

Tab 9

2. Physical and Socioeconomic Factors

Criteria Nos. 10, 11, 13, 14, 16, 18, 19, 24

Criteria 10
Consistency of the designation of the site
for a landfill with the Kaua‘i General Plan

The County of Kaua‘i General Plan identifies the need for a new solid waste facility as a successor to the Kekaha Landfill, Phase II Lateral Expansion. However, at the time of the preparation of the General Plan the future location of this site was not yet known. In determining the point values for the evaluation of this criterion the following rating system was used:

| <u>Point Value</u> | <u>Measure</u> |
|--------------------|-----------------------------------------------------------------------|
| 0 | Land uses (for a landfill) are not consistent with the General Plan |
| 2 | Land uses where a landfill may require a General Plan (Map) Amendment |
| 4 | Land uses where a landfill is consistent with the General Plan |

Notes:

- (1) A review of the General Plan indicates the Kekaha Landfill, Phase II Lateral Expansion, will serve as the County of Kaua‘i’s designated municipal landfill. No other sites were identified at the time of preparation of the General Plan.
- (2) A General Plan Amendment will need to be prepared to identify the location of the next landfill site once it is selected.

Criteria 11
Consistency of the site with the existing
County land use zoning designation

Regulations for land development and the construction of buildings and other structures are defined in the County's Comprehensive Zoning Ordinance (CZO). The regulations and standards prescribed by the CZO promote development that is compatible with the Island's scenic beauty and environment and attempts to preclude inadequate, harmful or disruptive conditions that may prove detrimental to the social and economic well-being of the residents of Kauai.

The major County Zoning Districts include: Residential (R), Resort (RR), Commercial (C), Industrial (I), Agriculture (A), Open (O), Special Treatment (ST), and Constraint (S). The categories were assigned to a ranking of desirability for a landfill as follows:

| <u>Point Value</u> | <u>Measure</u> |
|--------------------|----------------------------------------------------------------------------------------------|
| 1 | The siting of the landfill is clearly inconsistent with the underlying zoning classification |
| 2 | The siting of a landfill would require a Change of Zone and/or other land use entitlement |
| 3 | The siting of a landfill would not require a Change of Zone |

Notes:

- (1) Zoning information was obtained from the Planning Department, County of Kaua'i (December 15, 2008).

Criteria 13
Location of site relative to the
Underground Injection Control Line (UIC)

The Underground Injection Control (UIC) Program is managed by the Safe Drinking Water Branch of the State Department of Health (DOH). The purpose of the program is to protect the quality of Hawai‘i’s underground sources of drinking water from chemical, physical, radioactive, and biological contamination that could originate from injection well activity.

The DOH, Hawai‘i Administrative Rules (HAR), Title 11, Chapter 23 provides conditions governing the location, construction, and operation of injection wells so that injected fluids do not migrate and pollute underground sources of drinking water. Section 4 of the Rules gives the criteria for classifying aquifers into those that are designated as underground sources of drinking water and those that are not.

The boundary between non-drinking water aquifers and underground sources of drinking water is generally referred to as the “UIC” Line. Restrictions on injection wells differ, depending on whether the area is inland (mauka) or seaward (makai) of the UIC Line.

Various classifications of injection wells have been defined in Title 11, as well as regulations on the installation, operation, and closure of such injection wells. The use and operation of a landfill does not in itself constitute an injection well, however, the general concept involves the use of the UIC Line as the demarcation between the location of non-drinking and drinking water aquifers that should be protected against future potential sources of pollution.

The UIC Line for the Island of Kaua‘i is provided in the attached **Figure B.2.1**. (Department of Health UIC Line as presented on the DOH website:
<http://hawaii.gov/health/environmental/water/sdwb/uic/pdf/kauuic.pdf>).

Criteria 14

Proximity to surface water

The Island of Kaua‘i is the wettest and most weathered of the Hawaiian Islands and possesses a high number of freshwater wetlands. There are over 40 major streams and numerous tributaries. This criterion measures the location of the site relative to surface water resources located near the site. Sites that are closer to surface water resources have greater potential for transporting pollutants from a potential landfill onto coastal waters or inland streams and water bodies. The property line of each potential site was used as the boundary for locating the distance of the site from surface water resources. Relevant surface water resources were described using GIS values collected by the U.S. Fish and Wildlife Service during a State-wide inventory of wetlands in Hawai‘i in 1992.

Notes:

- (1) State of Hawai‘i GIS layer maps were used for the identification of surface (inland or coastal) water resources. TMK map layers were used for the identification of the planned landfill property boundaries.
- (2) Distance from the footprint boundary to the nearest surface water resource was determined using the distance calculation feature in the GIS program, ArcGIS, version 9.2. Distances are approximate to within 200 feet.
- (3) The attached **Figures B.2.2 (a-c)** show the surface water resources located near each site.

Criteria 16

Annual precipitation

An important factor in considering potential landfill sites is the amount of rainfall occurring at the site. The less rainfall a site has, the lower the volume of stormwater produced that has to be managed, making that location a better site.

Rainfall data collected for this criterion included the use of isohyetal data from Atlas of Hawai'i, University of Hawai'i Press (1998), overlaid onto a map of Kaua'i showing the potential landfill sites.

Isohyetal lines are lines joining points of equal precipitation on a map over a specific period of time (usually expressed in months or years). The isohyetal lines were used to measure the amount of rainfall received across each of the alternative landfill sites.

Interpolation between isohyets was used when the site did not fall exactly on a particular isohyet. In addition to its location relative to the nearest isohyet, the elevation gradient was also considered in determining the rainfall zone of the site.

Criteria 18
Haul distance from major municipal
solid waste generation areas

There are presently four refuse transfer stations established on Kaua‘i: Hanalei, Hanapēpē, Kapa‘a, and Lihu‘e. The centroid of Kapa‘a and Lihu‘e has the highest residential concentration on the island; therefore, the centroid is the origin of the largest proportion of waste on the island. The distances via major roadways between each potential landfill site and the transfer stations that serve each residential district were identified using ArcGIS layers and measurements were taken using GIS software tools.

Point values were assigned based on proximity to refuse transfer stations, with higher values assigned to potential sites that were closer to transfer stations. This is the distance from the closest refuse transfer station serving as the starting point for trips to the identified alternative landfill site. The distances were represented in order from highest to lowest. The list is divided into three ranks. A score of 3 was given to the group of sites closest to a refuse transfer station, while sites that were farthest from refuse transfer stations were given a score of 1.

The locations of the transfer stations were identified from the County of Kaua‘i Division of Public Works. Estimation of distances was calculated using the map distance measuring function of ArcGIS and are accurate to one-tenth of a mile.

| <u>Point Value</u> | <u>Measure</u> |
|--------------------|-----------------------------------------------------------------------------------------------------|
| 1 | The site is in the group with the greatest distance from a refuse transfer station |
| 2 | The site is in the group between the least and the highest distances from a refuse transfer station |
| 3 | The site is in the group with the least distance from a refuse transfer station |

Notes:

- (1) The attached **Figure B.2.3** shows the island of Kauai and the general location of each refuse transfer station as well as the potential landfill sites.

Criteria 19

Adequacy of Site Drainage

The ability of a landfill to drain surface water naturally from on and off-site tributary areas reduces engineering and design associated costs. Sites with soils conducive to good drainage are preferred (based on installation of a landfill liner system that meets or exceeds federal and state standards).

The ability of a landfill to drain water is a function of the soils associated with the general area. Fine-grained soils such as clays are not well-drained soils, and tend to deter drainage from occurring. Sandy and gravelly soils, on the other hand, are considered to be well-drained.

Information on soil associations for the general area was gathered for each potential landfill site. Soil properties information was obtained from the Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawai'i (Soil Conservation Service, U.S. Department of Agriculture, 1972). Locations for each soil type were collected using ArcGIS state layers and are provided in **Figure B.2.4 (a-d)**.

The particle size of the prevalent soil types determined the point value. Coarser grained soils (sands and gravels) provide good drainage and receive a score of 3. Finer grained materials (e.g. silts and clays) restrict the movement of water and receive a score of 1. A combination of fine and coarse grained materials (allows some drainage but at a slower rate) receives a score of 2.

| <u>Point Value</u> | <u>Measure</u> |
|--------------------|--------------------------------------------------------|
| 1 | Fine-grained soils or clays |
| 2 | Sand and/or gravel, some fine-grained soils identified |
| 3 | Coarse-grained soils |

Criteria 24
Availability of existing access roadway from
major highway or collector street/road

An important aspect of landfill site selection that can minimize development costs is the proximity of the site to existing standard roadways.

This criterion is ranked in order from highest to lowest anticipated costs and is based on one of three conditions: (1) no existing access road or trail; (2) limited site access provided but not for the entire length required to access the site; and (3) access road available but requires improvements.

| <u>Point Value</u> | <u>Measure</u> |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 1 | No access road available, construction required |
| 2 | Limited site access, the entire access does not meet County standards, construction required |
| 3 | Existing access roadway that meets County standards is available to the site from a major highway, minimal construction required |

The determination of this criterion was based on the availability of site trails or roads as identified on existing mapping sources. State of Hawai'i GIS layer maps were used to outline existing roads and proximities to the potential landfill sites. The Google Earth database, and County of Kaua'i map information were used to verify GIS data.