SACRED FALLS, OAHU SECTION 227 DEMONSTRATION PROJECT

cosponsored by:
US Army Corps of Engineers
Honolulu District

and:
State of Hawaii
Department of Land and Natural Resources
Office of Conservation and Coastal Lands

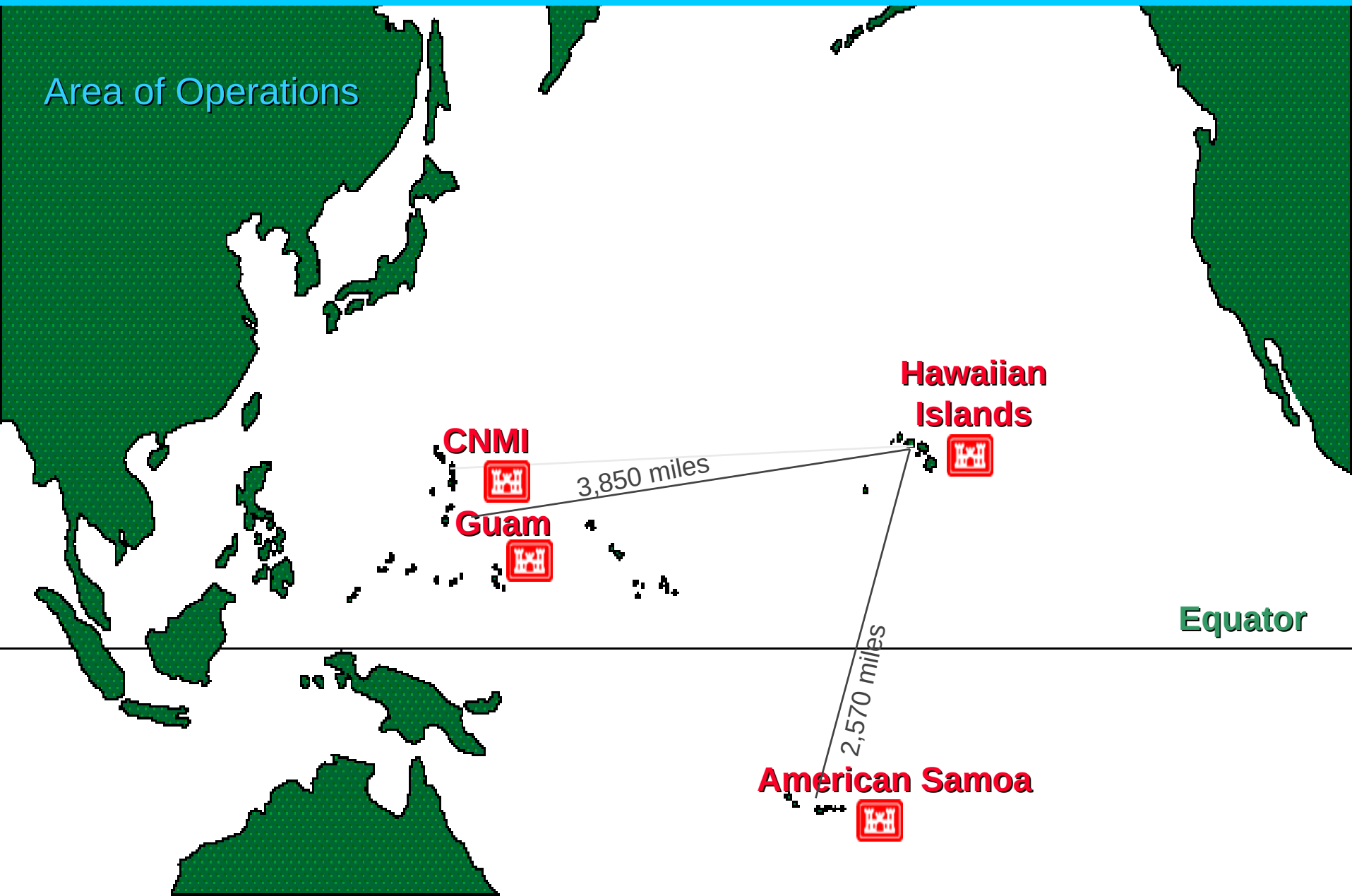
American Shore & Beach Preservation Association
October 11, 2005
San Francisco, CA

US Army Corps of Engineers®

TOPICS

- Site Characterization
- Numerical Modeling
- Physical Model
- Next Steps

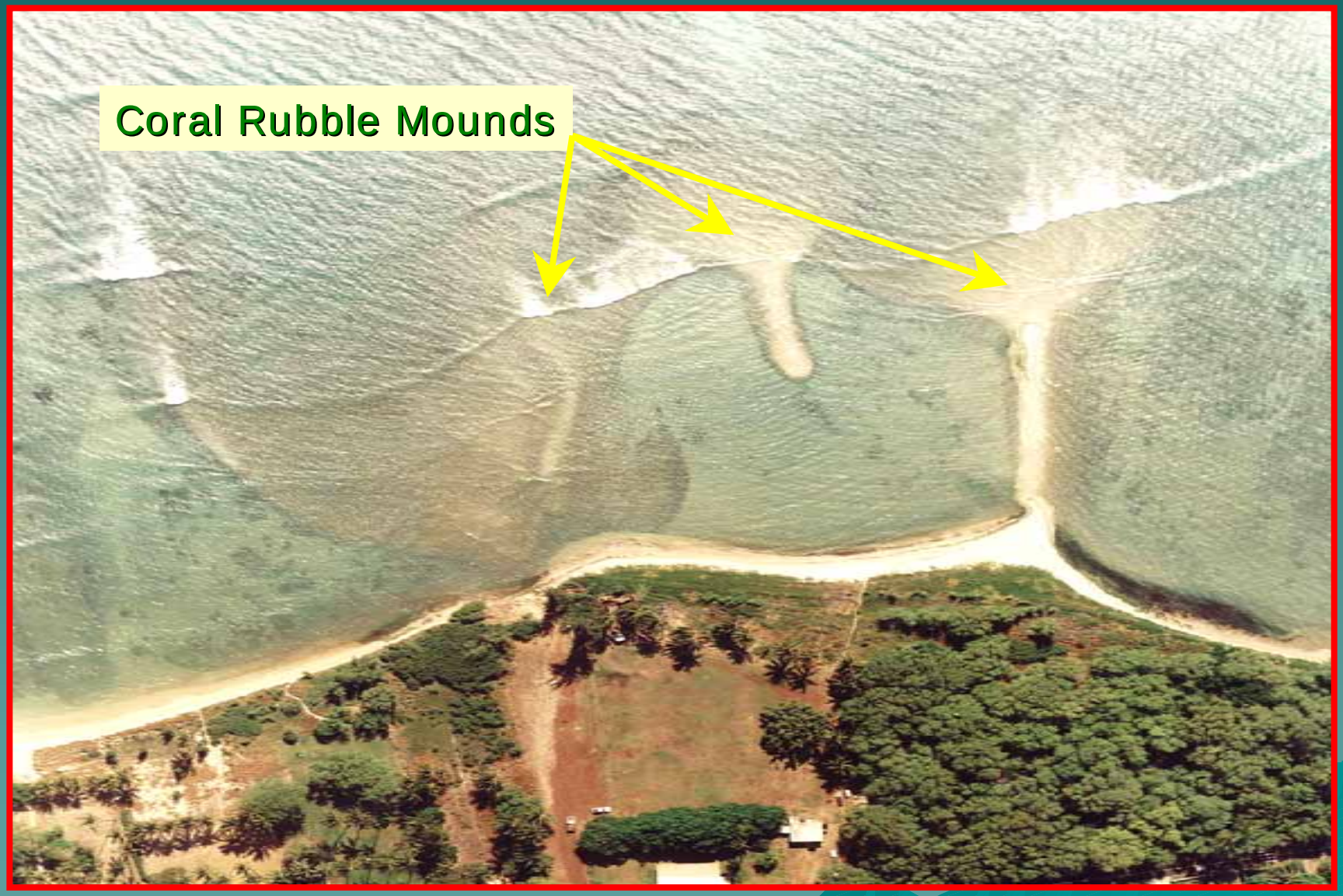
HONOLULU DISTRICT



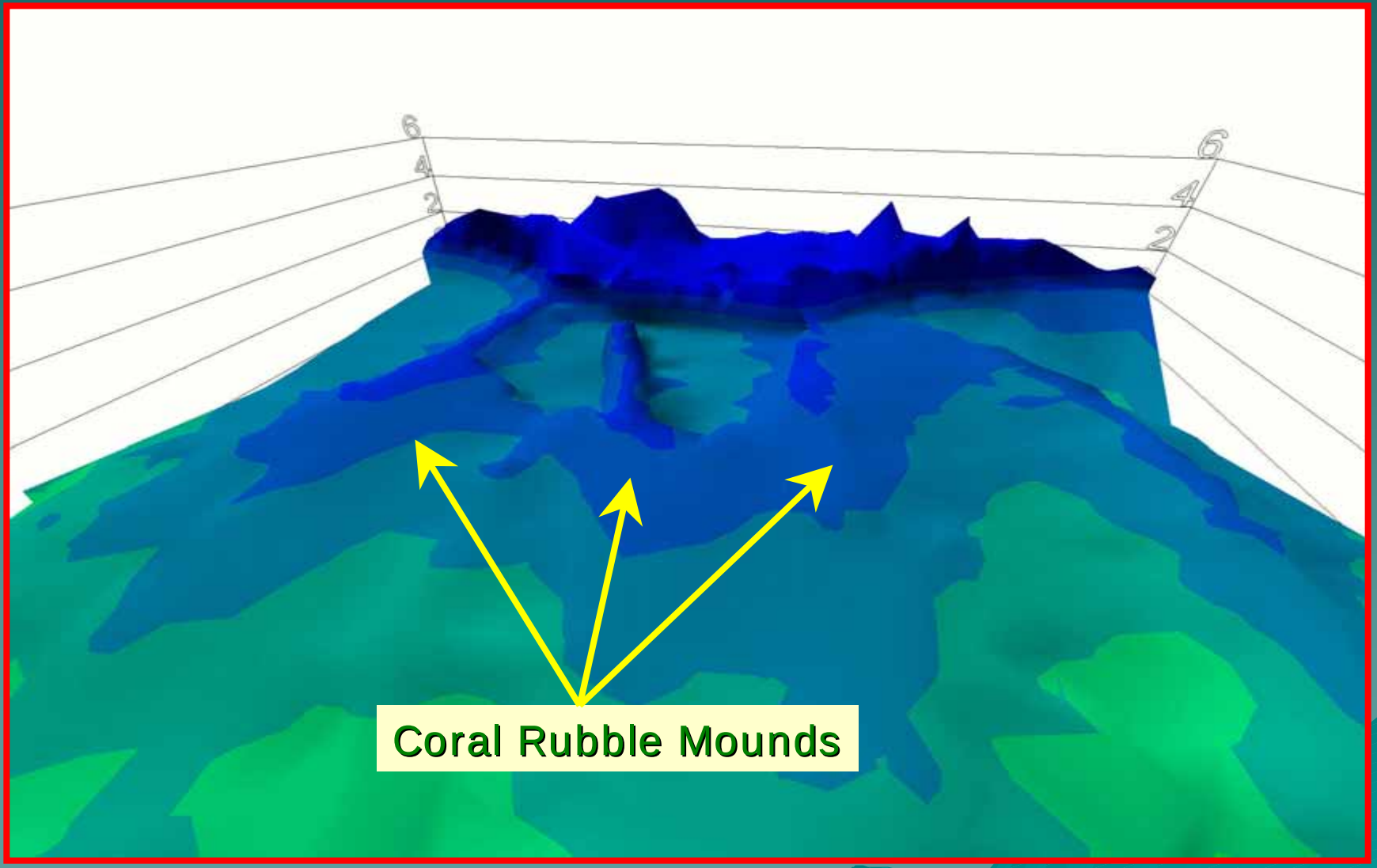
NON-ENGINEERED STRUCTURES

SITE CHARACTERIZATION

PROTOTYPE SITE: Kihei, Maui



PROTOTYPE SITE: Bathymetry

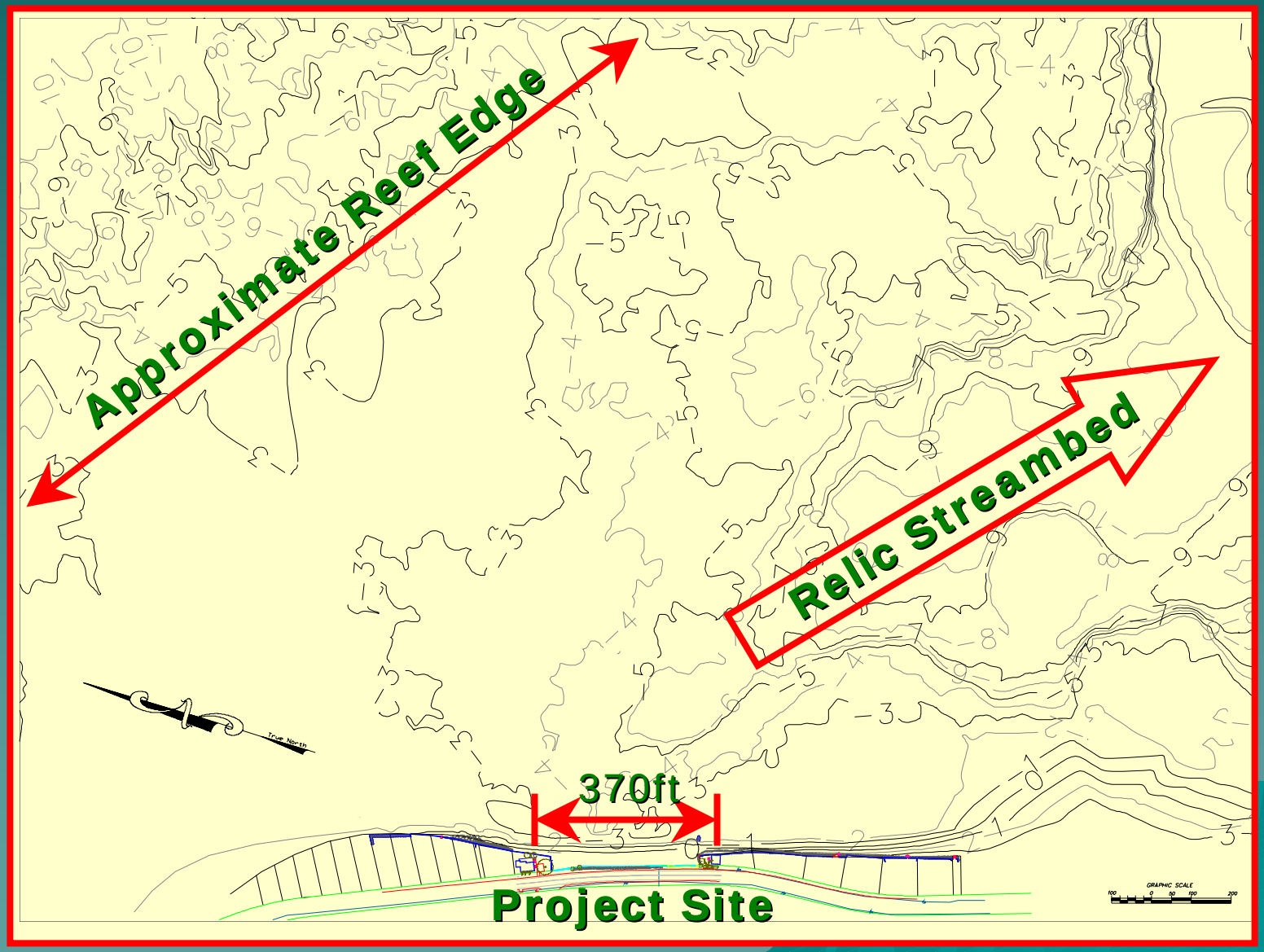


SACRED FALLS, OAHU

PROJECT SITE: Looking North

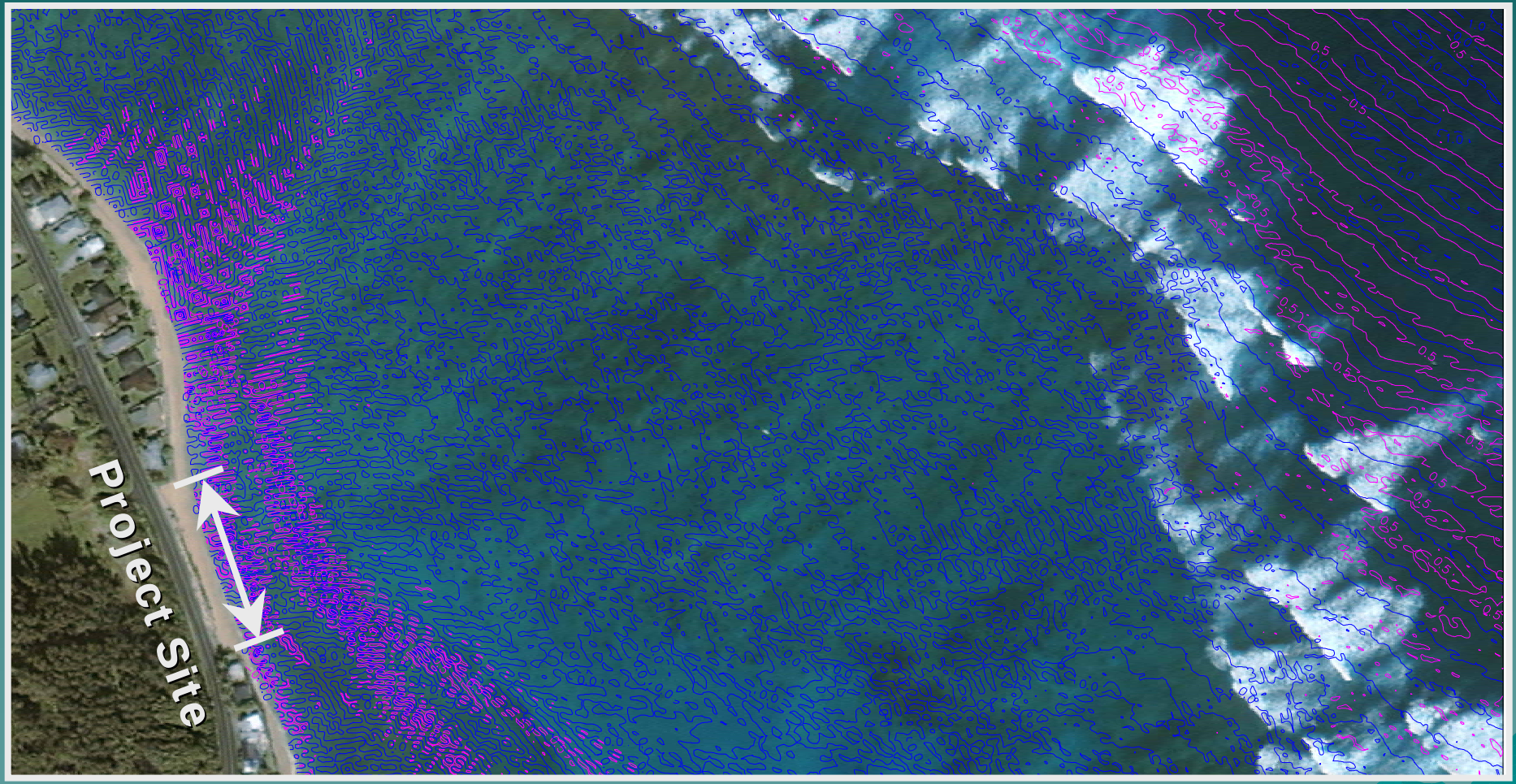
PROJECT SITE: Looking South

SACRED FALLS: Bathymetry



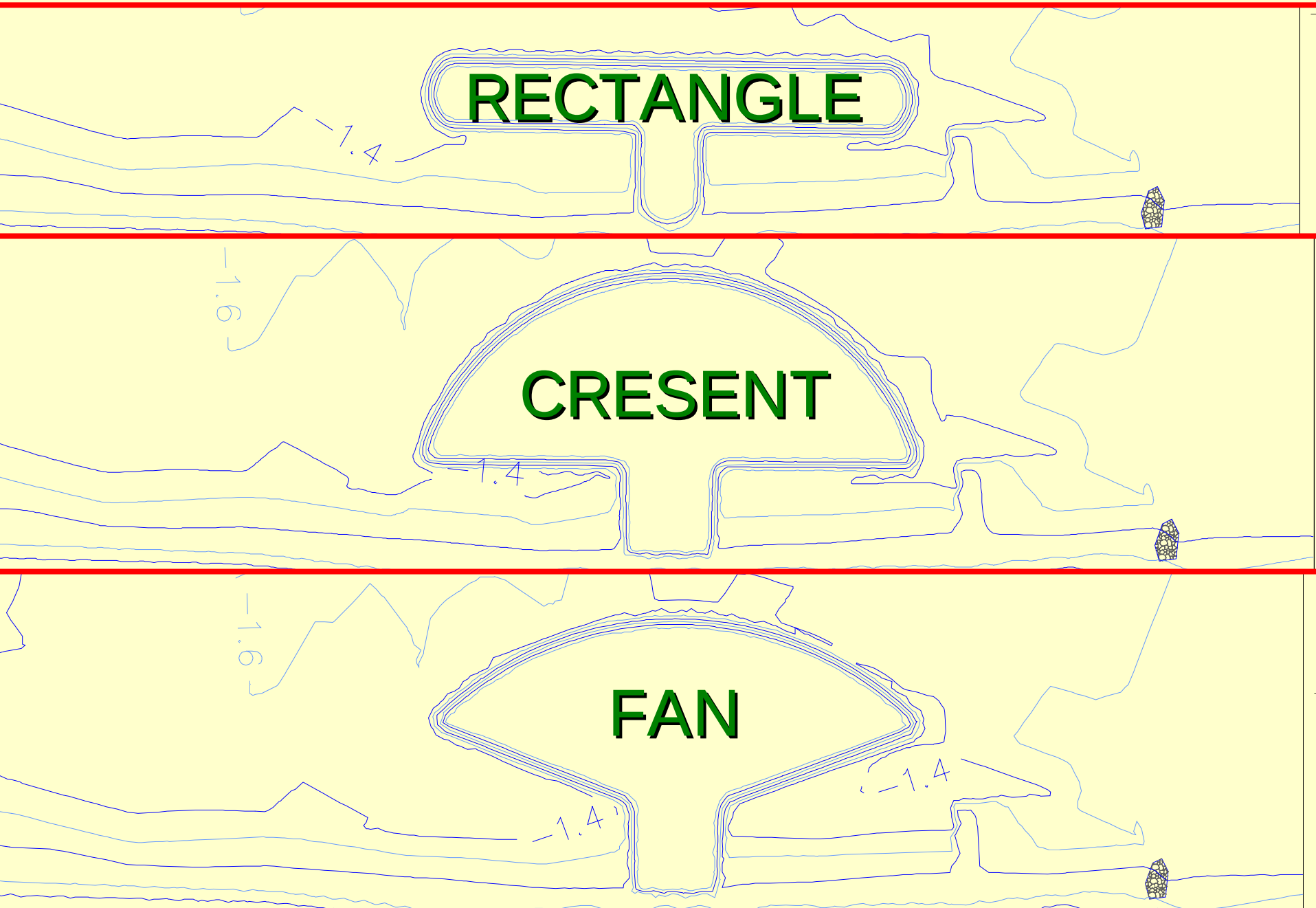
NUMERICAL MODELING

WAVE TRANSFORMATION

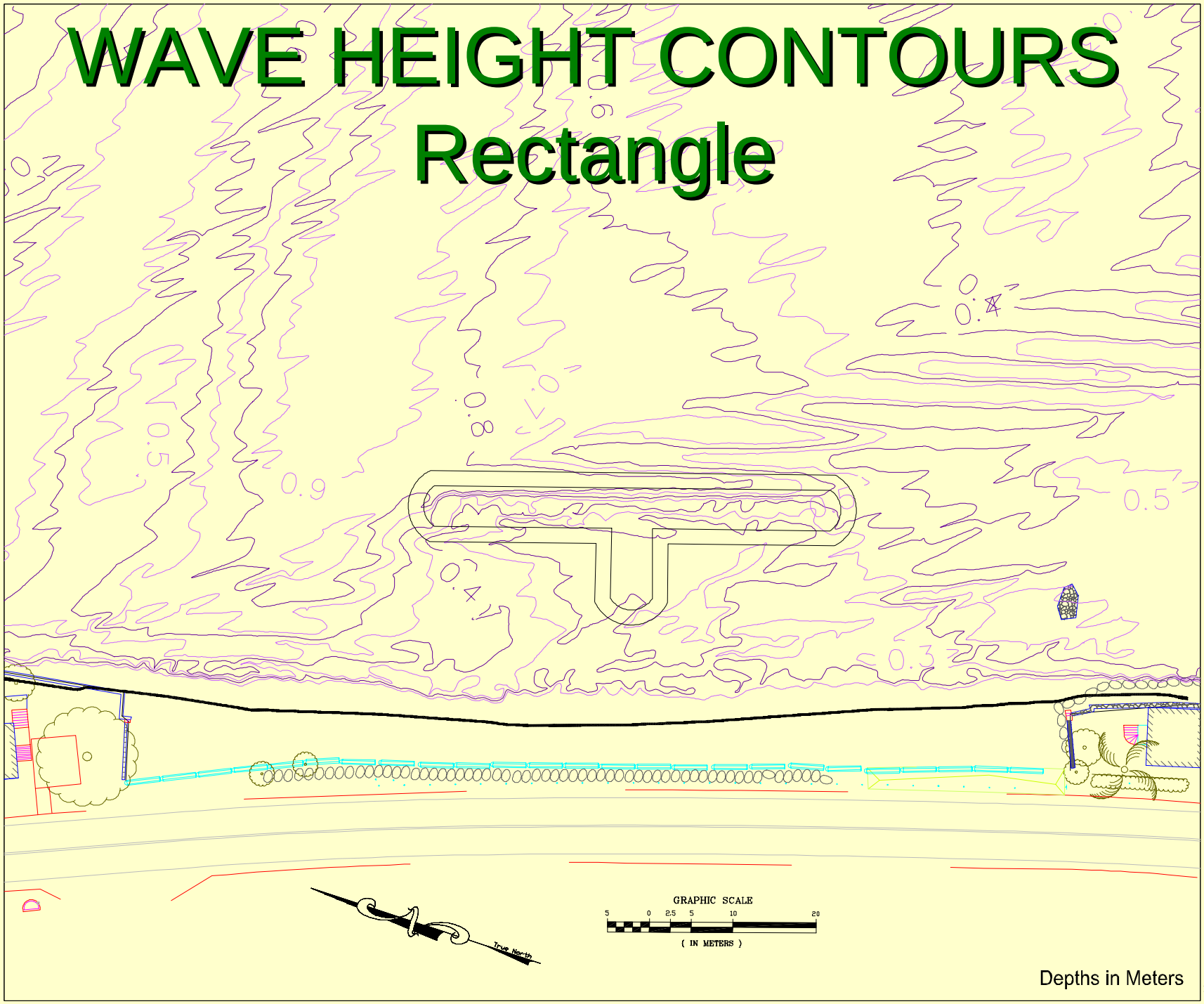


RefDif model results overlaid on IKONOS imagery.

SHAPES CONSIDERED



WAVE HEIGHT CONTOURS
Rectangle



Depths in Meters

Sea Engineering, Inc.
MAKAI RESEARCH PIER
WAIMANALO, HI 96795
(808) 259-7966/FAX (808) 259-8143

KEYNOTES

1. Datum is MHW.
2. Depth accuracy ±x.x m or better.
3. Soundings collected at discrete intervals. Bottom conditions may vary between soundings.
4. Horizontal Control
Station:
Hawaii State Plane - Zone #
Description:
X
Y
5. Vertical Control
Station Name:
Elevation:
6. Survey Date:

04-18 Section 227
Ref/Dif Results: Heights
Block 24, MHW Tide
September 7, 2004

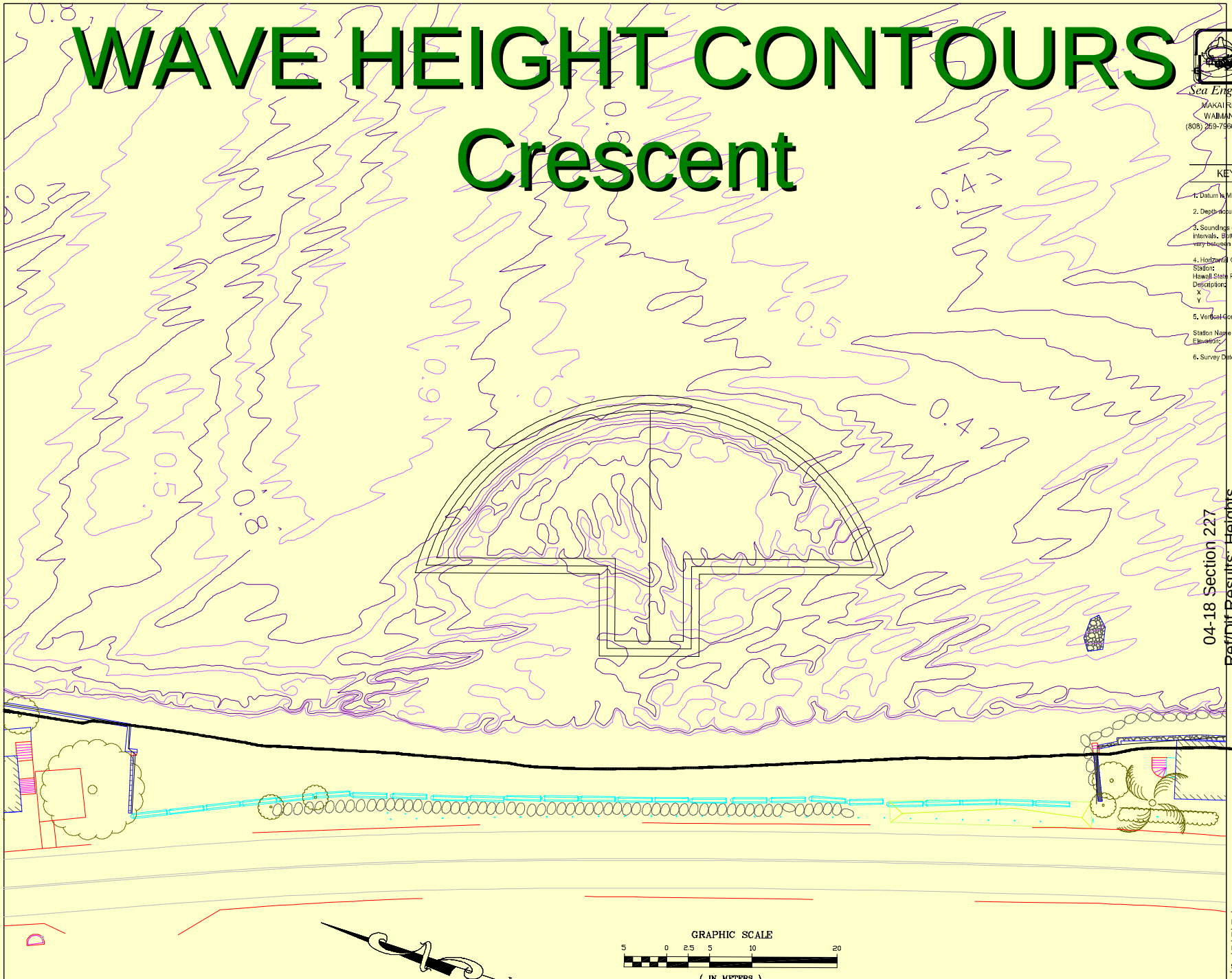
REVISIONS

NO.	DATE	REVISION

XXX
XXX

PROJECT NUMBER XXX
PROJECT ENGINEER XXX
DRAWN BY XXX CHECKED BY XXX
SCALE XXX DATE XXX
FILE
XXX

WAVE HEIGHT CONTOURS
Crescent



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Station:
Hawaii State Plane - Zone #
Description:
X
Y
5. Vertical Control
Station Name:
Elevation:
6. Survey Date:

04-18 Section 227
Ref/Dif Results: Heights
Block 20, MHW Tide
September 7, 2004

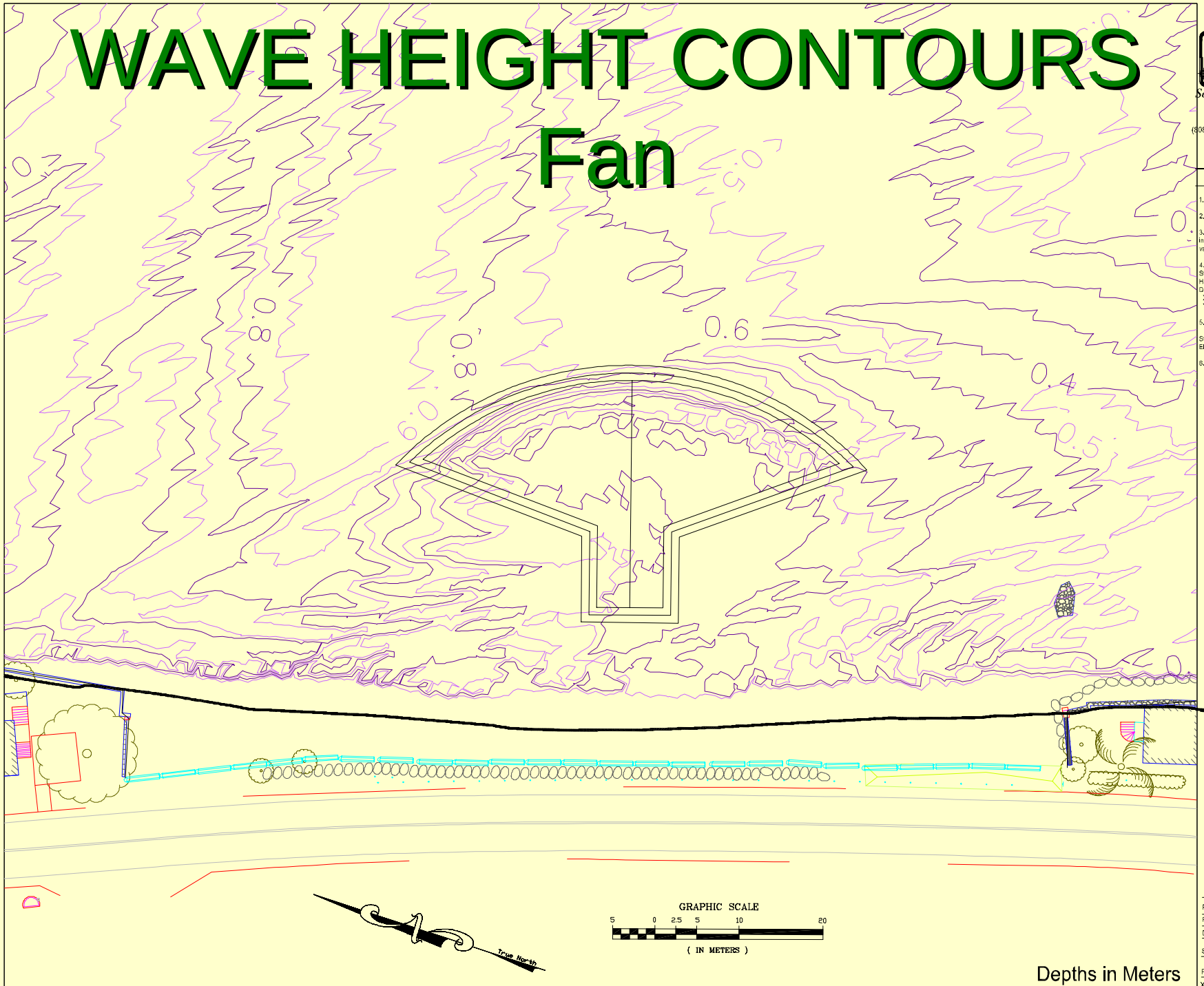
REVISIONS

NO.	DATE	REV

XXX
XXX

PROJECT NUMBER XXX
PROJECT ENGINEER X
DRAWN BY XXX CHEC
SCALE XXX DATE

WAVE HEIGHT CONTOURS
Fan



Depths in Meters

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4. Horizontal Control
Station:
Hawaii State Plane - Zone #
Description:
X
Y
5. Vertical Control
Station Name:
Elevation:
6. Survey Date:

04-18 Section 227
Ref/Dif Results: Heights
Block 22, MHW Tide
September 7, 2004

REVISIONS

NO.	DATE	REVISION

XXX

XXX

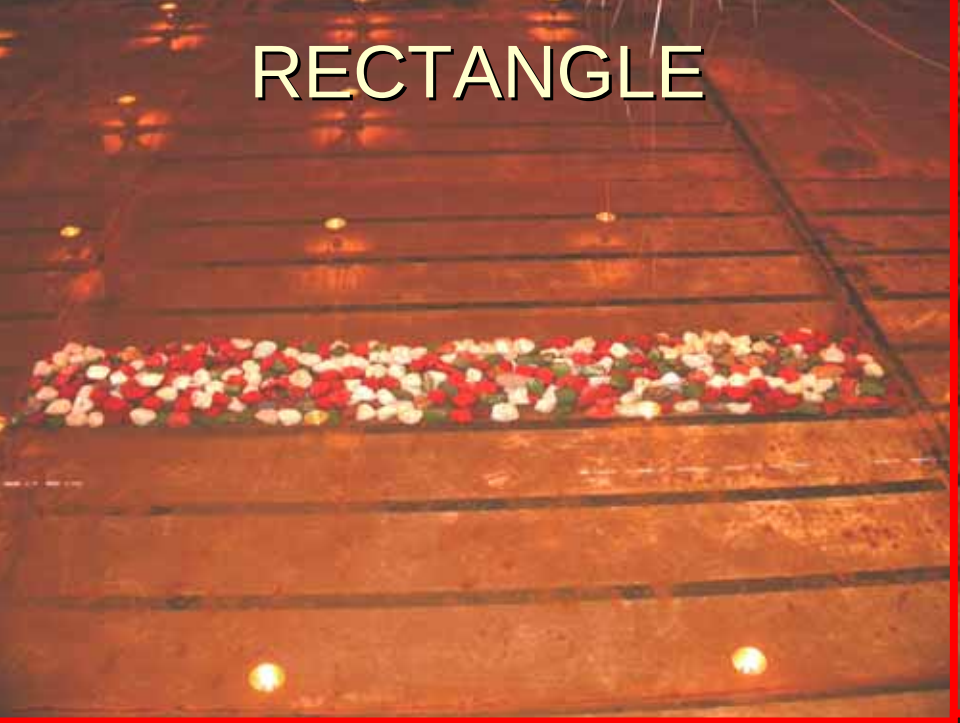
PROJECT NUMBER XXX
PROJECT ENGINEER XXX
DRAWN BY XXX CHECKED BY XXX
SCALE XXX DATE XXX
FILE
XXX

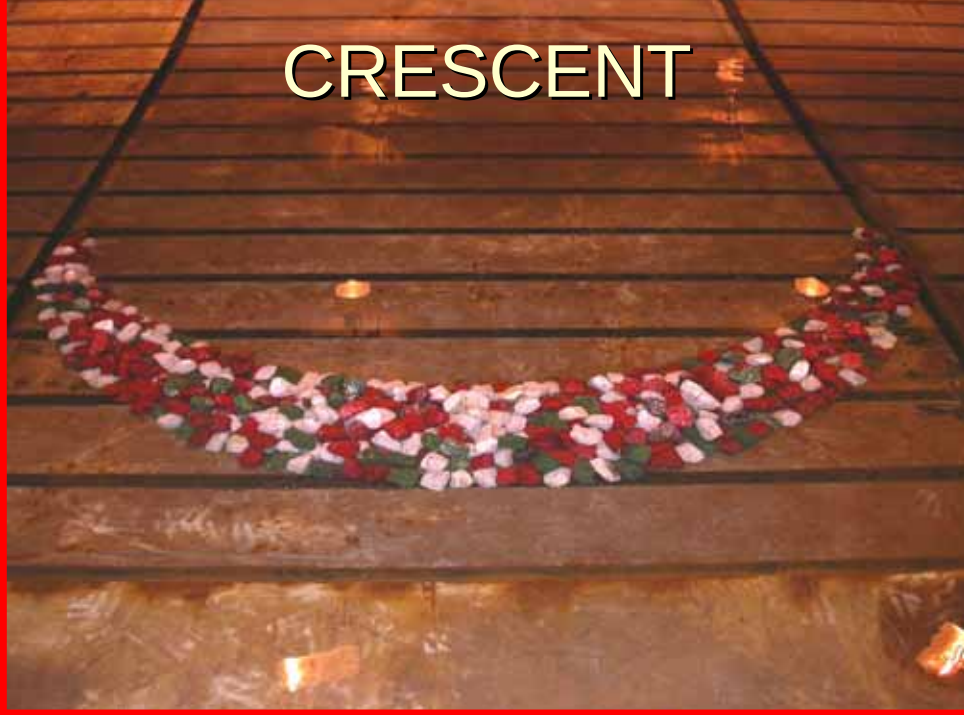
PHYSICAL MODEL

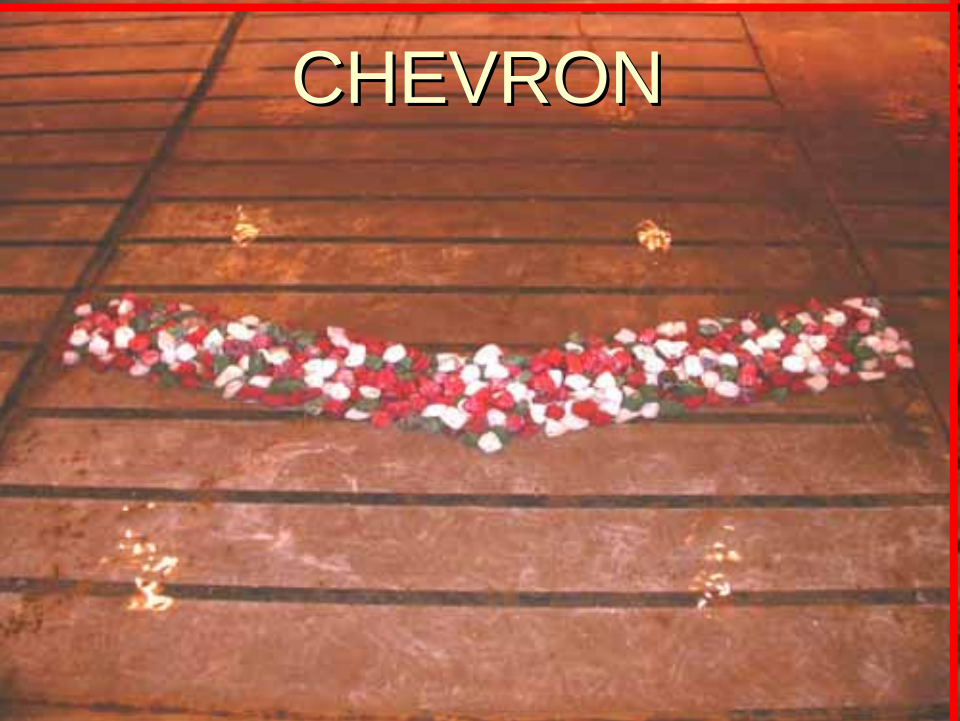
- Shape Performance
- Modular Design

PHYSICAL MODEL

- Flume: 56ft long X 32ft wide
- Scale: 1/16
- Wave Parameters:
  - Height: Depth Limited over Reef
  - Period: 9 and 16 second
  - Direction: -7 degrees
- Longshore Current
- Sediment Transport

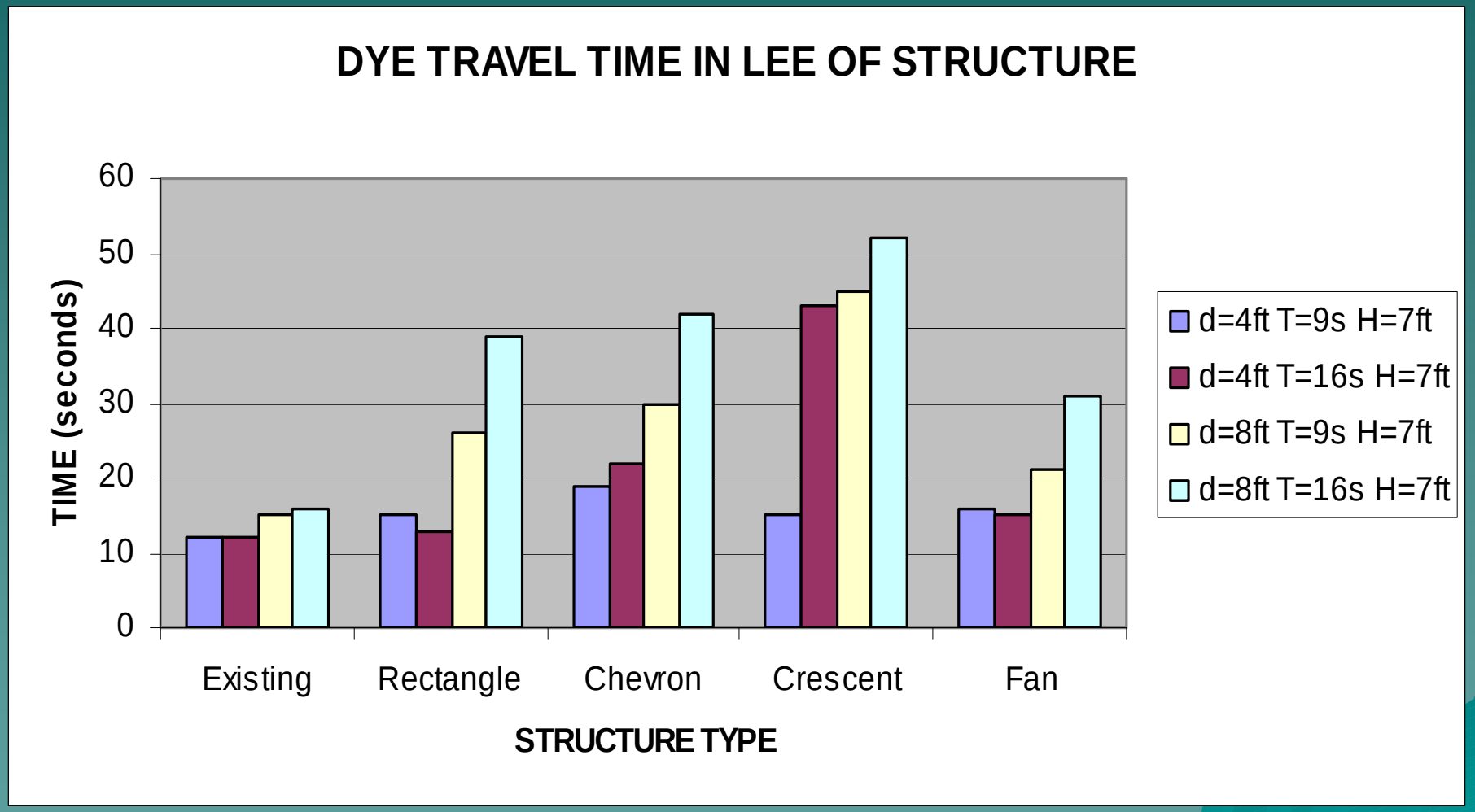

RECTANGLE


CRESCENT


CHEVRON

FAN

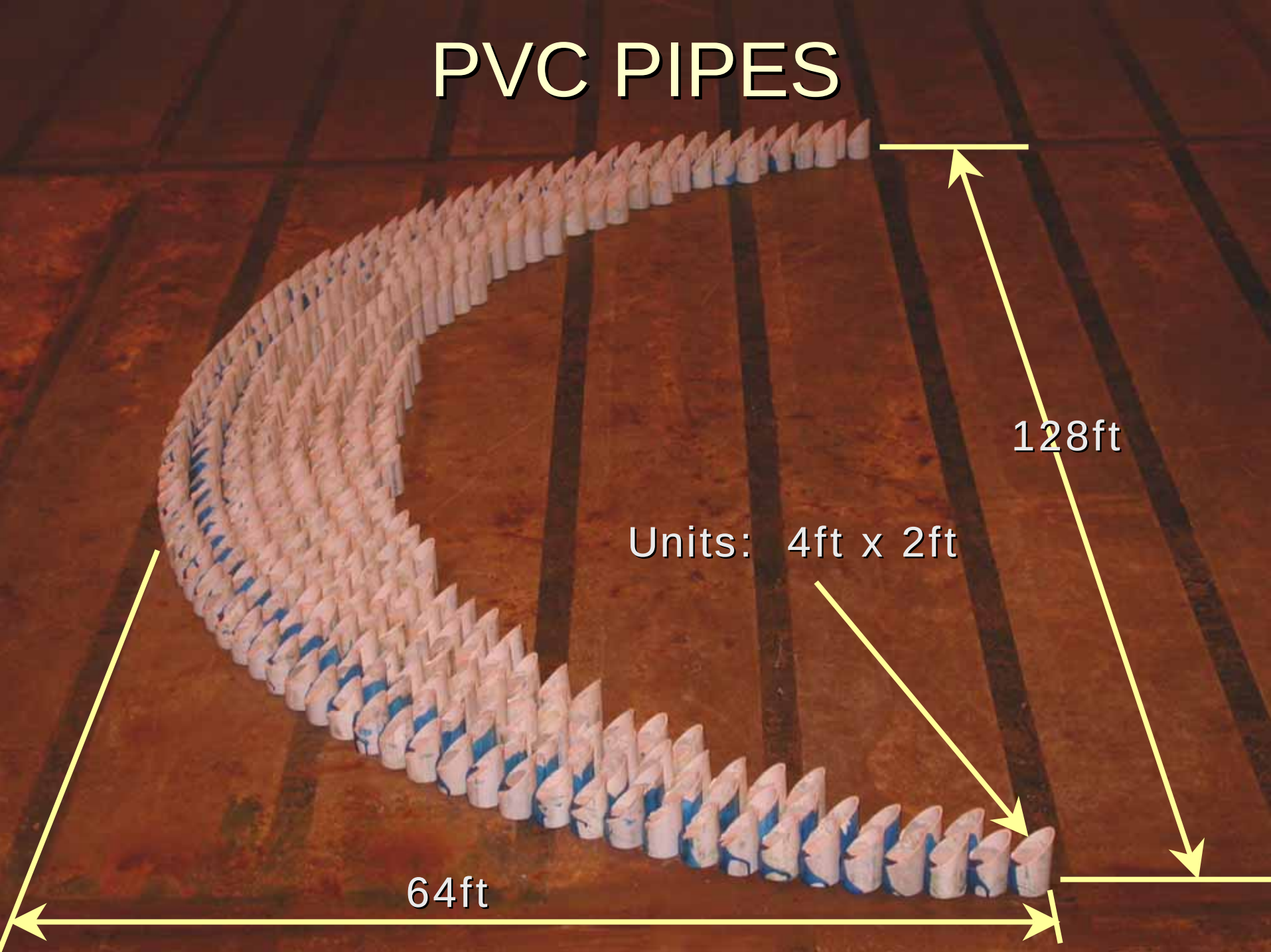
SHAPE PERFORMANCE

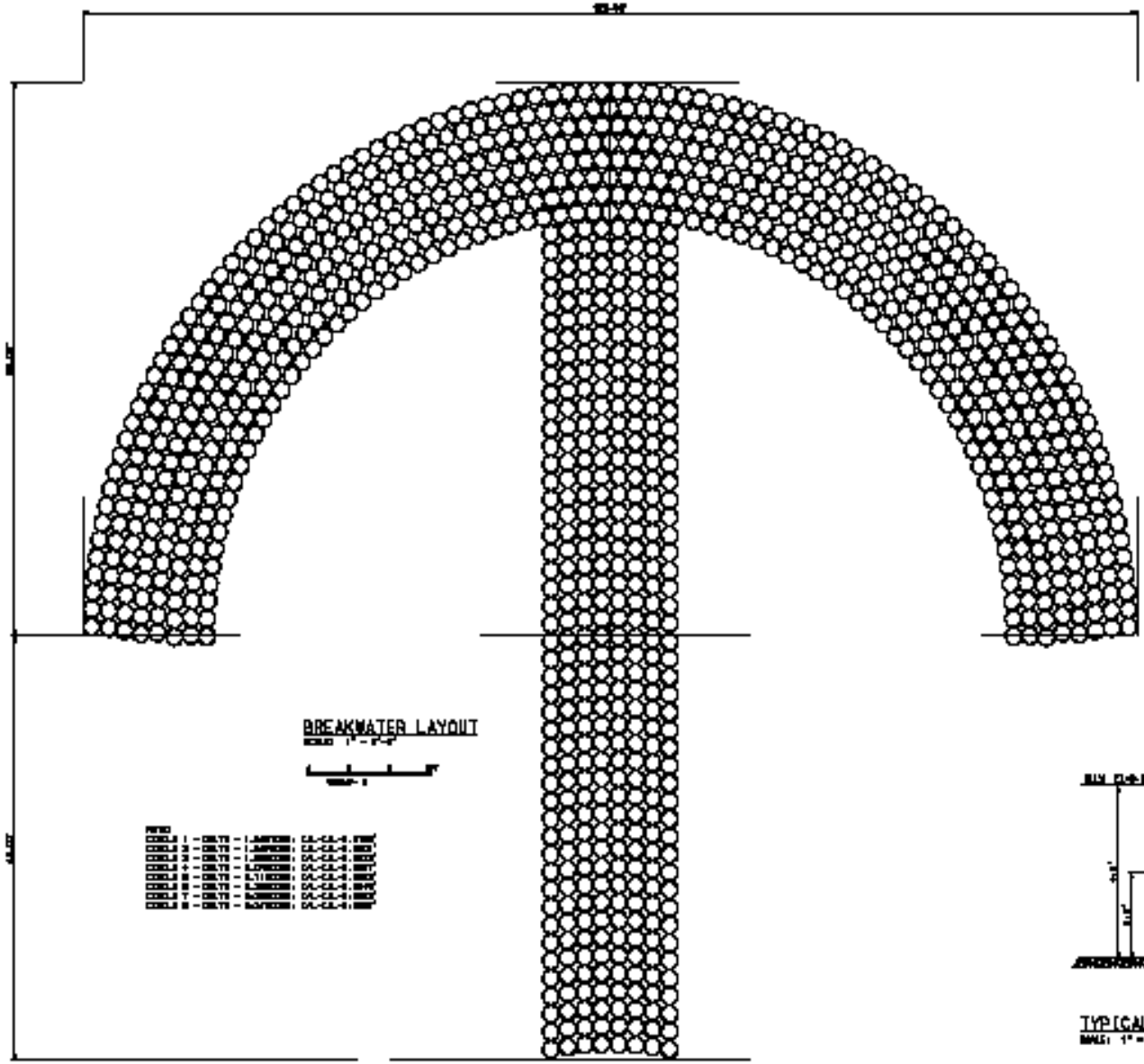


PHYSICAL MODEL
Modular Design

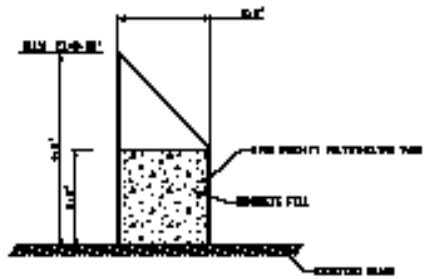
- PVC Pipes
- Plastic Traffic Barriers
- Cylindrical Storage Tanks
- Hawaiian Fish Pond Wall

PVC PIPES

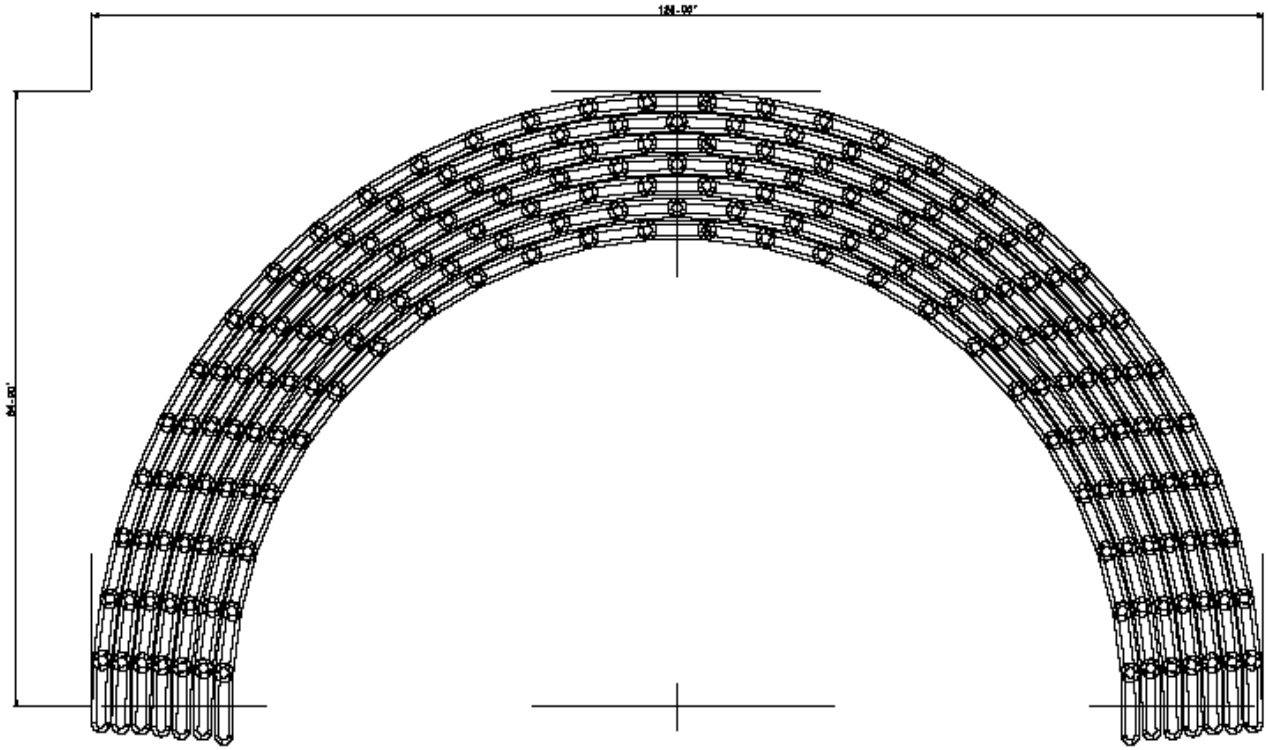




BREAKWATER LAYOUT

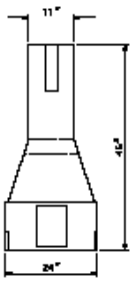


TYPICAL PYLON CROSS SECTION



BREAKWATER LAYOUT

SCALE: 1" = 8'-0"



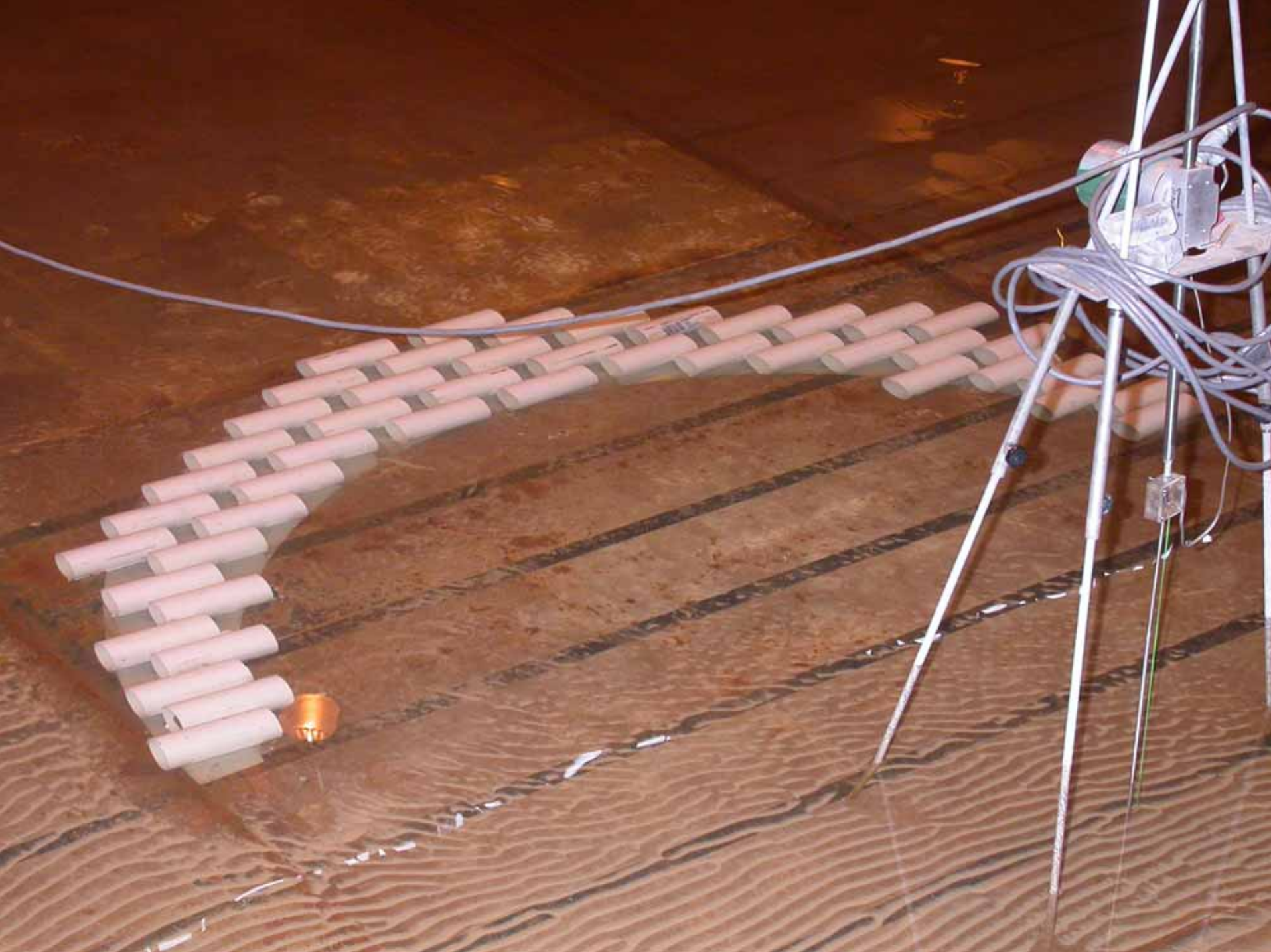
TYPICAL PYLON CROSS SECTION

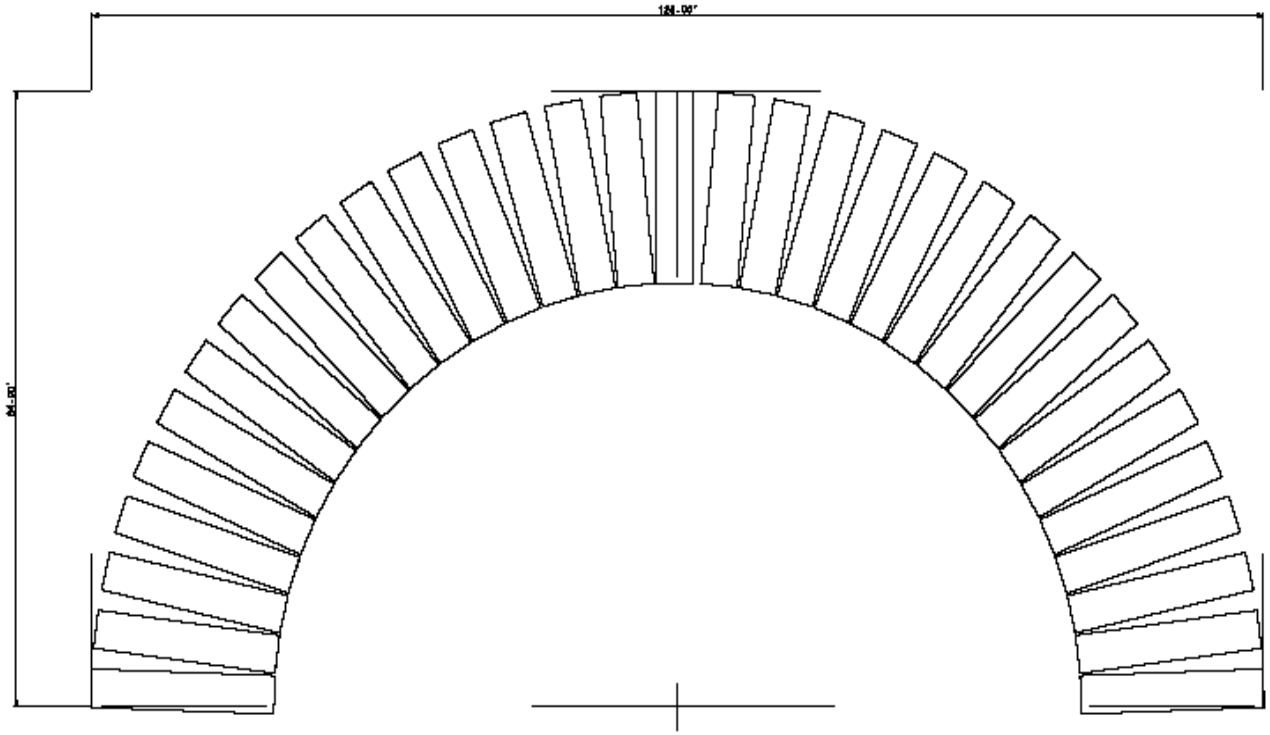
SCALE: 1" = 1'-0"

US Army Corps of Engineers
Honolulu District

DESIGN BRANCH

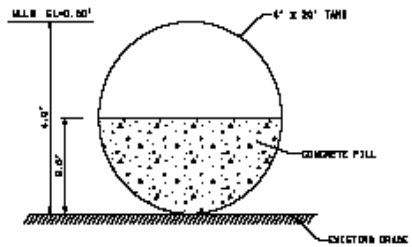
Sheet number
C-3





BREAKWATER LAYOUT

SCALE: 1" = 8'-0"



TYPICAL TANK CROSS SECTION

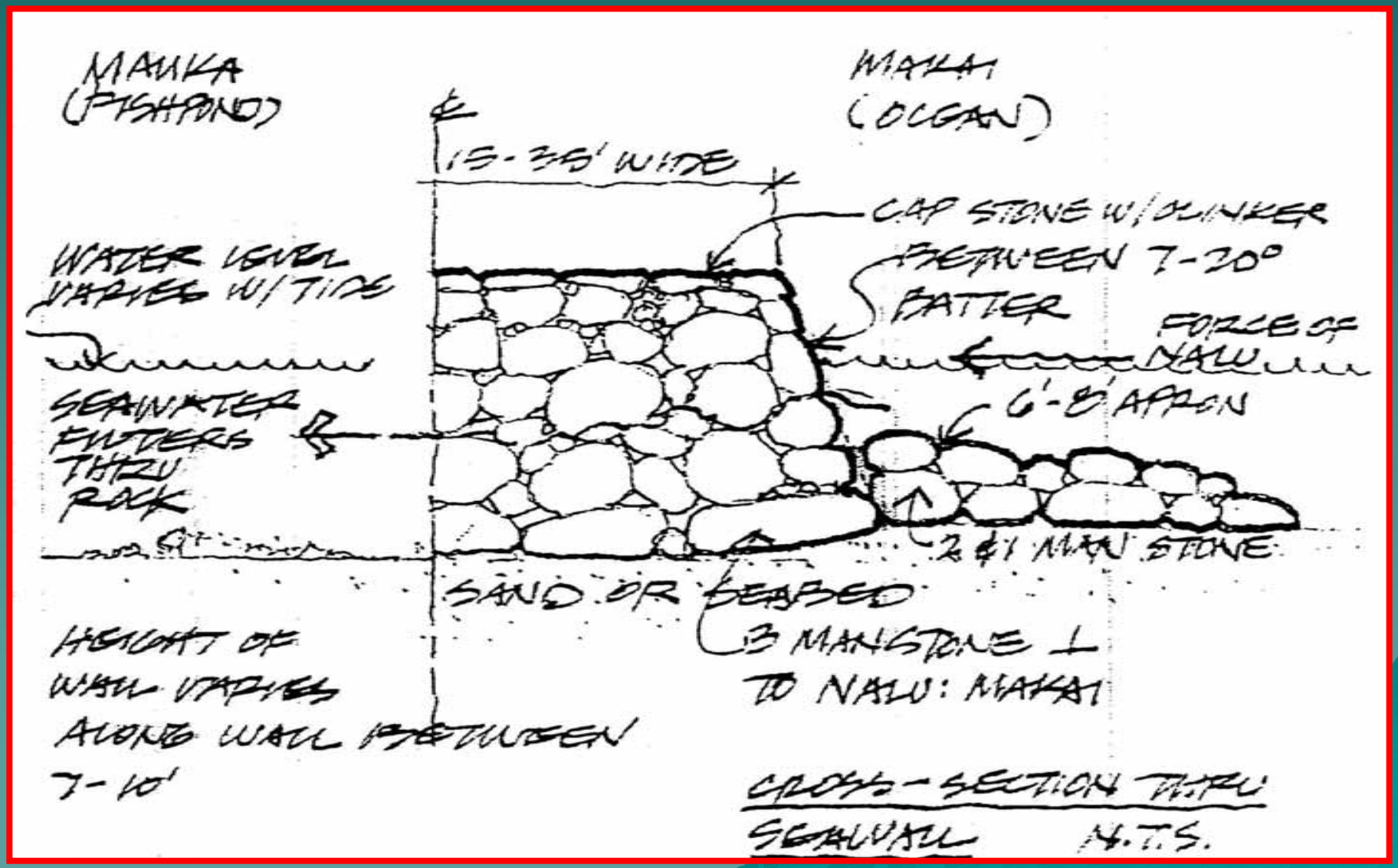
SCALE: 1" = 1'-0"

US Army Corps of Engineers Honolulu District

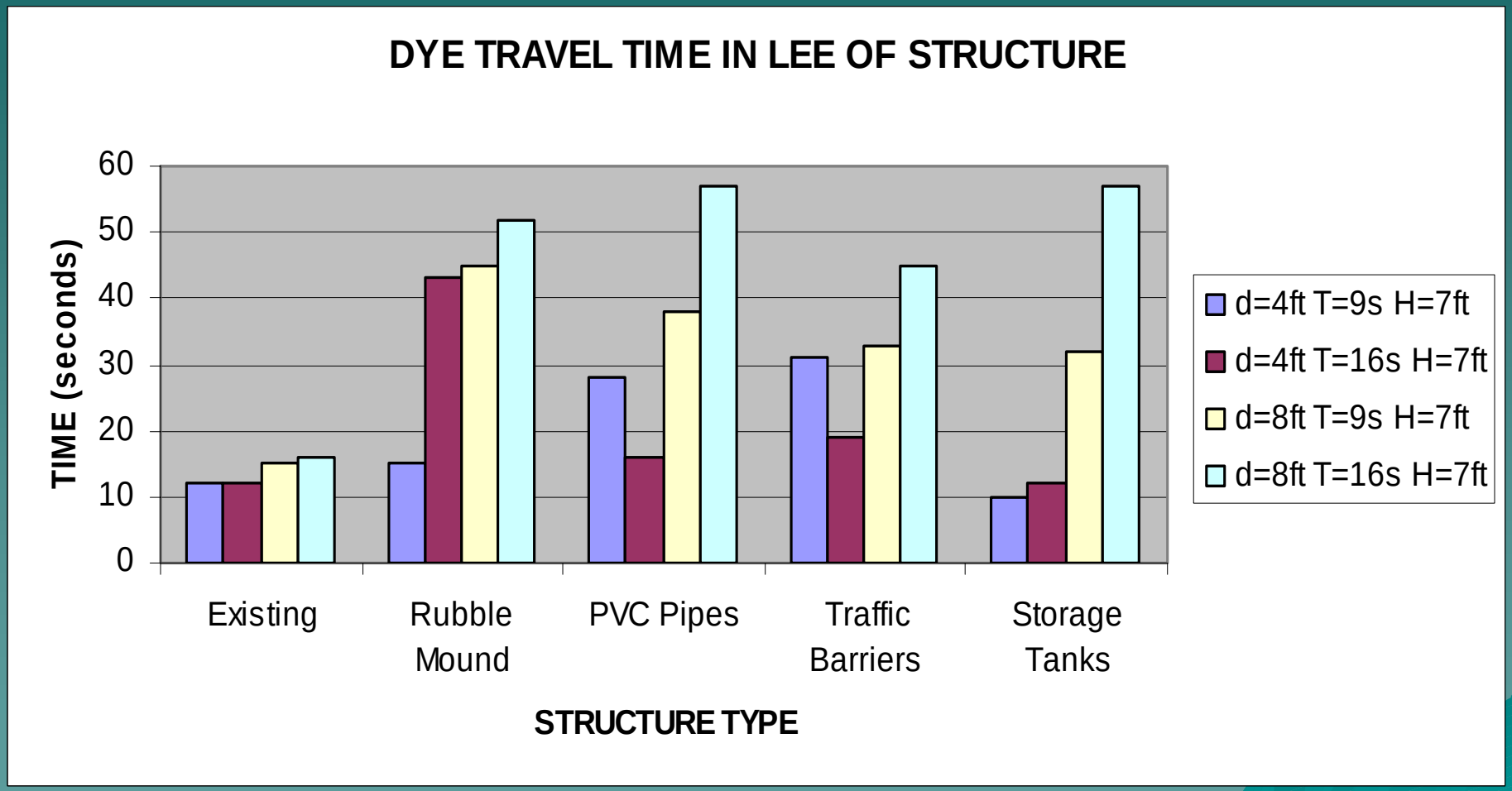
Sheet number

C-3

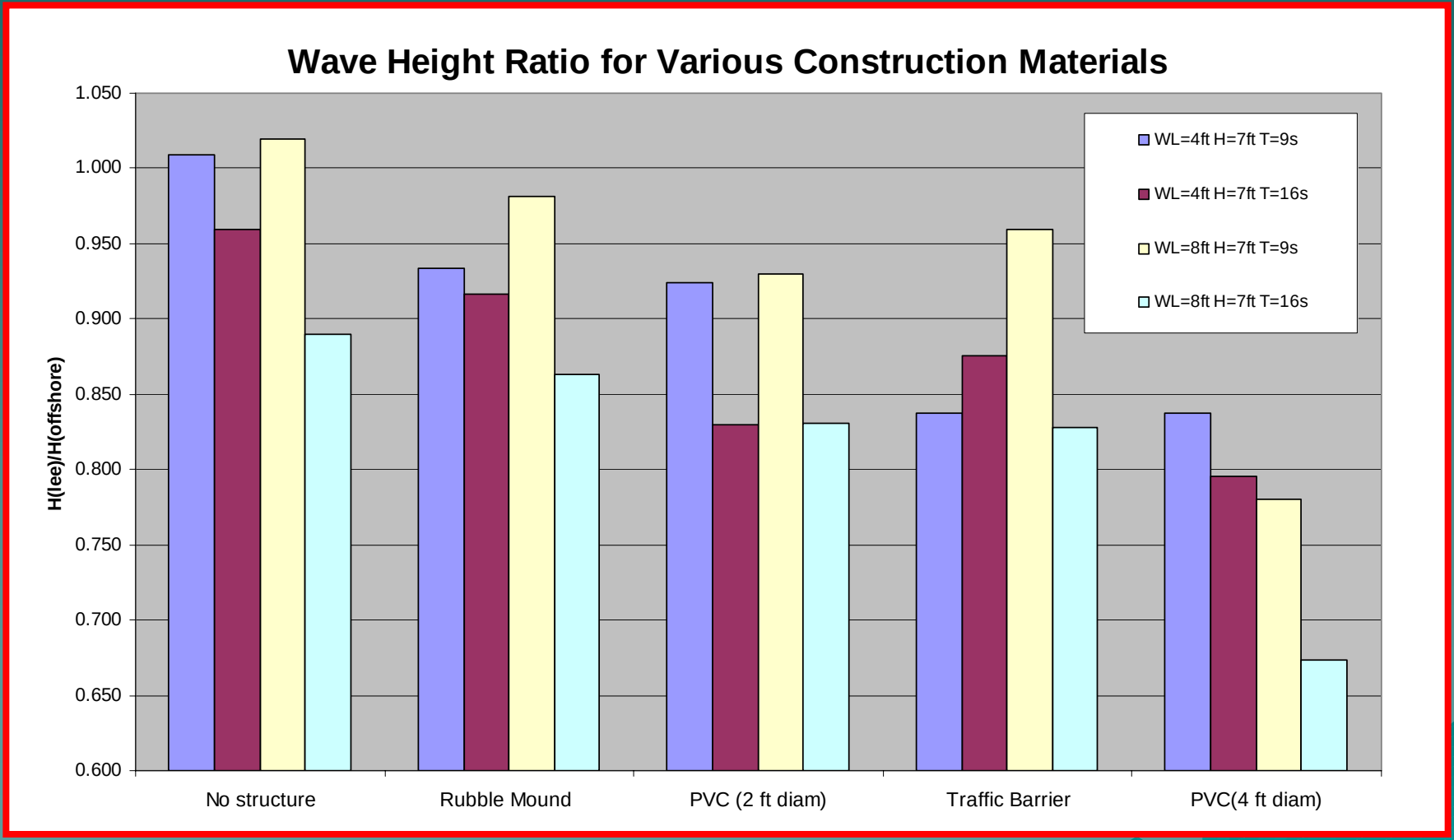
HAWAIIAN FISH POND WALL

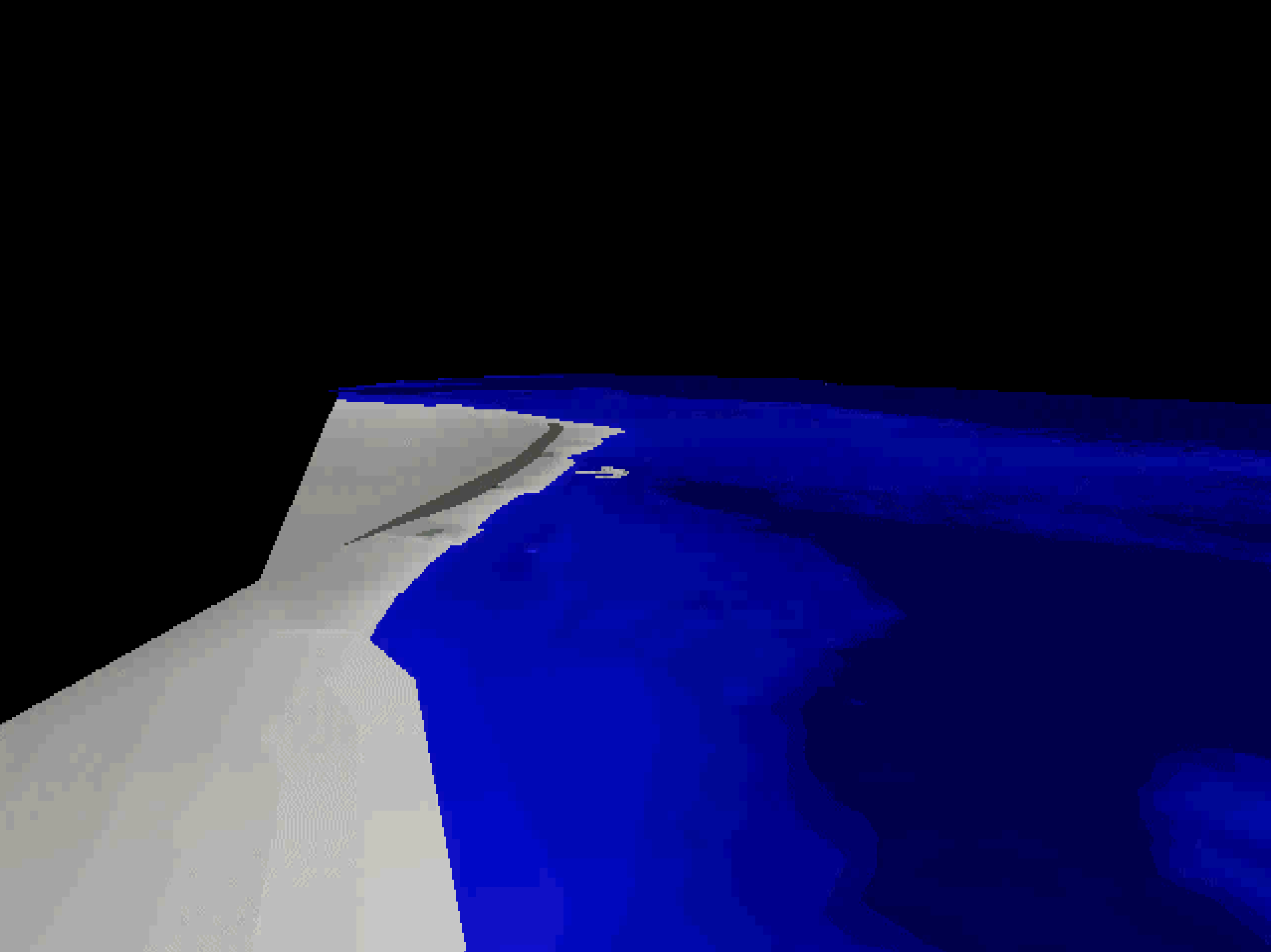


MODULAR PERFORMANCE



MODULAR PERFORMANCE





NEXT STEPS

- Environmental Coordination (FY05/06)
- Sand Source Investigations (FY05/06)
- Detailed Design (FY05/06)
- Construction (FY06)
- Monitoring and Evaluation (FY07->)

THANK YOU