WRITTEN DIRECT TESTIMONY OF Anson Murayama

1. **Please state your name and business address for the record.**

Anson Murayama
1286 Queen Emma Street
Honolulu, Hawaii 96813

2. **What is your current occupation?**

Civil Engineer

3. **How long have you been a civil engineer?**

31 years

4. **Did you provide a copy of your resume for these proceedings?**

Yes

5. **Is Petitioner's Exhibit 7 a true and correct copy of your resume?**

Yes

6. **Please briefly describe your educational background.**

Bachelor of Science in Civil Engineering from the University of Hawaii at Manoa

7. **Do you specialize in any particular areas?**

No.

8. **To what professional organizations do you belong?**

American Water Works Association
Construction Management Association of America

9. **What additional training or certifications do you have?**

Licensed as a Professional Engineer/Civil Branch in the State of Hawaii
Certified Construction Quality Control Manager

10. **What does a civil engineer do?**

Civil engineers design, build, supervise, operate, and maintain construction projects and systems in the public and private sector, including roads, airports, tunnels, dams, bridges, water systems, wastewater systems, and storm drainage systems.

Exhibit 8

11. **How long have you worked for Community Planning and Engineering, Inc.?**

14 years

12. **What is your title at Community Planning and Engineering, Inc.?**

Chief Executive Officer/Principal Engineer

13. **Please briefly describe some of the projects that you have been involved with over the course of your career.**

Over the course of my career, I have been involved with numerous public and private sector projects. Clients include:

- U.S. Army Corps of Engineers, Honolulu Engineer District and Far East District. Sample of projects include site work for enlisted personnel barracks, child development center, sewer system condition assessment, water system upgrades, flood control imporvements,etc.
- U.S. Navy, NAVFAC Hawaii. Sample projects include site work for enlisted personnel barracks, site engineering investigations for family housing, water system upgrades, etc.
- State Department of Transportation, Highways Division. Sample projects include pavement rehabilitation, resurfacing and reconstruction, traffic improvement feasibility studies, zipper lane extension, etc.
- State Department of Agriculture. Sample projects include irrigation system improvements in Waimea, Hawaii and Waiahole, Oahu.
- State Department of Hawaiian Home Lands. Sample project include residential subdivisions in Kula, Maui; Lalamilo, Hawaii; and Kapolei, Oahu.
- County of Maui, Department of Public Works, Engineering Division. Sample projects include pavement rehabilitation, resurfacing and reconstruction in Pukalani, and greater Kahului.
- County of Kauai, Department of Public Works, Engineering Division. Sample project include work on the Storm Drainage Standards update.
- County of Kauai, Housing Agency. Sample projects include housing development in Eleele and predevelopment sitework for affordable housing.
- County of Hawaii, Department of Public Works, Engineering Division. Sample project include sewer system replacement.
- City and County of Honolulu, Department of Design and Construction. Sample projects include pavement rehabilitation, sewer system improvements and rehabilitation, pump station upgrades, wastewater treatment upgrades.
- City and County of Honolulu, Board of Water Supply. Sample projects include water main replacement, site work for Granular Activated Carbon treatment, etc.
- Castle & Cooke. Sample project includes storm drainage improvements.
- Gentry Homes. Sample projects include residential subdivisions in Ewa and Kapolei.
- A&B Properties. Sample project include residential subdivision in Koloa, Kauai.

14. **Have you ever testified under oath based on your work position before a judicial or administrative body?**

No.

15. **If yes, when and where did you testify?**

16. **Have you ever testified as an expert based on your work position before a judicial or administrative body?**

No.

17. **If yes, when and where did you testify?**

18. **Are you familiar with the Lima Ola Workforce Housing project ("Project") being developed by the County of Kauai Housing Agency?**

Yes.

19. **Please describe your involvement in the Project.**

Community Planning and Engineering, Inc. is the prime consultant to the Kauai County Housing Agency and I am the Principal-in-Charge.

20. **Are Petitioner's Exhibit 10 of Exhibit 4, Exhibit 13-B, Exhibits 2 and 5 of Exhibit 13-B, and Exhibit 18 a true and correct copies of your reports?**

Yes

21. **Please summarize the scope of the report.**

a. Preliminary Engineering Report

The Preliminary Engineering Report (PER) considered that engineering aspects of the Petition Area in terms of infrastructure requirements, roads, water, sewer, storm drainage, electrical power, and telecommunications; and, consultation with County agencies, KIUC, Hawaiian Telephone Company, and Oceanic Cable. The PER proposed preliminary design concepts for the infrastructure requirements and construction cost estimates.

b. Water Master Plan

The County of Kauai, Department of Water (DOW) required the preparation of a Water Master Plan (WMP) for the Lima Ola Development. The purpose of the WMP

was to analyze the adequacy of the existing Hanapepe-Eleele Water System and determine the impacts to the existing water system by the proposed Lima Ola Development. The WMP incorporated water demands for the proposed development that determined pipe and tank sizes that conform to the 2002 Water System Standards for the Department of Water. Water demands for proposed developments were analyzed into an integrated water model with connections to the existing water system. The proposed water system for Phase 1 of the Lima Ola Development will be interconnected with the existing Hanapepe-Eleele Water System, drawing water from the existing source facilities: Hanapepe Well A, Hanapepe Well B, and Hanapepe Well No. 4. Source adequacy for subsequent phases 2, 3 and 4 will be re-evaluated at the time planning is implemented.

c. Master Plan Update

The Master plan serves as a roadmap for decision making. Those involved with the planning determined that Lima Ola would be a "real world example that integrates progressive objectives for residential living, environmental sustainability, and affordability." The Master Plan stated, ***"It is recognized that no plan can be definitive, especially for long-term development, and a reasonable amount of flexibility must be retained when community build-out will occur over many years."***

The Lima Ola Workforce Housing Development Master Plan Update, April 2017 ("Master Plan Update") provides an update of Lima Ola since the publication of the Master Plan in 2012. This Master Plan Update provides additional studies to supplement the previously published Master Plan.

d. Infrastructure Delivery Plan for Lima Ola Workforce Housing

The Infrastructure Delivery Plan (IDP) for Lima Ola Workforce Housing identifies the timing in which critical infrastructure would be constructed over the life of this development. The development is currently separated onto four phases and it is anticipated that full build-out could span over a 20-year period. Therefore, in lieu of when construction of infrastructure should commence, the IDP considers delivery of infrastructure requirements according to phase. Critical infrastructure consider those to be improvements necessary to support each phase of development, such as the improvement to the intersection of Kaumualii Highway/Mahea Road; construction of a new 300,000 gallon water storage tank at the 402-ft spillway elevation; the construction of the storm drainage detention basin and off-site drainage improvements. Construction of the on-site infrastructure will coincide with the phased development. Provisions will be made to allow an easy transition between phases. Along with physical infrastructure, the IDP also considered social and green infrastructure. Community facilities, low-impact development, and environmentally green initiatives have been considered and will be incorporated into the design of the project.

e. Preliminary Drainage Analysis for Lima Ola Workforce Housing

The Preliminary Drainage Analysis for Lima Ola Workforce Housing evaluated pre-development and post-development conditions to determine the increase in storm water runoff and propose mitigating measures address the impact to existing storm drainage facilities and surrounding areas. According to the County of Kauai Storm Drainage Standards, a drainage area of less than 100 acres, the recurring storm interval that could be used for design purposes is a 2-year 24-hour storm event to estimate the storm water runoff flow. In addition, the development must handle the increase in storm water runoff on-site and the flow amount that can be released downstream should not exceed existing conditions. Using the TR-55 method it was estimated that under existing conditions the storm water runoff was 82 cubic feet/second (cfs). The storm water runoff for post-development condition was 115 cfs; or an increase of 33 cfs. Mitigating measures considered was to detain the 33 cfs on-site. Since 33 cfs is only a peak flow, a calculation to estimate the total runoff volume for a 24-hour duration had to be performed. Unit hydrographs for both pre-development and post-development conditions were determined. The difference in area under both unit hydrographs is the detention volume requirement, which resulted in a required detention volume of 2.81 ac-ft. The discharge from the detention basin will be at 82 cfs which is similar to the existing condition, and therefore not have an impact on downstream facilities.

It is also noted that in addition to storm water runoff control, the design of the drainage system will also consider storm water quality. Roads will be paralleled with grass swales that act as bioswales to remove sediment or contaminant laden sediment from the storm water runoff. These bioswales will discharge into the proposed park which will act as an intermediary detention/sediment basin before enter the overall detention basin. The detention basin will be equipped with a rock filter perforated riser to allow the flow to slow down and have sediment to settle out storm water runoff, allowing cleaner water to discharge into downstream facilities; improving water quality.

22. **What studies, if any, did you rely on during your evaluation and in preparing the report?**

a. Preliminary Engineering Report: None

b. Water Master Plan:

1) State of Hawaii, Water System Standards (2002)
2) Water Plan 2020, Department of Water, County of Kauai (March 2001)
3) Lima Ola Workforce Housing Development, Master Plan, County of Kauai, Kimura International (March 2012)
4) Lima Ola Feasibility Study, R.M. Towill Corporation (January 2013)

c. Master Plan Update

1) Lima Ola Workforce Housing Sustainability Plan
2) Infrastructure Delivery Plan for Lima Ola Workforce Housing

3) Agricultural Impact Assessment
4) Lima Ola Workforce Housing Assessment of Relationship to Land Use Plans, Policies and Controls
5) Preliminary Drainage Analysis for Lima Ola Workforce Housing Development

d. Infrastructure Delivery Plan for Lima Ola Workforce Housing

1) Lima Ola Workforce Housing Development, Master Plan, County of Kauai, Kimura International (March 2012)

e. Preliminary Drainage Analysis for Lima Ola Workforce Housing

1) Rainfall-Frequency Atlas of the Hawaiian Islands for Areas to 200 Square Miles, Durations to 24 Hours, and Return Periods from 1 to 100 Years, Technical Paper No. 43, U.S. Commerce Department, Weather Bureau, Washington D.C., 1962.
2) Storm Water Runoff System Manual, Department of Public Works, County of Kauai, July 2001.
3) Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii, U.S. Department of Agriculture, Soil Conservation Service, Washington, D.C., August 1972.
4) Urban Hydrology for Small Watersheds, Technical Release 55, U.S. Department of Agriculture, Natural Resources Conservation Service, Second Edition, Washington, D.C., June 1986

23. **Did these studies form the basis for your conclusions?**

Yes

24. **What are the current and planned water infrastructure elements that will be used to serve the Project?**

Water will be provided by the County Department of Water from an existing well in Hanapepe Valley. This well feeds into two 400,000 gallon water storage tanks at the 340-ft spillway elevation. Water from the two 400,000 gallon water storage tanks is adequate to accommodate Phase 1 of the proposed Lima Ola Development and existing water demands within the 340-ft service area. New water lines and its appurtenances will be constructed for Phase 1 with provisions for connection for subsequent Phase 2 – 4.

When Phase 2 is ready to commence, the source of water will be re-evaluated based on water usage at that time. The same can be said for Phase 3 and 4. However, in Phase 2 an additional 300,000 gallon water storage tank will be constructed at the 402-ft spillway elevation, adjacent to the existing 200,000 gallon water storage tank. Phase 2 and subsequent Phase 3 and 4 will draw from the 402-ft system. On-site water distribution system will be installed with each phase of development.

25. **What are the current and planned water infrastructure elements that will be used to serve the Project?**

SAME QUESTION

26. **Did your study assess those elements?**

Yes

27. **What impacts, if any, will the Project have on those water infrastructure elements?**

None. Any impacts of the water system that serve the area will be upgraded to accommodate the Lima Ola Development.

28. **What mitigation measures do you propose to address those impacts?**

A new 300,000 gallon water tank at the 402-ft spillway elevation.

29. **What is the proposed water system for the Project?**

Proposed water system will draw water from the two existing 400,000 gallon water tanks at the 340-ft spillway elevation and the existing 200,000 gallon and proposed 300,000 gallon water tanks at the 402-ft spillway elevation. A water distribution system will be installed with each phase of the project and connected to the water transmission lines that service the 340-ft and 402-ft spillway elevation water storage tanks.

30. **Please describe the water source, storage and transmission for the Project?**

The Hanapepe/Eleele Water System has four water sources. Two in east side of Hanapepe River, one on the west side of Hanapepe River (well inactive) and the fourth up Hanapepe Heights. On the Eleele side there are two 400,000 gallon water storage tanks at the 340-ft spillway elevation, and a 200,000 gallon water storage tank at the 402-ft spillway elevation. 12-inch water transmission mains are connected to serve the distribution systems for each of the service areas. Transmission mains run along Kaumualii Highway and feeds water to Eleele and Port Allen.

31. **Has the County Department of Water reviewed the water master plan?**

Yes.

32. **Please describe the feedback from the Department of Water.**

Water is available to support Phase 1 and will re-evaluate the water situation as subsequent phases come on-line.

33. **Where does stormwater flow on the Petition Area?**

Storm water flows in a mauka-makai direction ponding on the upstream side of Halewili Road and crosses Halewili Road through 24-inch diameter pipe culvert and discharging storm water on the makai side of the road; ultimately make its way to the ocean.

34. **What is the Federal Insurance Administration's Flood Insurance Study designation for the Petition Area?**

The Petition area is within FEMA FIRM designation Flood Zone X, which means it is outside of the 0.2% (500-year) floodplain.

35. **Are you aware of any flood or drainage problems with the Petition Area?**

No.

36. **What mitigation measures do you propose to address the potential drainage impacts related to the Project?**

Install a detention basin on-site.

37. **What wastewater facilities are proposed for the Project?**

A wastewater conveyance system is being proposed for the Project and will be connected to the existing wastewater conveyance system within Mahea Road at the property boundary between Habitat for Humanity and Lima Ola.

38. **Do the wastewater systems have sufficient capacity for the entire Project?**

Yes, according to the County Department of Public Works Wastewater Management Division.

39. **What mitigation measures do you propose to address potential impacts on wastewater infrastructure?**

None. Existing wastewater infrastructure is adequate to accommodate wastewater flows generated by the Lima Ola Development.

40. **What sort of solid waste is expected to be generated during and after building of the Project?**

Construction waste will be generated during construction which should be able to go to the landfill.

General municipal household waste will be generated after construction.

41. **What mitigation measures are proposed to address impacts on solid waste infrastructure?**

None.

42. **What electrical and telecommunications resources are available for the Project?**

According to KIUC, the added demand from Lima Ola will not impact the KIUC grid. Hawaiian Telephone Co. will follow KIUC and bring in telephone cables to service the Lima Ola Development. Oceanic Time Warner Cable is the same as Hawaiian Telephone Co.

43. **Please describe your cost estimates for the proposed infrastructure elements proposed for the Project.**

Construction cost estimates below are based on preliminary conceptual layout plans for infrastructure development only (roads, water, sewer, storm drainage, electrical, telephone, lot grading, and grassing as required).

Phase 1: $19M
Phase 2: $14M
Phase 3: $6M
Phase 4: $11M

Total Development: $50M

44. **Please describe the slope and topography of the Project.**

The average slope over the entire project is about 4%.

45. **What impact, if any, does the slope and topography have on the Project?**

None.

46. **Is the topography suitable for the proposed Project?**

Yes.

47. **Are there any tsunami conditions, unstable soils or other adverse environmental conditions that make the Petition Area unsuitable for the proposed development?**

None, I am aware of.

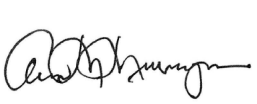
48. **In your professional opinion, and based upon your report, will the reclassification and development of the Project Area adversely affect area infrastructure resources?**

No.

49. **In your professional opinion, and based upon the report, is the Petition Area suitable for the proposed development?**

Yes.

DATED: Honolulu, Hawai‘i, May 11, 2017.



Digitally signed by Anson Murayama
DN: cn=Anson Murayama, o=Community Planning and Engineering, Inc., ou=Principal Engineer, email=amurayama@cpe-hawaii.com, c=US
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