KO‘OLAU POKO
WATERSHED MANAGEMENT PLAN
O‘AHU WATER MANAGEMENT PLAN

Commission on Water Resource Management
Status Briefing
November 16, 2011

City and County of Honolulu
Department of Planning and Permitting
Board of Water Supply

Consultant:

Townscape, Inc.
Presentation Outline

● Background
● OWMP Overview
● Island-Wide Summary
● Highlights of the Koʻolau Poko Watershed Management Plan

On August 28, 2008, the Commission approved the scope of work for the Koolaupoko and North Shore WMPs.

WMPs meet the statutory requirements of Sections 174C-5 and 31, HRS, State Water Code and Chapters 13-170-31 & 32, HAR, and addresses the recommended elements in the Statewide Framework pertaining to the update of the County WUDPs.

WMP’s meet the requirements of Chapter 30, Articles 1, 2 and 3, ROH. The OWMP serves as the WUDP for the City and County of Honolulu. The OWMP consists of policies and strategies, which guide the activities of the City and County of Honolulu and advises the Commission in the areas of planning, management, water development and use and allocation of Oahu’s natural water resources.
Overview section provides context for the regional WMPs, including:

- Plan goals and objectives applying the ahupua‘a watershed-based approach to holistic resource management;
- Plans, policies, guidelines and controls covering federal laws, State Water Code, Hawaii Water Plan (WRPP, AWUDP, SWPP & DHHL), Framework, water rights, public trust doctrine, the precautionary principle, and State & City land use plans and ordinances;
- Urban and agricultural forecasts by land use district;
- Sustainable yield, permitted use and water uses by water management area updated to 2009;
- Mean perennial stream flows;
- Existing and potential ground water, surface water and alternative sources of water to meet demand;
- Summary of adequacy of supply;
- Uncertainties and contingencies for ground water and surface water supplies and demand forecasts; and
- Plan implementation.
Island of O‘ahu
Development Plan Areas
Status of OWMP District Components

North Shore
Plan in progress

Koʻolau Loa
Plan adopted

Koʻolau Poko
Initiating approvals process

Central O‘ahu
Awaiting funding
Target: FY 2014

Primary Urban Center
Awaiting funding
Target: FY 2016

East Honolulu
Awaiting funding
Target: FY 2018

‘Ewa
Planning process to begin shortly

Wai‘anae
Plan adopted

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BWS Potable Water System Demand Projections
Historical Potable & Nonpotable Water Use

1970-1990 Growth Rate: ~ 1.60 mgd/yr

1970-2009 Growth Rate: ~ 1 mgd/yr
# Potable & Nonpotable Sources

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<th>RESOURCE</th>
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Watershed Management Plan Goal

To formulate an **environmentally holistic, community-based**, and **economically viable** watershed management plan that will provide a balance between:

(1) the protection, preservation and management of O‘ahu’s watersheds

(2) sustainable ground and surface water use and development to serve present users and future generations
Watershed Management Plan Objectives

1. Promote Sustainable Watersheds

2. Protect and Enhance Water Quality & Quantity

3. Protect Native Hawaiian Rights and Traditional & Cultural Practices

4. Facilitate Public Participation, Education & Project Implementation

5. Meet Future Water Demands at Reasonable Costs
K_PWMP CONTENTS

CHAPTERS
ES Executive Summary
1 O'ahu Water Management Plan Overview
2 Koʻolau Poko Watershed Profile
3 Water Use and Projected Demand
4 Plan Objectives, Water Supply, and Watershed Management Projects and Strategies
5 Implementation

APPENDICES
A O'ahu Watershed Management Plan Framework
B Plans, Policies, Guidelines, and Controls
C O'ahu Water Use Permit Index
D Overview of Oʻahu Hydrogeology
E Water Use and Demand – Methodology
F BWS Koʻolau Poko Stream Diversion Survey
G Neighborhood Board Endorsements
Koʻolau Poko Moku

(13.5% of Oʻahu)

Size: 43,598 acres
approx. 11% of Oʻahu

State Land Use
Conservation
19,880 ac. (48%)
Agriculture
5,760 ac. (14%)
Urban
15,990 ac. (38%)
Koʻolau Poko Watersheds

12 Ahupuaʻa

19 Watersheds

12 Perennial Streams
BWS Koʻolau Poko Stream Diversion Inventory
(2009 - 2011)

- Total stream flow recorded: 73.77 mgd
- Number of diversions: 117
  - Active 66
  - Inactive 44
  - Unknown 7
- Total diverted flow recorded: 21.24 mgd
- Uses: diversified agriculture, kalo, aquaculture, potable supply, other
Koʻolau Poko Aquifers (Ground Water)

Sustainable Yields
- Koʻolau Poko 30 MGD
- Waimānalo 10 MGD

Permitted Use
- Koʻolau Poko 15.3 MGD
- Waimānalo 1.6 MGD

Withdrawal* (2005)
- Koʻolau Poko 12.7 MGD
- Waimānalo 0.5 MGD

*Only reflects reported withdrawals.
Koʻolau Poko

Values
- Promote the cultivation of more locally grown food and the concept of food security
- Kāneʻohe Bay has potential for abundance
- Koʻolau Poko’s water resources are treasured
- Place names and cultural knowledge are valued
- Place-based natural resource management and cultural education programs are valued

Issues
- Invasive plants and animals
- Lack of access to resources
- Coordination of resource management needs improvement
- Impact of population growth on resources
- Drier climate is reducing water supply
- Water needs to be returned to streams for ag and in-stream uses
- Surface and near-shore water quality is degraded
- Storm water management needs improvement
- Illegal dumping
Water Supply Findings

- Urban water use projected to decrease as population decreases and conservation advances.
- As pumpage decreases, *streamflows are restored* for those surface waters affected by ground water.
- Continue water conservation efforts
- Develop non-potable water for agricultural and landscape irrigation
- Surface water can continue to supply agricultural demands, but improvements are needed to increase efficiency
- Recycled water can offset some of the irrigation needs
- Continue to import water from Koʻolau Loa, but use this water efficiently
Koʻolau Poko District Water Supply Options

GROUND WATER
1) Reduce BWS import of water from Koʻolau Loa wells
2) Additional Private Agriculture Wells

RECYCLED WATER
4) Waimānalo WWTP
5) Marine Corps Base Hawaiʻi WWTP

OTHER
5) Municipal Conservation and Agricultural Water Loss Minimization
6) Surface water use for agricultural irrigation: increase efficiency before proposing new diversions
Koʻolau Poko District
Projected Demand & Supply

- BWS Conservation
- Ag. Conservation
- Recycled Water
- Surface Water
- State & Private Permitted Use - Ground Water
- BWS Permitted Use - Ground Water
- Koolau Loa Import - Ground Water
- Non-Potable Demand
- Total Demand
Critical Watersheds

KĀNEʻOHE NB AREA: Heʻeia Watershed

- Important source of potable water
- Several ongoing projects that support sustainable watersheds, Native Hawaiian rights, and cultural practices
- Water quality and quantity are critical in the protection of ecosystem values, agricultural uses, and potable water needs

CATALYST PROJECT: Māhuahua ʻAi o Hoi – “Regrowing the Fruit of Hoi”

- Restore the ecological function and food-producing landscape of the Heʻeia wetlands.
Implementation of Water Supply And Watershed Projects

- Proposed strategies and projects guide agencies and organizations in implementing the most important initiatives.

- Implementation and funding is not the sole responsibility of the BWS, the City & County of Honolulu, or the State of Hawai‘i.

- Plan implementation and timing will depend on budgetary priorities, grant availability, and partnering efforts over the long term.

- Funding limitations should not preclude the City from planning.

- The Plan guides public and private investment and provides opportunities for agency and community collaboration.
KPWMP Status

- **CWRM approval** of Koʻolau Poko WMP scope of work: 2008

- **Public Participation**: Over 70 individual, community, neighborhood board, and agency meetings conducted.

- **Public Review Draft**
  - Released November 2010

- **Neighborhood Board Endorsement**
  - Kahaluʻu (NB 29) October 2011
  - Kāneʻohe (NB 30) November 2011 (expected)
  - Kailua (NB 31) November 2011
  - Waimānalo (NB 32) October 2011
### Approval Process

#### BRIEFINGS:
- BWS Manager & Board
- City and County
- CWRM

#### CITY COUNCIL Adoption by Ordinance
- 3 Council Readings
- Public Hearing
- Committee Meetings

#### Timeline

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- **CWRM 90 Day Notice**
- **Public Hearing**
- **CWRM Meeting & Approval**
The Honolulu Board of Water Supply (BWS) has begun the development of the district-wide "Koolau Poko Watershed Management Plan (KPWMP)." The KPWMP will be used to meet the requirements of preparing a county water use and development plan under the State of Hawaii Water Code and City and County of Honolulu ordinance. BWS is expanding the KPWMP to include a management plan for watershed protection that identifies critical watersheds and develops a list of watershed protection strategies and projects for those watersheds because fresh water is not an infinite resource; its high quality, quantity, and sustainability are essentially linked to the existence of healthy watersheds.

The overall goal of the KPWMP is to formulate an environmentally holistic, community-
Mahalo

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Bruce Tsuchida, President
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OWMP Framework

- Statewide Framework
- State Water Projects Plan
- State Agricultural WUDP
- Water Resources Protection Plan
  - Sustainable Yield and Instream Flow Standards
- Water Quality Plan
- Oahu Water Use and Development
- Wai‘ahole Ditch Decision
- DHHL
- Conservation
- Watershed partnerships
- ROH Chapter 30, Water Management
- O‘ahu General Plan and District-Level Land Use Plans
- BWS Sustainability Mission

Hawai‘i Water Plan
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<td>Ko'olau Poko</td>
<td>1,3,4</td>
<td>30</td>
<td>10.312</td>
<td>19.688</td>
<td>9.904</td>
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<td>Waimānalo</td>
<td>1,4</td>
<td>10</td>
<td>1.631</td>
<td>8.369</td>
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<tr>
<td>TOTAL</td>
<td></td>
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<td>91</td>
<td>31.633</td>
<td>59.367</td>
<td>20.580</td>
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<table>
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<th>TOTAL AQUIFER SECTOR</th>
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<td></td>
<td>407</td>
<td>293.894</td>
<td>113.106</td>
<td>181.111</td>
<td>225.889</td>
<td>6.448</td>
</tr>
</tbody>
</table>

| ‘Ewa Caprock       | Malakole      | 5                      | 1,000 mg/l                       | 0.603           |                                      | 4.414             |
|                   | Kapolei       | 5                      | 1,000 mg/l                       | 2.033           |                                      | 0.608             |
|                   | Pu'uloa       | 5                      | 1,000 mg/l                       | 12.261          |                                      | 1.426             |
| TOTAL             |                |                        | 15                               | 12.440          | 2.560                                | 8.524             | 6.476             |

| Waiāhole Ditch    |                |                        | 15                               | 12.440          | 2.560                                | 8.524             | 6.476             |
| TOTAL             |                |                        | 15                               | 12.440          | 2.560                                | 8.524             | 6.476             |

<table>
<thead>
<tr>
<th>GRAND TOTAL FRESH AND BRACKISH</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tr>
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<td>442</td>
<td>322.231</td>
<td>115.666</td>
<td>196.083</td>
<td>232.365</td>
<td>6.476</td>
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</table>
## Planned Potable Ground Water Sources

### Table 1.9

<table>
<thead>
<tr>
<th>New Ground Water Sources</th>
<th>Estimated Yield (mgd)</th>
<th>Additional Permitted Use Required (mgd)</th>
<th>CWRM</th>
<th>WM A</th>
<th>Potential Development Plan Area(s) Served</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Kahuku Wells Pump 3</td>
<td>1.0</td>
<td>1.0</td>
<td>Koolauloa</td>
<td>Koolauloa</td>
<td>Koolauloa</td>
</tr>
<tr>
<td>2 Opana Wells</td>
<td>1.0</td>
<td>1.0</td>
<td>Koolauloa</td>
<td>Koolauloa</td>
<td>Koolauloa</td>
</tr>
<tr>
<td>3 Kaipapau Well</td>
<td>1.0</td>
<td></td>
<td>Koolauloa</td>
<td>Koolauloa</td>
<td>Koolaupoko</td>
</tr>
<tr>
<td>4 Kaluanui Wells</td>
<td>1.5</td>
<td></td>
<td>Koolauloa</td>
<td>Koolauloa</td>
<td>Koolaupoko</td>
</tr>
<tr>
<td>5 Maakua Wells</td>
<td>1.0</td>
<td></td>
<td>Koolauloa</td>
<td>Koolauloa</td>
<td>Koolaupoko</td>
</tr>
<tr>
<td>6 Kuou Well III</td>
<td>0.5</td>
<td></td>
<td>Koolaupoko</td>
<td>Koolaupoko</td>
<td>Koolaupoko</td>
</tr>
<tr>
<td>7 Waimanalo Well III</td>
<td>0.5</td>
<td>0.3</td>
<td>Waimānalo</td>
<td>Koolaupoko</td>
<td>Koolaupoko</td>
</tr>
<tr>
<td>8 Aina Koa Well II</td>
<td>0.7</td>
<td></td>
<td>Waialae-West</td>
<td>East Honolulu</td>
<td>Ewa, Waianae</td>
</tr>
<tr>
<td>9 Waialae Nui Well</td>
<td>0.7</td>
<td></td>
<td>Waialae-West</td>
<td>East Honolulu</td>
<td>Ewa, Waianae</td>
</tr>
<tr>
<td>10 Wahiawā Well III</td>
<td>3.0</td>
<td>3.0</td>
<td>Wahiawa</td>
<td>Central</td>
<td>Central</td>
</tr>
<tr>
<td>11 Waipio Hts Wells II&amp; III</td>
<td>2.5</td>
<td>0.7</td>
<td>Waipahu-Waiawa</td>
<td>Central/PUC</td>
<td>Ewa, Waianae</td>
</tr>
<tr>
<td>12 Mililani Wells IV</td>
<td>3.0</td>
<td>1.0</td>
<td>Waipahu-Waiawa</td>
<td>Central</td>
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<tr>
<td>13 Waiawa Wells I-IV</td>
<td>6.0</td>
<td>6.0</td>
<td>Waipahu-Waiawa</td>
<td>Central</td>
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</tr>
<tr>
<td>14 Manana Well</td>
<td>1.0</td>
<td>0.9</td>
<td>Waipahu-Waiawa</td>
<td>PUC</td>
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<tr>
<td>15 Kunia Wells III</td>
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<td>Waipahu-Waiawa</td>
<td>Ewa, Waianae</td>
<td>Ewa, Waianae</td>
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<tr>
<td>16 Waipahu Wells II</td>
<td>3.0</td>
<td>1.0</td>
<td>Waipahu-Waiawa</td>
<td>Central</td>
<td></td>
</tr>
<tr>
<td>17 Waipahu Wells III</td>
<td>3.0</td>
<td></td>
<td>Waipahu-Waiawa</td>
<td>PUC</td>
<td></td>
</tr>
<tr>
<td>18 Waipahu Wells IV</td>
<td>3.0</td>
<td></td>
<td>Waipahu-Waiawa</td>
<td>Ewa, Waianae</td>
<td></td>
</tr>
<tr>
<td>19 Ewa Shaft</td>
<td>10.0</td>
<td>3.0</td>
<td>Waipahu-Waiawa</td>
<td>Ewa</td>
<td></td>
</tr>
<tr>
<td>20 Koa Ridge Makai Wells</td>
<td>2.0</td>
<td>2.0</td>
<td>Waipahu-Waiawa</td>
<td>Central</td>
<td></td>
</tr>
<tr>
<td><strong>Total Potable Resources</strong></td>
<td><strong>47.4</strong></td>
<td><strong>19.85</strong></td>
<td></td>
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</tr>
</tbody>
</table>
Holistic Approach to Water Use & Supply

Ground Water

Conservation

Recycled Water

Desalted Water

Brackish Water

Surface Water

Urban

Ag.

Traditional & Customary

Natural Resource Protection
# Alternative Potable & Nonpotable Sources

<table>
<thead>
<tr>
<th>RESOURCE</th>
<th>MINIMUM ESTIMATE</th>
<th>MAXIMUM ESTIMATE</th>
<th>DEVELOPMENT PLAN AREA(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desalination (potable)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Kapolei Brackish Desalination Plant</td>
<td>0.2</td>
<td>0.5</td>
<td>Ewa, Waianae</td>
</tr>
<tr>
<td>2 Kalaeloa Seawater Desalination Plant</td>
<td>5</td>
<td>15</td>
<td>Ewa, Waianae</td>
</tr>
<tr>
<td>Recycled Water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Wahiawā Recycled Water</td>
<td>2</td>
<td>4</td>
<td>Central</td>
</tr>
<tr>
<td>5 Honouliuli Recycled Water</td>
<td>12</td>
<td>20</td>
<td>Ewa</td>
</tr>
<tr>
<td>6 Waianae Recycled Water</td>
<td>2</td>
<td>3</td>
<td>Waianae</td>
</tr>
<tr>
<td>7 Kahuku, Turtle Bay, Lāie Recycled Water</td>
<td>0.8</td>
<td>2.6</td>
<td>Koolauloa</td>
</tr>
<tr>
<td>Nonpotable Water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Waiāhole Ditch</td>
<td>12.57</td>
<td>15</td>
<td>Ewa, Central</td>
</tr>
<tr>
<td>9 Wahiawa Reservoir</td>
<td>8.5</td>
<td>22</td>
<td>North Shore, Central</td>
</tr>
<tr>
<td>10 Kalauao Spring</td>
<td>0.5</td>
<td>3.3</td>
<td>PUC</td>
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<tr>
<td>11 Kapolei West Brackish Well</td>
<td>1</td>
<td>1</td>
<td>Ewa</td>
</tr>
<tr>
<td>12 Koolau Loa Agricultural Wells</td>
<td>6.3</td>
<td>12.6</td>
<td>Koolau Loa</td>
</tr>
<tr>
<td>Total Alternative Resources</td>
<td><strong>51.6</strong></td>
<td><strong>98.88</strong></td>
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</tr>
</tbody>
</table>
O‘ahu Water Management Plan Summary

- Protect watersheds
- Promote water efficiency and conservation
- Diversify natural & alternative water supplies
- Inventory water supply and existing water use
- Forecast demand: low, mid and high growth
- Identify uncertainties & contingencies
- Describe the water allocation process
Conclusion: There is enough water supply on O‘ahu for urban and ag demands through the 2030 planning horizon.

- Districts completed: Wai‘anae and Koʻolau Loa
- Districts in-process: Koʻolau Poko and North Shore
- Districts to begin shortly: ʻEwa
Island of Oʻahu
Development Plan Areas
Estimated Population Distribution
2000

North Shore
2.0 %

Koʻolau Loa
2.0 %

Central
17 %

Waiʻanae
5 %

ʻEwa
8 %

Primary Urban Center
48 %

Koʻolau Poko
13 %

East Honolulu
5 %
WATERSHED MANAGEMENT PLANS

One of eight district Watershed Management Plans that will make up the O'ahu Water Plan.

-- OUTPUTS (examples) --
Critical Watersheds

KAILUA NB AREA: Kawainui Watershed

- Several existing partnerships
- Provides opportunities to protect Native Hawaiian rights and practices
- Promotes sustainable watersheds: native ecological communities and potential food-producing opportunities
- Significant source of water for agriculture and habitat
- Water quality and quantity are critical for watershed health

CATALYST PROJECT: Management and Stewardship of Kawainui March

- Coordinate existing projects and organizations to maximize resources and minimize duplication of efforts