Mr. James Ikeda, Director
Office of Environmental Quality Control
Central Pacific Plaza
220 South King Street, 4th Floor
Honolulu, Hawaii 96813

Dear Mr. Ikeda:

SUBJECT: Maui Community Correctional Center
80-Bed Work Furlough Center
D.A.G.S. Job No. 15-27-6230

Four (4) copies of the Final Environmental Assessment for the proposed project are transmitted for publication in your OEQC Bulletin as a Negative Declaration.

If there are any questions, please have your staff contact Mike Shigetani at 586-0434.

Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

MS/1h
Enclosure
FINAL
ENVIRONMENTAL IMPACT
ASSESSMENT
FOR
MAUI COMMUNITY CORRECTION CENTER
80 - BED WORK FURLOUGH CENTER
WAILUKU, MAUI, HAWAII
DAGS JOB NO. 15-27-6230

TMK: 3-8-46: 6

PREPARED BY
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
DIVISION OF PUBLIC WORKS
STATE OF HAWAII

DECEMBER 1994
FINAL
ENVIRONMENTAL IMPACT
ASSESSMENT
FOR
MAUI COMMUNITY CORRECTION CENTER
80 - BED WORK FURLOUGH CENTER
WAILUKU, MAUI, HAWAII
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DIVISION OF PUBLIC WORKS
STATE OF HAWAII

DECEMBER 1994
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PROJECT DESCRIPTION:

The Department of Public Safety proposes to construct a single-story wood structure to house 80 inmates as part of the community based work furlough program. It is to be located on the former County rifle range which was conveyed to the State as part of a land exchange agreement.

This project will support a reintegration program for Maui County residents attempting to re-enter their community after spending a long term in the State's prison system.

It is hoped that the facility will help alleviate the over-crowding in the prison system.

The facility will have sleeping/studying accommodations, a community-type restroom, a serving kitchen and a small recreation area. A 16-feet high chain link fence will be installed at the rear and along the side boundary adjacent to the County's "homeless" village.

Fire protection and emergency power will also be provided.
ENVIRONMENTAL SETTING:

**General.** The proposed facility is situated at an elevation of about 240 feet between the Maui Memorial Park Cemetery and the County's "homeless" village. The site is identified as Tax Map Key 3-8-48:Portion 6 occupying an area of approximately 2.211 acres.

Access to the site is by Waiale Road, a narrow two lane asphaltic roadway. Public use of the roadway ends just beyond the correctional facility. The balance of the roadway is restricted to use by Wailuku Sugar Company personnel.

At the easterly boundary of the property is Wailuku Sugar Company's Spreckles Ditch which drains into the Waiale Reservoirs. Water stored in these open reservoirs are used for irrigation by the sugar company.

**Topography.** The topography of the site is relatively flat due to previous grading by the County in developing the site into a rifle range and more recently by the State in anticipation of the proposed project.

**Flora.** Vegetation consists primarily of weeds and scrub grass. No significant flora was identified on the project site.

**Fauna.** During site visitations, only common species of birds were seen in the area: doves, barred doves, sparrows...
and mynah. Other common species such as the cardinal and mijiros may pass through the area. Adjacent areas along the irrigation reservoirs may provide habitat for Hawaiian waterbirds, however, none were seen along the banks adjacent to the project site. Although not seen, other animal species that may be found in the area are rats and mongoose.

Soils. Soils at the site are classified as Iao silty clay (Iaa) and Puuone sand (PZUE) by the Soil Conservation Service in their Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii. (August 1972)

Iao silty clay is found in areas of 0% to 3% slopes and at depths ranging from 0- to 60- inches from the surface. The soil produces a slow runoff and erosion is no more than slight. The Iao series consists of well drained soils on valley fill and alluvial fans. This soil type is described to be fair for roadfill and to have a moderate shrink-swell potential.

The Puuone Series soils consists of somewhat excessively drained soils on low upland areas of Maui. These soils are derived from coral and seashells. They are moderately sloping to moderately steep. Puuone soils are geographically associated with Iao and Jauca soils.

Puuone Sand, 7 to 30 percent slopes (PZUE), is found on sandhills near the ocean. In a representative profile the surface layer is greyish-brown, calcareous sand about 20 inches thick. This is underlain by greyish-brown, cemented sand. The soil is moderately alkaline in the surface layer.
Permeability is rapid above the cemented layer. Runoff is slow, and the hazard of wind erosion is moderate to severe. Shrink-swell potential is described as low.

**Flood Zone.** The project site is located in an area designated as Zone C on the Federal Insurance Rate Map. Zone C is defined as an area of minimal flooding.

**Historical.** Although there are no known historical sites within the project site, the State Historic Preservation Office have documented burial sites within the general area. On the "homeless" shelter site burials were encountered during site development. Also, excavations by Maui County's Public Works Department encountered burials along Waiale Road. Based on the existence of burials within the surrounding area, the Historic Preservation Office suspects a high potential for other burial sites to be found in the area. As a precaution, an archaeologist will monitor the excavation phase of the work. Should any unforeseen archaeological or historical artifact or burial be encountered, excavation work will be temporarily stopped until a satisfactory resolution is obtained.

**Traffic.** Traffic impacts are not anticipated to be significant. Users of the roadway would be primarily personnel and visitors to the correctional facility as well as residents and visitors to the "homeless" village.

**Water Quality.** No significant impacts to water quality are anticipated. Wastewater will be discharged into the
County's sewerage system while rainwater will be by an on-site leaching field.

Social. The project is not anticipated to have a significant impact to the social environment in the area. The 80-bed facility will be an extension of the existing correctional center. Inmates to be housed in this 80-bed facility will be classified as minimum security. This classification is based on an individual's behavior and length of time remaining before probation and is considered the final phase of incarceration before being released into the community. Inmates at this facility will be participating in the department's work furlough program where they do work in the community in groups or individually.

Supervision of the individuals in the work furlough program ranges from closely observed to casually observed. Individuals in the casually observed category are able to attend community college classes or work for a business unsupervised with occasional checkups by departmental staff. However, these individuals must return to the correctional facility by a specified time each day depending upon the activity the individual is involved.

Economic. The participants in the work furlough program will contribute to the island's economy by performing work and earning wages. Although this may not have a significant economic impact, it will help make the individual a useful contributor to the island's work force upon release to probation.
PROBABLE IMPACT ON THE ENVIRONMENT

There will be a temporary increase in noise and air pollution for the duration of the construction.

Noise above the normal would comply with the noise regulations of the Department of Health, State of Hawaii. Activities generating noise above ambient levels would include site grading, hauling of materials and equipment, and general carpentry.

Air pollution levels would increase, though not significantly, from dust generated during grading operations, sawing operations, and exhaust emissions from vehicles and equipment.

No burning of construction debris will be permitted on the project site. All debris must be hauled to an approved sanitary landfill.

As the project site is located near the bottom of a knoll, the proposed building is not anticipated to significantly obstruct viewing planes from the adjacent "homeless" development.

Although the proposed building will increase surface run-off, an on-site catchment system will be constructed to retain any excess runoff above the natural conditions.

"Ka Hale Ake Ola" homeless shelter located adjacent to the project site is not anticipated to be adversely affected. The shelter is made up of 17 single story, wooden buildings. Twelve of the buildings will provide shelter for 30 family
units and one will be for singles. The other buildings will be used for providing child care, a thrift and food bank, kitchen and dining, and administration. A 16-foot, high fence will be installed along the common boundary to separate the projects.
SHORT TERM IMPACTS

The short term, construction-related, impacts will be temporary and localized. The use of the non-productive land will close future options of the use of this land until such time that the facility is no longer needed or is abandoned. However, the project's benefits to society in terms of community welfare and inmate health and safety will be enhanced and preserved with the implementation of the new 80-Bed Work Furlough Center. These intangible benefits are deemed necessary and outweigh the short-term impacts and temporary closure of land to future uses.

MITIGATIVE MEASURES

The proposed project is not anticipated to have any adverse environmental impacts other than those associated with the construction activities. To mitigate construction impacts, the contractor will be required to comply with all applicable pollution control requirements of Federal, State, and County agencies. This applies, but not limited to, noise pollution, air pollution, and water pollution.

Should any unrecorded burial sites or historical sites be encountered, work in the immediate area will be temporarily stopped. The State Historic Preservation Office will be notified and if applicable, the Maui/Lanai Islands Burial Council. No work will recommence until a satisfactory resolution, acceptable to all affected agencies and/or organizations is obtained.

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ALTERNATIVES:

NO ACTION. This action will keep the "status quo". The prison system will remain over-crowded and not comply with the conditions issued by the District Court in response to a suit by the American Civil Liberties Union.

ANOTHER SITE. There are no immediately available State lands that would be able to accommodate the proposed facility on Maui. The lengthy process of potential condemnation proceedings and designing the facility to fit the terrain was a factor in not considering this alternative.

SEPARATE FACILITY. Land immediately adjacent to the Maui Community Correctional Center was conveyed to the State as part of a land exchange agreement with the County of Maui. This site would allow the Department of Public Safety to concentrate the confinement of inmates at one location, permit more flexibility in use of departmental personnel, and would also provide for more bed space in the prison.
RELATIONSHIP OF PROPOSED ACTION TO LAND USE PLANS, POLICIES
AND CONTROLS:

The project site is in an area designated as "Urban" on the State Land Use Map.

Maui County establishes policies relating to developments within the Urban zone. To implement these policies, the County has developed a General Plan which guides development on the island. The site was originally zoned M-1 (Light Industrial) and Agriculture by the County, but has recently been rezoned to Quasi Public on their Community Plan.

The site is not within any Special Management Area established by the County.

Height limitations established for the project site is a maximum height four (4) stories or 48 feet. The proposed building is not anticipated to exceed these limits.
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Other than the commitment of labor and materials to construct the 80-bed facility, no cultural or natural resources surrounding the project site will be affected by the proposed action.

UNRESOLVED ISSUES

There are no known unresolved issues associated with this project.
DETERMINATION

The proposed project is not anticipated to have any adverse environmental impacts to any endangered flora and fauna, land use, surface and groundwater, air and noise pollution, scenic views, or the social/cultural heritage of the area.

An issue which will be addressed during construction is the possibility of unrecorded grave sites in the area. To mitigate this unforeseen condition, the State will have an archaeologist monitor all subsurface work.

Copies of the assessment were sent to various governmental agencies and community organizations for their review and comments. Only three responses were received and are appended to this document.

Based on the comments received and environmental concerns discussed in the assessment, it has been determined that it is appropriate to file this environmental assessment as a Negative Declaration.
LIST OF APPROVALS:

1. Building Permit
   a. Sewage flow calculations
   b. Hydrology report
   c. Drainage and soil erosion report
   d. Energy Code compliance
   e. Domestic water calculations
   f. Fire Flow calculations

2. Electrical Permit

3. Plumbing Permit
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County of Maui
Planning Department
200 South High Street
Wailuku, Hawaii 96793

County of Maui
Department of Parks and Recreation
200 South High Street
Wailuku, Hawaii 96793

County of Maui
Department of Public Works
200 South High Street
Wailuku, Hawaii 96793

County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

County of Maui
Economic Development Agency
200 South High Street
Wailuku, Hawaii 96793

Maui Malama Pono
P.O. Box 1297
Makawao, Hawaii 96768

Maui Tomorrow
P.O. Box 428
Honolulu, Hawaii 96768

Native Hawaiian Plant Society
P.O. Box 5021
Kahului, Hawaii 96732

Sierra Club Hawaii Chapter
Maui Group
P.O. Box 2000
Kahului, Hawaii 96732

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*** Denotes no response received and assumed no comments to offer

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Page 23
Mr. Robert P. Smith
Fish and Wildlife Service
U.S. Dept. of the Interior
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Smith:

Subject: Environmental Assessment for
Maui Community Correctional Center
80-Bed Work Furlough Center
D.A.G.S. Job No. 15-27-6230

Thank you for your comments on the environmental assessment.

We will include a statement on the absence of rare and endangered plant and animal species as well as the absence of wetlands within the project area in the final assessment.

All stormwater runoff will be collected and discharged into an on-site leaching system.

Should you need additional information, please contact Mike Shigetani, project coordinator, at 586-0434.

Very truly yours,

GORDON MATSUOXA
State Public Works Engineer

MS/1h
Mr. Gordon Matsuoka  
Department of Accounting and General Services  
State of Hawaii  
P. O. Box 119  
Honolulu, Hawaii 96810


Dear Mr. Matsuoka:

The U.S Fish and Wildlife Service (Service) has reviewed the Environmental Impact Assessment (EIA) for the Maui Community Correctional Center 80-Bed Work Furlough Center, Wailuku, Maui, Hawaii, and offers the following comments for your consideration.

Although the existing vegetation at the project is described in the EIA, we recommend including statements in the FLORA and FAUNA sections of the document citing the absence of rare and endangered and threatened plant and animal species, respectively. Similarly, the absence of wetlands should be referenced within a WATER RESOURCES section.

The EIA site plan indicates a proposed new parking area for the project. However, the EIA and site plan do not specify the actual number of parking stalls that will accommodate the furlough center. Increases in on-site paved areas for parking may increase storm water discharges within the property. Although the WATER QUALITY section mentions that rainwater will be handled by an on-site leaching field, the Service recommends that the leaching field be adequately designed to handle all storm water runoff for the project.

Based on the information presented in the document and to the best of our knowledge, the Service believes that the proposed project will not adversely impact fish and wildlife resources within the project area.
Based on the information presented in the document and to the best of our knowledge, the Service believes that the proposed project will not adversely impact fish and wildlife resources within the project area.

We appreciate the opportunity to provide these comments. If you have questions or need further assistance, please contact Arlene Pangelinan (808/541-3441).

Sincerely,

Robert P. Smith
Field Supervisor
Pacific Islands Office
July 8, 1983

Mr. Nethaniel R. Conner
Acting State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850-0001

Dear Mr. Conner:

Subject: Environmental Impact Assessment for
Nail Community Correctional Center
60-Bed Work Pupukea Center
D.A.G.S. Job No. 13-27-6233

We have completed our review of the assessment and have no major concerns about this proposed project. It is recommended that site grading incorporate soil erosion measures to reduce dust transport from the project site. We appreciate the opportunity to provide comment. Should you have any questions please contact Neal Fujikawa, District Conservationist at (808) 246-3939.

Sincerely,

[Signature]

NETHANIEL R. CONNER
Acting State Conservationist

cc: Neal Fujikawa, District Conservationist, SC Honolulu Field Office.
MEMORANDUM

TO: Mike Shigetani
Public Works Design Branch
Department of Accounting and General Services

FROM: Don Hubbard, Administrator

SUBJECT: Historic Preservation Review of the Proposed Maui Community Correctional Center 80-Day Bed Work Furlough Center - Preparation of an Environmental Assessment

Wekiu, Maui
TML: 3-8-46; 6

July 20, 1993

This responds to your request for information to be used in the preparation of an environmental assessment for this project.

A review of our records indicates the absence of historic sites within this parcel. However, the adjacent parcel to the south (parcel 21) contains site 50-04-2916 consisting of the burials encountered during the construction of the Maui Homeless Shelter. One intact primary burial and previously disturbed remains of two individuals were identified. In addition, recent excavations by Maui County Department of Public Works along Wai'ale Road have encountered two burials. No evidence of habitation sites has been found in the area. Based on previous findings from adjacent areas, it appears that the likelihood for burials to be present in this parcel is high.

You have mentioned on the telephone to Annie Griffin of our staff that the EA will propose monitoring during construction work as a form of mitigation. We believe that an archaeological survey by systematic subsurface testing is necessary to determine the presence or absence of historic sites. It is best to have this work completed as early as possible of the project planning process so that the Maui/Lana'i Islands Burial Council can make a determination of the appropriate treatment of burials, if present. A copy of the report should be submitted to our office for review and comments.

Please contact Ms. Griffin at 587-0013 if you have any questions.

AG:111
Mr. Don Hibbard  
Administrator  
Dept. of Land & Natural Resources  
Historic Preservation Division  
State of Hawaii  
Honolulu, Hawaii  

Dear Mr. Hibbard:

Subject: Maui Community Correctional Center  
50-Bed Work Furlough Center  
D.H.O.S. Job No. 13-27-6930  

Thank you for your comments on the environmental assessment.

As indicated in your memorandum of October 30, 1994, we are in the process of hiring a qualified archaeologist to monitor the excavation activities. The archaeologist will prepare an archaeological monitoring report which will be submitted to you for review and approval.

Should you need additional information, please contact Mike Shigeta at 586-0434.

Very truly yours,

[Signature]

GORDON NAKAMURA  
State Public Works Engineer

MS/1h
Mike Shigetani
Page 2

To: Mike Shigetani, Public Works Design Branch
Department of Accounting and General Services.

From: Don Hisbard, Administrator
State Historic Preservation Division

Subject: Historic Preservation Review of the Proposed Maui Community Correctional Center Work Puaikuhonou Center
Wailuku, Wailuku District, Island of Maui

This is a follow-up of our prior comments regarding the Environmental Assessment for the proposed construction project at the Maui Community Correctional Center (Memo dated July 30, 1993).

In our prior review of the project, we indicated that a subsurface survey would be needed of the area prior to construction of the proposed facility. We have since reviewed the construction plans and conducted a field inspection of the proposed building site.

The construction plans call for a combination of cutting and filling within the project area, and excavation for water lines, footings, and so on. In general, the extent of cutting varies from one to two feet. The proposed building in to be located on the site of a former shooting range, and has been cut considerably below grade in order to provide safety for surrounding areas. Due to the present condition of the project site, it does not appear highly likely that undisturbed human burials are present. There is, however, a possibility that isolated burials or previously disturbed human remains are present.

Given this new information, we believe that the project will have "no effect" on significant historic sites, if a contingency plan is used to deal with the possibility of isolated burials being found. For this plan, we recommend that excavation activities within the project area be monitored by a qualified archaeologist. This archaeologist could be on-call, and need not be on site at all times. If human remains are encountered during construction, all activity in the vicinity of the find should cease and the findings should be reported to the State Historic Preservation Division immediately. The monitoring archaeologist will undertake mitigation measures as determined by the State Historic Preservation Division. A report of the monitoring and any additional archaeological work should be submitted to the State Historic Preservation Division for review and approval.

Kdrjes
Mr. Gordon Matsuoka

Page 2 of 2

September 9, 1993

Mr. Gordon Matsuoka
State of Hawaii
Department of Accounting and General Services
P.O. Box 119
Honolulu, HI 96810

Dear Mr. Matsuoka:

We reviewed the subject environmental impact assessment and have the following comments:

1. Comments from the Engineering Division:
   a. Vehicular access to this site shall be from the existing driveway. No additional access onto Wailea Road will be allowed.
   b. Applicant shall construct an "on-site" drainage system as approved by the Department of Public Works.

The applicant is requested to contact the Engineering Division at 243-7745 for additional information.

2. Comments from the Wastewater Reclamation Division:
   a. The developer should be informed that Wastewater Reclamation Division cannot insure that wastewater system capacity will be available for the project.
   b. Wastewater contribution calculations are required before building permit is issued.

   Comments from the Solid Waste Division:
   a. The owners and their contractors shall implement solid waste reduction, re-use and recycling programs to reduce the amount of solid waste to be disposed of at the County landfill.
   b. All yard debris shall be composted and re-used on their landscape plantings.
   c. Alternative means of disposal of garbage material and rock shall be utilized other than disposed of at the County landfill.
   d. Refuse collection shall be by a private collector.

The applicant is requested to contact the Solid Waste Division at 243-7785 for additional information.

4. Comments from the Land Use and Codes Administration:
   a. The proposed wooden structure is not permitted by the building code. Construction shall conform to Type II fire resistant construction.
   b. The proposal is required to be submitted to the Commission on Persons with Disabilities.

The applicant is requested to contact the Land Use and Codes Administration at 243-7373 for additional information.

Very truly yours,

GEORGE N. KAYA
Director of Public Works

Rm #4
12931: Page 59
201: E.O.C.A.
Engineering Division
Solid Waste Division
Wastewater Reclamation Division
Mr. George Kaya, Director
County of Maui
Dept. of Public Works & Waste Management
250 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Kaya:

Subject: Environmental Impact Assessment for
Maui Community Correctional Center
80-Bed Work Furlough Center
D.A.G.S. Job No. 15-27-6230

Thank you for your comments on the environmental assessment and offer the following response to them:

1. Vehicular access will be from the existing driveway. There will be no additional access required onto Wailoa Road.

2. An on-site drainage system will be constructed similar to the one designed for the Maui Community Correctional Center's Expansion/Renovation Phase I project.

3. Although we are proposing connection to the County's wastewater system, we understand that you cannot insure that the wastewater system will have the capacity to accommodate the flows generated by this project.

4. Wastewater flow calculations will be submitted with the Building Permit Application.

5. We acknowledge that impact fees and assessments for off-site improvements may be imposed by the County.

6. At present, wastewater is proposed to be discharged into the renovated wastewater system of the expansion/renovation project. No easements are required.

7. A solid waste reduction program will be implemented to reduce the amount of solid waste disposed at County landfills.

8. A private contractor will be hired for refuse collection.

9. The proposed facility is designed as a dormitory type facility and not as a correctional facility as defined in the Building Code. The basis for this is that the occupants (inmates) are not in a fully secured facility and could attend night classes as well as work for businesses under minimal supervision. The State Department of Public Safety concurs that the facility cannot be upgraded to a medium security facility.

10. The plans and specifications for the project has been coordinated with the Commission on Persons with Disabilities.

Should you need additional information, please contact Mike Shigetani, project coordinator, at 586-0434.

very truly yours,

[Signature]
Gordon Matsumura
State Public Works Engineer

CC: Dept. of Safety (John Borders)
September 2, 1993

Mr. Gordon Matsuoaka
State Public Works Engineer
Department of Accounting & General Services
State of Hawaii
P.O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Matsuoaka:

Re: MAUI COMMUNITY CORRECTIONAL CENTER (ENVIRONMENTAL ASSESSMENT)

TO: 3-2-46:06, WAILuku

We have little to add to the subject EA. We would normally request that an applicant address water consumption issues in such a document. However, based on the attached correspondence, we will require the appropriate calculations at the time of the building permit application.

The project, if approved, will be served by the Iao Aquifer which is approaching allowable withdrawal. Therefore, the domestic uses of the project may not be available until such time as a new source for the Central Maui system is developed.

We recommend the use of water-efficient planting and irrigation techniques where landscaping is intended. Guidance may be found in the attached document or in the Maui County Planting Plan.

Sincerely,

David R. Craddock
Director

DOS: EK70

Enclosures

"By Water, All Things Flow On."
XERISCAPE
Water Conservation Through Creative Landscaping

Xeriscape Defined
Seven Water Conservation Fundamentals
Planning and Design
Soil Improvement
Efficient, Zoned Irrigation
Limited Turf Area
Use of Mulches
Use of Low Water-Demand Plants
Appropriate Maintenance
Community Water Management

XERISCAPE

The Department of Water Supply is faced with increasingly more difficult decisions regarding water use supply, quality, distribution, purification, management, and associated costs. Faible water is becoming scarce and the costs of building delivery systems and water treatment plants prohibitive. Consequently, there is a need to conserve water, not only during droughts, but to reduce demands of peak loading on systems in an attempt to delay construction of larger, expensive facilities. Saving water saves energy while conserving other valuable resources.

Water conservation takes on two broad aspects. First, efficient manipulation of physical factors in the landscape - delivery and irrigation systems, soils, percent hardscape used in a design, plants, microclimates, mulch, etc. Second, the people factors, which are often more important.

The incorrect perception that water is "cheap" or "inexensive" has led to the idea that the water supply is not finite and that it flows toward money. This in turn has fostered a national consciousness that high water use landscapes are normal, desirable and acceptable. Little has been done to change this mind set, particularly as it relates to water conservation in the landscape.

With the increased, continuous demand for high quality water exceeding supply of both surface and below ground sources, a new philosophy for conservation must be engendered: saving must reflect the real cost of water and people must learn and practice the "save" and "reuse" of water conservation. This is why xeriscaping began.

Xeriscape Defined

XERISCAPE (gie' a scape) is an integrated approach to landscape water conservation. Xeriscape was coined from the Greek word "xer" for dry. Thus, xeriscaping means dryscape or low water use landscaping. Xeriscapes are designed through wise planning, plant and construction materials selection, and proper installation to provide beautiful, water efficient, low maintenance landscapes.

In Hawaiian it means meaning "Cherish Our Water" is used to refer to xeriscaping.
activity dictates landscape water use. This includes all uses, whether functional or aesthetic. Thayer and Richman coined the term “hydrozone” to describe the type and intensity of human activity in the landscape and identified four classes of hydrozones. These will be discussed under the heading “Efficient, Zoned Irrigation”.

**Soil Improvement**

Residential soils can be difficult soils to manage because they have been badly disturbed by construction and urban activities. Normal soil horizons are mixed unevenly with non-soil materials vertically and horizontally. Often, hardpan exists and impedes root growth and equipment or traffic. Many of the physical and chemical soil properties plants require for growth are present or are not adequate. Soil improvements must correct poor water infiltration, percolation, and drainage, while providing adequate water holding capacity and improving the nutritional status of the soil. Organic amendments meet most of these requirements and improve tilth, making it easier to till the soil and manage weeds. Adding 3-5 cubic yards of well composted organic matter per 1000 square feet and tilling it into the top 6-12 inches of soil is recommended.

Other amendments, such as lime, are added to adjust an undesirable soil condition. These amendments should be made prior to planting.

**Efficient, Zoned Irrigation**

Matching the amount of water supplied to each plant with the plant’s water requirement is the most efficient way to irrigate. Until recently, this was difficult to do and most landscapes were irrigated to meet the needs of the turfgrass or other plants with high water requirements. Sprinklers cover large areas with high water requirements. To avoid wasting water, irrigation can be zoned according to the plant’s water requirements and use sprinklers or soaker hoses to deliver water to individual plants or to plants with similar moisture requirements (Figure 10-21). Properly timed irrigation prevents disease or water loss from overwatering.

Many have adopted the term as "lifestyle," which would imply no landscape or no landscape plantings. Others have equated "lifestyle" with "lifestyles," any of which are not landscapes with "techniques," many of which are not aesthetically pleasing and may not always conserve water or energy. Landscape itself is natural, produce food, and do little to prevent noise and air pollution, making them a poor substitute for landscape landscaping.

**Seven Water Conservation Fundamentals**

The landscape motto, “water conservation through creative landscaping,” provides the umbrella under which a wide variety of water conservation activities may be taught and employed in a community. And although there are many landscape techniques that conserve water, landscape planning should focus on seven broad, fundamental areas.

1. Planning and Design
2. Soils Improvement
3. Efficient, Zoned Irrigation
4. Limited Turf Areas
5. Use of Mulches
6. Use of Low Water Demand Plants
7. Appropriate Maintenance

**Planning and Design**

Architects, planners, and homeowners are encouraged and taught to incorporate standard design elements of function, circulation, topography, exposure, seasonal color, texture, safety, etc. into existing landscapes and new designs with emphasis on conserving, limiting and/or reusing water. 40% to 60% of the water homeowners use goes for yard watering, so the landscape-oriented homeowner can provide these very necessary appropriate design and planning can provide the homeowner with the same treatment of urban life and conserve water at the same time. Savings in both these areas can significantly reduce the amount of water used, and good landscape design can ameliorate the impact of a severe drought and irrigation can essentially provide a "rainy day" water supply to avoid the costly drain of water. Homeowners should avoid planting large lawns and turfgrass areas to save water. In addition, the use of alternative landscaping, such as native plants, can reduce the amount of water used in landscapes. This is the intensity of human activity determines landscape water use.
Turfgrass plays a primary role in most landscapes. Turfgrass makes excellent ground covers. They tolerate heavy foot traffic in the backyard, at the park, or on the athletic fields. And new or reseeded, they stabilize slopes and prevent erosion. They serve to unify designs and instill a sense of pride in home and neighborhood when well cared for. Turf helps keep homes and communities cleaner by reducing particulate and chemical air pollution. Unfortunately, a lawn consumes approximately half the landscape water and requires weekly care. As well, equipment, pest control and periodic cultural practices, such as core aerating, contribute to the expense, both in time and money, of maintaining a lawn.

Not only are irrigation zones essential to meet the physical or ecological water needs of plants, but turfgrass landscaping also recognizes that human activity will impact plant water needs. Thayer and Richman (1982) describe this irrigation zoning as matching human activity with zoning for an appropriate irrigation regimen (Figure 10-3).

The Principal Hydrozone represents the areas with the greatest human activity and consequently the greatest water use. These include yards, parks, and commercial fields where people frequently play, sit, walk, and relax. These areas include areas where people regularly contact plants.

The Secondary Hydrozone is less physically impacted by humans, but is visually important for areas of passive activities such as recreation areas, parks, or undeveloped areas. These include the remaining hydrozones. In this zone, plants are selected that need minimal supplemental water to survive the natural climate conditions.

The Elementary hydrozone consists of landscape plantings that require only natural precipitation to survive and seldom, if ever, incur human activity. Utility areas, mulched native plantings, and naturally sustainable, exotic vegetation belong to this hydrozone (Figure 10-4).

Flexible sprinkler heads and nozzles, adjustable delivery rates and coverage, modern valves, and automated controllers allow for greater water conservation through zoned irrigation. Drop-off watering is easily programmed to match water infiltration rates into soil, thus avoiding surface runoff. Also, water is better applied to areas specific plant needs as impacted by seasonal human activity and changes in the weather.

Collection systems should be designed and constructed throughout the landscape to gather and store runoff from roads, sidewalks, driveways, and slopes. By prioritizing high or moderate water collection basins, much of their water needs can be met by natural moisture accumulations rather than irrigation. On the other hand, drought-tolerant species may require supplemental water to meet seasonally water accumulations, which should be located on southern exposures or at the tops of slopes. Drought-tolerant species may require supplemental irrigation during establishment or during a severe drought, a permanent irrigation system may not be needed.
Figure 10-3. Hydrome Concept Applied to Suburban Lot

Turf should be limited by design to high-use areas in landscapes and separated from other plantings with different water needs. After reviewing the landscape plans, classify the turf areas as either passive or active use and seed and irrigate accordingly. Plant drought-tolerant species with poor resistance to heavy traffic in less-frequented sites.

Not only should the total turf areas be reduced in a landscape, but the perisurface measurement also must be reduced as much as possible. Long, narrow strips of turf are difficult to properly mow, fertilize, heap past free, and irrigate. Such strips require hard work to keep them attractive, which increases maintenance time and labor costs. Water from overspraying turf in narrow planter boxes, gardens, and areas, and around entrances not only runs off but also contributes to the deterioration of paint, walls, and asphalt in parking lots and streets. Mulches or groundcovers and grass on drip or underground irrigation can appropriately replace turf in many landscape sites. Drip emitters or sprinklers can be used to irrigate individual plants and eliminate waste caused by overspray. Mulches need no water, and well-chosen groundcovers require less water and maintenance than turf.

Figure 10-2. Five Steps to Efficient Irrigation
All types of plants with low water requirements are now available and some will become available as demand increases. The range of drought-tolerant plant species and those with low function, beauty, and season interest, is now wide enough to permit selecting for conditions and planting, taking care to fit the specific needs of the plant to the environmental conditions and the intensity of the human activity at the planting site. This is critical when using these plants in the landscape. Choosing the proper plants and planting them correctly will reduce water consumption and maintenance costs over many years.

Appropriate Maintenance

Low maintenance is not no maintenance. The use of all or even most of the principles of this landscaping will reduce but not eliminate maintenance. As a whole, the greater the human activity at a site, the greater the maintenance required. Trees, shrubs, groundcovers, and turf grasses are living organisms that require care. Weeding, watering, pruning, pest management, and other cultural practices necessary in landscape landscaping are reduced levels compared to conventional landscape plantings. Even mulched sites without plants must have litter removed periodically. Irrigation components for drip and sprinkler systems require routine checking and servicing. Landscape landscaping coupled with sound maintenance practices produces water and energy savings and environmentally sensitive landscapes that are aesthetically pleasing.

As has been stressed, integrating these principles in landscapes will conserve water and reduce annual maintenance costs. Most importantly, landscape landscaping provides these benefits without sacrificing function or beauty. And although these benefits are stressed in the literature, there is no substitute for creativity as a means of discovering and sharing new ways to conserve water without making yards and parks into deserts.

Community education in landscape landscaping is key to a successful water conservation program. The principles of landscape landscaping challenge the widespread but mistaken belief that water is cheap, unlimited resource which will always be available. Hopefully, the public will recognize that this is a misconception and that water conserving landscapes are necessary and should be considered "normal" within our society. At the same time, it teaches people the "why" and "how" of effective water conserving horticulture. To reach these objectives requires the cooperation of government leaders.

Likewise, the amount of turfgrass in a landscape may be reduced by increasing the hardscape. Patios, wooden decks, rock and gravel walls limit the turf area while reducing the water requirement.

Use of Mulches

Mulches function to buffer soils against climatic extremes. In summer, they reduce soil heating and slow evaporation water loss from soil surfaces. They also reduce weeds and make these present easier to remove. Proper use of mulches reduces or prevents soil erosion. Organic mulches also contribute to the nutritional level and tilth of the soil as they break down.

These practical functions are important; however, many mulches are included in the landscape for their design flexibility and attractiveness, not simply because they save water, protect roots, and reduce maintenance.

Mulches are classified as organic, inorganic, and living. Organic mulches include plant refuse, such as chips and slash from tree trimming operations, saw dust, composted leaves and manures, and graded bark products. Sized and washed rocks and gravels are popular inorganic mulches which come in many sizes, colors, and textures.蔺uous sheet plastic covered with either organic or inorganic mulches are popular. These plastic products prevent gas and water exchange between air and soil and create a waterlogged root environment, which is preferred. Mulches are applied to a depth of 3 to 4 inches deep over bare soil and only 2 to 3 inches deep over paved surfaces. Living mulches include low-growing groundcovers and low maintenance turf grasses. These function well as mulches, but may be heavy competitors for water and nutrients under newly planted trees and shrubs. If used, select horticultural species that require less water and nutrients. These species provide the best results and require less maintenance.

Use of Low Water-Desert Plants

Many beautiful and functional plants, both exotics and natives, are available that thrive with natural precipitation or small amounts of supplemental water. Chapter Two lists characteristics including their water requirements ranging from dry to wet (very-thirsty).
Agencies, landscape professionals, horticulturists, irrigation specialists, concerned citizens, and an array of volunteers enthusiastically supporting and promoting landscape programming.

Community Water Management

Xeriscaping landscaping, when followed, will conserve water, reduce maintenance costs, and establish beautiful, environmentally sound landscapes, parks, recreational facilities, and greenspaces throughout a community. Conservation water cuts the need to construct costly new delivery systems and waste treatment plants that would otherwise be needed to meet periods of peak loading. Xeriscaping also leads to changes in attitudes about what quality water use, and how a community's water should be managed, especially in landscape irrigation.

Literature Cited

Urban and Community Forestry - A Guide for the Interior Western United States - United States Department of Agriculture - Forest Service


Figure 10.4. Water Use Relating to Human Use—Three Approaches
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**LOW WATER USE/DROUGHT TOLERANT PLANT LIST**

All plants require water for establishment. After they are rooted and growing well their water requirements will vary.

The following is an incomplete list of drought tolerant plants. It is provided for your convenience.

Please review the following reference lists for many other suggestions.

1. Drought Resistant Plants for Hawaiian gardens by Norma C. Banzon, County Extension Agent, Cooperative Extension Service.
2. Drought Tolerant Native Hawaiian Plants for the Landscape - by Heidi Barnhart Horticulturist, Honolulu Botanic Garden.

**Key to Symbols**

- **A**: Accent Plant
- **F**: Flower Color
- **G**: Groundcover
- **O**: Ornamental Grass
- **S**: Shrub
- **S**: Succulent
- **ST**: Small Tree
- **HT**: Medium Tree
- **LT**: Large Tree
- **V**: Vine

**Key to Zones**

- **Zone 1**: Normal watering level. Includes lush lawns and gardens.
- **Zone 2**: Moderate watering level. Includes lawns, ground covers, and shrubs.
- **Zone 3**: Low watering level. Includes self-sustaining plant materials and natural vegetation with emphasis on plants that require little or no supplemental irrigation.
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</table>

- Brazilian Ironwood
- Chal 11-13 colors
- Crown Flower
- Althea's
- Nasturtium
- Creeping Nasturtium
- Hollyhocks
- Hotentot Fig
- Yellow Shower
- Rainier Shower
- All Colors
- Coral Tree
- Glory Flower
- Almarian Tree
- Small Leaf Canna
- Buttercup Tree
- Koi
- Broadhead Grass
- Jade Plant
- Caladium Tree
- India Rubber Vine
- Sago Palm
- Seramide Grass
- Spoon Flower
- Royal Poinciana
- 'Katie'
- Earpod
- Lacuna
- Hillwilli
- Treep Coral
- Hillwilli
- Tigers Claw
- Hibiscus salmut
- Crown of Thorns
- Pineapple Guava
- Stromanthe Ficus
- Fig
- Mistletoe Fig
- Chinese Pomegranate
- Taiwan Ficus
- Variegated Ficus
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<tr>
<th>Type</th>
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<th>Zone</th>
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<td>Rosmarinus officinalis</td>
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<td>Soapberry Tree</td>
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<td>Echeveria fascilata</td>
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<td>Giant Carrot Flower</td>
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<td>St. augustine</td>
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<td>S. stuckyi var. stuckyi</td>
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<td>MT</td>
<td>Tafubilla argentea</td>
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<td>Trachycarpus</td>
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<td>LT</td>
<td>T. cordatus</td>
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<td>G</td>
<td>Yucca gloriosa 'EMERALD'</td>
<td>2</td>
<td>Spanish Daylily</td>
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</tbody>
</table>
To:        Gordon Matsukawa, State Public Works Engineer
           Department of Accounting and General Services

From:     John C. Levin, M.D.
           Director of Health

Subject:  Request for Comments
           Environmental Assessment for Maui Community Correctional Center
           (D.A.G.S. Job No. 15-27-0220)
           Wailuku, Maui

           Date:     3-8-86: 6

Thank you for allowing us to review and comment on the subject project. I have the following comments to offer:

**Wastewater**

The subject project is located below the groundwater injection control line and is in a critical wastewater disposal area as determined by the Maui County Wastewater Advisory Committee. No new cesspools will be allowed in the subject area.

Wastewater generation and disposal have not been addressed in the document, therefore, we cannot offer any comments at this time. We will require a review of any follow-up documents regarding wastewater treatment and disposal.

However, if the project is located within a municipal sewer system, we will require connection to the sewer service system. No other means of wastewater disposal will be acceptable. Non-availability of treatment capacity will not be an acceptable justification for use of any private treatment works.

All wastewater plans must conform to applicable provisions of the DOH's Administrative Rules, Chapter 11-62, "Wastewater System."

If you should have any questions on this matter, please contact Ms. Laura Kealaeo of the Wastewater Branch at 586-4220.

cc: Wastewater Branch
    Safe Drinking Water Branch

Dr. John C. Levin
Director of Health
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Levin:

Subject: Environmental Assessment for Maui Community Correctional Center
          60-6900 Makawao Road Center
          D.A.G.S. Job No. 15-27-0220

Thank you for your comments on the environmental assessment.

We offer the following responses to your comments:

1. Wastewater discharge from the proposed facility will be connected to the County's sewer system.
2. We acknowledge that your department will only accept wastewater disposal into the municipal system.
3. Wastewater plans will comply with DOH requirements.

Should you need additional information, please have your staff contact Mike Shigeta, project coordinator, at 586-0434.

Very truly yours,

John C. Levin
Director of Health

GORDON MATSUKAWA
State Public Works Engineer