



NORTH KONA IMPROVEMENT DISTRICT PROJECT
Department of Environmental Management
County of Hawaii

Project Summary
June 6, 2006

A *North Kona Sewer Master Plan* was developed for the County of Hawai'i, Department of Environmental Management (DEM) to address future sewer improvements necessary to serve projected development in the North Kona region of the Island of Hawai'i. This sewer master plan would then be used to develop an Implementation Study to support the establishment of an "Improvement District" for North Kona by the County Council. This project is collectively referred to as the North Kona Improvement District (NKID) Project.

Background

An updated regional sewerage master plan is being conducted because existing sewer studies for this region are over 20 years old, and do not reflect the rapid confluence of both private and public developments planned on several large tracts of land. The County anticipates the need to implement improvements to their municipal sewer system and recycled water system serving this region. Such improvements would include assessing their gravity sewers, force mains, manholes, and pump stations situated north of the Kealakehe Wastewater Treatment Plant.

Therefore, the County Council adopted Resolution No. 129-03 directing the County DEM to develop an implementation plan for an improvement district. This implementation plan would include a sewer master plan for the region north of Kealakehe. It would also address the necessity, feasibility, boundaries, estimated costs, and desirable method of financing to provide sewer system improvements serving this North Kona district.

Scope Of Study

The study area boundary for this master plan generally extends from the County's Kealakehe Wastewater Treatment Plant northbound up to and inclusive of the Kohanaiki ahupua'a. This area encompasses about 5,600 acres, and Exhibit 1 graphically shows the boundary for this area. The boundary extends along the coastline and includes areas mauka (inland) about 3 to 4 miles up to Palani Road and Mamalahoa Highway.

The overall scope of study for this NKID project consists of two primary phases.

1. Phase 1 - Develop a sewer master plan to project future estimated flows and identify system improvements needed. The study year established for this master plan is 2025.
2. Phase 2 - Develop an implementation study identifying proposed sewer improvements and a desirable method of financing for the improvements.
3. This implementation study will then be transmitted to the County Council for consideration, processing, and action in formally establishing the North Kona Improvement District.

A draft sewer master plan has been completed, and the next step will be to finalize this master plan so that it can be used in conducting the implementation study. This will consist of the following major tasks:

1. Conduct a public informational meeting to present the preliminary findings of this sewer master plan.
2. Evaluate public comments received and revise the master plan as appropriate.
3. Identify the preferred improvement plan, refine cost estimates, and finalize the sewer master plan.

The focus of Phase 2 will be identifying the method of financing for sewer improvements and determining how the distribution of costs will be established among the landowners and developers. The results of that study will be documented in a future Implementation Plan report.

Major Stakeholders And Future Land Use Estimates

Major stakeholders within the study area were identified because they have significant amounts of property affected by the NKID project. Major stakeholders are defined as landowners or developers having a combined total of 10-acres or larger. Most of these properties are generally either undeveloped or partially developed, thus, their future development plans were used in developing the sewer master plan. Exhibit 2 graphically identifies them within the study area.

Future land uses were estimated based upon: 1) research of existing available references, entitlements, and studies, and 2) consultation with major stakeholders identified. Only the major land owners with parcels over 10 acres were solicited for land use information. Based upon the available information obtained, estimates were developed for future land uses for properties within the study area along with timeframes for their completion. Exhibit 3 graphically shows the future estimated land use patterns.

Future Wastewater Demands And Improvement Alternatives

Projected wastewater flows were based upon the City and County of Honolulu Wastewater Design Standards since the County of Hawai'i currently references these standards. The amount of wastewater generated from each parcel depended upon many factors including; usage of sewer connections (i.e., domestic, industrial, etc), entitled/proposed developments, existing domestic water consumption, groundwater conditions, and lifestyle. Each parcel was categorized into one of the various land uses from the design standards, and its associated capita per acre (cpa) values were utilized. The following Table 1 summarizes the estimated future Design Average Flow, Design Maximum Flow, and Design Peak Flow for the years 2015, 2020, 2025, and Total Build Out (estimate beyond 2025).

Table 1
Estimated Wastewater Flow Summary

Build-Out Year	Design Average Flow (mgd)	Design Maximum Flow (mgd)	Design Peak Flow (mgd)
Current ¹	0.55	2.78	7.91
2015	8.98	25.78	41.93
2020	9.94	29.81	45.96
2025	11.44	35.69	51.84
Total Build-Out	13.25	43.25	59.42

¹Current flows represents a hypothetical scenario if the entire study area was to be sewered and connected to the Kealakehe WWTP in the year 2005.

Based upon the projected flows, three proposed sewer alternatives were developed for this study area, and are summarized below along with Table 2 providing a comparison of alternatives.

Alternative 1 – Kamanu Lift

Alternative 1 is shown on Exhibit 4 and uses Kamanu, Maiiau, and Kealakaa Streets as collection sewer mains that would gravity flow in a southerly direction. Collection mains from Maiiau and Kealakaa would connect into the existing sewer main along Kealakehe Parkway. The collection sewer main along Kamanu Street would gravity flow to the south and be pumped mauka into the existing sewer system in Kealakehe Parkway.

The wastewater from the areas between the ocean and Kamanu Street would primarily be carried by gravity flow into the sewer system along Queen Kaahumanu Highway and eventually pumped to the Kealakehe Wastewater Treatment Plan (KWTP). This alternative also includes a gravity main along the Honokohau Boat Harbor Road. At the makai end of that road, a pump station will be needed to force the wastewater collected from the surrounding parcels into the KWTP.

Alternative 2 – Kamanu Gravity

Alternative 2 is shown on Exhibit 5, and is similar to Alternative 1. The main difference is at the south end of Kamanu Street where the sewer main would gravity flow across TMK parcel 7-4-020: 007 (State of Hawai‘i). Therefore, a new utility easement across this parcel would need to be obtained. Initial discussions with the State Department of Land and Natural Resources and the County of Hawaii indicated that a new easement would be possible given the public benefit from this improvement.

Alternative 3 – National Parks

Alternative 3 is shown on Exhibit 6 and is also similar to Alternative 1. The main difference is from the Hina Lani Street with Queen Kaahumanu Highway intersection where the sewer alignment would run through the National Parks property in a southern direction to the KWTP. This alignment is similar to that proposed in the Keahole to Kailua Development Plan (1991). A new utility easement across the National Parks property would need to be obtained; however, no discussions have been initiated with the National Parks at this time. In addition, at the south end of Kamanu Street, the sewer would flow makai and into the gravity main along Queen Kaahumanu Highway. The wastewater would then be pumped to the KWTP.

Comparison Of Alternatives

A summary comparison of the alternatives is shown on Table 2 below. In addition, some comments about associated with the pros and cons for each alternative is provided.

**Table 2
Comparison of Sewer Alternatives**

	Alternative 1 – Kamanu Lift	Alternative 2 – Kamanu Gravity	Alternative 3 – National Parks
Approximate Length (lineal feet) of New Gravity Sewers	120,280	123,690	129,980
Approximate Length (lineal feet) of New Sewer Force mains	11,210	10,560	10,560
Number of Proposed County-Owned Lift Stations	3 (sizes TBD)	2 (sizes TBD)	2 (sizes TBD)
Approximate area (acres) of New Utility Easements	None	1.16 (assume 15' wide easement)	2.83 (assume 15' wide easement)
Approximate area (acres) Land Acquisition (for pump stations)	TBD	TBD	TBD
Approximate Initial Construction Cost (2006 dollars)	\$46,300,000 ¹	\$47,200,000 ¹	\$49,400,000 ¹
Approximate Future Operations and Maintenance Costs (over 20-year lifecycle)	TBD	TBD	TBD
Does Alternative Service all of the NKID study area?	Yes	Yes	Yes
Is there a strong community opposition to this alternative? If yes, explain.	TBD, after 1 st public meeting	TBD, after 1 st public meeting	TBD, after 1 st public meeting

¹These cost estimates are for the collection system improvements only. Estimated costs for other improvements (recycled water, lift stations and wastewater treatment plant) will be determined later.

Alternative 1 – Kamanu Lift:

- Pros
 - ✓ Primarily uses gravity flow sewers
 - ✓ Sewer mains are aligned along existing or proposed County road rights-of-way.
 - ✓ No new utility easements anticipated.
 - ✓ Less future Operations/Maintenance Costs

- Cons
 - ✓ Approximately three new County-owned and operated lift stations, which will likely require some land acquisition
 - ✓ Additional future Operations/Maintenance Costs

Alternative 2 – Kamanu Gravity:

- Pros
 - ✓ Primarily uses gravity flow sewers
 - ✓ Sewer mains are generally aligned along existing or proposed road rights-of-way.
 - ✓ Less number of County-owned and operated lift stations (2)
 - ✓ Less future Operations/Maintenance Costs
- Cons
 - ✓ Additional future Operations/Maintenance Costs
 - ✓ New utility easements anticipated
 - ✓ Some land acquisition will likely be required for the lift stations.

Alternative 3 – National Parks

- Pros
 - ✓ Primarily uses gravity flow sewers
 - ✓ Sewer mains are generally aligned along existing or proposed road rights-of-way.
 - ✓ Less number of County-owned and operated lift stations (2)
- Cons
 - ✓ Additional future Operations/Maintenance Costs
 - ✓ Some land acquisition will likely be required for the lift stations.
 - ✓ New utility easements across U.S.A. Government lands anticipated

Preliminary Preferred Alternative

Based upon these preliminary findings, Alternative 2 is being considered for implementation because it maximizes the use of gravity sewers, has the least amount of County-owned lift stations, and requires an easement through State-owned lands.

Recycled/Reuse Water Distribution

The usage of Recycled/Reuse water would decrease the demand on the domestic water resources and provide an alternate source of irrigation water for many developers. The demand for recycled water was expressed by the following stakeholders for irrigation purposes.

- TMK 7-3-009: 003 (Kohanaiki Shores)
- TMK 7-3-009: 025 (MID Corporation)
- TMK 7-4-008: 071 & 072 (Kona Kai)

KWTP currently has the ability to treat wastewater to the R2 level. However, due to the lack of a distribution and treatment system for the recycled water, the plant has been treating the wastewater to the R3 level and disposing the effluent in a seepage pit. The total future demand for R1 recycled water will be determined, and more stakeholder information is needed to address the sizing of the R1 recycled main. This is expected to take place during finalization of the Sewer Master Plan and development of the Implementation Plan. Exhibit 7 indicates a possible alignment for the Recycled/Reuse water from the KWTP.