

Exhibit G

**Preliminary Engineering Report Wastewater Improvements
Kapa'a Highlands Phase II**

**Preliminary Engineering Report
Wastewater Improvements**

KAPAA HIGHLANDS – PHASE II

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Project Description

The Kapa'a Highlands Subdivision is on former cane lands situated on a bluff adjacent to the coastal plain of Kapa'a Town. It is bordered by Olohena Road to the north and the Kapa'a Bypass Road on the south and east sides of the project. Kapa'a Intermediate School is near the middle of the north portion of the property. Phase I of the development will consist of five agricultural lots on the west side of the property. The remainder of the property to the south and east of the school are proposed to be developed during Phase II of the subdivision. The proposed Phase II development will consist of 86 single and 683 multi-family units, plus a neighborhood commercial site, parks, and a church site as shown on Exhibit 1. Ground elevation of the development ranges from 20 to 180 feet above mean sea level. Due to its high density the Phase II development will require connection to the Wailua-Kapa'a Sewer System. The following report reviews the anticipated wastewater flows, the adequacy of the existing sewer collection system, and the proposed improvements needed to provide service for the development of Phase II.

Basis of Design

The *Sewer Design Standards, 1973* by the County of Kauai, Department of Public Works, together with the *Wailua Facility Plan, September 2008* by Fukunaga and Associates were the primary references for this report and will be abbreviated as SDS and WFP, respectively, when quoted in the report.

The WFP is a detailed study of the entire Wailua to Kapa'a wastewater system completed in 2008 to guide the County with the necessary expansion and management of the system through the year 2025. It broke down projected flows to the Wailua Treatment Plant in three phases, the current and near term flows up to the year 2010, middle term flows for the 2010-2015 period, and far term flows for the years 2015 to 2025.

Wailua-Kapa'a Average Daily Wastewater Flows ¹	
Planning Interval	Average Wastewater Flow (mgd)
Current	0.70
Near Term (2010)	0.98
Middle Term (2015)	1.39
Far Term at Wailua WWTP(2025)	1.72
Kapaa Start-Up (2025)	0.40

The need for the WFP was partially based upon the rapid development that was occurring in the Wailua-Kapaa area during 2004-2007 period. Development has slowed

considerably since this time and several of the developments anticipated in the WFP calculations have been put on hold or are no longer proposed. Of the proposed developments, the Coco Palms Hotel will be removed from the near term anticipate flows and be considered part of the middle term flows. The Coconut Beach Resort and Coconut Plantation Village will be removed from the middle term flows and be considered for the far term flows.

The proposed Kapa'a Highlands development is not expected to be at total capacity by 2015, but for the purposes of this report, it will be considered to be completed in the middle term planning period of the WFP. The table below is the adjusted Average Daily Flows (ADF) based upon the current flow to the Wailua Treatment Plant and adjustments due to slower development than anticipated by WFP.

Adjusted Wailua-Kapa'a Average Daily Wastewater Flows	
Planning Interval	Average Wastewater Flow (mgd)
Current	0.70
Near Term (2010)	0.98
Middle Term (2015)	1.39
Far Term at Wailua WWTP(2025)	1.72

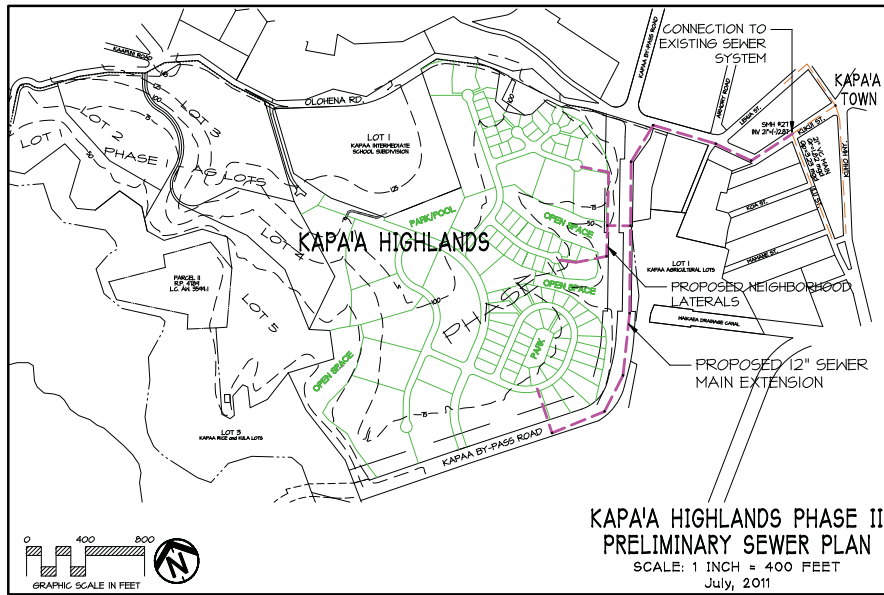
Kapa'a Highlands Phase II Wastewater Flow Estimates	
Item	Projected Wastewater Flow (gpd)
Single Family Homes	34,400
Multi-Family Homes	170,750
Neighborhood Commercial	4,800
Total	209,950

Note: Single Family Homes assumed to have 4 occupants/unit and Multi-Family Homes have 2.5 occupants/unit.

¹ Table ES-1, WFP, September 2008

Preliminary Design

Based upon the projected flow of 209,950 gpd (0.21 mgd), with a max load factor of 4.1, a 12" sewer main would be required to serve the development. The location of the main is shown on Exhibit 1. It would begin along the Kapa'a By-pass Road and terminate at an existing manhole near the intersection of Ulu and Kukui Streets. The length of the main within the existing public Right-of-Ways would be about 3,400 linear feet. At the existing manhole connection the existing main downstream of the connection is a 21" main with a capacity of 3.2 mgd. The 21" main currently has a peak flow of about 0.6 mgd, therefore the proposed flow is well within the capacity of the existing sewer system, including allowances for the future increases anticipated in the "Final Wailua Facility Plan", September 2008.



COMPUTATION OF SANITARY SEWAGE FLOW

SEWER: Kapā'a
 DISTRICT: Kāwāihau YEAR: 2010
 REFERENCE MAPS:
 PAGE: 1 of 1
 COMPUTED BY: BH
 DATE: 3-9-10

SEWER LOCATION		SANITARY SEWAGE (MGD)									SEWER DESIGN						
DISTRICT ZONE OR STREET	FROM TO	TRIBUTARY AREA (ACRES)		TRIBUTARY POPULATION		AVERAGE FLOW	SUMMATION AVERAGE FLOW	MAX FLOW FACTOR	MAX FLOW	INFILTRATION @ 1,250 or 2,750 GAD	SUMMATION INFILTRATION	PEAK FLOW	SIZE (in.)	SLOPE (H/D/F)	CAPACITY (mgd)	AVERAGE VELOCITY (fps)	PEAK VELOCITY (fps)
		INCREMENT	TOTAL	INCREMENT	TOTAL												
Kapā'a Highlands			67			0.21	4.1	0.86	1,250	0.08	0.94	12	1	2.3	2.6	4.2	

Remarks: