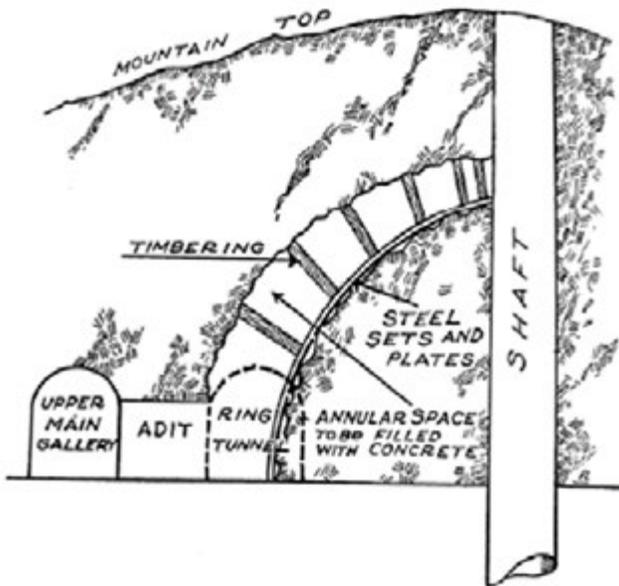
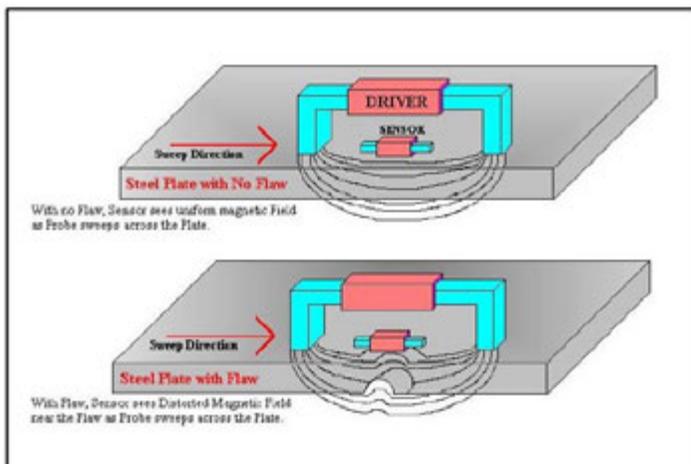


# ***Evaluating Corrosion of the Steel Liners of the Red Hill Tanks***



- How Corrosion Affects Integrity of the Red Hill Tanks Needs Further Study
- Although the Backside of the Steel Shell Cannot Be Visually Inspected, Non-Destructive Testing (NDT) Techniques Are Being Used to Identify Corrosion and Other Steel Shell Problems
- A Comprehensive Program Utilizing both Destructive and Non-Destructive Methods is Underway



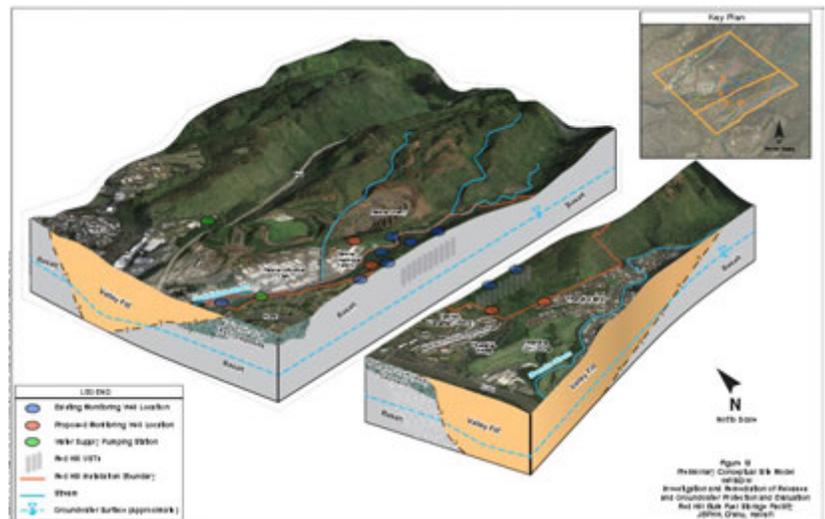
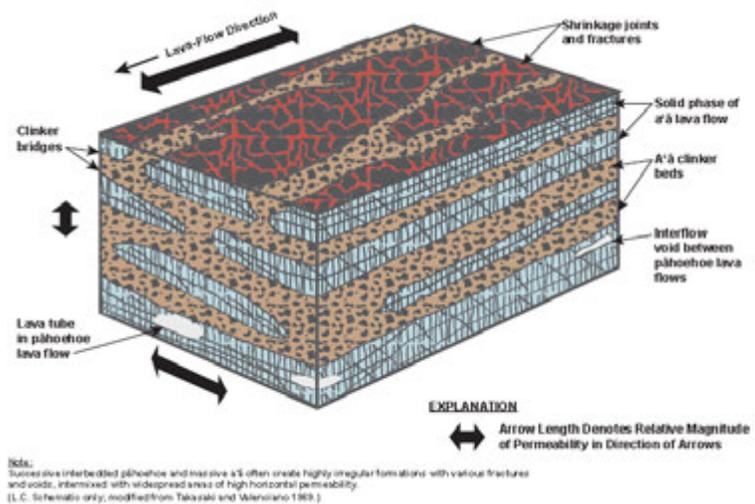
**Low Frequency Electronic Testing**

# Work Being Done to Safely Store Fuel at Red Hill

- Determine That the Combination of Technologies, Procedures, Practices, and Monitoring Are Adequate to Prevent Releases that Could Threaten Drinking Water Safety
- Determine the Probability and Magnitude of Potential Failures at the Facility is Well Understood, and Assess the Consequences of Potential Failures
- Ensure the Navy is Using Best Available Practicable Technologies for the Infrastructure
- Ensure that the Groundwater Monitoring Network and Monitoring Practices Are Protective of Drinking Water Quality

## Reducing Uncertainty

- Corrosion Rate of Steel Tank Lining
- Potential Failure Modes of Infrastructure
- Improved Tank Inspection Procedures
- Movement of Contamination in the Subsurface
- Movement of Fuel Above the Water Table
- Extent of Lateral Migration
- Groundwater Flow Directions and Rates
- Rate of Natural Degradation



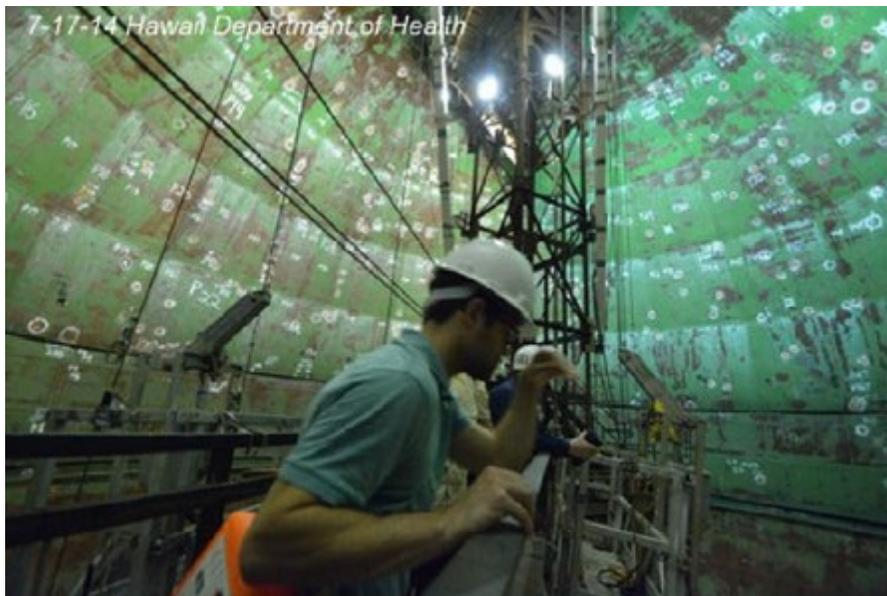
# ***Work to Better Understand Red Hill Geology***



**Need to Understand Dip and Strike to Predict Contaminant Movement**

# ***Why Did Tank 5 Leak Approximately 27,000 Gallons of Jet Fuel In January 2014?***

- Patch Plates Were Installed to Address Thin Spots / Defects Identified by Non-Destructive Testing (Petroleum Industry Best Practices)
- Weld Quality on Patch Plates Likely Caused Release (Not Corrosion)
- The Quality of the Repairs Including the Welds Were Not Properly and Thoroughly Verified by Navy
- Operators Initially Disregarded Fuel Loss Alarms



## **Improvements Since Tank 5 Release**

- New Repair and Verification Procedures
- More Frequent Tank Tightness Testing
- New Procedures for Filling During Recommissioning After Repair
- New Alarm Response Procedures
- Improvements in Contractor Specifications

# *Agencies Hire Experts To Evaluate Red Hill*



# ***Tank Upgrade Alternatives***

## ***Options for Detailed Evaluation***

### **1A Single Wall—Restoration of Tank**

- ◆ Current approach to inspection and repair with enhanced TIRM

### **1B Single Wall—Restoration of Tank Plus Interior Coating**

- ◆ Same as Alternative 1A plus coating of barrel and upper dome

### **1D Single Wall—Remove Steel Liner and Install New Steel Liner**

- ◆ Remove existing steel liner in its entirety
- ◆ Provide new steel liner

### **2A Double Wall—Composite Tank with Second Steel Liner**

- ◆ Existing steel liner provides secondary containment
- ◆ Construct steel liner with three inch interstitial space
- ◆ Internal coating of new steel liner

### **2B Double Wall—Composite Tank with Stainless Steel Liner**

- ◆ Same as 2A except new internal liner is stainless steel
- ◆ No internal coating

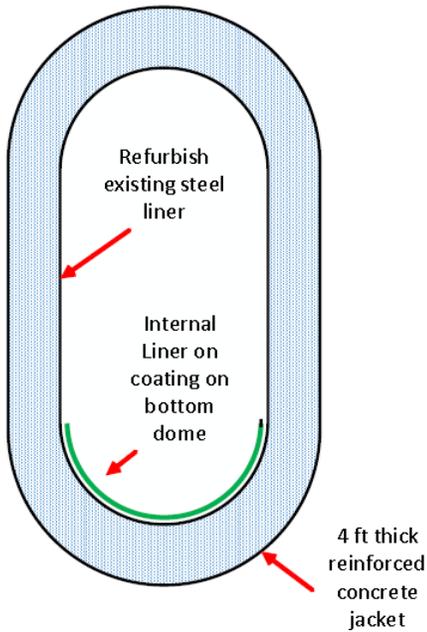
### **3A Double Wall—Tank within a Tank**

- ◆ Construct new steel tank with five foot accessible annular space
- ◆ Existing steel liner provides secondary containment

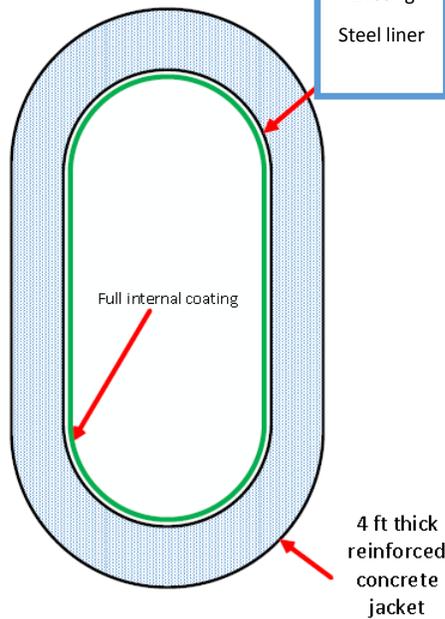
# Tank Upgrade Alternatives

## Options for Detailed Evaluation

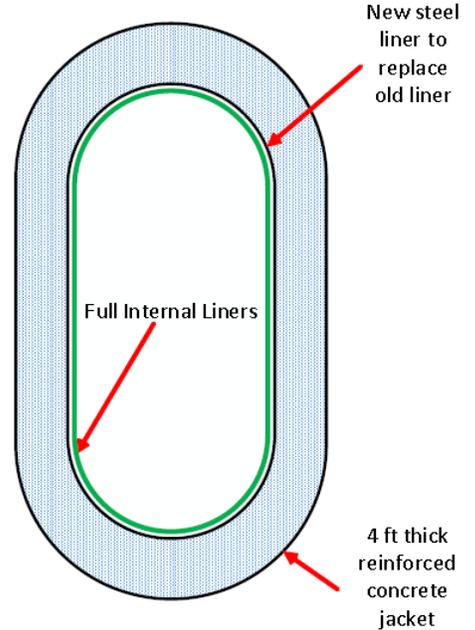
Alternate 1A



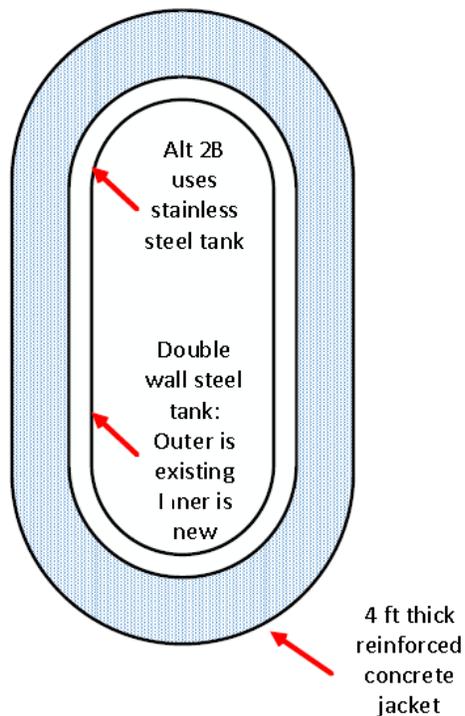
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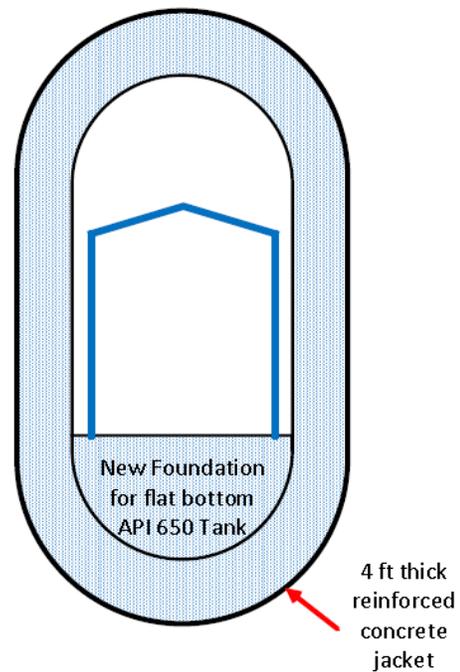
Alternate 1D



Alternate 2A/B

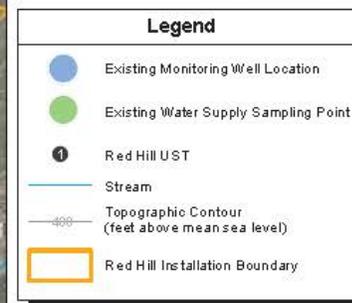
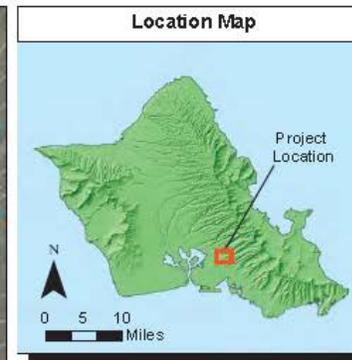
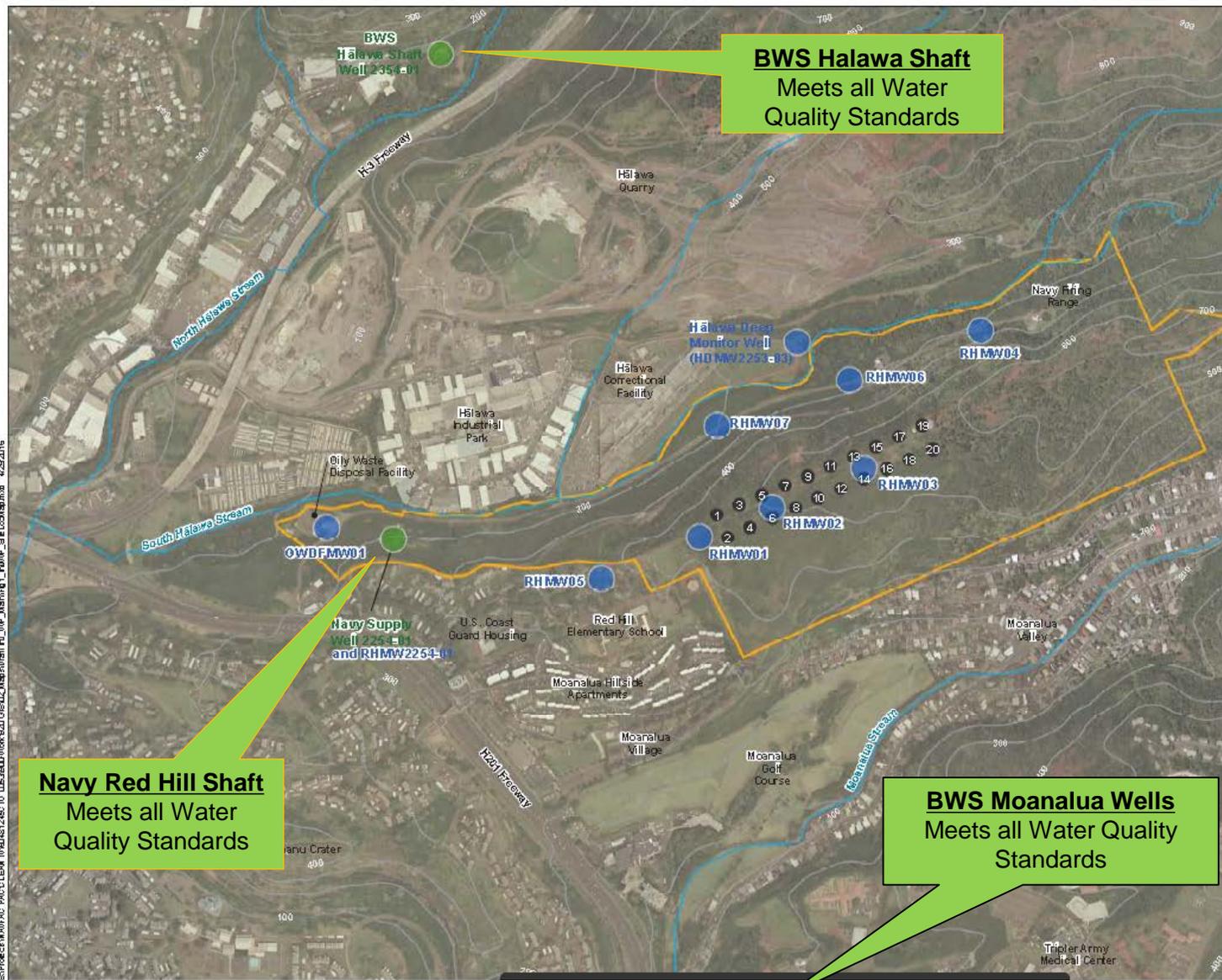


Alternate 3A



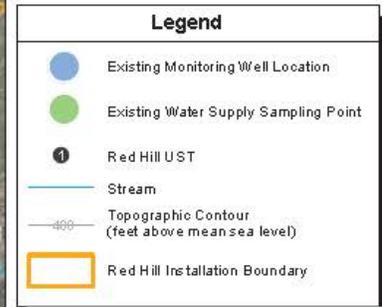
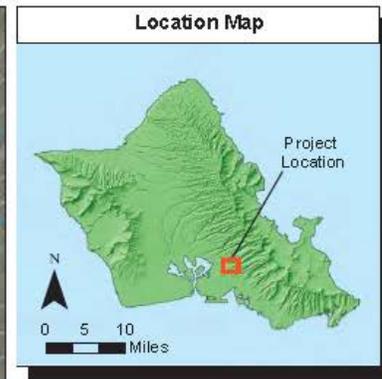
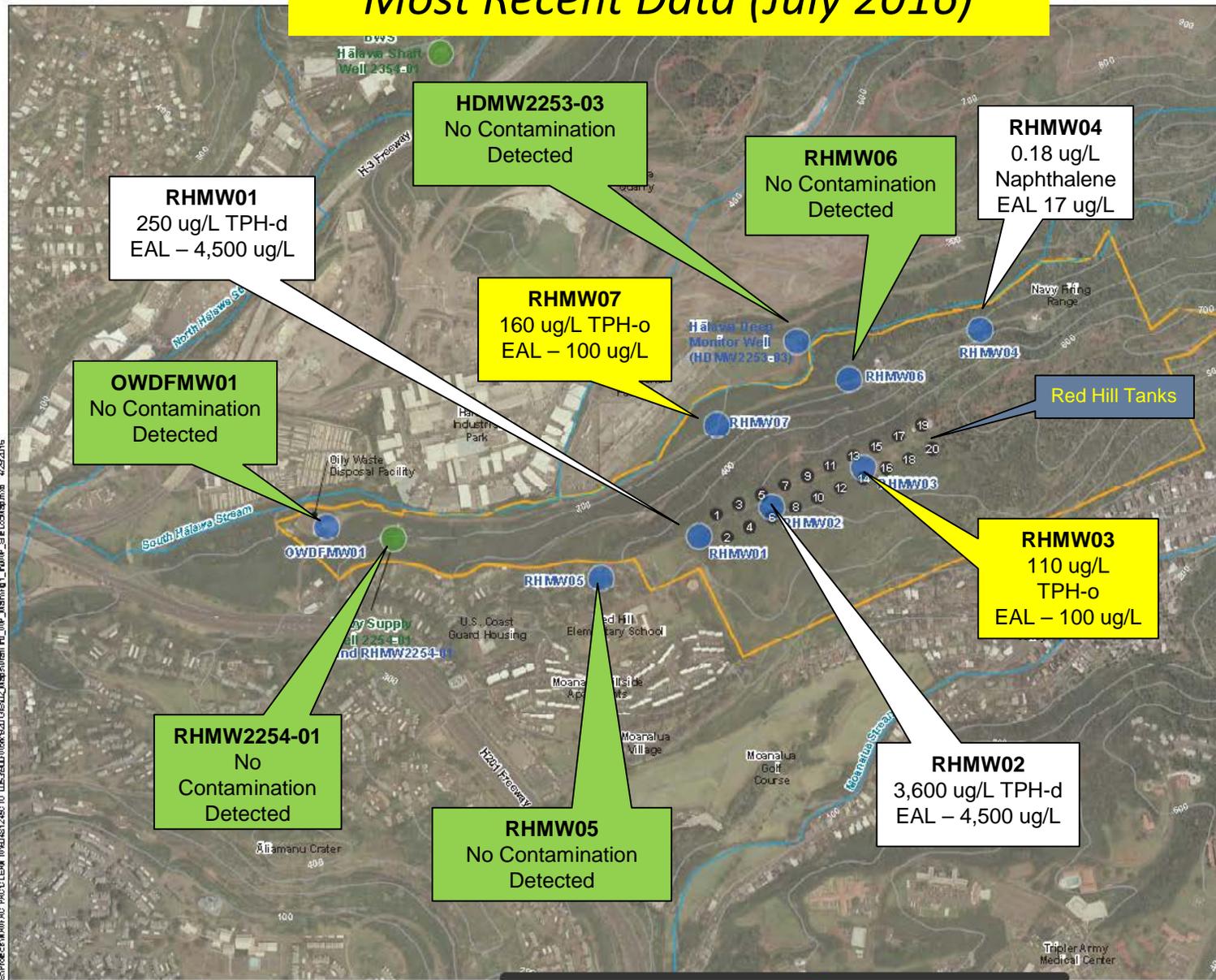
# DRINKING WATER AROUND RED HILL

*All Drinking Sources Meet Water Quality Standards*



# GROUNDWATER MONITORING DATA

*Most Recent Data (July 2016)*



EAL – Environmental Action Level

EALs are concentrations of contaminants in groundwater that indicate that a response action is required. EALs are not drinking water standards.