OFFSHORE STORMWATER DISCHARGES: A SOLUTION TO EXISITNG BEACH DUNE OUTFALLS

Karyn Erickson, D.CE., PE, President

Bobbi Claybrooke, EI

Erickson Consulting Engineers, Inc.

7201 Delainey Court

Sarasota, FL 34240

www.ericksonconsultingengineers.com

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PRESENTATION OVERVIEW

- Project Need
- Site Conditions
- Project Objectives
- Design Requirements
- Alternatives Considered
- Final Design
- Conclusion

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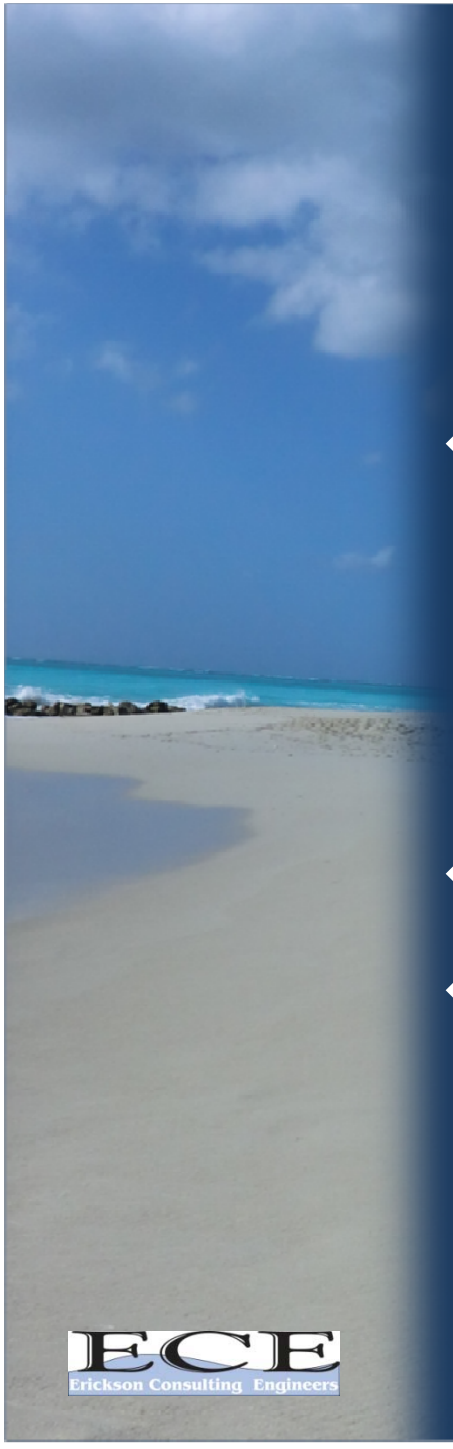

PROJECT NEED

- Existing Outfall Identified as Source of Fecal Coliform Causing Multiple Beach Closures
  - Maximum Safe Levels of Fecal Coliform are 399 # colonies/100mL
- Blocked Discharge Due to Accretion
- Localized Roadway Flooding Due to Back-up of Existing System During Seasonal Rainfall Events.

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Approximate
Location of Existing
Stormwater Pond
Existing
Vegetated
Ditch
Existing
Outfall


Accreting
Dune
Existing
Outfall


Existing
Outfall

SITE CONDITIONS

Offshore Discharge Factors in Design:

- Accreting/Stable Shoreline (8 ft/yr)
- Wide Beach with Depth of Closure at (-18 ft NAVD88)
- Public Beach Ranked #1 Beach in US in 2012 with High Recreational Use
- Absence of Hard-Bottom Features in Vicinity of Discharge

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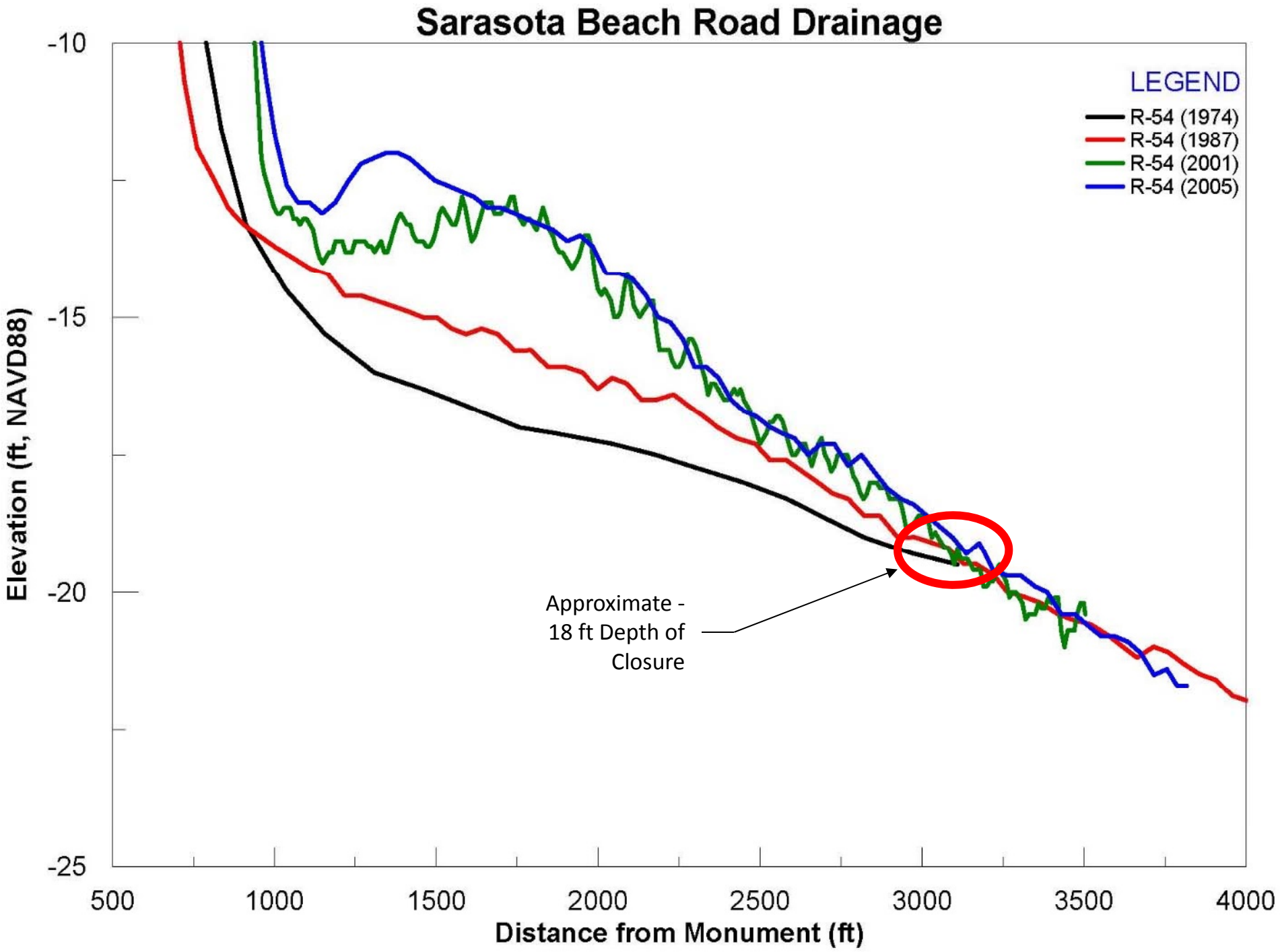
Sarasota Beach Road Drainage
LEGEND
R-54 (1974)
R-54 (1987)
R-54 (2001)
R-54 (2005)
Approximate - 18 ft Depth of Closure
Elevation (ft, NAVD88)
-10
-15
-20
-25
500
1000
1500
2000
2500
3000
3500
4000
Distance from Monument (ft)

SARASOTA COUNTY AERIAL 2008

SARASOTA COUNTY AERIAL 2010

SARASOTA COUNTY AERIAL 2012

OBJECTIVES & DESIGN REQUIREMENTS

- Prevent Erosion to Beach Dune and Littoral System
  - Transition to Offshore Discharge Pipeline
  - Existing Channel to Remain for High Rainfalls
- Treat Discharges for Fecal Coliform
  - Two Stage Treatment (Filtration and UV Disinfection)
- Improve Function of Existing System
  - Pump Treated Water Directly to Gulf
  - Water No Longer Stages Up to Crest the Dune
- Diffuser System
  - Future Changes to Diffuser Components or Structure
  - Minimize Damage from Anchors and Nets
  - Anchors Can Resist 10,000 lbs Force
- Limit Construction Impacts to Beach Dune

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Siesta Beach

Preliminary Design Plan

SARASOTA COUNTY

SARASOTA, FLORIDA

AERIAL FLIGHT DATA: 2007

CONTACT: MIKE STURM, PE: (941) 379-7600

SCALE: IN FEET

0 50 100 200

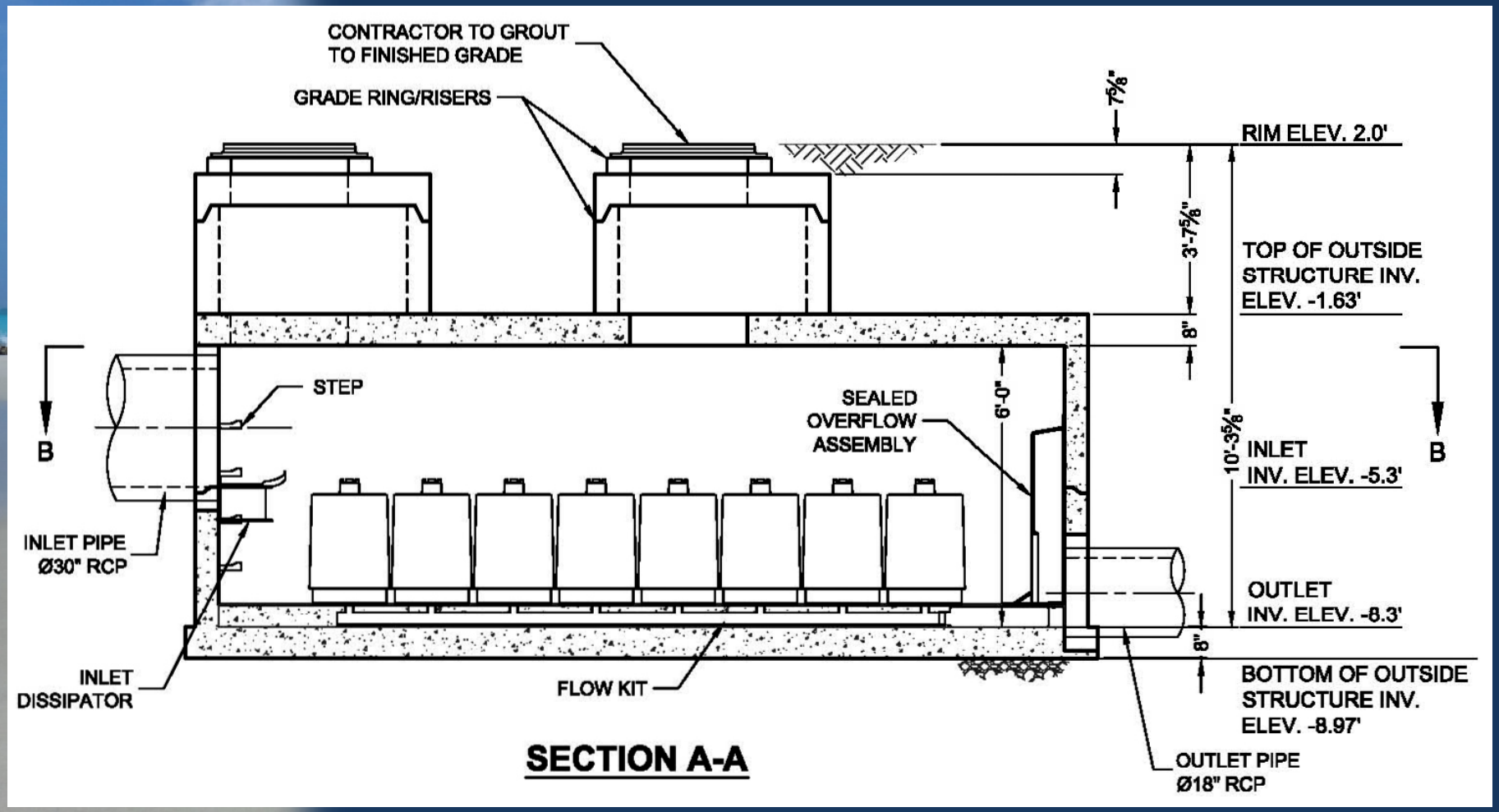
N

DATE: 3 DECEMBER, 2010

Kimley-Horn and Associates, Inc.

URBAN RESOURCE GROUP

Contech Storm Filter



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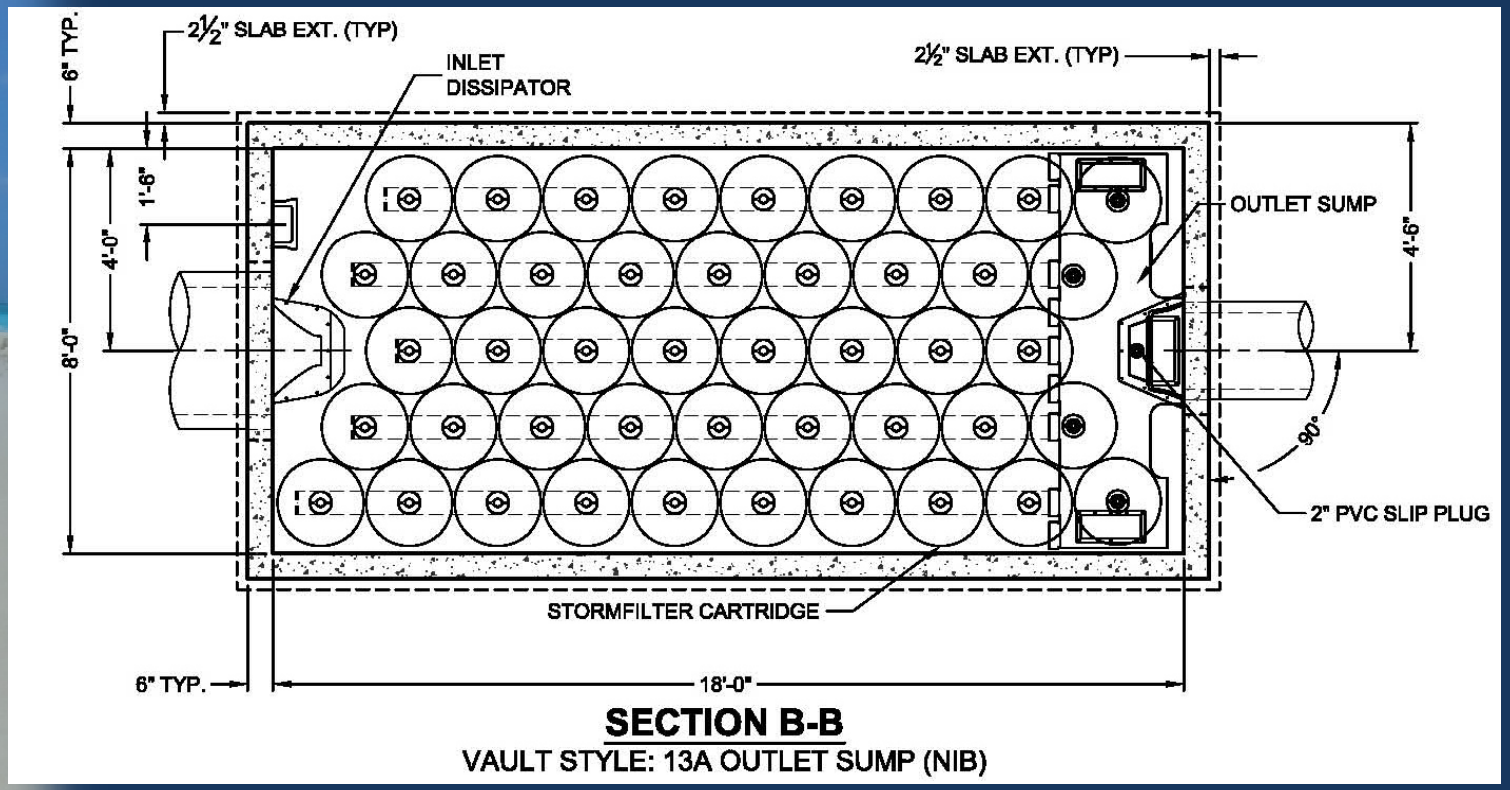
Contech Storm Filter



SECTION B-B

VAULT STYLE: 13A OUTLET SUMP (NIB)

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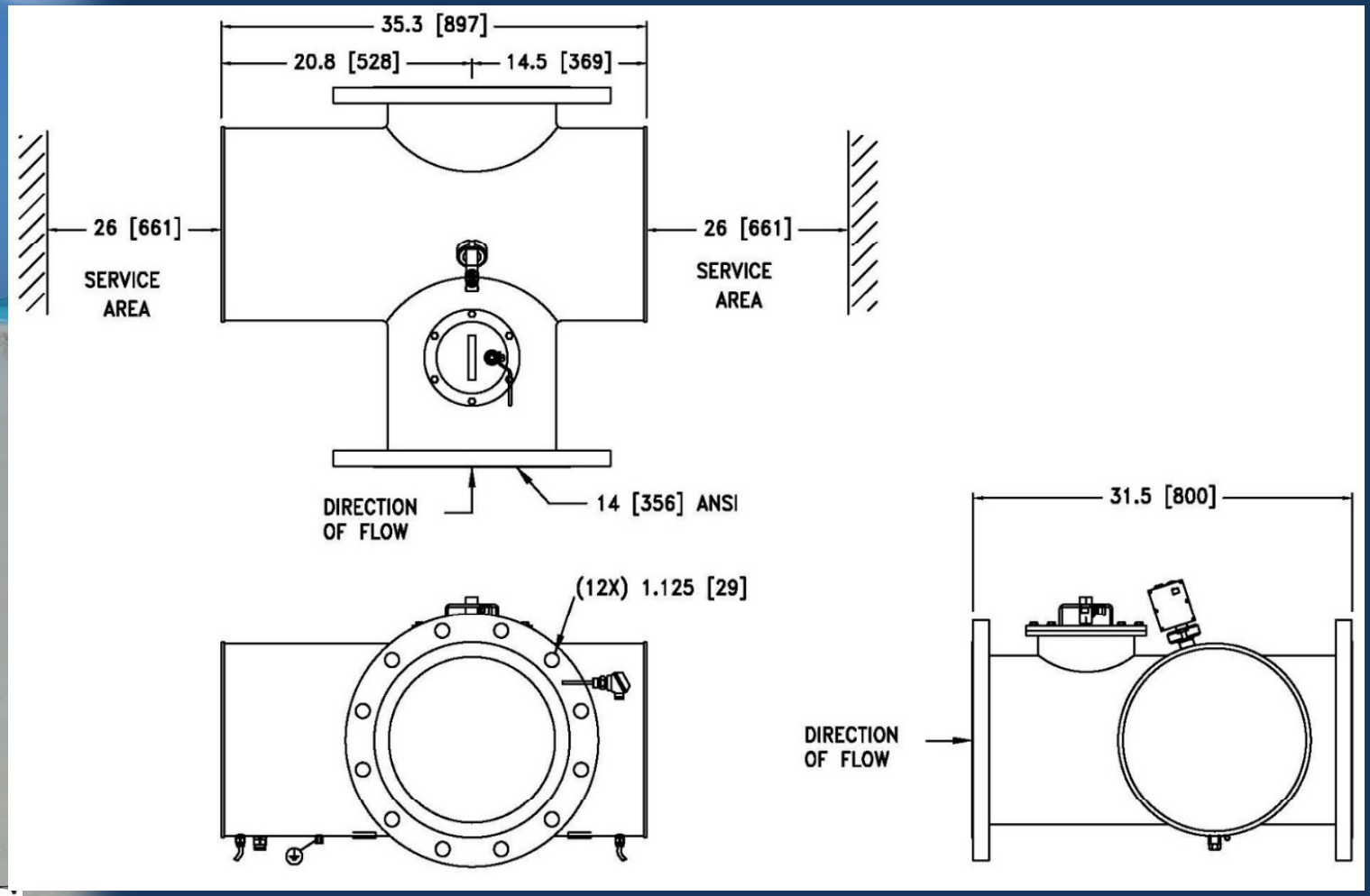
Acquionics In-Line UV Disinfection System



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Pipeline Route
Using HDD to
Minimize Sea
Oat Impacts


CAT
MCD-1000
mears
mears
NO PARKING


Safety
is a
core value
WASTE PRO®
941-355-9600
NO PARKING

DESIGN CONSIDERATIONS

- Pipeline Sizing
  - Discharge Normal, Seasonal Rainfall (2 in/85 ac)
  - Low Relief from Seafloor using HDD Placement
- Pipeline Placement
  - To Depth of Closure (-18 ft NAVD88)
  - Prevent Impacts to Nearshore Resources
- Diffuser Section
  - Mixing (8-10 fps Velocity) Zone (<150 ft)
  - Relief of Diffuser from Seafloor
  - Durability and Low Maintenance
- Anchoring System
  - Capacity (+/- 10,000 lbs force per anchor)
  - Strapping (316 Stainless Steel)
  - Underwater Installation for 45 ft Diffuser Section

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FINAL DESIGN DETAILS

Pipeline Material	16” HDPE – DR 9 (DIPS) Or 14” FPVC – DR 18 (DIPS)
Pipeline Length	3,200 ft (from pump station) 3,090 ft (HDD placement)
Pipeline Placement	Horizontal Directional Drill (HDD)
Filtration System	Storm Filter by Contech (40 siphon actuated, media-filled cartridges)
Bacteria Treatment System	UV Disinfection by Acquionics
Discharge Capacity	2.5 in Rainfall Event
HDD Pipeline Below Seabed	35-40 ft
Depth of Emergent Pipeline	18 ft
Anchoring System	12 Chance Helical Anchors (w/ 10,000 lbs resistance each)
Diffuser System	Power Seal Tapping Sleeve 4.5” Tideflex Duckbill Diffuser (8-10 fps discharge velocity – 8 diffusers)

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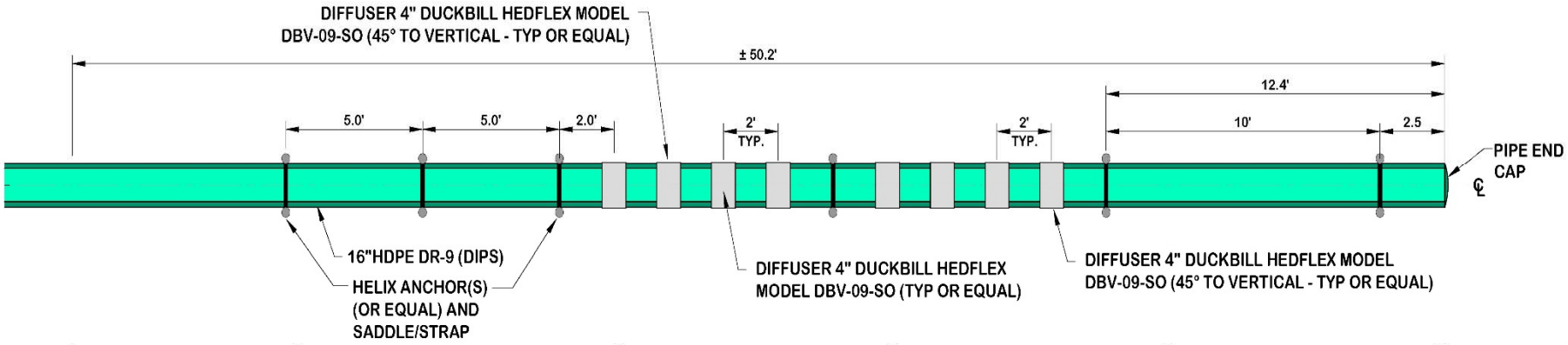
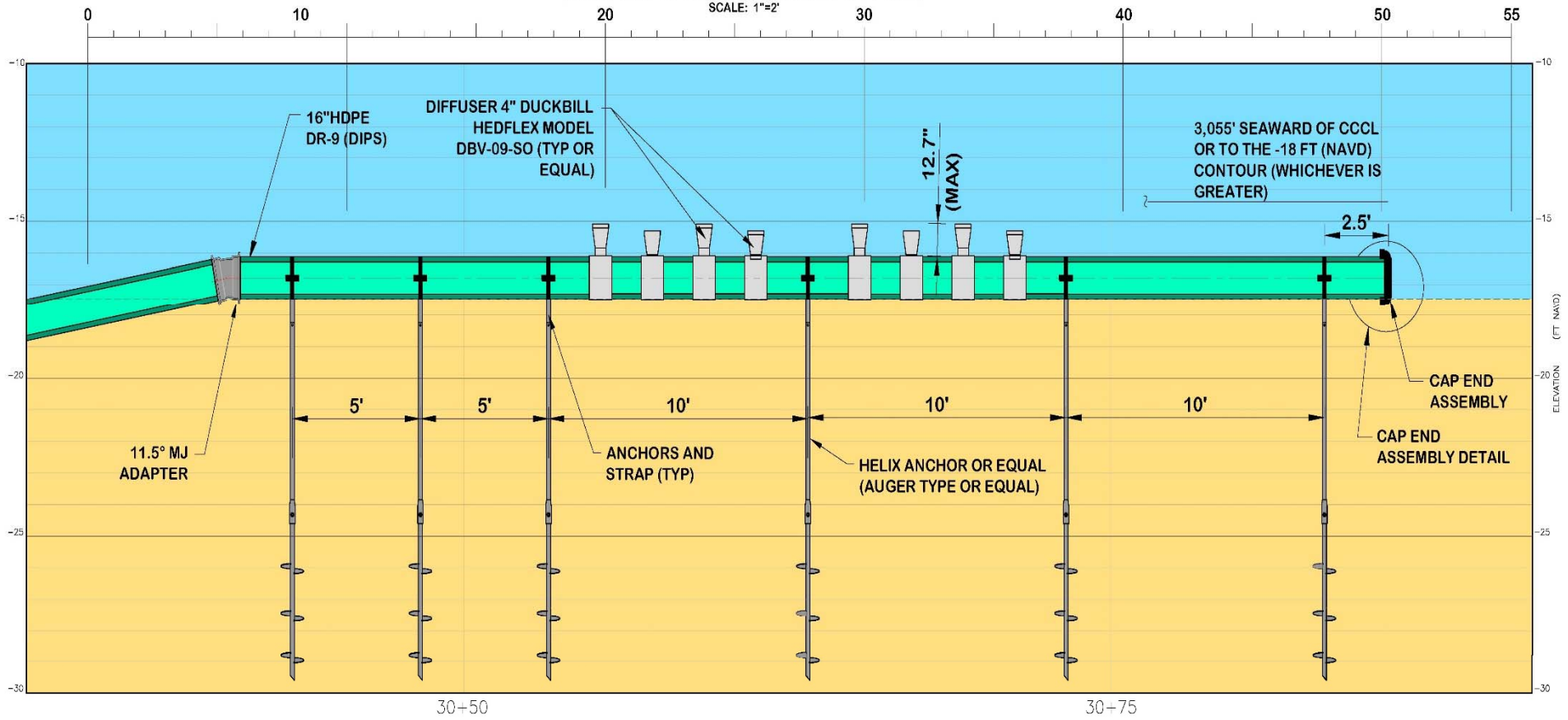
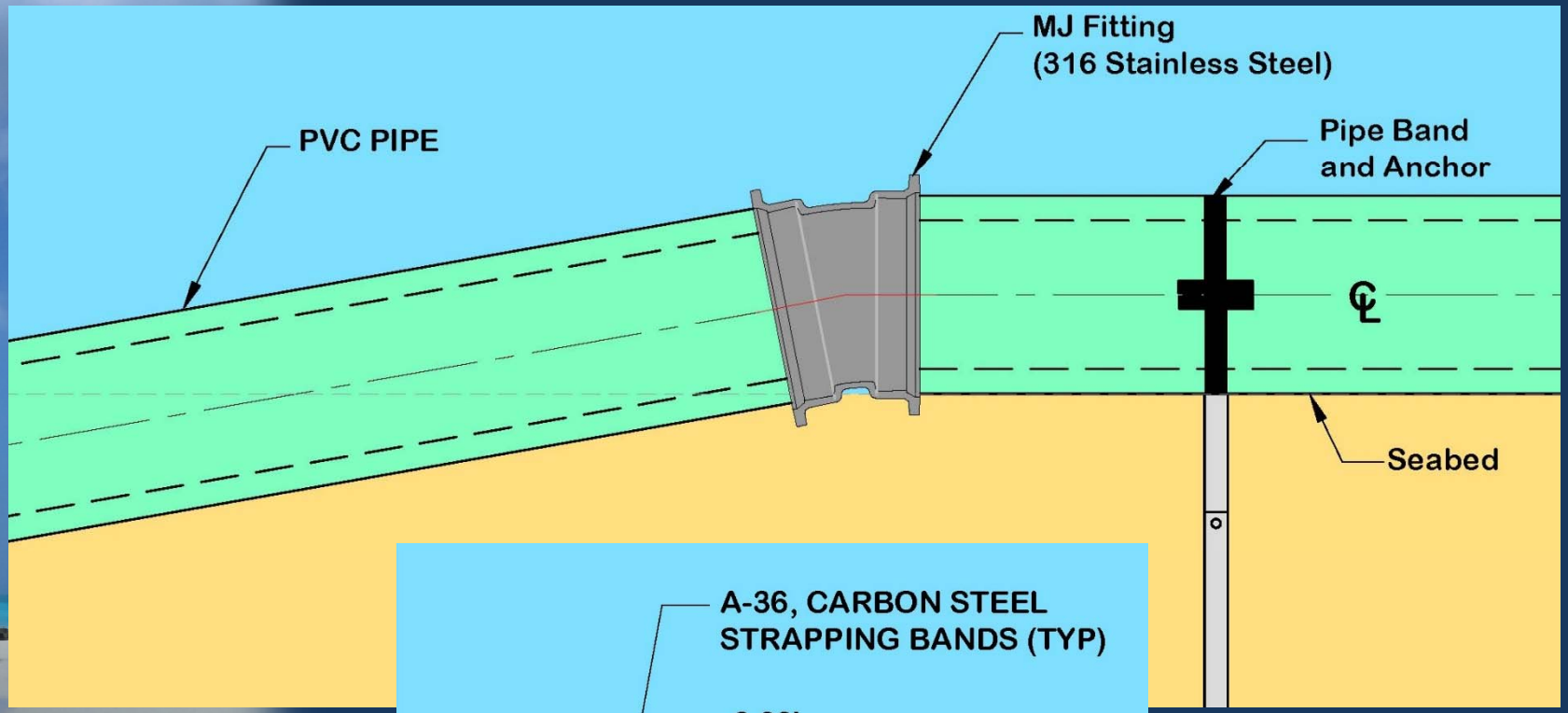


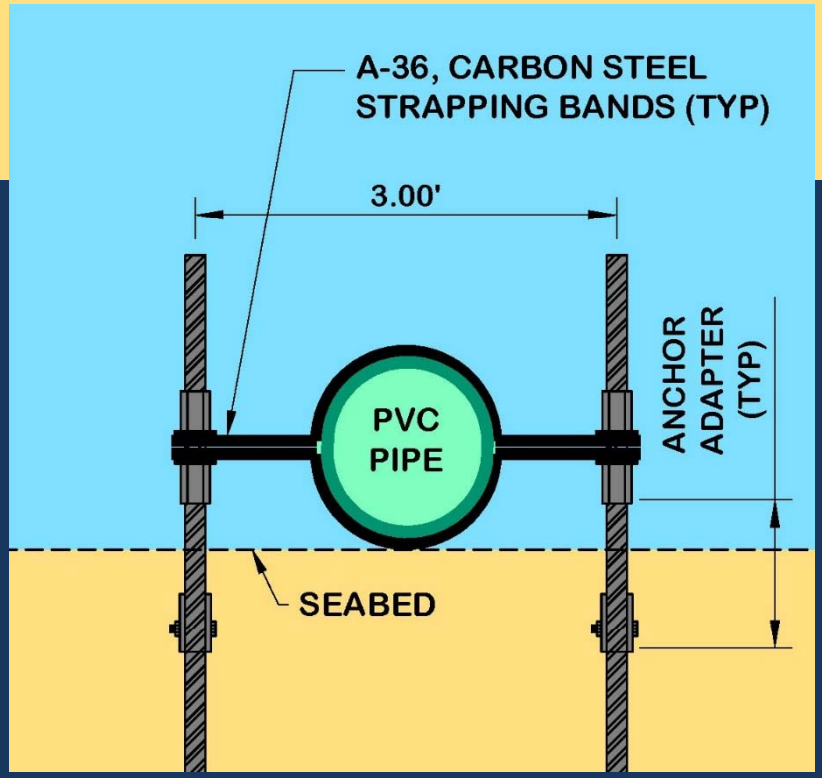
OUTFALL DIFFUSER DISCHARGE PLAN VIEW



OUTFALL DIFFUSER DISCHARGE SECTION

SCALE: 1"=2' (HORIZ.)
1"=2' (VERT.)





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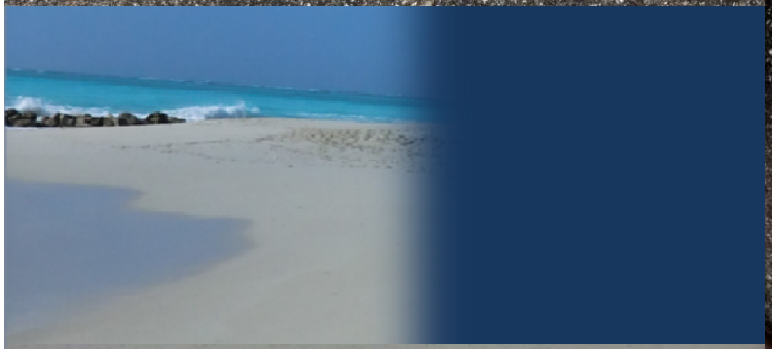


Beach Road Stormwater Improvements

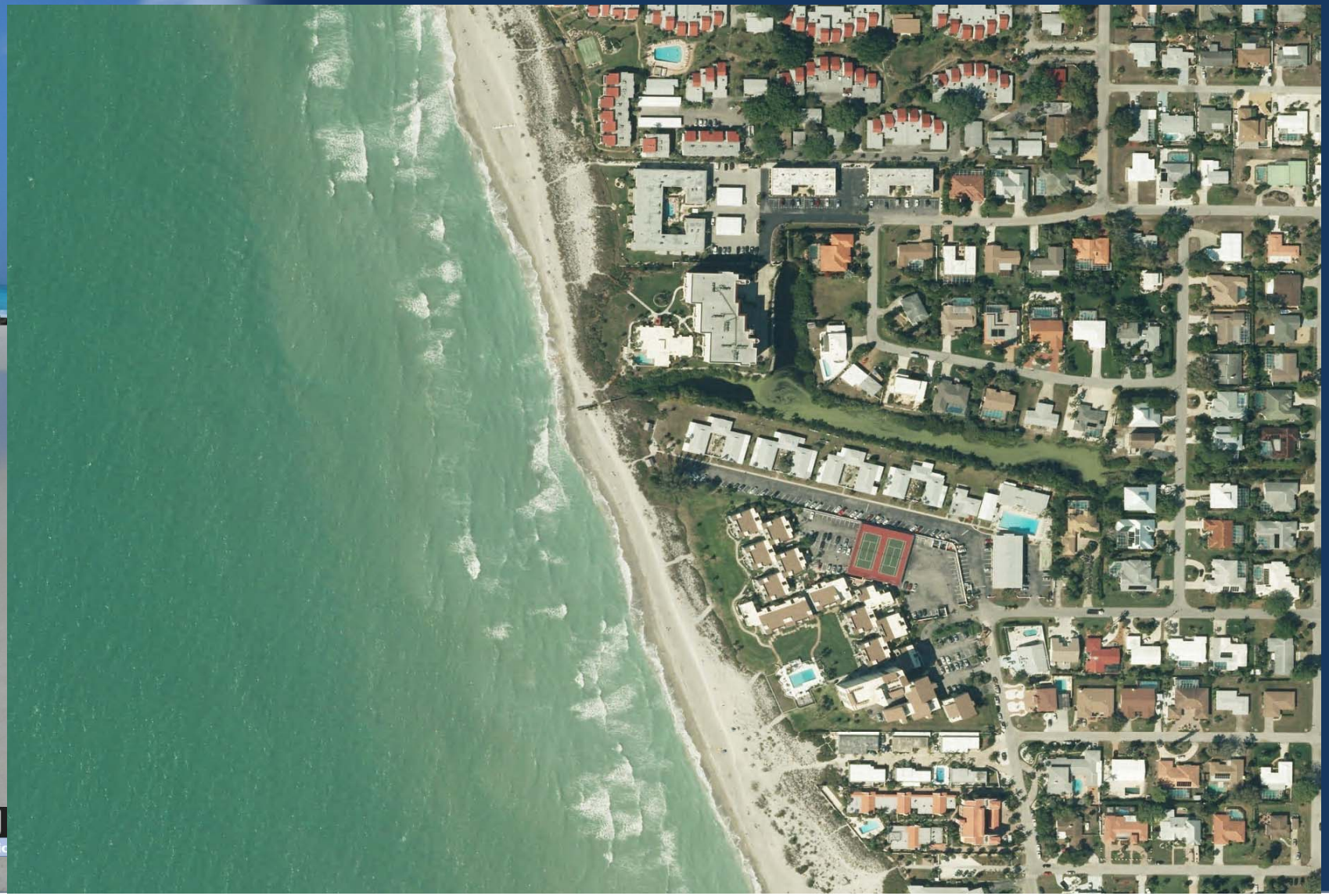
Owner: Sarasota County, FL

Engineer: Erickson Consulting Engineers

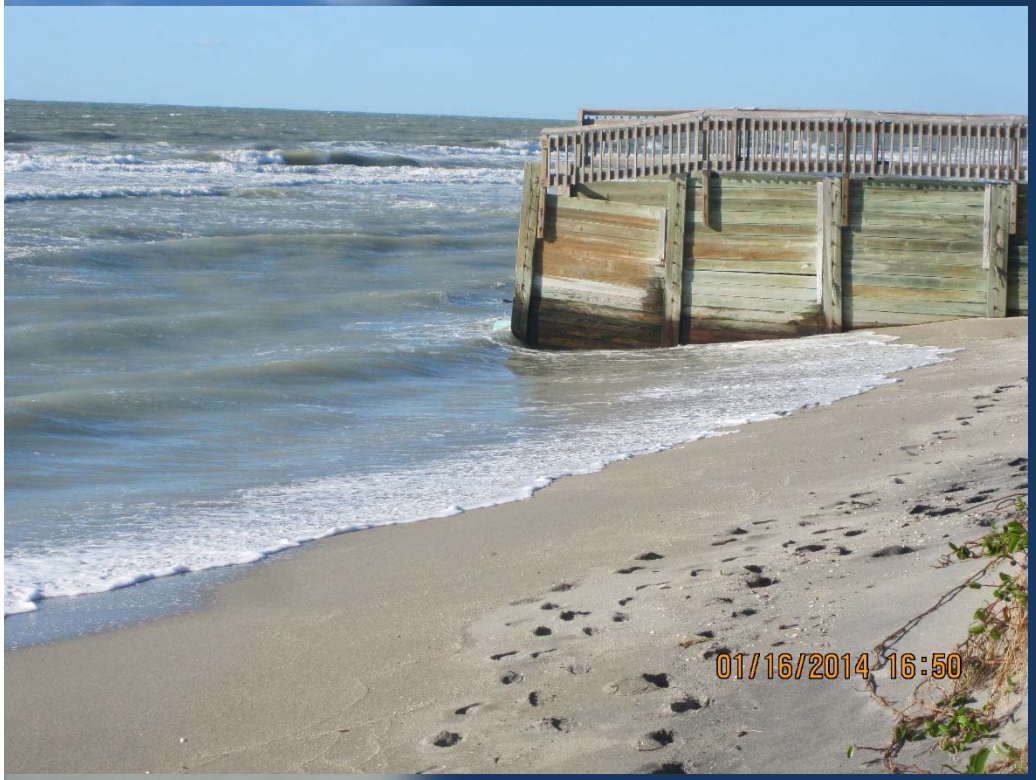
Contractor(s):

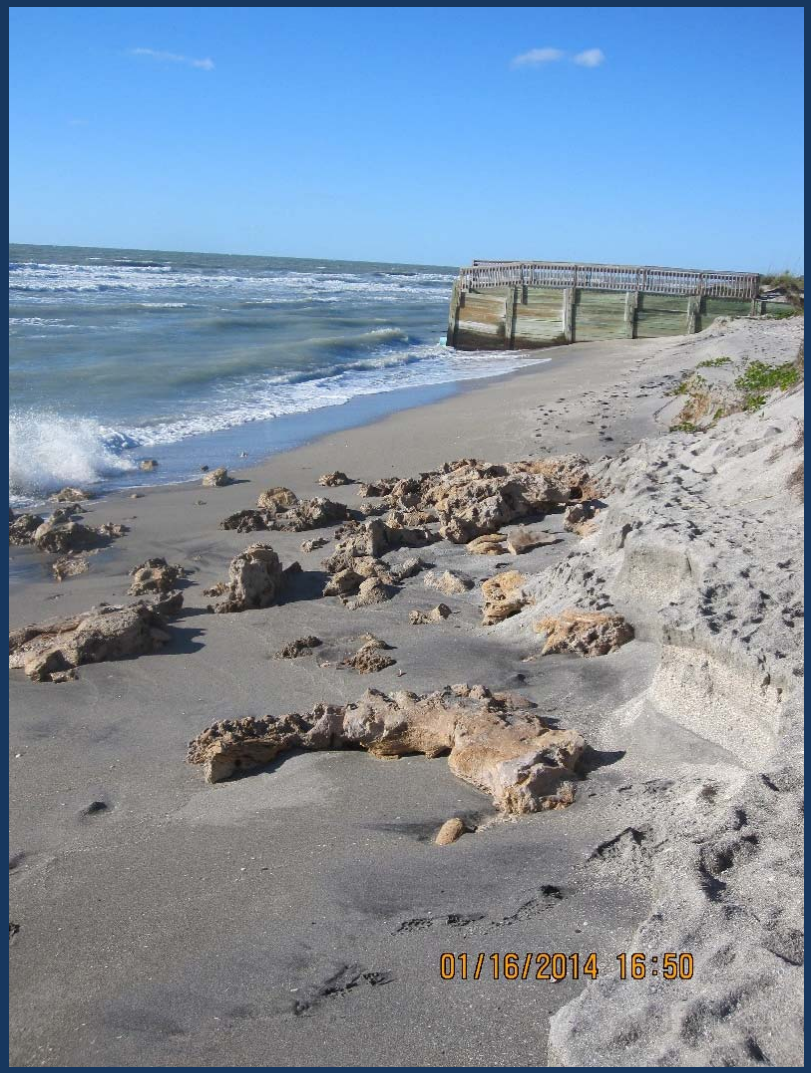
- Forsberg Construction, Inc. (Prime)
- Mears Group, Inc. (Driller)
- Orion Marine Group (Marine)

FLAMINGO DITCH SITE STORMWATER IMPROVEMENTS (Venice, FL)



FLAMINGO DITCH – EXISTING OUTFALL





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FLAMINGO DITCH – DISCHARGE SYSTEM DESIGN

Pipeline Material	2 - 24 in ID HDPE or FPVC (2 pipelines running parallel)
Pipeline Length	1,000 ft
Pipeline Placement	Horizontal Directional Drill (HDD)
Filtration System	Contech CDS Water Treatment Unit (vortex sediment removal)
Bacteria Treatment System	UV Disinfection by Acquionics
Discharge Capacity	2 in Rainfall Event
HDD Pipeline Depth	35-40 ft
Depth of Emergent Pipeline	16 ft
Anchoring System	20 Chance Helical Anchors (w/ +/-10,000 lbs resistance each)
Diffuser System	Power Seal Tapping Sleeve 3” Tideflex Duckbill Diffuser (8-10 fps discharge velocity – 32 diffusers)

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FLAMINGO DITCH - DESIGNED

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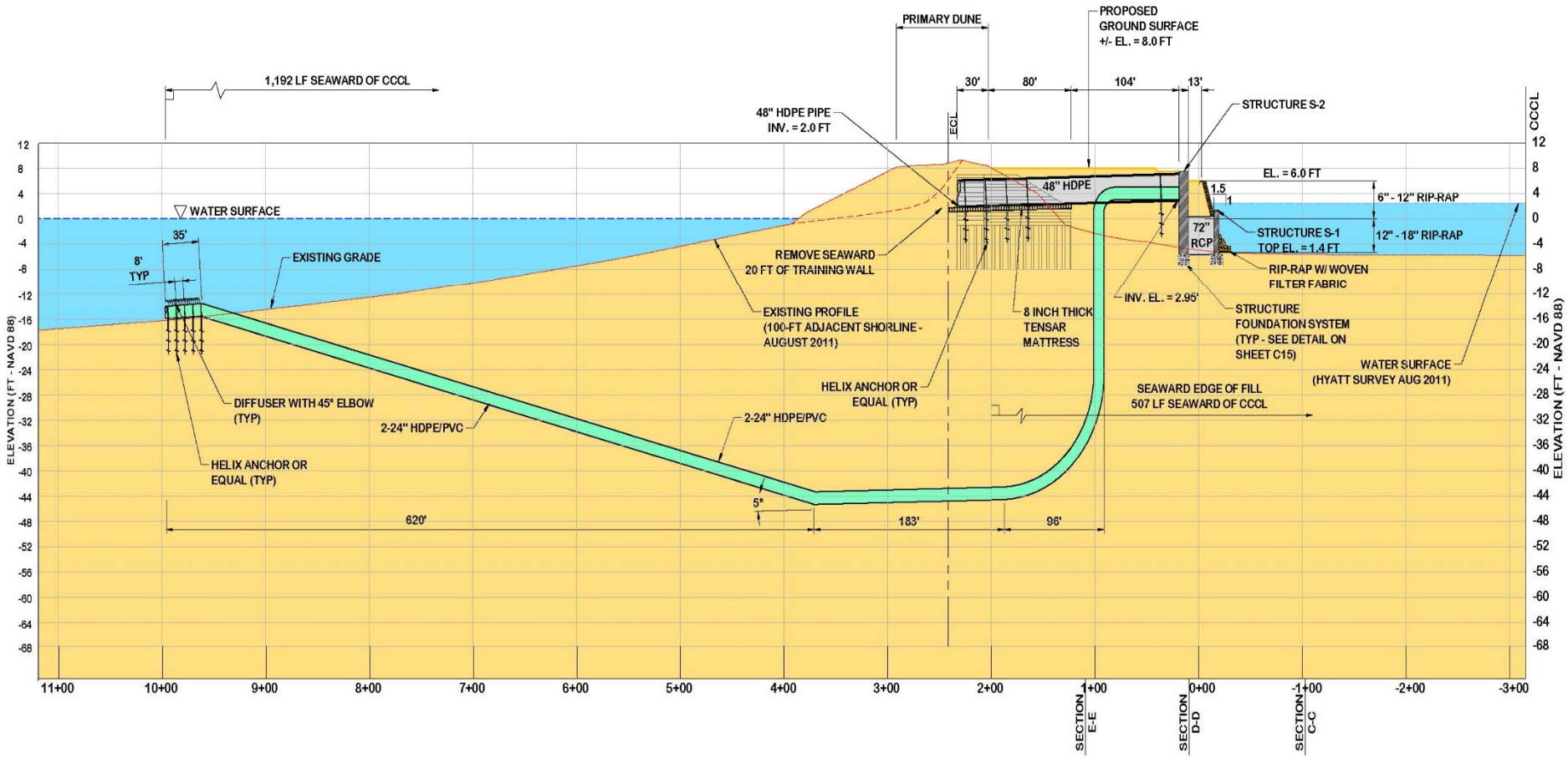
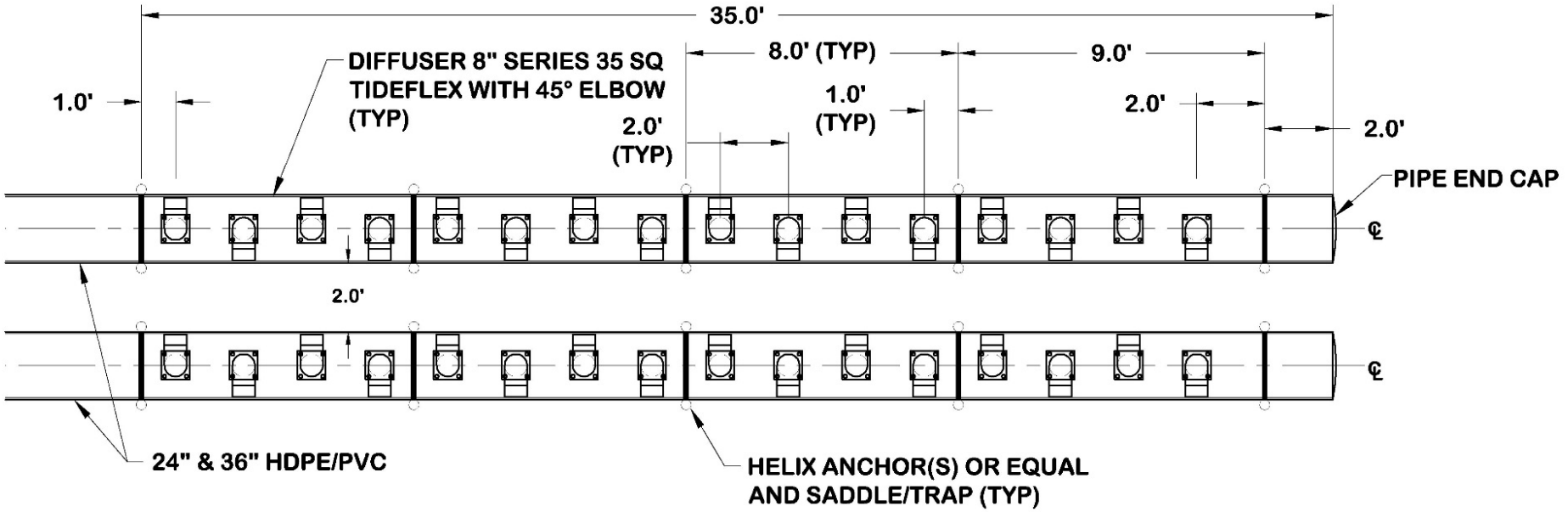


FLAMINGO DITCH - DESIGNED



DIFFUSER PLAN VIEW

SCALE: 1"=3'

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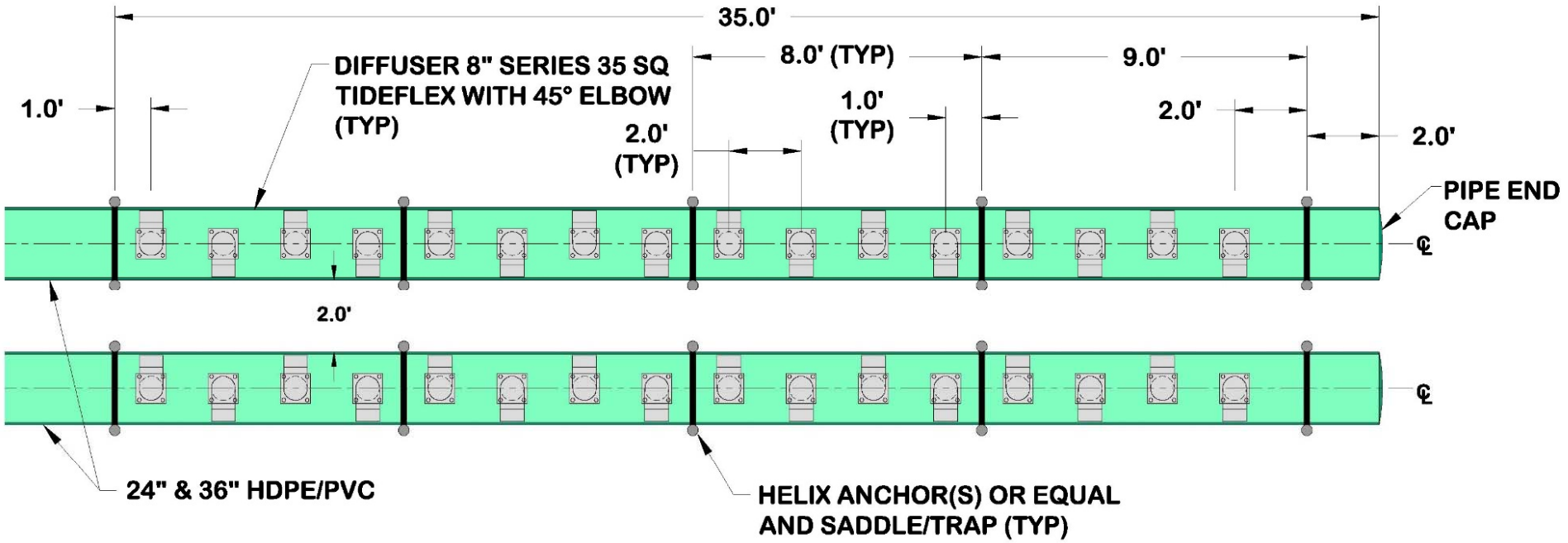
FLAMINGO DITCH - DESIGN



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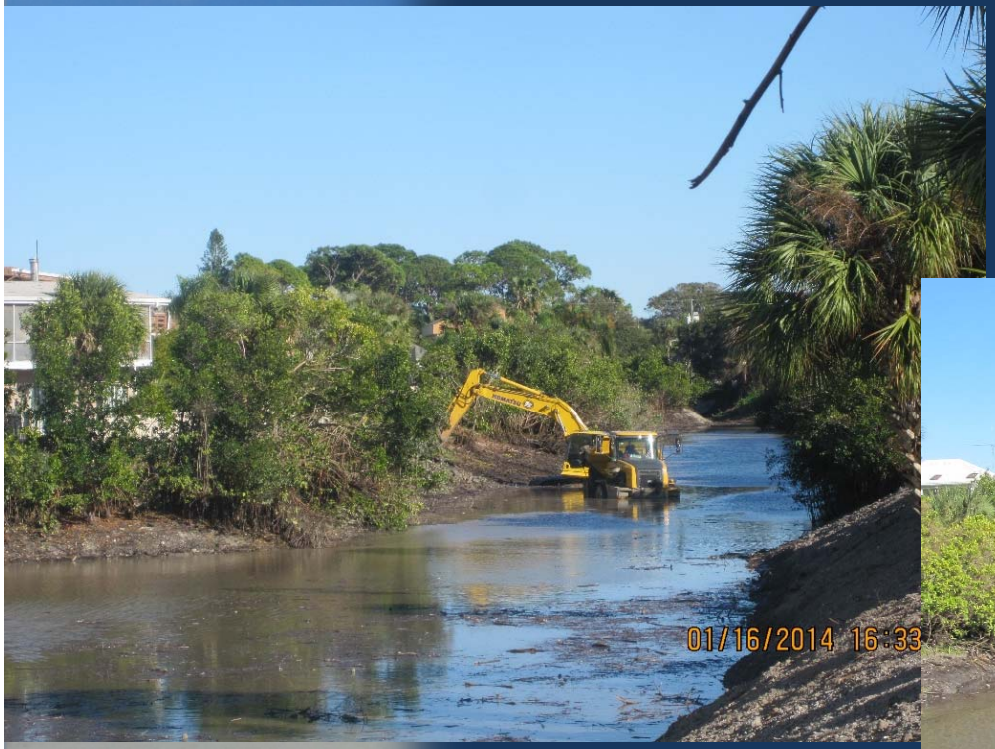
POND CLEAN UP WITH FINE SEDIMENT & EXOTICS REMOVED (-7 FT NAVD)



APR 2014

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FLAMINGO DITCH – Phase I CONSTRUCTION

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CONCLUSIONS:

- Stormwater Discharge Treatment with Discharge Offshore is Effective Solution
- Removes Bacterial and Fine Sediments to Protect Nearshore Water Quality
- Eliminates Erosion of Nourished Beaches and Between Nourishments
- Backshore Flooding of Low Barrier Islands Eliminated

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