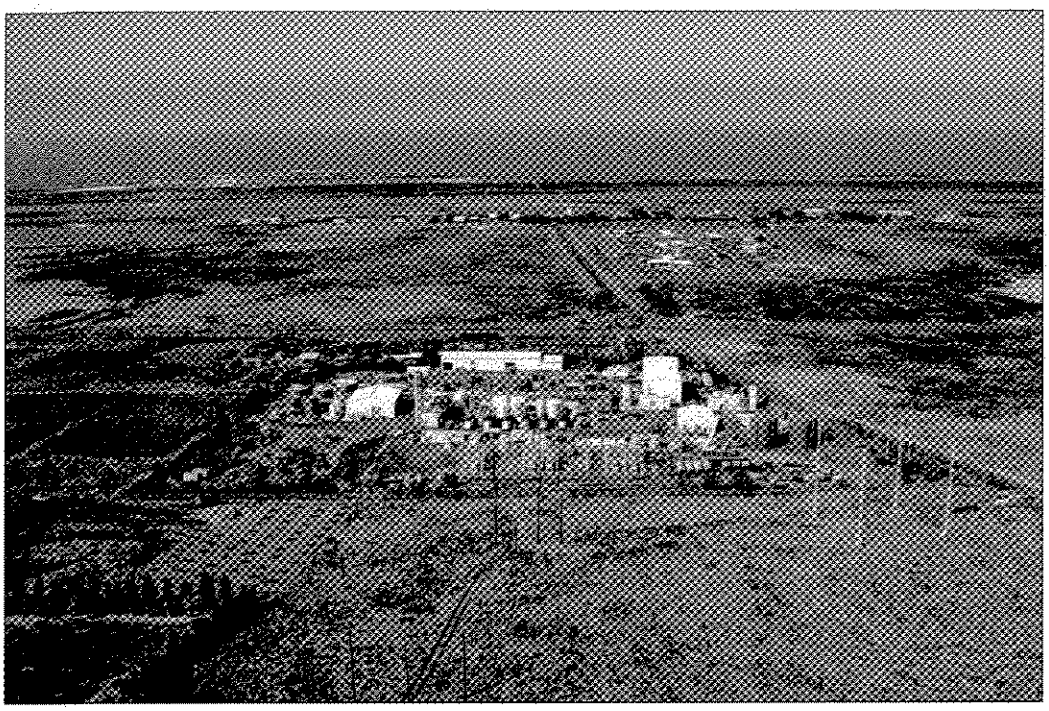
by vacant areas of open lava flows to the north and east, the Keahole Agricultural Park to the south and southeast, and a residential subdivision, Kona Palisades, beginning approximately 3,500 feet to the southeast. Four 90-foot towers owned by the Big Island Broadcasting Co. are located on a 4-acre parcel on the subject property's eastern boundary. The adjacent property to the north is owned by the Department of Hawaiian Home Lands (DHHL), and is planned for residential and commercial development. The Natural Energy Laboratory of Hawaii Authority (NELHA) is located on 870 acres of State-owned land just west of the airport.

3.2.2. POTENTIAL IMPACTS AND MITIGATION

Reclassification of the land to the Urban District and its eventual rezoning to an industrial designation would have a minimal impact on the surrounding area. The land has been used for industrial purposes for over 30 years and surrounding uses (i.e. airport, broadcast towers, agricultural concerns) support the industrial district ("MG") classification of the County of Hawaii Zoning Code.

Though the reclassification would have a minimal impact on the surrounding area, improvements and expansion of the existing facilities would in fact impact the neighboring community. These impacts and how they would positively or negatively affect the entire community are being thoroughly assessed in this Environmental Impact Statement (EIS). There is general consensus that the Big Island's electrical infrastructure must be improved and expanded to accommodate growth and ensure reliability. However, concerns have emerged within the immediate neighboring community over visual impacts, noise, air quality, the potential strain on natural resources, and the increased use of renewable energy sources.

PHOTOGRAPH 3-2: VIEW OF KEAHOLE GENERATING STATION LOOKING WEST TOWARD THE AIRPORT.



demand-side management (DSM), and energy efficient programs. All of these issues in addition to other factors are discussed in the following sections, along with any mitigation measures HELCO plans to institute.

3.2.3. THE IMPACTS OF THE ALTERNATIVES ON THE ENVIRONMENT

As discussed in Chapter Two, there are five alternatives that HELCO could take to accommodate present and projected future demand for electrical power on the Big Island. Each of these alternatives would impact the environment in differing ways and are discussed in subsequent sections.

For all alternatives, HELCO would continue to depend on a portfolio of power sources, including distributed generation, geothermal, wind, and run-of-river hydroelectric power to power its grid. The alternatives show proposed firm energy sources only. Alternative 5 incorporates biomass-produced power, a firm source of renewable power, which in the past, HELCO purchased from local sugar mills until the industry's subsequent demise in Hawaii. HELCO's use of renewable energy sources, which is ranked among the highest in the nation, would be maintained or increased, subject however, to cost issues, proximity to grid, and other factors.

For the West Hawaii Alternative (Alternative 3), the proposed landfill site below Puu Anahulu (Puu Anahulu site), which was part the 1988 *West Hawaii Site Study* conducted by CH2M Hill, is being used for comparison purposes and to appropriately assess the impacts of a generating station on an alternative site in West Hawaii.

For the East Hawaii Alternative (Alternative 4), the Hill Plant located in Hilo has been examined as a possible site. HELCO's Hill Plant is located in Hilo, on Halekauila Street between Kanoelehua Avenue and Railroad Avenue. It is a few blocks south of the Hilo Airport. The site covers approximately 14.5 acres. HELCO has a generating plant and ancillary facilities (fuel storage, wells), a substation, the operating station for the island grid, offices for transmission and maintenance staff, and parking and equipment storage space on-site. Adjoining properties are industrial.

3.3. GEOLOGY AND TOPOGRAPHY

3.3.1. EXISTING CONDITIONS

The Keahole Generating Station is located downslope from Hualalai's Northwest Rift Zone. The surface lavas along the rift zone are almost all less than 10,000 years old and most are less than 3,100 years old. (See geological report prepared by John P. Lockwood, Ph.D. of Geohazards Consultants International, Inc., and Michael O. Garcia, Ph.D., a professor of Geology at the University of Hawaii at Manoa, in Volume 2 of the EIS, identified as Appendix D.) All of the flows on the northwest flanks of the volcano, including those in the area, originated from the Northwest Rift Zone. These flows range widely in texture, from fluid, smooth pahoehoe to pasty, rough a`a.[1].

The subject property is relatively flat and slopes gently downward from the mountains east of the station to the Pacific Ocean. It is underlain by a single lava flow, which forms Keahole Point and underlies much of the Kona International Airport at Keahole to the west. Charcoal recovered beneath this flow gave a radiocarbon age of 2,140 plus or minus 100 years. This flow apparently erupted from four or more vents along Hualalai's Northwest Rift Zone at elevations of 2,000 to 4,200 feet above mean sea level (msl). The portion of the flow under the subject property consists of dense pahoehoe at the surface with irregular subsurface a`a lenses exposed in excavations on the subject property.

Lava flows are generally well suited to development that is appropriately designed and constructed. No indications of tectonic ground cracking or other secondary deformation structures were observed in the vicinity of the subject property.

3.3.2. POTENTIAL IMPACTS AND MITIGATION

Reclassification of the land to the Urban District and its eventual rezoning to an industrial designation would have no impact upon the topography or geology of the site. The reclassification and rezoning are policy actions that for all intents and purposes represent after-the-fact approvals of an existing facility. The installation of the ST-7 and the SCR system would not require ground disturbance, as it would result in the addition of new equipment atop an existing asphalt pad. As stated in Chapter Two, the installation of ST-7 at Keahole would allow for the utilization of waste heat from the existing CT-4 and CT-5, which would make the completed Keahole DTCC unit more fuel-efficient. SCR would further reduce emissions. In the State, DTCC units have been installed on Oahu (Kalaeloa), Maui (Maalaea), and Hawaii (Hamakua Energy Partners). Both utilities and independent power providers alike have recognized the benefits offered by DTCC units.

[1] Pahoehoe is a smooth, unbroken type of lava and a`a is a stony rough lava.

3.3.3. THE IMPACTS OF THE ALTERNATIVES ON GEOLOGY AND TOPOGRAPHY

ALTERNATIVES	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
1. No Action	✓			No impacts are anticipated under the No Action Alternative. The generating station would run in simple-cycle mode without ST-7 and SCR and the land would remain in the Conservation District. No mitigation measures in terms of geology or topography are warranted.
2. Proposed Action	✓			ST-7 and SCR would not require ground disturbance and would result in the installation of new equipment atop an existing asphalt pad. The generating station would be improved with the installation of ST-7, which would allow for the utilization of waste heat from the existing CT-4 and CT-5. The Keahole DTCC unit would be more fuel-efficient and SCR would further reduce emissions. No mitigation measures in terms of geology or topography are warranted..
3. West Hawaii		✓		The Puu Anahulu site contains varying topography and is within a potential geologic risk area and fault zone. The site consists of exposed a'a lava flows, which would likely require removal of these flows by site excavations. It is anticipated that layers of varying thickness of pahoehoe and a'a lava occur at the site. Lava tubes also appear to exist and would need to be filled to avoid collapse of these tubes prior to construction of critical facilities such as a generating station and fuel tanks. Earthwork would consist of excavating and reworking equal portions of both a'a and pahoehoe lava flows. The topography is relatively flat, although Puu Anahulu rises steeply mauka of the site. The nearby Puu Anahulu presents concerns about downwash and/or higher than usual impact levels in complex topography around the site. The facilities would need to be built far enough away from the base of the 600-foot-high ridge to avoid ridge downwash influences on the plant stacks. The slopes at the site appear to be less than 5 percent.
4. East/West Hawaii		✓		The construction of new turbines at the Hill Plant location would not impact the geology and topography of the site, primarily because generating stations are already operational at this location. However, geological conditions and topography would be key factors in the construction of transmission lines over varying terrains, which would be necessary to transport power over to West Hawaii
5. Renewable	✓			In terms of geology and topography, the land for this alternative must be conducive to growing crops for biomass power. HELCO's current planning assumptions are based on banagrass as the most-likely biomass feedstock. Land requirements would need to be project specific and highly depended on the yield of the acreage and the operational requirements of the generating unit. The projected land requirements would be 250-330 acres/MW. If the assumed biomass plant on the HELCO system is a nominal 25 MW, then the land requirements would be 6,250-8,250 acres of banagrass. Assuming that this cultivation would occur on former sugar lands, no impacts to geology or topography are anticipated.

3.4. SOIL AND AGRICULTURAL POTENTIAL

3.4.1. EXISTING CONDITIONS

The terrain in the project area is gently undulating, and consists of soils associated with lava flows, which include excessively drained, nearly barren lava flows and somewhat excessively drained and well-drained, coarse-textured and medium-textured soils that formed in volcanic ash, pumice, and cinders. (See Paul H. Rosendahl, Ph.D.'s report in Volume 2 of the EIS, identified as Appendix K.)

There are two types of soils in the project area: Kaimu extremely stony peat and Punaluu extremely stony peat. Kaimu extremely stony peat is used for pasture, macadamia nut, papaya, and citrus. The Punaluu series is generally used for pasture. Both are well-drained, thin organic soils that have developed over

lava bedrock, that are found on uplands from sea level to 1,000 feet, and are rapidly permeable, with slow runoff and slight erosion hazard.

The 179-acre Keahole Agriculture Park borders the subject property to the south and southeast. The park is a State-owned and leased subdivision of approximately 5-acre lots used for diversified agriculture. Crops grown in the agricultural park include flowers, plants, and local fruits.

3.4.2. POTENTIAL IMPACTS AND MITIGATIONS

While the subject property of approximately 15.643 acres potentially could have been used for agriculture, the need for adequate electrical infrastructure to power the region outweighs the need for agricultural use of the land. Approximately 1.2 million acres or 46 percent of the total land area in the County of Hawaii are in the State Land Use Agricultural District. Approximately 720,099 acres are in West Hawaii. This includes potentially high or high capacity agricultural lands as well as potentially low capacity lands. A sizeable percentage of the land is not currently being used for agriculture.[2]

The generating plant has existed within the community on the subject property for over 30 years. Reclassification of the land to the Urban District and its eventual rezoning to an industrial classification would have minimal impact upon the soil or potential for agriculture on the subject property.

3.4.3. THE IMPACTS OF THE ALTERNATIVES ON SOIL AND POTENTIAL FOR AGRICULTURE

ALTERNATIVES	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
1. No Action	✓			No substantial impacts on soil and potential for agriculture are anticipated under this alternative. The generating station has been operational for over 30 years.
2. Proposed Action	✓			No mitigation measures in terms of soil and potential for agriculture are warranted. No soil would be lost with the installation of ST-7 with SCR.
3. West Hawaii	✓			The Puu Anahulu site is on property owned by the State and lies within the Agriculture District. The County General Plan designates it for agricultural use, and the zoning is open/unplanned. All surrounding lands within approximately 10,000 feet of the site are also in the agricultural zone. A special use permit would be needed and the County zoning amended to allow industrial development. Given permitting requirements, development of this site would preclude agricultural use of the property. However, due to the fact that the property is predominately lava, its practical use for agriculture is questionable. Therefore, its redevelopment would likely have a negligible impact on agricultural activities.
4. East/West Hawaii		✓		The construction of new turbines at the Hill Plant location would not impact the soil and the potential for agriculture at the site, primarily because a generating station and ancillary facilities are already operational at these locations. Increasing capacity on the east side of the island and transporting power to the west side would require additional transmission capacity. Additional transmission equipment may have an affect on soil and the potential for agriculture as transmission equipment are constructed across the island. This issue would need to be addressed if the East/West Hawaii Alternative is selected.

[2] County of Hawaii Proposed General Plan, 2001. The revised 2001 General Plan was used instead of the existing plan because the County conducts five- and ten-year comprehensive reviews and updates of the General Plan to maintain dynamism and flexibility. The revised plan contains major changes and trends that have occurred and updated statistics.

Alternatives	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
5. Renewable		✓		The renewable or biomass alternative would require agricultural lands to grow and harvest fuel crops, possibly banagrass. Land requirements would need to be project specific and highly depended on the yield of the acreage and the operational requirements of the generating unit. The projected land requirements would be 250-330 acres/MW. If the assumed biomass plant on the HELCO system is a nominal 25 MW, then the land requirements would be 6,250-8,250 acres of banagrass. With increased generating capacity, the land requirements would increase accordingly. Over the long term, plant cultivation impacts soil by depleting its nutrients, thereby requiring periodic application of fertilizers. To date, there are no known commercially dedicated biomass-to-electricity facilities in the United States. All existing biomass-to-electricity plants use waste products to power their facilities as part of a cogeneration process. HELCO would need to depend on a non-utility entity to grow and harvest the fuel crop for this alterative. The grower would need to be able to withstand potentially low yield, caused by poor weather or disease, and ensure the supply of consistent firm power.

3.5. NATURAL HAZARDS

3.5.1. Tsunami Inundation – Existing Conditions

The largest and most destructive tsunami waves in reported history struck the Big Island early in the morning of April 1, 1946. The tsunami was generated by an earthquake in the Aleutian Islands off of Alaska that occurred five hours earlier with a reported magnitude of 7.1. Maximum runups were reported to be 54 feet in Molokai, and 55 feet in Pololu Valley on the Big Island. Waves in some areas penetrated more than half a mile inland. Between wave crests, the drawdown was reported to have exposed some areas of the seafloor 500 feet in the seaward direction. A total of 159 tsunami-related fatalities resulted from this destructive event. During the past century, 13 significant tsunamis impacting Hawaii were generated by earthquakes occurring along the geologically active margins of the Pacific basin. The last Pacific-wide tsunami occurred in 1964.

The University of Hawaii has developed a methodology for determining the maximum expectable inundation of our shores for worst-case tsunamis, drawing on the records compiled by the Joint Institute for Marine and Atmospheric Research. Historical data are mathematically analyzed to predict maximum wave heights along the coast. These heights are then used in numerical models involving the topography (land contours) to map the inundation in each location. In coordination with the Civil Defense officers on each island, a final map is prepared showing the actual evacuation zones.

3.5.2. Potential Impacts and Mitigations

The subject property is located approximately three-and-a-half miles from the shoreline and out of the evacuation zone. As such, probable impacts from a tsunami are highly unlikely. No mitigation measures are warranted.

3.5.3. The Impacts of Tsunami Inundation on the Alternatives

Alternatives	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
1. No Action	✓			The subject property is located out of the tsunami evacuation zone and the risks are very minimal. No mitigation measures to guard against tsunami inundation are warranted.

ALTERNATIVES	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
2. Proposed Action	✓			Tsunami inundation would not pose a threat to the improvements and expansion of the generation station, which would bring added capacity and reserve margins to the region. No mitigation measures are warranted.
3. West Hawaii	✓			The Puu Anahulu site is located out of the tsunami evacuation zone and the risks of tsunami inundation appear minimal. New studies, permits, and further research would be required prior to the construction of a facility at a new site, which would involve substantial time and costs.
4. East/West Hawaii	✓			The Hill Station site is outside of the tsunami evacuation zone identified by Hawaii County Civil Defense.
5. Renewable		✓		If the biomass plant and/or site for growing fuel crops are located in the evacuation zone, the impacts of a tsunami relate mainly to the potential damage on the power plant or cultivated field. The risks would need to be assessed once a location is identified.

3.5.4. FLOOD INUNDATION – EXISTING CONDITIONS

The subject property is located on the axis of a high-standing mound of pahoehoe and does not lie in any observed potential flood channel. The rocks underlying the subject property consist entirely of pahoehoe and consolidated a'a. The lava flows underlying the site are highly permeable, and surface water would quickly percolate downward. Narrow lenticular[3] voids up to several feet across were observed in the pahoehoe lavas in the walls on the eastern margin of the subject property, and similar cavities were also reported in the subsurface investigation of the subject property, based on numerous drill holes at the site. Lava flows are generally well suited to support properly designed construction. No indications of tectonic ground cracking or other secondary deformation structures were observed in the vicinity of the subject property. (See report by Drs. Garcia and Lockwood in Volume 2 of the EIS, identified as Appendix D.)

3.5.5. POTENTIAL IMPACTS AND MITIGATIONS

Flooding is not expected to be a hazard at the subject property, except at times of extremely heavy rainfall when local accumulations of rainwater may briefly appear at the site. No mitigation measures are warranted.

3.5.6. THE IMPACTS OF FLOODING ON THE ALTERNATIVES

ALTERNATIVES	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
1. No Action	✓			Because the subject property is located on the axis of a high-standing mound of pahoehoe and does not lie in any observed potential flood channel, the risk of flooding is minimal. Furthermore, lava flows underlying the site are highly permeable and surface water will quickly percolate downward. No mitigation measures to guard against flooding are warranted.
2. Proposed Action	✓			The subject property is at minimal risk for flooding and is large enough to accommodate the improvements and expansion of the Keahole Generating Station. The subject property is not located in a flood zone.
3. West Hawaii	✓			There are no known flood hazards in the Puu Anahulu area. The site is not mapped by the Federal Emergency Management Administration (FEMA) as within a 100 or 500-year flood plain Drainage of the site should not be a significant problem though onsite drainage must be properly designed to control erosion and runoff.

[3] Having the shape of a bi-convex lens; of or relating to a lens. A crack that's narrow in the middle and wide at each end.

Alternatives	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
4. East/West Hawaii	✓			Flooding would not be a concern in the construction of new turbines at the Hill Plant, primarily because generating stations are already operational. However, flooding could be a factor in the construction of transmission lines over varying terrains, which would be necessary to transport power over to West Hawaii
5. Renewable		✓		Flood impacts for this alternative cannot be known until the details of a biomass plant and/or location to grow fuel crops are determined. However, flooding of cultivated land could increase soil runoff if it occurs at a time when soils are exposed during the early portion of a cultivation cycle.

3.5.7. Earthquakes – Existing Conditions

The Big Island is one of the most seismically active areas on Earth, with more destructive earthquakes than in any other comparably sized area in the United States. According to Drs. Lockwood and Garcia, although the most severe historical earthquakes have occurred on the southern flank of Hawaii, the Kona area is subject to earthquakes with intensities up to VIII on the Modified Mercalli Scale.

3.5.8. Potential Impacts and Mitigations

Intensities of VIII on the Modified Mercalli Scale can cause moderate to severe damage to unreinforced structures or to buildings with inadequate foundations. Significant vertical ground accelerations are possible in this area, and must be considered in designing buildings.

The International Conference of Building Officials (ICBO), as expressed in their Uniform Building Code (UBC), has recommended that the entire island of Hawaii meet the UBC standards for Seismic Zone 4 (ICBO Code Committee, 1996). HELCO has constructed the station and substation in accordance with the UBC and County of Hawaii requirements.

3.5.9. The Impacts of Earthquakes on the Alternatives

Alternatives	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
1. No Action	✓			The facilities and additions were constructed in accordance with the UBC and built to mitigate the impacts of an earthquake..
2. Proposed Action	✓			The existing facilities as well as any improvements to the facilities comply with design codes and regulatory standards.
3. West Hawaii		✓		This site contains varying topography and is within a potential geologic risk area and fault zone. Consideration of this risk would be a factor in the construction of new facilities.
4. East/West Hawaii		✓		The East/West Hawaii Alternative would entail additional transmission across the island. Transmission lines have been known to be susceptible to damage in the event of a severe earthquake.
5. Renewable	✓			The impacts of earthquakes on a biomass plant and/or site for growing fuel crops would need to be investigated once a site is located. It is assumed that a biomass plant would be constructed to the approved standard.

3.5.10. Volcanic Hazards – Existing Conditions

The subject property is located entirely on the flanks of Hualalai Volcano, the least active of Big Island's three active volcanoes. This volcano is representative of the post-shield stage of Hawaiian volcanism, which is characterized by a marked decrease in the eruption rate as the volcano drifts off the Hawaiian

hotspot. The estimated lava production rate for Hualalai over the last 3,000 years is about 2 percent of the current rate of Kilauea volcano.

3.5.10.1. Lava Flows

To evaluate the statistical likelihood of a future eruption threatening the Keahole Generating Station, past eruption records were reviewed to understand how often lava flows have impacted this area. The lava flow underlying the subject property is more than 2,000 years old. Flows that occurred in 1801 are situated about a mile to the northwest. Thus, for a statistical evaluation of risk, a broader area than the subject property was selected for evaluation, using a 25-square-mile area centered on the subject property.

Six lava flows entered the subject property study area during the past 4,700 years, including five radiocarbon-dated lava flows and one, (Kona Palisades) whose age is inferred from paleomagnetic[4] and field data. These flows are randomly distributed in time, show no periodicity or other time-dependent trends, and by various statistical tests can be shown to follow a Poisson (random) time distribution. Small outcrops of as many as six undated older flows (>5,000 years) are also exposed in the area (Moore and Clague, 1991), but these cannot be used for statistical analyses, as they are undated.

The portion of the flow under the subject property consists of dense pahoehoe at the surface with irregular subsurface a`a lenses exposed in excavations on the subject property. To the north, the Keahole Point flow consists of rubbly a`a lava with common rocks within rocks. The flow is bordered by older lava flows to the north and south. To the west, it is overlain by the 1801 "Huehue Flow".

TABLE 3-B: AGES OF DATED LAVA FLOWS WITHIN THE KEAHOLE GENERATING STATION STUDY AREA.

INFORMAL LAVA FLOW NAME	AGE (RADIOCARBON YEARS B.P.)	REFERENCE
Huehue	AD 1801	Kauahikaua and Camera (2000)
Kona Palisades	1,750 yrs. b.p. (est.)	Garcia and Lockwood (2004)
Keahole Point	2,140 +/- 100 yrs. b.p.	Moore and Clague (1991)
Kaloko	2,410 +/- 40 yrs. b.p.	Garcia and Lockwood (2004)
Kohanaiki	3,020 +/- 150 yrs. b.p.	Moore and Clague (1991)
Unnamed old flow	4,700 +/- 350 yrs. b.p.	Moore and Clague (1991)

3.5.10.2. Potential Impacts and Mitigations

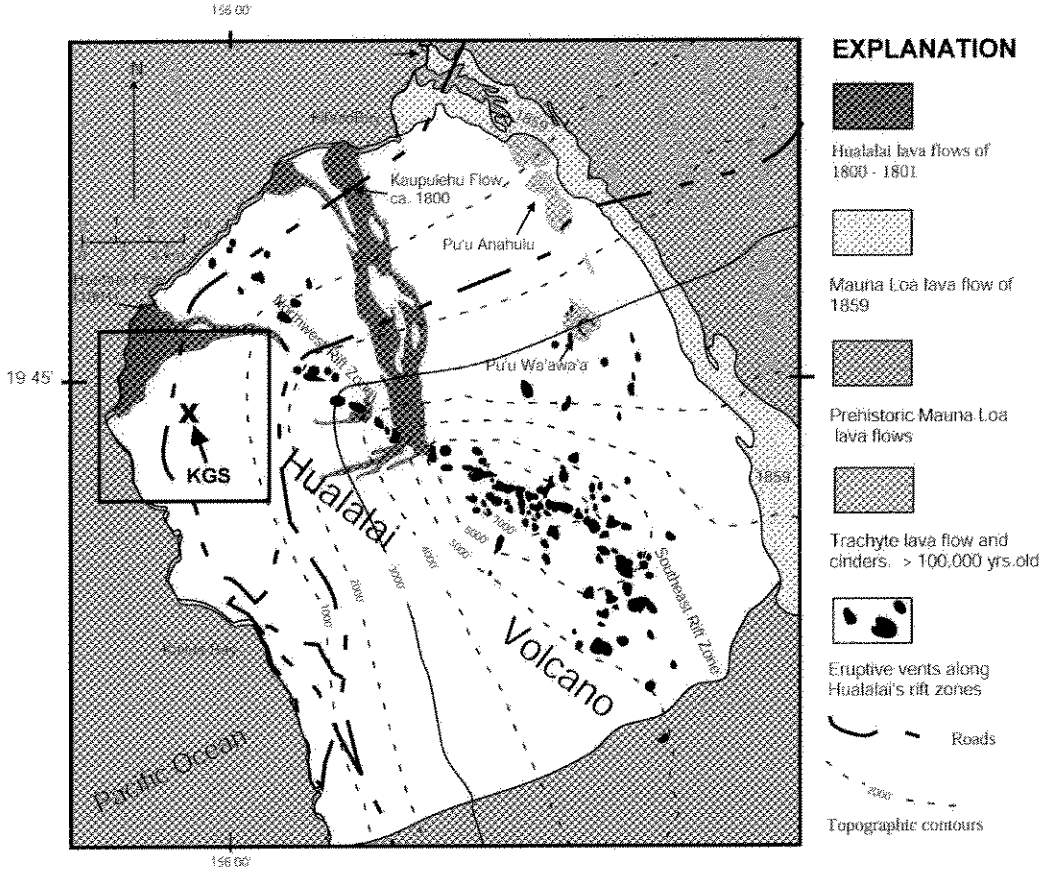
Hualalai is a geologically active volcano with clusters of eruptions occurring about every 500 years. According to Drs. Lockwood and Garcia, although the probability is high that Hualalai will erupt somewhere within the next few centuries, the odds that such an eruption will threaten the subject property are low.

The most recent flow to enter the 25 square mile study area surrounding the subject property is the 1801 Huehue lava flow, located about 1 mile to the northwest of the subject property. The next youngest flow, the "Kona Palisades Flow" (about a mile to the southeast), has an estimated age of about 1,800 years. Other lava flows in the area are more than 2,000 years old. Based upon the research, the statistical probability that future flows will enter this 25 square mile area within the next 50 years is about 6 percent

[4] The alignment of iron and nickel grains in rock with the earth's magnetic poles, fixed at the time of that rock's formation.

and within the next 100 years about 12 percent. The chance that a flow would directly impact the Keahole Generating Station is much lower. (See Volume 2, Appendix D.)

FIGURE 3-3: GRAPHICAL DEPICTION OF LAVA FLOWS (LOCKWOOD AND GARCIA)



Future Hualalai eruptive vents that could threaten the subject property are likely to develop 4-6 miles to the east on Hualalai's Northwest Rift Zone, at elevations between 2,000 and 4,200 feet above sea level. Eruptions from vents below the 2,000 feet elevation would send lava flows north of the subject property, eruptions occurring above 4,200 feet elevation would send flows south of the facility.

3.5.10.3. The Impacts of Volcanic Hazards on the Alternatives

ALTERNATIVES	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
1. No Action	✓			Based on the statistical probability of risk, the likelihood of volcanic hazards adversely affecting the subject property is minimal. No mitigation measures are warranted.
2. Proposed Action	✓			The improvements and expansion of the generating station would be at minimal risk to volcanic hazards. The generating station is well suited to

Alternatives	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
				accommodate the improvements to meet growing demand in the region.
3. West Hawaii		✓		The site may be exposed to volcanic impacts due to its exposure to the historic risk associated with Mauna Loa. The probability and potential impacts of future volcanic hazards would need to be assessed to determine the actual amount of risk involved.
4. East/West Hawaii		✓		The construction of new turbines at the Hill Plant in East Hawaii may be impacted by volcanic activity due to the historic risk associated with the South Hilo area's exposure to lava flows from Mauna Loa.
5. Renewable	✓			The impacts of volcanic hazards for this alternative cannot be known until the details of a biomass plant and/or location to grow fuel crops are determined. However, the risk of lava flow inundation is quite low if lands cultivated for biomass are in general proximity to those cultivated for sugar on the Hamakua Coast.

3.5.10.4. Tephra – Existing Conditions

Tephra is a general term for fragments of volcanic rock and lava, regardless of size, that are blown into the air by explosions or carried upward by hot gases in eruption columns or lava fountains. Volcanic ash is highly disruptive to economic activity because it covers just about everything, infiltrates most openings, and is highly abrasive. Airborne ash can obscure sunlight to cause temporary darkness and reduce visibility to zero. Ash is slippery, especially when wet; roads, highways, and airport runways may become impassable. Automobile and jet engines may stall from ash-clogged air filters and moving parts can be damaged from abrasion, including bearings, brakes, and transmissions. Fragments range in size from less than 2 millimeters (ash) to more than 1 millimeter in diameter. Large-sized tephra typically falls back to the ground on or close to the volcano and progressively smaller fragments are carried away from the vent by wind. Volcanic ash, the smallest tephra fragments, can travel hundreds to thousands of kilometers downwind from a volcano.[5] Tephra deposits on Hualalai are uncommon and if any, are of two basic types: cinder and spatter. Drs. Lockwood and Garcia examined many contacts between lava flows in the study area around the subject property. They observed no tephra in the vicinity of the subject property and no indication that tephra had fallen in these low-lying areas away from the rift zone.

3.5.10.5. Potential Impacts Mitigation Measures

Drs. Lockwood and Garcia could not exclude the possibility that minor amounts of glassy tephra ("Pele's hair") could fall in the future from high-fountaining episodes of the volcano. However, both expected these amounts to be slight and have little impact on the operations of the subject property. They did recommend that if a high-fountaining eruption were to occur, air filters on the air intakes at the plant would need to be changed more frequently.

3.5.10.6. The Impacts of Tephra on the Alternatives

Alternatives	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
1. No Action	✓			In accordance with procedural operations and applicable regulations, HELCO would take every precautionary measure to guard against any a high-fountaining eruption. In all probability air filters on the air intakes at the generating station would be changed more frequently.

[5] United States Government Service (USGS) Volcanic Hazards Program; http://volcanoes.usgs.gov.

Alternatives	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
2. Proposed Action	✓			HELCO would make every effort to safeguard the generating station from any high-fountaining eruptions, in accordance with operational procedures. In all probability air filters on the air intakes at the generating station would be changed more frequently
3. West Hawaii	✓			The hazards of tephra fall on this site would need to be assessed to ascertain potential risks. It is assumed there would be no greater risks that at Keahole.
4. East/West Hawaii	✓			The risk of tephra impacts is considered low because of the distance between historic eruption sites on Mauna Loa and the urbanization areas of Hilo.
5. Renewable	✓			The impacts of tephra hazards for this alternative cannot be known until the details of a biomass plant and/or location to grow fuel crops are determined. However, if former sugar land in Hamakua and North Kohala are used, the risk is considered to be quite low.

3.5.11. Wind Damage – Existing Conditions

The area is periodically subjected to seasonal high winds, which have been known to be damaging. The extent, duration, and intensity of these winds cannot be predicted. Severe weather can be destructive, causing outages, property damages, and significant expenses.

During the last 50 years many hurricanes and tropical storms have affected the Hawaiian Islands, but three have had devastating impacts. In all three cases, the island of Kauai was the hardest hit. Hurricane Iniki was the most destructive storm to strike the State in recorded history, with widespread wind and water damage exceeding $2.2 billion.[6] The Big Island, in comparison to Kauai and Oahu, suffered relatively minimal damages.

3.5.12. Potential Impacts and Mitigation

Power outages may occur from high winds and other natural disasters, and all islands could fall victim. Certain commercial buildings may suffer less damage than others, especially those built with heavier masonry such as reinforced concrete. Buildings built out of lighter materials may be more prone to damage by strong winds. Larger commercial and public buildings are usually designed by engineers and built to withstand earthquakes and strong winds.

HELCO's facilities have been engineered to withstand strong winds, in conformance with the Uniform Building Code (UBC). However, certain equipment may still be susceptible to severe weather conditions, in particular, transmission lines and other related equipment.

In Hawaii, hurricane winds, especially where augmented by local terrain or tall building structures, may be damaging to lightly built dwellings and other structures. The presence and design of the Keahole facilities, including the stacks, are not believed to contribute to how the wind would impact the surrounding area.

[6] See City & County of Honolulu, Oahu Civil Defense Agency, website at http://www.co.honolulu.hi.us/ocda/hurr1.htm.

3.5.13. THE IMPACTS OF WIND DAMAGE ON THE ALTERNATIVES

ALTERNATIVES	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
1. No Action	✓			The existing facilities have been built to withstand high wind damage, in accordance with the UBC and other regulatory design guidelines governing electrical generating stations. However, some damage may result from severe wind conditions.
2. Proposed Action	✓			Any improvements would also be designed and constructed to withstand high wind damage, in accordance with electrical design procedures as well as the UBC.
3. West Hawaii		✓		New studies, permits, and further research on the wind conditions would be needed prior to the construction of a facility at a new site, which would involve substantial time and costs
4. East/West Hawaii		✓		The East/West Hawaii Alternative would entail additional transmission equipment across the island. Transmission lines have been known to be more susceptible to wind damage than sturdier components of the plant itself.
5. Renewable		✓		The wind conditions affecting a new biomass plant and/or site for growing fuel crops would need to be assessed once a site is located. In general, however, crops are susceptible to wind damage, which in terms of biomass production could have a long-term effect on the production of firm energy.

3.6. GROUNDWATER, HYDROLOGY, SURFACE WATER AND DRAINAGE

Over the past 15 years, West Hawaii has experienced tremendous growth in population and resort development. In the early 1990s, there was fierce competition for water resources among landowners, developers, and other water purveyors in the region. The State Commission on Water Resource Management (CWRM) stepped in and found they needed to gather pertinent data on baseline water levels in order to mediate the problem and avoid major disputes. A 1991 – 2002 report, *A Study of the Ground-Water Conditions in North and South Kona and South Kohala Districts, Island of Hawaii,* is ongoing and presents over 10 years of baseline water-level data. Many wells were drilled in the region during the past 10 years by private landowners, public utilities, and the State, who invested large sums of money to drill these wells for the economic benefit of the island and the State. The CWRM credited these entities for allowing access to their wells for data collection and sampling used in the report.[7]

HELCO developed and pump tested in 1993 an onsite brackish supply well, identified as State No. 4461-02, for its proposed improvements and expansion of the generating station. This well can be pumped at an average of 210,000 to 230,000 gpd and is being used for the existing operations at the generating station. HELCO is using the brackish water supplied by the well as the primary source of water for operating the improvements to the station, which would allow HELCO to allocate its share of County of Hawaii Department of Water Supply's (DWS) potable commitment in excess of its needs to DHHL. The State, County, DHHL, and the immediate area would highly benefit from this arrangement. Although HELCO's right to use the brackish water has been challenged in court, at the time this document was being prepared, HELCO has not been enjoined from using the water.

While reclassification of the subject property would have a minimal impact on water resources in the area, improvements to the generating station would impact water resources in various ways. To assess all

[7] Data obtained from DLNR website (http://www.hawaii.gov/dlnr/cwrm/data/reports/pr200301.pdf).

of the impacts, HELCO retained Tom Nance of Tom Nance Water Resource Engineering (TNWRE), who is well-known in his field of study. The State CWRM also sought information from Mr. Nance for inclusion in its ongoing report. A summary of Mr. Nance's assessment pertaining to the improvements of generating station follows, and a complete copy of his report, *Potential Impacts on Water Resources of the Expansion of the Hawaii Electric Light Company's Power Generating Station at Keahole in North Kona, Hawaii*, is provided in Volume 2 of the EIS, identified as Appendix P.

3.6.1. EXISTING CONDITIONS

Annual rainfall in the North Kona area surrounding the project site is approximately 10 to 20 inches per year. Rainfall on the higher slopes of the mountain upslope from the project site increases to a rate of about 75 inches per year. Rainfall is uniformly distributed from March to October, with 60 percent or more of the annual rainfall occurring in the remaining four winter months. Due to the permeable character of the prehistoric and historic lava flows that comprise the west and northwest facing slopes of Hualalai, virtually all rainfall permeates into the ground, eventually collecting as groundwater. There is no surface water at or near the project site. There are no known perennial or intermittent streams at or near the site.

Storm water runoff does not occur in any significant amount even during the most intense rainfalls, due to the high permeability of the ground surface at or near the subject property.

According to the TNWRE report, two distinctly different modes of groundwater occur in the general vicinity of the subject property. Groundwater underlying the entire coastal zone occurs in a thin, brackish to saline basal lens which is underlain by saltwater at depth and is in hydraulic contact with seawater at the shoreline. Inland in the near vicinity of Mamalahoa Highway and extending some 20 miles from Kalaoa to Kealakekua, there is an abrupt change from basal to high-level groundwater. The existence of high-level groundwater was discovered in 1990. The geologic feature (e.g., one or more vertically oriented faults, dikes, or other low permeability zones) that causes this abrupt change has no surface expression and has not been identified. The presence of this feature has resulted in a substantial reservoir of potable quality groundwater impounded behind the feature that also controls the location and manner of leakage into the down-gradient basal lens in ways that are not yet understood.

Ground water is the most widespread source of fresh water, which is captured in aquifers (layers of sand, rock, limestone or gravel that form natural receptacles for the water as it is pulled downward by gravity). The aquifers catch the water as it seeps through the ground, and store it in large pools called water lenses. When the rock becomes too solid for the water to go farther, the water puddles along that rock layer forming the water lens pool, where wells are dug to draw the water. There are two kinds of water lenses, basal and parabasal. Water lenses can be a few feet to dozens of feet deep. Communities without surface water must rely on a water lens to supply their water. Care must be taken to not remove too much water at one time from the water lens or the lens may be destroyed.

Basal lens is a type of fresh water pool found floating on top of salt water. This happens when an aquifer is shallow or has a hard rock layer that the water cannot seep through. Water enters the aquifer and then runs off the rock layer to the side. The fresh water then sits on top of a salt-water layer. These two layers don't mix because of the difference in their densities so the top stays fresh, the bottom stays salty, and where they touch is a thin layer of brackish water. When wells are drilled down into a basal water lens, it is very important to not pump out too much fresh water or the salt water will be drawn up and destroy the fresh water lens.

3.6.2. POTENTIAL IMPACTS AND MITIGATIONS

According to the TNWRE report, the completion of CT-4, CT-5, and ST-7 with SCR has the potential to impact water resources in four ways: (1) by an increase in pumpage by the County DWS high elevation wells; (2) by drawing brackish groundwater from the underlying basal lens; (3) by the disposal of plant coolant waters in the saline zone below the basal lens; and (4) by the disposal of domestic wastewater in the existing septic tank and leach field system.

1. Increased Pumpage by DWS' High Elevation Wells. HELCO presently consumes approximately 30,000 gpd of potable water at the facility. The improvements to the generating station would require an additional 15,000 gpd of supply from DWS' North Kona system. Based on the system's hydraulics, most, if not all of this additional supply would come from DWS's four, high level wells toward the north end of its system (State Nos. 4057-01, 4158-02, 4258-03, and 4358-01). This increase of well pumpage would mean that the ultimate discharge of groundwater into the marine environment would be decreased by the same 0.015 mgd amount. Most of this decrease will occur nominally downgradient of the wells.

   The downgradient area for DWS' four high elevation wells is the 8-mile-long section of the coastline between Keahole Point and Kailua Town, a section where the groundwater discharge into the marine environment is on the order of 20 to 25 mgd. The plant expansion's use of 0.015 mgd of this from DWS high elevation wells would represent a decrease of less than one-tenth of one percent of the total groundwater flow toward and into the marine environment. The decrease would be distributed over a longer section of coastline and comprise an even smaller percentage of decrease.

   The only present uses of groundwater in the nominally downgradient area are for aquaculture (Well 3960-01 on Liliuokalani Trust property and Wells 4363-01 to 12 at the National Energy Laboratory Hawaii (NELH)). All of these are saline wells that would not be affected by a negligible decrease in the amount of fresh water leaking from the high level aquifer into the basal lens. Anchialine pools in the Kaloko-Honokohau National Historic Park and elsewhere along this shoreline are also dependent on the rate of basal groundwater flow. However, the negligible decrease in groundwater flowrate would be far too small to have an effect.

2. Pumpage of Onsite Brackish Groundwater. About 0.21 to 0.23 mgd of brackish, basal groundwater would be pumped from the plant's onsite well. The groundwater flowrate at Keahole is relatively low, on the order of 1.2 to 2.0 mgd per coastal mile. That means that withdrawal of 0.21 to 0.23 mgd would not be an insignificant amount. However, the only use of groundwater in the coastal area downgradient of the power plant is the Uwajima Fisheries Wells at NELH (Nos. 4363-01 to 12). These wells would not be adversely impacted by the power plant's withdrawals for the following reasons:

   - The loss of basal flowrate toward the NELH shoreline would translate to a small salinity increase, which would be of no consequence to the Uwajima saltwater wells.
   - The Uwajima wells are directly downgradient of Cyanotech's subsurface saltwater disposal of two to three mgd. Elsewhere within NELH, another 7 to 8 mgd is also disposed of in pits, trenches, and on the ground surface. The impact of the power plant's use of 0.23 mgd of brackish groundwater is inconsequential in comparison to the ongoing saltwater disposal throughout the NELH facility.

Deleted: Parabasal lens is a type of fresh water pool found floating on top of a rock layer. This happens when an aquifer is loose enough to allow the water to seep through and collect on a solid rock base. The rock base is usually made up of limestone, gravel, sand or rock. When drilling a well, the targeting of parabasal lens is preferable because there is less danger of drawing up salty or brackish water. ¶

3. Subsurface Disposal of the Power Plant's Treated Wastewater . An average of about 0.13 mgd of the plant's wastewater from the plant's wastewater treatment system will be disposed of in its two existing disposal wells. Most of its major chemical constituents will be similar to diluted seawater. However, there may be minor amounts of other constituents, which would not be removed completely by the media and cartridge filters. The maximum allowable levels of these constituents are specified by the Department of Health (DOH) Underground Injection Control (UIC) Permit No. UH-1776. Both disposal wells are at ground elevations of 195 to 200 feet and are 500 to 505 feet deep.

The discharges from the reverse osmosis water treatment system will be collected in a storage tank. After the storage tank is filled to a prescribed capacity, the water will be pumped through a nutshell filter medium and a reinjection cartridge filter to remove residual oil and suspended solids to a concentration of approximately 1 ppm. Because the water will be stored in a storage tank prior to injection, the water will be at ambient air temperature when it is pumped to the injection well. A maximum injection rate of 250 gpm will be used until the tank is emptied. The injection well is expected to operate for 8.5 hours per day, with an average daily injection rate of 89 gpm. All discharges to the injection well system would be in compliance with the UIC permit.

If it is determined that wash water from the HRSG system can be treated on site, an additional wastewater treatment system will be added to the facility. This addition would require an amendment to the current UIC permit. It is presently estimated that approximately 40,000 gallons of wash water will be generated a year. If the wash water contains hazardous waste, in the form of heavy metals, these must be extracted during the treatment process and disposed in a manner approved by the State DOH and the U.S. Environmental Protection Agency (EPA). A wash water sample will be collected each time the HRSG tubes are washed. All samples will be analyzed by an analytical laboratory following appropriate EPA methodologies for determining hazardous wastes. The frequency of sampling may be adjusted after significant testing (e.g., after collection of 10 or more data sets) has been conducted to properly characterize the waste stream as being hazardous or not. The need to wash the HRSG boiler tubes will be dependent on the freshness of the SCR catalyst and type of fuel. The fresher the catalyst and higher the sulfur content in the fuel, the more frequent washing will be needed. If the catalyst is kept fresh and low sulfur fuel is used, washing could be required only once per year; otherwise it could be more frequent, possibly quarterly. Hazardous wash water will be sent to EPA-approved treatment and disposal facilities on the mainland, in compliance with all applicable Federal and State hazardous waste regulations. These are EPA-permitted facilities that are designed to properly treat and/or dispose of hazardous wastes. However, at some future time, HELCO may determine that is economically prudent and environmentally appropriate to treat the wash water on site at the Keahole facility. Such treatment would involve the construction of a separate discrete wastewater treatment facility dedicated to treating the wash water. The sizing of the facility cannot yet be determined because the actual volume of wash water will depend upon the frequency that washing will occur. Therefore, the matter of whether or not the wash water may at some future time be treated on site is an Unresolved Issue. For further discussion of this matter, please refer to Section 6.4 of this EIS.

The injected water temperature will be 70 degrees and not a substantial contrast to the temperatures in the receiving zone in the bottom 50 feet of the wells, which is between 68 and 70 degrees. The salinity of the injected water will also be less than in the receiving groundwater.

Both these aspects mean that the injected water will be less dense than the ambient groundwater at depth. Disposal into groundwater would be limited to the lowest 50 feet in the wells at elevations from 250 to 300 feet below sea level. The only functional supply wells, which are nominally downgradient of this disposal, are the Uwajima Fisheries wells (Nos. 4362-01 to 12) in NELH. As discussed previously, the Uwajima Fisheries wells are near to and directly downgradient of the disposal of 2 to 3 mgd of saltwater by Cyanotech and in the general vicinity of another 7 to 8 mgd of saltwater disposal elsewhere at NELH. HELCO's disposal would be occurring about 1.8 miles away and at substantial depth below the basal lens. Its 0.13 mgd average disposal rate would be two orders of magnitude less than the present rate of saltwater disposal at NELH. The horizontal and vertical separation, meaning the distance between the HELCO and Uwajima wells, together with the ongoing disposal activities at NELH, mitigate against any adverse impact to the Uwajima wells.

4. Treatment and Disposal of Domestic Wastewater. As a result of the power plant expansion, the amount of domestic wastewater generated by the plant (i.e., restroom facilities, wash waters for sink, shower, and floor drains, and landscaping) that will be treated and disposed of in the plant's existing septic tank and leach field system would be increased by approximately 2,000 gpd. All of this water will ultimately reach the underlying basal lens. The primary issue with this method of disposal is the addition of nutrients to the underlying basal lens. Its potential impact can be qualified with the following series of approximations:

   - Raw domestic wastewater will have total nitrogen levels of 30 to 40 milligrams per liter (mg/l) and total phosphorus of 4 to 15 mg/l. The high ends of these ranges are assumed to be the case at the power plant.
   - Nitrogen and phosphorus removals by the septic tank and leach field system are conservatively assumed to be 50 and 20 percent, respectively. These relatively inefficient rates of removal were chosen because the leach field trenches were backfilled with gravel and crushed stone rather than with a loamy soil.
   - Further nutrient removal will occur naturally during the wastewater's downward movement through the vadose zone and lateral movement with groundwater toward the shoreline. Based on the analyses in Nance (2002), these rates are conservatively assumed to be at 80 percent for nitrogen and 95 percent for phosphorus.

The above series of assumptions indicates that the disposal of 2,000 gpd of domestic wastewater would add 0.066 pounds per day of nitrogen and 0.010 pounds per day of phosphorus to the flow of groundwater beneath the site. However, the nutrient load "naturally" in this groundwater is many times greater than this. For example, using a low flux rate of 1.2 mgd per mile and the nitrogen and phosphorus concentrations in the underlying groundwater of 1.85 and 0.40 mg/l, respectively, (based on the level in Well 4462-05 immediately downgradient), the nutrient load in basal groundwater discharging into the marine environment along the 1.3-mile long shoreline between Keahole Point and Unualoha Point amounts to 24.0 pounds of nitrogen and 5.2 pounds of phosphorus. The power plant's addition would amount to just 0.3 to 0.2 percent of this amount, respectively. When combined with the plant's present disposal of 1,500 gpd of wastewater, the loading would still only amount to 0.5 and 0.3 percent of nitrogen and phosphorus already "naturally" conveyed by groundwater into the marine environment.

3.6.3. THE IMPACTS OF THE ALTERNATIVES ON GROUNDWATER, HYDROLOGY, SURFACE WATER, AND DRAINAGE

ALTERNATIVES	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
1. No Action	✓			The impacts under this alternative would be minimal.
2. Proposed Action	✓			Reclassification of the land to the Urban District and its eventual rezoning to an industrial designation would have no impact on groundwater, hydrology, surface water, and drainage. The improvements and expansion of the generating station would have the following impacts: (1) Use of an additional 15,000 gpd from DWS's potable system. (2) Use of 0.21 to 0.23 mgd of brackish basal groundwater, which would be a relatively significant quantity. However, according to the TNWRE study, minimal impacts on other wells would occur by the use of brackish groundwater at the generating station. Moreover, because HELCO would primarily use brackish water for the operations of the station, HELCO would then be able to transfer its potable water allocation to the DHHL. This would be highly beneficial to the DHHL and its proposed development of its property. (3) An average of 0.13 mgd of the plant's wastewater would be disposed of into the saline groundwater. Because the wastewater would be stored in a storage tank prior to injection, the wastewater would be at ambient air temperature when it is pumped to the injection well. TNWRE concluded from the data that injection would be at 70 degrees, which would not be a substantial contrast to the temperatures in the receiving zone in the bottom 50 feet of the wells, which is between 68 and 70 degrees. (4) Disposal of about 2,000 gpd of domestic wastewater in the plant's existing septic tank and leach field system would add nutrients to the underlying basal groundwater, but in negligible quantities as compared to the levels of nutrients "naturally" occurring in the groundwater. Based on these results, TNWRE concluded that this alternative would not have a significant impact on water resources in the region. While the proposed action would increase the amount of impermeable surfaces at the plant, the resulting storm water runoff is not anticipated to be significant, as storm water runoff will be readily absorbed by the surrounding non-paved surfaces.
3. West Hawaii		✓		Only groundwater is available at the Puu Anahulu site. Surface water does not exist near the site and the ocean is a considerable distance away. Groundwater quality in the vicinity of the site is anticipated to be brackish. Wells for this site would be placed at the approximately 700-800 elevation levels. Discharge would most likely be through injection wells located onsite. An underground injection control permit would be required. Ocean waters directly accessible from the site are designated Class AA waters by the State, which would mean that discharge into the water is not allowed.
4. East/West Hawaii		✓		The construction of new turbines at the Hill Plant in East Hawaii would impact water resources in that area. The impacts would need to be analyzed before conclusions can be drawn.
5. Renewable		✓		The groundwater, hydrology, surface water, and drainage affecting a new biomass plant and/or site for growing fuel crops would need to be assessed once a site is located. It is unclear, however, if the process would require a significant volume of wash water, prior to combustion.

3.7. IMPACTS OF ELECTRICAL ENERGY CONSUMPTION

The Keahole Generating Station presently uses 0.8 megawatts of electrical energy to power the facility. Upon completion of the ST-7 unit, the total electrical energy consumption of the plant will increase to 2.1 megawatts. The increase of 1.3 megawatts is necessary to operate the ancillary equipment associated with the operation of the proposed heat recovery steam generator and the SCR system, which require the pumping of approximately 200,000 gpd of brackish water through the demineralizing system. The

impacts of this increase are considered negligible as it represents approximately 1.5 percent of the total energy output of the facility. As the proposed heat recovery system is intended to improve the operational efficiency of the facility by capturing waste heat, the increased consumption of electrical energy to operate the HRSG system is viewed as a positive impact.

Installation of a similar system in East Hawaii or at a new facility in West Hawaii would result in a similar impact, all other things being equal. It is not possible to estimate the consumption of electrical energy by a plant fueled by biomass as no specific designs are available. However, we believe it can be safely assumed that the electrical energy consumed would represent a fraction of the energy produced.

3.8. NATURAL ENVIRONMENT

3.8.1. CLIMATE AND AIR

Many people live in areas where air pollution can cause serious health problems. Local air quality can affect our daily lives. Like the weather, it can change from day to day depending on climatic conditions and other factors. Air pollution comes from many different sources such as factories, power plants, cars, buses, trucks, windblown dust, wildfires, and volcanic emissions. Air pollution can threaten the health of human beings, trees, lakes, crops, and animals, as well as damage the ozone layer and buildings.

The EPA protects human health and the environment through the regulatory process and voluntary programs. Under the Clean Air Act (CAA), the EPA sets limits on how much of a pollutant is allowed in the air anywhere in the United States. National air quality has improved over the last 20 years due to increased awareness, research, and the regulatory process.

In order to adequately assess the impacts on air quality that may arise from the improvements to the subject property, HELCO retained Jim Clary & Associates (JCA) of Dallas, Texas to evaluate the climate and air quality conditions at or near the subject property. JCA has completed air projects in 26 states and has become a recognized leader in air quality consulting. The firm is comprised of engineers, scientists, and meteorologists with extensive experience addressing air quality matters for industrial clients, such as electrical power, chemical manufacturing, oil and gas, portland cement, airline maintenance, coatings, pulp and paper, and various other industries. Specific data from JCA's report are incorporated in subsequent sections and a complete copy of JCA's report, *Climate and Air Quality*, dated July 2004, is provided in Volume 2 of the EIS, identified as Appendix I.

HELCO also retained Robert E. Paull, Ph.D., a professor of horticulture at the University of Hawaii at Manoa, to evaluate the potential effects of certain emissions on the plants and crops on the neighboring Keahole Agricultural Park. Dr. Paull is the author of numerous books and articles on tropical fruits and plants, plant physiology, and increasing plant life. Data from Dr. Paull's report are incorporated in subsequent sections and a complete copy of his report, *Emission Studies – Impact on Keahole Agricultural Park*, is provided in Volume 2 of the EIS, identified as Appendix L. The following sections will discuss (1) climate and air quality conditions near or at the subject property; (2) the CAA and the pollutants that are monitored and regulated; and (3) potential impacts and mitigation measures.

3.8.2. EXISTING CONDITIONS

The subject property is located on terrain that slopes gently downward from the mountains. There are no significant terrain features such as cliffs, bluffs, and hills that would affect air circulation. The Big Island enjoys a belt of uniform winds blowing from the Northeast. Two massive mountains, Mauna Loa and

Mauna Kea, which are connected by a high saddle, effectively block most trade wind air to the subject property. Thus, the daily land and sea breezes are the dominant conditions for the project area. Figure 3-4 shows a strong daily recurring (diurnal) flow for much of the year.

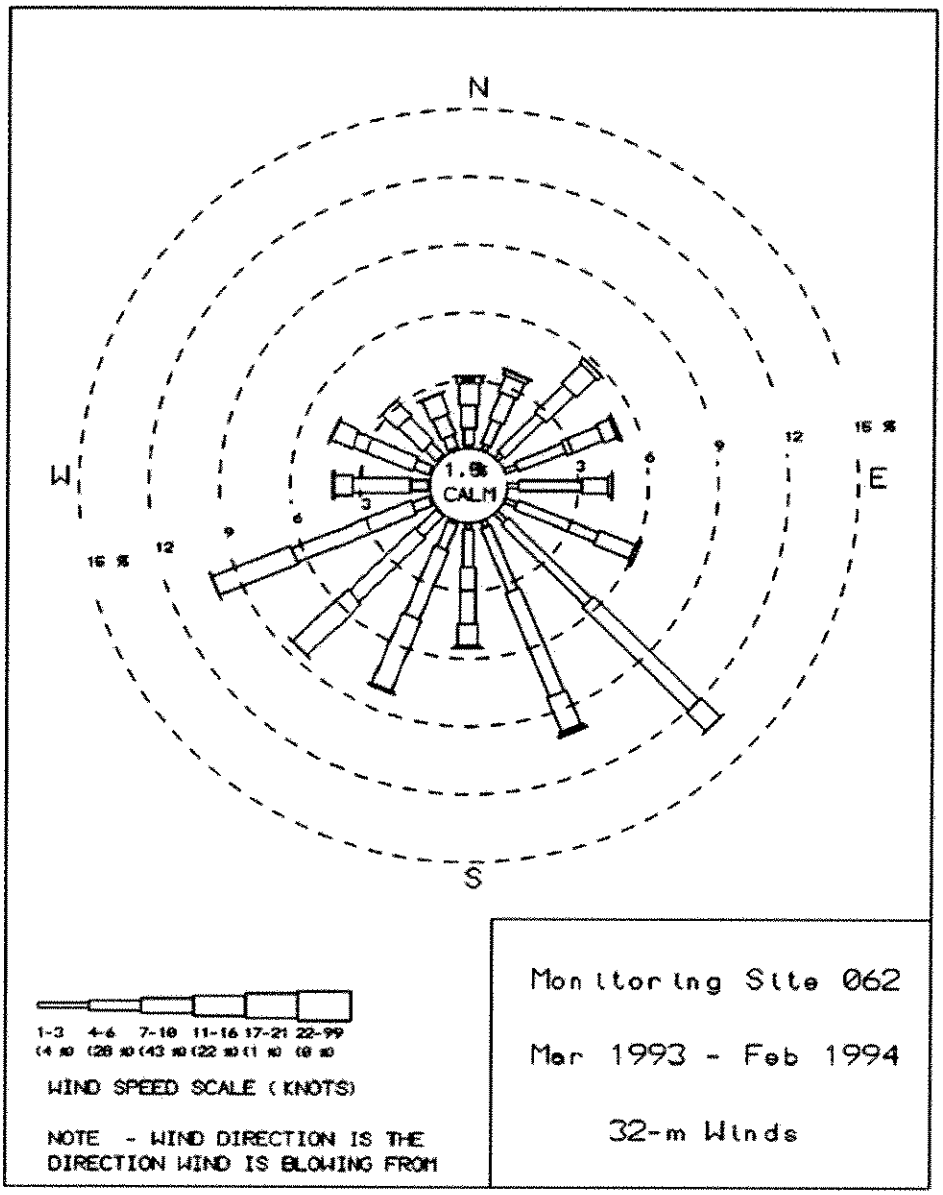
Average monthly temperatures at the subject property range from the low 70s (°F) in the coldest month of February to the upper 70s in August and September. Annual rainfall is approximately 10 to 20 inches per year Rainfall is uniformly distributed form March to October, with 60 percent or more of the annual rainfall occurring in the remaining winter months.

The subject property is located about one mile east of the Kona International Airport and about two miles northwest of the Kalaoa residential area. No other major industrial stationary sources are in the vicinity.

3.8.3. Components of the Clean Air Act (CAA) and the Regulatory Process

Although the CAA, as amended, is a federal law covering the entire country, the states do much of the work to carry out the Act. Under this law, the EPA sets limits on how much of a pollutant can be in the air anywhere in the United States. This ensures that all Americans have the same basic health and environmental protections. The law allows individual states to have stronger pollution controls, but not weaker ones than those set for the whole country.

FIGURE 3-4: MONITORING SITE 062 WIND ROSE



The law recognizes that the states should take the lead in carrying out the CAA, because pollution control problems often require special understanding of local industries, geography, housing patterns, etc. The United States government, through the EPA, assists the states by providing scientific research, expert studies, engineering designs, and money to support clean air programs. The major components of the

CAA include standards, programs, and provisions. In Hawaii, the DOH is the agency responsible for enforcing the CAA.

3.8.3.1. National Ambient Air Quality Standards (NAAQS)

The NAAQS under the CAA establishes the maximum pollution controls to be acceptable, with an adequate margin of safety, to protect public health and welfare. These standards must be attained in all areas that are accessible to the general public. NAAQS monitors six criteria pollutants: sulfur dioxide (SO_2); nitrogen dioxide (NO_2); carbon monoxide (CO); ozone (O_3); particulate matter (PM); and lead (pb). An explanation of these pollutants follow.

Hawaii's State Ambient Air Quality Standards (SAAQS) are very similar to the NAAQS, although the State has more stringent standards for carbon monoxide and nitrogen dioxide and has not adopted a standard for $PM_{2.5}$. Hawaii also has a standard for hydrogen sulfide (H_2S).

HOW DO THESE POLLUTANTS AFFECT US?[8]

Sulfur Dioxide (SO_2). SO_2 belongs to the family of sulfur oxide gases (SO_X), which dissolve easily in water. Sulfur is prevalent in all raw materials, including crude oil, coal, and ore that contains common metals like aluminum, copper, zinc, lead, and iron. SO_X gases are formed when fuel, containing sulfur, such as coal and oil, is burned. Over 65 percent of SO_2 released to the air, or more than 13 million tons per year, comes from electric utilities, especially those that burn coal. Other sources of SO_2 are industrial facilities that derive their products from raw materials like metallic ore, coal, and crude oil, or that burn coal or oil to produce process heat. Examples are petroleum refineries, cement manufacturing, and metal processing facilities.

Studies have found that SO_2 contributes to respiratory illness, and aggravates existing heart and lung diseases. SO_2 also contributes to the (1) formation of acid rain, which damages trees, crops, historic buildings, and monuments; and makes soils, lakes, and streams acidic; (2) formation of atmospheric particles that cause visibility impairment, most noticeably in national parks; and (3) SO_2 and the pollutants formed from SO_2, such as sulfate particles, can be transported over long distances and deposited far from the point of origin, which means that problems with SO_2 are not confined to areas where it is emitted.

Reducing emissions of SO_2 remains a crucial component of the EPA's strategy for cleaner air. Meeting EPA's national health-based air quality standards is an important step toward ensuring the air is safe to breathe. The EPA, states, and local governments work to reduce emissions of SO_2 through first meeting the national air quality standards. Levels of SO_2 in the air have decreased over the past 20 years. These reductions over time were accomplished by installing pollution control equipment at coal-fired power plants, reducing pollution from industrial processing facilities, reducing the average sulfur content of fuels burned, and using cleaner fuels like natural gas for residential and commercial heat. However, further reductions of SO_2 and other pollutants will likely be needed to solve the particulate matter and acid rain problems.

[8] Information from www.epa.gov/air/

Nitrogen Dioxide (NO_2). NO_2 is a reddish brown, highly reactive gas that is formed in the ambient air through the oxidation of nitric oxide (NO). Nitrogen oxides (NO_X), the generic term for a group of highly reactive gases that contain nitrogen and oxygen in varying amounts, play a major role in the formation of ozone, PM, haze, and acid rain. While the EPA tracks national emissions of NO_X, the national monitoring network measures ambient concentrations of NO_2 for comparison to national air quality standards. The major sources of man-made NO_X emissions are high-temperature combustion processes such as those that occur in automobiles and power plants. Home heaters and gas stoves can also produce substantial amounts of NO_2 in indoor settings. Motor vehicles contribute to 49 percent of NO_X emissions, utilities 27 percent, industrial/commercial/residential 19 percent; and other sources 5 percent.

NO_2 may lead to increased susceptibility to respiratory infection and may cause irreversible alterations in lung structure.

Carbon Monoxide (CO). CO is a colorless and odorless gas, formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 60 percent of all CO emissions nationwide. High concentrations of CO generally occur in areas with heavy traffic congestion. In cities, as much as 95 percent of all CO emissions may come from automobile exhaust. Other sources of CO emissions include industrial processes, non-transportation fuel combustion, and natural sources such as wildfires.

CO enters the bloodstream through the lungs and reduces oxygen delivery to the body's organs and tissues. The health threat from levels of CO sometimes found in the ambient air is most serious for those who suffer from cardiovascular disease. At much higher levels of exposure not commonly found in ambient air, CO can be poisonous, and even healthy individuals may be affected. Visual impairment, reduced work capacity, reduced manual dexterity, poor learning ability, and difficulty in performing complex tasks are all associated with exposure to elevated CO levels.

Nationally, the 2001 ambient average CO concentration is almost 62 percent lower than that for 1982 and is the lowest level recorded during the past 20 years. CO emissions from transportation sources, the major contributor to ambient CO concentration, have decreased slightly during this period. Between 1992 and 2001, ambient CO concentrations decreased 38 percent. This air quality improvement occurred despite an approximately 35 percent increase in vehicle miles traveled in the United States during this 10-year period and an increase in total CO emissions of 6 percent due to extremely serious wildfires in 2000. Nearly twice the number of U.S. acres burned in 2000 compared to the average year since 1982.

Ozone (O_3). O_3 is a gas that is not usually emitted directly into the air, but at ground level it is created by a chemical reaction between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of heat and sunlight. Ozone has the same chemical structure (VOC + NOx + Heat + Sunlight = Ozone) whether it occurs miles above the earth or at ground level and can be good or bad, depending on its location in the atmosphere. Good ozone occurs naturally in the stratosphere approximately 10 to 30 miles above the earth's surface and forms a layer that protects life on earth from the sun's harmful rays. In the earth's lower atmosphere, ground-level ozone is considered "bad."

Motor vehicle exhaust, industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of NO_x and VOC that help to form ozone. Sunlight and hot weather cause ground-level ozone to form in harmful concentrations in the air. As a result, it is known as a summertime air pollutant. Many urban areas tend to have high levels of "bad" ozone, but even rural areas are also subject to increased

ozone levels because wind carries ozone and pollutants that form it hundreds of miles away from their original sources.

Ozone triggers a variety of health problems even at very low levels and may cause permanent lung damage after long-term exposure. It may also damage plants and ecosystems.

Particulate Matter (PM, PM_{10}, $PM_{2.5}$). PM is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. PM_{10} is an air pollutant consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair). $PM_{2.5}$ refers to particulate matter that is 2.5 microns or smaller in size, which is approximately 1/30 the size of a human hair; so small that several thousand of them could fit on the period at the end of this sentence. Fine particles are of concern because they are risk to both human health and the environment, contributing to acid rain.

Particles can be suspended in the air for long periods of time. Some particles are large or dark enough to be seen as soot or smoke. Others are so small that individually they can only be detected with an electron microscope. Some particles are directly emitted into the air from a variety of sources such as cars, trucks, buses, factories, construction sites, tilled fields, unpaved roads, stone crushing, and burning of wood. Other particles may be formed in the air from the chemical change of gases. They are indirectly formed when gases from burning fuels react with sunlight and water vapor. These can result from fuel combustion in motor vehicles, at power plants, and in other industrial processes.

PM is associated with (1) serious health effects; (2) major source of haze that reduces visibility in many parts of the United States, including our National Parks; (3) settles on soil and water and harms the environment by changing the nutrient and chemical balance; (4) causes erosion and staining of structures including culturally important objects such as monuments and statues.

In 1997, EPA strengthened its health protection standards for PM by adding an indicator for even smaller-sized or "fine" particles. Fine particles generally come from industrial fuel combustion and from vehicle exhaust. We now know that fine particles are most closely associated with increased respiratory disease, decreased lung functioning, and even premature death. EPA has begun collecting monitor data at locations across the country to determine the levels of these smaller-sized particles in the air. Depending on the results, EPA may take steps in the future that result in fewer PM emissions being released into the air from sources such as utilities and other industrial fuel combustion. Prior to 1994, newly manufactured diesel trucks and buses produced higher levels of PM. Starting with model year 1994, engines for new diesel trucks have been built to meet EPA's emission standards, reducing PM emissions by 90 percent. Remodeled buses also reduced PM emissions even more than trucks. EPA is continuing to work with manufacturers to further reduce emissions from diesel engines, including non-road engines such as construction equipment. EPA issued visibility protection regulations in 1999 to reduce emissions that cause haze over large areas of the country. The haze is formed by pollution particles in the air, which can be carried by the wind and cause problems hundreds of miles away.

Lead (pb). Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been motor vehicles (such as cars and trucks) and industrial sources. Due to the phase out of leaded gasoline, metals processing is the major source of lead emissions to the air today. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Children are at greatest risk to lead, which is still found at high levels in urban and industrial areas. Deposits of pb on soil and water harms animals and fish. Although overall blood lead levels have decreased since 1976, infants and young children still have the highest blood lead levels. Children and others can be exposed to lead not only through the air, but also through accidentally or intentionally eating soil or paint chips, as well as food or water contaminated with lead.

Hydrogen Sulfide (H_2S). H_2S is a colorless, extremely poisonous gas that has a very disagreeable odor, much like that of rotten eggs. It is slightly soluble in water and is soluble in carbon disulfide. Dissolved in water, it forms a very weak dibasic acid that is sometimes called hydrosulfuric acid. Hydrogen sulfide is found naturally in volcanic gases and in some mineral waters. It is often formed during decay of animal matter. It is a part of many unrefined carbonaceous fuels, e.g., natural gas, crude oil, and coal; it is obtained as a byproduct of refining such fuels. It may be made by reacting hydrogen gas with molten sulfur or with sulfur vapors, or by treating a metal sulfide (e.g., ferrous sulfide (FeS)) with an acid. Hydrogen sulfide reacts with most metal ions to form sulfides; the sulfides of some metals are insoluble in water and have characteristic colors that help to identify the metal during chemical analysis. Hydrogen sulfide also reacts directly with silver metal, forming a dull, gray-black tarnish of silver sulfide.

Carbon Dioxide (CO_2). Although carbon dioxide is not a regulated substance, it is a topic of ongoing discussion with regard to global warming. The issue of climate change continues to undergo complex debate at international levels. It is appropriate that once global strategies are developed, national and state strategies and action plans should follow in that order. In the meantime, Hawaiian Electric Company and its subsidiaries remain committed to doing their part in addressing the issue of climate change by participating in voluntary efforts such as the U.S. Department of Energy's Climate Challenge Program, supporting renewable energy, offering demand side management and energy efficiency programs, developing efficient combined heat and power systems for customers, and continuously working to improve the efficiency of its generating units.

3.8.3.2. New Source Review

Congress established the New Source Review (NSR) pre-construction permitting program to (1) ensure that air quality is not significantly degraded from the addition of new and modified factories, industrial boilers, and power plants; and (2) assure people that any large new or modified industrial source in their neighborhoods will be as clean as possible, and that advances in pollution control occur concurrently with industrial expansion.

NSR requires stationary sources of air pollution to get permits before they start construction. NSR is also referred to as construction permitting or preconstruction permitting. There are three types of NSR permitting requirements. A source may have to meet one or more of these permitting requirements. The three types of NSR requirements are: (1) Prevention of Significant Deterioration (PSD) permits which are required for new major sources or a major source making a major modification in an attainment[9] area; (2) nonattainment[10] NSR permits which are required for new major sources or major sources making a major modification in a nonattainment area; and (3) minor source permits.

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[9] An attainment area is a geographic area in which levels of a criteria air pollutant meet the health-based primary standard (national ambient air quality standard, or NAAQS) for the pollutant. An area may have on acceptable level for one criteria air pollutant, but may have unacceptable levels for others. Thus, an area could be both attainment and nonattainment at the same time. Attainment areas are defined using federal pollutant limits set by EPA.

[10] A nonattainment area does not meet one or more of the NAAQS for the criteria pollutants designated in the CAA.

The PSD regulations (40 Code of Federal Regulations (CFR) 52.21) define a major source as any source that belongs to a list of 28 source categories that emit or have the potential to emit 100 tons per year or more of any pollutant regulated under the CAA, or any other source type that emits or has the potential to emit pollutants in amounts equal to or greater than 250 tons per year. Keahole Generating Station is currently classified as a major stationary source.

A PSD review is required in attainment areas for all pollutants from a major source showing significant net increases in emissions due to a modification. Because the Keahole Generating Station area has been designated either attainment or unclassifiable for all the NAAQS, a PSD review was required for all the pollutants that showed a significant net emissions increase associated with the addition of CT-4 and CT-5 (Alternative 1 or Alternative 2 without SCR).

The PSD regulations provide for the designation of all geographic areas into one of three classes:

- Class I applies to areas where practically any deterioration in air quality would be significant.
- Class II applies to areas where moderate, well-controlled, and sited industrial growth would be permitted.
- Class III applies where industrial areas would be allowed to experience the greatest degree of air quality deterioration.

NSR permits are legal documents that the source must follow. They specify what construction is allowed, what emission limits must be met, and often how the source must be operated. They may contain conditions to make sure that the source is built to match parameters in the application that the permit agency relied on in their analysis. For example, the permit may specify stack heights that the permit agency used in their analysis of the source. Some limits in the permit may be there at the request of the source to keep them out of other requirements. For example, the source may take limits in a minor NSR permit to keep the source out of PSD. To assure that sources follow the permit requirements, permits also contain monitoring, recordkeeping, and reporting requirements. In Hawaii, the State DOH, CAA branch, usually issues the NSR permits. The EPA issues the permit in some cases.

3.8.3.3. New Source Performance Standards

The New Source Performance Standards (NSPS) are national emission standards that are progressively tightened over time to achieve a steady rate of air quality improvement without unreasonable economic disruption. The NSPS imposes uniform requirements on new and modified sources through the nation. These standards are based on the best demonstrated technology (BDT). BDT refers to the best system of continuous emissions reduction that has been demonstrated to work in a given industry, considering economic costs and other factors, such as energy use. In other words, any new source of air pollution must install the best control system currently in use within that industry.

3.8.3.4. National Emissions Standards for Hazardous Air Pollutants (NESHAP)

The National Emissions Standards for Hazardous Air Pollutants (NESHAP) is comprised of a list all air pollutants (not already identified as criteria pollutants) identified by the EPA, pursuant to the CAA Amendments of 1970. The identified air pollutants "may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible or incapacitating reversible illness." For each pollutant identified, EPA was to then promulgate national emissions standards for hazardous air pollutants (HAP) at levels that would (1) ensure the protection of the public health with an ample margin of safety; and

(2) prevent any significant and adverse environmental effects, which may reasonably be anticipated, on wildlife, aquatic life, or other natural resources.

3.8.3.5. Maximum Achievable Control Technology (MACT) Standards

The EPA developed a list of categories of industrial sources that must meet technology requirements to control HAP. They are referred to as Maximum Achievable Control Technology (MACT) standards because they are based on the emission limitation that can be achieved using state-of-the-art emission control technologies and strategies, including pollution prevention. The EPA has developed, or are developing, MACT standards for each industrial source category that it's required to regulate.[11] (As of October 9, 2001, 50 MACT standards covering 86 different types of major industrial sources, such as chemical plants, oil refineries, aerospace manufacturers, and steel mills, as well as categories of smaller sources, such as dry cleaners, commercial sterilizers, secondary lead smelters, and chromium electroplating facilities. The requirements in many of these regulations take effect between 1996 and 2002. When fully implemented, these standards are projected to reduce annual air toxic emissions by about 1.5 million tons. The EPA has also proposed 21 MACT standards, and expect to propose an additional 24 MACT standards in the next year. Combined, these rules will cover all of the source categories that the EPA is required to regulate.

3.8.3.6. Good Engineering Practice (GEP) Stack Height Provisions

Good Engineering Practice (GEP) Stack Height Provisions are federal guidelines that identify the design criteria acceptable to regulatory agencies to establish a method for determining the stack height that will minimize the influence of nearby structures on normal plume dispersion.

3.8.4. Potential Impacts and Mitigations

JCA evaluated the State DOH *Ambient Air Quality Impact Report* for Alternatives 1 and 2 without SCR issued on December 27, 2000. The impact analysis used dispersion modeling to predict emissions of regulated air pollutants expected to be emitted from the Keahole Generating Station, and addressed the implementation of the improvements to add Alternatives 1 and 2 without SCR to the existing facilities. The addition of Alternative 2 with SCR would require updates to the report to address the impact of adding SCR, which would reduce NO_x emissions and add a small amount of ammonia emissions. HELCO has operated air quality monitoring stations at the Huehue Substation (Site 063, approximately 3.4 miles east-northeast of the Keahole Generating Station) and at the Kakahiaka Monitoring Station (Site 064, approximately 1.2 miles southeast of the Keahole Generating Station). Air quality data were collected at the Kakahiaka monitor at the request of DOH and EPA Region 9 to confirm that Huehue air quality data were representative of the Keahole Generating Station maximum impact areas.

3.8.5. How Does HELCO Measure Up to the Federal and State Regulations?

3.8.5.1. National Ambient Air Quality Standards

Because the project was a major source in an area that is in attainment for all NAAQS, the PSD permitting process rather than the nonattainment permitting process was followed. Hawaii's attainment status for all criteria pollutants means that the nonattainment regulations do not apply. Table 3-C shows the Federal and State Ambient Air Quality Standards (AAQS).

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[11] See, http://www.epa.gov/ttn/atw/eparules.html. See, also, Section 112 of the 1990 Clean Air Act Amendments.

TABLE 3-C: SUMMARY OF MODELING SIGNIFICANT IMPACT LEVELS, MONITORING DE MINIMIS LEVELS, PSD INCREMENTS, AND STATE AND FEDERAL STANDARDS FOR SELECTED POLLUTANTS

		MODELING SIGNIFICANT	MONITORING DE MINIMIS*	PSD INCREMENT		FEDERAL	STATE
POLLUTANT	AVERAGING PERIOD	IMPACT LEVELS ($\mu g/m^3$)	LEVELS ($\mu g/m^3$)	CLASS I ($\mu g/m^3$)	CLASS II ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	SAAQS ($\mu g/m^3$)
SO_2	3-hour	25	-	25[a]	512[a]	1300[a,b]	1300[a]
	24-hour	5	13	5[a]	91[a]	365[a]	365[a]
	Annual	1	-	2[c]	20[c]	80[c]	80[c]
NO_2	Annual	1	14	2.5[c]	25[c]	100[c]	70[c]
$PM_{2.5}$	24-hour					65[i]	-
	Annual					15[j]	-
PM_{10}	24-hour	5	10	8[f]	30[f]	150[d]	150[d]
	Annual	1	-	4[f]	17[f]	50[e]	50[e]
PM	24-hour	5	10	10[a]	37[a]	-	-
	Annual	1	-	5[a]	19[c]	-	-
CO	1-hour	2000	-	-	-	40,000[a]	10,000[a]
	8-hour	500	575	-	-	10,000[a]	5,000[a]
O_3	1-hour	-	-	-	-	235[d]	-
	8-hour	-	-	-	-	-	157[d]
	Annual	-[g]	-[h]	-	-	-	-
H_2S	1-hour	-	0.2	-	-	-	35
Pb	3-month	-	0.1	-	-	1.5[c]	1.5[c]

Notes:

a. Not to be exceeded more than once per year.
b. Secondary Standard.
c. Never to be exceeded.
d. Standard is attained when the expected number of exceedances is less than or equal to 1.
e. Standard is attained when the expected annual arithmetic mean is less than or equal to 50 $\mu g/m^3$.
f. Effective June 3, 1994.
g. No significant ambient impact concentration has been established. Instead, any net emissions increase of 100 tons per year of VOC subject to PSD would be required to perform an ambient impact analysis.
h. Any new source or modified existing source located in an unclassified or attainment area for ozone that is equal to or greater than 100 tons per year emissions will be required to monitor ozone.
i. Standard is attained when the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 ug/m^3.
j. Standard is attained when the 3-year average of the annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15 ug/m^3.

* *De minimis* refers to those levels below which the DOH may exempt a stationary source or modification from the air quality analysis pre-construction monitoring requirements. The pre-construction monitoring *de minimis* levels are also listed in the table.

3.8.5.2. New Source Review

As stated above, a PSD review is required in attainment areas for all pollutants from a major source showing significant net increases in emissions due to a modification. A PSD review was required for all the pollutants that showed a significant net emissions increase associated with the addition of CT-4 and CT-5 (Alternative 1 or Alternative 2 without SCR). Table 3-D compares the project emissions with the PSD significant levels.

TABLE 3-D: COMPARISON OF NET PROJECT EMISSION RATES TO PSD SIGNIFICANT NET EMISSION RATES

AIR POLLUTANT	NET PROJECT EMISSIONS[a] (TONS/YR)	PSD SIGNIFICANT LEVEL (TONS/YR)
Nitrogen Oxides (NO_X)	39.8	40
Sulfur Dioxide (SO_2)	964	40
Carbon Monoxide (CO)	4,166	100
Volatile Organic Compounds	2,607	40
Particulate Matter (TSP)	173	25
Particulate Matter (PM_{10})	173	15
Lead (Pb)	0.1	0.6
Sulfuric Acid Mist	18	7
Beryllium (Be)	0.00035	0.0004
Mercury (Hg)	0.001	0.01
Fluorides	0.018	3
Arsenic	0.0098	[b]
Benzene	0.22	[b]

Source: 09/28/95 Hawaii Dept. of Health Ambient Air Quality Impact report, Table 3, page 33, except for nitrogen oxide (NO_x) net project emissions, which were revised to 39.8 tpy in DOH's July 30, 1997 Supplement B.1, page 4. [a] – Estimated emissions are based on CT-4 and CT-5 units operating 8760 hours per year, and on the emergency diesel fire pump operating 80 hours per year. [b] – Any emission rate.

The net emissions increases for the addition of CT-4 and CT-5 are shown in Table 3-D. These emission increases are based on worst-case operations of 8,760 hours per year. On this basis, the addition of CT-4 and CT-5 was a significant source of sulfur dioxide, carbon monoxide, volatile organic compounds, particulate matter, sulfuric acid mist, arsenic, and benzene. The addition of CT-4 and CT-5 was not a significant source for beryllium (Be), mercury (Hg), lead (Pb), or fluorides (Fl). Therefore, according to JCA's report, the project was subject to PSD review only for SO_2, CO, VOC, PM/PM_{10}, sulfuric acid mist, arsenic, and benzene as follows:

- Application of Best Available Control Technology (BACT)
- Analysis of ambient air quality impacts from the project (PSD Class II increments for sulfur dioxide and PM/PM_{10}; NAAQS/SAAQS for sulfur dioxide, PM/PM_{10}, and carbon monoxide)
- Analysis of air quality and/or visibility impacts on Class I areas
- Analysis of air quality-related values such as soils, vegetation, and visibility that are affected directly as a result of the project and general commercial, residential, and other growth associated with the project

The DOH has designated the Keahole area as Class II. The closest Class I area is the Volcanoes National Park, which is approximately 50 miles southeast of the project site. The Class I and Class II PSD increments and the NAAQS/SAAQS for sulfur dioxide, nitrogen dioxide, PM/PM_{10}, and carbon monoxide are presented in Table 3-C. The modeling significant impact levels and *de minimis* monitoring levels for sulfur dioxide, nitrogen dioxide, carbon monoxide, and PM/PM_{10} are also presented.

3.8.5.3. National Emissions Standards for Hazardous Air Pollutants

According to JCA's evaluation, the Keahole Generating Station with Alternative 1 or Alternative 2 added is not a major source of HAPs (i.e., has a potential to emit (PTE) of less than 10 tons per year (tpy) for any HAP and less than 25 tpy for all HAPs collectively). Thus, NESHAP standards do not apply.

3.8.5.4. Maximum Achievable Control Technology (Mact) Standards

According to JCA's findings, the Keahole Generating Station with Alternative 1 or Alternative 2 added is not a major source of HAPs (i.e., has a potential to emit (PTE) of less than 10 tons per year (tpy) for any HAP and less than 25 tpy for all HAPs collectively). Thus, MACT standards do not apply.

3.8.5.5. Good Engineering Practice (GEP) Stack Height Provisions

The GEP stack height analysis performed for the Keahole Generating Station results in a 104-foot-high exhaust stack.

3.8.6. The Impacts of the Alternatives on Climate and Air Quality

JCA used EPA guideline dispersion models to calculate maximum concentrations of combustion pollutants that would potentially result from Alternative 1 and Alternative 2 without SCR additions at the Keahole Generating Station. The two models were used to estimate the impacts in the various terrain types surrounding the generating station. The following information was used to predict the maximum ground-level concentrations of air pollutants from Keahole Generating Station:

- A full year of meteorological data collected at the Keahole monitoring station, Site 062
- CT-4 and CT-5 emission rates as defined in Table 3-D
- The emission rates as defined in PSD permit application 88-01, which includes CT-2 and all existing sources at the generating station
- The existing generating station configuration GEP analysis

JCA evaluated the potential impacts of (1) construction air emissions; (2) operational air emissions; and (3) impacts to vegetation that the proposed expansion would have.

3.8.6.1. Construction Air Emissions

JCA found that in completing construction two types of emissions would be produced: (1) exhaust from vehicles and construction equipment, and (2) dust generated during site excavation and equipment movement. However, exhaust emissions would be small, localized, and transient. Dust emissions would also be insignificant because of the average level of on-site vehicle activity. Watering trucks will wet unpaved roads at least three times per day (and more frequently if dust is observed). Also, many unpaved roads have been surfaced with gravel to minimize dust from vehicle movement. JCA concluded that construction emissions would be insignificant.

3.8.6.2. Operational Air Emissions

The modeling analysis JCA used to predict the maximum ground-level concentrations for SO_2, CO, and PM_{10} for the CT-4 and CT-5 and the existing diesel and combustion turbine units at Keahole were added to the maximum background concentration data. It was then compared with the most stringent State or Federal AAQS. Table 3-E contains the results.

According to these modeling results, no federal or state AAQS are exceeded. The pollutant with the largest impact is carbon monoxide. The maximum annual concentration for carbon monoxide added to the background concentration will equate to 57 percent of the SAAQS. As stated earlier, this maximum ground-level concentration is from all existing units at the generating station plus CT-4 and CT-5.

TABLE 3-E: AMBIENT AIR QUALITY IMPACT ANALYSIS (DATA SETS: HUEHUE – FEBRUARY 1, 1999 TO MAY 17, 2000 AND KAKAHIAKA – FEBRUARY 5, 2000 TO MAY 17, 2000)

AIR POLLUTANT	PERIOD	MAXIMUM CONCENTRATION ($\mu g/m^3$)	BACKGROUND ($\mu g/m^3$)	TOTAL CONCENTRATION ($\mu g/m^3$)	AIR STANDARD ($\mu g/m^3$)	PERCENT OF STANDARD (%)
Sulfur Dioxide (SO_2)	3-Hour	381	87	468	1,300	36
	24-Hour	71	34	105	365	29
	Annual	14	4[b]	18	80	23
Particulate (PM_{10})	24-Hour	34	27	61	150	41
	Annual	7	12[b]	19	50	38
Carbon Monoxide (CO)	1-Hour	4,718	969	5,687	10,000	57
	8-Hour	1,178	736	1,914	5,000	38

Source: 12/27/00 Hawaii DOH Ambient Air Quality Impact report, Supplement D, Table 2, page 13. Maximum concentrations are the greater of Scenario 1 and Scenario 2. Scenario 1 includes CTs-2, 4 & 5, units D18 - D23, the emergency fire pump, and the black start unit. Scenario 2 includes CTs-2, 4 & 5, units D20 - D23, the emergency fire pump, and the black start unit. See Supplement A of the Ambient Air Quality Impact Report dated September 28, 1995. "Annual" concentrations are the highest, rolling 12-month averages.

The addition of selective catalytic reduction (SCR) for NO_X emission control, will result in some ammonia emissions. (See JCA report in Volume 2 of the EIS, identified as Appendix I.) Specifically, the addition of SCR will result in a maximum 1-hour average concentration of 20.7 micrograms of ammonia per square meter of air, and a maximum annual average of 0.2 micrograms per square meter of air. Because the Hawaii Department of Health does not have any ammonia ambient standards, JCA used the Texas Commission on Environmental Quality's Effects Screening Levels (ESLs) to evaluate the impacts of the estimated ammonia slip. ESLs are used to evaluate the potential for effects to occur as a result of exposure to concentrations of constituents in air. ESLs are based on data concerning health effects, odor nuisance potential, effects with respect to vegetation, and corrosive effects. While they are not ambient air standards, if predicted or measured airborne levels of a constituent do not exceed the screening level, adverse health effects would not be anticipated. Based upon the comparison, JCA concluded that the estimated 1-hour average ammonia concentration would be only 12 percent of the ESL, and the estimated annual average concentration would be only one percent of the ESL. Therefore, ammonia emissions are expected to be insignificant.

3.8.6.3. Impacts to Vegetation

Because of concerns expressed about the proximity of the project to the Keahole Agricultural Park (which is located to the south of the Keahole Generating Station), HELCO commissioned a study by Dr. Robert Paull on the potential effects of ethylene[12], SO_2, and NO_x emissions from the expanded Keahole Plant on plants and crops in the Keahole area. Of these emissions, ethylene has the greatest potential to adversely impact plant growth and development, while SO_2 and NOx would cause phytotoxic[13] symptoms on plants.

[12] Ethylene is a natural plant growth regulator used in agriculture in Hawaii and elsewhere to induce flowering of pineapple and ripening of bananas. The major urban and natural sources of ethylene are gasoline, diesel engines and fires. These sources lead to a localized increase in ethylene that may exceed the plant response threshold concentration influence plant growth. The other component of a plant's responsiveness to ethylene is the duration of exposure.

[13] Poisonous to plants.

Dr. Paull found that based on his review there would be no effect of the current operations or planned expansion at the generation plant on the plants growing in the agricultural park. His findings are based on the following:

- The plume from the stacks are estimated to only impact the agricultural park an average of three 15 minute periods per month with another 21 possible impacts of less than 15 minutes, giving a possible total of 24 per month.
- The highest ethylene levels recorded for brief periods in the agricultural park are similar to those found in urban air in which the main source is automobile exhaust. The agricultural park would be exposed to ethylene from all sources in the area for 15 minutes at 1/10 of the concentration of the 8 hour recommended American Hygiene Association Rural Standard (0.05 $\mu L \cdot L^{-1}$). The American Hygiene Standard and the higher California Standard are commonly used measures to avoid crop damage.
- There are no known published reports dealing with injury to ornamental plants including orchids, from ethylene, sulfur dioxide or nitrogen dioxide at the concentrations, frequency and exposure duration of gases from the generation plant impacting the agricultural park. The lack of published reports is due in part to the difficulty of performing these types of experiments and the lack of observable plant responses at these concentrations and exposure durations.

It is important to note that the PSD modeling process makes a number of conservative assumptions that overstate emissions from the generating station. Therefore, projected concentrations that result from the modeling can be considered "worst case," and typical ground-level concentrations should be lower than those described in the PSD application. Post-construction monitoring is designed to confirm that this is the case.

	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
Alternative 1 – No Action	✓			The generating station is already operational under an existing permit.
Alternative 2 – Proposed Action	✓			A permit for construction and operation dated July 25, 2001, was issued under state and federal regulatory authorities, which means that the modification fully complies with the applicable rules, regulations, and air quality standards. The provisions of the permit incorporate mitigation measures that will minimize air quality impact. Mitigation measures include limitations on the fuel sulfur content, water injection for NO_x control, GEP stack height for CT exhaust, emission limitations (3-hr averages) for five pollutants, and NO_x netting resulting in the retirement of units D18-D20 and a fuel limitation on unit D21. Post-construction air quality monitoring will be performed continuously for one year after initial startup.
Alternative 3 – West Hawaii		✓		The permitting process is often extensive, costly, and time consuming. A new site would require new studies, new permits, and new construction. The most efficient and cost-effective alternative to meet current demand and near-term projected demand would be to utilize an existing site.
Alternative 4 – East/West Hawaii		✓		While this alternative would utilize an existing site, transmission equipment would need to be constructed to transmit power to West Hawaii, where most of the load growth has occurred or is expected. Furthermore, new permits and studies would be needed for the additions to the generating station.
Alternative 5 - Renewable		✓		Property would need to be located, possibly numerous studies conducted; new permits would need to be obtained for a new biomass plant.

3.9. TRAFFIC CONDITIONS

Following is description of existing traffic conditions in the vicinity of the Keahole Generating Station and an analysis of the proposed project's impacts upon future traffic conditions. This information is a summary of the Traffic Impact Analysis Study prepared for the project and identified as Appendix A to this EIS.

3.9.1. EXISTING ROADWAY SYSTEM

In the vicinity of the project, Queen Kaahumanu Highway is a two-lane State highway that provides access between Kawaihae and Kailua town. Generally, Queen Kaahumanu Highway has two 12-foot travel lanes, one in each direction, with 10-foot shoulders.

The existing Keahole facility has two accesses, one on the north and one on the south. The principal access is on the south from Pukiawe Street which intersects with Kaiminani Drive and terminates at the facility in the northbound direction. Pukiawe Street is a two-lane collector road that provides access to both the Keahole facility (to the north) and a portion of the Keahole Agricultural Park (to the south).

A secondary access is provided on the north side of the facility by the Reservoir Road, which is the mauka extension of the Keahole Airport Access Road. The Keahole Airport Access Road is a two-lane collector road that provides access to the Kona International Airport, as well as supporting facilities such as rental car companies and other businesses that support airport operations.

For this project, there are two study intersections:

- Queen Kaahumanu Highway with the Keahole Airport Access Road and Reservoir Access Road.
- Queen Kaahumanu Highway with Kaiminani Drive.

For the signalized intersection of Queen Kaahumanu Highway, Keahole Airport Access Road and Reservoir Road, there are separate left turn lanes on the highway in the northbound and southbound direction and a separate right turn lane in the eastbound direction. There are southbound deceleration and acceleration lanes on the highway for the Keahole Airport Access Road. The Reservoir Access Road is a single lane road and serves the Keahole facility, including the Airport Substation, and terminates at the driveway to two water tanks uphill from the Keahole facility. The Reservoir Access Road abuts the north side of the Keahole facility, providing secondary access to it.

As discussed above, the primary access to the Keahole facility is provided by Kaiminani Drive, which also links Queen Kaahumanu Highway and Mamalahoa Highway. Kaiminani Drive serves as a collector road for the Kona Palisades subdivision and meets Queen Kaahumanu Highway in a signalized T-intersection.

There is a separate left turn lane on the highway in the southbound direction. In addition, for the signalized intersection of Queen Kaahumanu Highway, Keahole Airport Access Road and Reservoir Road, there are separate left turn lanes on the highway in the northbound and southbound direction and a separate right turn lane in the eastbound direction. There are southbound deceleration and acceleration lanes on the highway for the Keahole Airport Access Road.

3.9.1.1. Traffic Counts

Manual turning movement count data was collected at the intersection of Queen Kaahumanu Highway with Keahole Airport Road and Reservoir Road as well as the intersection of Queen Kaahumanu Highway and Kaiminani Drive. The traffic counts were conducted on March 9 and 10, 2004. The manual traffic count data is contained in Appendix A as an appendix to the traffic study. The weekday morning peak hour is at 6:30 to 7:30 a.m. while the weekday afternoon peak hour occurs at 3:15 to 4:15 p.m. The existing morning and afternoon peak hour traffic volumes are presented in Figure 3-5.

3.9.1.2. Analysis Results

The traffic study utilizes the Highway Capacity Manual (HCM) 2000 analytical methodology for signalized intersections. The analysis results provide Level of Service conditions, which are rated from A to F (best to worst), and capacity conditions. Level of Service represents a qualitative measure of traffic operating conditions and considers speed, travel time, freedom to maneuver, types of traffic controls and interruptions as well as driver comfort and convenience. Level of service definitions for signalized intersections are summarized in Appendix B of the traffic study, which is presented as Appendix A to this EIS.

For the intersection of Queen Kaahumanu Highway, Keahole Airport Road and Reservoir Road, the overall intersection is at Level of Service B during the morning peak hour and at Level of Service C during the afternoon peak hour. For the intersection of Queen Kaahumanu Highway and Kaiminani Drive, the overall intersection is at Level of Service B during the morning and afternoon peak hour. Overall, the field observations concur with analysis results of Level of Service C or better for these two study intersections. A summary of the analysis results is presented in Table 3-F.

3.9.2. Future Traffic Conditions Without The Project

Research of historical traffic volume data and traffic generated by nearby projects was conducted to develop future Year 2009 traffic forecasts without the proposed project improvements. Regional traffic studies, such as the Hawaii Long Range Land Transportation Plan, Keahole to Kailua Development Plan and the Keahole to Honaunau Regional Circulation Plan, were also reviewed. A growth factor of 4.8 percent was applied to account for historical regional growth in traffic volumes. In addition, traffic volumes generated by the nearby proposed Palamanui project were derived for Year 2009 from the project's traffic study report by Austin, Tsutsumi & Associates, Inc., dated January 27, 2004.

The Palamanui project has proposed two alternate access roads, as shown in Figure 3-6, and is currently conducting feasibility studies. The north access road for the Palamanui project would create a new T-intersection with Queen Kaahumanu Highway. Palamanui's south access road would connect to Queen Kaahumanu Highway at the current location of the Reservoir Road. Two future Year 2009 traffic assignments without the proposed HELCO project have been developed. If the Palamanui project selects its north access road as its primary access, then Figure 3-7 contains the future traffic assignment. However, if the Palamanui project prefers the south access road as its primary access road, then Figure 3-8 shows the traffic assignment for this proposal.

TABLE 3-F: EXISTING TRAFFIC CONDITIONS – SIGNALIZED INTERSECTION ANALYSIS RESULTS

Intersection	AM Peak Hour v/c Ratio	AM Peak Hour Delay (seconds)	AM Peak Hour Level of Service	PM Peak Hour v/c Ratio	PM Peak Hour Delay (seconds)	PM Peak Hour Level of Service
Queen Kaahumanu Highway/Keahole Airport Road & Reservoir Road						
Queen Kaahumanu Highway						
Northbound Approach	--	12.5	B	--	14.3	B
Left Turn	0.37	6.3	A	0.72	30.5	C
Right Turn/Through Movement	0.76	14.0	B	0.39	7.6	A
Southbound Approach	--	8.1	A	--	30.0	C
Left Turn	0.00	6.5	A	0.00	8.5	A
Through Movement	0.29	8.4	A	0.90	31.5	C
Right Turn	0.08	6.9	A	0.07	9.0	A
Keahole Aiport Road						
Eastbound Approach						
Left Turn	0.12	22.4	C	0.60	34.5	C
Reservoir Road						
Westbound Approach	0.01	21.7	C	0.01	27.3	C
Overall Intersection	0.60	11.6	B	0.92	24.6	C
Queen Kaahumanu Highway/Kaiminani Drive						
Queen Kaahumanu Highway						
Northbound Approach	--	17.9	B	--	10.0	A
Through Movement	0.82	19.5	B	0.55	10.8	B
Right Turn	0.15	7.5	A	0.32	8.3	A
Southbound Approach	--	7.5	A	--	14.2	B
Left Turn	0.14	7.9	A	0.75	19.6	B
Through Movement	0.35	7.4	A	0.74	12.1	B
Kaiminani Drive						
Westbound Approach						
Left Turn	0.66	25.8	C	0.32	26.0	C
Right Turn	FREE RIGHT TURN			FREE RIGHT TURN		
Overall Intersection	0.86	16.4	B	0.65	13.0	B

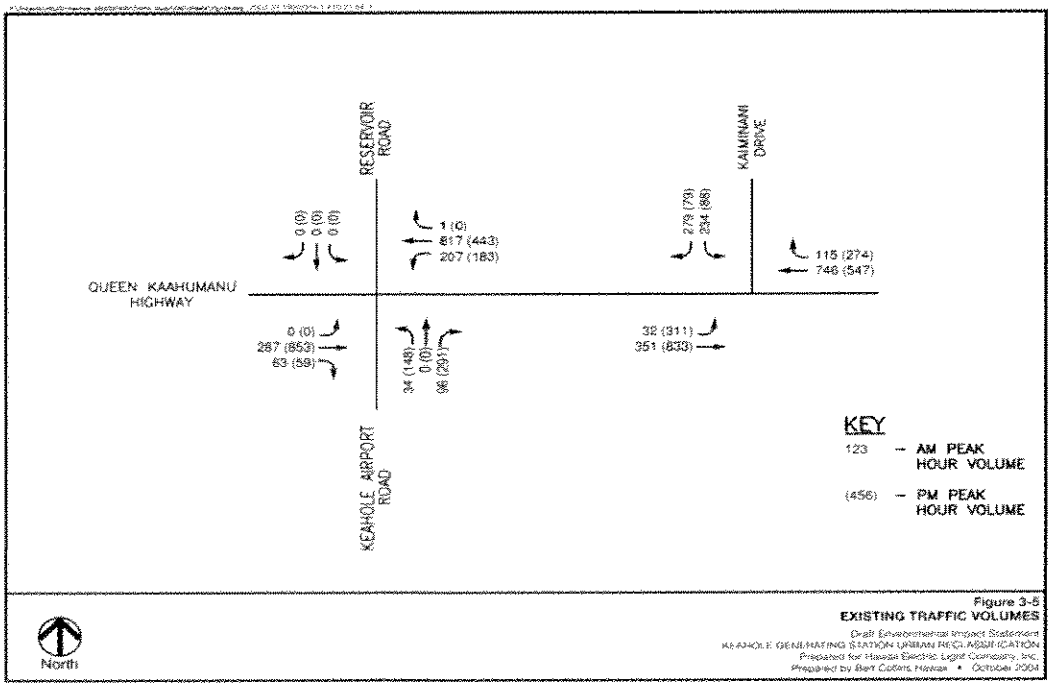

Figure 3-5
EXISTING TRAFFIC VOLUMES
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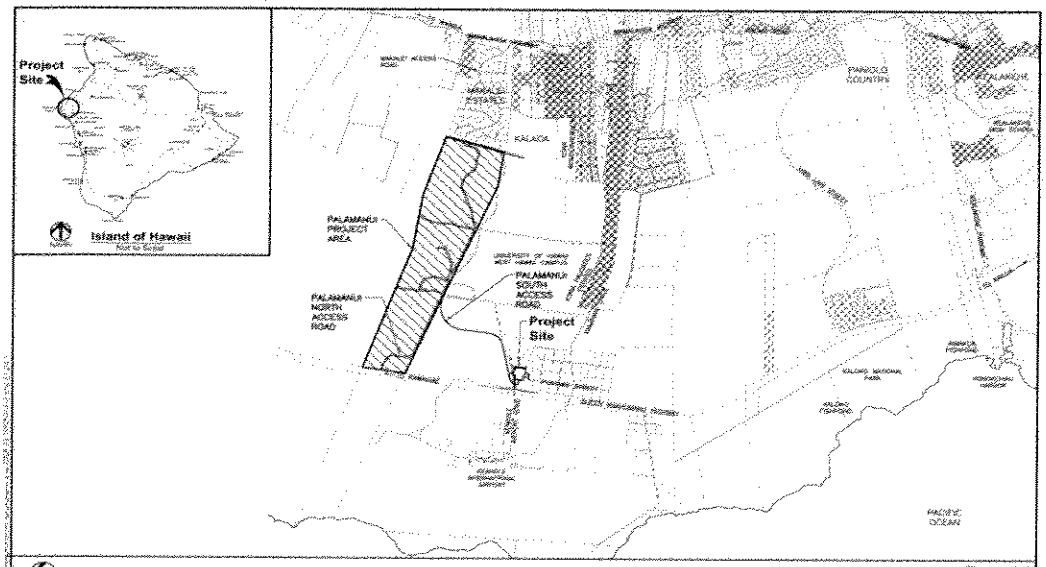

Figure 3-6
PROPOSED PALAMANUI ACCESS ROADS

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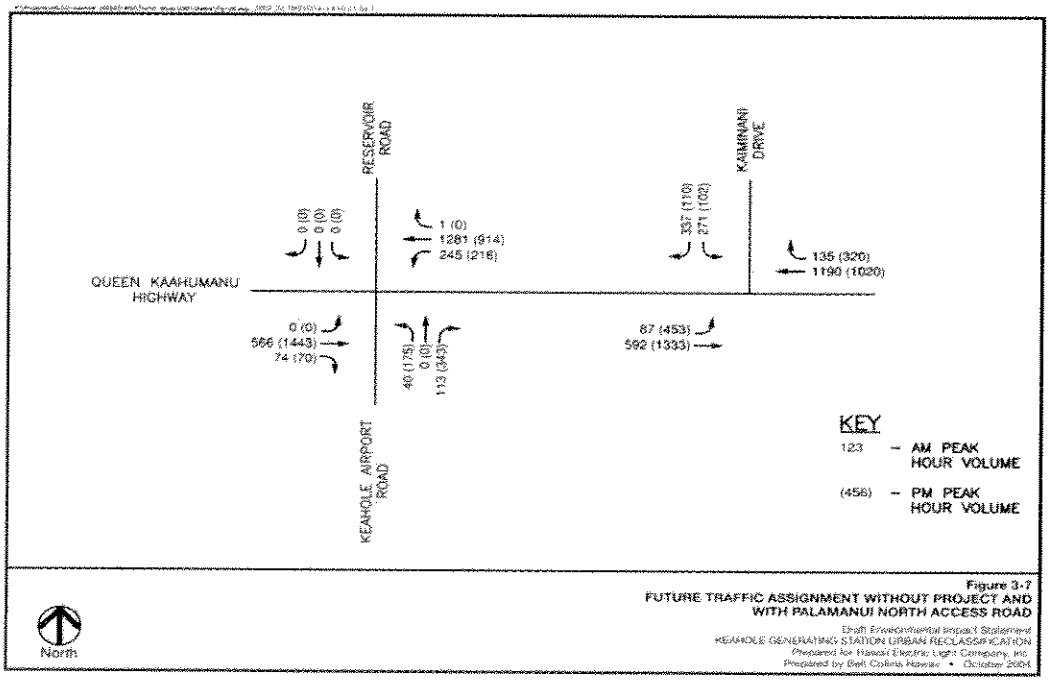

Figure 3-7
FUTURE TRAFFIC ASSIGNMENT WITHOUT PROJECT AND WITH PALAMANUI NORTH ACCESS ROAD

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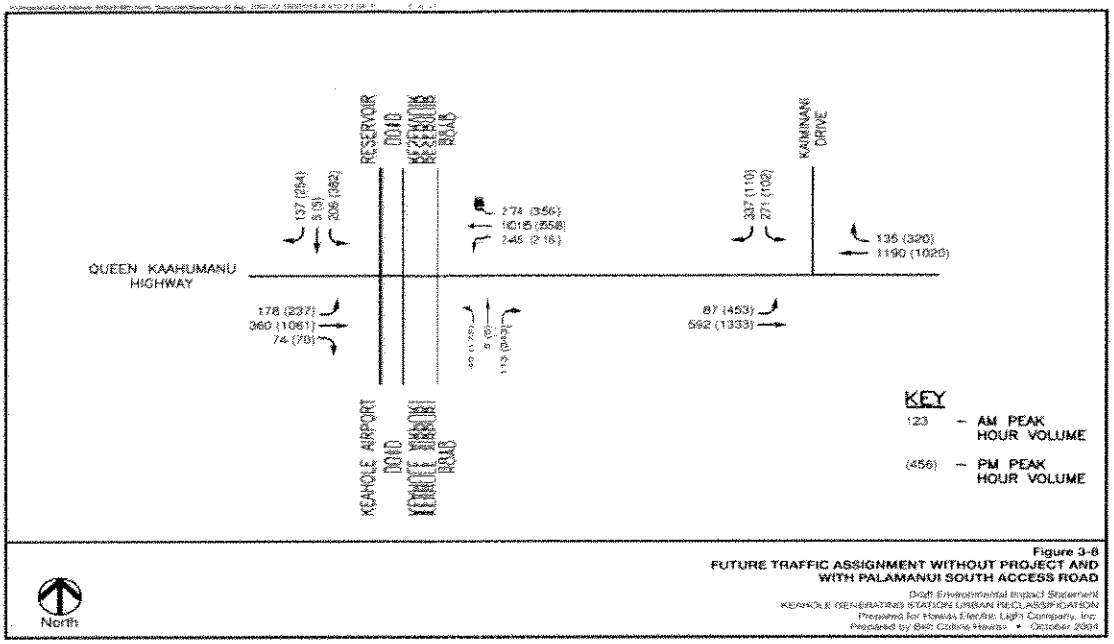

Figure 3-8
FUTURE TRAFFIC ASSIGNMENT WITHOUT PROJECT AND WITH PALAMANUI SOUTH ACCESS ROAD

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Prepared by: SMS Consulting Hawaii • October 2004

TABLE 3-G: FUTURE TRAFFIC CONDITIONS WITHOUT PROJECT (WITH PALAMANUI NORTH ACCESS ROAD)

	AM Peak Hour			PM Peak Hour		
Intersection	v/c Ratio	Delay (seconds)	Level of Service	v/c Ratio	Delay (seconds)	Level of Service
Queen Kaahumanu Highway/Keahole Airport Road & Reservoir Road						
Queen Kaahumanu Highway						
Northbound Approach	--	29.6	C	--	69.4	E
Left Turn	0.50	4.0	A	1.12	324.3	F
Right Turn/Through Movement	0.97	34.5	C	0.69	9.3	A
Southbound Approach	--	4.7	A	--	402.3	F
Left Turn	0.01	2.7	A	0.90	5.7	A
Through Movement	0.45	4.9	A	1.22	421.8	F
Right Turn	0.07	2.8	A	0.07	6.1	A
Keahole Airport Road						
Eastbound Approach						
Left Turn	0.42	33.8	C	1.13	362.2	F
Reservoir Road						
Westbound Approach	0.03	30.3	C	0.01	46.0	D
Overall Intersection	0.92	22.5	C	1.34	266.1	F
Queen Kaahumanu Highway/Kaiminani Drive						
Queen Kaahumanu Highway						
Northbound Approach	--	67.2	E	--	42.2	D
Through Movement	1.01	74.1	E	0.97	51.6	D
Right Turn	0.13	6.5	A	0.36	12.3	B
Southbound Approach	--	8.7	A	--	47.9	D
Left Turn	0.39	9.6	A	0.96	74.5	E
Through Movement	0.48	8.6	A	0.97	38.9	D
Kaiminani Drive						
Westbound Approach						
Left Turn	0.91	86.0	F	0.62	58.6	E
Right Turn	FREE RIGHT TURN			FREE RIGHT TURN		
Overall Intersection	1.04	52.0	D	0.99	45.9	D

The State Department of Transportation has proposed the Phase 1 widening of Queen Kaahumanu Highway from two to four lanes between Henry Street and Kealakehe Parkway; this improvement is scheduled for completion in Year 2008. In addition, a Phase 2 Queen Kaahumanu Highway widening between Kealakehe Parkway and Keahole Airport Road is being programmed for completion in Year 2011.

The analysis results for future conditions without the project are identified in Table 3-G with Palamanui north access road and in Table 3-H with Palamanui south access road. The signalized intersection analysis shows similar results if either the Palamanui north or south access road serves as its primary access road.

TABLE 3-H: FUTURE TRAFFIC CONDITIONS WITHOUT PROJECT (WITH PALAMANUI SOUTH ACCESS ROAD)

	AM Peak Hour			PM Peak Hour		
Intersection	v/c Ratio	Delay (seconds)	Level of Service	v/c Ratio	Delay (seconds)	Level of Service
Queen Kaahumanu Highway/Keahole Airport Road & Reservoir Road						
Queen Kaahumanu Highway						
Northbound Approach	--	106.2	F	--	142.1	F
Left Turn	345.00	5.4	A	1.31	636.6	F
Through Movement	1.07	156.0	F	0.66	26.8	C
Right Turn	0.33	9.4	A	0.50	22.8	C
Southbound Approach	--	31.9	C	--	404.6	F
Left Turn	0.93	87.0	F	0.78	39.6	D
Through Movement	0.38	9.7	A	1.26	511.8	F
Right Turn	0.09	7.4	A	0.10	16.5	B
Keahole Aiport Road						
Eastbound Approach	0.20	26.1	C	1.32	684.3	F
Left Turn	--	--	--	--	--	--
Through Movement	--	--	--	--	--	--
Reservoir Road						
Westbound Approach	1.14	331.8	F	1.30	603.1	F
Left Turn	--	--	--	--	--	--
Left Turn/Through Movement	--	--	--	--	--	--
Overall Intersection	1.05	105.6	F	1.64	349.3	F
Queen Kaahumanu Highway/Kaiminani Drive						
Queen Kaahumanu Highway						
Northbound Approach	--	67.2	E	--	42.2	D
Through Movement	1.01	74.1	E	0.97	51.6	D
Right Turn	0.13	6.5	A	0.36	12.3	B
Southbound Approach	--	8.7	A	--	47.9	D
Left Turn	0.39	9.6	A	0.96	74.5	E
Through Movement	0.48	8.6	A	0.97	38.9	D
Kaiminani Drive						
Westbound Approach						
Left Turn	0.91	86.0	F	0.62	58.6	E
Right Turn	FREE RIGHT TURN			FREE RIGHT TURN		
Overall Intersection	1.04	52.0	D	0.99	45.9	D

3.9.3. PROJECT TRAFFIC

The Keahole Generation Station expansion will add additional equipment and improved facilities at the project site. The traffic forecast of project traffic volumes is developed through a three-step procedure of trip generation, trip distribution and traffic assignment.

3.9.3.1. Trip Generation

In trip generation, the estimates of project traffic volumes are quantified through discussions with the HELCO staff about the number of employees at the site and their shift hours as well as deliveries. With

the recently completed installation of the two new CTs the staffing at the Keahole Generation Station has been modified. During the weekday, six maintenance personnel are employed between 6:00 a.m. and 5:30 p.m. while three operating personnel work on the first shift, 6:00 a.m. to 2:00 p.m. and two operating personnel are on the second shift, 2:00 p.m. to 10:00 p.m. During the weekend, there are four operating personnel assigned with two persons in two shifts of 6:00 a.m to 2:00 p.m and 2:00 p.m. to 10:00 p.m. Hence, most of the current shift changes occur at different times than the Queen Kaahumanu Highway peak hours of 6:30 to 7:30 a.m. and 3:15 to 4:15 p.m.

The fuel truck deliveries usually range between 3 to 4 trips per day, Monday through Friday. Fuel is trucked from Hilo Harbor. The Keahole Generation Station receives five mail deliveries per week. Also, other deliveries by vendor/supplier goods and services are likely to increase to between 5 and 10 deliveries per week.

At project completion in Year 2009, the Keahole Generation Station weekday staffing would change to eight maintenance personnel between 6:00 a.m. and 5:30 p.m. and seven operating personnel in three shifts (one person from 7:00 a.m. to 3:30 p.m., two persons from 6:00 a.m. to 2:00 p.m., two persons from 2:00 p.m. to 10:00 p.m. and two persons from 10:00 p.m. to 6:00 a.m.). For the weekend staffing, there would be six operating personnel with two persons in each of the three shifts: 6:00 a.m. - 2:00 p.m., 2:00 p.m. - 10:00 p.m. and 10:00 p.m. - 6:00 a.m.

Fuel deliveries would increase to 7 or 8 fuel trucks per day, Monday through Friday, but deliveries would be from Kawaihae Harbor instead of Hilo Harbor. Also, there would be five mail deliveries and approximately 8 to 12 vendor/ supplier deliveries per week.

The Keahole Generation Station and the Airport Substation would have the largest staffing, fuel truck deliveries and vendor/supplier deliveries at project completion. Although employee shifts are slightly different from the existing morning and afternoon roadway peak hour periods, some of the employee trips are included in the morning and afternoon peak hours since it is possible the project peak hour periods may become coincident to the future highway peak hour periods. The estimated project trips, as given in Table 3-I, are utilized for the future with project traffic conditions.

TABLE 3-I: PROJECT TRIPS

	AM Peak Hour		PM Peak Hour	
	Enter	Exit	Enter	Exit
Staff	13	4	2	10
Fuel Trucks	2	2	1	1
Ammonia Trucks	0	0	0	0
Vendor/Supplier	0	0	0	0
Total	15	6	3	11

3.9.4. FUTURE TRAFFIC CONDITIONS WITH THE PROJECT

The future Year 2009 traffic forecasts with the project are developed by adding the future project to the projected future conditions. The future traffic assignment with the project volumes with Alternative A and Alternative B is shown in Figure 3-9 and Figure 3-10, respectively.

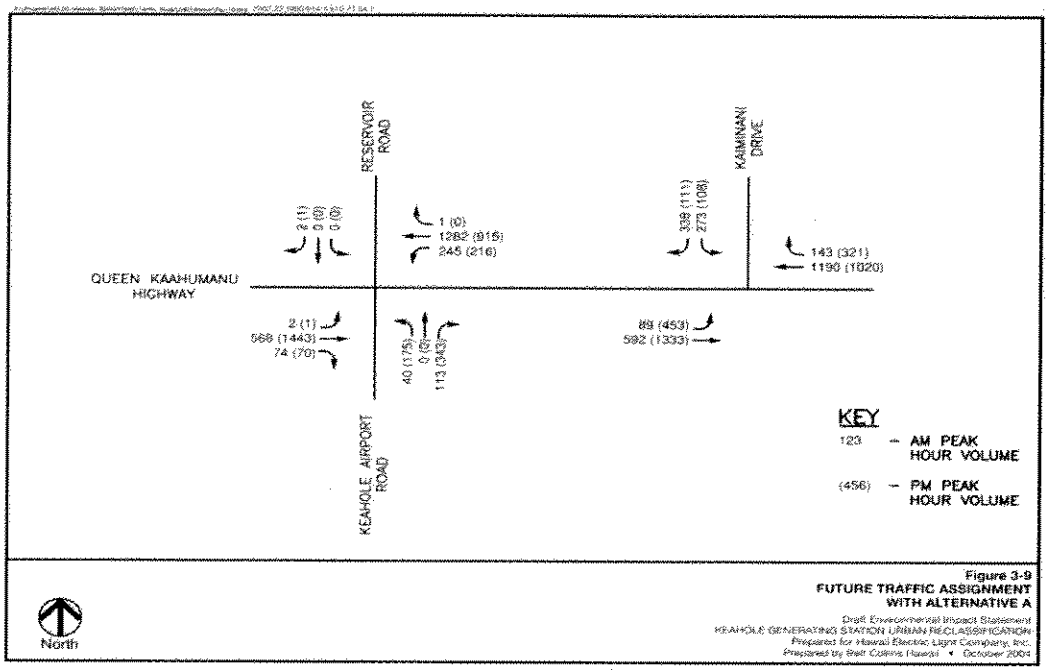

Figure 3-9
FUTURE TRAFFIC ASSIGNMENT WITH ALTERNATIVE A

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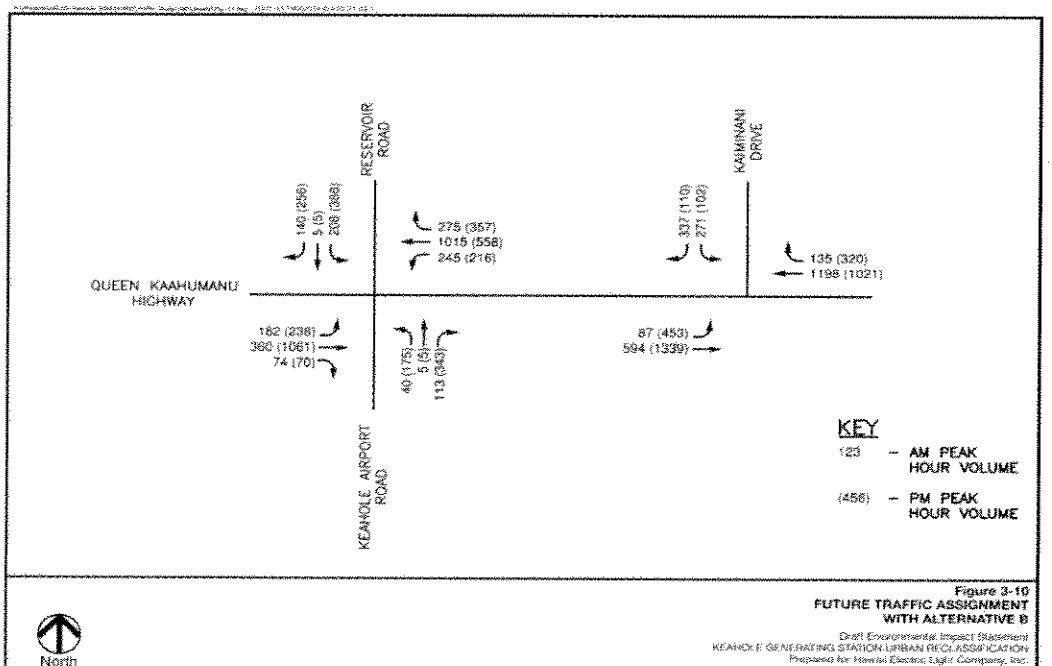

Figure 3-10
FUTURE TRAFFIC ASSIGNMENT WITH ALTERNATIVE B

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The State Department of Transportation is currently planning to implement the Phase I widening of Queen Kaahumanu Highway from two to four lanes between Henry Street and Kealakehe Parkway by Year 2008. Also, the Phase II widening of Queen Kaahumanu Highway to four lanes between Kealakehe Parkway and the Keahole Airport Road is scheduled for completion by Year 2011.

The analysis results with a two-lane Queen Kaahumanu Highway are similar to the future without project traffic conditions with the Palamanui north access road (Table 3-J, HELCO Alternative A) or south access road (Table 3-K, HELCO Alternative B). The intersection of Queen Kaahumanu Highway, Keahole Airport Road and Reservoir would be at Level of Service F and or operate with volume-to-capacity ratios greater than 1.0 during the afternoon peak hour while the intersection of Queen Kaahumanu Highway and Kaiminani Drive would exceed capacity during the morning peak hour. If Queen Kaahumanu Highway were widened to four lanes, then the analysis results in Table 3-L and Table 3-M indicates that both of these study intersections would operate at Level of Service E conditions of better.

TABLE 3-J: FUTURE TRAFFIC CONDITIONS WITH ALTERNATIVE A

	AM Peak Hour			PM Peak Hour		
Intersection	v/c Ratio	Delay (seconds)	Level of Service	v/c Ratio	Delay (seconds)	Level of Service
Queen Kaahumanu Highway/Keahole Airport Road & Reservoir Road						
Queen Kaahumanu Highway						
Northbound Approach	--	29.9	C	--	69.4	E
Left Turn	0.50	4.0	A	1.12	324.3	F
Right Turn/Through Movement	0.97	34.9	C	0.69	9.3	A
Southbound Approach	--	4.7	A	--	402.3	F
Left Turn	0.02	2.9	A	0.00	5.7	A
Through Movement	0.46	4.9	A	1.22	421.8	F
Right Turn	0.07	2.8	A	0.07	6.1	A
Keahole Aiport Road						
Eastbound Approach						
Left Turn	0.42	33.8	C	1.13	362.2	F
Reservoir Road						
Westbound Approach	0.04	30.4	C	0.01	46.0	D
Overall Intersection	0.93	22.7	C	1.34	266.0	F
Queen Kaahumanu Highway/Kaiminani Drive						
Queen Kaahumanu Highway						
Northbound Approach	--	66.8	E	--	42.2	D
Through Movement	1.01	74.1	E	0.97	51.6	D
Right Turn	0.14	6.6	A	0.36	12.3	B
Southbound Approach	--	8.7	A	--	47.9	D
Left Turn	0.40	9.7	A	0.96	74.5	E
Through Movement	0.48	8.6	A	0.97	38.9	D
Kaiminani Drive						
Westbound Approach						
Left Turn	0.92	68.5	F	0.66	61.2	E
Right Turn	FREE RIGHT TURN			FREE RIGHT TURN		
Overall Intersection	1.05	52.1	D	1.00	46.0	D

TABLE 3-K: FUTURE TRAFFIC CONDITIONS WITH ALTERNATIVE B

Intersection	AM Peak Hour v/c Ratio	AM Peak Hour Delay (seconds)	AM Peak Hour Level of Service	PM Peak Hour v/c Ratio	PM Peak Hour Delay (seconds)	PM Peak Hour Level of Service
Queen Kaahumanu Highway/Keahole Airport Road & Reservoir Road						
Queen Kaahumanu Highway						
Northbound Approach	--	81.9	F	--	142.0	F
Left Turn	0.42	8.0	A	1.31	636.6	F
Through Movement	1.03	118.0	F	0.66	26.8	C
Right Turn	0.33	14.3	B	0.50	22.8	C
Southbound Approach	--	44.1	D	--	404.5	F
Left Turn	0.94	115.6	F	0.78	40.0	D
Through Movement	0.37	14.7	B	1.26	511.8	F
Right Turn	0.09	11.6	B	0.10	16.5	B
Keahole Aiport Road						
Eastbound Approach	0.82	135.4	F	1.32	684.3	F
Left Turn	--	--	--	--	--	--
Through Movement	--	--	--	--	--	--
Reservoir Road						
Westbound Approach	0.98	147.4	F	1.32	640.0	F
Left Turn	--	--	--	--	--	--
Left Turn/Through Movement	--	--	--	--	--	--
Overall Intersection	1.00	79.0	E	1.65	354.4	F
Queen Kaahumanu Highway/Kaiminani Drive						
Queen Kaahumanu Highway						
Northbound Approach	--	73.9	E	--	42.6	D
Through Movement	1.01	81.5	F	0.97	52.1	D
Right Turn	0.13	6.5	A	0.36	12.3	B
Southbound Approach	--	8.8	A	--	50.2	D
Left Turn	0.40	9.7	A	0.96	75.8	E
Through Movement	0.48	8.6	A	0.98	41.6	D
Kaiminani Drive						
Westbound Approach						
Left Turn	0.91	86.0	F	0.62	58.6	E
Right Turn	FREE RIGHT TURN			FREE RIGHT TURN		
Overall Intersection	1.05	55.9	E	0.94	47.3	D

TABLE 3-L: FUTURE TRAFFIC CONDITIONS WITH ALTERNATIVE A AND WITH MITIGATION

Intersection	AM Peak Hour v/c Ratio	AM Peak Hour Delay (seconds)	AM Peak Hour Level of Service	PM Peak Hour v/c Ratio	PM Peak Hour Delay (seconds)	PM Peak Hour Level of Service
Queen Kaahumanu Highway/Keahole Airport Road & Reservoir Road						
Queen Kaahumanu Highway						
Northbound Approach	--	13.2	B	--	14.3	B
Left Turn	0.65	16.6	B	0.79	36.8	D
Right Turn/Through Movement	0.69	12.6	B	0.45	9.1	A
Southbound Approach	--	10.3	B	--	24.9	C
Left Turn	0.02	8.6	A	0.00	10.4	B
Through Movement	0.34	10.5	B	0.88	25.5	C
Right Turn	0.10	8.9	A	0.10	11.1	B
Keahole Airport Road						
Eastbound Approach						
Left Turn	0.11	19.3	B	0.60	32.1	C
Reservoir Road						
Westbound Approach	0.01	18.6	B	0.01	24.9	C
Overall Intersection	0.50	12.5	B	0.89	21.1	C
Queen Kaahumanu Highway/Kaiminani Drive						
Queen Kaahumanu Highway						
Northbound Approach	--	12.8	B	--	23.9	C
Through Movement	0.71	13.4	B	0.81	24.8	C
Right Turn	0.19	8.3	A	0.57	20.8	C
Southbound Approach	--	7.8	A	--	13.2	B
Left Turn	0.46	10.8	B	0.84	27.9	C
Through Movement	0.32	7.3	A	0.62	8.2	A
Kaiminani Drive						
Westbound Approach						
Left Turn	0.71	27.1	C	0.39	26.6	C
Right Turn	FREE RIGHT TURN			FREE RIGHT TURN		
Overall Intersection	0.83	13.0	B	0.88	16.1	B

TABLE 3-M: FUTURE TRAFFIC CONDITIONS WITH ALTERNATIVE B AND WITH MITIGATION

Intersection	AM Peak Hour v/c Ratio	AM Peak Hour Delay (seconds)	AM Peak Hour Level of Service	PM Peak Hour v/c Ratio	PM Peak Hour Delay (seconds)	PM Peak Hour Level of Service
Queen Kaahumanu Highway/Keahole Airport Road & Reservoir Road						
Queen Kaahumanu Highway						
Northbound Approach	--	22.0	C	--	38.2	D
Left Turn	0.59	13.6	B	0.83	54.4	D
Through Movement	0.85	25.1	C	0.48	31.1	C
Right Turn	0.52	18.1	B	0.69	39.5	D
Southbound Approach	--	20.0	B	--	43.5	D
Left Turn	0.82	34.3	C	0.61	20.3	C
Through Movement	0.30	14.1	B	0.91	49.9	D
Right Turn	0.14	13.2	B	0.13	26.4	C
Keahole Airport Road						
Eastbound Approach	--	26.7	C	--	62.3	E
Left Turn	0.29	26.9	C	0.76	62.8	E
Through Movement	0.04	25.4	C	0.02	44.4	D
Reservoir Road						
Westbound Approach	0.51	25.1	C	0.62	45.6	D
Left Turn	--	--	--	--	--	--
Left Turn/Through Movement	--	--	--	--	--	--
Overall Intersection	0.74	21.9	C	0.84	42.9	D
Queen Kaahumanu Highway/Kaiminani Drive						
Queen Kaahumanu Highway						
Northbound Approach	--	13.0	B	--	17.9	B
Through Movement	0.71	13.5	B	0.75	18.5	B
Right Turn	0.18	8.2	A	0.53	16.1	B
Southbound Approach	--	7.8	A	--	12.6	B
Left Turn	0.45	10.8	B	0.87	29.4	C
Through Movement	0.32	7.3	A	0.62	8.9	A
Kaiminani Drive						
Westbound Approach						
Left Turn	0.71	27.1	C	0.47	25.5	C
Right Turn	FREE RIGHT TURN			FREE RIGHT TURN		
Overall Intersection	0.84	13.1	B	0.90	15.2	B

With HELCO Alternative A or Alternative B, the proportion of project trips entering the Queen Kaahumanu Highway intersections with Keahole Airport Road/ Reservoir Road and with Kaiminani Drive ranges between 0.10 percent and 0.64 percent, as identified in Table 3-N. Hence, the proportion of traffic volumes attributable to the HELCO Keahole Generation Station and Airport Substation at the study intersections is less than one percent during morning and afternoon peak hour periods.

TABLE 3-N: PROJECT TRAFFIC VOLUMES ENTERING STUDY INTERSECTIONS

ALTERNATIVE A: Primary Access at South Gate and Fuel Trucks at North Gates

Intersection	AM Peak Hour	PM Peak Hour
Queen Kaahumanu Highway / Keahole Airport Road / Reservoir Road	0.30%	0.10%
Queen Kaahumanu Highway / Kaiminani Drive	0.50%	0.24%

ALTERNATIVE B: Primary Access at North Gates and South Gate Closed

Intersection	AM Peak Hour	PM Peak Hour
Queen Kaahumanu Highway / Keahole Airport Road / Reservoir Road	0.64%	0.27%
Queen Kaahumanu Highway / Kaiminani Drive	0.38%	0.21%

3.9.5. FINDINGS AND RECOMMENDATIONS

The existing intersections of Queen Kaahumanu Highway/Keahole Airport Road/Reservoir Road and Queen Kaahumanu Highway/Kaiminani Drive operate at Level of Service C conditions or better during the morning and afternoon peak hours. During the morning peak hour of the March 2004 traffic counts, there were total of 48 vehicles arriving and 11 vehicles departing at the north and south gates. During the afternoon peak hour, there were 7 vehicles arriving and 16 vehicles departing the north and south gates. Contractor vehicles parked external of the south gate and are included in these traffic counts. Most of the traffic volumes are due to the construction activities and testing of newly installed equipment at the Keahole Generation Station. With the existing traffic conditions, most of the HELCO generation station employees utilize the south gate and the north gates are used by fuel trucks.

For future traffic conditions without the project, there are increases in the forecasted Queen Kaahumanu Highway traffic volumes that would result in Level of Service F conditions or where highway capacity conditions are exceeded. The Palamanui project is currently studying the feasibility of a north access road and a south access road. The analysis results indicate that widening of Queen Kaahumanu Highway to four lanes would mitigate traffic conditions to Level of Service E or better. The proposed laneage configurations at the two study intersections are provided in Figure 3-11.

For future traffic conditions with the project, the analysis results would be similar to future traffic conditions without the project and the laneage recommendations would be the same as shown in Figure 3-11.

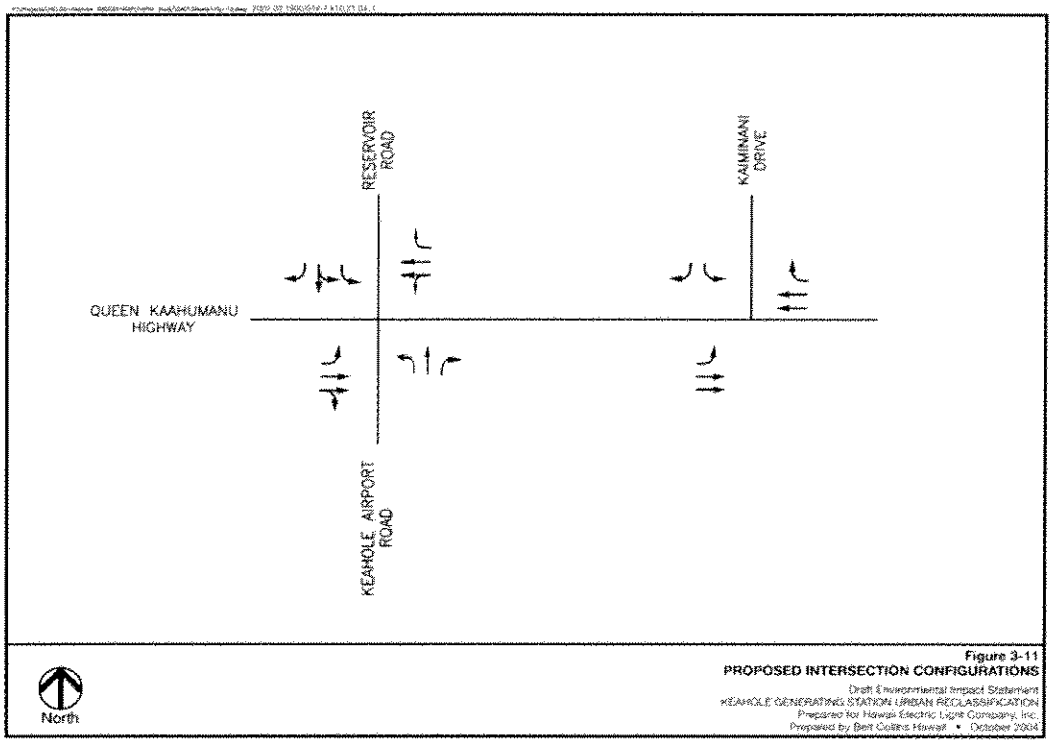


Figure 3-11
PROPOSED INTERSECTION CONFIGURATIONS
Draft Environmental Impact Statement
KEAHOLE GENERATING STATION URBAN RECLASSIFICATION
Prepared for Hawaii Electric Light Company, Inc.
Prepared by Belt Collins Hawaii • October 2004

If Palamanui project chooses to use its north access road as its primary connection to Queen Kaahumanu Highway, then HELCO would continue to utilize their north and south gates in a similar manner as the existing situation. If the Palamanui project selects to construct their south access road so that it connects at the Keahole Airport Road/Reservoir Road intersection, then HELCO would utilize their north gate for all project trips and close the south gates. HELCO is coordinating with the Palamanui developer as part of the Palamanui access feasibility study, but HELCO could continue with its existing gate usage for an indefinite period of time.

3.9.6. The Impacts of the Alternatives on Traffic Conditions

	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
Alternative 1 – No Action	✓			Operating the Keahole facility with CT-4 and CT-5, but without ST-7 with SCR , as a continuing use within the State Conservation District would have no substantive impact upon traffic conditions. Because no further amendments to the existing Conservation District Use Permit, under which the plant presently operates, would be considered by the DLNR, it is unlikely that there would be any change to fuel types used at the plant. In addition, there would be no need for the delivery of ammonia related to the SCR system.
Alternative 2 – Proposed Action	✓			The additional vehicular traffic generated by new employees, additional fuel delivery, ammonia delivery, and other vehicular-related activities associated with the

	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
				Proposed Action is projected to constitute between one tenth and six tenths of one percent of the future traffic projected on Queen Kaahumanu Highway in 2009. This can be considered to be a negligible impact.
Alternative 3 – West Hawaii	✓			Although no traffic study was performed on the Alternatives, in comparison to traffic volumes at the Airport intersection on Queen Kaahumanu Highway, traffic at the Puu Anahulu intersection is expected to be of significantly lower volume. Extrapolating the relatively low volume of traffic created by a power generating facility would lead us to anticipate little if any impacts on future traffic conditions.
Alternative 4 – East/West Hawaii	✓			Given the character of Highway 11 in Hilo, and assuming the same relative traffic impacts to the Hill Station as to the Keahole Station, we anticipate that there may not be a significant impact upon traffic by expanding the Hill plant.
Alternative 5 - Renewable		✓		Using the historical experience of the former sugar cane industry's impact upon traffic in the Hamakua and North Kohala areas, we would anticipate that the transportation of the cultivated biomass product from the fields to the combustion site would have a potentially significant impact upon the Hawaii Belt Road in Hamakua.

3.10. NOISE QUALITY

Loud noises are known to have adverse physiological and psychological effects on people. Residential and resort areas near airports are particularly affected. The State DOH Noise Radiation and Indoor Air Quality (NRIAQ) Branch conducts investigations of health and environmental-related problems, and performs regulatory functions to monitor compliance with applicable statutes and rules. These functions include permit issuance, monitoring, and enforcement.[14] NRIAQ also assures that noise emissions from permitted activities, including construction operations (day and night), stationary noise sources, and agricultural and industrial operations comply with specified conditions, standards, and rules.

In order to assess the noise impacts associated with improvements to the generating station, HELCO retained HFP Acoustical Consultants Inc. (HFP) of Houston, Texas to conduct an acoustical study for this EIS. HFP provides acoustical consulting services for major industrial, infrastructure, and architectural clients. Since 1979, HFP has completed more than 2,800 acoustical engineering projects in 19 countries on 6 continents. HFP has a strong history in noise measurement, assessment, and noise control for industrial facilities. The purpose of the study was to (1) quantitatively describe the existing acoustical environment surrounding the plant, (2) predict the future changes in sound level due to the improvements to the generating station and changes in traffic, and (3) predict the overall cumulative sound-level impact of the proposed improvements. HFP's report is summarized in subsequent sections and an entire copy of the report is attached as Appendix H.

HFP performed an environmental sound-level survey to characterize and quantify the existing acoustical environment in the area surrounding the subject property. It then processed the data to separate (to the extent possible) the noise contributions from existing conditions.

[14] Data from State DOH website (http://www.hawaii.gov/health/environmental/noise/.)

In order to assess the noise impacts of the proposed improvements, HFP constructed a computer noise model of the existing plant facility based on field measurements of the existing plant equipment and a separate model of the proposed improvements to the plant, including all proposed noise control treatments. The measurement data from the environmental sound level survey was combined with these computer noise model predictions to calculate the potential future environmental sound levels in the area surrounding the plant.

3.10.1. NOISE STANDARDS AND MEASUREMENTS

State DOH regulations require industrial facilities to generate less than the specified noise levels at the industrial facility property line. The specified noise levels depend on the area classification of the land surrounding the industrial area. However, the area classification of the land surrounding the subject property is unclear. Thus, HELCO voluntarily decided to meet the residential property line regulation of 55 dBA[15] during the daytime (7:00 a.m. to 10:00 p.m.) and 45 dBA during the nighttime (10:00 p.m. to 7:00 a.m.).

HFP surveyed the area surrounding the plant from June 25 through June 29, 2004. Nine measurement locations were chosen to characterize the acoustical environment surrounding the plant. Seven of these locations were in the residential neighborhoods to the south and west of the plant, with the remaining locations placed in the undeveloped lava fields to the north and east of the plant. Measurements were taken at each of the seven neighborhood locations for two 24 hour (approximately) non-contiguous measurement periods. The intent was to measure a large enough sample of sound levels to fairly characterize the existing acoustical environment. Only one measurement was taken at each of the lava field locations to the north and east of the plant. The measurement at the north location was approximately 17 hours in duration. The measurement at the east location was approximately 48 hours in duration.

LOCATION 1: West of Pukiawe Street at the Kupaloke Street intersection. The monitor was placed approximately 5 feet northwest of telephone pole number 7. This location has a clear line of sight to the plant. The exhaust stacks for CT-2, the reciprocating units, and CT-4 and 5 are clearly visible.

LOCATION 2: North side of Kupaloke Street at the west edge of the driveway to Residence C, on the north side of Kupaloke Street. The monitor was placed approximately 5 feet east-northeast of telephone pole number 3. The location has a direct line of sight to the plant, and the exhaust stacks for CT-2, the reciprocating units, and CT-4 and 5 are clearly visible. 3

LOCATION 3: East side of Lau'i Street at Kupaloke Street at the north edge of the intersection. The monitor was placed approximately 6 feet north of the telephone pole located east of the north edge of Kupaloke Street. The top of the plant stacks are barely visible from this location. The other plant equipment is not visible

[15] The decibel (dB) is used to measure sound level, but it is also widely used in electronics, signals and communication. The dB is a logarithmic unit used to describe a ratio. The ratio may be power, sound pressure, voltage or intensity or several other things. If the "A weighting filter" is used, the sound pressure level is given in units of dB(A) or dBA. Sound pressure level on the dBA scale is easy to measure and is therefore widely used.

LOCATION 4: East of Residence A, east of the centerline of the residence/business located to the west of the plant. The monitor was located approximately 4 feet inside the fence, directly east of the television aerial on the business / residence. This location is shielded from the plant by the maintenance building and topography. None of the equipment stacks are visible due to the building and the large elevation change.

LOCATION 5: East side of Lau'i Street, one block south of Kupaloke Street approximately one block south of Location 3. The monitor was placed approximately 6 feet north of telephone pole number 9 on Laui Street. The generating station is not visible from this location.

LOCATION 6: North of Kupaloke Street, north of Residence B. The monitor was placed approximately 3 feet west north-west of telephone pole number 2. The location has a direct line of sight to the plant, and the exhaust stacks for CT-2, the reciprocating units, and CT-4 and 5 are clearly visible.

LOCATION 7: West of Pukiawe Street, one block south of Kupaloke Street Location 7, approximately one block south of Location 1. The monitor was placed approximately 8 feet south of telephone pole number 10. The plant is partially visible from this location, though most of the equipment is shielded by ground vegetation or the residences to the north.

LOCATION 8: Approximately 2,000 feet northeast of the Plant in the middle of the lava field. This location was approximately 1,500 feet north northwest of the northwest corner of the two water tanks located at the east end of the access road north of the plant. This location has a direct line of sight to the plant equipment. This location is representative of the existing sound levels to the north and northeast of the plant. There are currently no residences or other structures in this undeveloped area.

LOCATION 9: Approximately 2,500 feet southeast of the Plant in the middle of the undeveloped lava field. The monitor was located directly east of Residence E and north of telephone pole number 11 on Kaiminani Road. The location has a direct line of sight to the CT-4 and CT-5 exhausts but most other of the plant noise sources were hidden by terrain and foliage. This location is representative of the sound levels to the east and southeast of the plant. There are currently no residences or other structures in this undeveloped area.

At the generating station, CT-4 was in peaking mode operation during the measurement periods. CT-5 was undergoing performance testing. One or both of these units were in operation during each measurement period. The weather conditions during the survey period were appropriate for an environmental sound-level survey. There were a few brief periods of rain during the measurement survey, and the only significant rain occurred on the morning of June 26, 2004.

During field observations the plant was inaudible at Locations 3, 5, 7, and 9. The plant was barely audible at measurement Locations 1, 2, 4, and 6. The plant was clearly audible at Location 8

3.10.2. EXISTING CONDITIONS

HFP divided the environmental noise sources surrounding the plant into short-term and steady state categories. Short-term sources include aircraft overflights and local neighborhood traffic. Steady state sources include the generating station, insects and birds (while they are active), traffic on Queen Kaahumanu Highway and Kaiminani Drive, and wind noise. The steady state sources vary with time, but their variation takes place over tens of minutes rather than one or two minutes like the short term sources.

HFP presented the results of its survey in graphical, tabular, and statistical form, all of which can be reviewed in its entirety in the Noise Study attached as Appendix H. The statistical results are presented herein in the following table.

TABLE 3-0: SUMMARY OF MEASUREMENT PERIOD DATA

AVERAGE OF 15 MINUTE L90s (Notes: Ld = day average; Ln = night average; Ldn = day-night average sound level[16]; Leq = Average of sound levels for a specified period; L90 = Sound level exceeded 90 percent of time; indicator of background or ambient sound level)								
START DATE	LOCATION	LD	LN	LDN	LEQ	L90 DAY	L90 NIGHT	L90 PERIOD
6/24/2004	1A	55.5	48.7	57.0	54.0	45.0	42.1	44.1
6/26/2004	1B	54.0	50.0	57.2	52.8	46.1	42.8	45.2
6/24/2004	2A	56.0	54.5	61.2	55.5	44.3	44.8	44.5
6/26/2004	2B	53.3	53.9	S60.2	53.5	44.1	40.9	43.2
6/24/2004	3A	61.7	50.4	61.3	59.8	54.8	35.7	52.7
6/26/2004	3B	59.6	53.8	61.7	58.2	51.5	34.9	49.5
6/24/2004	4A	55.0	49.6	57.3	53.6	48.4	44.9	47.4
6/26/2004	4B	54.3	48.7	56.5	52.9	49.0	44.0	47.7
6/25/2004	5A	51.5	48.9	55.8	50.7	40.8	40.2	40.6
6/27/2004	5B	50.7	44.2	52.3	49.2	38.8	37.7	38.4
6/25/2004	6A	53.3	48.3	55.9	52.1	44.2	41.4	43.4
6/27/2004	6B	53.9	53.5	60.0	53.7	42.2	43.0	42.5
6/25/2004	7A	57.8	50.4	59.0	56.2	46.1	42.3	45.0
6/27/2004	7B	57.3	52.1	59.7	55.9	44.9	41.6	44.0
6/25/2004	8	51.9	49.7	56.5	51.2	46.2	44.6	45.7
6/27/2004	9	48.3	47.4	54.0	48.0	39.2	39.3	39.2

In addition to the noise generated from the plant, HFP found that the existing acoustical environment surrounding the plant was dominated by noise from traffic on Queen Kaahumanu Highway, aircraft traffic from the Kona International Airport, and local traffic on Kaiminani Drive and other neighborhood streets. HFP observed several agricultural facilities in and around the neighborhood with significant truck and farm machinery activity associated with the facilities. The plant was inaudible at most of the measurement locations during the daytime hours because of the other environmental noise sources.

HFP measured existing plant contributions to the acoustical environment. The results for the existing, untreated plant[17] are shown in Table 3-P. This table shows the calculated environmental sound level contributions with two combinations of existing equipment in operation: (1) nighttime operation of the three combustion turbines (CT-2, CT-4, and CT-5) and (2) daytime operation of three combustion turbines and three reciprocating units (D-21, D-22, D-23).

[16] A standard noise measurement that takes into account the noise levels of all individual events that occur during a 24-hour period and the number of times those events occur. This measure includes a 10-decibel (dB) adjustment for the added intrusiveness of noise that occurs during normal sleeping hours, when people are more sensitive to noise.

[17] Without noise mitigation equipment.

TABLE 3-P: PREDICTED EXISTING PLANT CONTRIBUTIONS
ALL EXISTING EQUIPMENT OPERATING, AS CURRENTLY INSTALLED D-21, D-22, D-23, CT-2, CT-4, CT-5

LOCATION	CALM			WITH WIND		
	LD	LN	LDN	LD	LN	LDN
1	53	53	60	56	54	61
2	54	54	60	57	55	62
3	41	43	49	45	44	50
4	55	56	62	56	56	63
5	46	49	55	51	50	56
6	55	55	61	58	56	62
7	46	49	55	51	50	56
8	46	51	57	52	52	58
9	40	45	50	47	46	52

Table 3-Q calculates the total existing environmental sound levels, and summarizes all existing environmental noise sources as separated and calculated in the tables above along with the computer model prediction of the existing plant. The "Combination of All Sources" column shows the logarithmic sum of the noise from the different environmental noise sources.

TABLE 3-Q:CALCULATED TOTAL EXISTING ENVIRONMENTAL SOUND LEVELS, WITH PLANT

LOC.	TRAFFIC			AIRCRAFT			INSECTS			PREDICTED PLANT			COMBINATION OF ALL SOURCES		
	LD	LN	LDN	LD	LN	LDN	LD	LN	LDN	LD	LN	LDN	LD	LN	LDN
1A	50.6	46.1	53.5	52.9	41.6	52.4	48.8	42.8	50.8	56	54	61	59	55	62
1B	50.8	44.7	52.7	48.5	41.3	49.8	48.1	47.6	54.1	56	54	61	58	55	62
2A	47.7	43.2	50.7	49.3	36.1	48.4	54.0	48.9	56.5	57	55	62	60	56	63
2B	46.9	40.0	48.3	46.0	34.5	45.5	51.0	53.7	59.8	57	55	62	59	58	64
3A	45.8	40.1	48.0	56.2	39.6	54.7	60.2	49.8	60.1	45	44	50	62	51	62
3B	44.6	38.3	46.3	50.0	35.5	48.8	59.1	53.7	61.4	45	44	50	60	54	62
4A	52.3	46.4	54.3	51.5	42.1	51.8	43.0	45.0	51.2	56	56	63	59	57	64
4B	52.7	46.1	54.3	48.8	39.2	48.9	42.1	44.2	50.4	56	56	63	58	57	63
5A	45.7	42.5	49.6	50.0	46.3	53.5	40.8	42.7	48.9	51	50	56	54	53	59
5B	44.7	40.7	48.0	49.2	40.5	49.7	40.0	35.4	42.9	51	50	56	54	51	58
6A	48.1	45.3	52.3	51.4	41.9	51.6	42.9	43.0	49.4	58	56	62	59	57	64
6B	46.5	43.0	50.1	51.7	41.9	51.8	47.8	53.0	58.9	58	56	62	59	58	65
7A	51.0	47.6	54.7	55.4	44.3	55.0	51.7	44.3	52.9	51	50	56	59	53	61
7B	49.7	45.6	52.9	54.3	47.2	55.6	52.8	48.4	55.8	51	50	56	58	54	61
8	49.3	47.9	54.6	48.7	42.7	50.6	32.0	42.7	48.5	52	52	58	55	54	61
9	41.8	40.2	46.9	45.1	42.5	49.4	43.5	44.5	50.8	47	46	52	51	50	56

3.10.3. POTENTIAL IMPACTS AND MITIGATIONS

Significant noise control treatments are planned for the existing plant equipment. Each treatment project will specify property line sound level targets for the subject equipment. These targets will vary with a goal of meeting HELCO's overall property line targets of 55 dBA during daytime operation and 45 dBA during nighttime operation for all plant equipment. A summary of the property line targets for each treatment project are shown in Table 3-R.

TABLE 3-R: SUMMARY OF PROPERTY LINE NOISE CONTROL TARGETS

EQUIPMENT	PROPERTY LINE LIMIT			
	NORTH	EAST	SOUTH	WEST
CT-4 and CT-5 Simple Cycle	42 dBA, 70 dBC			
CT-2 Simple Cycle	36 dBA	40 dBA	34 dBA	40 dBA
Diesel Units, per Unit	48 dBA			

Notes: dBA = decibel with A weighting; dBC = decibel with C weighting (See glossary for weighting definitions).

3.10.4. THE NOISE IMPACTS OF THE ALTERNATIVES

	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
Alternative 1 – No Action		✓		HELCO will install noise control equipment that will limit the noise contributions of the CT-4 and CT-5 simple-cycle equipment to less than 42 dBA at all plant property lines. HELCO performed an analysis of the required noise control for CT-2 so that all plant equipment in simultaneous operation would produce less than 45 dBA at the plant property line. The initial review of the noise control treatments necessary to reduce the reciprocating diesel unit (D-21, D-22, and D-23) property line noise contributions to less than the nighttime 45 dBA target found that the predicted cost per megawatt hour would exceed HELCO's target. Since these units are used primarily as peaking power units and are small compared to the other equipment on site, HELCO has decided to restrict their use to daytime operation only. The daytime property line target chosen by HELCO is 55 dBA.
Alternative 2 – Proposed Action		✓		HELCO will reduce noise impacts by (1) installing enclosures around certain equipment and (2) installing silencers in the CT horizontal exhaust ducts at ground level. HELCO's December 19, 2003 letter to DOH provided analysis results confirming that the installations of enclosures and silencers do not change the results of the ambient air quality impact modeling analysis for the modification. According to HFP, the noise controls required for the CT-4 and CT-5 will be sufficient for the combined-cycle expansion to meet a 45 dBA property line target with all equipment in operation. HRSGs will be added to both the CT-4 and CT-5 exhaust ductwork. These are large devices, and they will function as additional barriers for the exhaust ductwork and other plant noise sources. The HRSGs will also provide significant additional exhaust silencing.

	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
				The most significant noise sources added with the combined cycle project would be the ST-7 unit and the associated ST-7 air cooled condenser bank. HELCO will install the equipment necessary to mitigate the noise generated by the condenser bank to the regulatory requirements.
Alternative 3 – West Hawaii		✓		The noise conditions and the impacts on the surrounding area would need to be assessed if a new generating station is built at the Puu Anahulu site. Because there are no residences in the immediate vicinity of the Puu Anahulu site, it is anticipated that noise mitigation measures would be less costly than those proposed for implementation at the Keahole site.
Alternative 4 – East/West Hawaii		✓		The expansion of the Hill site to accommodate new energy production equipment is anticipated to have a significant negative impact upon the surrounding area, because of its built-up character. The noise mitigation equipment needed is anticipated to represent a significant expenditure.
Alternative 5 - Renewable		✓		It is not possible to determine what the precise noise impacts might be because the specific location of a biomass burning facility is unknown. However, given the character of the facility, it is likely that it would be constructed away from existing urban concentrations.

3.11. VISUAL ATTRIBUTES

The components that are used to generate power to homes, hospitals, research facilities, universities, schools, businesses, federal, state, and county government facilities are of an industrial nature with a focus on function rather than form. The facilities, as depicted in Figure 2.3, are comprised of stacks, turbines, industrial equipment, and related structures, and are not visually appealing.

3.11.1. Existing Conditions

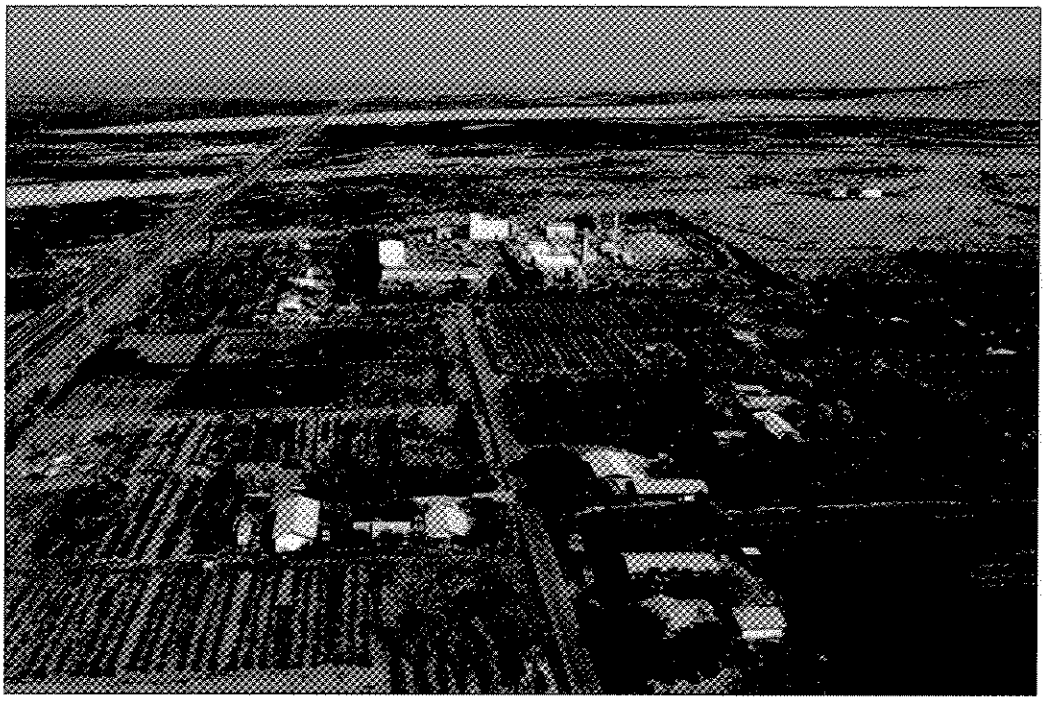
As described in detail in Chapter Two, the subject property includes a generating station and substation. It is surrounded by vacant areas of open lava flows to the north and east, the Keahole Agricultural Park to the south and southeast, and a residential subdivision, Kona Palisades, beginning approximately 3,500 feet to the southeast. Four 90-foot towers owned by the Big Island Broadcasting Co. are located on a 4-acre parcel on the subject property's eastern boundary. The adjacent property to the north is owned by the Department of Hawaiian Home Lands (DHHL), and is planned for residential and commercial development. To the south and southeast of the subject property is the State Keahole Agricultural Park, a 179-acre owned and leased subdivision of approximately 36 five-acre lots used for diversified agriculture.

Kona International Airport is one mile west of the subject property. Just west of Kona International Airport is the Natural Energy Laboratory of Hawaii Authority (NELHA) located on 870 acres of State-owned land.

3.11.2. Potential Impacts and Mitigation

Site selection helps to mitigate adverse visual impacts. The subject property is currently zoned "Open" (O) under the County of Hawaii zoning code. However, the "MG" (general industrial) designation appears to be more applicable to the current uses in the area, which include: (1) agricultural products processing, major and minor; (2) airfields, heliports and private landing strips; (3) aquaculture activities and facilities; (4) broadcasting stations; (5) greenhouses, plant nurseries; (6) utility facilities, public and private, including power plants, offices or yards for equipment, utility substations, as permitted under section 25-4-11. All of these "MG" or industrial permitted uses have co-existed in the area for many years.

Photograph 3-3: View of Keahole Generating Station looking north at main entrance. Queen Kaahumanu Highway is on the left. The Keahole Agriculture Park is in the foreground.

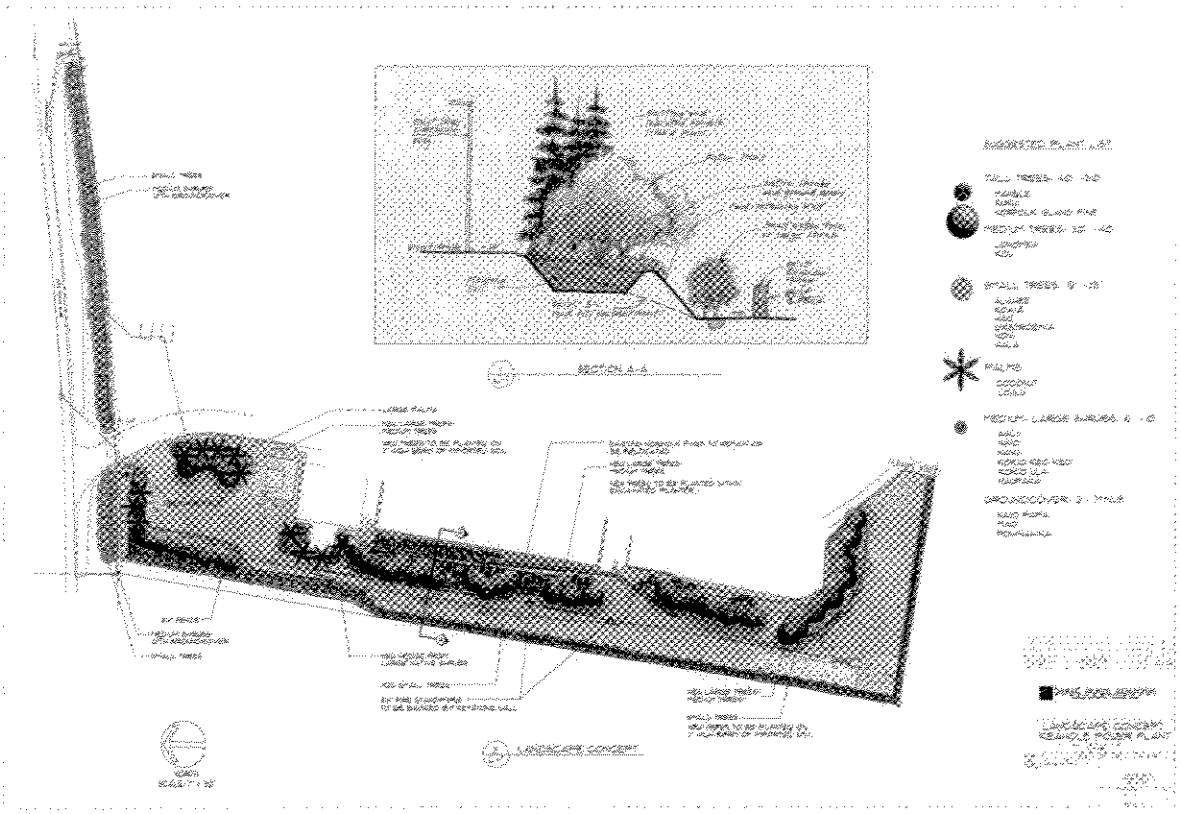


In addition to site selection, the visual impacts of a generating station decrease by distance and by the creation of buffers. In order to lessen the visual impacts of the improvements to the generating station on the immediate neighboring community, HELCO has sought and received approval from the DLNR for landscape improvements, gate modifications, and fence construction at the subject property. The perimeter landscaping along the southwest, west, and northwest sections of the property will be redone to help mitigate the adverse visual impacts of the improvements to the station. HELCO will create bermed planters in areas that are currently landscaped and transplant some of the existing vegetation. New trees

and plants will also be added to create a more effective and attractive visual buffer. The area of the proposed planters is approximately 9,500 square feet. (See landscape concept plan.)

HELCO will also convert its existing fence into a permanent perimeter fence and modify two existing gates by recessing the gates into the facility. The new gates would be automated, electronic card-reading gates.

FIGURE 3-12: LANDSCAPE CONCEPT PLAN



3.11.2.1. Cumulative Impacts

New lights were recently installed on the CT-4 and CT-5 exhaust stack. The lights are required by the Federal Aviation Administration (FAA) to identify the stack, which is treated as an obstruction in the area. HELCO has received comments from the community about the lights, which are 24-hour strobe lights. The lights do switch from 'day' intensity to a lower 'night' intensity, but is still somewhat bright for people in the area.

The FAA permit explicitly calls for medium intensity, white obstruction lights with 24-hour strobe and require a certain number of lights. HELCO must comply with FAA regulations. However, the situation

provides little comfort to the community. Given the public concerns, HELCO is discussing the matter with the FAA to see if there is any flexibility in the requirements.

3.11.3. THE VISUAL IMPACTS OF THE ALTERNATIVES

	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
Alternative 1 – No Action		✓		As depicted in the landscape concept plan, HELCO plans to improve the landscaping along the perimeter of the subject property. Tall, medium, and small trees; palms; medium and large shrubs; and groundcover will be planted to lessen the visual impacts of the CT-4 and CT-5 exhaust stack.
Alternative 2 – Proposed Action		✓		The reclassification and rezoning are policy actions that for all intents and purposes represent after-the-fact approvals of an existing facility. Uses in the area fall under the MG designation. The perimeter landscaping along the southwest, west, and northwest sections of the property will be redone to help mitigate the adverse visual impacts of the improvements to the station. HELCO will create bermed planters in areas that are currently landscaped and transplant some of the existing vegetation. New trees and plants will also be added to create a more effective and attractive visual buffer. The area of the proposed planters is approximately 9,500 square feet. As improvements are installed and cumulative impacts become apparent (e.g. FAA light requirements) HELCO has made reasonable efforts to address public concerns and work with the community.
Alternative 3 – West Hawaii		✓		It may not be necessary to institute visual buffers at the Puu Anahulu site. However, an assessment would need to be made identifying the attributes of the site and the surrounding area.
Alternative 4 – East/West Hawaii			✓	Unless transmission lines are constructed underground, it would be difficult to mitigate the visual impacts in this urban area. The cost would be substantial as the Big Island spans a large area and is not densely populated like Oahu.
Alternative 5 - Renewable		✓		Depending on the location of the new biomass plant, it may be necessary to institute visual buffers to mitigate the impacts.

3.12. TERRESTRIAL FLORA

Winona P. Char of Char & Associates, Botanical Consultants, conducted an updated field survey of the Keahole Generating Station (Parcel 36) and also surveyed the Airport Substation site (Parcel 37). She had surveyed in 1993 the Keahole Generating Station site for the 1993 Revised Final EIS (1993 RFEIS). The primary objectives of the field survey were to: (1) prepare a general description of the vegetation on the entire project site; (2) search for threatened and endangered specie and specie of concern; (3) identify areas of potential environmental problems or concerns; and (4) propose appropriate mitigation measures. A summary of her survey follows, and a complete copy of the *Botanical Resources Assessment Study* dated August 14, 2003, is provided in Volume 2 of the EIS, and identified as Appendix C.

3.12.1. EXISTING CONDITIONS

According to the study, the vegetation on the Keahole Generating Station and the primary and secondary access roads are comprised almost exclusively of introduced or alien species. Introduced species are all

those plants that were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact (Cook's arrival in the islands in 1778). Three native species were observed during the field studies. All are indigenous, that is, they are native to the Hawaiian islands and elsewhere. 'Uhaloa and ilima are found along the roadsides and other disturbed areas, while the beach naupaka is cultivated as landscape material.

The vegetation on Parcel 36 consists of landscape plantings with occasional weedy patches, especially along the perimeter fence line. Parcel 37 is located makai (west) of the larger Parcel 36. It has been bulldozed and supports a transformer station that is surrounded by a chain-link fence. There are only a handful of plants, which cover less than 1 percent, on the level, gravel-covered parcel.

None of the plants observed on Parcels 36 and 37 and along the primary and secondary access roads are threatened or endangered species or a species of concern. All of the plants can be found in similar lowland, dry habitats throughout the West Hawaii region. The previous botanical study conducted in 1993 also reported similar findings.

3.12.2. Potential Impacts and Mitigation

Given these findings, the reclassification or improvements of the land is not expected to have a significant negative impact on the botanical resources. According to Char & Associates' report, there are no botanical reasons to impose any restrictions, conditions, or impediments to the proposed land use reclassification. No mitigation measures of any kind are warranted.

3.12.3. The Impacts of the Alternatives on Terrestrial Flora

	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
Alternative 1 – No Action	✓			There would be no adverse impacts to botanical resources under the No Action Alternative. The land is developed and the plants are not threatened or endangered. The reclassification and rezoning are policy actions that for all intents and purposes represent after-the-fact approvals of an existing facility.
Alternative 2 – Proposed Action	✓			The reclassification of the land to the Urban District and its eventual rezoning to "MG" or general industrial would have no impact upon the botanical resources. The improvements would not require extensive ground disturbance, as the addition of new equipment would be atop an existing asphalt pad. No adverse impacts to botanical resources are anticipated under the Proposed Alternative.
Alternative 3 – West Hawaii		✓		A study would have to be conducted of the botanical resources at the Puu Anahulu site prior to the construction of the facilities. A new generating station would require substantial ground disturbance
Alternative 4 – East/West Hawaii		✓		The construction of new turbines at the Hill site in East Hawaii location would not impact the botanical resources of the site, primarily because the property is already developed. However, this issue may pose a problem as transmission lines are constructed over varying terrains across the island.

	No Impacts	Potential Impacts	Adverse Impacts	Comments/Mitigation Measures
Alternative 5 - Renewable		✓		The impacts on botanical resources for this alternative cannot be known until the details of a biomass plant and/or location to grow fuel crops are determined. However, it is anticipated that this alternative would have the greatest potential impact due to the likelihood that several hundred acres, if not thousands, might be required.

3.13. TERRESTRIAL FAUNA

Environmental Consultant Phillip L. Bruner conducted a field survey of the Keahole Generating Station property and nearby surrounding lands. The goals of the survey were to document the species of birds and mammals currently on or near the property, and to note any features of the site or nearby lands that contained habitat of potential value for native and migratory birds. A complete copy of the survey, *Avifaunal and Feral Mammal Field Survey of Keahole Generating Station* dated July 29, 2003, is provided in Volume 2 of the EIS, identified as Appendix B.

Dr. Bruner surveyed the area on foot and by car using existing roads to the north and south of the property. He accumulated data during the early morning and late afternoon when birds were most active and easily detectable. He established count stations throughout the survey area. All birds seen or heard-over an eight-minute period at each count station were tallied. Observations made outside these stations were also noted. Estimates of the relative abundance of each species were drawn from the data. Data on mammals were obtained from visual observations and scats, and no trappings were conducted. Weather during the survey was partly cloudy with light winds.

3.13.1. Existing Conditions

3.13.1.1. Avifauna - Native, Migratory, and Introduced Birds

Dr. Bruner reported that no native birds were observed during the current survey of the area. Also, migratory birds were not observed on the survey, which may have been primarily due to the timing of the survey as migratory birds are on their breeding grounds in the arctic at the time the survey was taken. The most abundant migrant to Hawaii is the Pacific Golden-Plover *(Pluvialis fulva)*. However, this species is not listed as threatened or endangered. A total of 13 species of introduced (non-native) birds were recorded on the survey. None of the introduced birds are listed as threatened or endangered. The array of species recorded on the 1992 and current survey are typical of what would be expected in this area.

3.13.1.2. Mammals

Dr. Bruner saw two domestic cats *(Fells catus)* and one small Indian mongoose *(Herpestes auropunctatus)* during the survey. The cats may not be feral since there are plant nurseries nearby. No rats or mice were observed. However, they are likely to occur in this area.

3.13.1.3. Threatened and Endangered Species

The actual generating plant site does not contain any unusual or unique habitat important to native or migratory birds or mammals. The findings conform with the results of the earlier survey of this area conducted in 1992.

3.13.2. POTENTIAL IMPACTS AND MITIGATION

No significant negative impacts on terrestrial fauna are likely to occur as a result of the proposed land use change or from the improvements. No mitigation measures of any kind are warranted.

3.13.3. THE IMPACTS OF THE ALTERNATIVES ON TERRESTRIAL FAUNA

	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
Alternative 1 – No Action	✓			The study found that the subject property does not contain any unusual or unique habitat important to fauna. No mitigation measures are warranted..
Alternative 2 – Proposed Action	✓			The improvements to the generating station would not adversely impact the terrestrial fauna, and no mitigation measures are warranted.
Alternative 3 – West Hawaii		✓		New studies would need to be conducted to ascertain the conditions of the Puu Anahulu site.
Alternative 4 – East/West Hawaii		✓		The construction of new turbines at the Hill site in East Hawaii would not impact the terrestrial fauna of the site, primarily because the property is already developed. However, this issue may pose a problem as transmission lines are constructed over varying terrains across the island.
Alternative 5 - Renewable		✓		The impacts on fauna for this alternative cannot be known until the details of a biomass plant and/or location to grow fuel crops are determined. However, because a large area of land is required for this alternative, impacts on fauna will probably occur. The degree cannot be ascertained at this time.

3.14. NEARSHORE ENVIRONMENT

Marine Research Consultants conducted an assessment of the potential impacts on the marine environment that may arise from the improvements and expansion of the subject property. A summary of Marine Research Consultants' report follows, and a complete copy of the report, *An Assessment of Potential Impacts to the Marine Environment* dated February 2004, is provided in Volume 2 of the EIS, identified as Appendix J.

3.14.1. EXISTING CONDITIONS

The Hawaii Ocean Science and Technology (HOST) Park and the Natural Energy Laboratory of Hawaii (NELH), which lie adjacent to one another at Keahole Point, North Kona, Hawaii, are nearly directly downslope from the HELCO facilities. HOST and NELH are owned and operated by the State, and administered by the Natural Energy Laboratory of Hawaii Authority (NELHA). The land on which NELHA is situated consists of 870 acres with a steep offshore bathymetry for easy access to the ocean depths. These facilities accommodate tenants doing business in ocean-related science and technology industries, research, development and commercial application of technology-intensive activities that utilize ocean water as a resource or depend on proximity to the ocean, including aquaculture, mariculture, and ocean-related activities.

All groundwater that is not pumped from the aquifer ultimately reaches the ocean. Alteration of groundwater flow and/or composition also is a factor that can potentially alter the nearshore marine environment. Alteration of groundwater flowing under HELCO's project site will represent a subsidy to existing conditions that may already be affected by other human activities.

In the case of the HELCO generating station, the location of the project site dictates that groundwater flow to the ocean would interact to some degree with the functional aspects of NELH and HOST Park, in terms of both water usage and discharge of "used" water back to the marine environment. These interactions are important because of the reliance on "high quality" ocean water for NELHA mariculture uses. Marine Consultants used existing data to assess the magnitude of changes that could be caused by HELCO's project with respect to the historical alteration to groundwater discharge to the ocean as a result of NELH/HOST Park activities. The contextual evaluation provided a valid basis in assessing the potential for impacts directly attributable to HELCO's project, which in turn, provided an estimate of the impact on marine biotic communities.

3.14.2. POTENTIAL IMPACTS AND MITIGATION

According to Marine Consultants' report, improvements, and expansion of the generating station have the potential to impact brackish groundwater in the vicinity of the plant through several means: (1) alteration of supply of onsite brackish groundwater; (2) subsurface disposal of the plant wastewater; and (3) disposal of domestic wastewater generated by operation of the power plant. In addition, HELCO's project will result in potential changes to the supply from the Hawaii County DWS system.

Marine Consultants evaluated various data sources, in particular the Tom Nance Water Resources Engineering report (attached to the EIS in Volume 2 as Appendix P), and the Comprehensive Environmental Monitoring Program (CEMP) data. CEMP was originally laid out in a 1987 EIS for the NELH and HOST Park and has since been modified several times. The two broad objectives of CEMP were to: (1) protect the unique environmental resources of the Keahole Point area and their diverse uses; and (2) provide the information necessary to comply with the permit requirements of various county, state and federal agencies. The water quality components of CEMP have produced a massive amount of data, which may be the largest set of continuous water quality data in the State for a single location. Virtually no other analysis or interpretation of the data had been conducted or reported.

The State in 2001 funded a comprehensive review of the seawater return system at NELH, which included a thorough examination of CEMP. The data analysis was designed to elucidate the effects the discharge of return water has had on the nearshore marine-receiving environment. With the large existing data set, a clear "story" of the effects of the discharge became evident. Because the return seawater is mixed with low salinity groundwater prior to discharge to the ocean, utilization of a conservative hydrographic mixing model proved to be an effective tool for evaluating the results of the CEMP. Because the effects to NELH/HOST Park are a concern in planning of HELCO's project, Marine Consultants used the long-term data set for the present evaluation of the potential effects of HELCO's project.

3.15. WATER CHEMISTRY

Marine Consultants interpreted the CEMP water chemistry data, which draws samples from a variety of water sources, including disposal trenches, wells, anchialine ponds, shoreline and offshore ocean samples.

3.15.1. EXISTING CONDITIONS

Marine Consultants used the NELHA CEMP database to analyze various fresh and marine water sources near the shoreline of Keahole Point directly downslope of the HELCO generating station. In evaluating the data, it was found through the evaluation that the disposal of seawater from NELH/HOST Park activities is responsible for periodic large nutrient subsidies that reach the ocean. The structure of the

CEMP was such that it was not possible to trace the exact source of the subsidies, although it is virtually certain that it is at least one of the mariculture ventures. While these subsidies are not continuous, they have been ongoing for decades. In addition, the discharge contains a percentage of "deep seawater" which contains substantially more nutrients than surface seawater. Time-course biological monitoring that was also part of the NELHA CEMP showed no impacts to the benthos or fish communities that could be attributable to the nutrient subsidies. Biotic monitoring did indicate, however, that there were changes to the biota from other factors (e.g., storm for the benthos, and fishing pressure).

3.15.2. Potential Impacts and Mitigation

The only potential source of change to nutrient loading to groundwater from the HELCO project is the disposal of domestic sewage generated at the plant. TNWRE estimated that the maximum change in loading of nitrogen and phosphorus from the total (existing plus future) discharge of domestic sewage effluent would amount to a maximum of 0.5 percent of the nutrient load that exists in natural groundwater, unaltered by human activities. On the other hand, mixing plots scaling nearshore nutrient concentrations to salinity can be used to calculate the percentage increase of nutrient subsidies from land relative to natural concentrations. In the case of nitrogen and phosphorus, there is an increase of up to about 20-30 percent over natural conditions in nearshore waters, which is likely a result of mariculture discharge. The potential changes attributable to the HELCO project of less than 1 percent are likely below the limits of detection compared to the existing fluctuations.

According to Marine Consultants, there is little potential for impact to marine communities in the nearshore area downslope from the project site. While human activities can increase the concentration of nitrate in groundwater entering the nearshore ocean, the concentration of natural groundwater (~80 μM) is approximately three orders of magnitude (i.e., one thousand times) higher than coastal ocean water. Hence, if nutrient subsidies were responsible for negative impacts to nearshore marine communities, such impacts would likely occur under natural conditions, with no subsidies from the activities of man. Hawaiian nearshore marine communities appear to have adapted to substantial input of groundwater nutrients.

Other land-use projects that have been in place in West Hawaii for decades also illustrate that it is very unlikely that there would be any effects to the nearshore marine environment as a result of increases in nutrient concentrations in groundwater. Dollar and Atkinson (1992) modeled the input of nutrients to the ocean downslope from two golf courses at Keauhou in West Hawaii over a four-year period. Discharge to the ocean of groundwater that flows under the golf courses is focused into Keauhou Bay, which is a small semi-enclosed basin with restricted circulation relative to the open ocean. Results of the studies showed that groundwater entering Keauhou Bay was enriched in nitrate nitrogen by about 100 percent over natural groundwater, while phosphate phosphorus enrichment was about 20 percent over natural conditions (compared to less than 1 percent projected for the HELCO project). Because the nutrients were retained within a well-stratified surface layer, however, there was no exposure to the benthos.

Other areas of similar input along open coastlines do not exhibit such strong stratification owing to rapid mixing of the water column. The major impact to coral reef communities from nutrient subsidies does not occur from a toxic effect to the corals, but rather from a changing competitive advantage between corals and macroalgae. In high nutrient conditions, algae may increase growth rates to either smother existing

corals, or to monopolize settling sites to prevent attachment of coral planulae.[18] With no increase in nutrient concentrations in the bottom waters, owing to the stratified water column or thorough mixing, such shifts in competitive advantage do not occur. Circulation within the embayment was also rapid enough to prevent phytoplankton blooms. These results indicated that even with long-term input of extremely high nutrient subsidies, there were no negative effects to the receiving environment.

The situation at Keauhou can be considered extremely relative to that at Keahole Point. Therefore, it is also unlikely that there would be any negative effects from the operation of the HELCO project. Based on these results, Marine Consultants determined that it is reasonable to conclude that the improvements and expansion of the Keahole generating station would not have a significant or even measurable effect on marine waters in the region.

3.15.3. THE IMPACTS OF THE ALTERNATIVES ON MARINE RESOURCES & WATER CHEMISTRY

	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
Alternative 1 – No Action	✓			Based upon the data and comparable studies, no significant impacts on marine water are anticipated.
Alternative 2 – Proposed Action		✓		The only potential source of change to nutrient loading to groundwater from the HELCO project is the disposal of domestic sewage generated at the plant. The potential changes attributable to the HELCO project of less than 1 percent are likely below the limits of detection compared to the existing fluctuations. Based upon the data and comparable studies, no significant impacts on marine water are anticipated from the improvements to the generating station.
Alternative 3 – West Hawaii		✓		New studies would need to be conducted to ascertain the impact on marine resources of new facilities at Puu Anahulu.
Alternative 4 – East/West Hawaii		✓		New studies would need to be conducted to ascertain the impact on marine resources at the Hill site in East Hawaii.
Alternative 5 - Renewable		✓		The impacts on marine resources for this alternative cannot be known until the details of a biomass plant and/or location to grow fuel crops are determined.

3.16. HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Paul H. Rosendahl, Ph.D., dba Paul H. Rosendahl, Inc. (PHRI), conducted in 1992 an archaeological inventory survey of the HELCO Keahole Generating Station property, identified as TMK 3-7-3-49:36, comprised of 14.998 acres. The survey was conducted in connection with the preparation of an EIS for the Conservation District Use Application (CDUA) that proposed to additional generating capacity to the Keahole Generating Station.

The basic objective of the survey was to provide information sufficient for compliance with all historic preservation regulatory review requirements of the State Historic Preservation Division (SHPD) and the Hawaii County Planning Department. The specific objectives of the survey were four-fold: (a) to identify all potentially significant archaeological remains present within the parcel; (b) to collect information sufficient to evaluate and document the potential significance of all identified remains; (c) to evaluate the

[18] Free-swimming or crawling larval type common in many species of the phylum Cnidaria (*e.g.*, jellyfish, corals, and sea anemones).

potential impacts of any proposed development upon any identified significant remains; and (d) to recommend appropriate measures that would mitigate any adverse impacts upon identified significant remains.

More recently on September 22, 2003, PHRI conducted an updated inspection to include TMK 3-7-3-49:37, comprised of 0.645 acres, and the primary and secondary access roads. HELCO's request for a reclassification from the Conservation District to the Urban District includes the Keahole Generating Station and Airport Substation, Parcels 36 and 37. A complete copy of the 1992 survey and the 2003 update, *Archaeological and Cultural Impact Assessment Study*, are provided in Volume 2 of the EIS, identified as Appendix K.

3.16.1. Existing Conditions

Four quarry sites consisting of seven pahoehoe excavations were identified during the 1992 fieldwork. These sites ranged from poor to good in physical condition, and were interpreted as quarry features related to prehistoric occupation of the general area. All four sites were assessed as significant for information content, and no further work or preservation was recommended. No subsurface test excavations were conducted as no cultural deposits of any kind were found within the identified features.

The updated field inspection of September 22, 2003 confirmed that the additional areas: Parcel 37 comprised of 0.645 acres, and the primary and secondary access roads, were fully developed elements of the project site. Parcel 37 is occupied by an existing transformer station and is related to the existing Keahole Generating Station site. Both the primary and secondary access roadways consist of existing paved roads, with the former being paved roadways within the adjacent Keahole Agricultural Park, and the latter being a paved roadway within the access and utility easement immediately adjacent to the north.

3.16.2. Potential Impacts and Mitigation

To the extent that no significant archaeological sites have been identified on the subject property, and being that the subject properties have been operational for close to 30 years, no significant archaeological impacts are anticipated.

Pursuant to PHRI 1992 report and the updated 2003 inspection, the data collected from the past archaeological surveys, and current inspections have been considered adequate and sufficient mitigation of the potential adverse impacts of further development and use of the parcel. SHPD reviewed the 1992 final report on the inventory survey and determined that:

- The field survey had adequately covered the project area.
- Data sufficient to determine and document the general significance of the four identified sites had been recorded.
- All four sites were significant for their information content only.
- Sufficient data had been collected from all four sites so that neither further work nor preservation of the sites was necessary or appropriate.
- No significant sites remained within the project area.
- The proposed expansion of the existing generation station would have "no effect" on historic properties.

3.16.3. THE IMPACTS OF THE ALTERNATIVES ON HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
Alternative 1 – No Action	✓			To the extent that no significant archaeological sites have been identified on the subject property, and being that the subject properties have been operational for close to 30 years, no significant archaeological impacts are anticipated and no mitigation measures are warranted.
Alternative 2 – Proposed Action	✓			No mitigation measures are warranted, as the proposed expansion of the existing generation station would have no effect on historic properties.
Alternative 3 – West Hawaii		✓		The historical, archaeological and cultural resources of the Puu Anahulu site would need to identified. New studies and further research would be needed prior to the construction of a facility at a new site, which would involve substantial time and costs
Alternative 4 – East/West Hawaii		✓		The construction of new turbines at the Hill Site in East Hawaii would not impact the historical, archaeological, and cultural resources of the site, primarily because generating stations are already operational at these locations. New transmission lines and switching station would need to be constructed over varying terrains to transport power to West Hawaii.
Alternative 5 - Renewable		✓		The impacts on historical, archaeological, and cultural resources for this alternative cannot be known until the details of a biomass plant and/or location to grow fuel crops are determined.

3.17. CULTURAL IMPACT ANALYSIS

PHRI also conducted in 1992 a cultural impact assessment of Parcel 36, and more recently, conducted an updated inventory of Parcel 37 and the two access roads. The assessment was conducted pursuant to the requirements of Chapter 343, as amended, and HAR Title 11, Chapter 200. The scope of work and methodology for the assessment considered: (1) the probable number and significance of known or suspected cultural properties, features, practices, or beliefs within or associated with the specific project area; (2) the potential number of individuals (potential informants) with cultural knowledge of the specific project area; (3) the availability of historical and cultural information on the specific project area or immediately adjacent lands; (4) the physical size, configuration, and natural and human modification history of the specific project area; and (5) the potential effects of the project on known or expected cultural properties, features, practices, or beliefs within or related to the specific project area.

3.17.1. EXISTING CONDITIONS

Based on the location, size, and the fact that historically Parcel 36, Parcel 37, and the access roads have been modified, developed and utilized, PHRI's study found that (1) potential cultural impact assessment issues would be highly unlikely, and (2) the negative results of the archaeological reconnaissance survey conducted for the project would confirm both the greatly altered physical nature of the project area and the absence of cultural resources within or related to the project area.

PHRI found no evidence of any potentially significant traditional cultural properties, natural resources, practices, or beliefs in the 1992 inventory survey covering Parcel 36 and the current inventory of Parcel 37 and the primary and secondary access roads.

3.17.2. POTENTIAL IMPACTS AND MITIGATION

Based on the results of the 1992 inventory survey and the more recent 2003 inspection, and the absence of any evidence that the project site is currently being used for any legitimate traditional cultural purposes by either Native Hawaiian cultural practitioners or individuals of any other cultural affiliation, it can be concluded that the HELCO Keahole Generating Station project should have no significant effects or any adverse impacts upon cultural resources.

Further, traditional and customary Native Hawaiian cultural practices that may occur along the Keahole shoreline are not anticipated to be negatively impacted by the proposed project. As discussed in Section 3.6.2, the project will have no significant adverse impacts on the nearshore waters resulting from its use of groundwater and the subsequent disposal of the facility's effluent.

3.17.3. THE IMPACTS OF THE ALTERNATIVES ON CULTURAL ISSUES

	NO IMPACTS	POTENTIAL IMPACTS	ADVERSE IMPACTS	COMMENTS/MITIGATION MEASURES
Alternative 1 – No Action	✓			The results of the 1992 inventory survey and the more recent 2003 inspection showed an absence of any evidence that the project site is currently being used for any legitimate traditional cultural purposes by either Native Hawaiian cultural practitioners or individuals of any other cultural affiliation. No mitigation measures are warranted.
Alternative 2 – Proposed Action	✓			PHRI concluded that the improvements to the Keahole Generating Station should have no significant effects or any adverse impacts upon cultural resources No mitigation measures are necessary.
Alternative 3 – West Hawaii		✓		New studies and further research of the cultural aspects of the Puu Anahulu site would be conducted prior to the construction of the new facility. The process would involve substantial time and costs.
Alternative 4 – East/West Hawaii		✓		The construction of new turbines at the Hill site in East Hawaii would in all probability not incur any cultural impacts as the land is already developed. Cultural issues may arise as transmission lines and switching stations are constructed across the island.
Alternative 5 - Renewable		✓		The cultural impacts for this alternative cannot be known until the details of a biomass plant and/or location to grow fuel crops are determined.

3.18. SOLID WASTE

Following is an analysis of the solid waste requirements of the proposed project and the alternatives.

3.18.1. EXISTING CONDITIONS

Current operations of the Keahole Generating Station and Airport Substation presently result in the generation of approximately 100 pounds of solid waste per day. The refuse is the direct result of day-to-day plant operations and includes trash generated by the employees, as well as used materials such as filters and cleaning supplies. It is all disposed of at the Puu Anahulu landfill. None of the refuse disposed of at the land fill is hazardous waste.

When the County's Puu Anahulu landfill was opened in North Kona, approximately 7.5 miles north of the project site, it was anticipated to accommodate a solid waste volume of approximately 70,300 tons per

year. In 2002, the County estimated that 90,000 tons were deposited at Puu Anahulu in the year 2000. This is equivalent to just over 246 tons per day (based on 365 days).

3.18.2. Potential Impacts and Mitigation

At full build out, the Keahole Generating Station and Airport Substation is anticipated to generate approximately 150 pounds of solid waste per day, or just over 27 tons per year. This represents a fifty percent increase over present conditions, but only .03 percent (three one-hundredths of one percent) of the average daily volume handled at the Puu Anahulu landfill. The reclassification of the subject property from the Conservation District to the Urban district will have, therefore, no significant negative impact upon solid waste disposal at the Puu Anahulu landfill.

The No Action alternative would hold the existing generation of solid waste as a constant: approximately 100 pounds per day.

It is estimated that Alternatives 3 and 4 would generate the same increase in solid waste as the Proposed Action (50 percent), as the improvements that would be required would be similar. Alternative 3 would have the same impact in terms of volume upon the Puu Anahulu landfill as the Proposed Action because it would require a new facility in West Hawaii. However, as the West Hawaii alternative would be located in close proximity to the Puu Anahulu landfill, the costs associated with transporting the solid waste to the landfill would be less than the Proposed Action. Alternative 4 (East Hawaii) would also impact the Puu Anahulu landfill because there is little capacity remaining at the South Hilo Landfill. Alternative 4 will therefore have increased impacts over the Proposed Action because it will require the transportation of its solid waste from the east side to the west side of Hawaii Island.

The solid waste impacts of Alternative 5 cannot be determined because the number of employees that may be associated with the production and processing of biomass cannot be easily estimated at this time. However, we believe it is reasonable to assume that there would be more than the 17 employees anticipated to be employed at the Keahole facility at full build out. In addition, based on the experience of operations of Hawaii's sugar industry over 40 years ago, it is anticipated that most of the ash generated by the burning of biomass would either escape to the air or be turned back into the cultivated fields. Thus, we expect that the extent of solid waste impacts would be focused primarily on the employees and their discarded equipment and supplies. Assuming that the biomass cultivation would occur in the Hamakua and Kohala areas, which are generally equidistant between Puu Anahulu and South Hilo, it would be difficult to estimate which landfill would be most impacted.

Potential mitigations associated with solid waste generation are generally limited to encouraging recycling and promoting higher consciousness among employees about their disposal habits.

CHAPTER FOUR: SOCIOECONOMIC FACTORS

4.1. INTRODUCTION

Hawaii Electric Light Company, Inc. (HELCO) retained SMS Research & Marketing Services, Inc. (SMS) to conduct a socioeconomic assessment for the proposed improvements and reclassification of the Keahole Generating Station and Airport Substation lands (collectively "subject property"). The purpose and organization of the assessment is intended to serve as an aid to decision makers and the wider community as they view and decide on the practicality of HELCO's petition for a reclassification and subsequent improvements to the subject property.

The analysis of impacts is approached through the various alternatives discussed in Chapters Two, Three, and subsequent sections. This chapter provides the (1) socioeconomic context of the region; (2) the concerns of stakeholders; and (3) the potential impacts and mitigation measures, which have or are in the process of being implemented.

John Kirkpatrick, Ph.D., of SMS gathered, researched, and analyzed information from a number of sources, and prepared a report titled, *Socio-Economic Impact Assessment of Redesignation of Keahole Generating and Transmission Sites*. The report is summarized in subsequent sections and attached in its entirety in Volume 2 of the Environmental Impact Statement (EIS) as Appendix M.

4.2. SOCIAL IMPACTS

4.2.1. EXISTING LAND USES IN THE AREA

The Keahole Agricultural Park, a 179-acre State-owned and leased subdivision of approximately 5-acre lots used for diversified agriculture, is located to the south and southeast of the subject property. Occupants of the park must demonstrate agriculture use of the property, although a number of lessees have actually built homes and live on their lots. The State Department of Hawaiian Homelands (DHHL) owns the land to the north, and plans are underway for future development. Four 90-foot towers owned by the Big Island Broadcasting Co. are located on a 4-acre parcel on the eastern boundary of the subject property. Directly to the west (makai or seaward) is the entry road to Kona International Airport at Keahole. Commercial aircraft make daily scheduled stops at the airport on inter-island, mainland, and international flights. Further seaward and to the south is the Hawaii Ocean Science and Technology (HOST) park, under the administration of the Natural Energy Laboratory of Hawaii Authority (NELHA). Queen Kaahumanu Highway is the primary roadway that connects Kailua-Kona, the major urban center of West Hawaii, with the South Kohala resort areas and the commercial port of Kawaihae.

4.2.2. POPULATION

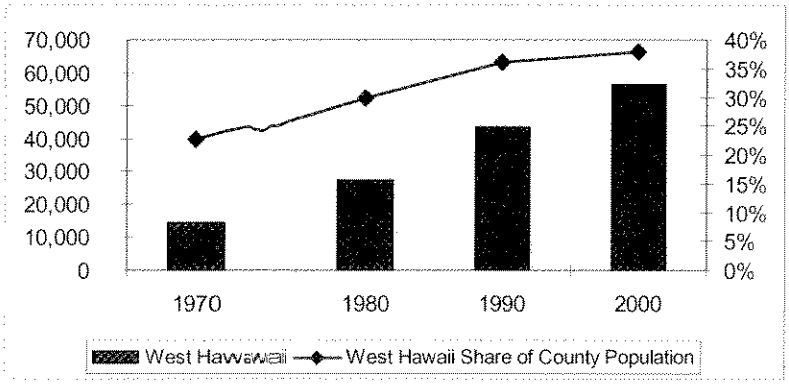
The West Hawaii region has experienced large population increases during the last 30 years, particularly in North Kona and South Kohala. These two districts have developed a visitor industry that is staffed by residents from all over West Hawaii and even from the rest of the island. However, the fastest growth has occurred in Puna, which according to Dr. Kirkpatrick can be attributable to the availability of inexpensive land and housing in that district. Over the last 30 years, the average annual growth rate in Puna has been 6.2 percent, while North Kona has reached 6.1 percent on average, and South Kohala 6 percent.

West Hawaii is home to nearly 40 percent of the County of Hawaii's (Big Island) residents. It also has more than 80 percent of the island's visitor rooms.[1] The average visitor count in 2000 on the Big Island was about 15 percent the size of the resident population, while visitors numbered over 30 percent of the resident population in West Hawaii.

TABLE 4-A: RESIDENT POPULATION, HAWAII COUNTY AND DISTRICTS, 1970 - 2000

COUNTY AND DISTRICT	1970	1980	1990	2000
STATE TOTAL	**769,913**	**964,691**	**1,108,229**	**1,211,537**
HAWAII COUNTY	**63,468**	**92,053**	**120,317**	**148,677**
Puna	5,154	11,751	20,781	31,335
South Hilo	33,915	42,278	44,639	47,386
North Hilo	1,881	1,679	1,541	1,720
Hamakua	4,648	5,128	5,545	6,108
North Kohala	3,326	3,249	4,291	6,038
South Kohala	2,310	4,607	9,140	13,131
North Kona	4,832	13,748	22,284	28,543
South Kona	4,004	5,914	7,658	8,589
Kau	3,398	3,699	4,438	5,827

FIGURE 4-1: WEST HAWAII SHARE OF COUNTY RESIDENT POPULATION



Note: In this report, "West Hawaii" is the combined judicial districts of North Kohala, South Kohala, North Kona and South Kona.

[1] State of Hawaii, Department of Business Economic Development and Tourism 2003 report.

TABLE 4-B: DEMOGRAPHIC CHARACTERISTICS, 1990 AND 2000[2]

	COUNTY OF HAWAII		WEST HAWAII		NORTH KONA		SOUTH KOHALA	
	1990	2000	1990	2000	1990	2000	1990	2000
RESIDENT POPULATION								
Total	120,317	148,677	43,373	56,301	22,284	28,582	9,140	13,131
Under 5 Years Of Age	7.9%	4.6%	8.1%	6.3%	7.8%	6.4%	8.2%	5.3%
18 And Over	71.3%	75.2%	71.9%	74.3%	73.6%	75.5%	70.3%	72.1%
65 And Over	12.5%	14.6%	10.0%	11.5%	10.1%	10.8%	7.4%	10.8%
Median Age	34.3	38.6	N/A	N/A	34.7	39.4	32.1	36.2
VISITOR POPULATION								
Annual Visitor Census	16,698	17,784	13,502	16,092	N/A	N/A	N/A	N/A
Hotel Rooms	7,846	9,774	7,423	8,278	4,096	4,295	3,327	3,983
HOUSING								
Total Housing Units	48,253	62,674	18,693	25,190	9,990	13,960	4,235	5,794
Occupied	85.9%	84.5%	79.9%	79.5%	79.1%	75.4%	73.1%	80.2%
Vacant	14.1%	15.5%	20.1%	20.5%	20.9%	24.6%	26.9%	19.8%
Seasonal, Recreational or Occasional Use	4.2%	8.7%	7.4%	15.4%	8.1%	19.7%	10.3%	15.3%
HOUSEHOLDS								
Number	41,461	52,895	14,935	20,034	7,898	10,522	3,095	4,648
Owner-Occupied	61.1%	64.5%	55.4%	60.2%	54.6%	58.5%	52.7%	58.9%
Renter-Occupied	38.9%	35.5%	44.6%	39.8%	45.4%	41.5%	47.3%	41.1%
Rental Vacancy Rate								
Average Household Size	2.86	2.75	2.85	2.81	2.75	2.7	2.91	2.81
GEOGRAPHIC MOBILITY								
Share of Population born in Hawaii	65.8%	63.3%	53.9%	53.2%	45.5%	48.1%	54.6%	53.2%
Share from Other States, Territories	25.7%	26.4%	38.4%	32.5%	46.8%	41.5%	36.2%	34.1%
Foreign-Born	8.5%	10.2%	7.7%	12.7%	7.6%	10.4%	9.2%	12.7%
Share Living in Same House for Five Years	53.1%	57.7%	42.9%	49.2%	39.4%	46.7%	37.4%	46.1%
Share Same County, Different House	25.7%	26.5%	26.8%	25.5%	26.8%	27.0%	27.4%	31.1%
Share Same State, Different County	6.7%	4.8%	7.2%	4.2%	6.8%	3.3%	10.0%	7.7%

[2] Source: US Census for 1990 and 2000.

According to County and State population forecasts, growth rates are expected to be higher than the mid-1990s, but lower than the 1980s. The resident population growth estimates of the State Department of Business Economic Development and Tourism (DBEDT) and the County, are shown on Figure 4-2 and the visitor population is shown on Figure 4-3. Near- and long-term growth rates are both much higher than the recent rates. However, the average annual visitor growth rate slightly below 2 percent is lower.

FIGURE 4-2: GOVERNMENT FORECASTS OF RESIDENT POPULATION GROWTH, HAWAII COUNTY[3]

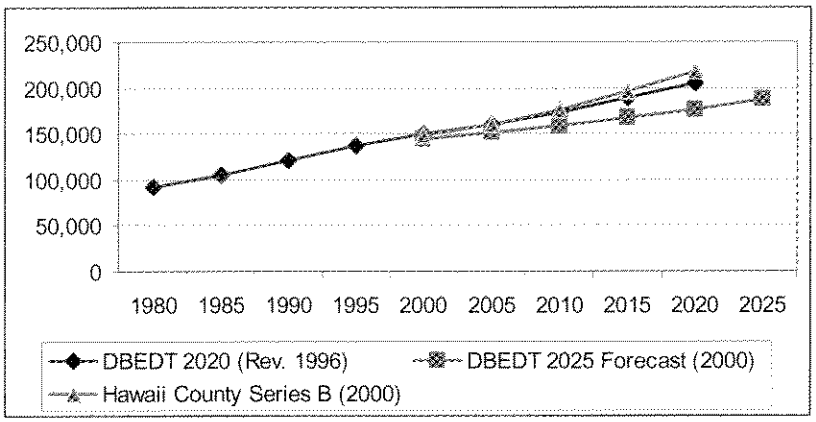
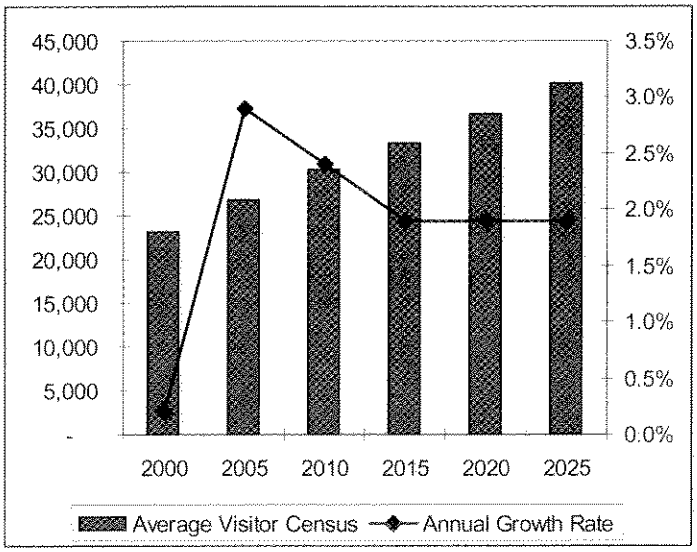


FIGURE 4-3: FORECAST VISITOR CENSUS, HAWAII COUNTY[4]



[3] Sources: DBEDT, 1996, 2000; County of Hawaii General Plan Draft (www.co.hawaii.hi.us)

[4] (Source: DBEDT (2000))

Table 4-C shows the overall relationship between population forecasts and energy demand forecasts. HELCO's estimates of growth in demand for electricity, as stated in its Integrated Resource Plan (IRP) and IRP Evaluation Report (see Appendices E and F in Volume 2 of the Draft EIS), are somewhat higher than the population forecasts. According to Dr. Kirkpatrick, this is reasonable in light of the combined effects of (a) renewed economic growth, (b) a tourism economy in which the visitor population is a significant contributor, and (c) a long-term trend for increasing demand for electricity, independent of population growth.

TABLE 4-C: PROJECTED GROWTH OF POPULATION AND DEMAND FOR ELECTRICITY, TO 2025[5]

	COUNTY OF HAWAII SERIES B	DBEDT 2025 SERIES		HELCO ESTIMATES OF PEAK LOAD (MW)	
	RESIDENTS	RESIDENTS	VISITORS (AVC)*	IRP	IRP2 EVALUATION
A. FORECAST YEARS					
2000	148,677	144,600	23,200	167	171
2005	159,907	151,400	26,800	181	192
2010	176,938	159,600	30,300	203	214
2015	195,965	168,300	33,300	230	244
2020	217,718	176,900	36,600		280
2025		187,700	40,200		322
B. AVERAGE ANNUAL GROWTH RATE FOR FIVE-YEAR PERIODS ENDING IN:					
2005	1.5%	0.9%	2.9%	1.6%	2.3%
2010	2.0%	1.1%	2.5%	2.3%	2.2%
2015	2.1%	1.1%	1.9%	2.5%	2.7%
2020	2.1%	1.0%	1.9%		2.8%
2025		1.2%	1.9%		2.8%

Note: AVC = average visitor count.

4.3. ECONOMIC CONDITIONS

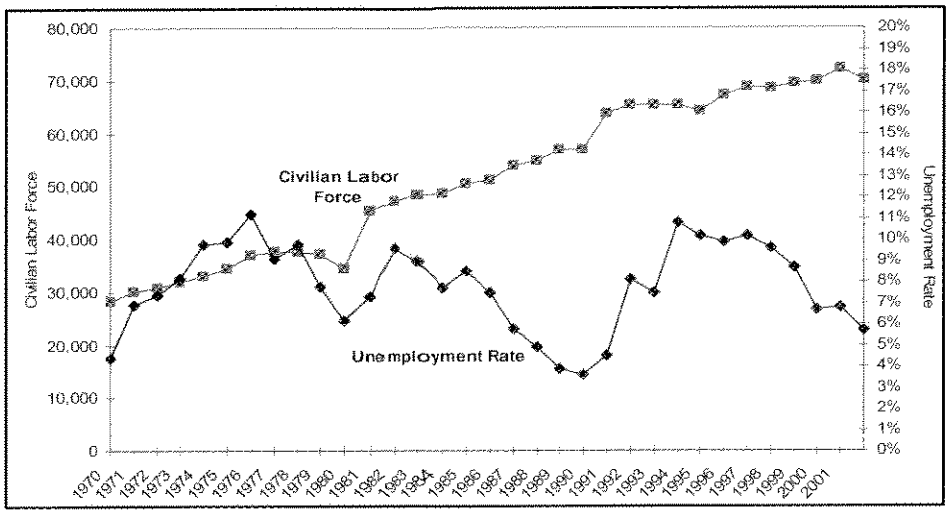
4.3.1. EXISTING EMPLOYMENT

The Big Island has experienced a surge of economic activity and recent job growth, particularly in construction and tourism-related industries. The unemployment rate in 2004 fell below 5 percent, which is well under the national rate (6.0 percent for March 2004).[6] Just a decade ago, lower visitor numbers and plantation closures created serious job loss, which resulted in high unemployment at around 10 percent. During the slowdown of the 1990s, many visitor industry workers had only part-time jobs. In times of economic growth, both unemployment and underemployment decline. The DBEDT 2025 forecast projects slow growth in wage and salary jobs (averaging 1.6 percent to 1.9 percent annually) in the coming years.

[5] Sources: Population forecasts shown in Figures 4-2 and 4-3. The HELCO peak load for 2000 shown in the far right column is based on recorded data. Other items in the "HELCO Estimates" columns are forecasts in HELCO Integrated Resource Plan (1998) and recent IRP-2 Evaluation (HELCO 2004).

[6] Data from State Department of Labor and Industrial Relations (DLIR) website, http://www.state.hi.us/dlir/rs/loihi/.

FIGURE 4-4: CIVILIAN LABOR FORCE AND UNEMPLOYMENT TRENDS[7] \F F



Census data (2000) show that West Hawaii has had a higher level of labor force participation than the Big Island as a whole. However, the level is falling as the population ages and retirees form a larger group. While the Big Island saw a major increase in the number of persons in poverty by the end of the 1990s, the increase was less severe in West Hawaii. The share of children in poverty was still high, although declining in West Hawaii.

TABLE 4-D: INCOME AND POVERTY, 1990 AND 2000

	COUNTY OF HAWAII		WEST HAWAII		NORTH KONA		SOUTH KOHALA	
	1990	2000	1990	2000	1990	2000	1990	2000
EMPLOYMENT STATUS								
Population 16 Years Over	88,999	114,647	32,201	43,473	16,836	22,390	6,613	9,708
Share in Labor Force	64.1%	61.9%	71.0%	67.5%	70.7%	39.2%	73.9%	70.7%
Civilian Labor Force	56,986	70,592	22,870	29,347	11,902	15,484	4,886	6,862
Unemployed	4.6%	4.9%	3.5%	2.8%	2.9%	2.7%	2.8%	2.3%
CLASS OF WORKER								
Private Wage and Salary Workers	71.0%	65.4%	74.9%	72.8%	75.7%	73.6%	79.9%	78.1%
Government Workers	17.6%	19.0%	10.4%	12.0%	9.1%	10.7%	7.4%	9.6%
Self-Employed, Not Incorporated	10.7%	12.0%	13.6%	13.2%	13.9%	13.7%	12.2%	10.9%
Unpaid Family Workers	0.7%	0.7%	1.0%	0.7%	1.3%	0.9%	0.5%	0.3%

[7] Source: Hawaii State Department of Labor and Industrial Relations, in DBEDT, 2003b.

	COUNTY OF HAWAII		WEST HAWAII		NORTH KONA		SOUTH KOHALA	
	1990	2000	1990	2000	1990	2000	1990	2000
POVERTY STATUS, PREVIOUS YEAR								
Individuals								
Total Below Poverty Line	16,776	22,821	4,343	5,581	2,032	2,756	922	1,100
Share of Related Children Under 18	41.3%	35.9%	38.1%	33.7%	34.7%	32.7%	44.4%	41.9%
Share of Persons 65 and Over	8.2%	6.1%	5.8%	6.4%	4.9%	6.4%	4.1%	4.5%

4.3.2. INDUSTRIES IN WEST HAWAII

As the center of the Big Island's visitor industry, West Hawaii is the site of most of the jobs and employment growth. As the following table indicates, 9 of the 15 largest employers in the Big Island are West Hawaii resorts, and the remaining six are countywide agencies. Within West Hawaii, the upscale South Kohala resorts (notably, Mauna Lani with some 2,000 employees) have larger staffs than the North Kona hotels and resort areas.

TABLE 4-E: THIRTY LARGEST EMPLOYERS, COUNTY OF HAWAII, 1999[6]

RANK	COMPANY	EMPLOYEES	BUSINESS
1	State of Hawaii	7,450 1/	State government
2	County of Hawaii	2,250 1/	County government
3	C. Brewer & Co.	1,987	Holding company; agribusiness; land development; alternative energy; trucking; guava and macadamia nuts; Kona coffee
4	Hilton Waikoloa Village	1,200	Tourism
5	United States Government	850 1/	Federal government
6	Mauna Lani Resort (Operation), Inc.	800	Tourism
7	KTA Superstores	776	Supermarkets
8	Mauna Lani Bay Hotel	650	Tourism
9	Hapuna Beach Prince Hotel	579	Tourism
10	Orchid at Mauna Lani	554	Tourism
11	Mauna Kea Beach Hotel	543	Tourism
12	Four Seasons Hualalai	492	Tourism
13	Sure Save Supermarkets	455 2/	Supermarkets
14	Royal Waikoloa Hotel	374	Tourism
15	Kona Coast Resort	325	Tourism
16	Mac Farms of Hawaii Inc.	231	Grower, processor and marketer of macadamia nut products
17	Hilo Hawaiian Hotel	230	Tourism
18	HELCO	226	Utilities
19	Kona Surf Resort and Country Club	217	Tourism
20	GTE Hawaiian Telephone	203	Utilities

[6] Source: Hawaii County, 2001.

Rank	Company	Employees	Business
21	HPM Building Supply	200	Wholesale, retail and manufacturing; lumber and building materials
22	Kona Village Resort	186	Tourism
23	Keauhou Kona Resort Co.	180	General contractor
24	Royal Kona Resort	180	Tourism
25	King Kamehameha's Kona Beach Hotel	166	Tourism
26	Maryl Group Inc.	165	Land developer; general contractor
27	Life Care Center of Hilo	160	Healthcare
28	Jack's Tour Inc.	150	Tourism
29	Isemoto Contracting Co., Ltd.	140	General contractor
30	Suisan Group Inc. 3/	130	Wholesale frozen foods, dry groceries, produce, wholesale and retail fresh fish, fresh-fish auction

Notes: 1/ Annual average job counts.
2/ Includes Wiki Wiki Mart and Wiki Wiki Video.
3/ Previously ranked as Suisan Co. Ltd.

Government, hotels, trade, and health services are major components of the Big Island economy, which accounts for about 10 percent of the overall State economy. The Big Island also has a small manufacturing sector and a strong agricultural industry. Even following the closure of major plantations, West Hawaii has continued to have productive agricultural areas. South Kona is the heart of Hawaii's coffee industry. The Parker Ranch, based in Waimea in the South Kohala uplands, is one of the largest ranches in the United States. Along the north coast of North Kohala are well-watered agricultural lands. The Keahole Agricultural Park provides about 179 acres of leased agricultural land near the airport and urban center, but it is only a small part of West Hawaii's agricultural area. As of 2000, some 484,741 acres in West Hawaii were designated Agricultural.

TABLE 4-F: COUNTY AND STATE ECONOMIES[9]

	County of Hawaii	State of Hawaii	Share
A. Indicators Of County Share Of State Economy			
Employed Persons, 2002	66,150	557,400	11.9%
Wage and Salary Job Count, 2002	58,250	562,600	10.4%
Personal Income, 2001 (Millions $)	$3,335	$35,625	9.4%
Estimated Personal Income, 2005 (Million 1992$)	$2,760	$31,764	8.7%
B. Estimated County Economy (Based On Recent State Data And Projections For 2003)			
Personal Income (Million $)	$3,690	$39,416	9.4%
Gross Domestic Product (Million $)	$5,063	$48,067	10.5%

[9] Sources: DBEDT, 2003b, 2003c, 2000

TABLE 4-G: EMPLOYMENT IN HAWAII COUNTY INDUSTRIES, 2002[10]

		COVERED EMPLOYMENT, 2002	
		AVERAGE EMPLOYMENT	TOTAL WAGES (MILLION $)
GOODS PRODUCING:		**7,575**	**$261.0**
	Construction	3,846	$176.8
	Manufacturing	1,406	$35.2
	Agriculture, Forestry, Mining	2,323	$49.0
DISTRIBUTION AND SERVICES:		**39,275**	**$989.1**
	Transportation, Utilities	2,414	$81.6
	Trade	9,335	$241.4
	Finance, Insurance, Real Estate	2,312	$75.4
	Food Services	4,393	$58.5
	Hotel, Accommodations	6,687	$188.1
	Health Services	5,482	151.7
GOVERNMENT		**11,016**	**$416.7**
	TOTAL	**57,866**	**$1,666.8**

4.3.3. EMERGING TRENDS

Recent economic growth and prosperity have brought both advantages and disadvantages to the West Hawaii region. New retail opportunities have been created with the opening of Costco, WalMart, Home Depot, and Lowe's in the Kailua area. At the same time, traffic congestion (long a problem during rush hour on Palani Road), has worsened appreciably on Queen Kaahumanu Highway and on the Hawaii Belt Road between Kailua and South Kona. However, plans are under way on highway improvements for both State and County roads. (See Traffic Report, attached as Appendix A.)

During the 1990s, little new investment occurred in the visitor industry until the Hualalai Resort at Kaupulehu opened in 1998. The project was highly successful and now includes several increments of resort housing along with a hotel and golf course. New and revived plans for urban growth have emerged closer to the project:

- New development is being proposed for the Kohanaiki site, where disputes over Nansay Hawaii's proposals for a resort project led to the PASH decision (protecting native Hawaiian access rights). Rutter Development now plans a golf course and housing project, while setting aside coastal lands for a public access beach park.
- At Honokohau, the State Department of Land and Natural Resources (DLNR) has requested proposals for marina redevelopment. The DHHL has entered into a lease agreement with a private development team for 200 acres, which will include commercial uses, resort development, and a possible golf course. DHHL also intends to increase its residential development in the Laiopua project, above the Queen Kaahumanu Highway near Honokohau, from 225 units to "more than double" that number.
- At Ooma, south of the HOST Park, the current owners have proposed developing some 400,000 square feet of commercial space, 400 hotel rooms, and 240 multi-family units. The Hawaii Planning Commission approved the project. However, Mayor Harry Kim has requested that the project be

[10] Source: Department of Labor and Industrial Relations, 2003.

deferred until the timing of highway improvements could be clarified. The Mayor's position was that this project and others like it would create new traffic and should not proceed until major nearby roadways are improved.

- At the HOST Park, a new Gateway Center is being developed to showcase new energy technologies.
- The 725-acre Palamanui project (Hawaiiluhilu Development, LLC) north of the HELCO site would include commercial development, single- and multi-family housing, a golf course, and infrastructure in support of the University of Hawai'i's West Hawaii College on adjoining State land. The University would first rent space in the commercial area, then presumably later develop its acreage. An access road for the private and public projects would connect with the Queen Kaahumanu access next to the subject property.
- DHHL acreage between the Palamanui project site and the HELCO facility could benefit from the proposed access road. Those lands are shown in DHHL's land inventory as largely residential, although part of the land, next to the highway and across the road from the project site, is identified as appropriate for commercial use. No further plans are definite.

Further development is possible in existing resort areas such as Mauna Lani and Waikoloa in South Kohala, Kaupulehu, and Kukio at the far north end of North Kona, and Keauhou at the southern end of North Kona. In the near term to about 2007, new construction is bringing needed new residential housing to North Kona in single-family and townhouse subdivisions. Development of resort residential projects is very active in South Kohala and proposed for Keauhou in North Kona and for South Kona. According to Dr. Kirkpatrick, the visitor-oriented projects would have little impact on population, but the higher density projects noted above would house more people and support more jobs in West Hawaii. Much of the development proposed could occur by the end of this decade.

4.3.4. ISSUES AND CONCERNS RELATED TO PROJECT

Dr. Kirkpatrick interviewed stakeholders about the proposed reclassification of the subject property and subsequent improvements. According to Dr. Kirkpatrick, most of those interviewed had no strong reaction to the reclassification of the lands, and actually viewed the issue as part of the Settlement Agreement, which they characterized as a "win-win" agreement. Nearly all those interviewed agreed that the settlement process was an important step for the community. The settlement would allow HELCO to proceed with improvements to the generating station while responding to neighbors' concerns. Many viewed HELCO's plan to implement a high level of emission controls favorably, and uniformly saw reclassification as not being a concern, but merely part of the process.

According to Dr. Kirkpatrick, most stakeholders were glad to see the lengthy arguments over power generation at Keahole finally resolved and new generators being installed. Many welcomed the new generating capacity on the Big Island grid to serve customers and lower the likelihood of blackouts. However, a few commented that they wished HELCO had shifted to another site some years ago. Many of those interviewed commented that that they favored increased reliance on renewable resources. A number of stakeholders saw the installation of a steam turbine (ST-7) with selective catalytic reduction (SCR) at the generating station as valuable, not just as a contribution to near-term generating capacity but also as giving the Big Island the firm capacity needed to depend more and more on resources other than fossil fuels.

4.4. ASSESSMENT OF IMPACTS

In this section, the social and economic impacts associated with the Preferred Alternative will be discussed and viewed in relation to the No Action Alternative and to the three remaining alternatives discussed in Chapters Two and Three.

4.4.1. LOCAL, REGIONAL, OR GENERAL IMPACTS

A project can have local impacts because its construction or its operations affect the lives and community organization of neighbors and nearby groups. It can have regional impacts by providing services or employment for a region, or by withdrawing resources that would otherwise be used in the area. General impacts are more widespread or widely dispersed.

On a local level, the Preferred Alternative would mainly consist of the mitigation of potential impacts discussed in Chapter Three (e.g., noise, emissions, water resources). The presence of additional generating capacity very close to the HOST Park and the new Energy Gateway Center would minimize the likelihood of transmission-related outages to these facilities. At the regional and island levels, assurance of generating capacity would support economic growth for West Hawaii and the Big Island.

4.5. DIRECT, INDIRECT OR INDUCED IMPACTS

In an input/output analysis, direct spending (on construction or operations) leads to direct employment and incomes. Indirect jobs and incomes are created as goods and services are purchased for the activity from other firms in the economy. Induced jobs and incomes are created as direct and indirect workers spend their wages in the economy. DBEDT has developed and refined a statewide input/output model, and these impacts can be calculated using industry multipliers in the model (DBEDT, 2002). Tables 4-H through 4-J identify direct impacts of construction and operations and show indirect and induced impacts on employment and wages.

4.5.1. CUMULATIVE IMPACTS

Cumulative impacts are the result of the insertion of a new activity in a developing context. They are the total impacts of the new activity and pre-existing factors. Cumulative impacts become especially important if a project adds to the demand for limited resources that are barely sufficient without the project but less than adequate for the project, plus all the other developments expected to exist ahead of the subject project.

The key cumulative impact of the Preferred Alternative and Alternatives 3 through 5 is that firm generating capacity to meet demand is assured through the year 2025, while the No Action Alternative does not provide that assurance.

In Tables 4-K and 4-M, the number of operations-related workers, their families, and their demand for new households are calculated. While some of these calculations rest on the input-output model (i.e., on a model of the entire economy), their cumulative impact is visible only when viewed in the context of the island workforce, population, and housing demand.

4.5.2. SYMBOLIC IMPACTS

According to Dr. Kirkpatrick, an action may have equal importance in the way it is perceived and by actual tangible results. Symbolic impacts are not always easily classified as adverse or beneficial. If a project is viewed as a sign of unwanted impending changes, that does not necessarily signal future

disorganization or a need by a community organization to avert adverse impacts. Symbolic impacts deserve close study, but since they are matters of value and expectation, their importance and consequences are often uncertain.

The Preferred Action allows HELCO to proceed with certain mitigation measures that would alleviate concerns identified by some of its neighbors as important to them. Under all the other alternatives, some change would be needed to the terms of the settlement between HELCO and other parties.

4.6. EMPLOYMENT AND INCOMES[11]

The alternatives under study fall into three groups in terms of generating jobs:

- The No Action Alternative creates no new jobs, either in construction or in operations.
- Alternatives 2 through 4 depend on the eventual construction of fossil fuel based generating facilities. Over the study period (2005 to 2025), these would involve some $30 to $36 million in construction costs.
- Alternative 5 depends on the construction of a new biomass plant to process organic matter and create energy. Such a plant is estimated to be considerably more expensive to build than a diesel fuel-based plant. Also, it demands far more workers. Hence this alternative involves a considerably larger workforce (and population, and housing demand) than the others.

4.6.1. CONSTRUCTION

Construction employment can be estimated based on construction costs and historic ratios of workers to construction spending. Table 4-H shows the workforce needed to put in place the various improvements needed to meet expected demand under the various alternative plans (Alternatives 2 through 5). The No Action Alternative is not included since it includes no construction. Construction jobs are full-time equivalents in "person-years." One person-year may represent steady employment for a worker or shorter engagements by several contractors.

The Input-Output model is used in Table 4-I to estimate the additional jobs in Hawaii associated with construction. Construction jobs pay well, and construction typically involves materials and supplies from local sources, so more indirect and induced jobs are supported than direct ones. The State Input-Output model does not report county-level impacts; these have been estimated by SMS. County-level estimates are hence approximations.

Incomes can be estimated from industry averages (Department of Labor and Industrial Relations (DLIR), 2003), adjusted in proportion to increases in the Consumer Price Index (DBEDT, 2003c). For indirect and induced jobs, average incomes for all wage earners are used. Incomes for the County of Hawaii workforce were estimated first, on the basis of County averages, and incomes for the remaining workforce associated with construction were estimated from State-wide averages.

[11] Two different approaches are used with the monetary calculations in this report. When assessing the impact of different alternatives on incomes and government revenues, all calculations use constant 2003 dollars. Again, estimates of the impact of the No Action Alternative's low reliability after 2015 are phrased in constant 2003 dollars. This approach allows readers to judge impacts in relation to current experience. However, when developing alternatives, HELCO used a more complex model, since the eventual cost of development for ratepayers and investors will be affected not just by the cost of new facilities but also by the timing of their installation.

TABLE 4-H: DIRECT CONSTRUCTION EMPLOYMENT[12]

		2006-2010	2011-2015	2016-2020	2021-2025	CUMULATIVE
CONSTRUCTION SPENDING IN MILLIONS OF 2004 $						
Alternative 2	Preferred	$11.7	$ 0.0	$14.9	$18.6	$ 45.2
Alternative 3	West Hawaii	$ 0.0	$ 7.4	$17.5	$16.0	$ 40.9
Alternative 4	East Hawaii	$ 0.0	$ 7.2	$17.4	$14.9	$ 39.5
Alternative 5	Renewable	$ 0.0	$25.4	$27.3	$50.9	$103.6
DIRECT CONSTRUCTION JOBS PERSON-YEARS						
Alternative 2	Preferred	85		107	134	326
Alternative 3	West Hawaii		54	126	116	296
Alternative 4	East Hawaii		52	126	107	285
Alternative 5	Renewable		183	197	367	747

TABLE 4-I: DIRECT, INDIRECT AND INDUCED CONSTRUCTION EMPLOYMENT

		2006-2010	2011-2015	2016-2020	2021-2025	CUMULATIVE
DIRECT, INDIRECT, AND INDUCED CONSTRUCTION-RELATED JOBS – PERSON-YEARS						
Alternative 2	Preferred	210		267	335	812
Alternative 3	West Hawaii		133	313	288	734
Alternative 4	East Hawaii		129	313	267	709
Alternative 5	Renewable		457	490	914	1861
DIRECT, INDIRECT, AND INDUCED CONSTRUCTION-RELATED JOBS IN COUNTY OF HAWAII - PERSON-YEARS						
Alternative 2	Preferred	174		221	277	671
Alternative 3	West Hawaii		110	259	238	608
Alternative 4	East Hawaii		106	259	221	586
Alternative 5	Renewable		378	406	755	1539

[12] Source: Construction cost estimates from HELCO, in 2004 $. These estimates are for work by local contractors, and exclude the cost of turbines and other major equipment. Jobs were estimates by SMS, based on historic ratios of construction spending to employment

TABLE 4-J: WORKFORCE INCOMES FROM CONSTRUCTION-RELATED EMPLOYMENT

		2006-2010	2011-2015	2016-2020	2021-2025	CUMULATIVE
DIRECT CONSTRUCTION JOBS IN MILLIONS OF 2003 $						
Alternative 2	Preferred	$ 3.9	$ 0.0	$ 5.0	$ 6.2	$15.10
Alternative 3	West Hawaii	$ 0.0	$ 2.5	$ 5.8	$ 5.3	$13.60
Alternative 4	East Hawaii	$ 0.0	$ 2.4	$ 5.8	$ 5.0	$13.20
Alternative 5	Renewable	$ 0.0	$ 8.5	$ 9.1	$17.0	$34.60
DIRECT, INDIRECT, AND INDUCED CONSTRUCTION-RELATED JOBS IN MILLIONS OF 2003 $						
Alternative 2	Preferred	$ 7.7	$ 0.0	$ 9.8	$12.3	$29.80
Alternative 3	West Hawaii	$ 0.0	$ 4.9	$11.5	$10.6	$27.00
Alternative 4	East Hawaii	$ 0.0	$ 4.7	$11.5	$9.8	$26.00
Alternative 5	Renewable	$ 0.0	$16.7	$18.0	$33.5	$68.20
DIRECT, INDIRECT, AND INDUCED CONSTRUCTION-RELATED JOBS IN COUNTY OF HAWAII IN MILLIONS OF 2003 $						
Alternative 2	Preferred	$ 6.3	$ 0.0	$ 8.0	$10.0	$24.30
Alternative 3	West Hawaii	$ 0.0	$ 4.0	$ 9.4	$ 8.6	$22.00
Alternative 4	East Hawaii	$ 0.0	$ 3.9	$ 9.4	$ 8.0	$21.30
Alternative 5	Renewable	$ 0.0	$13.7	$14.7	$27.4	$55.80

4.6.2. OPERATIONS

A number of jobs would be created from the direct operations of power generation (whether for HELCO or another power producer). SMS treated the many jobs created in Alternative 5 for biomass plants as similar to those in sugar mills to estimate the impacts of the jobs for the larger economy and for incomes. Those jobs are on average not as highly paid as are power generation personnel. However, the economic impact of the sugar mills has had a great impact on Hawaii. The direct workforce in biomass plants is much larger than that needed to generate power using diesel fuel, but the ratio of indirect and induced jobs to direct jobs associated with a biomass plant is also much higher than for fossil-fuel burning plants. (Tables 4-K and 4-L estimate the workforce and payrolls involved.) The No Action Alternative creates no operations jobs. It is not shown in the tables.

Operational jobs unlike construction jobs are long-term. Initially, there would be minimal employment associated with any of the alternatives, since the completion of combustion turbines CT-4 and CT-5 would expand generating capacity. Over time, the direct job count for the Preferred Alternative and Alternatives 3 and 4 would climb above 20 jobs. The job count for a system that relies on biomass for new generating capacity would exceed 100 jobs between 2005 and 2025.

TABLE 4-K: DIRECT, INDIRECT AND INDUCED OPERATIONS EMPLOYMENT

		2010	2015	2020	2025
DIRECT OPERATIONS JOBS – CUMULATIVE NEW PERMANENT JOBS					
Alternative 2	Preferred	4	4	12	21
Alternative 3	West Hawaii	0	4	13	21
Alternative 4	East Hawaii	0	4	16	24
Alternative 5	Renewable	0	34	68	136
DIRECT, INDIRECT AND INDUCED OPERATIONS-RELATED JOBS - CUMULATIVE NEW PERMANENT JOBS					
Alternative 2	Preferred	12	12	37	65
Alternative 3	West Hawaii	0	12	40	65
Alternative 4	East Hawaii	0	12	50	74
Alternative 5	Renewable	0	228	456	913
DIRECT, INDIRECT AND INDUCED OPERATIONS-RELATED JOBS IN COUNTY OF HAWAII CUMULATIVE NEW PERMANENT JOBS					
Alternative 2	Preferred	10	10	29	51
Alternative 3	West Hawaii	0	10	32	51
Alternative 4	East Hawaii	0	10	39	58
Alternative 5	Renewable	0	160	320	639

Notes: Direct employment estimated by HELCO planners. Indirect and induced jobs estimated by SMS based on the State Input-Output model (DBEDT)

TABLE 4-L: WORKFORCE INCOMES FROM OPERATIONS-RELATED EMPLOYMENT

		2010	2015	2020	2025
DIRECT OPERATIONS JOBS – MILLIONS OF 2003 $					
Alternative 2	Preferred	$ 0.3	$ 0.3	$ 0.9	$ 1.5
Alternative 3	West Hawaii	$ 0.0	$ 0.3	$ 0.9	$ 1.5
Alternative 4	East Hawaii	$ 0.0	$ 0.3	$ 1.1	$ 1.7
Alternative 5	Renewable	$ 0.0	$ 1.0	$ 2.0	$ 4.1
DIRECT, INDIRECT AND INDUCED OPERATIONS-RELATED JOBS - MILLIONS OF 2003 $					
Alternative 2	Preferred	$ 0.5	$ 0.5	$ 1.6	$ 2.8
Alternative 3	West Hawaii	$ 0.0	$ 0.5	$ 1.8	$ 2.8
Alternative 4	East Hawaii	$ 0.0	$ 0.5	$ 2.2	$ 3.2
Alternative 5	Renewable	$ 0.0	$ 7.0	$14.0	$27.9
DIRECT, INDIRECT AND INDUCED OPERATIONS-RELATED JOBS IN COUNTY OF HAWAII - MILLIONS OF 2003 $					
Alternative 2	Preferred	$0.5	$ 0.5	$ 1.4	$ 2.4
Alternative 3	West Hawaii	$ 0.0	$ 0.5	$ 1.5	$ 2.4
Alternative 4	East Hawaii	$ 0.0	$ 0.5	$ 1.8	$ 2.7
Alternative 5	Renewable	$ 0.0	$ 4.7	$ 9.4	$18.8

4.7. POPULATION AND HOUSING IMPACTS

SMS estimated the population and housing impacts from the job-creation associated with the project. To the extent that a project supports new permanent jobs, it may encourage in-migration. With new jobs, resident workers may have enough income to form new households.

The number of operations workers involved in Alternatives 2 through 5 is small, as shown in Table 4-M.[13] Since many of the direct workers are specialized technicians, some new hires could come from off-island, and add to local housing demand. A few more operations-related workers would be able to set up separate homes after some time, and their eventual creation of new households is also shown in Table 4-M.

TABLE 4-M: POPULATION AND NEW HOUSING IMPACTS

		AS OF:			
POPULATION SUPPORTED, COUNTY OF HAWAII		**2010**	**2015**	**2020**	**2025**
Alternative 1	No Action	0	0	0	0
Alternative 2	Preferred	20	20	61	107
Alternative 3	West Hawaii	0	20	66	107
Alternative 4	East Hawaii	0	20	81	122
Alternative 5	Renewable	0	20	227	453
		ON OR MORE LIKELY AFTER:			
MAXIMUM NEW HOUSING CREATION, COUNTY OF HAWAII		**2010**	**2015**	**2020**	**2025**
Alternative 1	No Action	0	0	0	0
Alternative 2	Preferred	2	2	6	11
Alternative 3	West Hawaii	0	2	7	11
Alternative 4	East Hawaii	0	2	8	12
Alternative 5	Renewable	0	34	68	136

Notes: Population and housing impacts based on operations jobs, since construction jobs are for a limited term. The number of persons per household (2.95) and ratio of jobs per household (1.41) are estimated from 2000 census data, State DLIR job counts, and SMS estimates. New household creation estimated at 15 percent to 30 percent of households, based on past resort studies. New household creation occurs over time, not necessarily in the year operations began, since workers accumulate income and for other reasons wait to establish households.

In West Hawaii, as in most of the State, affordable housing is very limited. Thus, a major increase in the demand for housing for an industrial workforce could be a significant impact. However, the eventual increase in demand associated with the fossil-fuel based alternatives is very small: less than one new house per year over 20 years. If one or more biomass plants were built, housing demand would be greater, but likely spread over the island.

4.8. IMPACTS ON THE ECONOMY

4.8.1. IMPLICATIONS OF THE ALTERNATIVE PLANS ON ENERGY PRODUCTION AND COST

According to Dr. Kirkpatrick, the alternatives considered by HELCO, other than the No Action Alternative, would meet the requirements of a planning model intended to assure the Big Island with adequate generating capacity to meet demand for electrical power. As a result, Alternatives 2 – 4 do not vary in reliability as to the power supply over the long term, but do vary in cost and local impacts.

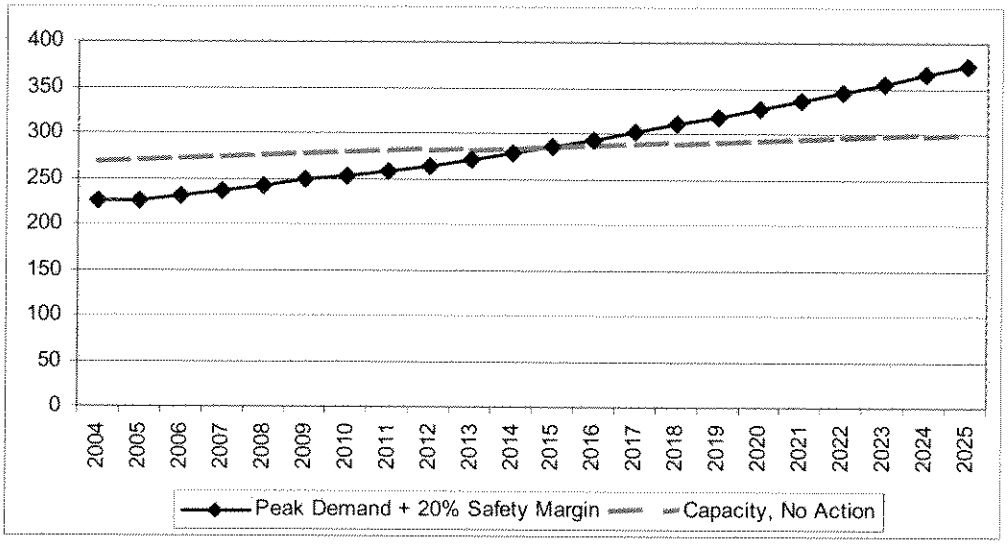
In contrast, the No Action Alternative does not meet the demands of the planning model, and hence it involves less firm generating capacity. A shortfall in supply relative to demand could become problematic by 2015. Figure 4-5 uses a planning standard – peak demand plus a 20 percent margin – against which the No Action Alternative would lead to shortfalls. (HELCO's capacity criterion calls for a reserve margin adequate to cover (1) peak demand; (2) a generating unit off-line for planned maintenance; and (3)

[13] (See attachment to SMS report attached as Appendix M for calculations of impact for each alternative plan.)

unexpected removal of the largest generating unit in the system. This criterion has been used since 1990.[14] Depending on which unit is on planned maintenance, the capacity needed over peak demand is about 17 percent to 20 percent. HELCO uses 20 percent to provide a margin of safety in general planning.

The No Action Alternative leads to an imbalance of demand and capacity similar to that seen in County of Hawaii in the early 1990s. This imbalance would be a continuing, worsening condition, not a short-term one. The cost of lowered reliability is discussed in the next section.

FIGURE 4-5: DEMAND FOR FIRM GENERATING CAPACITY AND CAPACITY AVAILABLE WITH NO ACTION ALTERNATIVE "\F F



The cost of supplying electrical power by different means can be estimated on the basis of forecasts of future costs. Table 4-N shows the total costs of the various alternatives that would meet planning criteria for supplying firm power. Cost estimates include equipment, construction, operations, and maintenance. The dollar values represent the net present value of future costs and treats near-term costs as larger than similar costs occurring later.[15]

The No Action Alternative is not fully comparable to the others, since it does not involve facilities and operations at levels needed to meet expected demand. The No Action Alternative is less expensive, but does not deliver the same service. Among the comparable plans, the Preferred Alternative and West Hawaii Alternative are the least expensive).[16]

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[14] Personal communication with Ross Sakuda, HECO Generation Development Planning, June 2004.

[15] Estimates of Net Present Value include a discount rate and inflation rate that will affect future costs. The discount rate allows for the fact that future expenditure of funds is less expensive than saving now, and paying later (all other factors held equal), while the inflation rate allows for cost increases throughout the economy. With these rates used to adjust future investments and costs, the resulting calculations are in terms comparable to present day dollars.

[16] The cost estimate for the Preferred Alternative is actually about $63,500 lower than for the West Hawaii Alternative. For this discussion, SMS viewed that difference, over a long-term analysis as too small to differentiate. Readers should note that the emissions controls accepted for Keahole under the Settlement Agreement were not necessary to meet environmental

Over time, the difference in cost among the plans with expanded reliance on fossil fuels is 0.6 percent or less. The difference in cost between dependence on biomass and on fossil fuels for a new firm energy-generating source is larger, ranges up to 7.4 percent.

TABLE 4-N: FORECAST COSTS FOR ALTERNATIVE PLANS

PLAN		DEVELOPMENT COSTS (MILLION $)		
		NET PRESENT VALUE TO 2025	COMPARISON	RANK
Alternative 1	No Action	$1,003.7	NC	
Alternative 2	Preferred Action	$1,808.5	100.0%	1
Alternative 3	New West Hawaii Plant	$1,808.5	100.0%	1
Alternative 4	East Hawaii	$1,819.8	100.6%	3
Alternative 5	Biomass	$1,942.3	107.4%	4

Notes: Components of plans are shown in Chapter Three. Cost estimates are expressed as Net Present Values 2004 dollars. Comparisons show relative cost of alternatives, expressed as percentages of lowest cost plan. (Source: HELCO estimates, 2004.)

4.8.2. IMPACTS OF ALTERNATIVES ON THE HAWAII COUNTY ECONOMY

The Big Island accounts for about 10 percent of the State economy and totals about $5 billion in gross domestic product. The Preferred Alternative (and the remaining alternatives designed to provide firm power adequate to support demand) would supply generating capacity to support anticipated economic growth. The No Action Alternative would subject Big Island customers to an increasingly inadequate power supply. Many customers would need to have back-up generating capacity.

4.8.3. NO ACTION ALTERNATIVE

The No Action Alternative would return the Big Island to a situation in which generating capacity was inadequate to meet demand. This would limit productivity and increase costs for firms. When HELCO is unable to meet demand, unanticipated outages or planned rolling blackouts may occur. Rolling blackouts typically occur at peak demand times around 6:00 p.m. Circuits at various places island wide are removed from the grid. In 1991-1992, HELCO had to refuse service to customers on 22 different days because of a shortfall in capacity.[17] On average, about 15,000 customers lost power on those days. A total of 387 circuit interruptions occurred. While the average interruption was for about 45 minutes, the longest single interruption lasted nearly three hours.

When blackouts are possible, many firms must plan to protect their core functions and information systems. According to Dr. Kirkpatrick, residential customers typically are resigned, but unhappy about blackouts, reporting that they keep candles and flashlights handy. Some have home generators, even though they are on the grid. Occasional blackouts have important consequences even for well-prepared customers, for example:

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standards. Hence, they were not included in the costs of development at other sites. Should other sites be chosen and should HELCO implement the control technologies requested and accepted for Keahole in the Settlement, then the cost of new plants elsewhere would rise.

[17] At that time, Puna Geothermal Venture had been contracted to provide 25 MW, but was not yet on line. Blackouts occurred when generating capacity was less than actual demand, because other units needed maintenance and went off-line.

- The HOST Park assures its tenants of a continuous supply of cold deep-ocean water. To do so, it maintains generating capacity and fuel to supply the pumps even if the local power supply fails for up to two weeks.
- The Keck Observatory can close its telescope dome using emergency power in the event of an outage. It does not have enough power to make and record observations, so viewing time is lost.
- At the North Hawaii Community Hospital, generators can supply offices and wards with power, but the operating theater is closed in the event of an outage.

In all these cases, uncertainty about power raises operating costs and can lower productivity. Under the No Action Alternative, rolling blackouts could be increasingly expected by 2015. This would make the Big Island less competitive than other counties in attracting new investment, since firms would need to plan to supply their own power as a matter of course.

As noted earlier, residential energy demand per person has been consistently growing. While some of that demand is unproductive, use of computers from home offices are productive and support residents' income-producing activities. Under the uncertain conditions that the No Action Alternative would create, residents would not be able to depend on power for such activity, and hence would be less able to telecommute and otherwise work from home.

Not all customers would be affected in the same way by rolling blackouts. HELCO first tries to minimize interruptions for commercial areas, taking areas with a largely residential customer base off the grid rather than commercial ones. Next, the largest customers are increasingly being encouraged to develop their own power resources. Mauna Lani, a major resort, now draws on its own solar power sources to supply 800 kW for hot water and air conditioning, and even to contribute to the grid. In such a case, HELCO and the customer would negotiate fee structures and connection agreements. The largest customers are likely to be insulated from the uncertainties of outages in the case of the No Action Alternative. This alternative could increase third-party producers' interest in developing distributed generation capacity.[18]

Distributed generation is an objective of HELCO plans and included in all alternatives under study. Distributed generation is most cost-effective, and most likely to be implemented by large customers. Those customers would in turn be protected from the risks that would arise under the No Action Alternative, while smaller customers would face both the risks and the reduced productivity associated with that alternative.

To encourage energy efficiency in this industry, HELCO offers substantial cost savings and rebates to hotels and other tourism-related businesses as an incentive for long-term planning and managing energy costs. Under HELCO's energy-efficiency rebate programs, customers who install energy efficient equipment receive cash incentives to reduce upfront costs. For most customers, installation costs can be recouped within three to five years with energy savings. The company also provides long-term planning and feasibility studies for specific projects or an overall facilities master plan including HVAC (Heating, Ventilation and Air Conditioning), water heating, lighting, pumping systems, and other energy uses and supplies. The company will generate a detailed report on the: (1) condition of the existing equipment with estimated remaining life; (2) opportunities for energy efficiency and recommendations for upgrades;

[18] The use of small electric power generators, using fossil fuels or renewable energy sources, located on the utility system at a utility site or at a customer site that may or may not be connected to the utility's power grid

(3) estimated energy savings, payback and life cycle cost analysis based on recommended upgrades; (4) priorities for upgrading mechanical systems; and (4) recommended maintenance for upgraded systems.

By encouraging conservation and energy efficiency, HELCO: (1) delays the construction of new plants that could cost millions of dollars; (2) offsets huge operating costs created by excessively high demand and system vulnerability; (3) supports and works with government initiatives to fulfill and achieve the desired level of energy sources needed to safeguard Hawaii's future; and (4) fulfills its duty and legal obligation to serve the public.

4.8.4. ALTERNATIVE PLANS

The Preferred Alternative and Alternatives 3 through 5 were designed to provide reliable service and avoid rolling blackouts. However, service interruptions could still occur due to unforeseen circumstances. The Alternatives vary in costs for ratepayers (discussed below), and should provide adequate capacity for consumer demand. Hence, the Alternatives do not involve major impacts on the island economy due to reliability.

Alternative 5 was included to address the feasibility of renewable firm resources as an alternative to fossil fuels. Currently, the renewable resources capable of supplying firm power on a large-scale are geothermal energy and biomass. HELCO has a 35-year power purchase agreement with Puna Geothermal Ventures (PGV) for 30 megawatt (MW) of firm capacity. However, PGV has not always consistently produced at that level due to initial startup problems and a blocked source well. PGV completed drilling an additional source well in February 2003, and converted the blocked source well into an injection well in early March 2003. The new injection well was tested and PGV's capacity is currently between 25 to 28 MW. As of early 2004, PGV anticipated that it would be fully restored to 30 MW by late 2004. As of January, 21, 2005, this did not yet happen. In April 2004, Ormat Industries purchased PGV for $71 million.

The Big Island grid for many years depended on biomass in the form of bagasse burned by sugar mills. With the closing of the sugar plantations in the 1990s, biomass is not readily available. In its place, Hilo Coast Power Company, formerly Hilo Coast Processing Company, (HCPC) supplied power by burning imported coal, rather than a locally grown resource. The contract with HCPC will ended on December 31, 2004.

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Should new biomass plants become viable, whether because of high fossil-fuel costs or energy policy, The Big Island would probably need to grow biomass expressly for this purpose, rather than as a by-product of plantation agriculture. For each 25 MW biomass plant, approximately 6,300 acres would be needed to supply biomass. This alternative would then provide demand for nearly 20,000 acres of agricultural land over the next two decades. (That amount is 1.6 percent of County's land designated as Agricultural by the State Land Use Commission.)

4.8.5. IMPACTS ON RATEPAYERS

The costs of Alternatives 2 - 5 are comparable because they are supplying generating capacity at the level forecast needed by Big Island consumers. The No Action Alternative is not comparable, because it does not involve the provision of the same amount of power.

Should the Biomass Alternative be pursued, ratepayers would likely cover the cost of this alternative. It would amount to about $50.50 per customer per year over the 21-year planning period.[19] A few agricultural ratepayers would of course offset this cost by supplying biomass for the plants. When the Preferred Alternative and West Hawaii Alternative are compared, the cost difference is minimal, and the Preferred Alternative is slightly less expensive.

4.8.6. IMPACTS ON STOCKHOLDERS

Hawaiian Electric Industries' (HEI) reports to stockholders have discussed the stalled development of the subject property as problematic. Alternative 2 or the Preferred Alternative would allow HELCO to generate power to meet demand and also to support a settlement that has been presented as a solution for the entire community. In contrast, the No Action Alternative and the Alternative 3 - 5 fail to meet key terms of the settlement. Consequently, the Preferred Alternative offers stockholders a much less uncertain future than the other alternatives. In that future, continuing good relations between HELCO and its customers could well lead to less contentious planning and permitting processes, and hence more efficient actions by HELCO.

The Preferred Alternative develops a dual-train combined-cycle (DTCC) plant at Keahole in this decade. As a result, energy generation becomes more cost-efficient, and energy lost through waste heat will be reduced under the Preferred Alternative.

4.8.7. IMPACTS ON PUBLIC SERVICES AND FACILITIES

The North Kona region is served by four public school complexes: Konawaena, Ho'okena, Kahakai, and Kealakehe; and three public libraries. The Kealakehe school complex is closest to the Keahole Generating Station: approximately three and a half miles away. The nearest police station is also situated at Kealakehe downslope of the school complex. The nearest Fire Department facility is located on Palani Road. The Kona Hospital is the nearest full-service hospital facility to the subject properties. It has 61 licensed beds, of which 44 are for acute care. Advanced life support ambulance units are located at the Kailua-Kona fire station on Palani Road.

The operation of the Keahole Generating Station and Airport Substation is critical to all of the aforementioned public facilities. Reclassification of the property to Urban will not undermine electrical service to these facilities, but rather, will help to ensure the availability of firm power and minimize the future potential for occasional disruptions to service.

The No Action alternative presents the potential for a significant adverse impact to the aforementioned public facilities because, as indicated in Table 2-E, it results in inadequate capacity in the system within nine years.

From the point of view of providing uninterrupted electrical energy to the aforementioned public facilities, Alternatives 3 and 4 result in the same minimal impact as the Preferred Alternative. Alternative 5 presumably will result in the same provision of uninterrupted service, but secondary impacts related to it (in terms of changing land use and population impacts) could place greater demand on the public services and facilities. For example, the additional employment generated by biomass cultivation and

[19] In 2002, HELCO had 66,411 customers (DBEDT, 2003). For this comparison, SMS assumed that HELCO would have, on average, 70,000 customers between 2004 and 2025.

processing will likely increase the demand for new housing, and therefore, the public services and facilities essential to serve the population.

4.9. FISCAL IMPACTS

Fiscal impacts consist of changes in government costs and revenues due to a project. In the present case, direct impacts are small. For the No Action Alternative, major cumulative impacts could arise, inasmuch as the reduced generating capacity under that alternative would tend to limit economic activity, as discussed in preceding sections. With reduced economic growth, government revenues tied to the economy in terms of general excise tax collections and property tax values would be lower or grow more slowly.

4.9.1. STATE OF HAWAII

Construction activities generate revenues for the State in the form of excise taxes, personal income tax, and corporate income tax. Table 4-O shows that the State would gain approximately $4 million (2003 dollars) from cash flows associated with construction for Alternatives 2 through 4, and $9 million for Alternative 5. Table 4-O draws on estimates of local construction spending. Estimates of specific revenue flows are shown in the Appendix to this report.

TABLE 4-O: STATE REVENUES ASSOCIATED WITH CONSTRUCTION

STATE TAX REVENUES, IN MILLION 2003 $	2006-2010	2011-2015	2016-2020	2021-2025	CUMULATIVE
Alternative 2 - Preferred	$1.1	$0.0	$1.4	$1.8	$4.3
Alternative 3 – West Hawaii	$0.0	$0.7	$1.7	$1.5	$3.9
Alternative 4 – East Hawaii	$0.0	$0.7	$1.7	$1.4	$3.8
Alternative 5 - Renewable	$0.0	$2.4	$2.6	$4.9	$9.9

The State public service company tax is calculated on the basis of gross receipts of utilities. So long as HELCO is able to respond appropriately to demand (under Alternatives 2 through 5), no difference in receipts is anticipated.

The No Action Alternative potentially could have a secondary impact on State revenues to the extent that it would limit economic growth, and hence, income. While SMS finds this argument plausible, it cannot be quantified without making speculative assumptions about the share of growth that would be diverted to other Counties, rather than outside Hawaii.

4.9.2. COUNTY OF HAWAII

The County's main revenue source is real property tax. Utilities pay only nominal real property taxes ($100/parcel). Consequently, no difference in County receipts is anticipated. Also, no difference in County costs is anticipated under Alternatives 2 through 5. For the No Action Alternative, with an important risk of outages, the County could anticipate lost work time and need to pay staff overtime due to disruptions associated with outages.

4.10. IMPACTS ON NEARBY AREAS AND ACTIVITIES

4.10.1. AGRICULTURAL AREAS

The Keahole Agricultural Park includes 36 lots, which are currently fully leased. Of those, 25 have dwellings. The developers of the Palamanui project plan to build a roadway that will connect to Reservoir

Road (the access road located on the north side of the HELCO property). It would then become the major road into and out of the Palamanui project and the eventual State developments on adjacent land. If the Palamanui project moves forward, then HELCO could consider changes in access to the Keahole Generating Plant. At present, fuel trucks enter and leave by the north gate (to the access road currently used only by HELCO) but all other visitors and workers reach the plant by the south gate, traveling through the agricultural park. With a wider access road, HELCO can consider using the north gate for all traffic to and from the generating station, which would lessen the impact of the station on its neighbors in the agricultural park. This road plan is unrelated to the project and alternatives discussed here, except as part of the context for impact analysis.

4.10.2. Impacts on Activities and Occupants

In the past, neighbors have expressed concern that emissions from the generating station might, in combination with vog, result in air quality harmful to those living and working nearby. This issue has been addressed in the Settlement Agreement and in Chapter Three. Under the Preferred Alternative, air quality will continue to meet or be better than current standards. Moreover, neighbors will have assurance that HELCO is taking steps to mitigate and monitor noise and emissions. Development of ST-7 with SCR would provide further reassurance, since it would use steam generated by the other combustion turbines to create additional power, thereby limiting emissions.

Under the other alternatives, the generating station would have increased generating capacity, increased emissions, and a higher stack to disperse the emissions. HELCO would comply with environmental standards and regulations. However, under the other alternatives, not all the measures in the Settlement designed to address the concerns of the Keahole plant's neighbors would necessarily be implemented, either at Keahole or at other generating plant sites.

4.10.3. Impacts on Property Values

Land in the agricultural park is leased by the State Department of Agriculture. Lease rents are determined by independent appraisals and leases may be sold to active farmers. When data on parcels in the agricultural park is compared with comparable leasehold agricultural parcels in West Hawaii, it turns out that sales values for land in the agricultural park are high, while the assessed values determined by County tax assessors are low:[20]

Table 4-P: Valuation Of Comparable West Hawaii Agricultural Properties

	Total Sample	Keahole Agricultural Park
Parcels	642	36
Parcels with Sales Since 1/1/1998	121	15
Average Land Value/Acre	$5,680	$ 1,845
Average Sales Price/Acre	$6,786	$18,650

According to Dr. Kirkpatrick, the park's status and/or location clearly tend to hold tax valuation down, but not sales values and the level of sales activity. It appears that Keahole Agricultural Park has maintained high sales values despite the presence of an active power plant to the north, and a major

[20] Data were gathered using Hawaii Information Service records in November 2003. Sales are for the period from 1/1/1998 to the time of analysis. The comparable data are for leasehold agricultural parcels from three to ten acres in size.

highway and airport to the west. In this situation, there is no obvious reason why the changes now underway, or the reclassification of the HELCO parcels could be expected to affect lease and resale values.

The Renewable Alternative or Alternative 5 would have an important impact on agricultural land, since it would involve production of fuel crops on some 20,000 acres by 2025. The consequences for valuation would depend on whether land used for biomass production had been valued previously as appropriate for high value crops or for little more than pasture. Agricultural values in the County range from $7 per acre (for poor pasture land, dedicated to agricultural use) to $2,000 per acre for land used for truck crops. Land for production of biomass or forage crops and dedicated to agricultural use would be valued at $250 per acre.

Currently, there is a lot of agricultural land in large lots on the Big Island that is used minimally, and valued at about $150 per acre or less.[21] Use of such property for biomass production with long-term agricultural dedication would lead to higher valuations and taxes. The tax impact for the entire area involved in biomass production would likely be a gain for the County in the order of $20,000 annually.

4.10.4. RESIDENTIAL AREAS

Currently, Kona Palisades is the only residential subdivision near the project and stretching below the 800-foot elevation. The closest homes are about 0.9 miles from the subject property by road. Eventually, additional housing could be located directly north and east of the subject property, in the Palamanui project and on State land, beginning about a mile away from the site. Additional housing could also be developed to the south of Kona Palisades.

4.10.5. IMPACTS ON ACTIVITIES AND OCCUPANTS

With the Preferred Alternative, HELCO would be able to implement the mitigations and control measures noted in the Settlement Agreement. Under all other Alternatives, residents would face a situation in which HELCO could not implement all the controls. Consequently, while the precautions in place would meet State and Federal standards, they are less stringent than the ones that some of the nearby property owners sought. Such a situation would be unsettling to some of HELCO's neighbors at the location of the Alternate sites, and unlikely to encourage improved relations between HELCO and its local customers.

4.10.6. IMPACTS ON PROPERTY VALUES

Reclassification is not expected to affect property values, since value is estimated on the basis of market trends for similar properties, not the classification of very different ones. Residents may be concerned that plant development and energy production may affect residential property values in the surrounding subdivisions. In the 1993 Revised Final EIS (RFEIS) for Keahole, an appraisal firm compared selected subdivisions and found no impact. For the present EIS, SMS ran a similar analysis for single-family properties in much of North Kona (in TMK zones 3-7-3 through 3-7-5) between Queen Kaahumanu Highway and about the 1,200 foot elevation. The aim was to learn whether location of residential property uphill from the Keahole industrial area was an important component of value. Analyses were run on both appraised values and records of sales. In all cases, the uphill location was not significantly associated with

[21] This claim is based on examination of values of some 20 properties in Hamakua and Kau over 500 acres, zoned for agricultural use. Since no sites for future biomass production are known, any sampling of potentially affected agricultural land is only preliminary.

value. In short, the presence of industrial activity and an international airport at Keahole does not now affect residential property values uphill. While we cannot rule out the possibility that the recently completed stack and new turbines will have a discernible impact on values, there is no evidence to suggest this. (As noted earlier, the new stack is an existing condition and is included under all alternatives, as part of the construction currently permitted in advance of the proposed land use changes.)

4.10.7. Commercial and Industrial Areas

The Alternatives considered here would have minimal impact on commercial and industrial areas. These areas are largely exempt from rolling blackouts that could occur if the No Action Alternative is realized. Improved reliability could lead to higher productivity and lower costs for Big Island businesses under Alternatives 2 through 5, but this is not an impact on a specific commercial area.

NELHA is developing an Energy Gateway site along Queen Kaahumanu Highway south of the subject property. That site will highlight energy research and development efforts in Hawaii and around the world. HELCO is an active collaborator in developing the site.

4.10.8. Other Areas and Activities in Hawaii County

The most immediate impact of the improvements to the subject property for the Big Island community in general is the provision of additional generating capacity.

Many residents that SMS interviewed commented that a visible industrial plant with a tall stack would be undesirable at the intersection of the Queen Kaahumanu Highway with the road to and from the airport. They suggested that tourists' appreciation of Kona as a destination would be lessened by the sight. In order to lessen the visual impacts of the improvements to the generating station, HELCO plans to increase landscaping that would tend to mask the contours of the plant from observers on the highway. HELCO has sought and received approval from the DLNR for landscape improvements, gate modifications, and fence construction at the subject property. The perimeter landscaping along the southwest, west, and northwest sections of the property will be redone to help mitigate the adverse visual impacts of the improvements to the station. HELCO will create bermed planters in areas that are currently landscaped and transplant some of the existing vegetation. New trees and plants will also be added to create a more effective and attractive visual buffer. The area of the proposed planters is approximately 9,500 square feet. (See landscape concept plan in Chapter Three.) HELCO will also convert its existing fence into a permanent perimeter fence and modify two existing gates by recessing the gates into the facility. The new gates would be automated, electronic card-reading gates.

The Renewable Alternative could well have complex impacts on the areas surrounding biomass plants. Environmental impacts such as water, air quality, and noise would likely arise. Traffic impacts associated with hauling biomass to the plant would need to be considered. These impacts could have important implications for nearby communities' quality of life. Those implications cannot be assessed here, for lack of detailed plans and siting decisions, but they must be acknowledged as issues to be faced if this alternative were to be implemented.

4.11. MEASURES TO MITIGATE ADVERSE IMPACTS IDENTIFIED IN THIS REPORT

The only adverse socio-economic impacts identified in this report for the Preferred Alternative are the higher cost for ratepayers and stockholders as compared to the West Hawaii Alternative. According to Dr.Kirkpatrick, these costs may be balanced against the gain in certainty achieved through the Settlement

Agreement. Also, the costs are minimal in relation to the overall costs of power generation over the study period.

The actions in the Settlement Agreement include specific responses to the concerns of the parties to the agreement, notably the installation of SCR technology to deal with air quality, and the use of landscaping and painting to minimize visual impacts. Leaving aside the technical question of how severe the impacts in question would have been, it is clear that these measures have served to demonstrate the willingness of HELCO to work with neighbors and have offered some reassurance that the Keahole plant will, under the Preferred Alternative, have less impact than feared. In this sense, the components of the Settlement Agreement can be seen as mitigating ongoing problems of community relations.

4.12. MITIGATION PROCESSES

Mitigation measures can be taken unilaterally or through a process in which key parties identify what they take to be important impacts, propose responses, and agree which response or set of responses most appropriately deal with the problem. The history of the Keahole proposal includes both types of decision-making process. HELCO has proposed and implemented some activities to limit impacts on neighbors, while others were proposed in the context of contested-case hearings and subsequent negotiations. The Settlement includes specific actions that respond to neighbors' concerns and hence mitigate both physical and social potential impacts.

The Preferred Alternative, as the implementation of the Settlement, continues this mitigation process. The No Action Alternative would set aside the settlement and offer no substitute. The remaining Alternatives would also leave the implementation of the Settlement unfinished, and would hence likely demand reopening negotiations with the other parties to the Settlement.

CHAPTER FIVE: RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AFFECTED AREA

HAWAII STATE PLANS AND CONTROLS

5.1. THE LAND-USE LAW

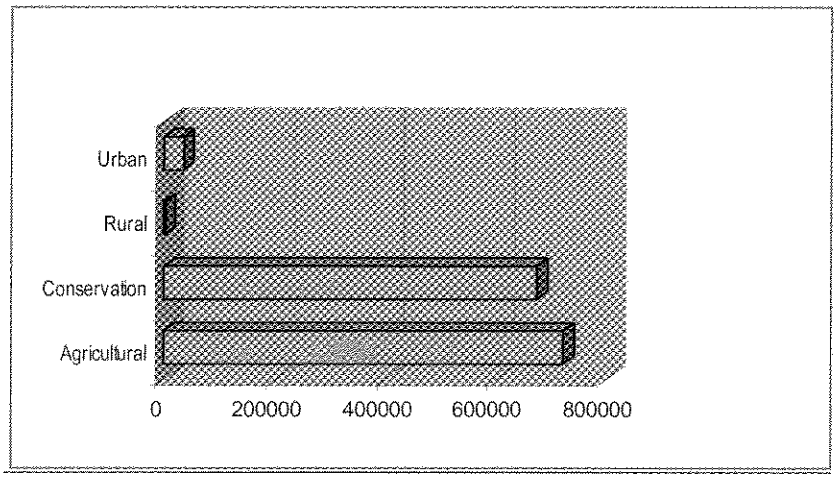
The Legislature for the State of Hawaii (State) determined in 1961 that a state-wide zoning system was needed to protect Hawaii's valuable land from development that provided a short-term gain for a few and resulted in a long-term loss to the income and growth potential of the State's economy. Accordingly, the Legislature established an overall framework of land-use management and adopted the Land Use Law under Chapter 205 of the Hawaii Revised Statutes (HRS). The law placed all lands in the State in one of four land-use districts: *Urban, Agricultural, Conservation, or Rural* (the Rural District was added in 1963), and established the Land Use Commission (Commission) under HRS Section 205-1.

Deleted: *Agriculture*

5.1.1. LAND USE DISTRICT BOUNDARIES

The Commission identified land areas suitable for inclusion in one of the four districts and set the standards for determining the boundaries. There are approximately 2.5 million acres of land in the County of Hawaii (Big Island); 1.4 million acres are in West Hawaii (North Kohala, South Kohala, North Kona, South Kona, and Kau). A large portion of the land is in the Agricultural and Conservation Districts.

FIGURE 5-1: PROPORTION OF LAND IN DISTRICT BOUNDARIES – WEST HAWAII



5.1.1.1. Urban District

The Urban District is generally defined as lands in urban use with sufficient reserve to accommodate foreseeable growth. This district generally includes city-like concentrations of people, structures, services, and vacant areas for future development. The individual county governs the zoning within the district. In the County of Hawaii, this district is comprised of approximately 54,267 acres or 2 percent of the island's total land area

5.1.1.2. Agricultural District

The Agricultural District includes lands with a high capacity for intensive cultivation as well as those with low capacity. The minimum lot size in this district under the State Land Use Law is one acre. This district has the second greatest land area with approximately 1,184,599 acres or slightly over 46 percent of the total land area of the County of Hawaii. This district includes activities or uses such as farming, aquaculture, game and fish propagation; agricultural services; farm buildings, employee housing, district mills, storage facilities, processing facilities, vehicle and equipment storage areas, roadside stands; wind machines and wind farms; small-scale meteorological, air quality, noise, and other scientific and environmental data collection and monitoring facilities; agricultural parks; and open area recreational facilities, including golf courses and golf driving ranges, provided that they are not located on land in the highest productivity categories as determined by the Commission. The Commission and/or County regulate special uses within the Agricultural District depending upon lot size. County zoning ordinances may further define accessory uses within this district.

5.1.1.3. Conservation District

Conservation Districts are primarily those lands in the existing forest and water reserve zones. This district has the largest land area with approximately 1,338,135 acres or 52 percent of the total land area of the County of Hawaii. This district includes areas necessary for (1) protecting watersheds and water sources; (2) preserving scenic and historic areas; (3) providing park lands, wilderness, and beach reserves; (4) conserving indigenous or endemic plants, forestry, fish, and wildlife; (5) preventing floods and soil erosion; (6) retaining open-space areas to enhance the present or potential value of abutting or surrounding communities; (7) using areas of value for recreational purposes, other related activities, and other permitted uses not detrimental to a multiple-use conservation concept. The State Board of Land and Natural Resources (BLNR) administers conservation lands and the State Department of Land and Natural Resources (DLNR) sets rules governing its uses.

The Conservation District has five subzones: (1) Protective, (2) Limited, (3) Resource, (4) General and (5) Special. The first four subzones are arranged in a hierarchy of environmental sensitivity, ranging from the most environmentally sensitive (Protective) to the least sensitive (General). The Special subzone applies to special cases, specifically to allow a unique land use on a specific site. Each subzone has a set of "identified land uses" which may be allowed by discretionary permit. Applications can only be accepted for an identified land use listed under the particular subzone covering the subject property. Most of the identified land uses require a discretionary permit or some sort of approval from the DLNR or BLNR. Major permits are required for land uses, which have the greatest potential impact, and an environmental assessment and/or an EIS is required (and may also require a Public Hearing).

5.1.1.4. Rural District

Rural Districts are defined under the State Land Use Law as lands primarily comprised of small farms mixed with low-density residential lots that have a minimum lot size of one-half acre. Of the four districts, this is the smallest, with approximately 807 acres of the County of Hawaii's total land area. This district generally includes low-density residential uses, agricultural uses, public, quasi public, and public utility facilities. These districts may include contiguous areas not suitable for low-density residential lots or small farms. Jurisdiction over rural districts is shared by the Commission and respective county.

5.1.2. THE LAND USE COMMISSION

The Commission's primary responsibilities are to: (1) administer the law and determine the boundaries for each district; (2) preserve and protect Hawaii's land; (3) encourage uses to which lands are best suited; and (4) ensure that areas of State concern are addressed in the land-use decision-making process.

The Commission also reviews and rules on applicant-initiated amendments to the district boundaries, pursuant to HRS Section 205-4 and the Hawaii Administrative Rules (HAR), Chapter 15-15, *Hawaii Land Use Commission Rules*, as amended, and approves special-use permits for land comprised of 15 acres or more, pursuant to HRS Section 205-6.

The Governor appoints members to the Commission, and the Senate confirms the appointments. Members are selected from a cross-section of the community for a specified term. One member is appointed from each of the four counties and five at large, for a total of nine.[1]

5.1.3. DECISION-MAKING CRITERIA FOR A BOUNDARY AMENDMENT

The Commission, when reviewing a petition for a boundary amendment, considers the decision-making criteria of HRS Section 205-17:

(1) The extent to which the proposed reclassification conforms to the applicable goals, objectives, and policies of the Hawaii state plan and relates to the applicable priority guidelines of the Hawaii state plan and the adopted functional plans;

DISCUSSION: Based upon the facts, data, and information compiled, Hawaii Electric Light Company Inc.'s (HELCO) *Petition for a Land Use District Boundary Amendment* for the Keahole Generating Station and Airport Substation (collectively "subject property"), filed on November 25, 2003, appears to be consistent and on track with the goals, objectives, policies, and priority guidelines of the Hawaii State Plan and the State Functional Plans. A thorough review of the Hawaii State Plan and the adopted State Functional Plans are discussed in detail in subsequent sections, beginning with Section 5.2.

(2) The extent to which the proposed reclassification conforms to the applicable district standards;

DISCUSSION: Both the BLNR and DLNR, the governmental entities that govern the Conservation District, support the reclassification of the subject property from the Conservation District to the Urban District. Staff members of the DLNR have stated that the land (1) does not have any important natural resource attributes; (2) has been utilized for industrial purposes for over 30 years; and (3) surrounding lands are being utilized for commercial/industrial purposes.[2] The Commission itself recently reclassified approximately 2,640 acres in the immediate vicinity of State-owned lands mauka of Queen Kaahumanu Highway from the *Conservation and Agricultural Districts* to the *Urban District*. (See Commission Docket No. BR92-685.) A reclassification to the Urban District would allow the subject property to

[1] Data in Section 5.1 obtained from Chapter 205 of the Hawaii Revised Statutes, State of Hawaii Land Use Commission website (http://luc.state.hi.us), and the 2001 County of Hawaii Proposed General Plan. The revised 2001 General Plan was used instead of the existing plan because the County conducts five- and ten-year comprehensive reviews and updates of the General Plan to maintain dynamism and flexibility. The revised plan contains major changes and trends that have occurred and updated statistics reflecting these changes.

[2] See memorandum to Nicholas Viccaro, Land Agent for the State DLNR, from Sam Lemmo, Administrator, Office of Conservation and Coastal Lands, DLNR, in Chapter Seven, Parties Consulted

(1) conform with the existing and proposed land use for an electrical generating station and substation; (2) accommodate the projected population growth of the island of Hawaii (Big Island); (3) support the current State land use classifications in the area; (4) support the State and County of Hawaii's proposed land uses in the area which include, but are not limited to, the Palamanui/University of Hawaii-West Hawaii College, University Heights Subdivision, Ooma Resort, improvements to the Kona International Airport, Keahole Agricultural Park, and the Natural Energy Laboratory of Hawaii (NELHA).

(3) The impact of the proposed reclassification on the following areas of state concern:

(A) Preservation or maintenance of important natural systems or habitats;

(B) Maintenance of valued cultural, historical, or natural resources;

(C) Maintenance of other natural resources relevant to Hawaii's economy, including, but not limited to, agricultural resources;

DISCUSSION: As the proposed action is to reclassify the subject property from the Conservation District to the Urban District, the impact on natural systems, habitats, cultural, historical or natural resources, and agricultural resources in the area will be negligible because the subject property is already developed and has been since the 1970s. However, HELCO has conducted, through various sub-consultants, updated studies to assess the current situation and address any cumulative impacts the improvements to the subject property would bring. (See Chapter Three.)

(D) Commitment of state funds and resources;

DISCUSSION: No commitment of State funds and resources are necessary, except for the costs associated with the hearing and processing of the proposed boundary amendment. In respect to improvements to the subject property, Hawaiian Electric Industries (HEI) maintains a balance of debt and equity in its capital structure, and this capital is used to fund all capital projects for its subsidiaries. Financing for ongoing improvements is a combination of equity investment and debt, including long- and short-term debt.

(E) Provision for employment opportunities and economic development; and

DISCUSSION: Reliable sources of electricity are key to economic development and employment opportunities. No adverse economic impacts stemming from a boundary amendment from the Conservation District to the Urban District are anticipated, because the subject property has been operating as an electrical utility since 1973. However, improvements to the generating station will be a key component in supplementing and firming the energy needed to meet growing demand in the region. (See Chapter Four.)

(F) Provision for housing opportunities for all income groups, particularly the low, low-moderate, and gap groups;

DISCUSSION: As a publicly regulated utility, HELCO is obligated to provide reliable electricity at a reasonable cost for existing and new housing regardless of income considerations. However, HELCO through its parent company does work with the State and counties on various programs designed for low-income residents to save on energy costs.

The State Functional Plan for Housing, which is discussed in Section 5.3.9, lists one of the obstacles to the development of affordable housing as the lack of infrastructure, particularly on the neighbor islands. HELCO is seeking to improve its facilities to accommodate the increasing amount of planned residential and resort-residential construction on the west side of the Big Island.

(4) The representations and commitments made by the petitioner in securing a boundary change.

DISCUSSION: HELCO is seeking the proposed action in order to: (1) bring the State Land Use District Classification into conformance with the existing and proposed use of the project area as an electrical generating station and substation; (2) facilitate future operation and maintenance of the generating station; and (3) implement proposed environmental mitigation measures.

In approving a boundary amendment, the Commission must also take into account the General Plan of the respective County; and where applicable, the objectives, policies, and guidelines of the State Coastal Zone Management Act (CZMA), HRS Chapter 205A. The following sections will discuss the various State and County of Hawaii plans and identify the applicability and the extent to which HELCO's proposed petition for a boundary amendment conforms to these plans.

5.2. HAWAII STATE PLAN

The Department of Business, Economic Development and Tourism (DBEDT) (formerly known as the Department of Planning and Economic Development) completed in 1978 a Hawaii State Plan to: (1) improve the planning process; (2) increase the effectiveness of government and private actions; (3) improve coordination among agencies and levels of government; (4) provide for the wise use of Hawaii's resources; and (5) guide the future development of the State. (State of Hawaii, Department of Planning and Economic Development, 1978, Revised 1989, 1991.)

The Legislature adopted in 1978 the Hawaii State Planning Act (Planning Act), as HRS Chapter 226. The Planning Act consists of a series of broad goals, objectives and policies that serve as guidelines for future long-term growth and development. It further (1) provides a basis for determining priorities and allocating limited resources; (2) seeks to improve coordination of Federal, State, and County plans, policies, programs, projects, and regulatory activities; and (3) establishes a system for plan formulation and program coordination to provide for an integration of all major State and County activities.

The Planning Act is divided into three sections: (1) *Overall Theme, Goals, Objectives and Policies*; (2) *Planning Coordination and Implementation*; and (3) *Priority Guidelines:*

Part I of the Planning Act consists of three overall themes: (1) individual and family self-sufficiency; (2) social and economic mobility; and (3) community or social well-being. These themes are considered "basic functions of society" and goals toward which government must strive (HRS Section 226-3).

Part II of the Planning Act primarily addresses internal government policies to help streamline, coordinate, and implement various plans and processes between governmental agencies. It seeks to eliminate or consolidate burdensome or duplicative governmental requirements imposed on business, where public health, safety, and welfare would not be adversely affected.

Part III of the Planning Act establishes overall priority guidelines to address areas of statewide concern (HRS Section 226-101). The overall direction and focus are on improving the quality of life for Hawaii's present and future population through the pursuit of desirable courses of action (HRS Section 226-102).

The following table, identified as Table 5-A, presents Parts I and III of the Planning Act, and rates HELCO's conformance and support of the State's goals and objectives. Part II is not presented, as this section primarily pertains to internal government affairs.

TABLE 5-A: HAWAII STATE PLANNING ACT

SECTION	CHAPTER 226 - PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	RATING
	A = ACTIVELY SUPPORTIVE, C= CONFORMS, I = GOAL IS INCONSISTENT WITH HELCO'S OBJECTIVES, NA = GOAL IS NOT APPLICABLE	
226-1	Findings and purpose.	
226-2	Definitions.	
226-3	Overall Theme	
226-4	State Goals. In order to guarantee, for present and future generations, those elements of choice and mobility that insure that individuals and groups may approach their desired levels of self-reliance and self-determination, it shall be the goal of the State to achieve:	
(1)	A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii's present and future generations.	A
(2)	A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well being of the people.	A
(3)	Physical, social, and economic well being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring, and of participation in community life.	C

COMMENTARY: HELCO has served the Big Island for over a century and has provided the necessary electrical infrastructure to help build a strong, viable economy. Reliable sources of power contribute to the physical, social, and economic well being of the entire population. HELCO is a publicly regulated utility providing electricity in response to existing and prospective patterns of development. The demand for electricity occurs from changes in land use, population density, and development. Changes in the intensity of land use greatly influence the quantitative design of utilities and services, particularly the design capacity. Both the State and County have planned and projected high economic and socioeconomic growth in the West Hawaii region. All plans, current and proposed projects, point to growth in many industries, and with it a growth in population and services. As the primary power provider, HELCO is improving its facilities to meet demand and implement environmental mitigation measures for legal and operational requirements. HELCO will be making a major financial commitment in infrastructure to accommodate demand, while safeguarding the environment.

226-5	OBJECTIVE AND POLICIES FOR POPULATION	
(a)	It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic, and social objectives contained in this chapter;	NA
(b)	To achieve the population objective, it shall be the policy of this State to;	
(1)	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.	NA
(2)	Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.	C
(3)	Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.	C
(4)	Encourage research activities and public awareness programs to foster an understanding of Hawaii's limited capacity to accommodate population needs and to address concerns resulting from an increase in Hawaii's population.	A
(5)	Encourage federal actions and coordination among major governmental agencies to promote a more balanced distribution of immigrants among the states, provided that such actions do not prevent the reunion of immediate	NA

SECTION	CHAPTER 226 - PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	RATING
	A = ACTIVELY SUPPORTIVE, C= CONFORMS, I = GOAL IS INCONSISTENT WITH HELCO'S OBJECTIVES, NA = GOAL IS NOT APPLICABLE	
	family members.	
(6)	Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state's population.	NA
(7)	Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.	NA

COMMENTARY: As a public utility, HELCO is unable to manage growth. Rather, it responds to growth by providing the required services. Federal, State, and County governments primarily institute and oversee population control measures. Electrical utilities emerge as growth or projected growth occurs from changes in land use, population density, and development. Population growth in the region has contributed to a rising demand for electrical services. Statistics show that load growth on the west side has increased at a much faster pace than on the east side of the island. Hence, the need to expand generating capacity on the west side.

226-6	OBJECTIVES AND POLICIES FOR THE ECONOMY-IN GENERAL.	
(a)	Planning for the State's economy in general shall be directed toward achievement of the following objectives:	
(1)	Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people.	C
(2)	A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.	C
(b)	To achieve the general economic objectives, it shall be the policy of this State to:	
(1)	Expand Hawaii's national and international marketing, communication, and organizational ties, to increase the State's capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.	NA
(2)	Promote Hawaii as an attractive market for environmentally and socially sound investment activities that benefit Hawaii's people.	NA
(3)	Seek broader outlets for new or expanded Hawaii business investments.	NA
(4)	Expand existing markets and penetrate new markets for Hawaii's products and services.	C
(5)	Assure that the basic economic needs of Hawaii's people are maintained in the event of disruptions in overseas transportation.	A
(6)	Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.	NA
(7)	Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist Hawaii's small-scale producers, manufacturers, and distributors.	A
(8)	Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.	NA
(9)	Foster greater cooperation and coordination between the government and private sectors in developing Hawaii's employment and economic growth opportunities.	C
(10)	Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.	A
(11)	Maintain acceptable working conditions and standards for Hawaii's workers.	C
(13)	Provide equal employment opportunities for all segments of Hawaii's population through affirmative action and nondiscrimination measures.	C
(14)	Encourage businesses that have favorable financial multiplier effects within Hawaii's economy.	NA
(15)	Promote and protect intangible resources in Hawaii, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.	C
(16)	Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new, potential growth industries in particular.	NA

SECTION	CHAPTER 226 - PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	RATING
	A = ACTIVELY SUPPORTIVE C= CONFORMS I = GOAL IS INCONSISTENT WITH HELCO'S OBJECTIVES NA = GOAL IS NOT APPLICABLE	
(17)	Foster a business climate in Hawaii - including attitudes, tax and regulatory policies, and financial and technical assistance programs - that is conducive to the expansion of existing enterprises and the creation and attraction of new business and industry.	C

COMMENTARY: Hawaiian Electric Industries (HEI), a publicly traded company, is the parent company of HECO, HELCO, and MECO. Almost 20,000 Hawaii residents are shareholders of HEI, which remains one of the few locally owned and operated major companies in the State. As a publicly traded company, HEI is obligated to its shareholders to make wise decisions that maximize efficiency and increase profits. As a public utility that serves the community, its subsidiaries are obligated to provide electrical power reliably at the lowest possible cost to consumers, while addressing environmental concerns.

HELCO is among the top 30 employers in the County of Hawaii. The company has provided employment opportunities that support the State's objectives to help achieve full employment, increase income and job choice, and improve living standards for Hawaii's people. The company as a whole follows equal employment and affirmative action measures and maintains acceptable working conditions. A collective bargaining agreement with the International Brotherhood of Electrical Workers (I.B.E.W.), American Federation of Labor-Congress of Industrial Unions (AFL-CIO), covers 73 percent of HELCO employees.

All economic activity — agriculture, communication, construction, manufacturing, distributing, retail, finance, hotel, food service — requires reliable electricity to power its business activity locally, nationally, or globally. A robust economy creates jobs and benefits everyone. The company has encouraged economic activity and has been a major contributing member of the community. It has (1) conducted research, formed partnerships, and invested in alternate and renewable energy sources; (3) promoted energy education and legislation through Hawaii's schools, businesses, and communities; (4) supported and developed an integrated approach to energy development and management; (5) invested when necessary in infrastructure to provide reliable energy for Hawaii's people, and (6) provided substantial rebates and consulting services to all businesses in terms of energy efficiency, production, and cost reduction.

226-7	OBJECTIVES AND POLICIES FOR THE ECONOMY- AGRICULTURE	
(a)	Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives: Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:	
(1)	Viability of Hawaii's sugar and pineapple industries.	NA
(2)	Growth and development of diversified agriculture throughout the State.	C
(3)	An agriculture industry that continues to constitute a dynamic and essential component of Hawaii's strategic, economic, and social well-being.	C
(b)	To achieve the agriculture objectives, it shall be the policy of this State to:	
(1)	Establish a clear direction for Hawaii's agriculture through stakeholder commitment and advocacy.	NA
(2)	Encourage agriculture by making best use of natural resources.	C
(3)	Provide the governor and the legislature with information and options needed for prudent decision making for the development of agriculture.	NA
(4)	Establish strong relationships between the agricultural and visitor industries for mutual marketing benefits.	C
(5)	Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawaii's economy.	NA
(6)	Seek the enactment and retention of federal and state legislation that benefits Hawaii's agricultural industries.	NA
(7)	Strengthen diversified agriculture by developing an effective promotion, marketing, and distribution system between Hawaii's producers and consumer markets locally, on the continental United States, and internationally.	NA
(8)	Support research and development activities that provide greater efficiency and economic productivity in agriculture.	A
(9)	Enhance agricultural growth by providing public incentives and encouraging private initiatives.	A
(10)	Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future	NA

SECTION	CHAPTER 226 - PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	RATING
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	needs.	
(11)	Increase the attractiveness and opportunities for an agricultural education and livelihood.	NA
(12)	Expand Hawaii's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.	C
(13)	Promote economically competitive activities that increase Hawaii's agricultural self-sufficiency.	C
(14)	Promote and assist in the establishment of sound financial programs for diversified agriculture.	NA
(15)	Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment.	NA
(16)	Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.	A

COMMENTARY: HELCO, through its parent company, has supported and encouraged the agricultural industry. For several decades, it purchased biomass power from local sugar mills to help extend the viability of this agricultural commodity in Hawaii. It has also worked with agricultural businesses to achieve cost savings, increase production, and become energy efficient. The company is presently pursuing or working with electro-technologies that would help agricultural businesses become more productive. These technologies include: (1) post harvest cooling system (to increase the shelf life of locally grown produce); (2) dairy farm and food processing technology; (3) energy management systems; (4) indoor air quality and dehumidification systems; (5) heat pump water heating; (6) cool thermal energy storage; and (7) new food processing technologies.

226-8	OBJECTIVE AND POLICIES FOR THE ECONOMY-VISITOR INDUSTRY.	
(a)	Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawaii's economy.	
(b)	To achieve the visitor industry objective, it shall be the policy of this State to:	
(1)	Support and assist in the promotion of Hawaii's visitor attractions and facilities.	A
(2)	Insure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people.	NA
(3)	Improve the quality of existing visitor destination areas.	C
(4)	Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.	A
(5)	Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawaii's people.	A
(6)	Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the visitor industry.	NA
(7)	Foster a recognition of the contribution of the visitor industry to Hawaii's economy and the need to perpetuate the aloha spirit.	A
(8)	Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawaii's cultures and values.	NA

COMMENTARY: Tourism contributes about $10 to $14 billion annually to the State's economy, and provides numerous opportunities for the people of Hawaii. At the same time, it also places a heavy demand on public utilities and services. To encourage energy efficiency in this industry, HELCO offers substantial cost savings and rebates to hotels and other tourism-related businesses as an incentive for long-term planning and managing energy costs. Under HELCO's energy-efficiency rebate programs, customers who install energy efficient equipment receive cash incentives to reduce upfront costs. For most customers, installation costs can be recouped within three to five years with energy savings. The company also provides long-term planning and feasibility studies for specific projects or an overall facilities master plan including HVAC (Heating, Ventilation and Air Conditioning), water heating, lighting, pumping systems and other energy uses and supplies. The company will generate a detailed report on the: (1) condition of the existing equipment with estimated remaining life; (2) opportunities for energy efficiency and recommendations for upgrades; (3) estimated energy savings, payback and life cycle cost analysis based on

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recommended upgrades; (4) priorities for upgrading mechanical systems; and (4) recommended maintenance for upgraded systems.

For example: (1) The Hilton Waikoloa Village installed new lights, motors/drivers, and window film and received $92,000 in total rebates from HELCO and will save 1.8 million kWh per year. (2) The Hapuna Beach Prince Hotel installed new lights and received $54,000 in rebates and will save 967,000 kWh per year. (3) The Mauna Lani Bay Hotel installed new lights, air conditioning, and window film and received $93,900 in rebates and will save 1.1 million kWh per year. (4) The Outrigger Waikoloa Beach Hotel installed new lights and motors and received $21,700 in rebates and will save 404,000 kWh per year. Also, the Outrigger Waikoloa Beach Hotel partnered with HELCO on a high temperature solar thermal system pilot study, which indicated savings of $86,757 and 231,260 kWh per year. (5) The Hapuna Beach Resort laundry worked with HELCO to install an ozone laundry system. The study showed savings of 80-90 percent hot water usage, 30 percent water and sewer costs, and net savings of 40 percent overall.

226-9	OBJECTIVE AND POLICIES FOR THE ECONOMY-FEDERAL EXPENDITURES.	
(a)	Planning for the State's economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal investment base as an integral component of Hawaii's economy;	C
(b)	To achieve the federal expenditures objective, it shall be the policy of this State to:	
(1)	Encourage the sustained flow of federal expenditures in Hawaii that generates long-term government civilian employment.	NA
(2)	Promote Hawaii's supportive role in national defense.	NA
(3)	Promote the development of federally supported activities in Hawaii that respect state-wide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawaii's environment.	C
(4)	Increase opportunities for entry and advancement of Hawaii's people into federal government service.	NA
(5)	Promote federal use of local commodities, services, and facilities available in Hawaii.	NA
(6)	Strengthen federal-state-county communication and coordination in all federal activities that affect Hawaii.	NA
(7)	Pursue the return of federally controlled lands in Hawaii that are not required for either the defense of the nation or for other purposes of national importance, and promote the mutually beneficial exchanges of land between federal agencies, the State, and the counties.	NA

COMMENTARY: According to reports generated by DBEDT, military and civilian expenditures by the federal government make up a large and dependable inflow of funds to Hawaii's economy. Federal spending, including transfer payments, exceeded $9 billion in 2001, and indications are that federal spending will increase to support military efforts in the coming years.

Executive Order 13123, adopted in 1994, mandates that each federal agency develop and implement a program to reduce energy consumption by 35 percent by the year 2010 to the extent that these measures are cost effective. The 35 percent reduction will be measured relative to the agency's 1985 energy use. HECO and HELCO continue to work with various federal agencies to implement demand-side management (DSM) programs that will help them achieve their energy reduction objectives. For example, the USDA, Smithsonian Institute, US Postal Services, and the US Department of Interior, installed new lighting, high efficient air conditioning, and window film and received $10,861 in total rebates and will save 169,490 kWh per year.

HECO and its subsidiaries have secured a number of large federal contracts that have brought millions of dollars into the State's economy and created jobs for its own staff and for small businesses. An example is the Million Solar Roofs Initiative (MSRI) where HECO worked with the U.S. Navy to install over 12,000 solar energy systems on Oahu to date. HELCO has installed 3,170 solar energy systems on the Big Island as part of MSRI. The goal is 21,000 systems in Hawaii by 2010. The project is a joint effort with the U.S. Department of Energy, HECO, and the solar and building industries. HELCO provides a $1,000 rebate, but relies on local solar industry for sales and installations. Hawaii's 35 percent tax credit and awareness program contributes to the success of the partnership.

Senator Daniel Inouye helped secure initial funding for a Hawaii Fuel Cell Test Facility through a $1.5 million U.S. Department of Defense appropriation for research collaboration between the University of Hawaii at Manoa's Hawaii Natural Energy Institute (HNEI) and the Naval Research Laboratory under the Hawaii Energy and Environmental Technology (HEET) Initiative. (The HEET initiative integrates research efforts on fuel cell development and

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alternative fuel sources such as biofuels and hydrogen-rich methane hydrates, an enormous energy resource found in seafloor sediments.) The Hawaii Fuel Cell Test Facility is a joint research project between HNEI, UTC Fuel Cells, the Office of Naval Research Hawaii Fuel Cell Test Facility, and HECO. The facility is located in a 4,000 sq. ft. warehouse at HECO's Ward Avenue property and currently houses three fuel cell test stands, with two more to be received by the end of the year. (See Appendix G for further discussion on fuel cell technology.)

HELCO obtained federal funds for a project, *Managing High Saturations of Distributed Energy Resources as a Microgrid on the Big Island.* The purpose was to optimize HELCO's utility network to produce the lowest electrical costs, highest reliability and power quality, and improved emissions levels. HELCO will work with the State to evaluate combinations of hybrid, controllable distributed energy resource systems, including: microturbines, fuel cells, customer-sited storage systems, hydrogen generation and storage, small wind, and photovoltaic systems and responsive load technologies.

226-10	OBJECTIVE AND POLICIES FOR THE ECONOMY-POTENTIAL GROWTH ACTIVITIES.	
(a)	Planning for the State's economy with regard to potential growth activities shall be directed towards achievement of the objective of development and expansion of potential growth activities that serve to increase and diversify Hawaii's economic base.	A
(b)	To achieve the potential growth activity objective, it shall be the policy of this State to:	
(1)	Facilitate investment and employment in economic activities that have the potential for growth such as diversified agriculture, aquaculture, apparel and textile manufacturing, film and television production, and energy and marine-related industries.	A
(2)	Expand Hawaii's capacity to attract and service international programs and activities that generate employment for Hawaii's people.	A
(3)	Enhance and promote Hawaii's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts.	C
(4)	Accelerate research and development of new energy- related industries based on wind, solar, ocean, and underground resources and solid waste.	A
(5)	Promote Hawaii's geographic, environmental, social, and technological advantages to attract new economic activities into the State.	C
(6)	Provide public incentives and encourage private initiative to attract new industries that best support Hawaii's social, economic, physical, and environmental objectives.	A
(7)	Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research.	A
(8)	Develop, promote, and support research and educational and training programs that will enhance Hawaii's ability to attract and develop economic activities of benefit to Hawaii.	A
(9)	Foster a broader public recognition and understanding of the potential benefits of new, growth-oriented industry in Hawaii.	A
(10)	Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawaii's social, economic, physical, and environmental objectives.	A
(11)	Increase research and development of businesses and services in the telecommunications and information industries.	A

COMMENTARY: The goals and policies set forth in HRS 226-10 correspond with the changes and growth occurring in the West Hawaii region. Bold initiatives set by the County of Hawaii's General Plan, the State's 1989 West Hawaii Regional Plan, the County's 1991 Keahole to Kailua Development Plan, and overall State plans are steadily materializing in the area. Over $1 billion of planned construction of resort-residential complexes has been announced, in addition to the substantial investment already in place. Various resort and resort-residential complexes are currently under construction or are planned for construction in the near future. Government, commercial, industrial activities, retail, banking services have sprouted in the region, including "Big-box" retailers such as Costco, K-Mart, and WalMart and international sporting events such as the IronMan are in Kona. New projects for 2004 on the Big Island include but are not limited to: Lowe's Home Improvement Center, Home Depot, reopening of Kona Surf as Sheraton Keauhou Bay Resort, Koyo USA Bottling Company, NELHA process seawater pump station,

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Kamehameha School, North Hawaii Community Hospital expansion, West Hawaii Concrete, and Waikoloa Water Company.

Diversified agriculture continues its upward momentum, bringing with it the potential for growth in related industries such as exporting, manufacturing, and production. Agricultural commodities for the local and export markets continues to expand and gain exposure through the tourism industry.

The State in collaboration with Hiluhilu Development LLC (also known as Palamanui), is currently in the planning stages for the new Palamanui/University of Hawaii Center at West Hawaii College project combined with residential development, which will encompass approximately 1,225 acres. The project will bring higher educational, research and information facilities, residential and commercial complexes, a medical wellness center, and numerous growth opportunities in the region.

Research projects at NELHA located on 870 acres of State-owned land supports development and commercialization of alternative energy and Ocean Thermal Energy Conversion (OTEC)-related technologies. Commercial companies located at NELHA specialize in a variety of land-based operations, including the production of algae, finfish, crustaceans, and mollusks. Other tenants are researching alternative energy, ocean instrumentation, marine biotechnology, and desalination. HELCO, together with its parent company, monitors the open-cycle OTEC demonstration project at NELHA, provides technical input on electrical interface concerns during plant start-up, and is a team member in a 50-kW closed-cycle OTEC demonstration project at NELHA.

HELCO has provided the necessary electrical infrastructure to reliably power growth in the region and to meet the demand for additional services. The company has encouraged economic activity and has been a major contributing member of the community. It has (1) conducted research, formed partnerships, and invested heavily in alternate and renewable energy sources; (3) promoted energy education and legislation through Hawaii's schools, businesses, and communities; (4) supported and developed an integrated approach to energy development and management; (5) invested when necessary in infrastructure to provide reliable energy for Hawaii's people, and (6) provided substantial rebates and consulting services to all businesses in terms of energy efficiency, production, and cost reduction.

226-10.5	OBJECTIVES AND POLICIES FOR THE ECONOMY-INFORMATION INDUSTRY.	
(a)	Planning for the State's economy with regard to the information industry shall be directed toward the achievement of the objective of positioning Hawaii as the leading dealer in information businesses and services in the Pacific Rim;	C
(b)	To achieve the information industry objective, it shall be the policy of this State to:	
(1)	Encourage the continued development and expansion of the telecommunications infrastructure serving Hawaii to accommodate future growth in the information industry;	C
(2)	Facilitate the development of new business and service ventures in the information industry which will provide employment opportunities for the people of Hawaii;	C
(3)	Encourage greater cooperation between the public and private sectors in developing and maintaining a well-designed information industry;	NA
(4)	Ensure that the development of new businesses and services in the industry are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people;	C
(5)	Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the information industry;	NA
(6)	Foster a recognition of the contribution of the information industry to Hawaii's economy; and	NA
(7)	Assist in the promotion of Hawaii as a broker, creator, and processor of information in the Pacific.	C

COMMENTARY: By being able to depend on a reliable source of electrical power, the information industry can continue with the advancements it has made in this segment our economy. The State views high technology as an important driver in the diversification of Hawaii's economy and one that provides quality, high-paying jobs for Hawaii residents.

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	HELCO through its parent company also publishes literature and posts information on its website for students, educators, businesses and residents on energy and how one could save on energy costs. HELCO also sends to its customers by request a residential handbook, Energy Tips & Choices, which contains useful information on reducing energy costs.	
226-11	OBJECTIVES AND POLICIES FOR THE PHYSICAL ENVIRONMENT-LANDBASED, SHORELINE, AND MARINE RESOURCES.	
(a)	Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:	
(1)	Prudent use of Hawaii's land-based, shoreline, and marine resources.	C
(2)	Effective protection of Hawaii's unique and fragile environmental resources.	A
(b)	To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:	
(1)	Exercise an overall conservation ethic in the use of Hawaii's natural resources.	A
(2)	Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.	A
(3)	Take into account the physical attributes of areas when planning and designing activities and facilities.	A
(4)	Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.	A
(5)	Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.	NA
(6)	Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.	C
(7)	Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.	C
(8)	Pursue compatible relationships among activities, facilities, and natural resources.	C
(9)	Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.	NA

COMMENTARY: The subject property is located approximately 3.5 miles inland from the shoreline. However, to ensure that its operations would not be of detriment to marine resources, HELCO commissioned a study by Marine Research Consultants. This report analyzed and interpreted data and found that the expansion of the generating station would in all probability not adversely affect marine resources. (See Chapter Three and Appendix J.)

In reference to conservation and environmental protection measures, HELCO, through its parent company, has invested in renewable energy sources that would benefit the physical environment. The company currently supports renewable sources in various ways: (1) such as solar water heating and heat pump programs; and (2) through purchased power contracts with nonutility generators using renewable sources (e.g., geothermal, hydroelectric, and wind turbine generating systems).

HELCO has a 35-year power purchase agreement with Puna Geothermal Ventures (PGV) for 30 MW of firm capacity. PGV, which was purchased by Ormat Industries in April 2004. The PGV facilities are located about 21 miles south of Hilo with facilities situated on about 25 acres of a 500-acre plot along the Lower East Rift Zone (LERZ) of the Kilauea Volcano. PGV's design is quite simple. Geothermal fluid is brought to the surface through production wells, which tap into the resource at a depth of almost a mile. All fluids are returned to the resource area through injection wells, which extend to a depth of a little more than a mile. The geothermal fluid, which is comprised of geothermal steam and brine, is separated in large separators. The steam, along with its non-condensable gases, is routed to the power plant and used to produce electricity for the needs of the Big Island. This quantity allows for operation/maintenance flexibility and for more efficient production of electrical power during the large load changes between day and night. PGV has plans to expand its operations in the immediate future[3]

On December 30, 2003, HELCO signed an approximately 10 MW as-available wind power contract with Hawi

[3] Puna Geothermal website at http://www.punageothermalventure.com.

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	Renewable Development. The electric utilities continue to initiate and support many renewable energy research and development projects to help develop these technologies (e.g., photovoltaic projects). Its Integrated Resource Plan (IRP) will continue to evaluate the use of more renewables. In December 2002, HECO formed a non-regulated subsidiary, Renewable Hawaii, Inc. (RHI), to invest in renewable energy projects. In 2003 and 2004, RHI solicited competitive proposals for investment opportunities in projects (1 MW or larger) to supply renewable energy on the islands of Oahu, Maui, Molokai, Lanai, and Hawaii. RHI is currently reviewing proposals received. RHI is seeking to take a passive, minority interest in such projects to help stimulate the addition of cost-effective, commercially viable renewable energy generation in the State. Investment in renewable projects through RHI in 2004 is estimated to be an additional $1 million.	
226-12	OBJECTIVE AND POLICIES FOR THE PHYSICAL ENVIRONMENT-SCENIC, NATURAL BEAUTY, AND HISTORIC RESOURCES.	
(a)	Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.	C
(b)	To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:	
(1)	Promote the preservation and restoration of significant natural and historic resources.	NA
(2)	Provide incentives to maintain and enhance historic, cultural, and scenic amenities.	NA
(3)	Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.	C
(4)	Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.	C
(5)	Encourage the design of developments and activities that complement the natural beauty of the islands.	A
	COMMENTARY: An electrical power plant by its very nature must include an emission stack. The height of the stack is a direct means of mitigating impacts on air quality by maximizing dispersal of regulated emissions. In order to mitigate any visual impacts, HELCO will use earth-tone construction materials and paint to minimize visibility of the project. As discussed in Chapters Two and Three, the landscaping will be improved to partially screen the project from viewers.	
226-13	OBJECTIVES AND POLICIES FORTHE PHYSICAL ENVIRONMENT-LAND, AIR, AND WATER QUALITY.	
(a)	Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:	
(1)	Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.	A
(2)	Greater public awareness and appreciation of Hawaii's environmental resources.	A
(b)	To achieve the land, air, and water quality objectives, it shall be the policy of this State to:	
(1)	Foster educational activities that promote a better understanding of Hawaii's limited environmental resources.	A
(2)	Promote the proper management of Hawaii's land and water resources.	A
(3)	Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.	A
(4)	Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawaii's people.	A
(5)	Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.	NA
(6)	Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.	A
(7)	Encourage urban developments in close proximity to existing services and facilities.	NA
(8)	Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people, their cultures and visitors.	C
	COMMENTARY: Electrical utilities are under stringent guidelines set by Federal, State, and County governments. As discussed in preceding chapters, HELCO will implement environmental mitigation measures, as necessary, for the improvements and upgrades to the Keahole Generating Station and Airport Substation. Improvements will include the	

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following: (1) new emissions controls, specifically a Selective Catalytic Reduction (SCR) system which is expected to involve ammonia transport, storage, and usage; (2) additional noise controls: new enclosures for diesel units, CT-2, and ancillary equipment; barrier walls along portions of the subject property boundary; and possible increases to the diameter of the upper portion of the CT-2, CT-4, CT-5 and diesel units stacks; (3) upgrades to the wastewater collection and treatment system, including waste management plans, UIC permit modification, and Spill Control and Counter Measures (SPCC) plans, etc.		
226-14	OBJECTIVE AND POLICIES FOR FACILITY SYSTEMS--IN GENERAL.	
(a)	Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.	A
(b)	To achieve the general facility systems objective, it shall be the policy of this State to:	
(1)	Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.	A
(2)	Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.	A
(3)	Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.	A
(4)	Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.	A
COMMENTARY: More than a decade ago, the State and County recognized that "extraordinary" development would occur in the West Hawaii region, and initiated plans to direct and guide this growth to ensure a well-planned, successful development that would serve as a model for future developments. As the primary electrical utility that serves the County of Hawaii, HELCO worked with State and County projections to ensure that the necessary electrical infrastructure would be in place to accommodate growth in the region. HELCO invested in infrastructure and also in renewable energy sources and research to respond to government initiatives, changes in the intensity of land use, population growth, and demand.		
226-15	OBJECTIVE AND POLICIES FOR FACILITY SYSTEMS--IN GENERAL.	
(a)	Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:	
(1)	Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.	A
(2)	Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.	A
(b)	To achieve solid and liquid waste objectives, it shall be the policy of this State to:	
(1)	Encourage the adequate development of sewerage facilities that complement planned growth.	A
(2)	Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.	A
(3)	Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes.	A
COMMENTARY: HELCO in 1993 developed two 500-foot deep disposal wells under UIC Permit No. UH-1776. These wells are being used to dispose of the plant's various treated wastewaters. Additionally, a 2,325-gallon septic tank and leach field have been constructed to accommodate approximately 2,000 gpd of domestic wastewater.		
226-16	OBJECTIVE AND POLICIES FOR FACILITY SYSTEMS-WATER.	
(a)	Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.	A
(b)	To achieve the facility systems water objective, it shall be the policy of this State to:	
(1)	Coordinate development of land use activities with existing and potential water supply.	A

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(2)	Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.	A
(3)	Reclaim and encourage the productive use of runoff water and wastewater discharges.	A
(4)	Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.	A
(5)	Support water supply services to areas experiencing critical water problems.	A
(6)	Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.	A
COMMENTARY: HELCO developed and pump tested in 1993 an onsite brackish supply well identified as State No. 4461-02. This well is able to be pumped at an average of 210,000 to 230,000 gpd and used for the existing operations and proposed improvements to the generating station.		
226-17	OBJECTIVES AND POLICIES FOR FACILITY SYSTEMS-TRANSPORTATION	
(a)	Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives:	
(1)	An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.	A
(2)	A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.	A
(b)	To achieve the transportation objectives, it shall be the policy of this State to:	
(1)	Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter;	NA
(2)	Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives;	A
(3)	Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties;	NA
(4)	Provide for improved accessibility to shipping, docking, and storage facilities;	NA
(5)	Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;	NA
(6)	Encourage transportation systems that serve to accommodate present and future development needs of communities;	NA
(7)	Encourage a variety of carriers to offer increased opportunities and advantages to interisland movement of people and goods;	NA
(8)	Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs;	NA
(9)	Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification;	A
(10)	Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment;	A
(11)	Encourage safe and convenient use of low-cost, energy-efficient, non-polluting means of transportation;	A
(12)	Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives; and	NA
(13)	Encourage diversification of transportation modes and infrastructure to promote alternate fuels and energy efficiency.	A
COMMENTARY: For the last nine years, HELCO, HECO, MECO, U.S. Department of Defense, State Department of Education (DOE), U.S. Department of Energy, and Young Brothers, Ltd. have partnered to sponsor the Electron Marathon. The first Electron Marathon was held in 1996 at Hawaii Raceway Park and has been an annual event ever since. This project requires the integration of academics to the construction of the electric vehicle. Students apply		

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math, science, automotive, electronics, and language arts skills learned in the classroom to the project. All parts of the project are aligned with the DOE's Hawaii Content and Performance Standards (HCPS II) and the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS). Electron Marathon addresses the need for an environmentally-clean ground transportation alternative. This program was developed to: (1) increase students' and teachers' knowledge and understanding of the technologies related to electric vehicles; (2) actively involve students and teachers in the design and construction of a mini-electric vehicle while using an integration of academic areas; (3) provide a variety of groups an opportunity to explore the pros and cons of electric vehicles; (4) foster teamwork within a variety of groups (students and students, students and teachers, teachers and teachers).

HELCO assists in planning, while HECO employees provide training for teachers in theory and concepts of electric vehicles. The company also assists the DOE and private schools in coordinating the teams for this event and provides each school with a standard kit which includes a motor, controller, potentiometer, emergency disconnect switch, fuse, contact, gears, steering kit, and brake kit. A cash grant is also given to each participating school.

226-18	OBJECTIVES AND POLICIES FOR FACILITY SYSTEMS-ENERGY	
(a)	Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all	
(1)	Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;	A
(2)	Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased;	A
(3)	Greater energy security in the face of threats to Hawaii's energy supplies and systems; and	A
(4)	Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use.	A
(b)	To achieve the energy objectives, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable energy services to accommodate demand.	A
(c)	To further achieve the energy objectives, it shall be the policy of this State to:	
(1)	Support research and development as well as promote the use of renewable energy sources;	A
(2)	Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth;	A
(3)	Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits;	A
(4)	Promote all cost-effective conservation of power and fuel supplies through measures including: (A) Development of cost-effective demand-side management programs; (B) Education; and (C) Adoption of energy-efficient practices and technologies;	A
(5)	Ensure to the extent that new supply-side resources are needed, the development or expansion of energy systems utilizes the least-cost energy supply option and maximizes efficient technologies;	A
(6)	Support research, development, and demonstration of energy efficiency, load management, and other demand-side management programs, practices, and technologies;	A
(7)	Promote alternate fuels and energy efficiency by encouraging diversification of transportation modes and infrastructure;	A
(8)	Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications; and	A
(9)	Support actions that reduce, avoid, or sequester Hawaii's greenhouse gas emissions through agriculture and forestry initiatives.	A

COMMENTARY: There are a variety of issues relating to renewable energy that must be addressed when trying to balance the four statutory energy objectives of HRS 226-18. According to HELCO's second IRP, these issues include: (1) higher costs and technical maturity; (2) integration with the existing electric system (intermittency, output variability, and system minimum load); (3) site and resource availability; and (4) environmental and social issues.

Most renewable energy technologies that are applicable for use in Hawaii cost more than conventional fossil fuel

technologies. Higher costs of renewable energy technologies are attributable to the lack of technical maturity and market development, as well as characteristics inherent to obtaining the energy from the renewable resource. For example, photovoltaics, ocean, and hydrogen fuel cell energy systems require further technological advancements and subsequent cost reductions. Also, the cost to obtain the energy from ocean and closed-loop biomass resources can be high.

Unlike electric utilities in the continental United States that are able to obtain backup power from other states through transmission lines, utilities in Hawaii do not have interconnections to other utilities. Therefore, Hawaii utilities must rely on dependable firm power that can be dispatched to customers when needed. Many renewable resources, such as solar, wind, and run-of-river hydro, are not available on demand, thus requiring backup generation or energy storage to ensure power is available when needed. The variability of the resource must also be considered. For example, the intermittent nature of wind can negatively affect the quality of power, especially on small island-based electric grid systems. Existing wind farms on the island of Hawaii have a measurable impact on system frequency deviations, especially during periods of low system load.

Despite the challenges, HELCO has incorporated renewable energy sources on its grid. In 2001, about 27 percent of energy generation was from renewable sources: 20 percent from geothermal, 5 percent from hydropower, 2 percent from wind, and a small percentage from solar photovoltaic panels. The percentage of renewable energy used on the grid fell in 2002 due to independent power producer PGV's drop in production because of a blocked injection well. PGV completed drilling an additional source well in February 2003, and converted the blocked source well into an injection well in early March 2003. The new injection well was tested and PGV's capacity is currently between 25 to 28 MW. As of early 2004, PGV anticipated that it would be fully restored to 30 MW by late 2004. In April 2004, Ormat Industries purchased PGV for $71 million.

226-18.5	OBJECTIVES AND POLICIES FOR FACILITY SYSTEMS-TELECOMMUNICATIONS.	
(a)	Planning for the State's telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people.	NA
(b)	To achieve the telecommunications objective, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable telecommunications services to accommodate demand.	NA
(c)	To further achieve the telecommunications objective, it shall be the policy of this State to:	
(1)	Facilitate research and development of telecommunications systems and resources;	NA
(2)	Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning;	NA
(3)	Promote efficient management and use of existing telecommunications systems and services; and	C
(4)	Facilitate the development of education and training of telecommunications personnel.	NA
226-19	OBJECTIVES AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT-HOUSING	
(a)	Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:	
(1)	Greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more affordable housing is made available to very low, low- and moderate-income segments of Hawaii's population.	NA
(2)	The orderly development of residential areas sensitive to community needs and other land uses.	NA
(3)	The development and provision of affordable rental housing by the State to meet the housing needs of Hawaii's people.	NA
(b)	To achieve the housing objectives, it shall be the policy of this State to:	
(1)	Effectively accommodate the housing needs of Hawaii's people.	NA
(2)	Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and gap-group households.	NA

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(3)	Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.	NA
(4)	Promote appropriate improvement, rehabilitation, and maintenance of existing housing units and residential areas.	NA
(5)	Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.	NA
(6)	Facilitate the use of available vacant, developable, and underutilized urban lands for housing.	NA
(7)	Foster a variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods that reflect the culture and values of the community.	NA
(8)	Promote research and development of methods to reduce the cost of housing construction in Hawaii.	NA

COMMENTARY: As a public utility, HELCO must accommodate demand for residential consumption across the board, regardless of income bracket. However, HELCO and affiliated companies have established a number of programs to help residents save on energy costs.

Through a partnership between HELCO, CU Hawaii, and the Department of Hawaiian Home Lands, the Big Island Solar Roofs Program will offer low-interest loans (0 percent or 3 percent) to qualified homeowners to help them install solar water heating systems on their homes. Starting in January 2005, this program was designed in part to assist families in the low to moderate income bracket, as well as families earning above the low and moderate income. By installing a solar water heating system, one can expect to save over 90 percent of the electricity one would normally use with an electric resistance water heater. HELCO will also pay the customer an instant $1,000 rebate on the system. The State offers a 35 percent tax credit for solar systems, which is based on the actual cost of the system less the $1,000 HELCO incentive amount. Rebates are also given on heat pump water heaters and high efficiency electric water heaters on qualifying models.

HELCO also recently launched two service programs by distributing over 17,000 high-efficient showerheads and 9,900 23W compact fluorescent lamps (CFLs) to residents of Hawaii County.

HECO also publishes literature and posts information at its website on the many ways residents can save on energy costs, and thereby, reduce monthly costs for electricity. HELCO will also send to its customers by request a residential handbook, Energy Tips & Choices, which contains useful information on reducing energy costs.

226-20	OBJECTIVES AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT-HEALTH.	
(a)	Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:	
(1)	Fulfillment of basic individual health needs of the general public.	NA
(2)	Maintenance of sanitary and environmentally healthful conditions in Hawaii's communities.	C
(b)	To achieve the health objectives, it shall be the policy of this State to:	
(1)	Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.	NA
(2)	Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.	NA
(3)	Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.	NA
(4)	Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.	NA
(5)	Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.	C
(6)	Improve the State's capabilities in preventing contamination by pesticides and other potentially hazardous substances through increased coordination, education, monitoring, and enforcement.	NA

COMMENTARY: Electrical power is vital to healthy and sanitary conditions. Electricity powers hospitals, water pumps, refrigeration, heating, cooling, and numerous other functions that contribute to advancements in health and

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quality of life.		
226-21	OBJECTIVE AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT-EDUCATION	
(a)	Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.	NA
(b)	To achieve the education objective, it shall be the policy of this State to:	
(1)	Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.	NA
(2)	Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.	NA
(3)	Provide appropriate educational opportunities for groups with special needs.	NA
(4)	Promote educational programs which enhance understanding of Hawaii's cultural heritage.	NA
(5)	Provide higher educational opportunities that enable Hawaii's people to adapt to changing employment demands.	NA
(6)	Assist individuals, especially those experiencing critical employment problems or barriers, or undergoing employment transitions, by providing appropriate employment training programs and other related educational opportunities.	NA
(7)	Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.	NA
(8)	Emphasize quality educational programs in Hawaii's institutions to promote academic excellence.	NA
(9)	Support research programs and activities that enhance the education programs of the State.	NA
226-23	OBJECTIVE AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT-LEISURE.	
(a)	Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.	NA
(b)	To achieve the leisure objective, it shall be the policy of this State to:	
(1)	Foster and preserve Hawaii's multicultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.	NA
(2)	Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.	NA
(3)	Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.	NA
(4)	Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.	NA
(5)	Ensure opportunities for everyone to use and enjoy Hawaii's recreational resources.	NA
(6)	Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.	NA
(7)	Provide adequate and accessible physical fitness programs to promote physical and mental well-being of Hawaii's people.	NA
(8)	Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.	NA
(9)	Encourage the development of creative expression in the artistic disciplines to enable all segments of Hawaii's population to participate in the creative arts.	NA
(10)	Assure adequate access to significant natural and cultural resources in public ownership.	NA
226-24	OBJECTIVE AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT--INDIVIDUAL RIGHTS AND PERSONAL WELL-BEING.	
(a)	Planning for the State's socio-cultural advancement with regard to individual rights and personal well-being shall be directed towards achievement of the objective of increased opportunities and protection of individual rights to	NA

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	enable individuals to fulfill their socio-economic needs and aspirations.	
(b)	To achieve the individual rights and personal well- being objective, it shall be the policy of this State to:	
(1)	Provide effective services and activities that protect individuals from criminal acts and unfair practices and that alleviate the consequences of criminal acts in order to foster a safe and secure environment.	NA
(2)	Uphold and protect the national and state constitutional rights of every individual.	NA
(3)	Assure access to, and availability of, legal assistance, consumer protection, and other public services which strive to attain social justice.	NA
(4)	Ensure equal opportunities for individual participation in society.	NA
226-25	OBJECTIVE AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT-CULTURE.	
(a)	Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawaii's people.	NA
(b)	To achieve the culture objective, it shall be the policy of this State to:	
(1)	Foster increased knowledge and understanding of Hawaii's ethnic and cultural heritages and the history of Hawaii.	NA
(2)	Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawaii's people and which are sensitive and responsive to family and community needs.	NA
(3)	Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community lifestyles in Hawaii.	NA
(4)	Encourage the essence of the aloha spirit in people's daily activities to promote harmonious relationships among Hawaii's people and visitors.	NA
226-26	SECTION 226-26 OBJECTIVES AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT-PUBLIC SAFETY.	
(a)	Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:	
(1)	Assurance of public safety and adequate protection of life and property for all people.	NA
(2)	Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.	C
(3)	Promotion of a sense of community responsibility for the welfare and safety of Hawaii's people.	A
(b)	To achieve the public safety objectives, it shall be the policy of this State to:	
(1)	Ensure that public safety programs are effective and responsive to community needs.	NA
(2)	Encourage increased community awareness and participation in public safety programs.	NA
(c)	To further achieve public safety objectives related to criminal justice, it shall be the policy of this State to:	NA
(1)	Support criminal justice programs aimed at preventing and curtailing criminal activities.	NA
(2)	Develop a coordinated, systematic approach to criminal justice administration among all criminal justice agencies.	NA
(3)	Provide a range of correctional resources which may include facilities and alternatives to traditional incarceration in order to address the varied security needs of the community and successfully reintegrate offenders into the community.	NA
(d)	To further achieve public safety objectives related to emergency management, it shall be the policy of this State to:	NA
(1)	Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.	NA
(2)	Enhance the coordination between emergency management programs throughout the State.	NA
226-27	OBJECTIVES AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT-GOVERNMENT	
(a)	Planning the State's socio-cultural advancement with regard to government shall be directed towards the	

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	achievement of the following objectives:	
(1)	Efficient, effective, and responsive government services at all levels in the State.	NA
(2)	Fiscal integrity, responsibility, and efficiency in the state government and county governments.	NA
(b)	To achieve the government objectives, it shall be the policy of this State to:	NA
(1)	Provide for necessary public goods and services not assumed by the private sector.	NA
(2)	Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response.	NA
(3)	Minimize the size of government to that necessary to be effective.	NA
(4)	Stimulate the responsibility in citizens to productively participate in government for a better Hawaii.	NA
(5)	Assure that government attitudes, actions, and services are sensitive to community needs and concerns.	NA
(6)	Provide for a balanced fiscal budget.	NA
(7)	Improve the fiscal budgeting and management system of the State.	NA
(8)	Promote the consolidation of state and county governmental functions to increase the effective and efficient delivery of government programs and services and to eliminate duplicative services wherever feasible.	NA

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226-101	Establishes overall priority guidelines to address areas of statewide concern.	
226-102	Overall direction. The State shall strive to improve the quality of life for Hawaii's present and future population through the pursuit of desirable courses of action in five major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, and quality education.	
226-103	ECONOMIC PRIORITY GUIDELINES.	
(a)	Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawaii's people and achieve a stable and diversified economy:	
(1)	Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.	A
(A)	Encourage investments which:	
(i)	Reflect long term commitments to the State;	A
(ii)	Rely on economic linkages within the local economy;	A
(iii)	Diversify the economy;	A
(iv)	Reinvest in the local economy;	A
(v)	Are sensitive to community needs and priorities, and	A
(vi)	Demonstrate a commitment to provide employment opportunities to Hawaii residents.	A
(2)	Encourage the expansion of technological research to assist industry development and support the development and commercialization of technological advancements.	A
(3)	Improve the quality, accessibility, and range of services provided by government to business, including data and reference services and assistance in complying with governmental regulations.	NA
(4)	Seek to ensure that state business tax and labor laws and administrative policies are equitable, rational, and predictable.	NA
(5)	Streamline the building and development permit and review process, and eliminate or consolidate other burdensome or duplicative governmental requirements imposed on business, where public health, safety and welfare would not be adversely affected.	NA
(6)	Encourage the formation of cooperatives and other favorable marketing or distribution arrangements at the regional or local level to assist Hawaii's small-scale producers, manufacturers, and distributors.	NA

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(7)	Continue to seek legislation to protect Hawaii from transportation interruptions between Hawaii and the continental United States.	NA
(8)	Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:	A
(A)	An industry that can take advantage of Hawaii's unique location and available physical and human resources.	A
(B)	A clean industry that would have minimal adverse effects on Hawaii's environment.	A
(C)	An industry that is willing to hire and train Hawaii's people to meet the industry's labor needs at all levels of employment.	A
(D)	An industry that would provide reasonable income and steady employment.	A
(9)	Support and encourage, through educational and technical assistance programs and other means, expanded opportunities for employee ownership and participation in Hawaii business.	A
(10)	Enhance the quality of Hawaii's labor force and develop and maintain career opportunities for Hawaii's people through the following actions:	
(A)	Expand vocational training in diversified agriculture, aquaculture, information industry, and other areas where growth is desired and feasible.	C
(B)	Encourage more effective career counseling and guidance in high schools and post-secondary institutions to inform students of present and future career opportunities.	C
(C)	Allocate educational resources to career areas where high employment is expected and where growth of new industries is desired.	C
(D)	Promote career opportunities in all industries for Hawaii's people by encouraging firms doing business in the State to hire residents.	NA
(E)	Promote greater public and private sector cooperation in determining industrial training needs and in developing relevant curricula and on-the-job training opportunities.	C
(F)	Provide retraining programs and other support services to assist entry of displaced workers into alternative employment.	NA
(b)	Priority guidelines to promote the economic health and quality of the visitor industry:	
(1)	Promote visitor satisfaction by fostering an environment which enhances the Aloha Spirit and minimizes inconveniences to Hawaii's residents and visitors.	A
(2)	Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provide for adequate shoreline setbacks and beach access.	A
(3)	Support appropriate capital improvements to enhance the quality of existing resort destination areas and provide incentives to encourage investment in upgrading, repair, and maintenance of visitor facilities.	A
(4)	Encourage visitor industry practices and activities which respect, preserve, and enhance Hawaii's significant natural, scenic, historic, and cultural resources.	A
(5)	Develop and maintain career opportunities in the visitor industry for Hawaii's people, with emphasis on managerial positions.	NA
(6)	Support and coordinate tourism promotion abroad to enhance Hawaii's share of existing and potential visitor markets.	NA
(7)	Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.	C
(8)	Support law enforcement activities that provide a safer environment for both visitors and residents alike.	C
(9)	Coordinate visitor industry activities and promotions to business visitors through the state network of advanced data communication techniques.	NA
(c)	Priority guidelines to promote the continued viability of the sugar and pineapple industries:	
(1)	Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.	NA
(2)	Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawaii.	NA

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(3)	Support research and development, as appropriate, to improve the quality and production of sugar and pineapple crops.	NA
(d)	Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:	
(1)	Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.	NA
(2)	Assist in providing adequate, reasonably priced water for agricultural activities.	NA
(3)	Encourage public and private investment to increase water supply and to improve transmission, storage, and irrigation facilities in support of diversified agriculture and aquaculture.	NA
(4)	Assist in the formation and operation of production and marketing associations and cooperatives to reduce production and marketing costs.	NA
(5)	Encourage and assist with the development of a waterborne and airborne freight and cargo system capable of meeting the needs of Hawaii's agricultural community.	NA
(6)	Seek favorable freight rates for Hawaii's agricultural products from interisland and overseas transportation operators.	NA
(7)	Encourage the development and expansion of agricultural and aquacultural activities which offer long-term economic growth potential and employment opportunities.	C
(8)	Continue the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and loans.	NA
(9)	Require agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.	NA
(10)	Support the continuation of land currently in use for diversified agriculture.	A
(e)	Priority guidelines for water use and development:	
(1)	Maintain and improve water conservation programs to reduce the overall water consumption rate.	NA
(2)	Encourage the improvement of irrigation technology and promote the use of nonpotable water for agricultural and landscaping purposes.	A
(3)	Increase the support for research and development of economically feasible alternative water sources.	A
(4)	Explore alternative funding sources and approaches to support future water development programs and water system improvements.	NA
(f)	Priority guidelines for energy use and development:	
(1)	Encourage the development, demonstration, and commercialization of renewable energy sources.	A
(2)	Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy.	A
(3)	Provide incentives to encourage the use of energy conserving technology in residential, industrial, and other buildings.	A
(4)	Encourage the development and use of energy conserving and cost-efficient transportation systems.	A
(g)	Priority guidelines to promote the development of the information industry:	
(1)	Establish an information network that will serve as the catalyst for establishing a viable information industry in Hawaii.	NA
(2)	Encourage the development of services such as financial data processing, products and services exchange, foreign language translations, telemarketing, teleconferencing, a twenty-four-hour international stock exchange, international banking, and a Pacific Rim management center.	NA
(3)	Encourage the development of small businesses in the information field such as software development, the development of new information systems and peripherals, data conversion and data entry services, and home or cottage services such as computer programming, secretarial, and accounting services.	NA
(4)	Encourage the development or expansion of educational and training opportunities for residents in the information and telecommunications fields.	NA
(5)	Encourage research activities, including legal research in the information and telecommunications fields.	NA
(6)	Support promotional activities to market Hawaii's information industry services.	NA

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226-104	POPULATION GROWTH AND LAND RESOURCES PRIORITY GUIDELINES.	
(a)	Priority guidelines to effect desired statewide growth and distribution:	
(1)	Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawaii's people.	A
(2)	Manage a growth rate for Hawaii's economy that will parallel future employment needs for Hawaii's people.	NA
(3)	Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.	A
(4)	Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.	A
(5)	Explore the possibility of making available urban land, low-interest loans, and housing subsidies to encourage the provision of housing to support selective economic and population growth on the neighbor islands.	NA
(6)	Seek federal funds and other funding sources outside the State for research, program development, and training to provide future employment opportunities on the neighbor islands.	C
(7)	Support the development of high technology parks on the neighbor islands.	C
(b)	Priority guidelines for regional growth distribution and land resource utilization:	
(1)	Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures, and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.	A
(2)	Make available marginal or nonessential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.	NA
(3)	Restrict development when drafting of water would result in exceeding the sustainable yield or in significantly diminishing the recharge capacity of any groundwater area.	NA
(4)	Encourage restriction of new urban development in areas where water is insufficient from any source for both agricultural and domestic use.	NA
(5)	In order to preserve green belts, give priority to state capital-improvement funds which encourage location of urban development within existing urban areas except where compelling public interest dictates development of a noncontiguous new urban core.	NA
(6)	Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.	A
(7)	Pursue rehabilitation of appropriate urban areas.	C
(8)	Support the redevelopment of Kakaako into a viable residential, industrial, and commercial community.	C
(9)	Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.	NA
(10)	Identify critical environmental areas in Hawaii to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean); areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources.	C
(11)	Identify all areas where priority should be given to preserving rural character and lifestyle.	A
(12)	Utilize Hawaii's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.	A
(13)	Protect and enhance Hawaii's shoreline, open spaces, and scenic resources.	A
226-105	CRIME AND CRIMINAL JUSTICE. PRIORITY GUIDELINES IN THE AREA OF CRIME AND CRIMINAL JUSTICE:	
(1)	Support law enforcement activities and other criminal justice efforts that are directed to provide a safer environment.	NA
(2)	Target state and local resources on efforts to reduce the incidence of violent crime and on programs relating to the apprehension and prosecution of repeat offenders.	NA
(3)	Support community and neighborhood program initiatives that enable residents to assist law enforcement agencies in preventing criminal activities.	NA

SECTION	CHAPTER 226 - PART III. PRIORITY GUIDELINES	RATING
	A = ACTIVELY SUPPORTIVE, C= CONFORMS, I = GOAL IS INCONSISTENT WITH HELCO'S OBJECTIVES, NA = GOAL IS NOT APPLICABLE	
(4)	Reduce overcrowding or substandard conditions in correctional facilities through a comprehensive approach among all criminal justice agencies which may include sentencing law revisions and use of alternative sanctions other than incarceration for persons who pose no danger to their community.	NA
(5)	Provide a range of appropriate sanctions for juvenile offenders, including community-based programs and other alternative sanctions.	NA
(6)	Increase public and private efforts to assist witnesses and victims of crimes and to minimize the costs of victimization.	NA
226-106	AFFORDABLE HOUSING. PRIORITY GUIDELINES FOR THE PROVISION OF AFFORDABLE HOUSING:	
(1)	Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low-and moderate-income and gap-group households.	NA
(2)	Encourage the use of alternative construction and development methods as a means of reducing production costs.	NA
(3)	Improve information and analysis relative to land availability and suitability for housing.	NA
(4)	Create incentives for development which would increase home ownership and rental opportunities for Hawaii's low- and moderate-income households, gap-group households, and residents with special needs.	NA
(5)	Encourage continued support for government or private housing programs that provide low interest mortgages to Hawaii's people for the purchase of initial owner-occupied housing.	NA
(6)	Encourage public and private sector cooperation in the development of rental housing alternatives.	NA
(7)	Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations.	NA
(8)	Give higher priority to the provision of quality housing that is affordable for Hawaii's residents and less priority to development of housing intended primarily for individuals outside of Hawaii.	NA
226-107	QUALITY EDUCATION. PRIORITY GUIDELINES TO PROMOTE QUALITY EDUCATION:	
(1)	Pursue effective programs which reflect the varied district, school, and student needs to strengthen basic skills achievement;	NA
(2)	Continue emphasis on general education "core" requirements to provide common background to students and essential support to other university programs;	NA
(3)	Initiate efforts to improve the quality of education by improving the capabilities of the education work force;	NA
(4)	Promote increased opportunities for greater autonomy and flexibility of educational institutions in their decision-making responsibilities;	NA
(5)	Increase and improve the use of information technology in education by the availability of telecommunications equipment for:	
(A)	The electronic exchange of information;	C
(B)	Statewide electronic mail; and	C
(C)	Access to the Internet.	C
(6)	Encourage programs that increase the public's awareness and understanding of the impact of information technologies on our lives;	C
(7)	Pursue the establishment of Hawaii's public and private universities and colleges as research and training centers of the Pacific;	C
(8)	Develop resources and programs for early childhood education;	C
(9)	Explore alternatives for funding and delivery of educational services to improve the overall quality of education; and	NA
(10)	Strengthen and expand educational programs and services for students with special needs.	NA

5.3. STATE FUNCTIONAL PLANS

The Planning Act called for the creation of functional plans to set specific objectives, establish policies, and implement actions for a particular field of activity. These functional plans further identified those

organizations responsible in carrying out the actions, the implementing timeframe, and the proposed budgets.

The most current functional plans and the relationship, if any, to HELCO's proposed petition for a boundary amendment are discussed in the following sections. It is important to note that while these plans are considered to be the current "official" State Functional Plans, a deviation from the original goals of the plan may have occurred due to national and world events or other unforeseeable factors.

5.3.1. STATE AGRICULTURAL FUNCTIONAL PLAN (1991)

5.3.1.1. Goals of the Plan

The State Agricultural Functional Plan sought to ultimately increase the overall level of agricultural development in Hawaii. At the time the plan was written, the two fundamental objectives were to (1) ensure the continued viability of Hawaii's sugar and pineapple industries, and (2) encourage the continued growth and development of diversified agriculture throughout the State. As we now know, lower labor and production costs in other parts of the world caused a rapid decline and demise of the pineapple and sugar industries in Hawaii. Diversified agriculture however has helped offset year-to-year declines for sugar and pineapple. According to Department of Agriculture (DOA) 2001 statistics, overall revenue for diversified agriculture had risen for nine consecutive years. The estimated gross state product for agriculture in 2001 was approximately $504 million (*State of Hawaii Data Book, 2002*).

The functional plan for agriculture also set objectives to develop capabilities to convert Hawaii-grown crops into potential new value/added products for the local community, visitor industry, and export markets. DEBDT, large corporations, and other organizations were delegated with the task of implementing actions to develop linkages between the agriculture industry and the State's $10-$14 billion annual tourism industry. The goal was to promote and develop a diverse range of products and programs focusing on niche marketing, such as Agritourism, and to assist in the development of diversified agriculture.

5.3.1.2. Agriculture in the County of Hawaii

Agriculture is an important industry in the County of Hawaii that helps to broaden and diversify the economy in terms of employment, and also supplies residential communities and resorts with agricultural commodities. A number of growers are also exporters of various crops. Other related agricultural industries include packing, processing, and manufacturing. Statewide, the County of Hawaii produces 35 percent of fresh vegetables, 72 percent of bananas, 30 percent of coffee, 95 percent of macadamia nuts, 51 percent of flowers and nursery products, and 37 percent of the total aquaculture operations in the State. The Big Island also hosts a number of energy farms that produce geothermal, wind, and hydroelectric power that HELCO purchases to meet increasing demand.

Approximately 1.2 million acres or 46 percent of the total land area in the County of Hawaii are in the State Land Use Agricultural District. Approximately 720,099 acres are in West Hawaii. This includes potentially high or high capacity agricultural lands as well as potentially low capacity lands. A sizeable percentage of the land is currently not used for agriculture.

The County predicts that agriculture's future will remain favorable with strong diversification and development of new export protocol and technology. If trends remain constant and diversified agricultural

continues its upward climb, the need for energy efficient technologies to support increased production will continue to evolve by necessity.

5.3.1.3. Conformance with the Goals of the Plan

HELCO for several decades purchased electricity from local sugar mills generated by the burning of biomass to help extend the viability of the agricultural industry in Hawaii. HELCO currently purchases renewable energy from a number of independent power producers (IPP). It has also worked with agricultural businesses to achieve cost savings, increase production, and become energy efficient. The company is presently pursuing or working with electro-technologies that would help agricultural businesses become more productive. These technologies include: (1) post harvest cooling system (to increase the shelf life of locally grown produce); (2) dairy farm and food processing technology; (3) energy management systems; (4) indoor air quality and dehumidification systems; (5) heat pump water heating; (6) cool thermal energy storage; and (7) new food processing technologies.[4]

5.3.2. STATE CONSERVATION FUNCTIONAL PLAN (1991)

5.3.2.1. Goals of the Plan

The State Conservation Lands Functional Plan addresses the impacts of population growth and economic development on Hawaii's natural environment and provides a framework for the protection and preservation of pristine lands and shore lands. The objective of the plan is to provide for a management program allowing the judicious use of the State's natural resources balanced with the need to protect these resources to varying degrees. The State is primarily responsible to provide the management of conservation areas. However, counties play a key role in directing urban and agricultural activities and in retaining open space and cultural sites as lands become urbanized.

5.3.2.2. Conservation Land in the County of Hawaii

Conservation Districts are primarily those lands in the existing forest and water reserve zones. This district has the largest land area with approximately 1,338,135 acres or 52 percent of the total land area of the County of Hawaii. The following table shows the amount of acreage for the various districts in the County of Hawaii:

TABLE 5-B: DISTRICT BOUNDARIES IN THE COUNTY OF HAWAII BY AREA

	AGRICULTURAL	CONSERVATION	RURAL	URBAN	TOTAL
Puna	175,104	138,563	146	6,329	320,142
South Hilo	70,695	169,493	0	12,814	253,002
North Hilo	53,587	120,110	71	608	174,376
Hamakua	162,729	235,805	13	1,041	399,588
East Hawaii	**462,115**	**663,971**	**230**	**20,792**	**1,147,108**
North Kohala	64,713	13,187	16	2,434	80,350
South Kohala	150,426	15,356	53	10,608	176,443
North Kona	158,853	188,331	477	17,787	365,448
South Kona	110,749	35,051	31	845	146,676

4. Data in Section 5.3.1 obtained from the 1991 State Agricultural Functional Plan, 2001 County of Hawaii Proposed General Plan for Agricultural, HEI website (www.heco.com), State of Hawaii, DBEDT, Office of Planning GIS Data, County of Hawaii Planning Department.

	Agricultural	Conservation	Rural	Urban	Total
Kau	237,743	422,239	0	1,801	661,783
West Hawaii	**722,484**	**674,164**	**577**	**33,475**	**1,430,700**
Total	**1,184,599**	**1,338,135**	**807**	**54,267**	**2,577,808**

State of Hawaii, DBEDT, Office of Planning GIS Data
County of Hawaii Planning Department

5.3.2.3. Conformance with the Goals of the Plan

The Keahole Generating Station and Airport Substation are situated within the State Conservation District-General Subzone. It is designated as Urban Expansion on the Land Use Pattern Allocation Guide map of the 1989 Hawaii County General Plan, as amended, and on the December 21, 2001 County of Hawaii General Plan Revision draft document. The subject property is not located within the Special Management Area. It is zoned Open (O) by the County of Hawaii.

In 1973, the State BLNR approved Conservation District Use Permit ("CDUP") No. HA-487 to allow construction and operation of the Keahole generating and switching station. Portions of the subject property are improved with operational components of an electrical energy generating facility, including transmission lines. The undeveloped portions of the subject property are generally vacant lava and soil vegetated with grasses and low brush.

HELCO's Petition for a Boundary Amendment would not have a detrimental effect on the State Conservation Lands Functional Plan as the current use for the subject property has been permitted and is in conformance with the State's regulation of uses within the Conservation District. No significant impacts are anticipated by the removal of the subject properties from the Conservation District because the continuing use of the properties is essentially the same as it has been for the past 30 years. The County of Hawaii would still retain 52 percent of its total land area in the Conservation District, even after the Keahole Generating Station and Airport Substation properties (comprised of approximately 15.643 acres), are reclassified into the Urban District.[5]

5.3.3. State Educational Functional Plan (1989)

5.3.3.1. Goals of the Plan

The State Educational Functional Plan reflects the Department of Education's (DOE) strategy to address the goals, policies, and priority guidelines of the Planning Act and the goals of the Board of Education (BOE). The plan outlines actions to be taken by the DOE to improve the public school system and to attend to various societal needs and trends.

5.3.3.2. Education in West Hawaii

New schools have emerged in the West Hawaii region to accommodate the increase in population arising from growth in the region. The Konawaena High School complex includes Konawaena High School, Konawaena Middle School, the newly constructed Konawaena Elementary School, Hookena Elementary School, and Honaunau Elementary School and serves approximately 2,882 students. The Kealakehe High School complex is comprised of the newly constructed Kealakehe High School, Kealakehe Intermediate School, Holualoa Elementary School, Kealakehe Elementary School, and Kahakai Elementary School,

[5] Data in Section 5.3.2 obtained from the 1991 State Conservation Functional Plan; 2001 County of Hawaii Proposed General Plan for Agricultural; State of Hawaii, DBEDT, Office of Planning GIS Data; and County of Hawaii Planning Department.

and serves approximately 4,063 students. The Kau High School complex is comprised of Kau High School, Pahala Elementary School, and Naalehu Elementary and Intermediate School, and serves a total enrollment of approximately 810 students from kindergarten through the 12th grade level.

The State is currently in the planning stages for the new University of Hawaii Center at West Hawaii, which will be located initially on a 33-acre portion of a larger 500-acre site on the mauka side of the Queen Kaahumanu Highway, directly mauka of the Kona International Airport. (See discussion in the next Section.) Upon completion, the new campus is anticipated to accommodate approximately 1,500 students.

5.3.3.3. Conformance with the Goals of the Plan

As a public utility, HELCO strives to ensure the reliable availability of electrical energy to serve the needs of the public school system. In addition, HELCO, through its parent company, collaborates with DBEDT to educate the public on energy conservation and usage. The company has worked with schools to (1) promote energy conservation education and legislation; (2) develop teaching materials on renewable energy of all kinds, such as videotapes and literature on conservation, environment, energy sources, and electricity available, free of charge; (3) support the school-to-work initiative; (4) provide annual electric car contests; and (5) support the National Science Foundation program. The company website provides an "Electric Universe," which serves as an educational and informational site covering topics such as electrical safety, science, history, and the use of electricity. In a number of schools, HELCO installs, operates and maintains, through the support of the community, solar electric systems using photovoltaic technology.[6]

5.3.4. STATE HIGHER EDUCATION FUNCTIONAL PLAN (1984)

5.3.4.1. Goals of the Plan

The objectives of the State Higher Education Functional Plan are to provide (1) a number of diverse postsecondary education institutions; (2) quality educational, research, and public services programs; (3) appropriate opportunities for all who can benefit; (4) financing to ensure accessibility; and (5) coordination of educational resources.

5.3.4.2. Higher Education in the County of Hawaii

The University of Hawaii at Hilo (located in Hilo on the east side of the island) provides alternative higher educational opportunities within the University of Hawaii system through a variety of programs. The Hawaii Community College provides access to higher education and workforce training for the entire County, and offers an extensive program of certificate and associate degree programs onsite and through distance education technologies. In West Hawaii, in addition to the Hawaii Community College programs, the college is responsible for the University of Hawaii Center, through which it delivers baccalaureate and masters degree programs.

The State completed in 1998 a long-range development plan for a University of Hawaii-West Hawaii College, and is currently preparing an environmental impact statement for the initial development phase on a 33-acre portion of a 500-acre State-owned parcel. Just adjacent to the proposed campus, Hiluhilu

[6] Data in Section 5.3.3 obtained from the 1989 State Educational Functional Plan, 2001 County of Hawaii Proposed General Plan for Public Facilities, and HECO's website (www.heco.com).

Development LLC (Hiluhilu) plans to develop a 725-acre vacant parcel and has proposed to provide supporting infrastructure for the West Hawaii College.

The project, which is known as Palamanui/University of Hawaii-West Hawaii College (formerly referred to as Hiluhilu Development) envisions a master planned community with a mix of single- and multi-family units, an 18-hole golf course, a university village center with commercial uses, university related uses, and a medical wellness center. Subject to an agreement with the University, plans include a mixture of classroom, offices, commercial areas, conference and community outreach facilities, parking, and athletic fields.

According to Hiluhilu's Final Environmental Impact Statement, the residential component of the project will include a mixture of housing types including single family, townhouses, condominiums, and apartments. A total of 845 housing units are planned: 590 for sale single family and attached residential units and 255 multi-family rental units. The single family units are envisioned to include a mixture of condominiums, patio or townhouse units, as well as single family detached lots. The multi-family residential units are envisioned to include 100 general apartments, 75 units for student housing and 80 units for senior housing. The commercial components of Palamanui will consist of retail, office, and professional uses which will provide support for the residential component of Palamanui and the adjacent University of Hawaii West Hawaii campus. Proposed commercial development includes 80,000 square feet of University Village commercial; 200,000 square feet for community commercial; 120,000 square feet for medical, and 220,000 square feet for research and development flex space.

Deleted: According to Hiluhilu's *Draft Environmental Impact Statement*, approximately 320 single-family units covering 142 acres and 70 one-acre lots will be built in the Kau Uplands. An additional 375 residential and rental units will be developed to support the West Hawaii College in the university village area. The units will be for residents, students, workers, and faculty. A commercial center to support the residential units and the West Hawaii Campus includes 3 acres of classrooms and teaching labs; 10 acres of general commercial space; 8 acres for a university house inn and conference center; 10 acres devoted to a medical and wellness campus; 5 acres for assisted living units; 50 acres for research related incubator and development space, and 20 acres for community commercial developments

The University of Hawaii's vision for West Hawaii is to develop a unique educational environment that will integrate the community into the educational enterprise. The mission is to incorporate the philosophies of multidisciplinary educational programs with an emphasis on Hawaiian studies, a multicultural environment, a learning-centered focus using the island as a living laboratory, and a technically advanced campus well positioned to support the future needs of the community. The proposed project will bring many opportunities to the region in terms of research, education, training, economic development, and diversification. The West Hawaii College will serve as a center for information technology and will provide job training and educational opportunities for local residents and incoming students.

5.3.4.3. Conformance with the Goals of the Plan

The proposed development will require electrical utilities to be brought onsite. As a public utility, HELCO must ensure the reliable availability of electrical energy to meet current and future demand in the region, including the needs of higher educational facilities. HELCO plans to work with the developers of the project to maximize energy efficiency and conserve energy usage by installing cost-effective technologies.

HELCO has worked and is currently working on a number of projects with the University of Hawaii. HELCO, through its parent company formed an energy partnership with the University of Hawaii in 1998 to incorporate innovative energy-efficient, cost-effective technologies on the University campuses, including the University of Hawaii at Hilo and Hawaii Community College. Projects initiated under the partnership have saved the University over 4.5 million kWh per year and almost $550,000 in operating costs annually. Through 2003, HELCO has paid $148,392 in energy efficiency rebates for University of Hawaii facilities on the Big Island. HELCO has also provided assistance on energy efficient design for

the University's new construction projects, including the New Classroom Office Building, which opened in 2002, and the planned Pacific Aquaculture and Coastal Resources Center (PACRC), Mauna Kea Astronomy Education Center (MKAEC), Science & Technology Building, and Student Life Center.

Additionally, HELCO has offered hands-on learning experiences to University students. HELCO has provided engineering mentors for students as well as summer internships in its Engineering and Distribution Departments. Also, HELCO personnel have served and continue to work with the University of Hawaii and Hawaii Community College in teaching or advisory capacities. For example, HELCO's Engineering Department, via the Electrical Installation & Maintenance Advisory Council, advises Hawaii Community College instructors on their curriculum, tools and equipments, etc. HELCO Engineers also volunteer as technical speakers for the classroom.

In terms of employment opportunities requiring higher education, HELCO, HECO, and MECO combined are the largest energy employer in the State. It provides a number of positions requiring higher education in the field of engineering, business administration, technology, and management.[7]

5.3.5. STATE EMPLOYMENT FUNCTIONAL PLAN (1990)

5.3.5.1. Goals of the Plan

The 1990 State Employment Functional Plan's objectives, policies, and implementing actions address four major issue areas: (1) education and preparation services for employment; (2) job placement; (3) quality of work life; and (4) employment planning information and coordination.

5.3.5.2. Employment Opportunities in West Hawaii

Employment opportunities on the Big Island have increased substantially and primarily have been created by the expanding visitor industry. A substantial amount of investor interest continues to flow into West Hawaii, primarily the Kohala and Kona districts, which according to the Hawaii County General Plan continue to accommodate the majority of the visitor market within the County. Over $1 billion of planned construction of resort-residential complexes has been announced, in addition to the substantial investment already in place.

TABLE 5-C: COUNTY OF HAWAII - EMPLOYMENT BY INDUSTRY

Description	1980	1990	2000
CLASS OF WORKER			
Employed persons 16 years and over	38,150	54,348	64,979
Private wage and salary workers	27,226	38,606	43,888
Government workers	7,335	9,565	12,782
Self-employed workers	3,310	5,802	7,807
Unpaid family workers	279	375	502
INDUSTRY			
Employed persons 16 years and over	38,150	54,348	64,979
Agriculture, forestry, fishing and hunting, and mining	4,272	5,437	4,600
Construction	3,477	5,153	5,057

[7] Data in Section 5.3.4 obtained from the 1984 State Higher Education Functional Plan, 2001 County of Hawaii Proposed General Plan; Draft Environmental Impact Statement for Hiluhilu Development, and from HECO's website (www.heco.com)

Description	1980	1990	2000
Manufacturing	3,177	2,721	1,685
Transportation and warehousing, and utilities	2,336	3,459	3,546
Information	-	-	1,159
Wholesale trade	1,477	1,754	1,786
Retail trade	6,683	10,055	7,826
Finance, insurance, real estate and rental and leasing	2,174	2,810	3,346
Educational, health and social services	4,790	7,338	12,287
Arts, entertainment, recreation, accommodation and food services	4,154	7,221	11,462
Professional, scientific, management, administrative, and waste management services	1,588	2,992	5,596
Other services (except public administration)	1,251	2,244	2,911
Public administration	2,771	3,164	3,718

Source: U.S. Bureau of the Census, *1980 Census of Population, General Social and Economic Characteristics, Hawaii*, PC80-1-C13 (June 1983), tables 176 and 178; and 1990 census STF 3A, 1990 CPH-L-81 (1992), table 2; and U.S. Census Bureau, "Table DP-3. Profile of Selected Economic Characteristics: 2000" series.

Annual employment for secondary industries, such as government, construction, trades (retail and wholesale), utilities, financial institutions, and professional services accounted for approximately 68 percent of the County's workforce. Kailua-Kona functions as the center for government, commercial, and industrial activities for West Hawaii. Retail, banking services and "big-box" retailers such as Costco, K-Mart, and WalMart and international sporting events such as the IronMan are in Kona.

Additionally, diversified agriculture in West Hawaii helps to broaden and diversify the economic base in terms of employment. Processing, manufacturing, and packaging are growing industries. Coffee production since the 1800s continues in the North and South Kona districts, with Kona coffee experiencing in 1982-1995 sales fluctuating between $2.1 and $8.7 million. Other agricultural enterprises include cattle ranching, aquaculture, and the growing of flowers, fruits, macadamia nuts, and vegetables. Timber and fishing are small industries in Kona. The Kailua-Kona Wharf is considered a major center for big game fishing and annual international tournaments. Quarrying operations for building materials are also conducted in North Kona. The old Kailua and Kaloko industrial areas provide the largest concentration of industrial activities within West Hawaii, which accommodate a wide range of manufacturing, service, wholesale, and retail activities.

NELHA is a state agency created in 1974 by the Hawaii State Legislature. NELHA operates a unique and innovative ocean science and technology park at Keahole Point next to the Kona International Airport at Keahole and adjacent to one of the steepest bathymetric offshore slopes in the Hawaiian Islands. NELHA's assets include office and laboratory facilities, infrastructure, pristine natural resources, and leasable open land for use by tenant research, education, and commercial projects. NELHA currently hosts nearly 30 thriving enterprises which generate about $30-40 million per year in total economic impact, including tax revenues, over 200 jobs, construction activity and high value product exports. Two pipeline systems pump deep and surface seawater to shore 24 hours per day, 7 days a week, and a third, the world's largest and deepest (to a depth of 3,000 feet), is being developed.

A new federally funded facility, the NELHA Gateway project, will provide a setting for leading edge research and development in distributed energy resources and renewable energy technologies, and a new commercial ocean center development that will provide opportunities for new ocean-related businesses.

5.3.5.3. Conformance with the Goals of the plan

HELCO itself is among the top 30 employers in the County of Hawaii, employing approximately 226 people in management, engineering, administrative, technical, clerical, and service jobs. The improvements to the Keahole Generating Station scheduled for completion in mid 2004 will create jobs during construction and may add a few positions to HELCO's staff.

Additionally, HELCO provides technical input on electrical interface concerns during plant start-up for the OTEC demonstration project at NELHA. HECO is a team member in a 50-kW closed-cycle OTEC demonstration project at NELHA.[8]

5.3.6. STATE ENERGY FUNCTIONAL PLAN (1991)

5.3.6.1. Goals of the Plan

The State Energy Functional Plan sought to (1) support the commercialization of Hawaii's alternative energy resources, (2) implement a wide range of energy conservation and efficiency technologies; (3) prepare for disruptions in the energy supply; and (4) reduce the State's dependence on imported fossil fuels, such as oil, for 90 percent of its total energy needs as opposed to 42 percent nationally.

The plan called for objectives and courses of action to lessen Hawaii's dependence on imported fossil fuels. The objectives were to: (1) moderate the growth in energy demand through conservation and energy efficiency; (2) displace oil and fossil fuels through alternate and renewable energy sources; (3) promote energy education and legislation; (4) support and develop an integrated approach to energy development and management; (5) ensure the State's abilities to implement energy emergency actions immediately in the event of fuel supply disruptions, and ensure essential public services are maintained and provisions are made to alleviate economic and personal hardships that may arise.

The State Legislature in 2001 passed a law establishing "renewable portfolio standard" goals for electric utilities of 7 percent by December 31, 2003, 8 percent by December 31, 2005, and 9 percent by December 31, 2010. HELCO is permitted to aggregate its renewable portfolio with other HEI electrical utilities in order to achieve these goals. Any electric utility whose percentage of sales of electricity represented by renewable energy that does not meet these goals will have to report to the PUC and provide an explanation. The law also requires that electric utilities offer net energy metering to solar, wind turbine, biomass or hydroelectric generating systems (or hybrid systems) with a capacity up to 10 kilowatts (i.e., a customer-generator may be a net user or supplier of energy and will make payments to or receive credits from the electric utility accordingly).

5.3.6.2. Energy in The County of Hawaii

HELCO's service territory is larger than the combined mass of the seven major Hawaiian islands. The Big Island has 148,700 people on 4,028 square miles compared to Oahu's 881,000 people on 600 square miles. This lower density equates to fewer people on the Big Island carrying the costs for the electrical infrastructure and service. A homeowner on the Big Island typically pays almost double per kilowatt hour than on Oahu.

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[8] Data in Section 5.3.5 obtained from the 1991 State Employment Functional Plan; 2001 County of Hawaii Proposed General Plan, the NEHLA Annual Report and website (@ www.nelha.org)

The Big Island's power supply is characterized by: (1) diverse generating sources widely distributed around the island; (2) a mix of fossil fuels and renewable energy sources with a potential for more renewable sources; (3) aging equipment with some units dating to the 1950s, 60s, and 70s; (4) a geographical mismatch of generating sources and loads — a large concentration of generating units are in East Hawaii, while the largest loads and rapid growth rate are found in West Hawaii; (5) sufficient capacity and reserves, but unit availability on occasion is insufficient due to the age of the equipment.

HELCO has about 250 MW of firm capacity (net) generating units located in West Hawaii (42 MW) and East Hawaii (213 MW). However, because one or more of these units are undergoing maintenance at any one time, HELCO's effective reserve margin to meet the expected 2003 peak of 183 MW is only about 30 MW. HELCO has about 24 MW of "as-available" energy from intermittent sources of power (mostly hydropower and wind) potentially available. However, at many times during the year when streams are running low and there are no trade winds, only 10 percent of this amount can be relied on to support the peak system demands.

The energy delivery system is characterized by (1) mostly 69,000 volt, single-circuit, wooden pole structures; (2) long cross-island transport of power from east to west with significant line losses; (3) supply to distribution substations isolated from other island transmission grids, which means that there are no inter-ties for importing or exporting power when needed; (4) exposure to environmental stress: lightning, temperature extremes, wind, rain, altitude conditions, earthquakes, volcanic fumes, corrosion, rapid tree growth, termites; (5) limited transmission capacity in certain areas when a key transmission line fails; (6) extra redundancy is required to ensure reliability.

5.3.6.3. Conformance with the Goals of the Plan

In conjunction with State energy initiatives, HELCO and affiliated companies have (1) helped moderate growth in energy demand by instituting programs that encourage conservation and energy efficiency; (2) conducted research, formed partnerships, and invested in alternate and renewable energy sources; (3) promoted energy education and legislation through Hawaii's schools, businesses, and communities; (4) supported and developed an integrated approach to energy development and management; (5) invested when necessary in infrastructure to provide reliable energy for Hawaii's people.

By encouraging conservation and energy efficiency, HELCO: (1) delays the construction of new plants that could cost millions of dollars; (2) offsets huge operating costs created by excessively high demand and system vulnerability; (3) supports and works with government initiatives to fulfill and achieve the desired level of energy sources needed to safeguard Hawaii's future; and (4) fulfills its duty and legal obligation to serve the public.

The Big Island leads the State in the use of renewable energy with over 22 percent of its energy use supplied by renewable energy resources in 2003. This percentage is one of the highest in the nation and includes the following renewable resources:

- Geothermal Energy – from an active volcano
- Wind Energy – the largest concentration in the State
- Solar Water Heating – HELCO's program is one of the most successful in the nation

- Run-of-the-River Hydro Energy – from the abundant rainfall received along the lush Hamakua Coast, and
- Solar Electric Energy – from the abundant year-round sunlight

HELCO has a 35-year purchased power contract with PGV for approximately 30 MW of geothermal power of firm capacity, which will expire on December 31, 2027. It signed in December 2003 an approximate 10 MW as-available wind power contract with Hawi Renewable Development. HELCO's parent company in 2002 formed a non-regulated subsidiary, Renewable Hawaii, Inc. (RHI), to invest in renewable energy projects. The electric utilities continue to initiate and support many renewable energy research and development projects to help develop these technologies (e.g., fuel cell research, photovoltaic projects). They are also conducting integrated resource planning to evaluate the use of more renewables. However, major impediments to the increased use of renewable energy sources include high costs, proximity to the grid, and reliability.

HELCO is currently using combined-cycle fossil-fuel-fired power plants, wind, hydroelectric for central stations, geothermal, and distributed generation for selected sites in order to provide quality power reliably. The Renewable Portfolio Standard law requires electrical utilities to increase its use of renewable energy sources and meet a percentage of electricity sales that should come from renewable energy. HELCO has been able to meet the requirements of the law, but must continue with parallel path planning using a multi-pronged track for its operations until such a time that a renewable energy source(s) has developed to the point where it can replace fossil fuels reliably at a reasonable cost to the consumer. In the near term, Hawaii will continue to need fossil fuels for its electrical energy and transportation needs.[9]

TABLE 5-D: ELECTRIC UTILITY POWER PRODUCTION BY RESOURCE - HAWAII COUNTY, 2000 AND 2001

	2000		2001	
RESOURCE	NET KWH/YR	% OF TOTAL	NET KWH/YR	% OF TOTAL
HELCO POWER				
Helco Diesel	263,611,660	25.2	77,887,670	7.4
Helco Steam	369,728,420	35.3	304,860,090	29.0
Helco Hydropower (NF) 1/	15,113,760	1.4	18,133,515	1.7
Helco Wind (NF) 1/	2,649,300	0.3	2,110,000	0.2
Total Helco Resources	651,103,140	62.2	402,991,275	38.4
PURCHASE POWER				
Total Coal 2/	62,593,653	6.0	69,079,118	6.6
Total Naphtha 2/	39,836,806	3.8	322,288,290	30.7
Total Geothermal	250,194,036	23.9	206,660,432	19.7

[9] Data in the section obtained from the 1991 State Energy Functional Plan, 2001 County of Hawaii Proposed General Plan, HELCO's 1999-2018 Draft Integrated Resource Plan 2004 Evaluation Report; *HELCO's Address to the Hawaii Leeward Planning Conference*, August 22, 2003.

	2000		2001	
RESOURCE	NET KWH/YR	% OF TOTAL	NET KWH/YR	% OF TOTAL
Total Purchase Hydro (NF) 1/	30,653,392	2.8	34,170,771	3.3
Total Wind (NF) 1/	13,228,723	1.3	15,318,737	1.5
Total Purchased Power	396,506,610	37.8	647,517,348	61.6
Total Energy Delivered to System	1,047,609,750	100.0	1,050,508,623	100.0

1/ 'Non-firm' resources (NF) produces electricity as the resource (i.e. wind, stream flow) is available.
2/ Hilo Coast Power Company.
3/ Hamakua Energy Partners.
Source: Hawaiian Electric Company, Inc., Customer Services Department.

5.3.7. STATE HEALTH FUNCTIONAL PLAN (1989)

5.3.7.1. Goals of the Plan

The 1989 State Health Functional Plan addressed six issue areas: (1) health promotion and disease prevention; (2) communicable disease prevention and control; (3) special populations with impaired access to health care; (4) healthcare services (acute, long-term, primary and emergent) for rural communities; (5) environmental health and protection; and (6) Department of Health (DOH) leadership. The plan also sought to boost the long-term economy by attracting a share of the rapidly developing, affluent, wellness-oriented market. It also sought to develop and implement new environmental protection and health services that would protect, monitor, prevent degradation, and enhance the quality of Hawaii's air, land, and water.

The generation of power, though necessary, may have significant impacts upon the environment unless mitigation measures are instituted. Legitimate concerns over the continuing reliance upon fossil fuels, emission impacts, noise impacts, and visual impacts all complicate the utility's ability to provide reliable power to the community at a reasonable cost. Government regulations related to facility operations are also continuing to evolve. Utilities are subject to stringent Federal, State, and County environmental laws. Applicable Federal and State laws include the (1) Federal Clean Air Act as amended; (2) Federal Regulations: Title 40, Code of Federal Regulations, Parts 50, 51, 52.21, 53, 58, 60, 61, 63, 70; (3) HRS, Chapter 342B, Air Pollution Control; and (4) HAR Title 11 Chapters 50, 60.1.

The DOH monitors ambient air quality in the State. There are a total of 16 stations: nine on Oahu, one on Kauai, two on Maui and four on Hawaii. The primary purpose of the state-wide monitoring network is to measure ambient air concentrations of the six criteria pollutants that the U.S. Environmental Protection Agency (EPA) has promulgated in the National Ambient Air Quality Standards (NAAQS). The six criteria pollutants with NAAQS are: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (pb), ozone (O_3), and particulate matter less than or equal to 10 micrometers (PM_{10}). (See Chapter Three.) The State also has standards for carbon monoxide and nitrogen dioxide, which is more stringent than the NAAQS, and an ambient air quality standard for hydrogen sulfide. Also, in September 2001, the State's ozone standard was revised to reflect the latest health studies and to be consistent with the new federal eight-hour ozone standard.

Most commercial, industrial, and transportation activities and their associated effect on air quality occur on Oahu where nine of the stations are located. Agricultural operations produce the greatest air quality

impacts on Maui and Kauai. Impacts on ambient air quality from the ongoing eruption of the Kilauea Volcano and from activities associated with geothermal energy production are being monitored on the Big Island.

Water and noise are other environmental concerns. The DOH is responsible for establishing, monitoring, and enforcing the Water Quality Standards. These standards are intended to protect the environmental quality of the waters of the island and maintain public health. The DOH is also responsible for establishing standards and regulations for noise control, which are uniform throughout the State. The Federal Aviation Agency has established noise guidelines for determining compatible land uses surrounding airports; however the regulation of uses on surrounding lands remains with the State and County.

5.3.7.2. Health Conditions in the County of Hawaii

Hawaii is recognized worldwide for its natural resources and pristine environment. The summits of Mauna Kea and Mauna Loa offer some of the best areas in the world for astronomy because of their optical clarity and accessibility. The Big Island and the other Hawaiian islands, escape major sources of man-made pollutants, because of their geographic isolation from mainland industries. However, as in any metropolitan area, there are pollution concerns over air quality, water contamination, and noise. (See Chapter Three for an in-depth discussion.)

The major sources of air pollution on the Big Island are volcanic emissions, open burning, sprayed agricultural chemicals, modes of transportation, and fixed combustion sources such as power plant emissions. Natural pollutants from airborne dust are also contributing factors. Prevailing northeast trade winds and diurnal land and sea breezes form air circulation patterns that can create local concentrations of pollutants. In areas where the topography favors a confluence of air currents, the potential is great for hazy conditions to develop, especially if vehicular, volcanic, and other air pollution sources increase.

Surface water resources, coastal waters, and groundwater resources of the County of Hawaii are vulnerable to contamination as population increases and further development occurs. According to County of Hawaii data, the major sources of water pollution are sewage, natural surface runoff, and the by-products of agricultural activities. Recycled water is currently being used for erosion and dust control at lined landfills, and there may be a need in the future to recycle sewage and wastewater effluent for use in irrigation. There are five municipal sewage systems with treatment plants that serve limited areas. As a result, only a small portion of the County of Hawaii's sewage is treated. Most sewage is disposed of in private cesspools, septic systems, or private wastewater treatment plants that must meet the State DOH water quality standards. The State DOH intends to promulgate rules that will prohibit the installation of cesspools.

Loud noises are known to have adverse physiological and psychological effects on people. Residential and resort areas near airports are particularly affected. Increased air transportation activity and changes in aeronautical technology could change the "noise contours" that affect lands surrounding the Kona International Airport at Keahole and Hilo International Airport. The County recommends appropriate easements and/or covenants be required in conjunction with land use approvals for lands in the vicinity of the airports to eliminate the likelihood of surrounding land use development conflicting with future airport activity and/or expansion.

5.3.7.3. Conformance to the Goals of the Plan

Emissions from other private and municipal sources such as power generation facilities are controlled through State and Federal regulations. Under the guidance of the Federal government, the State DOH continuously scrutinizes and updates the State's standards and regulations to address current issues, either meeting or exceeding Federal standards.

Emissions from the Keahole Generating Station have been monitored by air quality monitoring stations located approximately 1.9 kilometers (1.2 miles) southeast of the plant (i.e., Kakahiaka monitor) and 5.5 kilometers (3.4 miles) east-northeast of the plant (i.e., Huehue monitor). The Kakahiaka monitor operated from February 5, 2000 to May 17, 2000, and the Huehue monitor operated from February 1, 1999 to May 17, 2000. The monitoring data confirmed compliance with State and Federal ambient air quality standards for SO_2, PM_{10}, and CO and that the Huehue monitoring data set is representative of the maximum impact areas. (See Chapter Three.)

In continuing support of environmental health, HELCO plans to implement new emissions controls at the Keahole Generating Station, specifically a Selective Catalytic Reduction (SCR) system, which is expected to involve ammonia transport, storage, and usage. It will also improve the existing wastewater treatment system to process on-site and dispose of on-site treated wastewater, generated as a result of the SCR system. It has secured the necessary approvals to draw brackish water from a groundwater supply well that has already been permitted and constructed at the Keahole Generating Station.

Noise sources currently at and in the vicinity of Keahole Generating Station include various diesel generators and combustion turbines, vehicular traffic on Queen Kaahumanu Highway, and aircraft at Kona International Airport at Keahole. Existing and future mitigation measures at the Keahole Generating Station will be evaluated to address adverse noise impacts and the ability to maintain noise levels at 45/55 dBA once the generating station is fully operational. HELCO has taken steps to control noise levels from the generating station with the intent of satisfying applicable regulations. [10]

5.3.8. STATE HISTORIC PRESERVATION FUNCTIONAL PLAN (1991)

5.3.8.1. Goals of the Plan

The State Historic Functional Plan identifies issues, policies, and implementing actions that seek to preserve and protect the unsurpassable beauty, history, and culture of the Hawaiian islands. Hawaii's natural scenic beauty, clean environment, and rich multi-cultural heritage (including historic/cultural sites) are reasons why so many people have made Hawaii their home, and why so many visit the State.

5.3.8.2. Historic Preservation Sites in the County of Hawaii

According to the DLNR's State Historic Preservation Division (SHPD), an estimated 11,500 archeological and historic sites have been identified on the Big Island. However, only 5 percent of the island has been surveyed, and the other 95 percent of the island contains an undeterminable number of historic and archeological sites. The abundance of historic sites can be attributed to the fact that much of the early history of the Hawaiian islands had its setting on the Big Island. Archeological data indicates that Polynesian voyagers may have settled there as early as 600 A.D.

[10] Data for this section obtained from the 1989 State Health Functional Plan; 2001 County of Hawaii Proposed General Plan; DOH, Clean Air Branch, 2001 Annual Report; and from HECO.

5.3.8.3. Conformance to the Goals of the Plan

In 1992, Paul H. Rosendahl, Ph.D., dba Paul H. Rosendahl, Inc. (PHRI), conducted an archaeological inventory survey of the HELCO Keahole Generating Station, described as TMK 3-7-3-49:36, comprised of 14.998 acres. The survey was conducted in connection with the preparation of an Environmental Impact Statement for the CDUA that proposed additional generating capacity to the Keahole Generating Station.

The basic objective of the survey was to gather and provide information for compliance with all historic preservation regulatory review requirements of the State Historic Preservation Division (SHPD) and the Hawaii County Planning Department. The specific objectives of the survey were four-fold: (1) to identify all potentially significant archaeological remains present within the parcel; (2) to collect information sufficient to evaluate and document the potential significance of all identified remains; (3) to evaluate the potential impacts of any proposed development upon any identified significant remains; and (4) to recommend appropriate measures that would mitigate any adverse impacts upon identified significant remains. Since its construction in the 1970s, no native Hawaiian archaeological sites or cultural practices were known to be associated with the Keahole Generating Station

More recently on September 22, 2003, PHRI conducted an updated inspection to include the Airport Substation, described as TMK 3-7-3-49:37, comprised of 0.645 acres, and the primary and secondary access roads. HELCO's request for a reclassification from the Conservation District to the Urban District includes both the Keahole Generating Station and Airport Substation properties. The current inspection confirmed that no significant historical, archaeological, or cultural resources were found on the project site. (See Chapter Three.)[11]

5.3.9. STATE HOUSING FUNCTIONAL PLAN (1989, 1990)

5.3.9.1. Goals of the Plan

The 1990 State Housing Functional Plan identified a need to develop affordable housing throughout the State, and found that the housing needs of lower income households would not be adequately met in future residential developments. Obstacles identified to the development of affordable housing include (1) the lack of infrastructure, particularly on the neighbor islands; (2) the high cost of zoned land, high development costs, and the regulatory system particularly on Oahu; (3) government policies that have created a shortage of urban land zoned for housing; (4) lack of government funds to develop rental housing; (5) building codes and subdivision standards that constrain innovative, cost-saving technologies; and (6) current labor wages. The Plan recommended increased densities in residential developments where feasible, smaller and basic units, funding for rental developments, and state subsidies.

5.3.9.2. Housing on the County of Hawaii

The value of residential building permit authorizations was up 40.5 percent statewide for the second quarter of 2003. The number of single-family unit authorizations was up 22.2 percent, but multi-family units authorized were down 19.0 percent. Hawaii County authorizations increased 35.8 percent. In the North Kona area, over $1 billion of planned construction of resort-residential complexes have been

[11] Data in this section obtained from the 1991 State Historic Preservation Functional Plan and the 2001 County of Hawaii Proposed General Plan.

announced, in addition to the substantial investment already in place. Various resort and resort-residential complexes are currently under construction or are planned for construction in the near future.

5.3.9.3. Conformance to the Goals of the Plan

As a publicly regulated utility, HELCO is obligated to ensure that existing and new housing is provided reliable electricity in a cost-effective manner. In view of the increasing amount of planned residential and resort-residential construction on the west side of the Big Island, HELCO asserts that the most efficient and cost-effective solution is to expand its existing operations at the Keahole Generating Station. Thus, HELCO believes the proposed action is directly supportive of the Housing Functional Plan.

5.3.10. STATE HUMAN SERVICES FUNCTIONAL PLAN (1989)

5.3.10.1. Goals of the Plan

The Human Services Functional Plan addressed: (1) elder abuse; (2) child abuse and neglect; and (3) spouse/domestic abuse and violence. The plan details statistics, causes, and prevention measures that can help to combat very pressing societal issues.

5.3.10.2. Human Services in the County of Hawaii

The State Department of Human Services offers various programs throughout the State to assist the elderly, poor, and disabled and provides general assistance and cash benefits for food, clothing, shelter, and other essentials. The Hawaii County Office of Aging, an Area Agency on Aging, is responsible for developing a comprehensive system of services for older persons in the County of Hawaii.

5.3.10.3. Conformance to the Goals of the Plan

HELCO's petition for a boundary amendment will have a negligible effect on this plan.

5.3.11. STATE RECREATION FUNCTIONAL PLAN (1991)

5.3.11.1. Goals of the Plan

The 1991 State Recreation Functional Plan focused on six issue areas: (1) ocean and shoreline recreation; (2) mauka, urban, and other recreation; (3) public access to the shoreline and upland recreation areas; (4) resource conservation and management, (5) management of recreation programs and facilities; and (6) wetlands protection and management.

5.3.11.2. Recreation in West Hawaii

The County expects heavy demand on recreational resources as a result of an expanding population and a growing number of visitors in West Hawaii. According to the County of Hawaii General Plan, existing recreational areas and facilities in the North Kona district are being targeted for improvements and expansion as the area is generally inadequate. Approximately 27,400 residents are presently served by only nine County parks. Improved and expanded recreational facilities that support the proper ratio of 5.0 acres of recreation area for every 1,000 people are a part of the County's goals.

Some of the new or improved areas in the region include the newly completed Kealakehe High School, which offers facilities that are open to the public during non-school hours. The Kailua Park (Old Kona Airport) consists of 34 acres and provides lighted fields for baseball, softball, and football. New baseball and soccer fields were recently constructed. Also situated here are four lighted tennis courts, the old terminal building houses, restrooms, offices, and a meeting place. A multipurpose gymnasium was

completed in 1993 and a 50-meter olympic-size swimming pool was completed in 1999. The County has three developed beach parks in North Kona. There are three small boat harbors in the district: Kailua Bay, Keauhou, and Honokohau. Honokohau harbor has a capacity for 450 small boats and has other facilities to accommodate boat repair, restaurant, dry storage, etc.[12]

5.3.11.3. Conformance to the Goals of the Plan

Any improvements to the Keahole Generating Station are supportive of the State's Recreation Function Plan and State and County plans for the expansion of recreational facilities in the region.

5.3.12. STATE TOURISM FUNCTIONAL PLAN (1991)

5.3.12.1. Goals of the Plan

The 1991 State Tourism Functional Plan focused on six issues: (1) the positive and negative impacts of tourism growth on the community; (2) physical development in terms of product quality, product diversity, land use planning, adequate infrastructure, and visitor use of public services; (3) environmental resources and cultural heritage; (4) community, visitor, and industry relations; (5) employment and career development; and (6) effective marketing.

The plan primarily sought to strengthen tourism, while developing other industries to diversify the State's economic base in order to reduce its vulnerability from the fluctuations of a single market. Currently, however, despite the fluctuations caused by national and world events, tourism remains the primary source of revenue into the State through visitor expenditures and tourism-related capital investment. According to the Hawaii Tourism Authority (HTA) *2002 Annual Report to the Legislature*, tourism in 2002 remained Hawaii's economic driver, providing one out of five of jobs and about 21 percent of the State's tax revenue. Taxes generated from tourism provide the State with an immediate economic return, as the generated revenue goes to support schools, highways, police, parks, etc., and benefits practically every segment of the community.

Hawaii's visitor industry rebounded following the events of September 11, and showed overall growth in 2002 with total visitor days by air and by cruise ships up 4.1 percent compared to 2001. Total expenditures by air and cruise ship visitors rose 8.7 percent to nearly $10 billion.

5.3.12.2. Tourism in West Hawaii

Current growth in the County of Hawaii in terms of employment, population, income, and economic activity has been more closely tied to the visitor industry than any other sector of the economy. Employment opportunities spurred by the growth of tourism has been the catalyst for economic growth in the County. A substantial amount of investor interest continues to flow into West Hawaii primarily the Kohala and Kona districts, which according to the Hawaii County General Plan continues to accommodate the majority of the visitor market within the County. Over $1 billion of planned construction of resort-residential complexes have been announced, in addition to the substantial investment already in place. Various resort and resort-residential complexes are currently under construction or are planned for construction in the near future. Continued investor interest in resort and

[12] Data from this section obtained from the 2001 County of Hawaii Proposed General Plan.

resort-residential development in the County suggests an economic future that promises new jobs and more commercial, recreational, and cultural activities.[13]

5.3.12.3. Conformance with the Plan

As a regulated public utility, HELCO is obligated to ensure that the visitor industry is provided with a reasonably reliable source of electrical energy in a cost-efficient manner. The proposed action is supportive of this obligation and of the State Tourism Functional Plan, to that end. HELCO offers cost-saving conservation measures for hotels to help reduce energy costs.

HELCO's Commercial and Industrial Energy Efficiency Program offers participants rebates for energy conservation measures beyond current standard practice in retrofit and new construction projects. These measures include lighting (T-8 lamps and electronic ballasts, occupancy sensors, and optical reflectors), motors (high efficiency), space cooling (direct expansion air conditioners and chillers), and customized incentives.

For example: (1) The Hilton Waikoloa Village installed new lights, motors/drivers, and window film and received $92,000 in total rebates from HELCO and will save 1.8 million kWh per year. (2) The Hapuna Beach Prince Hotel installed new lights and received $54,000 in rebates and will save 967,000 kWh per year. (3) The Mauna Lani Bay Hotel installed new lights, air conditioning, and window film and received $93,900 in rebates and will save 1.1 million kWh per year. (4) The Outrigger Waikoloa Beach Hotel installed new lights and motors and received $21,700 in rebates and will save 404,000 kWh per year.

5.3.13. State Transportation Functional Plan (1991)

5.3.13.1. Goals of the Plan

The 1991 State Transportation Functional Plan sought to (1) construct facility and infrastructure improvements in support of Hawaii's thriving economy and growing population base; (2) develop a transportation system balanced with an array of new alternatives; (3) implement Transportation Systems Management to maximize the use of existing facilities and systems; (4) foster innovation and use of new technology in transportation; (5) maximize joint efforts with the private sector; (6) pursue land use initiatives which help reduce travel demand; (7) encourage resident quality-of-life improvements through improved mobility opportunities and travel reduction.

5.3.13.2. Transportation Conditions in West Hawaii

Kona International Airport at Keahole occupies 3,450 acres of land about seven miles northwest of Kailua-Kona and one mile east of HELCO's Keahole Generating Station and Airport Substation. The airport accommodates domestic overseas, international, inter-island, commuter/air taxi, and general aviation activities. According to the County of Hawaii Data Book, intrastate and overseas arrivals and departures have increased steadily since 1991, except for 2001 due to the tragic events of September 11, 2001.

[13] Data for this section obtained from the 2001County of Hawaii Proposed General Plan and the Hawaii Tourism Authority (HTA) *2002 Annual Report to the Legislature.*

TABLE 5-E: PASSENGER TRAFFIC AT KONA INTERNATIONAL AIRPORT AT KEAHOLE

Year	OVERSEAS		INTRASTATE	
	Departures	Arrivals	Departures	Arrivals
1991	128,630	134,006	941,346	914,795
1992	137,803	141,192	957,567	925,374
1993	145,980	150,796	952,901	929,385
1994	146,820	150,660	981,913	959,190
1995	113,115	108,972	1,051,409	1,029,959
1996	121,704	154,187	1,154,761	1,093,750
1997	157,671	213,268	1,175,607	1,081,611
1998	159,291	251,899	1,184,128	1,057,637
1999	198,599	253,630	1,166,265	1,049,688
2000	254,670	316,211	1,194,754	1,076,462
2001	275,062	356,118	1,054,349	954,789

Notes:
April 26, 1993: Keahole Airport was renamed the Keahole-Kona International Airport.
June 2, 1996: Japan Airline's first Tokyo-Kona landing at Keahole-Kona International Airport.
June 16, 1997: Keahole-Kona International Airport was renamed the Kona International Airport at Keahole.
September 11, 2001: Terrorist attacks on the United States led to the closing of all U.S. airports.
Source: Hawaii State Department of Transportation, Airports Division, Airport Activity Statistics, Calendar Year 2001.

The major traffic arteries serving the North Kona district are the Hawaii Belt Highway connecting Kona with South Kohala and Kau, the Queen Kaahumanu Highway, the Kuakini Highway connecting Kailua with the mauka Keauhou area, and Alii Drive serving the shoreline areas between Kailua and Keauhou. The latter of these systems is the only access to areas along the shoreline between Kailua and Keauhou. Mauka-makai access between the Mamalahoa Highway and the Queen Kaahumanu Highway is provided by Kaiminani Drive, Hina Lani Drive and Palani Road. Currently in its design stage, the proposed Kahului-Keauhou Parkway (formerly known as the Alii Highway) will provide another north-south arterial between its northern connection to the Queen Kaahumanu Highway at Kahului ahupuaa and its southern terminus at the Alii Drive-Kamehameha III Road intersection in Keauhou.

The Mamalahoa Highway is the only arterial roadway currently serving all of the South Kona District. Many portions of this roadway are narrow and winding. Lands mauka and makai of this roadway are served by private and County-owned collector roadways, many in poor condition.

The Hawaii County Mass Transit Agency provides public transportation around the island on the Hele-On bus. In addition, the Transit Agency offers a Shared Ride Taxi program which provides door-to-door transportation for as little as $2.00 within the urbanized area of Hilo and Kona.

Recent economic growth and prosperity in the West Hawaii region, have brought traffic congestion, which has worsened appreciably on Queen Kaahumanu Highway and on the Hawaii Belt Road between Kailua and South Kona. However, plans are under way for highway improvements for both State and County roads

5.3.13.3. Conformance with the Plan

Currently, fuel trucks utilize the north gates of the Keahole Generation Station while employees and deliveries access the project site through the south gate at Pukiawe Street. HELCO employees work in

shifts, and as such, do not contribute heavily to traffic congestion. During the weekday, six maintenance personnel are employed between 6:00 a.m. and 5:30 p.m. while three operating personnel work on the first shift, 6:00 a.m. to 2:00 p.m., and two operating personnel are on the second shift, 2:00 p.m. to 10:00 p.m. During the weekend, there are four operating personnel assigned with two persons in two shifts of 6:00 a.m to 2:00 p.m and 2:00 p.m. to 10:00 p.m.

Hence, most of the current shift changes occur at different times than the Queen Kaahumanu Highway peak hours of 6:30 to 7:30 a.m. and 3:15 to 4:15 p.m. The fuel truck deliveries usually range between 3 to 4 trips per day, Monday through Friday. Fuel is trucked from Hilo Harbor. The Keahole Generation Station receives five mail deliveries per week. Also, other deliveries by vendor/supplier goods and services are likely to increase to between 5 to 10 deliveries per week.

At project completion on or before 2009, the Keahole Generation Station weekday staffing would change to eight maintenance personnel between 6:00 a.m. and 5:30 p.m. and seven operating personnel in three shifts (one person from 7:00 a.m. to 3:30 p.m., two persons from 6:00 a.m. to 2:00 p.m., two persons from 2:00 p.m. to 10:00 p.m. and two persons from 10:00 p.m. to 6:00 a.m.). For the weekend staffing, there would be six operating personnel with two persons in each of the three shifts: 6:00 a.m. - 2:00 p.m., 2:00 p.m. - 10:00 p.m. and 10:00 p.m. - 6:00 a.m.

Fuel deliveries would increase to 7 or 8 fuel trucks per day, Monday through Friday, but deliveries would be from Kawaihae Harbor instead of Hilo Harbor. Also, there would be five mail deliveries and approximately 8 to 12 vendor/supplier deliveries per week. The Keahole Generation Station and the Airport Substation would have the largest staffing, fuel truck deliveries and vendor/supplier deliveries at project completion.

5.3.14. STATE WATER RESOURCES DEVELOPMENT FUNCTIONAL PLAN (1984)

5.3.14.1. Goals of the Plan

The 1984 State Water Resources Development Functional Plan set objectives to: (1) clarify the State water policy and improve management framework; (2) maintain the long-term availability of freshwater supplies while considering environmental values; (3) improve management of flood plains; (4) assure adequate municipal water supplies for planned urban growth; (5) assure the availability of adequate water for agriculture; (6) encourage and coordinate development of self-supplied industrial water and the production of water-based energy; (7) provide for the protection and enhancement of Hawaii's freshwater and estuarine environment; (8) improve state grant and loan procedures for water programs and projects; and (9) pursue water resources data collection and research to meet changing needs.

5.3.14.2. Water Conditions in West Hawaii

West Hawaii over the past 15 years has experienced tremendous growth in population and resort development, accompanied by a reliance on the available ground-water resources. In the early 1990s, there was fierce competition for water resources among landowners, developers, and other water purveyors in the region. The State Commission on Water Resource Management (CWRM) stepped in and found they needed to gather pertinent data on baseline water levels in order to mediate the problem and avoid major disputes. A 1991 – 2002 report, *A Study of the Ground-Water Conditions in North and South Kona and South Kohala Districts, Island of Hawaii* is ongoing and presents over 10 years of baseline water level data. Many wells were drilled in the region during the past 10 years by private landowners, public utilities, and the State, who invested large sums of money to drill these wells for the economic

benefit of the island and the State. The CWRM credited these entities for allowing access to their wells for data collection and sampling used in the report.[14]

The Keahole Generating Station and Airport Substation are located on the western flank of Hualalai where the ground surface is highly permeable and storm water runoff does not occur. Two modes of groundwater occur in the general vicinity: (1) a thin, brackish to saline basal lens underlying the entire coastal zone; and (2) high-level groundwater near the vicinity of Mamaloahoa Highway and extending 20 miles from Kalaoa to Kealakekua. Wells in the near vicinity of the Keahole Generating Station show that the basal groundwater is relatively saline.[15]

5.3.14.3. Conformance with the Plan

The County of Hawaii, Department of Water Supply (DWS) provides approximately 40,000 gallons per day (gpd) for CT NO_x control, the production of steam, domestic consumption by employees, and landscape irrigation. Upon completion of the improvements to the facilities, and by using the brackish water well, the demand for potable water will decrease to about 15,000 gpd. HELCO's onsite well, identified as State No. 44461-02, was developed and pump tested in 1993, and recently put into use. HELCO plans to pump from the well an average of between 210,000 and 230,000 GPD of brackish water to provide the majority of the water needed for improvements to the plant.

Per the Settlement Agreement, HELCO will transfer 90 percent of its existing potable water right commitments at Keahole to the DHHL. Once HELCO has confirmed its right to use brackish water (permits and approvals have already been granted, but the matter has been subjected to a legal challenge), HELCO will transfer 90 percent of its existing additional incremental potable water allocation of 100,000 gpd to DHHL, subject to DWS approval. The consent to transfer activity could begin promptly, but the actual transfer of potable water to DHHL cannot begin until HELCO confirms its right to use brackish water resources at Keahole.

5.4. HAWAII WATER CODE

The State Legislature adopted in 1987 the Hawaii Water Code, as HRS Chapter 174C, as amended, to "protect, control, and regulate the use of Hawaii's water resources for the benefit of its people." The CWRM administers the water code. The Code's policies include the (1) protection of water resources, maintenance of ecological balance and scenic quality with regard to the development of new resources; (2) improvement of water quality; and (3) the establishment of comprehensive water planning statewide. A major element of the code is the development of the Hawaii Water Plan.

The State Water Code pursuant to HRS 174-2(c) allows "maximum beneficial use of the waters of the State for purposes such as domestic uses, aquaculture uses, irrigation and other agricultural uses, power development, and commercial and industrial uses." Furthermore, the Code shall be liberally interpreted and applied in a manner, which conforms with intentions and plans of the counties in terms of land use planning.

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[14] Data obtained from DLNR website (http://www.hawaii.gov/dlnr/cwrm/data/reports/pr200301.pdf)

[15] Data obtained from Tom Nance Water Resource Engineering report for HELCO EIS, December 2003.

5.5. STATE OF HAWAII WATER PLAN

The Hawaii Water Plan, under HRS Section 174C-31, consists of four parts: (1) a water resource protection plan prepared by the water commission; (2) water use and development plans for each county prepared by each separate county and adopted by ordinance, setting forth the allocation of water to land use in that county; (3) a state water projects plan prepared by the agency which has jurisdiction over such projects in conjunction with other state agencies; and (4) a water quality plan prepared by the DOH.

All water use and development plans shall be conditioned upon and be consistent with: (1) water resource protection and water quality plans; (2) respective county land use plans and policies including general plan and zoning as determined by each respective county; (3) state land use classification and policies.

To prepare the water resource protection and water quality plans, the commission shall assess the quantity and quality of water needed for existing and contemplated uses, including irrigation, power development, geothermal power, and municipal uses.

5.6. STATE UNDERGROUND INJECTION CONTROL (UIC) PROGRAM

The Safe Drinking Water Act of 1974 legislated the protection of all aquifers, portions of aquifers, and any potential aquifer capable of yielding consumable drinking water sources. This mandate was based on increased evidence of contamination of this valuable resource and on a national concern for the quality of groundwater.

In 1976, the State Legislature enacted Act 84, *relating to Safe Drinking Water*, which required the State DOH to establish an UIC program to protect the quality of underground sources of drinking water. The UIC program identifies aquifers that should be protected from subsurface disposal of wastewater through injection wells, and designates areas now being used or could potentially be used for drinking water. The underground sources of drinking water (USDW) are protected and the program prohibits the construction of new injection wells that may pollute the USDW. Injection wells are allowed in exempted areas. The boundary lines, known as the UIC line, between the USDW and the exempted areas have been developed, with a 1,000-foot setback of wastewater systems from all public drinking water wells and springs.

The Keahole Generating Station is situated makai of the UIC line and injection wells are permissible in this area, without affecting USDW.

5.7. STATE ENVIRONMENTAL POLICY

HRS Chapter 344 establishes an environmental policy that (1) encourages productive and enjoyable harmony between people and their environment; (2) promotes efforts to prevent or eliminate damage to the environment and biosphere; (3) stimulates the health and welfare of humanity; and (4) enriches the understanding of the ecological systems and natural resources important to the people of Hawaii.

HRS Section 344-2 defines "environment" as the complex of physical and biological conditions that influence human well-being, including land, air, water, minerals, flora, fauna, energy, noise, and places of historic or aesthetic significance.

An electrical generating station, while necessary, also generates concerns over emissions and other environmental issues. The following table, identified as Table 5-F, contains the policies of the State

Environmental Policy, HRS Section 344, and discusses the relationship and applicability, if any, of the policy to HELCO's petition for a boundary amendment.

TABLE 5-F: STATE ENVIRONMENTAL POLICY

SECTION	STATE ENVIRONMENTAL POLICY	RATING
	A = ACTIVELY SUPPORTIVE, C= CONFORMS, I = GOAL IS INCONSISTENT WITH HELCO'S OBJECTIVES, NA = GOAL IS NOT APPLICABLE	
344-3	ENVIRONMENTAL POLICY. It shall be the policy of the State, through its programs, authorities, and resources to:	
(1)	Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawaii.	A
(2)	Enhance the quality of life by:	
(A)	Setting population limits so that the interaction between the natural and artificial environments and the population is mutually beneficial;	NA
(B)	Creating opportunities for the residents of Hawaii to improve their quality of life through diverse economic activities which are stable and in balance with the physical and social environments;	A
(C)	Establishing communities which provide a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian; and	NA
(D)	Establishing a commitment on the part of each person to protect an enhance Hawaii's environment and reduce the drain on nonrenewable resources.	A
344-4	GUIDELINES. In pursuance of the state policy to conserve the natural resources and enhance the quality of life, all agencies, in the development of programs, shall, insofar as practicable, consider the following guidelines:	
(1)	POPULATION.	
(A)	Recognize population impact as a major factor in environmental degradation and adopt guidelines to alleviate this impact and minimize future degradation;	NA
(B)	Recognize optimum population levels for counties and districts within the State, keeping in mind that these will change with technology and circumstance, and adopt guidelines to limit population to the levels determined.	NA
(2)	LAND, WATER, MINERAL, VISUAL, AIR, AND OTHER NATURAL RESOURCES.	NA
(A)	Encourage management practices which conserve and fully utilize all natural resources;	A
(B)	Promote irrigation and waste water management practices which conserve and fully utilize vital water resources;	A
(C)	Promote the recycling of waste water;	A
(D)	Encourage management practices which conserve and protect watersheds and water sources, forest, and open space areas;	A
(E)	Establish and maintain natural area preserves, wildlife preserves, forest reserves, marine preserves, and unique ecological preserves;	NA
(F)	Maintain an integrated system of state land use planning which coordinates the state and county general plans.	C
(G)	Promote the optimal use of solid wastes through programs of waste prevention, energy resource recovery, and recycling so that all our wastes become utilized.	A
(3)	FLORA AND FAUNA.	
(A)	Protect endangered species of indigenous plants and animals and introduce new plants or animals only upon assurance of negligible ecological hazard;	NA
(B)	Foster the planting of native as well as other trees, shrubs, and flowering plants compatible to the enhancement of our environment.	NA
(4)	PARKS, RECREATION, AND OPEN SPACE.	
(A)	Establish, preserve and maintain scenic, historic, cultural, park and recreation areas, including the shorelines, for public recreational, educational, and scientific uses;	NA

SECTION	STATE ENVIRONMENTAL POLICY	RATING
	A = ACTIVELY SUPPORTIVE, C= CONFORMS, I = GOAL IS INCONSISTENT WITH HELCO'S OBJECTIVES, NA = GOAL IS NOT APPLICABLE	
(B)	Protect the shorelines of the State from encroachment of artificial improvements, structures, and activities;	NA
(C)	Promote open space in view of its natural beauty not only as a natural resource but as an ennobling, living environment for its people.	NA
(5)	ECONOMIC DEVELOPMENT.	
(A)	Encourage industries in Hawaii which would be in harmony with our environment;	A
(B)	Promote and foster the agricultural industry of the State; and preserve and conserve productive agricultural lands;	A
(C)	Encourage federal activities in Hawaii to protect the environment;	A
(D)	Encourage all industries including the fishing, aquaculture, oceanography, recreation, and forest products industries to protect the environment;	A
(E)	Establish visitor destination areas with planning controls which shall include but not be limited to the number of rooms;	NA
(F)	Promote and foster the aquaculture industry of the State; and preserve and conserve productive aquacultural lands.	A
(6)	TRANSPORTATION.	
(A)	Encourage transportation systems in harmony with the lifestyle of the people and environment of the State;	A
(B)	Adopt guidelines to alleviate environmental degradation caused by motor vehicles;	A
(C)	Encourage public and private vehicles and transportation systems to conserve energy, reduce pollution emission, including noise, and provide safe and convenient accommodations for their users.	A
(7)	ENERGY.	
(A)	Encourage the efficient use of energy resources.	A
(8)	COMMUNITY LIFE AND HOUSING.	
(A)	Foster lifestyles compatible with the environment; preserve the variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods which reflect the culture and mores of the community;	NA
(B)	Develop communities which provide a sense of identity and social satisfaction in harmony with the environment and provide internal opportunities for shopping, employment, education, and recreation;	NA
(C)	Encourage the reduction of environmental pollution which may degrade a community;	A
(D)	Foster safe, sanitary, and decent homes;	A
(E)	Recognize community appearances as major economic and aesthetic assets of the counties and the State; encourage green belts, plantings, and landscape plans and designs in urban areas; and preserve and promote mountain-to-ocean vistas.	A
(9)	EDUCATION AND CULTURE.	
(A)	Foster culture and the arts and promote their linkage to the enhancement of the environment;	A
(B)	Encourage both formal and informal environmental education to all age groups.	A
(10)	CITIZEN PARTICIPATION.	
(A)	Encourage all individuals in the State to adopt a moral ethic to respect the natural environment; to reduce waste and excessive consumption; and to fulfill the responsibility as trustees of the environment for the present and succeeding generations; and	A
(B)	Provide for expanding citizen participation in the decision making process so it continually embraces more citizens and more issues.	A

SECTION	STATE ENVIRONMENTAL POLICY	RATING
	A = ACTIVELY SUPPORTIVE, C= CONFORMS, I = GOAL IS INCONSISTENT WITH HELCO'S OBJECTIVES, NA = GOAL IS NOT APPLICABLE	

COMMENTARY: HELCO highly encourages conservation measures and demand-side management programs that utilize natural resources and conserve energy (e.g., rebates on solar panels, efficiency water heaters, etc.). Moreover, its use of renewable energy sources such as geothermal, wind, water ranks among the highest in the nation. Research and development of alternative energy resources have been an adopted policy and accepted practice of the company (e.g. OTEC at NEHLA, fuel cell research, photovoltaic, etc.).

Spanning a 110-year history, the company has grown with the community and has worked with State and County plans to meet projected growth and demand. The historical facts show that HELCO, for the most part, has provided the necessary electrical infrastructure to power diverse economic activities and provide stability on the Big Island.

5.8. THE PUBLIC UTILITIES COMMISSION (PUC)

The PUC, as established by HRS Chapter 269 and HAR, Title 6, Chapter 60, (1) regulates all franchised or certificated public service companies operating in the State; (2) prescribes rates, tariffs, charges and fees; (3) determines the allowable rate of earnings in establishing rates; (4) issues guidelines concerning the general management of franchised or certificated utility businesses; and (5) acts on requests for the acquisition, sale, disposition or other exchange of utility properties, including mergers and consolidations.

The PUC recognizes that public utilities are undergoing significant changes due to developments in technology, markets, economic conditions, consumer needs, and environmental concerns. As a regulatory commission, it must protect public interest while simultaneously allowing and encouraging the public utilities to efficiently operate, grow, and develop. Its primary purpose is to efficiently, fairly, and impartially ensure that regulated utilities efficiently and safely provide utility customers with adequate and reliable utility services at just and reasonable rates, while providing regulated utilities with a reasonable opportunity to earn a fair rate of return. [16]

The PUC is also the accepting authority for all electrical IRPs. An IRP as discussed in previous chapters requires all electrical utilities in the State to systematically and thoroughly develop long-range plans for meeting Hawaii's future energy needs through integrated resource planning. IRP is a key vehicle for State regulatory commissions, electric utilities, energy stakeholders, and the public to understand and influence the planning process of identifying and evaluating combinations of demand-side and supply-side resources that will achieve objectives and meet forecasted demand. The main goal of IRP is to identify the resources or mix of resources for meeting near and long-term consumer energy needs in an efficient and reliable manner at the lowest possible cost. (See HELCO's 1998 Second IRP, 2004 Evaluation Report, and Review of Alternatives attached as Appendices E, F, and G, respectively.)

5.9. WEST HAWAII REGIONAL PLAN (1989)

The Office of State Planning, under former Governor John Waihee, produced in 1989 the West Hawaii Regional Plan to guide the development of the region. The State formulated the plan to (1) coordinate State activities in West Hawaii and respond effectively to emerging needs and critical problems; (2) address areas of State concern; (3) coordinate the Capital Improvements Program; and (4) provide guidance in the State land-use decision-making process. Contributors to the plan included the West Hawaii community, Federal, State, and County agencies.

[16] See PUC Annual Report for fiscal year 2002-2003.

The following table, identified as 5-H, presents the general goals of *The Vision for West Hawaii Plan,* and two pertinent sections, *Conservation District Lands,* and *Energy and Power Facilities.*

TABLE 5-G: WEST HAWAII REGIONAL PLAN

GENERAL GOALS AND OBJECTIVES FOR THE VISIONS OF WEST HAWAII	RATING
A = ACTIVELY SUPPORTIVE C= CONFORMS I = GOAL IS INCONSISTENT WITH HELCO'S OJECTIVES NA = GOAL IS NOT APPLICABLE	
Plan and maximize benefits for Hawaii's people.	A
Optimize the use of State-owned lands.	NA
Promote a diversified economic base which maximizes job choice and opportunities.	A
Ensure access to and adequacy of health, education, job-training, and human service programs.	NA
Ensure provision and adequacy of affordable housing.	NA
Minimize adverse impact of new development on local lifestyles, historic and cultural resources and community values.	A
Provide a wide range of outdoor recreational opportunities.	NA
Protect scenic areas, natural landmarks, open space, and viewsheds.	C
Ensure that existing and proposed developments can be adequately accommodated.	A
Support urban developments that maintain the unique character of the West Hawaii region.	A
Protect State investments of the Natural Energy Laboratory of Hawaii, the Hawaii Ocean Science and Technology Park, Keahole Airport, and the Mauna Kea observatories.	A
Ensure that new development does not adversely impact:	
agricultural resource activities;	A
aquacultural resource activities;	A
the quality of the aquifer	A
the quality of nearshore waters (including anchialine ponds)	A
the quality of offshore and deep ocean waters	A
the quality of air	A
the watersheds	A
Ensure that the servicing of resort development does not result in unnecessary in-migration.	NA
Ensure the clustering of resorts in order to minimize public service costs.	NA
Promote quality and diversity in future resort developments.	A
Develop only within infrastructure capacities and constraints.	A
Maintain the diversity of the region's natural and cultural assets.	NA
Maintain the diversity and character of existing communities.	NA
Ensure that development does not lead to deterioration in the quality of life.	A
Maintain opportunities for community participation during plan implementation.	A

COMMENTARY: As the primary provider of electrical power on the Big Island, HELCO has sought to meet growing demand as development, changes in land use, and population increases have occurred or have been projected to occur. As a publicly regulated utility, HELCO must provide electrical power reliably at the lowest possible cost, while adopting a renewable energy portfolio that would help reduce Hawaii's dependence on imported fossil fuels. HELCO has gained national recognition for its use of renewable energy resources on its grid. However, because a number of renewable sources are considered non-firm power, it must continue to chart a course of parallel planning and use conventional fossil-fuel methods in order to ensure reliability on its isolated grid.

GENERAL GOALS AND OBJECTIVES FOR THE VISIONS OF WEST HAWAII	RATING
A = ACTIVELY SUPPORTIVE C= CONFORMS I = GOAL IS INCONSISTENT WITH HELCO'S OJECTIVES NA = GOAL IS NOT APPLICABLE	
Rolling blackouts have had to occur during peak times as demand outweighed supply. HELCO however has still managed to power the tremendous development that is occurring in the West Hawaii region today.	
CONSERVATION DISTRICT LANDS	
PROBLEM STATEMENT	
The laws and rules governing uses in the Conservation District from 1964 – 1978 permitted quarries, resorts, subdivisions, residential uses, commercial and industrial communications and energy facilities in this district. Rules promulgated in 1978 no longer permitted such uses. In spite of changes, Conservation District evaluation criteria still allow approval of non-conservation type of land uses in specific Conservation District subzones. There is a need to reevaluate the boundaries of the Conservation District and Conservation District subzones to ensure consistency with heritage values, and a need to reevaluate the evaluation criteria for proposed uses in specific subzones.	A
STRATEGY	
Ensure that approved land uses are consistent with the purpose and intent of the Conservation District.	A
ACTIONS	
Reevaluate the criteria for the designation of lands in the Conservation District, particularly in relation to areas where conservation uses may not be defined, but where urban use would be premature.	A
Reevaluate the boundaries of the Conservation District and its subzones during the five-year review of the Land Use District Boundaries.	A
Reevaluate the criteria used to evaluate uses in specific subzones during the five-year review of the Land Use District boundaries.	NA
Require the consistency of conservation district land use approvals with the West Hawaii Regional Plan.	A
RATIONALE	
Conservation District lands encompass some of the most important natural, scenic, and cultural resource areas. Some of these areas embody our natural and cultural heritage; they represent some of the things, which are unique to the identity of the region – to its sense of place. Many of these resources are critical to the viability of the region and to a preferred quality of life. The management of Conservation Districts represents the State's direct influence on a significant portion of the lands in the region. The uses allowed have a direct influence on the successful implementation of this plan.	
COMMENTARY: According to the West Hawaii Plan, which was written in 1989, there is a need to reevaluate the criteria for proposed uses on conservation lands in specific subzones. The Keahole Generating Station and Airport Substation are situated within the State Conservation District General Subzone. It is designated as Urban Expansion on the Land Use Pattern Allocation Guide map of the 1989 Hawaii County General Plan, as amended, and on the December 21, 2001 County of Hawaii General Plan Revision draft document. The generating station and substation were constructed in 1973 and has been operational since. The BLNR and DLNR highly encourage and approve of HELCO's petition for a boundary amendment.	
ENERGY AND POWER FACILITIES	
PROBLEM STATEMENTS	
The Office of State Planning identified in 1989 the problems and issues associated with energy and power facilities arising out of development in the region. The following issues were identified:	
The impact of the proposed developments in West Hawaii on the County's energy mix would be severe.	A
The two-year trend toward energy self-sufficiency has been reversed, in large part due to large resorts, which typically requires five to ten megawatts of electricity.	C
Additional power is needed for the demands of population growth, increased residential and commercial activities, associated developments such as marinas, and other services.	A
HELCO plans to construct additional power plants fueled by petroleum or coal to meet increasing demand, which is expected to be 200 MW by 2007.	A

GENERAL GOALS AND OBJECTIVES FOR THE VISIONS OF WEST HAWAII	RATING
A = ACTIVELY SUPPORTIVE C= CONFORMS I = GOAL IS INCONSISTENT WITH HELCO'S OJECTIVES NA = GOAL IS NOT APPLICABLE	
Two sites were identified at Kawaihae Harbor, but further studies were needed.	A
Power plants located close to the demand can provide more efficient and reliable electricity, as less energy would be lost in transmission and chances of power line failures are minimized.	A
Additional capacity could prevent interruptions in service; however, negative impacts can be expected from fossil fuel-fired plants, and the State's progress toward energy self-sufficiency will be affected, and unless emission controls were instituted, there could be a negative effect on the region's air quality.	A
New power plants will require new power lines or improvements to existing power lines which may draw public concern in terms of lower property values and health concerns; establish corridors.	A
Geothermal resources is expected to satisfy 200 MW of increased demand and the transmission of up to 500 MW of geothermal power via the proposed undersea cable to Maui and Oahu.	A
Large-scale use of geothermal energy would displace fossil fuel plants, though it would not address the utility's preference for locating power supply facilities near demand.	A
At present (1989), plans for major resorts and utility expansion do not specify further development or use of renewable energy resources, such as geothermal, wind, biomass, hydro, solar, and ocean thermal.	A
The conservation of energy is a matter of serious concern and minimizing energy requirements should be a priority.	A
The design of energy efficient buildings and devices should be encouraged to conserve energy.	A
STRATEGIES	
Minimize the impact of new power plant construction on energy self-sufficiency.	A
Develop indigenous alternative energy resources.	A
Restore the trend toward energy self-reliance in Hawaii County.	C
Minimize the negative impacts of changes in the fuel and power generation and delivery systems on existing and new communities of residents and visitors.	A
Minimize the resorts' impact on energy supply.	A
Encourage the use of climate-appropriate architecture, vegetation and landscaping.	A
Minimize transportation fuel consumption.	A
ACTION	
Devise a long-term integrated resource plan that provides for the energy needs of West Hawaii residents, workers, guests and businesses in the most economical and environmentally acceptable manner.	A
Encourage early communication between the electric utility and potentially affected communities regarding power plant siting, power line corridors, likely emission levels, and other concerns in planning for the region.	A
Establish utility rights-of-way in new or proposed urban and residential developments to facilitate the expansion of water, gas and electric services while minimizing disruptions to established communities.	A
Encourage and promote the development of the Big Island's indigenous energy resources – wind, geothermal, solar, biomass, hydroelectricity, and ocean thermal energy – as alternatives to increased importation of fossil fuels.	A
Promote the development of geothermal energy for use on the Big Island as well as for export.	A
Promote the installation of cogeneration and other energy-efficient power supply alternatives.	A
Actively support efficient transportation methods for residents, visitors, and resort workers, such as buses, safe bicycling routes, van pooling and car pooling, to minimize traffic and fuel supply problems.	A

GENERAL GOALS AND OBJECTIVES FOR THE VISIONS OF WEST HAWAII	RATING
A = ACTIVELY SUPPORTIVE C= CONFORMS I = GOAL IS INCONSISTENT WITH HELCO'S OJECTIVES NA = GOAL IS NOT APPLICABLE	
RATIONALE	
The Big Island is in the unique position of being able to secure and ensure its energy future through the use of its ample indigenous energy resources. However, this future is being threatened by haphazard response to an enormous increase in regional energy requirements, and by slow development of the available resources State and County planning efforts need to address energy systems that require the least use of fossil fuels and the most efficient use of the fuels consumed, and would be in keeping with the State's long-term objective of becoming energy self-sufficient."	
COMMENTARY: HELCO purchases and invests in renewable resources and research to comply with the State's objectives toward energy self-sufficiency. It has embarked on a course of parallel planning using conventional fossil fuel methods, until such time that a renewable energy resource (s) can replace fossil fuels reliably.	

5.10. STATE ENVIRONMENTAL IMPACT STATEMENT REQUIREMENTS SIGNIFICANCE CRITERIA

HAR, Section 11-200-12, establishes thirteen (13) significance criteria which agencies shall use in evaluating an action's impacts. Following is a discussion of how the proposed action relates to the thirteen criteria.

Pursuant to subparagraph 12, ...an action shall be determined to have a significant effect on the environment if it:

(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

Discussion: The applicant does not anticipate the loss or destruction of any significant natural or cultural resource resulting from the proposed project. According to past and current studies, no significant cultural or natural resources are known to exist on the property. The subject property is a disturbed land area that has been developed as an electrical generating station and has operated since 1973.

(2) *Curtails the range of beneficial uses of the environment;*

Discussion: The improvements would bring additional capacity to meet rising demand for electric services; increase overall system reliability and margin of reserve generating capacity, improve system voltage, and help to ensure the availability of firm generating capacity to meet demand through the year 2025. Because the subject property has operated as an electrical generating station for over 30 years, and because the proposed action does not alter the substantive character of the facility, the range of beneficial uses of the property is generally limited to its existing use. Emissions and other potential adverse impacts arising from this generating station that may affect the environment will be monitored closely, and mitigated as necessary.

(3) Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders;

Discussion: The stated purpose of Chapter 344 is to establish a state policy which will encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of

humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawaii. The proposed project complies with the policies, goals, and guidelines of Chapter 344. The Keahole Generating Station has operated as a legally permitted facility for 30 years in compliance with all federal, state and local regulations and controls. Although it functions as an "industrial" use, HELCO has strove to ensure that the facility does not operate in a manner that is detrimental to the environment. HELCO also continues to implement programs with beneficial long-term environmental impacts. The most recent example of this is its conversion of the facility to brackish water, which will facilitate the use of up to 90,000 gallons per day of potable water by the DHHL.

(4) *Substantially affects the economic or social welfare of the community or State*;

Discussion: By creating reliable energy sources that meet present and future demand for electricity, the improvements will have a substantial effect on the economic and social welfare of the community. Electricity is a vital component of our community that is often taken for granted until a power failure occurs and everyone realizes how important it is in daily living. Electricity is used for heating, cooling, cooking, refrigeration, light, sound, computation, entertainment, communication, and numerous other functions. Without adequate power, life would be difficult and highly restrictive. Economic growth and development would be unlikely and virtually impossible.

(5) *Substantially affects public health*;

Discussion: No significant effects on public health are anticipated. The proposed facility will be required to operate in conjunction with EPA requirements under permits granted by the Department of Health. The applicant intends to operate the facility in compliance with all applicable rules, regulations, and permits.

(6) *Involves substantial secondary impacts such as population changes or effects on public facilities*;

Discussion: Except for the addition of a small number of employees, the improvements would not substantially increase population in the area. The DWS water supply will actually decrease for domestic consumption by employees, various wash waters, and landscape irrigation due to the conversion of the plant to brackish water use. The demand on other public facilities will be minimal. The proposed increase in generating capacity is intended to ensure that the County is provided a firm and reliable source of power to meet its energy needs. It is not anticipated that the availability of electrical energy will, in and of itself, induce new population growth.

(7) *Involves a substantial degradation of environmental quality*;

Discussion: The reclassification of the subject property would have a minimal impact on the surrounding area. However improvements and expansion of the existing facilities have raised concerns among the immediate neighboring community over visual impacts, noise, air quality, and the potential strain on natural resources. To address these concerns, HELCO has or is in the process of instituting mitigation measures to address the impacts. The reclassification of the property to the Urban district and its proposed subsequent rezoning to "General Industrial" will bring the property designations into conformance with the existing and proposed use. The new technology proposed for implementation will help to ensure that the surrounding environment is not degraded by the quality of air emissions.

(8) *Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;*

Discussion: Detailed mitigation measures will be taken to minimize any adverse effects the improvements would have in the short-term and in the future. The improvements represent a large commitment from HELCO to provide and meet the energy demands for the Big Island. The Keahole facility is part of the County-wide electrical grid. The proposed expansion will help to ensure the provision of firm energy. The implementation of the proposed project will not result in a commitment for larger actions. As discussed in Chapter 2, the facility will fulfill the need to provide additional electrical energy in the foreseeable future. Beyond that, population growth and electrical demand are likely to be affected by decision making outside of the control of HELCO. State and County land use policies and transportation policies will largely dictate HELCO's long-term future obligations to provide additional electrical energy. If the proposed project is approved, the future of the Keahole facility will be generally limited to operational improvements to increase efficiency.

(9) *Substantially affects a rare, threatened, or endangered species, or its habitat;*

Discussion: According to past and current studies, no rare, threatened, or endangered species or habitats are affected by the current actions.

(10) *Detrimentally affects air or water quality or ambient noise levels;*

Discussion: Pollutant emissions from the existing generating station are currently closely monitored for compliance with applicable State and Federal regulations. Monitoring will continue after the improvements are implemented, and any adverse effects will be mitigated as necessary. Anticipated noise levels from the improvements are expected to fall within applicable guidelines. New studies assessing air and water quality and noise levels have been conducted. The findings are discussed in Chapters Two and Three, and complete copies of the studies are attached as appendices. Mitigation efforts will be undertaken to prevent any detrimental affects on air or water quality and ambient noise levels. This EIS confirms that no detrimental affects on air, water or noise quality are anticipated as the result of the proposed action.

(11) *Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;*

Discussion: The subject property is not located in a flood zone, tsunami zone, beach or erosion-prone area. Current volcanic and geological studies have assessed the hazards as minimal. According to current studies, the impacts on fresh and coastal waters are minimal. Therefore, the facility is not likely to suffer damage as the result of its location.

(12) *Substantially affects scenic vistas and viewplanes identified in county or state plans or studies; or,*

Discussion: The subject property is not located in scenic vistas or viewplanes identified in county or state plans or studies. It co-exists in an area of general industrial or "MG" uses. However, because the generating station is of an industrial nature and not visually appealing, HELCO plans to lessen the visual impacts by improving the perimeter landscaping along the southwest, west, and northwest sections of the property. New trees and plants will be added to create a more effective and attractive visual buffer. Earth-tone construction materials and paint will be used to minimize visibility of the project. The facility's location at the exit from the Kona International Airport at Keahole predated the expansion of the airport. HELCO recognizes its obligation to ensure that the facility does not detract from arriving visitors' first impressions of the area.

(13) *Requires substantial energy consumption.*

Discussion: The Keahole Generating Station presently uses 0.8 MW of electrical energy to power the facility. Upon completion of the ST-7 unit, the total electrical energy consumption of the plant will increase to 2.1 MW. The facility's demand for energy is more than compensated by the additional electrical energy that it will provide to the entire County.

FEDERAL LAWS AND CONTROLS

5.11. COASTAL ZONE MANAGEMENT ACT (HRS CHAPTER 205A)

Federal Coastal Zone Management (CZM) enforcement authority (Public Law 92-583), as amended, has been delegated to the State and enacted as HRS Chapter 205A. The Hawaii CZM Program was promulgated in 1977 in response to the Federal CZM Act of 1972. Other than the review of federal applicants, federal permits, or federal activities, the State CZM review authority has been delegated to the county level through the Special Management Area (SMA) controls for development along the shoreline.

The CZM area encompasses the entire State including all marine waters seaward to the extent of the State's police power and management authority, including the 12-mile U.S. territorial sea and all archipelagic waters. The CZM Act is comprised of a number of objectives primarily related to (1) protecting and preserving the coastal zone; (2) improving the quality of coastal scenic and open space resources and ensuring that coastal dependent development such as harbors and ports, and coastal-related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and (3) encouraging research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Following is a summary of the project's conformance with the ten objectives of the coastal zone management program.

1A Provide coastal recreation opportunities accessible to the public.

Not applicable, as the project is approximately 3.5 miles from the coastline.

Deleted: The subject property is not located within the SMA and is approximately 3.5 miles from the shoreline. Landscaping measures will be used to minimize any adverse social, visual, and environmental impacts for the expansion and improvements to the generating station. (See Chapter Three.)

2A Protect, preserve, and where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

The proposed project will have no significant negative impact upon historic, prehistoric or cultural resources identified within the coastal zone management area. The only element of the project that has been identified during the consultation process as having a potential impact is the injection of effluent at the project site into the groundwater, and its subsequent impact upon nearshore water quality at the shoreline. It has been suggested that this might constitute a negative impact upon traditional and customary Native Hawaiian cultural practices related to fishing and gathering along the shoreline. We disagree with this assertion.

As discussed in Section 3.6.2.2 and 3.6.2.3, the volume of water being extracted from the groundwater and later injected as effluent constitutes a fraction of the volume of saltwater that is disposed of at the subsurface level by operations associated with Cyanotech and the NELH, which are situated between the HELCO facility and the shoreline. Specifically, HELCO will extract about 0.21 to 0.23 mgd of groundwater, or 210,000 to 230,000 gallons of groundwater per day. It will inject approximately 130,000 gallons per day back into the aquifer at depths of 250 to 300 feet below sea level. The composition of the injected effluent will comply with criteria established by the State Department of Health's Underground Injection Control (UIC) Permit No. UH-1776. It should be noted that together Cyanotech and NELH dispose of a combined total of 9,000,000 to 11,000,000 gallons per day of saltwater. The total daily volume of HELCO's injected effluent constitutes between 1.2 to 1.4 percent of the volume of seawater being disposed of downstream of HELCO's facility. This is considered to represent a negligible impact upon the groundwater. In addition, the effluent injected by HELCO must travel approximately 3.5 miles before reaching the ocean. During this time and over this distance, it will mix with the existing groundwater flow, and become part of the 1,200,000 to 2,000,000 gallons of groundwater that enter the nearshore waters per coastal mile per day and then mixes with oceanwater. Given the overall dynamic of saltwater disposal in the region, and the fact that NELH has been disposing of copious amounts of seawater for, at the very least, the past 15 years, traditional and customary Native Hawaiian practices that may have occurred along the Keahole shoreline over that same period of time have been entirely subject to nearshore water quality resulting from the NELH operations. Given the negligible surcharge resulting from the HELCO project, no significant adverse impacts to groundwater quality, nearshore water quality or cultural resources or activities are anticipated. The project is consistent with this objective.

3A Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.

As the proposed project is located about 3.5 miles from the shoreline, it is not applicable to this objective.

4A Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

As discussed under Objective 2A above, the proposed project will not have a significant adverse impact on the coastal ecosystem. In fact, according to the project's marine biologist, there is little

potential for impact to marine communities in the nearshore area downslope of the project site. The project is consistent with this objective.

5A *Provide public or private facilities and improvements important to the State's economy in suitable locations.*

The subject property has been utilized as an electrical generation station and transmission station for over 30 years. It is located outside of the Special Management Area, directly inland from West Hawaii's largest industrial site, the Keahole International Airport, and adjacent to the region's principal highway. The site is considered to be an ideal location for its use. The service the facility provides benefits the entire population and economy of Hawaii County. The project is consistent with this objective.

6A *Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.*

The Keahole Generating Station and Airport Substation are situated about 3.5 miles from the coastline, well outside of the identified tsunami inundation zone and the effects of storm waves. There are no streams in the vicinity of the project. Given the disturbed nature of the facility, there is little if any possibility for erosion to result from storm water runoff. The age of the underlying lava flow would suggest that the property is not subject to subsidence. Finally, and most importantly, the facility cannot operate without the approval of the State Department of Health and the Federal Environmental Protection Agency. Some of the improvements proposed to be implemented at the facility are intended to specifically improve the air quality of emissions. Thus, the project is consistent with this objective.

7 *Improve the development review process, communication, and public participation in the management of coastal resources and hazards.*

While the coastal element of this objective is not relevant to the project, the public participation aspect is. This Environmental Impact Statement was specifically prepared to be as "user friendly" as possible to ensure that the project is understood by the general population.

8 *Stimulate public awareness, education, and participation in coastal management.*

As this project is not situated near the coastline, this objective is not applicable.

9 *Protect beaches for public use and recreation.*

As this project is not situated near the coastline, this objective is not applicable.

10 *Promote the protection, use, and development of marine and coastal resources to assure their sustainability.*

As discussed above, the proposed project will have no significant negative impact upon the coastal resources of Keahole. Therefore, it is consistent with the intent of this objective.

5.12. FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) NATIONAL FLOOD INSURANCE PROGRAM

The Federal Emergency Management Agency (FEMA) assists states through disasters both natural and manmade, and has over the years undergone numerous changes. FEMA is a former independent agency that in March 2003 became a part of the new Department of Homeland Security (DHS). FEMA responds to, plans for, recovers from and mitigates against disasters.

The Congressional Act of 1803 is generally considered the first piece of disaster legislation, followed in the next century by ad hoc legislation passed more than 100 times in response to hurricanes, earthquakes, floods and other natural disasters. FEMA in 2001 had to focus on issues of national preparedness and homeland security following the terrorist attacks of September 11th. Billions of dollars of new funding were directed to FEMA to help communities face the threat of terrorism. FEMA began actively directing its "all-hazards" approach to disasters toward homeland security issues. FEMA in March 2003 joined 22 other federal agencies, programs, and offices in becoming the DHS. The new department, headed by Secretary Tom Ridge, brought a coordinated approach to national security for emergencies and disasters both natural and man-made. Today, FEMA is one of four major branches of DHS with 2,500 full-time employees in the Emergency Preparedness and Response Directorate, supplemented by more than 5,000 stand-by disaster reservists.

The National Flood Insurance Program (NFIP) is just one of FEMA's mitigative measures to assist communities in time of flood disaster. The U.S. Congress in 1968 established the program to enable property owners in participating communities to purchase insurance as a protection against flood losses. States and communities must first establish floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the federal government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the federal government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an insurance alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. The NFIP identifies and maps the Nation's floodplains.

FEMA prepared in 1988 Flood Insurance Rate Maps (FIRMS) for the County of Hawaii to delineate flood hazard zones and base flood elevations lines. The subject property is located 1.6 miles inland from the shoreline and outside of the 500-year floodplain. (FIRM Map No. 0681 C, Zone X, September 16, 1988.) Flood requirements and restrictions of the program do not apply.

5.13. FEDERAL AVIATION ADMINISTRATION

The Keahole Generating Station and Airport Substation are located approximately one mile east of Keahole International Airport. All new development in the vicinity of the airport is required to submit a "Notice of Construction or Alteration" FAA Form 7460-1 to the FAA to assist the agency in determining whether there may be any impacts to the airport or air traffic in the area. As the proposed action is the reclassification of the property from the Conservation District to the Urban District, the reclassification, in and of itself, is not anticipated to impact the airport or air traffic. Before new facilities associated with the proposed action are constructed, the aforementioned form will be submitted to the FAA for review. Based on the fact that the existing stack has already been approved by the FAA and no construction exceeding the height of the stack is proposed, no significant negative impacts upon the airport or air traffic are anticipated.

COUNTY OF HAWAII PLANS AND CONTROLS

5.14. COUNTY OF HAWAII GENERAL PLAN

The County of Hawaii adopted in 1971 its first comprehensive General Plan for the island of Hawaii. This General Plan reflected a departure from previous regional plans that had little island-wide integrative efforts and were primarily land use or physically oriented. The General Plan set forth a policy of comprehensive development for the entire island, and incorporated an awareness of the relationship between social, physical, and economic environments. The plan called for five- and ten-year comprehensive reviews and updates to maintain the dynamism and flexibility of the plan, and also, to accommodate major changes and trends that may occur. The County initiated a review of the Land Use Pattern Allocation Guide Map (LUPAG) in 1978 that led to several changes to the map, which included the addition of an energy element and procedures for specific amendments to the General Plan.

The first comprehensive 10-year review of the General Plan occurred in the mid-1980s, and adopted in November 1989 by the County Council. This comprehensive revision program resulted in various revisions to supporting data, individual study elements, and LUPAG and Facilities maps. The LUPAG map serves as a guide for the direction of future developments, and indicates the general location of various land uses in relation to each other. A second 10-year review of the General Plan began in 1999 and is currently with the Hawaii County Council for adoption. The plan consists of 12 major elements that are further broken down into sub-elements.

The following table, identified as 5-H, presents the goals and policies of the proposed 2001 Hawaii County General Plan and discusses by element the relationship and applicability, if any, to HELCO's petition for a boundary amendment.

TABLE 5-H: COUNTY OF HAWAII GENERAL PLAN

ELEMENTS OF THE HAWAII COUNTY GENERAL PLAN	RATING
A = ACTIVELY SUPPORTIVE, C= CONFORMS, I = GOAL IS INCONSISTENT WITH HELCO'S OJECTIVES, NA = GOAL IS NOT APPLICABLE	
GENERAL PLAN – ECONOMIC	
GOALS	
Provide residents with opportunities to improve their quality of life through economic development that enhances the County's natural and social environments.	A
Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawaii.	A
Strive for diversity and stability in the economic system.	A
Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural and social environment.	A
Strive for an economic climate that provides its residents an opportunity for choice of occupation.	A
Strive for diversification of the economy by strengthening existing industries and attracting new endeavors.	A
Strive for full employment.	A
Promote and develop the island of Hawaii into a unique scientific and cultural model, where economic gains are in balance with social and physical amenities. Development should be reviewed on the basis of total impact on the residents of the County, not only in terms of immediate short run economic benefits.	A
POLICIES	
Assist in the expansion of the agricultural industry through the protection of important agricultural lands, development of marketing plans and programs, capital improvements, and continued cooperation with appropriate State and Federal agencies.	A

ELEMENTS OF THE HAWAII COUNTY GENERAL PLAN	RATING
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The County of Hawaii shall strive for an economic climate which provides its residents an opportunity for choice of occupation.	A
Encourage the expansion of the research and development industry by working with and supporting the University of Hawaii at Hilo and West Hawaii, the Natural Energy Laboratory at Hawaii Authority, and other agencies' programs that support sustainable economic development in the County of Hawaii.	A
Encourage the development of a visitor industry that is in harmony with the social, physical, and economic goals of the residents of the County.	A
Require a study of the significant cultural, social and physical impacts of large developments prior to approval.	C
Encourage the sustainable development of the fishing industry, various forms of aquaculture, and other fresh and sea water-based activities.	C
Support all levels of educational, employment and training opportunities and institutions.	C
Capital improvements program shall improve the quality of existing commercial and industrial areas.	C
The land, water, air, sea, and people shall be considered as essential resources for present and future generations and should be protected and enhanced through the use of economic incentives.	A
Continue to encourage the research, development and implementation of advanced technologies and processes.	A
Support the development of high technology industries.	A
Continue to encourage development and utilization of by-products from alternate energy conversion projects.	A
Identify and encourage primary industries that are consistent with the social, physical, and economic goals of the residents of the County.	A
Encourage active liaison with the private sector with respect to the County's requirements for establishing businesses on the island.	A
Encourage the development of the retirement industry.	NA
Promote a distinctive identity for the island of Hawaii to enable government, business and travel industries to promote the County of Hawaii as an entity unique within the State of Hawaii.	NA
Identify the needs of the business community and take actions that are necessary to improve the business climate.	A
Support research and development that would lead to the removal of marketing restrictions on Hawaiian fruits and other perishables.	NA
Assist in the development of a film and video industry program to market Big Island sites and coordinate film and video activities on the Big Island.	NA
Assist the further development of agriculture through the protection of important agricultural lands.	NA
Assist in the promotion of the agriculture industry whose products are recognized as being produced on the island of Hawaii.	A
Encourage the establishment of open farmers markets to allow local agricultural producers to market their products.	NA
Assist in cooperative marketing and distribution programs and endeavors to expand opportunities for local agricultural products for export as well as to the local market.	A
Encourage the further development of the overseas capacity of Hilo International Airport for the exportation of agricultural crops.	NA
Encourage the health/wellness industry.	NA

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Encourage new industries that provide favorable benefit-cost relationships to the people of the County. Benefit-cost relationships include more than fiscal considerations.	A

COMMENTARY: Electrical power provides a basic and essential service that is often taken for granted until a power failure occurs and everyone realizes how important it is in daily living. Electricity is used for heating, cooling, cooking, refrigeration, light, sound, computation, entertainment, communication, and numerous other functions. Without adequate power, life would be difficult and highly restrictive. Economic growth and development would be unlikely and virtually impossible.

For over a century, HELCO has provided electrical power for the Big Island and responded to prospective patterns of development. HELCO today has committed close to $100 million for improvements to the subject property, including environmental protection measures to meet current demand and future projections for electrical power. It has invested heavily in research and development of renewable energy sources and continues to utilize renewable sources on its island-wide grid.

The Big Island is presently undergoing a surge of economic activity across various industries, particularly in West Hawaii. Economic activity has helped reduce the once high unemployment rate on the Big Island, which stood at a record high several years ago. Furthermore, statistics (2000 Census) show that approximately 22,821 residents on the Big Island were living in poverty, 35.9 percent of which were children. With increased economic activity, the numbers living in poverty, particularly in West Hawaii, are on the decline. (See, Socio-Economic Impact Assessment, attached as Appendix M, which is also summarized in Chapter Four.) Basic electrical infrastructure lays the foundation for a strong economy and allows a community to properly function in a modern society, where technological advancements and worldwide interaction have created a global economy.

GENERAL PLAN – ENERGY	
GOALS	
Strive towards energy self-sufficiency.	A
Establish the Big Island as a demonstration community for the development and use of natural energy resources.	A
POLICIES	
Encourage the development of alternate energy resources.	A
Encourage the development and use of agricultural products and by-products as sources of alternate fuel.	A
Encourage the expansion of energy research industry.	A
Strive to educate the public on new energy technologies and foster attitudes and activities conducive to energy conservation.	A
Ensure a proper balance between the development of alternative energy resources and the preservation of environmental fitness and ecologically significant areas.	A
Strive to assure a sufficient supply of energy to support present and future demands.	A
Provide incentives that will encourage the use of new energy sources and promote energy conservation.	A
Seek funding from both government and private sources for research and development of alternative energy resources.	A
Coordinate energy research and development efforts of both the government and private sectors.	A
Encourage the continuation of studies concerning the development of power that can be distributed at lower costs to consumers.	A
Strive to diversify the energy supply and minimize the environmental impacts associated with energy usage.	A
Continue to encourage the development of geothermal resources to meet the energy needs of the County of Hawaii.	A
Encourage the use of solar water heating through the continuation of state tax credit programs, through the Building Code, and in County construction.	A
Encourage energy-saving design in the construction of buildings.	A
Support net-metering and other incentives for independent power producers.	A
STANDARDS	
New power plants shall incorporate devices that minimize pollution.	A

ELEMENTS OF THE HAWAII COUNTY GENERAL PLAN	RATING
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Applicable standards and regulations of Title 11,Chapter 46, "Community Noise Control" of the Hawaii Administrative Rules.	A
Applicable standards and regulations of Title 11, Chapter 59, "Ambient Air Quality Standards" of the Hawaii Administrative Rules.	A
Applicable standards and regulations of Title 11,Chapter 60.1, "Air Pollution" of the Hawaii Administrative Rules.	A

Commentary: HELCO has complied with, supported, and urged the advancement of all of the above-stated goals and policies set forth in the County General Plan for Energy. It has worked with government on initiatives to help achieve optimal results for the community in terms of energy policy. The company currently uses a number of renewable energy sources on its grid and supports the continued research and development of alternative energy sources, DSM programs, education, consulting, conservation through incentives and rebates, investments in renewable resources.

HELCO has operated the generating station in accordance with HAR Title 11, Chapter 46, for *Community Noise Control;* Title 11, Chapter 59 for *Ambient Air Quality Standards;* and Title 11, Chapter 60.1 for *Air Pollution.* The improvements to the subject property will include added noise control and air quality measures beyond what is currently required.

GENERAL PLAN - ENVIRONMENTAL QUALITY	
GOALS	
Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.	A
Maintain and, if feasible, improve the existing environmental quality of the island.	A
Control pollution.	A
POLICIES	
Take positive action to further maintain the quality of the environment.	A
Reinforce and strengthen established standards where it is necessary, principally by initiating, recommending, and adopting ordinances pertaining to the control of pollutants that affect the environment.	A
Advise the public of environmental conditions and research undertaken on the island's environment.	A
Encourage the concept of recycling agricultural, industrial, and municipal waste material.	A
Encourage the State to establish air and water quality monitoring stations in areas of existing and potential urban growth.	A
Encourage the State to continue aircraft noise abatement strategies at Hilo International Airport and the Kona International Airport at Keahole.	NA
Participate in watershed management projects to improve stream and coastal water quality and encourage local communities to develop such projects.	A
Work with the appropriate agencies to adopt appropriate measures and provide incentives to control point and nonpoint sources of pollution.	A
Support programs to prevent harmful alien species from becoming established.	NA
Require golf courses to implement best management practices to limit leaching of nutrients to groundwater in areas where they may affect streams or coastal ecosystems.	NA
Require implementation of the management measures contained in Hawaii's Coastal Nonpoint Pollution Control Program as a condition of land use permitting.	NA
Review the County grading and grubbing ordinances to ensure that they adequately address potential erosion and runoff problems.	A
STANDARDS	
Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well being, through the enforcement of appropriate Federal, State and County standards.	A
Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.	A
Federal and State environmental regulations shall be adhered to.	A

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COMMENTARY: HELCO complies with all Federal, State, and County regulatory permits with regard to environmental controls and building standards. The addition of noise equipment and ST-7 with SCR, will contribute less noise to the acoustical environment, and make the plant more fuel-efficient while further reducing emissions. The use of brackish water at the plant, its treatment and subsequent injection has been demonstrated to result in no significant impact upon groundwater or nearshore water quality.	
GENERAL PLAN - FLOODING AND OTHER NATURAL HAZARDS	
GOALS	
Protect human life.	A
Prevent damage to man-made improvements.	A
Control pollution.	A
Prevent damage from inundation.	A
Reduce surface water and sediment runoff.	A
Maximize soil and water conservation.	A
POLICIES	
Enact restrictive land use and building structure regulations in areas vulnerable to severe damage due to the impact of wave action. Only uses that cannot be located elsewhere due to public necessity and character, such as maritime activities and the necessary public facilities and utilities, shall be allowed in these areas.	NA
Review land use policy as it relates to flood plain, high surf, and tsunami hazard areas.	NA
Update and improve the Flood Insurance Rate Maps and other flood maps in compliance with the National Flood Insurance Program (NFIP) as needed.	NA
Any development within the Federal Emergency Management Agency designated flood plain must be in compliance with Chapter 27.	NA
Promote and provide incentives for participation in the Soil and Water Conservation Districts' conservation programs for developments on agricultural and conservation lands.	NA
The "Drainage Master Plan for the County of Hawaii" shall be reviewed and updated to incorporate new studies and reflect newly identified priorities.	NA
Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works. and in compliance with all State and Federal laws.	A
Develop a comprehensive program for the coordinated construction of a drainage network along a single drainage system.	NA
Explore new methods of funding for the provision of adequate drainage systems and regulating potential flood inundation areas.	NA
The County and the private sector shall be responsible for maintaining and improving existing drainage systems and constructing new drainage facilities.	A
Develop an integrated shoreline erosion management plan that ensures the preservation of sandy beaches and public access to and along the shoreline, and the protection of private and public property from flood hazards and wave damage.	NA
Continue to promote public education programs on tsunami, hurricane, storm surge, and flood hazards.	NA
Encourage grassed shoulder and swale roadway design where climate and grade are conducive.	NA
Develop drainage master plans from a watershed perspective that considers non-structural alternatives, minimizes channelization, protects wetlands that serve drainage functions, coordinates the regulation of construction and agricultural operation, and encourages the establishment of floodplains as public green ways.	NA
Encourage and provide incentives for agricultural operators to participate in Soil and Water Conservation District Programs.	NA
Where applicable, natural drainage channels shall be improved to increase their capacity with special consideration for the practices of proper soil conservation, and grassland and forestry management.	A
Consider natural hazards in all land use planning and permitting.	A
Discourage intensive development in areas of high volcanic hazard.	NA

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COMMENTARY: Because HELCO provides a vital and essential service for the community and functions as a public service, HELCO goes through a rigorous and thorough process in the selection of a site for a new generating facility. For example, a study was conducted in 1988 for a potential new West Hawaii site. Certain lands were eliminated altogether: (1) flood plains, areas mapped by FEMA as locations within a 100- or 500-year flood plain; (2) military lands owned or managed by federal or state government for military purpose; (3) all lands designated as Federal, State, or County parks; (4) significant historic or cultural areas recognized by a governmental body as significant to the cultural history of the area; (5) planned resort developments for resort or commercial development; (6) all lands that have existing developments or are currently zoned for residential or commercial lands; (7) State-designated air quality non-attainment areas; (8) any areas mapped as unique or special habitat areas by local, state, or federal agencies (including threatened or endangered species).

Areas that are carefully screened and scrutinized but not eliminated include (1) hazard areas mapped by Federal, State, or County agencies as hazard areas (e.g. seismic, volcanic); (2) special management areas: all lands currently within the SMS were given close scrutiny because of the importance to some types of power generation; (2) all lands designated as Conservation on State or County maps were given close scrutiny (3) all areas mapped inside the underground injection control areas were given close scrutiny. Preference was given to (1) all areas that are within 15 miles of existing or planned major arterial or larger roadway; and (2) all lands within 10 miles of an existing power transmission line.

At the Keahole site, HELCO developed its own brackish well for industrial use as well as two injection wells for wastewater. Because HELCO provides a basic and essential service, it works extensively with government agencies in the planning and permitting process.

GENERAL PLAN - HISTORIC SITES	
GOALS	
Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawaii.	A
Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.	NA
Enhance the understanding of man's place on the landscape by understanding the system of ahupuaa.	NA
POLICIES	
Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.	C
Amend appropriate ordinances to incorporate the stewardship and protection of historic sites, buildings and objects.	NA
Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.	NA
Public access to significant historic sites and objects shall be acquired, where appropriate.	NA
Embark on a program of restoring significant historic sites on County lands. Assure the protection and restoration of sites on other public lands through a joint effort with the State.	NA
Encourage the restoration of significant sites on private lands.	NA
Collect and distribute historic sites information of public interest and keep an inventory of sites.	NA
Aid in the development of a program of public education concerning historic sites.	NA
Signs explaining historic sites, buildings and objects shall be in keeping with the character of the area or the cultural aspects of the feature.	NA
Develop a continuing program to evaluate the significance of historic sites.	NA
Develop policies to protect Hawaiian rights as identified under judicial decisions.	NA
Support the establishment of Hawaiian Heritage Corridors.	NA
All new historic sites placed on the State or Federal Register after the adoption of the general plan shall be included in the General Plan.	NA
Consider requiring Cultural Assessments for certain developments as part of the rezoning process.	NA

ELEMENTS OF THE HAWAII COUNTY GENERAL PLAN	RATING
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Recognize the importance of certain natural features in Hawaiian culture by incorporating the concept of "cultural landscapes" in land use planning.	NA
COMMENTARY: In June 1992, HELCO hired sub-consultant PHRI to conduct a historical and cultural assessment of the generating station site for the 1993 EIS. PHRI determined then that the expansion of the generating station would have no effect on historic properties. More recently, in September 2003, PHRI surveyed the Airport Substation and easements along the property, and confirmed that all three additions were fully developed elements of the project site. Dr. Rosendahl found that they was "no evidence of any potentially significant traditional cultural properties, natural resources, practices, or beliefs identified within the 1992 inventory survey project area or the three small project elements."	
GENERAL PLAN - NATURAL BEAUTY	
GOALS	
Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.	C
Protect scenic vistas and view planes from becoming obstructed.	C
Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.	C
POLICIES	
Increase public pedestrian access opportunities to scenic places and vistas.	NA
Develop and establish view plane regulations to preserve and enhance views of scenic or prominent landscapes from specific locations, and coastal aesthetic values.	NA
Maintain a continuing program to identify, acquire and develop viewing sites on the island.	NA
Access easement to public or private lands that have natural or scenic value shall be provided or acquired for the public.	NA
Develop standard criteria for natural and scenic beauty as part of design plans.	C
Consider structural setback from major thoroughfares and highways and establish development and design guidelines to protect important viewplanes.	A
Maintain a continuing program to identify exceptional trees or tree masses.	NA
Protect the views of areas endowed with natural beauty by carefully considering the effects of proposed construction during all land use reviews.	A
Do not allow incompatible construction in areas of natural beauty.	NA
COMMENTARY: As discussed in previous chapters and subsections, HELCO plans to mitigate the adverse visual impacts of the generating station with landscape improvements along the perimeter of the subject property. New trees and plants will be added to create a more effective and attractive visual buffer. HELCO will also convert its existing fence into a permanent perimeter fence and modify two existing gates by recessing the gates into the facility. The new gates would be automated, electronic card-reading gates.	
GENERAL PLAN – NATURAL RESOURCES AND SHORELINE	
GOALS	
Protect and conserve the natural resources from undue exploitation, encroachment and damage.	C
Provide opportunities for recreational, economic, and educational needs without despoiling or endangering natural resources.	A
Protect and promote the prudent use of Hawaii's unique, fragile, and significant environmental and natural resources.	A
Protect rare or endangered species and habitats native to Hawaii.	C
Protect and effectively manage Hawaii's open space, watersheds, shoreline, and natural areas.	C
Ensure that alterations to existing land forms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.	A
POLICIES	

ELEMENTS OF THE HAWAII COUNTY GENERAL PLAN	RATING
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Require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.	NA
Encourage a program of collection and dissemination of basic data concerning natural resources.	NA
Maintain the shoreline for recreational, cultural, educational, and/or scientific uses in a manner that is protective of resources and is of the maximum benefit to the general public.	NA
Protect the shoreline from the encroachment of man-made improvements and structures.	NA
Coordinate programs to protect natural resources with other government agencies.	NA
Investigate methods of beach replenishment and sand erosion control.	NA
Promote sound management and development of Hawaii's land and marine resources for potential economic benefit.	NA
Encourage public and private agencies to manage the natural resources in a manner that avoids or minimizes adverse effects on the environment and depletion of energy and natural resources to the fullest extent.	A
Encourage an overall conservation ethic in the use of Hawaii's resources by protecting, preserving, and conserving the critical and significant natural resources of the County of Hawaii.	A
Encourage the protection of watersheds, forest, brush, and grassland from destructive agents and uses.	NA
An identification and inventory of forest lands suitable for watershed purposes should be conducted jointly by County, appropriate State and Federal agencies, and private landowners.	NA
Work with the appropriate State, Federal agencies, and private landowners to establish a program to manage and protect identified watersheds.	NA
Encourage appropriate State agencies to review and designate forest and watershed areas into the conservation district during State land use boundary comprehensive reviews.	NA
The installation of utility facilities, highways and related public improvements in natural and wildland areas should avoid the contamination or despoilment of natural resources where feasible by design review, conservation principles, and by mutual agreement between the County and affected agencies.	A
Encourage the continued identification and inclusion of unique wildlife habitat areas of native Hawaiian flora and fauna within the Natural Area Reserve System.	NA
Encourage the use of native plants for screening and landscaping.	A
Develop policies by which native Hawaiian gathering rights will be protected as identified under judicial decisions.	NA
Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.	NA
Establish a system of pedestrian access trails to places of scenic, historic, cultural, natural, or recreational values.	NA
Preserve and protect significant lava tube caves.	NA
Ensure that activities authorized or funded by the County do not damage important natural resources.	NA
Within the Kona high rainfall/fog-drip belt, ground disturbing activities such as excessive soil compaction and excessive removal of vegetative cover should be minimized and mitigated consistent with management strategies that encourage the retention of existing forested and pasture areas, reforestation, minimal coverage by impervious surfaces and other strategies that encourage effective infiltration to groundwater.	A
Implement Council Resolution Nos. 330-96 and 58-97 in land use approvals.[17]	A
Create incentives for landowners to retain and re-establish forest cover in upland watershed areas with emphasis on native forest species.	NA

[17] Resolution No. 330-96 (1996): No lands in North or South Kona above 2,500 feet in elevation (except in the existing Kaloko Mauka Subdivision) should be rezoned to lot sizes less than 20 acres, without a corresponding reduction in density on contiguous lands. In Kaloko Mauka, the Council found that the concerns could be mitigated by specific rezoning conditions which would require that at least 80 per cent of the property be kept in forest cover, in the area above 3,000 feet in elevation (Resolution No. 58-97).

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COMMENTARY: HELCO's general approach and policies in constructing and/or improving its facilities to serve the Big Island have been conducted in accordance with all laws, rules, and regulations that protect Hawaii's natural resources. HELCO continuously promotes conservation measures and utilizes renewable energy sources to power its grid whenever feasible. It assists residential and commercial consumers in ways to reduce energy costs by offering consulting services, incentives, and rebates. As demonstrated in this EIS, the project is anticipated to have no significant impact upon coastal or nearshore resources.	
GENERAL PLAN – HOUSING	
GOALS	
Attain safe, sanitary, and livable housing for the residents of the County of Hawaii.	NA
Attain a diversity of socio-economic housing mix throughout the different parts of the County.	NA
Maintain a housing supply that allows a variety of choices.	NA
Create viable communities with affordable housing and suitable living environments.	NA
Improve and maintain the quality and affordability of the existing housing inventory.	NA
Seek sufficient production of new affordable rental and fee-simple housing in the County in a variety of sizes to satisfactorily accommodate the needs and desires of families and individuals.	NA
Ensure that housing is available to all persons regardless of age, sex, marital status, ethnic background, and income.	NA
Make affordable housing available in reasonable proximity to employment centers.	NA
Encourage and expand home ownership opportunities for residents.	NA
POLICIES	
Encourage a volume of construction and rehabilitation of housing sufficient to meet growth needs and correct existing deficiencies.	NA
Encourage the construction of specially designed facilities or communities for elderly persons needing institutional care and small home care units for active elderly persons.	NA
Encourage corporations and nonprofit organizations to participate in Federal, State and private programs to provide new and rehabilitated housing for low and moderate income families.	NA
Support the construction of housing for minimum wage and agricultural workers.	NA
Continue to review codes and ordinances for overly stringent restrictions that may impose unnecessary hardship and adopt amendments if warranted.	NA
Continue to study and implement appropriate measures to curb property speculative practices that result in increased housing costs.	NA
Large industries or developments that create a demand for housing shall provide employee housing based upon a ratio to be determined by an analysis of the locality's needs.	NA
Formulate a program for housing that identifies specific mechanisms to implement the housing goals.	NA
Utilize housing powers and programs to accomplish housing goals and seek out new programs and resources to address the housing needs of the residents.	NA
Initiate and participate in activities with the private sector including the provision of leadership and expertise to neighborhoods and nonprofit organizations in the development of housing and community development projects.	NA
Increase rental opportunities and choices in terms of quality, cost, amenity, style and size of housing, especially for low and moderate income households.	NA
Support programs that improve, maintain, and rehabilitate the existing housing inventory to maintain the viability of existing communities.	NA
Accommodate the housing requirements of special need groups including the elderly, handicapped, homeless and those residents in rural areas.	NA
Investigate, develop, and promote the creation of new innovative and timely financing techniques and programs to reduce the cost of housing.	NA
Encourage the use of suitable public lands for housing purposes in fee or lease.	NA

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Encourage the construction of homes for lease or lease with option to purchase.	NA
Promote research and development of methods, programs, and activities including the review of regulatory requirements and procedures as they affect housing, to reduce the costs consistent with the public health, safety and welfare.	NA
Adopt appropriate ordinances and rules as necessary to implement its housing programs and activities.	NA
Utilize financing techniques that reduce the cost of housing, including the issuance of tax-exempt bonds and the implementation of interim financing programs.	NA
Ensure that adequate infrastructure is available in appropriate locations to support the timely development of affordable housing.	A
Investigate the use of the County's taxing power as a possible means to increase the supply of affordable housing.	NA
Work with, encourage and support private sector efforts in the provision of affordable housing.	NA
Encourage the development of affordable retirement communities.	NA
Vacant lands in urban areas and urban expansion areas should be made available for residential uses before additional agricultural lands are converted into residential uses.	NA
Aid and encourage the development of a wide variety of housing to achieve a diversity of socio-economic housing mix.	NA
COMMENTARY: Affordable housing has been a major issue in the islands. As stated in previous sections, one of the reasons cited, in addition to the limited land area zoned for residential development, is the lack of adequate infrastructure (i.e., roads, wastewater, utilities, etc.). HELCO is seeking to improve its facilities with increased generating capacity in order to meet current and projected demand. Basic infrastructure such as electrical power is vital to the development of additional residential units. Many new residential and commercial projects are currently underway or being planned for future development in West Hawaii. To help residential consumers save on energy costs, HELCO offers rebates and incentives in energy savings.	
GENERAL PLAN –PUBLIC FACILITIES	
GOALS	
Encourage the provision of public facilities that effectively service community and visitor needs and seek ways of improving public service through better and more functional facilities in keeping with the environmental and aesthetic concerns of the community.	A
POLICIES	
Continue to seek ways of improving public service through the coordination of service and maximizing the use of personnel and facilities.	A
Coordinate with appropriate State agencies for the provision of public facilities to serve the needs of the community.	A
Develop short and long-range capital improvement programs and operating budgets for public facilities and services.	A
Develop and adopt an Impact Fees Ordinance.	NA
Capital Improvement and Operating budgets shall reflect the goals and policies of the County General Plan.	A
Require a six-year, long-term, capital improvements budget by County Departments and agencies that shall be reviewed for consistency with the General Plan.	A
COMMENTARY: HELCO seeks to improve its service to the community by increasing generating capacity to meet demand, while incorporating environmental and visual mitigation measures. The improvements are in coordination with State and County plans for the region. By expanding and improving an existing facility, HELCO maximizes the use of that facility and accompanying personnel.	
GENERAL PLAN - PUBLIC UTILITIES	
GOALS	
Ensure that properly regulated, adequate, efficient and dependable public and private utility services are available to users.	A
Maximize efficiency and economy in the provision of public utility services.	A
Design public utility facilities to fit into their surroundings or concealed from public view.	A

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POLICIES	
Public utility facilities shall be designed to complement adjacent land uses and shall be operated to minimize pollution or disturbance.	A
The County shall encourage the use of properties or easements owned by public or private utility companies or agencies as supplemental open space and recreational areas whenever practical.	A
Provide utilities and service facilities that minimize total cost to the public and effectively service the needs of the community.	A
Utility facilities shall be designed to minimize conflict with the natural environment and natural resources.	A
Improvement of existing utility services shall be encouraged to meet the needs of users.	A
Encourage the clustering of developments in order to reduce the cost of providing utilities.	NA
Develop short and long range capital improvement programs and plans for public utilities within its jurisdiction that are consistent with the General Plan.	A

COMMENTARY: Throughout the years, HELCO and its parent company, have been fiscally responsible, and have provided properly regulated, and dependable services for the islands. By improving the existing facilities, HELCO maximizes efficiency and minimizes the total cost to the public, while servicing the needs of the community. HELCO has a long history of working with the County in ensuring that adequate electrical power is available for the Big Island community.

GENERAL PLAN – ELECTRICITY	
POLICIES	
Power distribution shall be placed underground when and where practical. Encourage developers of new urban areas to place utilities underground.	A
Route selection for high voltage transmission lines should include consideration for setbacks from major thoroughfares and residential areas. Where feasible, delineate energy corridors for such high voltage transmission lines.	A
Continue to advise the electrical utility companies on the future revisions of their comprehensive Integrated Resource Plans.	A
Conform to safety standards as established by appropriate regulatory authorities.	A
STANDARDS	
There shall be minimal obstruction of scenic views and vistas by electrical facilities.	A
Facilities such as substations shall mitigate and minimize any aesthetic impacts to surrounding properties and scenic vistas.	A

COMMENTARY: Whenever feasible and practical, HELCO places power distribution equipment underground and considers setbacks from major thoroughfares and residential areas for high-voltage transmission lines.

HELCO has worked with State and County projections in the preparation of its IRP and Evaluation report. Conformance to safety standards established by regulatory authorities is an integral part of HELCO's procedures and policies.

New and improved landscaping will help to mitigate and minimize any aesthetic impacts to surrounding properties and scenic vistas.

GENERAL PLAN - RECREATION	
GOALS	
Provide a wide variety of recreational opportunities for the residents and visitors of the County.	NA
Maintain the natural beauty of recreation areas.	NA
Provide a diversity of environments for active and passive pursuits.	NA
POLICIES	
Strive to equitably allocate facility-based parks among the districts relative to population, with public input to determine the locations and types of facilities.	NA
Improve existing public facilities for optimum usage.	NA

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Recreational facilities shall reflect the natural, historic, and cultural character of the area.	NA
The use of land adjoining recreation areas shall be compatible with community values, physical resources, and recreation potential.	NA
Develop short and long range capital improvement programs and plans for recreational facilities that are consistent with the General Plan.	NA
The "County of Hawaii Recreation Plan" shall be updated to reflect newly identified recreational priorities.	NA
Facilities for compatible multiple uses shall be provided.	NA
Provide facilities and a broad recreational program for all age groups, with special considerations for the handicapped, the elderly, and young children.	NA
Coordinate recreational programs and facilities with governmental and private agencies and organizations. Innovative ideas for improving recreational facilities and opportunities shall be considered.	NA
Develop local citizen leadership and participation in recreation planning, maintenance and programming.	NA
Adopt an on-going program of identification, designation, and acquisition of areas with existing or potential recreational resources, such as land with sandy beaches and other prime areas for shoreline recreation in cooperation with appropriate governmental agencies.	NA
Public access to the shoreline shall be provided in accordance with an adopted program of the County of Hawaii.	NA
Develop a network of pedestrian access trails to places of scenic, historic, natural or recreational values. This system of trails shall provide at a minimum, an islandwide route connecting major parks and destinations.	NA
Establish a program to inventory ancient trails, cart roads and old government roads on the island in coordination with appropriate State agencies.	NA
Develop facilities and safe pathway systems for walking, jogging and biking activities.	NA
Develop a recreation information dissemination system for the public's use.	NA
Revise the ordinance requiring subdivisions to provide land area for park and recreational use or pay a fee in lieu thereof.	NA
Develop and adopt an Impact Fees Ordinance.	NA
Consider alternative sources of funding for recreational facilities.	NA
Develop best management practices for the development of golf courses in coordination with developers, State Department of Health, and other government agencies.	NA
Provide access to public hunting areas.	NA
GENERAL PLAN -- TRANSPORTATION	
GOALS	
Provide a transportation system whereby people and goods can move efficiently, safely, comfortably and economically.	NA
Make available a variety of modes of transportation that best meets the needs of the County.	NA
POLICIES	
A framework of transportation facilities that will promote and influence desired land use shall be established by concerned agencies.	NA
The agencies concerned with transportation systems shall provide for present traffic and future demands, including the programmed development of mass transit programs for high growth areas by both the private and public sectors.	NA
The improvement of transportation service shall be encouraged.	A
Consider the provision of adequate transportation systems to enhance the economic viability of a given area.	A
Develop a comprehensive, islandwide multi-modal transportation plan that identifies the location and operation of automobile, mass transit, bicycle and pedestrian systems, in coordination with appropriate Federal and State agencies.	NA
Work with various non-profit agencies to coordinate transportation opportunities.	A

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COMMENTARY: For the last nine years, HELCO, HECO, MECO, U.S. Department of Defense, State Department of Education DOE, U.S. Department of Energy, and Young Brothers, Ltd. have partnered to sponsor the Electron Marathon. The Electron Marathon addresses the need for an environmentally-clean ground transportation alternative. This program was developed to: (1) increase students' and teachers' knowledge and understanding of the technologies related to electric vehicles; (2) actively involve students and teachers in the design and construction of a mini-electric vehicle while using an integration of academic areas; (3) provide a variety of groups an opportunity to explore the pros and cons of electric vehicles; (4) foster teamwork within a variety of groups (students and students, students and teachers, teachers and teachers).

HELCO assists in planning, while HECO employees provide training for teachers in theory and concepts of electric vehicles. The company also assists the DOE and private schools in coordinating the teams for this event and provides each school with a standard kit which includes a motor, controller, potentiometer, emergency disconnect switch, fuse, contact, gears, steering kit, and brake kit. A cash grant is also given to each participating school.

As discussed in this EIS, the proposed improvements to the project have a negligible impact upon the existing and future use of the surrounding roadways. HELCO recognizes that State DOT plans for expansion of Queen Kaahumanu Highway are intended to address new growth in the region. However, that growth is not attributable to the proposed HELCO project or the existing and on-going operations at the Keahole facility.

GENERAL PLAN - LAND USE	
GOALS	
Designate and allocate land uses in appropriate proportions and mix and in keeping with the social, cultural, and physical environments of the County.	NA
Protect and encourage the intensive and extensive utilization of the County's important agricultural lands.	NA
Protect and preserve forest, water, natural and scientific reserves and open areas.	
POLICIES	
Zone urban types of uses in areas with ease of access to community services and employment centers and with adequate public utilities and facilities.	A
Promote and encourage the rehabilitation and use of urban areas that are serviced by basic community facilities and utilities.	A
Allocate appropriate requested zoning in accordance with the existing or projected needs of neighborhood, community, region and County.	A
Conduct a review and re-evaluation of the real property tax structure to assure compatibility with land use goals and policies.	NA
Incorporate innovations such as the "zone of mix" and "mixed use zones" into the Zoning Code.	NA
Encourage the development and maintenance of communities meeting the needs of its residents in balance with the physical and social environment.	A
Establish a program of continuing review of the Zoning Code in light of emerging new industries and technologies and incorporate revisions to land use regulations as necessary.	NA
Develop community development or regional plans for all of the districts or combinations of districts in cooperation with community residents and periodically review and amend these documents as necessary or as mandated.	A
Ensure that condominium property regimes (CPR) comply with the requirements of the Zoning Code, Subdivision Control Code and other applicable rules and regulations.	NA
Encourage urban development within existing zoned areas already served by basic infrastructure, or close to such areas, instead of scattered development.	A

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COMMENTARY: The reclassification of the subject property to the State Urban District and a change in County zoning would be in accordance with the existing or projected needs of the neighborhood, community, region, and the County. The improvements to the Keahole Generating Station will serve an area where current and future growth have occurred or are anticipated. The expansion of generating power on the west side of Hawaii would alleviate the need to transport power across the island. HELCO has continually worked with government projections and responded to prospective patterns of development by providing the electric power needed to sustain the community.	
GENERAL PLAN - LAND USE AGRICULTURE	
GOALS	
Identify, protect and maintain important agriculture lands on the island of Hawaii.	NA
Preserve the agricultural character of the island.	NA
Preserve and enhance opportunities for the expansion of Hawaii's Agricultural Industry.	A
POLICIES	
Assist in the development of basic resources such as water, roads, transportation and distribution facilities for the agricultural industry.	A
Assist other State agencies, such as the University of Hawaii, College of Tropical Agriculture and Human Resources, University of Hawaii at Hilo, College of Agriculture, Forestry and Natural Resources Management, Department of Business, Economic Development and Tourism, Office of Planning, Department of Land and Natural Resources and Department of Agriculture, on programs that aid agriculture.	A
Agricultural land may be used as one form of open space or as green belt.	NA
Coordinate and encourage efforts to solve the problems of the agricultural industry in the County of Hawaii.	A
In order to minimize the potential conflicts between agricultural and non-agricultural uses, standards and guidelines for the establishment of well defined buffer areas as part of new, non-agricultural developments that are located adjacent to important agricultural lands shall be developed.	A
Land zoned for use in the Rural District shall be expanded, where appropriate.	NA
Develop subdivision standards that make a distinction between agricultural and urban land uses.	NA
Designate, protect and maintain important agricultural lands from urban encroachment.	NA
Ensure that development of important agricultural land be primarily for agricultural use	NA
Support the development of private and State agricultural parks to make agricultural land available for agricultural activities.	A
Assist in the development of agriculture.	A
Assist in the development of water for agricultural purposes.	NA
Investigate possibilities to prevent non-agricultural uses that could interfere with potential or existing agricultural activities on important agricultural lands.	NA
Support efforts to provide tax relief and other incentives to enhance competitive capabilities of commercial farms and ranches, thereby insuring long-term preservation, enhancement, and expansion of viable agricultural lands.	NA
Ensure that condominium property regimes (CPR) on agricultural-designated lands comply with the requirements of the Zoning Code and other applicable laws, rules and regulations.	NA
Farm labor housing projects shall be developed in a manner that minimizes the use of important agricultural lands and is consistent with the character of surrounding land uses.	NA
Encourage, where appropriate, the establishment of visitor-related uses and facilities that directly promote the agriculture industry.	NA
Important agricultural lands shall not be rezoned to parcels too small to support economically viable farming units.	NA
Discourage speculative residential development on agricultural lands.	NA
Encourage other compatible economic uses that complement existing agricultural and pastoral activities.	NA

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COMMENTARY: As stated in subsequent sections, HELCO has supported and encouraged the agricultural industry. For several decades, it purchased biomass power from local sugar mills to help extend the viability of this agricultural commodity in Hawaii. It has also worked with agricultural businesses to achieve cost savings, increase production, and become energy efficient. The company is presently pursuing or working with electro-technologies that would help agricultural businesses become more productive. These technologies include: (1) post harvest cooling system (to increase the shelf life of locally grown produce); (2) dairy farm and food processing technology; (3) energy management systems; (4) indoor air quality and dehumidification systems; (5) heat pump water heating; (6) cool thermal energy storage; and (7) new food processing technologies. As discussed in this EIS, the Keahole facility has no substantive impact on agricultural activities in the neighboring agricultural park. The proposed project will not have a negative impact on the agricultural park. Agreed upon terms of the Settlement Agreement ensure that all mitigation measures requested by adjoining park tenants have been addressed by HELCO.	
GENERAL PLAN - LAND USE COMMERCIAL	
GOALS	
Provide for commercial developments that maximize convenience to users.	NA
Provide commercial developments that complement the overall pattern of transportation and land usage within the island's regions, communities, and neighborhoods.	NA
POLICIES	
Urban renewal, rehabilitation, and/or redevelopment programs shall be undertaken in cooperation with communities, businesses and governmental agencies	A
Commercial facilities shall be developed in areas adequately served by necessary services, such as water, utilities, sewers, and transportation systems. Should such services not be available, the development of more intensive uses should be in concert with a localized program of public and private capital improvements to meet the expected increased needs.	A
Distribution of commercial areas shall meet the demands of neighborhood, community and regional needs.	A
Existing strip development shall be converted to more appropriate uses when and where it is feasible.	NA
Encourage the concentration of commercial uses within and surrounding a central core area.	A
The development of commercial facilities should be designed to fit into the locale with minimal intrusion while providing the desired services. Appropriate infrastructure and design concerns shall be incorporated into the review of such developments.	A
Applicable ordinances shall be reviewed and amended as necessary to include considerations for urban design, aesthetic quality and the protection of amenities in adjacent areas through landscaping, open space and buffer areas.	A
Require developers to provide basic infrastructure necessary for development.	NA
Encourage commercial areas to develop on an axis perpendicular to the highway.	NA
COMMENTARY: Increased generating capacity at the Keahole Generating Station would serve existing regional commercial facilities, recently built, and/or proposed developments. Placing utilities close to demand is practical, more efficient, and less susceptible to power interruptions.	
GENERAL PLAN - LAND USE - INDUSTRIAL	
GOALS	
Designate and allocate industrial areas in appropriate proportions and in keeping with the social, cultural, and physical environments of the County.	A
Promote and encourage the rehabilitation of industrial areas that are serviced by basic community facilities and utilities.	A
POLICIES	
Support the creation of industrial parks in appropriate locations as an alternative to strip development.	NA
Achieve a broader diversification of local industries by providing opportunities for new industries and strengthening existing industries.	A
Locate industrial areas convenient to transportation facilities, and provide a variety of industrial zoned districts and lot sizes, depending on the needs of the industries and the communities.	A

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Improve the aesthetic quality of industrial sites and protect amenities of adjacent areas by requiring landscaping, open spaces, buffer zones, and design guidelines.	A
Industrial development shall be located in areas adequately served by transportation, utilities, and other essential infrastructure.	A
Provide flexibility within the Zoning Code to accommodate emerging new industries.	NA
Industrial-commercial mixed use districts shall be provided in appropriate locations.	NA
Require developers to provide basic infrastructure necessary for development.	NA
STANDARDS	
Industrial development shall maintain or improve the quality of the present environment.	A
Industrial activities may be located close to raw materials or key resources.	A
Topography of industrial land shall be reasonably level.	A
Industrial development shall be conveniently located to its labor resource.	A
Buffer zones shall be established between industrial and adjacent incompatible uses of land.	A
The direction of wind patterns and the absence of tradewinds shall be considered in the siting of industrial areas.	A
COURSES OF ACTION	
Identify sites suitable for future industrial activities.	A
Additional industrial acreage should be provided at the Kona International Airport at Keahole for support facilities for the airport.	A
Industrial development should be in harmony with surrounding uses and the environment.	A
Industrial-commercial mixed-use districts maybe provided in appropriate locations.	A
Service oriented Limited Industrial and/or Industrial-Commercial uses may be permitted in the Kainaliu-Honalo area although the area is not currently identified on the LUPAG map.	NA

COMMENTARY: HELCO is located on relatively flat terrain near the Kona International Airport at Keahole. While the land is within the State Conservation District and County "O" zone, the State Urban District classification and the County "MG" zone (general industrial) appear to be more appropriate for the subject property and the co-existing uses in the area, which includes agricultural products processing, major and minor; airfields, heliports and private landing strips; aquaculture activities and facilities; broadcasting stations; greenhouses, plant nurseries; utility facilities, public and private, including power plants, offices or yards for equipment; utility substations, as permitted under Section 25-4-11. The subject property is in conformity with the general goals, standards, policies, and courses of action for land use in an industrial area.

GENERAL PLAN – LAND USE RESIDENTIAL	
GOALS	
To provide for multiple residential developments that maximize convenience for its occupants.	NA
To provide for suitable living environments that accommodate the physical, social and economic needs of the island residents.	NA
To enhance the overall quality of life in our residential communities.	NA
POLICIES	
Appropriately zoned lands shall be allocated as the demand for multiple residential dwellings increases. These areas shall be allocated with respect to places of employment, shopping facilities, educational, recreational and cultural facilities, and public facilities and utilities.	A
Incorporate reasonable flexibility in applicable codes and ordinances to achieve a diversity of socio-economic housing mix.	NA
Encourage flexibility in the design of residential sites, buildings and related facilities to achieve a diversity of socio-economic housing mix and innovative means of meeting the market requirements.	NA
The rehabilitation and/or utilization of multiple residential areas shall be encouraged.	NA
To assure the use of multiple residential zoned areas and to curb speculation and resale of undeveloped lots only, the	NA

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County may impose incremental and conditional zoning, which shall be based on performance requirements.	
Applicable codes and ordinances shall be reviewed and amended as necessary to include consideration for urban design, and aesthetic quality through landscaping, open space, and buffer areas.	NA
Support the rezoning of those multiple residentially zoned lands that are used for other purposes to a more appropriate zoning designation.	NA
Require developers to provide basic infrastructure necessary for development.	NA
Recreational area and/or facilities shall be considered in multiple residential development.	NA
COURSES OF ACTION	
Re-evaluation of existing zoned areas and re-allocation of lands in appropriate locations shall be undertaken.	A
COMMENTARY: A number of residential developments are being planned in the West Hawaii. HELCO plans to provide adequate electrical power for these residential dwellings as they increase, as well as places of employment, shopping facilities, educational, recreational and cultural facilities, and public facilities.	
GENERAL PLAN - LAND USE RESORTS	
GOALS	
Maintain an orderly development of the visitor industry.	NA
Provide for resort development that maximizes conveniences to its users and optimizes the benefits derived by the residents of the County.	NA
Ensure that resort developments maintain the cultural and historic, social, economic, and physical environments of Hawaii and its people.	NA
POLICIES	
The County may impose incremental and conditional zoning that would be based on performance requirements.	NA
Promote and encourage the rehabilitation and the optimum utilization of resort areas that are presently serviced by basic facilities and utilities.	A
Lands currently designated Resort should be utilized before new resorts are allowed in undeveloped coastal areas.	NA
Zoning of resort areas shall be granted when the proposed development is consistent with and incorporates the stated goals, policies and standards of the General Plan.	NA
Continue to seek funds from the State Capital Improvement Program to help develop visitor destination areas in accordance with the County's General Plan.	NA
Designate and allocate future resort areas in appropriate proportions and in keeping with the social, economic, and physical environments of the County.	NA
Evaluate resort areas and the areas surrounding existing resorts to insure that viable quality resorts are developed and that the surrounding area contributes to the quality, ambience and character of the existing resorts.	NA
Encourage the visitor industry to provide resort facilities that offer an educational experience of Hawaii as well as recreational activities.	NA
Coastal resort developments shall provide public access to and parking for beach and shoreline areas.	NA
Re-evaluate existing undeveloped resort designated and/or zoned areas and reallocate these lands in appropriate locations.	NA
Require developers to provide the basic infrastructure necessary for development.	NA
COMMENTARY: HELCO offers substantial cost savings and rebates to hotels and other tourism-related businesses as an incentive for long-term planning and managing energy costs. Under HELCO's energy-efficiency rebate programs, customers who install energy efficient equipment receive cash incentives to reduce upfront costs. For most customers, installation costs can be recouped within three to five years with energy savings. The company also provides long-term planning and feasibility studies for specific projects or an overall facilities master plan.	
GENERAL PLAN - LAND USE OPEN SPACE	
GOALS	

ELEMENTS OF THE HAWAII COUNTY GENERAL PLAN	RATING
A = ACTIVELY SUPPORTIVE, C= CONFORMS, I = GOAL IS INCONSISTENT WITH HELCO'S OJECTIVES, NA = GOAL IS NOT APPLICABLE	
Provide and protect open space for the social, environmental, and economic well-being of the County of Hawaii and its residents.	NA
Protect designated natural areas.	NA
POLICIES	
Open space shall reflect and be in keeping with the goals, policies, and standards set forth in the other elements of the General Plan.	NA
Open space in urban areas shall be established and provided through zoning and subdivision regulations.	NA
Encourage the identification, evaluation, and designation of natural areas.	NA
Zoning, subdivision and other applicable ordinances shall provide for and protect open space areas.	NA
Amend the Zoning Code to create a category for lands that should be kept in a largely natural state, but that may not be in the Conservation District, such as certain important viewplanes, buffer areas, and very steep slopes.	NA
GENERAL PLAN - LAND USE – PUBLIC LANDS	
GOALS	
Utilize publicly owned lands in the best public interest and to the maximum benefit for the greatest number of people.	A
Acquire lands for public use to implement policies and programs contained in the General Plan.	A
POLICIES	
Encourage uses of public lands that will satisfy specific public needs, such as housing, recreation, open space and education.	NA
Encourage the adoption of State programs for State lands consistent with the General Plan.	C
State and County Capital Improvement Programs should continue to be coordinated.	NA
A sub-classification, University use, shall continue to be utilized, permitting the primary institutional and numerous supportive and accessory uses required for establishing and/or expanding a public university. Its designation shall continue to be shown on the Land Use Pattern Allocation Guide map.	NA
Support the U.S. Department of Interior, National Park Service's expansion plans for the Hawaii Volcanoes, Puukohola and Puuhonua O Honaunau National Historic Parks.	NA
Encourage the State to continue the Villages of Lai'opua project at Kealakehe.	NA

COMMENTARY: HELCO owns the subject property, and as a publicly regulated utility, it uses the property in the best interest of the public for the maximum benefit of the greatest number of people. As part of a publicly traded company, HELCO seeks to profit from its investment by providing an essential service for the public. The generation of electrical power lights homes, schools, hospitals, businesses, government services, and affects almost everyone in the community.

5.15. KEAHOLE TO KAILUA DEVELOPMENT PLAN

The County of Hawaii initiated in July 1988 the Keahole to Kailua Development Plan study (Keahole Plan) with the intent of developing the area. The Keahole Plan serves as an implementing tool for the General Plan of the County of Hawaii and as a sub-regional plan and developmental framework for the West Hawaii Plan.

The County contracted R.M. Towill Corporation to prepare the Keahole Plan, and in 1990 adopted it to serve as a guide for future infrastructure and land uses in the region. The Hawaii County Council in 1991 amended the plan to incorporate electricity and telephone accommodations that would allow improvements as demand increased. HELCO estimated at the time that full development could entail an additional 100 MW of power.

5.15.1. Goals and Objectives of the Keahole to Kailua Plan

The goal of the Keahole Plan was to develop a mixed residential, commercial, resort, industrial, and recreational community, with appropriate shoreline uses, public facilities, and infrastructure, which would be built in phases over the course of 20 years.

The objectives were to: (1) develop a plan for an integrated community that can be served by the required infrastructure in phases and provide a mix of land uses; (2) develop design guidelines for critical visual aspects; (3) develop an efficient, safe and pleasing road network over the next 10-20 years; (4) identify all areas subject to flood and tsunami inundation and develop a comprehensive flood control system; (5) develop a water system with 6 mgd capacity to serve land uses; (6) develop area-wide system of sewage facilities with 6 mgd capacity; (7) develop adequate solid-waste facilities; (8) develop recreational facilities that would meet the rise of new residents; (8) develop a financing approach that provides infrastructure financing, feasible land development, and feasible level of County capital expenditures.

Four alternative concept plans were slated for the area. A regional center; residential development; elementary, middle and high schools; university site; community, district, and waterfront parks; municipal golf course; regional sports complex; industrial; judiciary, hospital; fire station, and cemetery were included in these plans.

5.15.2. Land Use Plan for the Area

The major growth assumptions of the plan were that (1) the Keahole to Kailua area would be the location for a new "Civic and Business Center" with civic and commercial uses; (2) 4,500 new residential units would be built between 1990 and 2010; (3) a number of facilities were planned that would serve a much larger region, including a municipal golf course, regional sports complex and University of Hawaii - West Hawaii College; and (4) the project area would accommodate resort development in the range of 1,500 visitor units.

A flexible land use plan was developed for the area to provide a framework for future growth, infrastructure costs, public-private implementation of major infrastructure projects, and State and County action on designating lands for urban development. However, more importantly than specific boundaries, the plan emphasized that four major development themes should guide the planning and development of the area: (1) three major development zones; (2) new civic and business center; (3) major new roadways; and (4) regional greenbelt system.

5.15.3. Current and Projected Resident Population in West Hawaii

The population in the North Kona region increased 62 percent in 1980-1990 from 13,748 to 22,284, and 28 percent in 1990-2000 from 22,284 to 28,543. (U.S. Census, 2000; Hawaii County Department of Research and Development). The following table shows the numbers as of 2000 and the projected population to the year 2020.

TABLE 5-I: PROJECTION OF RESIDENT POPULATION BY DISTRICT YEAR 2000 TO 2020

DISTRICT	2000	2005	2010	2015	2020
North Kohala	6,038	6,622	7,917	9,446	11,273
South Kohala	13,131	15,659	18,184	21,072	24,426
North Kona	28,543	30,467	34,024	37,922	42,275
South Kona	8,589	10,253	11,414	12,681	14,092
Kau	5,827	6,443	7,050	7,698	8,408
	64,128	71,449	80,599	90,834	102,494

Economic Assessment, PKF Hawaii, January 2000
U.S. Census, 2000
Hawaii County Department of Research and Development

According to the County of Hawaii General Plan, various resort and resort-residential complexes are currently under construction or are planned for construction in the near future. Most of these developments are concentrated in West Hawaii in the Kohala and Kona Districts, which will continue to accommodate the majority of the visitor market within the County. Visitor accommodation units within the County totaled 9,655 units in 1998, up from 8,952 units in 1990. Bed and breakfast units, although not a significant part of the total visitor unit count, have been the fastest growing segment of the industry, growing from 55 units in 1990 to 171 units in 1998.

5.15.4. HELCO'S CONFORMANCE AND SUPPORT OF THE KEAHOLE TO KAILUA PLAN

In light of the current and anticipated development in the region, HELCO needs to provide the necessary electrical power to support current and future demand in the region.

CHAPTER SIX: CONTEXTUAL

6.1. RELATIONSHIP BETWEEN SHORT-TERM USES AND MAINTENANCE OF LONG-TERM PRODUCTIVITY

Hawaii Electric Light Company, Inc. (HELCO) seeks a reclassification of its Keahole Generating Station and Airport Substation lands (collectively "subject property") from the State of Hawaii (State) Conservation District to the Urban District, and a subsequent change in County of Hawaii zoning from Open ("O") to General Industrial ("MG"). The reclassification and change in zoning would bring the subject property into conformance with its existing use for industrial purposes. The generating station and airport substation have been operating on the subject property since 1973, and HELCO has been serving the island of Hawaii (Big Island) since 1894. The ongoing consumption of petroleum for the generation of electricity ensures long-term economic productivity on the island. The addition of ST-7 is intended to improve efficiency, thereby contributing to a reduction in the facilities' dependence upon increased consumption of petroleum.

The reclassification and change in zoning should result in a shorter permitting process. Currently, HELCO must first obtain approval from the State Board of Land and Natural Resource (BLNR) of the Department of Land and Natural Resources (DLNR), before it can make any improvements to the subject property. As discussed in Chapters Two and Five, the State Legislature established the Land Use Law and set the boundaries for the Conservation District to protect and preserve Hawaii's lands and natural resources, not to oversee issues of urbanization. The governance of the Urban Districts rests with the Counties as they are better suited to decide on urbanization issues within their own jurisdiction.

The principal long-term benefits would include increased generating capacity for the Big Island to accommodate economic activity and projected growth in the region. HELCO would be able to (1) improve the subject property; (2) implement environmental mitigation measures; (3) improve operating efficiency at the existing power plant; (4) accommodate future legal and operational requirements; and (5) alleviate a costly and time-consuming step in the permitting process. Moreover, the BLNR and DLNR would not have to decide on issues of urbanization that are out of the department's jurisdiction.

The long-term productivity of the subject property would be significantly enhanced with the completion of two combustion turbines (CT-4 and CT-5), noise mitigation equipment, installation of a steam turbine (ST-7) with selective catalytic reduction (SCR). The installation would allow the utilization of waste heat, which would make the plant more fuel-efficient. New and improved landscaping would help to mitigate any adverse visual impacts. SCR would further reduce emissions. The community would benefit by being provided with a source of reasonably reliable electrical power.

Socioeconomic benefits would also accrue to the State and County in the form of added revenue as a result of increased economic activity. By being assured that adequate and basic infrastructure such as electrical power are in place, the State and County could further their plans to encourage commercial and residential development, build higher educational facilities, and create a sustainable future for the Big Island community.

6.2. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Major resource commitments by HELCO include (1) substantial operational and equipment expenses and costs; (2) the resolve to bring an end to a lengthy litigation process; (3) the alleviation of fears and

environmental concerns within the neighboring community by agreeing to institute environmental measures; and (4) the allocation of potable water and other resources to the Department of Hawaiian Home Lands (DHHL), subject however, to various permitting approvals.

According to the latest quarterly report[1] filed with the U.S. Securities and Exchange Commission, HELCO's costs incurred in its efforts to put CT-4 and CT-5 into service and to support existing units amounted to approximately $93 million. This includes $34 million for equipment and material purchases; $39 million for planning, engineering, permitting, site development, and other costs; and $20 million for an allowance for funds used during construction (AFUDC) up to November 30, 1998, after which date HELCO's management decided not to accrue AFUDC because of the delays that had been experienced.

As of June 30, 2004, estimated additional costs of $8 million would be required to complete the installations of CT-4 and CT-5, including the costs necessary to satisfy the requirements of the Settlement Agreement. To date, HELCO has reclassified $81 million of capital costs for CT-4, CT-5, and related pre-air permit facilities from "construction in progress" to "plant and equipment." Depreciation will be recorded beginning in January 2005. HELCO's electric rates, however, will not change as a result of including CT-4 and CT-5 as plant and equipment. To obtain any electric rate increases, HELCO must first file an application with the State Public Utilities Commission (PUC) and the PUC must then grant HELCO rate relief.

Based on management's expectation that the remaining conditions under the Settlement Agreement will be satisfied, HELCO recorded as expenses in November 2003, approximately $3.1 million of legal fees and other costs required to be paid under the Settlement Agreement. Assuming that the Settlement Agreement is implemented and ST-7 is installed, HELCO would have incurred approximately $21 million of capital expenditures relating to noise mitigation, visual mitigation, and air pollution control at the subject property (approximately $8 million for CT-4 and CT-5, $9 million for ST-7 when installed, and approximately $4 million for other existing units).

The reclassification would allow HELCO to significantly improve the subject property to accommodate current and future power demand in the region. The project does not call for a commitment of government supplied services or facilities over and above that which would be required and necessary for permitting and other government related functions. The continued reliance upon non-renewable fuel sources to meet Hawaii County's electrical energy demand represents a significant irreversible and irretrievable commitment. To that end, the construction of ST-7 will help reduce the impacts by improving the operational efficiency of the facility.

6.3. OFFSETTING CONSIDERATIONS OF GOVERNMENTAL POLICIES

The proposed project is generally consistent with the applicable Hawaii State Plan, the various State Functional Plans, the County of Hawaii Revised General Plan, the West Hawaii Plan, the Keahole to Kailua Plan, the Land Use Law, and various laws, goals, policies, and standards.

6.4. UNRESOLVED ISSUES

HELCO is faced with an increased demand for electrical power due to the Big Island's steadily growing population and heightened economic activity, particularly on the west side of the island. One of the ways

[1] See HEI Quarterly Report at www.sec.gov.

HELCO would like to meet growing demand is through the increased use of renewable energy resources, which in 2003 amounted to 22 percent of HELCO's total annual electrical energy production. However, major impediments to the increased use of renewable energy sources include high costs, proximity to the grid, and reliability. As such, HELCO must continue to use a multi-faceted energy portfolio using combined-cycle fossil-fuel-fired power plants together with wind, hydroelectric for central stations, geothermal, and distributed generation for selected sites in order to provide quality power reliably.

The State's Renewable Portfolio Standard law requires electrical utilities to increase their use of renewable energy sources and meet a percentage of electricity sales that should come from renewable energy. HELCO has been able to meet the requirements of the law, but must continue with parallel path planning using a multi-pronged approach for its operations until such a time that a renewable energy source(s) has developed to the point where it can replace fossil fuels reliably at a reasonable cost to the consumer. In the near term, Hawaii will continue to need fossil fuels for its electrical energy and transportation needs.

The State requires that every energy utility systematically and thoroughly develop long-range plans for meeting Hawaii's future energy needs. HELCO evaluates and integrates both resources that *supply* electricity and resources that reduce or better manage the *demand* for electricity and prepares an Integrated Resource Plan (IRP), which is then submitted to the PUC. (See Appendices E and F in Volume 2 of the EIS.) The emerging and evolving character of supply and demand means that some issues pertaining to HELCO's future ability to produce energy are unresolved at the time this document is prepared. These are presented below.

HELCO has a 35-year power purchase agreement (PPA), which expires on December 31, 2027, with Puna Geothermal Venture (PGV) for 30 MW of firm capacity from its geothermal steam facility. PGV's output was reduced to 6 MW from April 2002 to March 2003. The loss of generation was attributed to the blockage of a source well due to a failed liner 5,000 feet below the earth's surface and decreasing steam quality emanating from one of PGV's source wells. PGV completed drilling an additional source well in February 2003, and converted the blocked source well into an injection well in early March 2003. As of early 2004, PGV anticipated that it would be fully restored to 30 MW by late 2004, with the increase of steam supply from existing wells. As of September 2004, PGV exports approximately 26 MW.

In September 2003, PGV announced that it had long-range plans to expand the capacity of the facility to 60 MW, in 8 MW increments. However, in April 2004 Ormat Industries purchased PGV for $71 million. Therefore, current long-range planning activities do not assume that PGV will provide capacity above 30 MW. As further information becomes available as to the direction Ormat Industries will take the company in the near future, HELCO would then be able to include actual anticipated geothermal capacity in the next IRP.

In October 2003, the PUC opened Docket No. 03-0371 to investigate Distributed Generation (DG) issues in Hawaii. DG involves the use of small electric power generators, using fossil fuels or renewable energy sources, located on the utility system at a utility site or at a customer site that may or may not be connected to the utility's power grid. The issues include, but are not limited to: (1) addressing interconnection matters; (2) determining who should own and operate distributed generation projects; (3) identifying what impacts, if any, distributed generation will have on Hawaii's electric distribution systems and market; (4) defining the role of regulated electric distributions companies and the PUC in the deployment of distributed generation in Hawaii; (5) identifying the rate design and cost allocation issues

associated with the deployment of distributed generation facilities; and developing the necessary revisions to the integrated resource planning process, if necessary.

As of September 2004, HELCO is unable to predict the outcome of the proceedings, and how it may impact long-term planning activities such as IRP.

In October 2003, the PUC opened Docket No. 03-0372 to evaluate competitive bidding as a mechanism for acquiring or building new generating capacity in Hawaii. The competitive bidding process has been widely implemented throughout the United States and may serve as an alternative for Hawaii to facilitate wholesale market competition and enhance the potential for higher efficiency and lower costs for its electric industry. Competitive bidding for new generating capacity is often referred to as a wholesale market model that includes equity and efficiency considerations, encouragement of competitive generation options and new technologies, lower costs through competition, more choices, reliable supplies, and a level playing field on which all generation options could compete. The issues include, but are not limited to: (1) evaluating the benefits and impacts of competitive bidding; (2) developing a fair competitive bidding system, if necessary, (a) ensuring that competitive benefits result from the system and ratepayers are not placed at undue risk; (b) specifying competitive bidding guidelines and requirements to prospective bidders, including the evaluation system to be used, and process for evaluation and selection; (3) encouraging broad participation from a range of prospective bidders; and (4) developing the necessary revisions to the integrated resource planning process, if necessary.

As of September 2004, HELCO is unable to predict the outcome of the proceedings, and how it may impact long-term planning activities such as IRP.

Combined Heat and Power (CHP), or cogeneration, is an electricity generation technology that involves the recovery of waste heat from the electric generation process to produce other forms of useful energy simultaneously, such as useable heat or steam. CHP is better for the environment, the economy, and our nation's energy supply than generating heat and power separately because conventional electricity generation is inherently inefficient.

For the purposes of this analysis, forecasts have been made regarding the impact of Utility and Non-Utility CHP units on the HELCO system. These estimates are consistent with the October 2003 PUC application for approval of a proposed utility-owned CHP program in Docket No. 03-0366. At this time, HELCO is unable to predict the outcome of the proceedings.

In reference to load forecast, while a comprehensive analysis is undertaken to develop HELCO's Sales and Peak forecast, there are uncertainties regarding any forecast. Load forecasts are used to help determine when a generating unit must be added. Therefore, the precise timing of unit additions, especially in distant years, is often difficult to achieve.

On October 4, 1999, HELCO entered into a power purchase agreement (PPA) with Hilo Coast Processing Company (HCPC) effective January 1, 2000 through December 31, 2004, subject to early termination by HELCO after two years, whereby HELCO purchases 22 MW of firm capacity from HCPC's coal-fired facility.

As of September 2004, HELCO in unaware of any municipal solid waste (MSW) projects. However, HELCO is aware of the County of Hawaii's ongoing process of soliciting proposals to handle solid-waste,

which may include a future MSW plant. If such a facility is constructed in the future, inclusion of garbage-to-energy technology could have a beneficial impact upon the availability of additional electrical energy resources.

In addition to energy issues, HELCO is also faced with unresolved traffic issues. Access to the Keahole facility is presently provided by two roads that intersect with Queen Kaahumanu Highway, one to the south and one to the north. A private development project, Palamanui, north of the Keahole facility, has proposed to realign and expand the right of way of the access road on the northside of the generating station. At this point in time, the location and configuration of the realigned access road's intersection with Queen Kaahumanu Highway has not been resolved between Palamanui and the State Department of Transportation. However, because the Keahole Generating Station can continue to use the access road on the south side of the generating station, the ultimate decision regarding the northern access road intersection would not substantively affect the future operation of the facility, one way or the other.

More than a decade ago, HELCO had planned to increase generating capacity and retire older units with the installation of CT-4 and CT-5, followed by a 17.8-megawatt (MW) heat steam turbine recovery generator (ST-7). The installation was significantly stalled as a result of (1) delays in obtaining an amendment of a land use permit from the BLNR; (2) delays in obtaining a required air permit from the State Department of Health (DOH) and the U.S. Environmental Protection Agency (EPA); and (3) by lawsuits and administrative proceedings initiated by independent power producers (IPPs) and other parties contesting the grant of these permits and objecting to the expansion of the generating station on numerous grounds. One of the issues of contention for the IPPs was that HELCO could alternatively purchase power from them to meet increased electrical generation demand. Numerous proceedings commenced before the Third Circuit Court and the BLNR, which further delayed or otherwise adversely affected the completion of the improvements. In November 2003, a Settlement Agreement had been entered into by all of the parties, except for Waimana Enterprises, an IPP.

On November 17, 2003, HELCO resumed construction of CT-4 and CT-5. On June 30, 2004, CT-4 and CT-5 were placed in commercial operation. Under the Settlement Agreement, HELCO has agreed to undertake a number of actions, which include (1) applying stricter noise standards; (2) further mitigating air emissions; (3) using primarily brackish instead of potable water resources; (4) assisting DHHL in installing solar water heating in its housing projects; (5) transferring a major part of HELCO's potable water allocation from the County of Hawaii to DHHL; (6) supporting the Keahole Defense Coalition in participating in certain PUC cases; (7) addressing aesthetic concerns by new and improved landscaping; (8) expediting efforts to obtain permits and approvals necessary for the installation of ST-7 with SCR emissions control equipment; (9) operating existing CT-2 within existing air permit limitations rather than the less stringent limitations in a pending air permit revision; and (9) cooperating with neighbors and community groups.

Since construction activities resumed in November 2003, HELCO has laid the groundwork for implementation of many of its commitments under the Settlement Agreement. However, project opponents have continued to pursue efforts to stop or delay the Keahole project and to interfere with implementation of the Settlement Agreement. As a result, there could be further delays in completing construction.

In the meantime, HELCO's management remains concerned with the condition and performance on the HELCO system of certain aging generators, which were to be retired or operated less frequently once CT-

4 and CT-5 were installed. However, since progress has been made in completing the installation of CT-4 and CT-5, ancillary equipment, and mitigation measures, a few generators have since been retired.

HELCO is also mindful of the operating status of various IPPs, which provide approximately 43 percent of HELCO's generating capacity under power purchase agreements. Hilo Coast Power Company (HCPC), which supplies energy from coal, will cease to be a source of firm power on or before December 31, 2004. A related concern is the possibility of power interruptions under exigent circumstances, including rolling blackouts, as IPPs and/or HELCO's generating units become unavailable or less available (i.e., available at lower capacity) due to forced outages or planned maintenance. HELCO is continuing its efforts to avert power interruptions, but there can be no assurance that power interruptions will not occur.

HELCO's plans for ST-7 with SCR are pending until it obtains the contemplated reclassification of the subject property from the Conservation District to the Urban District and other necessary permits. The costs of ST-7 will be higher than originally planned, not only by reason of the change in schedule in its installation, but also by reason of additional costs that will be incurred to satisfy the requirements of the Settlement Agreement.

At the time of the preparation of this Environmental Impact Statement, a determination has not yet been made regarding the type of ammonia (anhydrous or urea pellets) that will be utilized at the facility. A decision is anticipated before mid-2007. Once a decision has been made a plan addressing emergency procedures in case of accidental release or spill during transit or operations at the facility will be developed and submitted to the State Department of Health for approval.

At the time this Environmental Impact Statement is being prepared, HELCO has not yet determined whether it is economically prudent and environmentally appropriate to treat the wash water on site rather than ship it to a disposal facility on the mainland. If treated on site, the heavy metals removed from the wash water would be shipped to an EPA-approved disposal facility on the mainland. This would greatly reduce the volume of hazardous material being transported. If treated onsite, all wastestreams (water and solid) should be nonhazardous. Samples will be collected to confirm this. As such, the treated nonhazardous sludge remaining after treatment (which will contain heavy metals) can be dewatered and disposed of at a local landfill (e.g., West Hawaii Landfill). All requests for solid waste disposal at the West Hawaii Landfill must go through a review and approval process. This option for waste disposal could eliminate the need to send anything to the mainland. However, a detailed analysis must be conducted by HELCO to determine the feasibility of this approach before a commitment can be made to a specific course of action. At this time, it is HELCO's intention that once the ST-7 unit with the SCR has become operational, and the frequency of washing the HSRG tubes has been determined, a study will be conducted to determine the feasibility of treating the wash water on site. This study will include an analysis of the physical requirements of a discrete wash water treatment facility, the operational requirements, the cost, and most importantly, the environmental considerations, including mitigations and a detailed response plan for emergency situations. HELCO recognizes that the decision to treat hazardous waste on site is a matter that deserves full public disclosure, review and participation, and will therefore comply with all applicable requirements of environmental review pursuant to Chapter 343, Hawaii Revised Statutes as amended. At this point in time, it is anticipated that a study to determine the feasibility of treating wash water on site commence approximately one year after ST-7 becomes operational.

6.5. SECONDARY IMPACTS

The term "secondary impact" means effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. These impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

The Proposed Action of urbanizing the subject property and rezoning it to industrial use will have no impact upon population growth in the locale or region. Since the facility already exists, the proposed reclassification of its State Land Use designation is, in effect, bringing its land use classification into conformance with it use. The action of reclassification will not induce people to relocate to the properties surrounding the facility. Nor will it present a motivation for people to relocate from elsewhere in the State to the Kona area. Thus, no impact on existing land use patterns is anticipated.

The availability of an increased supply of electrical energy resulting from the approvals sought is not anticipated to induce population growth or affect land use patterns. Rather, the increased supply will help to ensure that residents of the Big Island enjoy continued and uninterrupted electrical service.

Because the improvements proposed to the facility in the form of making productive use of a by-product of the existing generating system (heat) through the installation of ST-7 are subject to compliance with air quality and noise quality standards, and are not anticipated to exceed those standards, they are not anticipated to result in a substantive impact upon the natural environment.

As discussed in the Socio-Economic Impact Study appended to this document (Tables 4-A through 4-F), of the alternatives considered, other than the No Action alternative, the Proposed Action (also known as the Preferred Alternative) has the least amount of induced or secondary socio-economic impacts. While the other alternatives (3-5) are more labor intensive, thereby contributing potentially more revenue to the State and County economies, they will also result in greater impacts in the form of population change resulting from the need for more employees, altered land use patterns resulting from the need for more housing, and potentially greater impacts upon the natural environment.

6.6. CUMULATIVE IMPACTS

Cumulative impacts are defined as impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The Proposed Action would contribute to the applicant's goal of ensuring firm generating capacity to meet demand projected to the year 2025, and would thus serve as the primary cumulative impact. Because the public utility is obligated to provide power, at some point in the future, additional population growth on the Big Island may require the development of additional generating capacity (i.e. expansion of the electrical grid). The applicant has agreed to a settlement which states, in part, that there will be no further expansion of generating facilities at Keahole. Therefore, if new facilities are required in the future, they must be developed elsewhere. To that end, the Proposed Action will ensure that the Keahole facility remains an important element of Hawaii County's cumulative electrical energy supply system until such time that technological advancements render its operating system obsolete. Said another way, implementation of the proposed project does not preclude the development of alternative forms of energy

supply. Rather, it extends the period until demand is projected to once again exceed supply. Thus, implementation of the Proposed Action has a cumulative impact upon the integrity of the entire electrical system by providing a firm and relatively reliable source of power for the foreseeable future. And during this period when supply is sufficient to meet projected demand, it is hoped that new alternative forms of energy supply may become technologically and financially feasible options for the Island of Hawaii.

6.6.1. DRAINAGE AND RUNOFF

The project's cumulative contribution to regional drainage and runoff as it relates to surrounding land uses, both present and future, is anticipated to be negligible. As is required of any new development, storm runoff generated by new impermeable surfaces (roofs and pavement) is required to be minimized and must be contained on site. With regard to regional drainage, the high permeability of the ground at and around the property results in no observable drainageways. Thus, the presence of the project is not anticipated to have a cumulative impact upon drainage or runoff, when combined with the projected effects of the adjacent DHHL lands. Other projects such as Palamanui, Ooma, and Kohanaiki are too far from the Keahole site to be considered for prospective cumulative drainage impacts.

6.6.2. TRAFFIC

As the proposed project is anticipated to have a negligible impact on regional traffic (a total of 21 A.M. peak hour trips and 14 P.M. peak hour trips on a roadway with over 1,100 vehicles moving in each direction during peak hours), both now and in the foreseeable future, the anticipated impact, when taking into account other proposed regional projects, is also negligible. As discussed in Section 3.9.2, the traffic impacts of the proposed Palamanui project were included in the traffic analysis of future impacts for the Keahole project. General traffic impacts related to other development projects in the area were assumed to be part of an annual future growth factor of 4.8 percent.

6.6.3. VISUAL

The cumulative visual impacts of the project, with relation to future surrounding development cannot be assessed easily, as the visual character of development that may be proposed on the adjacent DHHL land is not yet known. As discussed in this Final EIS, the proposed project includes specific landscaping recommendations to help mitigate its visual impacts. If it can be assumed that other projects will consider similar landscaping mitigation measures, then the cumulative impact may be a regional change in the character of the landscaping. The low scrub vegetation may be replaced with more formalized landscaping, including trees and palms and hedges to screen specific project elements.

6.6.4. AIR AND NOISE

The subject property is required to operate under very specific air quality and noise regulations. Given the assumption that it will continue to do so, the cumulative impact on regional noise and air quality, when taking into consideration other adjacent or nearby development proposals, is not anticipated to constitute a significant negative impact. As CT-4 and CT-5 will be in operation well before other developments in the region commences, and ST-7 will be implemented with SCR and noise controls to specifically reduce air quality and noise impacts, other future projects will have to include the Keahole Generating Station and Airport Substation as part of the baseline condition.

6.6.5. GROUNDWATER

The proposed project will have no substantive cumulative impact upon the quality or quantity of groundwater that enters the ocean approximately three and a half miles down slope from the project site. As the project has already been granted the necessary withdrawal permits and it is not anticipated that well practices will deviate from their current permits, the proposed project is considered as part of the baseline condition for future development projects in the region and future development projects' assessment of cumulative impacts will have to take into account the operations of the Keahole facility. In addition, the State's continuing oversight with regard to new well permits represents an opportunity for the cumulative impacts on groundwater and the aquifer to be addressed with each new project. Thus, through the previous granting of the withdrawal permit for the Keahole facility, the project's cumulative impacts on the regional groundwater have already been assessed and found to not have a significant impact on water resources in the region.

6.6.6. COASTAL WATERS

Closely related to the discussion of groundwater above, the project's cumulative impacts upon coastal waters relate to the dynamics of surface runoff and drainage, groundwater impacts, and social impacts. In the former two instances, surface runoff and drainage, and groundwater impacts, are anticipated to not have a significant impact on water resources in the region. Therefore, no significant negative impact upon the coastal waters is anticipated. The cumulative impact of other existing and proposed developments has been taken into account in this finding to the extent that specific facts about those projects are known. Future projects that are only in their conceptual stage will have to include the Keahole facility in their baseline. With regard to social impacts, as the project will create only a limited number of new permanent jobs and will have no identifiable impact on population generation, the project's presence is not anticipated to generate an increase in shoreline recreational activity (either passive or active), that in turn might impact the quality of coastal waters.

CHAPTER SEVEN: PARTIES CONSULTED AND THOSE WHO PARTICIPATED IN THE PREPARATION OF THIS EIS

7.1. CONSULTED PARTIES

Hawaii Electric Light Company, Inc. (HELCO) on November 25, 2003 submitted a *Petition for a Land Use District Boundary Amendment; Verification; Certificate of Service; Exhibits 1-11* to the State of Hawaii (State) Land Use Commission (Commission). A copy of HELCO's *Environmental Impact Statement Preparation Notice* (EISPN) was attached to the Petition as Exhibit 4. Additional copies of the EISPN, together with the *Office of Environmental Control (OEQC) Bulletin Publication Form* and *EISPN Distribution List* were also provided to the Commission for forwarding to the OEQC, State Department of Health (DOH). The OEQC on December 8, 2003 published in its Bulletin a summary of the EISPN to officially notify the public of HELCO's *Petition for a Land Use District Boundary Amendment.*

The following parties, in addition to the Commission and the OEQC have either received copies of the EISPN and/or will be receiving a copy of the Draft Environmental Impact Statement (EIS) for participation in the EIS process. Furthermore, copies of the Draft EIS will be sent to major State and regional libraries and various news agencies

7.1.1. FEDERAL GOVERNMENT

U.S. Army Corps of Engineers

U.S. Army Pacific Headquarters

U.S. Coast Guard

U.S. Department of Agriculture, Resources Conservation Service

U.S. Department of the Interior, Fish & Wildlife Services

U.S. Department of the Interior, Geological Survey

U.S. Environmental Protection Agency

U.S. Environmental Protection Agency, Pacific Island Contact Office

U.S. Federal Aviation Division

U.S. Navy, Naval Base Pearl Harbor

7.1.2. STATE GOVERNMENT

Office of the Governor, Honorable Linda Lingle, Governor

The Senate, Honorable Paul Whalen, Senator – District 3

The Senate, Honorable Carol Fukunaga, Chair – Economic Development

The Senate, Honorable J. Kalani English, Chair – Energy & Environment

The Senate, Honorable Rosalyn Baker, Chair – Health

The Senate, Honorable Lorraine R. Inouye, Chair – Water Land & Agriculture

House of Representatives, Honorable Cindy Evans, District Representative

House of Representatives, Honorable Brian Schatz, Chair – Economic Development

House of Representatives, Honorable Hermina Morita, Chair – Energy & Environment

House of Representatives, Honorable Dennis Arakaki, Chair – Health

Department of Accounting & General Services

Department of Agriculture

Department of Defense

Department of Education

Department of Hawaiian Home Lands, Hawaiian Homes Commission

Department of Health, Environmental Planning Office

Department of Health, Office of Environmental Quality Control

Department of Land & Natural Resources

Department of Land & Natural Resources, State Historic Preservation Office

Department of Business, Economic Development & Tourism (DBEDT)

DBEDT – Energy, Resources & Technology Division

Department of Transportation

Housing & Community Development Corporation of Hawaii

National Energy Laboratory of Hawaii Authority

Office of Planning

University of Hawaii – Manoa, Institute of Marine Biology

University of Hawaii - Manoa, Environmental Center

University of Hawaii - Manoa, Water Research Center

7.1.3. COUNTY OF HAWAII

Office of the Mayor, Honorable Harry Kim, Mayor

Hawaii County Department of Environmental Management

Hawaii County Department of Parks & Recreation

Hawaii County Department of Public Works

Hawaii County Department of Research & Development

Hawaii County Department of Water Supply

Hawaii County Fire Department

Hawaii County Planning Department

Hawaii County Police Department

7.1.4. COMMUNITY ORGANIZATIONS, ASSOCIATIONS, AND INTEREST GROUPS

American Lung Association

Hawaii's 1000 Friends

Keahole Defense Coalition

The Nature Conservancy

Office of Hawaiian Affairs

The Outdoor Circle

Sierra Club

Waimana Enterprises, Inc.

7.1.5. NEIGHBORING PROPERTY OWNERS AND RESIDENTS

Big Island Broadcasting Co.

George and Honoree Broderson

Henry Cho

Mahi and Joni Cooper

County of Hawaii Water Commission

Kona International Airport at Keahole

Peggy J. Ratcliff

Michael J. Matsukawa, Esq.

Kazumi Shigezawa, Keahole AG Ventures

Stanley T. Tomono

7.2. ORGANIZATIONS AND INDIVIDUALS WHO ASSISTED IN THE PREPARATION OF THIS ENVIRONMENTAL IMPACT STATEMENT

The following parties were involved in the preparation of this Draft Environmental Impact Statement:

7.2.1. BELT COLLINS HAWAII, LTD.

Anne Mapes, Principal

Lee W. Sichter, Principal Planner and Project Manager

Susan Uejo, Civil Engineer - Traffic

Gene Yong, Planner

Ed Kuniyoshi, Senior Planner

Karon Aoki, Graphic Designer

Diane Yamamoto, Graphic Designer

7.2.2. SUBCONSULTANTS

Philip L. Bruner, Avifaunal and Feral Mammal Environmental Consultant

Winona P. Char, Botanical Consultant

Michael Garcia Ph.D. and John P. Lockwood, Geohazards Consultant

HFP Acoustical Consultants, Noise Consultant

Jim Clary & Associates, Climate and Air Quality Consultants

JTJL Business Services LLC, Publication and Administrative Consultant

Marine Research Consultants, Marine Consultant

Paul H. Rosendahl, Ph.D. Inc., Archaeological and Cultural Consultant

Robert E. Paull, Ph.D., Emissions Consultant

SMS Research, Socioeconomic Consultants

Stone & Webster, Inc., A Shaw Group Company, Naptha Fuel and SCR Consultants

Tom Nance Water Resource Engineering; Water Resource Consultant

7.2.3. EISPN COMMENTS AND RESPONSES

Following are copies of all responses received, commenting on the aforementioned EIS Preparation Notice, published on December 8, 2003. A copy of each comment is presented, followed by a written response letter. The parties commenting on the EISPN were:

Russ K. Saito, State Comptroller, State of Hawaii Department of Accounting and General Services

Genevieve Salmonson, Director, State of Hawaii Office of Environmental Quality Control

George P. Young, Chief – Regulatory Branch, U.S. Department of the Army

Stephanie Aveiro, Executive Director, Housing and Community Development Corporation of Hawaii

Galen M. Kuba, Division Chief, County of Hawaii Department of Public Works

Rodney K. Haraga, Director, State of Hawaii Department of Transportation

George Broderson, Keahole Agricultural Park Neighboring Property Owner

Anthony J.H. Ching, Executive Officer, State of Hawai Land Use Commission

Patricia Hamamoto, Superintendent, State of Hawaii Department of Education

Christopher J. Yuen, Planning Director, County of Hawaii Planning Department

Diedre S. Mamiya, Administrator, State of Hawaii, Department of Land and Natural Resources

Gary Martin, State of Hawaii, Department of Land and Natural Resources

Sam Lemmo, Administrator, State of Hawaii, Department of Land and Natural Resources

Keith Chun, State of Hawaii, Department of Land and Natural Resources

Eric T. Hirano, Chief Engineer, State of Hawaii, Department of Land and Natural Resources

Michael G. Buck, Administrator, State of Hawaii, Department of Land and Natural Resources

Daniel S. Quino, State of Hawaii, Department of Land and Natural Resources

Mary Lou Kobayashi, Planning Program Administrator, Office of Planning

John B. Ray, President, Hawaii Leeward Planning Conference

Melvin N. Kaku, Director, U.S. Department of Navy, Environmental Planning Division

P. Holly McEldowney, Administrator, Historic Preservation Division

LINDA LINGLE
GOVERNOR

RECEIVED
2003 DEC 19 PM 1:

RUSS K. SAITO
COMPTROLLER

KATHERINE H. THOMASON
DEPUTY COMPTROLLER

(P)1372.3

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810

DEC 17 2003

Mr. Lee Sichter, Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Sichter:

Subject: Hawaiian Electric Light Company, Inc.
Keahole Generating Station & Keahole Airport Substation
North Kona, Hawaii
TMK: 7-3-49
Environmental Impact Statement Preparation Notice

Thank you for the opportunity to review the information regarding the subject project. This project does not impact any of the Department of Accounting and General Services' projects or existing facilities. Therefore, we do not have any comments to offer.

If you have any questions, please call me at 586-0400 or have your staff call Mr. Inder Mirchandani of the Public Works Division at 586-0490.

Sincerely,

Russ K. Saito

RUSS K. SAITO
State Comptroller

c: Office of Environmental Quality Control

BeltCollins

October 8, 2004
03P-357/2002.33.1900

Mr. Russ K. Saito, State Comptroller
State of Hawaii, Department of Accounting
& General Services
P.O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Saito:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii – Tax Map Key Nos. 7-3-49-36 and 7-3-49-37

Thank you for your letter of December 17, 2003 regarding Hawaii Electric Light Company, Inc.'s proposed reclassification of its Keahole Generating Station and Airport Substation lands in North Kona. A copy of the Draft Environmental Impact Statement will be forwarded to you for your review.

Should you have any questions or comments, please feel free to contact me at your convenience.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

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LINDA LINGLE
GOVERNOR OF HAWAII

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

December 19, 2003

Anthony Ching
Land Use Commission
PO Box 2359
Honolulu, HI 96804
Cc: Lee Sichter
Attention: Russell Kumabe

Dear Mr. Ching:

Subject: Environmental Impact Statement (EIS) Preparation Notice
HELCO Keahole Generating Station, Airport Substation, North Kona

We have the following comments to offer:

Two-sided pages: In order to reduce bulk and save on paper, please print on both sides of the pages in the EIS.

Acronyms/glossary list: A list of acronyms, abbreviations and a glossary of terms would be useful for the reviewer. For example, the term "Tephra Zone" appears in section 5.g. *Natural Hazards* and the abbreviations SO_2 and PM_{10} appear in section j, *Air quality*. Please include such a list in the EIS.

Air quality: In the draft EIS include a full discussion of air quality impacts to both makai and mauka facilities. Also include a windrose.

Traffic impacts assessment: In your assessment include cumulative impacts of this project in addition to those mauka of this area, i.e., Hiluhilu Development and UH Center -- West Hawaii Campus

Significance criteria: In section 8 you inadvertently omitted the 9th criterion listed in HAR 11-200-12: "(9) Substantially affects a rare, threatened, or endangered species, or its habitat." Include a discussion of this in the draft EIS.

Energy consumption: Significance criterion #13 (listed erroneously as #12 in section 8) notes that the generating station "seeks to increase not consume additional energy." In the draft EIS show the actual energy consumption of the station and list any measures you will take to reduce it.

If you have any questions call Nancy Heinrich at 586-4185.

Sincerely,

Genevieve Salmonson

GENEVIEVE SALMONSON
Director

c: Lee Sichter

Belt Collins

October 8, 2004
03P-358/2002.33.1900

Ms. Genevieve Salmonson, Director
State of Hawaii
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

We received a copy of your letter dated December 19, 2003 addressed to Mr. Anthony Ching of the State of Hawaii, Land Use Commission. In reference to your comments on Hawaii Electric Light Company's (HELCO) Keahole Generating Station and Airport Substation project, we respond as follows:

Two-Sided Pages: We will utilize both sides of the pages in printing of the Draft and Final Environmental Impact Statements (EIS) in order to reduce bulk and save on paper.

Acronyms/Glossary List: A complete list of acronyms, abbreviations, and glossary of terms will be included in the Draft and Final EIS for use by reviewers.

Air Quality: A complete and thorough discussion of air quality impacts on the surrounding area and a windrose showing the relative frequency or strength of winds from different directions will be included in the Draft and Final EIS.

Traffic Impacts Assessment: The Draft EIS will include the cumulative impacts on traffic stemming from HELCO's improvements to the generating station and other new projects in the immediate area, which will include the Palamanui/ University of Hawaii Center - West Hawaii College project, formerly known as Hiluhilu.

Significance Criteria: The ninth criterion for the Hawaii Administrative Rules, Section 11-200-12, which was inadvertently omitted in the Environmental Impact Statement Preparation Notice, will be included and discussed in the Draft EIS.

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Energy Consumption: HELCO will provide data on the actual energy consumed by the improvements to its Keahole Generating Station and Airport Substation. Any conservation measures taken to reduce consumption will also be included in the Draft EIS.

Should you have any questions or any additional comments, please feel free to contact me. Thank you very much.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: State of Hawaii, Land Use Commission
Attention: Mr. Anthony J.H. Ching, Executive Officer
Mr. Russell Kumabe, Planner

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

December 23, 2003

RECEIVED
2003 DEC 26 PM 2:02
BELT COLLINS HAWAII

Regulatory Branch

Mr. Lee Sichter
Project Manager
Belt Collins Hawaii, Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Mr. Sichter:

This responds to your request dated December 5, 2003, for comments regarding the preparation of an Environmental Impact Statement for the proposed improvements at the Hawaii Electric Light Company's Keahole Generating Station and Airport Substation, North Kona, Hawaii Island (TMKs (3)7-3-049: 36 and 37). Based on the information provided, I have determined that this location is in an upland area, and outside the limit of our jurisdiction. Therefore a Department of Army (DA) permit will not be required.

File Number 200400096 has been assigned to this project. Please feel free to contact Mr. Farley Watanabe of my staff at 438-7701, if you have additional questions.

Sincerely,

Peter C. Galloway
for GEORGE P. YOUNG, P.E.
Chief, Regulatory Branch

Belt Collins

October 8, 2004
03P-359/2002.33.1900

Mr. George P. Young, P.E.
Chief, Regulatory Branch
Department of the Army
U.S. Army Engineer District, Honolulu
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Young:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49-36 and 7-3-49-37
Department of Army, File Number 200400096

Thank you for your letter dated December 23, 2003 regarding Hawaii Electric Light Company, Inc.'s (HELCO) Environmental Impact Statement Preparation Notice. A copy of the Draft Environmental Impact Statement will be forwarded to you for your review.

We acknowledge that HELCO's Keahole Generating Station and Airport Substation are located beyond the boundaries of the Department of Army's jurisdiction, and therefore, would not require an Army permit. If further contact is necessary, we will reference the file number you provided and will also contact Mr. Farley Watanabe of your staff.

Again, thank you for your response. Should you have any questions, please feel free to contact me at your convenience.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

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LINDA LINGLE
GOVERNOR

STEPHANIE AVEIRO
EXECUTIVE DIRECTOR

PAMELA Y. DODSON
EXECUTIVE ASSISTANT

RECEIVED
2003 DEC 23 PM 2:21
BELT COLLINS HAWAII

STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
HOUSING AND COMMUNITY DEVELOPMENT CORPORATION OF HAWAII
677 QUEEN STREET, SUITE 300
Honolulu, Hawaii 96813
FAX: (808) 587-0600

03:PEO/155

December 17, 2003

Mr. Lee Sichter
Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Sichter:

Re: Hawaii Electric Light Company – Keahole Generating Station/Airport Substation

We have reviewed the Environmental Impact Statement Preparation Notice for the subject project and have no comments to offer at this time. We would appreciate being kept apprised of the status of the project.

Thank you for the opportunity to comment.

Sincerely,

Stephanie Aveiro

Stephanie Aveiro
Executive Director

c: Office of Environmental Quality Control

BeltCollins

October 8, 2004
03P-360/2002.33.1900

Ms. Stephanie Aveiro, Executive Director
Department of Human Services
Housing & Community Development
Corporation of Hawaii
677 Queen Street, Suite 300
Honolulu, Hawaii 96813

Dear Ms. Aveiro:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

Thank you for your letter dated December 17, 2003 regarding Hawaii Electric Light Company, Inc.'s Environmental Impact Statement Preparation Notice. We will keep you apprised of the status of the project and also forward for your review a copy of the Draft Environmental Impact Statement.

Should you have any questions or comments, please feel free to contact me at your convenience.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

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Harry Kim
Mayor

Bruce C. McClure
Director

Dixie Kaetsu
Managing Director

Ronald K. Takahashi
Deputy Director

County of Hawaii

DEPARTMENT OF PUBLIC WORKS

101 Pauahi Street, Suite 7 · Hilo, Hawaii 96720-3224
(808) 961-8321 · Fax (808) 961-8630

December 28, 2003

Lee Sichter, Project Manager
Belt Collins Hawaii, Ltd.
2153 N. King Street, Suite 200
Honolulu, HI 96819-4554

Subject: Environmental Impact Statement Preparation Notice
Keahole Generating Station Expansion
Keahole, N. Kona, HI
TMK: 7-3-049:036, 037

Thank you for the opportunity to comment on the subject.

DRAINAGE

All development generated runoff shall be disposed of on-site and shall not be directed toward any adjacent properties. A drainage study shall be prepared, and the recommended drainage system shall be constructed meeting with the approval of DPW.

ROADWAYS

Reservoir Road, serving the subject property is owned by the State. It has a 9-foot wide pavement within an 80- foot wide right-of-way. Reservoir Road is identified as University Drive, a collector street, in the Keahole to Kailua Development Plan (K to K Plan) as adopted by Council Resolution 296-91.

For urban industrial zones our policy is to call for improvements consisting of, but not limited to, pavement widening with concrete curb, gutter and sidewalk, drainage improvements, and any relocation of utilities; meeting with the approval of the DPW. In deference to the Planning Director, we realize the limited applicability of such improvements to the proposed development at this time, assuming the subject property will be used for electrical generation only. We would like to call attention to the alignment on the TMK maps for the continuation of this facility mauka, avoiding the reservoir site. An engineering evaluation should be made of what appears to be an infeasible or non-conforming alignment, prior to preparation of any improvement plans.

We defer to the Department of Transportation regarding the Reservoir Road entry to Queen Kaahumanu Highway.

Pukiawe Street is County owned local street that provides the primary access to the subject from County collector, **Kaiminani Drive**. Kaiminini Drive is signalized at Queen Kaahumanu Highway but not at its mauka terminus, Mamalahoa Highway. Both arterials are under the jurisdiction of the Department of Transportation. The County has no immediate plans to improve Kaiminani Drive or signalize its intersection with Mamalahoa Highway.

We may further comment upon reviewing a current TIAR to be provided with the draft EIS.

If you have any further questions, please contact Kiran Emler of our Kona office at 327-3530.

Galen M. Kuba, Division Chief
Engineering Division

KE

c: ENG-Hilo/Kona
Planning Director
Office of Environmental Quality Control

Belt Collins

October 8, 2004
03P-363/2002.33.1900

Mr. Galen M. Kuba, Division Chief
Engineer Division, County of Hawaii
Department of Public Works
101 Pauahi Street, Suite 7
Hilo, Hawaii 96720-4224

Dear Mr. Kuba:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

Thank you for your letter of December 28, 2003 commenting on Hawaii Electric Light Company, Inc.'s (HELCO) Environmental Impact Statement Preparation Notice. In reference to your comments on the Keahole Generating Station and Airport Substation properties (collectively "subject property"), we respond as follows:

DRAINAGE

HELCO has commissioned a comprehensive water resources and drainage study to assess the potential impacts of the improvements to the subject property. The results of this study will be included in the Draft Environmental Impact Statement (EIS). Be assured that HELCO will comply with all rules and regulations set by the County of Hawaii and work with the Department of Public Works to ensure that proper drainage systems are in place for any improvements to the subject property.

ROADWAYS

Reservoir Road: We concur with your comments.

Policy for Urban Industrial Zones: In the course of addressing cumulative impacts, we have learned that the Palamanui/University of Hawaii-West Hawaii Campus development, formerly known as Hiluhilu, intends to use the Reservoir Road as its primary access. We anticipate that the intersection and roadway will therefore be improved to conform to urban/residential requirements. The Draft EIS will document the planning efforts for future design of the roadways.

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Alignment: In reference to the alignment on the tax map key maps for the continuation of the Reservoir Road in the mauka direction, please be advised that any planned extension or realignment of the Reservoir Road will be the responsibility of the Palamanui project. HELCO's use of the road will be generally limited to the extent of existing access easements.

Pukiawe Street: Our findings concur.

Kaiminani Drive: Our findings concur.

We will keep you apprised of any developments and forward to you a copy of the Draft EIS. Should you have any questions or additional comments, please feel free to contact me at your convenience. Thank you very much.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RECEIVED
2004 JAN -2 PM 2:13
BELT COLLINS HAWAII

RODNEY K. HARAGA
DIRECTOR

Deputy Directors:
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

AIR-P
03.0275

December 30, 2003

Mr. Lee Sichter
Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Sichter:

Subject: Hawaii Electric Light Company, Inc. - Keahole Generating Station/Airport Substation
Early Consultation: Environmental Impact Statement Preparation Notice (EISPN)

Thank you for the opportunity to comment on the subject EISPN. We have no comments at this time.

Please contact Ms. Lynette Kawaoka, Planner, at (808) 838-8818 if you need further information.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

c: Office of Environmental Quality Control

Belt Collins

October 8, 2004
04P-004/2002.33.1900

Mr. Rodney K. Haraga, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Haraga:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii – Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

Thank you for your letter dated December 30, 2003 regarding Hawaii Electric Light Company, Inc.'s Environmental Impact Statement Preparation Notice. A copy of the Draft Environmental Impact Statement will be forwarded to you for your review

Should we need additional information, we will be in contact with Planner, Ms Lynette Kawaoka, of your department. Thank you for your assistance.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

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Kailua Kona, HI. 96740
Phone: 808-334-1633
Fax: 808-327-1703

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Fax

To:	Lee Sichter BELT COLLINS HAWAII	**From:**	George Broderson
Fax:	808-538-7819	**Date:**	January 6, 2004
Phone:	808-521-5361	**Pages:**	2
Re:	HELCO Keahole e.i.s.	**CC:**	Office of Environmental Quality Control

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Attached response letter for EISPN publication.

George Broderson

Lee Sichter, Project Manager January 6, 2004
BELT COLLINS HAWAII LTD.

Re: HELCO E.I.S. Preparation notice for **Keahole Generating Station/Airport Substation**

Sir.

I am writing in response to the rather benign paragraph (article 5, section k) about the noise coming from the HELCO Keahole facility. I'm supposing that the author of the paragraph visited the site during an operation period. The plant does have periods of quite when demand is low.

As a residence living next door to the power plant I speak with experience. I have monitored the plant using sound detectors and concur that HELCO has made improvements in sound muffling, particularly with the existing CT unit. Let me relate the present state of affairs. During peak demand, notably from the afternoon well into evening, its is not uncommon for people standing outside at our house having to raise their voices to be heard. Even though our house is located 3 football fields away and we have built a 6,000 ton rock mound between us and the power plant we still find it necessary to close the doors and windows on the HELCO side in order to block the sound. This sound is akin to a vacuum cleaner being left on for hour after hour, a constant drone and whine that is irritating ad nausium We are presently building a waterfall in hopes that this will make the noise from the plant less of a nuisance.

The other sounds mentioned do exist. The airplanes are louder. Fortunately they are sporadic and last for only a few seconds at a time. The up and down hum of the highway is a distant sound for us, easily drowned out by the power plant In fact the nature of the highway sound is similar to the ocean which itself can be quite loud and yet have a calming effect.

So with this thought, the second paragraph of article 5, section k "Noise Quality", might be something like

"HELCO has taken steps to control noise levels from the generating station with the intent of satisfying applicable regulations. Noise associated with vehicular traffic on Queen Kaahumanu Highway and jet aircraft arrivals and departures from Kona International Airport represent <other> events in the area. <Though they are different in nature being more sporadic and shorter in duration.>"

George Broderson
73-897 Kupaloke St.
Kailua Kona, HI 96740

Belt Collins

October 8, 2004
04P-005/2002.33.1900

Mr. George Broderson
73-897 Kupaloke Street
Kailua-Kona, Hawaii 96740

Dear Mr. Broderson:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

Thank you for your letter dated January 6, 2004 commenting on Hawaii Electric Light Company, Inc.'s (HELCO) Environmental Impact Statement Preparation Notice. A copy of the Draft Environmental Impact Statement will be forwarded to you for your review

Your comments were very helpful. We concur that the noise generated from jet aircraft arrivals and departures are the louder events in the area, but are probably more sporadic and shorter in duration than the quieter but constant noise generated from the power plant.

Please be assured that HELCO has indeed taken steps to control current noise levels at the Keahole Generating Station and will continue to do so after the improvements are completed. We have commissioned a noise study, the findings of which will be included in the Draft Environmental Impact Statement.

Should you have any questions or further comments, please contact us again. Thank you.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

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LINDA LINGLE
GOVERNOR

ANTHONY J.H. CHING
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
P.O. Box 2359
Honolulu, Hawaii 96804-2359
Telephone: 808-587-3822
Fax: 808-587-3827

December 31, 2003

Mr. Lee Sichter
Belt Collins Hawaii, Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Mr. Sichter:

Subject: Keahole Generating Station and Airport Substation
Environmental Impact Statement Preparation Notice ("EISPN")
TMK: 7-3-049: 036
7-3-049: 037
North Kona, State and County of Hawaii

This is to acknowledge receipt of the subject EISPN on November 25, 2003.

Based upon review of the subject EISPN, we have the following comments:

1. Section 5. a. Land Use Designations and Controls – We recommend that the Draft Environmental Impact Statement ("DEIS") include discussion of the project's conformance with the policies and objectives of Chapter 205A, Hawaii Revised Statutes ("HRS"). Though the project area is not within the Special Management Area for the County of Hawaii, it is within the Coastal Zone Management Area pursuant to Section 205A-1, HRS.

2. We would like to point out that north of the adjacent proposed University of Hawaii – West Hawaii campus project, will be the proposed Palamanui, residential and mixed-use development comprising of approximately 725 acres of land in the State Land Use Conservation and Agricultural Districts. We recommend including

descriptions of this project in the DEIS section relating to areas surrounding the subject project.

3. We recommend including Waimana Enterprises, Inc. ("Waimana") in the public/agency review of the DEIS. Waimana has filed its intent to intervene in the LUC proceedings of the subject project.

4. We reserve additional comments for our review of the DEIS.

Should you require clarification or further assistance in this matter, please do not hesitate to contact Russell Kumabe of my staff at 587-3822.

Sincerely,

ANTHONY J. H. CHING
Executive Officer

c: Benjamin A. Kudo, Esq.
Warren H. W. Lee

BelfCollins

October 8, 2004
04P-026/2002.33.1900

Mr. Anthony J.H. Ching, Executive Officer
State of Hawaii, Land Use Commission
P.O. Box 2359
Honolulu, Hawaii 96804-2359

Dear Mr. Ching:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

Thank you for your letter dated December 31, 2003 commenting on Hawaii Electric Light Company, Inc.'s (HELCO) Environmental Impact Statement Preparation Notice for the Keahole Generating Station and Airport Substation in North Kona. In reference to your comments, we respond as follows:

1. Hawaii Revised Statutes (HRS), Chapter 205A: A discussion of HRS Chapter 205A and Section 205A-1, will be included in the Land Use Designation and Controls section of HELCO's Draft Environmental Impact Statement (EIS).

2. University of Hawaii – West Hawaii Campus Project: A discussion of the proposed Palamanui/University of Hawaii-West Hawaii campus project, which will include residential and mixed-use development comprised of approximately 725 acres of land in the State Land Use Conservation and Agricultural Districts, will be included in the Draft EIS. In addition to the Palamanui project located to the north of power plant, other proposed projects within the immediate vicinity will also be discussed.

3. Waimana Enterprises, Inc.: We will include Waimana Enterprises, Inc. as a consulted party if they so request, or are accepted by the Land Use Commission as an intervening party.

Should you have any questions or further comments, please contact me at your convenience. Thank you very much.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter, Project Manager

cc: Office of Environmental Quality Control

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[redacted]
LINDA LINGLE
GOVERNOR

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

PATRICIA HAMAMOTO
SUPERINTENDENT

RECEIVED
2004 JAN -7 PM 2:32
BELT COLLINS HAWAII

OFFICE OF THE SUPERINTENDENT

January 5, 2004

Mr. Lee Sichter, Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Sichter:

Subject: Keahole Generating Station and Airport Substation
Keahole, North Kona, TMK: 7-3-49:35 and 7-3-49:37

The Department of Education (DOE) has reviewed the Environmental Impact Statement Preparation Notice (EISPN) for Hawaii Electric Light Company, Inc.'s Keahole Generating Station and Airport Substation. The DOE has no comment or concern at this time.

Thank you for the opportunity to review the report. If you have any questions, please call Rae M. Loui, Assistant Superintendent of the Office of Business Services, at 586-3444 or Heidi Meeker of the Facilities and Support Services Branch at 733-4862.

Very truly yours,

Patricia Hamamoto
Superintendent

PH:hy

c: OBS
FSSB
G. Salmonson, OEQC
CAS/Hawai'i District

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

Belt Collins

October 8, 2004
04P-027/2002.33.1900

Ms. Patricia Hamamoto, Superintendent
State of Hawaii, Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Dear Ms. Hamamoto:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

Thank you for your letter dated January 5, 2004 regarding Hawaii Electric Light Company, Inc.'s Environmental Impact Statement Preparation Notice. A copy of the Draft Environmental Impact Statement will be forwarded to you for your review.

Should you have any questions, please feel free to contact me at your convenience.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

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Harry Kim
Mayor

Christopher J. Yuen
Director

Roy R. Takemoto
Deputy Director

County of Hawaii
PLANNING DEPARTMENT
101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720-3043
(808) 961-8288 • Fax (808) 961-8742

December 29, 2003

Mr. Lee Sichter, Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, HI 96819

Dear Mr. Sichter:

Early Consultation: Environmental Impact Statement Preparation Notice
Hawaii Electric Light Company, Inc.
Keahole Generating Station/Airport Substation

Thank you for providing us with a copy of the Environmental Impact Statement Preparation Notice (EISPN) for the Hawaii Electric Light Company, Inc.'s Keahole Generating Station/Airport Substation.

Page 7 of the EISPN states that the existing General Plan Land Use Pattern Allocation Guide Map designates the property as Extensive Agriculture and that proposed revision to the General Plan would designate the property as Urban Expansion. For your information, we are sending you a copy of the Planning Department's letter dated January 14, 1994, informing Mr. Albert Lyman that the General Plan Land Use Pattern Allocation Guide Map designation for the property is Urban Expansion Area. Therefore, the proposed amendment to the 2001 General Plan LUPAG map is merely a housekeeping change to reflect the current land use designation for the Hawaii Electric Light Company, Inc.'s property based on an interpretation made previously by this department.

Although we have no additional comments at this time, we would appreciate being consulted when the Draft Environmental Impact Statement is completed.

Should you have any questions in the meantime, please feel free to contact Norman Hayashi of this office at 961-8288.

Sincerely,

CHRISTOPHER J. YUEN
Planning Director

Enclosure

NH:pak
P:\wpwin60\norm\letters\sichter helco eisps 12-29-03

cc: Mr. Warren Lee, President, HELCO

Belt Collins

October 8, 2004
04P-028/2002.33.1900

Mr. Christopher J. Yuen
Planning Director, County of Hawaii
Planning Department
101 Pauahi Street, Suite 3
Hilo, Hawaii 96720-3043

Dear Mr. Yuen:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49-36 and 7-3-49-37

Thank you for your letter dated December 29, 2003 clarifying the land use designations for the Keahole Generating Station and Airport Substation properties (collectively "subject property").

We understand that in 1994, the Planning Department determined that the subject property would be designated as Urban Expansion on the Land Use Pattern Allocation Guide map for the County of Hawaii General Plan. We will revise our text for the Draft Environmental Impact Statement (EIS) accordingly.

A copy of the Draft EIS will be forwarded to you for your review. Should you have any questions or additional comments, please feel free to contact me. Thank you very much.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 8, 2004
KEAHOLEGENSTAFF.RCM2
AO3-734HELC.RCM2

LD-NAV
P-10332

Belt Collins Hawaii
Mr. Lee Sichter, Project Manager
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Mr. Sichter:

SUBJECT: Early Consultation - Environmental Impact Statement Preparation Notice
Petition: AO3-743/Hawaii Electric Light Company, Inc.
Project: Electrical Generating Station and Substation
Location: Keahole, North Kona, Hawaii - TMK: (3) 7-3-49: 036

Thank you for your letter dated December 5, 2003 informing us of the proposed project.

A copy of your letter and (summary of project) was made available or distributed to the following Department of Land and Natural Resources' Divisions for their review and comment:

- Division of Forestry and Wildlife
- Na Ala Hele Trails
- Division of State Parks
- Engineering Division
- Commission on Water Resource Management
- Office of Conservation and Coastal Lands
- Land-Hawaii District Land Office
- Land-Planning and Development

Enclosed please find a copy of the Engineering Division, Office of Conservation and Coastal Lands and Gary Martin of the Land Division Central Office comments.

Further enclosed is a copy of our correspondence to the Department of Business Economic Development & Tourism, Office of State Planning pertaining to Hawaii Electric Light Company, Inc.'s application for State Land Use District Boundary Amendment.

Based on the attached responses, the Department of Land and Natural Resources has no other comment to offer on the subject matter. Should you have any questions, please contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 587-0384.

Very truly yours,

DIERDRE S. MAMIYA
Administrator

Belt Collins

October 8, 2004
04P-029/2002.33.1900

Ms. Dierdre S. Mamiya, Administrator
State of Hawaii, Department of Land
and Natural Resources, Land Division
P.O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Mamiya:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

Thank you for your letter dated January 8, 2004, and for providing us with the responses from various staff members of the Department of Land and Natural Resources' (DLNR) divisions. Copies of the Draft Environmental Impact Statement will be forwarded to the DLNR for further review and comment.

Should you or any or your staff members have any questions or additional comments, please feel free to contact me.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

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GOVERNOR OF HAWAII

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KAHOOLAWE ISLAND RESERVE COMMISSION
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January 7, 2004

LD-GM

MEMORANDUM:

TO: Nick Vacarro

FROM: Gary Martin

SUBJECT: EIS Preparation Notice – Hawaii Electric Light Company, Inc. (HELCO), Keahole Generating Station/Airport Substation, Tax Map Key: 7-3-49: 36

Our office is processing a water permit for HELCO, at its request, to use brackish groundwater obtained via an existing well located at its Keahole Generating Station site. The permit will serve as an interim agreement providing HELCO with sufficient land tenure to commence the operation of the well while it pursues a long term lease for the use of the groundwater for industrial and emergency fire suppression purposes.

HELCO estimates it will need about 200,000 gallons of water per day in serving the above purposes. The Keauhou aquifer system is the groundwater source for HELCO's on site well and has an estimated sustainable yield of 38 million gallons per day. This system covers approximately 167 square miles.

Prior to commencing the well's operation, however, HELCO must reapply for a for a water well pump installation permit to replace its expired permit that was approved by the Commission on Water Resource Management (CWRM) in 1999. On December 12, 2003 HELCO resubmitted its application, which is currently being processed by CWRM.

The permit to HELCO, which was approved by the Board of Land and Natural Resources at its December 12, 2003 meeting, under agenda item D-31, and subsequent lease of the groundwater rights to HELCO will assist it in honoring its commitment, pursuant to a recent settlement agreement, to transfer 90% of its potable County of Hawaii water allocation to the Department of Hawaiian Home Lands (DHHL). The transfer cannot occur until HELCO has secured the long-term use of water from an alternate source.

DHHL owns several hundred acres of land adjacent and/or in close proximity to HELCO's Keahole Generating Station. HELCO's commitment to transfer its potable water allocation to DHHL allows DHHL to expedite the residential development of its Keahole lands. Without HELCO's commitment DHHL's alternatives were 1) to develop its own potable water system at great cost, or 2) to wait for the county government to develop additional water sources.

Although HELCO's well is located on land it owns the water permit from the State is necessary because the Keahole Generating Station is former State-owned land conveyed to HELCO by Land Patent Grant No. S-15,951 which reserved unto the State the appurtenant water and mineral rights.

We support HELCO's request to reclassify its Keahole Generating Station site from the conservation district to the urban district for the reasons disclosed in the EIS Preparation Notice.

We appreciate this opportunity to comment on the subject matter.

If you have any questions, please call Gary Martin at 587-0421.

c: Belt Collins Hawaii, Ltd./Lee Sichter
Central Files
District Files

Belt Collins

October 8, 2004
04P-030/2002.33.1900

Mr. Gary Martin
State of Hawaii, Department of Land
and Natural Resources, Land Division
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Martin:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii – Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

Thank you for forwarding us a copy of your memorandum dated January 7, 2004, directed to Mr. Nick Vacarro of the Land Division for the Department of Land and Natural Resources (DLNR). We appreciate the DLNR's support of Hawaii Electric Light Company, Inc.'s (HELCO) Petition for a Boundary Amendment for its Keahole Generating Station and Airport Substation lands in North Kona. In response to your comments, we respond as follows:

Water Permits and Usage
We concur with your statements with regard to the water permits and approximate usage. The Board of Land & Natural Resources (BLNR) did approve on December 12, 2003 a water permit and subsequent lease of groundwater rights that would allow HELCO to draw brackish groundwater from an existing well located at the Keahole Generating Station site. HELCO estimates that it will need approximately 200,000 gallons of water per day for industrial and emergency fire suppression purposes.

Transfer of Water to Department of Hawaiian Home Lands
Your statements are correct, in that, pursuant to the terms of a Settlement Agreement, HELCO plans to transfer approximately 90 percent of its potable County of Hawaii water allocation in excess of its needs to the Department of Hawaiian Home Lands (DHHL). This transfer would allow DHHL to expedite residential development of its lands adjacent to the generating station. Otherwise, the DHHL would have had to (1) develop its own potable water at great cost, or (2) wait for the County to develop additional water sources.

Support of Reclassification
The reclassification of the land from the Conservation District to the Urban District would be a step in the right direction. The reclassification would allow HELCO to (1) bring the State Land Use District Classification into conformance with the existing and proposed use of the project area as an electrical generating station and substation; (2) facilitate future operation and maintenance of the generating station; and (3) implement proposed environmental mitigation measures.

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Should you have any questions or additional comments, please feel free to contact me. Again, thank you for your comments.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
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KAHOOLAWE ISLAND RESERVE COMMISSION
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MEMORANDUM:

TO: Nicholas Viccaro, Land Agent
Land Division

FROM: Sam Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT: State Land Use Boundary Amendment from Conservation to Urban by Hawaii Electric Light Company, Inc.

The Hawaii Electric Light Company, Inc. has been ordered by the Board of Land and Natural Resources to file a petition for boundary amendment with the State Land Use Commission. The deadline for filing was December 31, 2003. The petition was filed on November 25, 2003.

The Department and Board of Land and Natural Resources instructed HELCO to file a petition and seek a boundary change from Conservation to Urban because the subject land does not have important natural resource attributes and is being utilized for industrial purposes. The surrounding lands are being utilized for commercial/industrial purposes. The Department and Board of Land and Natural Resources supports the proposed change from Conservation to Urban.

Should you have any questions on any of these matters, please feel free to contact me at 587-0381.

Belt Collins

October 8, 2004
04P-031/2002.33.1900

Mr. Sam Lemmo, Administrator
Office of Conservation and Coastal Lands
State of Hawaii, Department of Land
and Natural Resources, Land Division
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Lemmo:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii – Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

We received a copy of your memorandum to Nicholas Viccaro of the Land Division for the Department of Land and Natural Resources (DLNR). We appreciate the DLNR's and the Board of Land and Natural Resources' support of Hawaii Electric Light Company, Inc.'s Petition for a Boundary Amendment from the Conservation District to the Urban District. The reclassification is a step in the right direction, given the fact that the land does not have important natural resource attributes and has been utilized as a generating station and substation since the 1970s.

Should you have any additional comments or questions, please feel free to contact me.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 10, 2003

LD/NAV
Ref.: KEAHOLEGENSTAT.CMT Suspense Date: 12/19/03

MEMORANDUM:

TO: Division of Aquatic Resources
*XXX Division of Forestry & Wildlife
*XXX Na Ala Hele Trails
XXX Division of State Parks (DD)
XXX Engineering Division (DD)
Division of Boating and Ocean Recreation
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Land-Hawaii District Land Office (DD)
*XXX Keith Chun Planning and Development Manager

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Early Consultation: Environmental Impact Statement Preparation Notice (EISPN) pertaining to Hawaii Electric Light Company, Inc. Keahole Generating Station and Keahole Airport Substation North Kona, Hawaii - TMK: (3) 7-3-49 & 10 (34 parcels)

Please review the EISPN pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the EISPN is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the document, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(✓) We have no comments. ( ) Comments attached.

Division: LAND DIV; PLANNING & DEVELOPMENT Signed: KC

Date: 12/19/03 Name: KEITH CHUN

LINDA LINGLE
GOVERNOR OF HAWAII

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2003 DEC 29 A 11:05

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
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PETER T. YOUNG
CHAIRPERSON
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COMMISSION ON WATER RESOURCE MANAGEMENT

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DEPUTY DIRECTOR - WATER

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December 22, 2003

LD/NAV
Ref.: AO3-734HELC.CMT

Suspense Date: 12/27/03

MEMORANDUM:

TO:
- Division of Aquatic Resources
- *XXX Division of Forestry & Wildlife
- *XXX Na Ala Hele Trails
- *XXX Division of State Parks
- *XXX Engineering Division
- Division of Boating and Ocean Recreation
- *XXX Commission on Water Resource Management
- *XXX Office of Conservation and Coastal Lands
- XXX Land-Hawaii District Land Office (DD)
- *XXX Keith Chun Planning and Development Manager

FROM: Dierdre S. Mamiya, Administrator
Land Division

RECEIVED
LAND DIVISION
2003 DEC 29 P 3:55

SUBJECT: PETITION FOR AMENDMENT TO THE STATE LAND USE DISTRICT BOUNDARIES
- Request: Conservation to Urban District
- Applicant: Hawaii Electric Light Company, Inc.
- Proposed: Electrical Generating Station and Substation
- Location: North Kona, Hawaii
- TMK: (3) 7-3-49: 36 & 37

Please review the document pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the document is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the document, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(✓) We have no comments. ( ) Comments attached.

Division: PLANNING/DEVELOPMENT Signed: KC

Date: 12-23-03 Name: KEITH CHUN

BelfCollins

October 8, 2004
04P-032/2002.33.1900

Mr. Keith Chun, Manager
Planning and Development
State of Hawaii, Department of Land
and Natural Resources, Land Division
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Chun:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

Thank you for your responses dated December 19 and December 23, 2003 regarding Hawaii Electric Light Company, Inc.'s Petition for a Land Use District Boundary Amendment from the Conservation District to the Urban District. Copies of the Draft Environmental Impact Statement will be forwarded to the Department of Land and Natural Resources for further review and comment.

Should you have any questions, please feel free to contact me.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

Belt Collins Hawaii Ltd.
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LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION
2003 DEC 15 P 1:55

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 10, 2003

LD/NAV
Ref.: KEAHOLEGENSTAT.CMT

Suspense Date: 12/19/03

RECEIVED
LAND DIVISION
2004 JAN -2 A 10:05

MEMORANDUM:

TO:
- Division of Aquatic Resources
- *XXX Division of Forestry & Wildlife
- *XXX Na Ala Hele Trails
- XXX Division of State Parks (DD)
- XXX Engineering Division (DD)
- Division of Boating and Ocean Recreation
- *XXX Commission on Water Resource Management
- *XXX Office of Conservation and Coastal Lands
- XXX Land-Hawaii District Land Office (DD)
- *XXX Keith Chun Planning and Development Manager

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Early Consultation: Environmental Impact Statement Preparation Notice (EISPN) pertaining to Hawaii Electric Light Company, Inc. Keahole Generating Station and Keahole Airport Substation North Kona, Hawaii - TMK: (3) 7-3-49 & 10 (34 parcels)

Please review the EISPN pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the EISPN is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the document, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

( ) We have no comments. (✓) Comments attached.

Division: Engineering

Signed: Eric T. Hirano

Date: 12/31/03

Name: ERIC T. HIRANO, CHIEF ENGINEER

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LA/NAV

Ref.: KEAHOLEGENSTAT.CMT

COMMENTS

(✓) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone X.

( ) Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone ___.

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

( ) Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- ( ) Mr. Robert Sumimoto at (808) 523-4254 or Mr. Mario Siu Li at (808) 523-4247 of the City and County of Honolulu, Department of Planning and Permitting.
- ( ) Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.
- ( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
- ( ) Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

( ) The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.

( ) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

( ) Additional Comments: _____

( ) Other: _____

Should you have any questions, please call Mr. Eric Yuasa of the Planning Branch at 587-0254.

Signed: Eric T. Hirano
ERIC T. HIRANO, CHIEF ENGINEER

Date: 12/31/03

Belt Collins

October 8, 2004
04P-033/2002.33.1900

Mr. Eric T. Hirano, Chief Engineer
Engineering Division
State of Hawaii, Department of Land
and Natural Resources, Land Division
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Hirano:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii – Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

Thank you for your response dated December 31, 2003 regarding Hawaii Electric Light Company, Inc.'s Petition for a Land Use District Boundary Amendment from the Conservation District to the Urban District. Copies of the Draft Environmental Impact Statement will be forwarded to the Department of Land and Natural Resources for further review and comment.

We concur that the project is located in Flood Zone X on the Flood Insurance Rate Map. Should you have any further comments or questions, please feel free to contact me.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

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LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

December 10, 2003

LD/NAV
Ref.: KEAHOLEGENSTAT.CMT

Suspense Date: 12/19/03

RECEIVED
LAND DIVISION
2003 DEC 22 P 4:05

MEMORANDUM:

TO: Division of Aquatic Resources
*XXX Division of Forestry & Wildlife
*XXX Na Ala Hele Trails
XXX Division of State Parks (DD)
XXX Engineering Division (DD)
Division of Boating and Ocean Recreation
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Land-Hawaii District Land Office (DD)
*XXX Keith Chun Planning and Development Manager

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Early Consultation: Environmental Impact Statement Preparation Notice (EISPN) pertaining to Hawaii Electric Light Company, Inc. Keahole Generating Station and Keahole Airport Substation North Kona, Hawaii - TMK: (3) 7-3-49 & 10 (34 parcels)

Please review the EISPN pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the EISPN is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the document, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(X) We have no comments. ( ) Comments attached.

Division: _____

Signed:

Date: DEC 17 2003

Name: MICHAEL G. BUCK, ADMINISTRATOR
DIVISION OF FORESTRY AND WILDLIFE

Belt Collins

October 8, 2004
04P-034/2002.33.1900

Mr. Michael G. Buck, Administrator
Division of Forestry and Wildlife
State of Hawaii, Department of Land
and Natural Resources, Land Division
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Buck:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

Thank you for your response dated December 17, 2003 regarding Hawaii Electric Light Company, Inc.'s Petition for a Land Use District Boundary Amendment from the Conservation District to the Urban District. Copies of the Draft Environmental Impact Statement will be forwarded to the Department of Land and Natural Resources for further review and comment.

Should you have any questions, please feel free to contact me.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

Honolulu
Guam
Hong Kong
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LINDA LINGLE
GOVERNOR OF HAWAII

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DIVISION OF
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Dec 15 10 15 AM '03

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 10, 2003

LD/NAV
Ref.: KEAHOLEGENSTAT.CMT Suspense Date: 12/19/03

MEMORANDUM:

TO:
- Division of Aquatic Resources
- *XXX Division of Forestry & Wildlife
- *XXX Na Ala Hele Trails
- XXX Division of State Parks (DD)
- XXX Engineering Division (DD)
- Division of Boating and Ocean Recreation
- *XXX Commission on Water Resource Management
- *XXX Office of Conservation and Coastal Lands
- XXX Land-Hawaii District Land Office (DD)
- *XXX Keith Chun Planning and Development Manager

FROM: Dierdre S. Mamiya, Administrator
Land Division

RECEIVED
LAND DIVISION
2003 DEC 19 A 8:00

SUBJECT: Early Consultation: Environmental Impact Statement Preparation Notice (EISPN) pertaining to Hawaii Electric Light Company, Inc. Keahole Generating Station and Keahole Airport Substation North Kona, Hawaii - TMK: (3) 7-3-49 & 10 (34 parcels)

Please review the EISPN pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the EISPN is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the document, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(✓) We have no comments. ( ) Comments attached.

Division: State Parks Signed:

Date: 12/18/03 Name: David S. Quinn

Belt Collins

October 8, 2004
04P-034/2002.33.1900

Mr. Daniel S. Quino
Division of State Parks
State of Hawaii, Department of Land
and Natural Resources, Land Division
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Quino:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49:36 and 7-3-49:37

Thank you for your response dated December 18, 2003 regarding Hawaii Electric Light Company, Inc.'s Petition for a Land Use District Boundary Amendment from the Conservation District to the Urban District. Copies of the Draft Environmental Impact Statement will be forwarded to the Department of Land and Natural Resources for further review and comment.

Should you have any questions, please feel free to contact me.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

Honolulu
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Hong Kong
Philippines
Seattle
Singapore
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DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

RECEIVED

OFFICE OF PLANNING
235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

'03 DEC 18 A8:20

DEPT OF LAND
& NATURAL RESOURCES
STATE OF HAWAII

Ref. No. P-10332

December 15, 2003

To: Peter Young, Chairperson
Department of Land and Natural Resources

From: Mary Lou Kobayashi
Planning Program Administrator, Office of Planning

Subject: Petition for Amendment to the State Land Use District Boundaries

We have received the following petition requesting a District Boundary change:

Petition:	A03-743/Hawaii Electric Light Company, Inc.
Requested Change:	Conservation to Urban District
Proposed Use:	Electrical Generating Station and Substation
Location:	Keahole, North Kona, Hawaii TMK: (3) 7-3-049: 036 and (3) 7-3-049: 037
Area:	15.643 acres

RECEIVED
LAND DIVISION
2003 DEC 19 P 3:13

We are transmitting the subject petition for your review and comments. We are particularly interested in information regarding the anticipated effects of the boundary change on areas of concern to your Department, as well as any programs planned for the subject area. We request that your comments address any applicable goals, objectives, policies, and priority guidelines of the Hawaii State Plan. Any planning documents, maps, statistics, or other information relevant to your comments or of interest to our review of the petition would also be appreciated.

The State's position on the petition must be filed with the Land Use Commission (LUC) within 30 days of the petition's acceptance as a proper filing by the LUC. To insure that your agency's comments are considered in the development of the State's position, it is important that your comments are received no later than December 31, 2003.

Belt Collins

October 8, 2004
04P-034/2002.33.1900

Ms. Mary Lou Kobayashi
Planning Program Administrator
Office of Planning, Department of Business
Economic Development & Tourism
235 South Beretania Street, 6th Floor
Honolulu, Hawaii 96813

Dear Ms. Kobayashi:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49-36 and 7-3-49-37

We received a copy of your memorandum directed to Chairperson Peter Young of the Department of Land and Natural Resources (DLNR), regarding Hawaii Electric Light Company Inc.'s (HELCO) Petition for a Boundary Amendment from the State Conservation District to the Urban District. The DLNR fully supports the boundary amendment, and in fact, actually instructed HELCO to petition the Land Use Commission for the change.

HELCO's Draft Environmental Impact Statement (EIS) will fully discuss in detail the effects of the boundary amendment on any applicable goals, objectives, policies, and priority guidelines of the Hawaii State Plan; the State Functional Plans; and applicable County of Hawaii plans. A copy of the Draft EIS will be forwarded to you for your review.

Should you have any questions, please feel free to contact me. Thank you very much.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200 ▪ Honolulu, Hawaii 96819-4554 USA
T/808 521 5361 ▪ F/808 538 7819 ▪ honolulu@beltcollins.com ▪ www.beltcollins.com
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P.O. BOX 2159
KAMUELA, HAWAII 96743
TEL: 808.885.9588
FAX: 808.885.9590
hlpc@gte.net

HAWAII LEEWARD PLANNING CONFERENCE
PO BOX 2159 • KAMUELA, HAWAII 96743-2159

RECEIVED 12/16/03

December 15, 2003

Hawaii Electric Light Company, Inc.
P.O. Box 2750
Honolulu HI 96840

RE: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN). KEAHOLE GENERATING STATION AND AIRPORT SUBSTATION

To Whom It May Concern:

The Hawaii Leeward Planning Conference has been involved in Land Use and Planning issues in West Hawaii for the past 30 years and has actively participated in all County and State General and Regional Plans.

We strongly support the expansion and upgrades to the Keahole Facility and the proposed reclassification of the land from the State Conservation District to the Urban District. The Hawaii Island Energy Roundtable (a diverse group of public and private organizations and individuals) has strongly endorsed the expansion of Keahole as a key component to address our critical energy needs. The land reclassification conforms to all existing plans for the region.

Thank you for the opportunity to comment.

Regards,

John B. Ray

John B. Ray
President
Hawaii Leeward Planning Conference

Belt Collins

October 8, 2004
04P-035/2002.33.1900

Mr. John B. Ray, President
Hawaii Leeward Planning Conference
P.O. Box 2159
Kamuela, Hawaii 96743

Dear Mr. Ray:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49-36 and 7-3-49-37

Thank you very much for your letter of December 15, 2003, voicing your support of Hawaii Electric Light Company, Inc.'s (HELCO) proposed land use reclassification and improvements to the Keahole facility in North Kona. A copy of the Draft Environmental Impact Statement will be forwarded to you for your review.

HELCO concurs with members of the Hawaii Leeward Planning Conference and the Hawaii Island Energy Roundtable that the project will be a key component in addressing the energy needs on the Big Island, and in particular, the West Hawaii region.

Should you have any questions or additional comments, please feel free to contact me.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

Honolulu
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Singapore
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DEPARTMENT OF THE NAVY
PACIFIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
258 MAKALAPA DR., STE. 100
PEARL HARBOR, HI 96860-3134

RECEIVED
2005 JAN 20 PM 2:29
BELT COLLINS

5090P.1F0C
Ser PLN23/

15 JAN 2004

Mr. Lee Sichter, Project Manager
Belt Collins Hawaii, Ltd.
2153 North King Street, Suite 200
Honolulu, HI 96819-4554

Dear Mr. Sichter:

Subj: EARLY CONSULTATION: ENVIRONMENTAL IMPACT STATEMENT (EIS) PREPARATION NOTICE HAWAII ELECTRIC LIGHT COMPANY, INC. – KEAHOLE GENERATING STATION/AIRPORT SUBSTATION

Thank you for the opportunity to comment on the Environmental Impact Statement Preparation Notice (EISPN) for the Hawaii Electric Light Company, Inc. – Keahole Generating Station and Airport Substation located in North Kona, Hawaii.

The Navy has no comments to offer at this time. However, the Navy requests to remain on the mailing list to receive the Draft and Final EIS documents for the subject project. Request all future correspondence on this project be sent to the following address:

Commander
Attn: N465
Navy Region Hawaii
850 Ticonderoga Street, Suite 110
Pearl Harbor, HI 96860-5102

We look forward to receiving your future correspondence on this project.

Sincerely,

MELVIN N. KAKU
Director
Environmental Planning Division

Copy to:
Office of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, HI 96813

Belt Collins

October 8, 2004
04P-036/2002.33.1900

Melvin N. Kaku, Director
Environmental Planning Division
Department of the Navy,Pacific Division
Naval Facilities Engineering Command
258 Makalapa Drive, Ste. 100
Pearl Harbor, Hawaii 96860-3134

Dear Mr. Kaku:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii - Tax Map Key Nos. 7-3-49-36 and 7-3-49-37

Thank you for your letter dated January 15, 2004 regarding Hawaii Electric Light Company, Inc.'s (HELCO) Environmental Impact Statement Preparation Notice. We will forward a copy of the Draft Environmental Impact Statement to the Commander for the Navy Region Hawaii at the address provided in your letter.

Again, thank you for your response. Should you have any questions, please feel free to contact me.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

Honolulu
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Hong Kong
Philippines
Seattle
Singapore
Thailand

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LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

RECEIVED
2004 FEB 26 PM 3:
BELT COLLINS HA

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

February 23, 2004

Lee Sichter, Project Manager
Belt Collins Hawaii Ltd.
2153 North King St.
Honolulu, Hawaii 96819

LOG NO: 2004.0555
DOC NO: 0402MM26

Dear Mr. Sichter:

SUBJECT: Chapter 6E-42 Early Consultation for Environmental Impact Statement Preparation Notice, Hawaii Electric Light Company, Inc., Keahole Generating Station/Airport Substation Kalaoa 1-4, North Kona District, Hawaii Island
TMK: (3) 7-3-049:036-037

Thank you for your letter of December 5, 2003 with your request to comment on the EIS preparation for this project. We apologize for the delay in responding, and for any inconvenience this may have caused you.

We understand you propose to change the classification of the subject property from State Conservation District to Urban District and change the County of Hawaii zoning from "Open" to "General Industrial." The project area includes both Parcels 36 and 37, and roadway easements 1-3 which are currently on State-owned land.

You indicate that the 1993 Revised Final Environmental Impact Statement (RFEIS) identified no archaeological sites within Parcel 36, and that no sites are present on Parcel 37 due to previous land alteration. You state, however, that "appropriate research and a review of the archaeological, historical, and documentary background of the Keahole Generating Station project area will be conducted to update the archaeological inventory survey taken in 1992."

We agree that an updated inventory survey to meet current standards will assure that the total project area, including the easements, is properly evaluated. We look forward to reviewing this work.

If you have any questions about these comments, please feel free to contact Dr. Patrick McCoy in our Oahu office (808) 692-8029 or MaryAnne Maigret in our Hawaii Island office (808) 327-3690.

Aloha,

P. Holly McEldowney, Administrator
State Historic Preservation Division

MM:jen

c. Chris Yuen, County of Hawaii Planning Department
Kai Emler, County of Hawaii Department of Public Works
Mary Lou Kobayashi, Administrator, Office of Planning

Belt Collins

October 8, 2004
04P-095/2002.33.1900

P. Holly McEldowney, Administrator
State Historic Preservation Division
Department of Land & Natural Resources
Kakuhihewa Building, Room 555
Kapolei, Hawaii 96707

Dear Ms. McEldowney:

Environmental Impact Statement Preparation Notice for the
Hawaii Electric Light Company, Inc. - Keahole Generating Station & Airport Substation
North Kona, Hawaii – Tax Map Key Nos. 7-3-49-36 and 7-3-49-37
Department of Army, File Number 200400096

Thank you for your letter dated February 23, 2004 regarding Hawaii Electric Light Company, Inc.'s (HELCO) Environmental Impact Statement Preparation Notice. A copy of the Draft Environmental Impact Statement will be forwarded to you for your review.

The current inventory survey of the archaeological, historical, and documentary background of the Keahole Generating Station will include the Airport Substation and roadway easements. The purpose of the survey is to meet current standards and ensure that the entire project area is properly evaluated.

Again, thank you for your response. Should you have any questions, please feel free to contact me.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee Sichter
Project Manager

cc: Office of Environmental Quality Control

Honolulu
Guam
Hong Kong
Philippines
Seattle
Singapore
Thailand

7.3. COMMENTS ON DRAFT EIS

The Notice of Availability of the Draft Environmental Impact Statement for the Keahole Generating Station and Airport Substation Urban Reclassification was published in the Office of Environmental Quality Bulletin on November 8, 2004. The 45-day public review and comment period ended on December 23, 2004. A total of twenty-six (26) written comments were received, and postmarked before the deadline. One additional comment letter was received after the deadline and has been included in this Final Environmental Impact Statement. Following is a list of the agencies, organization and/or individuals who commented on the Draft Environmental Impact Statement, in the order the comments were received. All 27 letters, together with our responses to them are reproduced below. Where ever changes to the document have been made in response to a comment received, the revised text is presented in our response letter and the revision is highlighted in the text of the Final Environmental Impact Statement. We sincerely appreciate the time and effort of the consulting parties in reviewing the document. We believe it is better because of their participation.

William Wong, P.E., Chief, Safe Drinking Water Branch, Environmental Management Division, State of Hawaii, Department of Health

Russell S. Takata, Program Manager, Noise, Radiation & Indoor Air Quality Branch, State of Hawaii Department of Health

Harold K. Yee, P.E., Chief, Wastewater Branch, State of Hawaii, Department of Health

Raymond Carr, Energy Coordinator, County of Hawaii, Department of Research and Development

Darice B. N. Young, Realty Contracting Officer, U.S. Department of Transportation Federal Aviation Administration, Western-Pacific Region, Real Estate and Utilities Section, AHNL-54B

Stephanie Aveiro, Executive Director, State of Hawaii, Department of Human Services, Housing and Community Development Corporation of Hawaii

Genevieve Salmonson, Director, State of Hawaii, Office of Environmental Quality Control

Dierdre S. Mamiya, Administrator, State of Hawaii, Department of Land and Natural Resources, Land Division. Includes letters from the Engineering Division, Commission on Water Resources Management, Office of Conservation and Coastal Lands, Land-Hawaii District Land Office, and Land-Gary Martin.

George P. Young, P.E., Chief, Regulatory Branch, Department of Defense, Department of the Army

Maurice H. Kaya, P.E., Chief Technology Officer, State of Hawaii, Department of Business, Economic Development & Tourism, Strategic Industries Division

Darryl Oliveira, Fire Chief, County of Hawaii, Fire Department

Lawrence K. Mahuna, Police Chief, County of Hawaii, Police Department

Anthony J. H. Ching, Executive Officer, State of Hawaii, Department of Business, Economic Development & Tourism, Land Use Commission

Ernest Y. W. Lau, Public Works Administrator, State of Hawaii, Department of Accounting and General Services

Christopher J. Yuen, Planning Director, County of Hawaii, Planning Department

John T. Harrison, Ph.D., Environmental Coordinator, University of Hawaii at Manoa, Environmental Center

Michael J. Matsukawa, Attorney at Law

Kaipo Kincaid, Executive Director, Hui Kako'o 'Aina Ho'opulapula

Rae M. Loui, Assistant Superintendent, Office of Business Services, State of Hawaii, Department of Education

Rodney K. Haraga, Director of Transportation, State of Hawaii, Department of Transportation

Wilfred K. Nagamine, Manager, Clean Air Branch, State of Hawaii, Department of Health

Mary Lou Kobayashi, Administrator, State of Hawaii, Department of Business, Economic Development & Tourism, Office of Planning

Clyde W. Namu'o, Administator, State of Hawaii, Office of Hawaiian Affairs

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

RECEIVED
2004 NOV 16 PM 2:30
BELT COLLINS HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O.BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to
EMD/SDWB

November 12, 2004

Mr. Lee Sichter
Principal Planner
Belt Collins Hawai`i Ltd.
2153 North King Street, Suite 200
Honolulu, Hawai`i 96819-4554

Dear Mr. Sichter:

SUBJECT: REVIEW OF NOVEMBER 2004 DRAFT EIS FOR
HELCO-KEAHOLE GENERATING STATION AND AIRPORT SUBSTATION
UNDERGROUND INJECTION CONTROL (UIC)
UIC PERMIT NO. UH-1776

We concur with the information contained in the document regarding the facility's injection wells and UIC permit.

If you have any questions regarding this subject, please contact Norris Uehara of the Safe Drinking Water Branch at 586-4258.

Sincerely,

William Wong

WILLIAM WONG, P.E., CHIEF
Safe Drinking Water Branch
Environmental Management Division

NU:nbp

BeltCollins

January 19, 2005
2002.33.1900 / 05P-018

Mr. William Wong, P.E., Chief
Safe Drinking Water Branch
Environmental Management Division
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Mr. Wong:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of November 12, 2004 regarding the above project. Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

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GOVERNOR OF HAWAII

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CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:

November 15, 2004

TO: Casey Cummings, Project Manager
Hawaii Electric Light Company, Inc.

FROM: Russell S. Takata, Program Manager
Noise, Radiation & Indoor Air Quality Branch

SUBJECT: **Comments to the EIS w/Appendices Pursuant to Chapter 343 of the HRS and Chapter 200, Title 11 of the Hawaii Administrative Rules**
HELCO-Keahole Generating Station and Airport Substation
North Kona, Hawaii
T.M.K. No. (3) 7-3-049:036 and (3) 7-3-049:037

Our comments should be printed as follows:

"Project activities shall comply with the Administrative Rules of the Department of Health:

- Chapter 11-46 Community Noise Control.

Should there be any questions, please contact Russell S. Takata, Environmental Health Program Manager, Noise, Radiation and Indoor Air Quality Branch, at 586-4701."

BeltCollins

January 19, 2005
2002.33.1900 / 05P-019

Mr. Russell S. Takata
Program Manager
Noise, Radiation & Indoor Air Quality Branch
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Mr. Takata:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your memo of November 15, 2004 to Mr. Casey Cummings regarding the above project. The Hawaii Electric Light Company, Inc. will comply with Chapter 11-46 of the Administrative Rules of the Department of Health pertaining to Community Noise Control.

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

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CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer to:
EMD / WB

November 17, 2004

H7 3 049 036.wpd
w12 wb040986

Mr. Lee Sichter
Belt Collins
2153 North King Street Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Sichter:

Subject: **HELCO-Keahole Generating Station & Airport Substation**
North Kona Judicial District, Island of Hawaii
TMK: (3) 7-3-049: 036 and 7-3-049: 037 15.643 acres

We have reviewed the document on the subject project submitted which proposes to reclassify the generating station and airport substation lands from conservation district to urban district.

At this time, the our wastewater rules restrict the use of a septic tank to no more than 1,000 gallons per day. Therefore, in order to use a single large sized septic tank, you will need to obtain a variance from the provisions of Chapter 11-62. If you wish to apply for a variance from our rules, please contact Lori Kajiwara at 586-4294.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please contact the Planning & Design Section of the our Branch at 586-4294.

Sincerely,

HAROLD K. YEE, P.E., CHIEF
Wastewater Branch

LNKM:erm

c: J. Harrigan-Lum, EPO

Belt Collins

January 19, 2005
2002.33.1900 / 05P-020

Mr. Harold K. Yee, P.E., Chief
Wastewater Branch
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Mr. Yee:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of November 17, 2004 regarding the above project. Please note that the discussion at Section 2.4.7 (page 2-13) of the Draft EIS states that the anticipated increase in wastewater volume will be accommodated by the facility's existing septic system. We are advised by staff of the Hawaii Electric Light Company that the system is already permitted by the Department of Health (DOH letter 2-25-99, File No. 2861), and therefore, no new permits or variances are required. We are further advised by HELCO that the existing system conforms to applicable provisions of Chapter 11-62, "Wastewater Systems."

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

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Harry Kim
Mayor

Jane H. Testa
Director

County of Hawaii
DEPARTMENT OF RESEARCH AND DEVELOPMENT
25 Aupuni Street, Room 219 • Hilo, Hawaii 96720-4252
(808) 961-8366 • Fax (808) 935-1205
E-mail: chrsdev@interpac.net

November 18, 2004

Mr. Casey Cummins, Project Manager
Hawaii Electric Light Company, Inc.
C/O Hawaiian Electric Company
Honolulu, Hawaii 96840

Dear Mr. Cummins:

Subject: Draft Environmental Impact Statement
Hawaii Electric Light Company- Keahole
Generating Station and Airport Substation.

Thank you for your letter of November 4, 2004 requesting comments on the referenced Draft Environmental Impact Statement.

We support the proposed action to reclassify and rezone the subject property because it will enable HELCO to make improvements to further mitigate environmental impacts and will also facilitate addition of a heat recovery steam generator to the two simple-cycle turbines. We urge HELCO to proceed as soon as feasible with the conversion to a combined cycle system so as to maximize the efficiency of generation, thereby providing more electricity to the grid without the need to increase fuel imports and their transportation from Hilo Harbor to Keahole.

We note the noise control treatments being planned for the existing plant equipment and trust that HELCO will monitor noise levels once the proposed actions are implemented to ensure that impacts on nearby residents are at acceptable levels.

Yours truly,

Raymond Carr
Energy Coordinator

c.c. Jane Testa, Director

Belt Collins

January 19, 2005
2002.33.1900 / 05P-021

Mr. Raymond Carr
Energy Coordinator
Department of Research and Development
County of Hawaii
25 Aupuni Street, Room 219
Hilo, HI 96720-4252

Dear Mr. Carr:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of November 18, 2004 to Mr. Casey Cummings regarding the above project. We sincerely appreciate your support of the project. Please be assured that the Hawaii Electric Light Company shares your desire to implement the combined cycle system in an expedient manner. In addition, we are advised by HELCO staff that facilities at the Keahole Generating Station are, and will continue to be, monitored to ensure that noise impacts on nearby residents are at acceptable levels.

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

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U.S. Department
of Transportation
Federal Aviation Administration

Western-Pacific Region
Real Estate and Utilities Section, AHNL-548

P. O. Box 50109
Honolulu, Hawaii 96850-5000

RECEIVED
2004 NOV 23 PM 2:06
BELT COLLINS

November 22, 2004

Hawaii Electric Light Company, Inc.
c/o Hawaiian Electric Company, Inc.
P. O. Box 2750
Honolulu, HI 96840
Attn: Casey Cummings, Project Manager

Dear Mr. Cummings:

The Federal Aviation Administration (FAA) has reviewed the Draft Environmental Impact Statement (EIS) with Appendices regarding the HELCO-Keahole Generating Station and Airport at North Kona, Island of Hawaii, State of Hawaii (Tax Map Key (3)7-3-049:036 and 037).

We were not able to find any discussion of whether or not there are impacts to the Keahole International Airport other than the project site's distance one mile west (Chapter 2, Page 2-5). We ask that you submit a "Notice of Construction or Alteration" FAA Form 7460-1, for this project to determine whether there may be any impacts to the airport and air traffic in the area. This form and related instructions can be obtained at our website http:www.faa.gov.

We appreciate this opportunity to comment on your proposed project. If there are any questions, I may be contacted at 541-1236.

Sincerely,

Darice B. N. Young
Realty Contracting Officer

cc:
IDENTICAL COPIES SENT TO:

State of Hawaii Land Use Commission
P. O. Box 2359
Honolulu, Hawaii 96804
Attn: Anthony J. H. Ching, Executive Director

Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, HI 96819-4554
Attn: Lee Sichter, Principal Planner

Belt Collins

January 19, 2005
2002.33.1900 / 05P-022

Ms. Darice B.N. Young
Realty Contracting Officer
Real Estate and Utilities Section, AHNL-54B
Western-Pacific Region
Federal Aviation Administration
U.S. Department of Transportation
P.O. Box 50109
Honolulu, HI 96850-5000

Dear Ms. Young:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of November 22, 2004 to Mr. Casey Cummings regarding the above project. In response to your comment concerning the lack of discussion in the Draft EIS concerning the project's impacts on the Kona International Airport, please be advised that a new section has been added to the discussion of Federal Laws and Control in Chapter 5 of the document. The new section states:

> *The Keahole Generating Station and Airport Substation are located approximately one mile east of the Keahole International Airport. All new development in the vicinity of the airport is required to submit a "Notice of Construction or Alteration" FAA Form 7460-1 to the FAA to assist the agency in determining whether there may be any impacts to the airport or air traffic in the area. As the proposed action is the reclassification of the property from the Conservation District to the Urban District, the reclassification, in and of itself, is not anticipated to impact the airport or air traffic. Before new facilities associated with the proposed action are constructed, the aforementioned form will be submitted to the FAA for review. Based on the fact that the existing stack has already been approved by the FAA and no construction exceeding the height of the stack is proposed, no significant negative impacts upon the airport or air traffic are anticipated.*

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Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

LINDA LINGLE
GOVERNOR

STEPHANIE AVEIRO
EXECUTIVE DIRECTOR

PAMELA Y. DODSON
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
HOUSING AND COMMUNITY DEVELOPMENT CORPORATION OF HAWAII
677 QUEEN STREET, SUITE 300
Honolulu, Hawaii 96813
FAX: (808) 587-0600

IN REPLY REFER TO
04:PEO/225

November 24, 2004

RECEIVED
2004 DEC -1 PM 1:38
BELT COLLINS HAWAII

Hawaii Electric Light Company, Inc.
c/o Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840

Attn: Casey Cummings, Project Manager

Dear Mr. Cummings:

SUBJECT: Draft Environmental Impact Statement,
HELCO-Keahole Generating Station and Airport Substation

Thank you for the opportunity to review the Draft Environmental Impact Statement for the HELCO-Keahole Generating Station and Airport Substation. We have no comments to offer at this time.

Sincerely,

Stephanie Aveiro

Stephanie Aveiro
Executive Director

c: Anthony J.H. Ching, Executive Director, Land Use Commission
✓Lee Sichter, Principal Planner, Belt Collins Hawaii Ltd.

Belt Collins

January 19, 2005
2002.33.1900 / 05P-023

Ms. Stephanie Aveiro, Executive Director
Housing and Community Development Corporation of Hawaii
Department of Human Services
State of Hawaii
677 Queen Street, Suite 300
Honolulu, HI 96813

Dear Ms. Aveiro:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of November 24, 2004 to Mr. Casey Cummings regarding the above project. Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

Belt Collins Hawaii Ltd.
2153 North King Street Suite 200 ▪ Honolulu, Hawaii 96819-4554 USA
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LINDA LINGLE
GOVERNOR OF HAWAII

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

November 29, 2004

Anthony Ching
Land Use Commission
PO Box 2359
Honolulu, HI 96804

Attn: Bert Saruwatari

Dear Mr. Ching:

Subject: Draft Environmental Impact Statement (EIS)
Keahole Generating Station & Airport Substation

We have the following comments to offer:

Title page signature: The applicant needs to sign the final EIS, noting that all ancillary documents were under his/her direction. A signature by the applicant's agent is not permitted. The FEIS copy with the original signature should be submitted to the accepting authority. Copies of the FEIS with a photocopied signature can be distributed elsewhere, including OEQC.

Unresolved issues:

Section 1.7 lists possible future energy sources as an unresolved issue. Although this is an important issue, it does not belong in this section. Unresolved issues are those project elements whose final design, configuration, magnitude, inclusion or exclusion are not known at the time of the EIS preparation, but will be decided at a future point.

Most the issues discussed only affect future plans, not this project. The access road, moreover, is an unresolved issue for Palamanui Project, not this project.

In this section include only such elements with the characteristics noted above, and in the fuller discussion in section six, note how these issues will eventually be resolved.

Land ownership: Who is the landowner for these parcels? If the state or the county owns any of the land, include this information in section 5.1.3.(3)(D), *Commitment of State funds and resources*, or in the summary sheet on page 1.

Permits and approvals: In section 2.10, *Approvals and permits*, note the status of each. For

Permits and approvals: In section 2.10, *Approvals and permits*, note the status of each. For those not yet granted, list the date of application, and for those not yet applied for, indicate the expected date of application.

If you have any questions call Nancy Heinrich at 586-4185.

Sincerely,

Genevieve Salmonson

GENEVIEVE SALMONSON
Director

c: Lee Sichter
Casey Cumming, HELCO Project Manager

Belt Collins

January 19, 2005
2002.33.1900 / 05P-024 (rev.)

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, HI 96813

Dear Ms. Salmonson:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of November 29, 2004 to Mr. Anthony Ching regarding the above project. Following are our responses to your comments in the order they were presented in your letter.

Title Page Signature: The Final EIS will include a signature page with the applicant's signature. The page will also include the signature of the president of Belt Collins Hawaii Ltd., as it is our policy to ensure that reviewing agencies and the general public are aware of who accepts responsibility for the document on behalf of our firm.

Unresolved Issues: With all due respect, we disagree with your recommendation that the discussion of future energy sources and the discussion of the access road should not be included in Section 1.7 and/or Section 6.4. With regard to future energy sources, the applicant is obligated to advise the public that the development of a new renewable energy technology at some point in the future could, in fact, impact the design and or configuration of the existing facility. For example, if an ocean thermal energy conversion project were implemented in the Keahole region, it is very likely that the transmission lines would be routed through the Keahole Generating Facility and/or Airport Substation.

With regard to the Reservoir Road becoming a future access road for the Palamanui development, please note that there have been ongoing discussions among the Palamanui developer, the Department of Hawaiian Home Lands, and the Hawaii Electric Light Company regarding the design of the roadway, in light of HELCO's desire to utilize it as an alternate route for delivering fuel to the Keahole facility. From HELCO's perspective, until the design is finalized, and specific turning radii are determined, HELCO is unable to determine whether it will be able to accommodate fuel trucks. Because HELCO's desire is to utilize the new access road as an alternative to routing fuel trucks through the Agricultural

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park along the current access road to the south, the design of the new road is very much an unresolved issue.

Finally, we believe that the discussion in Section 6.4 adequately addresses to the best of HELCO's ability how each issue will be eventually resolved. In each instance, the nature of the unresolved issue pertains to the uncertainties of supply and demand and/or governmental decision making. In all instances, the passage of time and a sense of urgency will ultimately resolve the issue. However, we have clarified wherever possible the time frame for resolving design-related issues.

Land Ownership: The first sentence of the fourth paragraph at Section 1.1. addressed the issue of ownership and states: "HELCO has filed a petition for a boundary amendment to reclassify its Keahole Generating Station and Airport Substation properties…" (emphasis added). Please note that the first sentence at Section 2.1 also refers to the proposed reclassification of HELCO's land. To further emphasize ownership of the subject property, we have now amended the first paragraph of Section 2.2 to read: "The subject property consists of two abutting tax map key parcels, both situated in Keahole, North Kona, on the west side of the island of Hawaii (Big Island), and both owned by the applicant."

Permits and approvals: Section 2.10 has been revised to include the status of the permits.

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
2004 DEC -3 PM 2:35
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PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 30, 2004
LD-NAV

A04-734HELCO.RCM2

Honorable Mary Lou Kobayashi, Director
Office of Planning
State of Hawaii
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Ms. Kobayashi:

Subject: Draft Environmental Impact Statement
State Land Use District Boundary Amendment
Petition: A04-734 HELCO - TMK: 3) 7-3-049: 036 and 037
Proposed: Electrical Generating Station & Substation

Thank you for the opportunity to review and comment on the subject matter.

A copy of the document pertaining to the subject matter was made available to the following Department of Land and Natural Resources' Divisions for their review and comment:

- Engineering Division
- Commission on Water Resource Management
- Office of Conservation and Coastal Lands
- Land-Hawaii District Land Office
- Land-Gary Martin

Enclosed please find a copy of the Engineering Division, Commission on Water Resource Management and Office of Conservation and Coastal Lands comments.

Based on the attached responses, the Department of Land and Natural Resources has no other comment to offer on the subject matter. Should you have any questions, please contact Nicholas A. Vaccaro of the Land Division Support Services Branch at (808) 587-0384.

Very truly yours,

DIERDRE S. MAMIYA
Administrator

C: HDLO
HELCO
Belt Collins

BeltCollins

January 19, 2005
2002.33.1900 / 05P-025

Ms. Dierdre S. Mamiya, Administrator
Land Division
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, HI 96809

Dear Ms. Mamiya:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of November 30, 2004 to Mary Lou Kobayashi regarding the above project. Thank you for circulating the document to the divisions of the Department of Land and Natural Resources with potential interest in it, and for your participation in the public and agency review of the above document. We will respond to each division's comments under separate cover.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

Belt Collins Hawaii Ltd
2153 North King Street, Suite 200 ▪ Honolulu, Hawaii 96819 USA
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LINDA LINGLE
GOVERNOR OF HAWAII

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LAND DIVISION
2004 NOV -9 A 10:08

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

November 5, 2004

LD/NAV
OA3-734HELC
DEISHELCOGENSTATION.CMT

Suspense Date: 11/26/04

MEMORANDUM:

TO:
XXX Engineering Division
XXX Commission on Water Resource Management
XXX Office of Conservation and Coastal Lands
XXX Land-Hawaii District Land Office
XXX Gary Martin

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Impact Statement
Request: Conservation to Urban District
Applicant: Hawaii Electric Light Company, Inc.
Proposed: Electrical Generating Station and Substation
Location: North Kona, Hawaii
TMK: (3) 7-3-49: 36 & 37

Please review the document pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

Should you need more time to review the document, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(√) We have no comments (x) additions to those for the prep. notice

( ) Comments attached.

Division: Land

Signed: Gary Martin

Date: NOV - 8 2004

Name: GARY MARTIN

BeltCollins

January 19, 2005
2002.33.1900 / 05P-027

Mr. Gary Martin
Land Division
Dept. of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Martin:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your memorandum of November 8, 2004 to Dierdre Mamiya regarding the above project. Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

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LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

LAND DIVISION
HILO, HAWAII

November 5, 2004

LD/NAV
OA3-734RELC
DEISHELCOGENSTATION.CMT

Suspense Date: 11/26/04

MEMORANDUM:

TO:
XXX Engineering Division
XXX Commission on Water Resource Management
XXX Office of Conservation and Coastal Lands
XXX Land-Hawaii District Land Office
XXX Gary Martin

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Impact Statement
Request: Conservation to Urban District
Applicant: Hawaii Electric Light Company, Inc.
Proposed: Electrical Generating Station and Substation
Location: North Kona, Hawaii
TMK: (3) 7-3-49: 36 & 37

Please review the document pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

Should you need more time to review the document, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(✓) We have no comments. ( ) Comments attached.

Division: LAND

Signed:

Date: 11/12/04

Name: Harry Yada

BeltCollins 50

January 19, 2005
2002.33.1900 / 05P-028

Mr. Harry M. Yada
Hawaii District Land Agent
Land Division
Dept. of Land and Natural Resources
State of Hawaii
P.O. Box 936
Hilo, HI 96721

Dear Mr. Yada:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your memorandum of November 12, 2004 to Dierdre Mamiya regarding the above project. Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

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LINDA LINGLE
GOVERNOR OF HAWAII

'04 NOV 08 AM 07:31 ENGINEERING

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

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LAND
STATE PARKS

November 5, 2004

LD/NAV
OA3-734HELC
DEISHELCOGENSTATION.CMT

Suspense Date: 11/26/04

MEMORANDUM:

TO:
XXX Engineering Division
XXX Commission on Water Resource Management
XXX Office of Conservation and Coastal Lands
XXX Land-Hawaii District Land Office
XXX Gary Martin

FROM: Dierdre S. Mamiya, Administrator
Land Division

RECEIVED
LAND DIVISION
2004 NOV -9 P 3:45

SUBJECT: Draft Environmental Impact Statement
Request: Conservation to Urban District
Applicant: Hawaii Electric Light Company, Inc.
Proposed: Electrical Generating Station and Substation
Location: North Kona, Hawaii
TMK: (3) 7-3-49: 36 & 37

Please review the document pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

Should you need more time to review the document, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(X) We have no comments. Our previous additional comment to the early consultation for the EISPN (12/23/03) was attached in the Draft EIS document. ( ) Comments attached.

Division: Engineering Signed:

Date: 11/22/04 Name: ERIC T. HIRANO, CHIEF ENGINEER

Belt Collins

January 19, 2005
2002.33.1900 / 05P-029

Mr. Eric T. Hirano, Chief Engineer
Engineering Division
Dept. of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Hirano:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your memorandum of November 9, 2004 to Dierdre Mamiya regarding the above project. Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

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LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
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DEPUTY DIRECTOR - WATER

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LAND
STATE PARKS

REF:PB:SL

NOV 10 2004

File Number Corr. OA-05-106

MEMORANDUM:

TO: Nicholas Vaccaro
Land Division

FROM: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT: Draft Environmental Impact Statement to Rezone the Keahole Generating Station Site from Conservation to Urban

We have reviewed the submitted documentation and have the following comments.

In approving a time extension request to extent the construction deadline for the expansion of the HELCO facility, the Board of Land and Natural Resources imposed a condition stating as follows:

> Within ninety (90) days of this decision and order, HELCO shall file with the Land Use Commission an application for a boundary amendment to remove the facility site from the conservation district.

We support the petition for the proposed boundary amendment

Please feel free to contact me at 587-0381.

RECEIVED
LAND DIVISION
2004 NOV 12 A 11:51

BeltCollins

January 19, 2005
2002.33.1900 / 05P-026

Mr. Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands
Dept. of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Lemmo:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of November 10, 2004 to Nicholas Vaccaro regarding the above project. Please note that the applicant has complied with the Board's condition that a boundary amendment be filed with the State Land Use Commission. We note that although the condition in the Board's March 25, 2002 Decision and Order was that HELCO file a boundary amendment petition within 90 days from the Board's Decision and Order, the December 3, 2003 letter confirming the Board's October 10, 2003 extension of the construction deadline required that a boundary amendment petition be re-filed with the Commission by December 31, 2003, or thirty (30) days after court orders are in place that allow HELCO to re-commence construction, whichever event is later. HELCO resubmitted the boundary amendment petition to the Commission on November 25, 2003.

We sincerely appreciate your support of the proposed project.

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

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MEREDITH J. CHING
CLAYTON W. DELA CRUZ
JAMES A. FRAZIER
CHIYOME L. FUKINO, M.D.
LAWRENCE H. MIKE, M.D., J.D.
STEPHANIE A. WHALEN

YVONNE Y. IZU
DEPUTY DIRECTOR

RECEIVED
LAND DIVISION
2004 NOV 24 A 10:42

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

November 23, 2004

TO: Ms. Dede Mamiya, Administrator
Land Division

FROM: Yvonne Y. Izu, Deputy Director
Commission on Water Resource Management (CWRM)

SUBJECT: Draft EIS – HELCO Electrical Generating Station and Substation, North Kona

FILE NO.: OA3-734HELC

Thank you for the opportunity to review the subject document. Our comments related to water resources are marked below.

In general, the CWRM strongly promotes the efficient use of our water resources through conservation measures and use of alternative non-potable water resources whenever available, feasible, and there are no harmful effects to the ecosystem. Also, the CWRM encourages the protection of water recharge areas, which are important for the maintenance of streams and the replenishment of aquifers.

[ ] We recommend coordination with the county government to incorporate this project into the county's Water Use and Development Plan.

[ ] We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

[ ] We are concerned about the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

[ ] A Well Construction Permit and/or a Pump Installation Permit from the Commission would be required before ground water is developed as a source of supply for the project.

[ ] The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit from the Commission would be required prior to use of this source.

[ ] Groundwater withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

[ ] We are concerned about the potential for degradation of instream uses from development on highly erodible slopes adjacent to streams within or near the project. We recommend that approvals for this project be conditioned upon a review by the corresponding county's Building Department and the developer's acceptance of any resulting requirements related to erosion control.

[ ] If the proposed project includes construction of a stream diversion, the project may require a stream diversion works permit and amend the instream flow standard for the affected stream(s).

[ ] If the proposed project alters the bed and banks of a stream channel, the project may require a stream channel alteration permit.

[ ] OTHER:

In section 3.6.1, the discussion of a parabasal lens is irrelevant, as the lens in the area surrounding the project is basal.

If there are any questions, please contact Ryan Imata at 587-0255.

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
04 NOV 5 P4:11

PETER T. YOUNG
CHAIRPERSON
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DEPUTY DIRECTOR - WATER

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HONOLULU, HAWAII 96809

November 5, 2004

LD/NAV
OA3-734HELC
DEISHELCOGENSTATION.CMT

Suspense Date: 11/26/04

MEMORANDUM:

TO:
XXX Engineering Division
XXX Commission on Water Resource Management
XXX Office of Conservation and Coastal Lands
XXX Land-Hawaii District Land Office
XXX Gary Martin

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Impact Statement
Request: Conservation to Urban District
Applicant: Hawaii Electric Light Company, Inc.
Proposed: Electrical Generating Station and Substation
Location: North Kona, Hawaii
TMK: (3) 7-3-49: 36 & 37

Please review the document pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

Should you need more time to review the document, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

( ) We have no comments. (X) Comments attached.

Division: CWRM Signed:

Date: 11/22/04 Name: Ryan Imata

50419

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50 YEARS OF EXCELLENCE

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LAND DIVISION
2004 NOV -4 P 3:14

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'04 NOV -4 P12:17

November 4, 2004
04P-335/2002.33.1900

Mr. Peter T. Young, Chair
Tax Map Key 7-3-010-033
Department of Land & Natural Resources
[illegible]
[illegible]
Honolulu, HI 96809

Dear Mr. Young:

Attached for your review are five copies of a Draft Environmental Impact Statement (EIS) with Appendices, which was prepared pursuant to Chapter 343 of the Hawaii Revised Statutes and Chapter 200, Title 11, of the Hawaii Administrative Rules.

TITLE OF PROJECT: HELCO - KEAHOLE GENERATING STATION AND AIRPORT SUBSTATION

LOCATION: (Island) Hawaii (District) North Kona

TAX MAP KEY NO. (3) 7-3-049:036 and (3) 7-3-049:037

AGENCY ACTION [ ] APPLICANT ACTION [X]

YOUR COMMENTS MUST BE RECEIVED OR POSTMARKED BY: December 23, 2004
(minimum 45-day comment period)

Please send original comments to the Applicant:

HAWAII ELECTRIC LIGHT COMPANY, INC.
C/O Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840
Attention: Casey Cummings, Project Manager (Tel: (808) 543-7567)

Copies of the comments should be sent to the following parties:

Approving and Accepting Authority: STATE OF HAWAII LAND USE COMMISSION
P.O. Box 2359
Honolulu, Hawaii 96804
Attention: Anthony J.H. Ching, Executive Director
(Tel: (808) 587-3822)

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Consultant: BELT COLLINS HAWAII LTD.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554
Attention: Lee Sichter, Principal Planner (Tel: (808) 521-5361)

If you no longer need this EIS, please recycle it. Thank you for your participation in the EIS process.

[illegible]
process.
[illegible]
process

Sincerely,

BELT COLLINS HAWAII LTD.

Lee Sichter
Principal Planner

Enclosure:
(5 Sets) Draft EIS with Appendices

BeltCollins

January 19, 2005
2002.33.1900 / 05P-030

Ms. Yvonne Y. Izu
Deputy Director
Commission on Water Resource Management
Dept. of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, HI 96809

Attention: Mr. Ryan Imata

Dear Ms. Izu:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your memorandum of November 23, 2004 to Dierdre Mamiya regarding the above project. We believe the proposed project's use of non-potable water is consistent with the Commission's policies as stated in your memorandum. With regard to your comment regarding a parabasal lens, we concur and have removed the discussion from the document. Thank you for catching our error and for your participation in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

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DEPARTMENT OF THE ARMY
U S ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

December 6, 2004

RECEIVED
2004 DEC -7 PM 2:00
BELT COLLINS HAWAII

Regulatory Branch

Mr. Lee Sichter
Project Manager
Belt Collins Hawaii, Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Mr. Sichter:

This responds to your request dated November 4, 2004, for comments regarding the draft Environmental Impact Statement (dEIS) for the proposed improvements at the Hawaii Electric Light Company's Keahole Generating Station and Airport Substation, North Kona, Hawaii Island (TMKs (3)7-3-049: 36 and 37). Based on the information provided, I have determined that this location is in an upland area, and outside the limit of our jurisdiction. Therefore a Department of Army (DA) permit will not be required.

File Number POH-2004-1122 has been assigned to this project. Please feel free to contact Mr. Farley Watanabe of my staff at 438-7701, if you have additional questions.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

Belt Collins

January 19, 2005
2002.33.1900 / 05P-031

Mr. George P. Young, P.E.
Chief, Regulatory Branch
U.S. Army Engineer District, Honolulu
Department of the Army
Building 230, Room 204
Ft. Shafter, HI 96858-5440

Dear Mr. Young:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 6, 2004 regarding the above project. We acknowledge your determination that the project area is outside the limit of your agency's jurisdiction. Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

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DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

LINDA LINGLE
GOVERNOR
THEODORE E. LIU
DIRECTOR
STEVE BRETSCHNEIDER
DEPUTY DIRECTOR

STRATEGIC INDUSTRIES DIVISION
235 S. Beretania Street, 5th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Tel.: (808) 587-3812
Fax: (808) 586-2536

December 6, 2004

Mr. Casey Cummings, Project Manager
Hawaii Electric Light Company, Inc.
c/o Hawaiian Electric Company, Inc.
PO Box 2750
Honolulu, Hawaii 96840

Dear Mr. Cummings:

This letter is in support of the Hawaii Electric Light Company's proposed action as described in the Draft Environmental Impact Statement (DEIS) for the HELCO Keahole Generating Station. We believe the plan comports with the State's energy objectives by offering improved energy efficiency and reduced use of imported petroleum, the proposed facility's steam recovery generator will also result in greater energy security, reductions of greenhouse gas emissions, and reduction of the threat of other environmental consequences.

While some may have concerns about the nature and timing of this project, the benefits are significant in reduced fuel use, improved ability to meet growing electricity demands in West Hawaii, and reduced environmental impacts. We believe the ongoing Integrated Resource Planning process, being conducted by the Public Utilities Commission is the venue for decisions about future electricity supply technologies and their timing.

We urge the Land Use Commission and other state agencies involved in this effort to approve HELCO's application and DEIS in an expedited manner.

Thank you for the opportunity to offer these comments.

Sincerely,

Maurice H. Kaya, P.E.
Chief Technology Officer

c: Anthony J. H. Ching, Executive Director, State of Hawaii Land Use Commission
Lee Sichter, Principal Planner, Belt Collins Hawaii

Belt Collins

January 19, 2005
2002.33.1900 / 05P-032

Mr. Maurice H. Kaya, P.E.
Chief Technology Officer
Strategic Industries Division
Dept. of Business, Economic Development & Tourism
State of Hawaii
P.O. Box 2359
Honolulu, HI 96804

Dear Mr. Kaya:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 6, 2004 to Mr. Casey Cummings regarding the above project. Thank you for your support of the project and for your participation in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

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Harry Kim
Mayor

Darryl J. Oliveira
Fire Chief

Desmond K. Wery
Deputy Fire Chief

County of Hawai'i
FIRE DEPARTMENT
25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720
(808) 961-8297 • Fax (808) 961-8296

December 6, 2004

TO : CASEY CUMMINGS, PROJECT MANAGER
HAWAII ELECTRIC LIGHT COMPANY, INC.
C/O HAWAIIAN ELECTRIC COMPANY, INC.
P.O. BOX 2750
HONOLULU, HAWAII 96840

FROM : DARRYL OLIVEIRA, FIRE CHIEF

SUBJECT: HELCO-KEAHOLE GENERATING STATION AND AIRPORT SUBSTATION
LOCATION: NORTH KONA, HAWAII
TAX MAP KEY: (3) 7-3-049:036 AND (3) 7-3-049:037

We have no comments to offer at this time on the above-referenced draft Environmental Impact Statement.

DARRYL OLIVEIRA
FIRE CHIEF

NA:cmj

cc: STATE OF HAWAII
LAND USE COMMISSION

Hawai'i County is an Equal Opportunity Provider and Employer

BelfCollins

January 19, 2005
2002.33.1900 / 05P-033

Mr. Darryl Oliveira, Fire Chief
Fire Department
County of Hawaii
25 Aupuni Street, Suite 103
Hilo, HI 96720

Dear Chief Oliveira:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your memo of December 6, 2004 to Mr. Casey Cummings regarding the above project. Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

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Harry Kim
Mayor

Lawrence K. Mahuna
Police Chief

Harry S. Kubojiri
Deputy Police Chief

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2004 DEC 13 PM 2:49
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County of Hawaii
POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-2389

December 9, 2004

Mr. Lee Sichter
Principal Planner
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Sichter:

Thank you for allowing us to give input on your Draft Environmental Impact Statement for the Keahole generating plant.

Our primary concern centers around the traffic impact on Queen Kaahumanu Highway. As noted in the report, the proposed facility will be accessed only from the south via Pukiawe Street. This measure mitigates our concerns relating to traffic flow along Queen Kaahumanu Highway. However, if future developments require direct access onto Queen Kaahumanu Highway, we would ask that you consider it be via an intersection aligned with the existing Keahole Airport access road.

We would request that no other additional driveways or intersections be placed on Queen Kaahumanu Highway as its flow is already restricted.

Should you have any further questions, please contact Major John Dawrs at 326-4646, extension 246.

Sincerely,

LAWRENCE K. MAHUNA
POLICE CHIEF

JD:dmv

BeltCollins

January 19, 2005
2002.33.1900 / 05P-034

Mr. Lawrence K. Mahuna
Police Chief
Police Department
County of Hawaii
349 Kapiolani Street
Hilo, HI 96720-3998

Dear Chief Mahuna:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 9, 2004 regarding the above project. We acknowledge your stated concerns regarding traffic impacts on Queen Kaahumanu Highway. As you are aware, discussions are continuing among the Palamanui developer, the Department of Hawaiian Home Lands, and the State Department of Transportation regarding the possible redevelopment of the Airport Access Road intersection to function as the Palamanui Access Road. HELCO would likely utilize that intersection but must await decision making that is presently beyond its control. We also acknowledge your concern about the need to limit future access to the highway, and can assure you that no new driveways or intersections are contemplated by HELCO.

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

Belt Collins Hawai'i Ltd
2153 North King Street, Suite 200 • Honolulu, Hawai'i 96819 USA
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LINDA LINGLE
GOVERNOR

ANTHONY J.H. CHING
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
P.O. Box 2359
Honolulu, Hawaii 96804-2359
Telephone: 808-587-3822
Fax: 808-587-3827

December 13, 2004

Mr. Lee Sichter
Belt Collins Hawaii, Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Mr. Sichter:

Subject: LUC Docket No. A03-743/Hawaii Electric Light Company, Inc.
Draft Environmental Impact Statement (DEIS) for the Keahole Generating Station and Airport Substation Urban Reclassification

We have reviewed the subject DEIS and have the following comments:

1) In Chapter 5, Section 5.1 entitled *The Land-Use Law* on page 5-1, the Agricultural District is incorrectly identified as the "Agriculture" District. This misidentification of the district also occurs on page 2-31.

2) We acknowledge that Table 2-A on pages 2-6 to 2-7 provides a historical and projected timeframe of events related to the Keahole Generating Station and Airport Substation. We suggest, however, that a more detailed timeline of events between 2004 and 2009 be provided relative to the engineering, design, and construction of each specific component of the proposed project.

3) The discussion on the Coastal Zone Management Act (HRS Chapter 205A) contained on page 5-57 should be expanded to include an assessment of the proposed project's conformity to each of the ten objectives of the coastal zone management program.

4) Information on the projected amount of solid waste from the proposed project and the alternatives, including an assessment of its impacts upon the Puu Anahulu Landfill and any mitigative measures, if any, should be provided.

5) Information on the availability and adequacy of police and fire protection, medical and emergency services, and other public services and facilities in the region to serve the proposed project and the alternatives and any mitigative measures, if any, should be provided.

6) The description of the Palamanui development on page 5-31 does not appear to be consistent with the information provided in the Final Environmental Impact Statement (FEIS) for the development. For your information, the Land Use Commission accepted the FEIS on October 7, 2004.

7) In Chapter 7, a portion of your October 8, 2004, letter responding to the comments of Melvin N. Kaku, Director of the Environmental Planning Division, Department of the Navy, Pacific Division, on the EISPN appears to have been blocked out. The letter should be reproduced in its entirety pursuant to the requirements of section 11-200-17, Hawaii Administrative Rules.

We have no further comments to offer at this time. Please feel free to contact Bert Saruwatari of my office at 587-3822, should you require clarification or any further assistance.

Sincerely,

ANTHONY J. H. CHING
Executive Officer

c: Office of Environmental Quality Control
Casey Cumming, HECO

BeltCollins

January 19, 2005
2002.33.1900 / 05P-035

Mr. Anthony J.H. Ching
Executive Officer
Land Use Commission
Dept. of Business, Economic Development & Tourism
State of Hawaii
P.O. Box 2359
Honolulu, HI 96804-2359

Dear Mr. Ching:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 13, 2004 regarding the above project. Following are our responses to your comments in the order they were presented in your letter.

1. Our references to the "Agriculture" district have been corrected to read "Agricultural."

2. Table 2-A has been expanded to provide more detail relative to engineering, design and construction between 2004 and 2009.

3. The discussion of the project's relationship to the Coastal Zone Management Act at Section 5.11 has been expanded to include an assessment of its conformity with each of the ten objectives of the coastal zone management program.

4. Discussion of the volume of solid waste generated by the project and alternatives has been added as Section 3.18 in the EIS.

5. Thank you for noting the inadvertent omission. A new section (4.7.7) has been added to Chapter 4 to discuss the project and alternatives' impacts on public services and facilities.

Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200 • Honolulu, Hawaii 96819-4554 USA
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6. The Draft EIS for the Keahole Project was going to print at about the time the Palamanui Final EIS was accepted by the State Land Use Commission. Due to the uncertainties of the approval process, it was felt at the time that it was best to cite the Draft EIS for Palamanui. The text in Section 5.3.4.2 has been revised to update the information to reflect the Final EIS for Palamanui.

7. With regard to your comment about a portion of our response to Mr. Mel Kaku being "blocked out," we have confirmed that a printing error occurred and that a "post-it" used for tabbing pages was inadvertently left on the page during Xeroxing. We will make sure that the correction is made for the Final EIS. However, as the Navy responded that they had no comments, our response letter was non-substantive.

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

LINDA LINGLE
GOVERNOR

RECEIVED
2004 DEC 16 PM 2:44
BELT COLLINS HAWAII

RUSS K. SAITO
COMPTROLLER
KATHERINE H. THOMASON
DEPUTY COMPTROLLER

(P)1387.4

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810

DEC 14 2004

Mr. Casey Cummings, Project Manager
Hawaiian Electric Company Inc.
P.O. Box 2750
Honolulu, HI 96840

Dear Mr. Cummings:

SUBJECT: HELCO – Keaho le Generating Station and Airport
Draft Environmental Impact Statement
North Kona, Island of Hawaii
TMK: (3) 7-3-49:36 & 37

Thank you for the opportunity to review the information regarding the subject project. The project does not impact any of the Department of Accounting and General Services' projects or existing facilities and we have no comments to offer.

If you have any questions, please have your staff call Mr. David DePonte of the Planning Branch at 586-0492.

Sincerely,

ERNEST Y.W. LAU
Public Works Administrator

DD:mo

c: Mr. Anthony Ching, State Land Use Commission
Mr. Lee Sichter, Belt Collins Hawaii, Ltd.

BeltCollins

January 19, 2005
2002.33.1900 / 05P-036

Mr. Ernest Y.W. Lau
Public Works Administrator
Dept. of Accounting and General Services
State of Hawaii
P.O. Box 119
Honolulu, HI 96810

Dear Mr. Lau:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 14, 2004 to Mr. Casey Cummings regarding the above project. Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

Belt Collins Hawaii Ltd
2153 North King Street, Suite 200 ▪ Honolulu, Hawaii 96819 USA
T 808 521 5361 ▪ F 808 538 7819 ▪ honolulu@beltcollins.com ▪ www.beltcollins.com
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Harry Kim
Mayor

Christopher J. Yuen
Director

Roy R. Takemoto
Deputy Director

County of Hawaii

PLANNING DEPARTMENT

101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720-3043
(808) 961-8288 • Fax (808) 961-8742

December 8, 2004

Mr. Casey Cummings
c/o Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, HI 96840

Dear Mr. Cummings:

Environmental Impact Statement
Hawaii Electric Light Company, Inc.
Keahole Generating Station/Airport Substation
TMK: (3) 7-3-049: 036 and (3) 7-3-049: 037

Thank you for providing us with a copy of the Draft Environmental Impact Statement (DEIS) for the Hawaii Electric Light Company, Inc.'s Keahole Generating Station/Airport Substation. We have the following comments to offer:

- Executive Summary, page 2, Compatibility with Land Use Plans and Policies and Chapter 1, page 2, Section 1.5 - "County of Hawaii Proposed General Plan" should be "County of Hawaii General Plan." As indicated in our December 29, 2003, letter to Mr. Lee Sichter of Belt Collins Hawaii Ltd., the Planning Department, in it's letter to Mr. Albert Lyman dated January 14, 1994, determined that the General Plan Land Use Pattern Allocation Guide Map (LUPAG) for the area is Urban Expansion Area. Thus, the request is compatible with the current General Plan. As the proposed revision to the General Plan is currently pending before the County Council, references to the "proposed General Plan" should be omitted.

- Executive Summary, page 3 and Chapter 1, page 6, Section 1.9 Necessary Approvals and Permits - the rezoning of the property from the Open to the Industrial district will also require the recommendation of the Hawaii County Planning Commission prior to action by the Hawaii County Council and the Mayor.

- Chapter 2, Section 2.4.1, Purpose and Need - a statement should be included to indicate that the property was zoned Open by the County to conform with the State Land Use Conservation District.

We have no additional comments at this time. Should you have any questions, please contact Norman Hayashi of this office at 961-8288.

Sincerely,

CHRISTOPHER J. YUEN
Planning Director

NH:syw
p:\wpwin60\norm\letters\cummings helco deis 12-8-04
cc: Mr. Anthony J.H. Ching, Executive Director, State Land Use Commission
Mr. Warren Lee, President, HELCO

Belt Collins

January 19, 2005
2002.33.1900 / 05P-037

Mr. Christopher J. Yuen, Director
Planning Department
County of Hawaii
101 Pauahi Street, Suite 3
Hilo, HI 96720-8742

Dear Mr. Yuen:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 8, 2004 to Mr. Casey Cummings regarding the above project. Following are our responses to your comments in the order they were presented in your letter.

1) Our reference to the County of Hawaii Proposed General Plan has been revised to delete the word "proposed" on the second page of the Executive Summary.

2) Reference to the Planning Commission's review has been added to the discussion on page 3 of the Executive Summary.

3) We have added the following statement to Section 2.3: "The subject properties were originally zoned Open by the County to conform with the State Land Use Commission's classification of the property as Conservation District in the early 1960s."

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200 ▪ Honolulu, Hawaii 96819 USA
T 808 521 5361 ▪ F 808 538 7819 ▪ honolulu@beltcollins.com ▪ www.beltcollins.com
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UNIVERSITY OF HAWAI'I AT MĀNOA
Environmental Center

December 17, 2004
RE 0745

Casey Cumming
Hawai'i Electric Light Company
c/o Hawaiian Electric Light Co
PO Box 2750
Honolulu, Hawai'i 96840

Dear Mr. Cumming:

Draft Environmental Impact Statement (DEIS)
Urban Reclassification for Keahole Generating Station and Airport Substation
North Kona, Hawai'i

The Hawai'i Electric Light Company, Inc. (HELCO) seeks a reclassification of its Keahole Generating Station and Airport Substation lands (subject property) in order to increase the generating capacity of the facility. This reclassification would turn the subject property from the State of Hawai'i Conservation District to the Urban District, and a subsequent change in Hawai'i County zoning from Open (O) to General Industrial (MG). The new generation produced will be accomplished by the installation of a steam turbine generator (ST-7) with selective catalytic reduction (SCR). Allowing utilization of the waste heat generated by the two recently completed combustion turbines (CT), thereby, making the plant more fuel-efficient. The estimated cost to revamp the subject property is $4,870,000. This allotment reflects 2003/2004 labor and material rates, and includes the use of capital equipment and estimates for engineering and construction.

The Environmental Center conducted this review with the assistance of Steve Masutani, Hawai'i Natural Energy Institute; and Kerry Halford, Environmental Center.

General Comments

The proposed reclassification of 15.643 acres in North Kona, comprising two abutting parcels identified as TMK Nos. (3) 7-3-049:036 and (3) 7-3-049:037, from Conservation District to Urban District appears to be warranted and logical. This reclassification recognizes the *de facto* industrial application of the parcels for the past 30+ years.

The Draft EIS states that HELCO is seeking the reclassifications to: "(1) bring the State Land Use District Classification into conformance with the existing and proposed use of the project area as an electrical generating station and substation; (2) facilitate future operation and maintenance of the generating station; and (3) implement proposed environmental mitigation measures." In pursuit of (2) and (3), the Draft EIS notes that HELCO intends: to convert two combustion turbines to a combined cycle by the addition of recovery steam generators and a bottoming steam T-G, along with a SCR system to reduce NOx emissions; draw between 210,000 to 230,000 gpd of brackish groundwater from

2500 Dole Street, Krauss Annex 19, Honolulu, Hawai'i 96822-2318
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

an onsite well to provide for projected increased consumption associated with the planned plant improvements; and possibly convert their combustion systems from No. 2 diesel to other fuels such as Naphtha in the future.

The arguments presented in the Draft EIS to justify the planned increase in firm capacity and the emissions control measures to be employed are credible and demonstrate a clear benefit to the community with modest associated environmental impacts. HELCO's stated plans, however, raise a number of concerns that should be addressed by clarifications and additions to the EIS.

Selective Catalytic Reduction (SCR)

SCR is a mature technology that has been deployed successfully and safely in many other power generation facilities throughout the world. The benefits of incorporating SCR to reduce NOx emissions are not disputed. The point of concern in the HELCO plan relates to the lack of detail and specificity regarding the precise ammonia storage and handling systems to be employed. HELCO appears to be keeping its options open to use either or both anhydrous ammonia or pelletized solid urea and provides a general description of the transport, storage, and delivery systems that MAY be employed. Although the quantity of ammonia (either anhydrous or in the form of solid urea) stored and used onsite is projected to be modest, the potential for a spill or unintentional release exists. An appropriate spill plan and detailed description of the safety systems and procedures need to be submitted for public scrutiny before the system is deployed and operated. It is unclear, after reviewing Sections 1.9 and 2.10 in the draft EIS, which of the alternative ammonia storage and supply systems HELCO intends to employ. Regardless of whether or not HELCO will be required to provide this information later in the permitting/approval process, the information should be included in the present EIS (which has the stated primary purpose of land reclassification, rather than approval for installation of the power plant improvements *per se*.)

(ref. §11-200-7 HAR Multiple or phased applicant or agency actions. A group of actions proposed by an agency or an applicant shall be treated as a single action when:

(1) The component actions are phases or increments of a larger total undertaking;
(2) An individual project is a necessary precedent for a larger project;
(3) An individual project represents a commitment to a larger project, or;
(4) The actions in question are essentially identical and a single statement will adequately address the impacts of each individual action and those of the group of actions as a whole.

Ref §11-200-17(f) HAR The draft EIS shall describe in a separate and distinct section alternatives...The section shall include a rigorous exploration and objective evaluation of the environmental impacts of all such alternative actions...Examples of alternatives include:

...(3) Alternatives related to different designs or details of the proposed actions which would present different environmental impacts...

In each case the analysis shall be sufficiently detailed to allow the comparative evaluation of environmental benefits, costs, and risks of the proposed action and each reasonable alternative.)

Ammonia

In regards to the SCR ammonia alternatives noted in the previous paragraph, while the environmental impacts of normal utilization of ammonia onsite are discussed, consideration of the safety issues and transient environmental hazards associated with transport and with emergency scenarios, such as spills, however, is missing from the Draft EIS.

Naphtha

The possibility of switching from No.2 diesel to Naphtha in the future is discussed in the Draft EIS. As in the case of SCR, Naphtha combustion systems have been deployed extensively and there is clear evidence that these systems can be operated safely and with modest or minimal environmental impacts. Moreover, Naphtha offers the benefit of reduced SOx emissions, which is attractive, given that no de-SOx flue gas treatment (e.g., wet or dry scrubbing) apparently will be incorporated in the upgraded Keahole power system. Although the Draft EIS mentions the potential explosion risk due to the relatively low flash point of Naphtha, and describes some generic safety systems and procedures that would be applied if this fuel switch occurs, a more detailed and specific discussion will need to be prepared and submitted for public review before the change is implemented. This narrative should not be limited to the onsite issues but must include a review of the offsite facilities and activities (e.g., new terminal infrastructure on the Big Island and road transport), mentioned in Section 2.9.5.6 and Section E of Appendix N, that will be needed to provide the required supply of Naphtha to the plant. A review of Section 2.9.5.5 and Section D of Appendix N, suggests that the preparation of additional, detailed information on the specific equipment, procedures, and associated impacts, as well as an acceptable emergency spill plan, could be deferred until the application for the updated Land Use permit and submission of the updated EPA Risk Management Plan. The language used in Section 2.9.5.5 and Section D of Appendix N is rather vague, however ("...the following permits will LIKELY require updates or re-submittal."), and does not guarantee that a future opportunity for open review of the Naphtha option will exist. While Section F of Appendix N states that "Emergency response plans will need to be create (sic)..." it does not mention whether these plans will be submitted for prior public review or will be internal documents. Pursuant to EIS content requirements previously cited, such documentation must be subject to public review through the EIS process. If the conversion to Naphtha is implemented in the future, consideration of this major change in the project design will require preparation of a Supplemental EIS pursuant to Subchapter 10 of the EIS Rules (§11-200-26 through §11-200-29.)

VOC emissions

It is unclear if the projected VOC emissions included in Table 2 of Appendix I and reproduced in Table 3-D represents the baseline diesel combustion case or takes into account the proposed switch to Naphtha (which has the potential to produce more VOC emissions due to its low flash point). This reviewer could not find this information in the Report, but suspects that the Naphtha option was not considered. Here again, it is recommended that the projected emissions inventory be updated before a fuel switch is implemented.

Wash Water

The discussions concerning waste generation and disposal (e.g., Section 2.9.4.6 and 3.6.2) mention that "if the wash water waste is determined to be hazardous, it will be collected for off-site disposal." This pertains to the potential contamination of wash water from the HRSG system with heavy metals. It is not clear what standards will be employed to make the determination of the water being hazardous, nor are the testing protocols or frequency of testing discussed. There also is no discussion of where off-site the hazardous waste water will be disposed and what are the likely environmental effects of such disposal. These details should be included in the EIS.

Palamanui Project

The Palamanui project begins the initial phase of the West Hawai'i campus residential units, mixed uses, an 18-hole golf course, and a university village center in 2004. Given the proximity of the Keahole project to the Palamanui project a cumulative impact study regarding the impacts of the latter development on this plan should be completed and addressed in the final EIS. In Appendix A, pg 32, the Palamanui project is mentioned, yet the description of the impacts concerning the Keahole project are very vague. A more involved study should be included in the final EIS. This study should include what will be coordinated, and how this will be accomplished with the planners of the Palamanui project.

Thank you for the opportunity to review this Draft EIS.

Sincerely,

John T. Harrison, Ph.D.
Environmental Coordinator

cc: OEQC
LUC
Belt Collins
James Moncur, WRRC
Steve Masutani, HNEI
Kerry Halford

Belt Collins

January 19, 2005
2002.33.1900 / 05P-038

John T. Harrison, Ph.D.
Environmental Coordinator
Environmental Center
University of Hawaii at Manoa
Krauss Annex 19
2500 Dole Street
Honolulu, HI 96822-2313

Dear Dr. Harrison:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 17, 2004 to Mr. Casey Cummings regarding the above project. Following are our responses to your comments in the order they were presented in your letter.

1) We agree that it would be difficult to ascertain which ammonia system HELCO intends to employ by reviewing Sections 1.9 and 2.10 of the Draft EIS. Section 1.9 presents the necessary permits and approvals for the facility. Section 2.10 also discusses the necessary permits and approvals. A detailed discussion of the Selective Catalytic Reduction (SCR) system is presented in Section 2.9.3, which contains five pages of information pertaining to the system and the use of ammonia alternatives. Included in that discussion at Sections 2.9.3.3, 2.9.4.1, 2.9.4.4, 2.9.4.5, and 2.9.4.7 are descriptions of the safety systems to be employed for use of ammonia at the facility. Please note that the discussion in Section 6.5 Unresolved Issues, notes that plans for the ST-7 with SCR are pending until the project is reclassified to the Urban District and receives the other necessary permits. The decision regarding which ammonia alternative to employ will be made once all approvals are secured. Therefore, it would be premature to identify a preferred alternative for ammonia at this time. We feel that the information is adequate for the purposes of the EIS.

Belt Collins Hawaii Ltd
2153 North King Street, Suite 200 • Honolulu, Hawaii 96819-4554 USA
T 808 521 5361 • F 808 538 7819 • honolulu@beltcollins.com • www.beltcollins.com

2) We have provided additional information regarding the safety issues and hazards associated with the transport of ammonia to Section 2.9.4.7. In accordance with the Hawaii Emergency Planning and Community Right to Know Act (HEPCRA), Hawaii Electric Light Company submits annual updates to the Department of Health of all required information for its generation and substation facilities, including the Keahole Power Plant and substation. These forms include contact information for use in emergencies or non-emergencies. A spill plan will be developed once a determination has been made as to which type of ammonia will be used. We have added a notation to that effect in Section 6.4, unresolved issues.

3) We appreciate your concerns about the need to fully disclose environmental impacts associated with converting the facility to naphtha fuel. HELCO recognizes that further analysis must be done internally to determine whether naphtha conversion is feasible from a variety of perspectives including physical plant, economic, environmental, and operational efficiency. The decision to pursue naphtha cannot be made until this analysis is conducted. The discussion of naphtha in the Draft EIS was presented for the purpose of ensuring full disclosure to the public and reviewing agencies. If the analysis supports naphtha conversion and HELCO decides upon that course of action, HELCO recognizes the need to comply with the requirements of Chapter 343, Hawaii Revised Statutes, as applicable.

4) The projected VOC emissions presented in Table 2 of Appendix I and reproduced in Table 3-D do not include the possible conversion to naphtha. As indicated in the discussion above, if an analysis by HELCO concludes that naphtha is a viable fuel alternative, HELCO will comply with all applicable requirements of Chapter 343, Hawaii Revised Statutes, to ensure full public disclosure of the decision. At that point in time, information pertaining to emissions will be updated to include VOC emissions related to naphtha.

5) We have added the following discussion to the end of the third paragraph under Section 3.6.2(3):

> *A wash water sample will be collected each time the HRSG tubes are washed. All samples will be analyzed by an analytical laboratory following appropriate EPA methodologies for determining hazardous wastes. The frequency of sampling may be adjusted after significant testing (e.g., after collection of 10 or more data sets) has been conducted to properly characterize the waste stream as being*

hazardous or not. The need to wash the HRSG boiler tubes will be dependent on the freshness of the SCR catalyst and type of fuel. The fresher the catalyst and higher the sulfur content in the fuel, the more frequent washing will be needed. If the catalyst is kept fresh and low sulfur fuel is used, washing could be required only once per year; otherwise it could be more frequent, possibly quarterly. Hazardous wash water will be sent to EPA-approved treatment and disposal facilities on the mainland, in compliance with all applicable Federal and State hazardous waste regulations. These are EPA-permitted facilities that are designed to properly treat and/or dispose of hazardous wastes. However, at some future time, HELCO may determine that it is economically prudent and environmentally appropriate to treat the wash water on site at the Keahole facility. Such treatment would involve the construction of a separate discrete wastewater treatment facility dedicated to treating the wash water. The sizing of the facility cannot yet be determined because the actual volume of wash water will depend upon the frequency that washing will occur. Therefore, the matter of whether or not the wash water may at some future time be treated on site is an Unresolved Issue. For further discussion of this matter, please refer to Section 6.4 of this EIS.

We have also added a new discussion on the matter of HRSG wash water in Chapter Six, at Section 6.4, Unresolved Issues:

At the time this Environmental Impact Statement is being prepared HELCO has not yet determined whether it is economically prudent and environmentally appropriate to treat the wash water on site rather than ship it to a disposal facility on the mainland. If treated on site, the heavy metals removed from the wash water would be shipped to an EPA-approved disposal facility on the mainland. This would greatly reduce the volume of hazardous material being transported. However, a detailed analysis must be conducted by HELCO to determine the feasibility of this approach before a commitment can be made to a specific course of action. At this time, it is HELCO's intention that once the ST-7 unit with the SCR has become operational, and the frequency of washing the HSRG tubes has been determined, a study will be conducted to determine the feasibility of treating the wash water on site. This study will include an analysis of the physical requirements of a discrete wash water treatment facility,

the operational requirements, the cost, and most importantly, the environmental considerations, including mitigations and a detailed response plan for emergency situations. HELCO recognizes that the decision to treat hazardous waste on site is a matter that deserves full public disclosure, review and participation, and will therefore comply with all applicable requirements of environmental review pursuant to Chapter 343, Hawaii Revised Statutes as amended. At this point in time, it is anticipated that a study to determine the feasibility of treating wash water on site commence approximately one year after ST-7 becomes operational.

6) The proposed project's impacts upon the Palamanui project and Palamanui's impacts on the HELCO project are fully addressed in Appendix M, the Socio-Economic Impact Assessment for the project, and are summarized in Chapter 4 of the DEIS.

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

MICHAEL J. MATSUKAWA
ATTORNEY AT LAW
TERRITORIAL CENTRE, SUITE 201
75-5751 KUAKINI HIGHWAY
KAILUA-KONA, HI 96740
TELEPHONE NO. (808) 329-1385
FAX NO. (808) 329-0512

December 20, 2004

Hawaii Electric Light Co., Inc.
c/o HECO
P.O. Box 2750
Honolulu, HI 96840

Attention Casey Cummings

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT
HAWAII ELECTRIC LIGHT COMPANY, INC.
BOUNDARY AMENDMENT FOR KEAHOLE GENERATING STATION

Dear Mr. Cummings:

The depth and quality of the HELCO Generating Station Draft EIS document sets a "new" standard for environmental documents and your staff deserves to be complemented for their work. Hopefully, this reflects a trend in the consulting industry to provide meaningful and adequate disclosures and information upon which decision-makers and the public can evaluate a development proposal. That being said, I direct your attention to the subjects discussed below.

1. **Executive Summary:** The summary states that without a boundary amendment, "the installation of ST-7 with SCR would not be possible." One of the goals of the boundary amendment is to eliminate procedural, historical and other obstacles presented (unintended) to the installation of ST-7 at the station site. The quoted statement should be clarified to explain that the boundary amendment helps implement a desired objective.

2. **Executive Summary:** The summary also states that the 58 MW plant is in complete conformance with all Conservation District requirements. However, the State BLNR did not make such a finding; nor did the Hawaii Supreme Court. The 58 MW plant was

actually "deemed approved" because the State BLNR did not make a finding on conformance. However, the State BLNR later required HELCO to seek a boundary amendment. The summary statement should be clarified and should incorporate Parts 3 and 5, below, as well because the reader should be apprised of the historical and procedural events underlying the proposed boundary amendment.

3. **Part 3, Page 2-8 (Conformance):** The statement contained at page 6-1, line 4 (that "the reclassification and change in zoning would bring the subject property in conformance with its existing use for industrial purposes") describes the situation at hand. Although the courts have determined that the expanded generator station is a lawful use under existing Conservation District rules, future management and regulation of the station site would be made more effective, efficient and consistent with sound land use policies. The statement at page 6-1, line 4 should also be used in Part 3, page 2-8.

4. **Part 1.9, Page 1-6 (Permits Needed):** The County of Hawaii General Plan is still under review. One of the proposed revisions is the industrial designation of the Keahole Generating Station site. However, the proposed revision will not take effect until the County Council enacts the same (estimated to be in mid-2005). If the County Council does not enact the proposed revision in a timely manner, HELCO's "rezoning" must include an amendment to the existing General Plan (Ordinance 89-142), which amendment should be included in the list of required permits and approvals.

5. **Part 2.3 (History):** A footnote or other statement should direct the reader to the fact that the Conservation District and its regulations evolved over time and that under the regulations in effect in 1973, industrial uses (such as a power plant) were deemed to be appropriate uses in the Conservation District. This explains why government officials allowed HELCO to build the existing generator station at the station site in the first instance in the Conservation District. In this context, the boundary amendment helps to resolve what some have described to be an "historical accident."

6. **Part 3.8.3.1 (Regulated Emissions):** Carbon dioxide (CO_2) is not a regulated substance. However, the public is aware of carbon dioxide's contribution to "global warming" and of the Kyoto Treaty (whether based on "science" or not). Some discussion of the subject might be helpful.

7. **Part 2.9.3.2 (SCR):** The subject of maximum and best available control technology such as SCR remains a subject of debate. In this instance, regulatory officials applied an "emissions netting" formula to exclude the mandatory use of SCR at the Keahole Generating Station. However, under the Settlement, HELCO and State Department of Health officials agreed to the use of SCR. This fact should be clarified.

8. **Part 4.10 (Mitigation, Emergency Plan):** A discussion of the emergency response plan (ERP) that HELCO and civil defense agencies intend to use to address events such as tanker truck accidents, hazardous substance "spills," fire and earthquakes as well as "9/11 measures" is in order. Such a plan should also contain a contact name and number for the public (and particularly ag park tenants) and government officials to use in case of emergencies and for non-emergency inquiries as well.

9. **Appendix I (Air Study):** The author should include a bibliography (as did Dr. Paull in Appendix L), including references to the University of Hawaii, Big Island scientific community, State of Hawaii Department of Health and Environmental Protection Agency sources.

10. **Other Documents:** In recent months, environmental documents have been prepared for other projects in the same region as the Keahole Generator Station (e.g., University of Hawaii West Hawaii campus, Hiluhilu Development and Department of Hawaiian Home Lands). Reference to these documents and the public's ability to review the same in context of HELCO's project would be helpful to give the reader a truly "regional" view of the development proposed for the Keahole Airport to Kailua Village corridor and the context of HELCO's project therein.

Thank you for this opportunity to comment and I hope the final document will address the comments, especially the executive summary section.

Yours truly,

Michael J. Matsukawa
Attorney for Peggy J. Ratliff, Mahi Cooper and Keahole Defense Coalition, a Hawaii nonprofit corporation

MJM:jff\kdc\eis.ltr

xc: State Land Use Commission
Attention: Anthony J.H. Ching
P.O. Box 2359
Honolulu, HI 96804

Belt Collins Hawaii, Ltd.
Attention: Lee Sichter
2153 North King Street, Suite 200
Honolulu, HI 96819-4554

BelfCollins

January 19, 2005
2002.33.1900 / 05P-039

Michael J. Matsukawa, Esq.
Territorial Centre, Suite 201
75-5751 Kuakini Highway
Kailua-Kona, HI 96740

Dear Mr. Matsukawa:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 20, 2004 to Mr. Casey Cummings regarding the above project. Following are responses to your comments in the order they were presented in your letter. First of all, thank you for your kind words on the overall depth and quality of the document.

1) Your reference to the statement in the Executive Summary may be neglecting the context in which it was presented. The statement is in direct reference to the No Action Alternative. In other words, if the land were to remain in the Conservation District, the installation of ST-7 would not be possible. We fully concur that the boundary amendment helps to implement a desired objective, and we believe that objective is accurately stated in the second and third paragraphs of the Executive Summary.

2) We are unable to find your reference to "complete conformance" in the Executive Summary. The second paragraph of the Executive Summary states, in part, "The reclassification and change in zoning would bring the subject property into conformance with its existing use for industrial purposes." That point notwithstanding, we concur with your observation and will revise relevant statements through the text as appropriate.

3) We have made the requested changes.

4) Per the December 8, 2004 comment letter from Mr. Christopher Yuen, we have deleted reference to the "proposed" General Plan because the Planning Department has previously found the project to be in conformance with the existing General Plan.

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5) We concur with your recommendation and have footnoted the third sentence of the first paragraph under Section 2.1 with the following text: "It should be noted that the rules governing permitted uses in the Conservation District have evolved over time. In 1973, industrial uses (such as a power plant) were deemed to be appropriate uses in the Conservation District. This helps explain why the original facility was permitted in the first instance."

6) We have added a brief discussion of carbon dioxide at the end of Section 3.8.3.1, which now reads:

> *Carbon Dioxide (CO_2): Although carbon dioxide is not a regulated substance, it is a topic of ongoing discussion with regard to global warming. The issue of climate change continues to undergo complex debate at international levels. It is appropriate that once global strategies are developed, national and state strategies and action plans should follow in that order. In the meantime, Hawaiian Electric Company and its subsidiaries remain committed to doing their part in addressing the issue of climate change by participating in voluntary efforts such as the U.S. Department of Energy's Climate Challenge Program, supporting renewable energy, offering demand side management and energy efficiency programs, developing efficient combined heat and power systems for customers, and continuously working to improve the efficiency of its generating units.*

7) We have added the following statement to the end of Section 2.9.3.2: "Although regulatory officials applied an "emissions netting" formula to exclude the mandatory use of SCR at the Keahole Generating Station, under the Settlement Agreement, HELCO and State Department of Health officials agreed to the use of SCR."

8) In accordance with the Hawaii Emergency Planning and Community Right to Know Act (HEPCRA), Hawaii Electric Light Company submits annual updates to the Department of Health of all required information for its generation and substation facilities, including the Keahole Power Plant and substation. These forms include contact information for use in emergencies or non-emergencies. We have also amended Section 2.9.4.7 to include the following statement:

HELCO is also required to prepare and submit a Risk Management Plan ("RMP") in accordance with guidelines issued by the Environmental Protection Agency ("EPA") pursuant to Section 112(r) of the Clean Air Act Amendments of 1990. Ammonia, in both anhydrous and aqueous forms, is listed as a regulated substance under 40 CFR Part 68. The RMP will include the following components:

- *Hazard assessment that details the potential effects of an accidental release, an accident history over the last 5 years, and an evaluation of worst-case and alternative accidental releases;*
- *Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and*
- *Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies should an accident occur.*

These plans are submitted to the EPA and made available for public review. The plans must be updated and resubmitted every five years. Also, under EPA's Emergency Planning and Community Right to Know Act (EPCRA), the quantities of ammonia and storage locations are reported to the State of Hawaii Department of Health, the Local Emergency Planning Committee, and the Hawaii County Fire Department. This information is submitted annually under the EPCRA Tier II program.

Compliance with the risk management program requirements (including submission of an RMP) is required by the date on which a regulated substance first becomes present above a threshold quantity in a process at a stationary source (the initial compliance deadline was June 21, 1999 for sources holding more than a threshold quantity of a regulated substance in a process prior to that date) (40 CFR §68.10(a)). If EPA adds a chemical to the list of regulated substances, part 68 requirements must be met with respect to that chemical within three years of the date on which the chemical is listed (40 CFR§68.10(a)(2)).

9) Appendix I has been amended to include the requested bibliography.

10) We have added the following discussion to the end of Section 1.6.2: "It should be noted that several other projects in the region surrounding the Keahole Generating Station are presently undergoing environmental review. For a broader perspective, the reader may wish to consult the Office of Environmental Quality Control to obtain copies of documents pertaining to the University of Hawaii's proposed West Hawaii campus, the Hiluhilu development (also known as Palamanui), and the Department of Hawaiian Home Lands."

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

HUI KAKO'O 'AINA HO'OPULAPULA
"Let the people flourish on the land"

December 22, 2004

Casey Cummings
Project Manager
Hawaii Electric Light Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840

Dear Mr. Cummings:

Subject: Comments on HELCO's Draft Environmental Impact Statement
HELCO – Keahole Generating Station and Airport Substation

Thank you for the opportunity to provide comments on the above referenced matter.

Hui Kako'o 'Aina Ho'opulapula is a native Hawaiian organization that represents eligible and qualified native Hawaiians for Hawaiian Home Land leases. Department of Hawaiian Home Lands has jurisdiction over lands that adjoin the HELCO power plant in Keahole that may be available for leasing to members of Hui Kako'o. Hui Kako'o also has members that live in the Kona district and engage in traditional and customary fishing along the near shore waters off the Kona coast, and in particular makai of the Natural Energy Laboratory of Hawaii (NELHA) and the Hawaii Ocean Science and Technology Park (HOST). The ocean waters off the Kona coast are known as an 'opelu fishing grounds that many native Hawaiians, including members of Hui Kako'o, fish for subsistence purposes.

In reviewing the draft EIS, in particular the "Assessment of Potential Impacts to the Marine Environment," we note that the report states that,

> [A]ll groundwater that is not pumped from the aquifer ultimately reaches the ocean, alteration of groundwater flow and/or composition also constitutes a factor that can potentially alter the nearshore marine environment. It is also important to note that alteration of groundwater flowing under the HELCO's project site will represent a subsidy to existing conditions that may already be affected by other anthropogenic activities. In the case of the HELCO generating station, the location of the project site dictates that

Post Office Box 37958, Honolulu, Hawai'i 96837 • Phone/Fax: (808) 262-5299 • E-mail: hui_kakoo@hotmail.com

> groundwater flow to the ocean will interact to some degree with the functional aspects of NELH and HOST Park, in terms of both water usage and discharge of "used" water back to the marine environment. These interactions are important because of the reliance of "high quality" ocean water for NELHA mariculture uses.

The report continues on to suggest that the data sources are extensive in evaluating the potential impacts of the HELCO power plant to the near shore waters. However, based upon our understanding of the location of the various monitoring wells and research tools, including shoreline samples, to determine the impact of HELCO's activities on the near shore waters, there are no monitoring wells situated makai of the HELCO power plant and mauka of NELHA and HOST Park operations. We believe it would be more appropriate to locate monitoring wells between HELCO and NELHA operations to accurately distinguish the impact of the HELCO's operations on the nearshore waters from the impacts of the NELHA and HOST activities. This information will provide the kinds of information necessary to distinguish the impacts on the marine environment from HELCO's activities. If there are no impacts as HELCO's reports conclude, than they should not be adverse to placing several monitoring wells makai of the HELCO power plant as we suggest. Without this information, we will never know the impact of HELCO's water use on the near shore marine environment and consequently the impact to native Hawaiian traditional and customary practices, including subsistence fishing, gathering of limu, etc.

We further find the draft EIS to be inadequate in the following analysis as is required by the Hawaii Supreme Court in, Ka Pa'akai O Ka 'Aina v. Land Use Commission, 94 Haw. 31, 7 P.3d 1068 (2004).

(1) Identifying the scope of "valued cultural, historical, or natural resources" in the subject area;
(2) The extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action; and
(3) The feasible action, if any, to be taken by the agency to reasonably protect native Hawaiian rights if they are found to exist.

We believe that the Hawaii Supreme Court clearly places the burden on the applicant and the government agencies to preserve and protect native Hawaiian traditional and customary practices. We find the draft EIS to

unilaterally conclude that since there are no impacts to near shore marine environment, than there are no adverse impacts to our PASH rights. The draft EIS is clearly absent of any identification of the valued cultural, historical or natural resources in the subject area. The subject area should go beyond the project site because as the draft EIS concludes the groundwater that is pumped on HELCO's project site will flow to the ocean. At a minimum, the draft EIS should at least identify those resources.

We thank you for the opportunity to submit our comments to the draft EIS.

Sincerely,

KAIPO KINCAID
Executive Director

Cc: Board Directors
Dawn Chang, Esq.
Anthony J.H. Ching, State Land Use Commission
Belt Collins Hawaii Ltd.

Belt Collins

January 19, 2005
2002.33.1900 / 05P-040

Ms. Kaipo Kincaid
Executive Director
Hui Kako'o'Aina Ho'opulapula
P.O. Box 37958
Honolulu, HI 96837

Dear Ms. Kincaid:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 22, 2004 to Mr. Casey Cummings regarding the above project. Thank you for taking the time to offer your comments. Following are responses to your comments (in italics) in the order they were presented in your letter.

1) *No monitoring wells between NELHA and Keahole Generating Station.* We wish to clarify that there are four monitoring wells between the Keahole Generating Station and NELHA. As indicated in Figure 1 of Appendix P, and discussed in Section II.A.3 of the report contained in Appendix J, *An Assessment of Potential Impacts to the Marine Environment* by Marine Research Consultants (February 2004), which you cite in your letter, there are four monitoring wells on the mauka side of the NELHA property, situated between the Keahole Generating Station and the NELHA facility, that are used to monitor water quality. Three are located at the Kona International Airport and the fourth is located near the shoreline. The airport well that is furthest inland is situated just makai of Queen Kaahumanu Highway, immediately downstream from the Keahole Generating Station. We are advised by our marine consultant, Dr. Steven Dollar, that these monitoring wells can be used to measure the impact, if any, of HELCO's use of groundwater and disposal of approximately 50% of that groundwater back into the Keauhou aquifer.

Further, as discussed in the Draft EIS, the quality of the effluent that is injected into the ground must conform to the parameters established by the State Department of Health in the existing Underground Injection Control permit (Permit No. UH-1776). HELCO intends to comply with all permit

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conditions and is confident that the quality of the effluent will meet all Department of Health water quality standards as required in Permit No. UH-1776.

Given these facts, we conclude that there is no need for additional monitoring wells.

2) *Subject area should go beyond the project site and should include the near shore over 3 miles from the project site.* We respectfully do not concur that the "subject property" or "subject area" should extend to the shoreline over three miles away for the purpose of the cultural impact assessment. During the consultation with government agencies and community groups as part of the public scoping process conducted for this Draft EIS, there was a general consensus that given that the potential impacts of the proposed project on the near shore area were anticipated to be minimal, if any, there was no reasonable basis for including the near shore area within the scope of the cultural impact assessment. The cultural impact assessment included as Appendix K in the Draft EIS was prepared in consultation with the staff of the State Historic Preservation Division and we believe it is adequate to address the impacts of the project.

However, for the purposes of responding to your concerns, we will address the anticipated impacts to the shoreline makai of the project site. Based on the reports attached as Appendix K, we believe that the proposed project will have no significant negative impact upon historic, prehistoric or cultural resources identified within the coastal zone management area makai of the Keahole Generating Station.

You have stated that Hui Kako'o has members that live in the Kona District who engage in traditional and customary fishing along the near shore off of the Kona Coast, and in particular makai of the NELHA and HOST. You have claimed that use of groundwater by the facility and the injection of effluent at the project site into the groundwater, and its subsequent impact upon near shore water quality at the shoreline, might constitute a negative impact upon traditional and customary Native Hawaiian cultural practices related to fishing and gathering along the shoreline.

First, during the scoping of the Cultural Impact Assessment methodology, we concluded that there are recreational activities that occur along the shoreline, but there is no evidence of traditional and customary native Hawaiian

practices that would warrant extending the assessment to the coastal area. Although you have stated on behalf of Hui Kako'o that there are members of your organization who practice traditional and customary fishing along the near shore makai of the project area, Hui Kako'o has not identified any members during the scoping or comment period of this Draft EIS that actually do exercise their traditional and customary Hawaiian fishing rights in this specific area. Further, we recognize your organization made a similar claim during an appeal before the 3rd Circuit Court, and that Judge Ibarra, in his decision on that lawsuit (Hui Kako'o, Waimana & Hee v. BLNR/DLNR (3rd Circuit Court, Civil 04-1-0051k dated November 3, 2004), specifically found "...Hui Kako'o failed to produce evidence to show that it or its members have any "personal" interest as native Hawaiians who traditionally and customarily exercised practices for subsistence, cultural, or religious purposes." Therefore, in the absence of any new or compelling information, we do not believe a change in the methodology of the cultural impact assessment is warranted.

Second, based again on scientific studies attached as Appendices J and P, we anticipate that the effect of the proposed project on the near shore waters will be minimal and will not have a significant negative impact. Sections 3.6.2.2 and 3.6.2.3, state that the volume of water being extracted from the groundwater and later injected as effluent constitutes a fraction of the volume (approximately 1.2 to 1.4 %) of saltwater that is disposed of at the subsurface level by operations associated with Cyanotech and the NELHA, which are situated between the HELCO facility and the shoreline. This is considered by the project's hydrologist and marine scientist to represent a negligible impact upon the groundwater.

In addition, the effluent injected by HELCO must travel approximately 3.5 miles before reaching the ocean. During this time and over this distance, it will mix with the existing groundwater flow, and become part of the 1,200,000 to 2,000,000 gallons of groundwater that enter the near shore waters per coastal mile per day and then mixes with ocean water. Given the overall dynamic of saltwater disposal in the region, and the fact that NELHA has been disposing of copious amounts of seawater for, at the very least, the past 15 years, traditional and customary Native Hawaiian practices that may have occurred along the Keahole shoreline over that same period of time have been subject to near shore water quality impacts that may have resulted from the NELHA operations. Given the negligible increased surcharge resulting from the HELCO project, no significant adverse impacts to

groundwater quality, near shore water quality or cultural resources or activities are anticipated. The project is consistent with this objective.

3) *The Draft EIS is inadequate under Ka Pa'akai O Ka 'Aina v. LUC, 94 Hawai'i 31, 7 P.3d 1068(2004).* We do not believe that our analysis of cultural impacts is inadequate as it pertains to the Ka Pa'akai decision. We note the original Supreme Court PASH decision, 79 Hawaii 425, 451, 903 P.2d 1246 (1995), states:

> "In other words, the State is authorized to impose appropriate regulations to govern the exercise of native Hawaiian rights in conjunction with permits issued for the development of land previously undeveloped or not yet fully developed."

In fact, the subject property, as well as the land extending makai of the subject property to the certified shoreline is fully developed. The proposed project will not affect access to any of those makai parcels including the near shore by traditional and customary Hawaiian practices. The properties between the project site and the ocean are, in the order from mauka to makai, the plant nursery abutting the makai side of the subject property (part of the State Department of Agriculture's Keahole Agricultural Park); Queen Kaahumanu Highway; the Kona International Airport; and finally, the NELHA and HOST facilities southwest of the Airport. Thus, we believe, and the staff of the State Historic Preservation Division have concurred, that the scope of the cultural impact assessment contained in the Draft EIS was appropriate.

With regard to your specific comments arising from the Ka Pa'akai case, we offer the following:

a. Identifying the scope of "valued cultural, historic, or natural resources" in the subject area:

Please note that in determining the methodology for the cultural impact assessment contained in the EIS, the project archaeologist specifically addressed the matter of the potential effects of the project on known or expected cultural properties, features, practices or beliefs within or related to the specific project area (see discussion of report Methodology in Appendix K). Given the fact that the subject property is fully developed and devoid of any cultural sites and/or known

cultural practices, and given the fact that no cultural sites or practices related specifically to the project site were identified on lands immediately abutting the project site, it was therefore determined that the extent of analysis for the purposes of cultural impact assessment was reasonable. Further, we believe the analysis in the Draft EIS exceeds the minimum analysis required by Ka Pa'akai. That case requires analysis of "valued cultural, historic, or natural resources" "in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area."

b. The extent to which those resources - including traditional and customary native Hawaiian rights - will be affected or impaired by the proposed action:

It is important to note that the proposed project will not in any way impair access to traditional and customary practices at the shoreline. In the PASH case, the issue was access to areas for traditional and customary practices. As discussed above, although we do not believe that any traditional or customary native Hawaiian cultural practices or rights are specifically tied to the petition area, nor is access to the near shore for those practices impeded in any way, we believe that the proposed action (that is to say, the reclassification of the property from the Conservation District to the Urban District) will have no significant adverse impact to activities along the shoreline or in near shore waters. Further, we believe the EIS adequately demonstrates that the current and future operations of the Keahole Generating Station will have no significant negative impact to activities along the shoreline or in near shore waters.

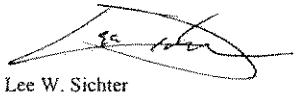
c. The feasible action, if any, to be taken by the agency to reasonably protect native Hawaiian rights if they are found to exist:

We believe the EIS already identifies the feasible action that HELCO is presently taking to protect near shore water quality: (1) Monitoring program that requires HELCO to do periodic water quality monitoring to make sure that this proposed project does not adversely affect near shore waters and (2) Requiring HELCO comply with the conditions of approval for its existing UIC permit, which regulates the quality of any water injected into the groundwater at the Keahole Generating Station.

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.



Lee W. Sichter
Principal Planner

LWS:lf

LINDA LINGLE
GOVERNOR

PATRICIA HAMAMOTO
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAII 96804

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OFFICE OF BUSINESS SERVICES

December 27, 2004

Mr. Casey Cummings, Project Manager
Hawaii Electric Light Company, Inc.
C/O Hawaiian Electric Company, Inc.
P. O. Box 2750
Honolulu, Hawaii 96840

Dear Mr. Cummings:

Subject: Keahole Generating Station and Airport Substation
Keahole, North Kona TMK: 7-3-49:36 and 7-3-49:37

The Department of Education (DOE) has reviewed the Draft Environmental Impact Statement (DEIS) for Hawaii Electric Light Company, Inc.'s Keahole Generating Station and Airport Substation.

The DEIS does not appear to have any information on the distance between the stations and the closest public schools: Kealakehe Elementary, Middle, and High schools. The information would have been helpful in gauging possible impacts of the stations on the schools.

The DOE has no further comment. Thank you for the opportunity to review the report.

If you have any questions, please call me at 586-3444 or Heidi Meeker of the Facilities and Support Services Branch at 733-4862.

Sincerely yours,

Rae M. Loui, Assistant Superintendent
Office of Business Services

RML:hy

c: Alvin Rho, CAS, Honokaa/Kealakehe/Kohala/Konawaena Complex Area
Anthony J.H. Ching, Land Use Commission
✓Lee Sichter, Belt Collins Hawaii Ltd.

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Belt Collins

January 19, 2005
2002.33.1900 / 05P-041

Ms. Rae M. Loui
Assistant Superintendent
Office of Business Services
Department of Education
State of Hawaii
P.O. Box 2360
Honolulu, HI 96804

Dear Ms. Loui:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 27, 2004 to Mr. Casey Cummings regarding the above project. We have provided additional information pertaining to the schools closest to the Keahole Generating Station. The closest school complex is Kealakehe, which is about three miles south of the Keahole Generating Station. Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200 ★ Honolulu, Hawaii 96819 USA
T 808.521.5361 ★ F 808.538.7819 ★ honolulu@beltcollins.com ★ www.beltcollins.com
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LINDA LINGLE
GOVERNOR

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
BARRY FUKUNAGA
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.1517

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

December 23, 2004

RECEIVED
'04 DEC 28 P1:11
OFC. OF ENVIRONMENTAL QUALITY CONTROL

Mr. Casey Cummings
Project Manager
Hawaii Electric Light Company, Inc.
c/o Hawaiian Electric Company, Inc.
P. O. Box 2750
Honolulu, Hawaii 96840

Dear Mr. Cummings:

Subject: HELCO Keahole Generating Station and Airport Substation
Draft Environmental Impact Statement (DEIS)
TMK: (3) 7-3-049: 036 and (3) 7-3-049: 037

Thank you for requesting our review of the subject report. We have the following comments to update and supplement our prior comments on the electric generation facility, the most recent being in February 2004 for Land Use Commission petition, Docket No. A03-743:

While the electric facility itself will not significantly affect our highway and airport facilities, its location mauka of Queen Kaahumanu Highway and Kona International Airport at Keahole has some potentially adverse effects.

Pollution, drainage and water (surface and ground) quality controls and monitoring for contaminants or storm flows that may affect our facilities are concerns because of wind direction or water flow migration. HELCO should be required to keep us apprised and coordinate its plans and efforts in these subject areas with our respective divisional highway or airport district offices on the island of Hawaii.

We appreciate the opportunity to provide our comments.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

Enc.

c: Genevieve Salmonson, Office of Environmental Quality Control
Mary Lou Kobayashi, Office of Planning, DBEDT
Anthong Ching, Land Use Commission
Christopher Yuen, Hawaii Planning Department

JAN-03-2005 MON 08:48 AM 808 586 4186 P. 01

BeltCollins

January 19, 2005
2002.33.1900 / 05P-042

Mr. Rodney K. Haraga, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, HI 96813-5097

Dear Mr. Haraga:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 23, 2004 to Mr. Casey Cummings regarding the above project. We appreciate your concerns regarding the facility's proximity to the Queen Kaahumanu Highway in terms of potential impacts in the form of storm water runoff and contaminants. In accordance with the Hawaii Emergency Planning and Community Right to Know Act (HEPCRA), Hawaii Electric Light Company submits annual updates to the Department of Health of all required information for its generation and substation facilities, including the Keahole Power Plant and substation. These forms include contact information for use in emergencies or non-emergencies. HELCO would be pleased to provide a copy of its annual updates to the Department of Transportation to help keep the department apprised and to coordinate its plans and efforts with the Highways and Airports Divisions.

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

Belt Collins Hawaii Ltd
2153 North King Street Suite 200 • Honolulu Hawaii 96819 USA
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LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to
File:

December 23, 2004

04-1106A CAB

Mr. Casey Cummings, Project Manager
Hawaii Electric Light Company, Inc.
c/o Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840

Dear Mr. Cummings:

SUBJECT: Draft Environmental Impact Statement for the Proposed Keahole Generating Station and Airport Substation Project

The project must comply with all applicable Air Pollution Control Permit conditions and requirements. In addition, we have the following comments on the subject document:

Control of Fugitive Dust:

There is a significant potential for fugitive dust emissions during all phases of construction. Proposed construction activities will occur in proximity to existing residences, public areas and major thoroughfares, thereby exacerbating potential dust problems. It is recommended that a dust control management plan be developed which identifies and addresses all activities that have a potential to generate fugitive dust. Implementation of adequate dust control measures during all phases of development and construction activities is warranted.

Construction activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust.

The contractor should provide adequate measures to control dust from the road areas and during the various phases of construction. These measures include, but are not limited to, the following:

a) Plan the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;

b) Provide an adequate water source at the site prior to start-up of construction activities;
c) Landscape and provide rapid covering of bare areas, including slopes, starting from the initial grading phase;
d) Minimize dust from shoulders and access roads;
e) Provide adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
f) Control dust from debris being hauled away from the project site.

If you have any questions, please contact Mr. Barry Ching of my staff at 586-4200.

Sincerely,

WILFRED K. NAGAMINE
Manager, Clean Air Branch

BC:jhm

Belt Collins

January 19, 2005
2002.33.1900 / 05P-043

Mr. Wilfred K. Nagamine
Manager, Clean Air Branch
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Mr. Nagamine:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 23, 2004 to Mr. Casey Cummings regarding the above project. Please be aware that virtually all construction at the site was completed prior to the publication of the Draft EIS, pursuant to already approved permits. The EIS is for the reclassification of the subject property from the Conservation District to the Urban District. The limited amount of new construction that remains will be generally limited to the conversion of the existing combustion turbines to a dual train system. This work will occur in areas that are already paved, and therefore, there is a minimum potential for fugitive dust emissions. Nevertheless, prior to the commencement of this work, HELCO will submit its construction plans to your branch for the purpose of determining whether a Dust Control Management Plan will be needed.

Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200 ▪ Honolulu, Hawaii 96819 USA
T (808) 521-5361 ▪ F (808) 538-7819 ▪ honolulu@beltcollins.com ▪ www.beltcollins.com
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LINDA LINGLE
GOVERNOR
THEODORE E. LIU
DIRECTOR
STEVE BRETSCHNEIDER
DEPUTY DIRECTOR
MARY LOU KOBAYASHI
ADMINISTRATOR
OFFICE OF PLANNING

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

OFFICE OF PLANNING
235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824

Ref. No. P-10762 2004: 1105005

January 11, 2005

Hawaii Electric Light Company, Inc.
c/o Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840

Attention: Mr. Casey Cummings

Gentlemen:

Subject: A03-743, HELCO-Keahole Generating Station and Airport Substation
Draft Environmental Impact Statement (DEIS)

We have reviewed the above mentioned Draft Environmental Impact Statement for the HELCO-Keahole Generating Station and Airport Substation. The EIS addresses the impacts of the proposed reclassification from the State Conservation District to the State Urban District to expand HELCO's facilities and generating capacity. We note that HELCO has completed a substantial amount of the construction of the combustion turbines, and related equipment. The Petitioner proposes to reclassify the subject property to Urban because of its existing industrial use. HELCO will maintain the power generation plant and implement environmental mitigation measures.

The DEIS describes the unresolved issues as follows:

1. Issues of utilizing renewable resources for electrical generation.

2. HELCO has various agreements with Independent Power Producers which provide about 43 percent generating capacity under power purchase agreements. Some of those agreements will end in December 2004, and other agreements do not promise to provide additional electrical power to HELCO.

3. Location of the access road to Queen Kaahumanu Highway is an unresolved issue because of the neighboring development that proposes to connect their access to the Keahole Generating Facility.

We note that the DEIS indicates that the neighboring property owners and tenants have expressed concerns regarding noise, air quality, and visual impacts of the improvements to the generating station. The DEIS includes studies and appendices on traffic, avifauna and feral mammals, volcanic hazards, integrated resource planning, alternative resources, noise, climate and air quality, the marine environment, an archaeological and cultural report, emissions, socio-economics, and water resources.

Thank you for the opportunity to review this document. The Office of Planning will further comment with testimony to the Land Use Commission regarding the proposal to reclassify the subject property from the Conservation to the Urban District. If you have any questions, please contact Lorene Maki of my staff at 587-2888.

Sincerely,

Mary Lou Kobayashi
Administrator

c: Anthony Ching, Land Use Commission
Rodney Haraga, Department of Transportation

BeltCollins

January 19, 2005
2002.33.1900 / 05P-044

Ms. Mary Lou Kobayashi, Administrator
Office of Planning
Dept. of Business, Economic Development & Tourism
State of Hawaii
P.O. Box 2359
Honolulu, HI 96804

Dear Ms. Kobayashi:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of January 11, 2005 to Mr. Casey Cummings regarding the above project. We look forward to your comments at the State Land Use Commission. Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200 ▪ Honolulu, Hawaii, 96819, USA
T. 808 521 5361 ▪ F. 808 538 7819 ▪ honolulu@beltcollins.com ▪ www.beltcollins.com
Belt Collins Hawaii is an Equal Opportunity Employer

PHONE (808) 594-1888 FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD04/659B

December 28, 2004

Casey Cummings
Project Manager
Hawaii Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840

Re: Draft Environmental Impact Statement, HELCO-Keahole Generating Station and Airport Substation, North Kona, Island of Hawaii, TMK: (3) 7-3-049:036 and (3) 7-3-049: 037

Dear Mr. Cummings:

The Office of Hawaiian Affairs (OHA) is in receipt of a Draft Environmental Impact Statement (DEIS) from Belt Collins Hawaii, Inc., regarding a proposal by HELCO to reclassify its lands at the Keahole Generating Station and Airport Substation, from State of Hawai'i Conservation District to the Urban District, and a subsequent change in Hawai'i County zoning from Open to General Industrial.

This reclassification would bring the subject property into conformance with its existing use for industrial purposes. Planned improvements for the facility could then be made and increase generating capacity for the County of Hawaii to meet increasing demands for power.

Several alternatives to this proposal were also included in the DEIS and reviewed by staff, and this plan is preferred overall to the Pu'uanahulu proposal as that area is known to contain numerous historic and cultural sites and an established system of 'ohana and descendants actively involved in cultural preservation activities.

After carefully reviewing the submitted materials, OHA offers no substantive comments or concerns at this juncture but would like to be kept informed of any updates or further approvals concerning this project.

If you have any questions or concerns, please contact Kai Markell, Policy Advocate, at 594-1945 or kaim@oha.org. Once again, thank you for your patience during our review and assessment of this important matter.

'O wau iho nō,

for Clyde W. Nāmu'o
Administrator

c. Anthony J.H. Ching, Executive Director, State Land Use Commission

BeltCollins

January 21, 2005
2002.33.1900 / 05P-052

Mr. Clyde W. Namu'o
Administrator
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, HI 96813

Dear Mr. Namu'o:

Review of Draft EIS for
Keahole Generating Station and Airport Substation

This is in response to your letter of December 28, 2004 to Mr. Casey Cummings regarding the above project. Thank you for participating in the public and agency review of the above document.

Very truly yours,

BELT COLLINS HAWAII LTD.

Lee W. Sichter
Principal Planner

LWS:lf

Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200 ★ Honolulu, Hawaii 96819-4554 USA
T/808 521 5361 ★ F/808 538 7819 ★ honolulu@beltcollins.com ★ www.beltcollins.com

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G L O S S A R Y O F T E R M S

A-weighting
A sound level weighting scale in which the sound levels in individual frequency bands are adjusted to match the response of the human ear. The reference adjustment is 0 dB at 1000 Hz. The human ear is much less responsive at low frequencies. An A-weighted overall sound level is the total contribution from all sound frequencies, with the appropriate weighting factors applied.

A'a
Stony rough lava.

Actual Peak Load Reductions
The actual reduction in annual peak load (measured in kilowatts) achieved by consumers that participate in a utility DSM program. It reflects the real changes in the demand for electricity resulting from a utility DSM program that is in effect at the same time the utility experiences its annual peak load, as opposed to the installed peak load reduction capability (i.e., Potential Peak Load Reduction). It should account for the regular cycling of energy efficient units during the period of annual peak load.

Air Pollution
The contamination of the atmosphere by any toxic or radioactive gases and particulate matter as a result of human activity.

Air Quality Assessment
A prescribed level of atmospheric pollution allowed for a certain compound during a specific time in a specific geographical area. Standards are set by some regulating body, office or agency.

Air Quality Standards
The level of pollutants prescribed by regulations that are not be exceeded during a given time in a defined area.

Allowance
A tradable permit to emit a specific amount of a pollutant. For example, under the Acid Rain Program, one allowance permits the emissions of one ton of sulfur dioxide (SO_2).

Alternative Fuels: Substitutes for traditional liquid, oil-derived motor vehicle fuels like gasoline and diesel. Includes mixtures of alcohol-based fuels with gasoline, methanol, ethanol, compressed natural gas, and others.

Ambient Air: Any unconfined portion of the atmosphere: open air, surrounding air.

Ambient Temperature: Temperature of the surrounding air or other medium.

Ammonia
The molecular formula for ammonia is NH_3. Ammonia is one of the most important inorganic nitrogen compounds in atmospheric water droplets. It reacts with strong acids and is one of the only known basic, gas phase atmospheric components. Atmospheric ammonia can also enhance the nucleation rate and the production of new particles in the atmosphere. These new particles can be activated to become condensation nuclei and then, through various processes, grow to a particle size of 0.05 micrometer or larger which can then be effective as cloud condensation nuclei. This process can, therefore, affect the global radiation budget. The major sources of ammonia are decaying natural organic matter, livestock wastes, fertilizers, and industrial activity.

Ampere (amp)
A unit for measuring the strength of an electric current. The unit of measurement of electrical current produced in a circuit by 1 volt acting through a resistance of 1 ohm. Measurement of the amount of flow in an electrical current; shorten to "amp"; named in honor of Andre'-Marie Ampere (1775-1836) for his early work in the field of electrodynamics.

Ancillary Services
Services necessary to support the transmission of energy from resources to loads while maintaining reliable operation of the Transmission Provider's transmission system in accordance with Good Utility Practice.

Anhydrous
Free from water and especially water of crystallization.

Annual Consumption
Annual consumption refers to the amount of electricity used by a consumer in one year and is typically measured in kilowatt-hours (kWh). This information can be acquired from your electricity bill or by contacting your energy provider.

Annual Transmission Costs
The total annual cost of the Transmission System shall be the amount specified in Schedule 1 until amended by the Transmission Provider or modified by the Commission.

G L O S S A R Y O F T E R M S

Aquifers
Layers of sand, rock, limestone or gravel that form natural receptacles for the water as it is pulled downward by gravity.

Attainment Area
An area considered to have air quality as good as or better than the national ambient air quality standards as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others.

Basal
A type of fresh water pool found floating on top of salt water.

Base Load
An electric utility's minimum load of electricity over a certain time period. The minimum amount of electric power delivered or required over a given period of time at a steady rate.

Baseload Capacity
The generating equipment normally operated to serve loads on an around-the-clock basis.

Bathymetry
The measurement of water depth at various places in a body of water; *also* the information derived from such measurements.

Benthos Organisms that live on or in the bottom of a body of water.

Beryllium (Be)
A metal that could be hazardous to human health when inhaled as an airborne pollutant. It is discharged by machine shops, ceramic and propellant plants, and foundries.

Biomass
Material composed of garbage, leaf and yard debris, and other organic materials; when decomposed, serves as source of methane gas used for fuel.

Biomass Burning
The process of oxidizing living material. This process produces atmospheric particulates as well as the production of greenhouse and reactive tropospheric gases. These gases include carbon dioxide (CO_2), cabon monoxide (CO), (nitrogen oxides) NO_x, methane (CH_4), methyl chloride/chloromethane (CH_3Cl) along with the addition of black carbon. All of these chemical species can be lofted relatively high in the atmosphere due to the convective heating of a fire.

British Thermal Unit (Btu)
Often marked on heaters to show their measure of heating capacity; measure of heat needed to raise temperature one degree Fahrenheit in one pound of water. (See also, Calorie.)

Buffering Capacity
The resistance of water or soil to changes in pH.

C-weighting
A sound level weighting scale that is relatively flat from 31.5 Hz to 8k Hz with a roll-off higher and lower than those frequencies. The adjustment is 0 dB from 200 Hz to 1250 Hz. A C-weighted overall sound level is the total contribution from all sound frequencies, with the appropriate weighting factors applied

Capability
The maximum load that a generating unit, generating station, or other electrical apparatus can carry under specified conditions for a given period of time without exceeding approved limits of temperature and stress.

Capacity
The amount of electric power delivered or required for which a generator, turbine, transformer, transmission circuit, station, or system is rated by the manufacturer.

Carbon 14
An isotope of carbon 12 (containing two more neutrons) that is radioactive and used in carbon dating.

Carbon Cycle A complex cycle that circulates carbon through the atmosphere, oceans, and land, which includes vegetation and soil and carbon is in various forms and oxidation states throughout the cycle.

GLOSSARY OF TERMS

Carbon Dioxide (CO_2)
A compound consisting of one carbon and two oxygens. It is a reactant in photosynthesis and necessary for plant life. Abundant in the atmosphere due to anthropogenic and natural activities. It is a greenhouse gas. Burning fossil fuels releases carbon that has been stored underground for millions of years into the atmosphere.

Carbon Monoxide (CO)
A toxic, odorless, colorless gas produced during fossil fuel or biomass burning. Compound consisting of one carbon and one oxygen. Except for carbon dioxide, it is one of the longest lived naturally occurring atmospheric carbon compounds. Carbon monoxide is produced as a result of incomplete burning of carbon-containing fuels including coal, wood, charcoal, natural gas, and fuel oil. Running cars produce CO. It can be emitted by combustion sources such as unvented kerosene and gas space heaters, furnaces, woodstoves, gas stoves, fireplaces, water heaters, automobile exhaust from attached garages, and tobacco smoke. In low concentrations, it can cause fatigue in healthy people and chest pain in people with heart disease. At higher concentrations, it can cause impaired vision and coordination; headaches; dizziness; confusion; nausea.

Catalytic Converter
An air pollution control device using the exhaust system of cars. The converter helps complete combustion of any fuel that was not burned in the engine and reduces the presence of other harmful emission concentrations. The converter changes the unburned hydrocarbons and carbon monoxide in the exhaust into carbon dioxide and water vapor. The converter use chemical catalysis to create this change.

Clean Air Act (CAA)
The Clean Air Act passed in 1970 and later in November of 1990 made into law established nationwide levels of acceptable air pollution from automobiles, individuals, and industry. The Environmental Protection Agency is responsible for enforcement of standards and regulations of the Clean Air Act.

Coal
Coal is formed from plant and animal matter that has been subjected to geologic heat and pressure, transformed over millions of years into hard black solids. Because coal is a readily available resource in the United States, coal power plants provide about half of the nation's electricity. However, coal-fired power plants generally cause more pollution per unit of electricity than any other fuel. Most coal plants are required to have several pollution control devices to reduce the amount of pollutants that are released into the air from burning the coal. These controls have played an important role in cleaning up air quality in many areas of the country.

Cogenerator
A generating facility that produces electricity and another form of useful thermal energy (such as heat or steam) used for industrial, commercial, heating, or cooling purposes. To receive status as a qualifying facility (QF) under the Public Utility Regulatory Policies Act (PURPA), the facility must produce electric energy and "another form of useful thermal energy through the sequential use of energy," and meet certain ownership, operating, and efficiency criteria established by the Federal Energy Regulatory Commission.

Combined Cycle
An electric generating technology in which electricity is produced from otherwise lost waste heat exiting from one more gas (combustion) turbines. The exiting heat is routed to a conventional boiler or to a heat recovery steam generator for utilization by a steam turbine in the production of electricity. This process increases the efficiency of the electric generating unit.

Combined Cycle Unit
An electric generating unit that consists of one or more combustion turbines and one or more boilers with a portion of the required energy input to the boiler(s) provided by the exhaust gas of the combustion turbine(s).

Combined Heat And Power (CHP)
Use of waste heat to drive a system and thereby reducing the energy it otherwise would need. Combined heat and power (CHP), or cogeneration, is an electricity generation technology that involves the recovery of waste heat from the electric generation process to produce other forms of useful energy simultaneously, such as useable heat or steam. CHP is better for the environment, the economy, and our nation's energy supply than generating heat and power separately because conventional electricity generation is inherently inefficient. On average, two-thirds of the heat used to make electricity is emitted as excess heat. CHP systems, in contrast, are capable of converting more than 70 percent of the fuel into usable energy.

Combustion
Burning, or rapid oxidation, accompanied by release of energy in the form of heat and light. Refers to controlled burning of waste, in which heat chemically alters organic compounds, converting into stable inorganics such as carbon dioxide and water.

Combustion Turbine (CT)
Combustion turbines have been used for power generation for decades and range in size from units starting at about 1 MW to over a 100 MW. Combustion turbines have relatively low installation costs, low emissions, high heat recovery, infrequent maintenance requirements, but low electric efficiency. With these traits, combustion turbines are typically used for cogeneration, as peakers, and in combined cycle configurations.

Conservation (DSM)
This Demand-Side Management category represents the amount of consumer peak load reduction at the time of system peak due to utility programs that reduce consumer load during many hours of the year. Examples include utility rebate and shared savings activities for the installation of energy efficient appliances, lighting and electrical machinery, and weatherization materials. In addition, this category includes all other Demand-Side Management activities, such as thermal storage, time-of-use rates, fuel substitutions, measurement and evaluation, and any other utility-administered Demand-Side Management activity designed to reduce demand and/or electricity use.

Consumption (fuel)
The amount of fuel used for gross generation, providing standby service, start-up and/or flame stabilization.

Control Area
An electric power system or combination of electric power systems to which a common automatic control scheme is applied in order to: (1) match, at all times, the power output of the generators within the electric power system(s) and capacity and energy purchased from entities outside the electric power system(s), with the load in the electric power system(s); (2) maintain, within the limits of Good Utility Practice, scheduled interchange with other Control Areas; (3) maintain the frequency of the electric power system(s) within reasonable limits in accordance with Good Utility Practice; and (4) provide sufficient generating capacity to maintain operating reserves in accordance with Good Utility Practice.

Cooling System
Energy Efficiency program promotion aimed at improving the efficiency of the cooling delivery system, including replacement, in the residential, commercial, or industrial sectors.

Current
A flow of electrons in an electrical conductor. The strength or rate of movement of the electricity is measured in amperes.

dB (dBA)
The decibel (dB) is used to measure sound level, but it is also widely used in electronics, signals and communication. The dB is a logarithmic unit used to describe a ratio. The ratio may be power, sound pressure, voltage or intensity or several other things. If the "A weighting filter" is used, the sound pressure level is given in units of dB(A) or dBA. Sound pressure level on the dBA scale is easy to measure and is therefore widely used.

Demand (electric)
How consumers purchase supplies; the amount of services the electric utility has to provide at any one time. The rate at which electric energy is delivered to or by a system, part of a system or piece of equipment, at a given instant or averaged over any designated period of time.

Demand Side Management (DSM)
A conservation measure that encourages commercial and residential customers to use electricity more efficiently, and thereby reduce electricity usage.

Distributed Generation (DG)
The use of small electric power generators, using fossil fuels or renewable energy sources, located on the utility system at a utility site or at a customer site that may or may not be connected to the utility's power grid.

Distribution System (Grid)
The portion of an electric system that is dedicated to delivering electric energy to an end user.

Dual Train Combined Cycle (DTCC)
A configuration in which there are two combustion turbines, two heat recovery steam generators, and one steam turbine.

Efficiency
In electrical energy; the amount of a utility's power generation process that is efficiently used to produce power; some power is lost in the transmission process.

GLOSSARY OF TERMS

Electric Plant
A facility containing prime movers, electric generators, and auxiliary equipment for converting mechanical, chemical, and/or fission energy into electric energy.

Electric Rate Schedule
A statement of the electric rate and the terms and conditions governing its application, including attendant contract terms and conditions that have been accepted by a regulatory body with appropriate oversight authority.

Electric Utility
A corporation, person, agency, authority, or other legal entity or instrumentality that owns and/or operates facilities within the United States, its territories, or Puerto Rico for the generation, transmission, distribution, or sale of electric energy primarily for use by the public and files forms listed in the Code of Federal Regulations, Title 18, Part 141. Facilities that qualify as cogenerators or small power producers under the Public Utility Regulatory Policies Act are not considered electric utilities.

Electrical Energy
Energy converted; the force of moving electrons.

Electron
Basic particle that orbits the nucleus of an atom; can be stimulated to movement by various forces like magnetism.

Emission
The release or giving out of a gas, light or heat. An automobile releases uncombusted or partially oxidized hydrocarbon emissions from its tailpipe when the engine is running. Atoms in an excited state often emit light in order to reach a lower energy state. These emissions can be used to determine the presence of the atoms in a sample.

Energy Efficiency (products)
Energy efficiency refers to products or systems using less energy to do the same or better job than conventional products or systems. Energy efficiency saves energy, saves money on utility bills, and helps protect the environment by reducing the amount of electricity (and associated environmental impacts) that needs to be generated. When buying or replacing products or appliances for your home, look for the EPA ENERGY STAR® label — the national symbol for energy efficiency. For more information on ENERGY STAR® labeled products, please visit the ENERGY STAR® Web site.

Energy Efficiency (programs)
Programs that are aimed at reducing the energy used by specific end-use devices and systems, typically without affecting the services provided. These programs reduce overall electricity consumption (reported in megawatthours), often without explicit consideration for the timing of program-induced savings. Such savings are generally achieved by substituting technically more advanced equipment to produce the same level of end-use services (e.g. lighting, heating, motor drive) with less electricity. Examples include high-efficiency appliances, efficient lighting programs, high-efficiency heating, ventilating and air conditioning (HVAC) systems or control modifications, efficient building design, advanced electric motor drives, and heat recovery systems.

Energy Source
The primary source that provides the power that is converted to electricity through chemical, mechanical, or other means. Energy sources include coal, petroleum and petroleum products, gas, water, uranium, wind, sunlight, geothermal, and other sources.

Energy
The study of energy; the capacity to do work; many forms of conversion using various fuels; in electrical energy. (see also, joules, calorie, btu, or kilowatt-hour) The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Energy has several forms, some of which are easily convertible and can be changed to another form useful for work. Most of the world's convertible energy comes from fossil fuels that are burned to produce heat that is then used as a transfer medium to mechanical or other means in order to accomplish tasks. Electrical energy is usually measured in kilowatt-hours, while heat energy is usually measured in British thermal units.

Equivalent Forced Outage Rate (EFOR)
Calculated rate, which takes into account forced partial outages. For each forced partial outage, an equivalent full load outage duration is calculated to include the effect of partial as well as full forced outages on the forced outage rate.

Equivalent Forced Outage Time (TE)
For a forced partial outage, an equivalent full load outage duration calculated from the duration and load reduction of a Forced Partial Outage.

Ethanol
Also known as ethyl alcohol or alcohol, (C_2H_5OH) is an oxygenated hydrocarbon that can be burned as a fuel, or blended into gasoline. Thought of as an alternative fuel and clean fuel, ethanol is a renewable energy source that is made from corn or other grains. If blended into gasoline, ethanol helps with the combustion process and therefore less unburned hydrocarbons form. Ethanol blended fuels competed with methyltertbutylether (MTBE), but because of the cost and the fact MTBE can be shipped through exisisting pipelines, MTBE was chosen. MTBE is now being banned because of its ability to travel in ground water and the bad taste it imparts to drinking water, because of this ethanol is once again being put back into the gas.

Ethylene A flammable and colorless gas that has considerable effect as a regulator of plant growth. It is used to induce pineapple flowering and fruit coloring, ripen bananas, and induce flowering.

Evaporation - The process of the change in the state of a liquid or solid to a gas or vapor. Vanishing of the surface of a liquid to the atmosphere.

Fauna - Animals or animal life of a particular region or a particular time.

Firm Power
Power or power producing capacity intended to be available at all times during the period covered by a guaranteed commitment to deliver, even under adverse conditions.

Flora
A plant or plant life of a specific region or particular period.

Forced Outage (FO)
The occurrence of a component failure or other condition which requires that a unit be removed from service immediately or up to and including the very next weekend.

Forced Outage Hours (FOH)
The time in hours during which a unit or major equipment is unavailable due to a Forced Outage.

Forced Partial Outage Hours (FPOH)
The time in hours during which a unit or major equipment is unavailable for full load due to a forced partial outage.

Forced Partial Outage
The occurrence of a component failure or other condition which requires that the load on a unit be reduced 2 percent or more immediately or up to and including the very next weekend.

Fossil Fuels
Any naturally occurring organic fuel, such as petroleum, coal, and natural gas. Fossil fuels are the nation's principal source of electricity. The popularity of these fuels is largely due to their low costs. Fossil fuels come in three major forms—coal, oil, and natural gas. All three were formed many hundreds of millions of years ago before the time of the dinosaurs—hence the name fossil fuels. Because fossil fuels are a finite resource and cannot be replenished once they are extracted and burned, they are not considered renewable. These natural resources contain stored energy from the sun, which is released upon combustion. These fuels also release various types of pollutants such as sulfur dioxide, carbon dioxide and nitrogen dioxide when burned.

Fuel Cell
In electrical generation; apparatus for combining a certain fuel and oxygen to help in the generation of electricity; converting chemicals to electrical energy.

Generating Capacity
The maximum output commonly expressed in megawatts (MW), that generating equipment can supply to system load, adjusted for ambient conditions.

Generating Plant
In electrical generation; location where certain fuels (coal, natural gas, or nuclear) or hydro power are converted to electrical power; composed of turbines, generators, transformers, substations, power towers, and transmission lines.

Generating Unit
Any combination of physically connected generator(s), reactor(s), boiler(s), combustion turbine(s), or other prime mover(s) operated together to produce electric power.

Generation (electricity)
The process of producing electric energy by transforming other forms of energy; also, the amount of electric energy produced, expressed in watt-hours (Wh).

Generator
A machine that converts mechanical energy into electrical energy.

Geologic Time Scale
A time scale in which the earth and its atmosphere are dated. It is broken into two division; Relative Time: Determines the age relative to other surrounding objects; Absolute Time: Obtained with radiometric dating of the object.

Geothermal Energy
The potential energy contained in the earth; the molten rock heats underground water into steam, which, in some locations, may be harnessed to drive turbines to generate electricity.

Geothermal Plant
A plant in which the prime mover is a steam turbine. The turbine is driven either by steam produced from hot water or by natural steam that derives its energy from heat found in rocks or fluids at various depths beneath the surface of the earth. The energy is extracted by drilling and/or pumping.

Gigawatt (GW)
One billion watts.

Gigawatthours (GWh)
One billion watt-hours.

Grid
The layout of an electrical distribution system.

Ground-Level Ozone
Ground-level ozone is formed by a chemical reaction between volatile organic compounds and oxides of nitrogen in the presence of sunlight. Ozone concentrations can reach unhealthful levels when the weather is hot and sunny with little or no wind. High concentrations of ozone near ground level are harmful to people, animals, crops, and other materials.

Haze
Haze consists of sufficient smoke, dust, moisture, and vapor suspended in air to impair visibility. The term regional haze means haze that impairs visibility in all directions over a large area.

Heat Pump
Apparatus that converts cool temperatures into heat, or warmer temperatures into cool, using some kind of energy, like electricity; used in businesses, homes, other structures.

Hydrocarbons
Chemicals containing only carbon and hydrogen. These are of prime economic importance because they encompass the constituents of the major fossil fuels, petroleum and natural gas, as well as plastics, waxes, and oils. In urban pollution, these components--along with NO_x and sunlight--contribute to the formation of tropospheric ozone.

Hydroelectric Power (large)
The process of generating electricity by harnessing the power of moving water is called hydroelectricity. Hydroelectric power (hydropower) is generated by forcing water that is flowing downstream, often from behind a dam, through a hydraulic turbine that is connected to a generator. The water exits the turbine and is returned to the stream or riverbed. Much of the hydroelectricity in the United States is generated at large facilities and in the Pacific Northwest, where it meets about two-thirds of the electricity demand. In the U.S., hydroelectricity contributes about 10 percent of the total electricity supply.

Hydroelectric Power (small)
In addition to very large hydro plants in the West, the United States has many smaller hydro plants. Like large plants, small-scale hydroelectric systems capture the energy in flowing water and convert it to electricity. Although the potential for small hydroelectric systems depends on the availability of suitable water flow, these systems can provide cheap, clean, reliable electricity where the resource exists.

Hydroelectricity
In electrical generation; using the power of rushing water to push turbine blades, which turn shafts in generators that produce electricity.

Hydrogen Sulfide (H_2S)
H_2S, hydrogen sulfide is a reducing species, which is relatively unstable but survives for rather a long time owing to its slow reaction with atmospheric oxygen. This sulfur-containing gas is a major participant in gas to particle conversion in the atmosphere. Many sulfur-containing gases are reactive and thus are rapidly converted to sulfuric acid.

Indoor Air Quality
A measure of the value or comfort of people with the air they breathe inside buildings and homes. "Suitable" indoor air quality can conferred on air in which there are no known contaminants at harmful levels as determined by appropriate authorities or--more likely--air with which 80 percent or more of the people exposed do not express dissatisfaction.

Industrial Air Pollution
This term refers to the emissions of the following pollutants: sulfur oxides, nitrogen oxides, mercury, and carbon dioxide. These air emissions contribute to such environmental concerns as urban smog; acid deposition; excessive nutrient loads to important bodies of water, such as the Chesapeake Bay; haze in national parks and wilderness areas; and global climate change.

Integrated Resource Planning
A planning process required of each energy utility in the State of Hawaii to systematically and thoroughly develop long-range plans for meeting Hawaii's future energy needs. An IRP evaluates and integrates both resources that *supply* electricity and resources that reduce or better manage the *demand* for electricity.

Kilowatt (kW)
A unit of electrical power equal to 1000 watts. A kilowatt represents the rate at which energy is being used or the size of the electrical load.

Kilowatt-Hour (kWH)
A unit of electrical energy equal to one kilowatt used for one hour.(For example, a 1000 watt appliance running continually at full load for one hour will consume one KWH of energy; a 100 watt light bulb left on for ten hours will consume one KWH of energy.)

Ld, Ln, Ldn
Ld = day average; Ln = night average; Ldn = day-night average sound level. A standard noise measurement that takes into account the noise levels of all individual events that occur during a 24-hour period and the number of times those events occur. This measure includes a 10-decibel (dB) adjustment for the added intrusiveness of noise that occurs during normal sleeping hours, when people are more sensitive to noise.

L90
A statistical parameter representing the sound level exceeded 90 percent of the sampled time period. The L90 is often used as an indicator of the background or ambient sound level, because short term higher-level noise events have limited effects on the L90 value.

Lead (Pb)
A heavy metal used in gasoline, paints, and plumbing compounds has been sharply restricted or eliminated by federal laws and regulations. Metallic elements with high atomic weights; (e.g. mercury, chromium, cadmium, arsenic, and lead); can damage living things at low concentrations and tend to accumulate in the food chain. May be hazardous to the health if breathed or swallowed.

Lenticular
Having the shape of a double-convex lens; of or relating to a convex lens

Leq
The equivalent continuous A-weighted sound level. It is defined as the logarithmic average of the sound levels for a specified time period. It is the most commonly used form of sound level averaging

L90
A statistical parameter representing the sound level exceeded 90 percent of the sampled time period. The L90 is often used as an indicator of the background or ambient sound level, because short term higher-level noise events have limited effects on the L90 value.

Line Losses
The amount of energy lost during transmission and distribution of electricity, including unaccounted for uses.

Load (electric) The amount of electric power delivered or required at any specific point or points on a system. The requirement originates at the energy consuming equipment of the consumers.

Magnetic Field
In study of magnetism; area around a magnet which is influenced by the magnet's power.

Mariculture
The cultivation of marine organisms in their natural environment.

Megawatt (MW)
A unit for describing how much electricity a power plant can generate; 1,000,000 watts of power or 1,000 kilowatts.

Megawatthour (MWh)
One million watt-hours.

Mercury (Hg)
Heavy metal that can accumulate in the environment and is highly toxic if breathed or swallowed.

Mercury/Mercury Compounds Mercury is a toxic heavy metal that is a byproduct of the combustion of fossil fuels, especially coal. Mercury and compounds containing mercury can accumulate in the environment and are highly toxic to humans and animals if inhaled or swallowed. Exposure can permanently damage the brain, kidneys, and fetuses.

Naphthalene
A naturally occurring volatile organic compound, is a component of petroleum and coal and is released by the burning of wood or tobacco. It is also used in moth repellants, dyes and pharmaceuticals. Like other nonmethane hydrocarbons, it reacts with NO in the atmosphere to produce NO_2. The NO_2 is photolzed to produce NO and O. The O then reacts with O_2 to produce ozone.

National Ambient Air Quality Standards (NAAQS)
Sets the levels of air quality for the United States, in the Code of Federal Regulations (40 CFR §50.2), to protect the population is health. These are the minimum and might be more stringent from state to state.

National Oceanic and Atmospheric Administration (NOAA)
A United States Government agency created in 1970 as part of the United States Department of Commerce to determine how our oceans and atmosphere should be developed, regulated, analyzed, formed, and mined. NOAA tries to achieve these goals with the help of eight major federal services, The National Oceanic Survey, The National Weather Service, The National Fisheries Service, The Environmental Research Laboratories, The Environmental Data Service, The Environmental Satellite Service, The Office of Sea Grant, and The Office of Coastal Zone Management.

Natural Gas
A fossil fuel formed when layers of buried plants and animals decompose over a long period of time. The energy that the plants and animals originally obtained from the sun is stored in the natural gas. The primary component of natural gas is methane, a potent greenhouse gas. Natural gas is a nonrenewable resource because it cannot be replenished on a human time frame. Natural gas power plants provide about 14 percent of the electricity produced in the United States, ranking third behind coal and nuclear power. Natural gas is available in most areas of the U.S. However, natural gas is not as plentiful as coal, and it is estimated that United States' supply of natural gas will last only 60 more years.

Net Energy Metering
If you own an eligible renewable energy generator, you may enter into an agreement with your utility to connect your generator to the utility grid, allowing it to feed surplus electricity into the grid. Net energy metering applies to solar, wind, biomass or hydroelectric generating facilities, or a hybrid system consisting of two or more of these facilities, with a capacity of not more than 10 kilowatts. Net energy metering means that any kilowatt-hours your renewable energy generator produces and feeds back into the grid will be subtracted from the kilowatt-hours of electricity you obtain from your utility to determine the **net** amount of kilowatt-hours. You will be billed only on the **net** kilowatt-hours.

Net Generation
Gross generation less the electric energy consumed at the generating station for the station's use.

Nitrogen (N_2)
A colorless, tasteless, odorless gas, which makes up 78.1 percent of the atmosphere. Atmospheric nitrogen is converted by nitrogen fixation and nitrification into compounds used by plants and animals. In the far upper atmosphere, N_2 is broken down when large numbers of energetic secondary electrons are produced and available to react with the N_2. This leads to the eventual production of NO in that part of the atmosphere and is not- by definition-anthropogenic in nature.

Nitrogen Dioxide (NO_2)
A reddish brown, highly reactive gas that is formed in the ambient air through the oxidation of nitric oxide (NO). Nitrogen oxides (NO_X), the generic term for a group of highly reactive gases that contain nitrogen and oxygen in varying amounts, play a major role in the formation of ozone, PM, haze, and acid rain. While the EPA tracks national emissions of NO_X, the national monitoring network measures ambient concentrations of NO_2 for comparison to national air quality standards. The major sources of man-made NO_X emissions are high-temperature combustion processes such as those that occur in automobiles and power plants. Home heaters and gas stoves can also produce substantial amounts of NO_2 in indoor settings. NO_2 may lead to increased susceptibility to respiratory infection and may cause irreversible alterations in lung structure.

Nitrogen Monoxide (NO)
The principal emitted NO_x gas from high temperature combustion in air. This gas can act as a catalyst in the reactions that cause the destruction of ozone. Reacting with ozone and tropospheric radicals, NO is inextricably linked with the polluted urban atmospheric production of NO_2, ozone, and other secondary pollutants.

Nitrogen Oxides (NO_X)
Nitrogen oxides include various nitrogen compounds like nitrogen dioxide and nitric oxide. These compounds play an important role in the atmospheric reactions that create ground-level ozone and acid rain. Ozone is formed when volatile organic compounds (VOCs) react in the presence of heat and sunlight. Nitrogen oxides form when fuels are burned at high temperatures. The two major sources of nitrogen oxides are transportation vehicles and stationary combustion sources, such as electric utility and industrial boilers, and other industrial, commercial, and residential sources that burn fuels. It is one of the main ingredients involved in the formation of ground-level ozone, which can trigger serious respiratory problems.

Nitrous Oxide (N_2O)
This is a by-product of biological activity of a symbiotic bacteria living in leguminous plant roots. It is a principal greenhouse gas that absorbs in the infrared wavelength region and unfortunately falls in an IR "window" between IR absorbing features of water and carbon dioxide (a characteristic of all the "trace" greenhouse gases with significant radiative forcing). It is also laughing gas used in medicine as a gentle general anesthetic.

Non-Attainment Area
Area that does not meet one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act.

Non-Firm Power
Power or power producing capacity supplied or available under a commitment having limited or no assured availability.

Nonutility Power Producer
A corporation, person, agency, authority, or other legal entity or instrumentality that owns electric generating capacity and is not an electric utility. Nonutility power producers include qualifying cogenerators, qualifying small power producers, and other nonutility generators (including independent power producers) without a designated franchised service area, and which do not file forms listed in the Code of Federal Regulations, Title 18, Part 141.

Ocean Thermal Energy Conversion (OTEC)
Uses the difference in temperature between the surface of the ocean and the bottom of the ocean. This process produces a vapor, which then turns a turbine generator to make electricity.

Off-Peak Power
In electrical generation; amount of power generation during a period of low consumer demand. (see also, peak power).

Oil
A liquid fossil fuel formed from layers of buried plants and animals that have been subjected to geologic heat and pressure over a long period of time. The energy that the plants and animals originally obtained from the sun is stored in the oil in the form of carbon. In addition to carbon, oil contains elements such as nitrogen, sulfur, mercury, lead, and arsenic. Oil is a nonrenewable resource because it cannot be replenished on a human time frame.

Oxygen (O_2)
Is found on Earth as a gas and constitutes about 20.8 percent of the air we breathe. Elemental molecular oxygen consists of two oxygen atoms bonded together. A photochemical reaction of oxygen is (ultimately) responsible for the production of ozone in the stratosphere. Oxygen concentrations found in ice core samples (using isotopic $^{16}O/^{18}O$ rations) have been used to determine past atmospheric levels of oxygen and have helped in determining past climates.

Ozone (O_3)
A bluish gas that is harmful to breathe. Nearly 90 percent of the Earth's ozone is in the stratosphere and is referred to as the ozone layer. The ozone layer absorbs a band of ultraviolet radiation called UVB that is particularly harmful to living organisms. For people, overexposure to UV rays can lead to skin cancer, cataracts, and weakened immune systems. Increased UV can also lead to reduced crop yield and disruptions in the marine food chain. It is caused by the release of chlorofluorocarbons (CFCs) and other ozone-depleting substances (ODS), which were used widely as refrigerants, insulating foams, and solvents. When CFCs reach the stratosphere, the ultraviolet radiation from the sun causes them to break apart and release chlorine atoms which react with ozone, starting chemical cycles of ozone destruction that deplete the ozone layer. One chlorine atom can break apart more than 100,000 ozone molecules. Other chemicals that damage the ozone layer include methyl bromide (used as a pesticide), halons (used in fire extinguishers), and methyl chloroform (used as a solvent in industrial processes for essential applications). As methyl bromide and halons are broken apart, they release bromine atoms, which are 40 times more destructive to ozone molecules than chlorine atoms.

Pahoehoe
Smooth, unbroken type of lava, contrasting with a'a.

Paleomagnetic
The intensity and direction of residual magnetization in ancient rocks.

Parabasal Lens
A type of fresh water pool found floating on top of a rock layer.

Particulate Matter (PM_{10}) Particulate matter (PM_{10}) is an air pollutant consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air sacs deep within the lungs where they may be deposited and result in adverse health effects. Particulate matter is the generic term used for a type of air pollution that consists of complex and varying mixtures of particles suspended in the air we breathe. Particles are present everywhere, but high concentrations and/or specific types of particles have been found to present a serious danger to human health. Particulate matter is a combination of fine solids such as dirt, soil dust, pollens, molds, ashes, and soot; and aerosols that are formed in the atmosphere from gaseous combustion by-products such as volatile organic compounds, sulfur dioxide and nitrogen oxides. Particulate pollution comes from such diverse sources as factory and utility smokestacks, vehicle exhaust, wood burning, mining, construction activity, and agriculture.[1]

Particulate Matter (PM_{15}) Particulate matter (nominally 15m and less).

Particulate Matter ($PM_{2.5}$)
Refers to particulate matter that is 2.5 microns or smaller in size, which is approximately 1/30 the size of a human hair; so small that several thousand of them could fit on the period at the end of this sentence. The sources of $PM_{2.5}$ include fuel combustion from automobiles, power plants, wood burning, industrial processes, and diesel-powered vehicles such as buses and trucks. These fine particles are also formed in the atmosphere when gases such as sulfur dioxide, nitrogen oxides, and volatile organic compounds (all of which are also products of fuel combustion) are transformed in the air by chemical reactions. Fine particles are of concern because they are risk to both human health and the environment, contributing to acid rain.

Particulate Matter (PM)
PM includes dust, dirt, soot, smoke, and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, construction activity, fires, and natural windblown dust. Particles formed in the atmosphere by condensation or the transformation of emitted gases such as sulfur dioxide and volatile organic compounds (VOCs) are also considered PM.

Particulates
Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions. Very small solids suspended in water; they can vary in size, shape, density and electrical charge and can be gathered together by coagulation and flocculation.

Parts Per Million (ppm) and Parts Per Billion (ppb)
These terms give scientists a way to describe how much of a substance is contained in a sample: parts of analyte per million parts of sample, for instance. In atmospheric chemistry these become volume parts of analyte per volume parts of atmosphere: ppmv, ppbv, etc. At low analyte gas phase concentrations the analyte is assumed to act as an ideal gas. For instance, a 1 ppmv concentration of formaldehyde would represent 1 liter of formaldehyde per every 1,000,000 liters of air; also equivalent to 1 microliter of H_2CO per 1 L air. In gas phase concentrations these units are also called gas phase mixing ratios. The reason is because they are just that, ratios of analyte volume to sample volume; the volume of the sample doesn't matter.

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[1] See American Lung Association website at http://www.lungusa.org.

Peak Capacity
Capacity of generating equipment normally reserved for operation during the hours of highest daily, weekly, or seasonal loads. Some generating equipment may be operated at certain times as peaking capacity and at other times to serve loads on an around-the-clock basis.

Peak Demand
The maximum load during a specified period of time.

Peak Load Plant
A plant usually housing old, low-efficiency steam units, gas turbines, diesels, or pumped storage hydroelectric equipment normally used during the peak-load periods.

Peak Power (On-Peak power)
In electrical generation; amount of power generation during a period of high consumer demand. (see also, off-peak power)

Photovoltaic Cell
In electrical generation; a device where light energy is converted to electrical energy.

Plant
A facility with prime movers, electric generators, and auxiliary equipment for converting mechanical, chemical, and/or nuclear energy into electric energy. A plant may contain more than one type of prime mover.

Planulae
Free-swimming or crawling larval type common in many species of the phylum Cnidaria (*e.g.,* jellyfish, corals, and sea anemones).
Pleistocene
An epoch in Earth history from about 2-5 million years to 10,000 years ago. Also refers to the rocks and sediment deposited in that epoch.

Plume
A plume is a visible smoke-like structure, which may contain pollutants emitted from an exhaust or smoke stack and released into the atmosphere. This elongated band of smoke has changing characteristics that vary with its local environmental conditions. These conditions may include the physical and chemical nature of the pollutant, weather conditions and downwind topography.

Point Source
Pollutants which are put into the atmosphere by stationary objects, such as refineries, power plants, mills, and the like. In Texas any source that emits more than one ton in a calendar year is considered a point source.

Pollutants
A pollutant may be considered as any substance, usually an unwanted by-product or waste, that is released into the environment as a result of (human) activities that alter the chemical, physical and biological characteristics of the environment. These substances may be found in any of the solid, liquid or gas phases. Their long-term effects are difficult to predict and depend upon future human or cultural judgments.

Radiocarbon Dating
Establishing the relative age of various materials with the use of carbon-14. This involves measuring the amount of ^{14}C and of ^{12}C and comparing the measured ratio to the one established by the production of ^{14}C in the upper atmosphere by cosmic rays. When an organism is alive the $^{14}C/\ ^{12}C$ ratio in its biomass is constant (because of constant atmospheric ^{14}C production, difussion to the lower atmsophere, absorption by organisms, and because of constant ^{14}C radioactive decay) but when the organism dies the ratio begins to change--at a very predictable rate. Therefore knowing the carbon-14/carbon-12 ratio **now** in some artifact gives a very good measure of how long the carbon has been "dead." The object however must obviously have organic material either in it or on it for this method to work. Also the lenth of time one can "look back" is limited because the amount of carbon-14 must be detected with some certainty for the age to be known with confidence, and the longer the sample has been dead the less ^{14}C is present because it is continually decaying.

Rate Base
The value of property upon which a utility is permitted to earn a specified rate of return as established by a regulatory authority. The rate base generally represents the value of property used by the utility in providing service and may be calculated by any one or a combination of the following accounting methods: fair value, prudent investment, reproduction cost, or original cost. Depending on which method is used, the rate base includes cash, working capital, materials and supplies, and deductions for accumulated provisions for depreciation, contributions in aid of construction, customer advances for construction, accumulated deferred income taxes, and accumulated deferred investment tax credits.

Rate Rider
Consumers incentives to reduce peak load demand.

Renewable Energy (RE)
Energy sources that are renewed or replenished through natural forces such as wind, solar, biomass (including municipal solid waste), and geothermal. The term renewable energy generally refers to electricity supplied from renewable energy sources. These energy sources are considered renewable sources because they are continuously replenished on the Earth.

Reserve Margin (operating)
The amount of unused available capability of an electric power system at peak load for a utility system as a percentage of peak load.

Sales
The amount of kilowatt-hours sold in a given period of time; usually grouped by classes of service, such as residential, commercial, industrial, and other. Other sales include public street and highway lighting, other sales to public authorities and railways, and interdepartmental sales.

Scheduled Partial Outage
The occurrence of a component failure or other condition which requires that the load on a unit be reduced 2% or more but where this reduction could be postponed past the very next weekend.

Sea Level
This is the average level of the ocean over the entire earth. Tidal fluctuation is taken into account when determining sea level. Mean Sea Level (MSL) is used to reference the height of structures above ground level and depth below the ocean's surface. Atmospheric pressure is also referenced from sea level. At sea level, 760mm (29.92 inches) of mercury is normally displaced by the pressure of the air column above that point on the earth.

Selective Catalyst Reduction (SCR)
A process that reduces nitrogen oxides (NOx) emissions from power plants. SCR uses ammonia and a catalyst to convert NOx to nitrogen (N2) and water (H2O).

Settlement Agreement
An agreement entered into in November 5, 2003 by HELCO, Keahole Defense Coalition, et al., State of Hawaii Department of Health, Department of Land & Natural Resources and Board of Land and Natural Resources The Agreement resolved various issues between the parties and allowed the completion of the improvements to the Keahole Generating Station.

Solar Cell
A apparatus that collects energy from the sun and converts it to electrical energy; often an arrangement of solar cells would be used to provide the optimum collection.

Solar Energy
The use of energy that reaches the Earth from the sun.

Stability
The property of a system or element by virtue of which its output will ultimately attain a steady state. The amount of power that can be transferred from one machine to another following a disturbance. The stability of a power system is its ability to develop restoring forces equal to or greater than the disturbing forces so as to maintain a state of equilibrium.

Steam Electric Plant (conventional) A plant in which the prime mover is a steam turbine. The steam used to drive the turbine is produced in a boiler where fossil fuels are burned.

Steam Turbine (ST)
A device for converting energy of high-pressure steam (produced in a boiler) into mechanical power, which can then be used to generate electricity.

Substation
Facility equipment that switches, changes, or regulates electric voltage.

Sulfur Dioxide (SO_2)
Sulfur Dioxide (SO_2) is a pungent, colorless gas about 2.5 times as heavy as air, with a suffocating smell, faint sweetish odor and becomes a pollutant when present in large amounts. The main natural sources of sulphur dioxide are volcanoes, forest fires, and oceans. The main human sources of sulphur dioxide are burning fossil fuels, smelting, paper manufacture, and the production of sulphuric acid. Increasingly there are health concerns with sulphur dioxide as it can trigger respiratory conditions in certain individuals. Sulphur dioxide is found in soft drinks such as fruit juices, some meats and wines and is also found in bleaching and in purifying petroleum products. Sulphur dioxide is a reducing agent and is used as a fumigant and food preservative.

Sulfuric Acid
In the atmosphere sulfur oxides (see sulfur dioxide) are converted to sulfuric acid. Oxides of sulfur and nitrogen combine with atmospheric moisture to produce acid rain. Although some sulfur oxides are introduced into the atmosphere by natural means, such as volcanic eruptions, the majority of the sulfur oxides responsible for the damaging effects of acid rain come from anthropogenic sources, mainly the burning of fossil fuels. Areas in the northeastern United States, eastern Canada, and northern Europe have suffered damage due to the effects of acid rain. In many areas damage to forests, crops, lakes, and streams are so severe that they are completely devoid of any life forms. Steps are now being taken in many parts of the world to reduce the amount of sulfur dioxide introduced into the atmosphere. In 1990, amendments where made to the Clean Air Act that places restrictions on the release of sulfur dioxides by power plants. The amendment calls for the reduction of sulfur emissions from a 1990 level of nearly 20 million tons per year to approximately 10 million tons per year by January 1, 2000.

Switching Station Facility equipment used to tie together two or more electric circuits through switches. The switches are selectively arranged to permit a circuit to be disconnected, or to change the electric connection between the circuits.

System (electric) Physically connected generation, transmission, and distribution facilities operated as an integrated unit under one central management, or operating supervision.

Tectonic Activity - The process of the formation, movement, interaction, and destruction of parts of the earth's crust on a generally large scale. This can be used to explain seismicity, volcanism, and mountain building.

Tephra
Solid material ejected into the air during a volcanic eruption; especially ash. Such fragments range in size from less than 2 mm (ash) to more than 1 m in diameter. Large-sized tephra typically falls back to the ground on or close to the volcano and progressively smaller fragments are carried away from the vent by wind. Volcanic ash, the smallest tephra fragments, can travel hundreds to thousands of kilometers downwind from a volcano.

Tephra Zone
The area where tephra is likely to fall during a volcanic eruption.

Total Full Force Outage Time (TF)
The total number of hours that the full rated capacity of a unit is unavailable due to a Forced Outage.

Transformer
An electrical device for changing the voltage of alternating current.

Transmission
The movement or transfer of electric energy over an interconnected group of lines and associated equipment between points of supply and points at which it is transformed for delivery to consumers, or is delivered to other electric systems. Transmission is considered to end when the energy is transformed for distribution to the consumer.

Transmission Lines
Wires for getting the high voltage of electricity from one place to another.

Transmission System
An interconnected group of electric transmission lines and associated equipment for moving or transferring electric energy in bulk between points of supply and points at which it is transformed for delivery over the distribution system lines to consumers, or is delivered to other electric systems.

Turbine
A machine for generating rotary mechanical power from the energy of a stream of fluid (such as water, steam, or hot gas). Turbines convert the kinetic energy of fluids to mechanical energy through the principles of impulse and reaction, or a mixture of the two.

µg
A microgram is one millionth of a gram.

Urea
A soluble weakly basic nitrogenous compound that is the chief solid component of mammalian urine and an end product of protein decomposition; is synthesized from carbon dioxide and ammonia, and is used especially in synthesis (as of resins and plastics) and in fertilizers and animal rations.

Volatile Organic Compounds (VOC)
Any organic compound that participates in atmospheric photochemical reactions except those designated by EPA as having negligible photochemical reactivity.

Volt (V)
A unit of electrical pressure, the force at which electrical charges move through conductors. (In most homes, 120 volt service is supplied to all wall outlets and lights and 240 volt service is supplied to large appliances – electric ranges, water heaters, clothes dryers and larger air conditioners.)

Voltage
In electrical generation; a measure of the force of electrical current; named after the scientist who perfected the dry cell battery in 1800, Alessandro Volta.

Watt (W)
A Unit Of Electrical Power. A Watt Represents The Amount Of Electricity Required To Power A Light Bulb, An Appliance, Or Other Electrical Equipment. The Rate Of Energy Transfer Equivalent To 1 Ampere Flowing Under A Pressure Of 1 Volt At Unity Power Factor.

Watt Hour (Wh)
An Electrical Energy Unit Of Measure Equal To 1 Watt Of Power Supplied To, Or Taken From, An Electric Circuit Steadily For 1 Hour.