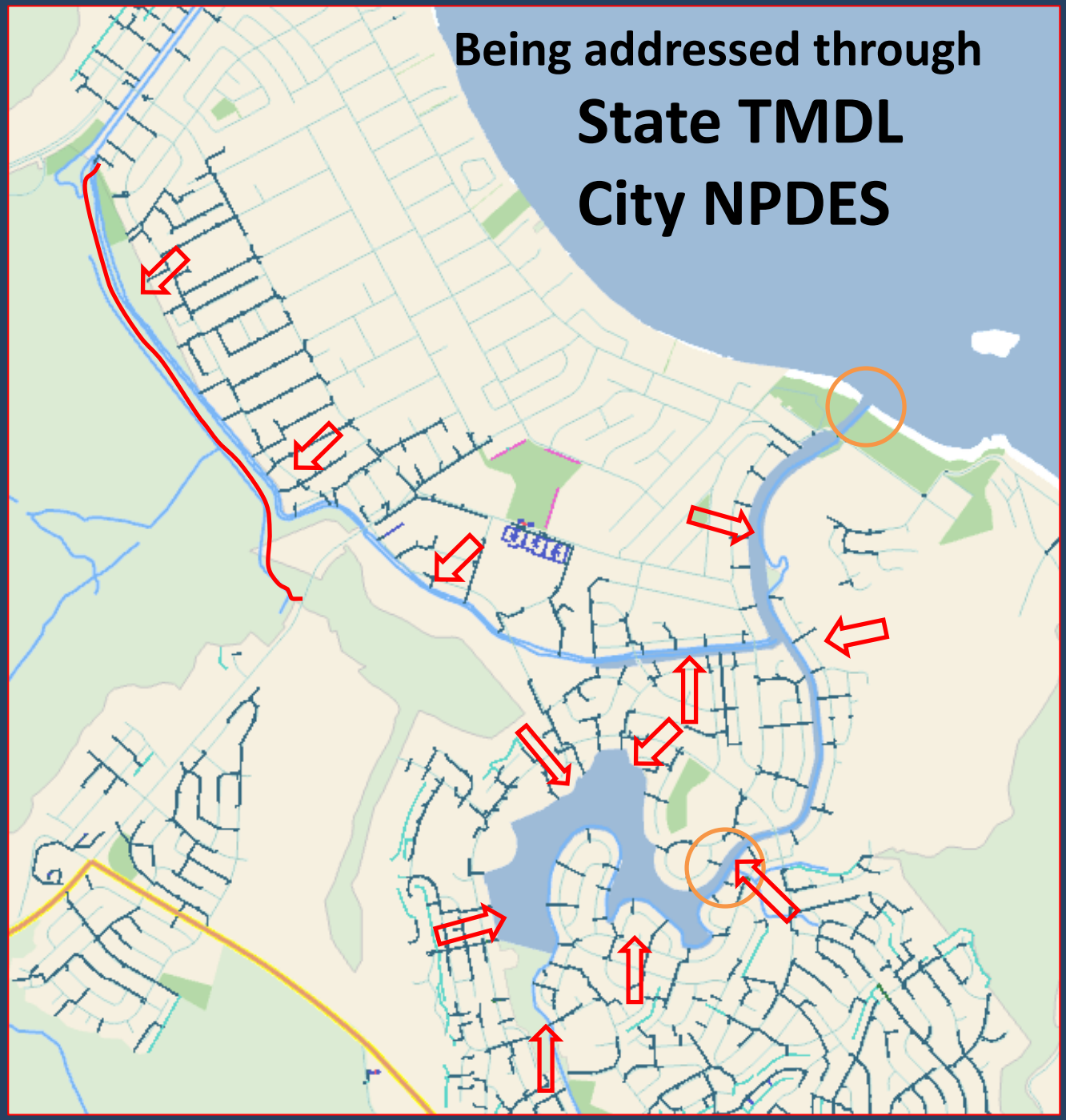
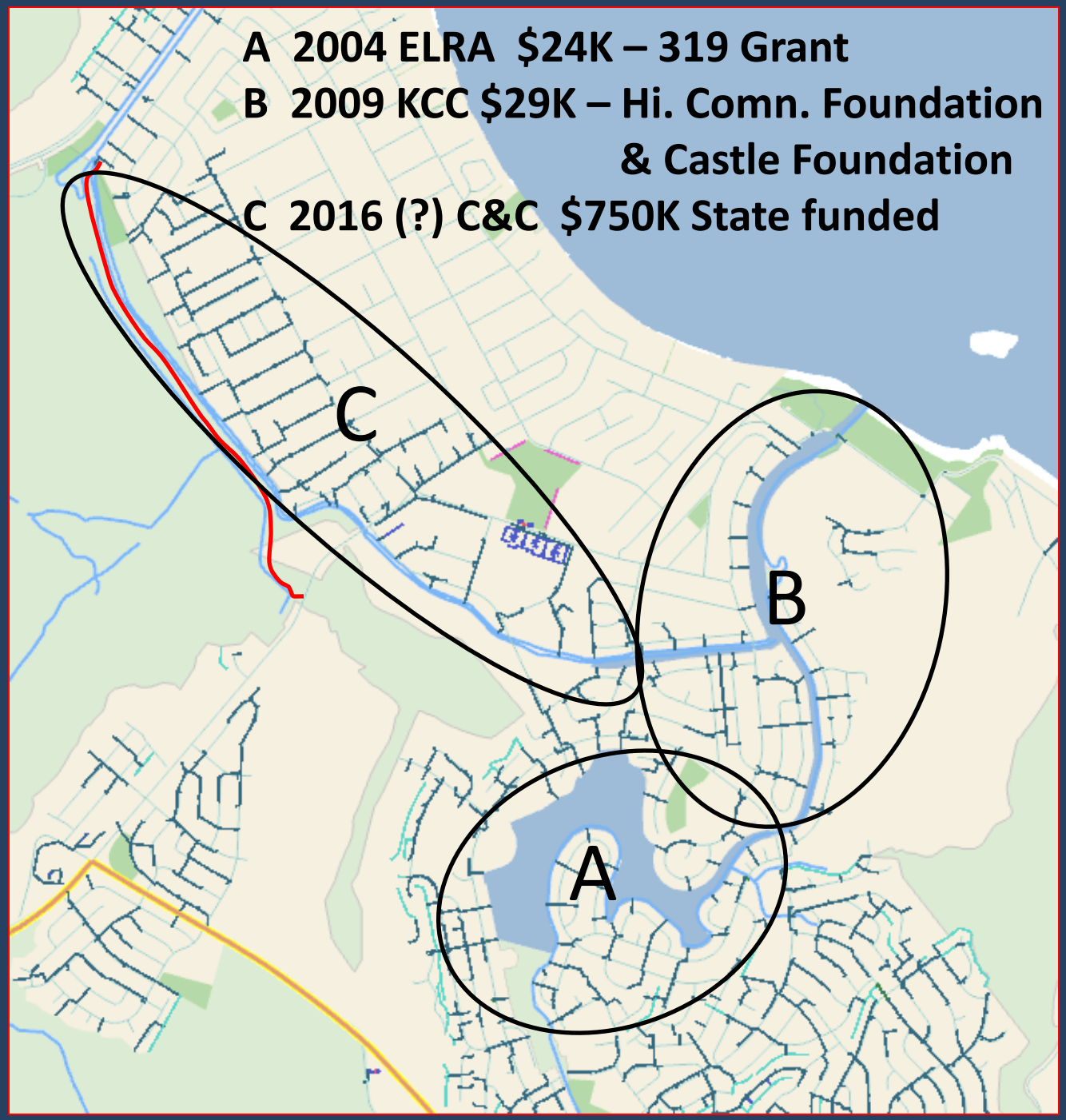


ESTUARY CHALLENGES

- EXCISED FROM HEADWATER FLOWS
- DECREASED STREAM MOUTH EXCHANGE
- BATHYMETRY CHANGES
- URBAN STORM WATER FLOWS
- INVASIVE SPECIES



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Of the principle problems confronting the estuary:

- Pollutant flows from urban storm drains
- Poor salt wedge penetration into pond
- Poor exchange at stream mouth
- Invasive Species (mangrove)
- Lack of sufficient water flow

Improving water flow was deemed likely to provide the greatest benefit with the least effort.

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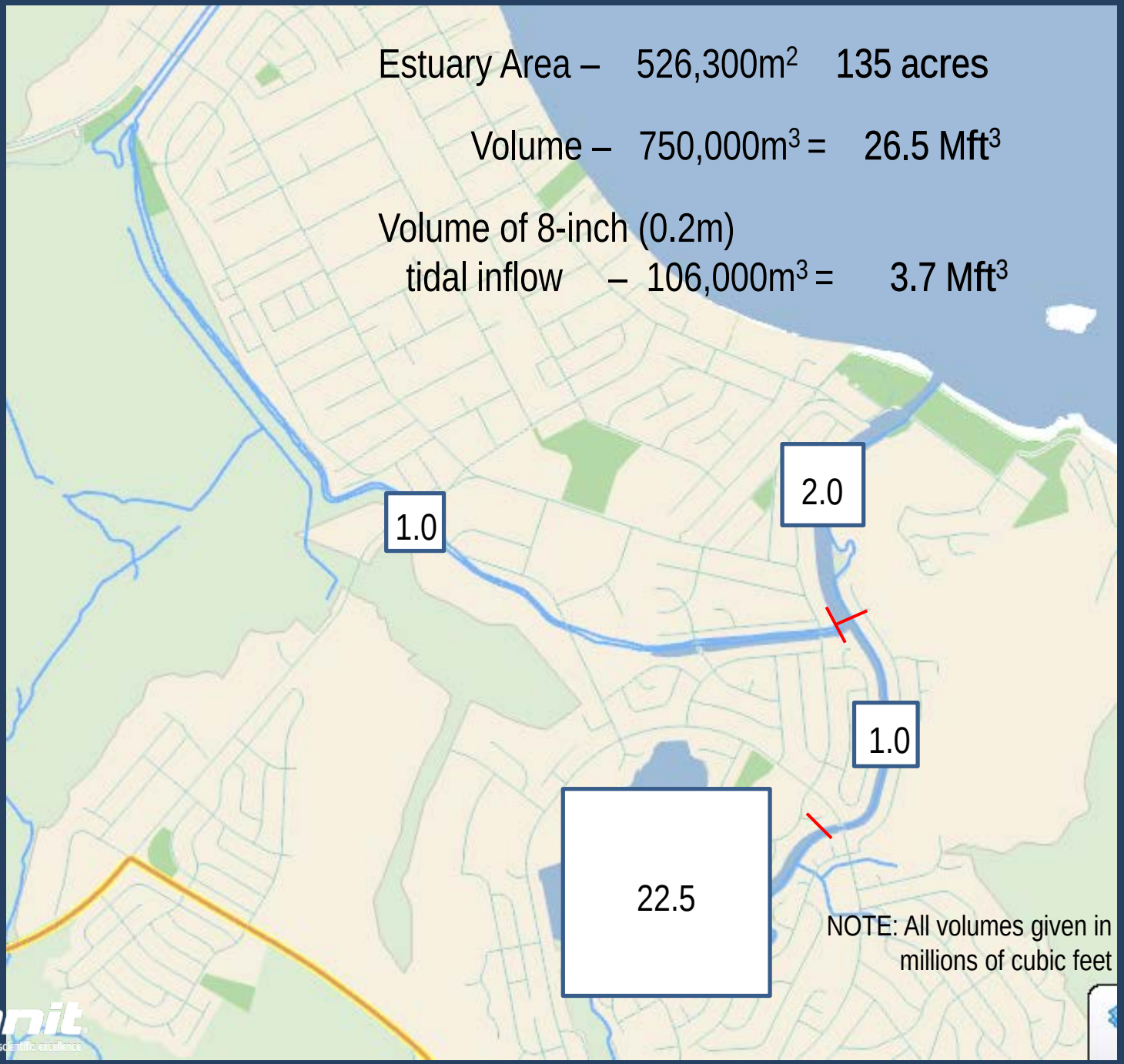

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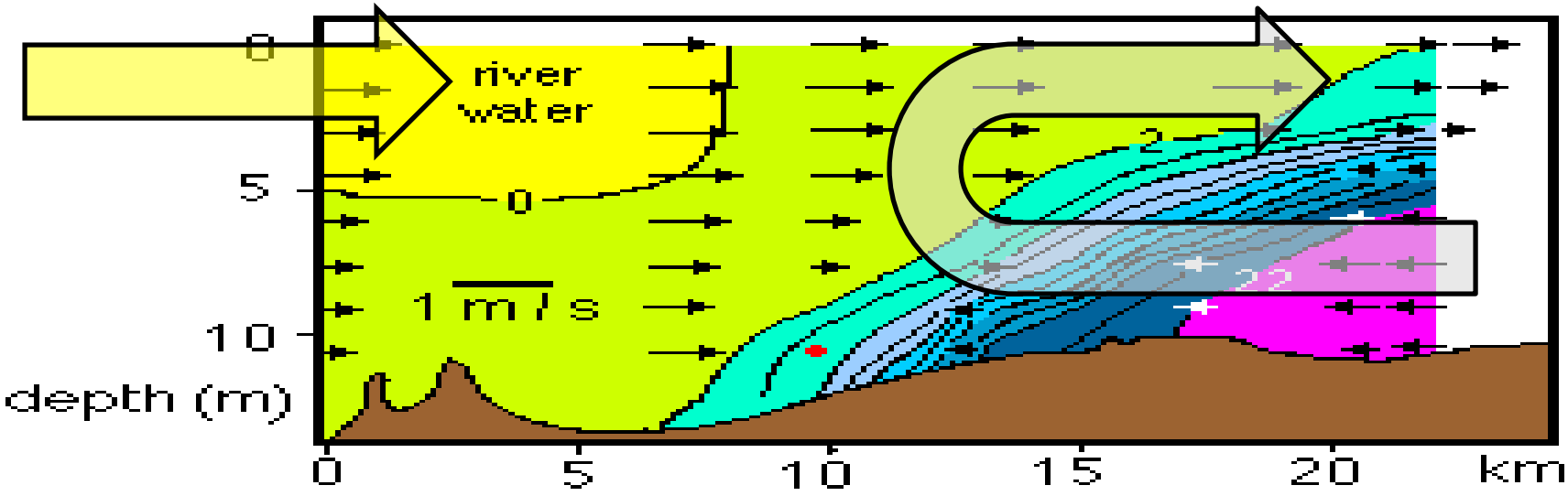
CLASSICAL SALT WEDGE AND EXCHANGE CURRENTS IN AN ESTUARY



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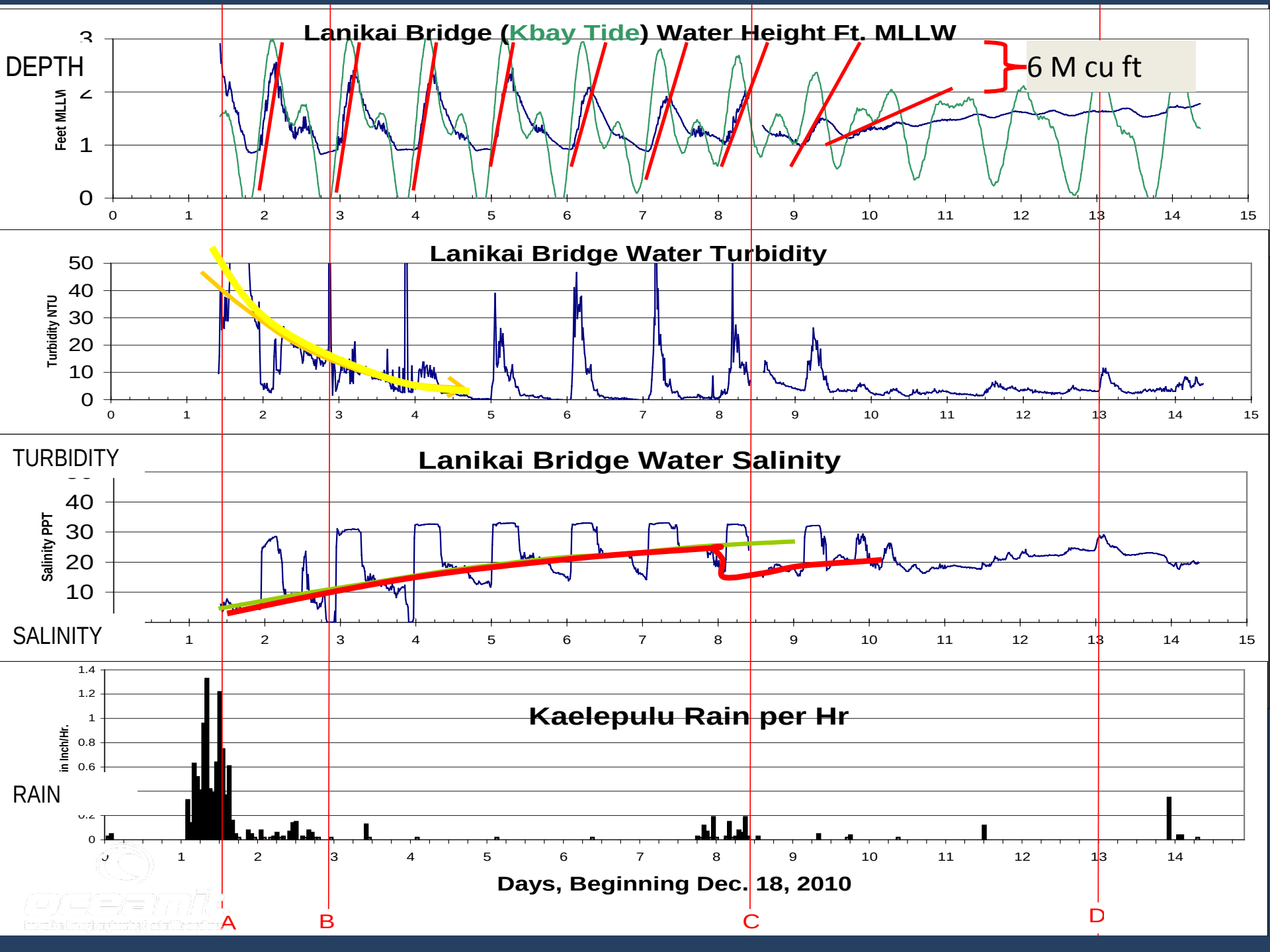
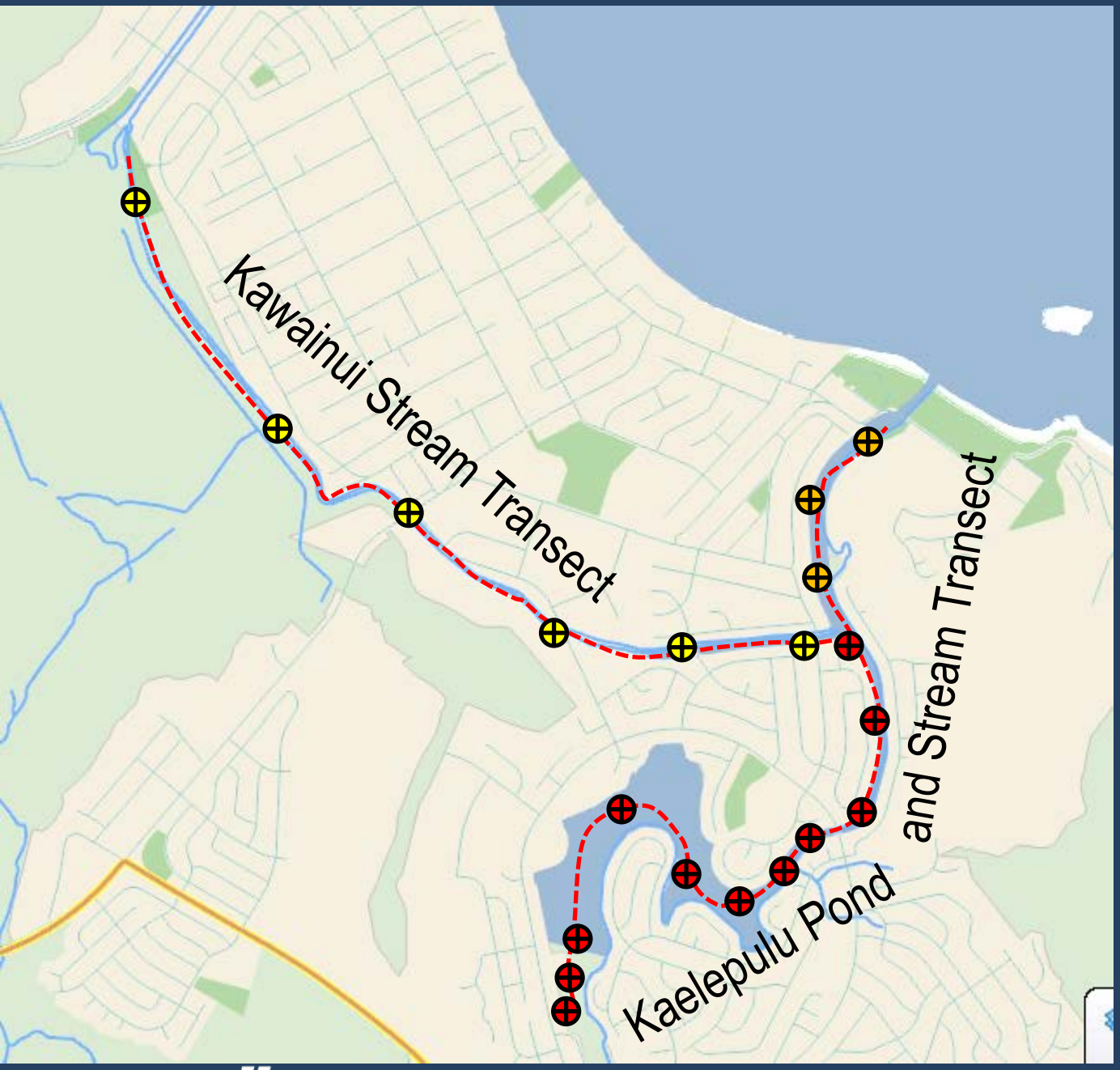

Lanikai Bridge (Kbay Tide) Water Height Ft. MLLW
DEPTH
Feet MLLW
6 M cu ft
Lanikai Bridge Water Turbidity
Turbidity NTU
TURBIDITY
Lanikai Bridge Water Salinity
Salinity PPT
SALINITY
Kaelepulu Rain per Hr
in Inch/Hr.
RAIN
Days, Beginning Dec. 18, 2010
A
B
C
D



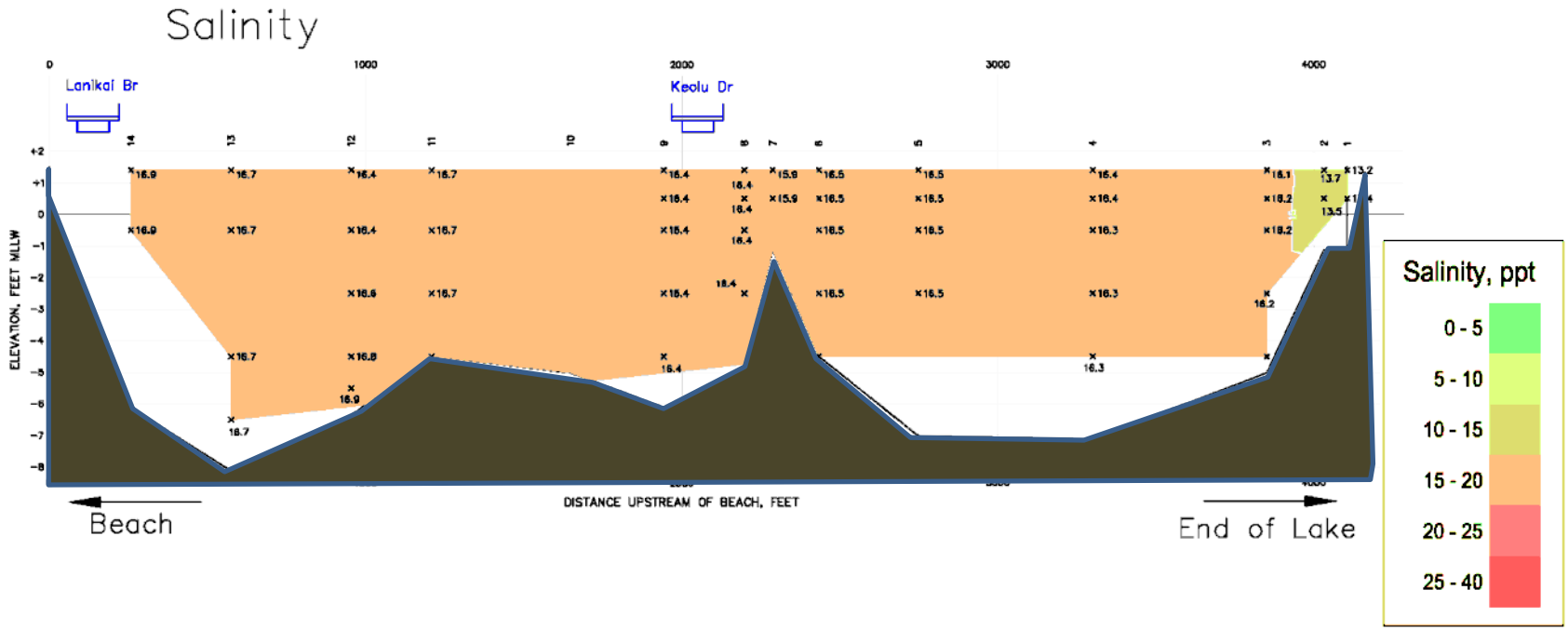
PHYSICAL WATER QUALITY TRANSECTS OF ESTUARY

CONDUCTED BEFORE AND AFTER EACH STREAM MOUTH OPENING EVENT

T, Salinity, pH, NTU, Chl-a, PC, DO%

@ 15 cm
30 cm
60 cm
120 cm
180 cm

Beach Channel Pond



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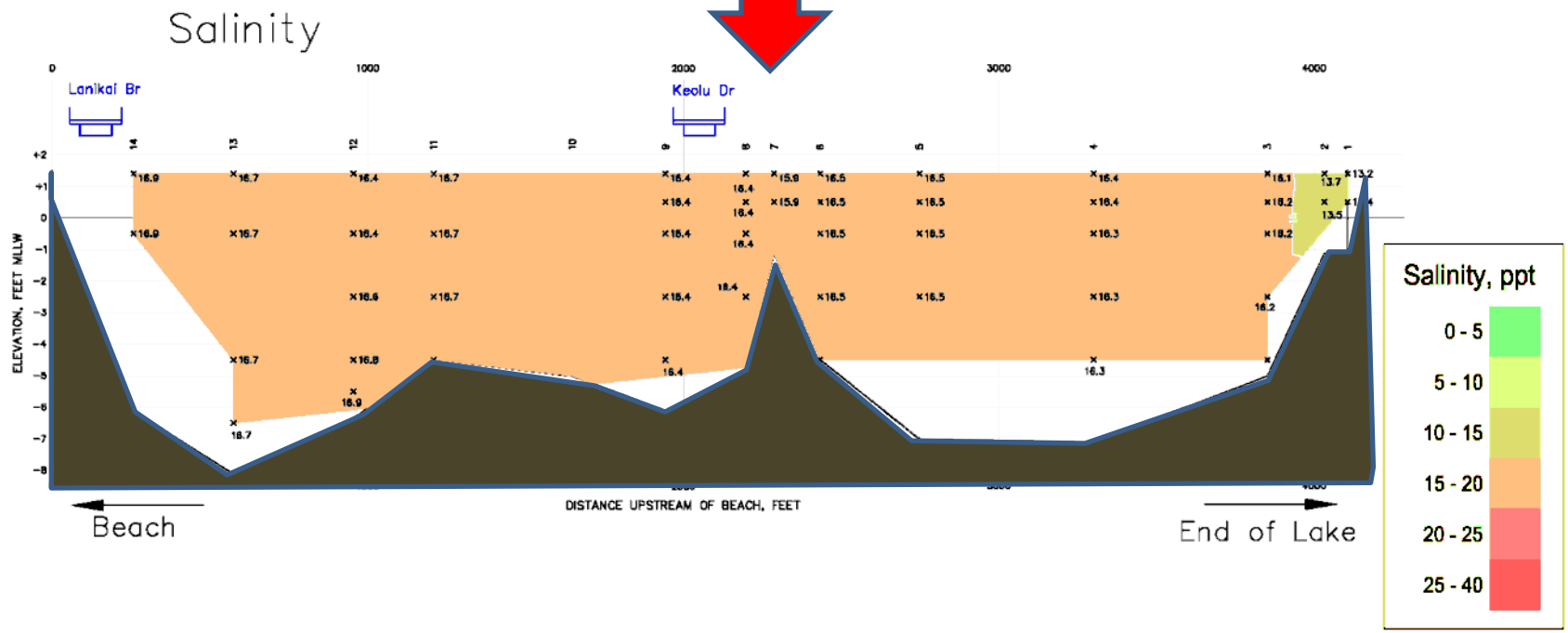
Shallows

Beach Channel Pond



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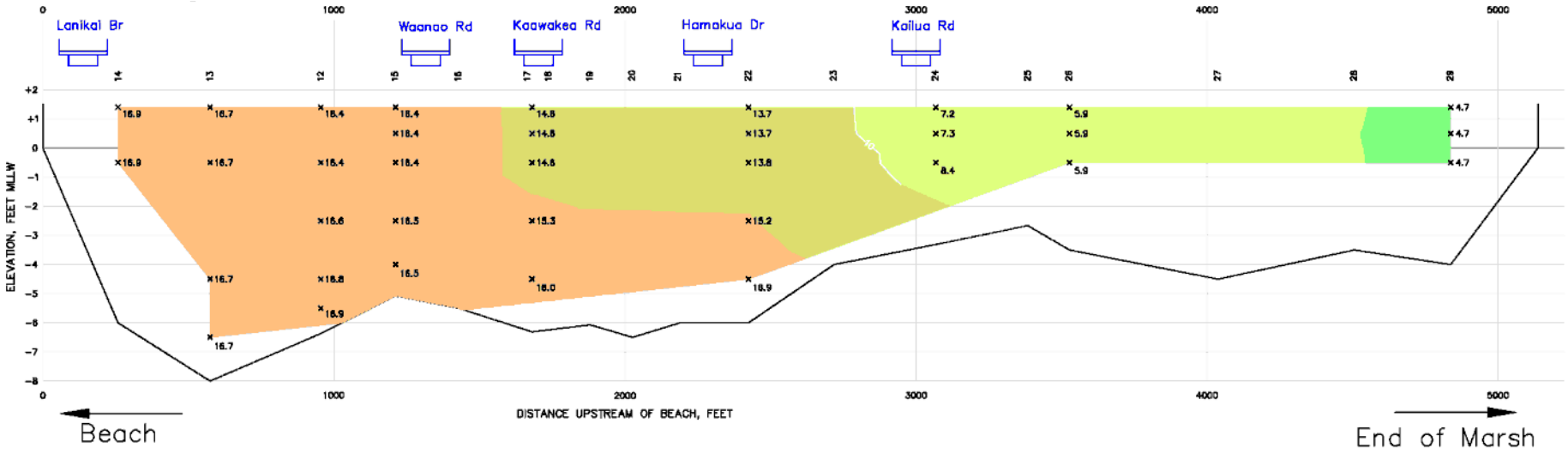
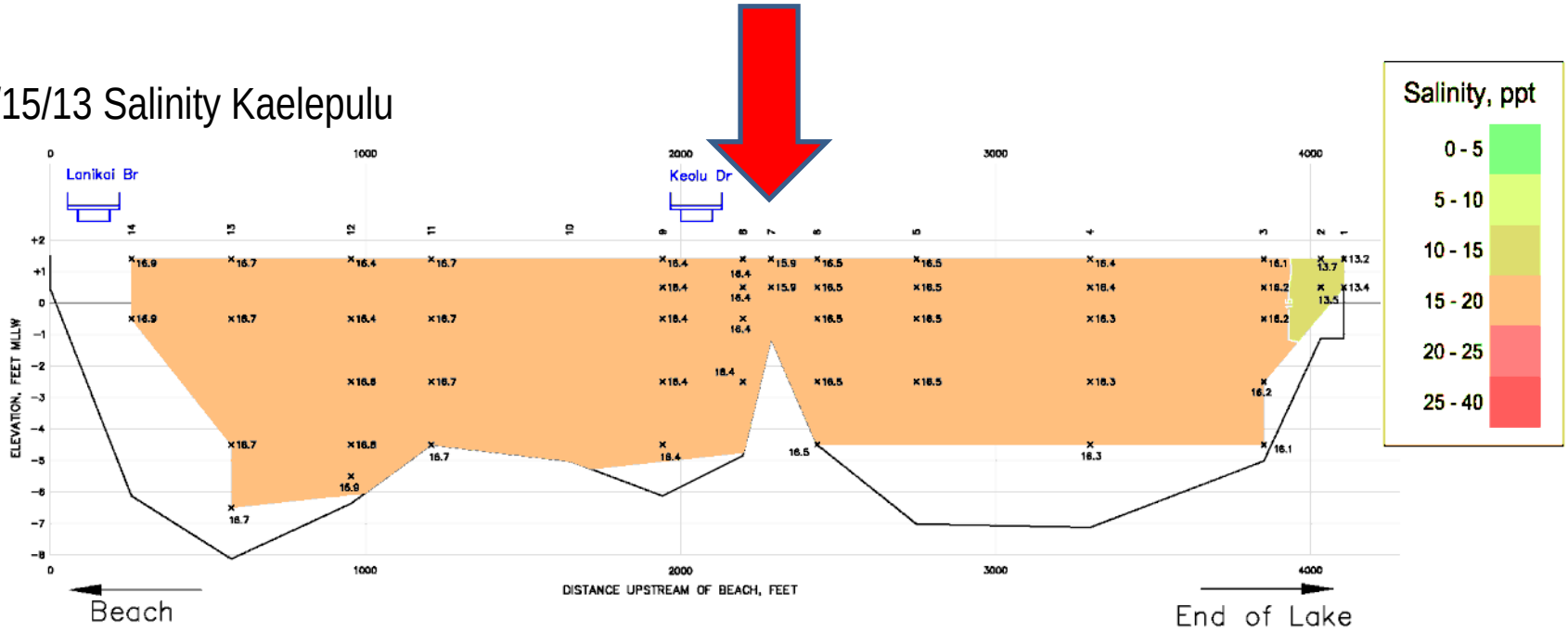
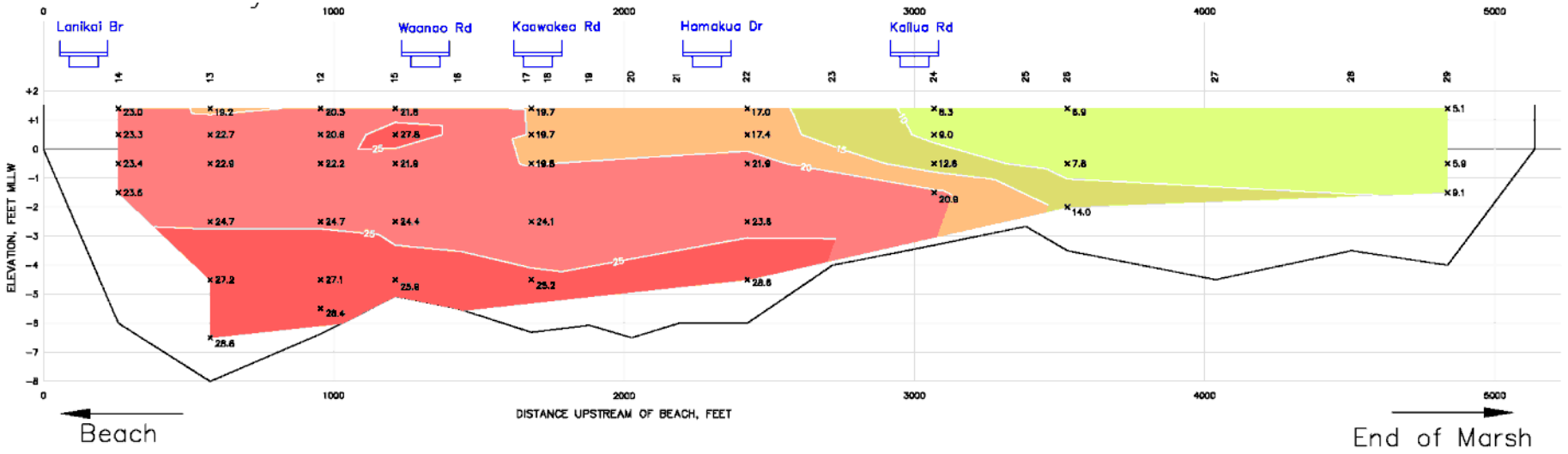
9/15/13 Salinity Kawainui Pre Opening



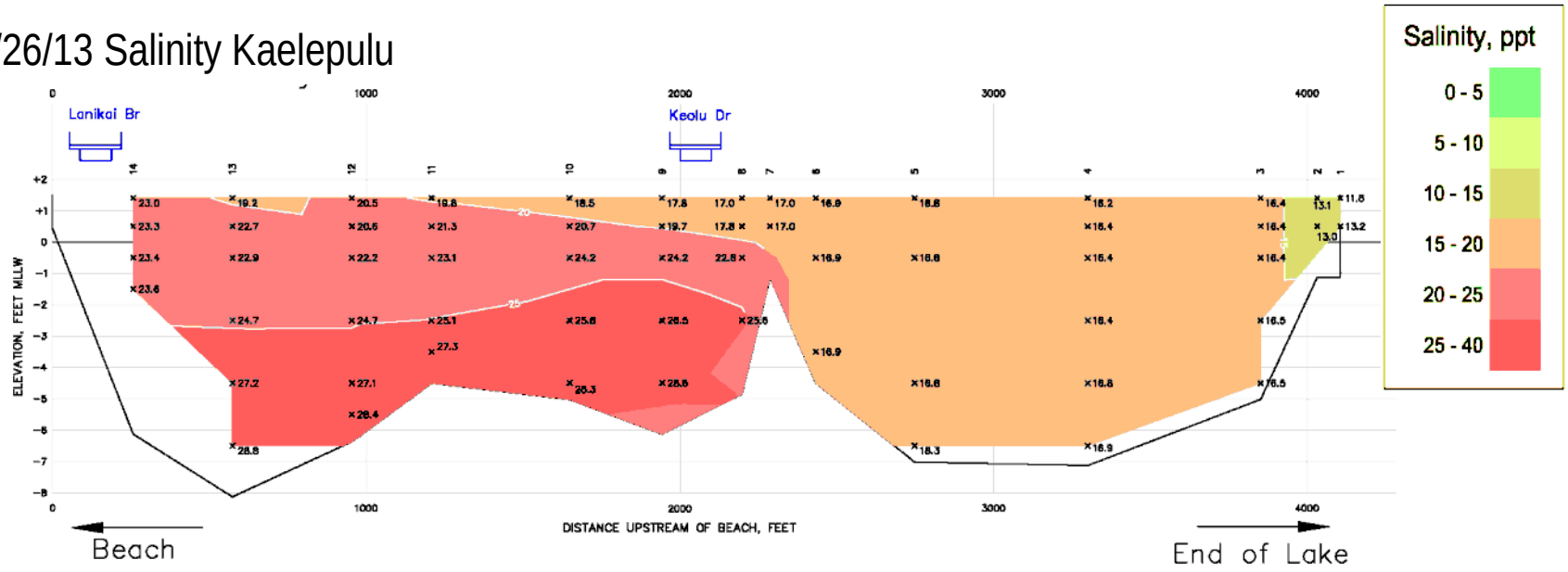
9/15/13 Salinity Kaelepulu



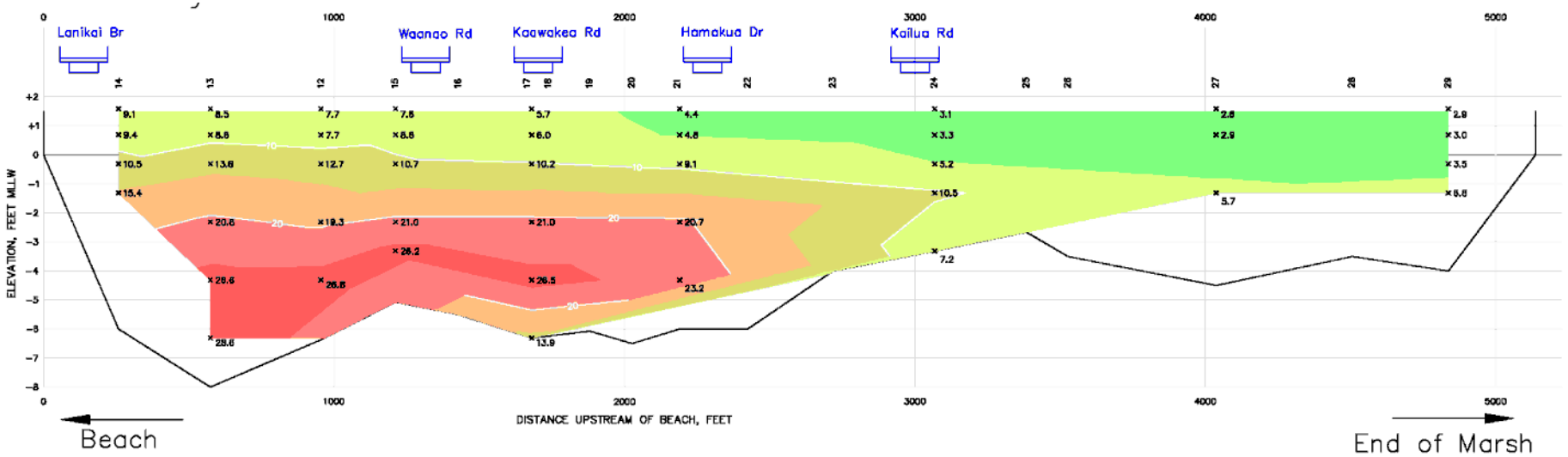
9/26/13 Salinity Kawainui Post opening



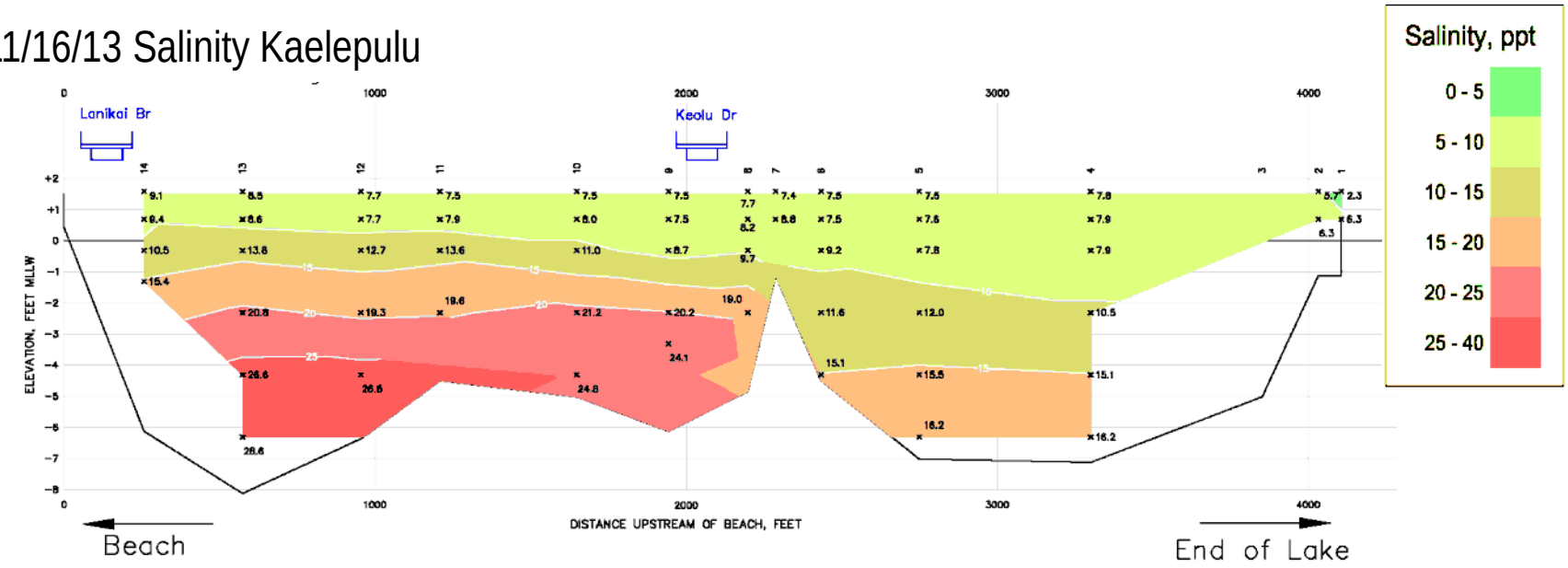
9/26/13 Salinity Kaelepulu



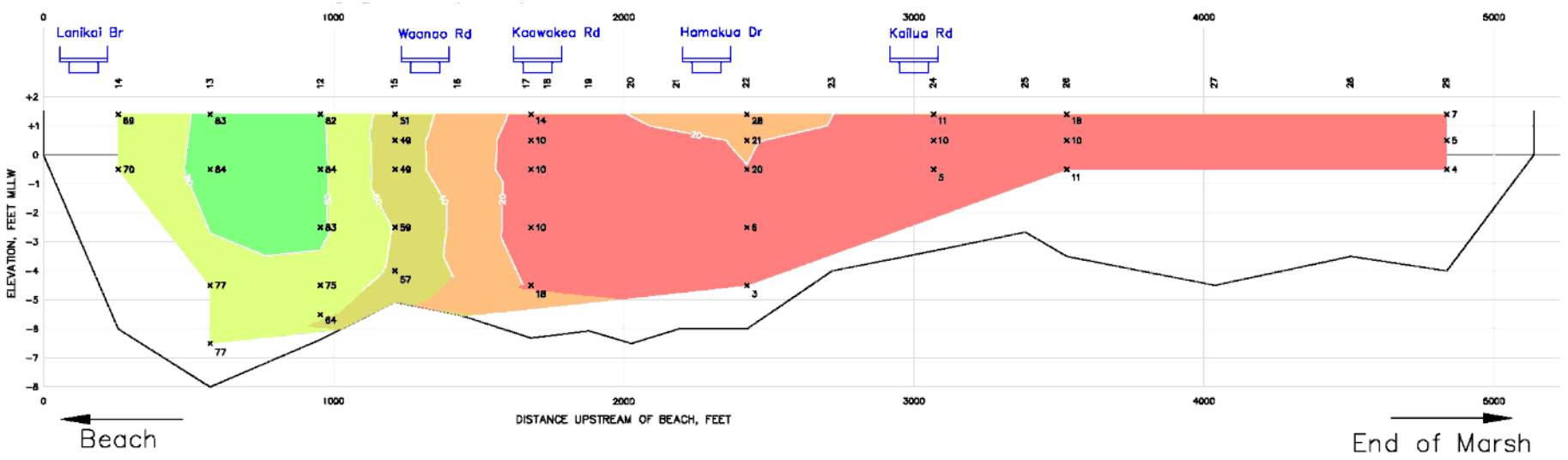
11/16/13 Salinity Kawainui – Pre opening



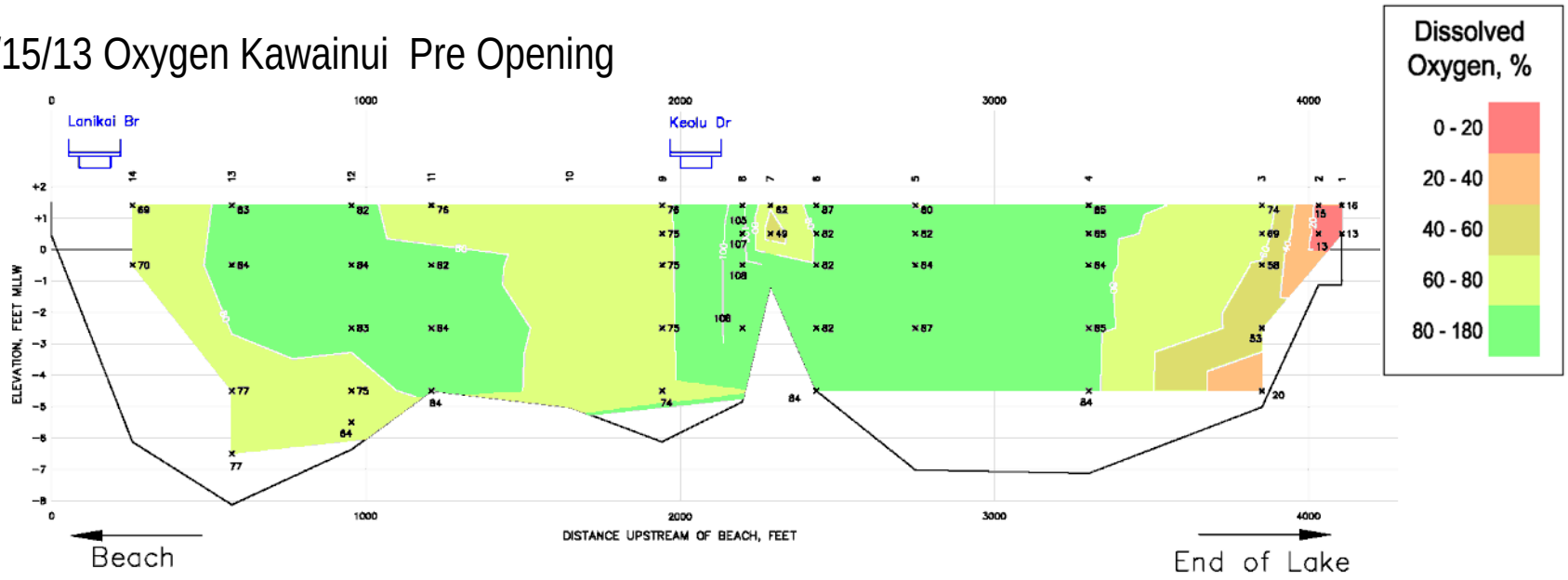
11/16/13 Salinity Kaelepulu



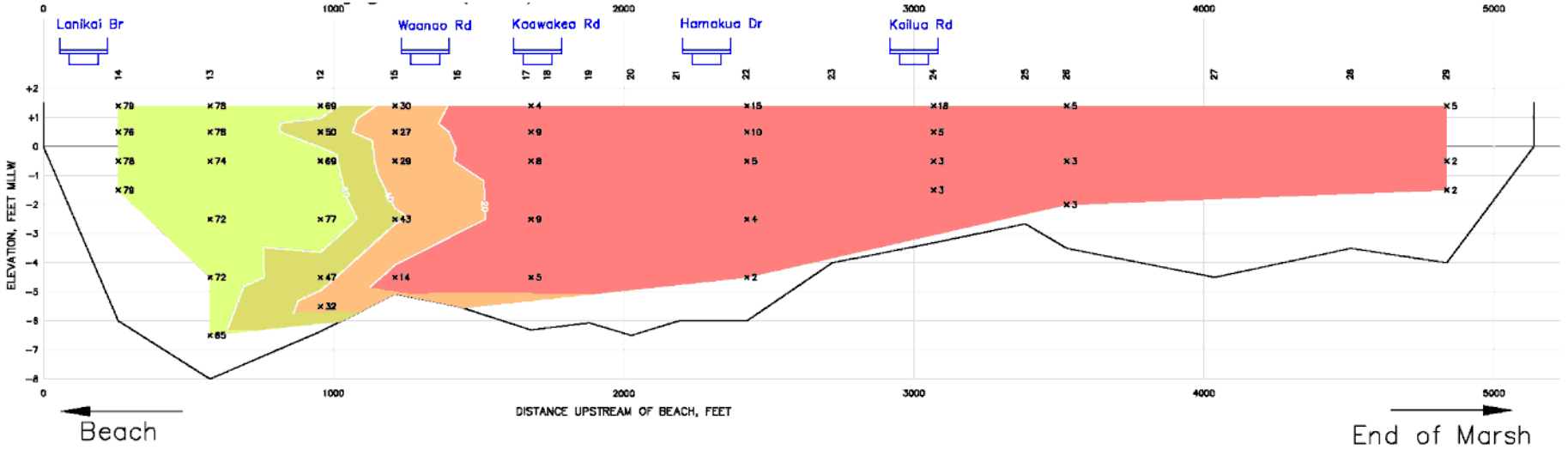
9/15/13 Oxygen Kaelepulu



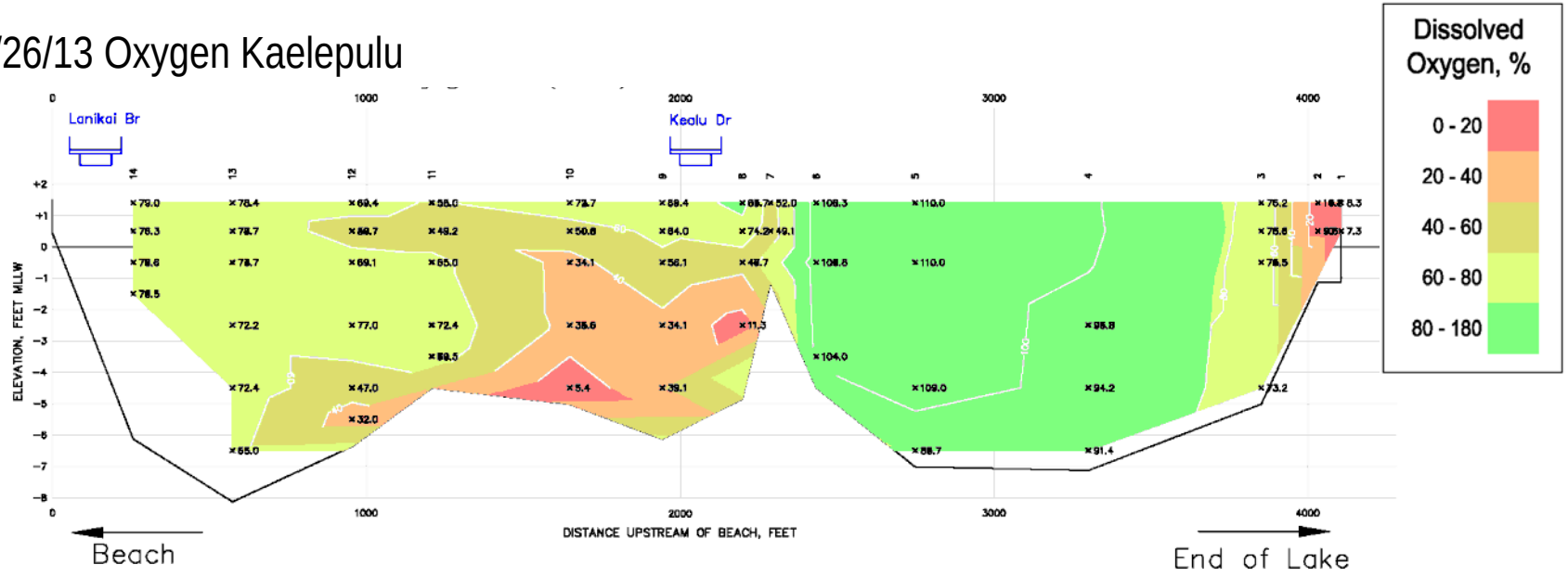
9/15/13 Oxygen Kawainui Pre Opening



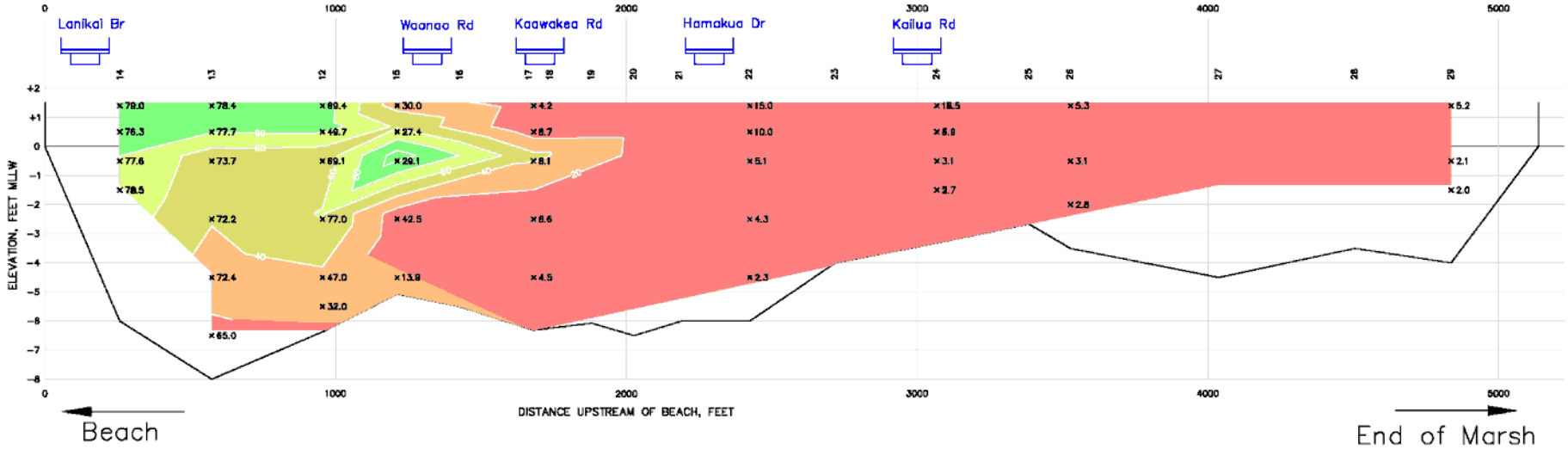
9/26/13 Oxygen Kawainui Post opening



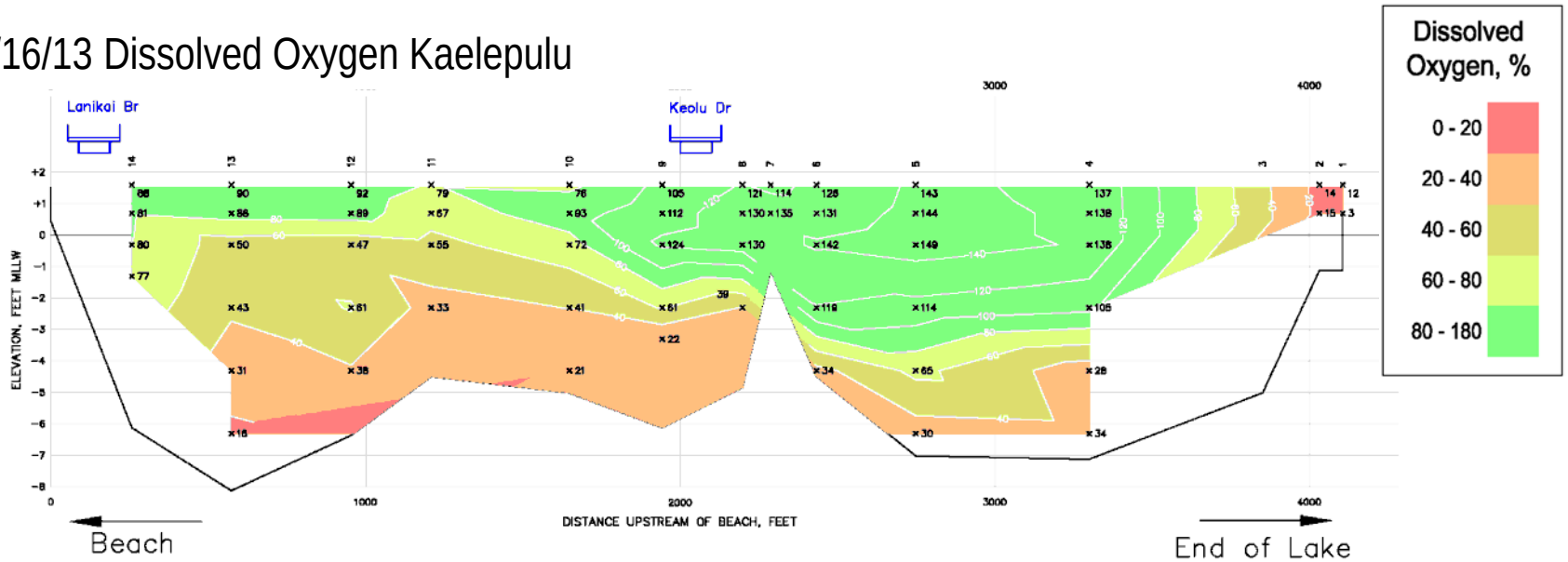
9/26/13 Oxygen Kaelepulu



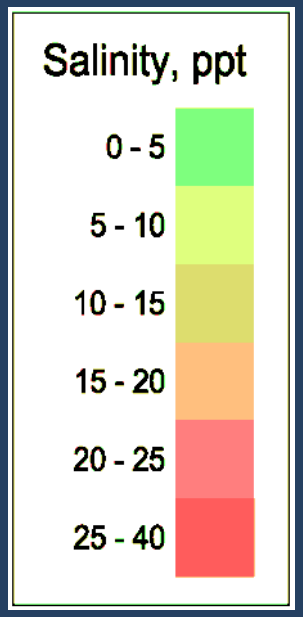
11/16/13 Dissolved Oxygen Kawainui – Pre opening



11/16/13 Dissolved Oxygen Kaelepulu

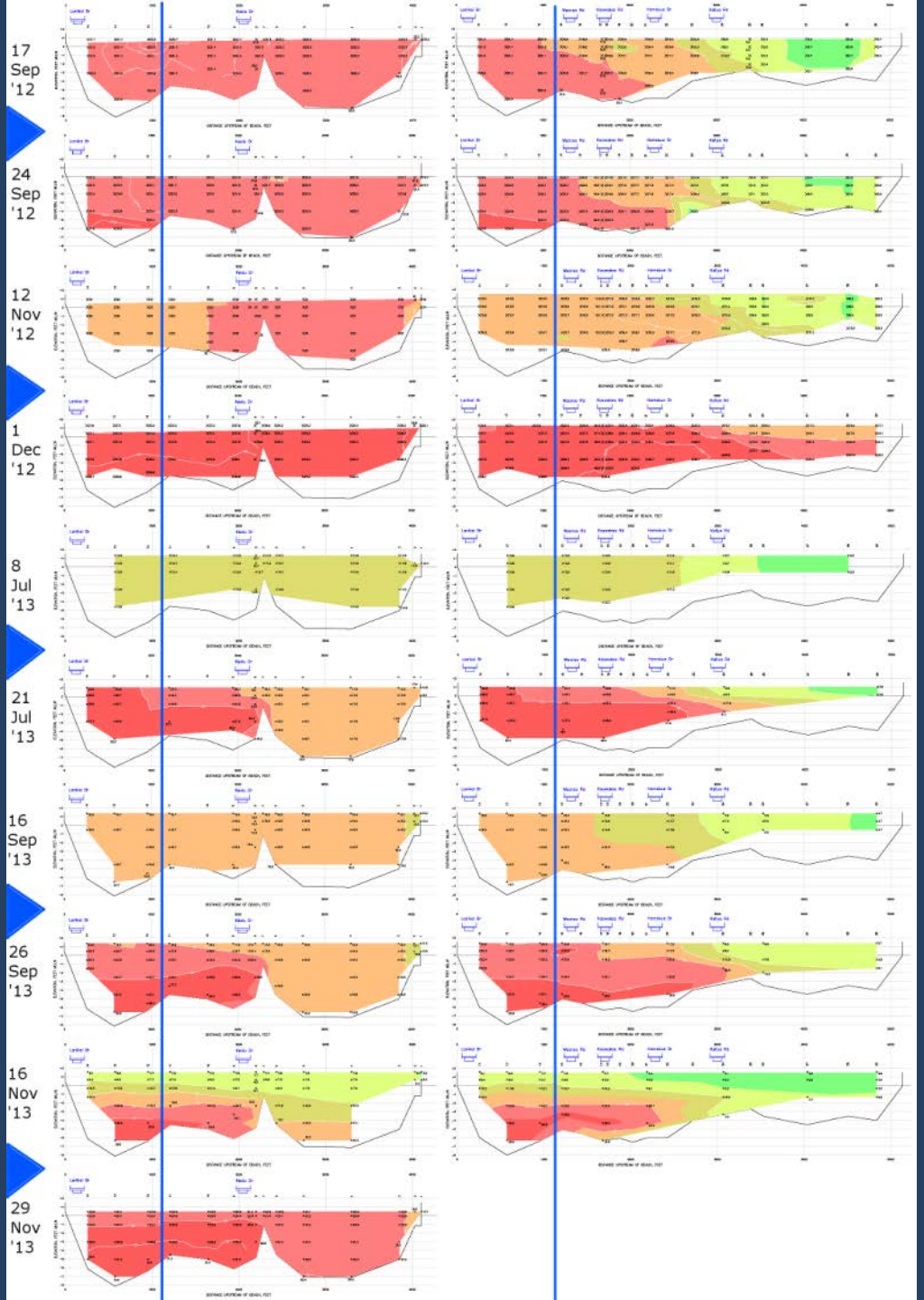


Salinity for 10 Sampling Events



Other Parameters Tracked:

- Temperature
- Dissolved Oxygen
- pH
- Turbidity
- PC
- CHL-A
- Volume Exchange



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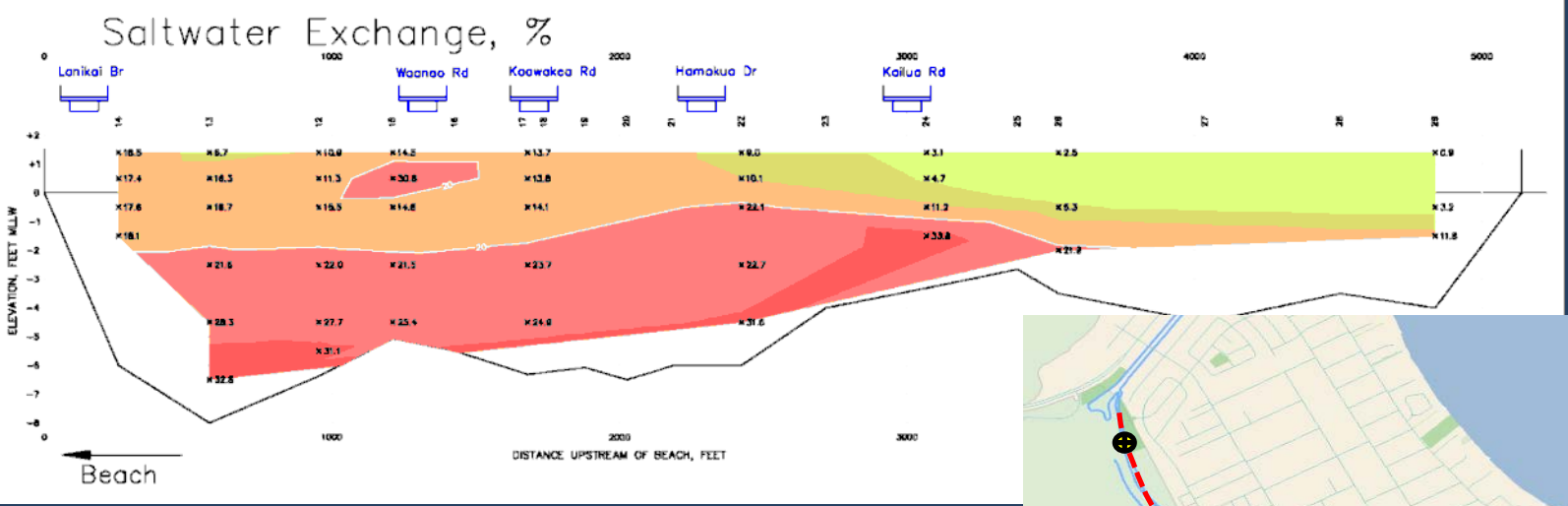
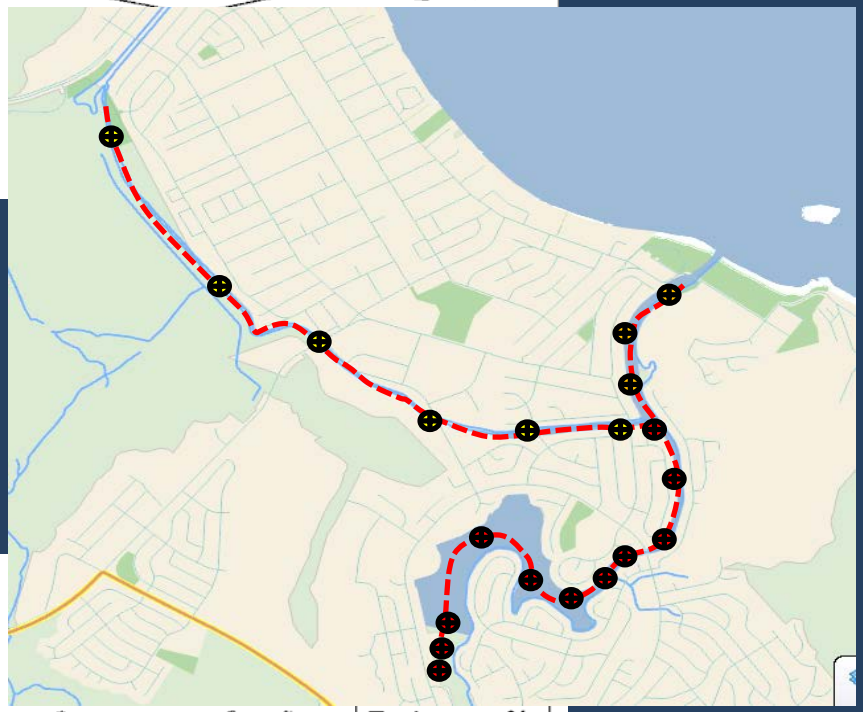
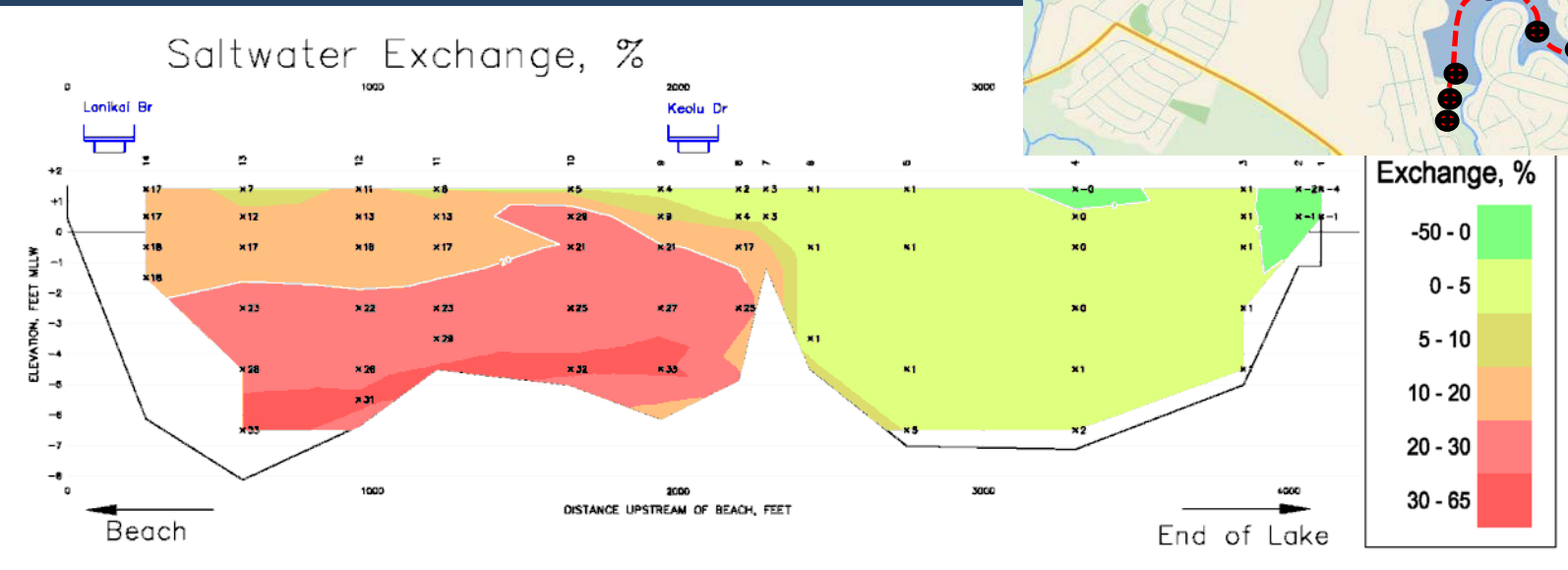
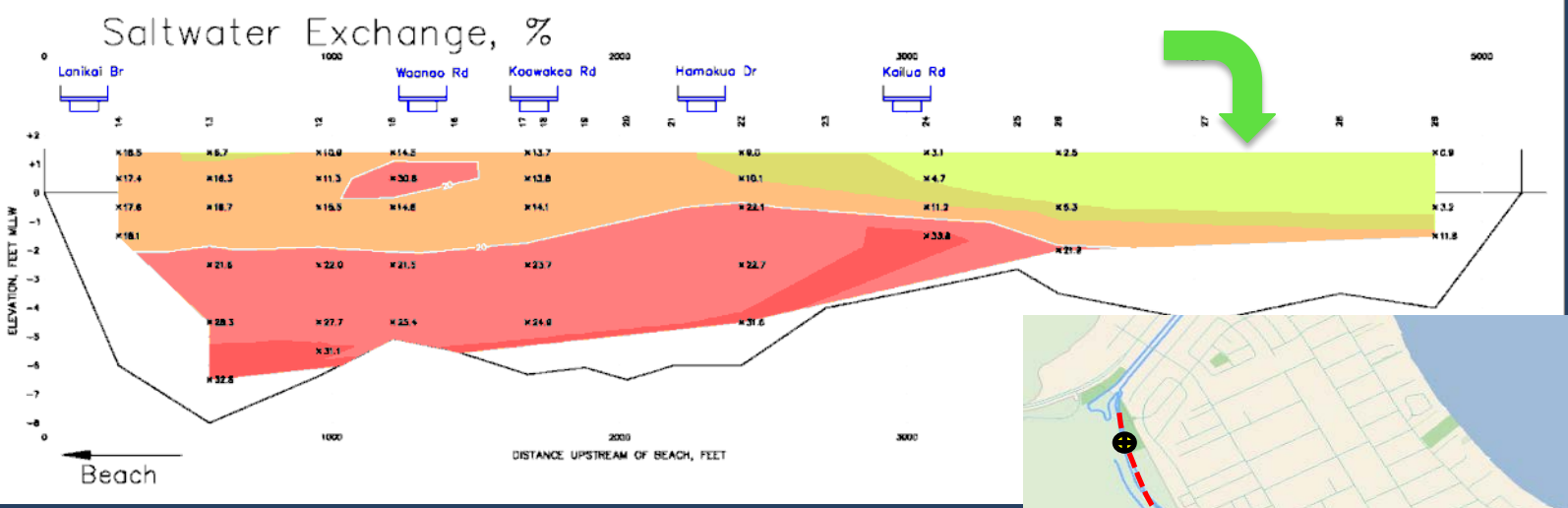


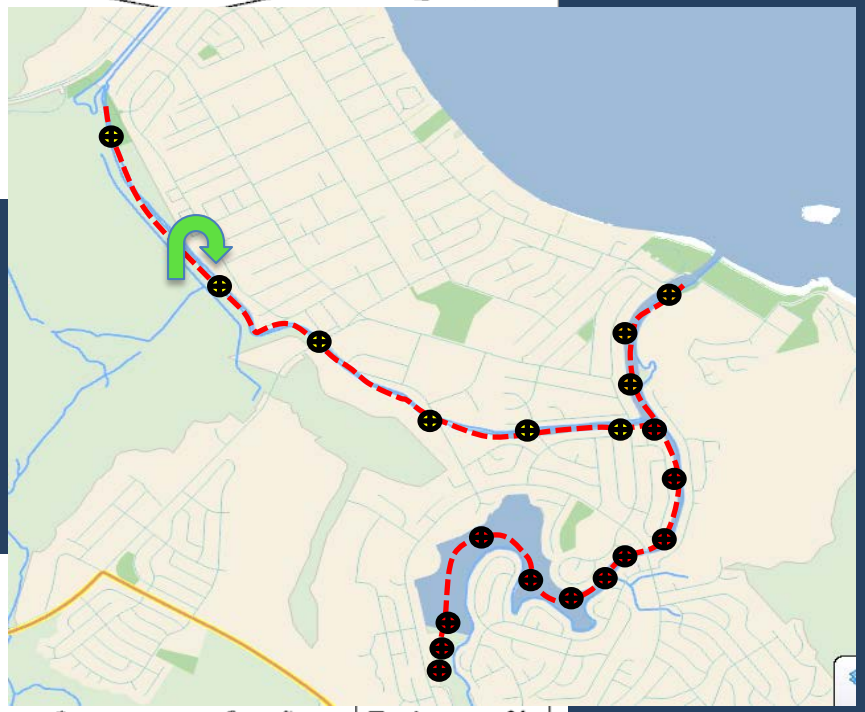
$$\% \text{ Exchange} = (S_F - S_I) / (35 - S_I)$$

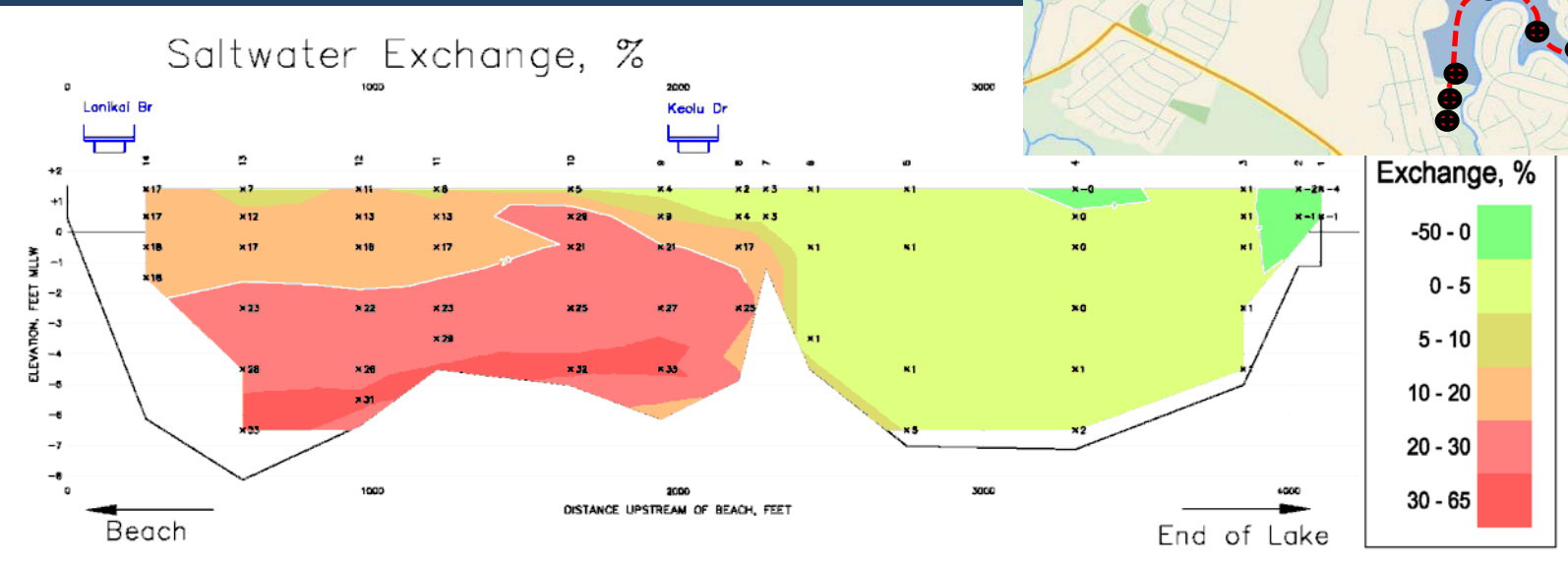






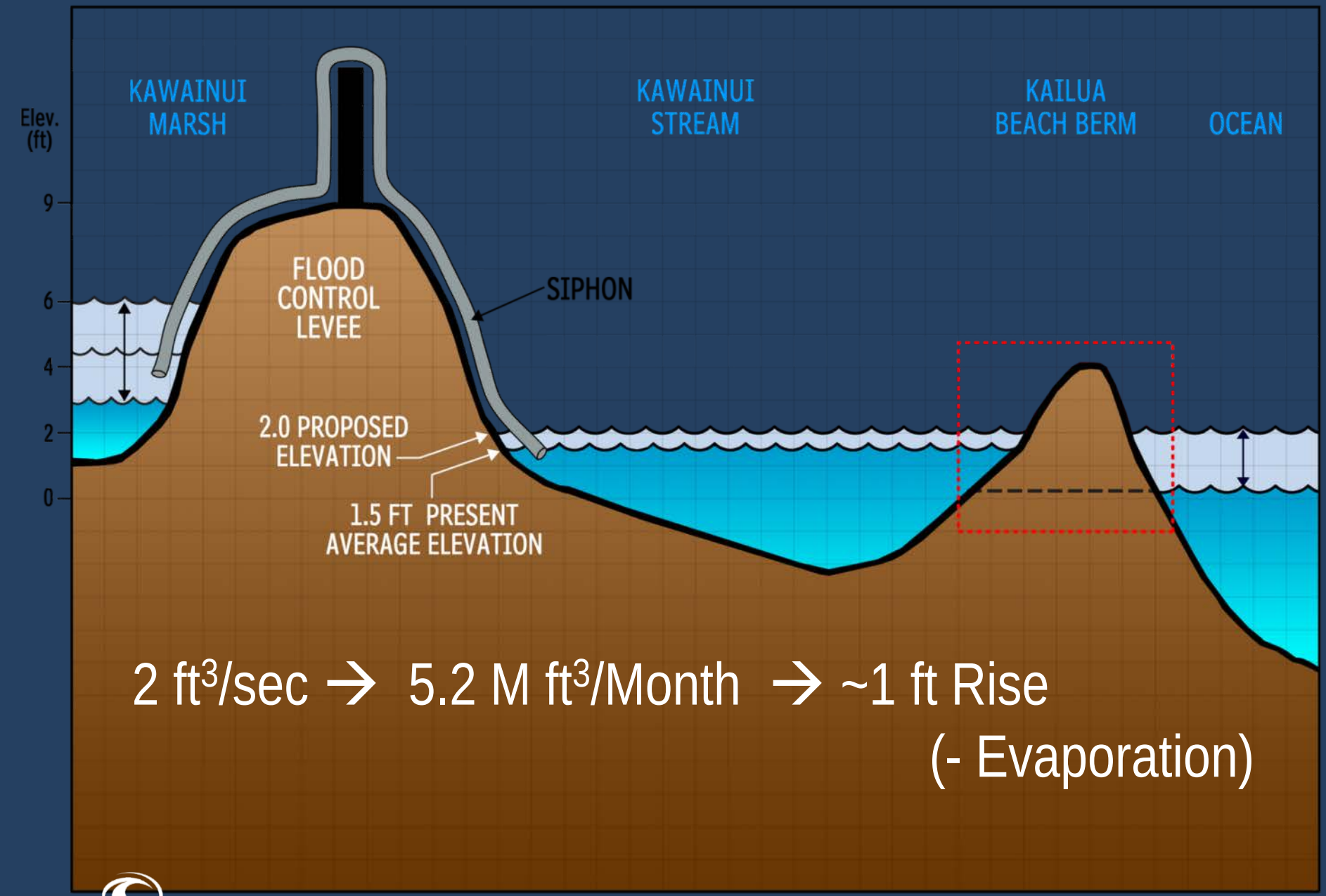
$$\% \text{ Exchange} = (S_F - S_I) / (35 - S_I)$$





PROPOSAL TO TEST FLOW RESTORATION BY INSTALING TEMPORARY SIPHON OVER LEVEE

~ 6 L/s



2 ft^3/sec → 5.2 M ft^3/Month → ~1 ft Rise

(- Evaporation)

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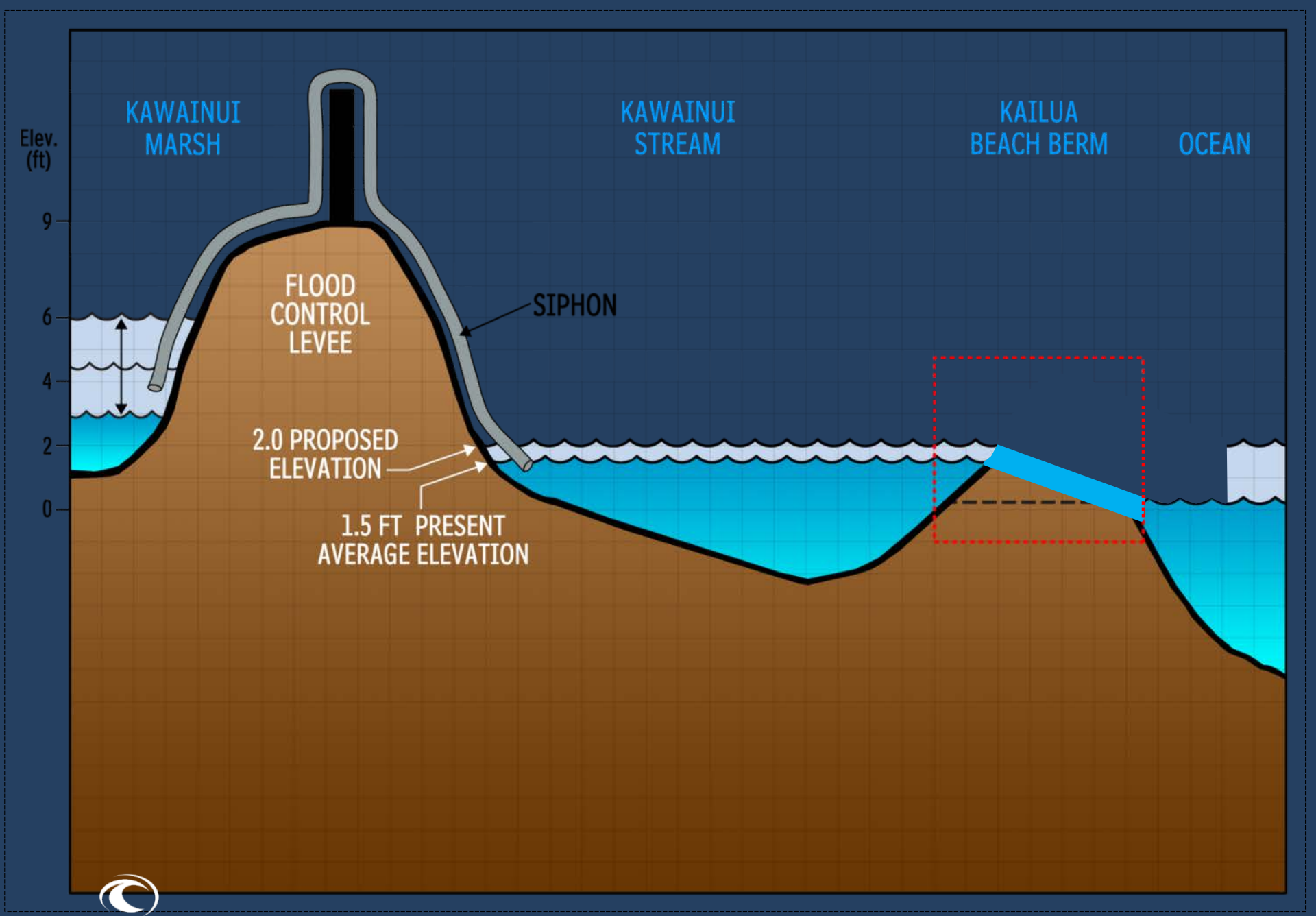

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Construction of Four 6-inch PVC Siphons over Levee


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TEST TRIAL IS HYPOTHESIZED TO DEMONSTRATE THAT THE FLOW RESTORATION WILL

- Increase monthly water exchange in the Kawainui Stream Channel thereby improving water quality
- Increase volume and period of exchange with the ocean by enhanced opening head and flow dynamics

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